TRI-COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION

NOTICE OF ADDITIONAL FEES FOR INDIVIDUAL SEWAGE DISPOSAL SYSTEM
PER TRI-COUNTY BOARD OF HEALTH RESOLUTION OF July 1, 1995

NOTE: PERMIT OR FINAL APPROVAL WILL NOT BE ISSUED UNTIL ALL APPLICABLE FEES HAVE BEEN PAID.

OBJECT CODE	ADDITIONAL SERVICE	TOTAL
506000	Plan Review by Department Engineer: _____ hour(s) @ $50.00/hour	_____
	Date(s) Performed: _____	
507500	Staff Consultation: _____ hour(s) @ $30.00/hour	_____
	Date(s) Performed: _____	
506500	Additional Site Visit(s): _____ Visit(s) @ $50.00/visit	_____
	Date(s) Performed: _____	
507000	Additional Inspection(s): 1 Inspection(s) @ $50.00/inspection	50.00
	Date(s) Performed: 11-5-02	
	TOTAL FEES DUE:	50.00

****

File Number _____ Permit Number (if issued) 2002-07-102268

Property Owner Light House Custom Homes Phone # 720-489-1804

Address/Legal Description of Property Served by System: 2950 Castle Butte Dr.

City Castle Rock State CO Zip 80104

****

The fee of 50.00 must be paid at the following office: (office address stamp)

TRI-COUNTY HEALTH DEPARTMENT
101 Third Street
Castle Rock, CO 80104
303-663-7650

John Kleckner
Environmental Health Specialist

11/05/02
Date Completed

CK # 3024
11-15-02
Date Paid

Tri-County Health Department services are provided without regard to race, color, national origin, handicap, age or sex.

TCHD S-191 6/96

TRI-COUNTY HEALTH DEPARTMENT

RECORD OF COMMUNICATION

Permit Number and/or Address of System:

Notes[(indicate date, EHS, person contacted (indicate whether property owner, builder, installer, soils engineer, design engineer, etc.), and what was discussed and agreed upon]:

Test Pit Required Applicant Notified Yes _____ No _____

TEST PIT "WAIVER" WORKSHEET

Address of Proposed ISDS: 2950 Castle Butte Drive

Engineer who submitted soils and percolation test: Castle Rock Eng.

If the system is engineered for the following conditions, a test pit may be waived:

1. When the average percolation rate is slower than one (1) inch in sixty (60) minutes or faster than one (1) inch in five (5) minutes.
2. Where the maximum seasonal level of the groundwater table is less than four (4) feet below the bottom of the proposed absorption system.
3. Where bedrock or Dawson sand exists less than four (4) feet below the bottom of the proposed absorption system
4. Where the ground slope is in excess of (20%) percent.

If the system is **not** engineered for reasons 1-4 above, the EHS **must** consider the following criteria to determine if a "test pit" is necessary. A "yes" answer to any question will require a test pit, except as noted on question #1.

1. Is one or more of the **individual** test hole percolation rates greater than 60 minutes per inch, but the **average** percolation rate (for all test holes) is less than 60 minutes per inch?

Yes _____ No ✓

For example: Hole #1: 24 mpi; Hole #2: 16 mpi; Hole #3 90 mpi; Average: 43

If the owner agrees to have the system engineered for the highest percolation rate, the test pit can be waived.

2. Did the engineer answer "yes" to the question; "Did water remain in the hole after the overnight soaking period", and the average percolation rate is less than 60 mpi?

Yes _____ No ✓

3. This question only applies to soils classified as SW (sand, well graded), SP (sand, poorly graded). Did the engineer report a blow count of 20/12 (twenty blows to drive the sampler 12 inches) or more, but does not indicate that bedrock is present?

Yes _____ No _____ NA

4. Did the engineer indicate that bedrock or groundwater are present within 8 feet of the surface?

Yes _____ No ✓

5. Did the engineer indicate that the soils are "wet" and not indicate that groundwater is present?

Yes _____ No ✓

TEST PIT REQUIRED? YES _____ **NO** ✓

EHS: Don Russell EHS Number: 813 Date: 8-7-02

ISDS INSPECTION

Partial (Final)

Date: 11-1-02

Time: _____

Date Ready: 11-1-02

Permit #: _____

Address of Property: 2950 Castle Butte Dr.

Installer: Cline Contractors

Phone #: 303-663

Chambers: B or T # Units 44

Schmidt 1250

Engi? _____ Sq. Ft

Insp. Waived? Y N By: _____

Need Warrens approval of Lift Station Application. bd 11-1-02

Tri-County Health Department

Serving Adams, Arapahoe and Douglas Counties

Richard L. Vogt, M.D.
Executive Director

CERTIFICATION OF INDIVIDUAL SEWAGE DISPOSAL SYSTEM

This certifies that Individual Sewage Disposal System (ISDS) at
2950 Castle Butte Drive Castle Rock CO 80104
Subdivision: Keene Ranch 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: 2002-07-022624

The soils and percolation test was performed by: Castle Rock Engineering Inc

The design engineer for the system was: No Design Engineer Used

The system was installed by: Cline Utility Contractors Inc

The system consists of:
- 1,000 gallon septic tank
- 500 gallon dosing tank
- 44 chambers
- 800 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: John T Kleckner
KLECKNER, JOHN T.

Date: 1/9/03

101 Third Street◆Castle Rock, Colorado 80104-2428
303-663-7650◆FAX 303-688-8870

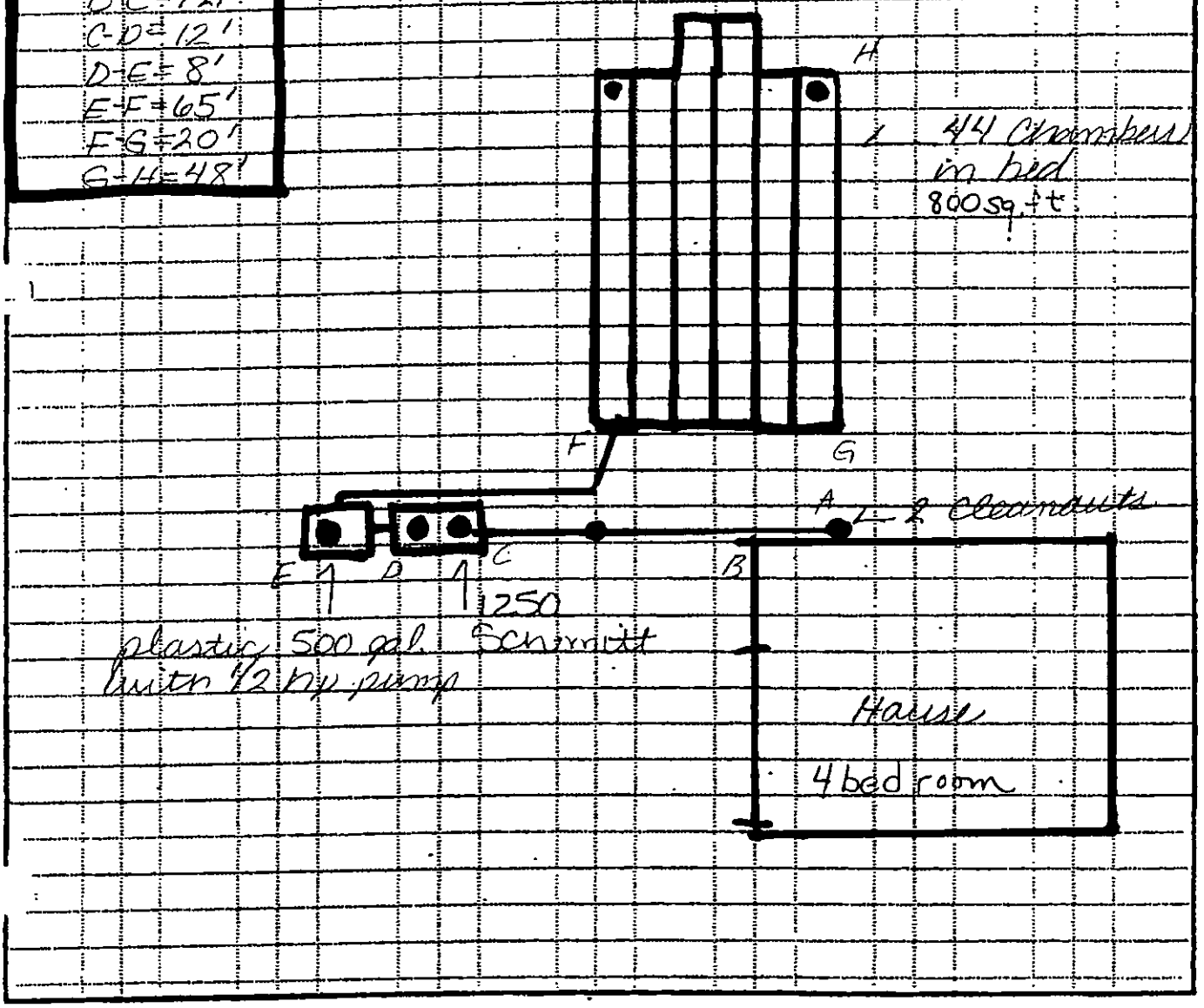
Lot #141

Onsite System As-Built Drawing

Property Address 2950 Castle Butte Dr.
Permit #
Date System Completed 11/01/02
Installer's Name Cline Utility Cont. Inc.
Installer's License #
Installer's Address and Phone P.O. Box 792 Franktown, CO 80116 303 663-6565

