Preliminary Geotechnical Investigation Report
CDOT Project: STA 1281-011 – 15782
120th Avenue Connection Over US-36
Broomfield County

Prepared for:

Jacobs Carter Burgess
707 17th Street, Suite 2300
Denver, CO 80202-5131

Attention: Mr. Mark Talvitie

December 2008

RockSol Consulting Group, Inc.

6510 W 91st Ave, Ste 130
Westminster, CO 80031

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION AND SCOPE

This report documents the preliminary geotechnical investigations for the roadway, bridge structures and retaining wall foundations of the proposed SH-128 (120th Avenue Connection) over US-36 located in Broomfield. The purpose of the geotechnical investigation is to conduct field exploration and drilling at selected locations, to collect the soil samples at selected intervals in each boring, to test the representative soil samples in the laboratory and to develop preliminary geotechnical considerations.

The geotechnical investigations and analyses were conducted and compiled according to the Scope of Work and through review of geotechnical reports and geologic records. The recommendations contained in this report comply with current geotechnical practices in the local area with similar soil and bedrock conditions and our understanding of the proposed study.

The scope of work included the following items:

(a) Formulate a drilling pattern and perform the necessary subsurface investigation and collect samples as required.

(b) Perform the appropriate laboratory tests and analyze the data.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration for this project was performed by geotechnical engineers and engineering geologists according to the project scope of work including review of the existing documents and available information, field reconnaissance and a subsurface investigation including laboratory analysis.

A total of thirty one boreholes were drilled by RockSol for this project between October of 2007 and September of 2008. Figure 1 shows the locations of the boreholes. Borings were drilled using truck-mounted drill rigs. The borings were advanced to a maximum depth of approximately sixty-five feet below the existing site grade using 4-inch diameter solid flight augers.

Subsurface materials were retrieved using modified California barrel or split-spoon samplers. In addition, bulk samples of drill cuttings were collected at some locations. California or Standard Penetration Tests were performed at frequent intervals using a standard hammer weighing 140 pounds falling 30 inches. The borings were backfilled immediately after completion of drilling and the asphalt or concrete pavement was immediately repaired using asphalt patch or quick-setting, high strength grout. Results of the field investigation are shown on boring log sheets (Appendix A).

3.0 LABORATORY TESTING

Samples retrieved from the field were examined in RockSol's laboratory by the project geotechnical engineer. Soil samples were tested and analyzed according to the Unified Soils Classification Systems (USCS) as well as AASHTO Classification. The following laboratory tests were performed in accordance with the American Standard of Testing Materials (ASTM) and current local practices:

(a) Gradation, ASTM D-422
(b) Liquid and Plastic limits, ASTM D-4318
(c) Dry Density, ASTM D-2937
(d) Water Content, ASTM D-2216
(e) Swell Potential, ASTM D-4546
(f) Water Soluble Sulfates, CDOT Materials Manual
(h) Unconfined Compression Test, ASTM D-2938

The test results were used to obtain properties of subsurface materials and to develop foundation and earthwork recommendations. For soil classification, RockSol conducted sieve analyses and Atterberg limits tests on the field samples. Consolidation characteristics of the subsurface materials were determined by performing swell tests. Water soluble sulfate content of the subsurface materials was assessed using lab results.

Based on the laboratory results, the field logs were conformed or modified. Appendix A contains the borehole logs.

4.0 FIELD CONDITIONS

4.1 Geologic Descriptions

Geologic conditions of note include:

1) High shrink-swell potential in soils, surficial deposits, and fine-grained bedrock; low-strength soils; low-permeability soils; moderately to severely erodible soils; and potentially corrosive soils. These conditions exist across the area of interest.
2) High slope, stony soils, and locally shallow bedrock, with the potential for small rotational landslides in disturbed slopes. These conditions exist primarily from US 36 westward.

Subsidence over abandoned coal mines is not a concern because the area is not undermined.

Topography and Drainages (based on 7.5 minute USGS topographic map for the Lafayette Quadrangle). Topographic relief across the area of interest totals approximately 175 feet. Regional slopes are generally from west to east, with a lesser slope component from south to north. Maximum elevations are at the extreme western edge of the area. Maximum slopes are between US 36 and the west end of the area of interest. At least two agricultural waterways cross the area of interest, one slightly west of US 36, and the other between Vance and Upham streets.

Geologic Units (based on Machette 1977). The area is underlain by sedimentary bedrock of the Upper Cretaceous Arapahoe Formation. Overlying surficial deposits include: 1) ancient stream-

laid alluvium on elevated terraces and terrace remnants at the western and southern edges of the area, 2) small unmapped areas of colluvium on the terrace slopes, and 3) windblown loess in small unmapped areas and north of 119th Ave.

The bedrock is predominantly interbedded claystone and siltstone, but some thick, commonly lenticular units of sandstone and conglomerate also are present. Locally the sandstones are well-cemented and hard. Clayey layers within the bedrock may exhibit high shrink-swell potential. The bedrock unit is approximately 280-290 feet thick in the immediate area.

Ancient alluvium caps the high terrace at the west edge of the area. The alluvium consists of gravelly to silty sand and may contain a well-defined calcium carbonate horizon. Small areas of colluvium consisting of poorly sorted sand, silt, and clay lie on the terrace slopes. Thin loess deposits of windblown sand and silt overlie bedrock at the northern edge of the area of interest, and small loess deposits also may be scattered across the remainder of the area. Areas of artificial fill also may be encountered along roadways, highways, railways, and industrial sites.

Depth to Bedrock (based on Price and Amen 1980; RockSol boreholes). Depth to bedrock varies irregularly across the area, from at or very near the surface to at least 19 feet beneath the surface. Depth to bedrock may vary significantly within relatively small lateral distances. Cutting and filling along highways, roads, and railroads has altered the natural depth to bedrock.

Landslides. No landslides are mapped within the area, but small rotational slumps have occurred in equivalent bedrock and surficial materials on excavated slopes less than 0.5 miles south of the area (Machette, 1977). Landslides in these strata may be triggered by excavating the toe of a slope, by overloading the top of a slope with fill or structures, or by introducing excessive moisture into the slope (Lindvall, 1979).

Seismic Conditions. Colorado is in an area of moderate seismic risk and could experience damaging earthquakes. Risk assessment across the area of interest indicates less than 10% probability in 50 years of ground motion values exceeding threshold levels for damage to older dwellings (USGS Earthquake Hazards Program website, accessed 2/08/08). Standard Specifications for Highway Bridges AASHTO shows horizontal acceleration of 0.025g for this area with a 90% probability of not being exceeded in 50 years.

High Shrink-Swell Potential. The upper 10 feet of surficial materials across the area, including soil, alluvium, and loess, typically exhibit high shrink-swell potential (Hart, 1974). All the major soils in the area typically exhibit high or moderate shrink-swell potential.

Low Permeability and High Susceptibility to Erosion. Slow infiltration rates are common in the area due to low permeability and the development of hardpan layers in the soils. Soils on the terrace slopes exhibit rapid runoff rates, and moderate runoff rates are common elsewhere across the area. These effects are enhanced where the soils are thin and overlie low-permeability bedrock. Soils on the terrace slopes are severely susceptible to erosion by running water. Soils on the lower slopes are moderately susceptible to wind erosion. Soils on the lower land surfaces are moderately susceptible to erosion by running water. Soils in local drainages are moderately susceptible to erosion by both running water and wind.

Corrosive Soils and Saline Soils. Soils across the region tend to be highly corrosive to uncoated steel. Soils on the lower slopes west of US 36 may exhibit moderate to high salinity, and soils atop the terrace at the western end of the area may locally have moderate salinity.

Soils with Shallow Water Tables and Flooding. Soils within the area of interest generally are not susceptible to shallow groundwater and flooding, but seasonally high water tables (5-6 ft) and rare brief flooding could occur in spring and summer from seepage on agricultural waterways and from surface irrigation. Seasonal fluctuations in the water table increase shrink-swell effects in susceptible soils and bedrock, and shallow groundwater enhances soil corrosivity and frost action, decreases soil strength in slopes, and increases susceptibility to water erosion.

Mineral Resources

Coal. In the area of 120th Avenue and Wadsworth Blvd, the bedrock that has produced coal elsewhere in the region lies at least 280-290 feet beneath the ground surface (Machette, 1977). Coal has not been mined from beneath this area (Roberts et al, 2001). Coalbed methane could exist in the coal-bearing strata, but this resource has not been produced in the metropolitan Denver area.

Oil and Gas. No recorded boreholes or approved or pending drilling permits are located within the area of interest (Colorado Oil and Gas Conservation Commission, Colorado Oil and Gas Information System (COGIS), accessed 2/08/08).

Sand and Gravel. Ancient alluvium on terraces and terrace remnants at the west and southwest margins of the area contain gravel that is generally of poor quality for concrete aggregate due to many unsound stones and abundant caliche coatings and cement (Trimble and Fitch, 1974). No records or permits for sand or gravel quarrying within the area were found (Colorado Division of Minerals and Geology, Mine Permit Reports, accessed 2/08/08).

Recovery of Mineral Resources. The State of Colorado recognizes separate ownership of "surface estates" and "mineral estates," meaning that owners of mineral rights can exercise their option to develop mineral resources even where the surface land is owned by others. The extraction of coal, oil and gas, and sand and gravel is regulated by the State.

4.2 Subsurface Condition

Subsurface conditions of the project area have been estimated based on interpretation of the field investigation, and in conjunction with the laboratory investigation data.

West of the US 36 highway, 9 boreholes were drilled (B-1 through B-6; and SB-4, SB-5, and SB-11). Fill material was encountered in four of these boreholes: B-1 and B-2 which are located in the westernmost portion of the project area within the RTD Park-N-Ride parking lot; and the two boreholes drilled a few feet from the US 36 frontage road (B-5 and B-6). The subgrade fill material underlying the parking lot and frontage road consisted mainly of gravelly, sandy clay with some cobbles (occasionally consisting of gravelly, clayey sand). The thickness of the fill material was ranging from approximately 1 to 4 feet thick along the frontage road, and 5 to 10 feet thick below the parking lot.

Native soil was encountered under fill material in all of the boreholes drilled west of the highway, with the exception of B-3 which consisted of a thin layer of topsoil overlying bedrock. The native soil consisted of clay with varying amounts of silt and sand with depth. The thickness of native soil varies from approximately 7 to 15 feet. This soil transitions into the underlying claystone bedrock. Laboratory testing of samples taken from this native soil indicates sulfate exposure to be negligible at all locations except at SB-11 where results indicate 0.5% sulfate content.

Testing for swelling potential revealed significant results within the native soil at these borehole locations – the most significant being approximately 12% at a depth of 5 feet in borehole SB-4. The other boreholes show a swelling potential of about 3-6% within the native soil at depths between 5 and 10 feet.

Bedrock was intersected in all of the boreholes west of the interstate at varying depths, overall, the bedrock is gently to moderately dipping from west to east. The bedrock west of the interstate is primarily composed of a highly plastic claystone from the Upper Cretaceous Arapahoe Formation. There is significant variation within the bedrock, however, in that it is commonly interbedded with thin layers of siltstone and fine-grained sandstone, as well as containing irregular lenses of silt and fine sand, affecting the plasticity of the unit throughout with depth. Because of the interbedded nature of the claystone bedrock within the project area, plasticity of the unit and its swelling potential is quite variable. In borehole B-5, swelling potential was determined to be over 10% at depths of 30 and 40 feet.

East of US 36, the remaining 22 boreholes were drilled in the open fields adjacent to the highway to the residential and commercial areas of the City of Broomfield in the eastern limit of the project area. Fill material was encountered in only a few of these boreholes: boreholes B-17 through B-20 in the easternmost portion of the project area; and SB-1. The fill material encountered in the four boreholes in the eastern portion of the project area consisted of a 1-3 foot-thick layer of gravelly sand, being uniform and consistent within the different boreholes. The fill material in SB-1 was approximately 12 feet thick, and consisting of sandy clay with reworked native clay material underlying the fill.

Under fill, native material was found to be the same as the native soil discovered in the boreholes to the west of US 36 – a silty, sandy clay exhibiting similar soil properties as the soil to the west of the highway, with the exception of density. Native soil consisting of a well sorted silty sand was also encountered in the area. Generally, the thickness of this soil layer was observed to be approximately 3-4 feet, but was found to be about 10 feet thick in borehole B-17.

East of US 36, a sandstone layer was found to overlie claystone in several of the boreholes. The bedrock on the east side of the highway is moderately dipping from west to east and consists of interbedded claystone and sandstone of the Upper Cretaceous Arapahoe Formation with some possible erosional remnants of the Denver Formation overlying the highly interbedded Arapahoe units. The sandstone bedrock encountered overlying the claystone bedrock greatly varied in thickness from 7 feet to as much as 30 feet-thick in some areas. The sandstone was also found to have varying levels of cementation – mostly moderate to light cementation, but a very heavily cemented (with silica) layer was occasionally encountered. The underlying claystone bedrock was found to be similar to that was encountered to the west of the highway.

Groundwater Overview

Groundwater was encountered during subsurface exploration at varying depths ranging from 13 to 63 feet below the ground surface (5372 feet to 5430 feet in elevation). Groundwater was not encountered in boreholes B-1, B-2, B-3, B-4, B-5, B-7, B-8, B-10, B-16, B-17, SB-1, SB-2, SB-3, SB-4, SB-5, SB-7, SB-8, SB-9, SB-10, and SB-11. The highest water level (elevation 5430 feet, depth of 44 feet) was encountered in borehole B-6. The lowest water level (elevation 5372 feet, depth of 13 feet) was encountered in borehole B-20. These levels reflect both the topography of

the site and the variable permeability of the encountered interbedded bedrock. The groundwater levels are affected by the more permeable sandstone deposits overlying claystone bedrock on the east side of US 36 and the interbedding of siltstone within the sandstone and claystone layers. The permeability of these two bedrock layers influences the location of groundwater encountered during drilling. Also, groundwater measurements were taken at the time of drilling, therefore, measurements reflecting long term and seasonal fluctuations are not currently available.

5.0 GEOTECHNICAL CONSIDERATIONS

Based on the subsurface investigations carried out for this study, drilled shafts and driven piles foundation systems may be used for the proposed bridge structure. In addition, shallow foundation systems as well as drilled shafts and driven piles may be considered for the proposed retaining walls.

5.1 Drilled Shafts

Drilled shaft foundation systems may be used to support the bridge structure. The drilled shafts socketed into the bedrock can considered using techniques developed by local professional engineers. The final design and construction details of the drilled shafts should consider the following items:

(a) The construction of the drilled shafts should follow the guidelines specified in “CDOT Standard Specifications for Road and Bridge Construction (SSRBC).

(b) Drilled shafts should be embedded at least 12 feet into hard to very hard bedrock. The length should increase to at least 12 to 14 feet for firm to medium hard rocks. The depth of embedment would depend on the axial and lateral loads of the proposed structures on the drilled shafts.

(c) During construction of the drilled shafts, casing or slurry may be required to support the excavation where holes are unstable due to soil conditions and/or where groundwater exists.

(d) Prior to the placement of concrete, the excavation and the bottom of the hole should be cleaned of all loose material. Dewatering of excavations may be required if water is present. For wet conditions, concrete placement by “tremie” methods should be used.

(e) Drilled shafts should be designed to resist the uplift loading for materials with swell potentials, and/or downdrag for materials with high settlement potentials.

(f) Lateral load capacity of the drilled shafts may be evaluated using LPILE (or COM624) parameters.

(g) All piers should be reinforced full depth for the applied axial, lateral and uplift stresses imposed.

For drilled shaft foundation systems, the potential hazards of differential foundation movement should be considered in the design. The axial and lateral load capacities for drilled shafts should be used for analysis. Additional subsurface investigation should be conducted for detailed foundation design. Foundation design should be reviewed and construction should be inspected by professional engineers.

5.2 Driven Piles

Driven steel H-piles may be considered as an alternate foundation system for supporting the proposed structures. The design and construction details of the driven piles are presented below:

(a) The installation of driven steel H-piles should follow the guidelines specified in the SSRBC. Piles should be driven to virtual refusal, defined in the SSRBC.

(b) Battered piles may be used to resist the lateral loads.

(c) The piles may achieve the allowable load capacities for a pile length of 10 feet driven into the bedrock. Depending on the bedrock conditions, the actual length of the piles should be determined during final design and pile installation.

(d) Piles should be driven using the hammer driving criteria presented in SSRBC.

(e) For closely spaced piles, the axial and lateral capacities should be appropriately reduced. Group action of piles should be analyzed on an individual basis to assess the appropriate reduction.

(f) Predrilling may be required for difficult subsurface conditions. Pile tips should be protected against wear and tear using driving shoes for hard sedimentary bedrocks.

(g) Piles should be designed to resists the uplift loading during driving.

(h) Damage to property or exiting structures during pile installation due to noise and vibrations should be evaluated.

Additional subsurface investigation should be conducted for detailed foundation design. Foundation design should be reviewed and installation of piles should be observed by professional engineers.

5.3 Retaining Walls

Cantilever retaining walls or Mechanically Stabilized Earth (MSE) walls supported on shallow foundations may be used. The cantilever retaining walls may be fabricated either as pre-cast or cast-in-place. The foundations may be founded on compacted Class 1 structure backfill and/or native soils with negligible to low swell potential which are suitable for supporting retaining wall structures. As an alternative to cantilever retaining walls, MSE walls utilizing Class 1 structure backfill may be used. Construction of the spread footings utilizing Class 1 structure backfill or recompacted soils should meet the specifications provided in SSRBC

In excavations of unstable and unsuitable soil including soft and organic clays and loose sand, replacement with structure backfill is recommended. For shallow foundation systems, the potential hazards of frost action, drainage, and differential foundation movement should be considered in the design. Foundation design should be reviewed and construction should be inspected by professional engineers.

6.0 PAVEMENT INVESTIGATION

A pavement section is a layered structure designed to transfer normal stresses to the underlying soil. Pavement design involves the determination of the most cost-effective combination of pavement type and thickness for a roadway, which will be structurally and functionally adequate during the design life of the pavement.

Performance of a pavement system is related to the physical properties of the subgrade materials and traffic loading. In pavement design, R-Value and CBR tests are used for subgrade materials. Fourteen (14) R-Value tests and three (3) CBR tests have been conducted at various locations on samples obtained from the boreholes at the approximate depth of 4 to 9 feet below top of the pavement elevation. The results of these tests are included in Appendix B. The following table summarizes the test results.

Table 4. R-Value and CBR Test Results

Sample Location	R-Value	CBR
SB-2	60	8.1
SB-3	28	-
SB-5	<5	-
SB-6	15	-
SB-8	26	-
SB-9	66	10.5
SB-11	<5	5.5
B-1	<5	-
B-3	2	-
B-4	<5	-
B-16	70	-
B-17	14	-
B-19	9	-
B-20	59	-

Additional testing should be conducted during the final design to obtain appropriate parameters for pavement design.

7.0 CONSTRUCTION RECOMMENDATIONS

Proper construction practices should be followed during earthwork, excavation, site preparation, material placement, and embankment construction for the long term excellent performance of the project, in accordance with SSRBC. Excavation support should be provided to maintain onsite safety and the stability of excavations and slopes. The support should be in accordance with the local, state and federal regulations including OSHA guidelines.

The subsurface conditions may vary from the information obtained during the subsurface investigations. Additional subsurface investigation should be conducted for detailed construction recommendations. Excavation, below groundwater construction, drainage, and swell potential of material should be evaluated prior to detailed design and during construction. Design and construction plans should be reviewed and onsite construction should be observed and inspected by the professional engineers.

8.0 LIMITATIONS

The preliminary geotechnical investigation was conducted and compiled according to the scope of work for the exclusive use of the Colorado Department of Transportation and their representatives for specific use on 120th Avenue Connection over US 36 Project. The recommendations contained in this report comply with current geotechnical practices in the Denver and local area with similar soil and bedrock conditions and our understating of the proposed study. Additional requirements specified by various state and city codes, and other agencies related to the project should be considered and implemented, if necessary.

This report is based on the results obtained from our exploratory borings at specific locations and to the depth specified and does not take into account the variation in the subsurface conditions away from the borings. If variations in the subsurface conditions from those described in the report is discovered, then the recommendations contained in this report must be re-evaluated. Additional investigation is required to address such variation. If during construction, fill, soil, rock or water conditions appear to be different from those described herein, this office should be advised at once so that the reevaluation of the recommendations may be made. We recommend on-site observation of excavations and foundation bearing strata by a representative of the geotechnical engineer.

9.0 REFERENCES

Colorado Division of Minerals and Geology, Mine Permit Reports, <http://mining.state.co.us>.

Colorado Oil and Gas Conservation Commission, Colorado Oil and Gas Information System, <http://oil-gas.state.co.us/>.

Hart, S.S., 1974, Potentially swelling soil and rock in the Front Range urban corridor, Colorado. Colorado Geological Survey, Environmental Geology 7, 23p, map sheets 1 (Boulder-Fort Collins-Greeley area) and 2 (greater Denver area), scale 1:100,000.

Hillier, D.E., P.A. Schneider Jr., and E.C. Hutchinson, 1983, Depth to the Water Table (1976-1977) in the Greater Denver Area, Front Range Urban Corridor, Colorado. U.S. Geological Survey Miscellaneous Investigations Map I-856-K, scale 1:100,000.

Lindvall, R.M., 1979, Geologic map of the Arvada Quadrangle, Adams, Denver, and Jefferson Counties, Colorado. U.S. Geological Survey Geologic Quadrangle Map GQ-1453, scale 1:24,000.

Machette, M.N., 1977, Geologic map of the Lafayette Quadrangle, Adams, Boulder, and Jefferson Counties, Colorado. U.S. Geological Survey Geologic Quadrangle Map GQ-1392, scale 1:24,000.

Price, A.B., and A.E. Amen, 1980, Soil survey of Golden area, Colorado, parts of Denver, Douglas, Jefferson, and Park Counties. U.S. Department of Agriculture, Soil Conservation Service, 405 p; Sheet No. 4 (Arvada Quadrangle), scale 1:24,000.

Roberts, S.B., J.L. Hynes, and C.L. Woodward, 2001, Maps showing the extent of mining, locations of mine shafts, adits, air shafts, and bedrock faults, and thickness of overburden

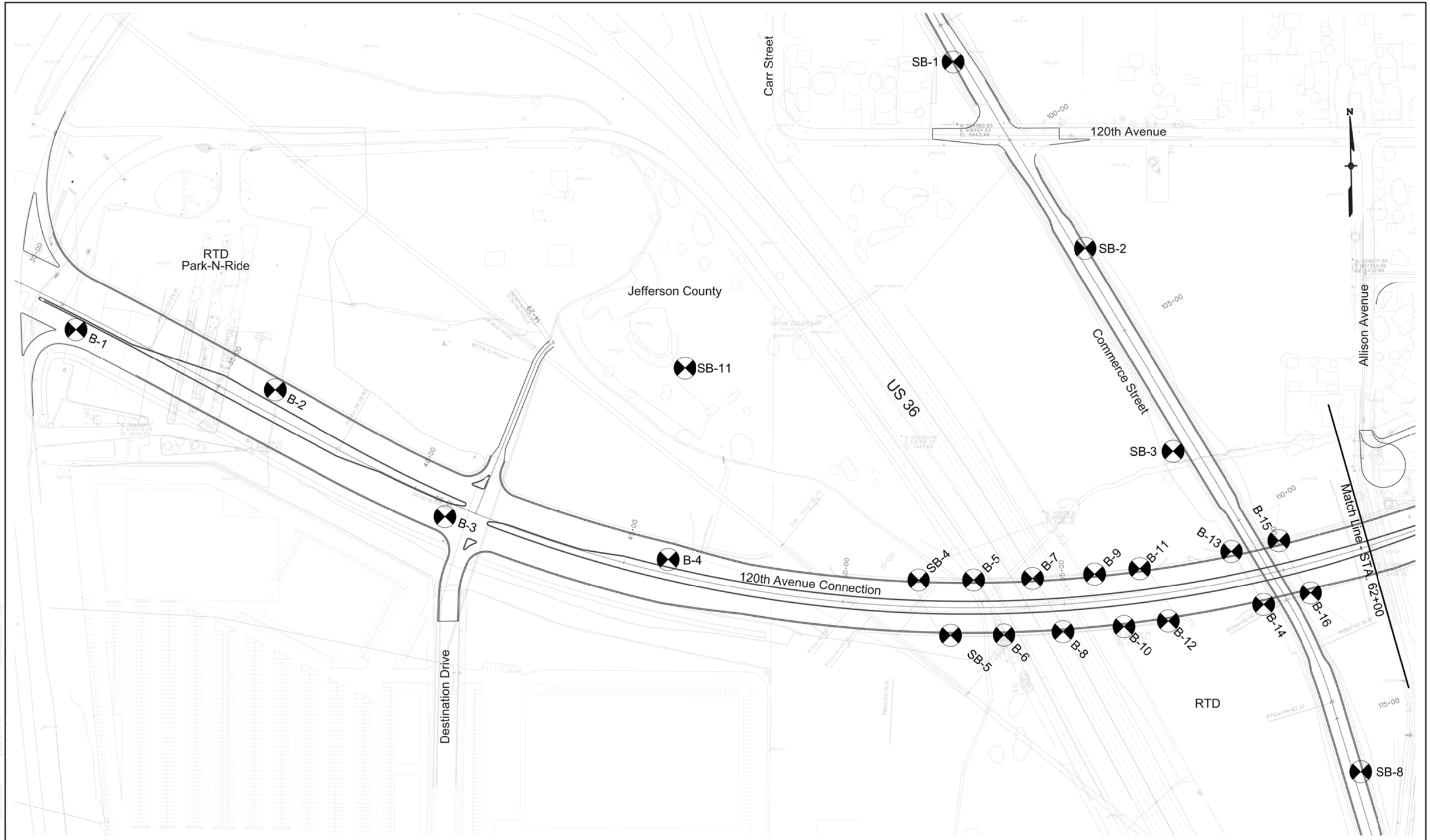
above abandoned coal mines in the Boulder-Weld coal field, Boulder, Weld, and Adams Counties, Colorado. U.S. Geological Survey Geologic Investigations Series I-2735, Version 1.0, scale 1:48,000.

Trimble, D.E., and H.R. Fitch, 1974, Map showing potential gravel sources and crushed-rock aggregate in the greater Denver area, Front Range urban corridor, Colorado. U.S. Geological Survey Miscellaneous Investigations Map I-856-A, scale 1:100,000.

U.S. Geological Survey, 1965, revised 1994, Lafayette Quadrangle, Colorado, 7.5 minute series topographic map. Scale 1;24,000.

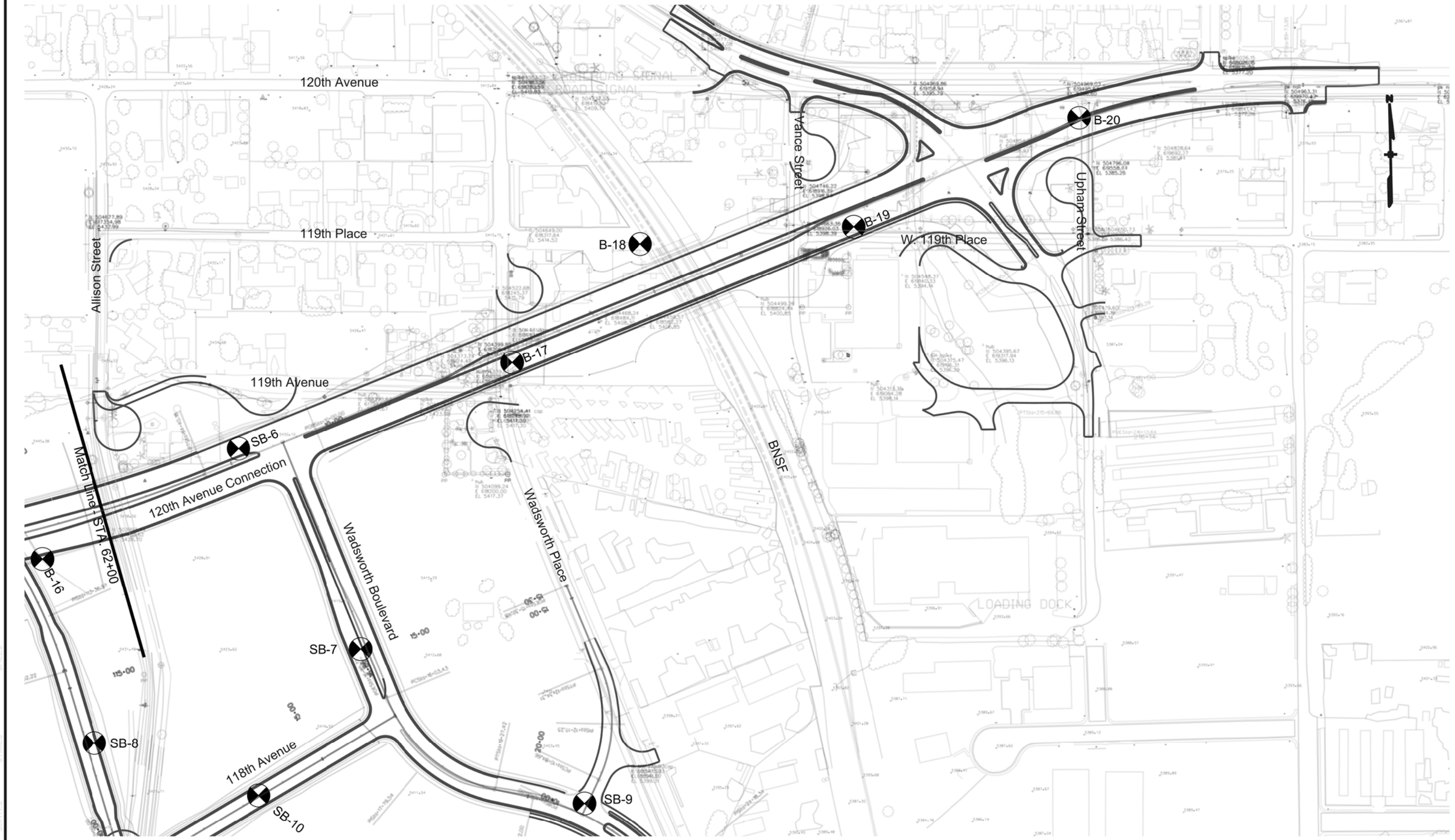
U.S. Geological Survey Earthquake Hazards Program website, <http://eqint.cr.usgs.gov/eqprob/2002/index.php>.

MAPS AND SITE PLAN SHEETS



DESIGNED BY: R.Smith DATE:	RockSol Consulting Group, Inc.	DRAWING SCALE: 1" = 200'	FIGURE 1 BORING LOCATION PLAN
DRAWN BY: D. Knight DATE: 10/10/08	6510 West 91st Avenue Suite 130 Westminster, CO 80031 303-962-9300	0 200 400 Scale: (Feet)	**120th Avenue Connection - US 36 Broomfield, CO**
CHECKED BY: DATE:			REFERENCE NUMBER: RS-196.02
APPROVED BY: DATE:			SHEET 1 OF 2

347089 120th&US36 1.dgn 10/27/2008 2:05:19 PM USER: dknight US Survey Foot



DESIGNED BY: R.Smith	DATE:		
DRAWN BY: D. Knight	DATE: 10/10/08		
CHECKED BY:	DATE:		
APPROVED BY:	DATE:		

RockSol Consulting Group, Inc.

6510 West 91st Avenue
Suite 130
Westminster, CO 80031
303-962-9300

DRAWING SCALE: 1" = 200'

0 200 400

Scale: (Feet)

FIGURE 1
BORING LOCATION PLAN

120th Avenue Connection - US 36

Broomfield, CO

REFERENCE NUMBER: RS-196.02

SHEET 2 OF 2

347089

US Survey Foot

APPENDIX A: BORING LOGS

RockSol Consulting Group, Inc.

BORING : B-01

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.01
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/01/07 **COMPLETED** 11/01/07
GROUND ELEVATION 5532.053 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: RTD Park N Ride lot - west side
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 11/1/2007
NOTES STA: 31+65.17 Offset (ft): 33.7836
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5532	0		(Pavement) ASPHALT										
			(Fill) SUBGRADE FILL - gravelly, sandy clay/clayey sand with pebbles and occas. cobbles, slightly moist to very moist, with dissem. fine grain calcareous material, very stiff, mottled - orangish brown, red, gray; mod. to high plasticity, slightly weathered, occas. very sandy, with native material mixed in	MC 1		17/12							
5527	5			MC 2		19/12		110	14	46	19	27	49
			(Native) slightly sandy, slightly silty CLAY, fat, well sorted, homogenous, brown to dark brown, orangish brown - mottled where weathered (slightly) , slightly moist, hard, fracturing - blocky, with calcareous material - dissem. and fine grain, subtle structure visible - approaching bedrock, with occas. coaly flecks below 15'										
5522	10			MC 3		12/12							
5517	15			MC 4		41/12		109	19	55	20	35	91
			(Bedrock) silty CLAYSTONE, homogenous, gray to dark gray, slightly moist, massive structure, fat - high plast. - mod. to low where silty/sandy, slightly fractured - blocky (sub-planar), weathered along fracs - orangish brown staining, very hard										
5512	20			MC 5		50/6							
			Bottom of hole at 20.5 feet.										

RockSol Consulting Group, Inc.

BORING : B-02

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.01
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/01/07 **COMPLETED** 11/01/07
GROUND ELEVATION 5534.655 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: RTD Park N Ride lot - east side
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 11/1/2007
NOTES STA: 36+01.68 Offset (ft): -48.8164
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5535	0		(Pavement) ASPHALT										
			(Fill) SUBGRADE FILL - sandy, gravelly clay with pebbles and occas. cobbles, slightly moist to very moist, very stiff, mottled - orangish brown, red, gray; mod. to high plasticity, slightly weathered	MC 1		17/12							
5530	5			MC 2		14/12		101	22	51	19	32	58
5525	10			MC 3		21/12							
			(Native) slightly silty CLAY, fat, well sorted, homogenous, brown to dark brown, orangish brown - mottled where weathered (slightly) , slightly moist, hard, fracturing - blocky, with calcareous material - dissem. and fine grain, subtle structure visible - approaching bedrock										
5520	15			MC 4		43/12		112	18	55	19	36	97
5515	20		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm) and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. moist, very hard, occas. with coaly material (rectangular flecks), moderate to high plasticity - low where silt/sand lenses	MC 5		50/11		107	21	41	15	26	100
5510	25			MC 6		50/8							
			Bottom of hole at 25.7 feet.										

RockSol Consulting Group, Inc.

BORING : B-03

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.01
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/01/07 **COMPLETED** 11/01/07
GROUND ELEVATION 5508.229 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: field e. of RTD Park N Ride
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 11/1/2007
NOTES STA: 40+86.37 Offset (ft): 32.5668
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5508	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. moist, very hard, occas. with coaly material (rectangular flecks), moderate to high plasticity - low where silt/sand lenses, 1-2' sand/silt lenses @ 5' and 9', occas. gypsum crystallization (small lenses, < 1")	MC 1		50/7							
5503	5			MC 2		50/8		105	16	70	19	51	98
5498	10			MC 3		50/6							
5493	15			MC 4		50/6		100	10	51	16	35	90
5488	20			MC 5		50/5							
			Bottom of hole at 20.4 feet.										

RockSol Consulting Group, Inc.

BORING : B-04

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.01
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/01/07 **COMPLETED** 11/01/07
GROUND ELEVATION 5496.339 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: field e. of RTD Park N Ride
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 11/1/2007
NOTES STA: 45+95.05 Offset (ft): -31.0469
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5496	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Native) slightly silty CLAY, fat, well sorted, homogenous, brown to light brown, light brown to yellowish brown (deeper), moist to slightly moist, hard to very hard, fracturing - blocky, with calcareous material - dissem. and fine grain	MC 1		50/12							
5491	5			MC 2		40/12		108	11	46	17	29	92
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. moist, very hard, occas. with coaly material (rectangular flecks), moderate to high plasticity - low where silt/sand lenses									
5486	10			MC 3		50/8		110	11	43	16	27	90
5481	15			MC 4		50/7							
5476	20			MC 5		50/6		109	18	58	22	36	99
			Bottom of hole at 20.5 feet.										

RockSol Consulting Group, Inc.

BORING : B-05

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.01
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/30/07 **COMPLETED** 10/30/07
GROUND ELEVATION 5478.698 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: US36 front. rd. @ mp 48.4
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 10/30/2007
NOTES STA: 52+96.45 Offset (ft): -62.728
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5479	0		(Fill) SUBGRADE FILL - gravelly clay with pebbles and occas. cobbles, slightly moist to moist, with dissem. fine grain calcareous material, stiff	MC 1		12/12							
5474	5		(Native) slightly silty, sandy CLAY, fat, well sorted, homogenous, brown to light brown, gray to dark gray (deeper), moist to slightly moist, very stiff to hard, fracturing - blocky, with calcareous material - dissem. and fine grain, with occas. fleck of carbonaceous material (coaly flecks), weathered below 8' - approaching bedrock	MC 2		22/12		110	18	49	16	33	83
5469	10			MC 3		45/12		114	15	47	16	31	96
5464	15		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. dry, very hard, occas. with coaly material (below 25'), with dissem. fine grain biotite', gypsum crystallization veins (2-4cm) @ 40', occas. fossilized organic material below 25' (sticks @ 45'), interbedded sandstone below 63'	MC 4		50/7		109	15	49	17	32	97
5459	20			MC 5		50/5							
5454	25			MC 6		50/4		115	13	42	18	24	96
5449	30			MC 7		50/6							
5444	35												

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-05

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.01 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5444	35												
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. dry, very hard, occas. with coaly material (below 25'), with dissem. fine grain biotite', gypsum crystallization veins (2-4cm) @ 40', occas. fossilized organic material below 25' (sticks @ 45'), interbedded sandstone below 63' *(continued)*	MC 8		50/6							
5439	40			MC 9		50/7							
5434	45			MC 10		50/8							
5429	50			MC 11		50/3		117	14	53	19	34	95
5424	55			MC 12		50/4							
5419	60			MC 13		50/4							
5414	65		Bottom of hole at 65.1 feet.	MC 14		50/1							

RockSol Consulting Group, Inc.

BORING : B-06

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.01
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/30/07 **COMPLETED** 10/30/07
GROUND ELEVATION 5474.339 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: US36 front. rd. @ mp 48.5
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 44.0 ft on 10/30/2007
NOTES STA: 53+63.69 Offset (ft): 61.8173
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5474	0		(Fill) SUBGRADE FILL - gravelly clay with pebbles and occas. cobbles (next to frontage road)										
			(Native) slightly silty CLAY, fat, well sorted, homogenous, dark brown, gray to dark gray, moist to very moist, stiff to hard, fracturing - blocky, with roots @ 2', weathered below 4'	MC 1		15/12							
5469	5			MC 2		35/12		111	19	55	23	32	94
5464	10		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. dry, very hard, occas. with coaly material, with dissem. fine grain biotite', very silty/sandy @ 25', top 4.5' is siltstone - lightly cemented	MC 3		50/7		107	14	29	21	8	73
5459	15			MC 4		50/9		97	17	57	22	35	99
5454	20			MC 5		50/4							
5449	25			MC 6		50/2			12	24	22	2	46
5444	30			MC 7		50/3							
5439	35												

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-06

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.01 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5439	35												
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. dry, very hard, occas. with coaly material, with dissem. fine grain biotite', very silty/sandy @ 25', top 4.5' is siltstone - lightly cemented *(continued)*	MC 8		50/3							
5434	40			MC 9		50/6							
5429	45			MC 10		50/6							
5424	50			MC 11		50/6		113	16	54	23	31	99
5419	55			MC 12		50/6							
5414	60			MC 13		50/6							
5409	65		Bottom of hole at 65.0 feet.	MC 14		50/.5							

BORING : B-07

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/30/07 **COMPLETED** 10/30/07
GROUND ELEVATION not given **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: US36 EB median @ mp 48.4
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 10/30/2007
NOTES Station & offset data not given
WATER DEPTH --- on

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(Pavement) ASPHALT - 6"										
		(Fill) ROADBASE (6-8" thick) underlain by SUBGRADE FILL: gravelly sand with pebbles, black to dark brown, slightly moist										
		(Native) slightly silty CLAY, fat, well sorted, homogenous, dark brown, gray to dark gray, slightly moist to moist, hard, fracturing - blocky, subtle structure visible - approaching bedrock	MC 1		15/12							
5			MC 2		34/12		109	19	49	22	27	89
10		(Bedrock) very silty SANDSTONE with some clay - occas. very clayey, well to very well sorted (predom. fine sand to silt) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered (along horizontal bedding planes), very dense	MC 3		0/12		106	10	24	22	2	43
			MC 4		50/5							
15			MC 5		50/5		97	9	21	18	3	58
20		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. dry, very hard, occas. with coaly material, with dissem. fine grain biotite, fossilized stems/sticks @ 25'	MC 6		50/10		114	15	35	15	20	82
25			MC 7		50/5							
30			MC 8		50/6		110	18	68	28	40	98
35												

DIA WITHOUT ELEVATION 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-07

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist - occas. dry, very hard, occas. with coaly material, with dissem. fine grain biotite, fossilized stems/sticks @ 25' *(continued)*	MC 9		50/3							
40			MC 10		50/4							
45			MC 11		50/3							
50			MC 12		50/3							
55			MC 13		50/3			11	31	15	16	71
60		Bottom of hole at 60.3 feet.	MC 14		50/4							

RockSol Consulting Group, Inc.

BORING : B-08

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/31/07 **COMPLETED** 10/31/07
GROUND ELEVATION not given **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: US36 EB median @ mp 48.5
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 10/31/2007
NOTES Station & offset data not given
WATER DEPTH --- on

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(Pavement) ASPHALT - 4"										
		(Fill) ROADBASE										
		(Native) slightly silty CLAY, fat, well sorted, homogenous, dark brown, gray to dark gray, slightly moist, hard, fracturing - blocky, subtle structure visible - approaching bedrock	MC 1		37/12		117	14	42	18	24	95
5		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, with dissem. fine grain biotite, interbedded sandstone @ 20'	MC 2		50/11		109	19	56	22	34	90
10			MC 3		50/6							
15			MC 4		50/5		111	16	59	22	37	94
20			MC 5		50/5							
25			MC 6		50/5		118	13	42	18	24	91
30			MC 7		50/5							
35												

(Continued Next Page)

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS LIQUID LIMIT	ATTERBERG LIMITS PLASTIC LIMIT	ATTERBERG LIMITS PLASTICITY INDEX	FINES CONTENT (%)
35		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, with dissem. fine grain biotite, interbedded sandstone @ 20' *(continued)*	MC 8		50/4							
40			MC 9		50/3							
45			MC 10		50/5							
50			MC 11		50/2		110	11	67	16	51	95
55												
60			MC 12		50/2							
65		Bottom of hole at 65.0 feet.										

RockSol Consulting Group, Inc.

BORING : B-09

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/02/07 **COMPLETED** 11/02/07
GROUND ELEVATION 5459.189 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 63.0 ft on 11-2-07
NOTES STA: 55+69.63 Offset (ft): -73.4262
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5459	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Native) slightly silty CLAY, fat, well sorted, homogenous, with fine grain dissem. calcareous precipitates (altered clay minerals), brown to light brown (lighter colored where altered), slightly moist to dry, very hard, fracturing - blocky	MC 1		49/12							
5454	5			MC 2		38/12		101	9	46	18	28	95
5449	10		(Bedrock) slightly silty CLAYSTONE, fat, well sorted, homogenous, with fine grain dissem. calcareous precipitates (altered clay minerals and claystone fragments), brown to light brown (lighter colored where altered), slightly moist, very hard	MC 3		50/2		100	7	35	13	22	76
5444	15		(Bedrock) slightly silty SANDSTONE with some clay - occas. very clayey and very silty, well to very well sorted (predom. fine sand to silt) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered (along horizontal bedding planes), very dense	MC 4		50/2		93	7	21	15	6	47
5439	20			MC 5		50/4							
5434	25			MC 6		50/4			5	19	16	3	30
				SS 7		50/2							
5429	30			MC 8		50/4							
5424	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-09

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5424	35		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, interbedded sandstone @ 53-63' *(continued)*	MC 9		50/3		116	13	50	18	32	89
5419	40			MC 10		50/6							
5414	45			MC 11		50/3							
5409	50			MC 12		50/4		110	11	53	15	38	89
5404	55			MC 13		50/1							
5399	60		Bottom of hole at 63.0 feet.	MC 14		50/1							

RockSol Consulting Group, Inc.

BORING : B-10

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/02/07 **COMPLETED** 11/02/07
GROUND ELEVATION 5453.572 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 11/2/2007
NOTES STA: 56+19.41 Offset (ft): 52.9327
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5454	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Bedrock) slightly silty CLAYSTONE, fat, well sorted, homogenous, with fine grain dissem. calcareous precipitates (altered clay minerals and claystone fragments), brown to light brown (lighter colored where altered), slightly moist, very hard	MC 1		50/11							
5449	5			MC 2		50/8		115	8	38	17	21	74
5444	10												
			(Bedrock) slightly silty SANDSTONE with some clay - occas. very clayey and very silty, well to very well sorted (predom. fine sand to silt) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered (along horizontal bedding planes), very dense	MC 3		50/3							
5439	15			MC 4		50/3		96	5	20	15	5	42
5434	20			MC 5		50/3							
5429	25			MC 6		50/2		111	4	NP	NP	NP	19
5424	30			MC 7		50/5							
5419	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-10

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5419	35												
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, interbedded sandstone @ 40', 43', 50', 55' *(continued)*	MC 8		50/5		109	18	63	26	37	99
5414	40			MC 9		50/3							
5409	45			MC 10		50/3		108	11	47	17	30	96
5404	50			MC 11		50/1							
5399	55			MC 12		50/0							
5394	60			MC 13		50/4							
			Bottom of hole at 60.3 feet.										

RockSol Consulting Group, Inc.

BORING : B-11

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/03/07 **COMPLETED** 11/03/07
GROUND ELEVATION 5454.32 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 34.0 ft on 11-3-07
NOTES STA: 56+75.21 Offset (ft): -75.1762
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5454	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Native) slightly silty CLAY, fat, well sorted, homogenous, with fine grain dissem. calcareous precipitates (altered clay minerals), brown to light brown (lighter colored where altered), slightly moist, very hard	MC 1		50/10			9	38	20	18	87
5449	5		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, interbedded sandstone @ 9-11.5', 24-27', 34-36', 48-52'	MC 2		50/2			6	27	16	11	63
5444	10												
5439	15			MC 3		50/10		108	13	36	15	21	90
5434	20			MC 4		50/1							
5429	25			MC 5		50/3		113	3	NP	NP	NP	15
5424	30			MC 6		50/6		115	16	49	20	29	99
5419	35												

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-11

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5419	35												
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, interbedded sandstone @ 9-11.5', 24-27', 34-36', 48-52' *(continued)*	MC 7		50/5							
5414	40			MC 8		50/10		106	21	70	23	47	100
5409	45			MC 9		50/3							
5404	50			MC 10		50/1							
5399	55												
5394	60												
			Bottom of hole at 60.1 feet.	MC 11		50/1							

RockSol Consulting Group, Inc.

BORING : B-12

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/02/07 **COMPLETED** 11/02/07
GROUND ELEVATION 5448.164 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 53.0 ft on 11-2-07
NOTES STA: 57+19.70 Offset (ft): 52.3571
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5448	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Bedrock) slightly silty CLAYSTONE, fat, well sorted, homogenous, with fine grain dissem. calcareous precipitates (altered clay minerals), brown to light brown (lighter colored where altered), slightly moist, very hard	MC 1		50/10		106	13	54	20	34	82
5443	5		(Bedrock) slightly silty SANDSTONE, well to very well sorted (predom. fine sand to silt) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense	MC 2		50/8			9	NP	NP	NP	75
5438	10			MC 3		50/3			3	NP	NP	NP	37
5433	15			MC 4		50/1							
5428	20			MC 5		50/0							
5423	25												
			(Bedrock) CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, occas. dark gray to black, plasticity decreasing below 43', claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, interbedded and cemented sandstone from 45' to 58'	MC 6		50/6							
5418	30			MC 7		50/5		98	30	61	21	40	93
5413	35												

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-12

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5413	35		(Bedrock) CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, occas. dark gray to black, plasticity decreasing below 43', claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material, interbedded and cemented sandstone from 45' to 58' *(continued)*	MC 8		50/5							
5408	40			MC 9		50/5							
5403	45			MC 10		50/3		106	18	72	26	46	99
5398	50			MC 11		50/0							
5393	55			MC 12		50/2							
5388	60		Bottom of hole at 60.3 feet.	MC 13		50/4							

RockSol Consulting Group, Inc.

BORING : B-13

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/03/07 **COMPLETED** 11/03/07
GROUND ELEVATION 5446.292 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 45.0 ft on 11-3-07
NOTES STA: 58+94.38 Offset (ft): -80.8344
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5446	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Native) silty, very sandy CLAY (sand/silt content decreasing with depth - predom. clay below 5'), moderate to low plasticity (increasing with depth), homogenous, slightly moist to dry, brown to light brown - occas. dark brown; hard to very hard, with occas. coaly material (flecks) @ 5', subtle structure - submassive - with block fracs. - weathered along fracs	MC 1		50/11							
5441	5			MC 2		45/12		113	11	42	16	26	77
			(Bedrock) slightly silty SANDSTONE, well to very well sorted (predom. fine sand to silt) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense, clay grading in with depth below 23', occas. flecks of coaly material, with claystone fragments below 23'										
5436	10			MC 3		50/2			3	NP	NP	NP	29
5431	15			MC 4		50/.5							
5426	20			MC 5		50/4		116	11	25	15	10	39
5421	25			MC 6		50/4							
5416	30		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material	MC 8		50/4		118	12	48	18	30	96
5411	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-13

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5411	35												
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, light brown to brown, gray to dark gray, claystone structure is massive with blocky fracturing, slightly moist, very hard, occas. with coaly material *(continued)*	MC 9		50/4							
5406	40			MC 10		50/4		104	13	57	21	36	98
5401	45												
5396	50			MC 11		50/1							
5391	55												
5386	60												
			Bottom of hole at 60.0 feet.	MC 12		50/0							

RockSol Consulting Group, Inc.

BORING : B-14

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/03/07 **COMPLETED** 11/03/07
GROUND ELEVATION 5442.102 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 58.0 ft on 11-3-07
NOTES STA: 59+36.37 Offset (ft): 52.6496
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5442	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Native) slightly clayey, very silty SAND, very well sorted - predominantly fine sand to silt, slightly moist - occas. dry, brown to light brown, dense, with roots, with calcareous precipitates (dissem., fine grain)	MC 1		50/12		97	6	27	15	12	45
5437	5		(Bedrock) slightly silty SANDSTONE, well to very well sorted (predom. fine sand to silt) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense	MC 2		50/1		89	5	NP	NP	NP	39
5432	10			MC 3		50/2							
5427	15			MC 4		50/2			6	NP	NP	NP	16
5422	20		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, slightly moist to dry, very hard, with occas. carbonaceous fragments (coaly material), fewer laminations and thinly bedded layers with depth - massive structure	MC 5		50/9		96	19	57	22	35	97
5417	25			MC 6		50/4							
5412	30			MC 7		50/6		109	20	55	26	29	99
5407	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5407	35												
			(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, occas. bluish gray, slightly moist to dry, very hard, with occas. carbonaceous fragments (coaly material), fewer laminations and thinly bedded layers with depth - massive structure *(continued)*										
5402	40			MC 8		50/6							
5397	45												
5392	50			MC 9		50/2		100	10	25	15	10	54
5387	55												
5382	60			MC 10		50/1							
			Bottom of hole at 60.1 feet.										

BORING : B-15

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/03/07 **COMPLETED** 11/03/07
GROUND ELEVATION 5443.645 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 30.0 ft on 11-3-07
NOTES STA: 60+08.23 Offset (ft): -82.2278
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5444	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material (roots, grass)										
			(Native) silty SAND, very well sorted - predominantly fine sand to silt, slightly clayey in top 1', slightly moist to dry, tan to light brown, intermittantly weathered - w/ orangish brown staining, dense to very dense, with roots	MC 1		50/10							
5439	5		(Bedrock) slightly silty SANDSTONE, well to very well sorted (predom. fine to medium grain sand) - rounded, thinly bedded - laminated, moderate cementation - occas. heavy, slightly moist to moist (occas. dry), tan to light brown, occas. slight weathering along bedding planes - orangish brown staining where weathered, very dense, lense of coaly material @ 20'	MC 2		50/2			21	NP	NP	NP	20
5434	10			MC 3		50/11							
5429	15		(Bedrock) sandy, silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm), with occas. thickness exceeding 2' and occas. sand lenses, massive structure, fat, fractured - blocky, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, moist to slightly moist, very hard, very sandy @ 15', fossilized organic material (stems) @ 30' - also with coaly material and carbon staining	MC 4		50/12		99	11	25	16	9	48
5424	20			MC 5		50/8							
5419	25			MC 6		50/6		113	16	47	17	30	97
5414	30		▼	MC 7		50/6		108	20	58	21	37	100
5409	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-15

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5409	35		(Bedrock) sandy, silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm), with occas. thickness exceeding 2' and occas. sand lenses, massive structure, fat, fractured - blocky, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, moist to slightly moist, very hard, very sandy @ 15', fossilized organic material (stems) @ 30' - also with coaly material and carbon staining *(continued)*										
5404	40			MC 8		50/2							
5399	45												
			Bottom of hole at 49.0 feet.	MC 9		50/0							

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

RockSol Consulting Group, Inc.

BORING : B-16

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 11/01/07 **COMPLETED** 11/01/07
GROUND ELEVATION 5438.981 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: (RTD prop) field e. of US36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 11/1/2007
NOTES STA: 60+45.18 Offset (ft): 51.1195
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5439	0		(Native) TOPSOIL - sandy silt, slightly clayey, with organic material (roots, grass)										
			(Native) silty SAND, very well sorted - predominantly fine sand to silt, slightly moist to dry, tan to light brown, intermittantly weathered - w/ orangish brown staining, medium dense to dense, with occas. roots	MC 1		30/12		94	4	NP	NP	NP	27
5434	5		(Bedrock) slightly silty SANDSTONE, well to very well sorted (predom. fine to medium grain sand) - rounded, moderate cementation - occas. heavy, slightly moist to dry, tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense	MC 2		50/4							
5429	10			MC 3		50/0							
5424	15			MC 4		50/5							
5419	20			MC 5		50/5		111	10	28	14	14	60
5414	25		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining,slightly moist to dry, very hard, with occas. carbonaceous fragments (coaly material)	MC 6		50/5							
5409	30			MC 8		50/5							
5404	35												

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : B-16

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5404	35		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm, with occas. thickness exceeding 2') and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining,slightly moist to dry, very hard, with occas. carbonaceous fragments (coaly material) *(continued)*	MC 9		50/5		106	14	58	19	39	76
5399	40			MC 10		50/3							
5394	45			MC 11		50/2			8	30	11	19	57
5389	50			MC 12		50/0							
5384	55			MC 13		50/2				23	15	8	46
5379	60			SS 14		50/2							
			Bottom of hole at 60.0 feet.	MC 15		50/1							

RockSol Consulting Group, Inc.

BORING : B-17

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/29/07 **COMPLETED** 10/29/07
GROUND ELEVATION 5416.024 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: 119th Ave & Wadsworth Blvd
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 10/29/2007
NOTES STA: 71+53.40 Offset (ft): 26.5275
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5416	0		(Pavement) ASPHALT - 5"										
			(Fill) ROADBASE (6-12" thick) underlain by SUBGRADE FILL: gravelly sand with pebbles, black to dark brown, slightly moist	MC 1		19/12							
5411	5		(Native) silty SAND, occas. slightly clayey, very well sorted - predominantly fine to medium grain sand, slightly moist, tan to light brown, intermittantly weathered - w/ orangish brown staining, with occas. claystone fragment (1-3cm, gray, very fat, homogenous), loose to medium dense	MC 2		7/12		102	11	NP	NP	NP	36
5406	10			MC 3		26/12		106	8	NP	NP	NP	29
5401	15		(Bedrock) silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm) and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining,slightly moist to dry, very hard, with occas. carbonaceous fragments (coaly material)	MC 4		50/7		116	15	46	15	31	77
5396	20			MC 5		50/6							
			Bottom of hole at 20.5 feet.										

RockSol Consulting Group, Inc.

BORING : B-18

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/29/07 **COMPLETED** 10/29/07
GROUND ELEVATION 5409.367 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: W 119th Pl & Wadsworth Blvd
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 14.0 ft on 10-29-07
NOTES STA: 75+09.78 Offset (ft): -108.3656
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5409	0		(Fill) ROADBASE (dirt road - commercial/indust. area) - gravelly sand with pebbles and occas. cobbles										
			(Native) slightly silty, sandy CLAY (sand/silt content increasing with depth - very sandy below 5'), moderate to low plasticity (decreasing with depth), homogenous, well to very well sorted, slightly moist to moist, brown to dark brown, light brown; stiff to very stiff, black & carbonaceous material @ 1-2', roots @ 5', dissem. calcareous materail (fine grain) @ 5'	MC 1		20/12							
5404	5			MC 2		15/12		110	14	40	16	24	77
			(Bedrock) slightly silty SANDSTONE, well to very well sorted (predom. fine to medium grain sand) - rounded, light cementation - occas. lenses of mod. to heavy, slightly moist to very moist (saturated @ 15'), tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense										
5399	10			MC 3		50/9		99	9	NP	NP	NP	14
5394	15			MC 4		50/3							
5389	20		(Bedrock) sandy, silty CLAYSTONE with interbedded silt/sandstone (intermittant and varying in thickness - moderate to light cementation, occas. heavy) and with silt/sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath. - @ 45') - with orangish brown staining, slightly moist, low plasticity, very hard, sandstone @ 33-38' & with increasing sand/silt content in claystone above/below	MC 5		50/6		107	13	44	17	27	84
5384	25			MC 6		50/5							
5379	30			MC 7		50/2		104	15	28	20	8	77
5374	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5374	35		(Bedrock) sandy, silty CLAYSTONE with interbedded silt/sandstone (intermittant and varying in thickness - moderate to light cementation, occas. heavy) and with silt/sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath. - @ 45') - with orangish brown staining, slightly moist, low plasticity, very hard, sandstone @ 33-38' & with increasing sand/silt content in claystone above/below *(continued)*	MC 8		50/3							
5369	40			MC 9		50/3		106	19	39	15	24	20
5364	45			MC 10		50/4							
				SS 11		50/5							
5359	50		Bottom of hole at 50.1 feet.	MC 12		50/1							

BORING : B-19

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/29/07 **COMPLETED** 10/29/07
GROUND ELEVATION 5395.148 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: W 119th Pl & Vance St
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 14.0 ft on 10-29-07
NOTES STA: 79+56.48 Offset (ft): 32.3772
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5395	0		(Fill) SUBGRADE FILL - gravelly sand with pebbles and occas. cobbles										
			(Topsoil from 0-6" - sandy clay with organic material - roots, grass)	MC 1		31/12							
5390	5		(Native) slightly silty, sandy CLAY (sand/silt content increasing with depth - very sandy below 5'), moderate to low plasticity (decreasing with depth), homogenous, well to very well sorted, slightly moist to moist, brown to dark brown, light brown; very stiff, with tiny burrows (< 1mm) and roots @ 5', occas. calcareous precip. - fine grain	MC 2		25/12		88	10	33	16	17	57
5385	10		(Bedrock) slightly silty SANDSTONE with claystone fragments (1-3cm, gray, very fat, homogenous), well to very well sorted (predom. fine to medium grain sand) - rounded, light cementation, slightly moist to moist, tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense	MC 3		50/6		93	8	NP	NP	NP	32
5380	15			MC 4		50/3							
				SS 5		50/3							
5375	20		(Bedrock) sandy, silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm) and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, moist to slightly moist, very hard, with occas. carbonaceous flecks (fine grain)	MC 6		50/6		120	13	53	16	37	51
5370	25			MC 7		50/2							
				SS 8		50/2							
5365	30			MC 9		50/3		116	16	34	12	22	67
5360	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5360	35		(Bedrock) sandy, silty CLAYSTONE with interbedded silt/sandstone (intermittant and thinly bedded - .25 to 2 cm) and occas. sand lenses, weathered along bedding planes (horiz.) (consistent - occas. very weath.) - with orangish brown staining, moist to slightly moist, very hard, with occas. carbonaceous flecks (fine grain) *(continued)*	MC 10		50/2							
				SS 11		50/1							
5355	40			MC 12		50/3		107	20	39	15	24	85
5350	45			MC 13		50/2							
5345	50			MC 14		50/3							
			Bottom of hole at 50.3 feet.										

RockSol Consulting Group, Inc.

BORING : B-20

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 10/29/07 **COMPLETED** 10/29/07
GROUND ELEVATION 5384.864 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: W 120th St & Upham St
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH 13.0 ft on 10-29-07
NOTES STA: 85+03.47 Offset (ft): -5.3518
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5385	0		(Pavement) ASPHALT - 5"										
			(Fill) ROADBASE (6-8" thick) underlain by SUBGRADE FILL: gravelly sand with pebbles, black to dark brown, slightly moist										
			(Native) slightly silty, slightly sandy CLAY (sand/silt content increasing slightly with depth - gradational changes), moderate to low plasticity (decreasing with depth), homogenous, well to very well sorted, moist, brown to dark brown, light brown; stiff to very stiff	MC 1		19/12							
5380	5			MC 2		13/12		105	21	40	17	23	74
			(Bedrock) silty SANDSTONE, slightly clayey (clay particles grading out with depth), well to very well sorted (predom. silt to fine grain sand) - rounded, light cementation, slightly moist to moist, tan to light brown, occas. slight weathering - orangish brown staining where weathered, very dense	MC 3		50/7		100	15	25	18	7	25
5375	10												
5370	15			MC 4		50/2			20	NP	NP	NP	20
			Bottom of hole at 15.4 feet.	SS 5		50/2							

RockSol Consulting Group, Inc.

BORING : SB- 1

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/27/08 **COMPLETED** 08/27/08
GROUND ELEVATION 5442.79 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: Field N. of 120th Ave.
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Berends
WATER DEPTH Not Encountered on 8/27/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5443	0		(Fill) SUBGRADE FILL - silty to very silty, sandy to very sandy clay, occasional gravel, with disseminated CaCO3, moderate to strong reaction to HCl acid, moderate plasticity, brown to grayish brown, slightly moist, very stiff to hard, some black carbonaceous material (0.5-1cm) at 5', bottom foot of stratum is silty, sandy gravel (poorly sorted, with black hydrocarbon staining, slightly moist, very dense)	MC 1		41/12							
5438	5		(Topsoil from 0-6" - clayey, very silty sand, occasional gravel, organics (plant material), brown, slightly moist to dry)	MC 2		33/12		114	11	42	16	26	63
5433	10			MC 3		30/12							
5428	15		(Reworked Native) sandy CLAY, chunks of bluish gray claystone (~1cm), moderate plasticity, brown, slightly moist, stiff	MC 4		27/12		118	15	47	16	31	68
			(Bedrock) silty CLAYSTONE, trace of fine gravel, moderate plasticity, bluish gray with much iron oxide staining in areas, slightly moist, hard										
			Bottom of hole at 16.0 feet.										

RockSol Consulting Group, Inc.

BORING : SB- 2

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 09/04/08 **COMPLETED** 09/04/08
GROUND ELEVATION 5445.268 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: S. of 120th E. of US 36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY S. Birney
WATER DEPTH Not Encountered on 9/4/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
5445	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Native) slightly clayey SAND, occasional gravel at 5', organic material, reaction to HCl, light brown, tan, white, medium dense to very dense	MC 1		10/12							
5440	5			MC 2		50/12		111	2	30	16	14	15
			(Bedrock) silty SANDSTONE, homogenous, light tannish brown, slightly moist, very dense										
5435	10			MC 3		50/7		106	3	NP	NP	NP	28
5430	15		(Bedrock) CLAYSTONE, blocky, dark gray, top 0.5' is weathered with orangish brown coloring, slightly moist to moist, very hard	MC 4		50/11		109	14	37	8	29	76
			Bottom of hole at 16.0 feet.										

RockSol Consulting Group, Inc.

BORING : SB- 3

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 09/04/08 **COMPLETED** 09/04/08
GROUND ELEVATION 5456.079 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: W. of Allison in field E. of US 36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 9/4/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5456	0		(Native) TOPSOIL - silty sand, slightly clayey, with organic material/vegetation (roots, grass)										
			(Bedrock) silty SANDSTONE, homogenous, clayey at 2', occasional area has reaction to HCl above 10', no reacton to HCl below 15', mica flecks and larger grain sizes below 15', whitish tan, slightly moist, very dense	MC 1		50/7		113	5	22	17	5	42
5451	5			MC 2		100/2							
5446	10			MC 3		150/2.5		92	4	NP	NP	NP	26
5441	15			MC 4		150/4.5							
5436	20			MC 5		100/5.5		99	3	NP	NP	NP	16
			Bottom of hole at 20.5 feet.										

RockSol Consulting Group, Inc.

BORING : SB- 4

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/28/08 **COMPLETED** 08/28/08
GROUND ELEVATION 5481.83 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: E. of Park n Ride
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 8/28/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5482	0		(Native) TOPSOIL - sandy clay with pebbles/cobbles and vegitation										
			(Native) sandy, silty CLAY, moderate to high plasticity, fine grained disseminated CaCO3, very strong reaction to HCl, light brown, tan, slightly moist to moist, hard	MC 1		34/12							
5477	5		At 5': subtle structure visible indicating transition into bedrock, medium-grained black coaly flecks, some weathering - orangish brown staining	MC 2		36/12		93	15	52	17	35	80
5472	10		(Bedrock) CLAYSTONE, moderate to high plasticity, well sorted, massive structure, no reaction to HCl, small flecks of orangish brown stained weathered material below 15', planar fractures with weathering below 25', large coaly flecks (up to pebble size) below 40', light gray to dark gray, grayish brown, slightly moist, very hard	MC 3		50/8		110	14	49	13	36	98
5467	15			MC 4		50/7							
5462	20			MC 5		50/7							
5457	25			MC 6		50/7		120	12	43	13	30	95
5452	30			MC 7		50/5							
5447	35												

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : SB- 4

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5447	35		(Bedrock) CLAYSTONE, moderate to high plasticity, well sorted, massive structure, no reaction to HCl, small flecks of orangish brown stained weathered material below 15', planar fractures with weathering below 25', large coaly flecks (up to pebble size) below 40', light gray to dark gray, grayish brown, slightly moist, very hard *(continued)*	MC 8		50/4							
5442	40			MC 9		50/5							
5437	45			MC 10		50/6							
5432	50			MC 11									
5427	55			MC 12		50/2							
5422	60			MC 13		50/2		113	17	59	15	44	99
5417	65		Bottom of hole at 65.3 feet.	MC 14		50/4							

BORING : SB- 5

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/27/08 **COMPLETED** 08/27/08
GROUND ELEVATION 5484.35 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: E. of Park n Ride
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 8/27/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
5484	0		(Native) TOPSOIL - sandy clay with pebbles/cobbles and vegitation										
			(Native) slightly sandy silty CLAY, with white fine-grained CaCO3, strong reaction to HCl, occasional fine gravelsome black carbonaceous material at 5', light brown, slightly moist, hard	MC 1		35/12							
5479	5			MC 2		44/12		126	10	42	12	30	70
5474	10		(Bedrock) CLAYSTONE, high plasticity, gray, slightly moist, very hard, carbonaceous material at 15', iron oxide staining from 15'-20'	MC 3		50/10							
5469	15			MC 4		50/6		121	12	54	16	38	99
5464	20			MC 5		50/5							
5459	25			MC 6		50/5							
5454	30			MC 7		50/5		115	14	57	16	41	99
5449	35												

(Continued Next Page)

RockSol Consulting Group, Inc.

BORING : SB- 5

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5449	35		(Bedrock) CLAYSTONE, high plasticity, gray, slightly moist, very hard, carbonaceous material at 15', iron oxide staining from 15'-20' *(continued)*	MC 8		50/5							
5444	40			MC 9		50/5		118	14	62	15	47	99
5439	45			MC 10		50/5							
5434	50			MC 11		50/3							
5429	55			MC 12		50/3							
5424	60		Bottom of hole at 60.0 feet.	MC 13		50/3		114	15	62	17	45	99

BORING : SB- 6

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/27/08 **COMPLETED** 08/27/08
GROUND ELEVATION 5434.174 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: S.E. corner of CDOT lot
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Berends
WATER DEPTH 29.0 ft on 8/27/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5434	0		(Native) TOPSOIL - clay, very silty sand, occasional fine gravel, organics (plant material), brown, slightly moist to dry										
			(Bedrock) slightly silty to silty SANDSTONE, very well sorted, slight to moderate cementation, highly cemented from 26-27', sand grains are fine to medium, light tan to tan, orangish tan with occasional piece of gray claystone at 10', slightly moist to moist, very dense, much disseminated CaCO3 at top of stratum (significant fraction of material) and decreases with depth (no CaCO3 by 10')	MC 1		50/8		100	5	NP	NP	NP	40
5429	5			MC 2		50/5							
5424	10			MC 3		50/5		104	5	NP	NP	NP	35
5419	15			MC 4		50/11		115	7	NP	NP	NP	25
5414	20			MC 5		50/2							
5409	25			MC 6		50/3							
5404	30		(Bedrock) slightly silty CLAYSTONE, moderate to high plasticity, massive structure, occasional iron oxide staining, gray, slightly moist, very hard	MC 7		100/10		121	13	41	14	27	93
			Bottom of hole at 30.8 feet.										

DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

RockSol Consulting Group, Inc.

BORING : SB- 7

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/27/08 **COMPLETED** 08/27/08
GROUND ELEVATION 5416.33 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: Tilled farmland E. of Allison St.
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Berends
WATER DEPTH Not Encountered on 8/27/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5416	0		(Native) TOPSOIL - clayey, very silty sand, occasional gravel, organics (plant material), brown, slightly moist to dry										
			(Native) slightly sandy, silty CLAY, low to moderate plasticity, well sorted, disseminated and pockets of CaCO3, strong reaction to HCl, tannish light brown, slightly moist, very hard, visible bedding planes in areas around 5'	MC 1		50/9							
5411	5			MC 2		50/10		109	6	34	12	22	57
			(Bedrock) silty to very silty SANDSTONE, light cementation, very well sorted, sand grains are fine, light tan, slightly moist to dry, very dense, material is finer at 15'										
5406	10			MC 3		50/5		109	2	NP	NP	NP	23
5401	15			MC 4		50/4							
			Bottom of hole at 15.3 feet.										

BORING : SB- 8

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 09/04/08 **COMPLETED** 09/04/08
GROUND ELEVATION 5426.972 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: Field between Allison and US 36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY S. Birney
WATER DEPTH Not Encountered on 9/4/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5427	0		(Native) TOPSOIL - clayey sand										
			(Native) silty CLAY, some organic material, strong reaction to HCl, white to light brown, slightly moist, very hard	MC 1		50/11							
5422	5			MC 2		19/12		101	10	24	15	9	72
			(Bedrock) silty CLAYSTONE, some areas of SANDSTONE, tan to light brown with orange staining, slightly moist, very hard/very dense										
5417	10			MC 3		50/0							
5412	15			MC 4		50/0							
5407	20			MC 5		50/1		103	3	NP	NP	NP	27
			Bottom of hole at 20.3 feet.	MC 6		200/2.75							

BORING : SB- 9

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/27/08 **COMPLETED** 08/27/08
GROUND ELEVATION 5400.34 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: Tilled farmland E. of Allison St.
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 8/27/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
5400	0		(Native) TOPSOIL - clayey sand										
			(Native) sandy SILT/ silty SAND, some clay in areas, sand is all fine-grained, very well sorted, disseminated fine-grained CaCO3, very strong reaction to HCl, light tan, chalky white, slightly moist, hard	MC 1		36/12		101	5	29	12	17	42
5395	5		(Bedrock) SANDSTONE, very well sorted, predominantly fine-grained sand with silt, some interbedded siltstone, little to no cementation, no reaction to HCl, light tan to light brown, slightly moist to moist, very dense	MC 2		50/5		107	1	NP	NP	NP	19
5390	10			MC 3		50/6							
5385	15			MC 4		50/6		103	10	NP	NP	NP	47
			Bottom of hole at 15.5 feet.										

RockSol Consulting Group, Inc.

BORING : SB-10

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 08/27/08 **COMPLETED** 08/27/08
GROUND ELEVATION 5416.42 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: Tilled farmland E. of Allison St.
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 8/27/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
5416	0		(Native) TOPSOIL - clayey sand										
			(Native) clayey, very sandy SILT/very silty SAND, occasionaly clayey, very well sorted, all material is fine sand size or smaller, fine grained CaCO3, very strong reaction to HCl, tan, light brown, some orangish brown staining, slightly moist, dense/hard	MC 1		42/12		109	7	38	17	21	45
5411	5		(Bedrock) sandy, very clayey SILTSTONE with interbedded sandstone, little to no cementation, very well sorted, very low plasticity, very slight reaction to HCl, light brown to tan, slightly moist, very hard	MC 2		50/5		99	6	22	11	11	54
5406	10		(Bedrock) CLAYSTONE with interbedded silt/sandstone, well sorted layers, all material is fine sand size and smaller, moderate to high plasticity, no reaction to HCl in most areas, some lenses of fine-grained CaCO3 (chalky white), light brown to grayish brown otherwise, slightly moist to moist, very hard	MC 3		50/6		114	5	NP	NP	NP	37
5401	15		(Bedrock) SANDSTONE with interbedded siltstone, all material is fine sand to silt sized, no reaction to HCl, tan to light brown, slightly moist, very dense	MC 4		50/4		107	5	NP	NP	NP	45
			Bottom of hole at 15.3 feet.										

BORING : SB-11

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess
PROJECT NAME 120th Ave Connection US36
PROJECT NUMBER RS - 196.02
PROJECT LOCATION Broomfield, Colorado
DATE STARTED 09/04/08 **COMPLETED** 09/04/08
GROUND ELEVATION 5470.777 ft **HOLE SIZE** 4.25"
DRILLING CONTRACTOR Dakota Drilling
BORING LOCATION: field between Park'N'Ride and US 36
DRILLING METHOD Solid Stem Auger
GROUND WATER DEPTH:
LOGGED BY R. Smith
WATER DEPTH Not Encountered on 9/4/2008
NOTES Station & offset data not given
WATER DEPTH --- on

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	UCCS. (ksf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
										LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
5471	0		(Native) TOPSOIL - sandy clay, heavy vegitation, dark brown, moist										
			(Native) slightly silty, slightly sandy to sandy CLAY, moderate to high plasticity, well sorted, CaCO3 stringers, strong reaction to HCl, dark brown, slighlty moist, hard to very hard, mottled (brown, gray, orangish brown), some weathering (orangish brown lineations along horizontal bedding planes) at 10', some plant roots and occasional coarse sand/piece of gravel at 5' and above	MC 1		47/12		112	11	47	12	35	74
5466	5			MC 2		50/9							
5461	10			MC 3		46/12		110	18	57	15	42	95
5456	15		(Bedrock) CLAYSTONE, well sorted, fat, high plasticity, weathered along planes with fossilized organic material, fractured and blocky, brown to dark brown, gray, orangish brown, slightly moist, very hard	MC 4		50/11							
5451	20			MC 5		50/12		107	20	61	18	43	97
			Bottom of hole at 21.0 feet.										

APPENDIX B: LABORATORY TEST RESULTS

RockSol Consulting Group, Inc.

SUMMARY OF PHYSICAL & CHEMICAL TEST RESULTS

CLIENT Carter & Burgess

PROJECT NAME 120th Ave Connection US36

PROJECT NUMBER RS - 196.02

PROJECT LOCATION Broomfield, Colorado

Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Swell Potential (%)	%<#200 Sieve	USCS Class-ification	AASHTO Class-ification	Water Content (%)	Dry Density (pcf)	Unconfined Compressive Strength (psi)	Sulfate (%)
B-01	5	46	19	27		49	SC	A-7-6 (9)	14.3	110.4		0.00
B-01	15	55	20	35	3.03	91	CH	A-7-6 (34)	19.3	109.1		
B-02	5	51	19	32		58	CH	A-7-6 (15)	21.6	100.6		
B-02	15	55	19	36	5.87	97	CH	A-7-6 (38)	17.9	111.7		0.01
B-02	20	41	15	26	4.16	100	CL	A-7-6 (27)	21.1	107.2		
B-03	5	70	19	51	9.07	98	CH	A-7-6 (56)	16.1	104.7		0.08
B-03	15	51	16	35	8.13	90	CH	A-7-6 (33)	10.3	99.7		
B-04	5	46	17	29		92	CL	A-7-6 (28)	10.9	107.9		0.00
B-04	10	43	16	27	4.60	90	CL	A-7-6 (25)	11.4	110.0		0.03
B-04	20	58	22	36		99	CH	A-7-6 (40)	18.1	109.3		
B-05	5	49	16	33		83	CL	A-7-6 (27)	17.5	110.0		
B-05	10	47	16	31	3.13	96	CL	A-7-6 (31)	15.2	113.7		0.01
B-05	15	49	17	32	4.40	97	CL	A-7-6 (33)	15.2	109.2		0.02
B-05	25	42	18	24	1.73	96	CL	A-7-6 (24)	12.9	115.2	125.5	0.05
B-05	50	53	19	34	6.67	95	CH	A-7-6 (35)	13.8	117.4	111.4	
B-06	5	55	23	32		94	CH	A-7-6 (34)	18.9	111.3		
B-06	10	29	21	8	-1.07	73	CL	A-4 (4)	14.3	107.4		0.01
B-06	15	57	22	35	5.23	99	CH	A-7-6 (39)	17.4	97.2	36.3	0.07
B-06	25	24	22	2	-0.34	46	SM	A-4 (0)	11.9	118.5		
B-06	50	54	23	31	1.20	99	CH	A-7-6 (35)	16.4	112.8		
B-07	5	49	22	27		89	CL	A-7-6 (26)	18.6	108.9		
B-07	10	24	22	2		43	SM	A-4 (0)	10.4	105.6		0.01
B-07	15	21	18	3	-1.13	58	ML	A-4 (0)	9.4	96.9	4.2	0.01
B-07	20	35	15	20	0.80	82	CL	A-6 (15)	15.5	113.8		0.10
B-07	30	68	28	40		98	CH	A-7-6 (46)	18.1	110.2		
B-07	55	31	15	16		71	CL	A-6 (9)	11.5			0.03
B-08	2	42	18	24		95	CL	A-7-6 (24)	14.5	116.9		
B-08	5	56	22	34	4.67	90	CH	A-7-6 (33)	19.0	109.2	82.2	0.05
B-08	15	59	22	37		94	CH	A-7-6 (39)	16.0	110.7		
B-08	25	42	18	24	0.06	91	CL	A-7-6 (22)	12.8	118.1	107.7	0.02
B-08	50	67	16	51	9.07	95	CH	A-7-6 (53)	11.2	109.6		0.12
B-09	5	46	18	28	0.73	95	CL	A-7-6 (28)	8.7	101.4		0.02
B-09	10	35	13	22		76	CL	A-6 (14)	6.8	100.0		
B-09	15	21	15	6	-2.53	47	SC-SM	A-4 (0)	7.3	93.2		0.00
B-09	25	19	16	3		30	SM	A-2-4 (0)	5.4			
B-09	35	50	18	32	4.35	89	CH	A-7-6 (30)	13.3	116.3	111.1	0.03
B-09	50	53	15	38	0.73	89	CH	A-7-6 (35)	10.8	109.8		0.02
B-10	5	38	17	21	3.27	74	CL	A-6 (14)	7.6	115.4		0.01
B-10	15	20	15	5		42	SC-SM	A-4 (0)	4.7	95.6		
B-10	25	NP	NP	NP		19	SM	A-2-4 (0)	3.8	110.7		0.01
B-10	35	63	26	37	3.40	99	CH	A-7-6 (43)	18.0	108.5	52.3	0.03
B-10	45	47	17	30	0.47	96	CL	A-7-6 (31)	10.5	108.0		0.02
B-11	2	38	20	18	-2.87	87	CL	A-6 (16)	8.9			

RockSol Consulting Group, Inc.