Lighthouse Custom Homes

A-C = 130'
B-C = 121'
C-D = 12'
D-E = 8'
E-F = 65'
F-G = 20'
G-H = 48'



TCHD S-103 1/88

2002-07-
PERMIT # 1022624

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:

2980 CASTLE BUTTE DR — Street Address
CASTLE ROCK — City
80104 — Zip Code
Douglas — County

Parcel NE 1/4 Sec NW 1/4 Sec ____ Section 30 Township 8S Range 67W Lot 141 Block —

Legal Description (if no street address)

KEENE RANCH — Subdivision Name
3 — Filing (if applicable)

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

Property Owner:
Name Light House Custom Homes
Address Box 708
City, State Littleton CO
Zip 80160 Phone 720 488-1804

Applicant: SAME
Name ____
Address ____
City, State ____
Zip ____ Phone ____

Systems Contractor: R.U.S. — TCHD Use Only: License # ____

Soils/Percolation Test Engineer Castle Rock Engineering — Job # 02-2730

TCHD Use Only: FSE # ____

Design Engineer (if applicable ____ — Job # ____

TCHD Use Only: FSE # ____

Is this to be an Engineered System? ☐Yes ☒No

Lot Size: 7 A. — 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 ____

Continued on back

PERMIT # 1022624

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: 8-6-02 Received By: bd

Payment Type: ☐ Cash

☒ Check (# 1275)

☐ Charge

☐ Other _____

Amount Paid $300.00

Applicant's Name WALT SLAGEL
Please Print

Applicant's Signature _____ Date Aug 6-02

☐ Aurora 15400E. 14th Place, Ste. 309 Aurora, CO 80011 303-341-9370	☐ Castle Rock 101 3rd Street Castle Rock, CO 80104 303-663-7650	☐ Commerce City 4201 E. 72nd Avenue, Ste. D Commerce City, CO 80022 303-288-6816	☐ Englewood 4857 S. Broadway Englewood, CO 80110 303-761-1340

Tri-County Health Department

Serving Adams, Arapahoe and Douglas Counties

Richard L. Vogt, M.D.
Executive Director

Permit # 2002-07-022624

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

Owner *LIGHT HOUSE CUSTOM HOMES*
Location: *2950 Castle Butte Drive Castle Rock CO 80104*
Subdivision: Keene Ranch County: Douglas

==========

System Requirements:
Tank Size: 1250 Gallons

Design Requirements:	Trench System:	Bed System:
Min. Disposal Area in Sq. Ft.	1,000	1,300
Number of Chambers (Except EQ36)	36	44
Number of Chambers - EQ36 ONLY	44	64

Max Depth of Disposal Area: (Bed or Trench): 56.00 inches

Min Depth of Disposal Area: (Bed or Trench): 22.00 inches

Maximum depth of chambers shall not exceed 48 inches

==========

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: *08/09/2003*
Issued by: Klecknet, John T., John Klecknet EHS

Reviewed by: James L Hall
Tri-County Health Department on *August 12, 2002*

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 #1275
Received By: Dutton, Elizabeth on 08/06/2002
( )Owner Copy ( ) Bldg. Dept. Copy ( ) Installer Copy ( ) H.D.

101 Third Street◆Castle Rock, Colorado 80104-2428
303-663-7650◆FAX 303-688-8870

To: Warren Brown

Tri-County Health Department

APPLICATION TO INSTALL A LIFT STATION

ADDRESS OF PROPERTY SERVED BY PROPOSED LIFT STATION: 2950 Castle Butte Dr. - Keene Ranch Subdivison

Systems Contractor: Cline Utility Cont Ins. Date Submitted: 10-31-02

Phone Number: 720 635-1756 Fax Number: 720 733-8126

Reason for Installing Lift Station: System up hill from house

Pump manufacturer and model: Little Giant 95 1/2 hp

Elevation (height) difference between bottom of dosing tank and bottom of absorption area distribution pipe (feet) 8'

Dosing tank size in gallons (minimum allowable size is 300 gallons): 500 gallon

Is dosing tank a two-compartment tank? X yes X no

Note: Adequate septic tank capacity, as specified in the installation permit, must be provided in addition to the dosing tank.

Manufacturer of dosing tank: Ratronics Mfg Inc. - Same as for lift station installed for Sonoran Homes 2 weeks ago ☺

Distance from dosing tank to absorption area (feet): 40'

Size of supply line pipe from pump to absorption area (inches): 2"

General Requirements for All Lift Stations

- A "quick disconnect" shall be provided in supply line from the pump, to allow for removal of pump.
- Liquid level controls shall be provided to start and stop the pump in addition to an alarm float switch.
- A "high water" alarm shall be provided inside the dwelling, garage or building to signal malfunction of the lift station pump or controls.
- Provision shall be made, to prevent siphoning of effluent within the absorption system back to the dosing tank, and to drain effluent within the supply line back to the dosing tank or to the absorption area between doses, to prevent freezing of the effluent within the supply line. Automatic air release valves shall be installed at high points in the pressure line where necessary to prevent air locking.
- Pumps shall be installed at least four inches off the floor of the tank.
- All electrical work, equipment, and material shall comply with the requirements of the National Electrical Code in force on the effective date of this application, or those revisions of said Code as are adopted by the State Electrical Board.

Reviewed and Approved by: [signature] Date: 11/1/02

FINAL VISIT WORKSHEET

Permit Number: 2002-07-022624 Date Printed: August 12, 2002

Property Location: *2950 Cstle Butte Drive Lot 141*
County: Douglas
Owner: *Light House Custom Homes*
System Installer#: Clines (This will appear on the Certification Letter)
System sized for 4 Bedrooms

SITE INFORMATION:

Keys for completing information on installed tanks:
Usage (D)osing (T)reatment (V)ault

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 Use (D) (T) (V)
Type (C) (PT) (FG) T's or Baffles (T) (B) Effluent Screen Y (N)

Tank 2:
Size 500 Use (D) (T) (V)
Type (C) (PT) (FG) T's or Baffles (T) (B) Effluent Screen Y (N)

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

Secondary Treatment System Y (N) If yes, type: (circle one)
Sand Filter (SF) Constructed Wetlands (CW) Trickling Filter (TF)
Aerobic System (AS) Recirculating Sand Filter (RSF) Other (OT)

Final Treatment Type:
Bed (BD) Mound (MD) Trench (T)
ET (ET) Pond (PD) Sand Filter (SF)
Bed (Chambers) (BD-CH) Trench SB-2 (TR-SB) Drip Irrigation (DR)
Trench (Chambers) (TR-CH) Other (OT)
Area Size (s.f.) 800 If Chambers Used, # 44 ET Lined Y N

Method of Waste Water Application:
Dosed w/Pump (DP) Dosed w/Siphon (DS) Gravity (GR)
Uniformly Dosed w/ Pump (UDP) Uniformly Dosed w/ Siphon (UDS)

Continued on Next Page

FINAL VISIT WORKSHEET

Permit Number: 2002-07-022624 Date Printed: August 12, 2002

RECORD OF FINAL VISITS:

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

Visit 1 Date 11/01/02 By (EHS #) 1555

Visit 2 Date 11/05/02 By (EHS #) 1555

Visit 3 Date _____ By (EHS #) _____

Visit 4 Date _____ By (EHS #) _____

System Engineer Inspection Y (N) Date _____

Design Engineer # _____ (This will appear on Certification Letter)

FINAL SITE VISIT COMMENTS:

11/01 Pump station not finished

11/05 Inspected pump station.

Waiting for As-Built J.K.

Final Approval Given (Y) N By (EHS #) J.K.

SITE VISIT WORKSHEET

Permit Number: 2002-07-022624 Date Printed: August 7, 2002

Property Location: *2950 Cstle Butte Drive Lot 141*
County: Douglas
Owner: *Light House Custom Homes*

SITE INFORMATION AS REPORTED BY ENGINEER:

PERC RATE:
Holes:

One 7 Two 7 Three 7 Four ____ Five ____ Six ____ Avg Rate 7 Sizing Rate 20

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 (%) 5% to W

Max depth of disposal area (in) 56 (not to exceed depth of percolation test holes)

Min depth of disposal area (in) 22

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 Test Pit Waived
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: 2002-07-022624 Date Printed: August 7, 2002

RECORD OF SITE VISITS:

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

Visit 1 Date 8/9/2002 By (EHS #) 1555

Visit 2 Date _____ By (EHS #) _____

Visit 3 Date _____ By (EHS #) _____

Visit 4 Date _____ By (EHS #) _____

SPECIAL CONDITIONS

COMMENTS

made field visit, found all Parcs, No Wells within 100 ft. approved

Signature TCHD Inspector: John K Beckner Date 8/9/2002

GEOTECHNICAL & STRUCTURAL CONSULTANTS

CASTLE ROCK ENGINEERING INC. 101 Briscoe Street, Unit A, Castle Rock, CO 80104 • Phone/Fax (303) 688-5151

PREPARED FOR

LIGHTHOUSE CUSTOM HOMES
P. O. BOX 708
LITTLETON, CO 80160

SUBSURFACE INVESTIGATION AND PERCOLATION TESTING

OF

LOT 141
KEENE RANCH SUBDIVISION
DOUGLAS COUNTY, COLORADO

REPORT NO. 02-2730
JULY 15, 2002

TABLE OF CONTENTS

DISCLAIMER

The parties specifically agree that Castle Rock Engineering, Inc. has not been retained nor will they render an opinion concerning any environmental issues, hazardous waste or any other known or unknown conditions that may be present on this site.

SCOPE OF WORK

This report presents the results of data obtained during the subsoil investigation of Lot 141, Keene Ranch Subdivision, Douglas County, Colorado. The purpose of this investigation is to test, analyze, and report the conditions of the soils encountered. These tests pertain to the suitable design and construction of an appropriate foundation for the proposed building and/or residences to determine the load-bearing capacities of the soil.

SITE CONDITIONS

The site is currently vacant. It is our understanding that a single family home is planned to be built on this site.

FOUNDATION REQUIREMENTS

A satisfactory type of foundation system will be continuous concrete footings. Footing foundations should bear on the undisturbed natural soils and below all organic material. All loose and disturbed soil shall be removed before pouring the concrete for the footings. These footings should be designed for a maximum soil bearing pressure of 2,000 pounds per square foot. Refer to foundation design for footing size verification. All continuous footings supporting perimeter concrete foundation walls should be at least 16 inches wide. Foundation walls should be well reinforced, a minimum of two No. 5, grade 60, top and bottom. We recommend reinforcement sufficient to span an unsupported distance of at least 10 feet. The exterior footings shall be a minimum of 3 feet below final grade for frost protection. Some movement may occur with this type of foundation system.

LATERAL LOADS

Below grade walls must be designed for lateral loads. We recommend the walls be designed for an equivalent fluid pressure of 35 pound per cubic foot (pcf). The recommended design pressure does not include surcharge or hydrostatic loads. To reduce the risk of development of hydrostatic pressure, we recommend installation of an exterior or interior foundation drain as indicated on Figure 4.

SUBSURFACE DRAINAGE

The installation of a foundation drainage system is required for any habitable space below grade level. See Perimeter Drain Detail, Figure 4, for a suggested method of installing this system

FIELD AND LABORATORY INVESTIGATION

Two (2) exploratory test holes were drilled on July 9, 2002, at the site shown on the Location Map, Figure 1. This test hole was drilled with a 4-inch diameter auger. At specific intervals, the drilling

tools were removed from the test holes and soil samples were taken. A description of the soils encountered is shown on the Logs of Test Holes, Figure 2, and the Summary of Laboratory Testing, Table 1.

All soil samples were carefully inspected in the field during the drilling operation. These samples were classified in the laboratory through visual inspection and testing to determine the pertinent properties. The natural moisture content was obtained from relatively undisturbed drive samples of typical soils.

SUBSURFACE CONDITIONS

The subsurface conditions encountered in the borings consisted of silty, clayey sand to the depths of borings, 20 feet. Free groundwater was not encountered in the borings at the time of drilling. The results of the swell consolidation and gradation tests are presented on Figure 3 through 3c.

DESIGN AND DETAILS FOR SLAB ON GRADE CONSTRUCTION

The natural soils appear suitable for the support of exterior and interior concrete slabs. It is very important for the moisture to stay constant during the construction process. When sandy soils have an increase in moisture content, they may consolidate and settle, potentially lowering and cracking the concrete slab. When clayey soils are exposed to an increase in moisture content, they can increase in volume resulting in movement and possible cracking of the concrete slab. Experience with similar soil conditions has shown that the following details help prevent damage to a concrete slab. Experience with similar soil conditions has shown that the following details help prevent damage to a concrete slab:

1. The slab must be placed directly on undisturbed natural soils, or on recompacted soil. Do not place a gravel layer beneath the concrete slab.
2. The floating slab must be separated from the foundation or utility lines to allow for independent movement of the slab. A positive slip joint must be provided at the junction between the slab and foundation walls.
3. Control joints must be provided in the slab to confine cracks to the joints and not in the visible are of the slab. Control joints must be one-third the thickness of the slab. The maximum slab area between control joists shall be 200 square feet. A maximum dimension of 16 feet in any direction is permitted.
4. A minimum void of 1½ inches shall be provided at the bottom of all non-bearing partitions. Drywall or paneling shall not be placed within 2 inches of the top surface of the slab, allowing space for upward movement of the slab.
5. If a hot water heating system is used, the piping should not be placed beneath the concrete floor slab. If a forced air furnace is used, a 2-inch flexible connection should be installed between the furnace and the duct.
6. The soils that will support the concrete slabs should be kept moist, but not wet, during construction.
7. If the builder or future owner provides decorative gravel or bark around the building, see Foundation Grading Detail, Figure 5, for an acceptable method of installation. This

method will prevent ponding of water near the foundation and provide for proper drainage away from the building.

SURFACE DRAINAGE

The backfill soil around the building should be kept moist and well compacted to prevent future settling. Controlled puddling of the backfill soils is not allowed. For proper drainage, a slope of 10% (6 inches in first 5 feet) away from the foundation in all directions is required. This slope must be maintained for a minimum distance of 5 feet. The future owners are advised to immediately fill in any settled area near the building to eliminate containment of water. Downspouts must discharge onto four-foot long concrete splash blocks or into metal gutter extensions to direct water away from the house.

The future owners should be cautioned regarding the installation of a lawn adjacent to the foundation walls. Lawn irrigation can not be permitted within 5 feet of the foundation walls. Any watering adjacent to the foundation should be by hand and kept to a minimum.

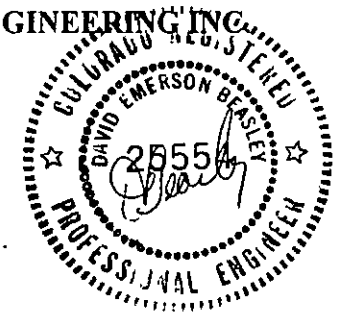
LIMITATIONS

In any soil investigation it is necessary to assume that the subsurface soil conditions do not vary greatly from the conditions encountered in our field and laboratory testing. Our experience has been that at times soil conditions do change and variations do occur and may become apparent at the time of excavation for the foundation system. If soil conditions are encountered which appear different from the test borings as presented in this report, it is requested that an engineer from this office be called to inspect the open excavation. This inspection service is not a part of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. No warranty, expressed or implied, is made. We prepared the report as an aid in design of the proposed project.

Should you have any questions or if we may be further assistance in this matter, we are at your service.