SUMMARY OF PHYSICAL & CHEMICAL TEST RESULTS

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Swell Potential (%)	%<#200 Sieve	USCS Class-ification	AASHTO Class-ification	Water Content (%)	Dry Density (pcf)	Unconfined Compressive Strength (psi)	Sulfate (%)
B-11	5	27	16	11		63	CL	A-6 (4)	6.4			0.00
B-11	13	36	15	21		90	CL	A-6 (18)	12.7	107.7		0.01
B-11	25	NP	NP	NP		15	SM	A-2-4 (0)	3.5	113.0		
B-11	30	49	20	29	2.80	99	CL	A-7-6 (32)	15.9	114.8	148.2	0.00
B-11	40	70	23	47	2.53	100	CH	A-7-6 (54)	20.8	105.6	63.2	0.03
B-12	2	54	20	34	5.67	82	CH	A-7-6 (29)	12.8	105.8		0.00
B-12	5	NP	NP	NP		75	ML	A-4 (0)	8.5			
B-12	10	NP	NP	NP		37	SM	A-4 (0)	3.5			0.01
B-12	30	61	21	40	4.50	93	CH	A-7-6 (41)	29.9	98.1	70.7	0.06
B-12	45	72	26	46	6.00	99	CH	A-7-6 (53)	17.8	105.9		0.02
B-13	5	42	16	26		77	CL	A-7-6 (19)	11.3	112.7		
B-13	10	NP	NP	NP	-5.60	29	SM	A-2-4 (0)	2.6			0.02
B-13	20	25	15	10	0.07	39	SC	A-4 (1)	11.1	115.8	33.1	0.00
B-13	30	48	18	30		96	CL	A-7-6 (31)	12.0	118.3		
B-13	40	57	21	36	2.20	98	CH	A-7-6 (40)	12.8	103.5	48.6	0.02
B-14	2	27	15	12		45	SC	A-6 (2)	6.3	97.1		
B-14	5	NP	NP	NP		39	SM	A-4 (0)	4.8	89.0		
B-14	15	NP	NP	NP		16	SM	A-2-4 (0)	5.6			0.01
B-14	20	57	22	35		97	CH	A-7-6 (38)	18.7	96.0		
B-14	30	55	26	29	7.87	99	CH	A-7-6 (34)	19.9	109.3	73.6	0.01
B-14	50	25	15	10	-2.10	54	CL	A-4 (2)	9.5	99.9		0.02
B-15	5	NP	NP	NP		20	SM	A-2-4 (0)	21.2			
B-15	15	25	16	9	0.70	48	SC	A-4 (1)	10.5	98.9	4.8	0.01
B-15	25	47	17	30	4.20	97	CL	A-7-6 (31)	16.3	113.2	55.2	0.02
B-15	30	58	21	37	2.27	100	CH	A-7-6 (42)	20.0	108.4	48.4	0.02
B-16	2	NP	NP	NP		27	SM	A-2-4 (0)	3.5	93.9		
B-16	20	28	14	14		60	CL	A-6 (5)	9.6	111.1		0.01
B-16	35	58	19	39		76	CH	A-7-6 (30)	14.4	106.4	49.2	0.02
B-16	45	30	11	19		57	CL	A-6 (7)	8.3			
B-16	55	23	15	8		46	SC	A-4 (1)				
B-17	5	NP	NP	NP	-1.34	36	SM	A-4 (0)	10.7	102.0		
B-17	10	NP	NP	NP	-0.46	29	SM	A-2-4 (0)	7.5	106.0		0.00
B-17	15	46	15	31	3.85	77	CL	A-7-6 (23)	14.7	115.9		0.01
B-18	5	40	16	24		77	CL	A-6 (17)	14.0	110.4		
B-18	10	NP	NP	NP	-0.07	14	SM	A-2-4 (0)	9.3	98.9		0.00
B-18	20	44	17	27	2.27	84	CL	A-7-6 (23)	13.3	106.9		0.01
B-18	30	28	20	8		77	CL	A-4 (5)	14.9	103.6		
B-18	40	39	15	24	-0.07	20	SC	A-2-6 (1)	18.9	105.7		0.01
B-19	5	33	16	17		57	CL	A-6 (7)	9.7	88.3		
B-19	10	NP	NP	NP		32	SM	A-2-4 (0)	8.0	92.8		
B-19	20	53	16	37	2.65	51	CH	A-7-6 (14)	13.1	119.9		0.01
B-19	30	34	12	22	0.00	67	CL	A-6 (12)	15.5	115.8		0.01
B-19	40	39	15	24	1.20	85	CL	A-6 (20)	20.4	107.2		0.01

RockSol Consulting Group, Inc.

SUMMARY OF PHYSICAL & CHEMICAL TEST RESULTS

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado

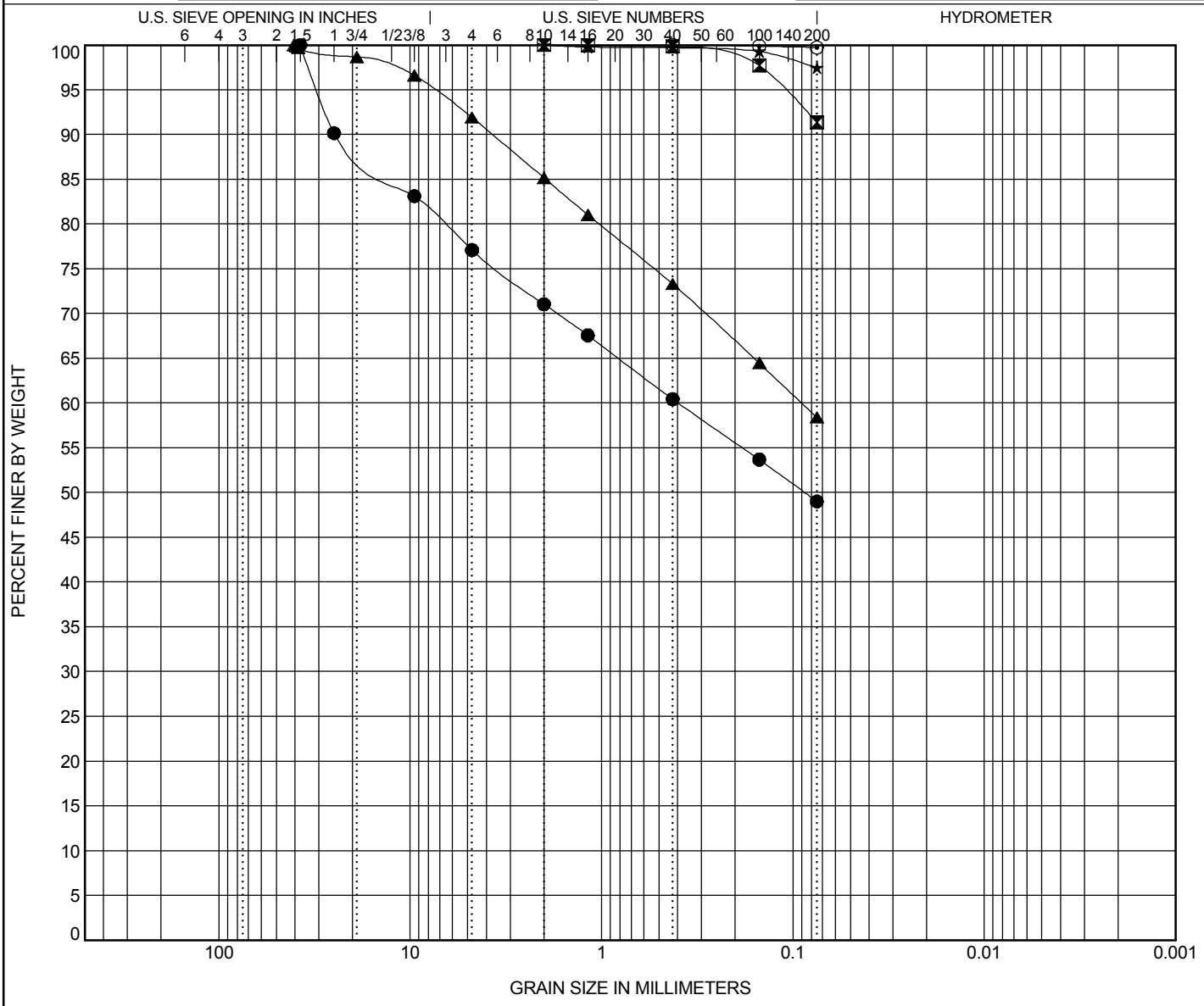
Borehole	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Swell Potential (%)	%<#200 Sieve	USCS Class-ification	AASHTO Class-ification	Water Content (%)	Dry Density (pcf)	Unconfined Compressive Strength (psi)	Sulfate (%)
B-20	5	40	17	23		74	CL	A-6 (15)	20.8	105.3		
B-20	10	25	18	7	0.00	25	SC-SM	A-2-4 (0)	14.9	100.3		
B-20	15	NP	NP	NP		20	SM	A-2-4 (0)	20.3			
SB- 1	5	42	16	26		63	CL	A-7-6 (14)	11.0	114.4		0.01
SB- 1	15	47	16	31		68	CL	A-7-6 (19)	15.2	117.5		0.00
SB- 2	5	30	16	14		15	SC	A-2-6 (0)	2.0	110.9		0.07
SB- 2	10	NP	NP	NP		28	SM	A-2-4 (0)	3.2	106.2		
SB- 2	15	37	8	29	6.97	76	CL	A-6 (19)	14.1	108.9		0.02
SB- 3	2	22	17	5	-2.19	42	SC-SM	A-4 (0)	4.7	113.1		
SB- 3	10	NP	NP	NP	-2.29	26	SM	A-2-4 (0)	3.6	91.8		0.00
SB- 3	20	NP	NP	NP		16	SM	A-2-4 (0)	3.2	99.2		
SB- 4	5	52	17	35	12.13	80	CH	A-7-6 (28)	15.1	93.5		
SB- 4	10	49	13	36	7.99	98	CL	A-7-6 (37)	13.8	110.1		0.53
SB- 4	25	43	13	30		95	CL	A-7-6 (29)	12.3	119.8	81.7	0.03
SB- 4	60	59	15	44	2.23	99	CH	A-7-6 (47)	16.6	113.5		
SB- 5	5	42	12	30	6.12	70	CL	A-7-6 (18)	10.0	126.5		0.00
SB- 5	15	54	16	38		99	CH	A-7-6 (41)	12.0	121.2	100.4	0.00
SB- 5	30	57	16	41	11.03	99	CH	A-7-6 (44)	13.9	114.6	119.4	0.14
SB- 5	40	62	15	47	10.27	99	CH	A-7-6 (51)	13.9	117.9		
SB- 5	60	62	17	45		99	CH	A-7-6 (49)	14.5	114.3		0.36
SB- 6	2	NP	NP	NP	-0.95	40	SM	A-4 (0)	4.8	100.1		
SB- 6	10	NP	NP	NP		35	SM	A-2-4 (0)	4.8	103.7		0.01
SB- 6	15	NP	NP	NP	-1.30	25	SM	A-2-4 (0)	7.0	114.6		0.01
SB- 6	30	41	14	27	5.12	93	CL	A-7-6 (25)	12.6	120.8		
SB- 7	5	34	12	22	-3.47	57	CL	A-6 (9)	6.4	108.5		
SB- 7	10	NP	NP	NP		23	SM	A-2-4 (0)	2.0	108.9		0.00
SB- 8	5	24	15	9	0.32	72	CL	A-4 (4)	10.3	101.2		0.02
SB- 8	20	NP	NP	NP	-3.93	27	SM	A-2-4 (0)	3.5	103.2		
SB- 9	2	29	12	17		42	SC	A-6 (3)	5.4	100.5		0.01
SB- 9	5	NP	NP	NP	-2.62	19	SM	A-2-4 (0)	0.9	106.7		0.00
SB- 9	15	NP	NP	NP		47	SM	A-4 (0)	9.6	102.7		
SB-10	2	38	17	21		45	SC	A-6 (5)	6.8	109.3		0.00
SB-10	5	22	11	11	-1.14	54	CL	A-6 (2)	5.7	98.6		
SB-10	10	NP	NP	NP	-1.49	37	SM	A-4 (0)	5.5	114.4		0.00
SB-10	15	NP	NP	NP	-4.77	45	SM	A-4 (0)	4.6	106.6		
SB-11	2	47	12	35	8.63	74	CL	A-7-6 (24)	11.5	112.2		
SB-11	10	57	15	42		95	CH	A-7-6 (43)	18.1	110.0	75.3	0.49
SB-11	20	61	18	43	3.72	97	CH	A-7-6 (46)	20.2	106.9		

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-01	5.0	CLAYEY SAND with GRAVEL(SC)	46	19	27		
⊠	B-01	15.0	FAT CLAY(CH)	55	20	35		
▲	B-02	5.0	SANDY FAT CLAY(CH)	51	19	32		
★	B-02	15.0	FAT CLAY(CH)	55	19	36		
⊙	B-02	20.0	LEAN CLAY(CL)	41	15	26		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	5.0	37.5	0.398			22.9	28.1	49.0	
⊠	B-01	15.0	2				0.0	8.7	91.3	
▲	B-02	5.0	40.5	0.09			8.1	33.5	58.4	
★	B-02	15.0	2				0.0	2.5	97.5	
⊙	B-02	20.0	0.425				0.0	0.3	99.7	

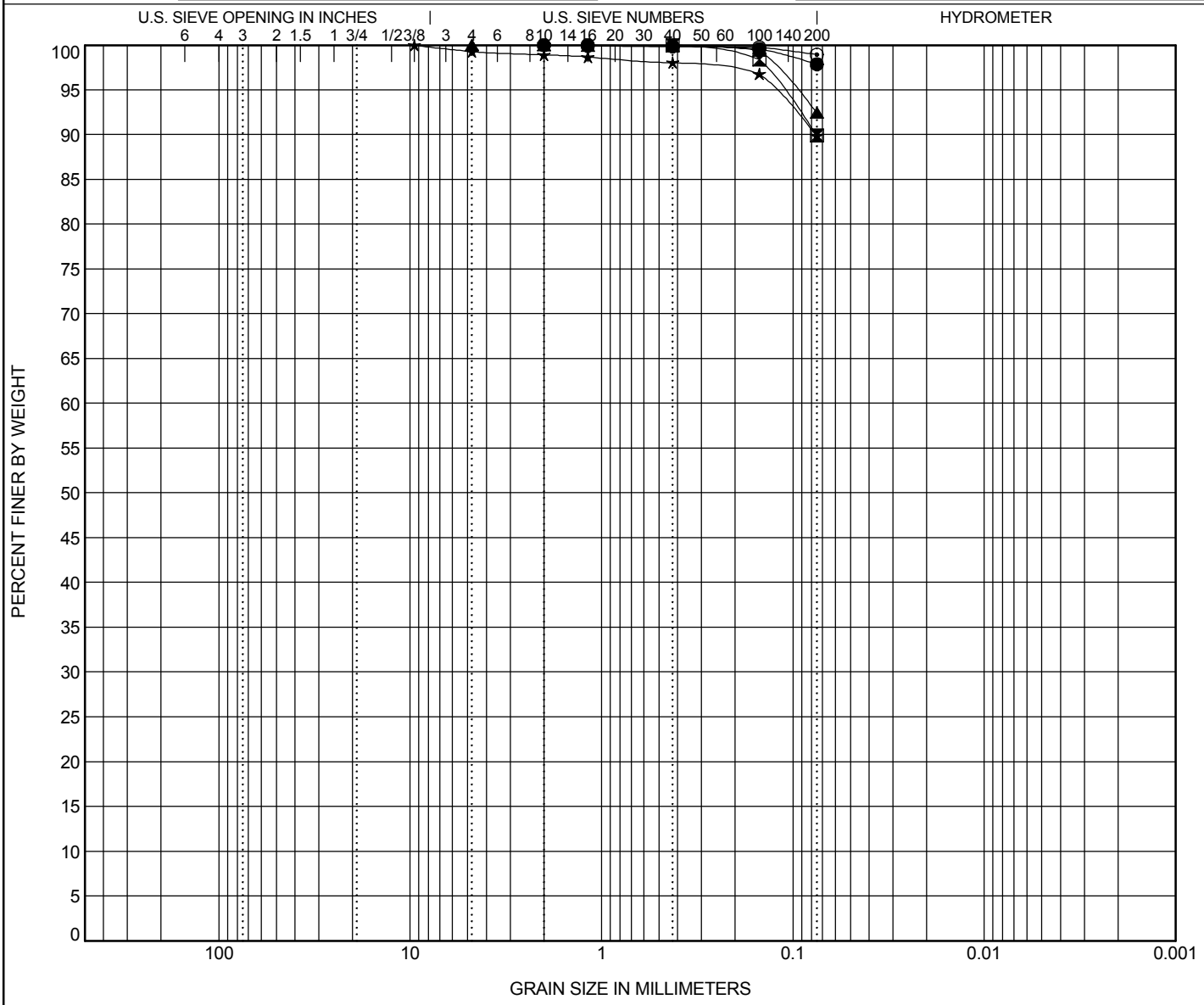
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-03	5.0	FAT CLAY(CH)	70	19	51		
⊠	B-03	15.0	FAT CLAY(CH)	51	16	35		
▲	B-04	5.0	LEAN CLAY(CL)	46	17	29		
★	B-04	10.0	LEAN CLAY(CL)	43	16	27		
⊙	B-04	20.0	FAT CLAY(CH)	58	22	36		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03	5.0	2				0.0	2.1	97.9	
⊠	B-03	15.0	0.425				0.0	10.1	89.9	
▲	B-04	5.0	4.75				0.0	7.5	92.5	
★	B-04	10.0	9.5				0.7	9.4	89.9	
⊙	B-04	20.0	1.18				0.0	1.1	98.9	

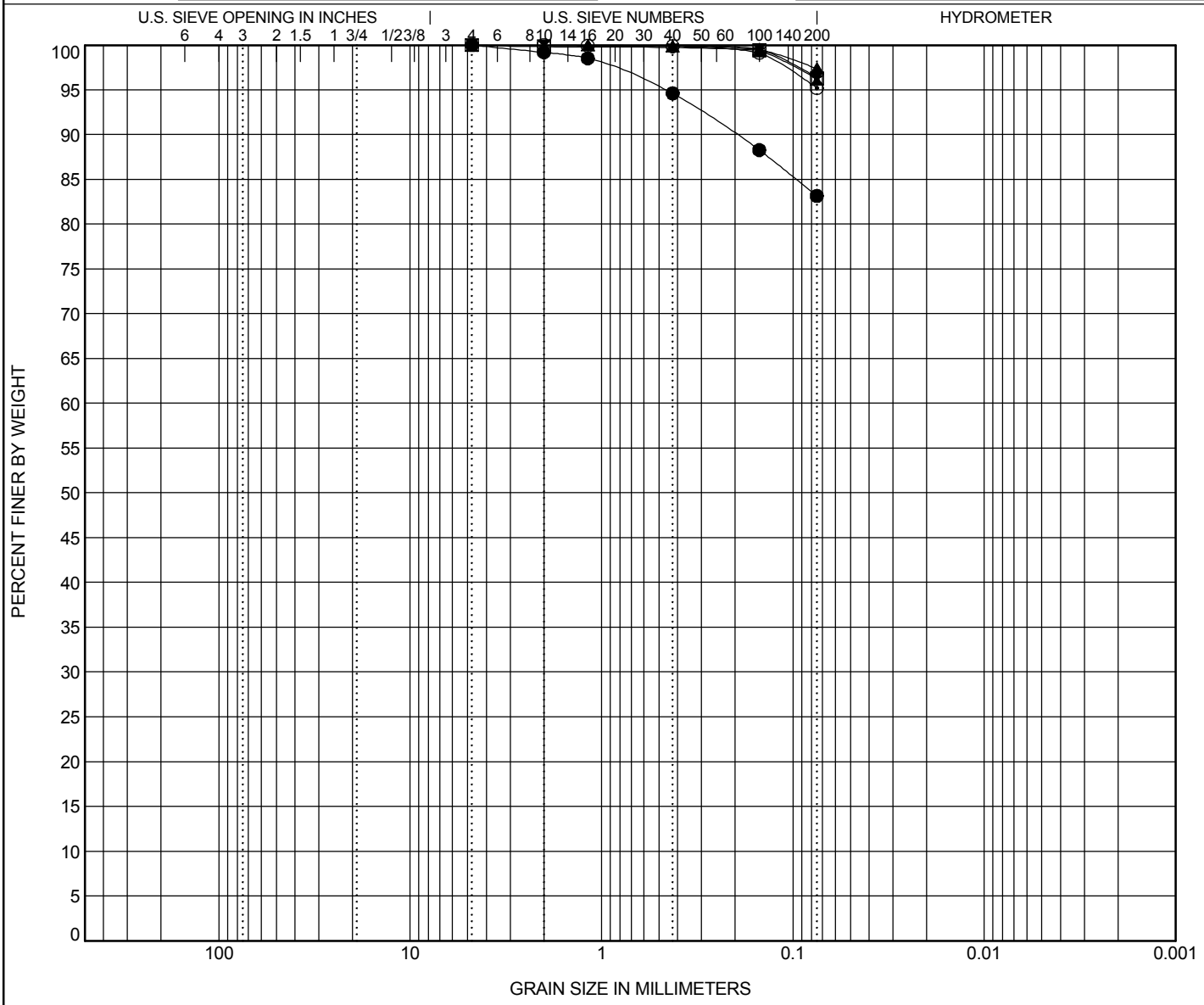
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-05	5.0	LEAN CLAY with SAND(CL)	49	16	33		
⊠	B-05	10.0	LEAN CLAY(CL)	47	16	31		
▲	B-05	15.0	LEAN CLAY(CL)	49	17	32		
★	B-05	25.0	LEAN CLAY(CL)	42	18	24		
⊙	B-05	50.0	FAT CLAY(CH)	53	19	34		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-05	5.0	4.75				0.0	16.8	83.2	
⊠	B-05	10.0	4.75				0.0	3.7	96.3	
▲	B-05	15.0	1.18				0.0	2.6	97.4	
★	B-05	25.0	0.425				0.0	3.6	96.4	
⊙	B-05	50.0	2				0.0	4.8	95.2	

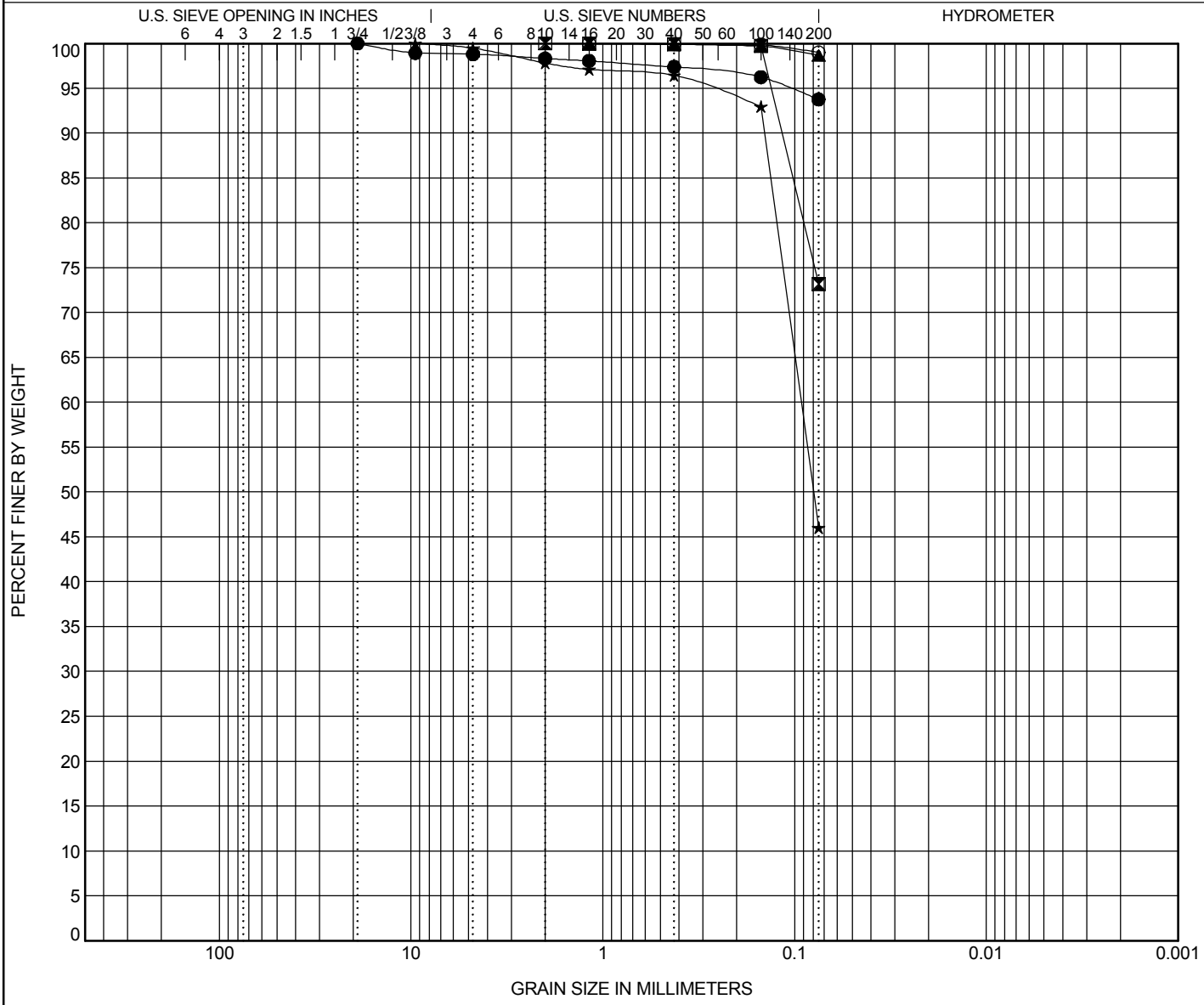
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-06	5.0	FAT CLAY(CH)	55	23	32		
⊠	B-06	10.0	LEAN CLAY with SAND(CL)	29	21	8		
▲	B-06	15.0	FAT CLAY(CH)	57	22	35		
★	B-06	25.0	SILTY SAND(SM)	24	22	2		
⊙	B-06	50.0	FAT CLAY(CH)	54	23	31		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-06	5.0	19				1.2	5.0	93.8	
⊠	B-06	10.0	2				0.0	26.8	73.2	
▲	B-06	15.0	1.18				0.0	1.3	98.7	
★	B-06	25.0	9.5	0.092			0.5	53.5	46.0	
⊙	B-06	50.0	1.18				0.0	1.0	99.0	

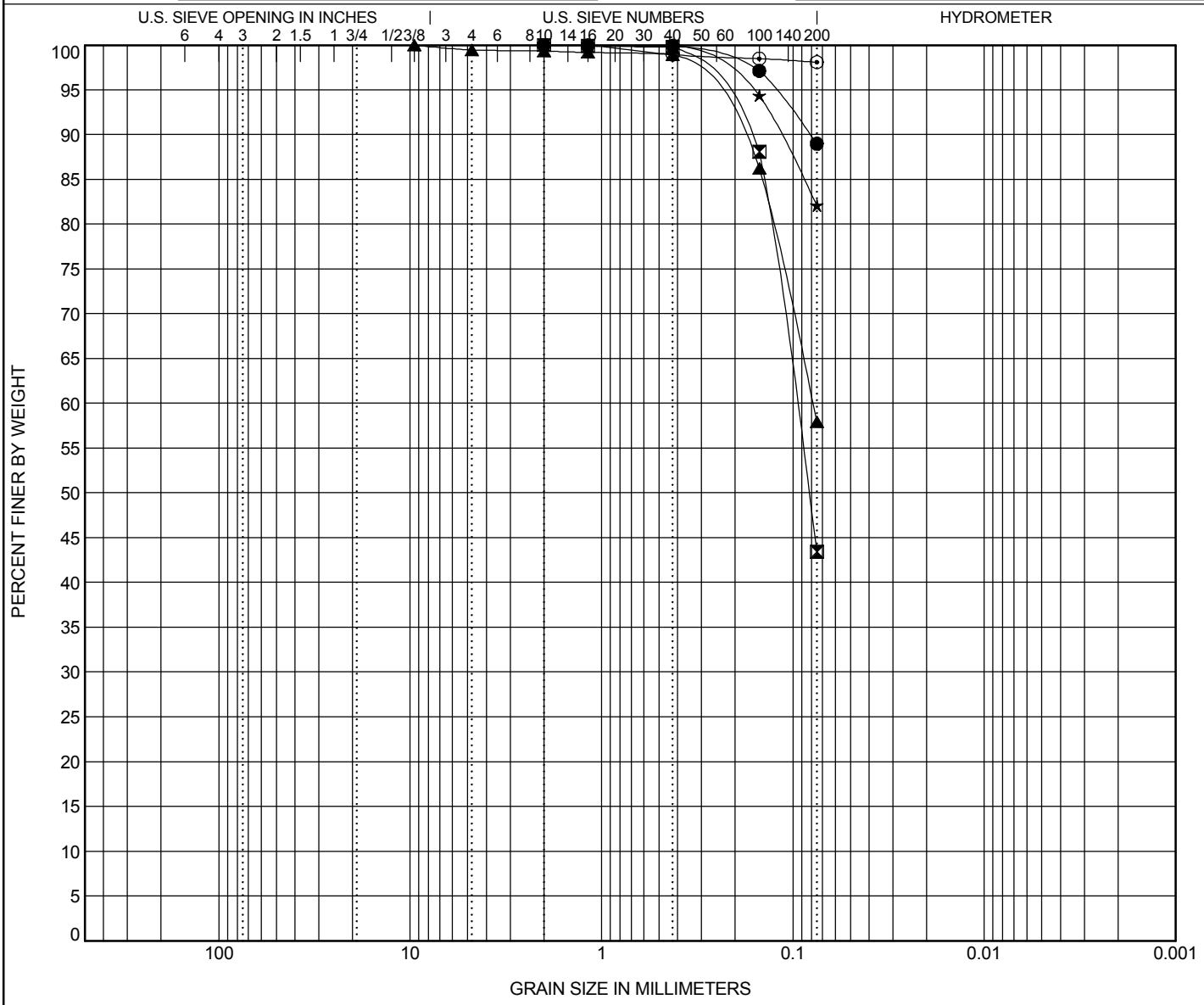
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-07	5.0	LEAN CLAY(CL)	49	22	27		
⊠	B-07	10.0	SILTY SAND(SM)	24	22	2		
▲	B-07	15.0	SANDY SILT(ML)	21	18	3		
★	B-07	20.0	LEAN CLAY with SAND(CL)	35	15	20		
⊙	B-07	30.0	FAT CLAY(CH)	68	28	40		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-07	5.0	2				0.0	11.0	89.0	
⊠	B-07	10.0	2	0.097			0.0	56.6	43.4	
▲	B-07	15.0	9.5	0.079			0.5	41.5	57.9	
★	B-07	20.0	1.18				0.0	17.9	82.1	
⊙	B-07	30.0	2				0.0	1.9	98.1	

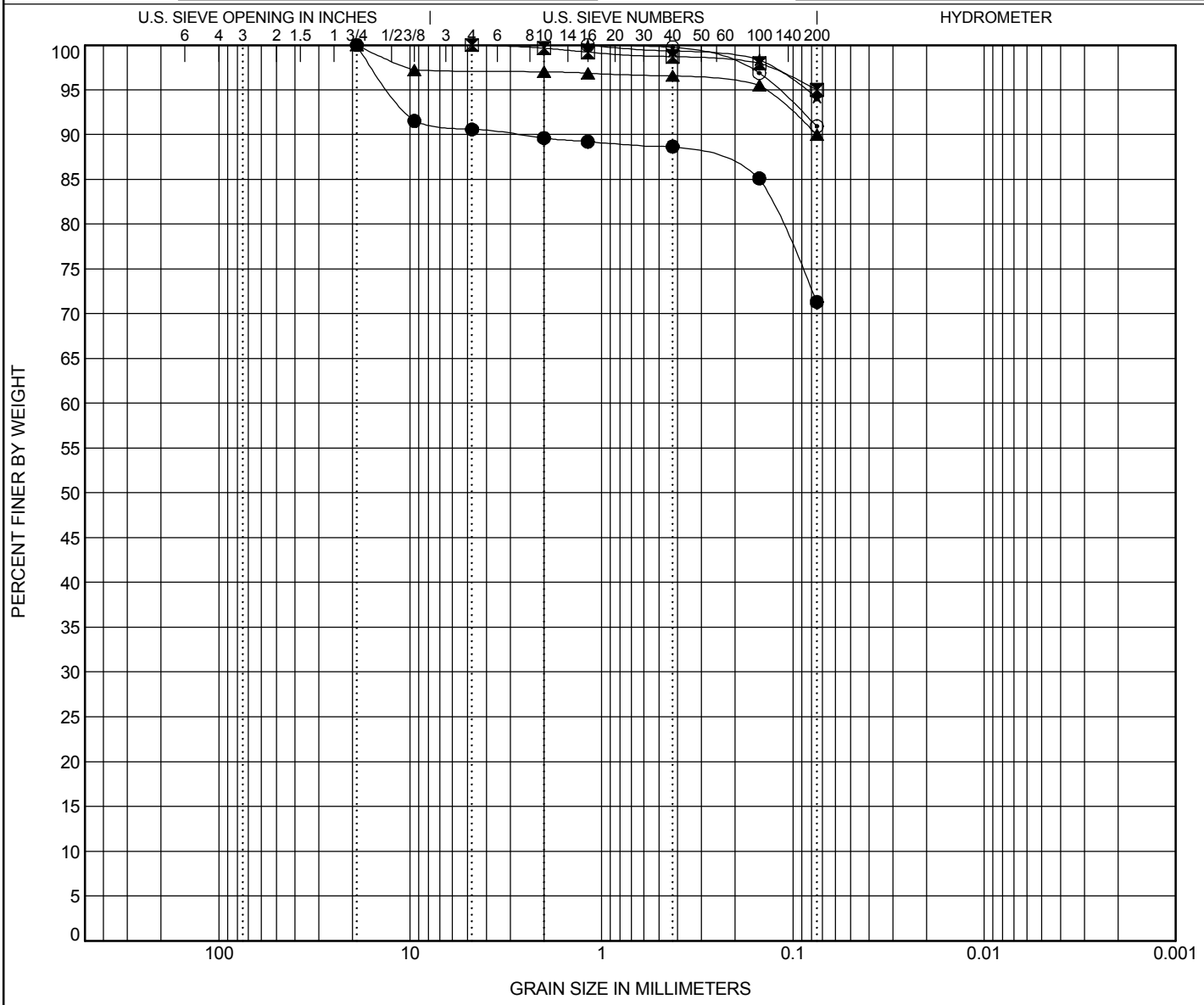
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-07	55.0	LEAN CLAY with SAND(CL)	31	15	16		
⊠	B-08	2.0	LEAN CLAY(CL)	42	18	24		
▲	B-08	5.0	FAT CLAY(CH)	56	22	34		
★	B-08	15.0	FAT CLAY(CH)	59	22	37		
⊙	B-08	25.0	LEAN CLAY(CL)	42	18	24		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-07	55.0	19				9.4	19.3	71.3	
⊠	B-08	2.0	4.75				0.0	5.0	95.0	
▲	B-08	5.0	19				2.9	7.1	90.0	
★	B-08	15.0	1.18				0.0	5.8	94.2	
⊙	B-08	25.0	1.18				0.0	9.1	90.9	

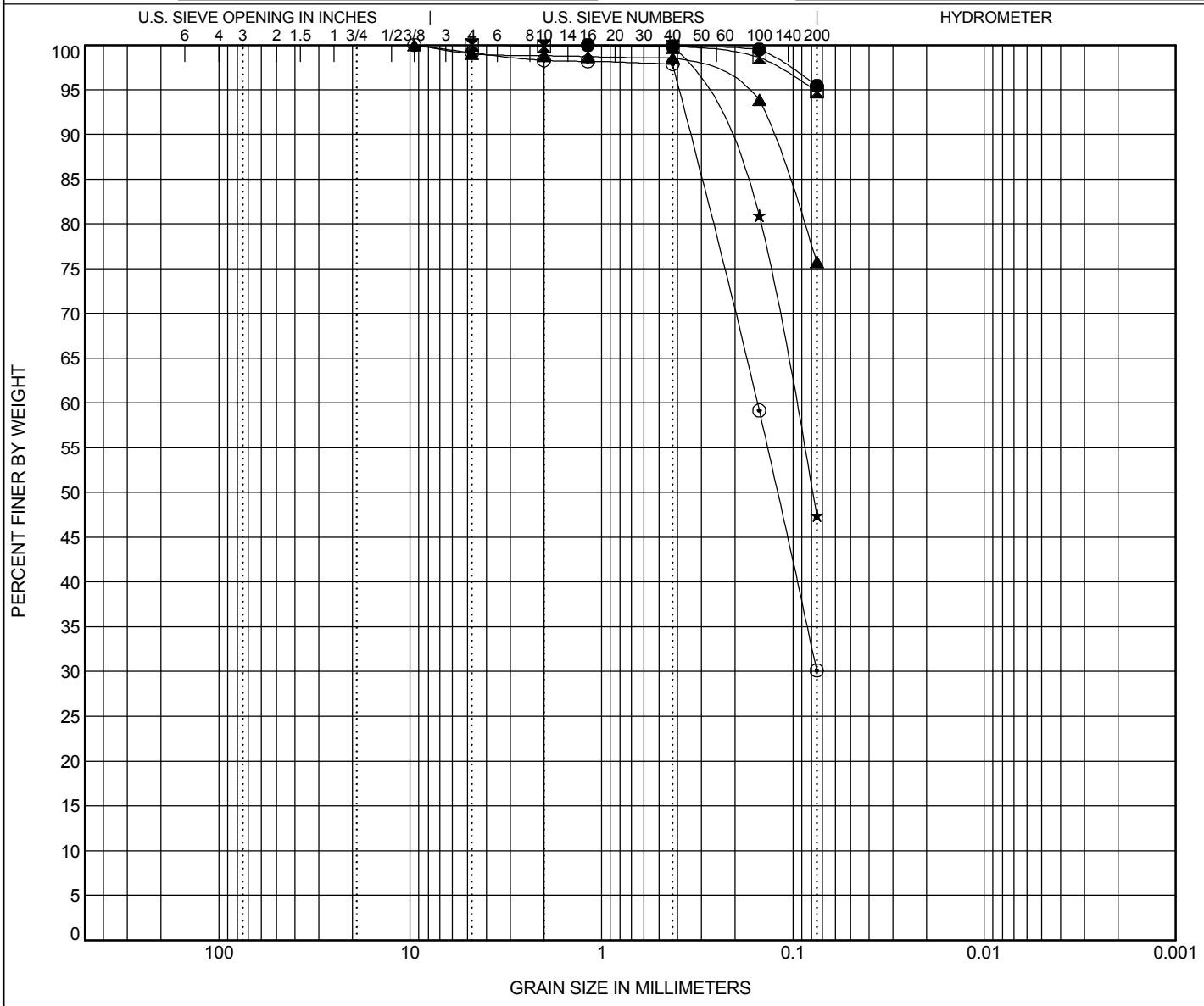
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-08	50.0	FAT CLAY(CH)	67	16	51		
⊠	B-09	5.0	LEAN CLAY(CL)	46	18	28		
▲	B-09	10.0	LEAN CLAY with SAND(CL)	35	13	22		
★	B-09	15.0	SILTY, CLAYEY SAND(SC-SM)	21	15	6		
⊙	B-09	25.0	SILTY SAND(SM)	19	16	3		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-08	50.0	1.18				0.0	4.6	95.4	
⊠	B-09	5.0	4.75				0.0	5.2	94.8	
▲	B-09	10.0	9.5				1.0	23.3	75.8	
★	B-09	15.0	1.18	0.097			0.0	52.6	47.4	
⊙	B-09	25.0	9.5	0.153			0.9	69.0	30.1	

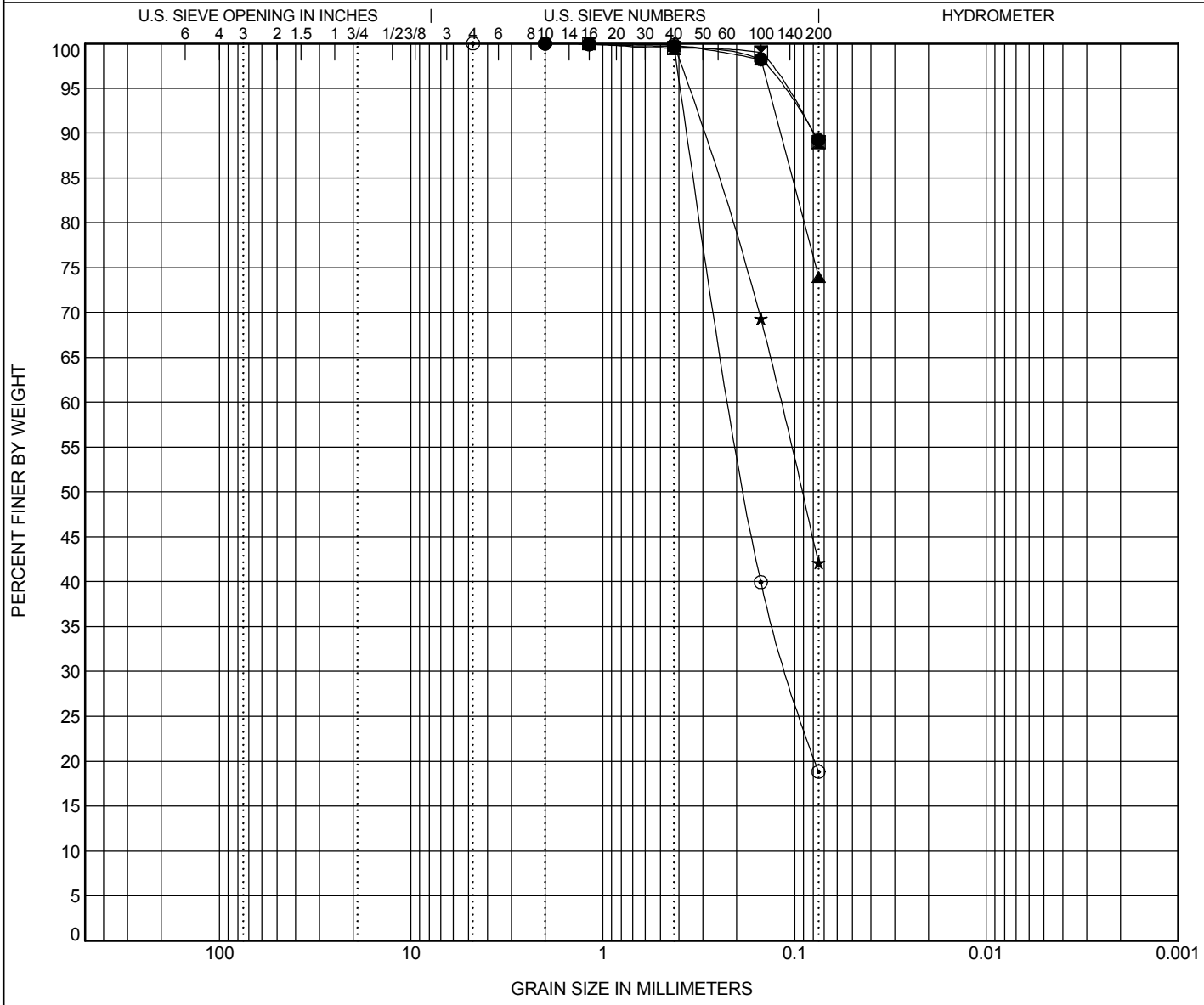
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-09	35.0	FAT CLAY(CH)	50	18	32		
⊠	B-09	50.0	FAT CLAY(CH)	53	15	38		
▲	B-10	5.0	LEAN CLAY with SAND(CL)	38	17	21		
★	B-10	15.0	SILTY, CLAYEY SAND(SC-SM)	20	15	5		
⊙	B-10	25.0	SILTY SAND(SM)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-09	35.0	2				0.0	10.8	89.2	
⊠	B-09	50.0	1.18				0.0	11.0	89.0	
▲	B-10	5.0	1.18				0.0	26.0	74.0	
★	B-10	15.0	0.425	0.118			0.0	57.9	42.1	
⊙	B-10	25.0	4.75	0.213	0.108		0.0	81.2	18.8	

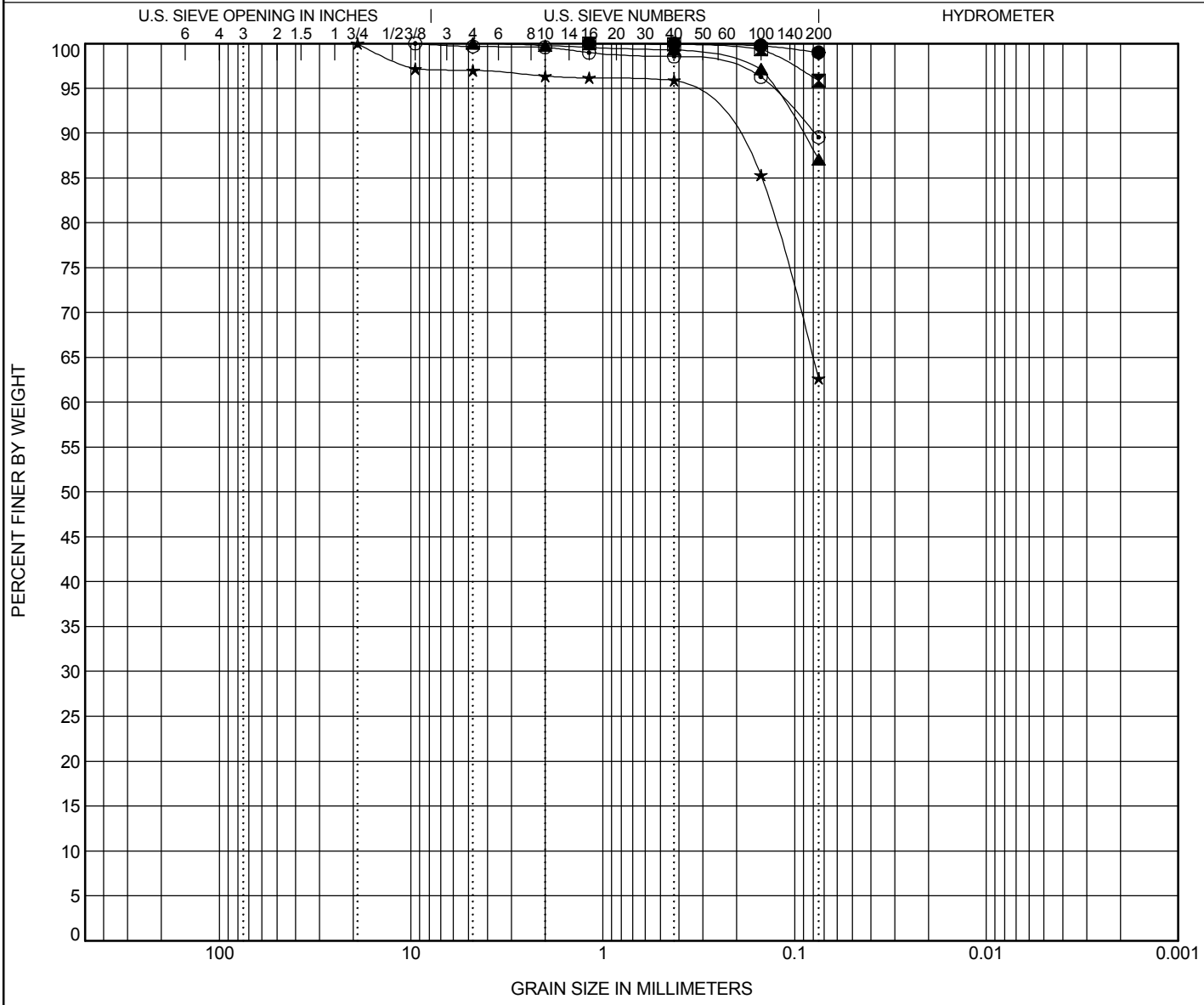
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-10	35.0	FAT CLAY(CH)	63	26	37		
⊠	B-10	45.0	LEAN CLAY(CL)	47	17	30		
▲	B-11	2.0	LEAN CLAY(CL)	38	20	18		
★	B-11	5.0	SANDY LEAN CLAY(CL)	27	16	11		
⊙	B-11	13.0	LEAN CLAY(CL)	36	15	21		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-10	35.0	1.18				0.0	1.0	99.0	
⊠	B-10	45.0	1.18				0.0	4.1	95.9	
▲	B-11	2.0	4.75				0.0	12.9	87.1	
★	B-11	5.0	19				3.0	34.3	62.7	
⊙	B-11	13.0	9.5				0.3	10.1	89.5	

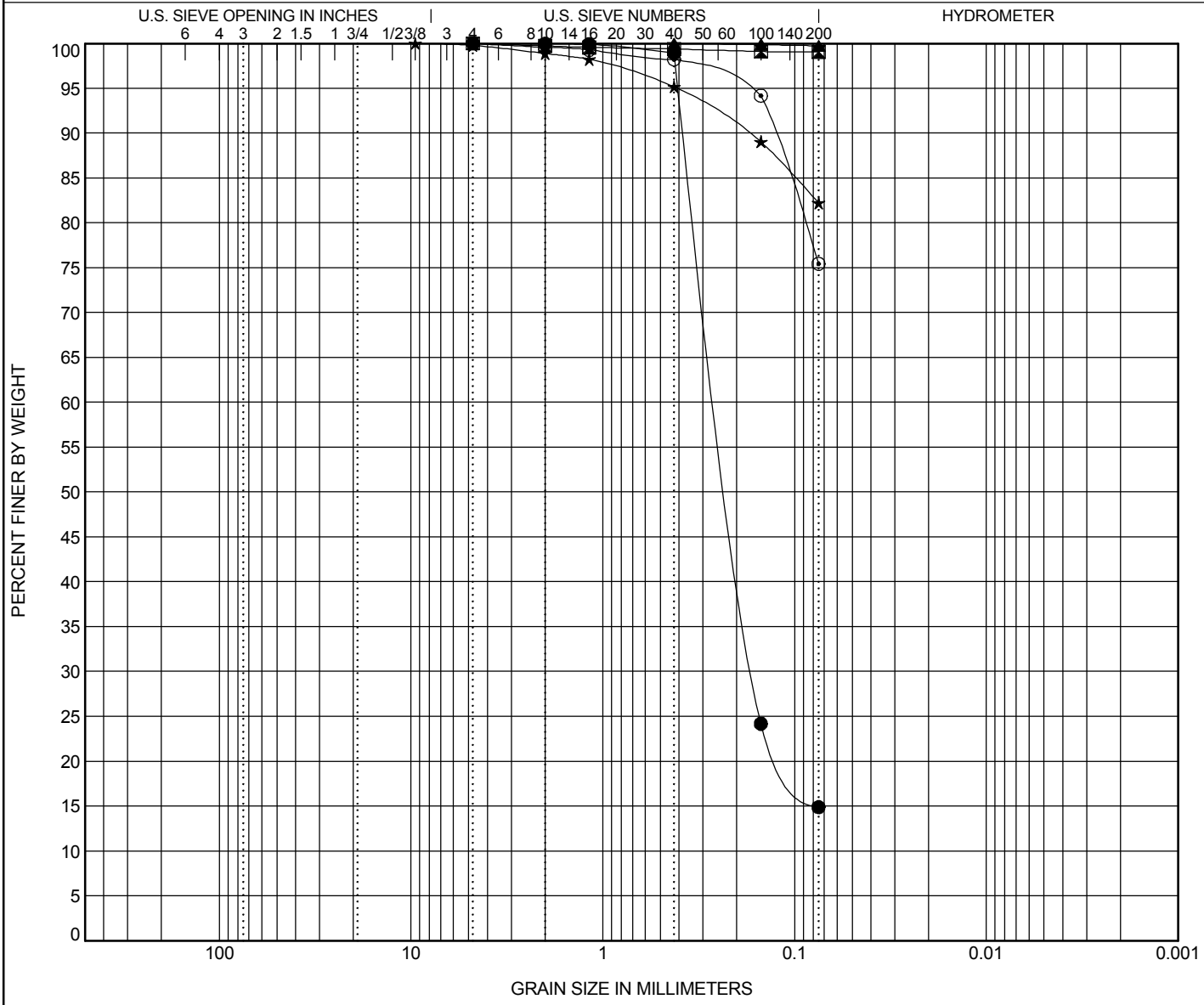
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-11	25.0	SILTY SAND(SM)	NP	NP	NP		
⊠	B-11	30.0	LEAN CLAY(CL)	49	20	29		
▲	B-11	40.0	FAT CLAY(CH)	70	23	47		
★	B-12	2.0	FAT CLAY with SAND(CH)	54	20	34		
⊙	B-12	5.0	SILT with SAND(ML)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-11	25.0	4.75	0.247	0.163		0.0	85.1	14.9	
⊠	B-11	30.0	4.75				0.0	1.0	99.0	
▲	B-11	40.0	1.18				0.0	0.3	99.7	
★	B-12	2.0	9.5				0.2	17.6	82.2	
⊙	B-12	5.0	4.75				0.0	24.6	75.4	

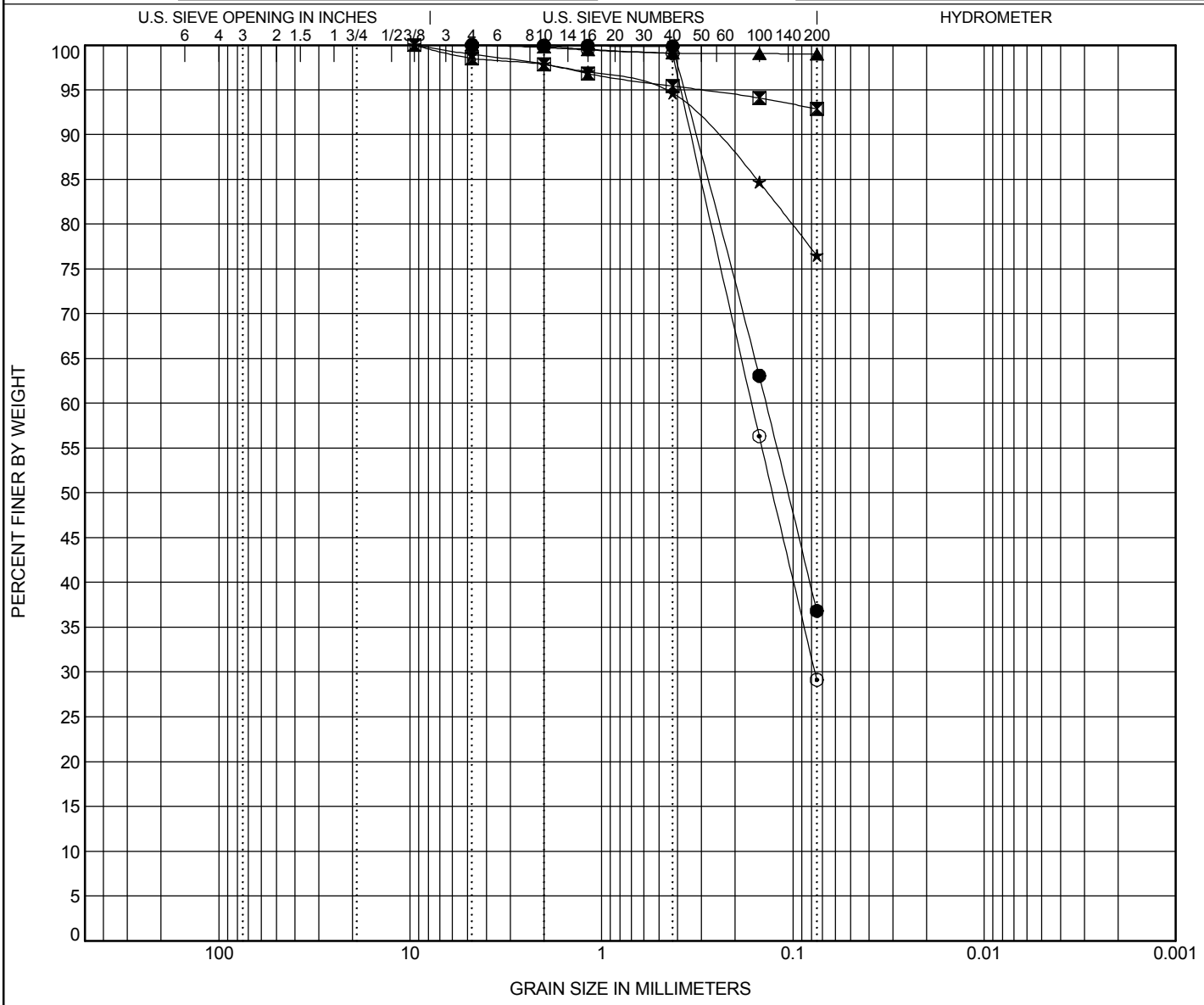
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-12	10.0	SILTY SAND(SM)	NP	NP	NP		
⊠	B-12	30.0	FAT CLAY(CH)	61	21	40		
▲	B-12	45.0	FAT CLAY(CH)	72	26	46		
★	B-13	5.0	LEAN CLAY with SAND(CL)	42	16	26		
⊙	B-13	10.0	SILTY SAND(SM)	NP	NP	NP		

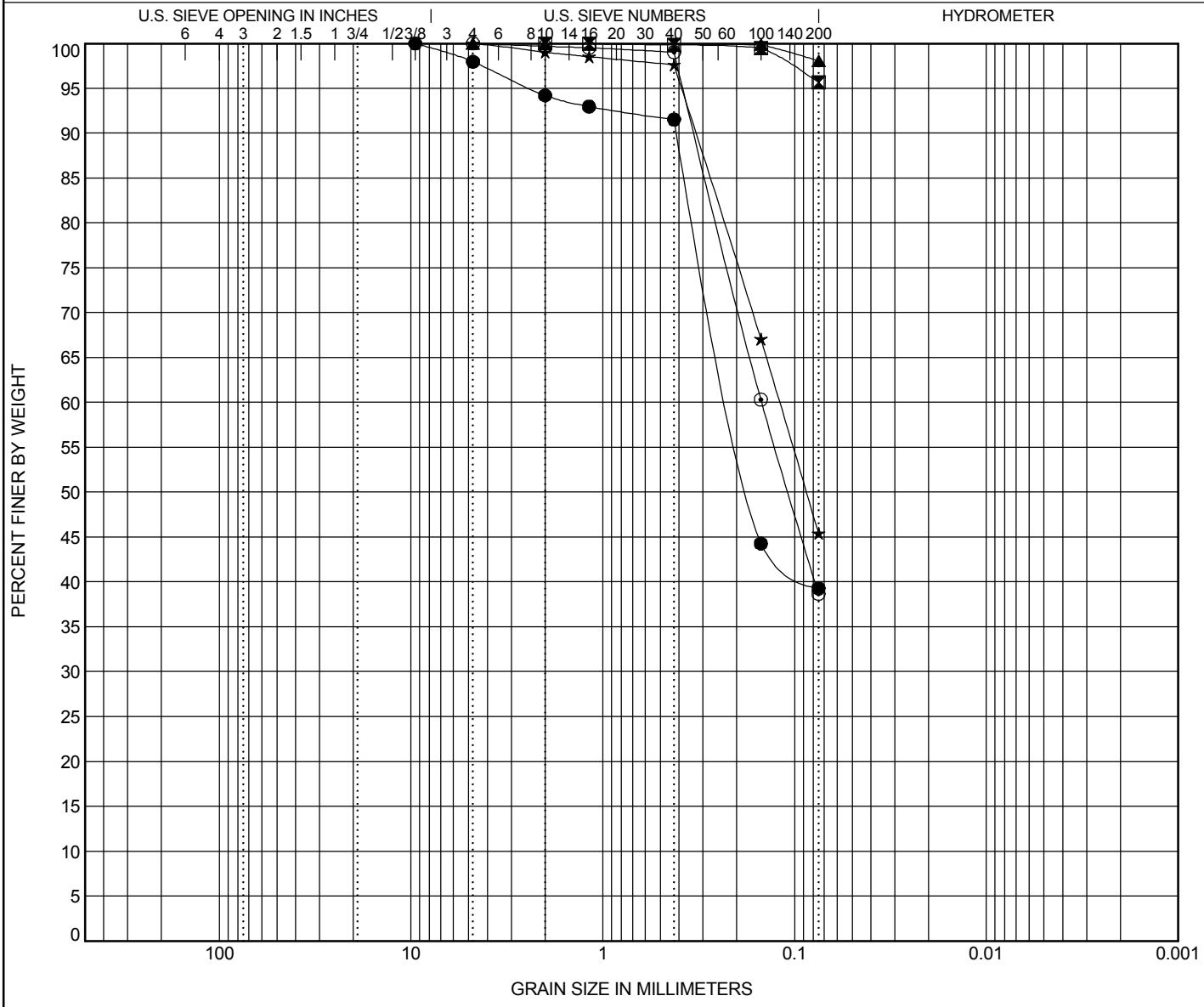
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-12	10.0	4.75	0.138			0.0	63.2	36.8	
⊠	B-12	30.0	9.5				1.5	5.6	92.9	
▲	B-12	45.0	4.75				0.0	1.0	99.0	
★	B-13	5.0	9.5				1.0	22.4	76.5	
⊙	B-13	10.0	4.75	0.164	0.077		0.0	70.9	29.1	

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-13	20.0	CLAYEY SAND(SC)	25	15	10		
⊠	B-13	30.0	LEAN CLAY(CL)	48	18	30		
▲	B-13	40.0	FAT CLAY(CH)	57	21	36		
★	B-14	2.0	CLAYEY SAND(SC)	27	15	12		
⊙	B-14	5.0	SILTY SAND(SM)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-13	20.0	9.5	0.212			2.0	58.7	39.3	
⊠	B-13	30.0	2				0.0	4.4	95.6	
▲	B-13	40.0	4.75				0.0	2.0	98.0	
★	B-14	2.0	9.5	0.12			0.0	54.6	45.4	
⊙	B-14	5.0	4.75	0.149			0.0	61.3	38.7	

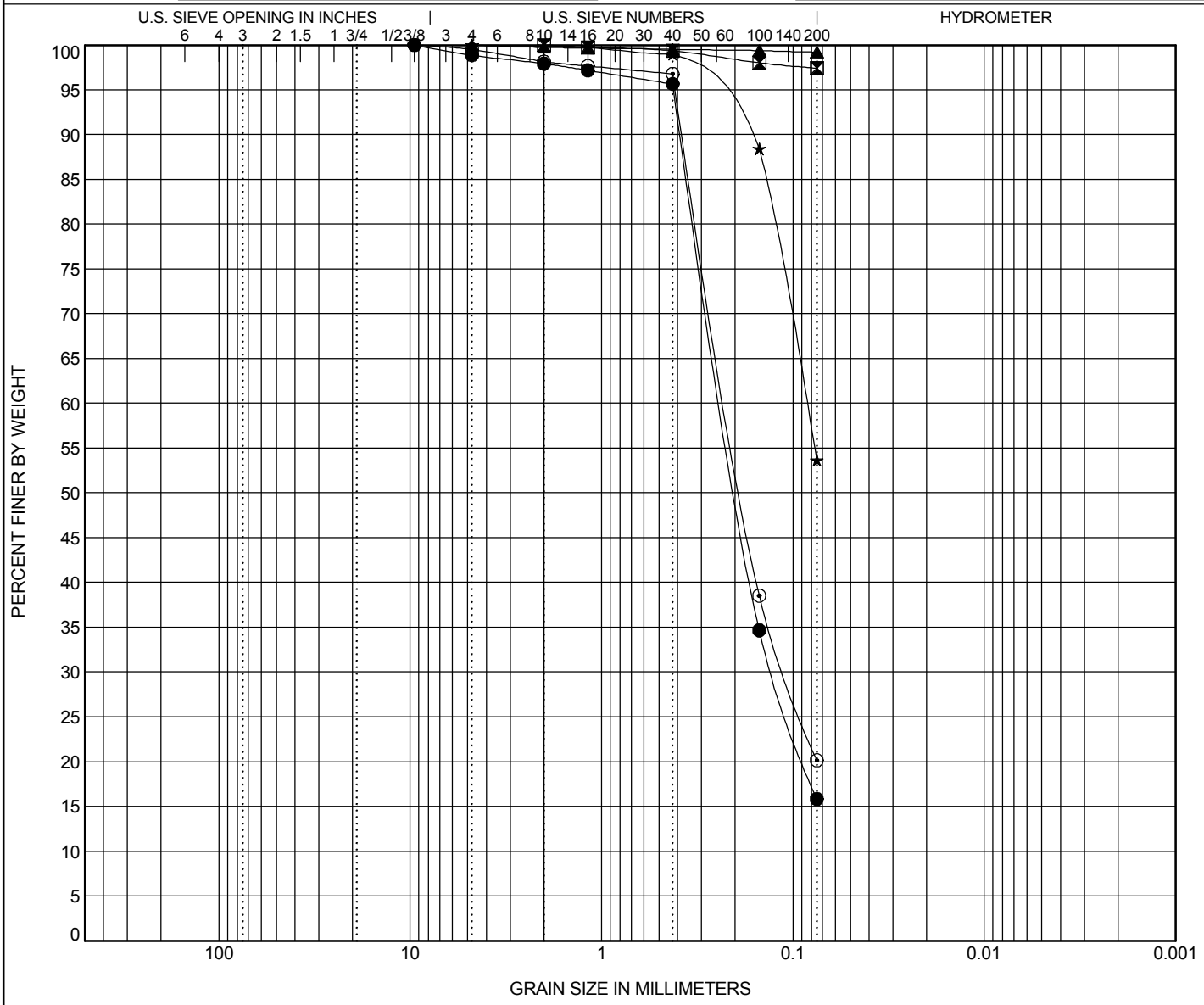
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-14	15.0	SILTY SAND(SM)	NP	NP	NP		
⊠	B-14	20.0	FAT CLAY(CH)	57	22	35		
▲	B-14	30.0	FAT CLAY(CH)	55	26	29		
★	B-14	50.0	SANDY LEAN CLAY(CL)	25	15	10		
⊙	B-15	5.0	SILTY SAND(SM)	NP	NP	NP		

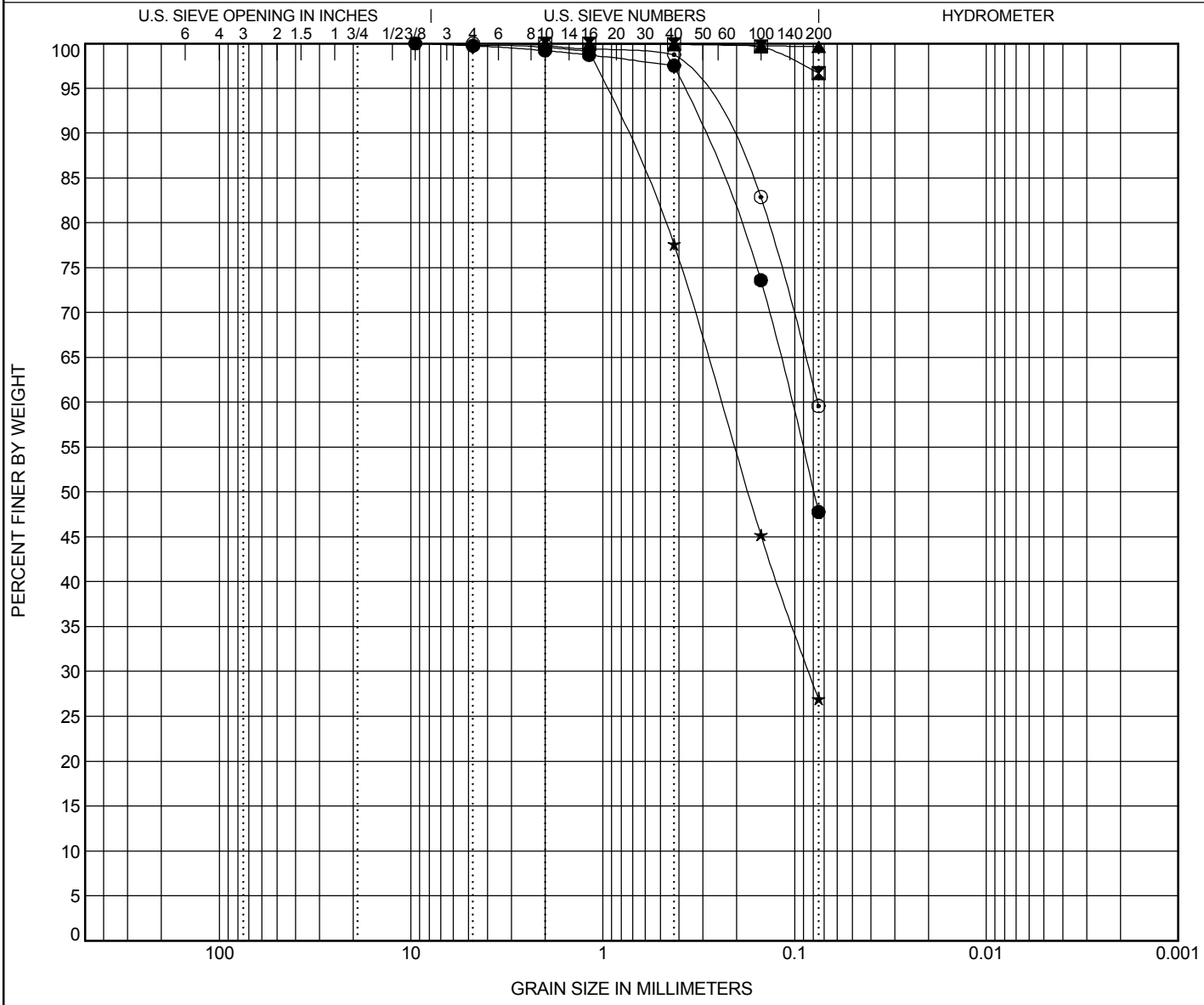
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-14	15.0	9.5	0.231	0.126		1.1	83.1	15.8	
⊠	B-14	20.0	2				0.0	2.6	97.4	
▲	B-14	30.0	4.75				0.0	0.8	99.2	
★	B-14	50.0	4.75	0.085			0.0	46.3	53.7	
⊙	B-15	5.0	9.5	0.22	0.109		0.5	79.4	20.1	

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-15	15.0	CLAYEY SAND(SC)	25	16	9		
⊠	B-15	25.0	LEAN CLAY(CL)	47	17	30		
▲	B-15	30.0	FAT CLAY(CH)	58	21	37		
★	B-16	2.0	SILTY SAND(SM)	NP	NP	NP		
⊙	B-16	20.0	SANDY LEAN CLAY(CL)	28	14	14		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	15.0	9.5	0.104			0.3	52.0	47.8	
⊠	B-15	25.0	2				0.0	3.3	96.7	
▲	B-15	30.0	2				0.0	0.4	99.6	
★	B-16	2.0	9.5	0.241	0.084		0.2	72.9	26.9	
⊙	B-16	20.0	4.75	0.076			0.0	40.4	59.6	

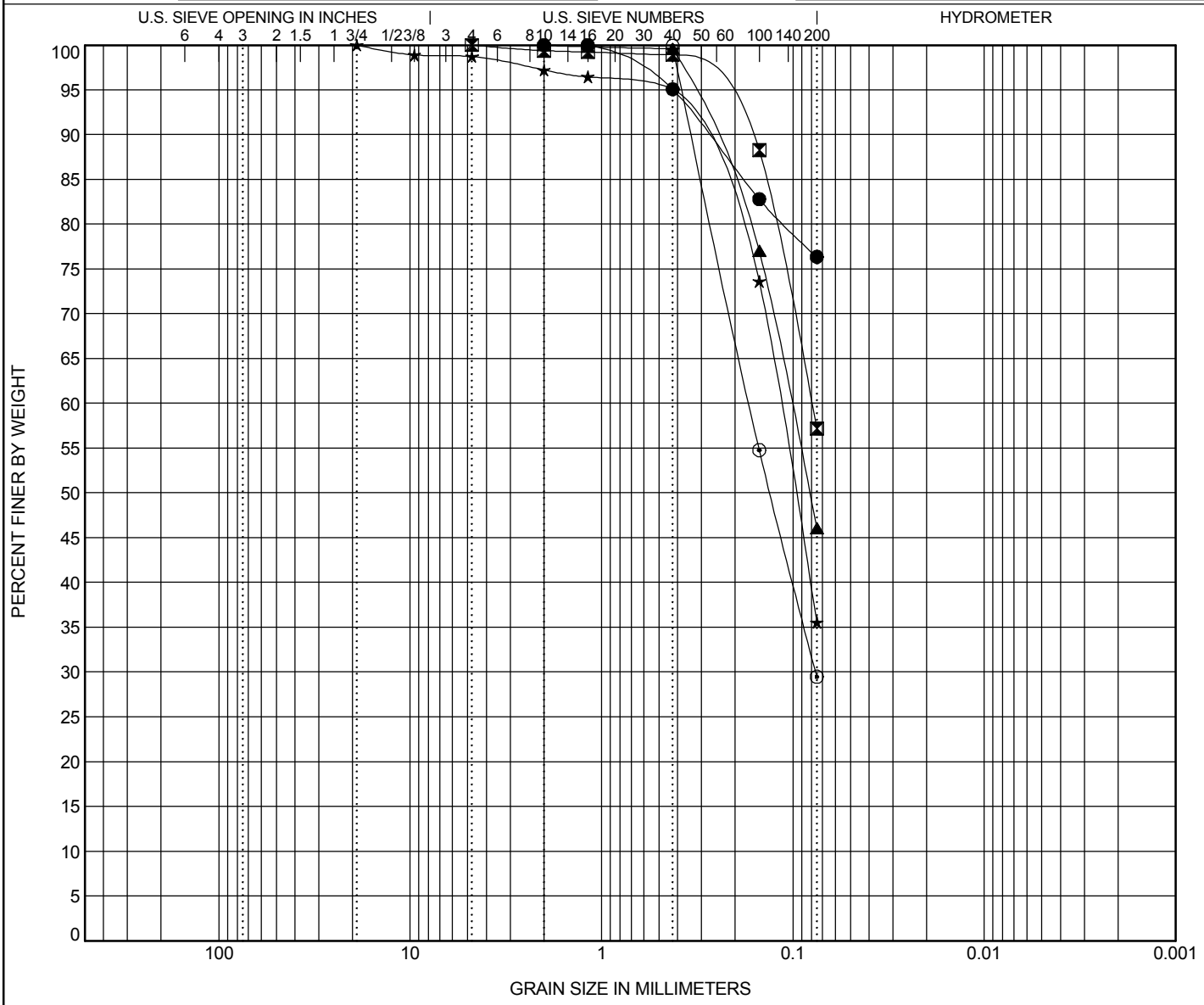
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-16	35.0	FAT CLAY with SAND(CH)	58	19	39		
⊠	B-16	45.0	SANDY LEAN CLAY(CL)	30	11	19		
▲	B-16	55.0	CLAYEY SAND(SC)	23	15	8		
★	B-17	5.0	SILTY SAND(SM)	NP	NP	NP		
⊙	B-17	10.0	SILTY SAND(SM)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-16	35.0	2				0.0	23.7	76.3	
⊠	B-16	45.0	4.75	0.08			0.0	42.8	57.2	
▲	B-16	55.0	2	0.102			0.0	54.0	46.0	
★	B-17	5.0	19	0.117			1.3	63.2	35.5	
⊙	B-17	10.0	1.18	0.169	0.076		0.0	70.5	29.5	

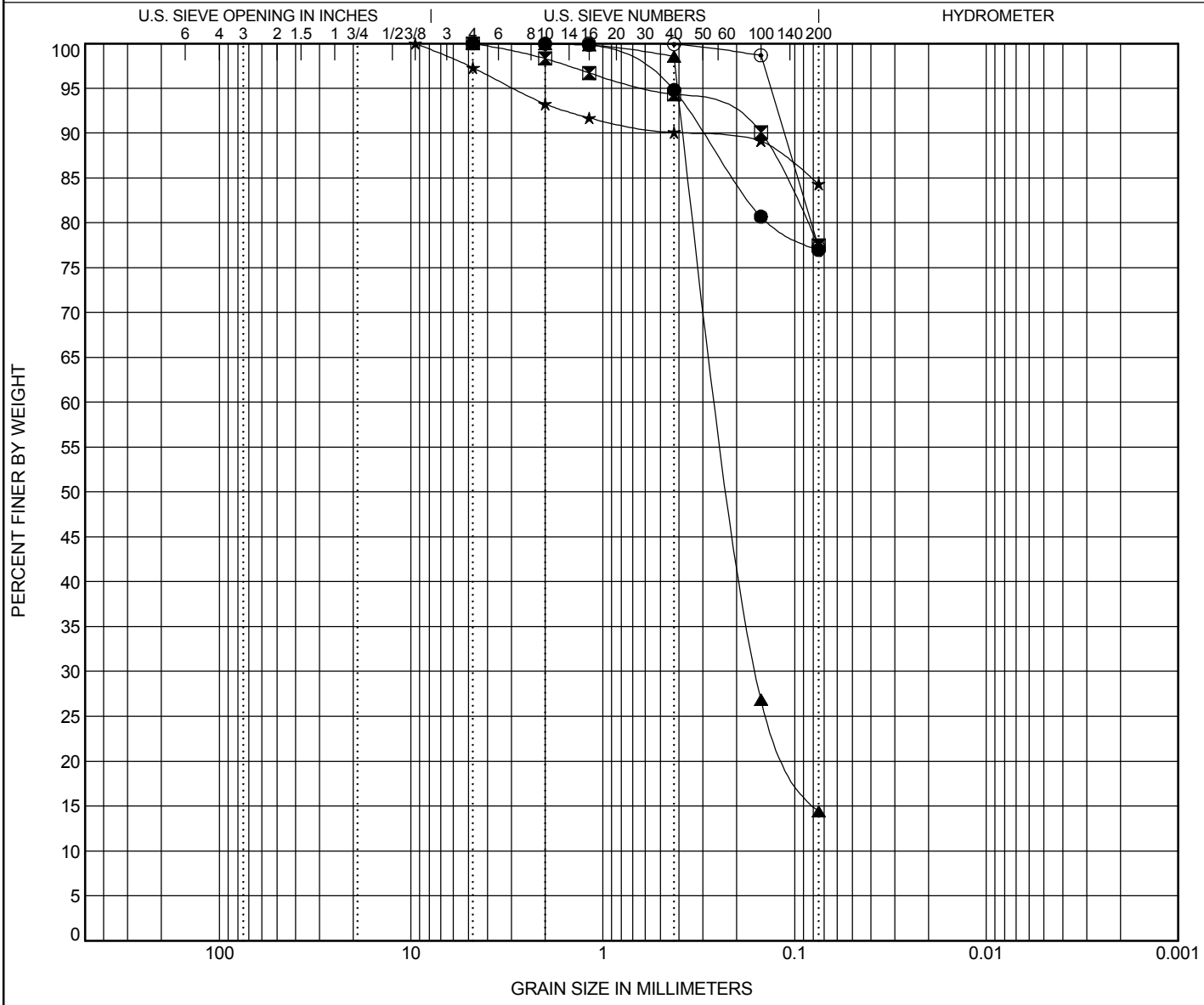
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-17	15.0	LEAN CLAY with SAND(CL)	46	15	31		
⊠	B-18	5.0	LEAN CLAY with SAND(CL)	40	16	24		
▲	B-18	10.0	SILTY SAND(SM)	NP	NP	NP		
★	B-18	20.0	LEAN CLAY with SAND(CL)	44	17	27		
⊙	B-18	30.0	LEAN CLAY with SAND(CL)	28	20	8		

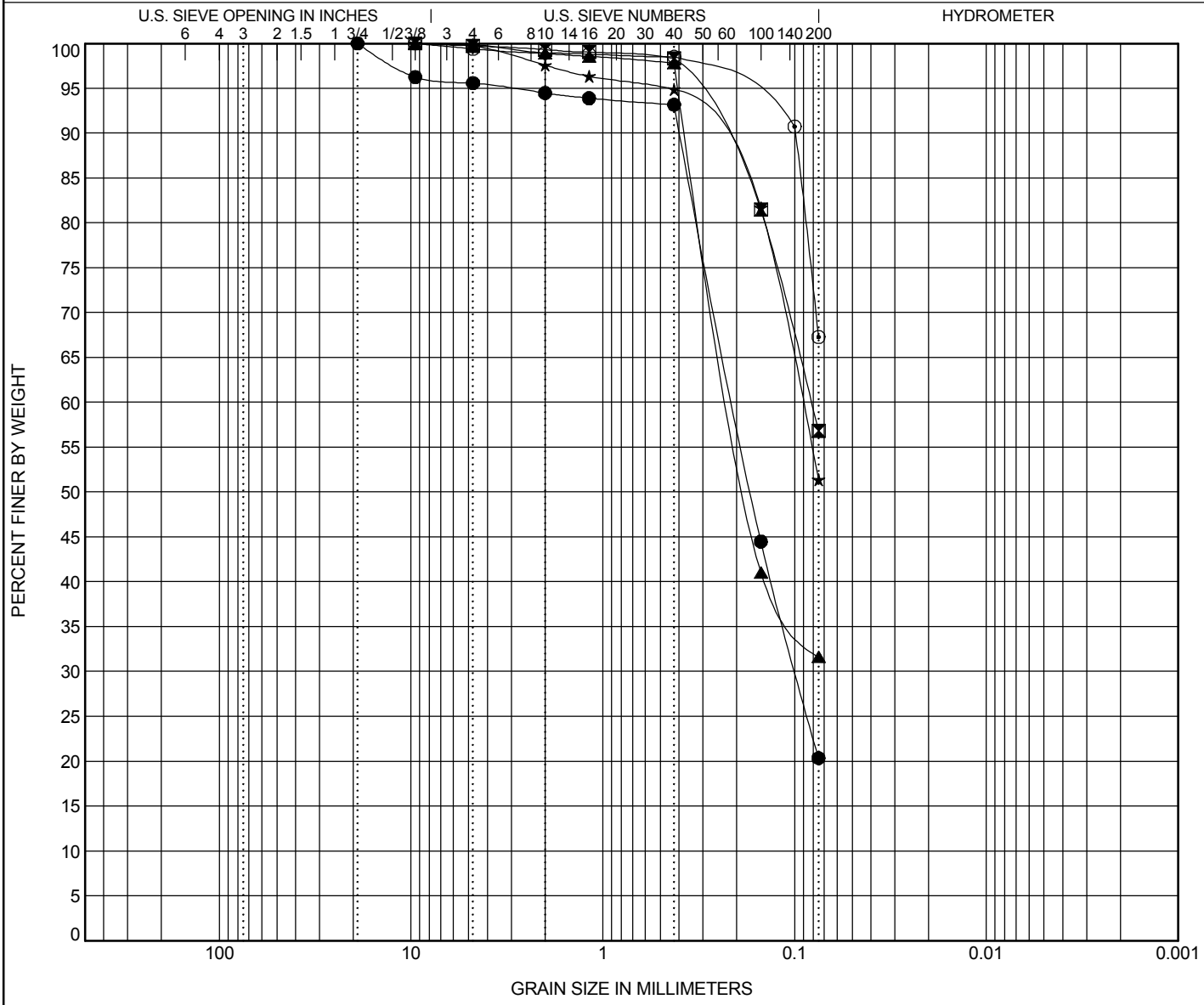
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-17	15.0	4.75				0.0	23.0	77.0	
⊠	B-18	5.0	4.75				0.0	22.5	77.5	
▲	B-18	10.0	4.75	0.243	0.157		0.0	85.6	14.4	
★	B-18	20.0	9.5				2.7	13.0	84.3	
⊙	B-18	30.0	1.18				0.0	22.8	77.2	