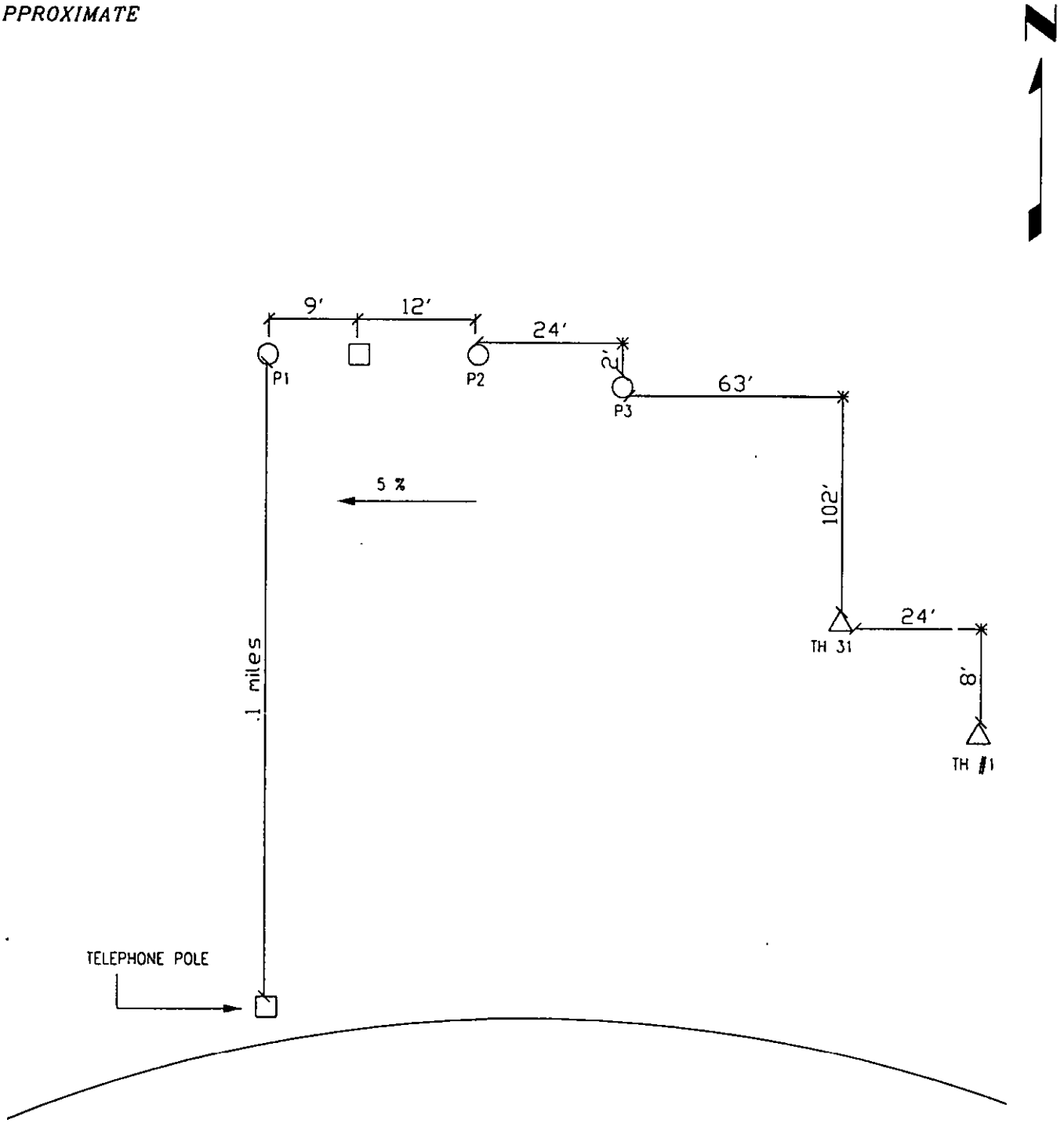
CASTLE ROCK ENGINEERING INC.



David E. Beasley, P.E.

dcc

ALL MEASUREMENTS ARE APPROXIMATE

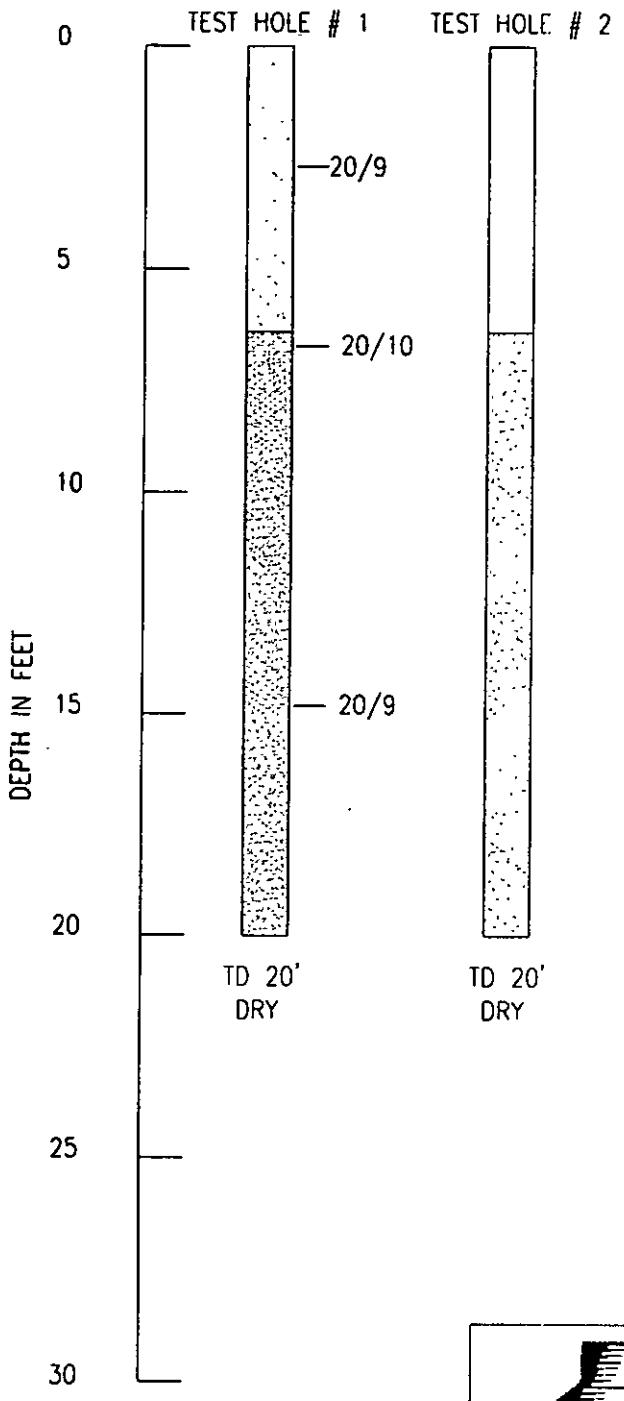


△ SOIL TEST HOLE FOR BUILDING

□ SOIL PROFILE HOLE FOR ABSORPTION BED

○ PERCOLATION TEST HOLE

CASTLE ROCK ENGINEERING, INC.	*LOCATION MAP*	*DATE: 7/12/02*
	Consulting Engineering	*JOB NO. 02-2730*
	Soil & Percolation Test, Foundation & Septic System Design	*FIG. NO. 1*



SM-SAND, silty, sli clayey, loose to med dense, moist, brn to lt brn

SC-SAND, v clayey, silty, v gravely, v moist, brn to lt brn

NOTES:

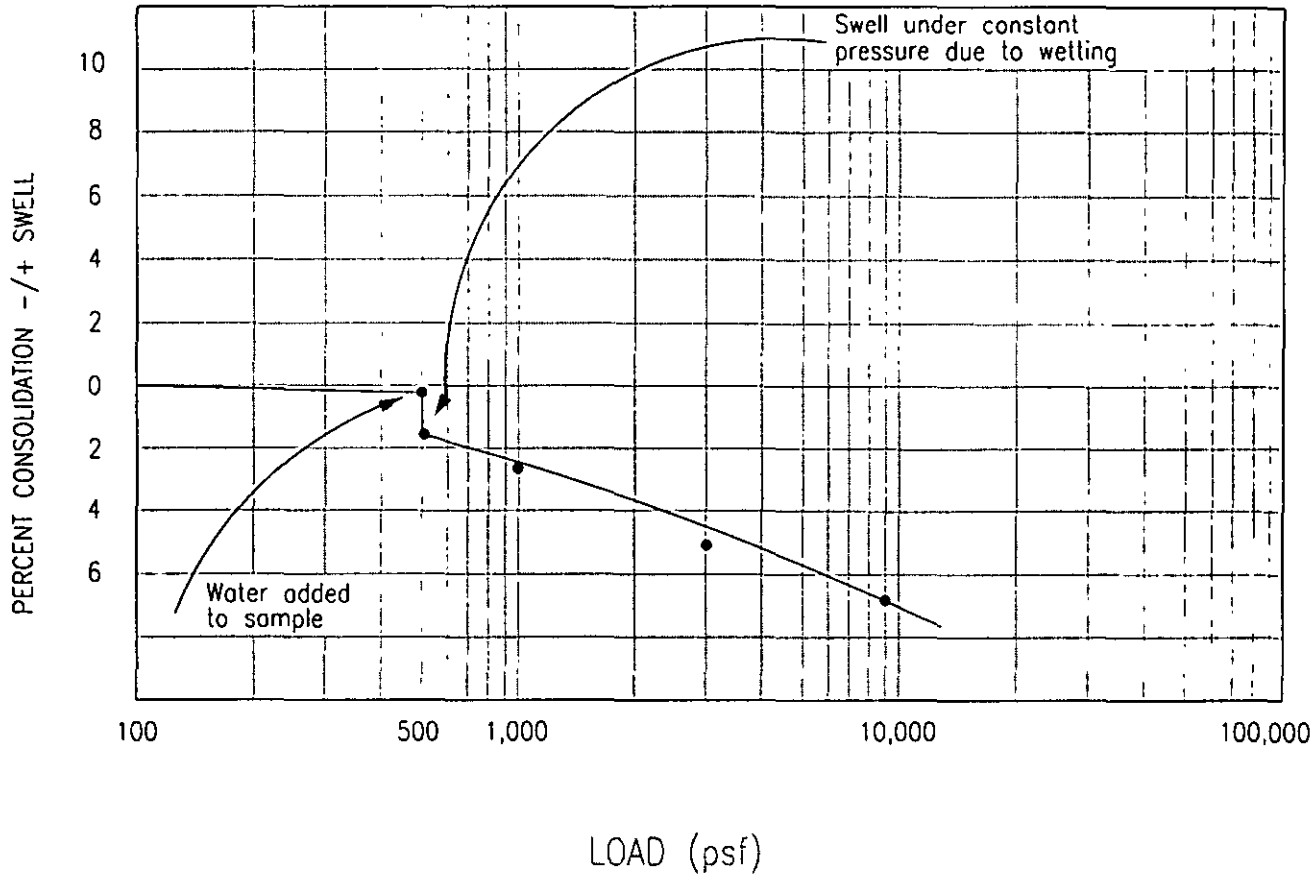
1. No water was encountered during the drilling of the test holes
2. ⊏ Location of modified California barrel sample: (26/12) indicates that 26 blows with a 140# hammer, falling 30" were required to drive a 2.5" dia. sampler 12"
3. ▽ Groundwater on Drill Date
   ▽ Groundwater 24-48 hours later

CASTLE ROCK ENGINEERING INC.