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-18	40.0	CLAYEY SAND(SC)	39	15	24		
⊠	B-19	5.0	SANDY LEAN CLAY(CL)	33	16	17		
▲	B-19	10.0	SILTY SAND(SM)	NP	NP	NP		
★	B-19	20.0	SANDY FAT CLAY(CH)	53	16	37		
⊙	B-19	30.0	SANDY LEAN CLAY(CL)	34	12	22		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-18	40.0	19	0.209	0.099		4.4	75.2	20.3	
⊠	B-19	5.0	9.5	0.082			0.3	42.9	56.8	
▲	B-19	10.0	9.5	0.212			0.1	68.3	31.6	
★	B-19	20.0	9.5	0.091			0.3	48.4	51.4	
⊙	B-19	30.0	9.5				0.6	32.1	67.3	

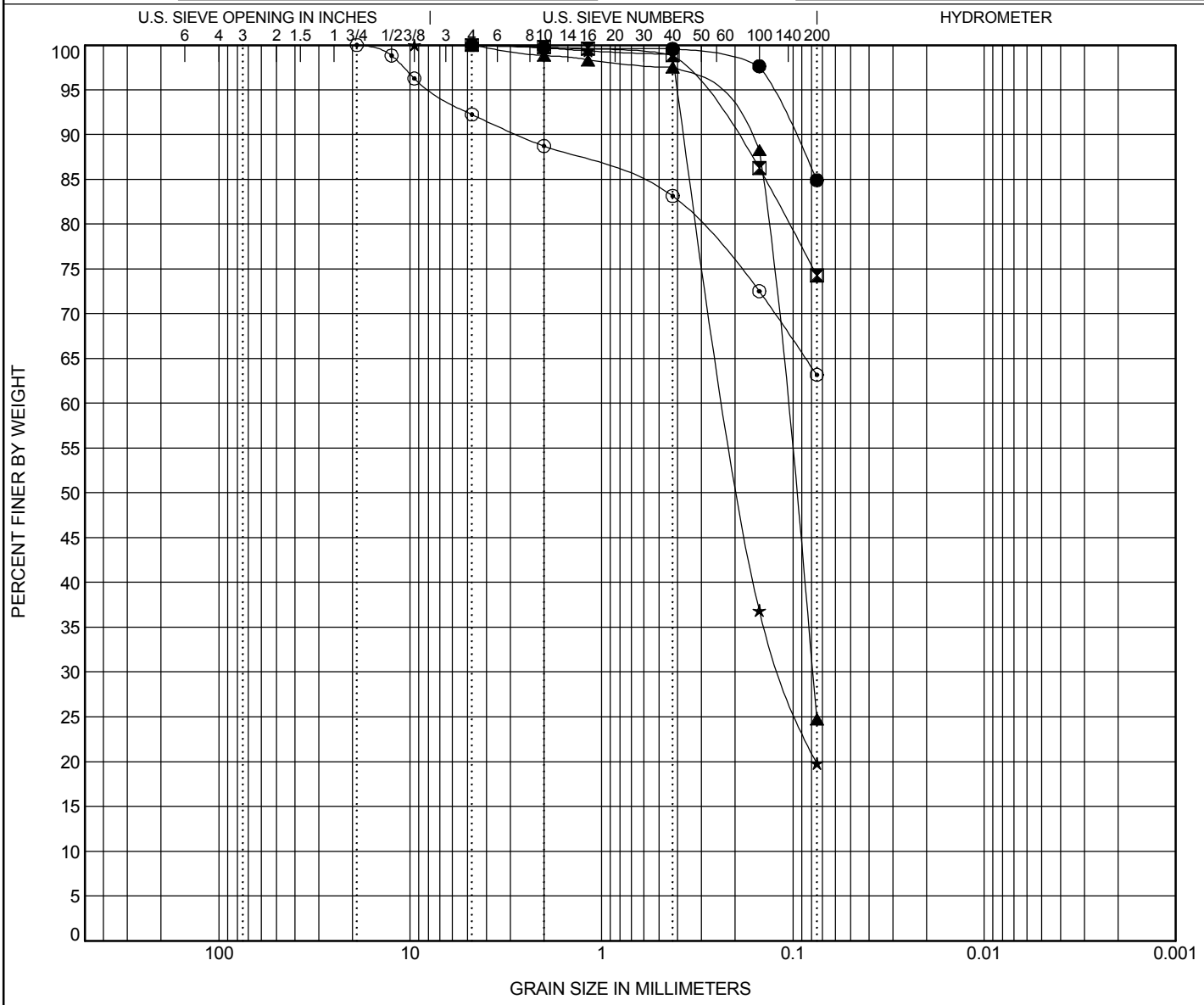
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	B-19	40.0	LEAN CLAY with SAND(CL)	39	15	24		
⊠	B-20	5.0	LEAN CLAY with SAND(CL)	40	17	23		
▲	B-20	10.0	SILTY, CLAYEY SAND(SC-SM)	25	18	7		
★	B-20	15.0	SILTY SAND(SM)	NP	NP	NP		
⊙	SB- 1	5.0	SANDY LEAN CLAY(CL)	42	16	26		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-19	40.0	4.75				0.0	15.1	84.9	
⊠	B-20	5.0	4.75				0.0	25.7	74.3	
▲	B-20	10.0	4.75	0.11	0.079		0.0	75.3	24.7	
★	B-20	15.0	9.5	0.221	0.114		0.1	80.1	19.8	
⊙	SB- 1	5.0	19				7.8	29.1	63.2	

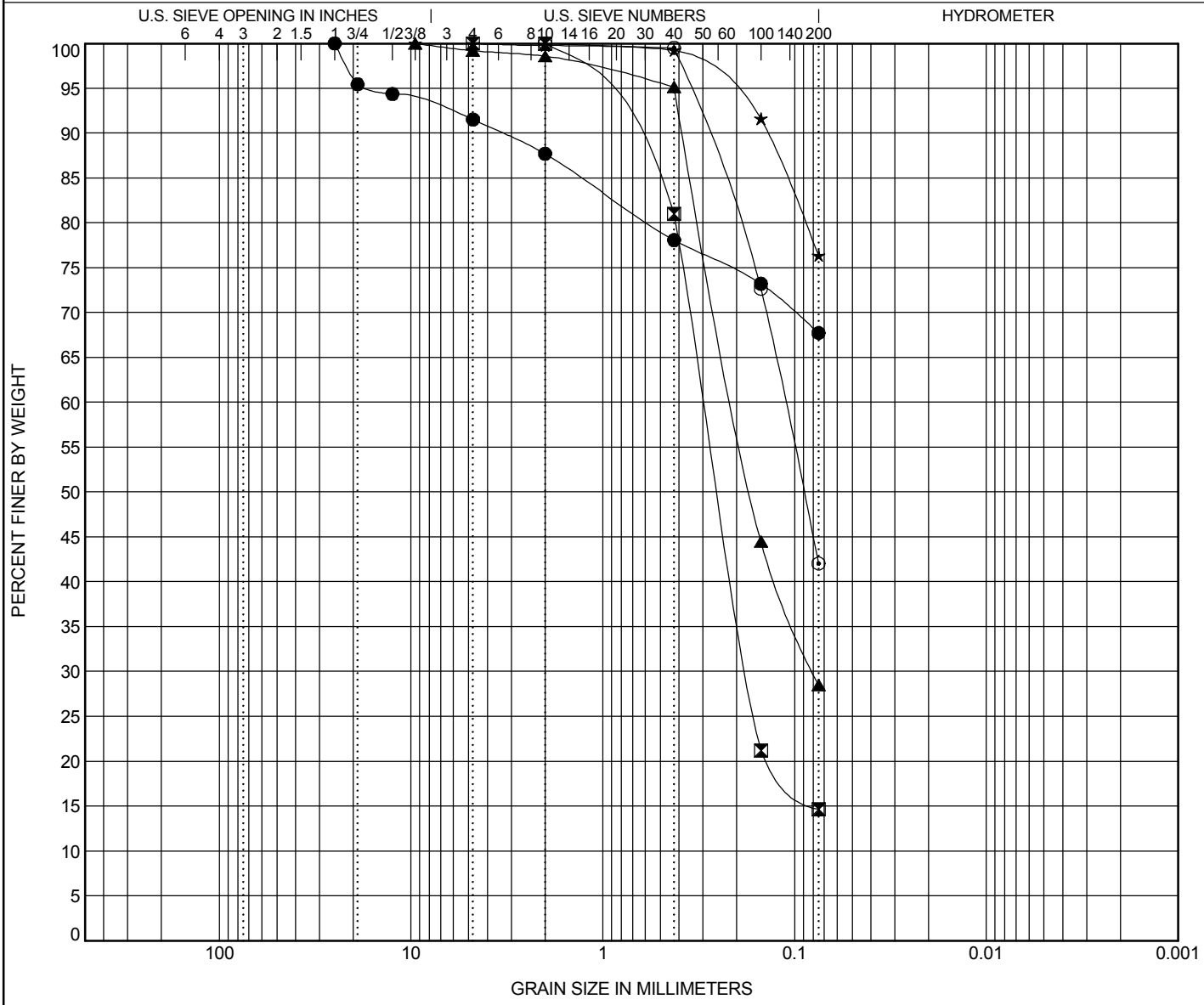
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB- 1	15.0	SANDY LEAN CLAY(CL)	47	16	31		
⊠	SB- 2	5.0	CLAYEY SAND(SC)	30	16	14		
▲	SB- 2	10.0	SILTY SAND(SM)	NP	NP	NP		
★	SB- 2	15.0	LEAN CLAY with SAND(CL)	37	8	29		
⊙	SB- 3	2.0	SILTY, CLAYEY SAND(SC-SM)	22	17	5		

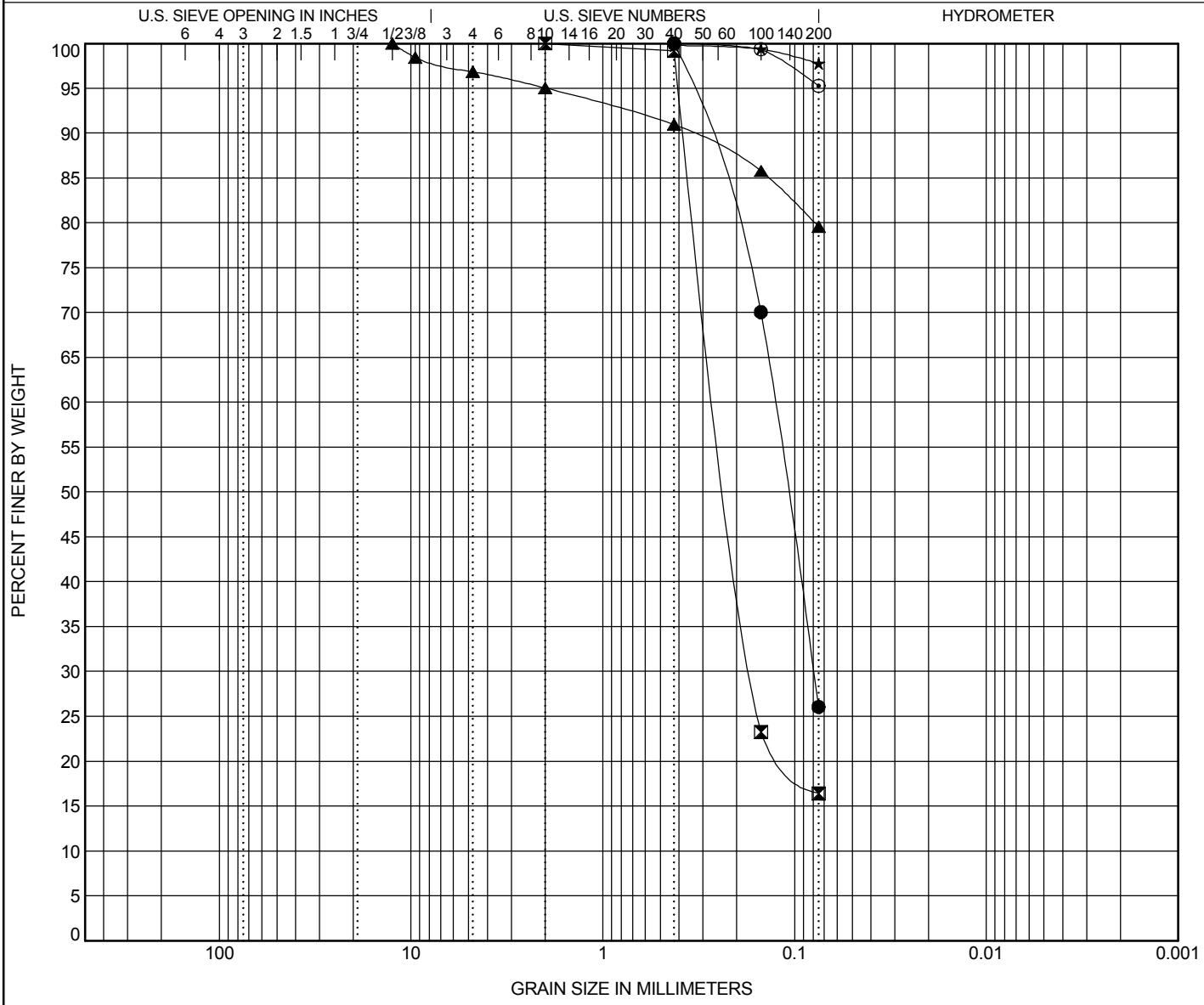
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB- 1	15.0	25				8.5	23.8	67.7	
⊠	SB- 2	5.0	4.75	0.295	0.175		0.0	85.4	14.6	
▲	SB- 2	10.0	9.5	0.206	0.08		0.8	70.7	28.5	
★	SB- 2	15.0	9.5				0.0	23.6	76.4	
⊙	SB- 3	2.0	2	0.113			0.0	58.0	42.0	

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB- 3	10.0	SILTY SAND(SM)	NP	NP	NP		
⊠	SB- 3	20.0	SILTY SAND(SM)	NP	NP	NP		
▲	SB- 4	5.0	FAT CLAY with SAND(CH)	52	17	35		
★	SB- 4	10.0	LEAN CLAY(CL)	49	13	36		
⊙	SB- 4	25.0	LEAN CLAY(CL)	43	13	30		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB- 3	10.0	0.425	0.128	0.08		0.0	74.0	26.0	
⊠	SB- 3	20.0	2	0.248	0.165		0.0	83.6	16.4	
▲	SB- 4	5.0	12.5				3.2	17.2	79.6	
★	SB- 4	10.0	0.425					2.0	97.8	
⊙	SB- 4	25.0	0.425				0.0	4.7	95.3	

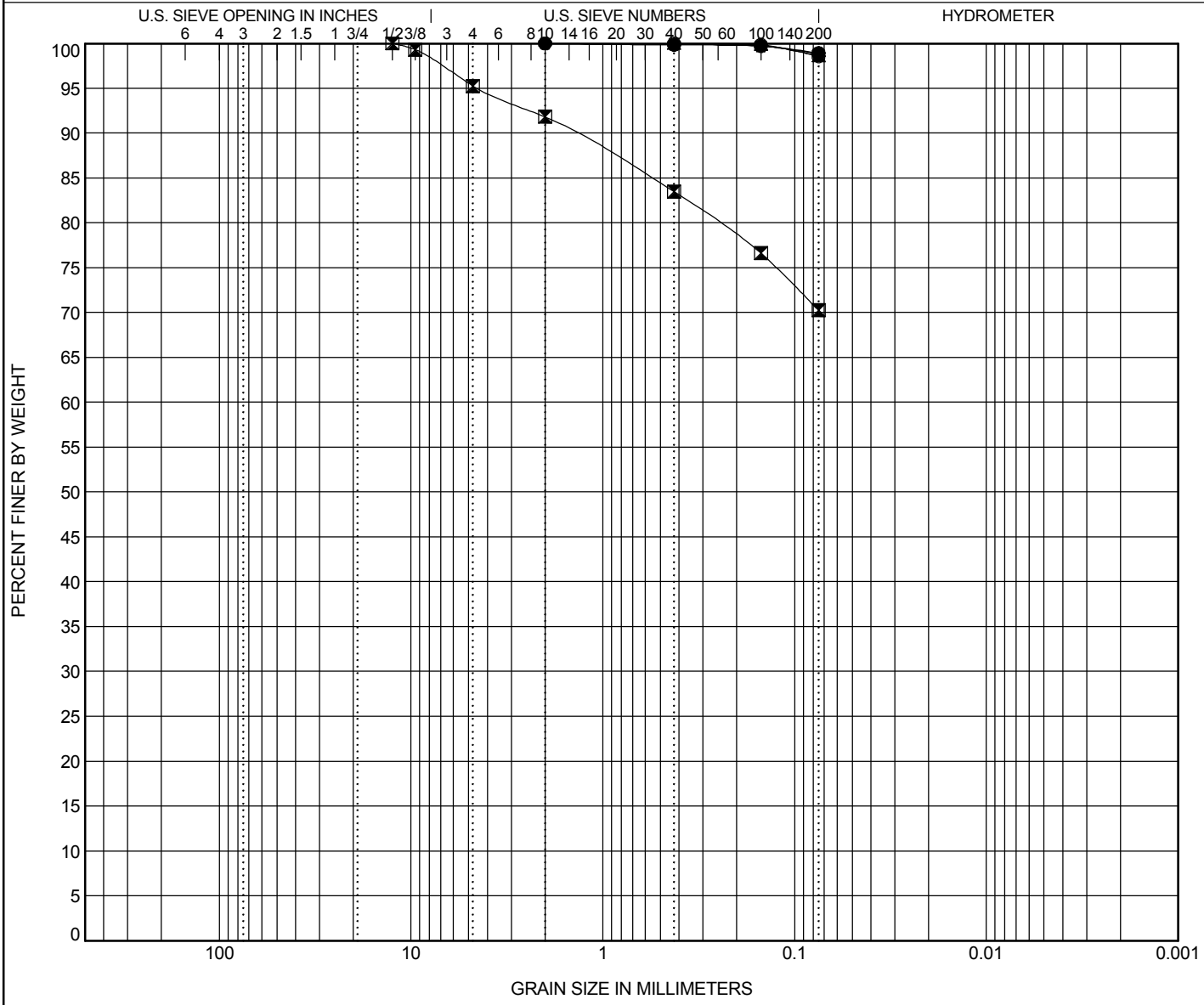
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB- 4	60.0	FAT CLAY(CH)	59	15	44		
⊠	SB- 5	5.0	LEAN CLAY with SAND(CL)	42	12	30		
▲	SB- 5	15.0	FAT CLAY(CH)	54	16	38		
★	SB- 5	30.0	FAT CLAY(CH)	57	16	41		
⊙	SB- 5	40.0	FAT CLAY(CH)	62	15	47		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB- 4	60.0	2				0.0	1.1	98.9	
⊠	SB- 5	5.0	12.5				4.7	25.0	70.2	
▲	SB- 5	15.0	0.425				0.0	1.4	98.6	
★	SB- 5	30.0	2				0.0	1.2	98.8	
⊙	SB- 5	40.0	0.425				0.0	1.4	98.6	

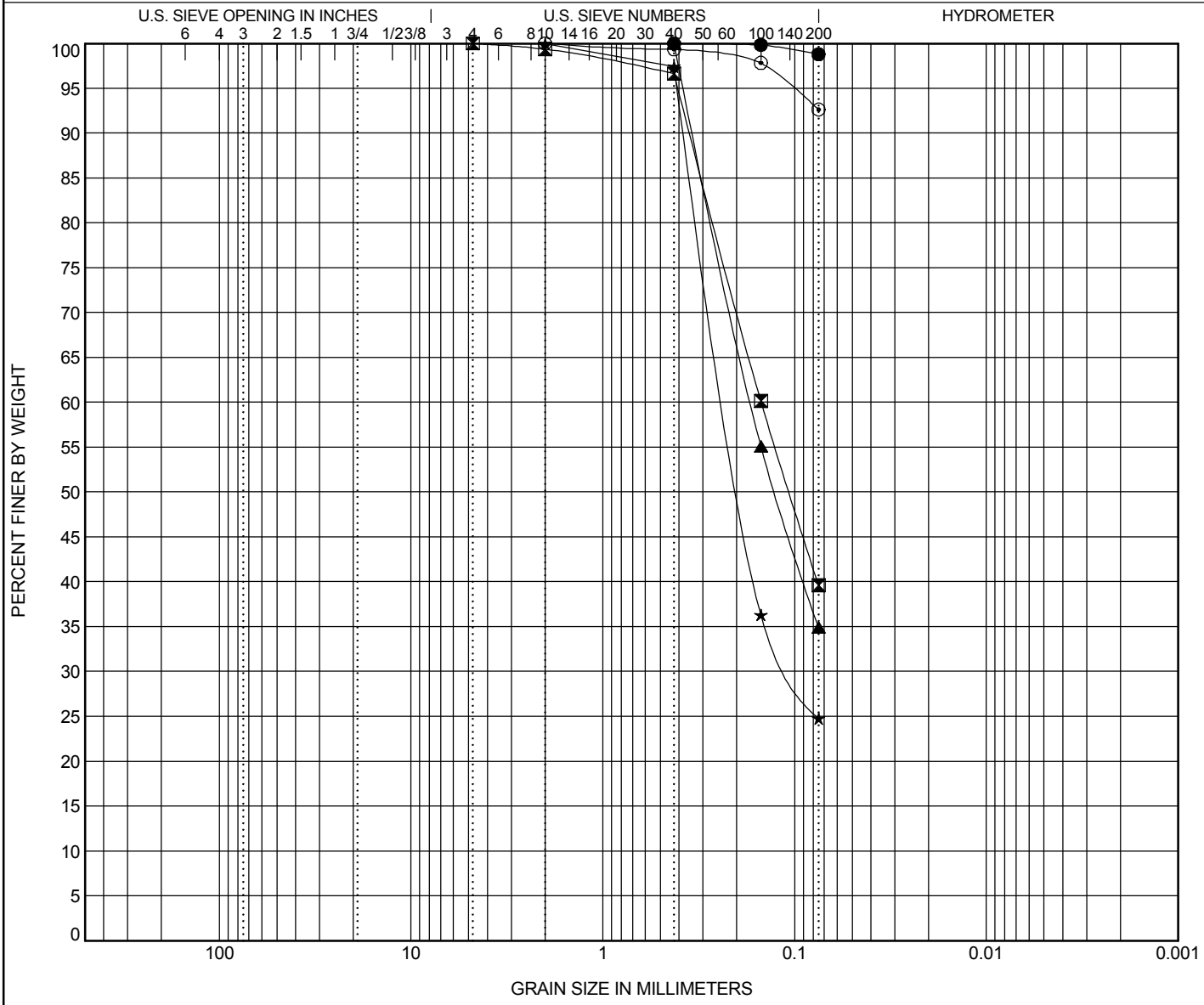
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB- 5	60.0	FAT CLAY(CH)	62	17	45		
⊠	SB- 6	2.0	SILTY SAND(SM)	NP	NP	NP		
▲	SB- 6	10.0	SILTY SAND(SM)	NP	NP	NP		
★	SB- 6	15.0	SILTY SAND(SM)	NP	NP	NP		
⊙	SB- 6	30.0	LEAN CLAY(CL)	41	14	27		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB- 5	60.0	0.425				0.0	1.2	98.8	
⊠	SB- 6	2.0	4.75	0.149			0.0	60.4	39.6	
▲	SB- 6	10.0	0.425	0.168			0.0	65.1	34.9	
★	SB- 6	15.0	2	0.225	0.103		0.0	75.2	24.8	
⊙	SB- 6	30.0	2				0.0	7.4	92.6	

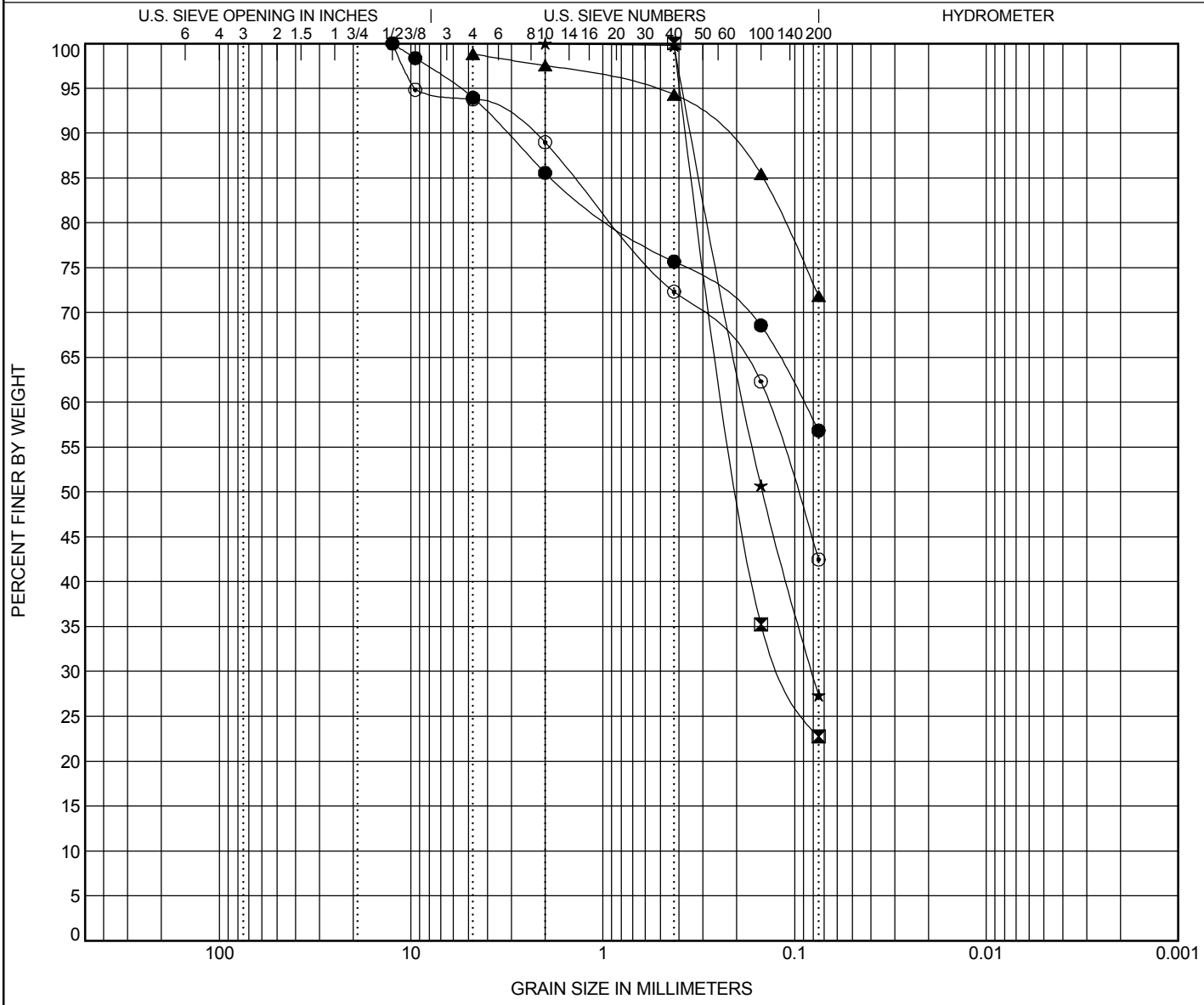
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	SB- 7	5.0	SANDY LEAN CLAY(CL)	34	12	22		
⊠	SB- 7	10.0	SILTY SAND(SM)	NP	NP	NP		
▲	SB- 8	5.0	LEAN CLAY with SAND(CL)	24	15	9		
★	SB- 8	20.0	SILTY SAND(SM)	NP	NP	NP		
⊙	SB- 9	2.0	CLAYEY SAND(SC)	29	12	17		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB- 7	5.0	12.5	0.09			6.0	37.1	56.9	
⊠	SB- 7	10.0	0.425	0.223	0.112		0.0	77.2	22.8	
▲	SB- 8	5.0	4.75					27.0	71.8	
★	SB- 8	20.0	2	0.183	0.081		0.0	72.6	27.4	
⊙	SB- 9	2.0	12.5	0.138			6.2	51.3	42.5	

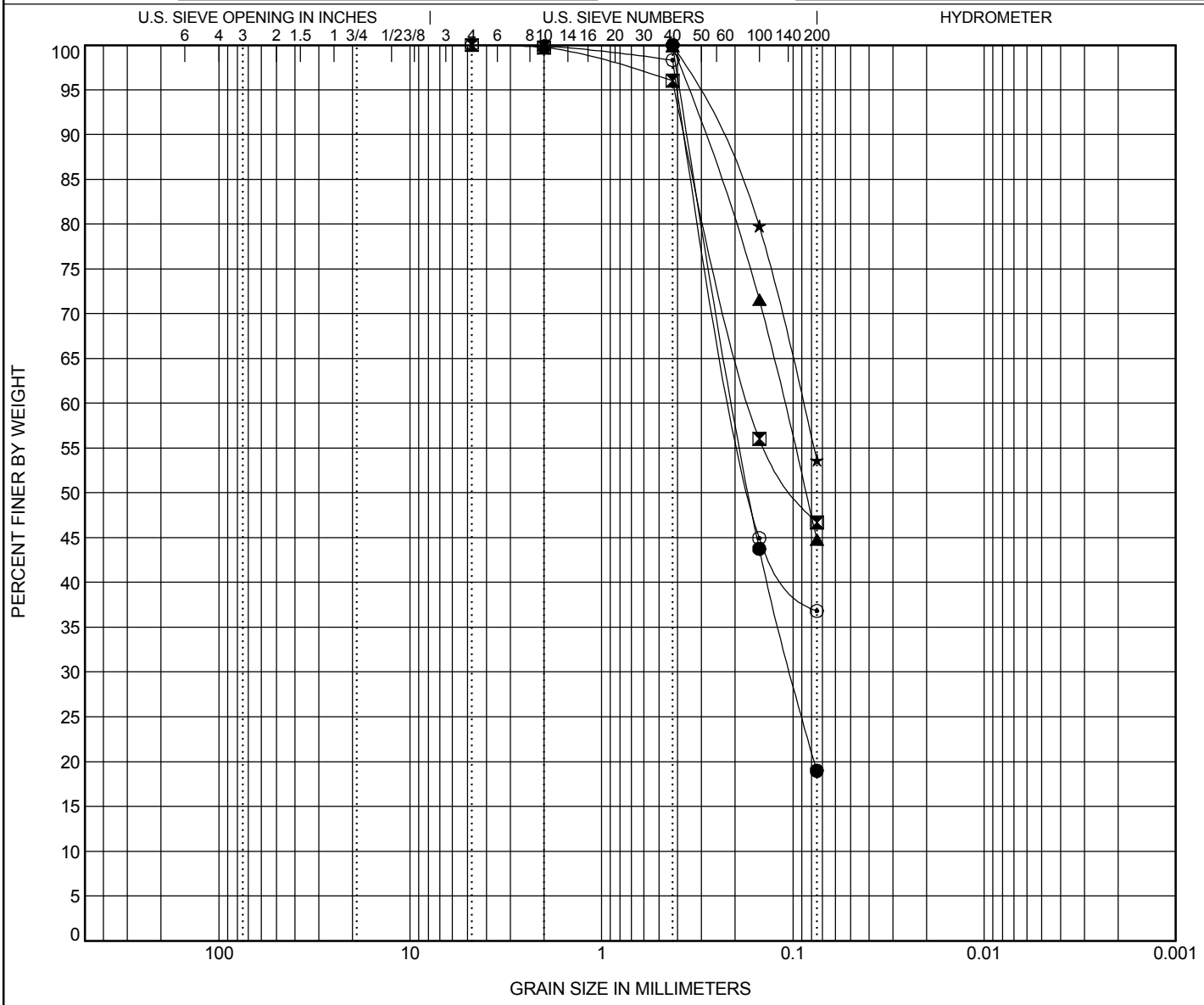
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB- 9	5.0	SILTY SAND(SM)	NP	NP	NP		
⊠	SB- 9	15.0	SILTY SAND(SM)	NP	NP	NP		
▲	SB-10	2.0	CLAYEY SAND(SC)	38	17	21		
★	SB-10	5.0	SANDY LEAN CLAY(CL)	22	11	11		
⊙	SB-10	10.0	SILTY SAND(SM)	NP	NP	NP		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB- 9	5.0	0.425	0.203	0.102		0.0	81.0	19.0	
⊠	SB- 9	15.0	4.75	0.166			0.0	53.3	46.7	
▲	SB-10	2.0	2	0.111			0.0	55.2	44.8	
★	SB-10	5.0	0.425	0.089			0.0	46.4	53.6	
⊙	SB-10	10.0	4.75	0.201			0.0	63.2	36.8	

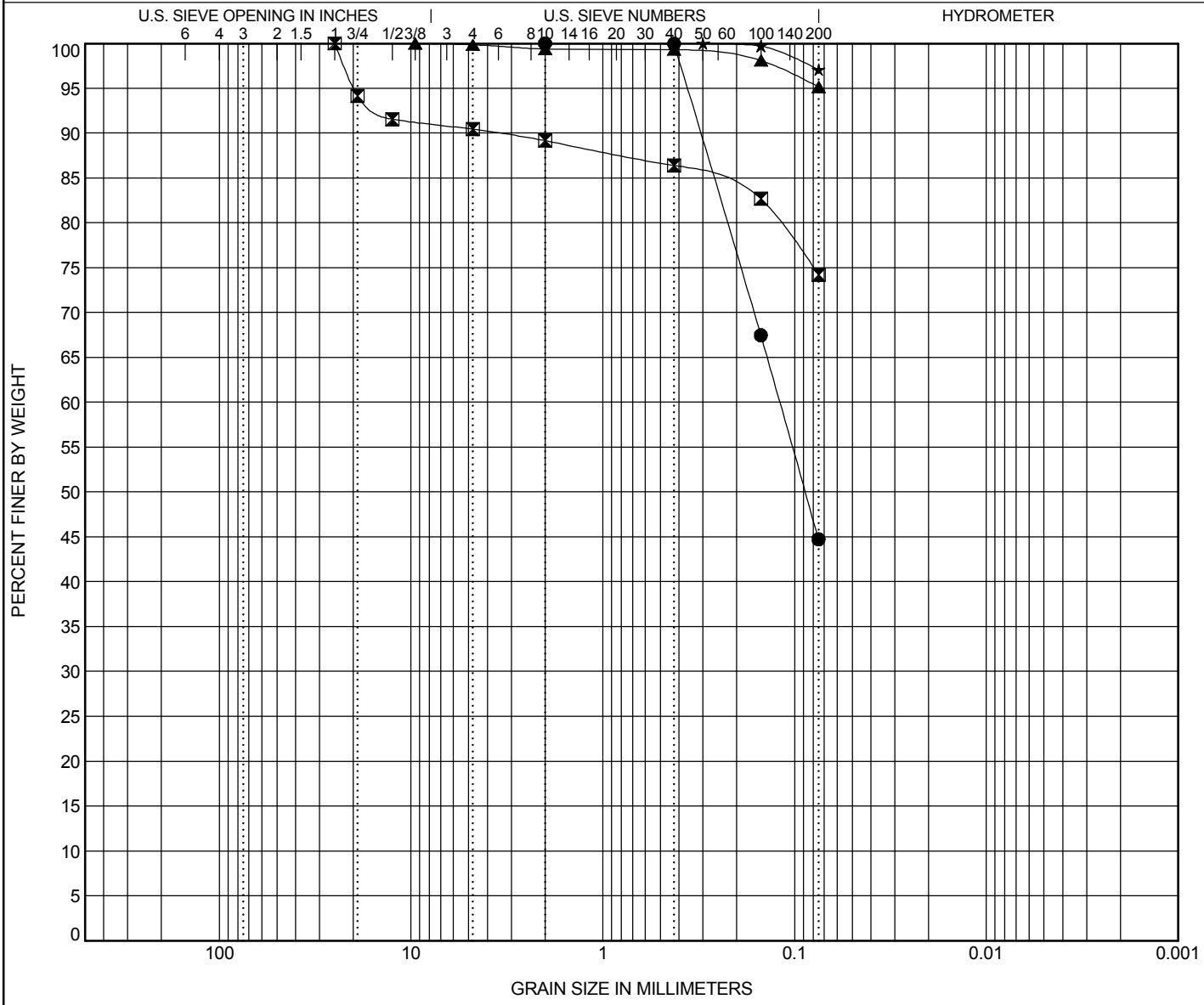
GRAIN SIZE 1 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

GRAIN SIZE DISTRIBUTION

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	SB-10	15.0	SILTY SAND(SM)	NP	NP	NP		
⊠	SB-11	2.0	LEAN CLAY with SAND(CL)	47	12	35		
▲	SB-11	10.0	FAT CLAY(CH)	57	15	42		
★	SB-11	20.0	FAT CLAY(CH)	61	18	43		

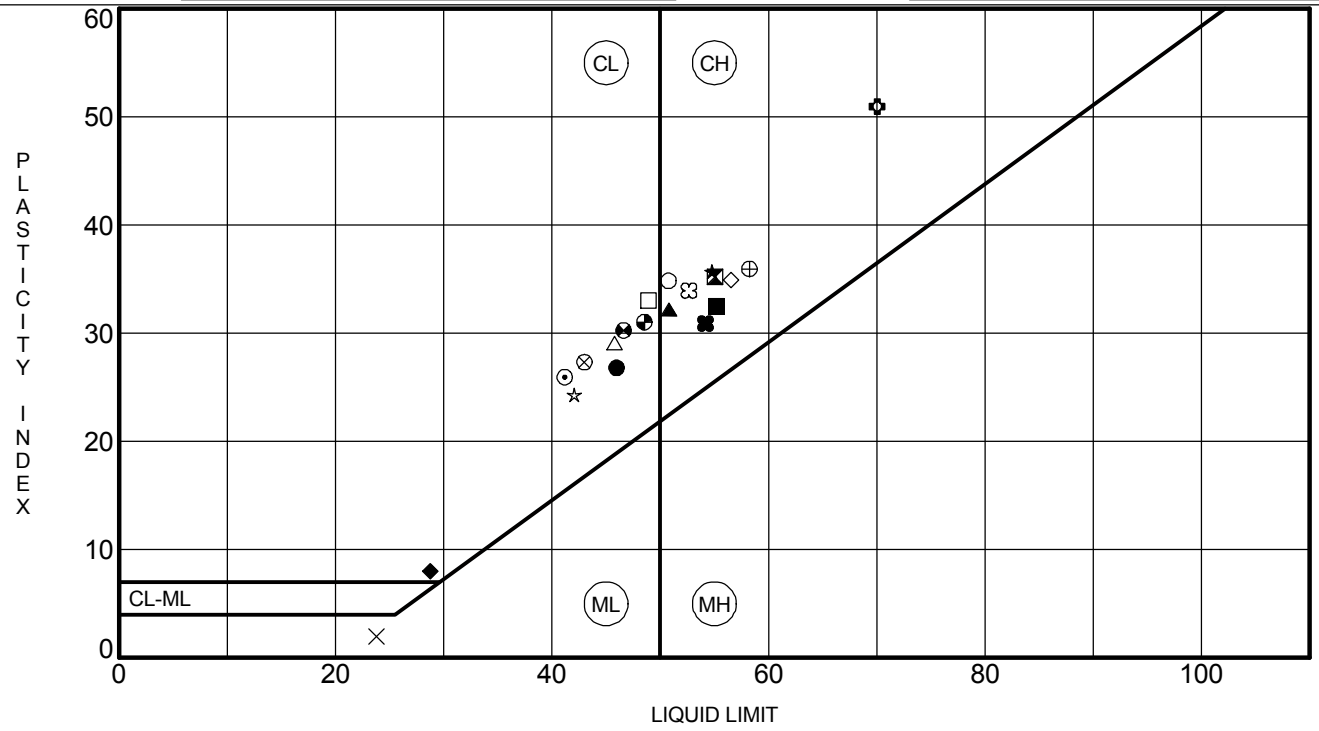
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	SB-10	15.0	2	0.119			0.0	55.3	44.7	
⊠	SB-11	2.0	25				9.6	16.2	74.2	
▲	SB-11	10.0	9.5				0.1	4.7	95.2	
★	SB-11	20.0	0.3				0.0	2.9	97.1	

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



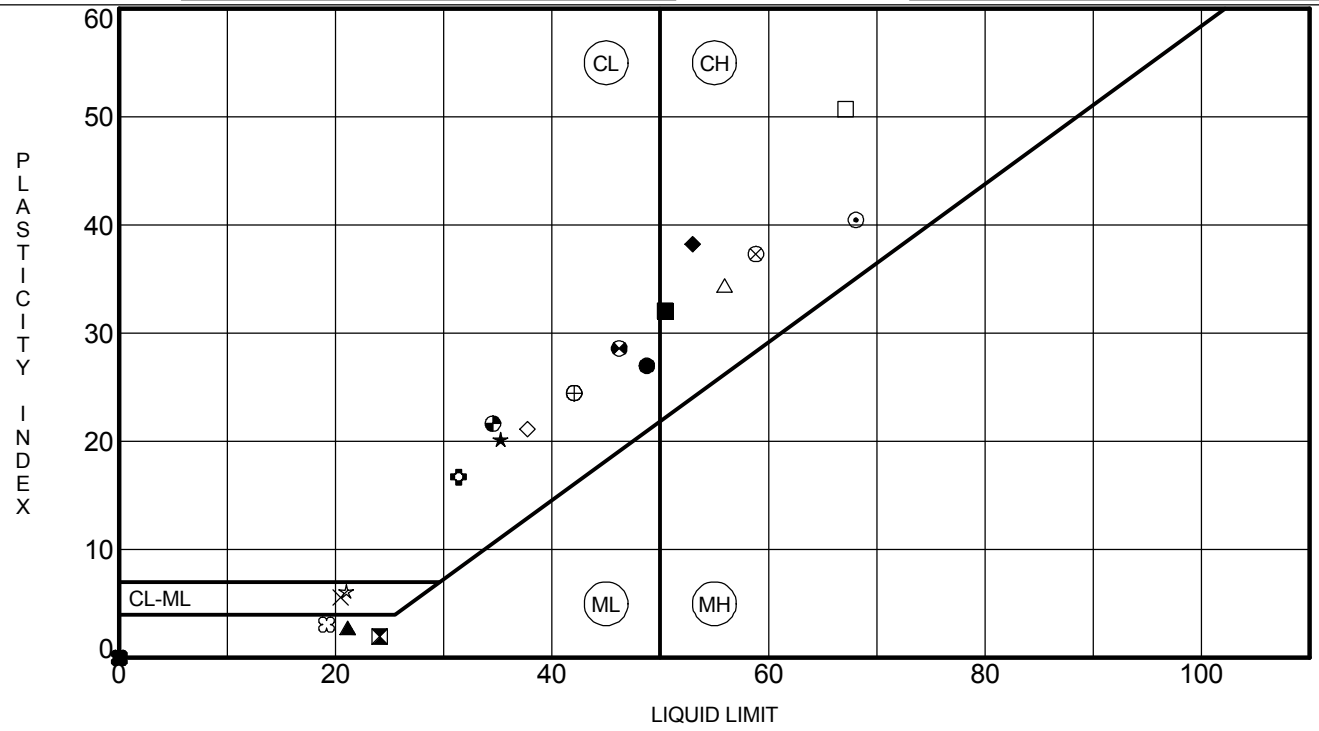
	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-01	5.0	46	19	27	49	CLAYEY SAND with GRAVEL(SC)
⊠	B-01	15.0	55	20	35	91	FAT CLAY(CH)
▲	B-02	5.0	51	19	32	58	SANDY FAT CLAY(CH)
★	B-02	15.0	55	19	36	97	FAT CLAY(CH)
⊙	B-02	20.0	41	15	26	100	LEAN CLAY(CL)
✿	B-03	5.0	70	19	51	98	FAT CLAY(CH)
○	B-03	15.0	51	16	35	90	FAT CLAY(CH)
△	B-04	5.0	46	17	29	92	LEAN CLAY(CL)
⊗	B-04	10.0	43	16	27	90	LEAN CLAY(CL)
⊕	B-04	20.0	58	22	36	99	FAT CLAY(CH)
□	B-05	5.0	49	16	33	83	LEAN CLAY with SAND(CL)
⊛	B-05	10.0	47	16	31	96	LEAN CLAY(CL)
◕	B-05	15.0	49	17	32	97	LEAN CLAY(CL)
☆	B-05	25.0	42	18	24	96	LEAN CLAY(CL)
⊠	B-05	50.0	53	19	34	95	FAT CLAY(CH)
■	B-06	5.0	55	23	32	94	FAT CLAY(CH)
◆	B-06	10.0	29	21	8	73	LEAN CLAY with SAND(CL)
◇	B-06	15.0	57	22	35	99	FAT CLAY(CH)
×	B-06	25.0	24	22	2	46	SILTY SAND(SM)
✖	B-06	50.0	54	23	31	99	FAT CLAY(CH)

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



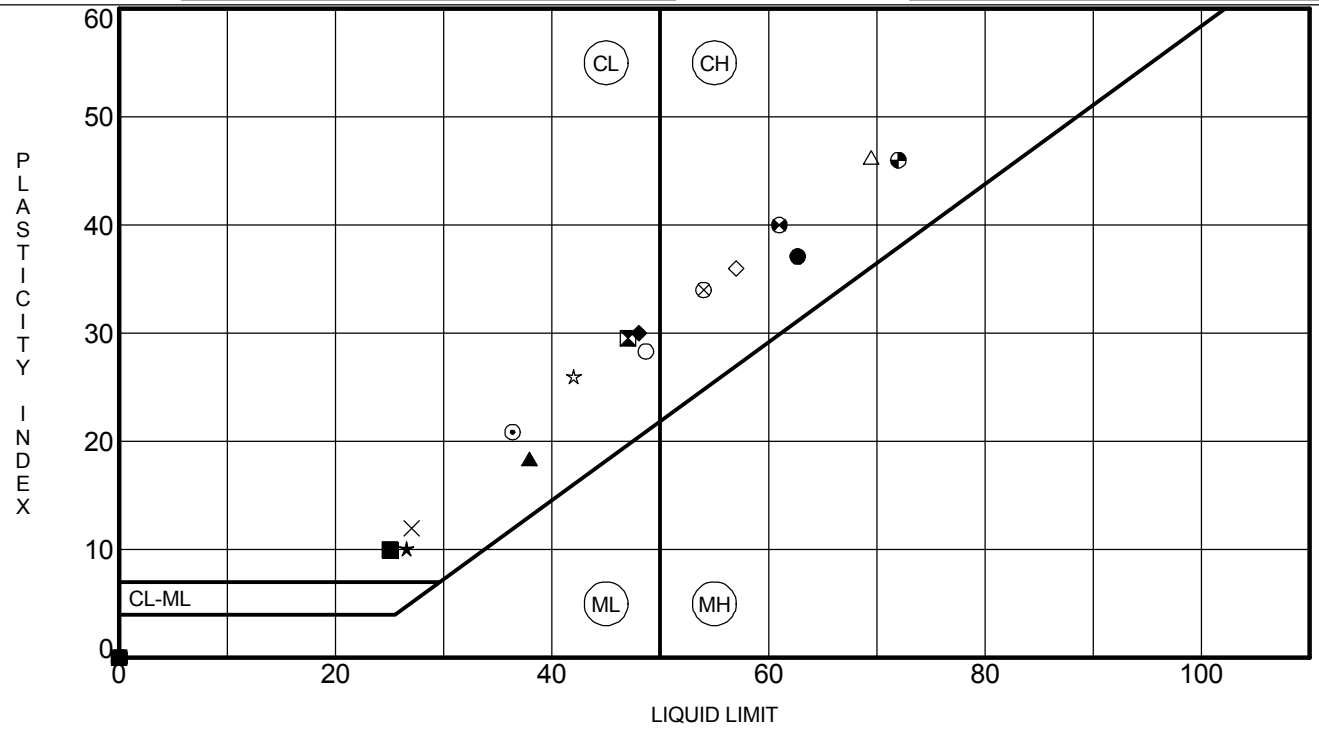
	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-07	5.0	49	22	27	89	LEAN CLAY(CL)
⊠	B-07	10.0	24	22	2	43	SILTY SAND(SM)
▲	B-07	15.0	21	18	3	58	SANDY SILT(ML)
★	B-07	20.0	35	15	20	82	LEAN CLAY with SAND(CL)
⊙	B-07	30.0	68	28	40	98	FAT CLAY(CH)
✿	B-07	55.0	31	15	16	71	LEAN CLAY with SAND(CL)
○	B-08	2.0	42	18	24	95	LEAN CLAY(CL)
△	B-08	5.0	56	22	34	90	FAT CLAY(CH)
⊗	B-08	15.0	59	22	37	94	FAT CLAY(CH)
⊕	B-08	25.0	42	18	24	91	LEAN CLAY(CL)
□	B-08	50.0	67	16	51	95	FAT CLAY(CH)
⊛	B-09	5.0	46	18	28	95	LEAN CLAY(CL)
◕	B-09	10.0	35	13	22	76	LEAN CLAY with SAND(CL)
☆	B-09	15.0	21	15	6	47	SILTY, CLAYEY SAND(SC-SM)
⊠	B-09	25.0	19	16	3	30	SILTY SAND(SM)
■	B-09	35.0	50	18	32	89	FAT CLAY(CH)
◆	B-09	50.0	53	15	38	89	FAT CLAY(CH)
◇	B-10	5.0	38	17	21	74	LEAN CLAY with SAND(CL)
×	B-10	15.0	20	15	5	42	SILTY, CLAYEY SAND(SC-SM)
✖	B-10	25.0	NP	NP	NP	19	SILTY SAND(SM)

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



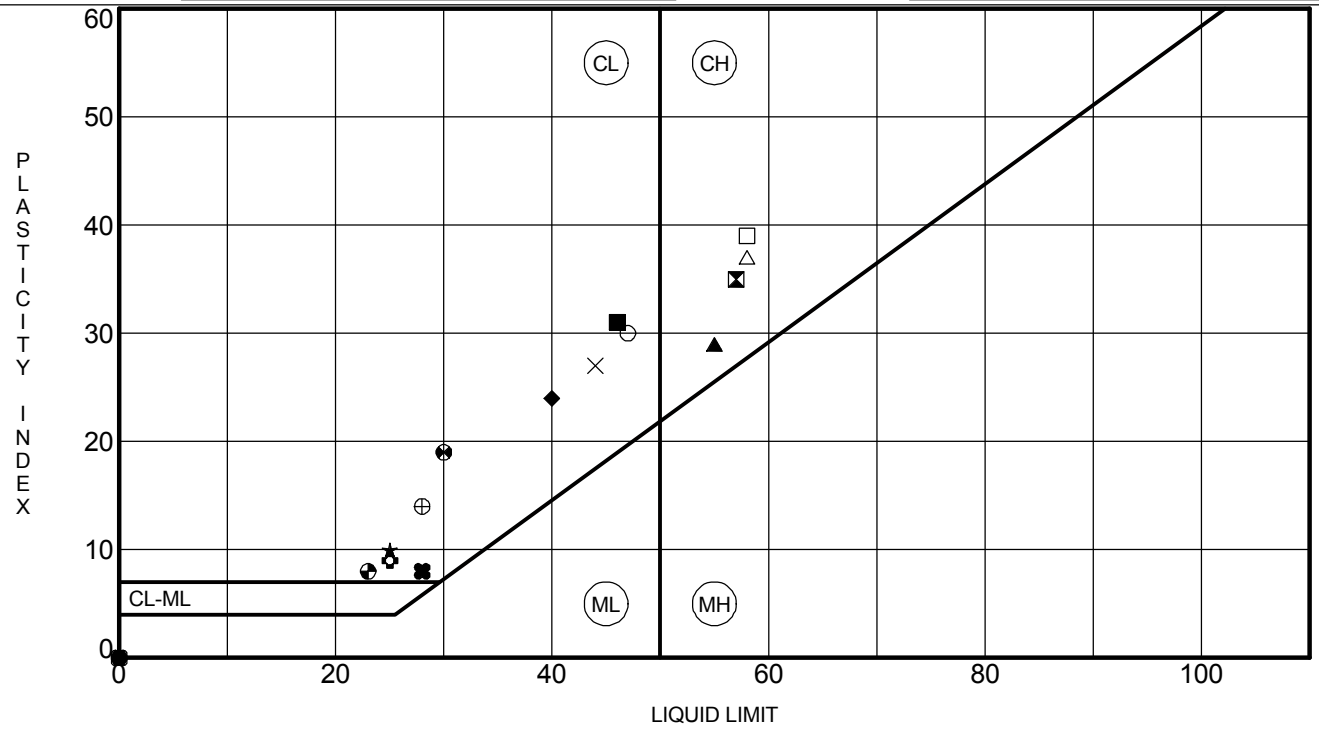
	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-10	35.0	63	26	37	99	FAT CLAY(CH)
⧓	B-10	45.0	47	17	30	96	LEAN CLAY(CL)
▲	B-11	2.0	38	20	18	87	LEAN CLAY(CL)
★	B-11	5.0	27	16	11	63	SANDY LEAN CLAY(CL)
⊙	B-11	13.0	36	15	21	90	LEAN CLAY(CL)
✿	B-11	25.0	NP	NP	NP	15	SILTY SAND(SM)
○	B-11	30.0	49	20	29	99	LEAN CLAY(CL)
△	B-11	40.0	70	23	47	100	FAT CLAY(CH)
⊗	B-12	2.0	54	20	34	82	FAT CLAY with SAND(CH)
⊕	B-12	5.0	NP	NP	NP	75	SILT with SAND(ML)
□	B-12	10.0	NP	NP	NP	37	SILTY SAND(SM)
⊛	B-12	30.0	61	21	40	93	FAT CLAY(CH)
◕	B-12	45.0	72	26	46	99	FAT CLAY(CH)
☆	B-13	5.0	42	16	26	77	LEAN CLAY with SAND(CL)
⊠	B-13	10.0	NP	NP	NP	29	SILTY SAND(SM)
■	B-13	20.0	25	15	10	39	CLAYEY SAND(SC)
◆	B-13	30.0	48	18	30	96	LEAN CLAY(CL)
◇	B-13	40.0	57	21	36	98	FAT CLAY(CH)
×	B-14	2.0	27	15	12	45	CLAYEY SAND(SC)
✖	B-14	5.0	NP	NP	NP	39	SILTY SAND(SM)

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



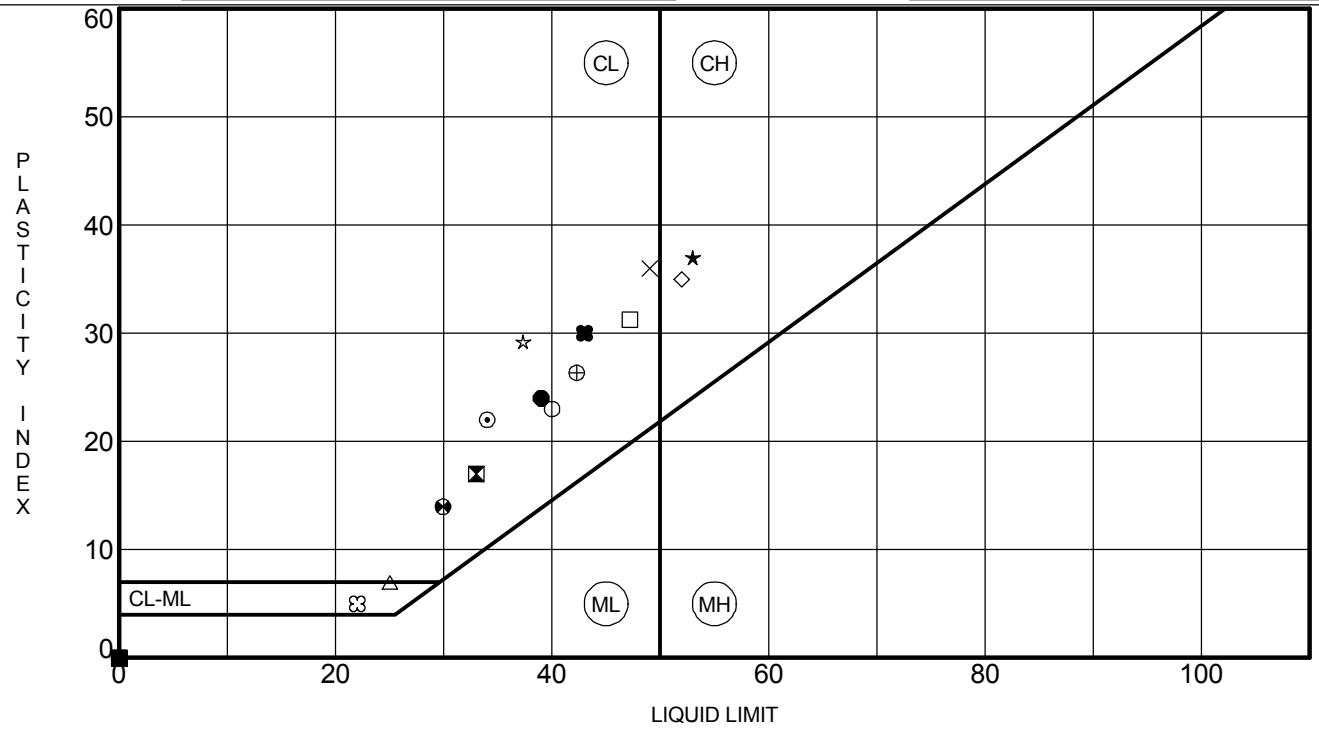
	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-14	15.0	NP	NP	NP	16	SILTY SAND(SM)
⊠	B-14	20.0	57	22	35	97	FAT CLAY(CH)
▲	B-14	30.0	55	26	29	99	FAT CLAY(CH)
★	B-14	50.0	25	15	10	54	SANDY LEAN CLAY(CL)
⊙	B-15	5.0	NP	NP	NP	20	SILTY SAND(SM)
✿	B-15	15.0	25	16	9	48	CLAYEY SAND(SC)
○	B-15	25.0	47	17	30	97	LEAN CLAY(CL)
△	B-15	30.0	58	21	37	100	FAT CLAY(CH)
⊗	B-16	2.0	NP	NP	NP	27	SILTY SAND(SM)
⊕	B-16	20.0	28	14	14	60	SANDY LEAN CLAY(CL)
□	B-16	35.0	58	19	39	76	FAT CLAY with SAND(CH)
⊛	B-16	45.0	30	11	19	57	SANDY LEAN CLAY(CL)
◕	B-16	55.0	23	15	8	46	CLAYEY SAND(SC)
☆	B-17	5.0	NP	NP	NP	36	SILTY SAND(SM)
⊠	B-17	10.0	NP	NP	NP	29	SILTY SAND(SM)
■	B-17	15.0	46	15	31	77	LEAN CLAY with SAND(CL)
◆	B-18	5.0	40	16	24	77	LEAN CLAY with SAND(CL)
◇	B-18	10.0	NP	NP	NP	14	SILTY SAND(SM)
×	B-18	20.0	44	17	27	84	LEAN CLAY with SAND(CL)
✱	B-18	30.0	28	20	8	77	LEAN CLAY with SAND(CL)

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



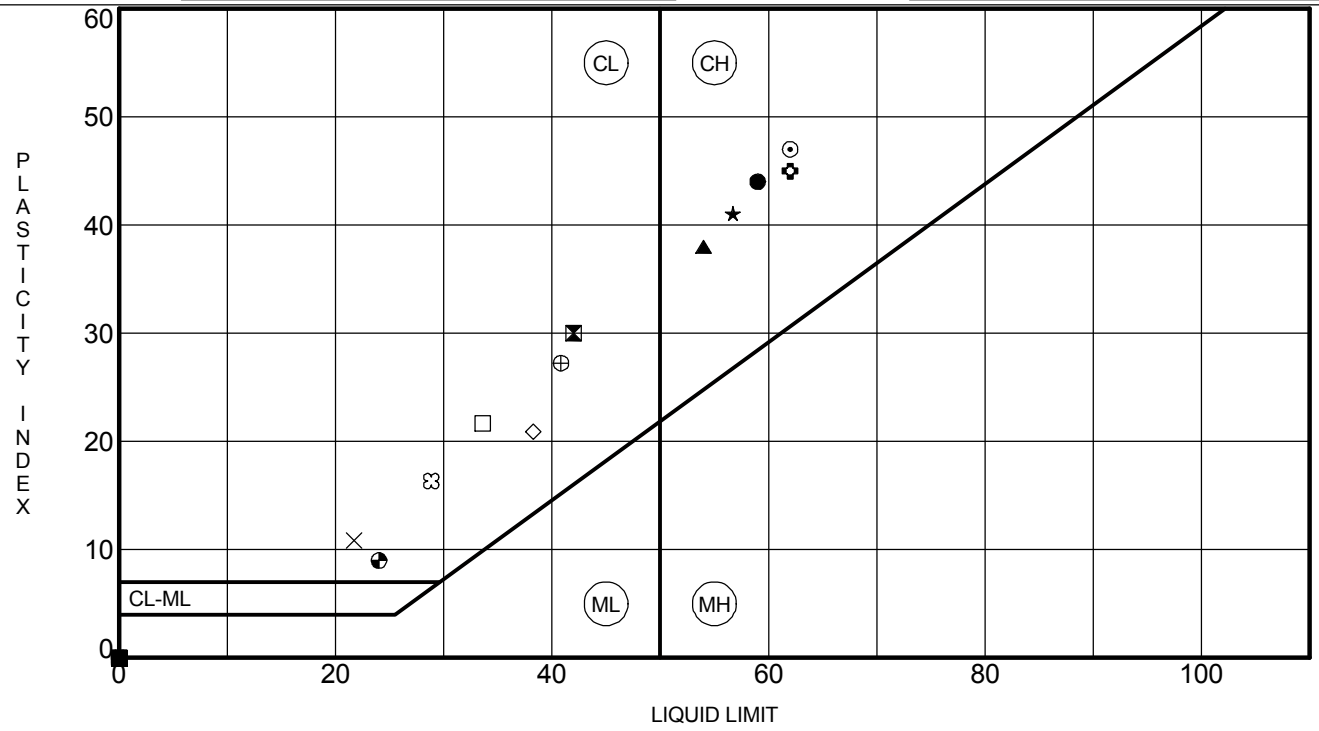
	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-18	40.0	39	15	24	20	CLAYEY SAND(SC)
⊠	B-19	5.0	33	16	17	57	SANDY LEAN CLAY(CL)
▲	B-19	10.0	NP	NP	NP	32	SILTY SAND(SM)
★	B-19	20.0	53	16	37	51	SANDY FAT CLAY(CH)
⊙	B-19	30.0	34	12	22	67	SANDY LEAN CLAY(CL)
✿	B-19	40.0	39	15	24	85	LEAN CLAY with SAND(CL)
○	B-20	5.0	40	17	23	74	LEAN CLAY with SAND(CL)
△	B-20	10.0	25	18	7	25	SILTY, CLAYEY SAND(SC-SM)
⊗	B-20	15.0	NP	NP	NP	20	SILTY SAND(SM)
⊕	SB- 1	5.0	42	16	26	63	SANDY LEAN CLAY(CL)
□	SB- 1	15.0	47	16	31	68	SANDY LEAN CLAY(CL)
⊛	SB- 2	5.0	30	16	14	15	CLAYEY SAND(SC)
◕	SB- 2	10.0	NP	NP	NP	28	SILTY SAND(SM)
☆	SB- 2	15.0	37	8	29	76	LEAN CLAY with SAND(CL)
⊠	SB- 3	2.0	22	17	5	42	SILTY, CLAYEY SAND(SC-SM)
■	SB- 3	10.0	NP	NP	NP	26	SILTY SAND(SM)
◆	SB- 3	20.0	NP	NP	NP	16	SILTY SAND(SM)
◇	SB- 4	5.0	52	17	35	80	FAT CLAY with SAND(CH)
×	SB- 4	10.0	49	13	36	98	LEAN CLAY(CL)
✖	SB- 4	25.0	43	13	30	95	LEAN CLAY(CL)

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



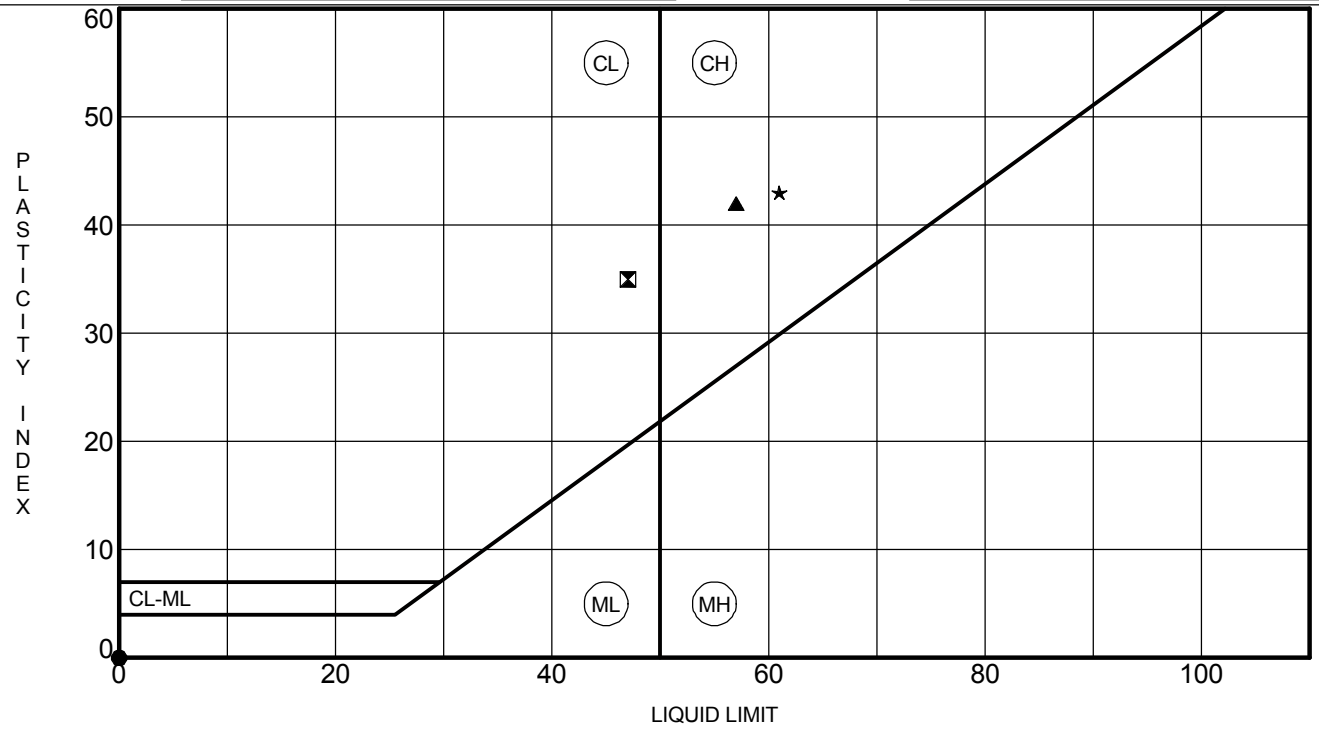
	Specimen Identification		LL	PL	PI	Fines	Classification
●	SB- 4	60.0	59	15	44	99	FAT CLAY(CH)
⊠	SB- 5	5.0	42	12	30	70	LEAN CLAY with SAND(CL)
▲	SB- 5	15.0	54	16	38	99	FAT CLAY(CH)
★	SB- 5	30.0	57	16	41	99	FAT CLAY(CH)
⊙	SB- 5	40.0	62	15	47	99	FAT CLAY(CH)
✿	SB- 5	60.0	62	17	45	99	FAT CLAY(CH)
○	SB- 6	2.0	NP	NP	NP	40	SILTY SAND(SM)
△	SB- 6	10.0	NP	NP	NP	35	SILTY SAND(SM)
⊗	SB- 6	15.0	NP	NP	NP	25	SILTY SAND(SM)
⊕	SB- 6	30.0	41	14	27	93	LEAN CLAY(CL)
□	SB- 7	5.0	34	12	22	57	SANDY LEAN CLAY(CL)
⊛	SB- 7	10.0	NP	NP	NP	23	SILTY SAND(SM)
◕	SB- 8	5.0	24	15	9	72	LEAN CLAY with SAND(CL)
☆	SB- 8	20.0	NP	NP	NP	27	SILTY SAND(SM)
⊠	SB- 9	2.0	29	12	17	42	CLAYEY SAND(SC)
■	SB- 9	5.0	NP	NP	NP	19	SILTY SAND(SM)
◆	SB- 9	15.0	NP	NP	NP	47	SILTY SAND(SM)
◇	SB-10	2.0	38	17	21	45	CLAYEY SAND(SC)
×	SB-10	5.0	22	11	11	54	SANDY LEAN CLAY(CL)
⊠	SB-10	10.0	NP	NP	NP	37	SILTY SAND(SM)

ATTERBERG LIMITS' RESULTS

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



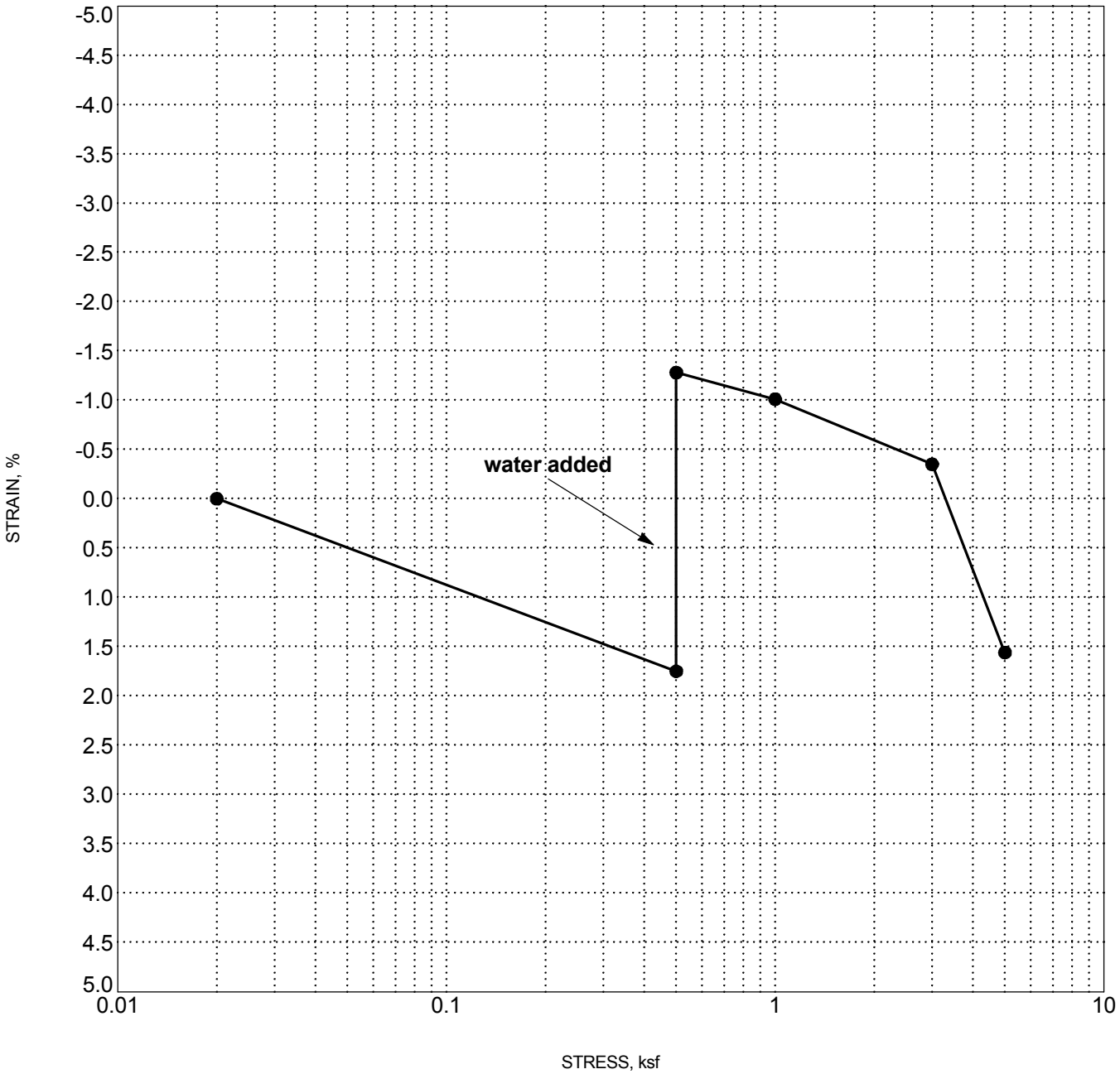
	Specimen Identification		LL	PL	PI	Fines	Classification
●	**SB-10**	**15.0**	**NP**	**NP**	**NP**	**45**	**SILTY SAND(SM)**
⊠	**SB-11**	**2.0**	**47**	**12**	**35**	**74**	**LEAN CLAY with SAND(CL)**
▲	**SB-11**	**10.0**	**57**	**15**	**42**	**95**	**FAT CLAY(CH)**
★	**SB-11**	**20.0**	**61**	**18**	**43**	**97**	**FAT CLAY(CH)**

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-01**	**15.0**	**FAT CLAY(CH)**	**3.03**	**109.1**	**19.3**

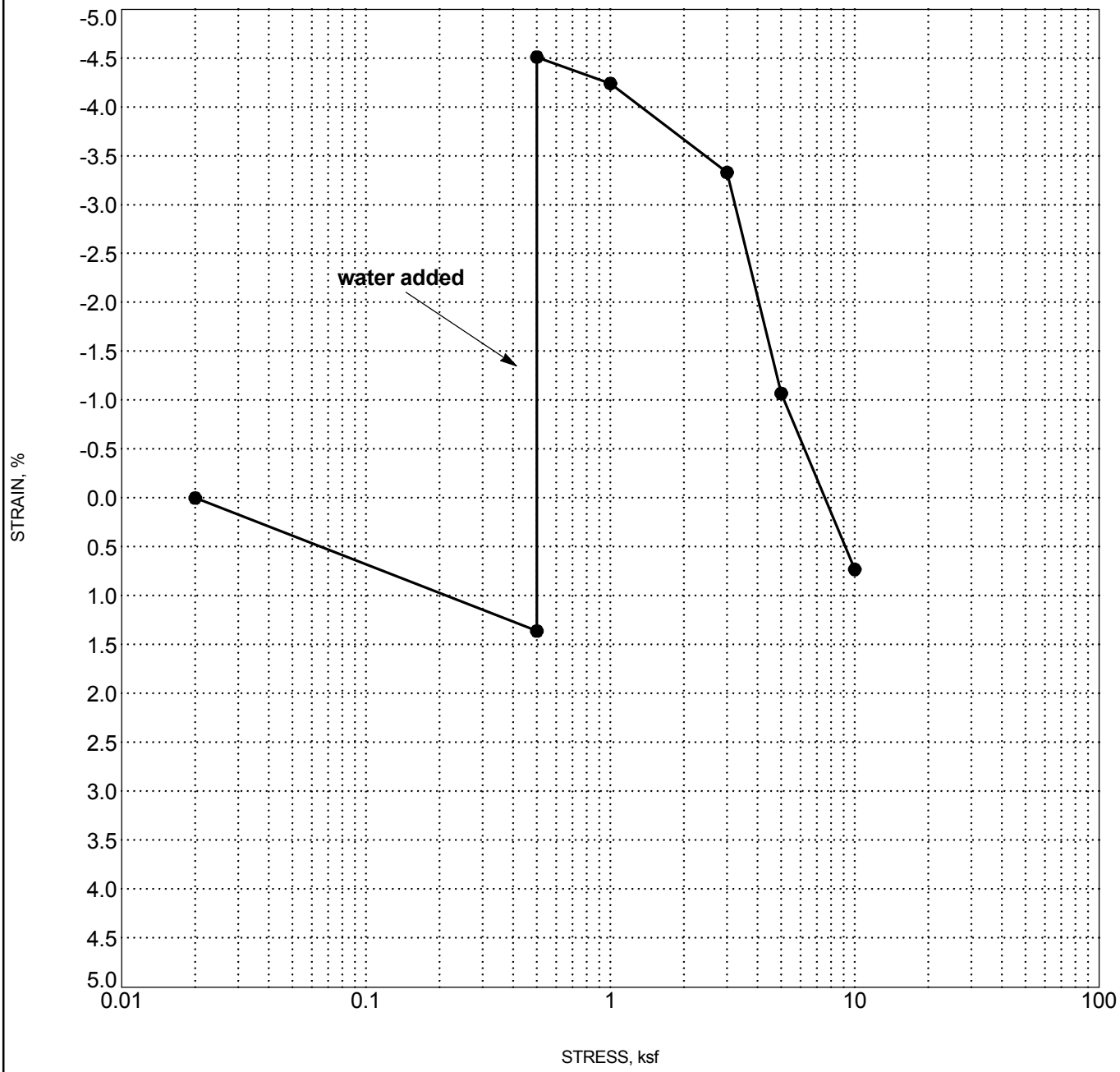
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-02	15.0	FAT CLAY(CH)	5.87	111.7	17.9

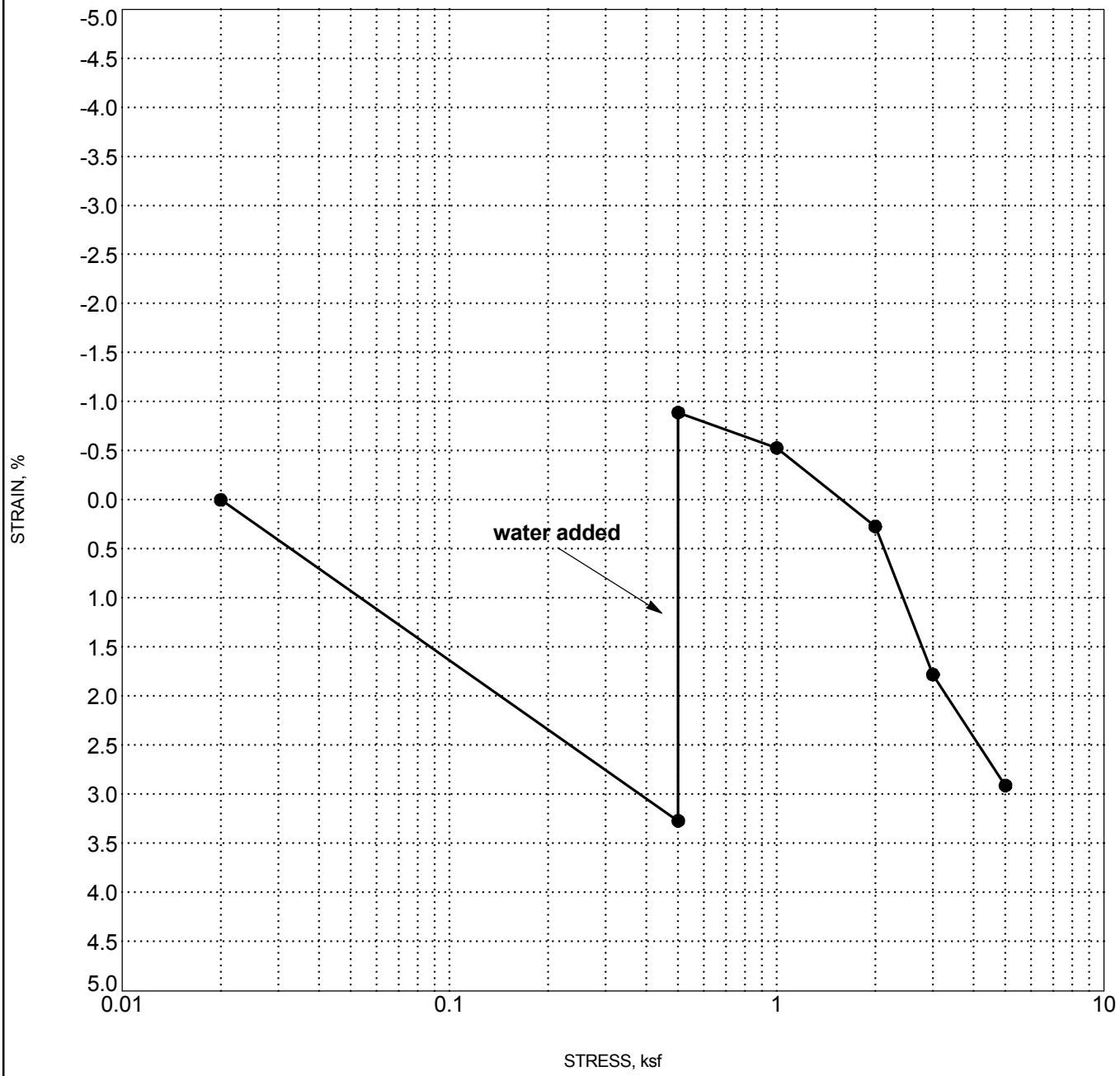
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-02**	**20.0**	**LEAN CLAY(CL)**	**4.16**	**107.2**	**21.1**