GEOTECHNICAL & STRUCTURAL CONSULTANTS

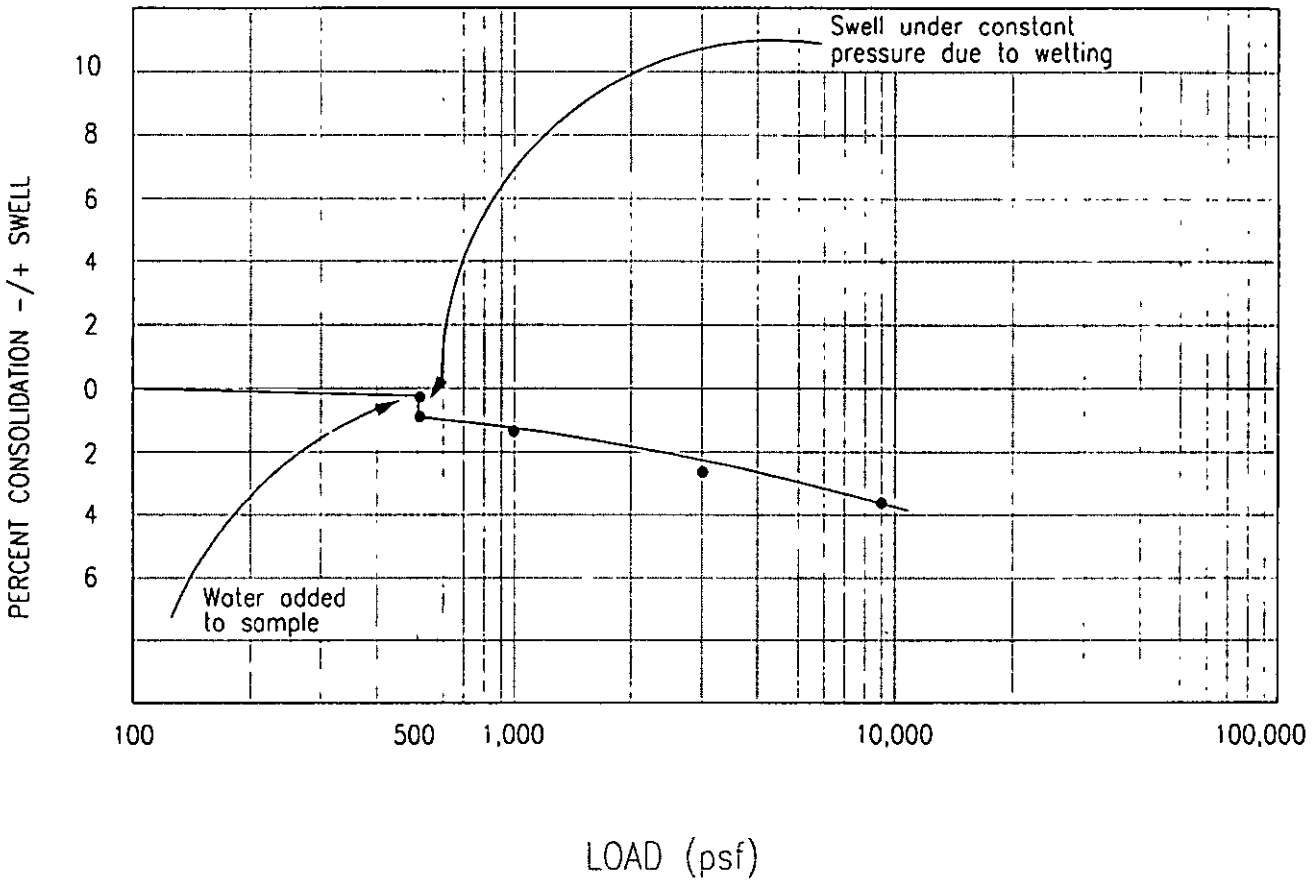
LOG OF TEST HOLES

DATE:	7/12/02
JOB NO.	02-2730
FIG. NO.	2



Specimen Identification	Classification	DD (pcf)	MC (%)
TH # 1 @ 3'	SM-SAND, silty, sli clayey, loose to med dense, moist, brn to lt brn	103.6	3.9

CASTLE ROCK ENGINEERING INC.	SWELL-CONSOLDATION TEST GEOTECHNICAL & STRUCTURAL CONSULTANTS	DATE: 7/15/02 JOB NO. 02-2730 FIG. NO. 3



Specimen Identification	Classification	DD (pcf)	MC (%)
TH # 1 @ 8'	SC-SAND, v clayey, silty, v gravely v moist, brn to lt brn	112.9	6.4

CASTLE ROCK ENGINEERING INC.

GEOTECHNICAL & STRUCTURAL CONSULTANTS

SWELL-CONSOLDATION TEST

DATE: 7/15/02

JOB NO. 02-2730

FIG. NO. 3a

Hole No.	Depth (feet)	Moisture Content %	Dry Density pcf	140# Hammer Blows	Passing 200 sieve %	Swell (+) or Consol (−) %	Soil Description
TH #1	3'	3.9	103.6	20/9	16.0	−1.9	SM−SAND, silty, sli clayey, loose to med dense, moist, brn to lt brn
TH #1	8'	6.4	112.9	20/10	6.9	−0.6	SC−SAND, v clayey, silty, v gravely, v moist, brn to lt brn
BAG SAMPLE SPH	2'−7'	6.8	---	---	21.7	---	SC−SAND, v clayey, silty, med dense, v moist, lt brn
BAG SAMPLE SPH	7'−10'	6.1	---	---	10.0	---	SC−SAND, v clayey, silty, med dense v moist, gravely, brn to lt brn

CASTLE ROCK ENGINEERING INC.