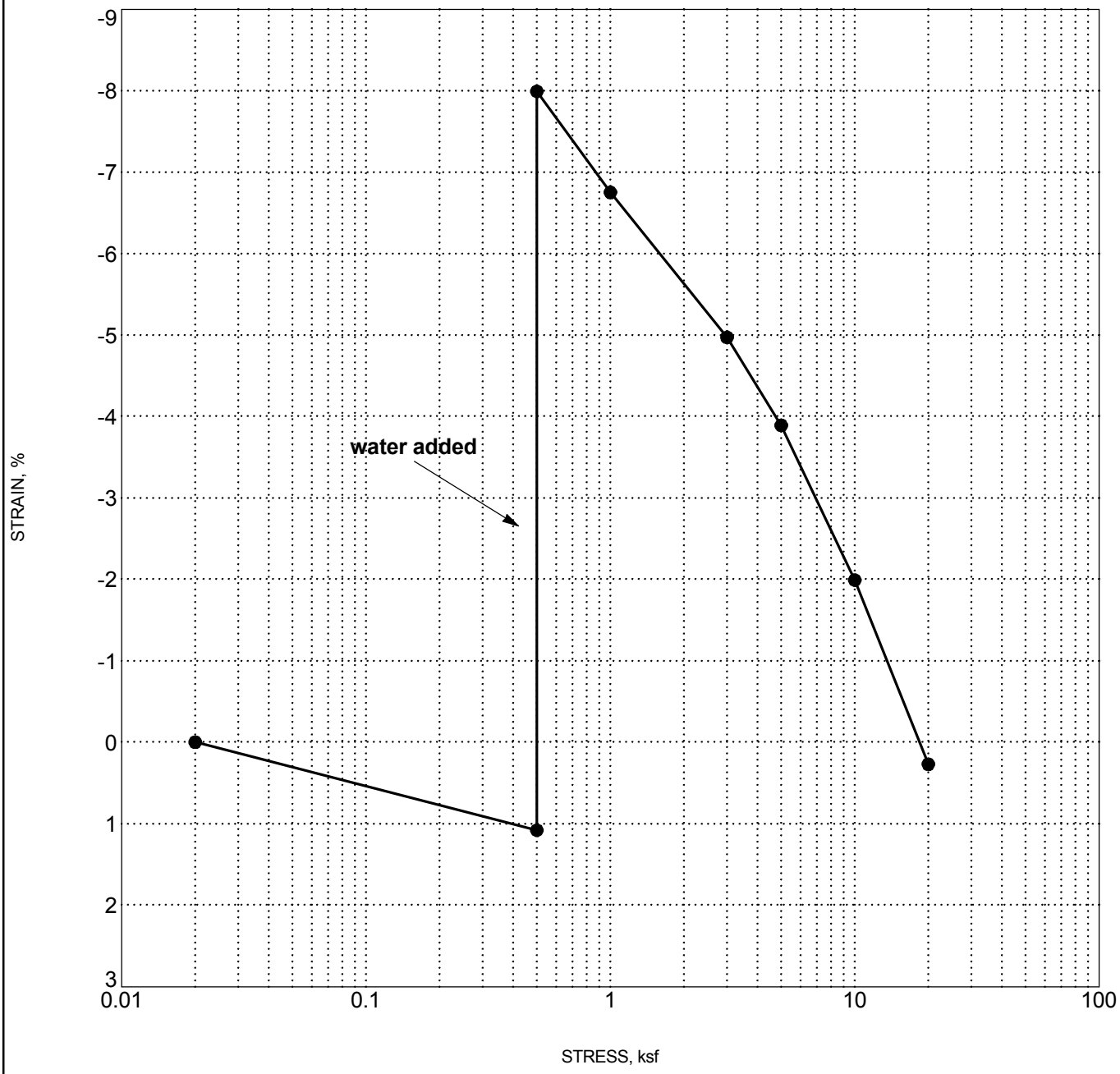
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-03**	**5.0**	**FAT CLAY(CH)**	**9.07**	**104.7**	**16.1**

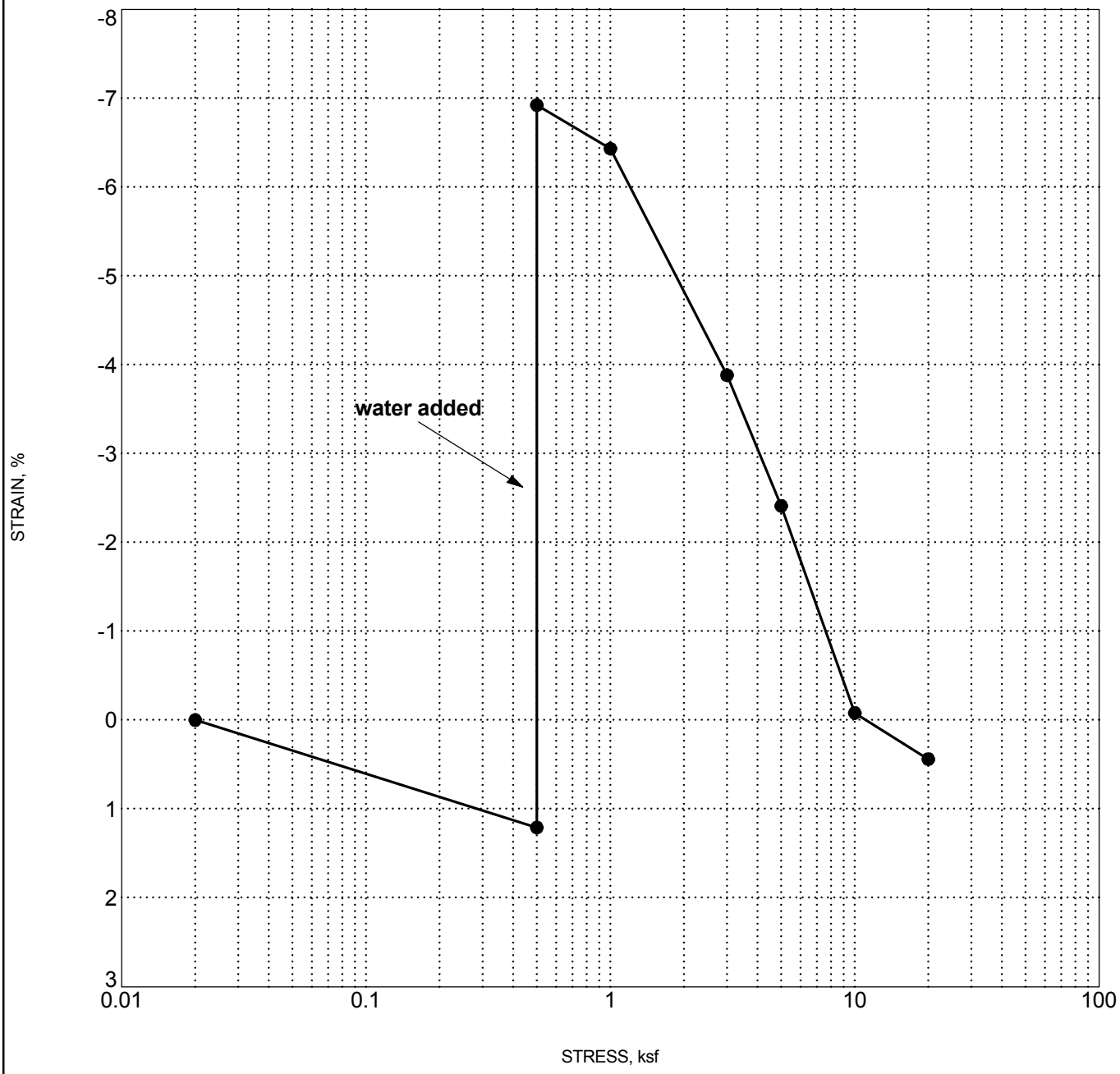
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-03**	**15.0**	**FAT CLAY(CH)**	**8.13**	**99.7**	**10.3**

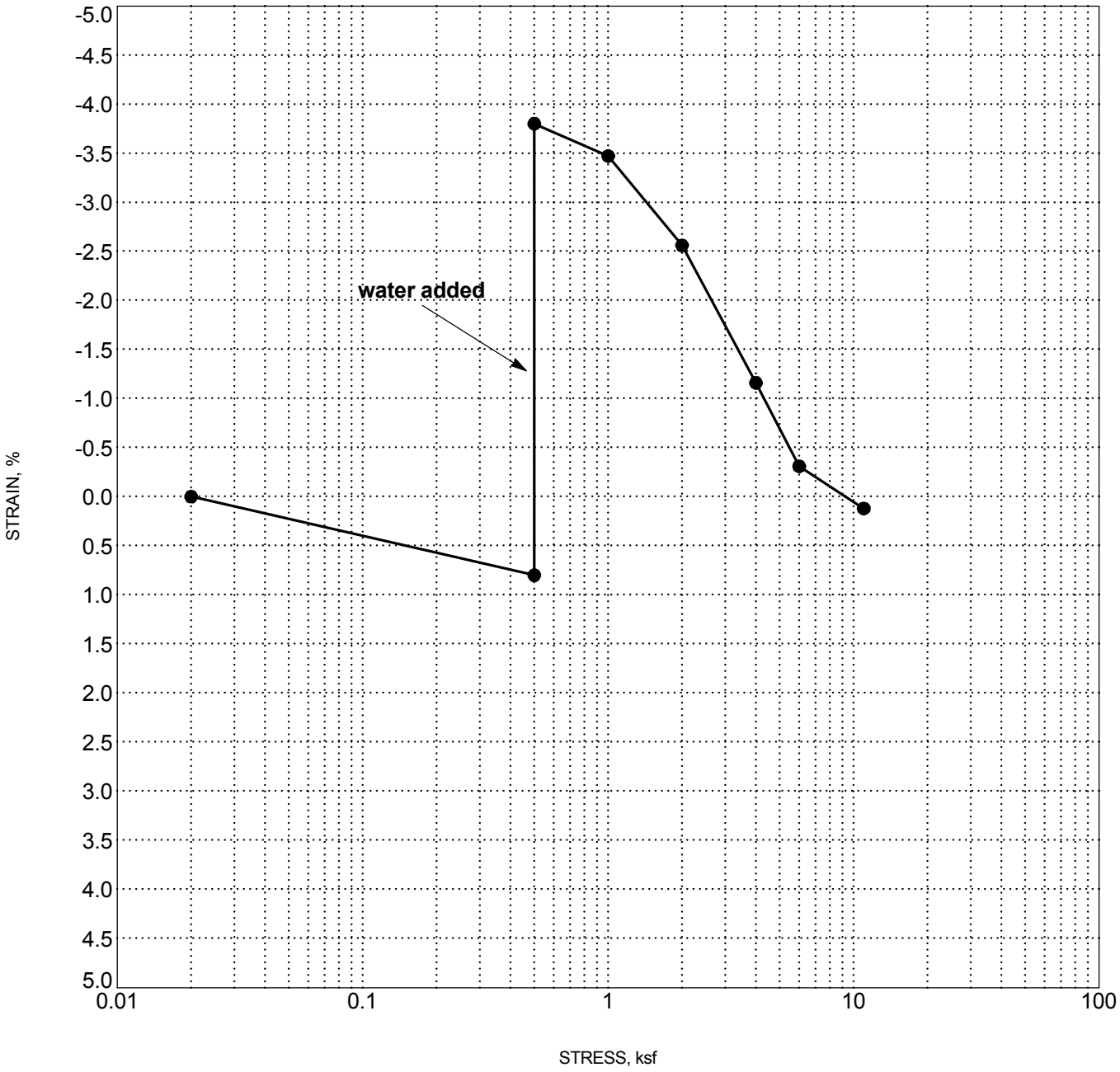
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-04**	**10.0**	**LEAN CLAY(CL)**	**4.60**	**110.0**	**11.4**

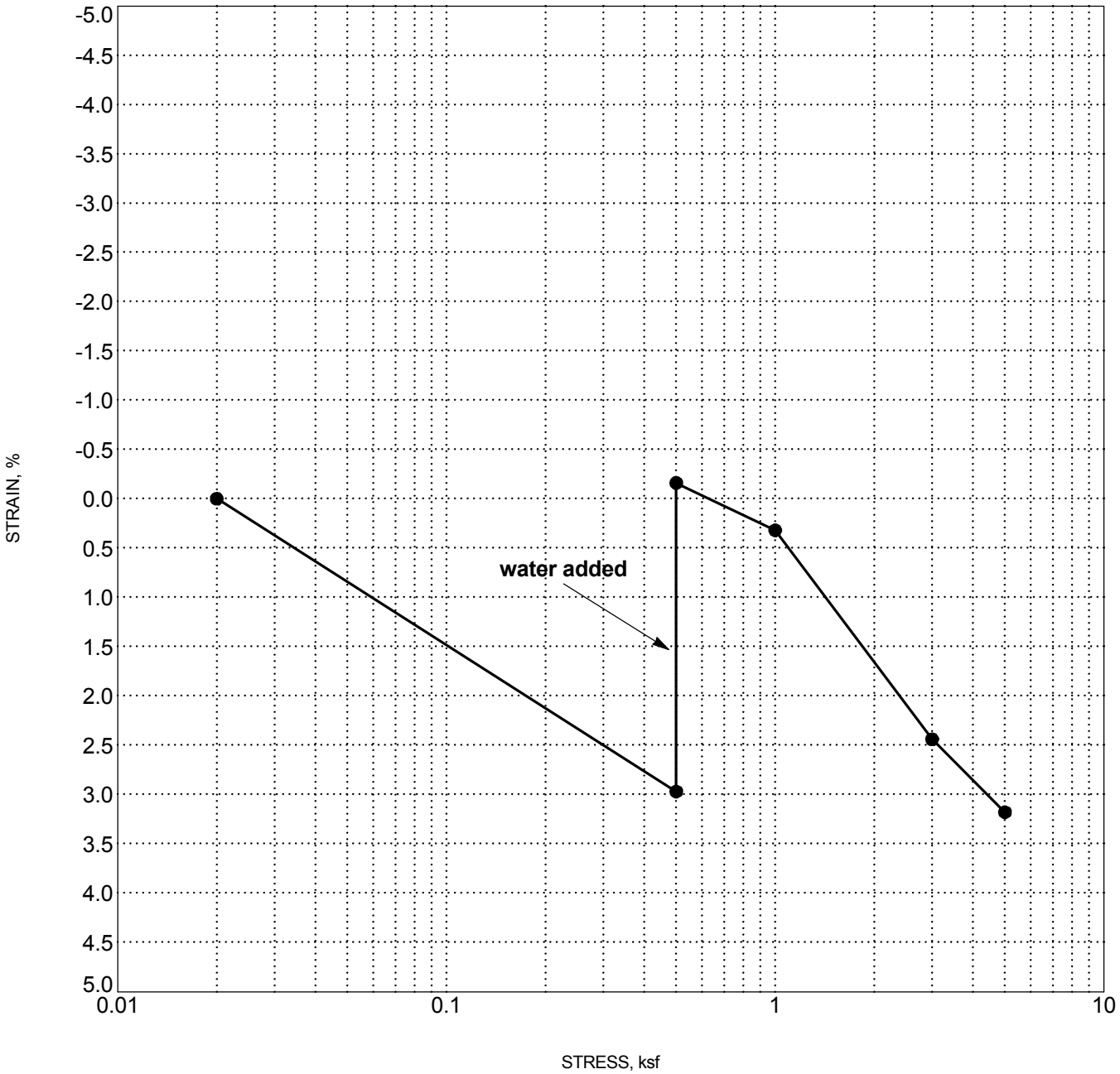
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-05**	**10.0**	**LEAN CLAY(CL)**	**3.13**	**113.7**	**15.2**

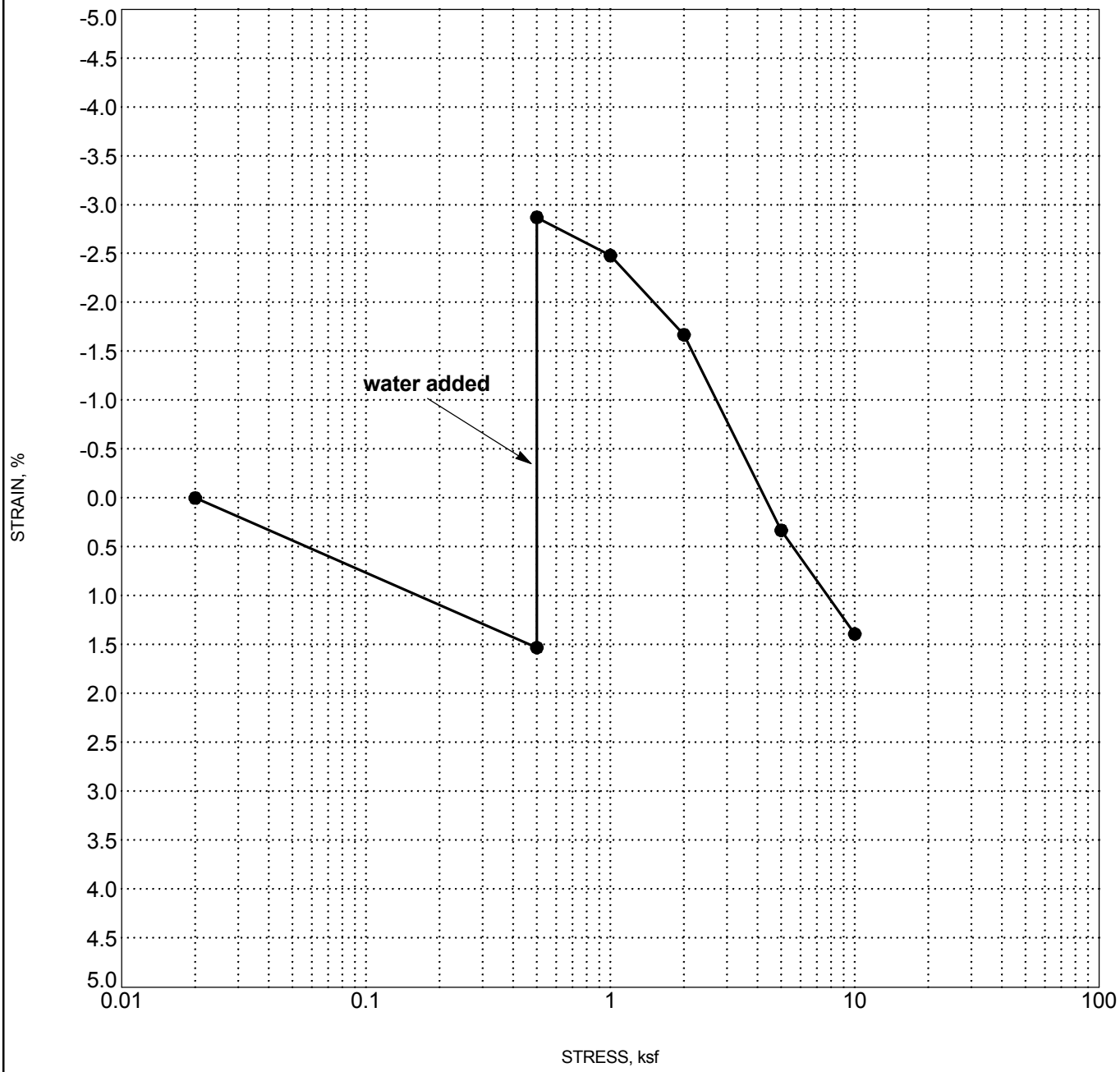
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-05**	**15.0**	**LEAN CLAY(CL)**	**4.40**	**109.2**	**15.2**

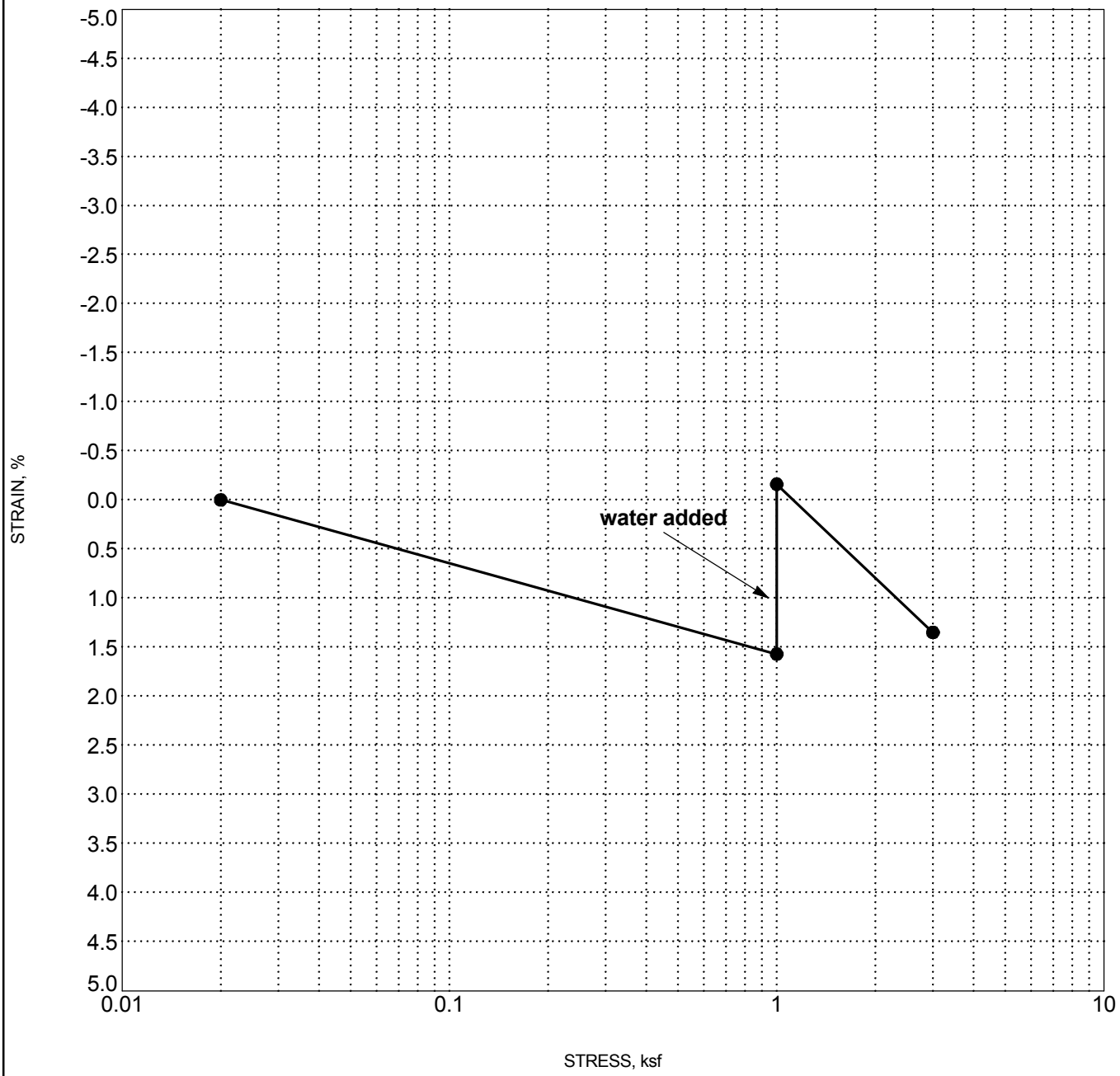
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-05**	**25.0**	**LEAN CLAY(CL)**	**1.73**	**115.2**	**12.9**

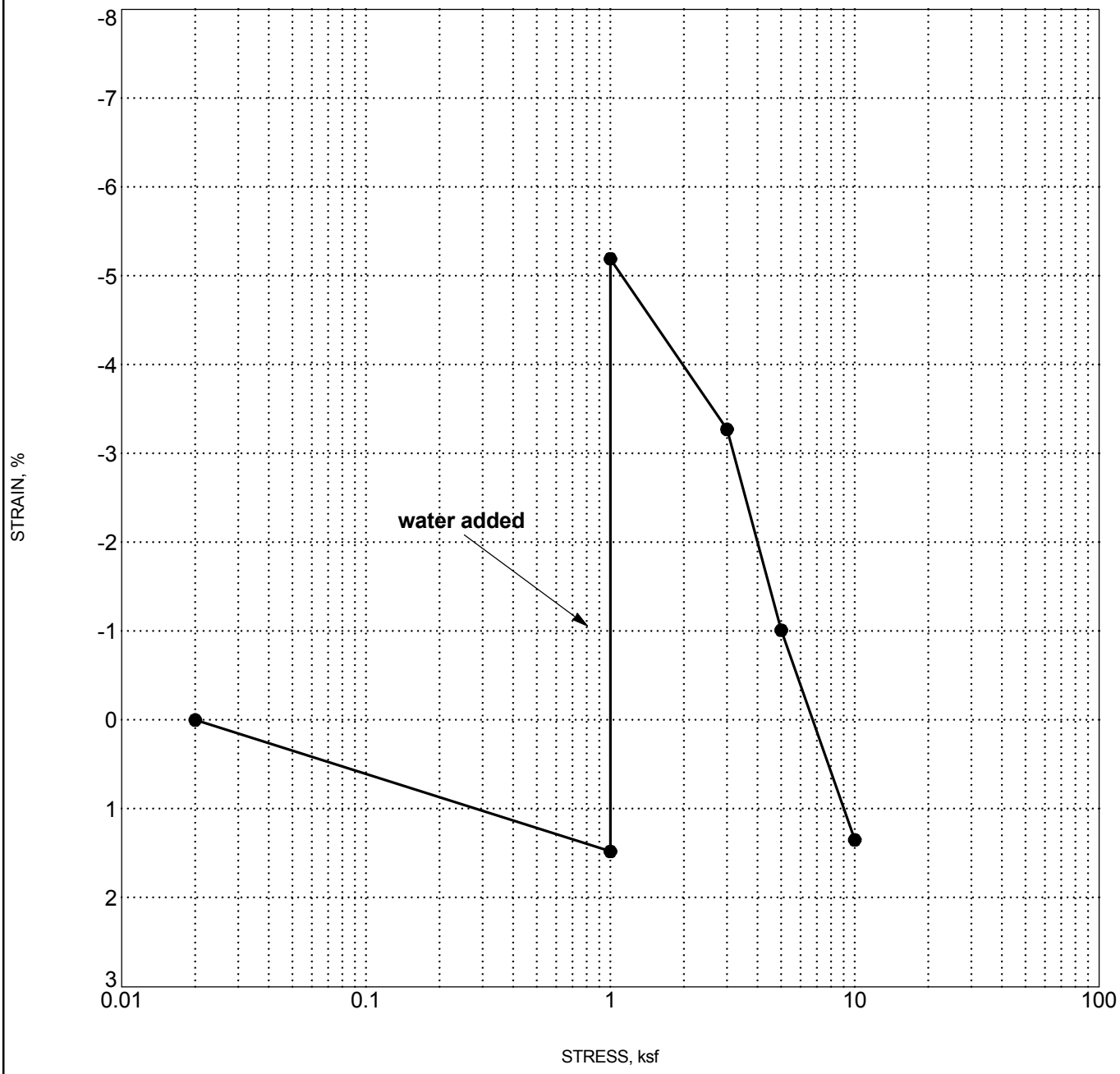
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-05	50.0	FAT CLAY(CH)	6.67	117.4	13.8

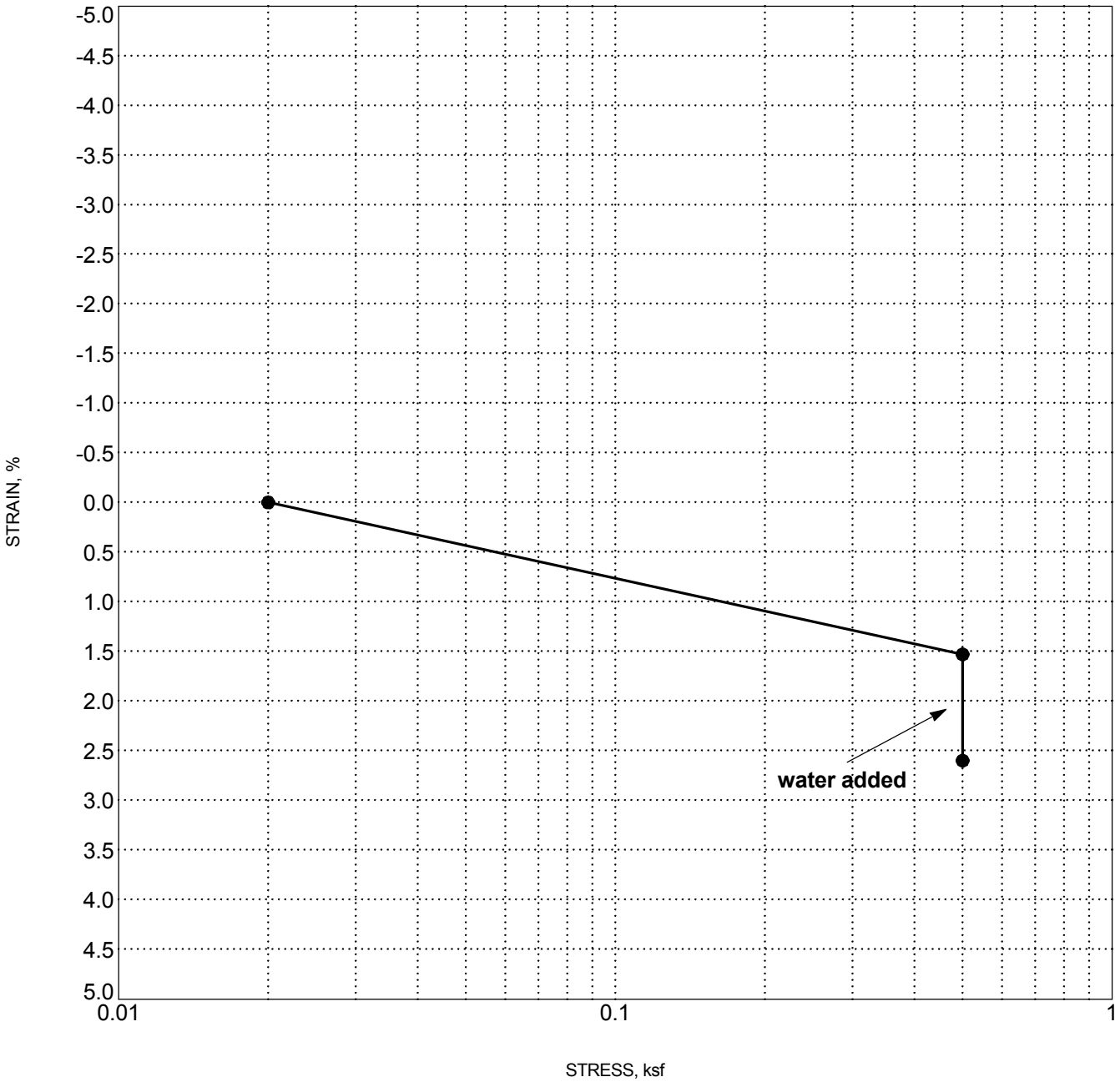
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-06	10.0	LEAN CLAY with SAND(CL)	-1.07	107.4	14.3

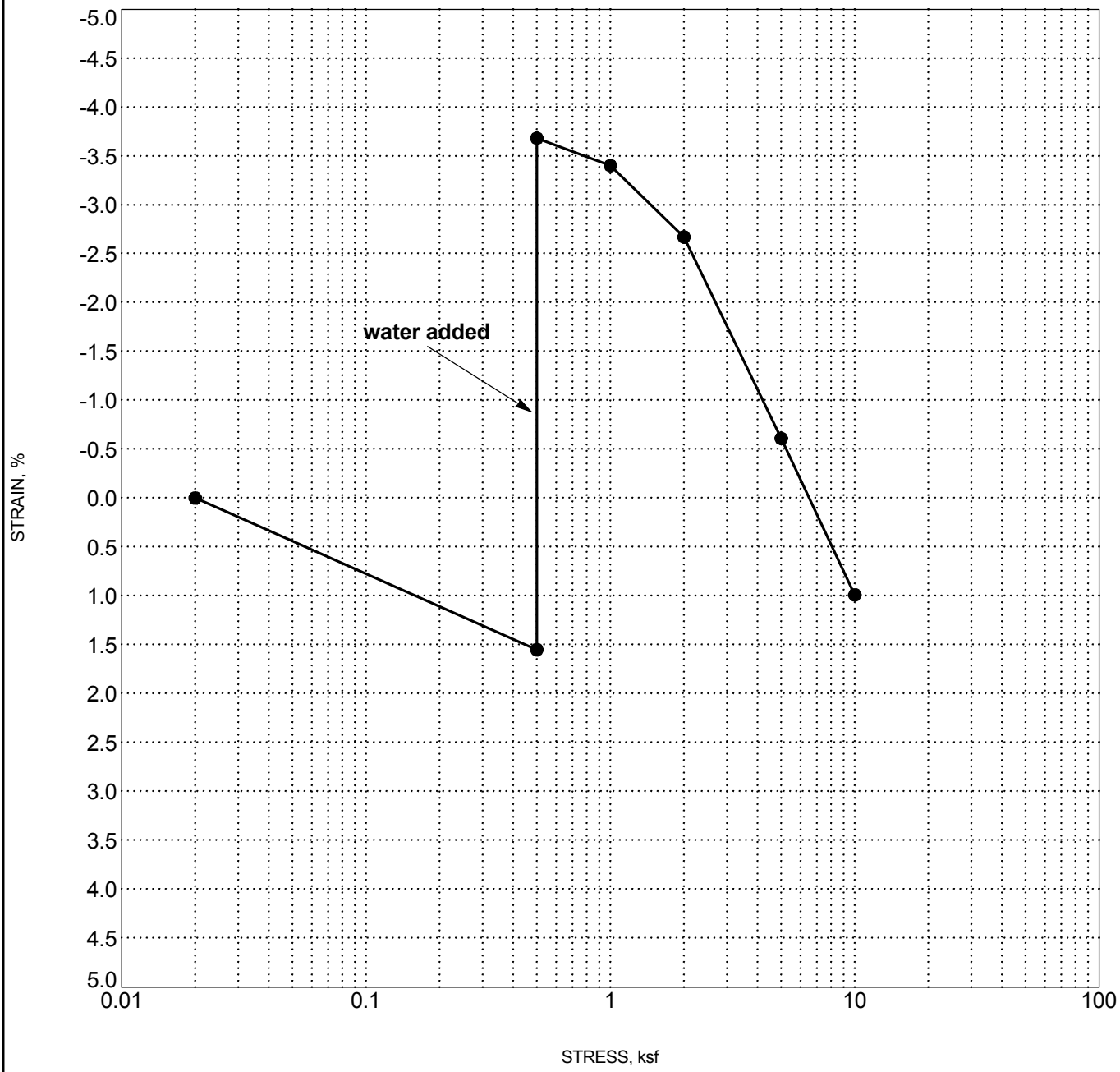
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-06**	**15.0**	**FAT CLAY(CH)**	**5.23**	**97.2**	**17.4**

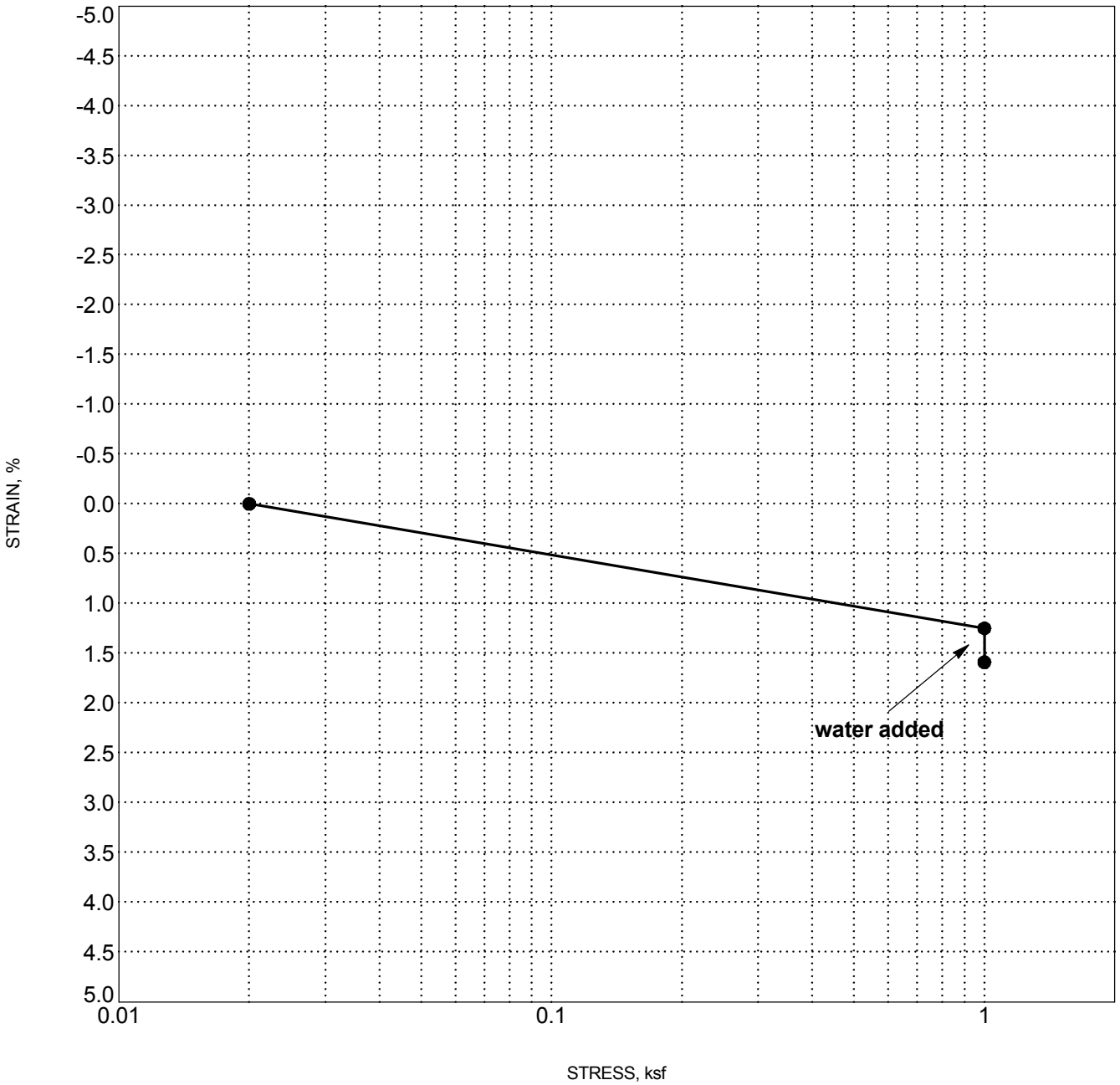
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-06**	**25.0**	**SILTY SAND(SM)**	**-0.34**	**118.5**	**11.9**

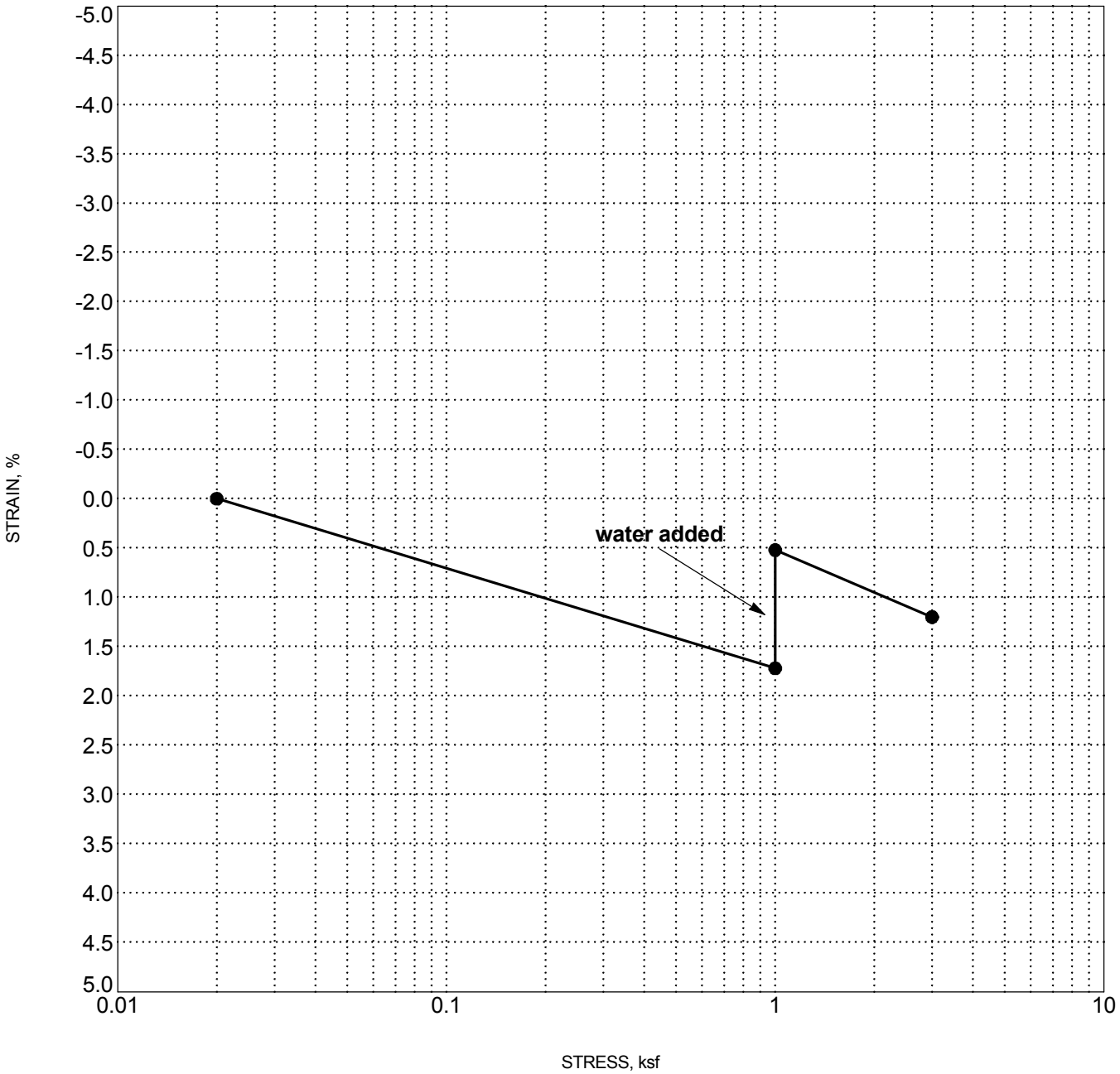
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-06**	**50.0**	**FAT CLAY(CH)**	**1.20**	**112.8**	**16.4**

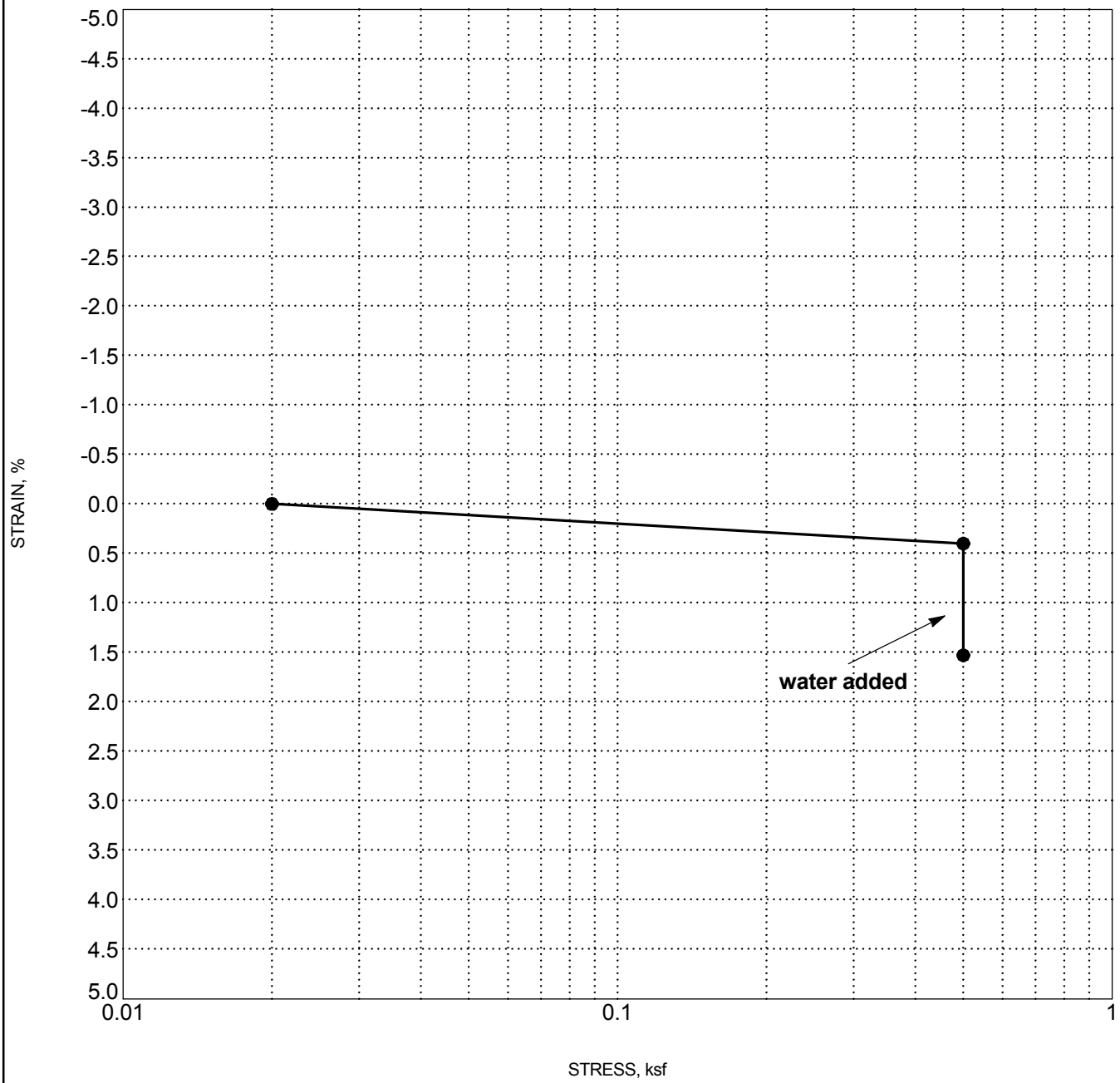
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-07	15.0	SANDY SILT(ML)	-1.13	96.9	9.4

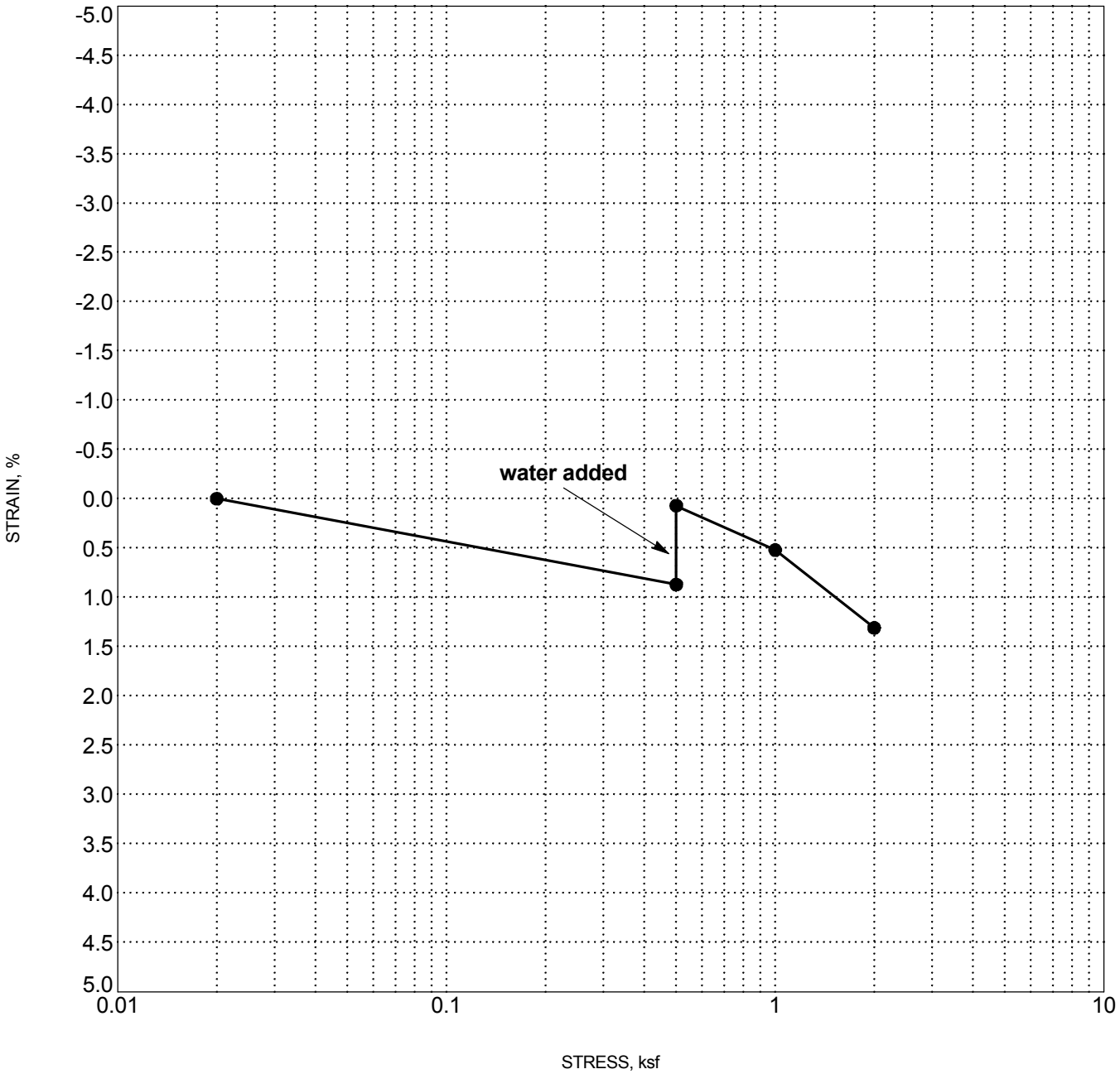
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-07	20.0	**LEAN CLAY with SAND(CL)**	**0.80**	**113.8**	**15.5**

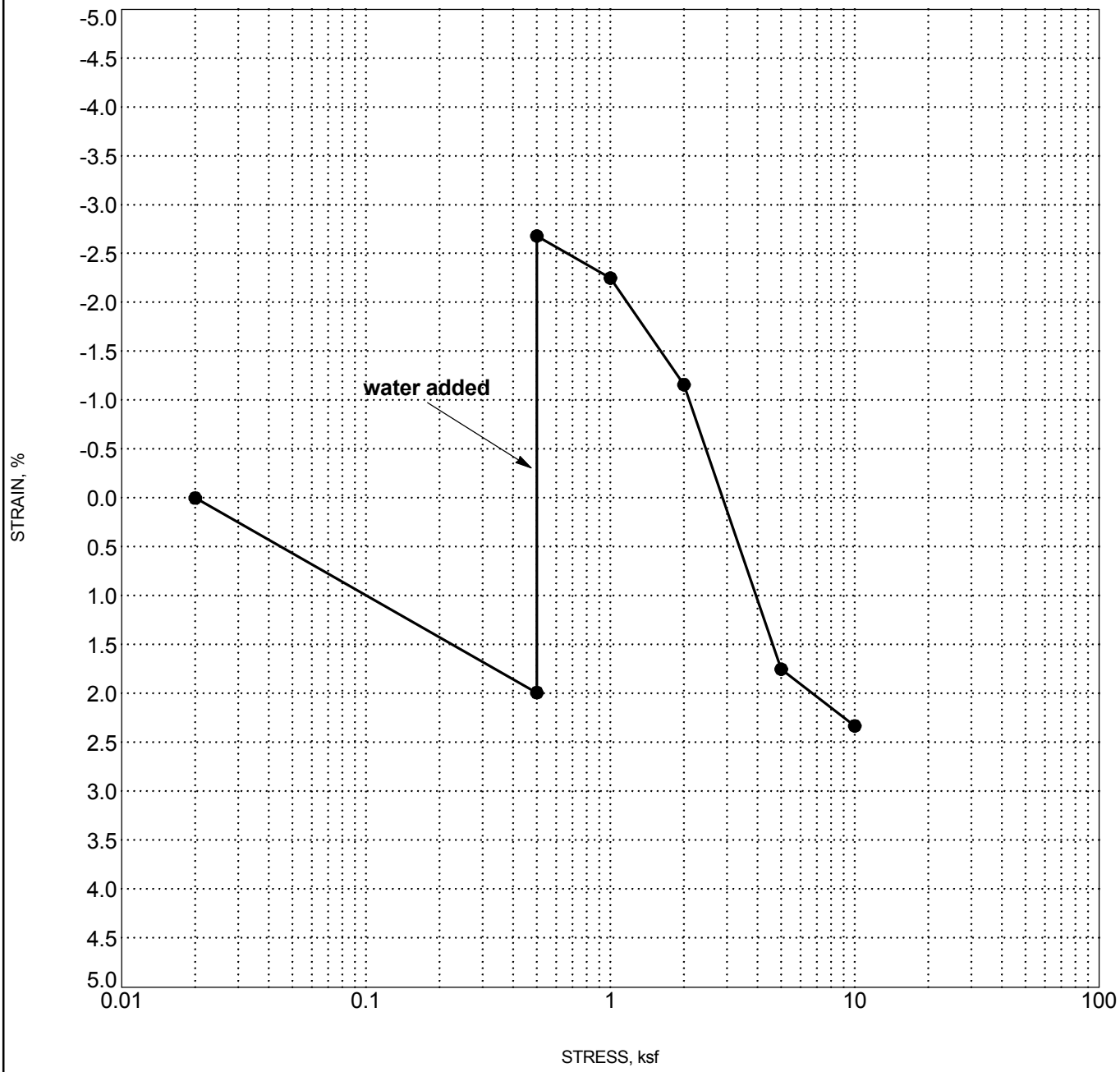
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-08**	**5.0**	**FAT CLAY(CH)**	**4.67**	**109.2**	**19.0**

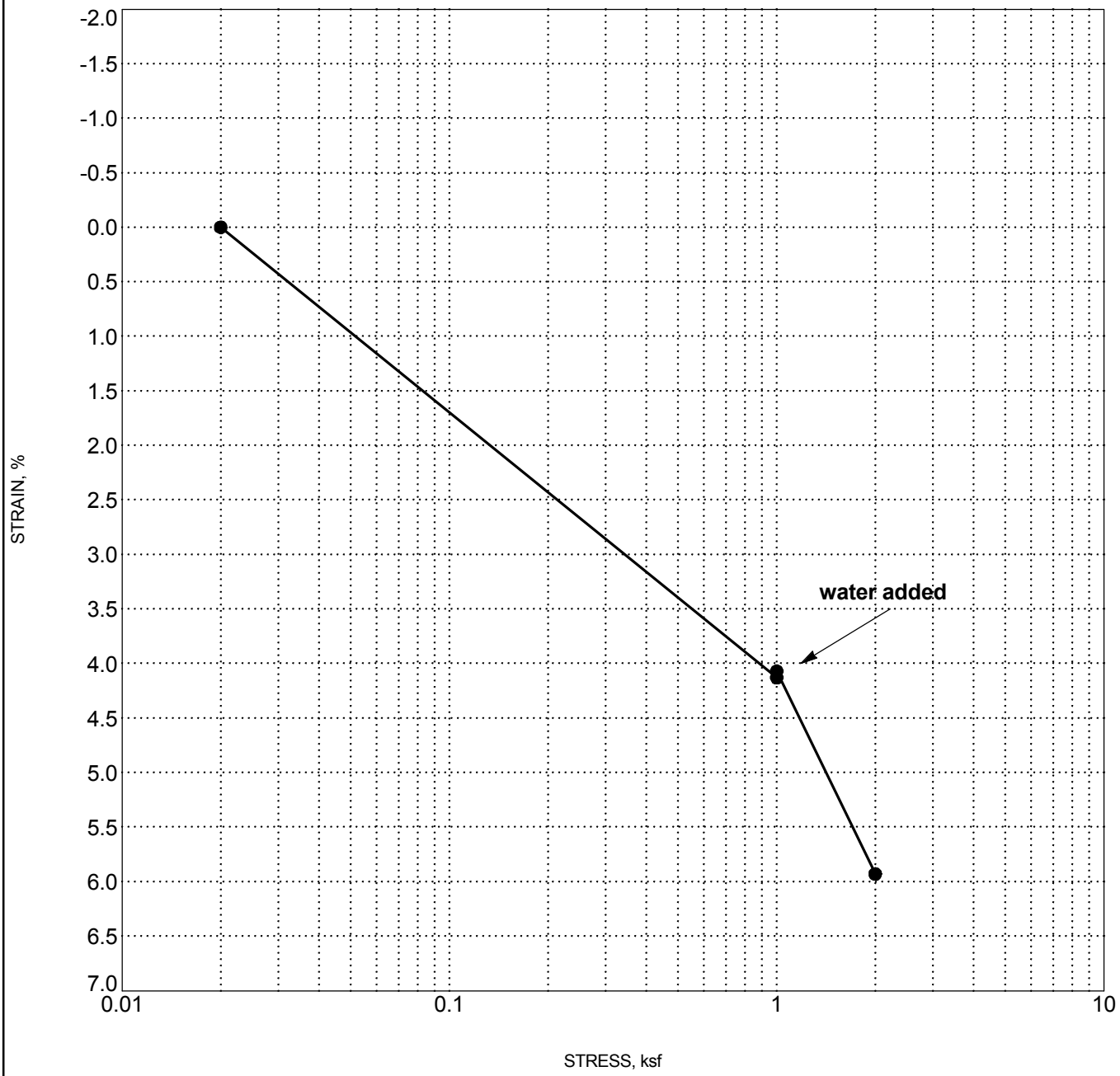
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-08**	**25.0**	**LEAN CLAY(CL)**	**0.06**	**118.1**	**12.8**

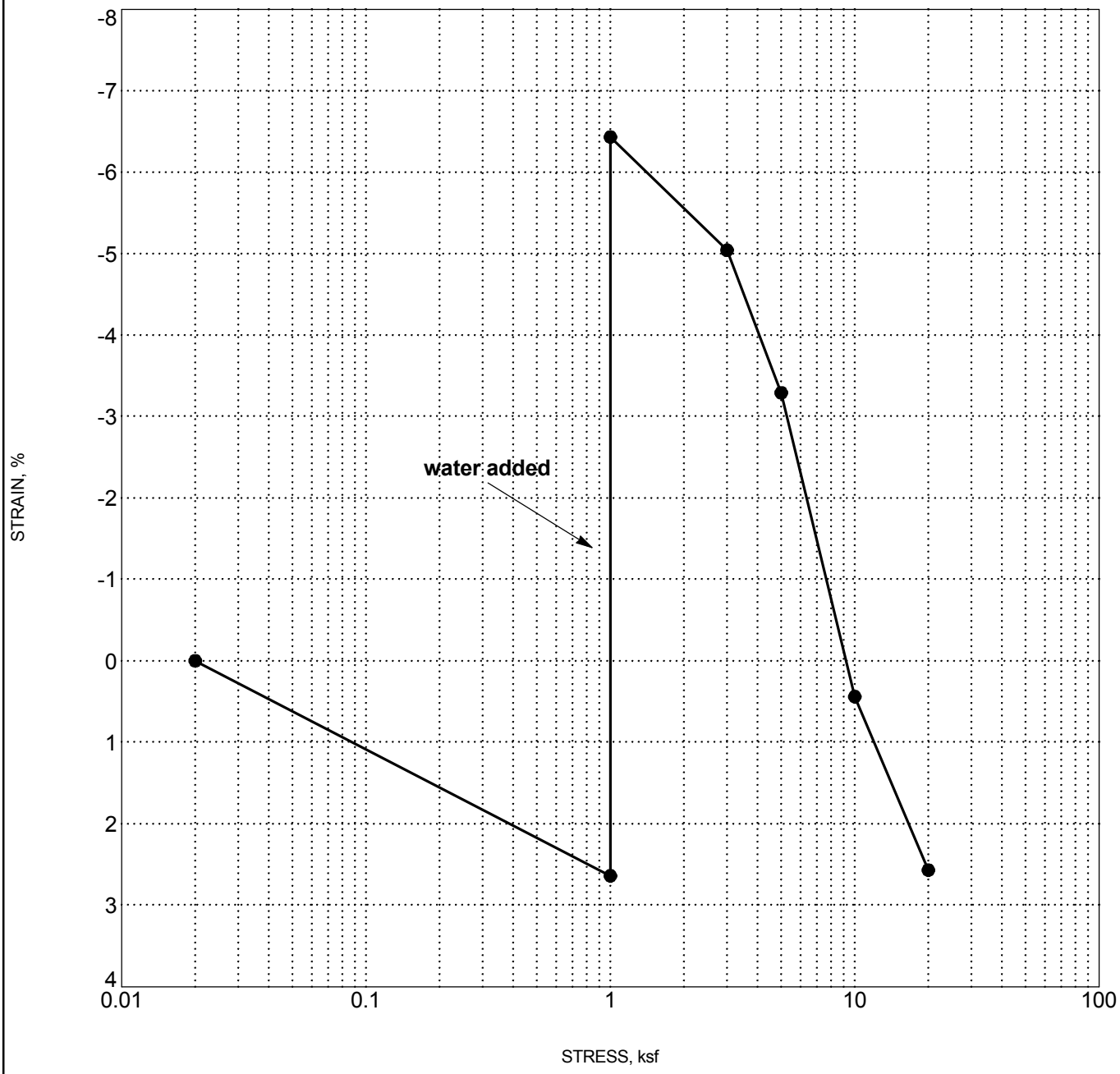
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-08	50.0	FAT CLAY(CH)	9.07	109.6	11.2

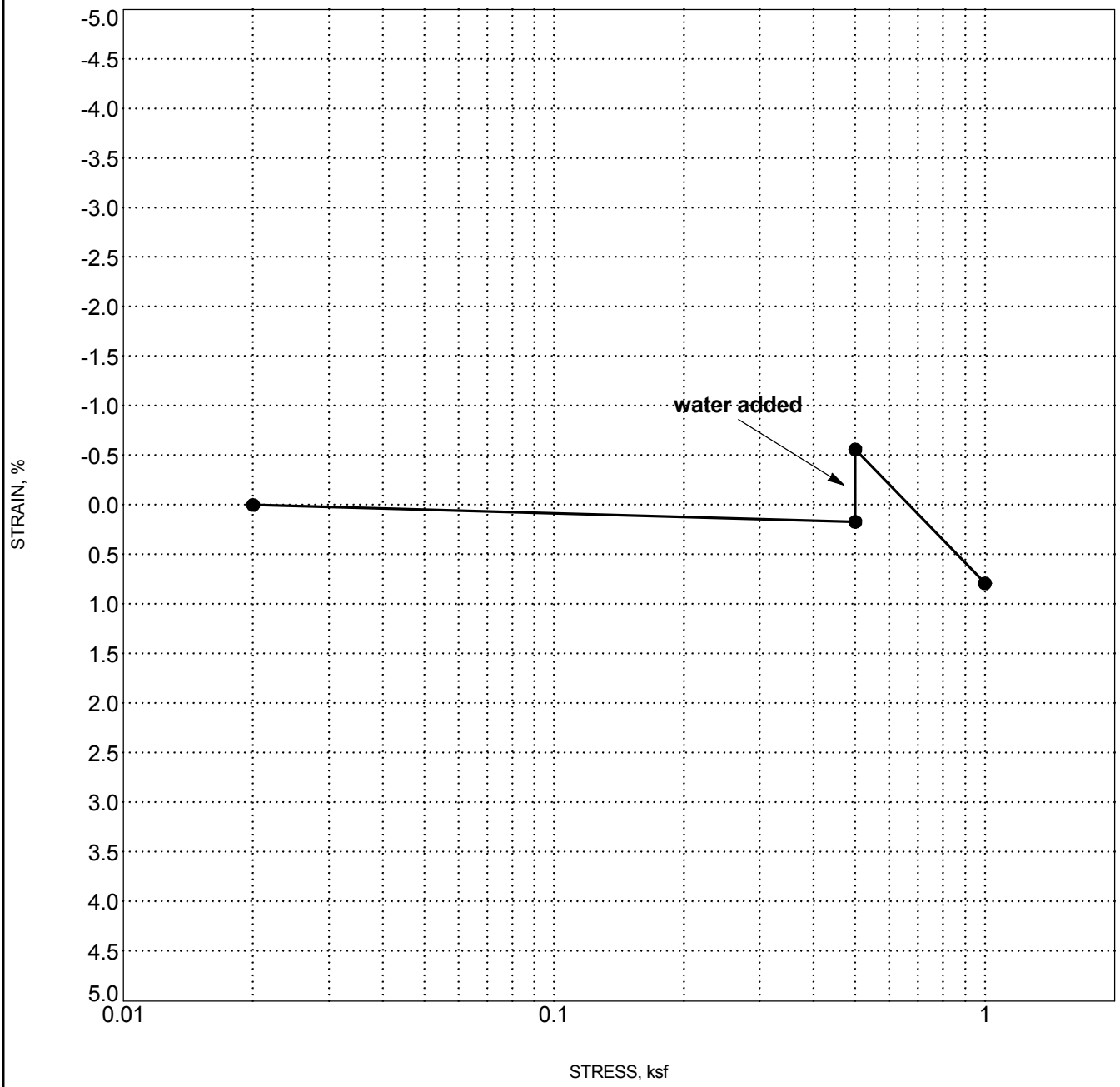
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-09**	**5.0**	**LEAN CLAY(CL)**	**0.73**	**101.4**	**8.7**

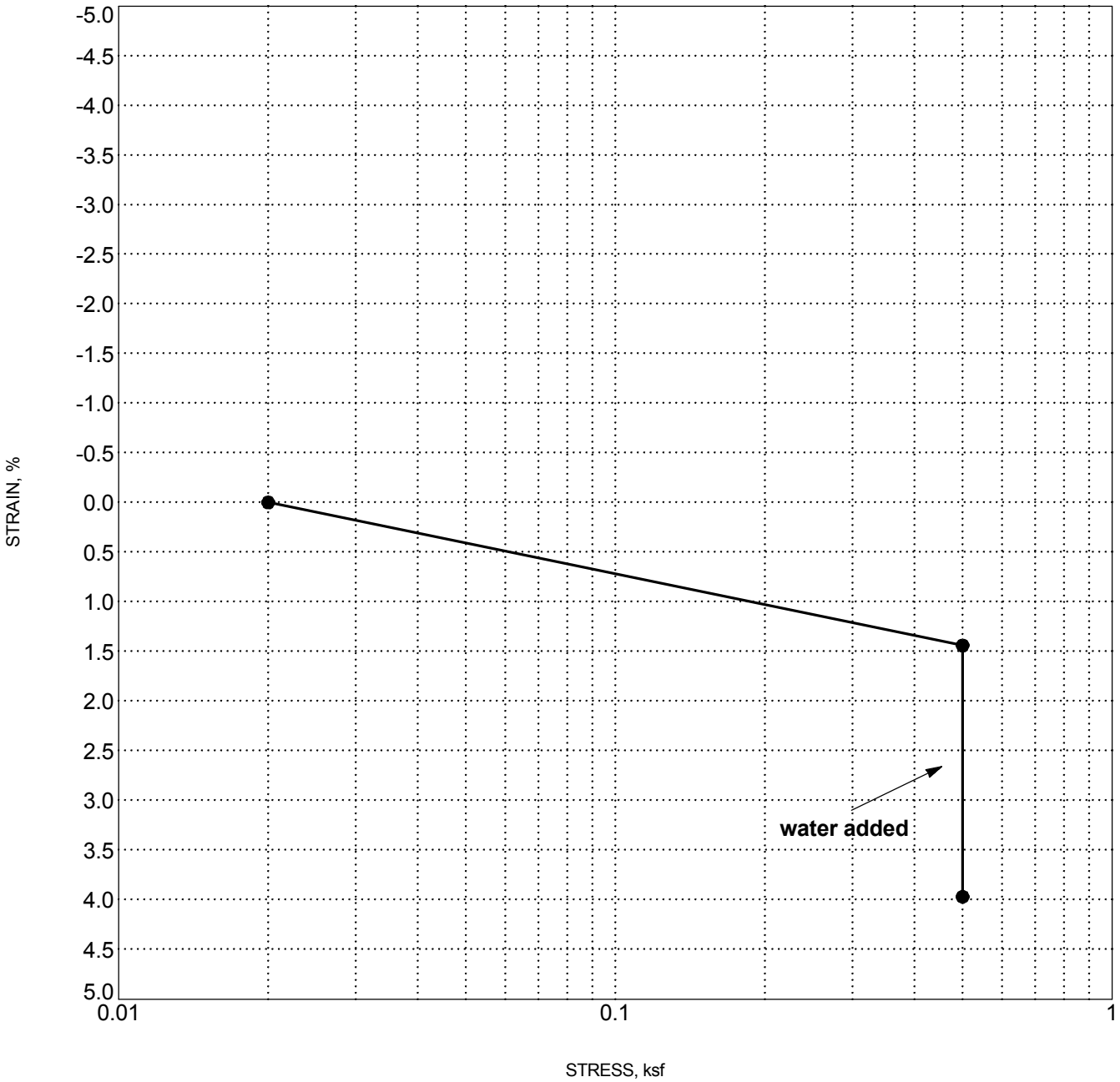
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-09	15.0	SILTY, CLAYEY SAND(SC-SM)	-2.53	93.2	7.3

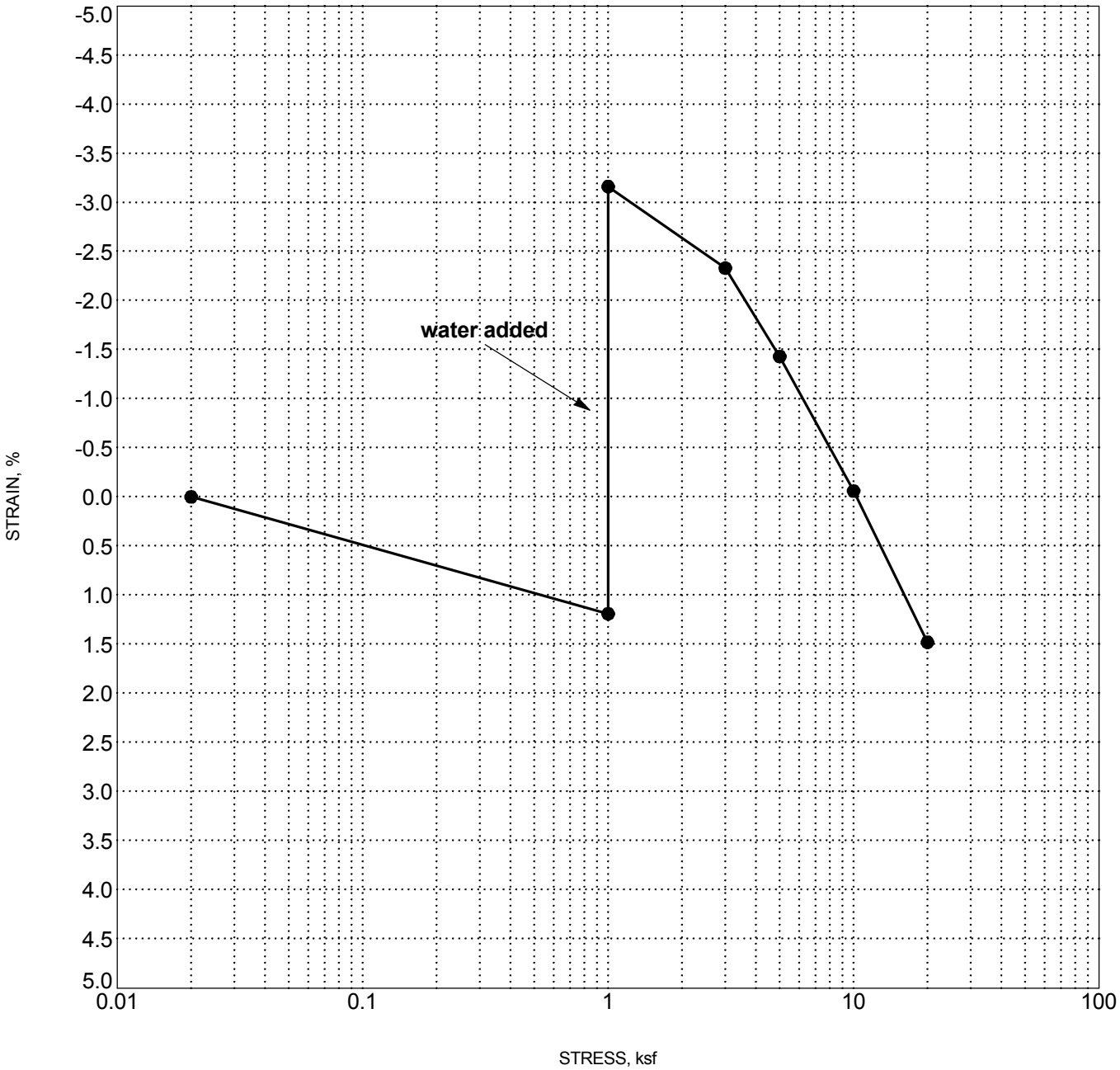
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-09**	**35.0**	**FAT CLAY(CH)**	**4.35**	**116.3**	**13.3**

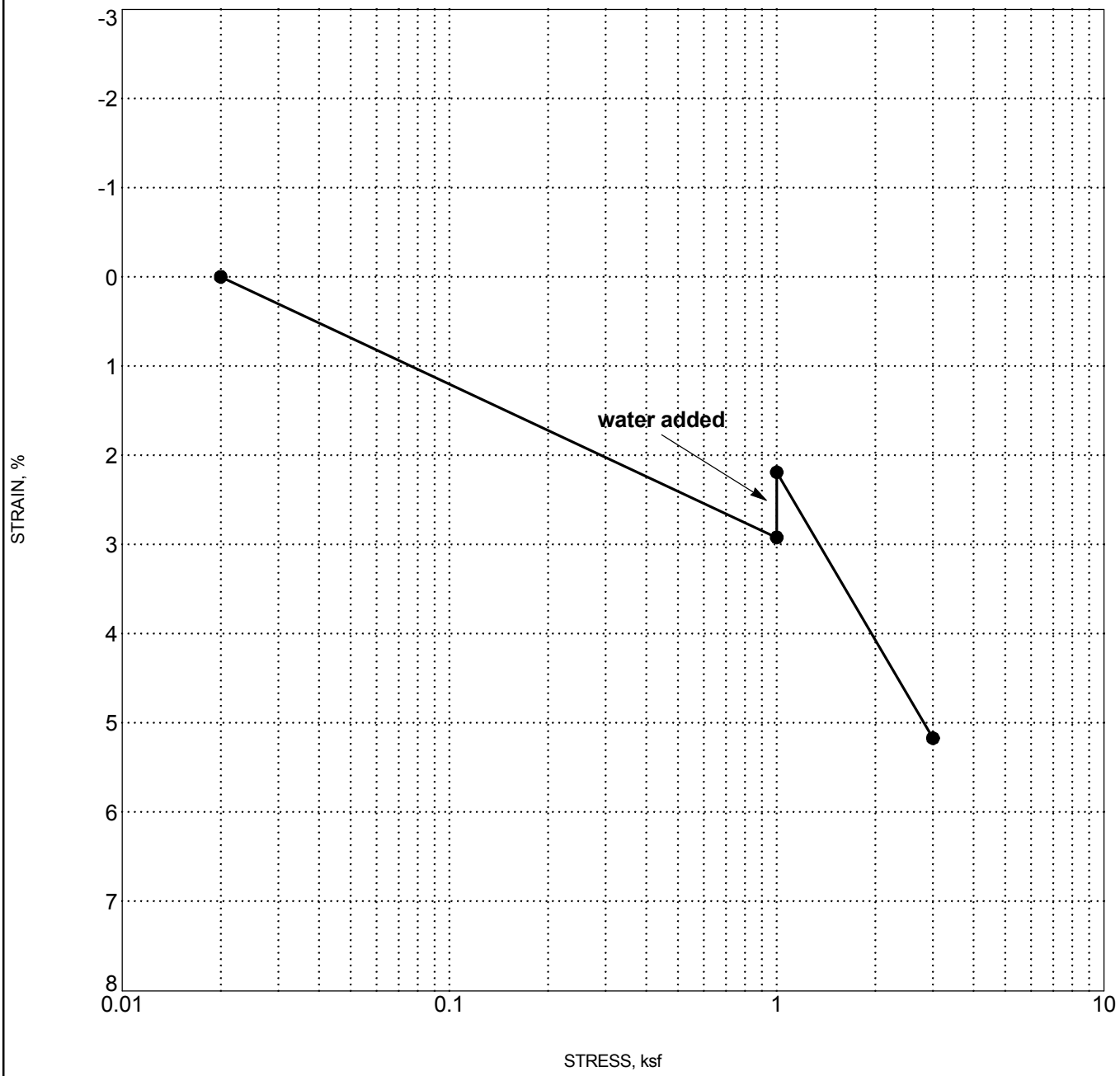
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-09**	**50.0**	**FAT CLAY(CH)**	**0.73**	**109.8**	**10.8**

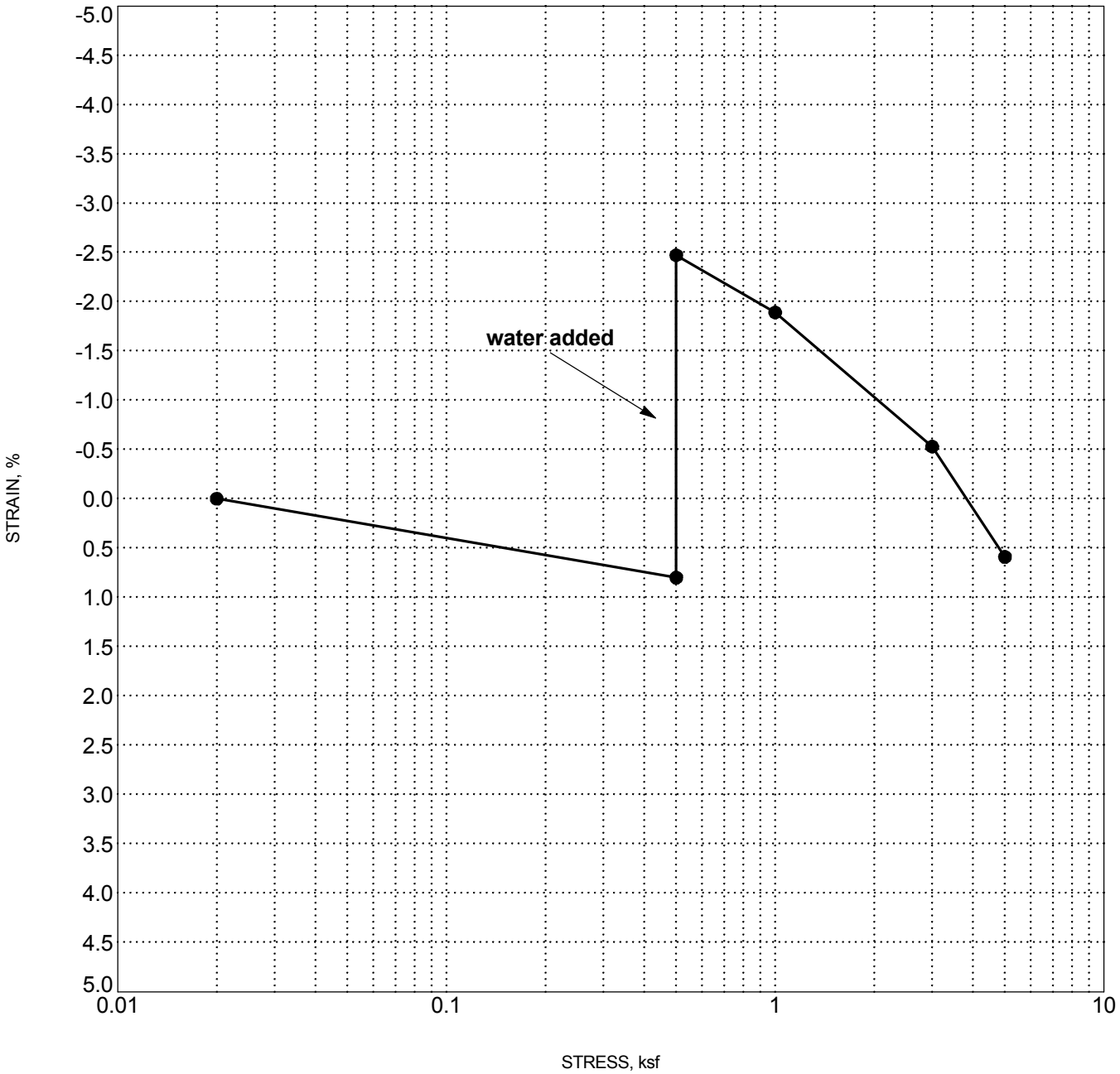
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-10**	**5.0**	**LEAN CLAY with SAND(CL)**	**3.27**	**115.4**	**7.6**

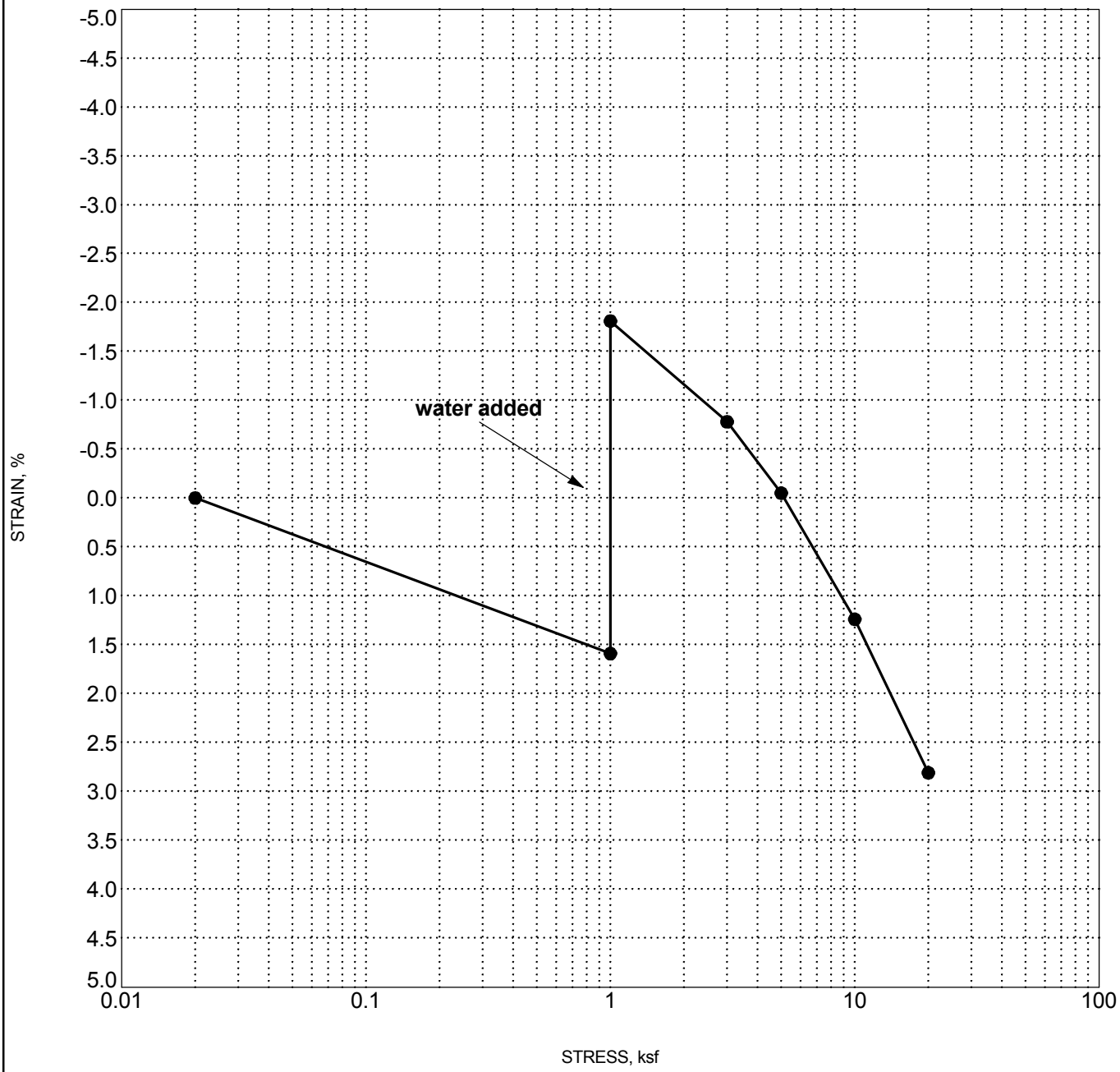
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-10**	**35.0**	**FAT CLAY(CH)**	**3.40**	**108.5**	**18.0**

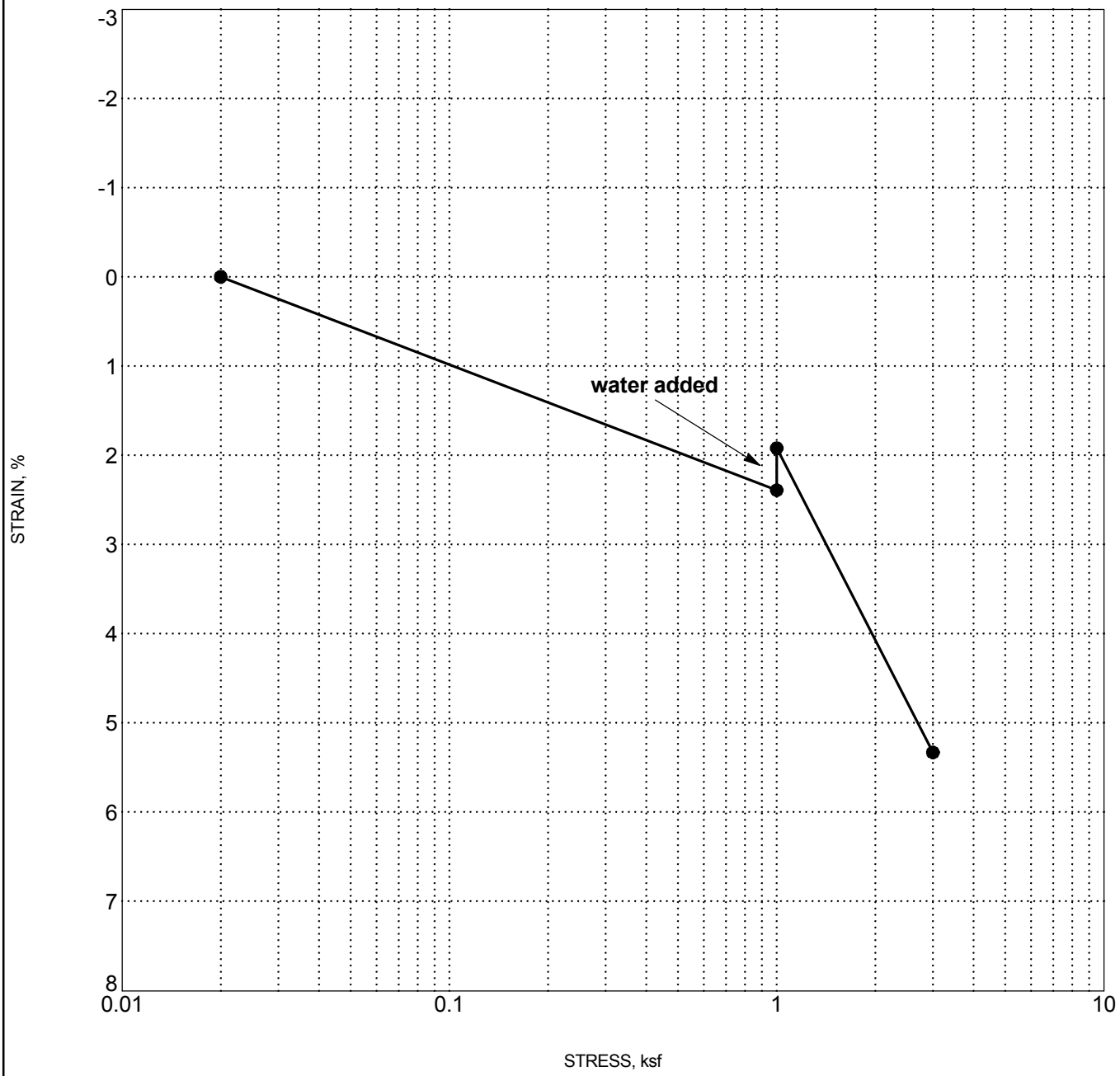
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-10**	**45.0**	**LEAN CLAY(CL)**	**0.47**	**108.0**	**10.5**

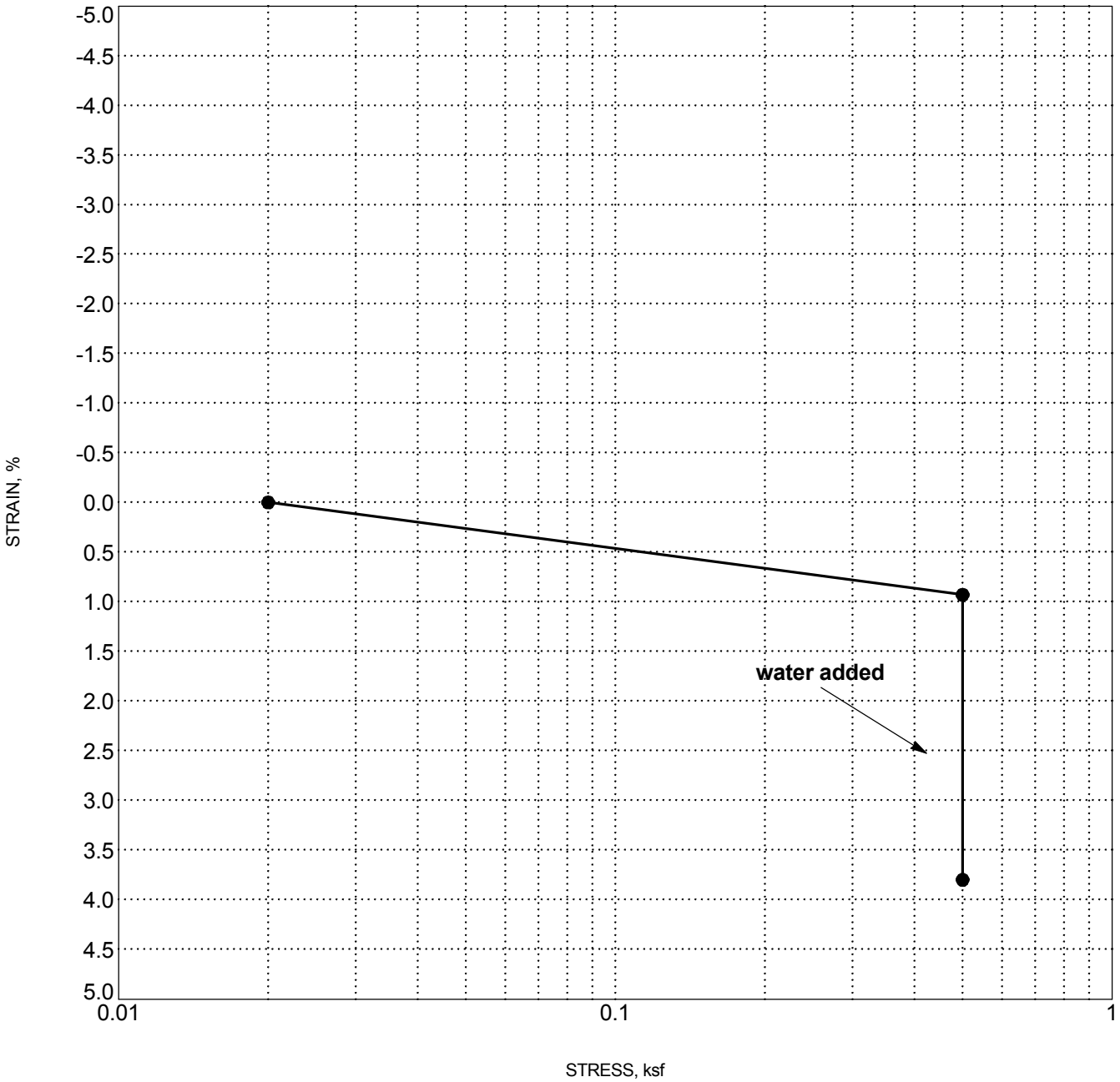
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-11	2.0	LEAN CLAY(CL)	-2.87		8.9

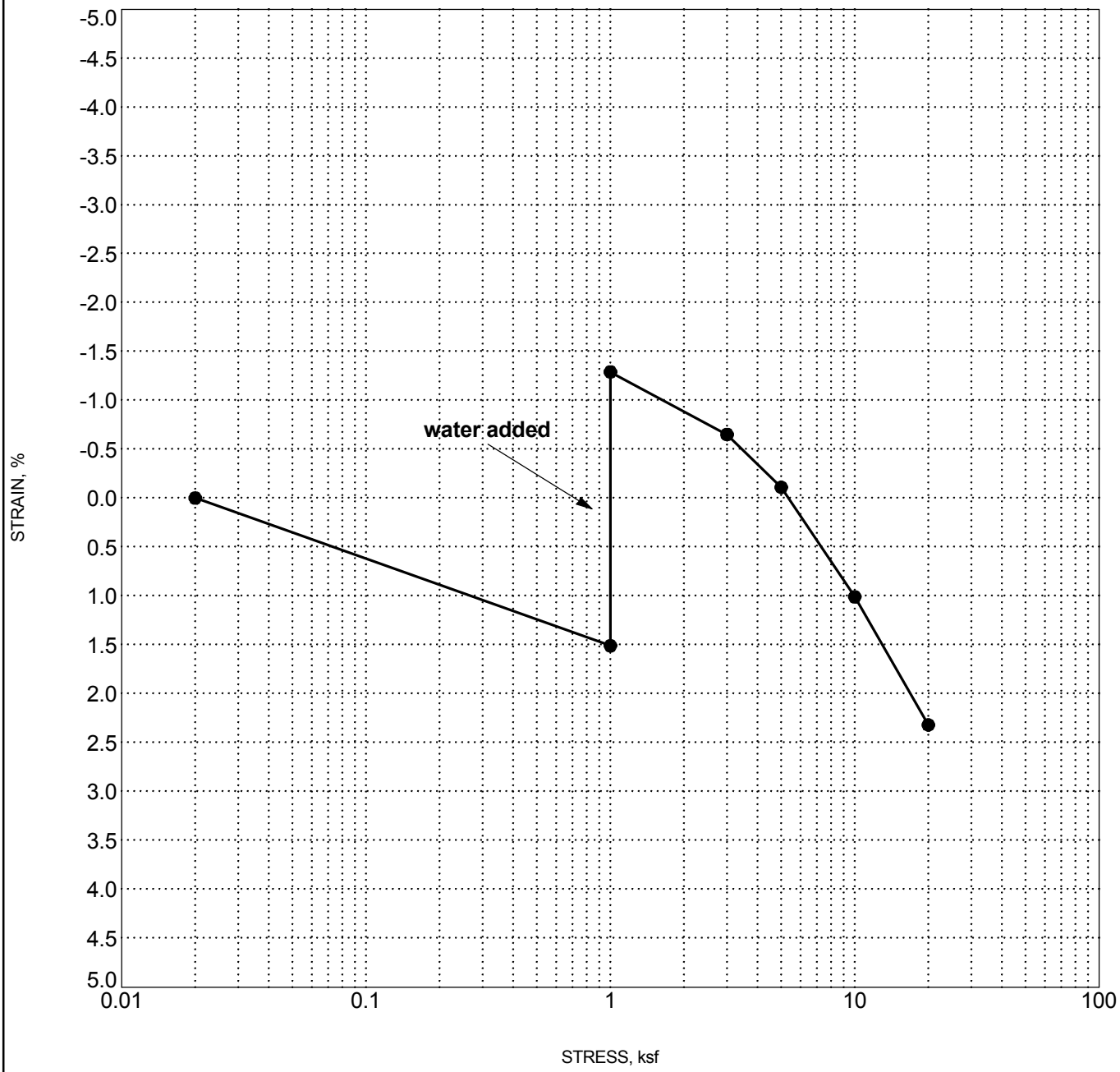
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-11**	**30.0**	**LEAN CLAY(CL)**	**2.80**	**114.8**	**15.9**

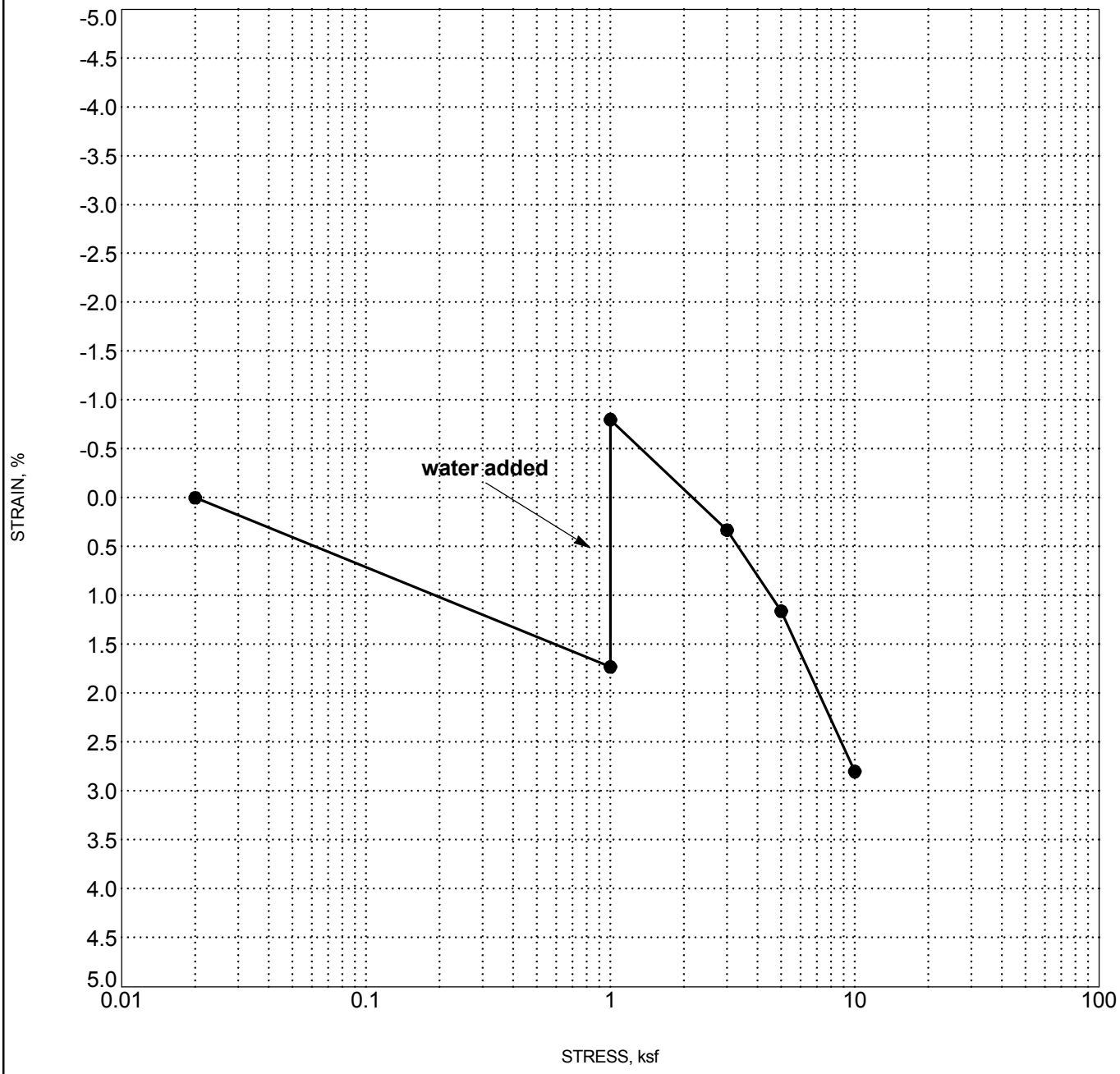
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-11**	**40.0**	**FAT CLAY(CH)**	**2.53**	**105.6**	**20.8**

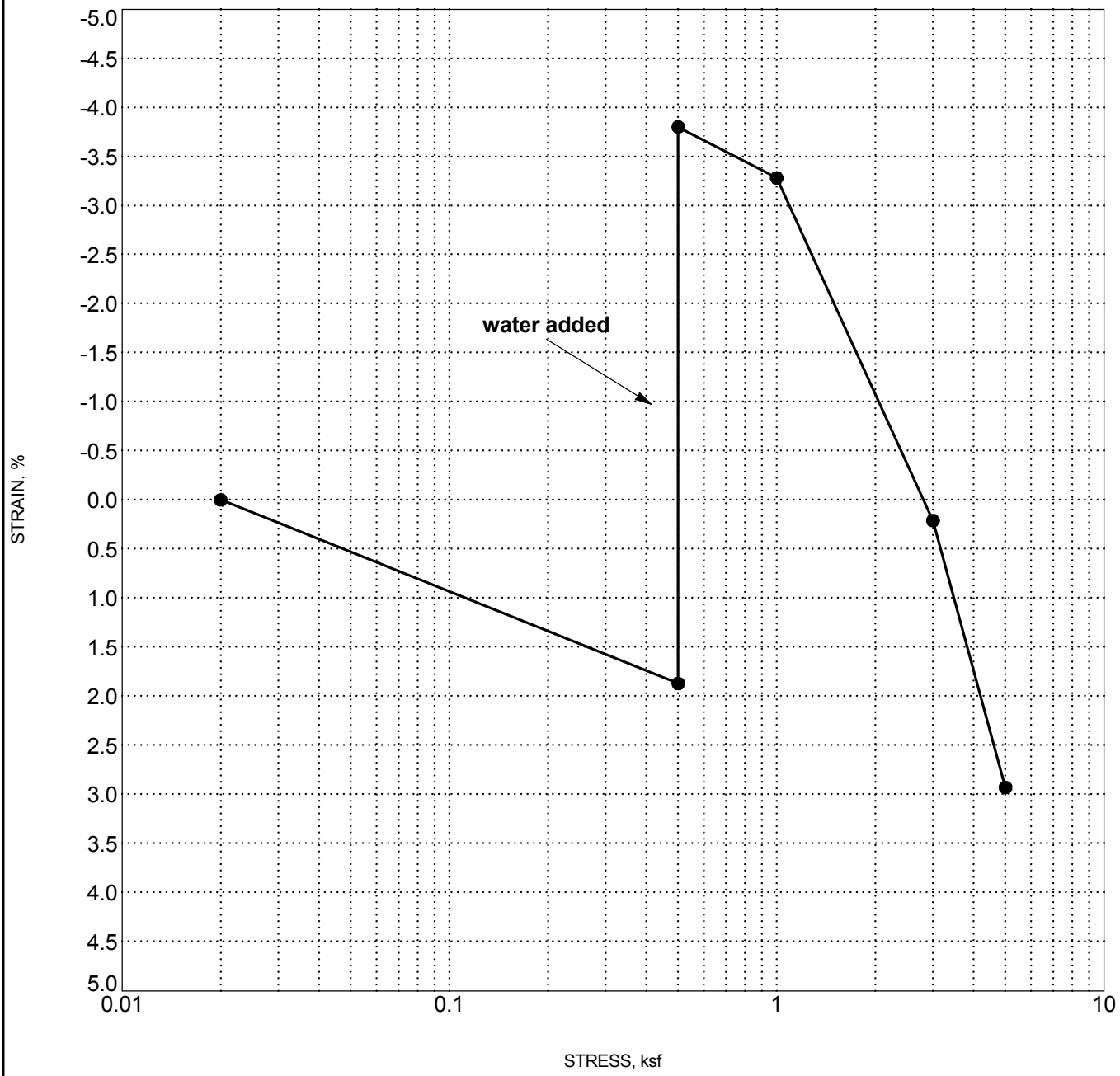
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-12**	**2.0**	**FAT CLAY with SAND(CH)**	**5.67**	**105.8**	**12.8**

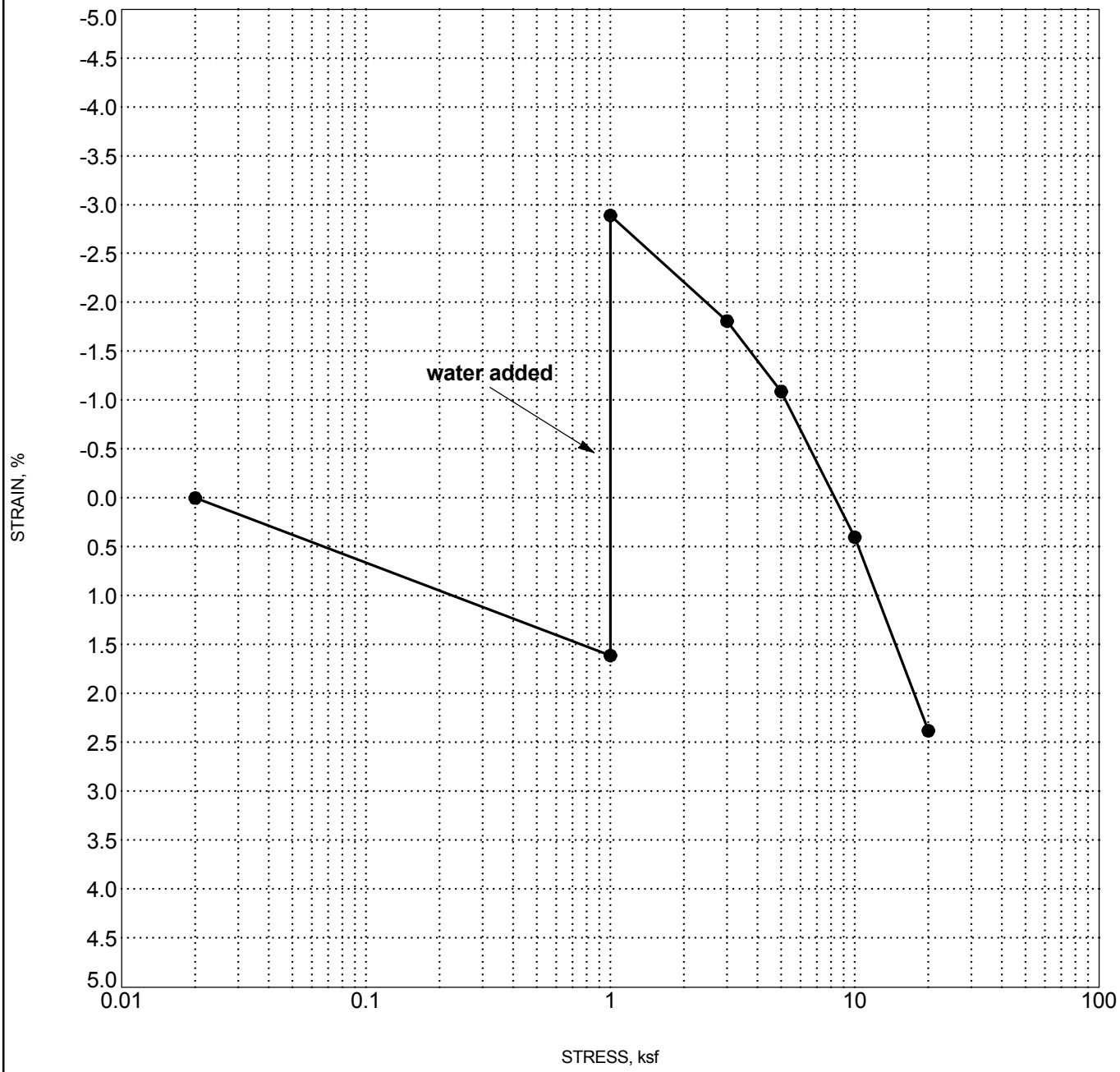
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-12**	**30.0**	**FAT CLAY(CH)**	**4.50**	**98.1**	**29.9**

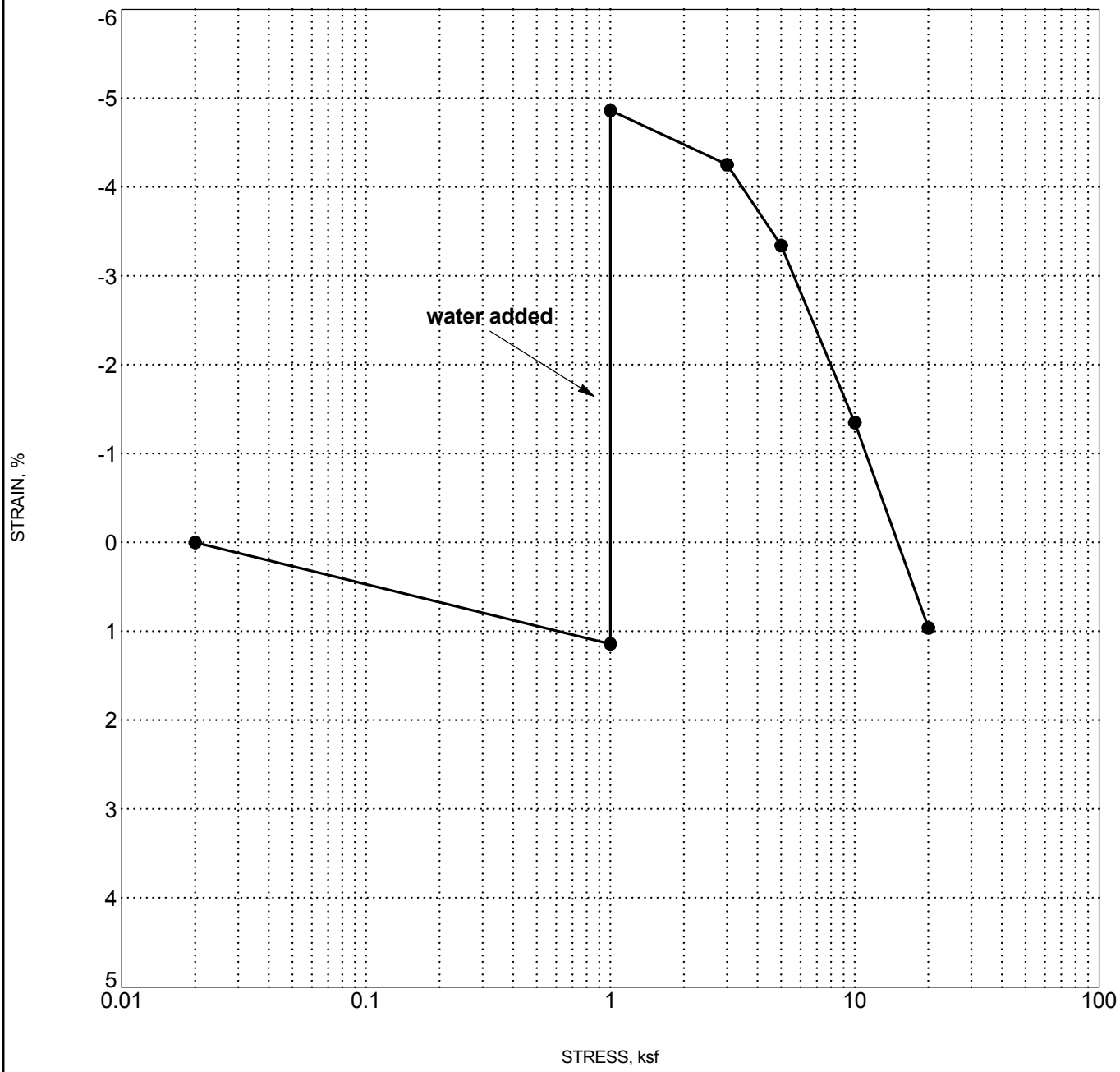
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-12	45.0	FAT CLAY(CH)	6.00	105.9	17.8

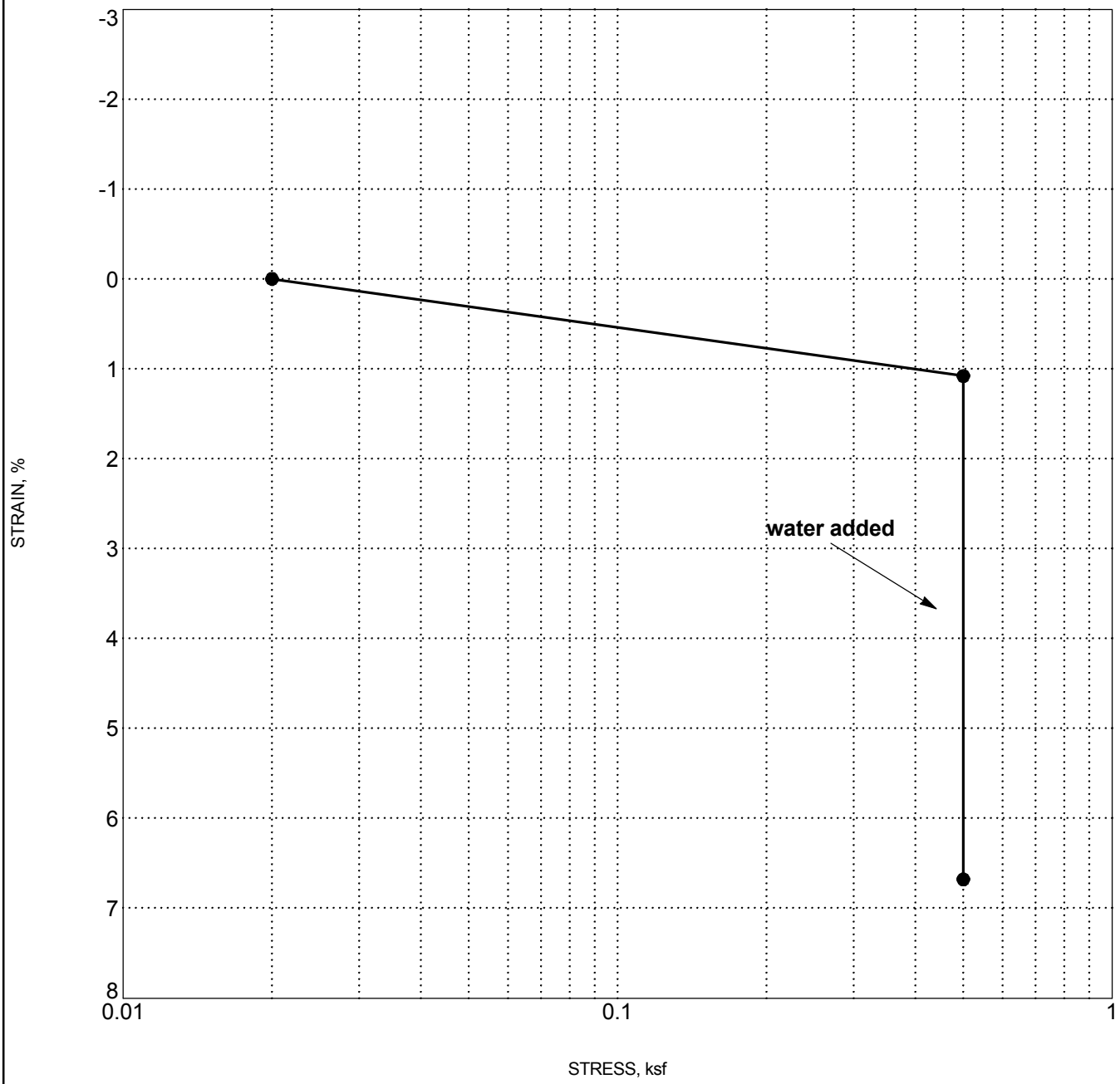
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-13**	**10.0**	**SILTY SAND(SM)**	**-5.60**		**2.6**

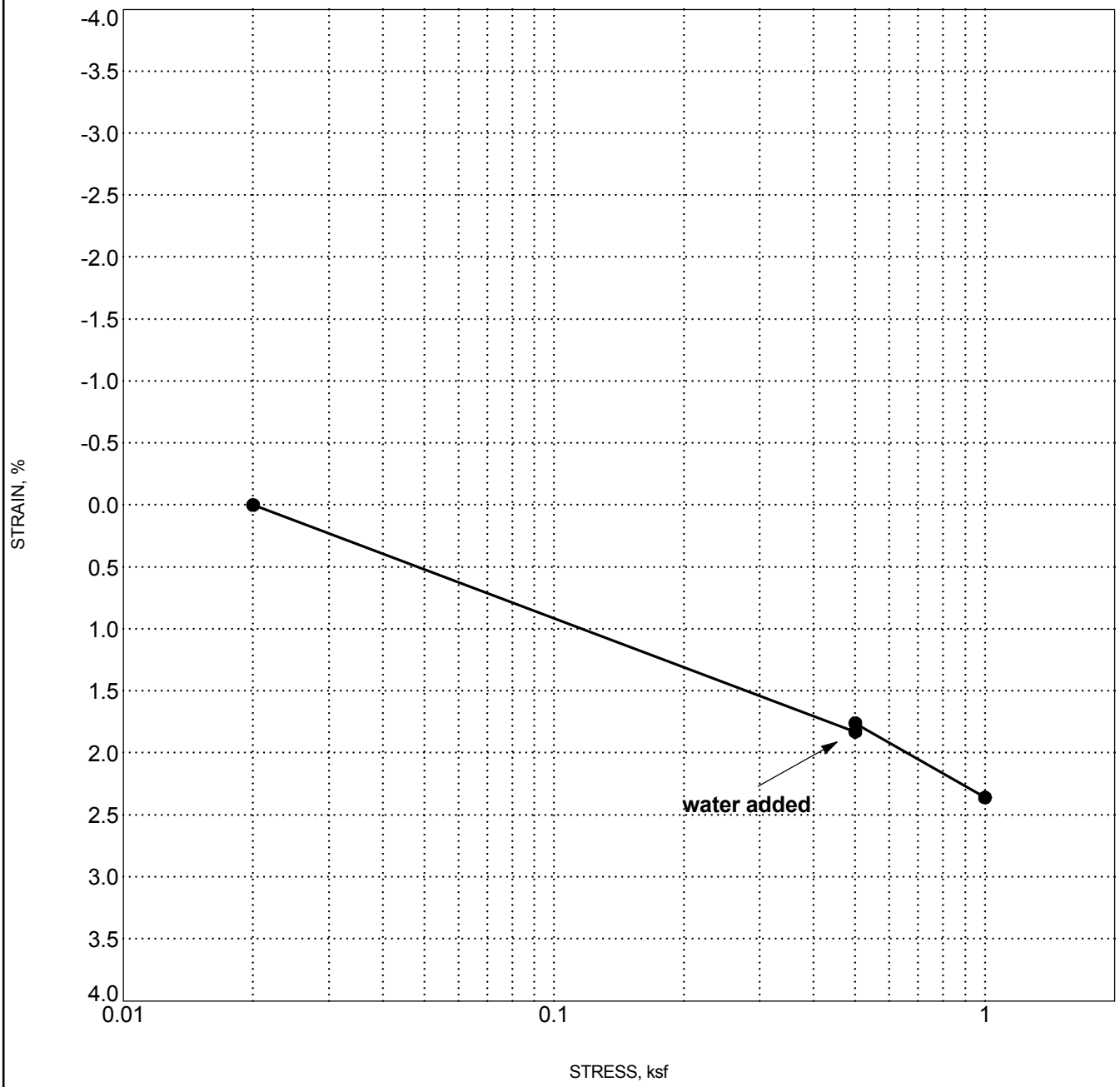
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-13**	**20.0**	**CLAYEY SAND(SC)**	**0.07**	**115.8**	**11.1**

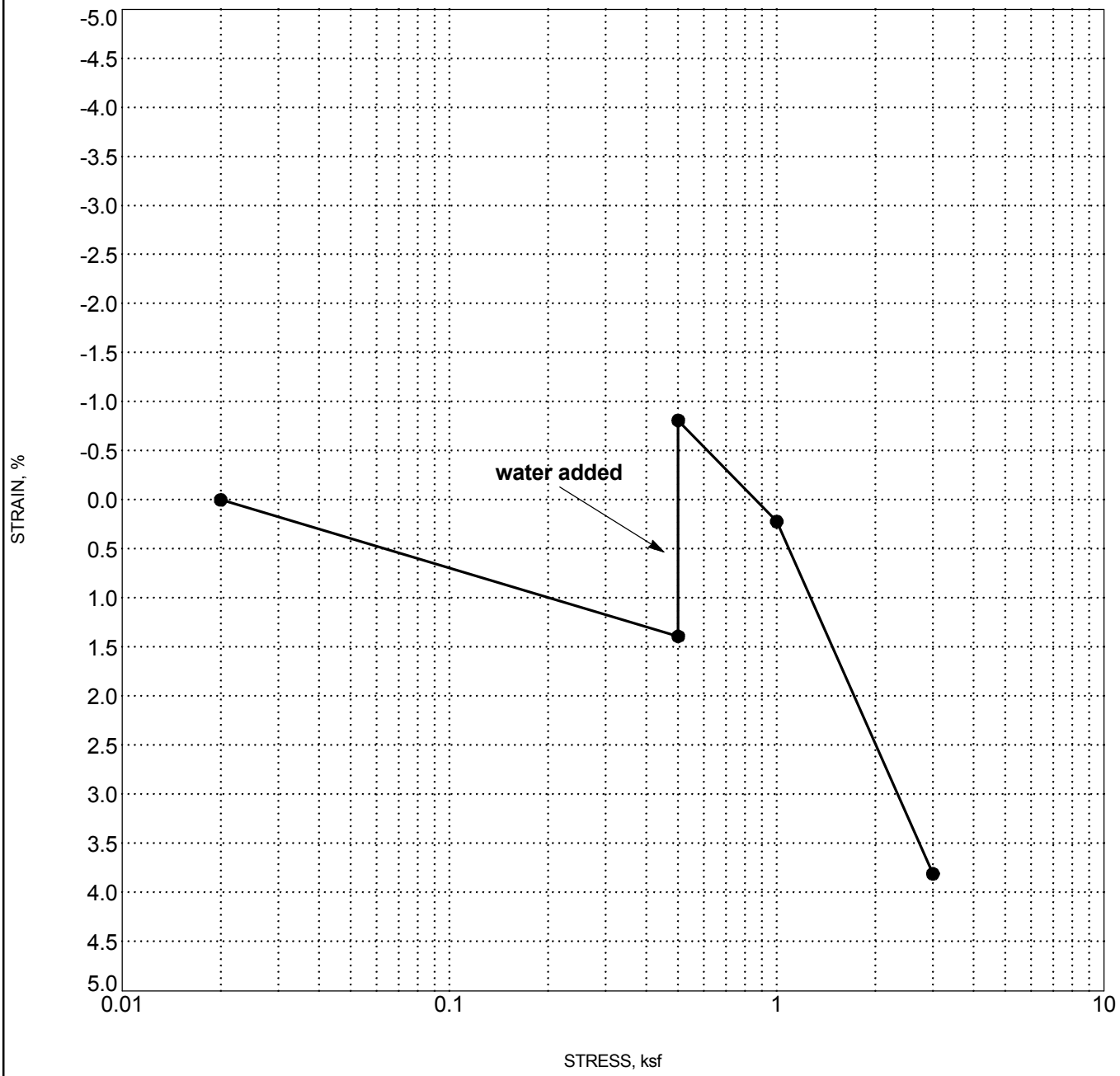
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-13**	**40.0**	**FAT CLAY(CH)**	**2.20**	**103.5**	**12.8**

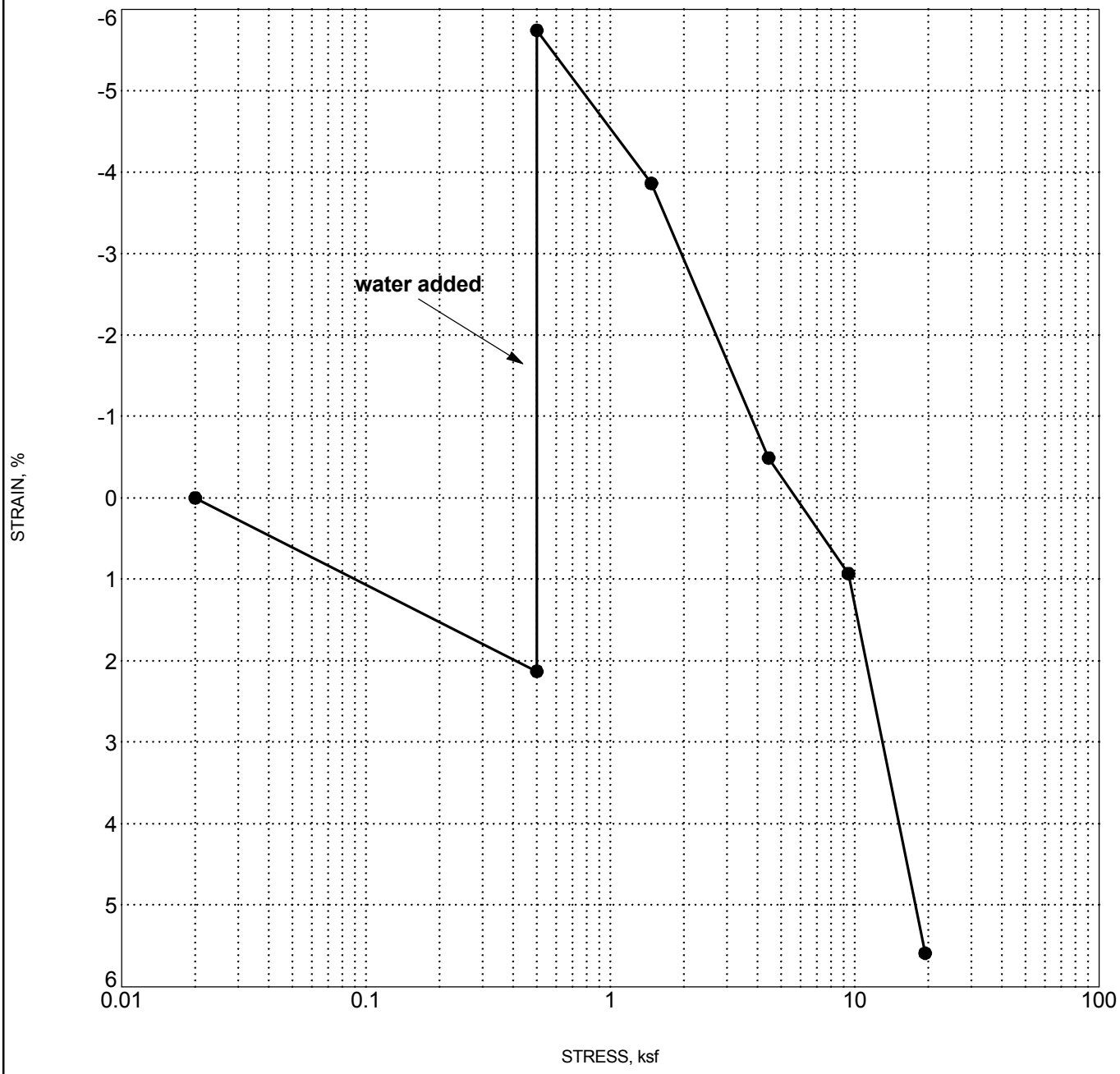
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-14	30.0	FAT CLAY(CH)	7.87	109.3	19.9

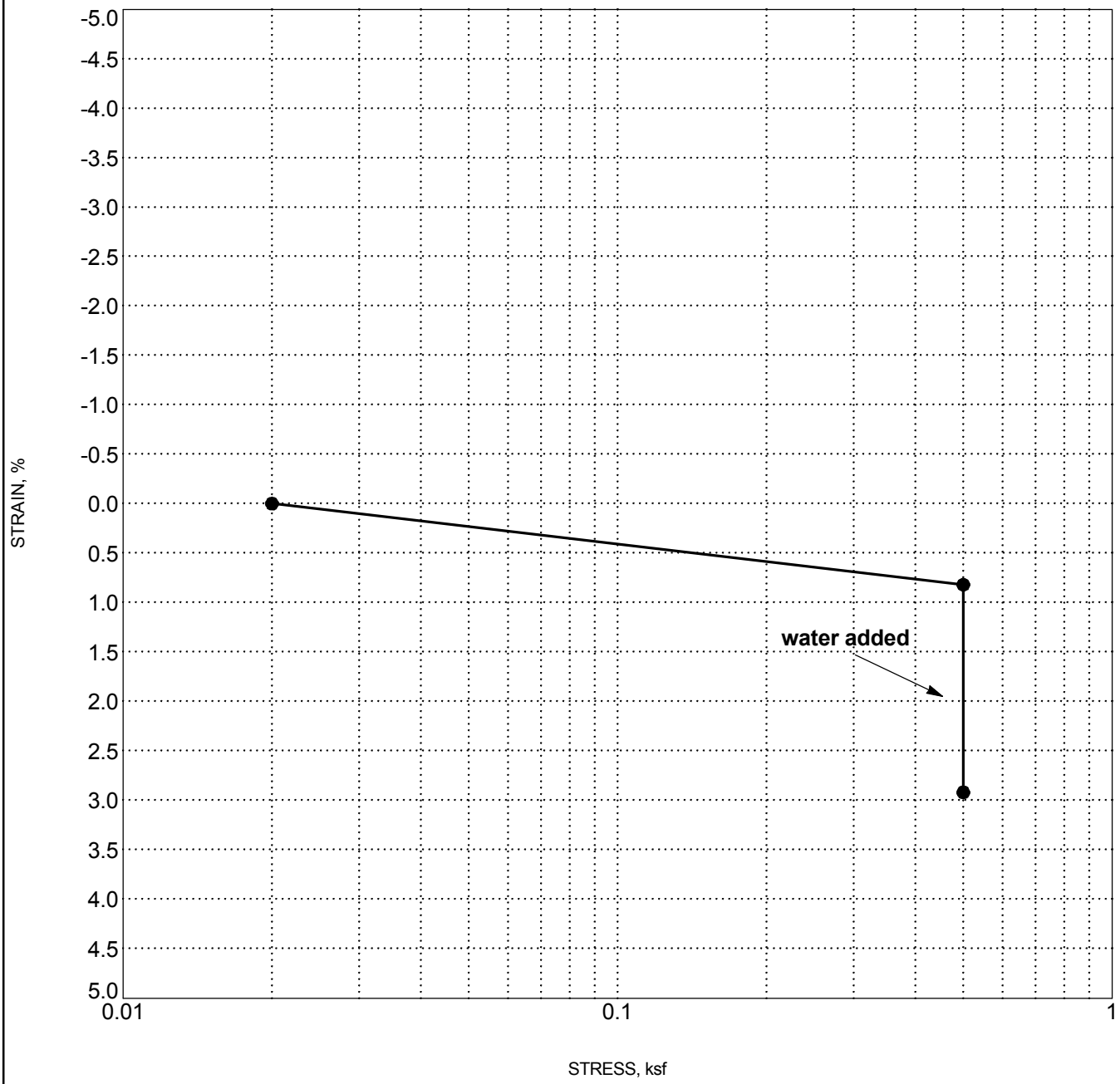
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-14	50.0	SANDY LEAN CLAY(CL)	-2.10	99.9	9.5

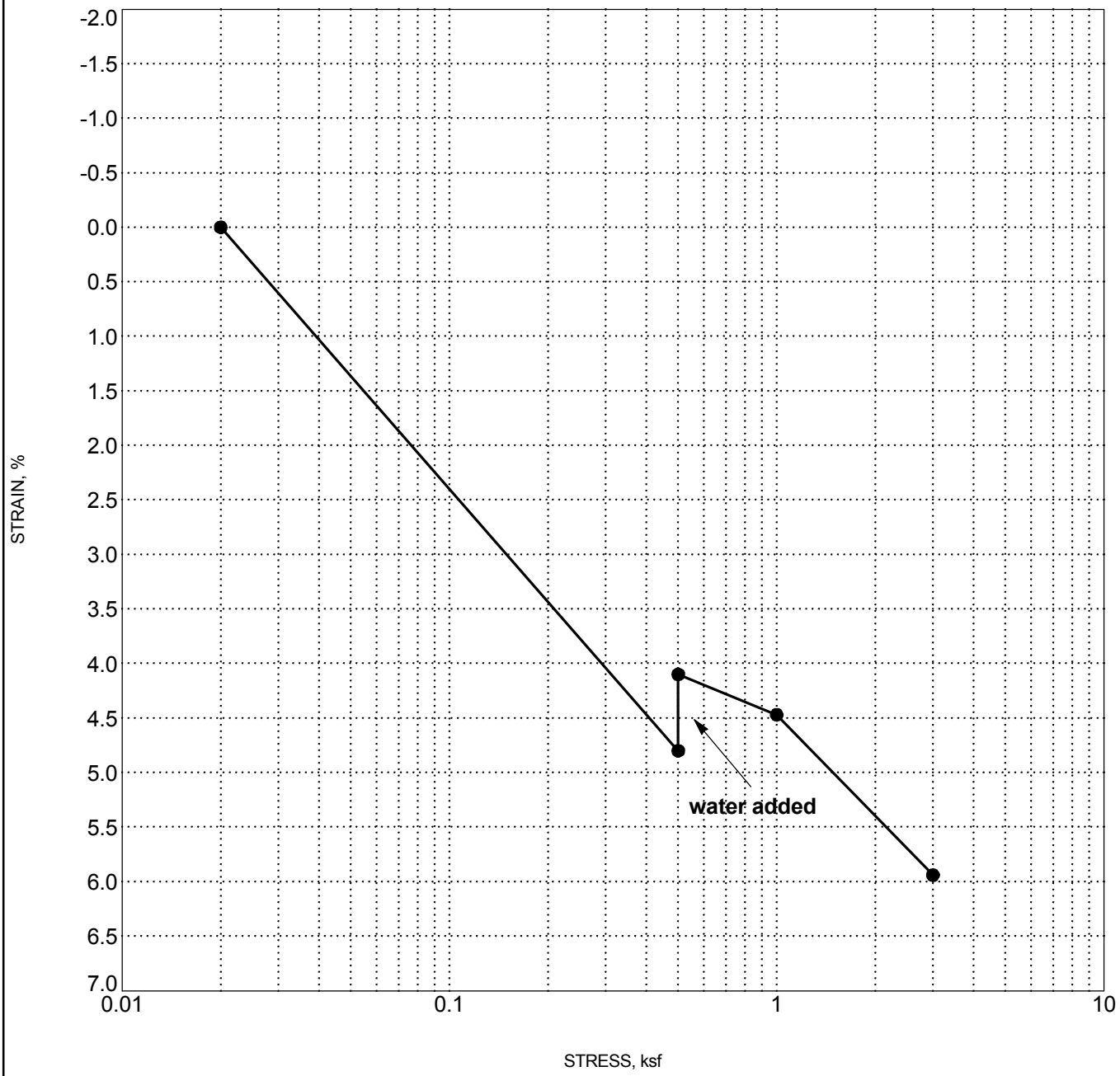
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-15**	**15.0**	**CLAYEY SAND(SC)**	**0.70**	**98.9**	**10.5**

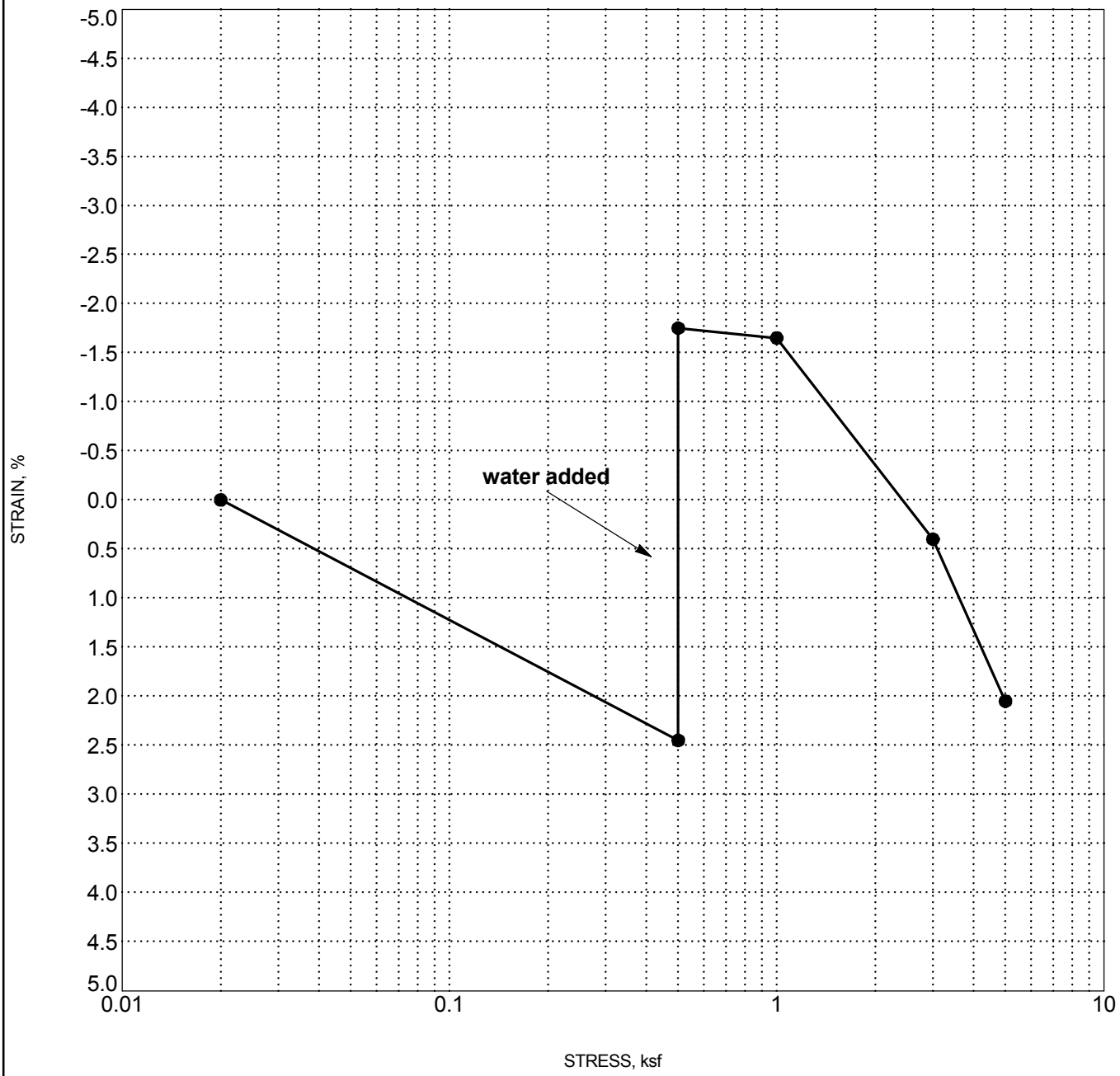
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-15**	**25.0**	**LEAN CLAY(CL)**	**4.20**	**113.2**	**16.3**

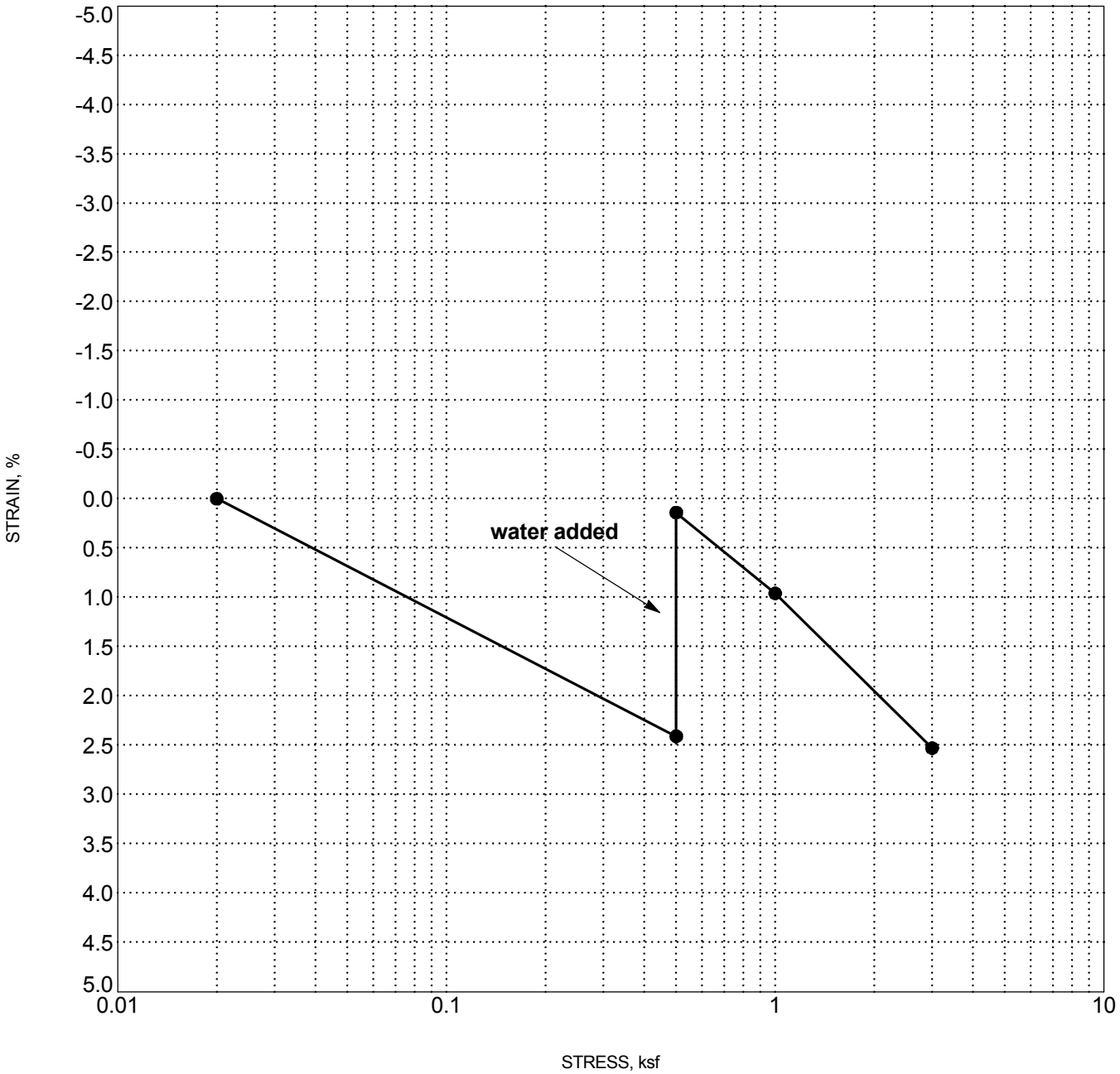
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-15**	**30.0**	**FAT CLAY(CH)**	**2.27**	**108.4**	**20.0**

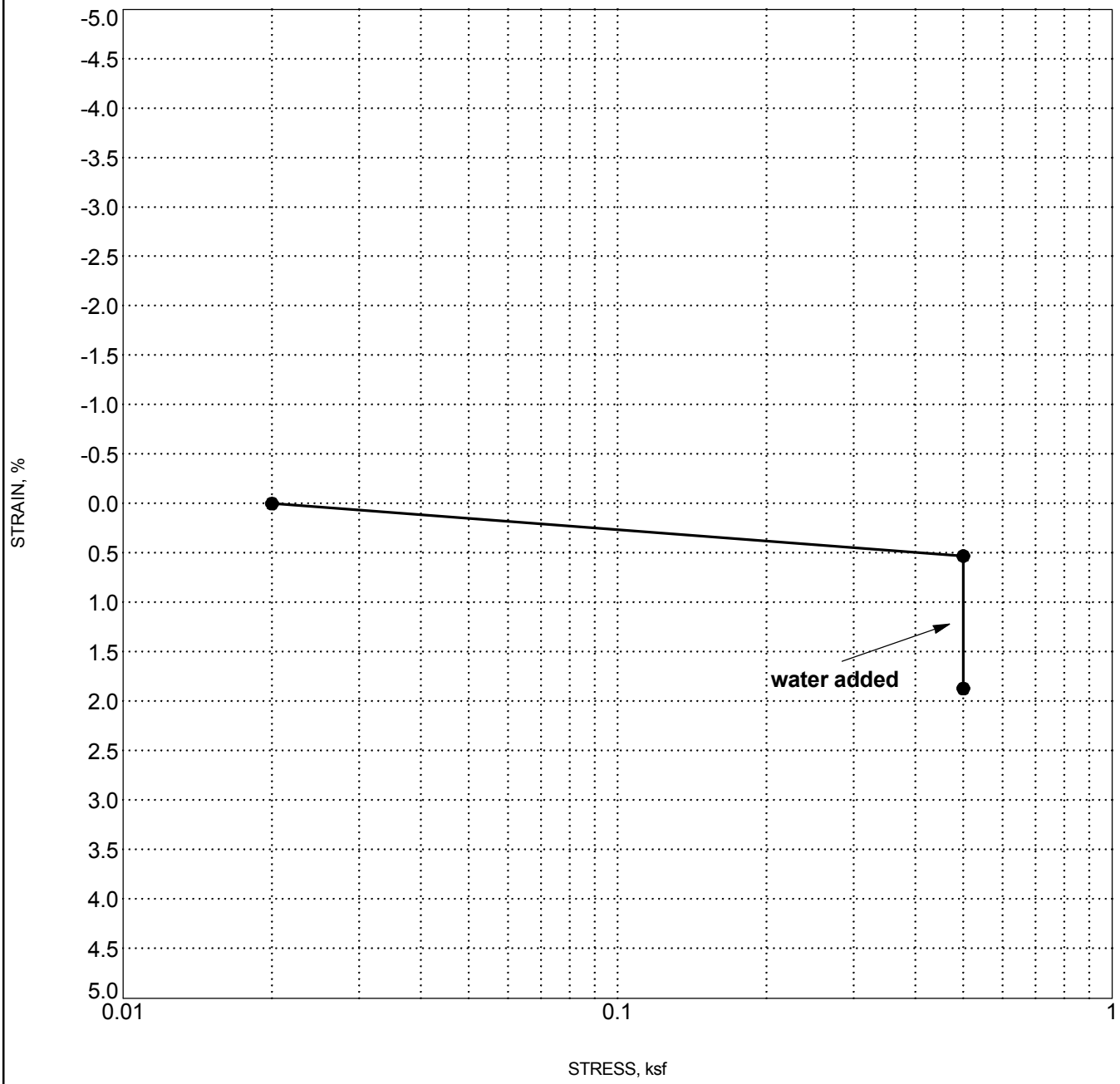
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-17**	**5.0**	**SILTY SAND(SM)**	**-1.34**	**102.0**	**10.7**

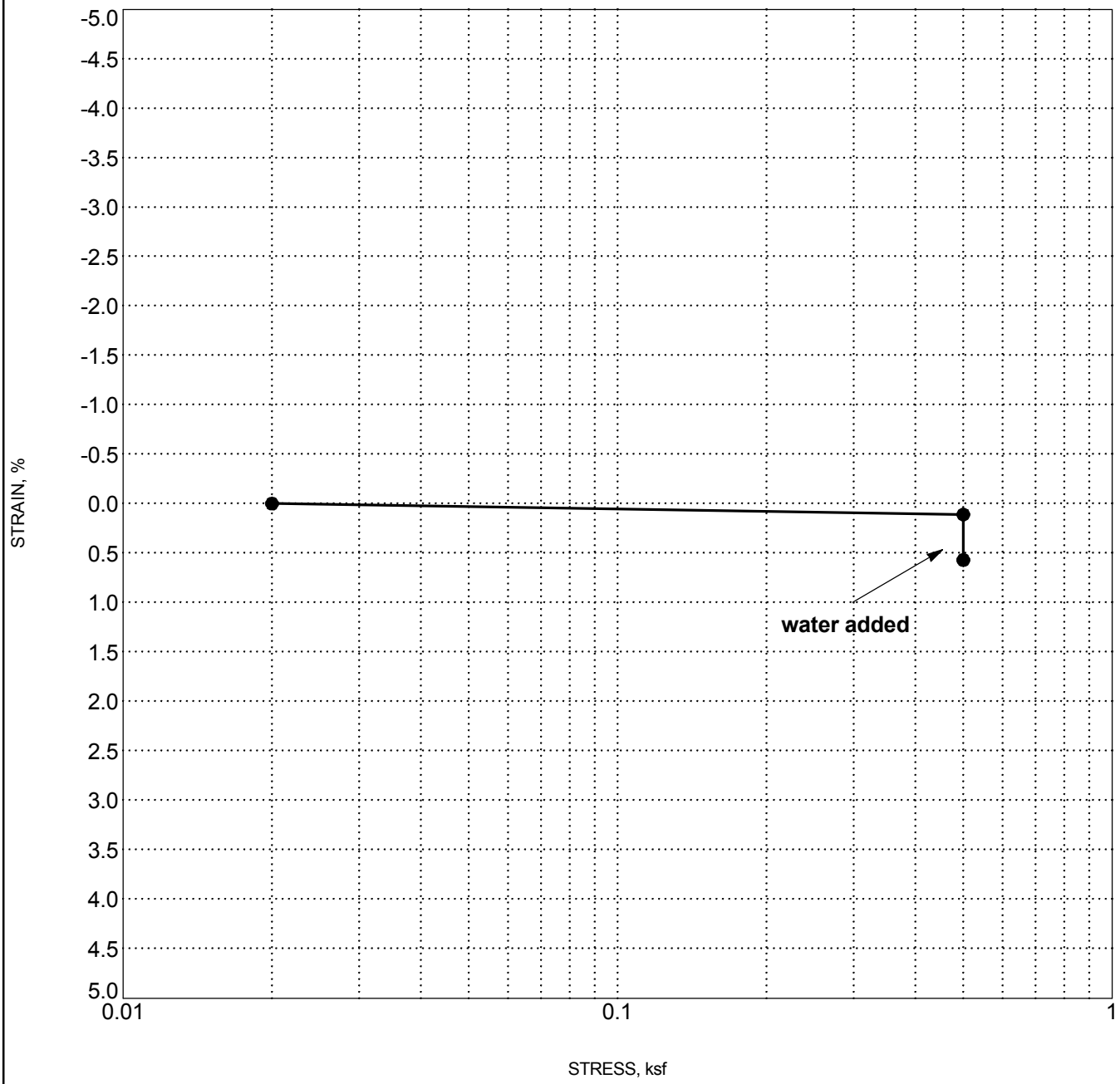
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-17	10.0	**SILTY SAND(SM)**	**-0.46**	**106.0**	**7.5**

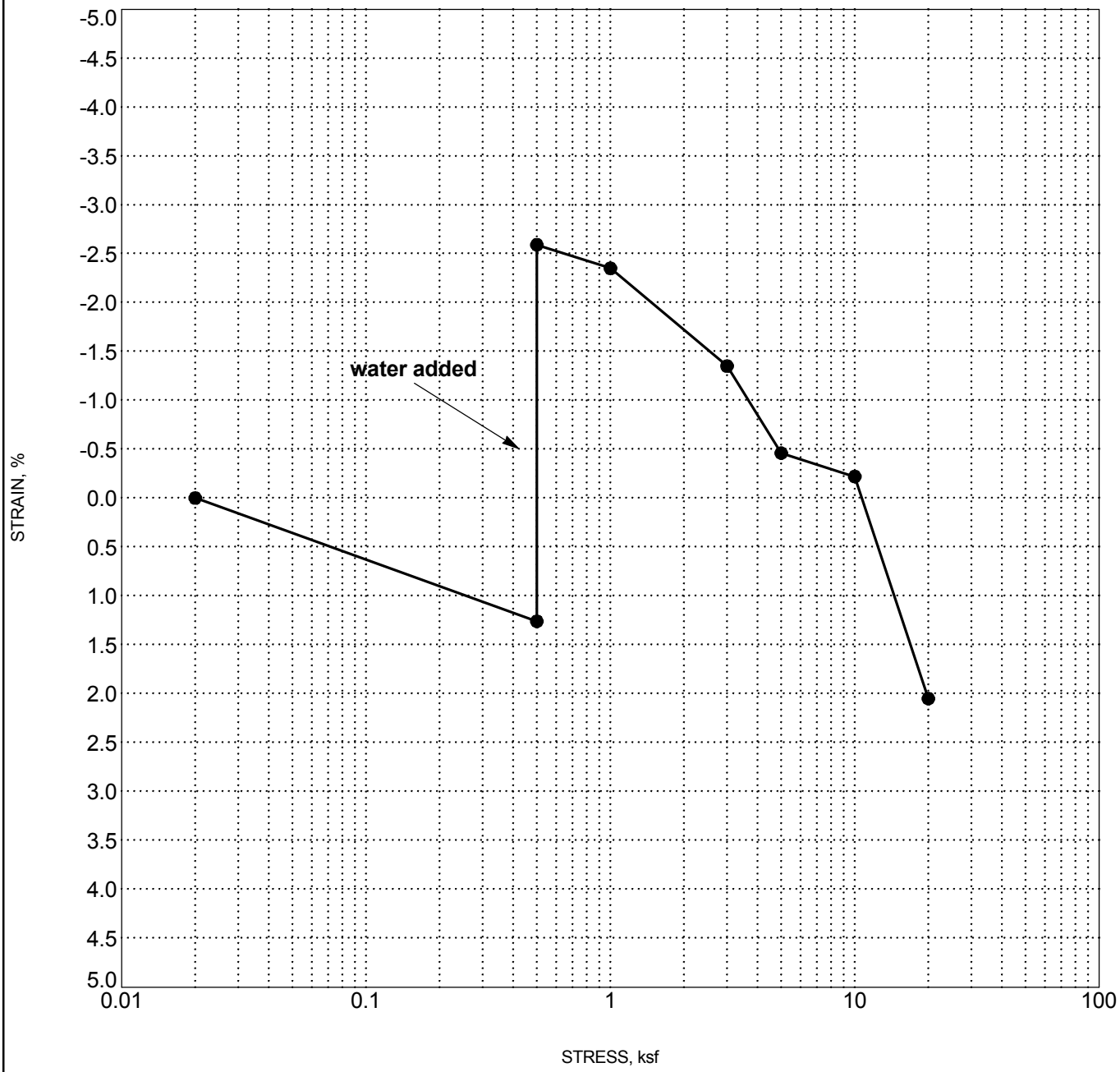
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-17	15.0	**LEAN CLAY with SAND(CL)**	**3.85**	**115.9**	**14.7**

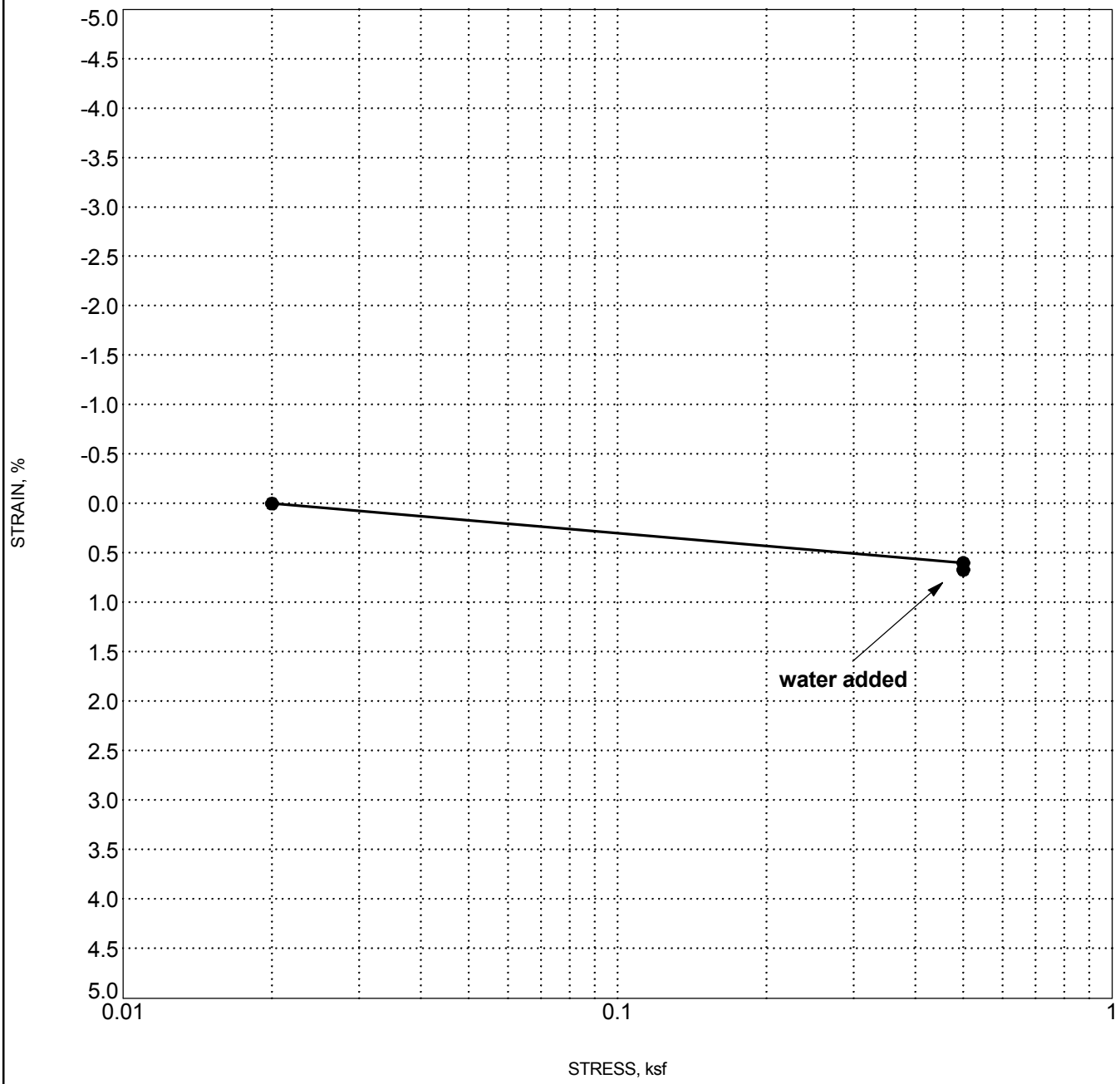
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-18	10.0	SILTY SAND(SM)	-0.07	98.9	9.3

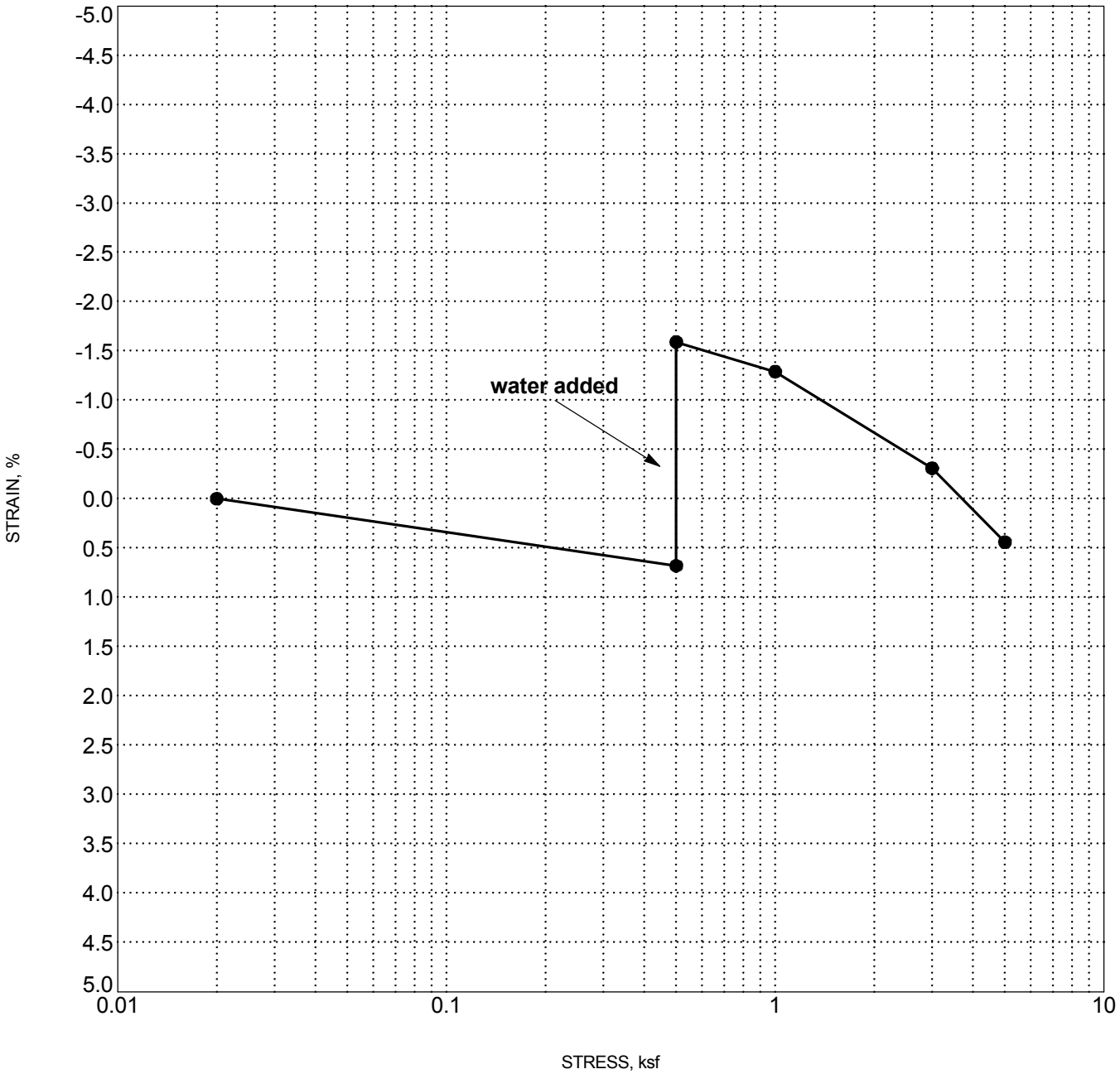
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-18	20.0	**LEAN CLAY with SAND(CL)**	**2.27**	**106.9**	**13.3**