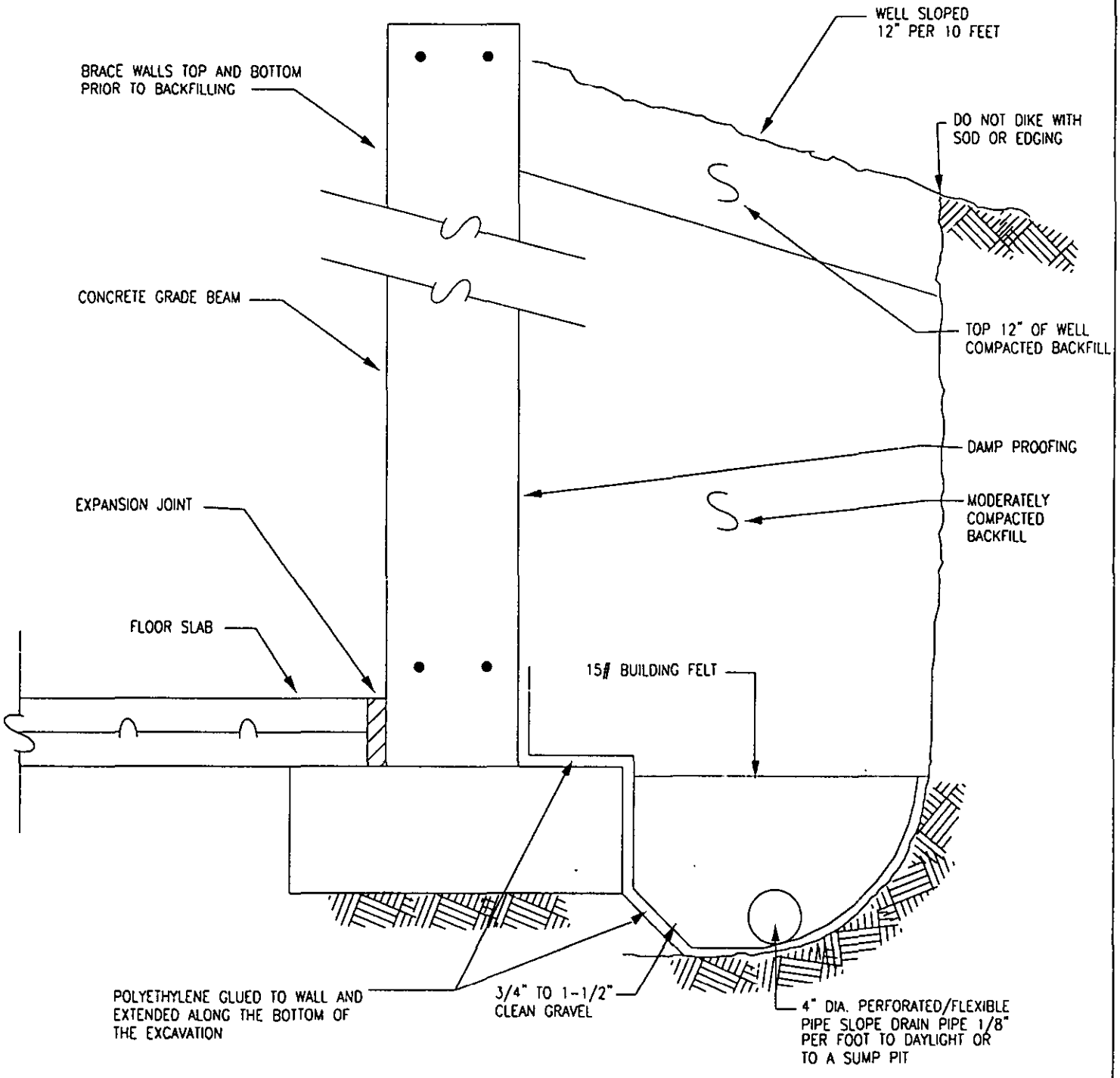
GEOTECHNICAL & STRUCTURAL CONSULTANTS

SUMMARY OF LABORATORY TESTING

DATE: 7/15/02

JOB NO. 02-2730

TABLE 1

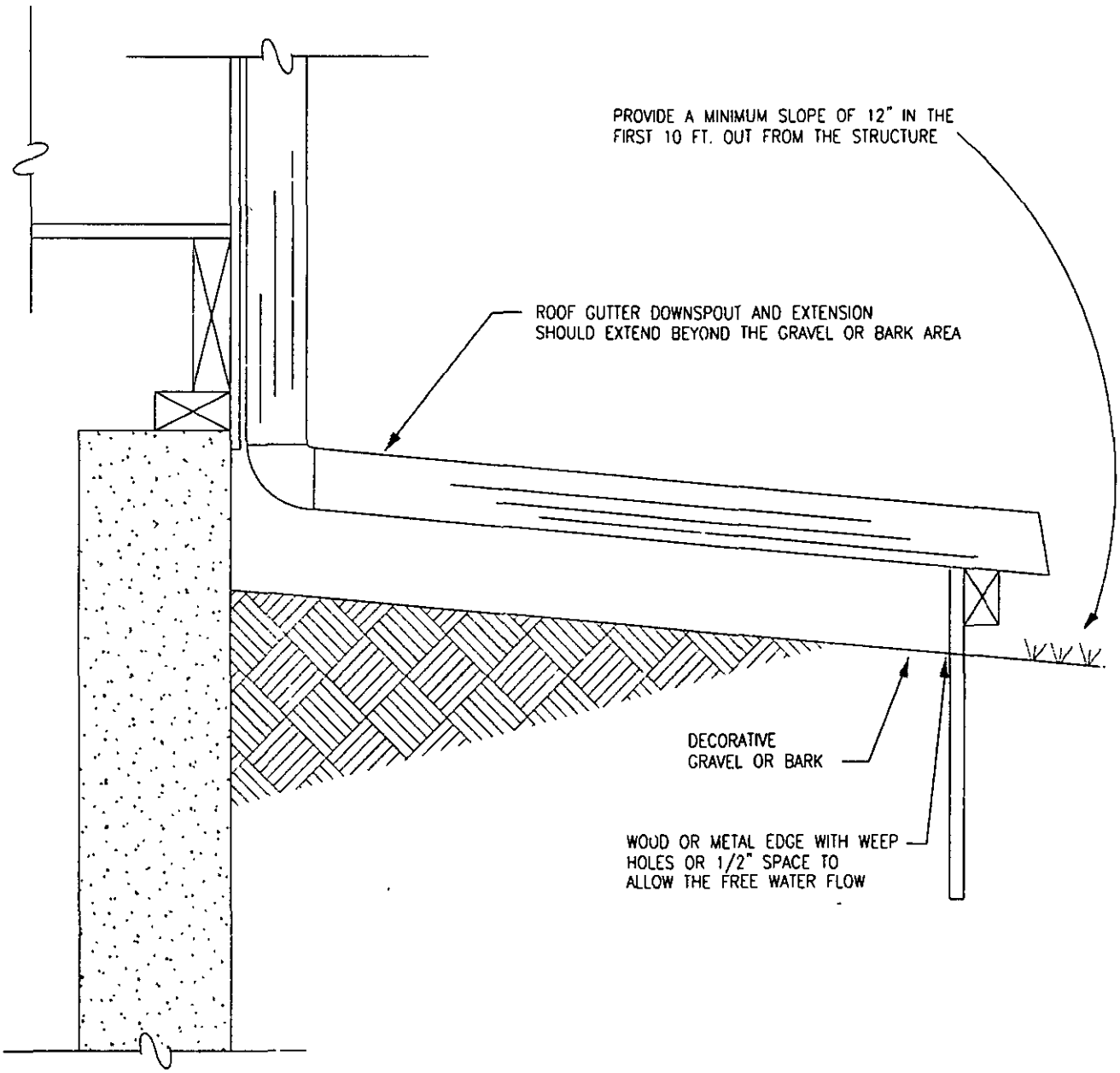


BACKFILL AROUND THE FOUNDATION SHOULD BE MOISTENED AND COMPACTED AND THE FINAL GRADE SHOULD BE WELL SLOPED TO PRECLUDE PONDING OF RAINFALL, IRRIGATION WATER AND SNOW MELT ADJACENT TO FOUNDATION WALLS. CAUTION: DO NOT DIKE OR IMPEDE THE FLOW OF WATER AWAY FROM FOUNDATION WALLS WITH SOD, EDGING OR DECORATIVE GRAVEL AND POLYETHYLENE. DOWNSPOUTS AND SILL COCKS SHOULD DISCHARGE INTO SPLASH BLOCKS OR LONG EXTENSIONS.

FOOTING FOUNDATION SYSTEM

DRAIN SYSTEM BELOW GRADE & BACKFILL DETAILS	*DATE: 7/12/02*
	JOB NO. 02-2730
GEOTECHNICAL & STRUCTURAL CONSULTANTS	*FIG. NO. 4*

CASTLE ROCK ENGINEERING INC.



CASTLE ROCK ENGINEERING INC.	DRAINAGE AROUND FOUNDATION WALL	DATE: 7/12/02
GEOTECHNICAL & STRUCTURAL CONSULTANTS		JOB NO. 02-2730
		FIG. NO. 5

GEOTECHNICAL & STRUCTURAL CONSULTANTS

CASTLE ROCK ENGINEERING INC. 101 Briscoe Street, Unit A, Castle Rock, CO 80104 • Phone/Fax (303) 688-5151

Lighthouse Custom Homes
P. O. Box 708
Littleton, CO 80160

Date: July 12, 2002
Observation Date: July 10, 2002
Job No.: 02-2730

At your request, we ran percolation tests at Lot 141, Keene Ranch Subdivision, Douglas County, Colorado on July 10, 2002 (refer to Fig. 1). We recommend that this site utilize a conventional leaching system.

Test results are as follows:

Lot 141
Keene Ranch Subdivision
Douglas County, Colorado

Percolation hole #1:	7
Percolation hole #2:	7
Percolation hole #3:	7
Average Perc Rate:	7

If you have any questions, please call.

CASTLE ROCK ENGINEERING INC.

Reviewed by:

COLORADO REGISTERED DAVID EMERSON BEASLEY 25554 PROFESSIONAL ENGINEER

David E. Beasley, P.E

Tri County Health Department

Percolation Test and Soils Data Form

Property address Lot 141, Keene Ranch Subdivision, Douglas County, Colorado

Legal description _____

Property Owner:

Name Lighthouse Custom Homes

Address P. O. Box 708, Littleton, CO 80160

Phone (303) 901-6848

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.

Saturation and Swelling

Date and time presoak water added:
7/9/02

Amount of presoak added (gallons):
FIVE GALLONS

Date and time percolation test started:
7/10/02

Did water remain in hole after the overnight swelling period:

Hole 1 ☐ Yes ☒ No

Hole 2 ☐ Yes ☒ No

Hole 3 ☐ Yes ☒ No

Percolation Rate Measure:

Hole 1 7

Hole 2 7

Hole 3 7

Average 7

Groundwater

Groundwater Encountered: ☐ Yes ☒ No

If yes, at what depth: N/A feet

Estimated depth to maximum seasonal water table if not encountered in profile: 20'

Is area believed to be subject to seasonal fluctuations which could result in a seasonal water table within 8' of surface?

☐ Yes ☒ No

Slope determination in absorption area: 5.0 % to the west (direction)

Bedrock

Bedrock Encountered: ☐ Yes ☒ No

If yes, bedrock encountered at N/A feet

Type of bedrock (if present):

☐ Sandstone ☐ Claystone ☐ Siltstone

☐ Other: _____

If present is bedrock fractured or weathered:

☐ Yes ☒ No

PROFILE HOLE INFORMATION (Cont.)

(Soils must be classified using Unified System ASTM D2487)

PROFILE HOLE LOG

SPH # 1

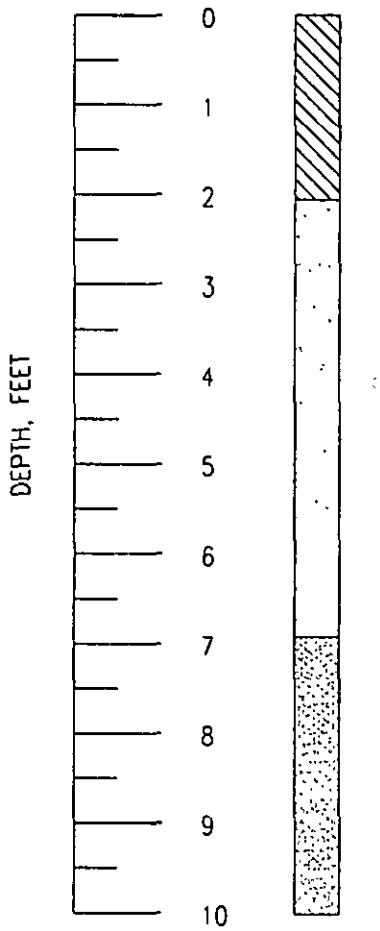
Blow Counts at Depth of Bed: 20/10

Atterberg Limits:

PL: _____

LL: _____

PI: _____



SC-SAND, v clayey, v moist, drk brn

SC-SAND, v clayey, silty, med dense, v moist, lt brn

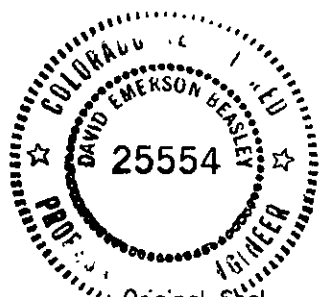
SC-SAND, v clayey, silty, med dense, v moist, gravely, brn to lt brn

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 1-96 by myself or under my supervision.

Original Signature

7/23/02
Date



Original Seal

Castle Rock Engineering Inc.
101 Briscoe St. Unit A, Castle Rock, CO 80104
(303) 688-5151

TRI-COUNTY HEALTH DEPARTMENT
PERCOLATION TEST RESULT FORM

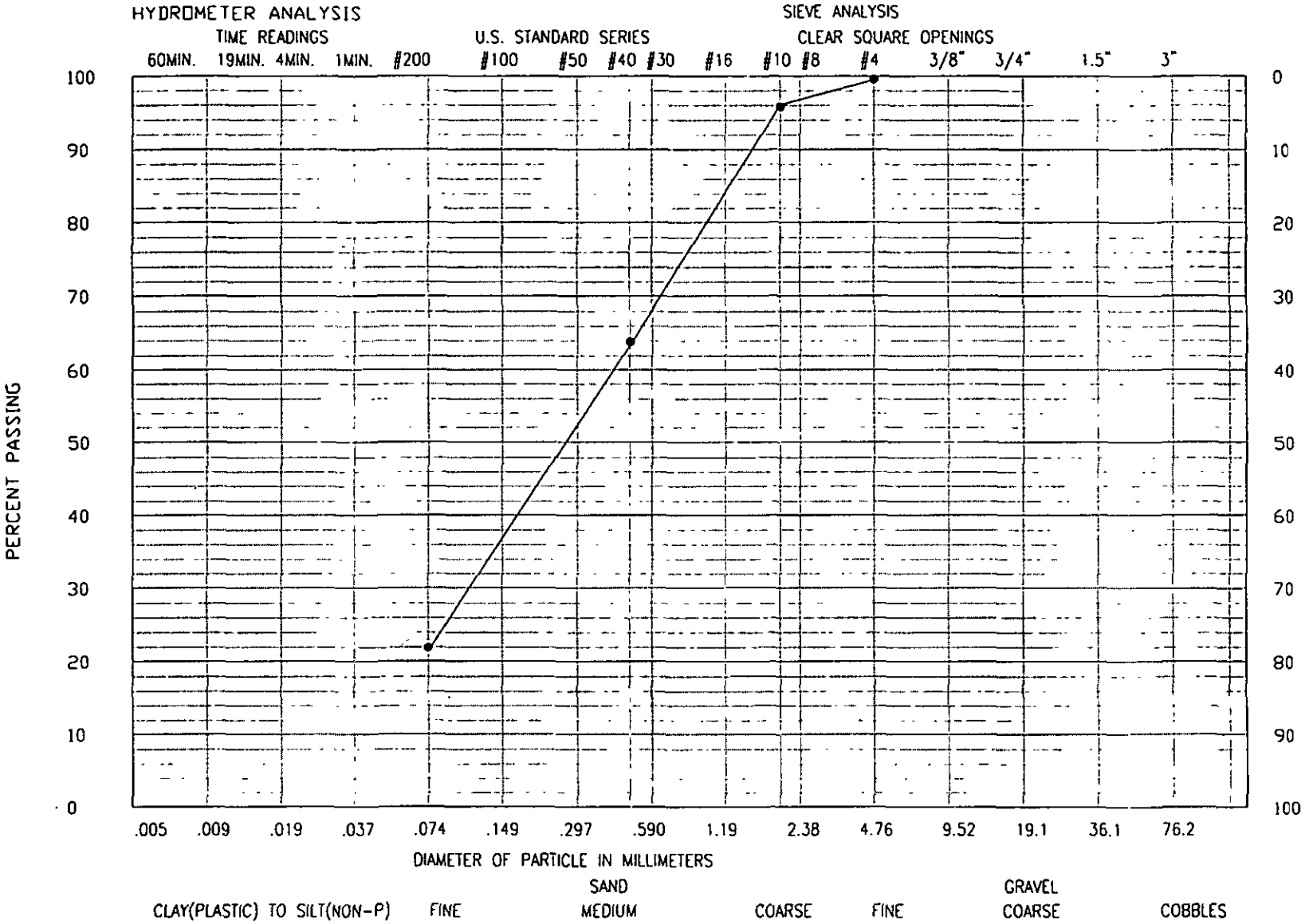
JOB NO. 02-2730

Hole No.	Hole Depth (in.)	Length of Interval (min.)		Water Depth at Start of Interval (in.)	Water Depth at End of Interval (in.)	Drop in Water Level (in.)	Percolation Rate at Final Interval (min./in.)
1	58"	10	**	82.5000	72.5000	10.0000	1.0
		10	**	72.5000	69.5000	3.0000	3.3
		10		77.5000	75.0000	2.5000	4.0
		10		75.0000	73.5000	1.5000	6.7
		10		73.5000	72.0000	1.5000	6.7
		10		75.0000	71.5000	3.5000	2.9
							7
2	62"	10	**	222.0000	216.0000	6.0000	1.7
		10	**	228.5000	224.0000	4.5000	2.2
		10		224.0000	222.2500	1.7500	5.7
		10		222.2500	221.0000	1.2500	8.0
		10		224.0000	222.0000	2.0000	5.0
		10		222.0000	220.5000	1.5000	6.7
							7
3	55"	10	**	127.5000	117.0000	10.5000	1.0
		10		117.0000	113.2500	3.7500	2.7
		10		127.5000	121.5000	6.0000	1.7
		10		121.5000	117.5000	4.0000	2.5
		10		117.5000	114.5000	3.0000	3.3
		10		114.5000	113.0000	1.5000	6.7
							7
					Average Perc Rate		7

** WATER ADDED

*FIELD NOTES SHALL BE RECORDED ON THIS FORM OR IN THIS FORMAT; TYPED COPIES OF FIELD RECORDS MAY BE SUBMITTED ON THIS FORM.

*A FOUR HOUR TEST MUST BE CONDUCTED UNLESS (A) WATER REMAINS IN THE HOLE AFTER THE PRESOAK IN WHICH CASE ONE 30 MIN. INTERVAL IS SUFFICIENT, (B) THE FIRST 6" OF WATER SEEPS AWAY IN <30 MINUTES IN WHICH CASE A ONE-HOUR TEST OF 6 - 10 MINUTE TIME INTERVALS MAY BE USED, (C) THE TEST IS BEING CONDUCTED IN SAND (SW OR SP) IN WHICH CASE A ONE HOUR TEST OF 6 - 10 MINUTE TIME INTERVALS MAY BE USED, (D) THREE SUCCESSIVE WATER LEVEL DROPS DO NOT VARY BY MORE THAN 1/16 INCH IN WHICH CASE A TWO-HOUR TEST MAY BE CONDUCTED, (E) TEST IS IN DAWSON SANDS, IN WHICH CASE THE TEST MUST BE RUN A MINIMUM OF FOUR HOURS UNTIL THE LAST THREE SUCCESSIVE WATER LEVEL DROPS VARY BY LESS THAN 1/16 INCH.