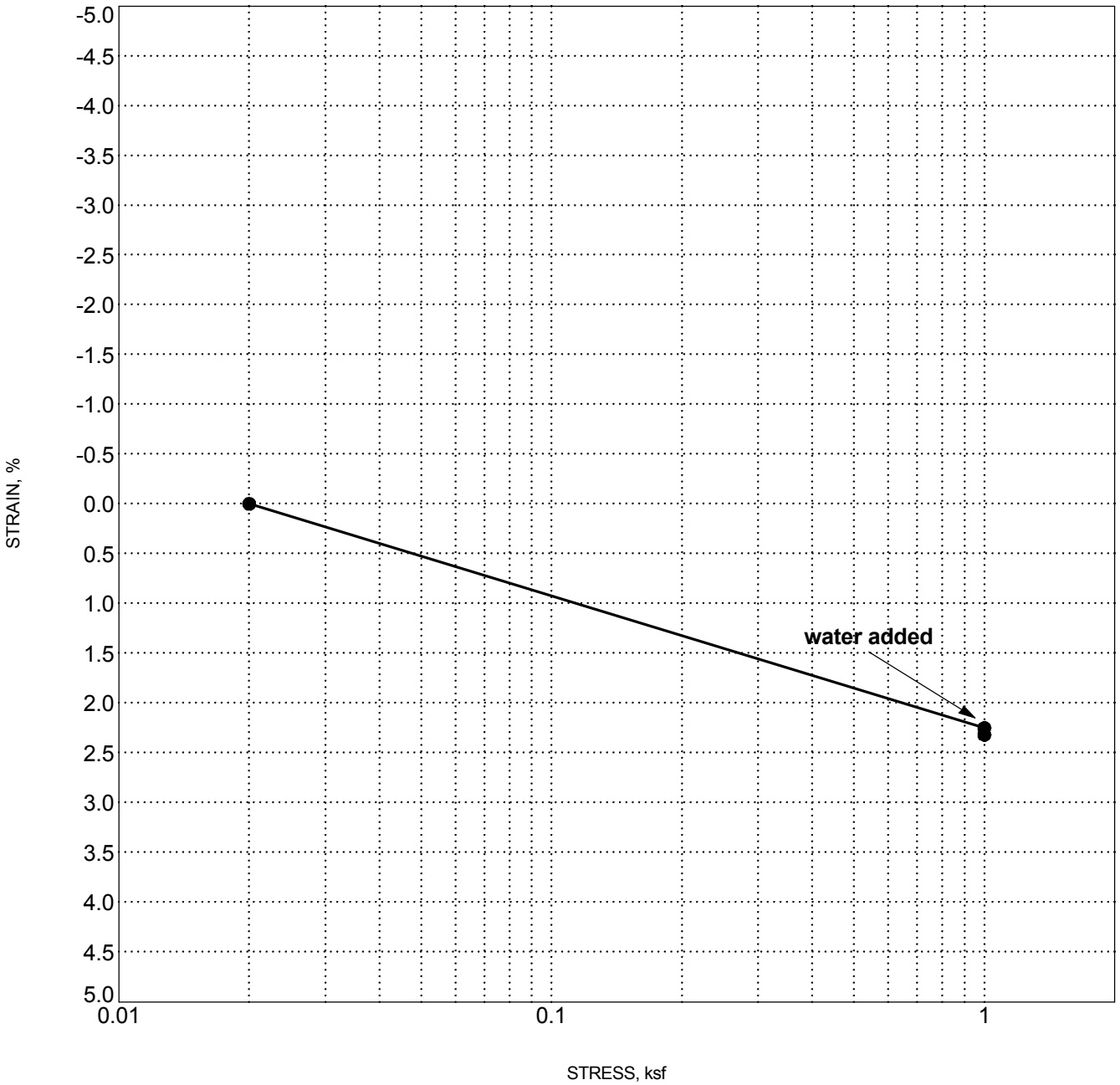
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-18	40.0	CLAYEY SAND(SC)	-0.07	105.7	18.9

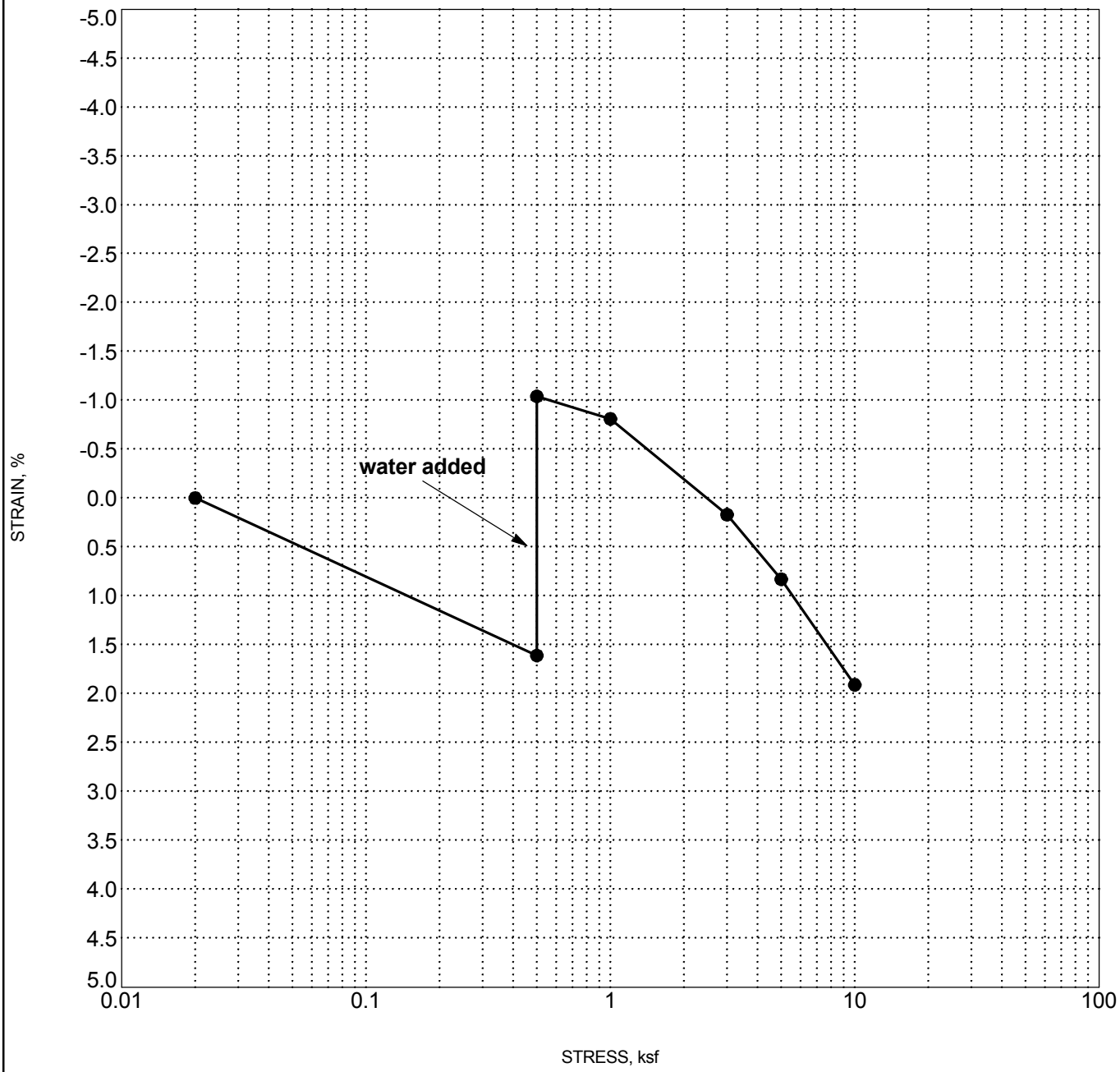
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-19**	**20.0**	**SANDY FAT CLAY(CH)**	**2.65**	**119.9**	**13.1**

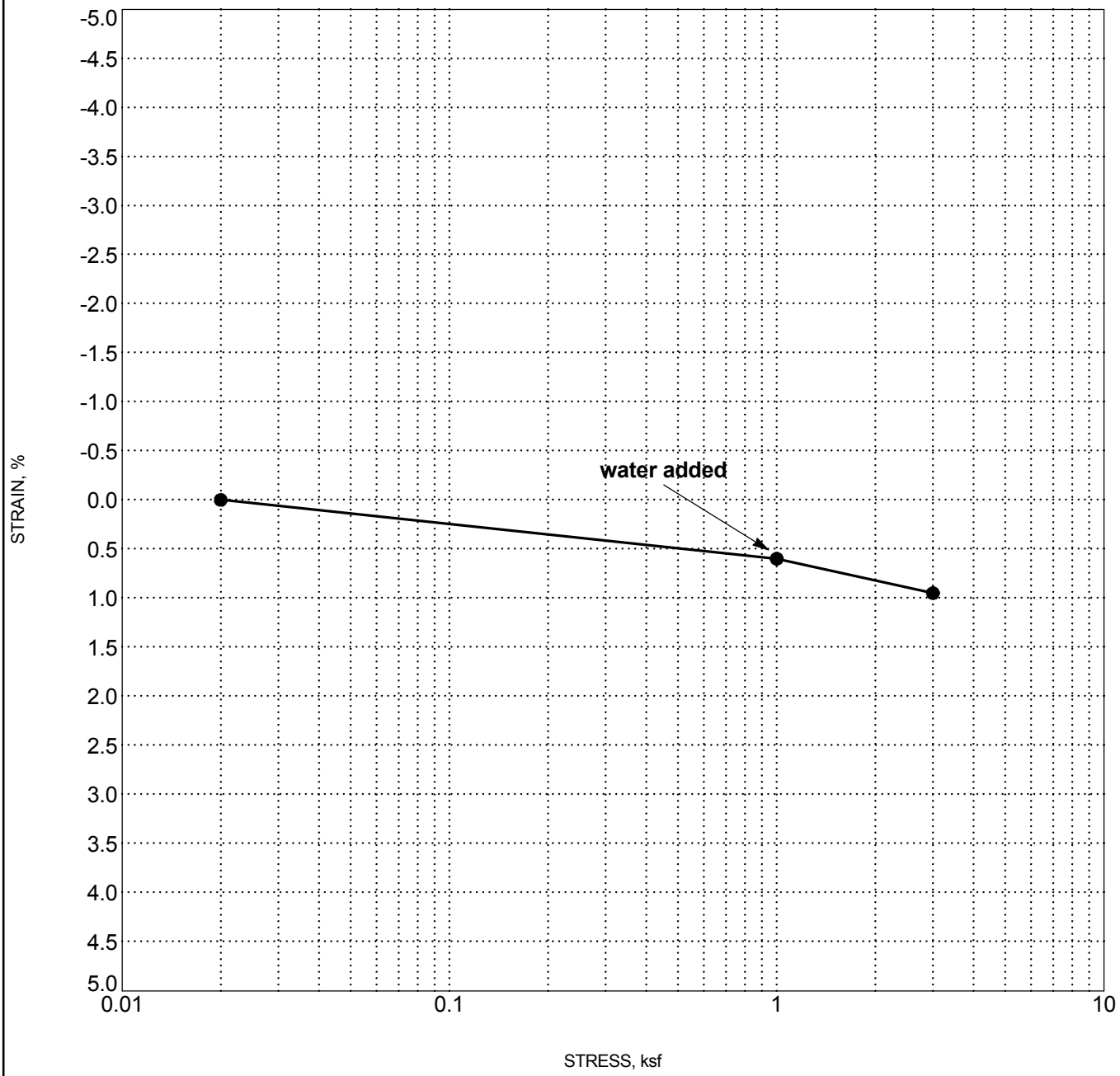
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **B-19**	**30.0**	**SANDY LEAN CLAY(CL)**	**0.00**	**115.8**	**15.5**

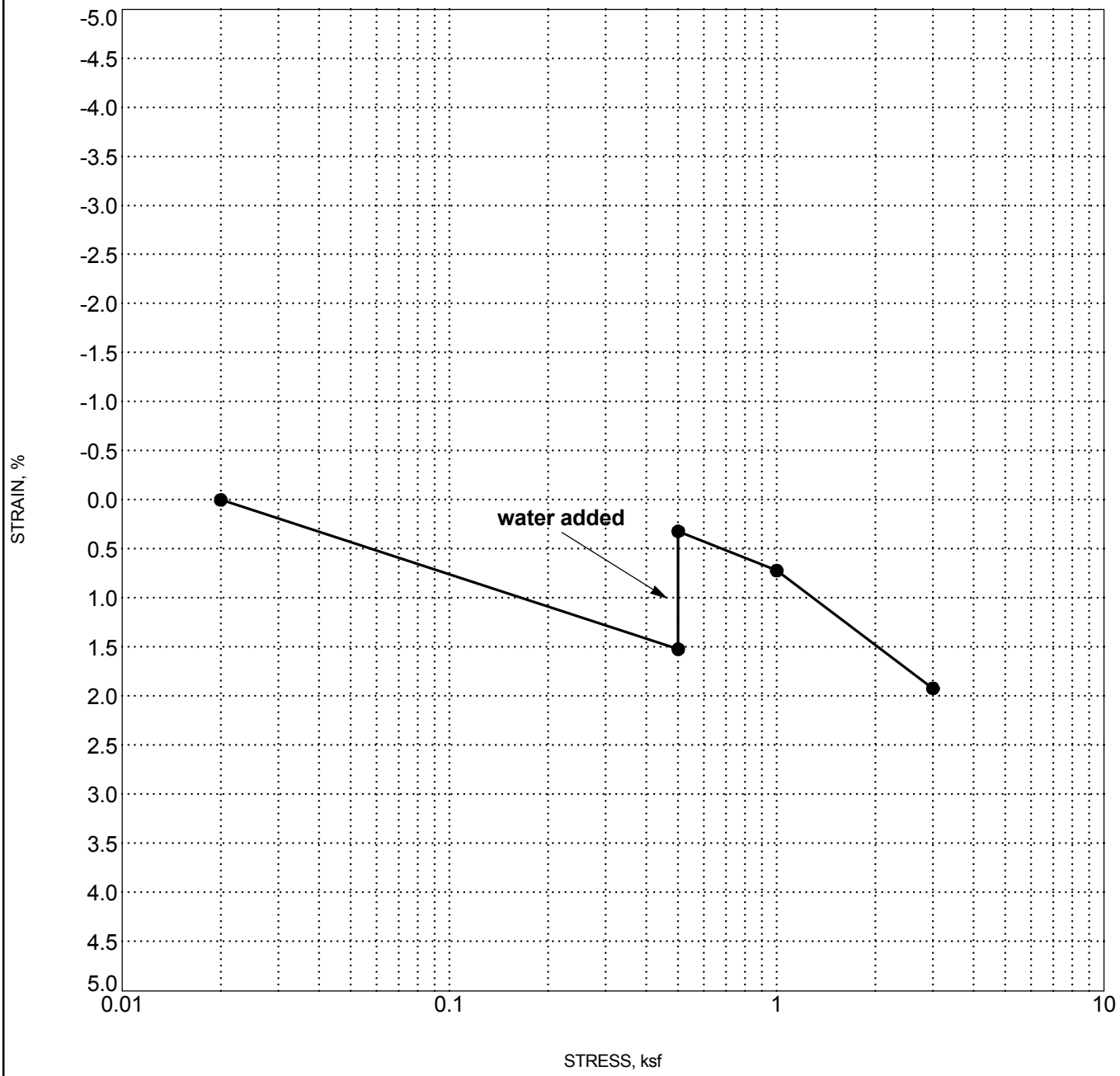
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-19	40.0	**LEAN CLAY with SAND(CL)**	**1.20**	**107.2**	**20.4**

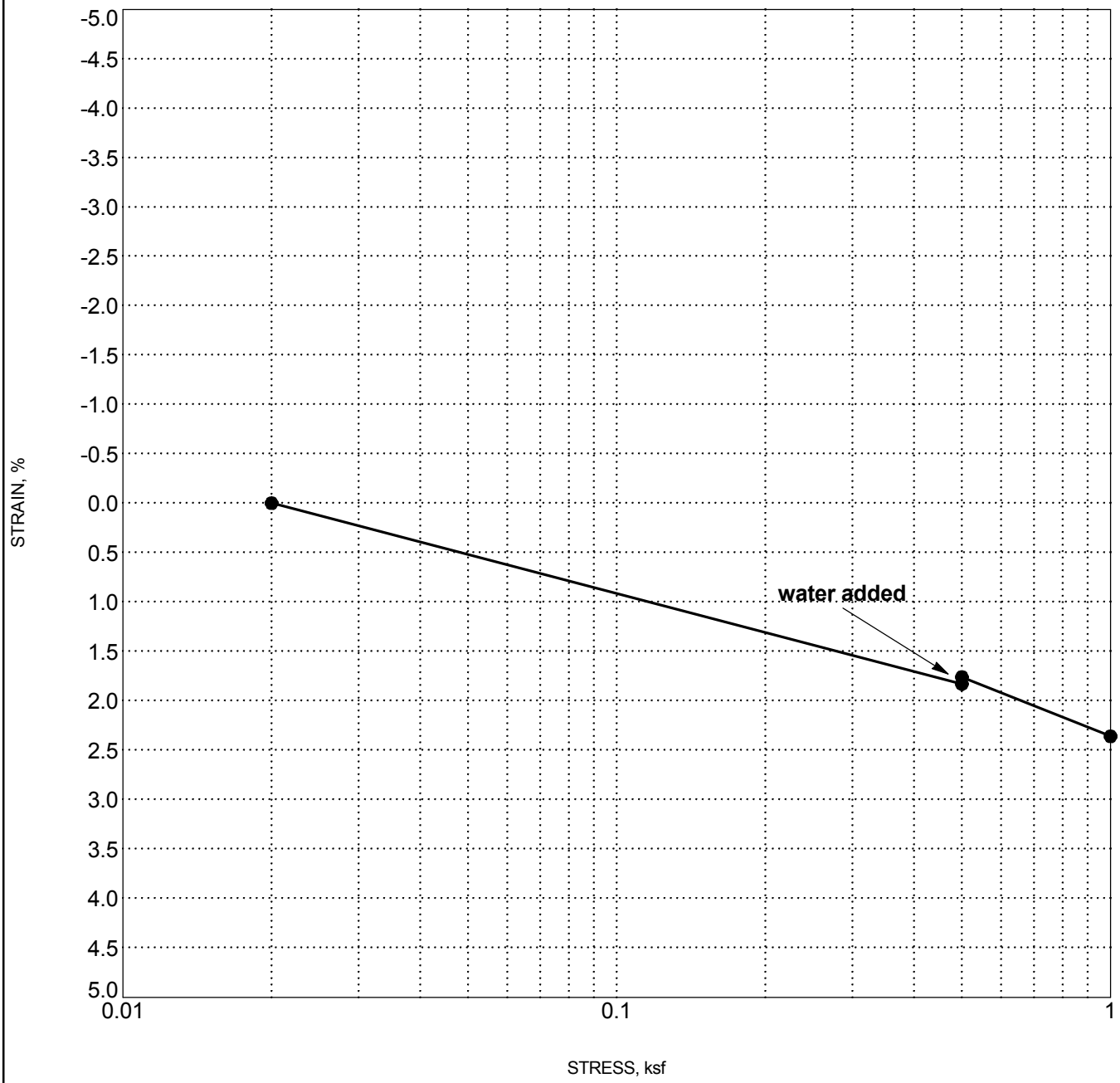
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● B-20	10.0	SILTY, CLAYEY SAND(SC-SM)	0.00	100.3	14.9

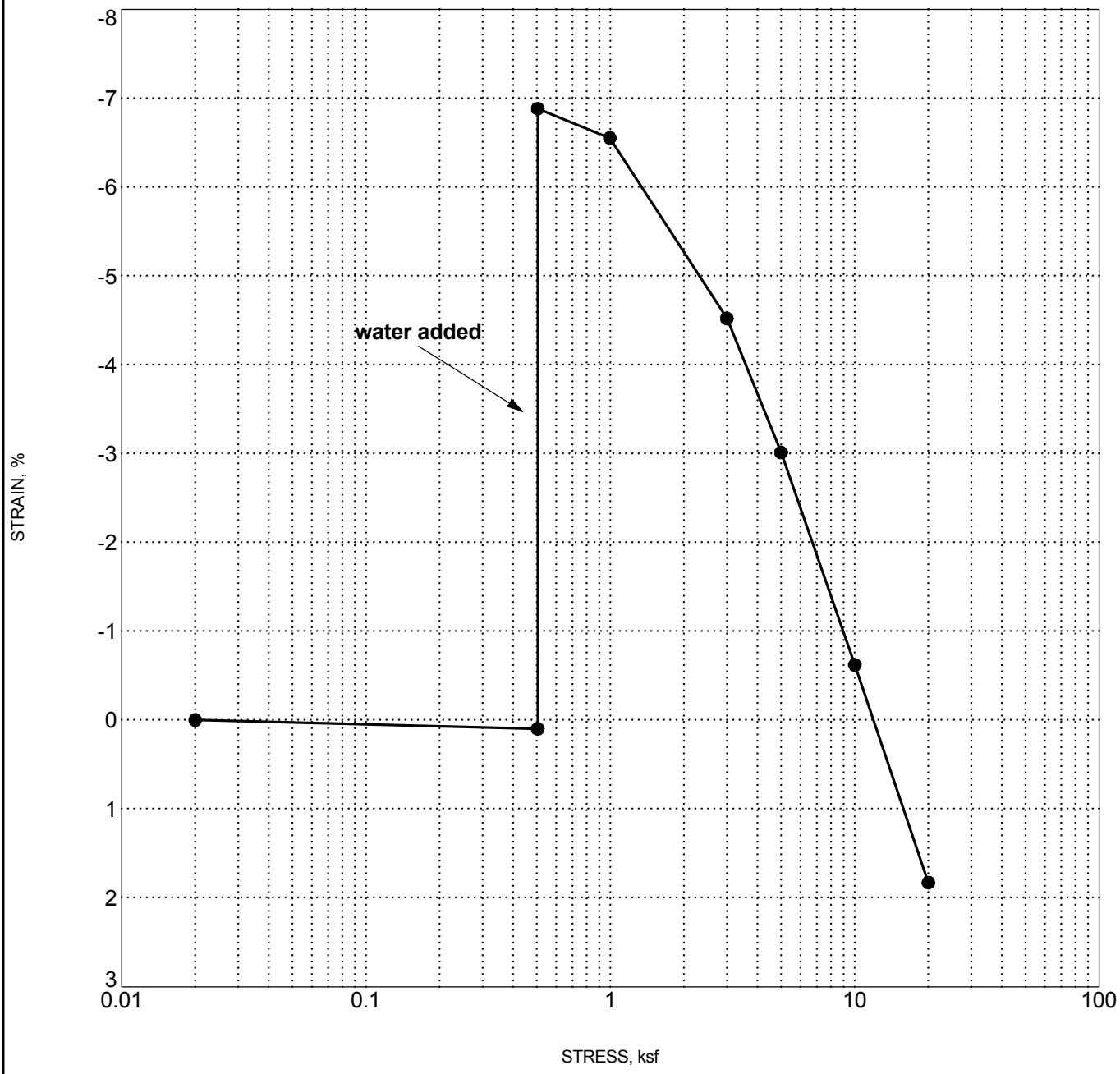
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 2	15.0	LEAN CLAY with SAND(CL)	6.97	108.9	14.1

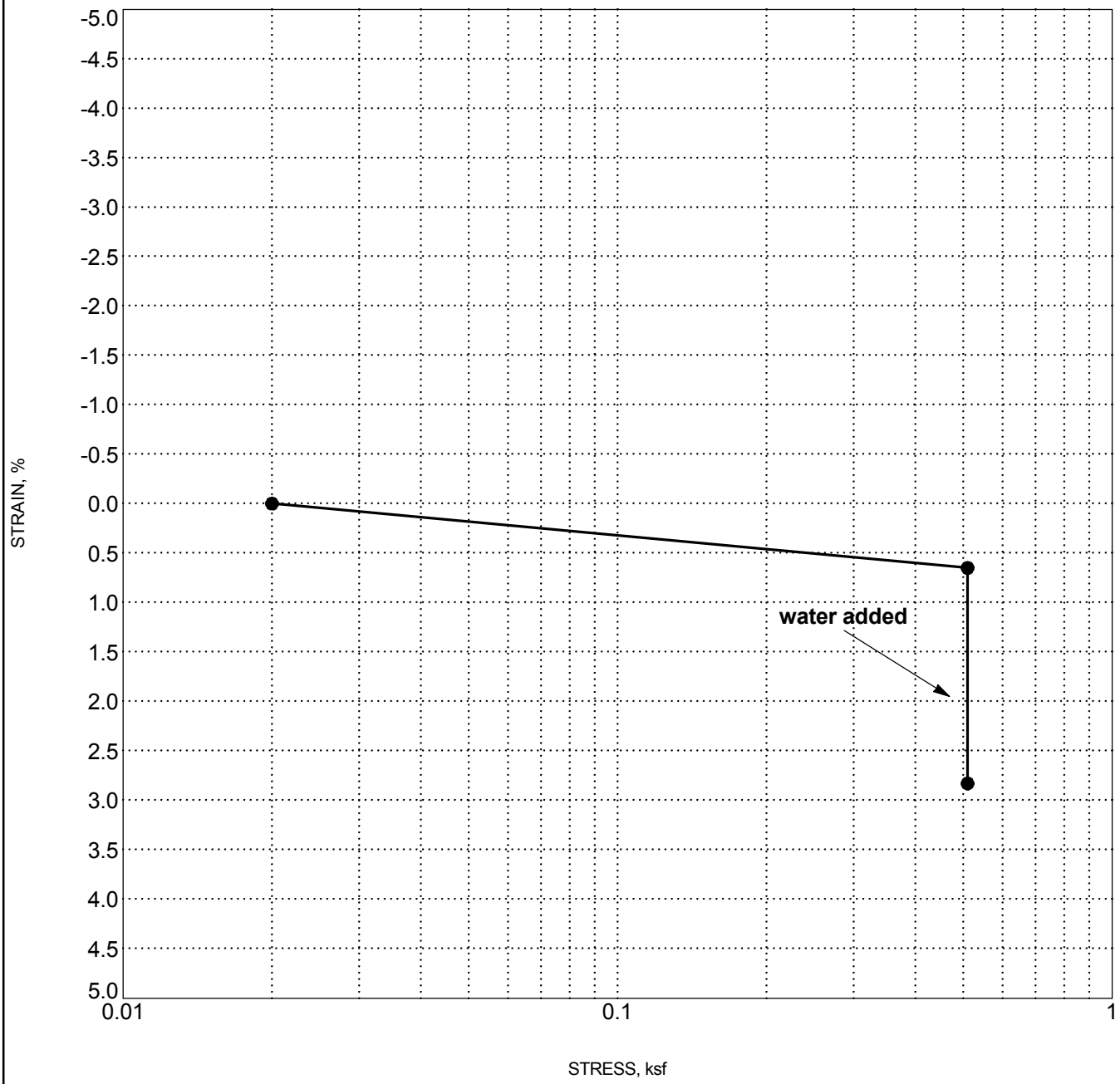
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 3	2.0	SILTY, CLAYEY SAND(SC-SM)	-2.19	113.1	4.7

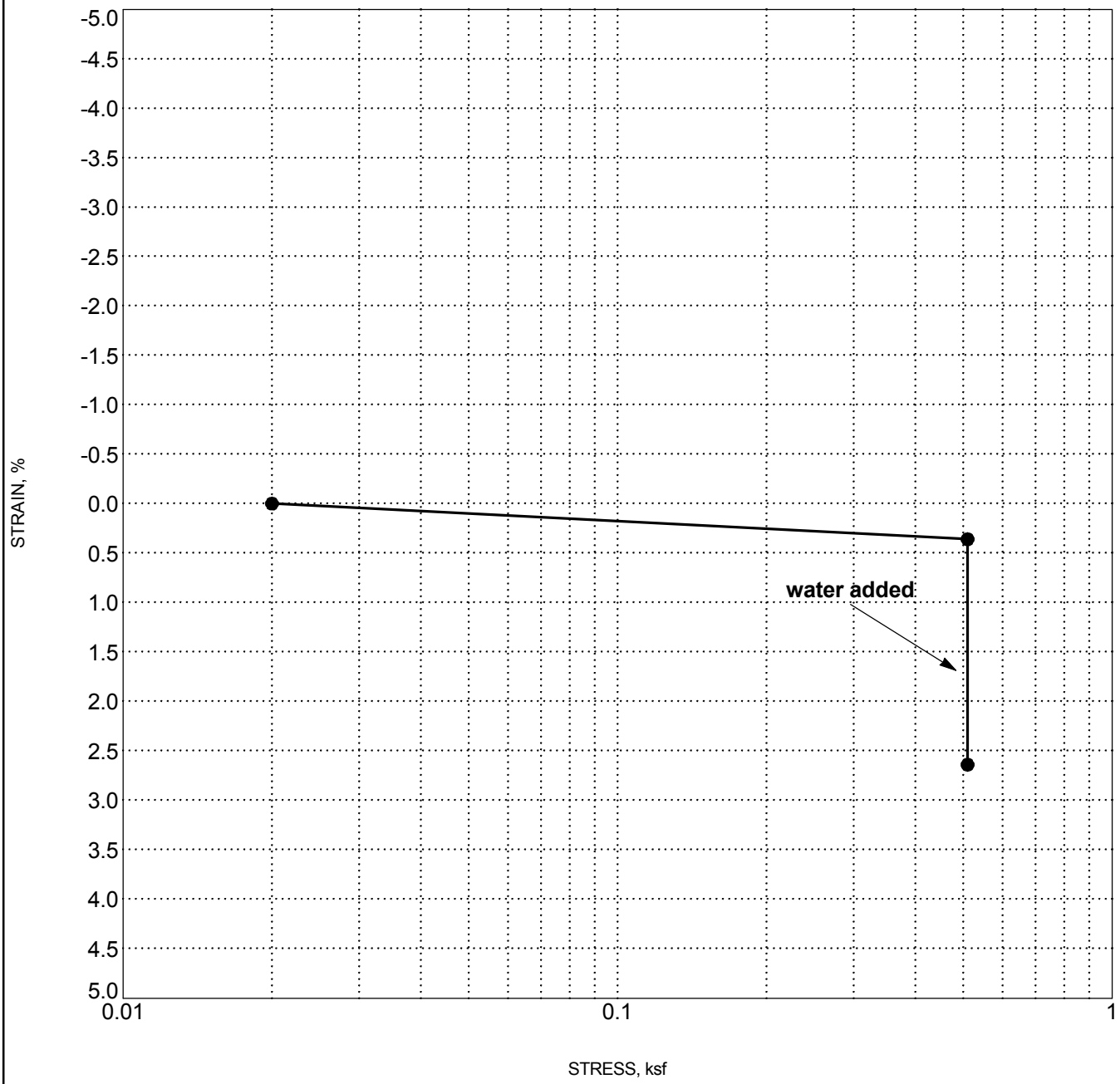
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 3	10.0	SILTY SAND(SM)	-2.29	91.8	3.6

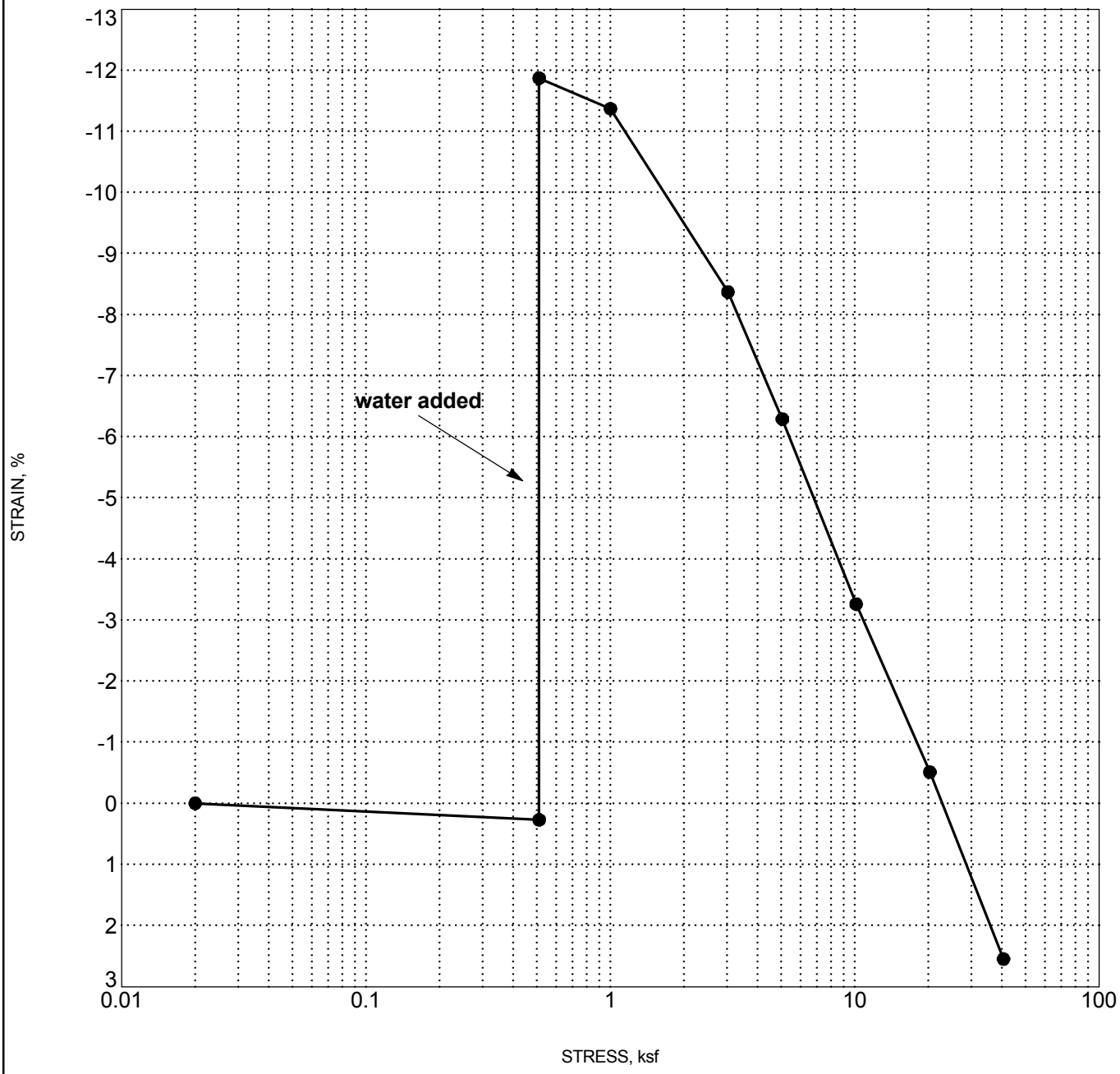
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 4	5.0	FAT CLAY with SAND(CH)	12.13	93.5	15.1

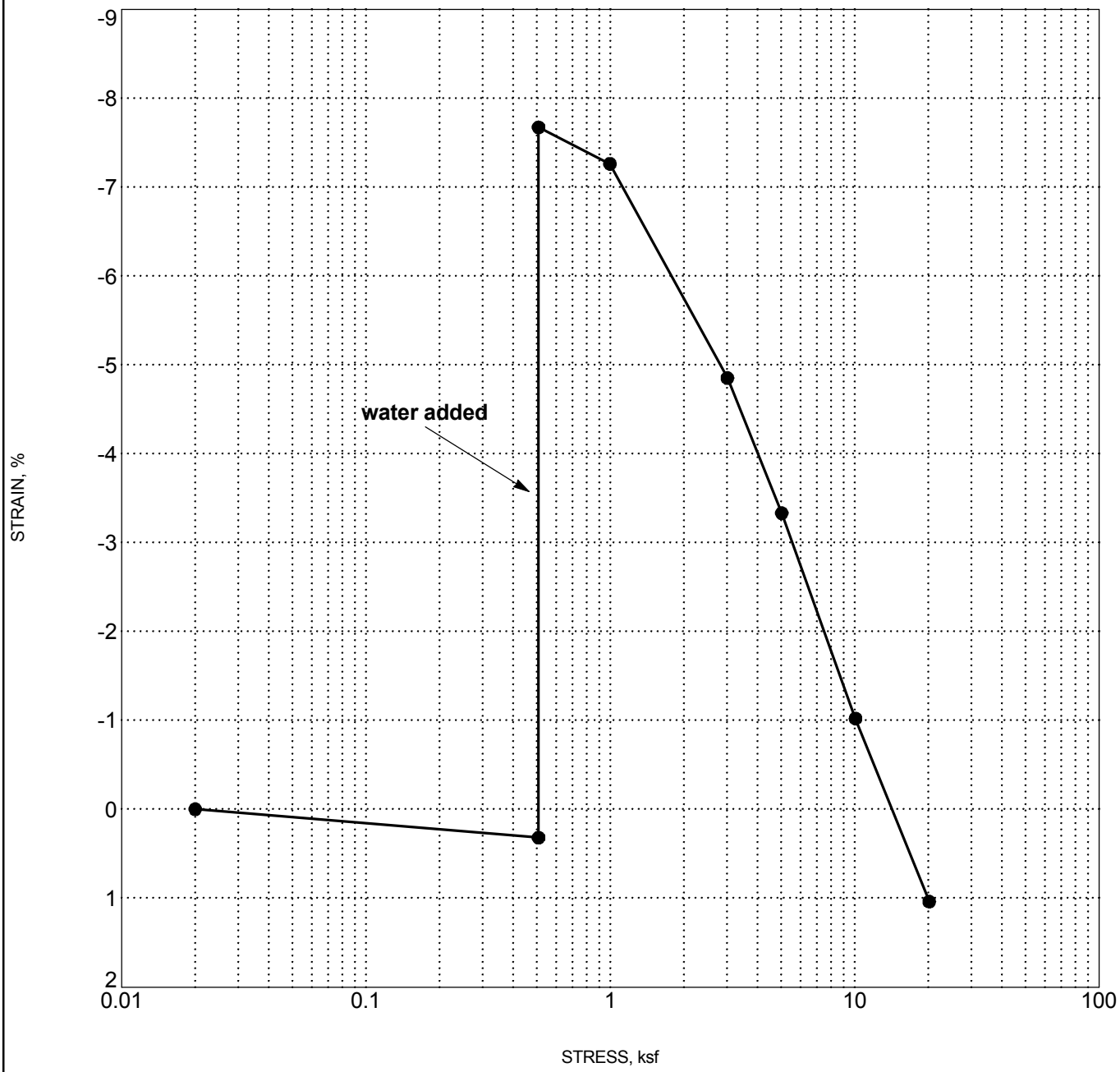
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 4	10.0	LEAN CLAY(CL)	7.99	110.1	13.8

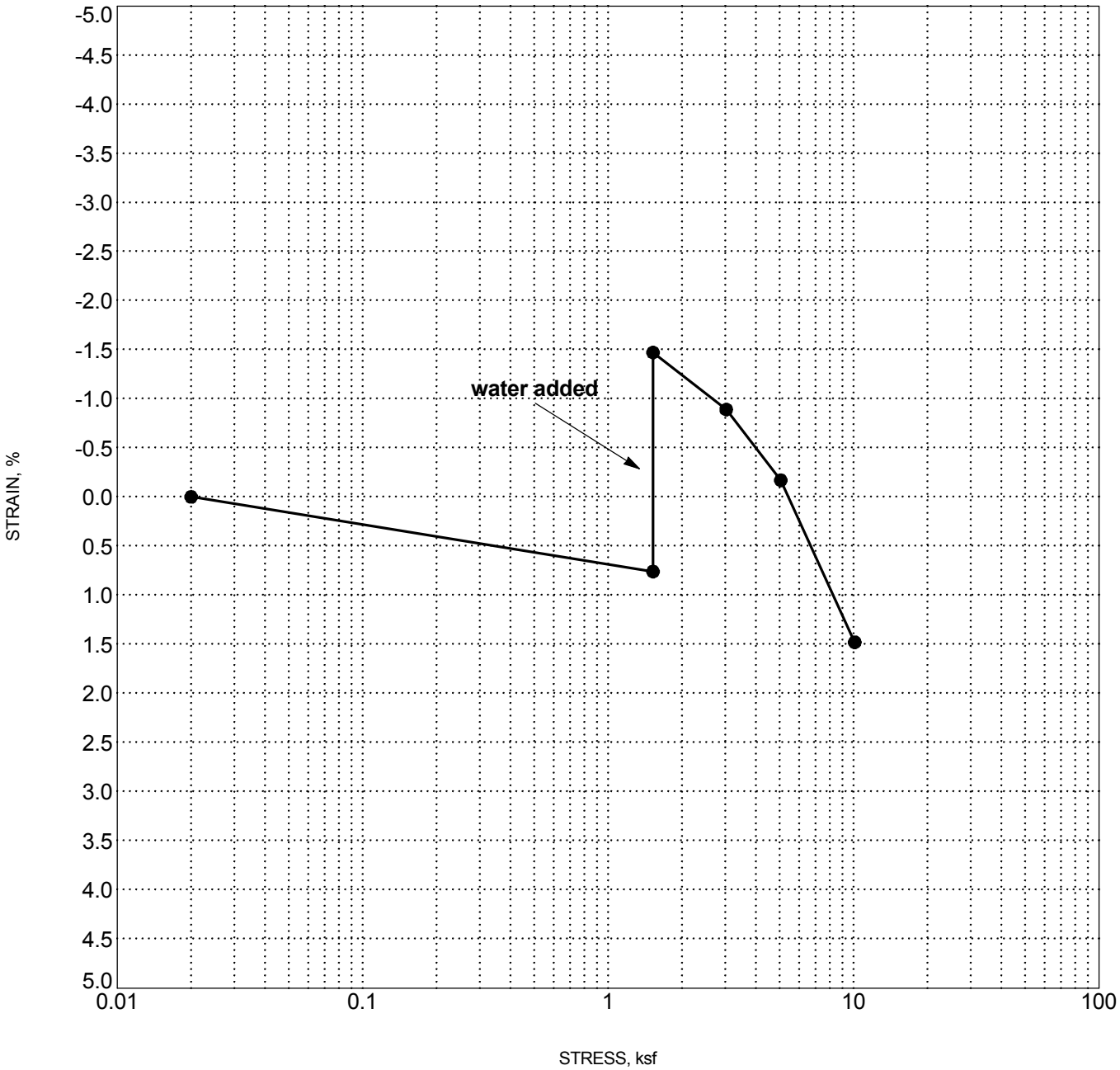
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 4	60.0	FAT CLAY(CH)	2.23	113.5	16.6

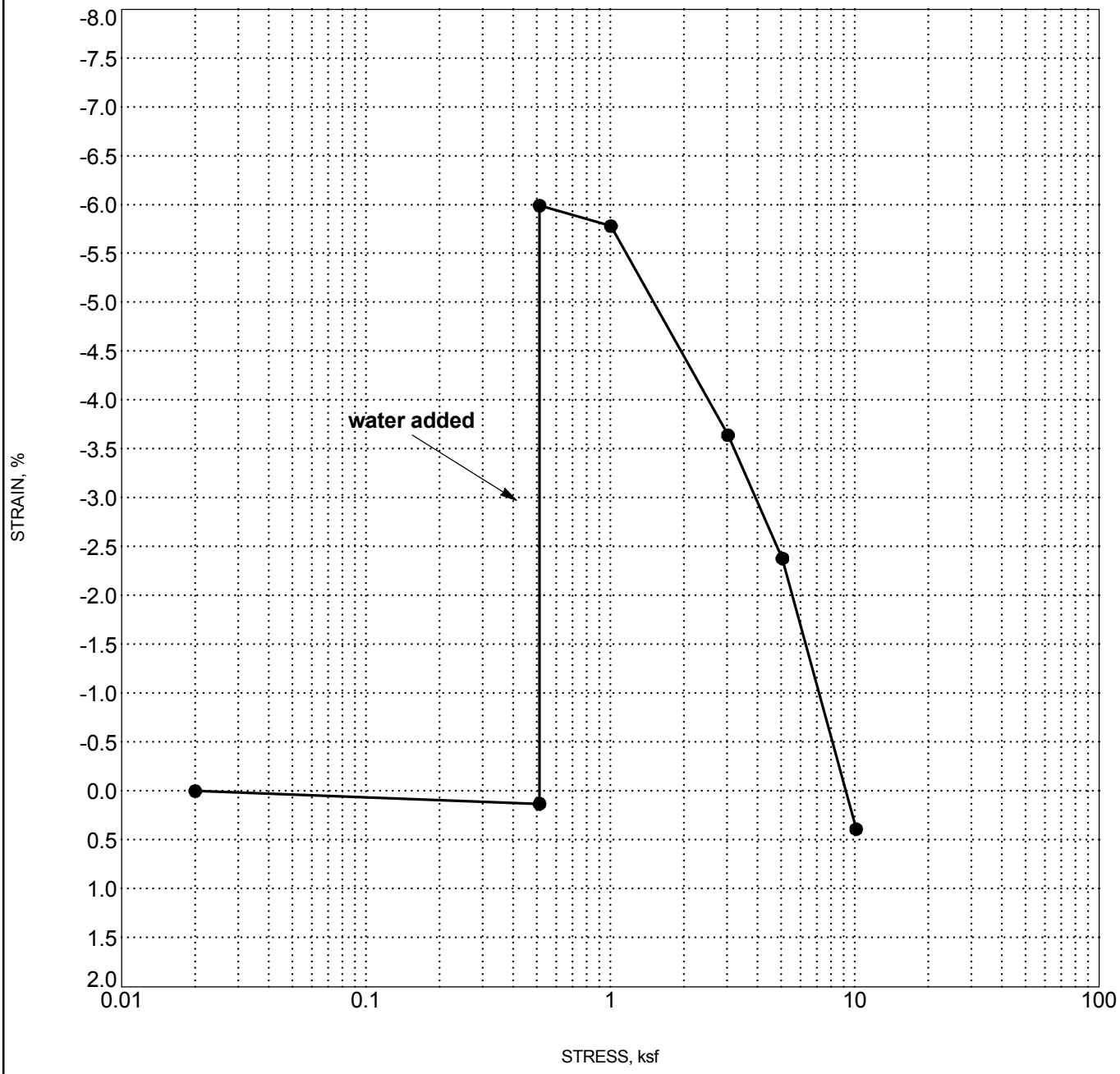
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 5	5.0	LEAN CLAY with SAND(CL)	6.12	126.5	10.0

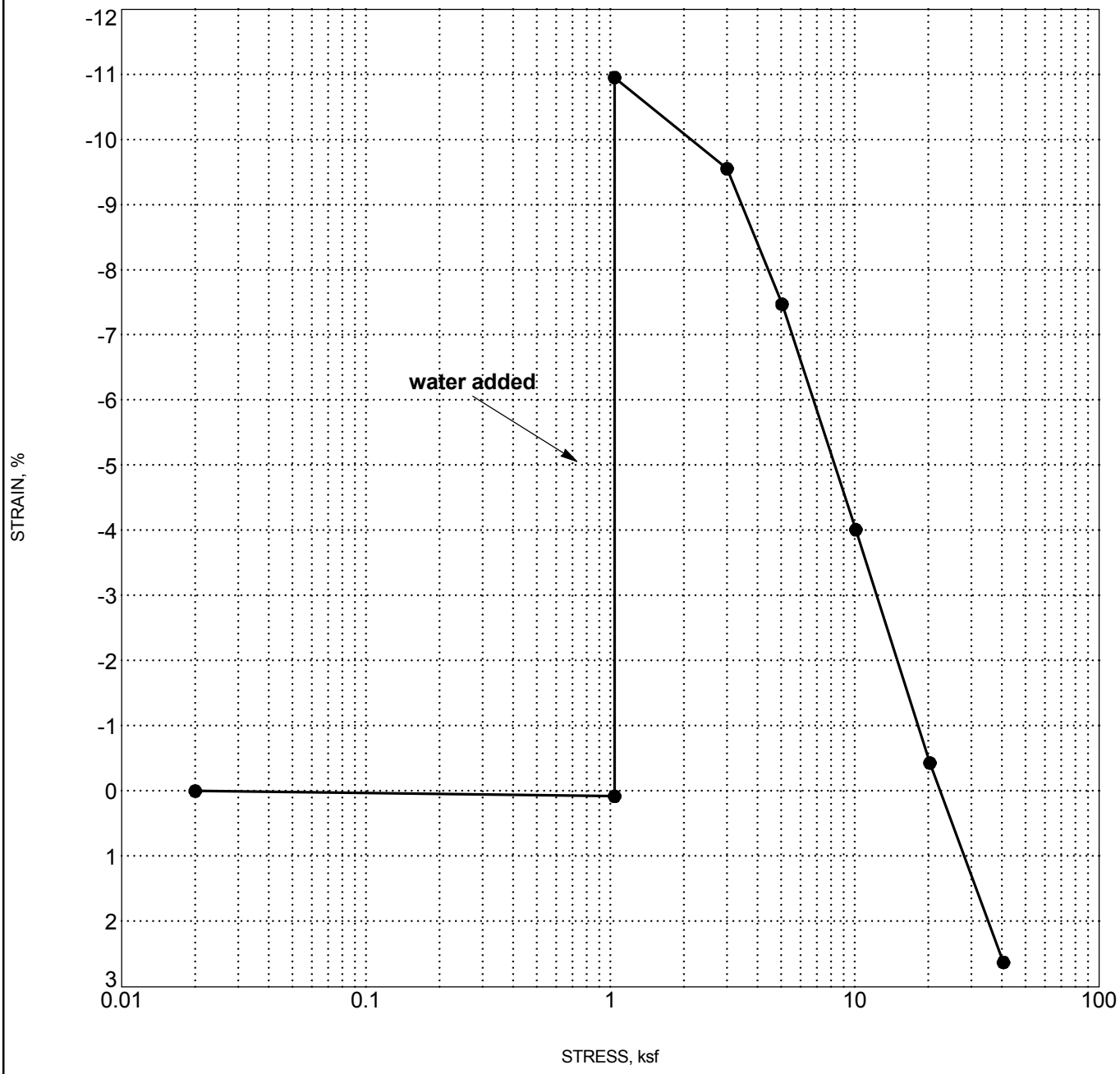
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 5	30.0	FAT CLAY(CH)	11.03	114.6	13.9

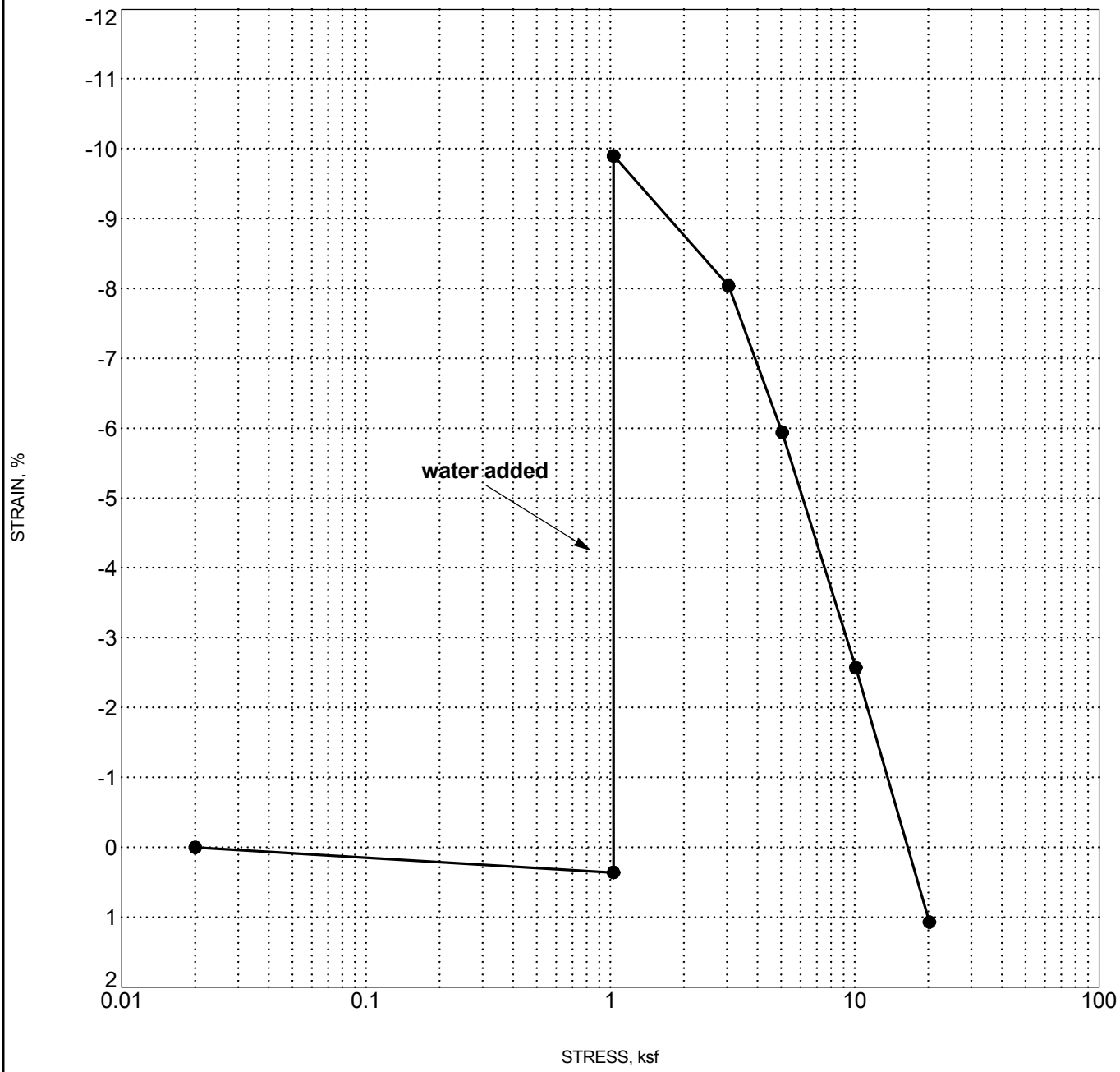
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 5	40.0	FAT CLAY(CH)	10.27	117.9	13.9

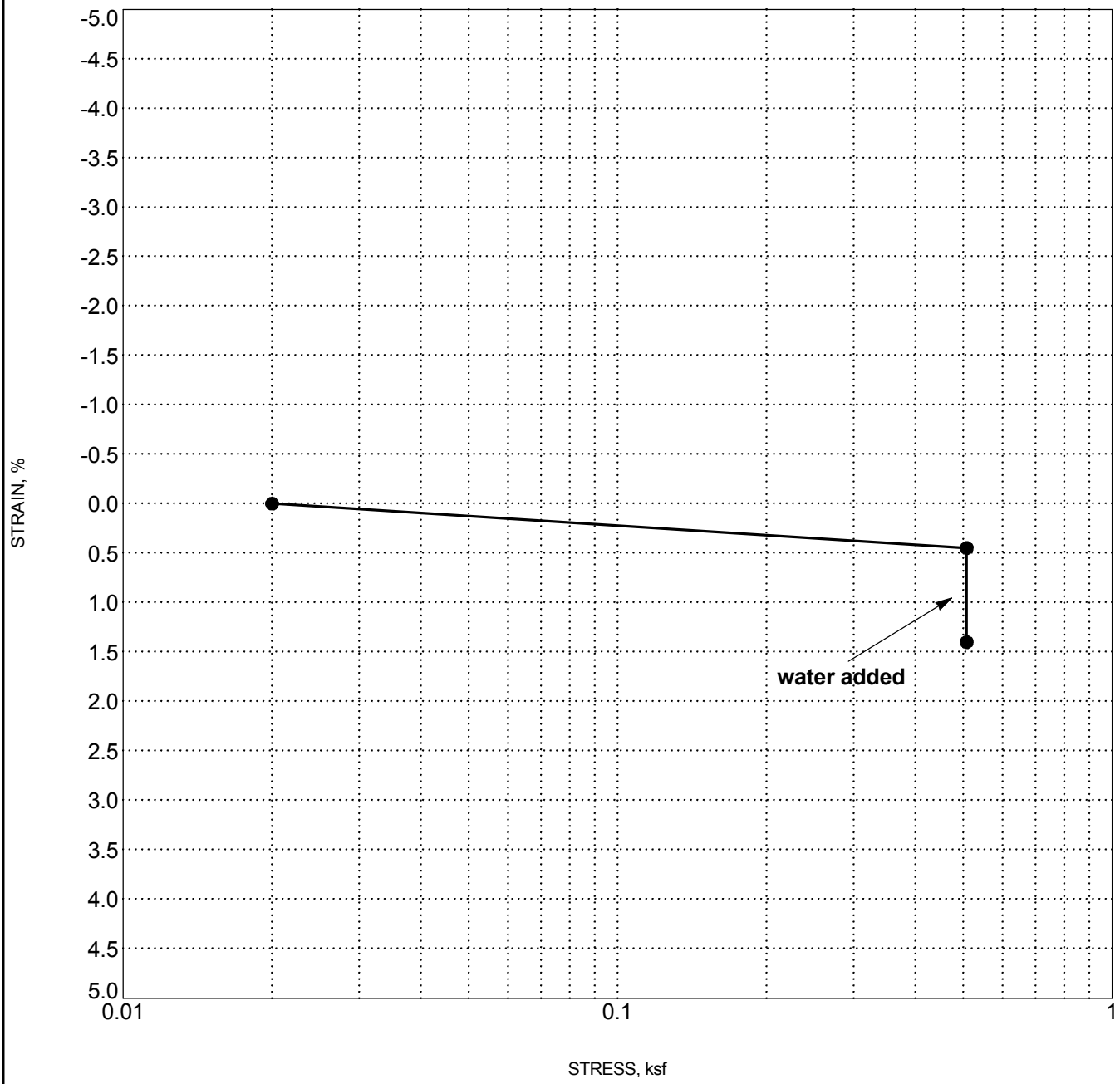
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 6	2.0	SILTY SAND(SM)	-0.95	100.1	4.8

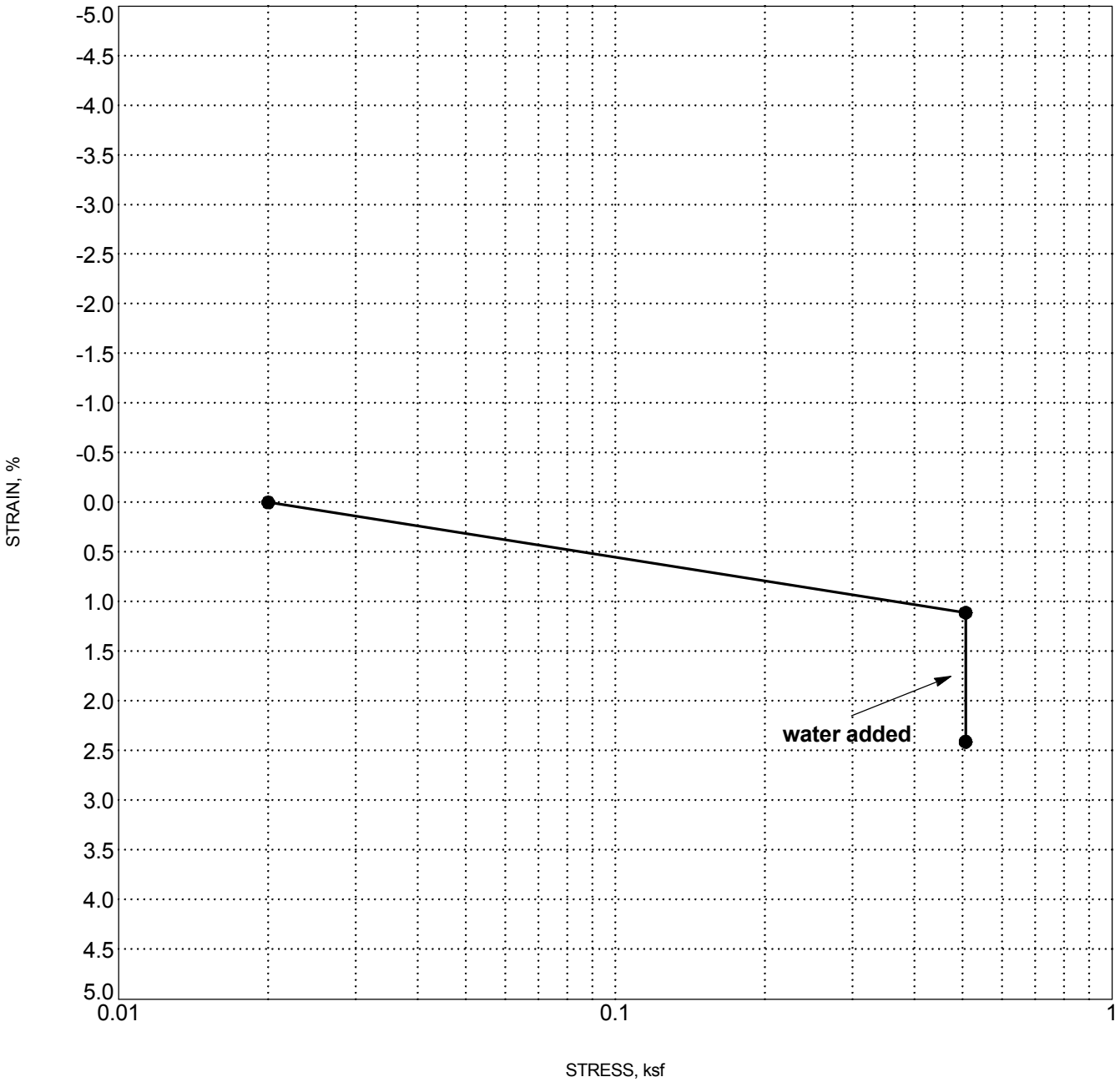
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 6	15.0	SILTY SAND(SM)	-1.30	114.6	7.0

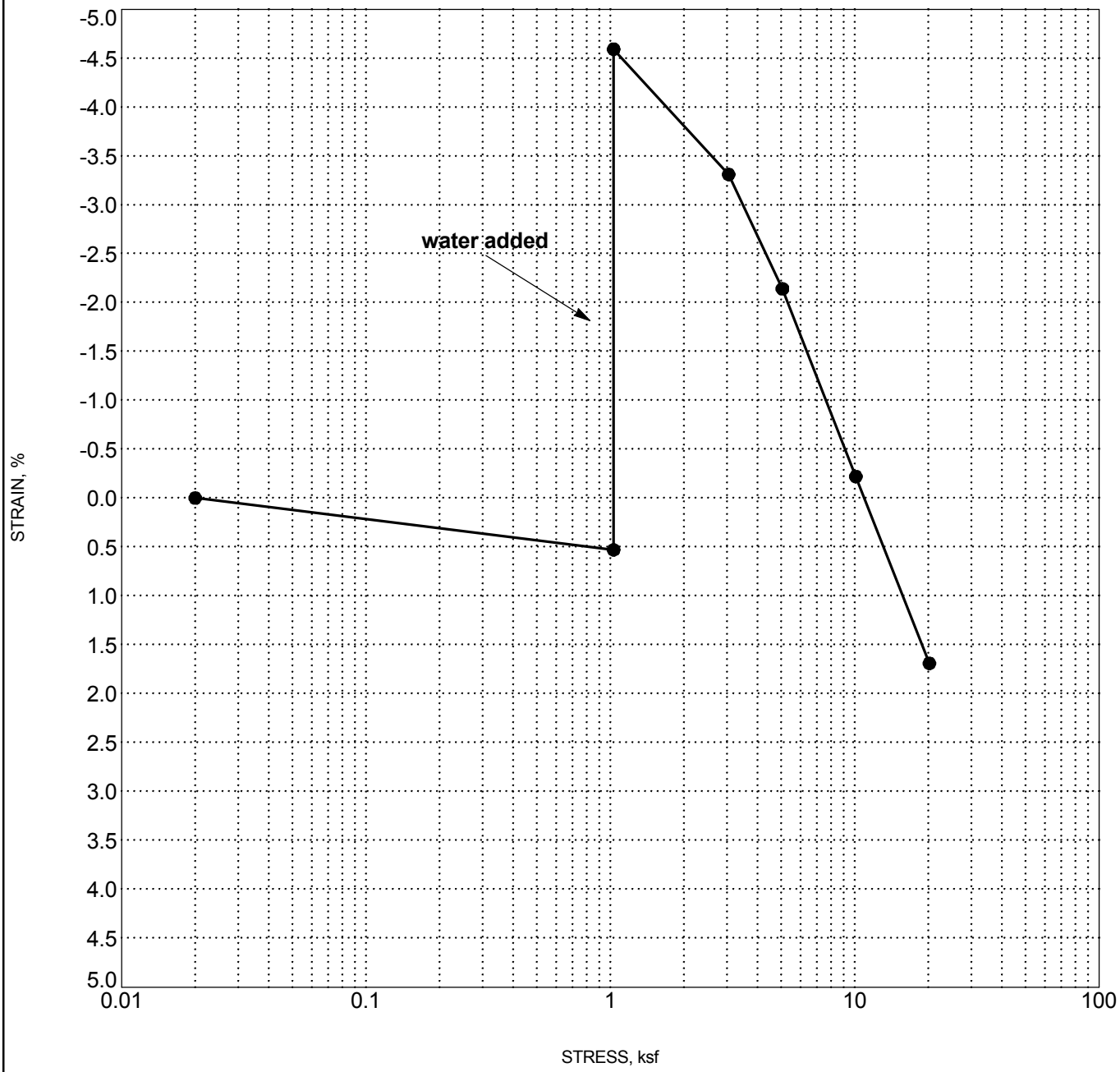
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 6	30.0	LEAN CLAY(CL)	5.12	120.8	12.6

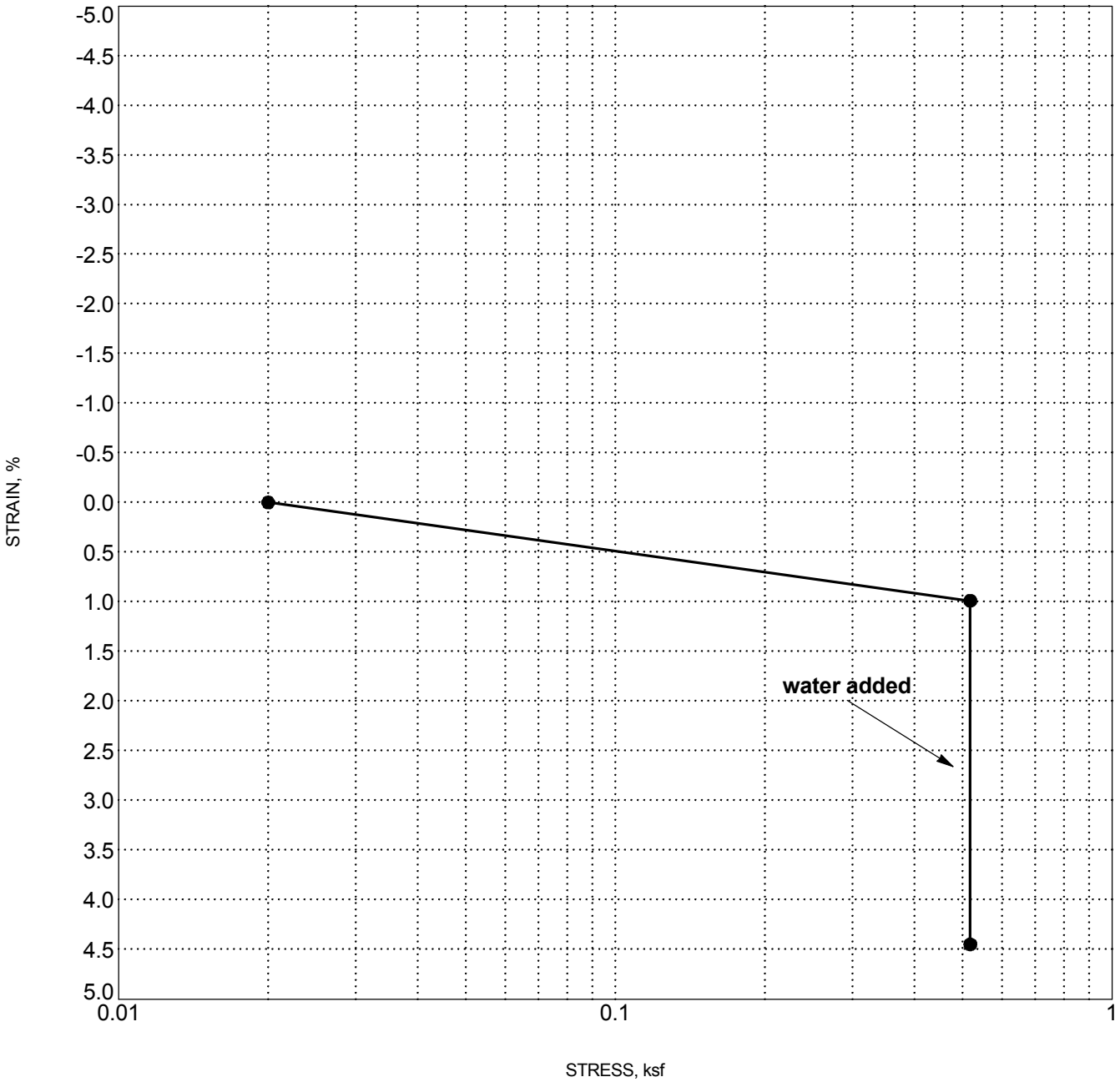
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 7	5.0	SANDY LEAN CLAY(CL)	-3.47	108.5	6.4

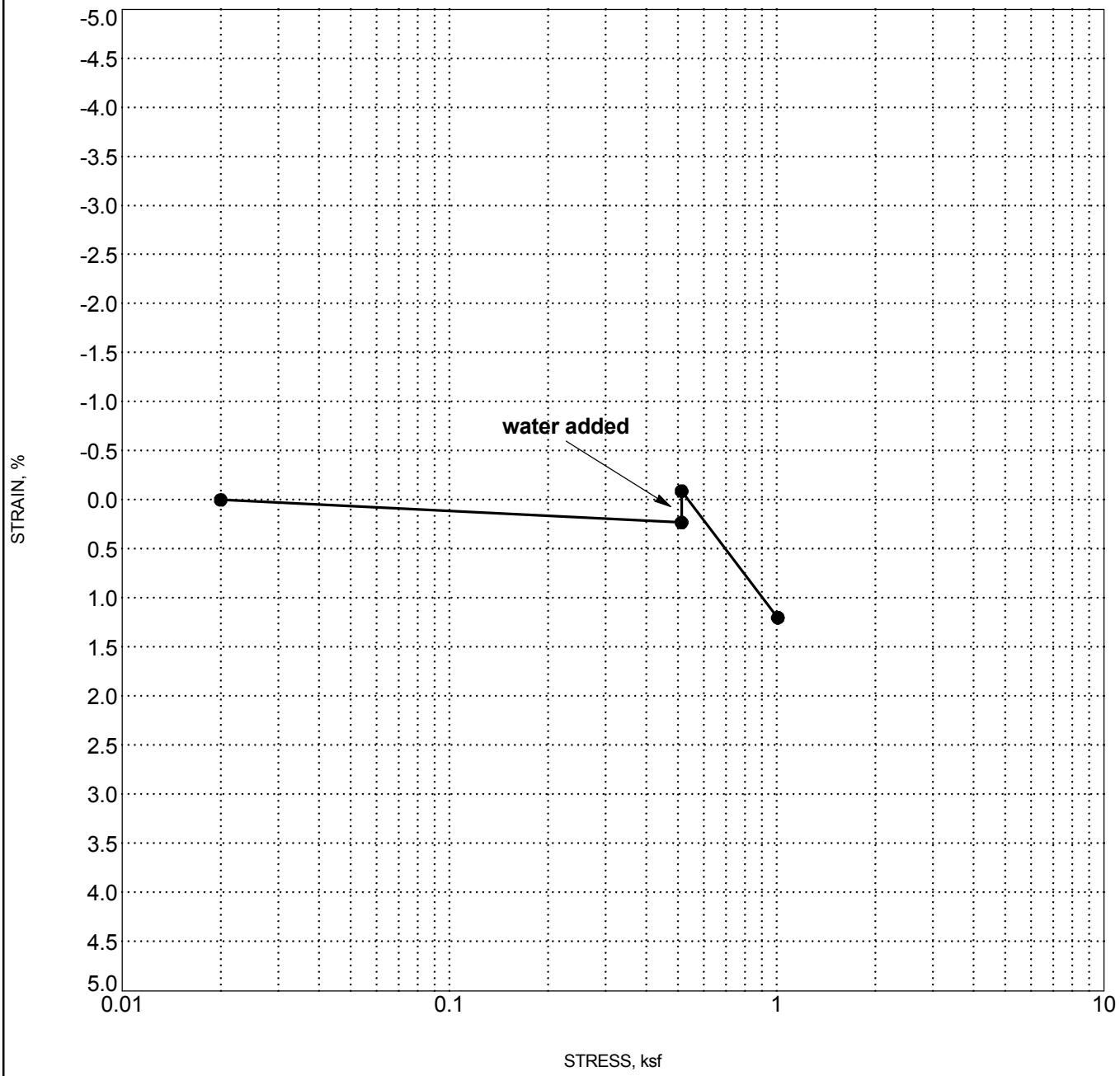
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 8	5.0	LEAN CLAY with SAND(CL)	0.32	101.2	10.3

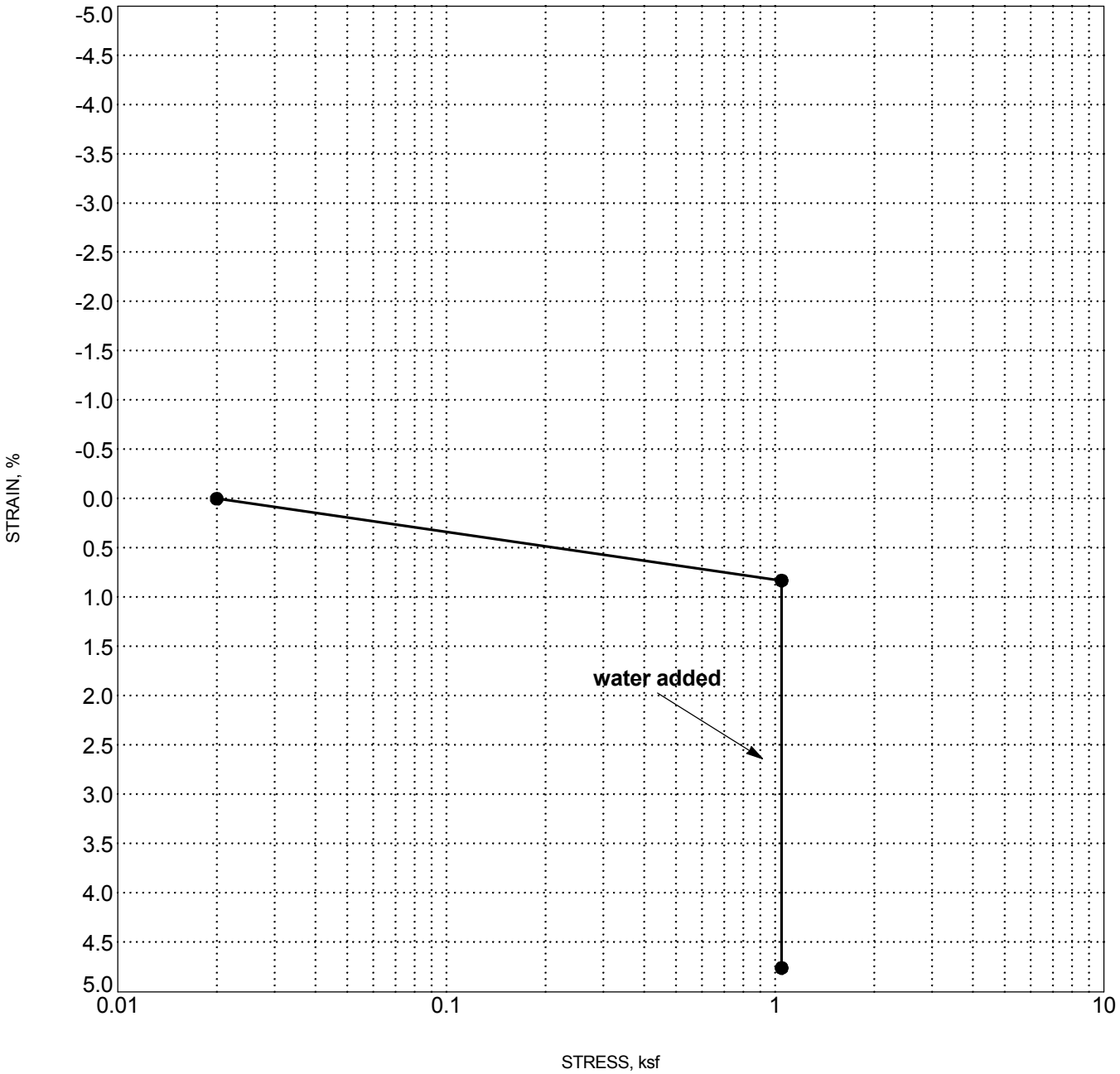
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 8	20.0	SILTY SAND(SM)	-3.93	103.2	3.5

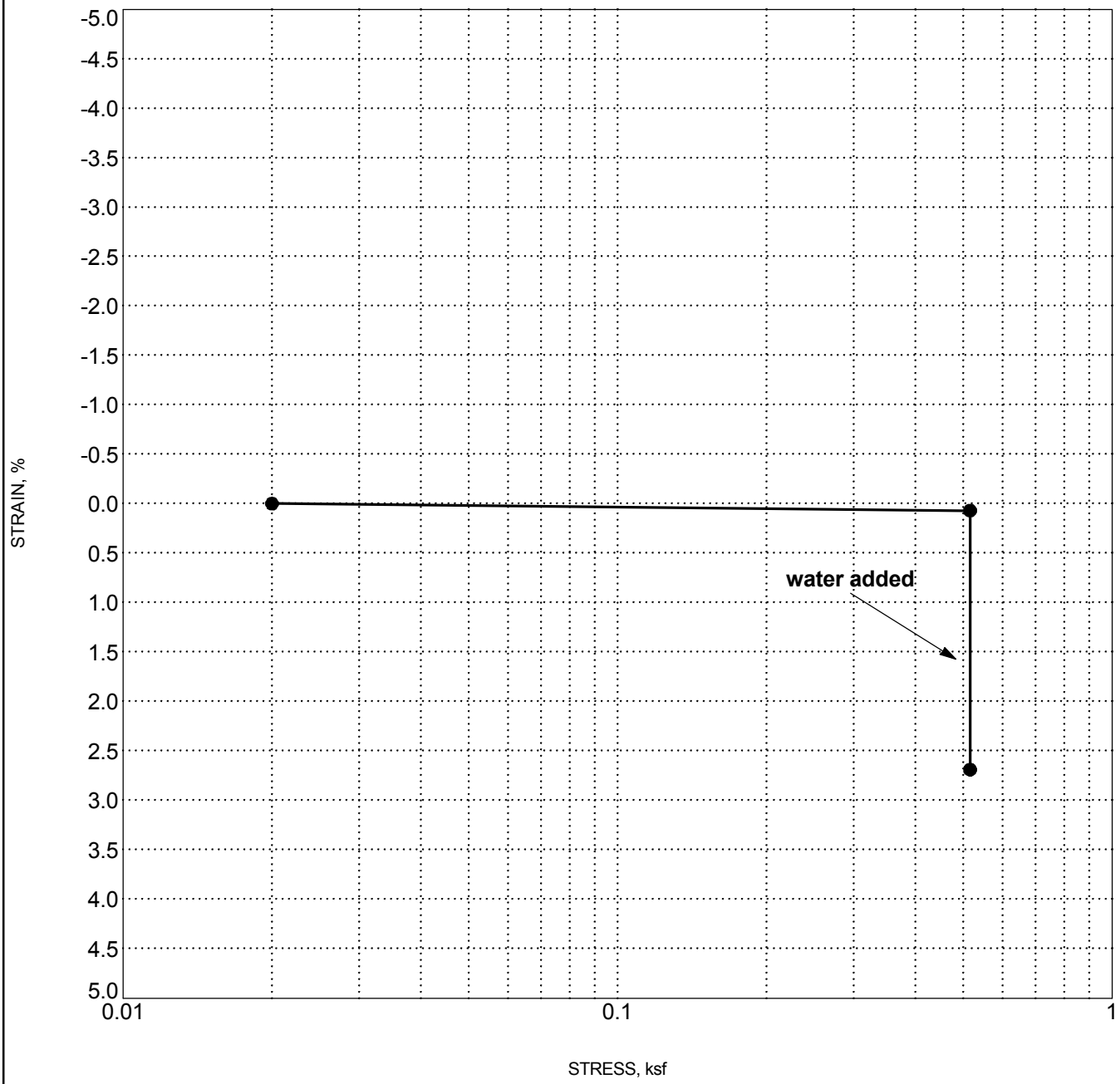
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB- 9	5.0	SILTY SAND(SM)	-2.62	106.7	0.9

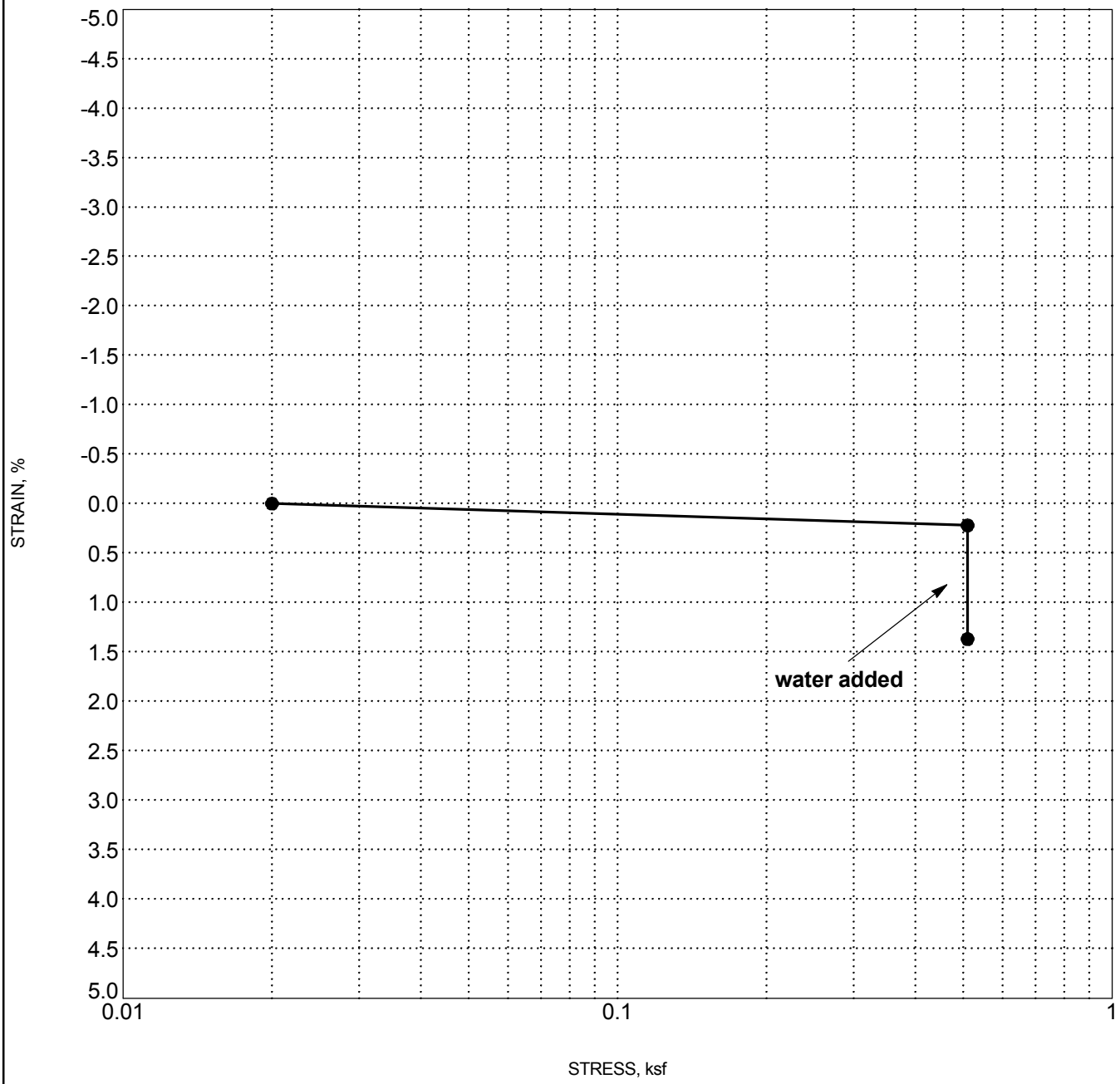
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● SB-10	5.0	SANDY LEAN CLAY(CL)	-1.14	98.6	5.7

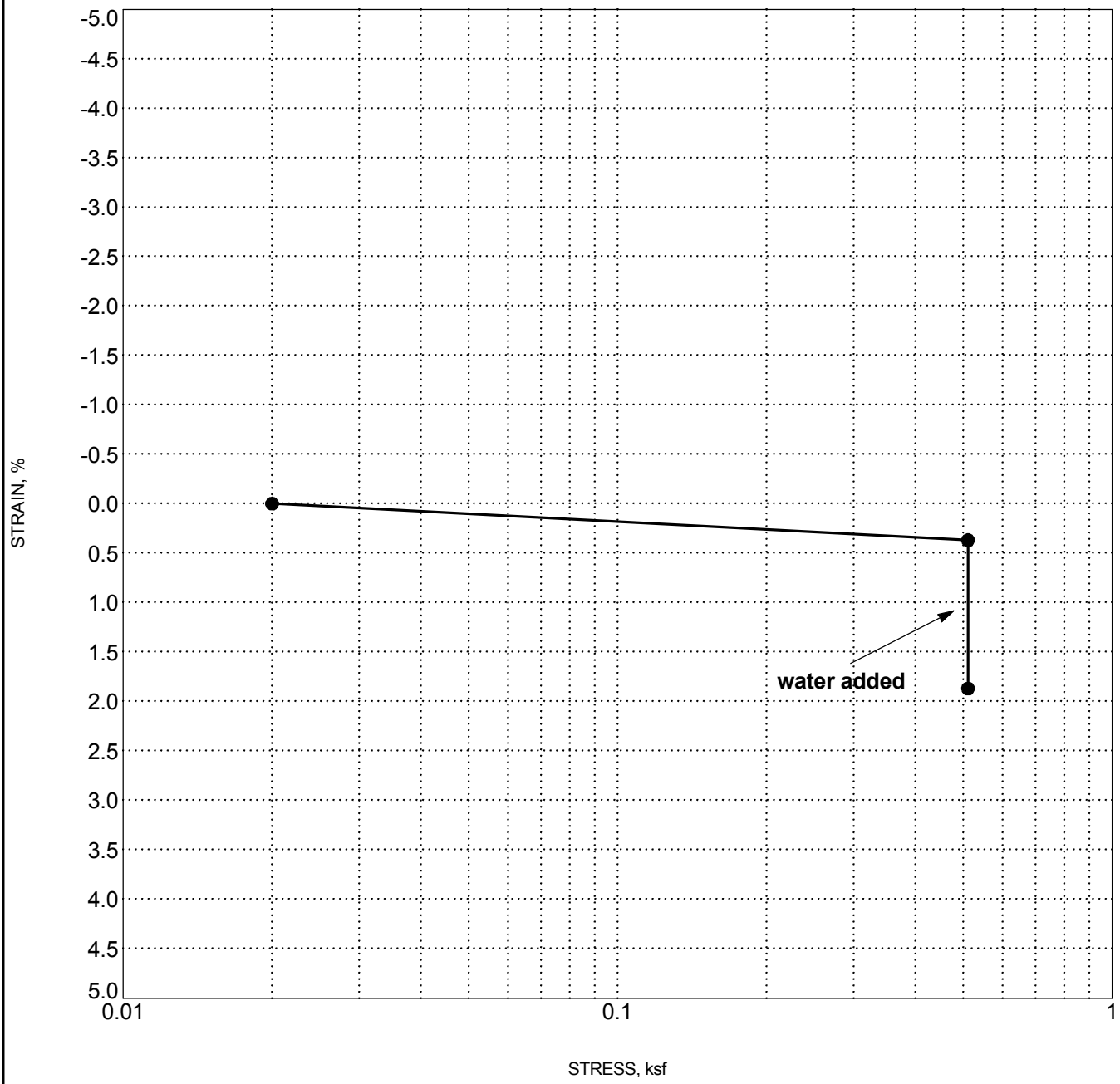
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **SB-10**	**10.0**	**SILTY SAND(SM)**	**-1.49**	**114.4**	**5.5**

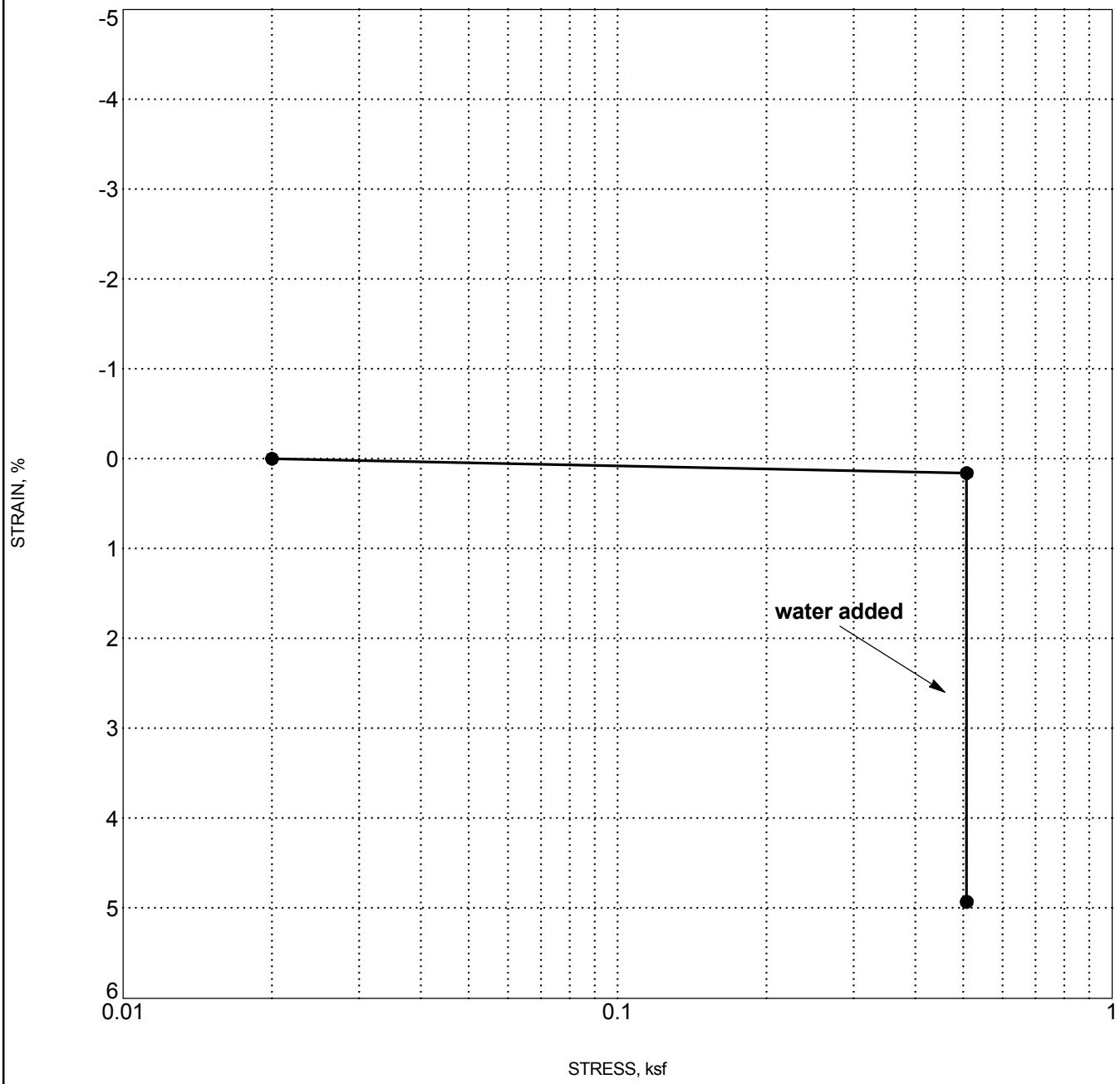
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **SB-10**	**15.0**	**SILTY SAND(SM)**	**-4.77**	**106.6**	**4.6**

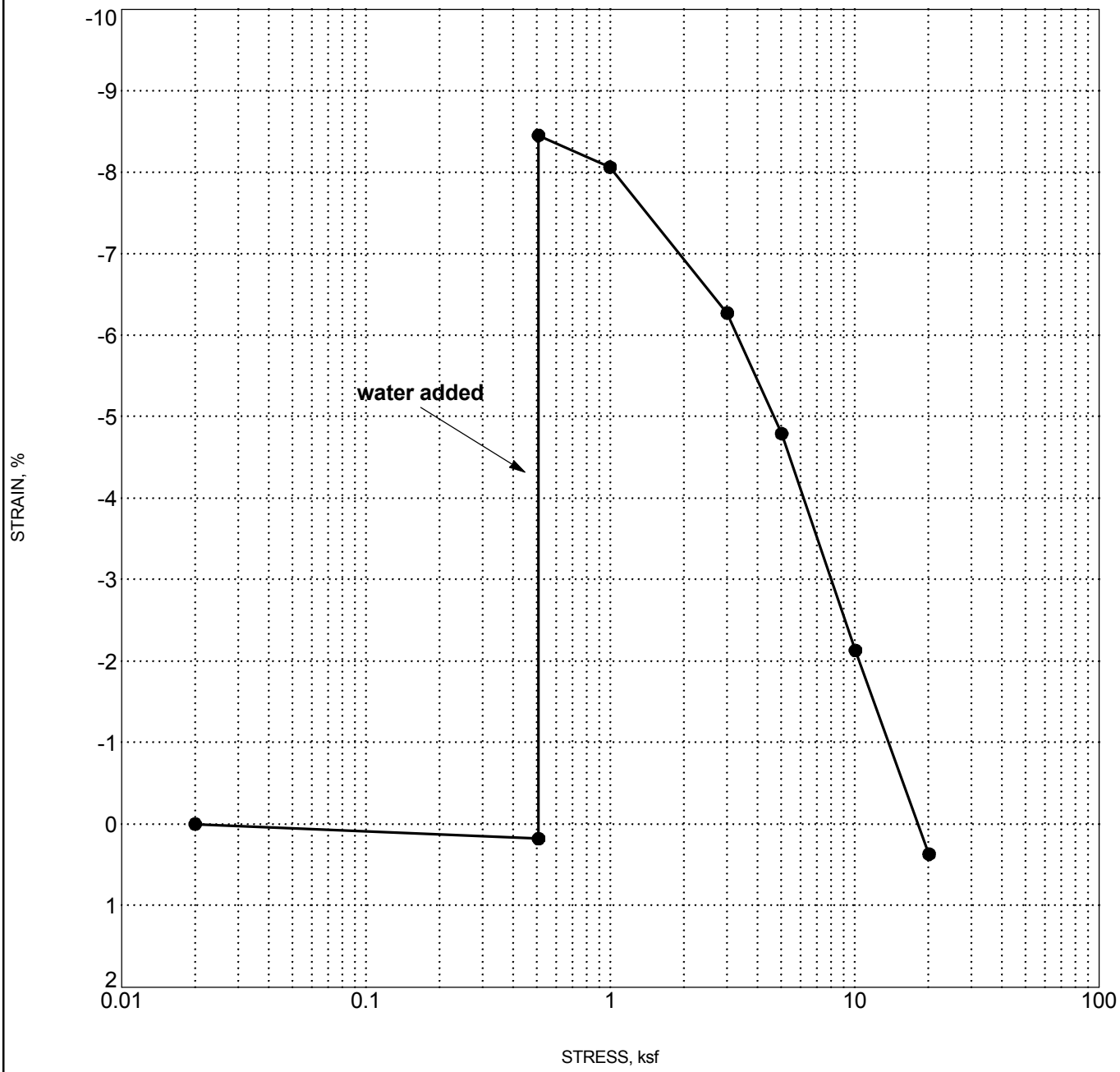
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **SB-11**	**2.0**	**LEAN CLAY with SAND(CL)**	**8.63**	**112.2**	**11.5**

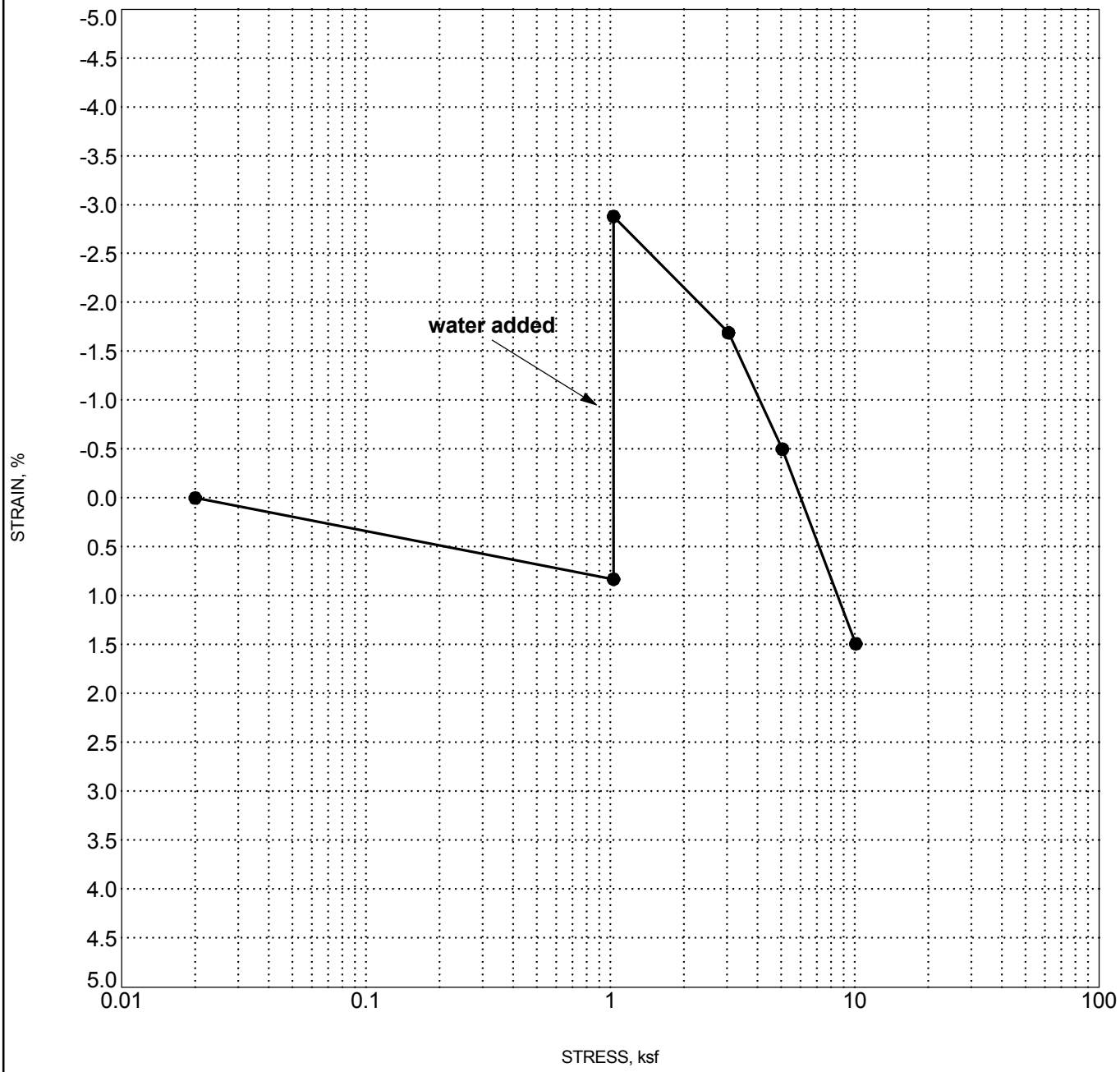
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

SWELLING - CONSOLIDATION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Swell/Consol. (%)	γ_d (pcf)	MC%
● **SB-11**	**20.0**	**FAT CLAY(CH)**	**3.72**	**106.9**	**20.2**

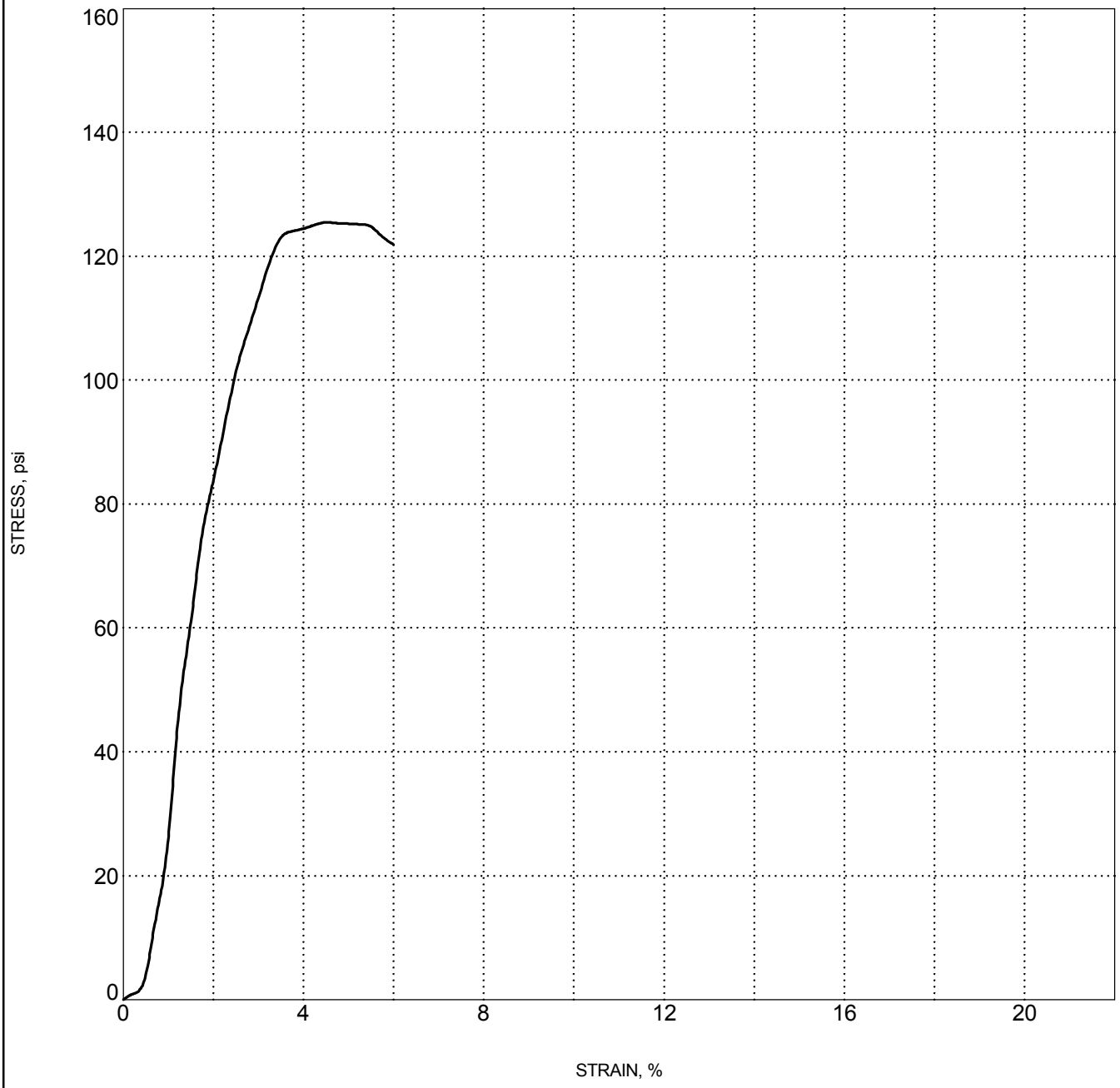
SWELL DIA 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-05	25.0	**LEAN CLAY(CL)**	**125.5**	**115.2**	**12.9**
⊠					
▲					
★					
⊙					
✿					

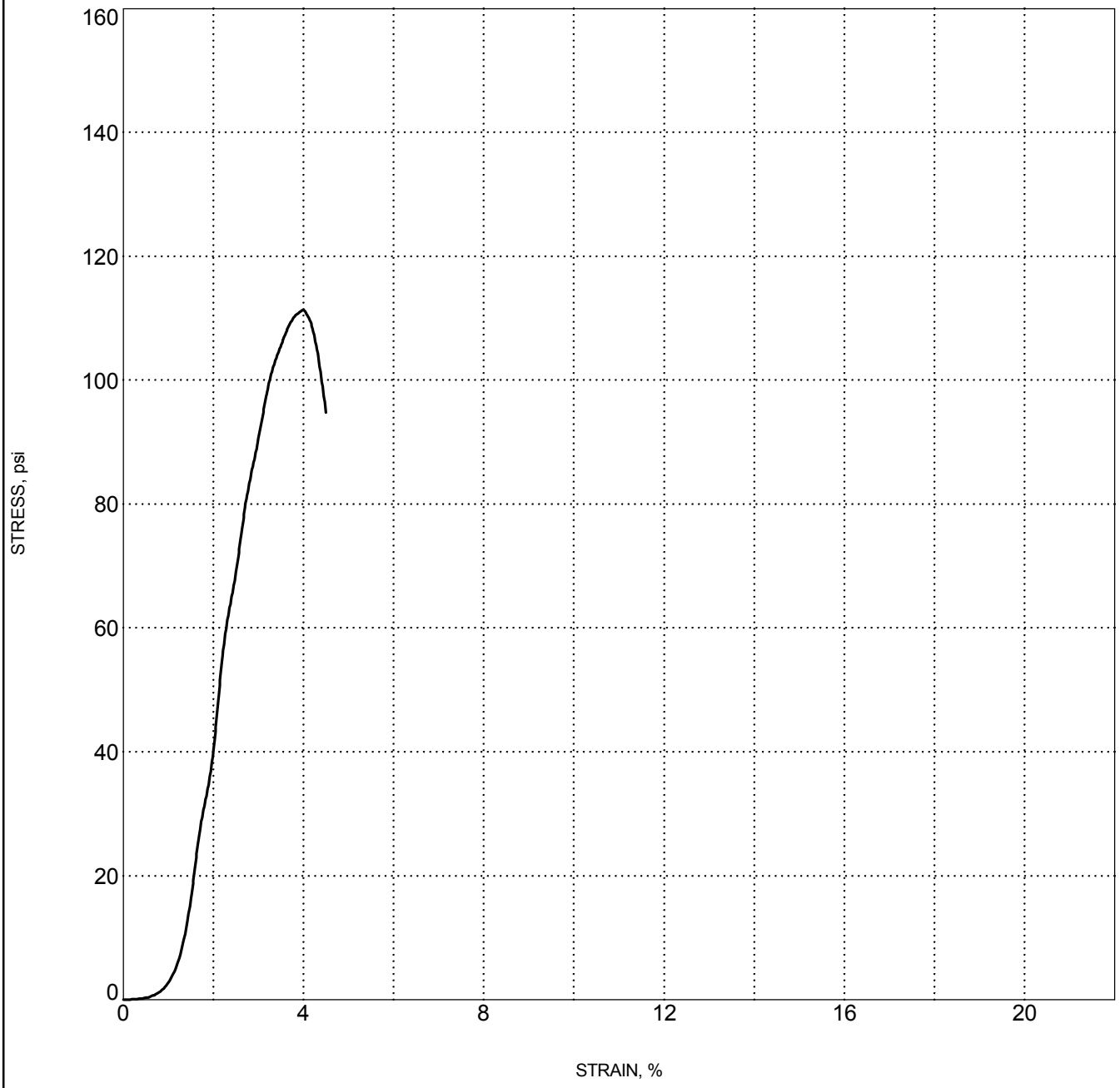
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-05	50.0	FAT CLAY(CH)	111.4	117.4	13.8
⊠					
▲					
★					
⊙					
✿					

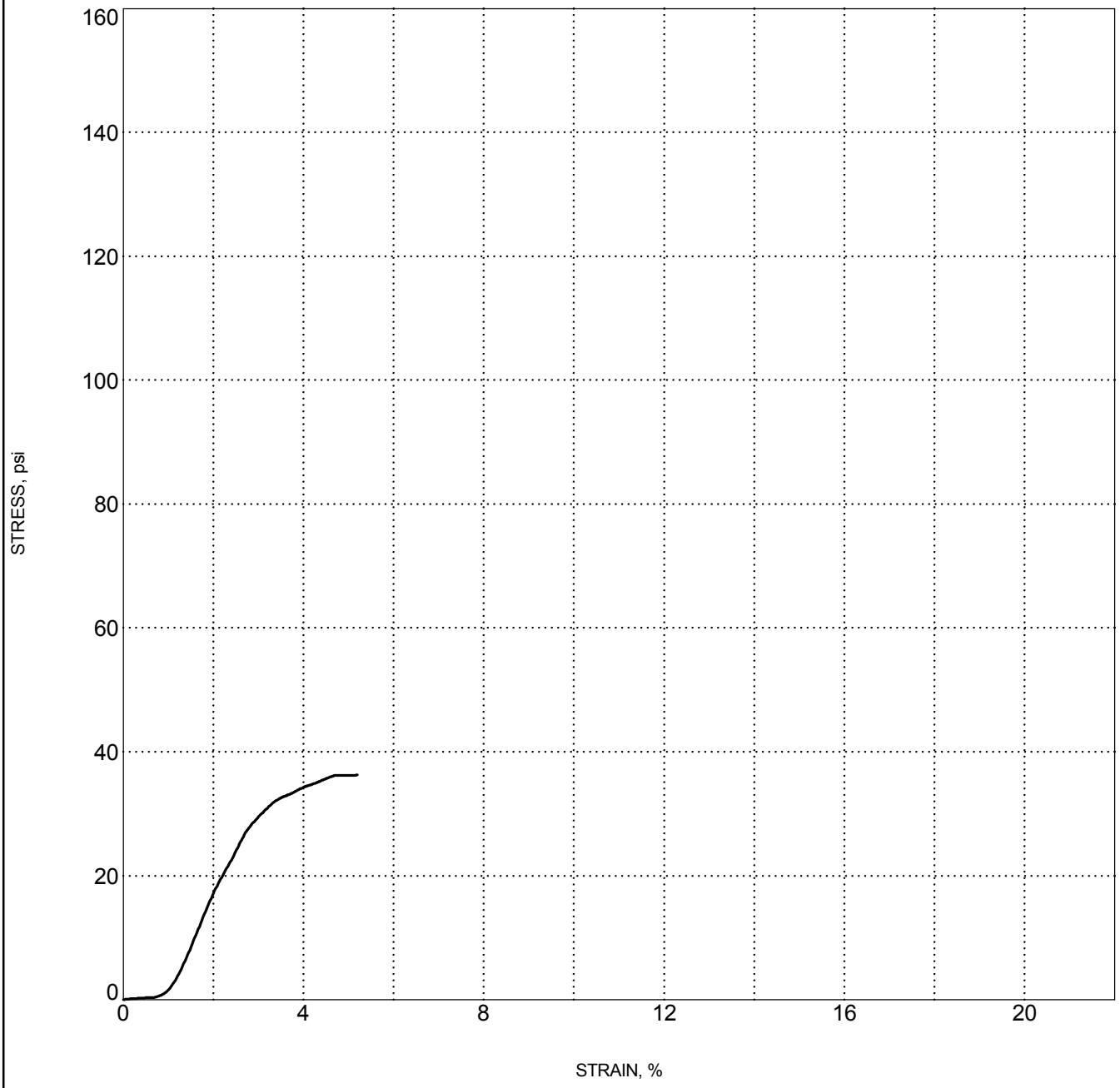
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-06	15.0	**FAT CLAY(CH)**	**36.3**	**97.2**	**17.4**
⊠					
▲					
★					
⊙					
✿					

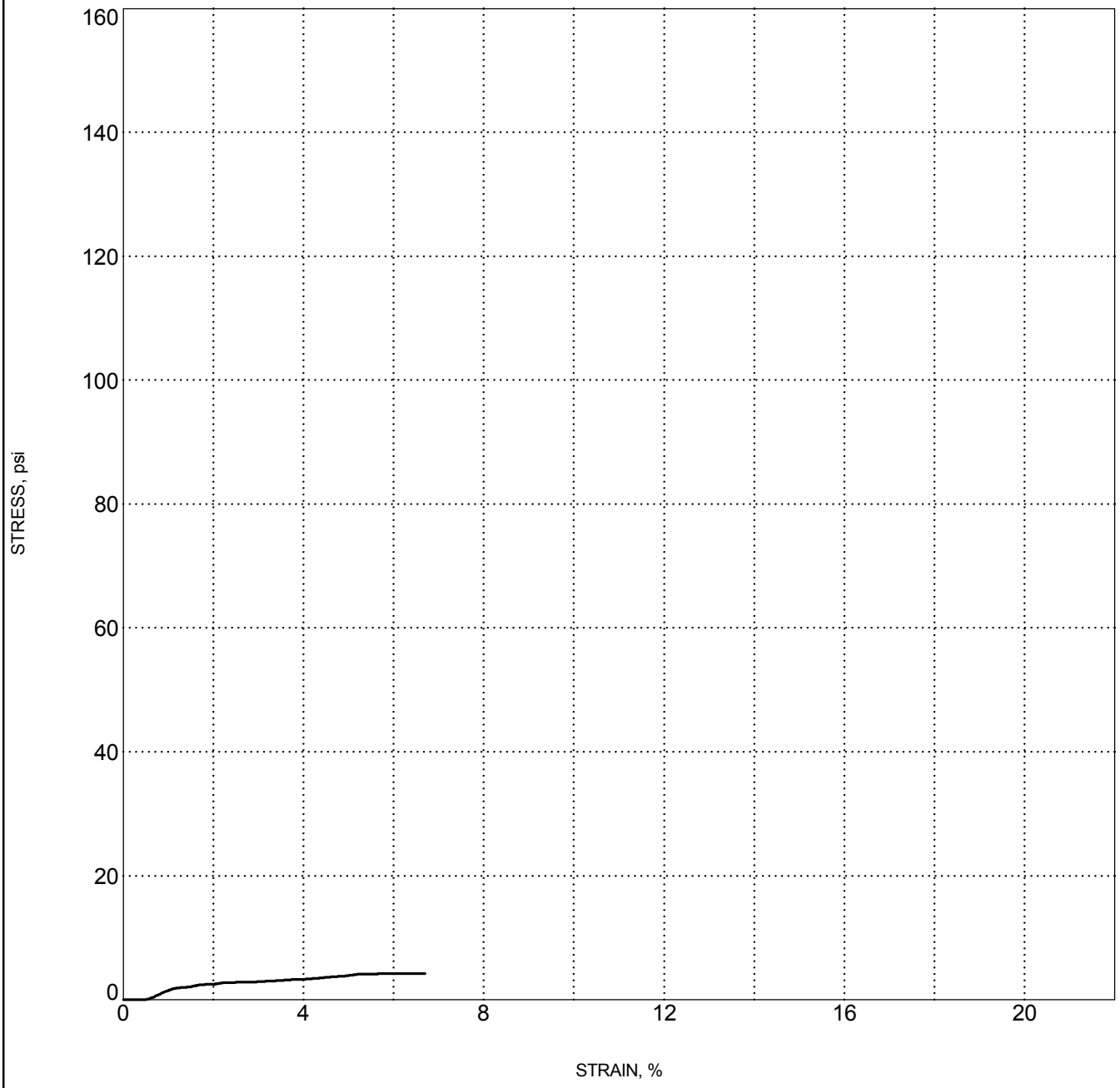
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



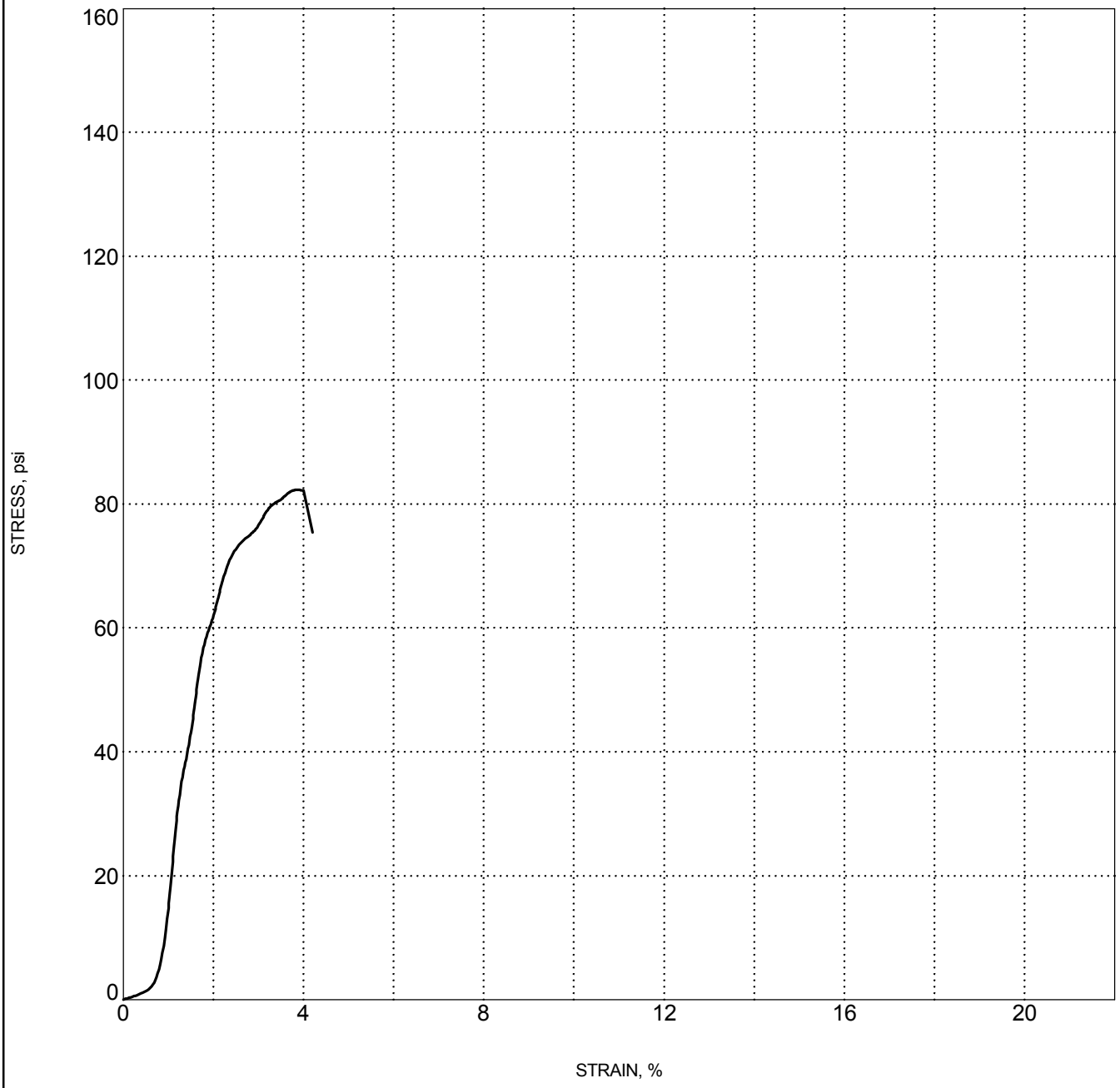
Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-07	15.0	**SANDY SILT(ML)**	**4.2**	**96.9**	**9.4**
⊠					
▲					
★					
⊙					
✿					

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● **B-08**	**5.0**	**FAT CLAY(CH)**	**82.2**	**109.2**	**19.0**
⊠					
▲					
★					
⊙					
✿					

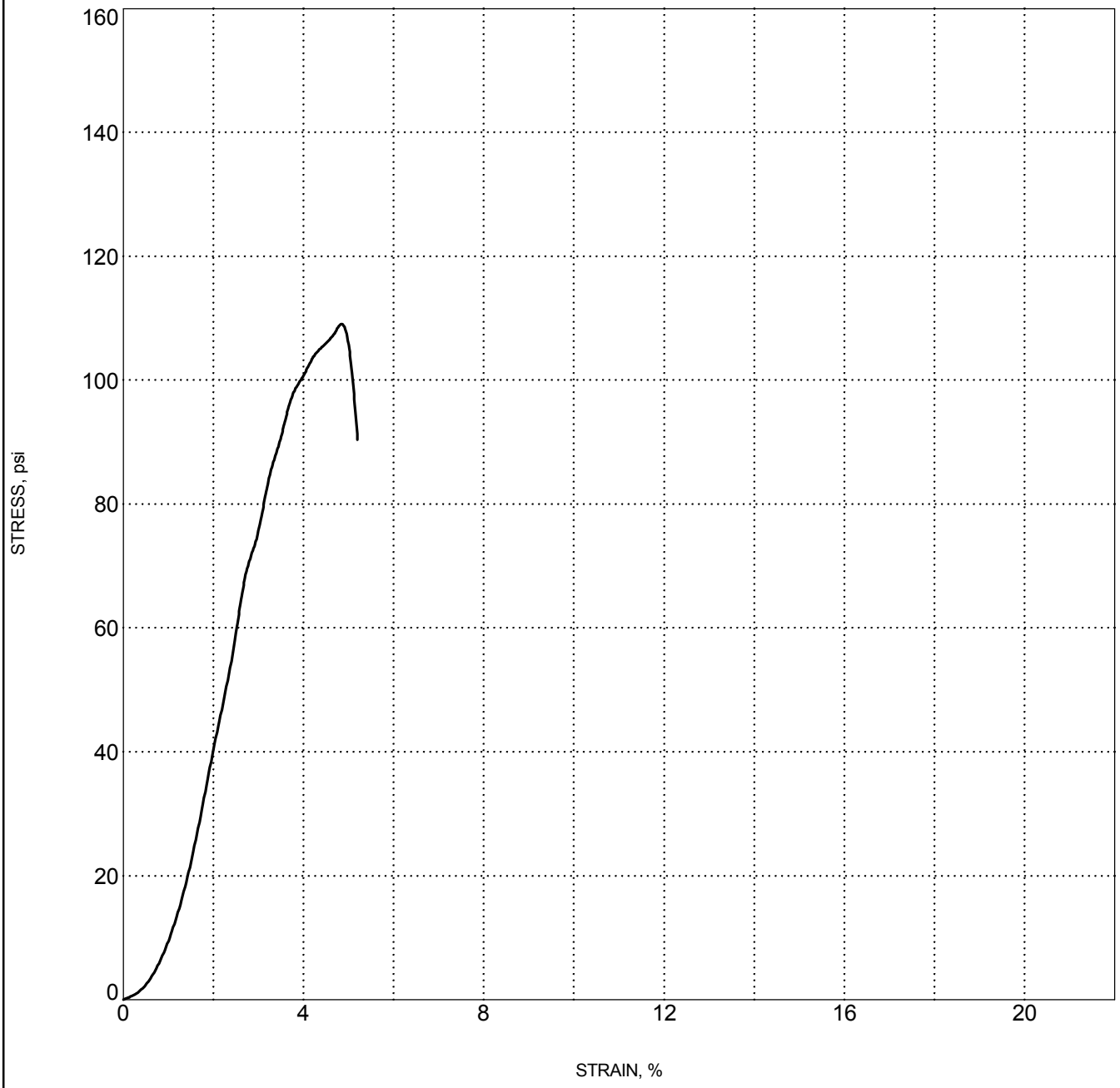
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-08	25.0	**LEAN CLAY(CL)**	**107.7**	**118.1**	**12.8**
⊠					
▲					
★					
⊙					
✿					

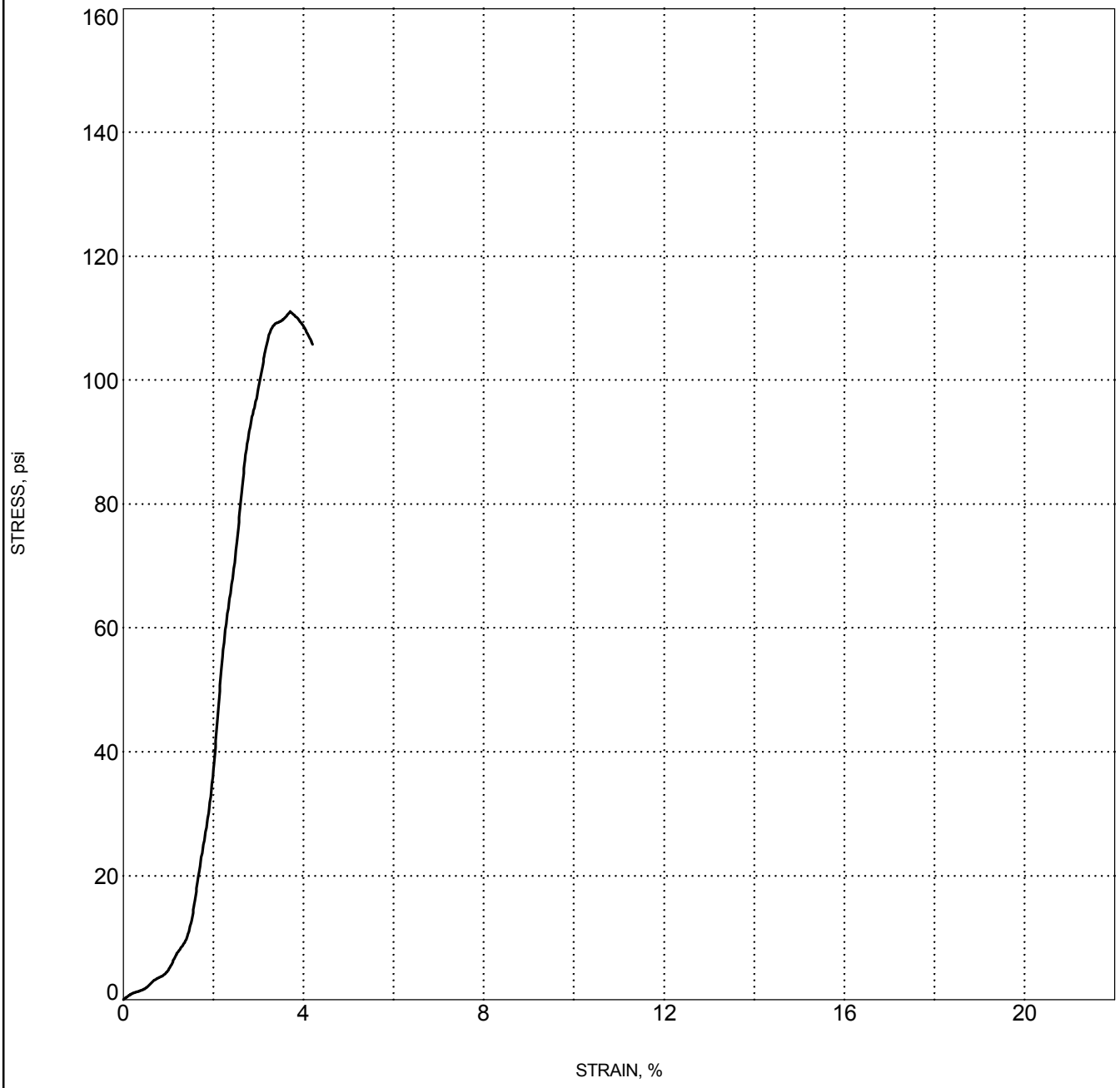
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-09	35.0	FAT CLAY(CH)	111.1	116.3	13.3
⊠					
▲					
★					
⊙					
✿					

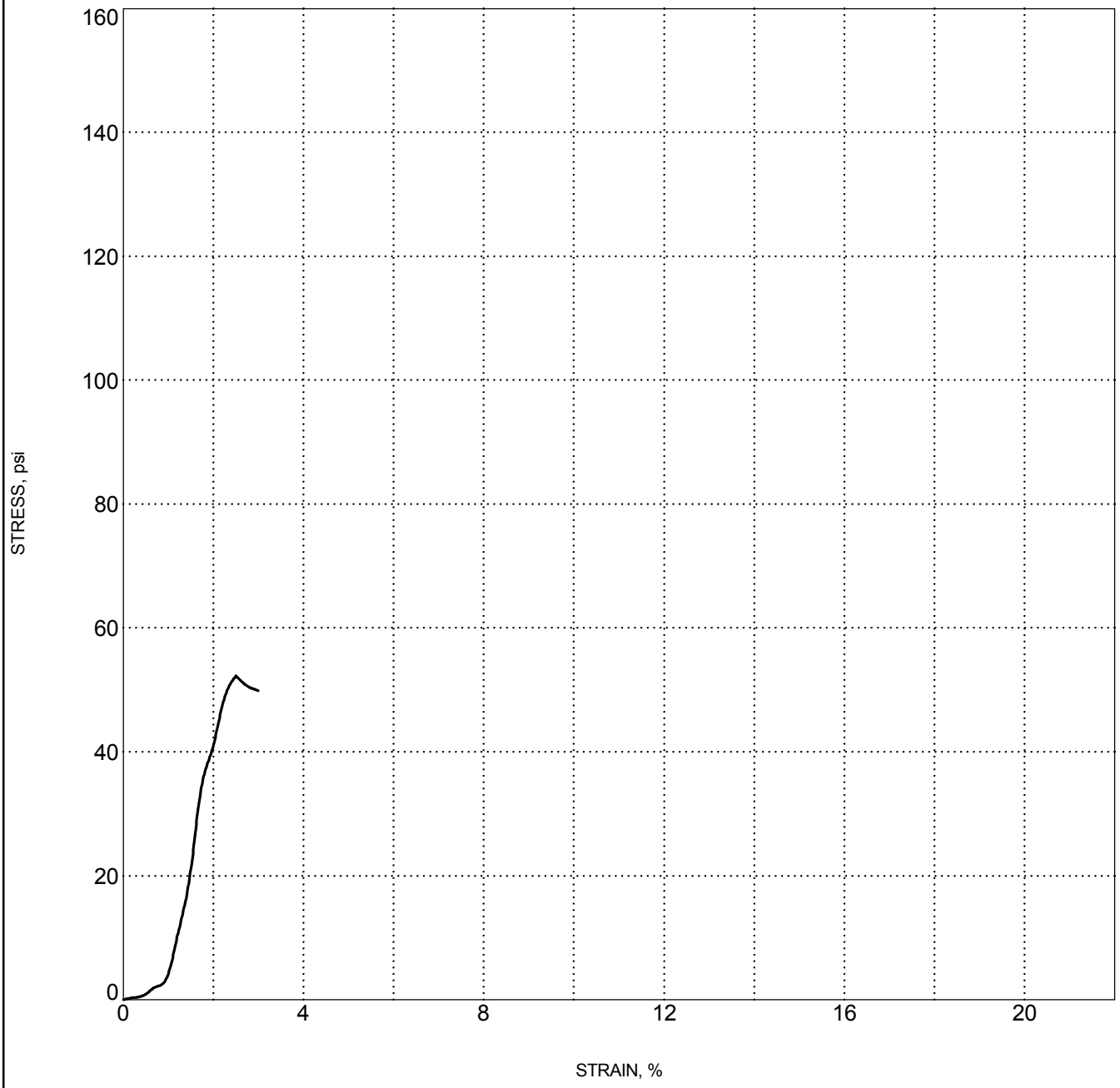
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● **B-10**	**35.0**	**FAT CLAY(CH)**	**52.3**	**108.5**	**18.0**
⊠					
▲					
★					
⊙					
✿					

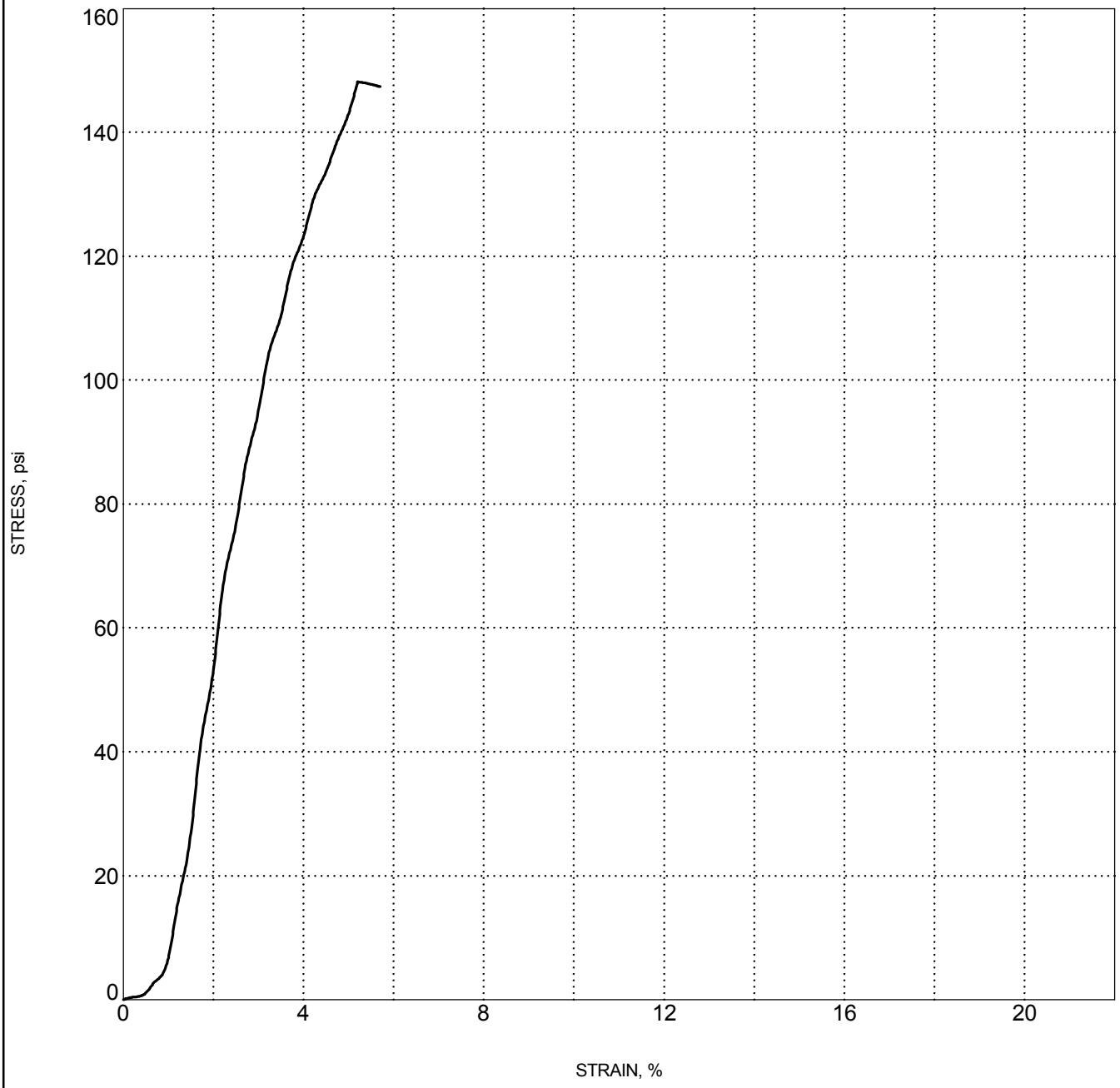
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-11	30.0	**LEAN CLAY(CL)**	**148.2**	**114.8**	**15.9**
⊠					
▲					
★					
⊙					
✿					

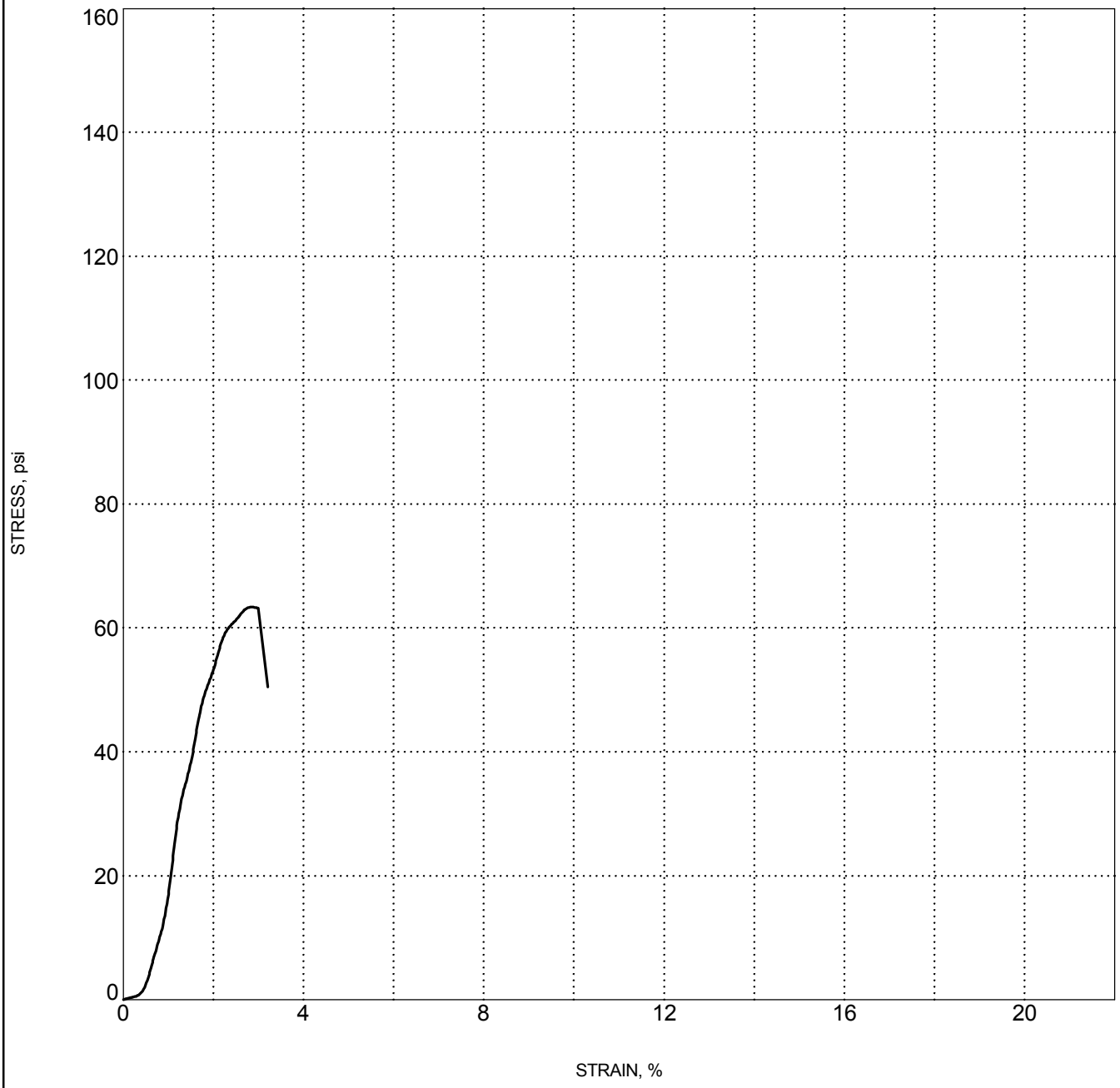
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-11	40.0	**FAT CLAY(CH)**	**63.2**	**105.6**	**20.8**
⊠					
▲					
★					
⊙					
✿					

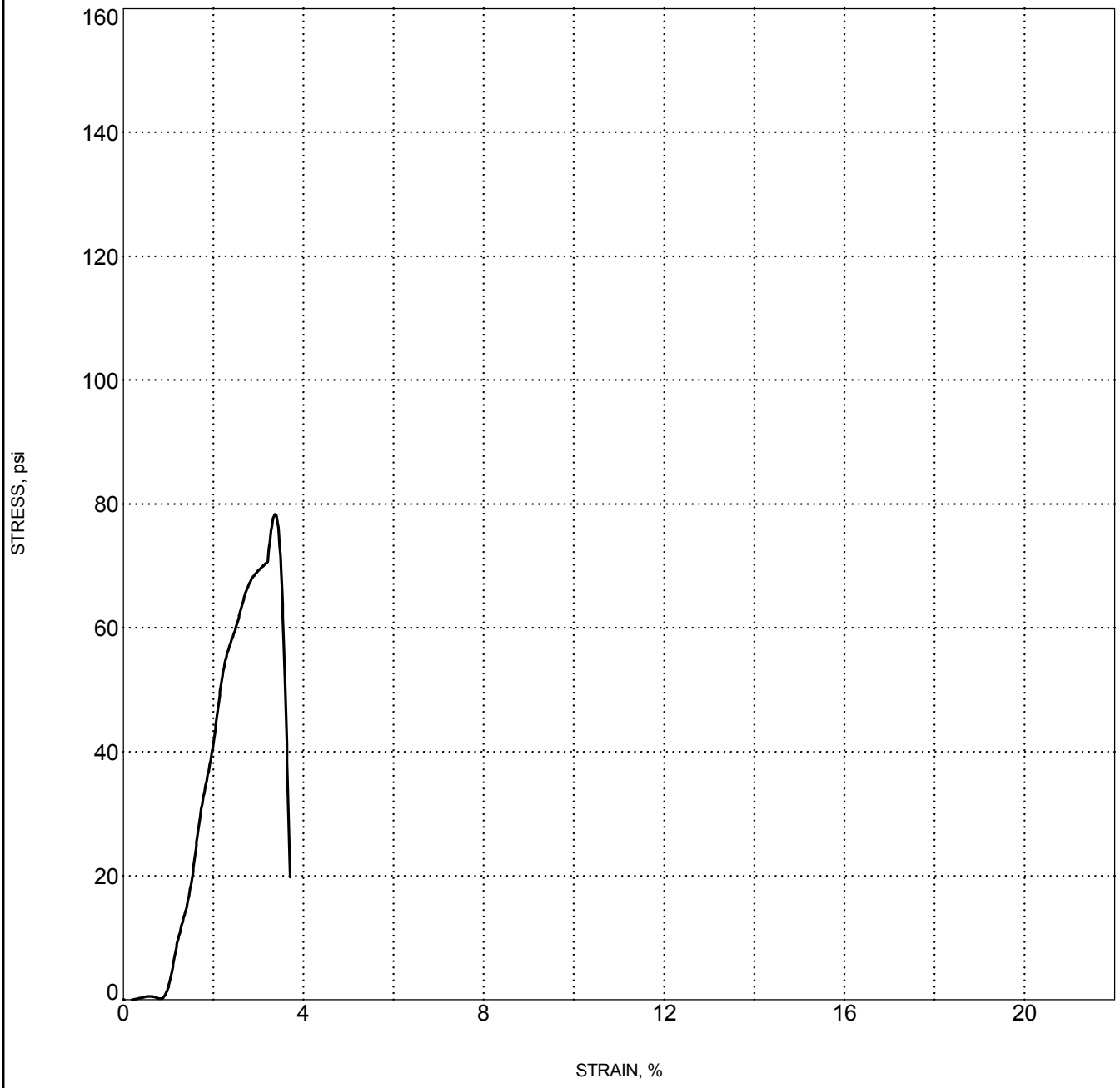
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-12	30.0	FAT CLAY(CH)	70.7	98.1	29.9
⊠					
▲					
★					
⊙					
✿					

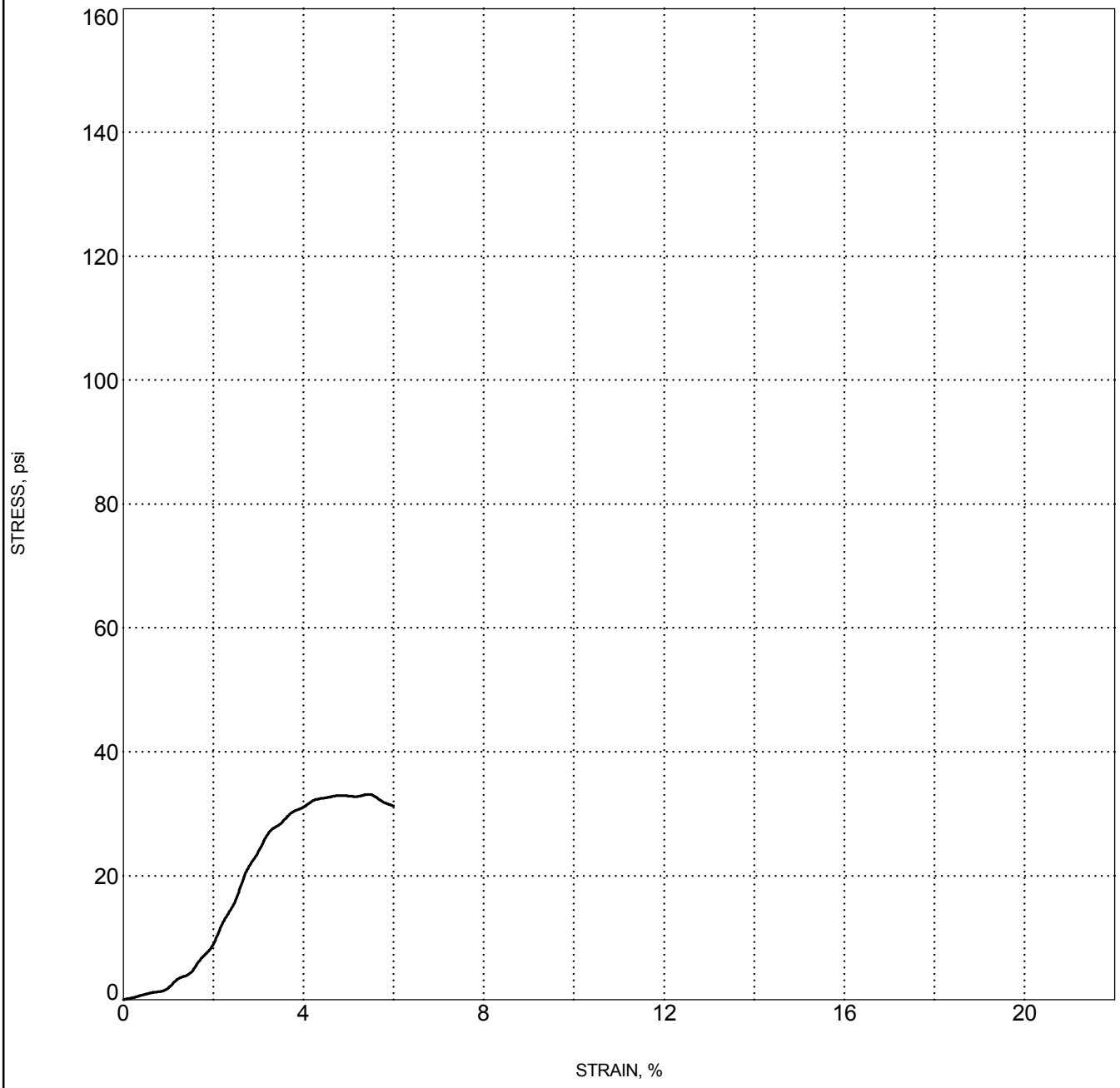
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-13	20.0	CLAYEY SAND(SC)	33.1	115.8	11.1
⊠					
▲					
★					
⊙					
✿					

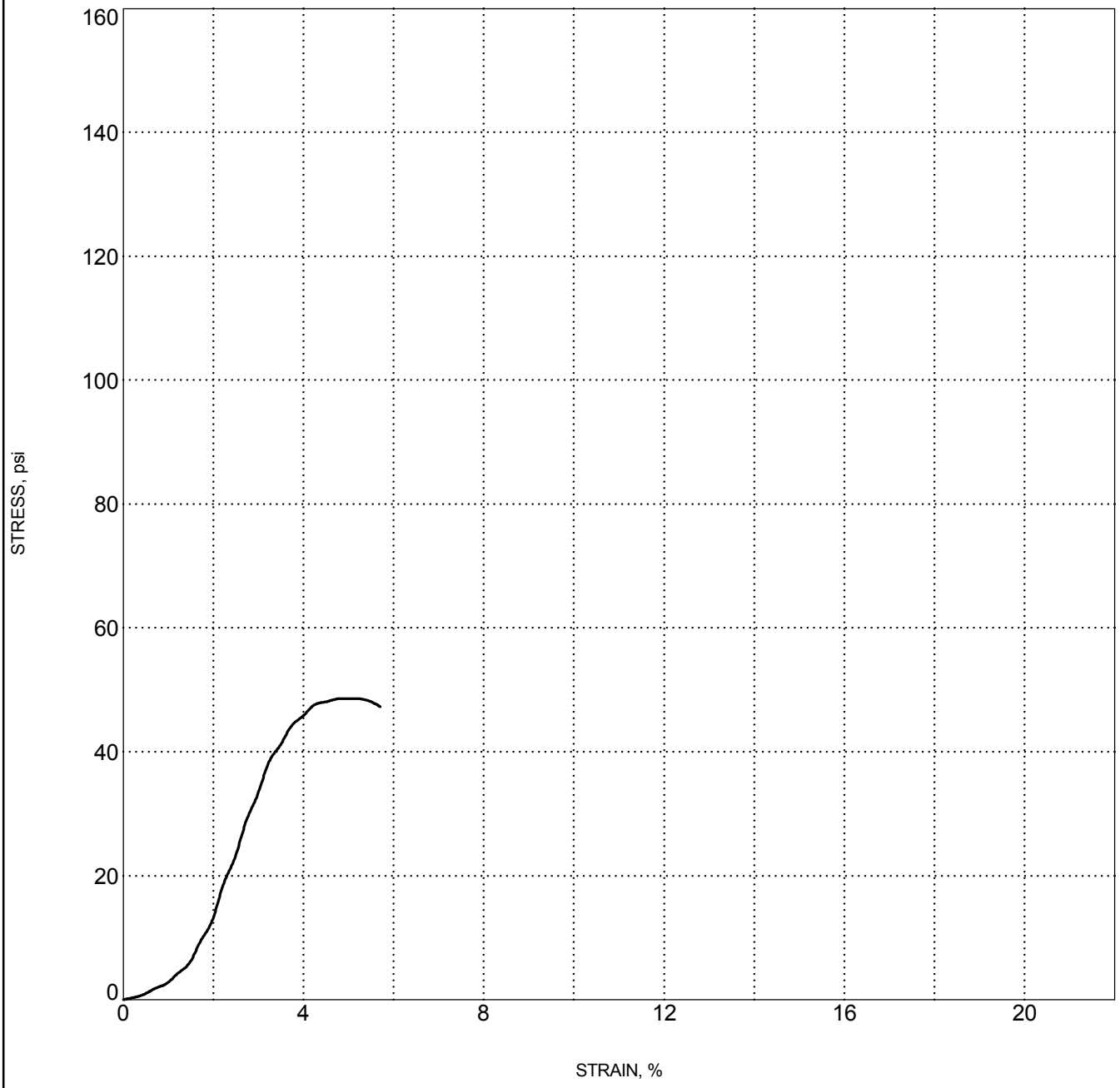
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-13	40.0	FAT CLAY(CH)	48.6	103.5	12.8
⊠					
▲					
★					
⊙					
✿					

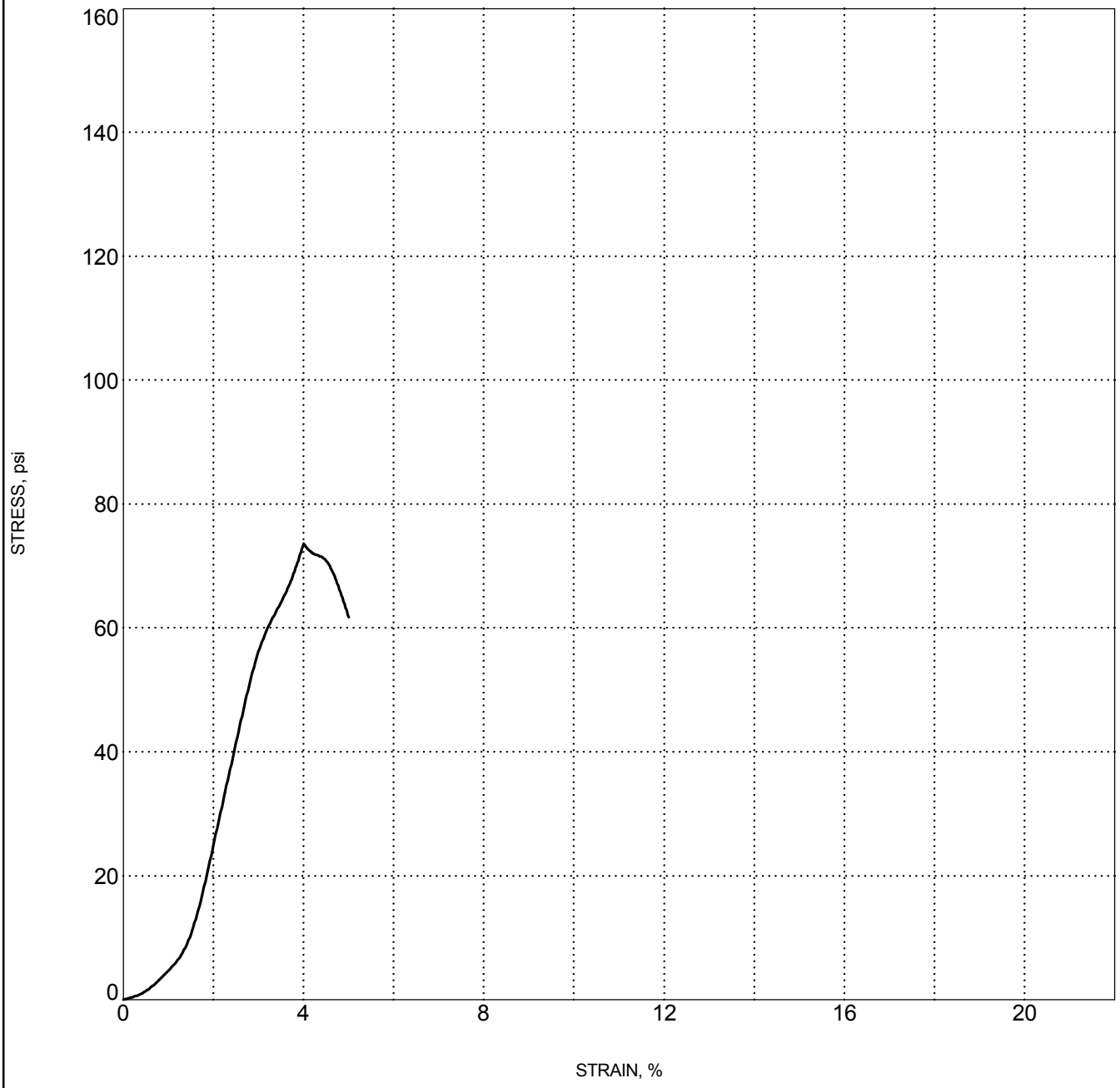
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-14	30.0	**FAT CLAY(CH)**	**73.6**	**109.3**	**19.9**
⊠					
▲					
★					
⊙					
✿					

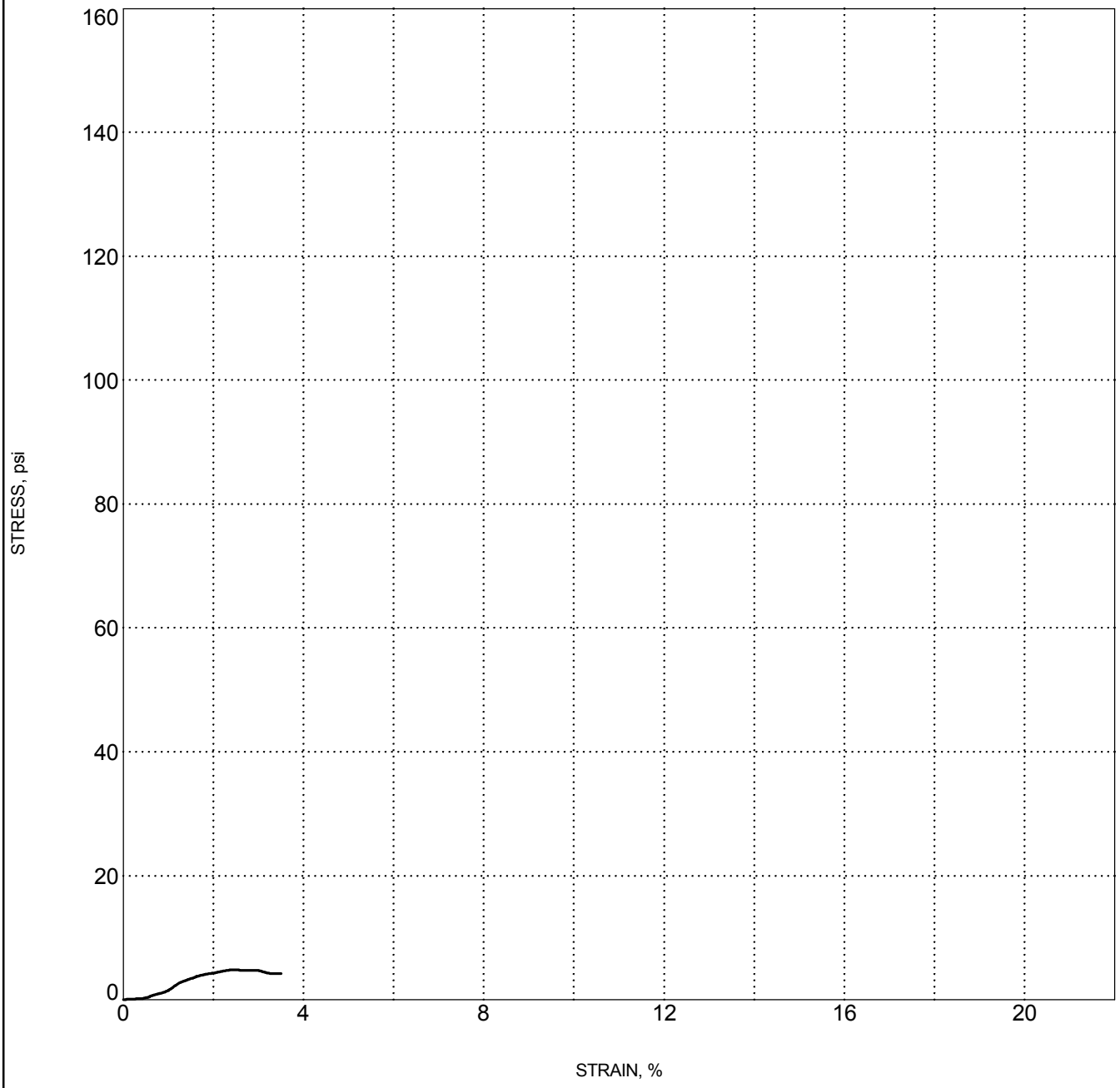
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-15	15.0	CLAYEY SAND(SC)	4.8	98.9	10.5
⊠					
▲					
★					
⊙					
✿					

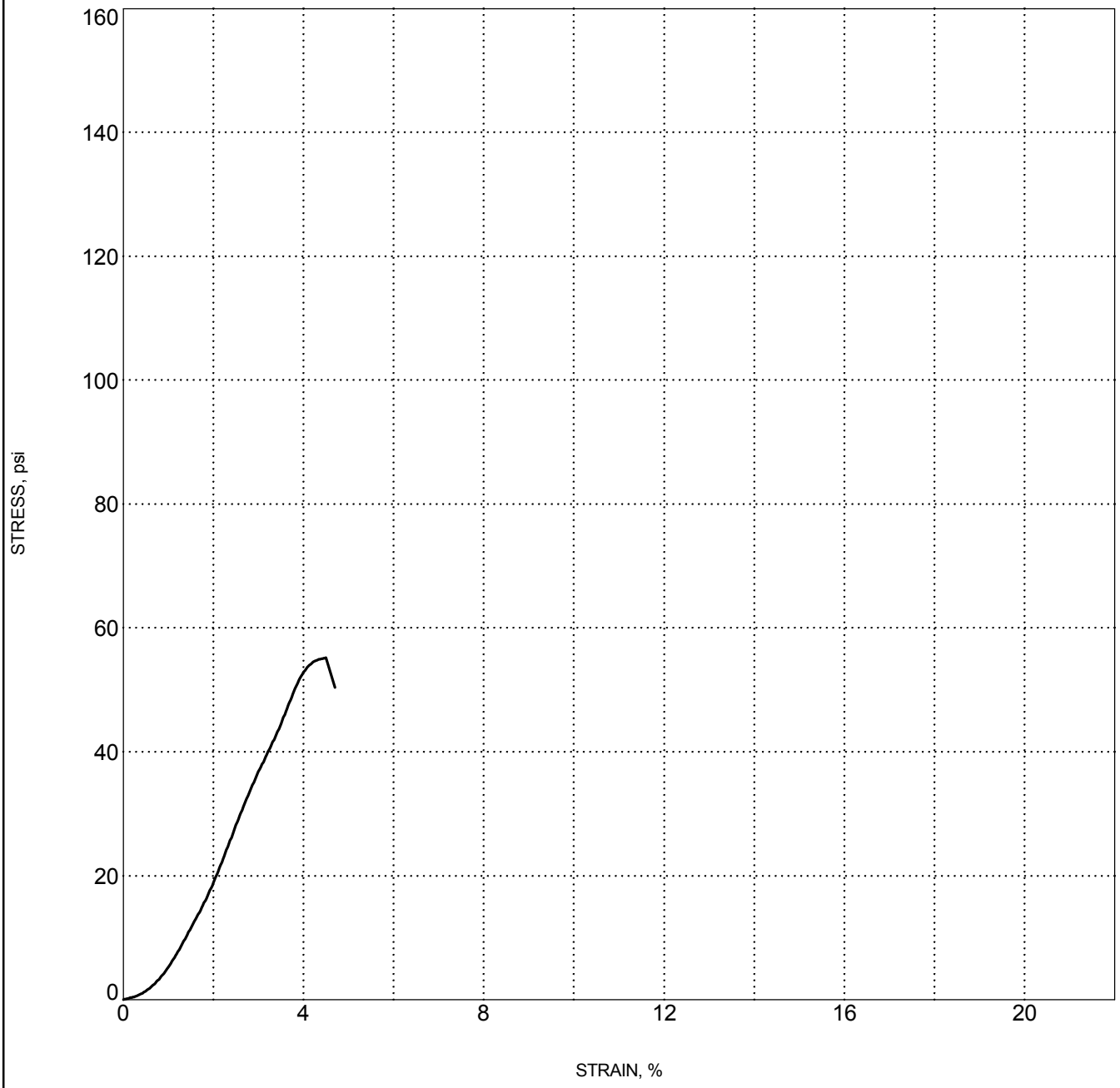
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-15	25.0	**LEAN CLAY(CL)**	**55.2**	**113.2**	**16.3**
⊠					
▲					
★					
⊙					
✿					