GRAVEL 0.2 % SAND 78.1 % SILT & CLAY 21.7 %

BAG SAMPLE OF SPH @ 2'-7'

GRADATION TEST RESULTS

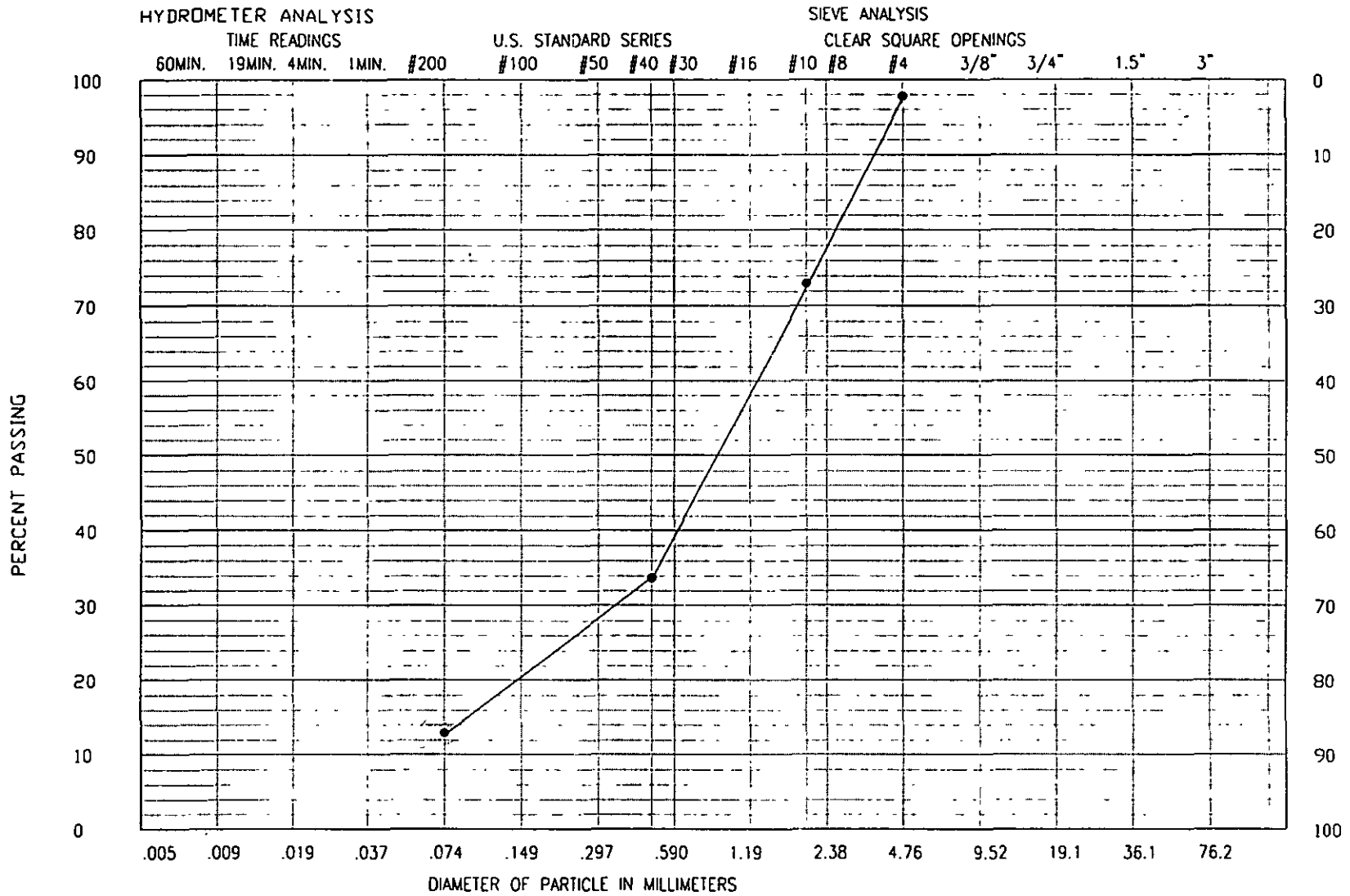
CASTLE ROCK ENGINEERING INC.

GEOTECHNICAL & STRUCTURAL CONSULTANTS

DATE: 7/15/02

JOB NO. 02-2730

FIG. NO. 3b



GRAVEL 2.8 % SAND 87.2 % SILT & CLAY 10.0 %

BAG SAMPLE OF SPH @ 7'-10'

CASTLE ROCK ENGINEERING INC.

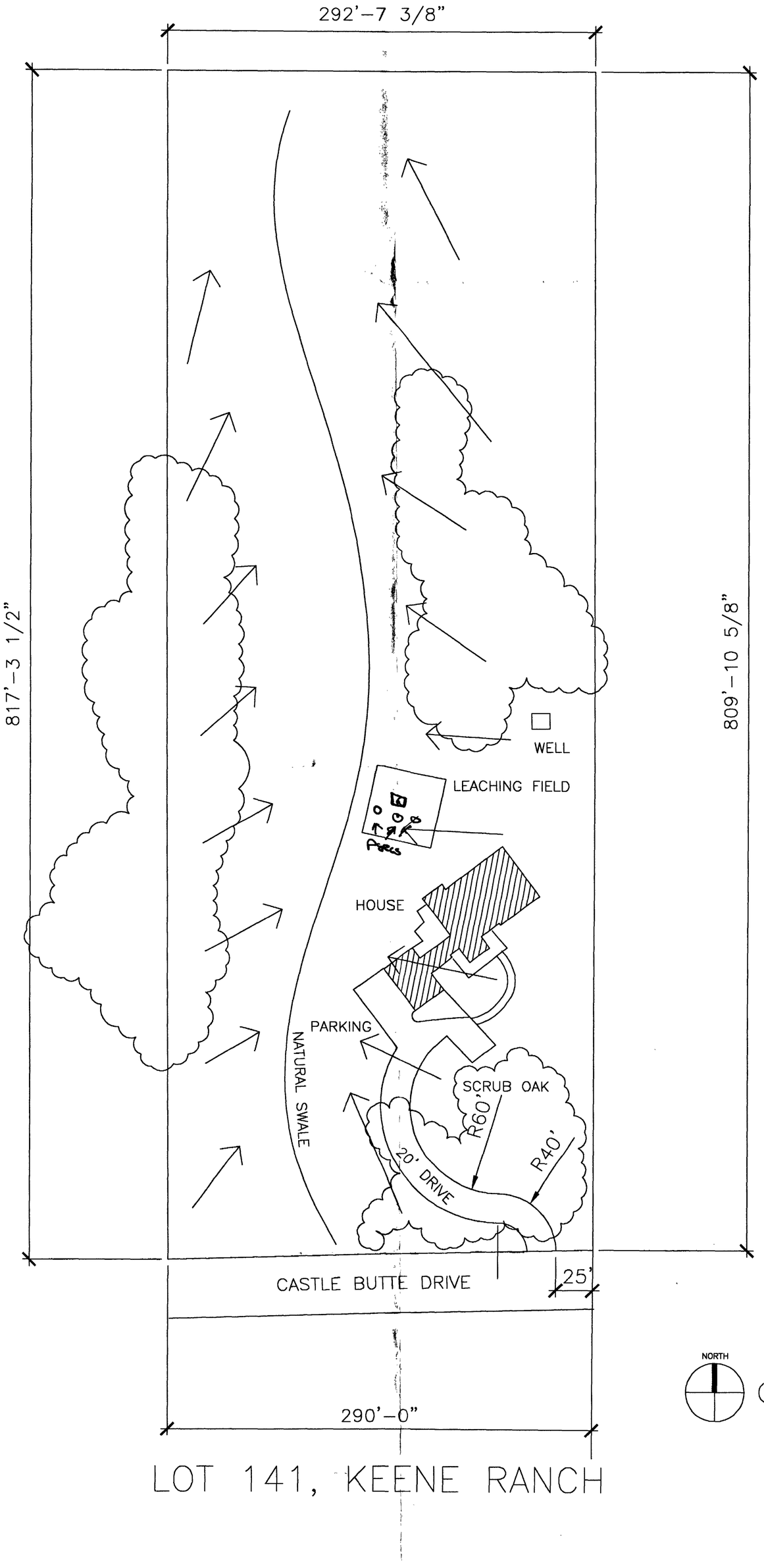
GEOTECHNICAL & STRUCTURAL CONSULTANTS

GRADATION TEST RESULTS

DATE: 7/15/02

JOB NO. 02-2730

FIG. NO. 3c



NORTH

SP.01 SITE PLAN
1" = 50'

Aug 6 02

LANE ASSOCIATES, LLC
303.940.2527 (phone)
303.424.5160 (fax)
7305 W. 46th Place
Wheat Ridge, Colorado 80033
• DESIGN/BUILD
• INTERIORS

PROPOSED RESIDENCE
LOT 141, KEENE RANCH
DOUGLAS COUNTY, COLORADO

SUBMITTALS:
curb cut–07/15/02

REVISIONS:

DATE: 07/02/02
SCALE: AS SHOWN
LA JOB # : 110101
SHEET SP1