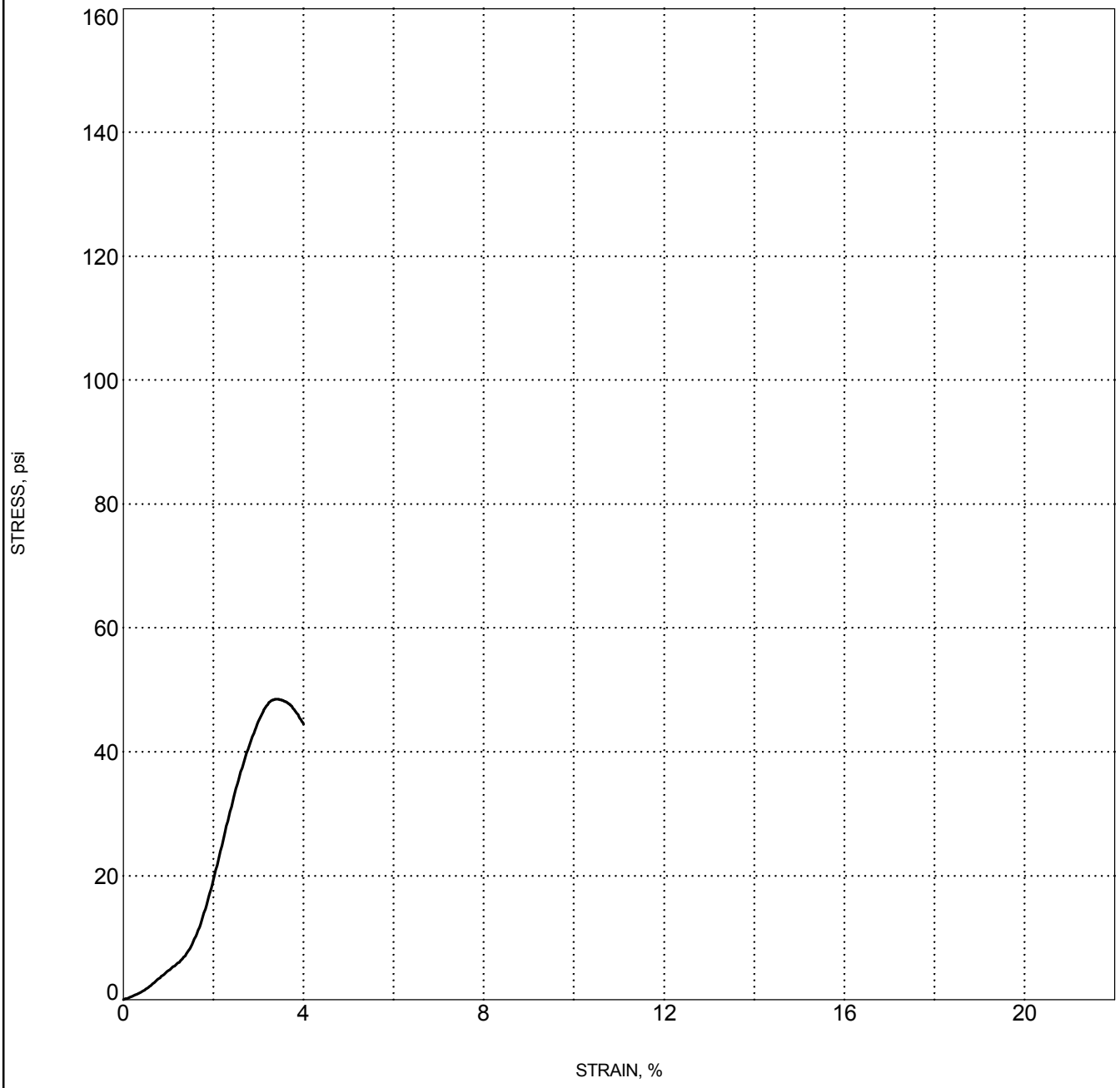
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● B-15	30.0	**FAT CLAY(CH)**	**48.4**	**108.4**	**20.0**
⊠					
▲					
★					
⊙					
✿					

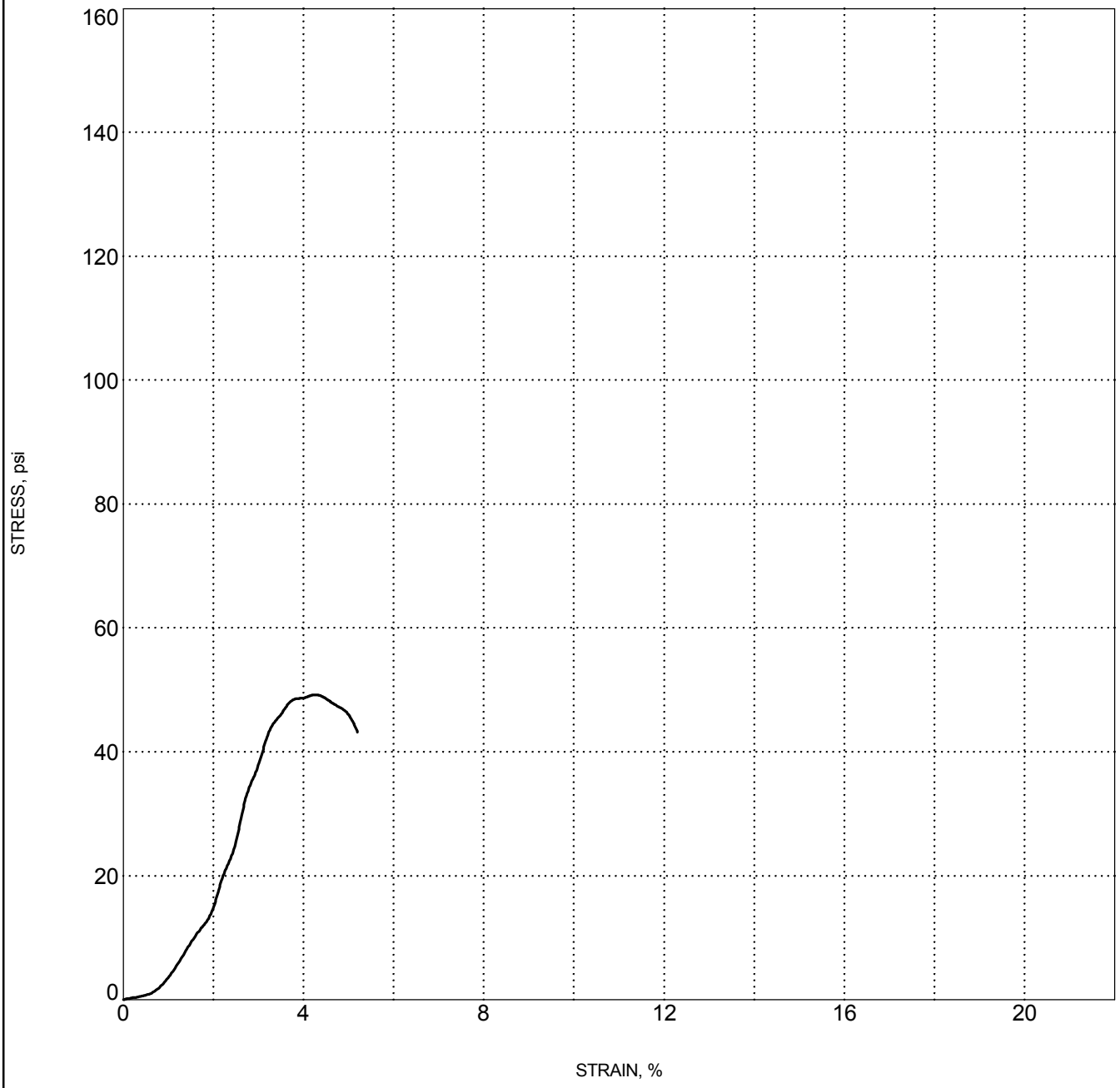
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



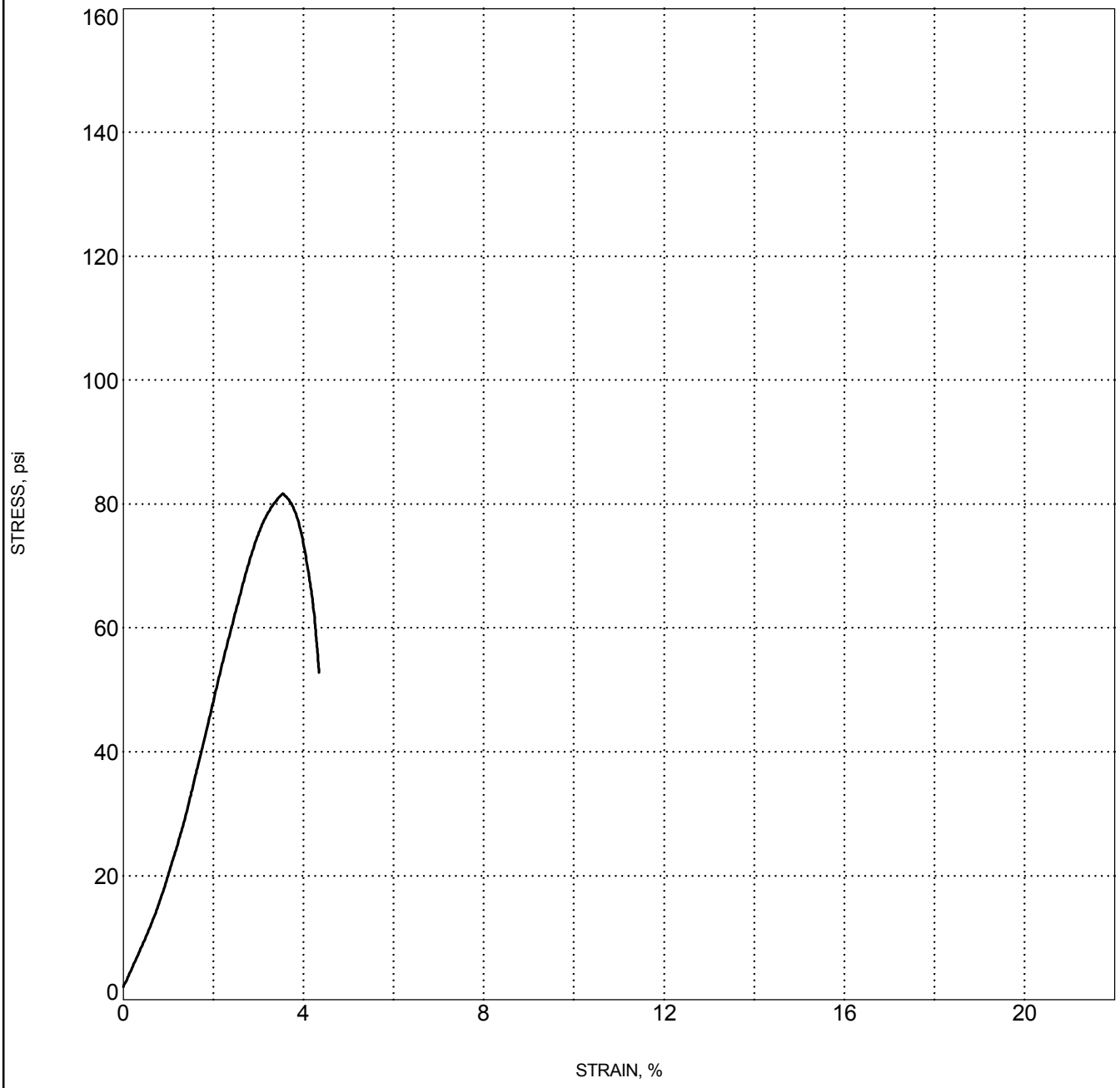
Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● **B-16**	**35.0**	**FAT CLAY with SAND(CH)**	**49.2**	**106.4**	**14.4**
⊠					
▲					
★					
⊙					
✿					

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● SB- 4	25.0	LEAN CLAY(CL)	81.7	119.8	12.3
⊠					
▲					
★					
⊙					
✿					

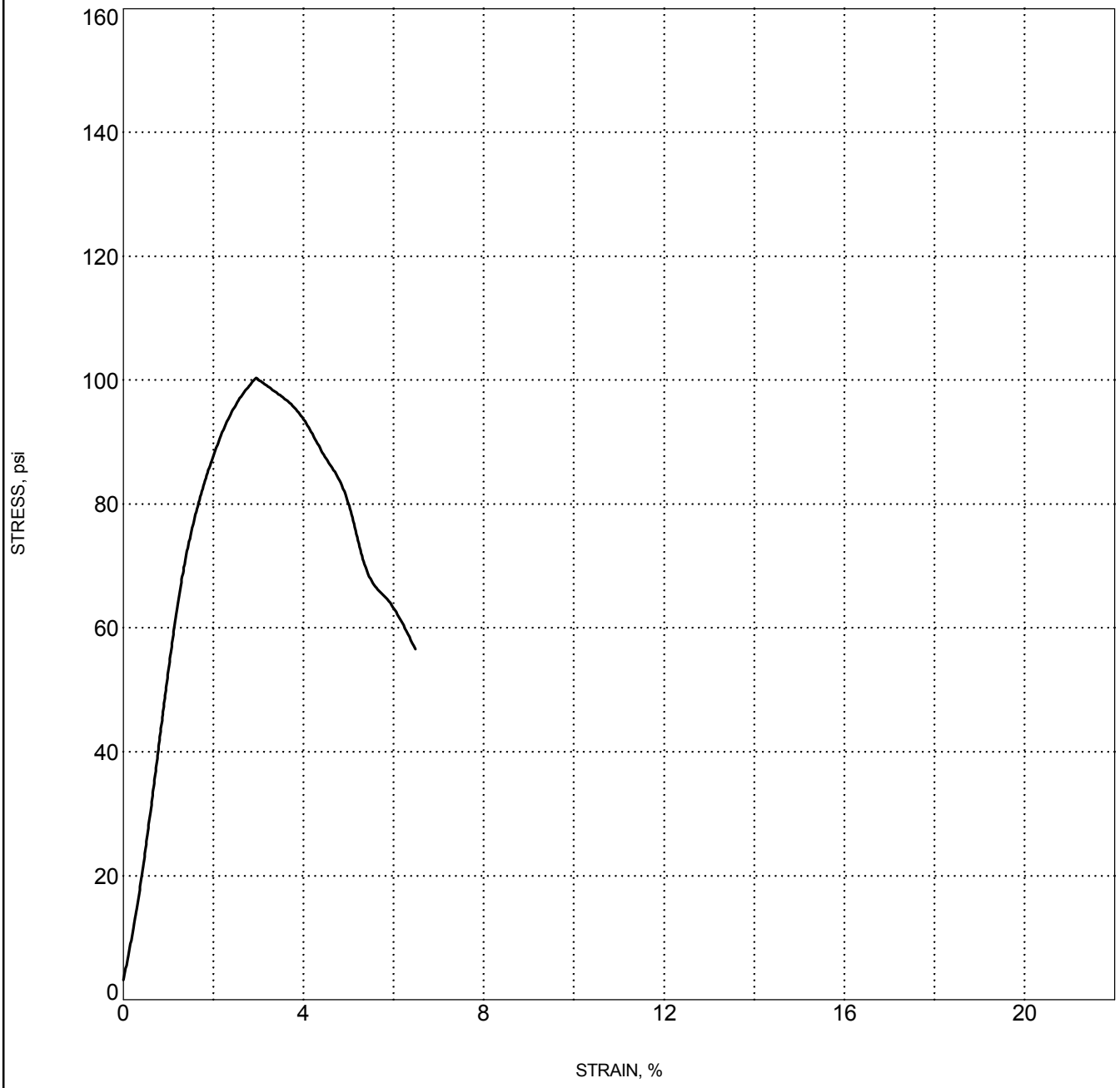
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● SB- 5	15.0	FAT CLAY(CH)	100.4	121.2	12.0
⊠					
▲					
★					
⊙					
✿					

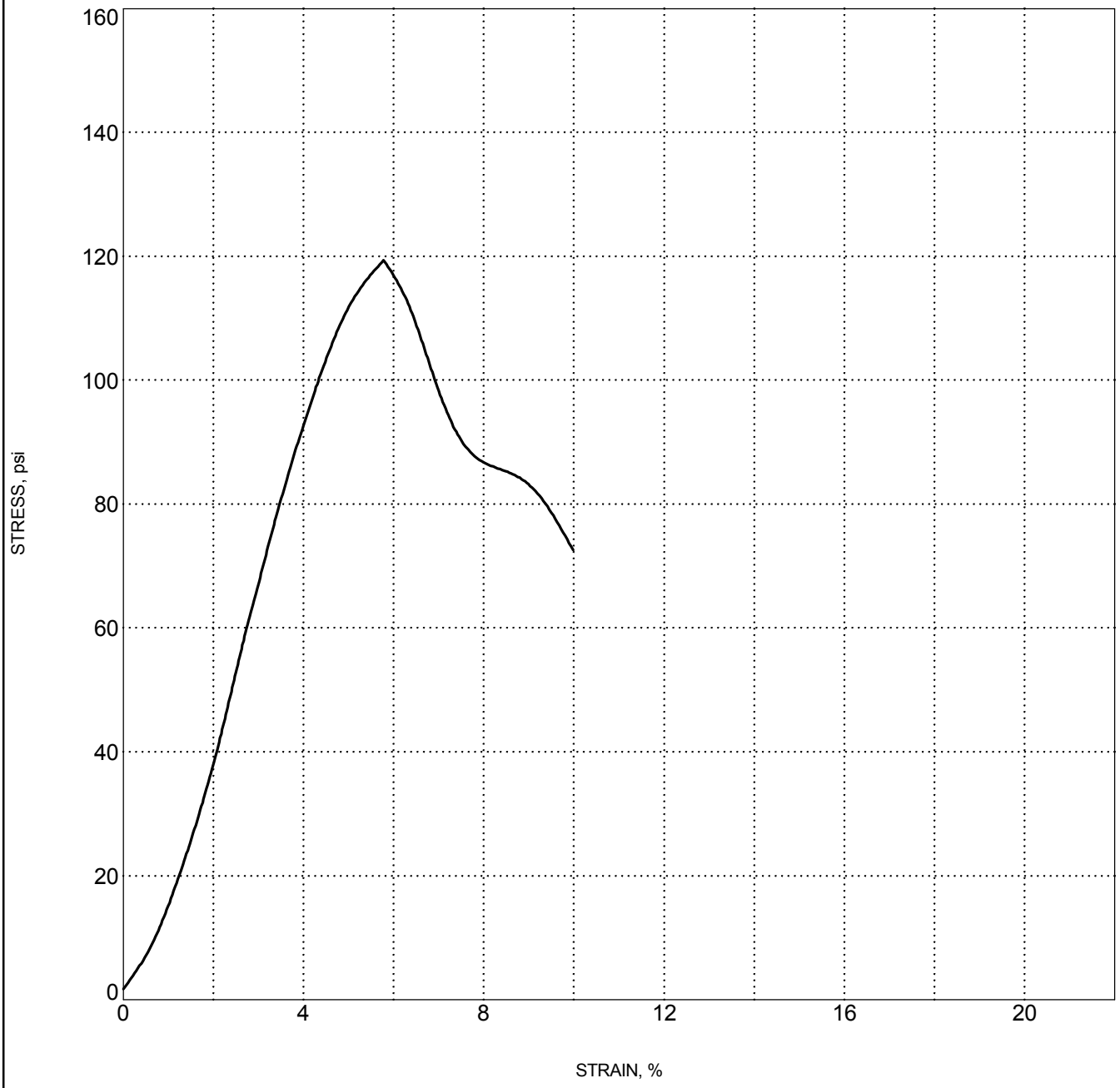
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● SB- 5	30.0	FAT CLAY(CH)	119.4	114.6	13.9
⊠					
▲					
★					
⊙					
✿					

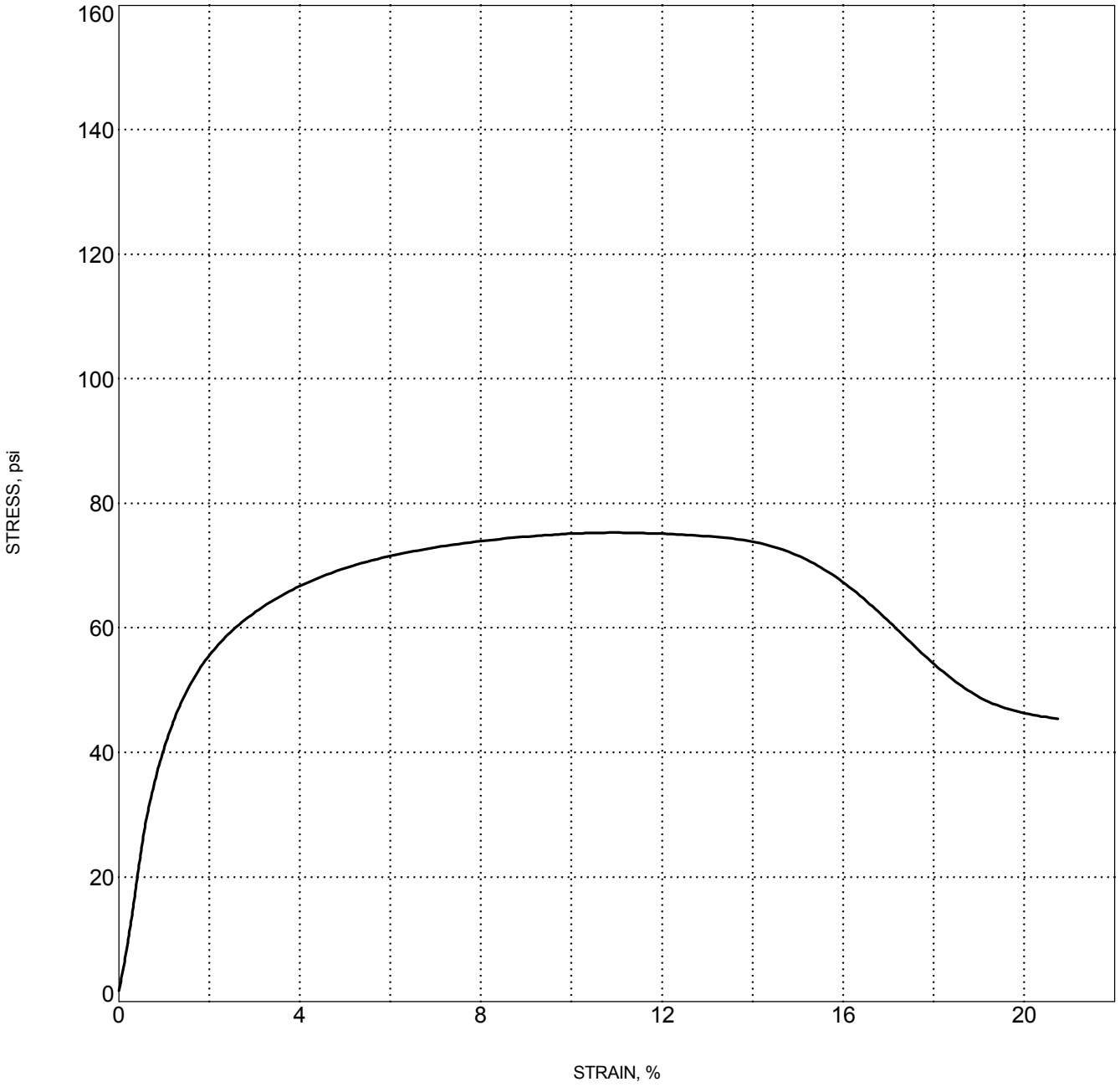
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

UNCONFINED COMPRESSION TEST

RockSol Consulting Group, Inc.

CLIENT Carter & Burgess **PROJECT NAME** 120th Ave Connection US36

PROJECT NUMBER RS - 196.02 **PROJECT LOCATION** Broomfield, Colorado



Specimen Identification		Classification	Strength (psi)	γ_d (pcf)	MC%
● **SB-11**	**10.0**	**FAT CLAY(CH)**	**75.3**	**110.0**	**18.1**
⊠					
▲					
★					
⊙					
✿					

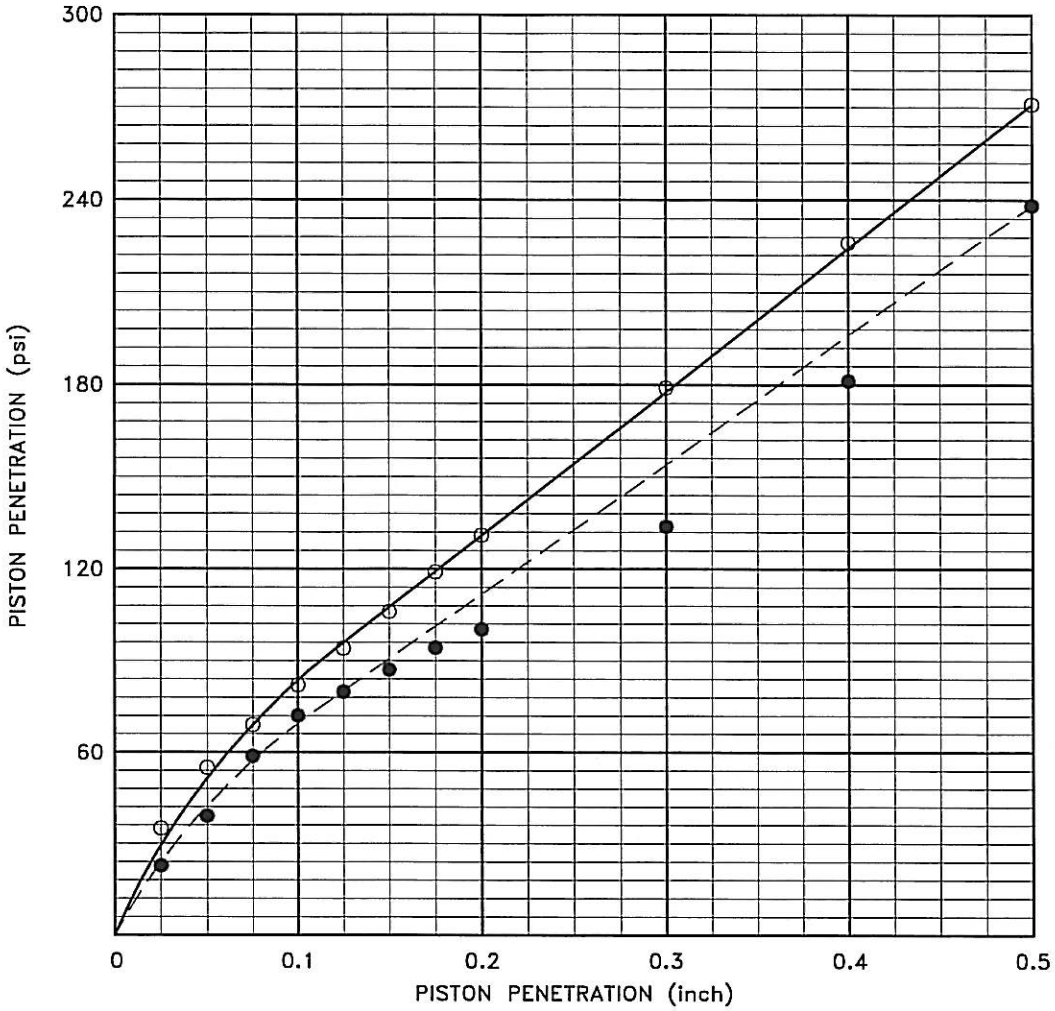
UNCONFINED 120TH AVE & US36.GPJ GINT US LAB.GDT 11/06/08

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NO.: 08-1-424
PROJECT NAME: ROCKSOL, 120th AVE. & US 36, #196.02
DATE SAMPLED: LATE SUMMER/FALL 2008
DATE RECEIVED: 09-30-08

SAMPLE LOCATION		DATE TESTED	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)	GRADATION		PERCENT PASSING No. 200 SIEVE	ATTERBERG LIMITS		R-VALUE @ 300 psi	CBR @ 95%	MATERIAL TYPE
BORING	DEPTH (feet)				GRAVEL* (%)	SAND (%)		LIQUID LIMIT (%)	PLASTICITY INDEX (%)			
SB-2	4-9'	10-3	121.6	11.2	0	71	29	NV	NP	60	8.1	A-2-4 (0)
SB-3	4-10'	10-3								28		Silty Sand (A-2**)
SB-5	4-9'	10-3								<5		Sandy Lean Clay (A-6**)
SB-6	4-9'	10-3								15		Silty sand with Gravel (A-2**)
SB-8	4-10'	10-3								26		Silty Sand (A-2**)
SB-9	4-9'	10-3	115.1	11.8	0	78	22	NV	NP	66	10.5	A-2-4 (0)
SB-11	4-10'	10-3	111.9	16.1	2	20	78	40	24	<5	5.5	A-6 (17)

* GRAVEL IS >#10 SIEVE
** VISUAL CLASSIFICATION ONLY



SURCHARGE PRESSURE (psf) 200					
TEST No.	AS-MOLDED DRY DENSITY (pcf)	AS-MOLDED PERCENT COMPACTION	AS-MOLDED MOISTURE (%)	MOISTURE AFTER SOAKING IN TOP INCH (%)	CONSOLIDATION OR SWELL (%)
1	113.2	93.1	11.3	13.7	0
2	117.6	96.7	11.6	12.8	0
3					

CORRECTED PISTON PRESSURE-PENETRATION DATA

TEST NO.	PRESSURE (psi)	PENETRATION (inch) .025	.050	.075	.100	.125	.150	.175	.200	.300	.400	.500	CBR (%)
1		24	42	57	69	80	91	101	112	154	196	238	7.4
2		29	51	69	84	96	107	119	131	178	224	271	8.7
3													

LOCATION: 120th Ave. & US 36

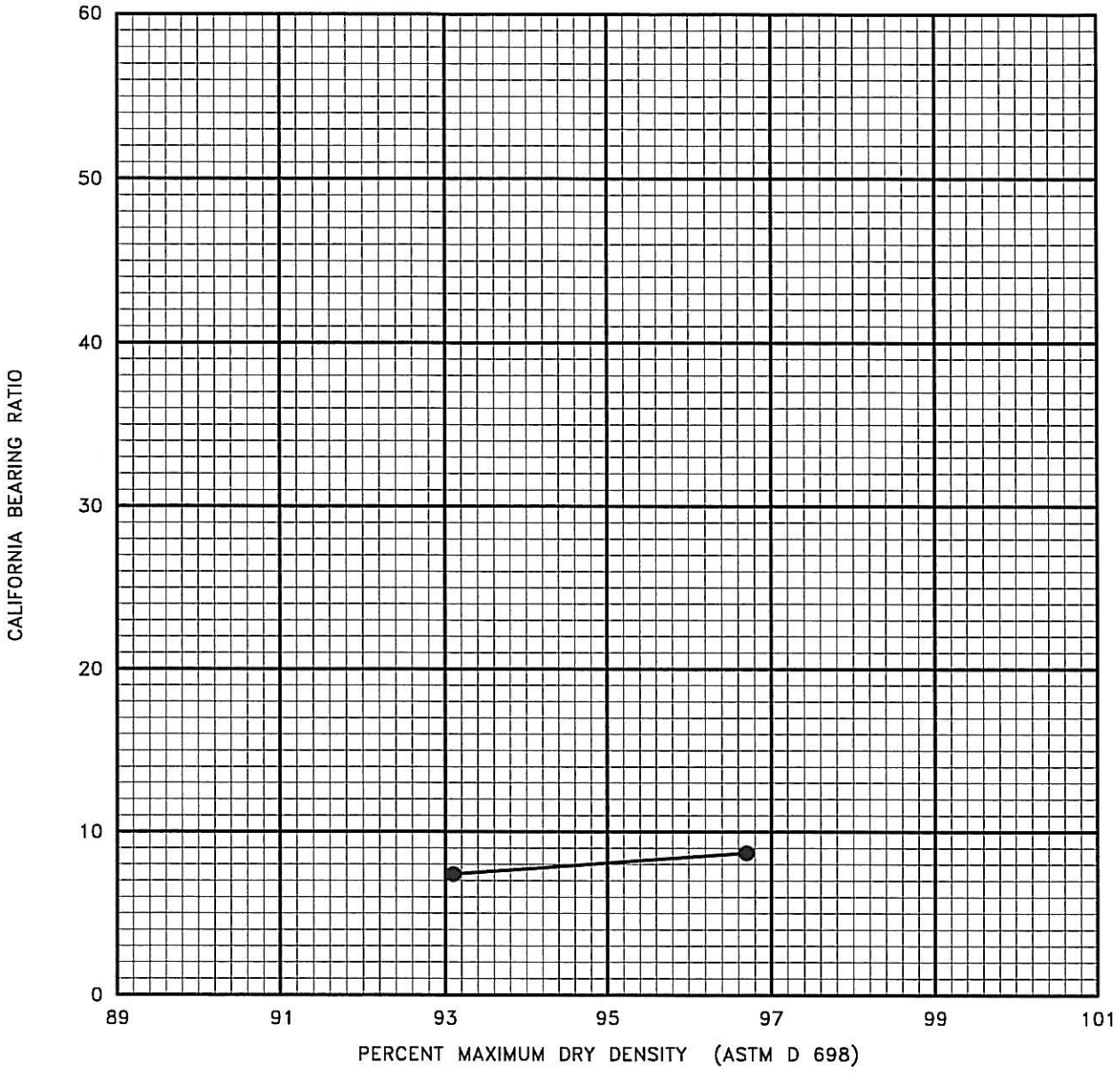
SAMPLE NO. : SB-2 DEPTH: 4-9'

PERCENT PASSING NO. 200 SIEVE: 29 LIQUID LIMIT: NV PLASTICITY INDEX: NP

MAXIMUM DRY DENSITY: 121.6 PCF OPTIMUM MOISTURE CONTENT: 11.2 %

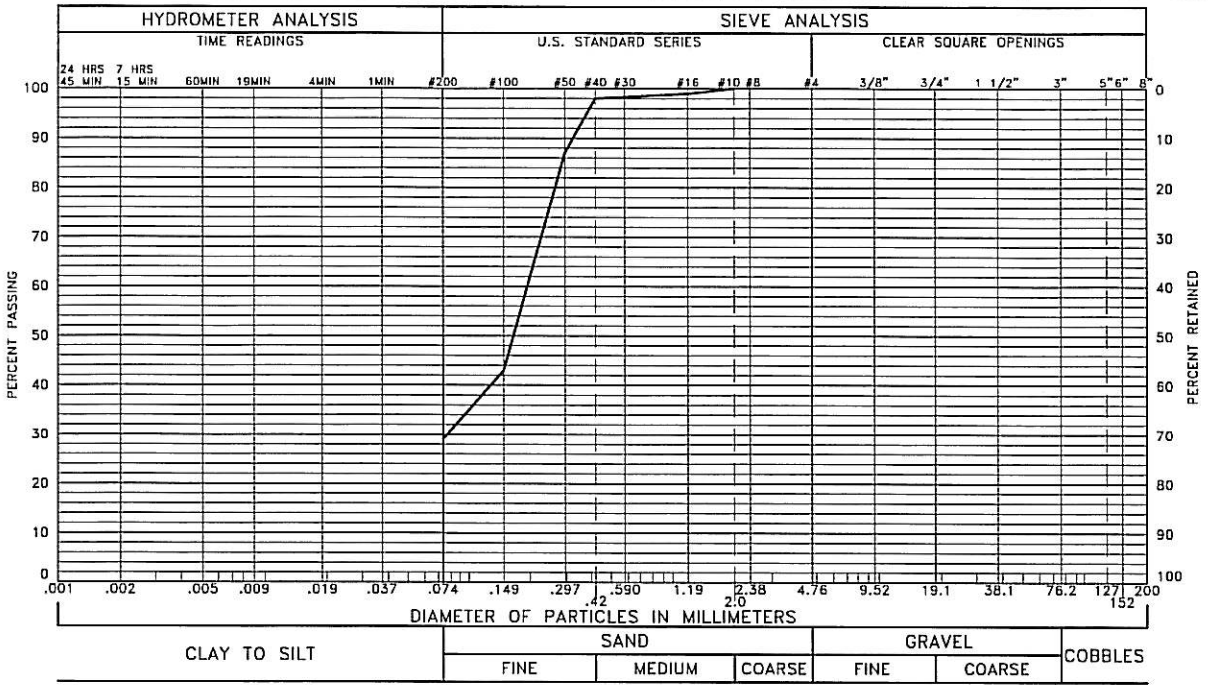
SOIL DESCRIPTION: A-2-4 (0)

08-1-424	Kumar & Associates	CALIFORNIA BEARING RATIO TEST RESULTS	6958



SAMPLE IDENTIFICATION	CBR VALUE @ 95% MAXIMUM DRY DENSITY
120th Ave. & US 36 SB-2 @ 4-9'	8

08-1-424	Kumar & Associates	CALIFORNIA BEARING RATIO TEST RESULTS	6958



SIEVE SIZE	PERCENT PASSING	SPECIFIED PERCENT PASSING
#10	100	
#16	99	
#40	98	
#50	87	
#100	43	
#200	29	

GRAVEL 0 % SAND 71 % SILT AND CLAY 29 %

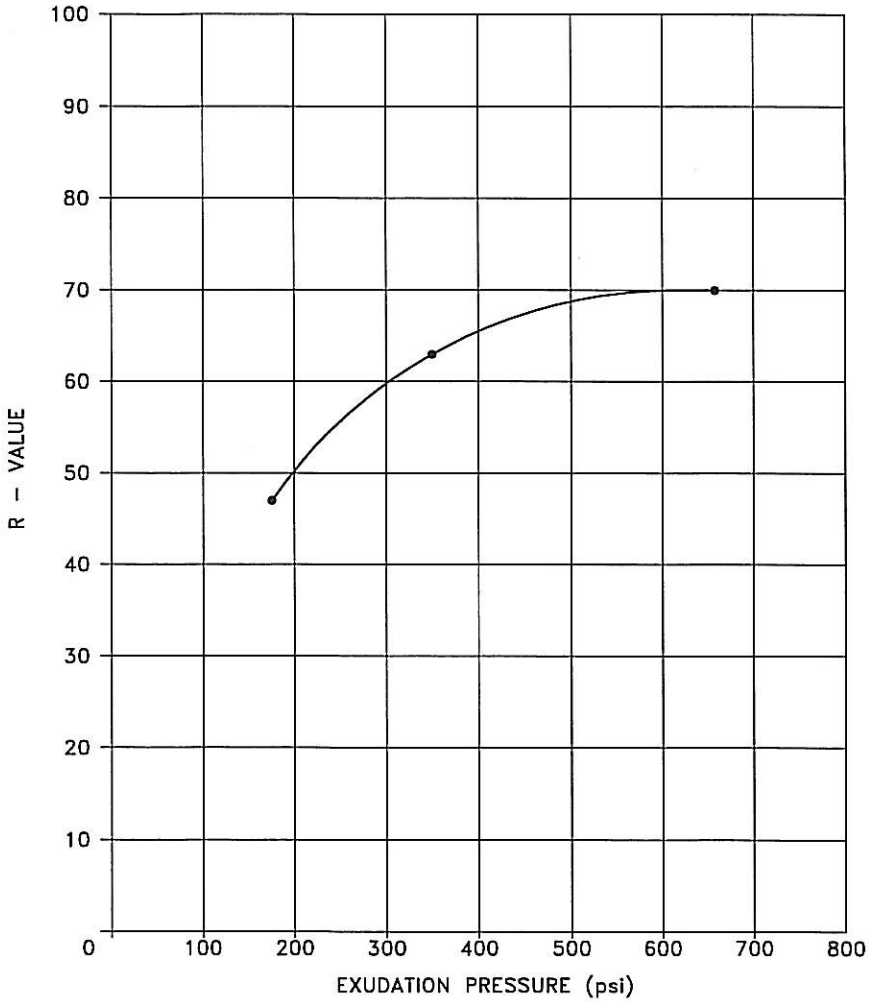
LIQUID LIMIT NV PLASTICITY INDEX NP

SAMPLE OF: A-2-4 (0)

FROM: SB-2 @ 4-9'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-03-08

TEST SPECIMEN	1	2	3	4	R -VALUE (300 psi)
MOISTURE CONTENT (%)	11.1	12.0	10.3		
DENSITY (pcf)	127.0	123.9	125.4		
EXPANSION PRESSURE (psi)	0.000	0.000	0.000		
EXUDATION PRESSURE (psi)	350	176	658		
R VALUE	63	47	70		60



SOIL TYPE: A-2-4 (0)

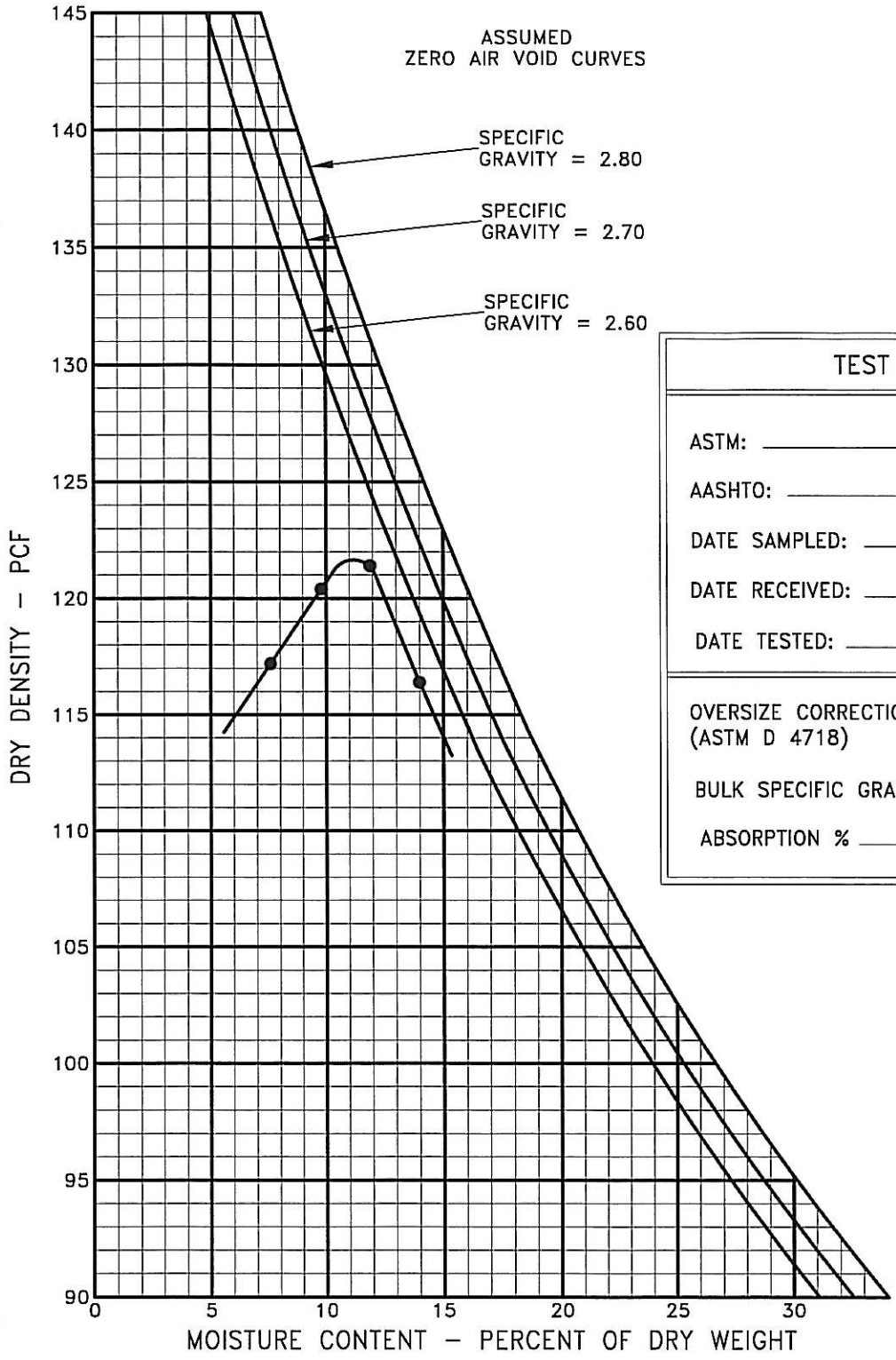
LOCATION: SB-2 @ 4-9'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-01-08

GRAVEL: 0 % SAND: 71 % SILT AND CLAY: 29 %

LIQUID LIMIT: NV PLASTICITY INDEX: NP

08-1-424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6958



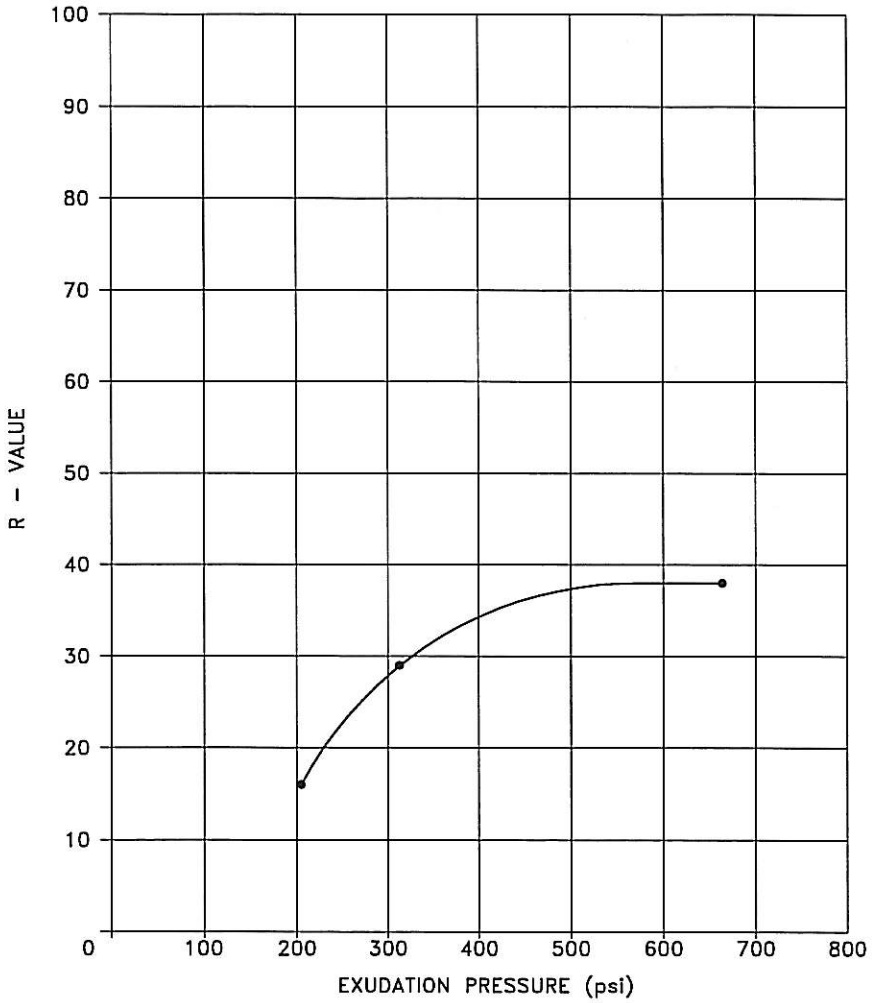
TEST METHOD	
ASTM:	
AASHTO:	T99-01A
DATE SAMPLED:	09-30-08
DATE RECEIVED:	09-30-08
DATE TESTED:	10-03-08
OVERSIZE CORRECTION (ASTM D 4718)	N/A
BULK SPECIFIC GRAVITY	
ABSORPTION %	

MAXIMUM DRY DENSITY: 121.6 pcf OPTIMUM MOISTURE CONTENT: 11.2 %

SOIL TYPE:	A-2-4 (0)	GRAVEL: 0 %	
SAMPLE NO.:		SAND: 71 %	LIQUID LIMIT: NV
		SILT AND CLAY(-200): 29 %	PLASTICITY INDEX: NP
LOCATION:	120th Ave. & US 36	BORING NO.: SB-2	DEPTH: 4-9'

08-1-424	Kumar & Associates	MOISTURE-DENSITY RELATIONSHIPS	6958

TEST SPECIMEN	1	2	3	4	R -VALUE (300 psi)
MOISTURE CONTENT (%)	11.7	12.5	10.9		
DENSITY (pcf)	124.7	126.1	128.1		
EXPANSION PRESSURE (psi)	0.000	0.000	0.000		
EXUDATION PRESSURE (psi)	313	205	664		
R VALUE	29	16	38		28



SOIL TYPE: Silty Sand (A-2)

LOCATION: SB-3 @ 4-10'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-03-08

GRAVEL: _____ % SAND: _____ % SILT AND CLAY: _____ %

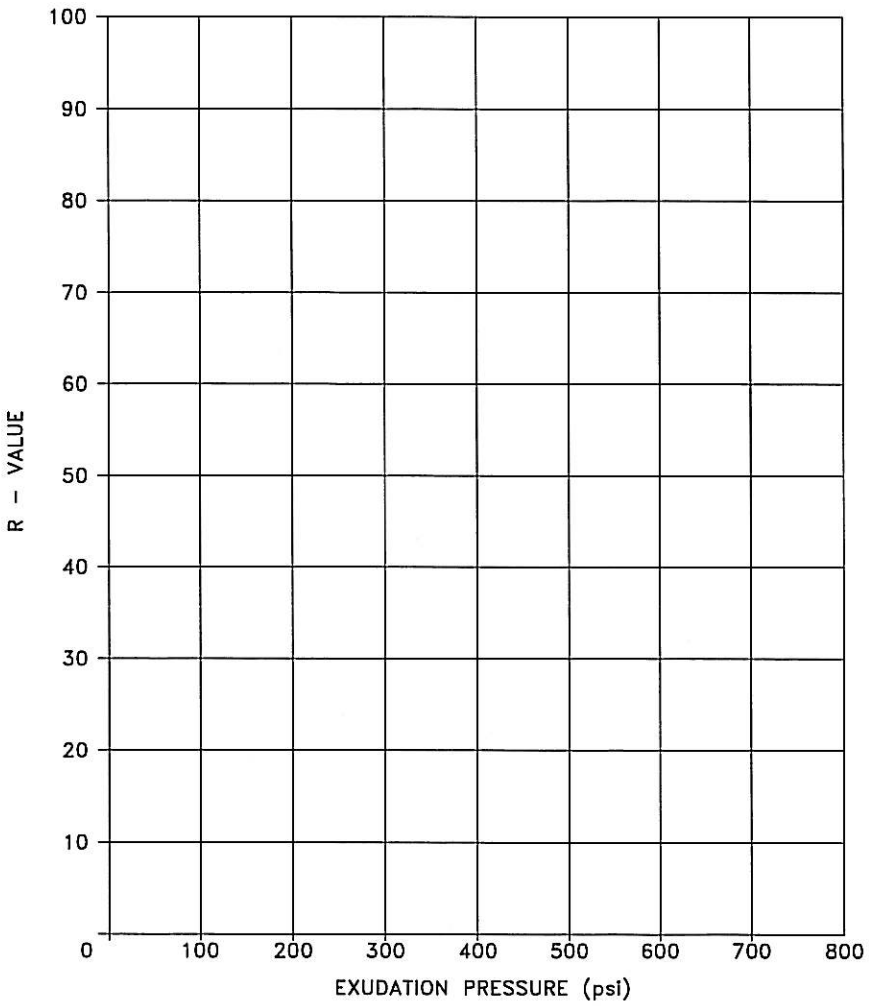
LIQUID LIMIT: _____ PLASTICITY INDEX: _____

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. R-value performed in accordance with ASTM D2844. Atterberg limits performed in accordance with ASTM D4318. Sieve analyses performed in accordance with ASTM D422, D1140.

08-1-424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6959

TEST SPECIMEN	1	2	3	4	R -VALUE (300 psi)
MOISTURE CONTENT (%)					
DENSITY (pcf)					
EXPANSION PRESSURE (psi)					
EXUDATION PRESSURE (psi)					
R VALUE					LESS THAN 5*

*SAMPLE EXTRUDED AROUND FOLLOWER. PER ASTM STANDARDS, THE SAMPLE IS LABELED WITH AN R-VALUE OF LESS THEN 5



SOIL TYPE: Sandy Lean Clay (A-6)

LOCATION: SB-5 @ 4-9'

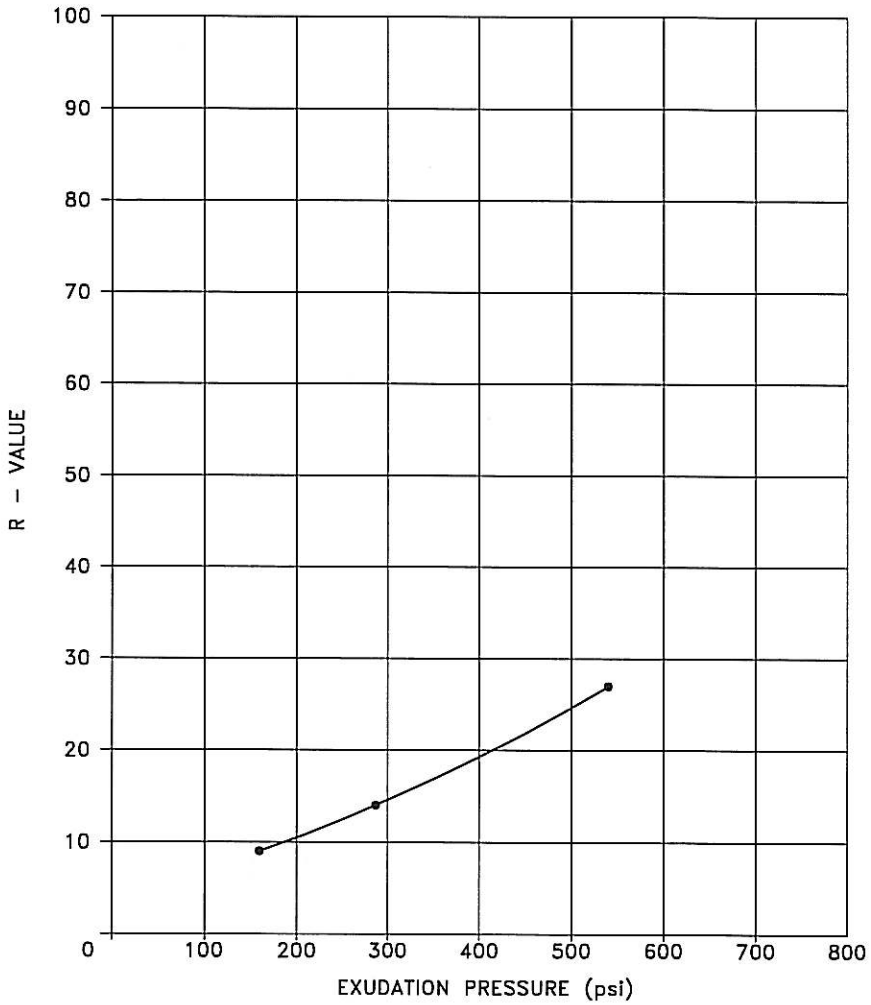
DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-07-08

GRAVEL: _____ % SAND: _____ % SILT AND CLAY: _____ %

LIQUID LIMIT: _____ PLASTICITY INDEX: _____

08-1-424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6960

TEST SPECIMEN	1	2	3	4	R –VALUE (300 psi)
MOISTURE CONTENT (%)	11.5	13.2	14.4		
DENSITY (pcf)	106.2	107.7	105.3		
EXPANSION PRESSURE (psi)	0.001	0.000	0.000		
EXUDATION PRESSURE (psi)	540	287	160		
R VALUE	27	14	9		15



SOIL TYPE: Silty Sand with Gravel (A-2)

LOCATION: SB-6 @ 4-9'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-07-08

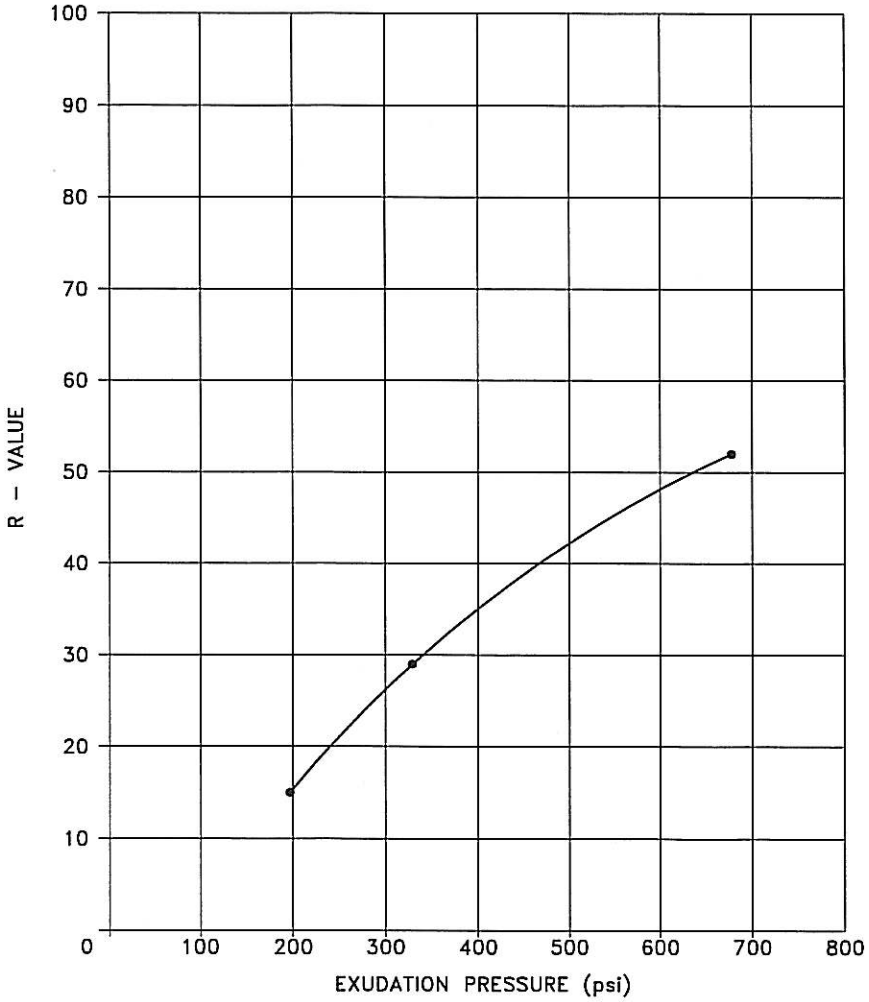
GRAVEL: _____ % SAND: _____ % SILT AND CLAY: _____ %

LIQUID LIMIT: _____ PLASTICITY INDEX: _____

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. R-value performed in accordance with ASTM D2844. Atterberg limits performed in accordance with ASTM D4318. Sieve analyses performed in accordance with ASTM D422, D1140.

08-1-424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6961

TEST SPECIMEN	1	2	3	4	R -VALUE (300 psi)
MOISTURE CONTENT (%)	12.1	12.9	11.2		
DENSITY (pcf)	123.6	121.1	125.2		
EXPANSION PRESSURE (psi)	0.000	0.000	0.000		
EXUDATION PRESSURE (psi)	329	197	678		
R VALUE	29	15	52		26



SOIL TYPE: Silty Sand (A-2)

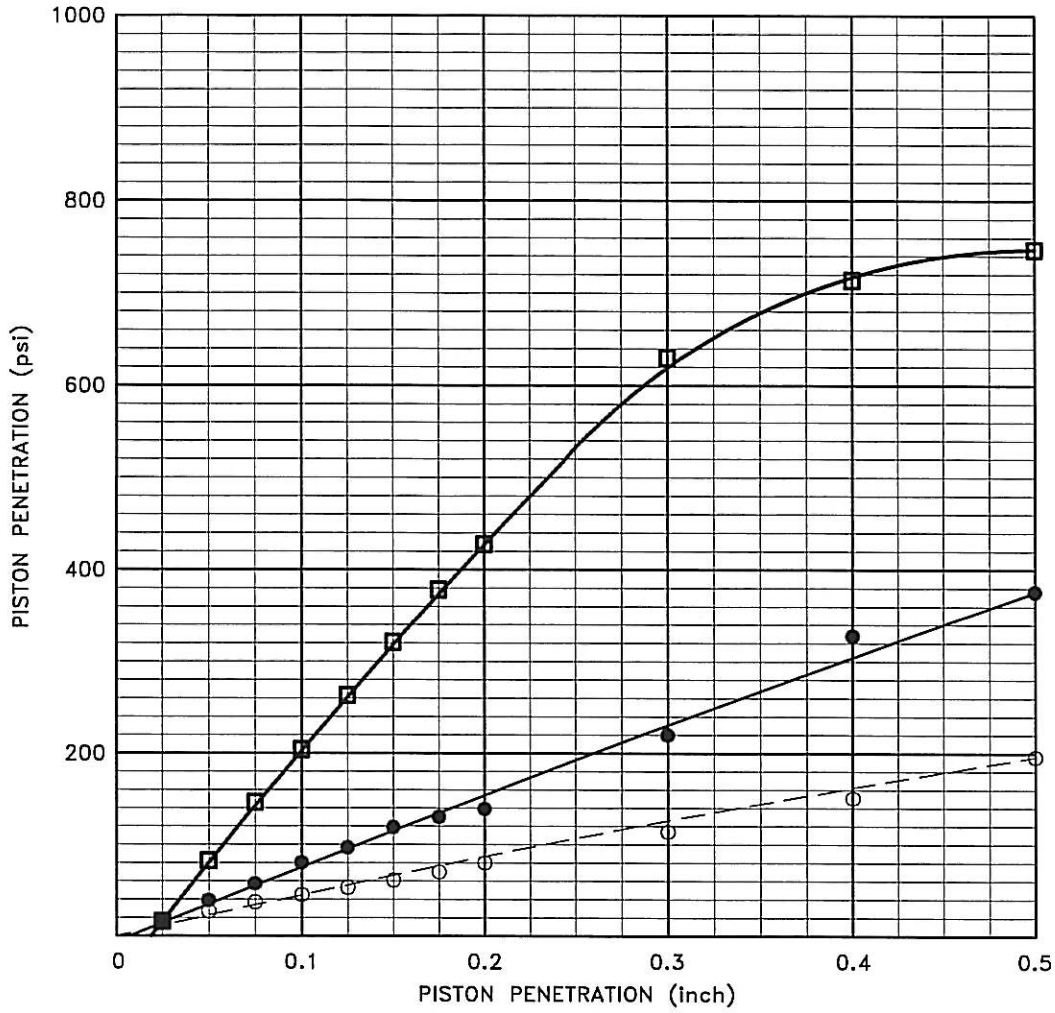
LOCATION: SB-8 @ 4-10'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-08-08

GRAVEL: _____ % SAND: _____ % SILT AND CLAY: _____ %

LIQUID LIMIT: _____ PLASTICITY INDEX: _____

08-1-424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6962



SURCHARGE PRESSURE (psf) 200					
TEST No.	AS-MOLDED DRY DENSITY (pcf)	AS-MOLDED PERCENT COMPACTION	AS-MOLDED MOISTURE (%)	MOISTURE AFTER SOAKING IN TOP INCH (%)	CONSOLIDATION OR SWELL (%)
1	103.7	90.1	11.8	15.0	−0.26
2	109.6	95.2	11.6	13.7	−0.15
3	114.6	99.6	12.4	12.7	−0.04

CORRECTED PISTON PRESSURE−PENETRATION DATA

TEST NO.	PRESSURE (psi)	PENETRATION (inch) .025	.050	.075	.100	.125	.150	.175	.200	.300	.400	.500	CBR (%)
1		12	23	34	45	56	66	77	87	126	163	196	5.8
2		21	41	61	81	101	121	141	160	236	310	381	11
3		64	127	188	247	304	360	414	467	644	728	747	31

LOCATION: 120th Ave. & US 36

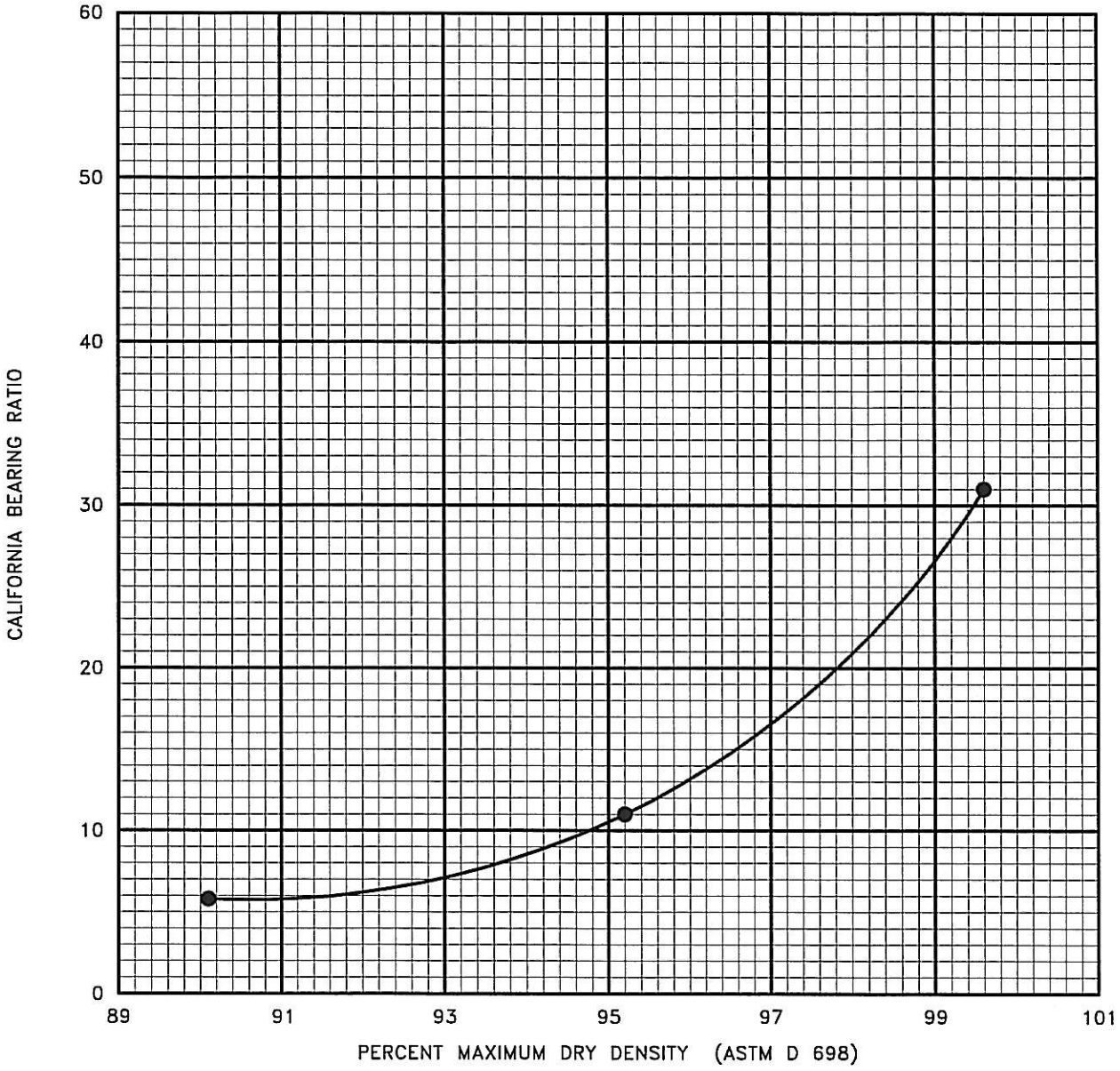
SAMPLE NO. : SB−9 DEPTH: 4−9'

PERCENT PASSING NO. 200 SIEVE: 22 LIQUID LIMIT: NV PLASTICITY INDEX: NP

MAXIMUM DRY DENSITY: 115.1 PCF OPTIMUM MOISTURE CONTENT: 11.8 %

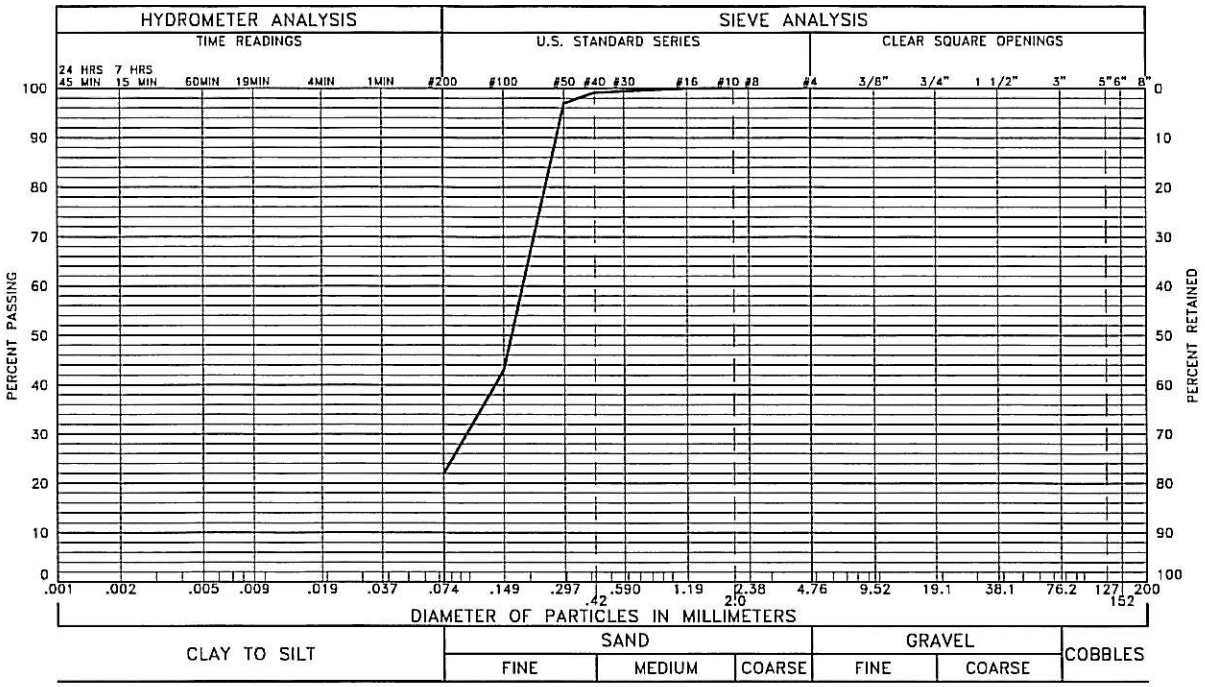
SOIL DESCRIPTION: A−2−4 (0)

08−1−424	Kumar & Associates	CALIFORNIA BEARING RATIO TEST RESULTS	6963



SAMPLE IDENTIFICATION	CBR VALUE @ 95% MAXIMUM DRY DENSITY
120th Ave. & US 36 SB-9 @ 4-9'	10.5

08-1-424	Kumar & Associates	CALIFORNIA BEARING RATIO TEST RESULTS	6963



SIEVE SIZE	PERCENT PASSING	SPECIFIED PERCENT PASSING
#10	100	
#16	100	
#40	99	
#50	97	
#100	43	
#200	22	

GRAVEL 0 % SAND 78 % SILT AND CLAY 22 %

LIQUID LIMIT NV PLASTICITY INDEX NP

SAMPLE OF: A-2-4 (0)

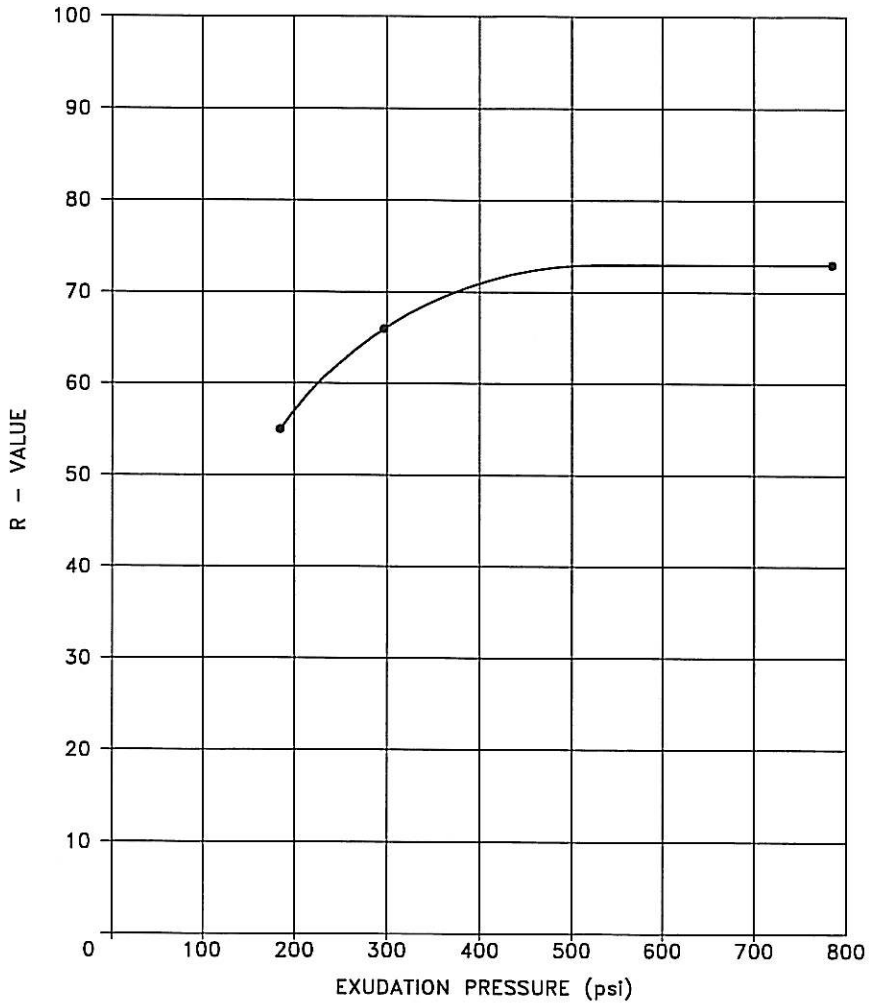
FROM: SB-9 @ 4-9'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-06-08

These test results apply only to the samples which were tested. The testing report shall not be reproduced, except in full, without the written approval of Kumar & Associates, Inc. Sieve analysis testing is performed in accordance with ASTM D422, ASTM C136 and/or ASTM D1140.

08-1-424	Kumar & Associates	GRADATION TEST RESULTS	6963

TEST SPECIMEN	1	2	3	4	R -VALUE (300 psi)
MOISTURE CONTENT (%)	12.2	11.3	11.8		
DENSITY (pcf)	121.9	121.6	121.7		
EXPANSION PRESSURE (psi)	0.000	0.000	0.000		
EXUDATION PRESSURE (psi)	185	785	297		
R VALUE	56	73	66		66



SOIL TYPE: A-2-4 (0)

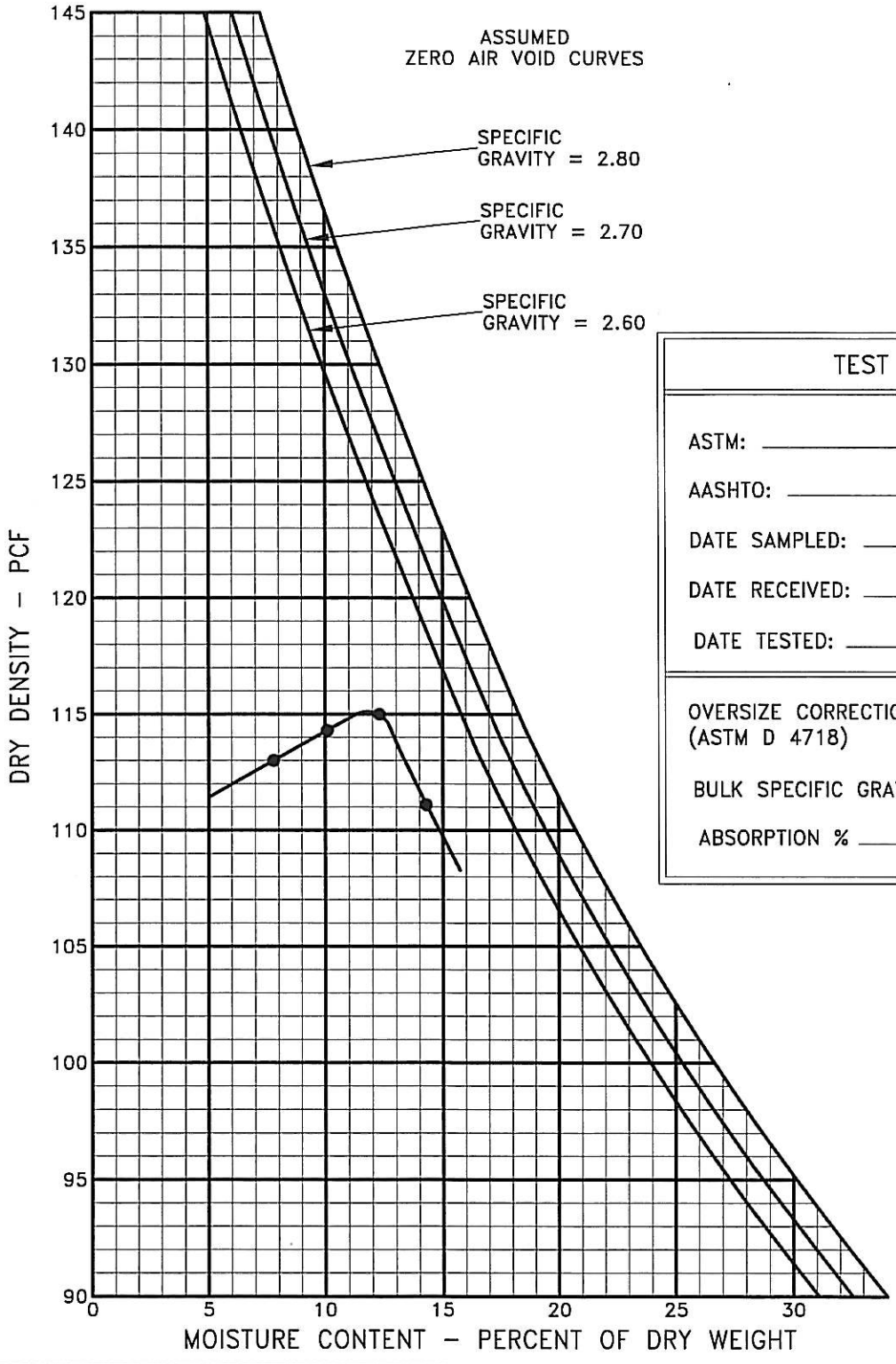
LOCATION: SB-9 @ 4-9'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-02-08

GRAVEL: 0 % SAND: 78 % SILT AND CLAY: 22 %

LIQUID LIMIT: NV PLASTICITY INDEX: NP

08-1-424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6963



TEST METHOD	
ASTM:	
AASHTO:	T99-01A
DATE SAMPLED:	09-30-08
DATE RECEIVED:	09-30-08
DATE TESTED:	10-06-08
OVERSIZE CORRECTION (ASTM D 4718)	N/A
BULK SPECIFIC GRAVITY	
ABSORPTION %	

MAXIMUM DRY DENSITY: 115.1 pcf OPTIMUM MOISTURE CONTENT: 11.8 %

SOIL TYPE: A-2-4 (0)

SAMPLE NO.:

GRAVEL: 0 %

SAND: 78 %

SILT AND CLAY(-200): 22 %

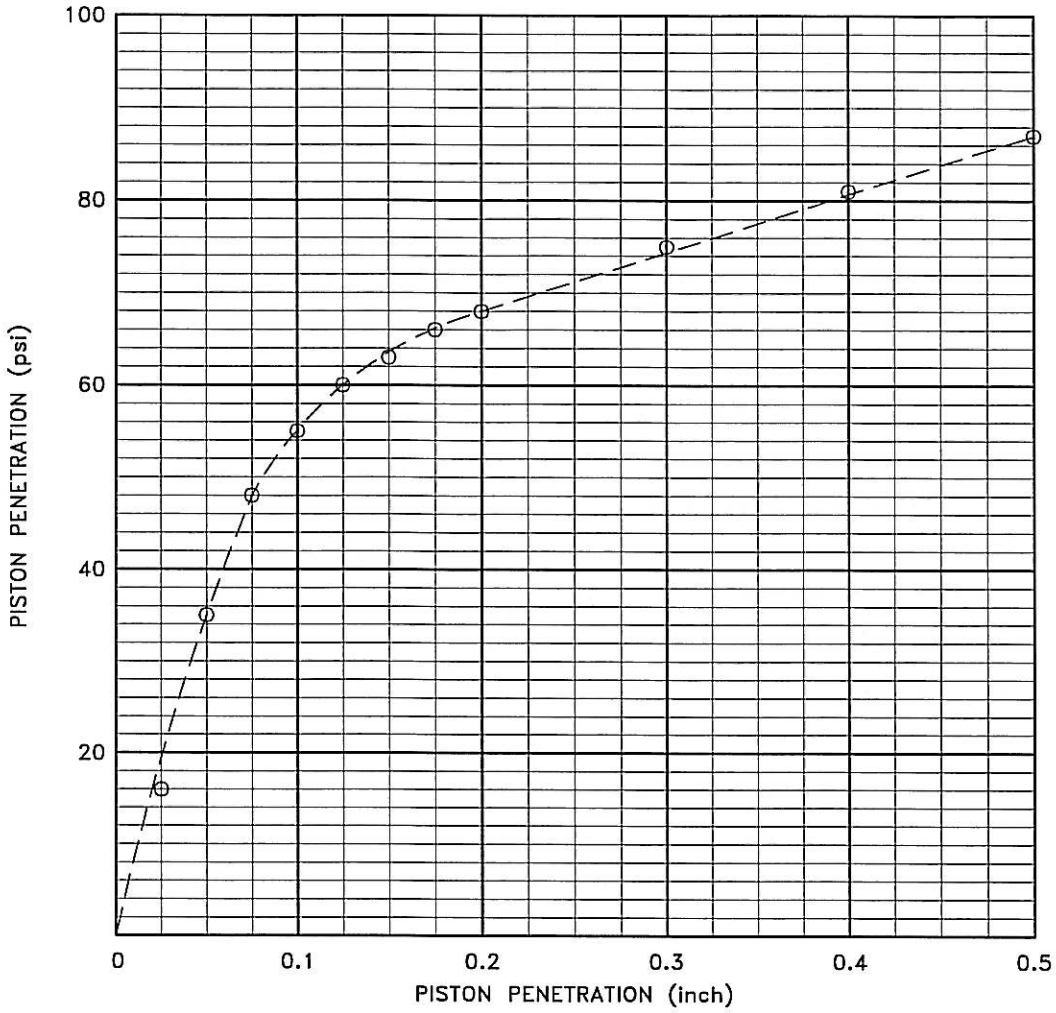
LIQUID LIMIT: NV

PLASTICITY INDEX: NP

LOCATION: 120th Ave. & US 36

BORING NO.: SB-9 DEPTH: 4-9'

08-1-424	Kumar & Associates	MOISTURE-DENSITY RELATIONSHIPS	6963



SURCHARGE PRESSURE (psf) 200					
TEST No.	AS-MOLDED DRY DENSITY (pcf)	AS-MOLDED PERCENT COMPACTION	AS-MOLDED MOISTURE (%)	MOISTURE AFTER SOAKING IN TOP INCH (%)	CONSOLIDATION OR SWELL (%)
1	106.1	94.9	16.3	22.5	1.66
2					
3					

CORRECTED PISTON PRESSURE-PENETRATION DATA

TEST NO.	PRESSURE (psi)	PENETRATION (inch)											CBR (%)
		.025	.050	.075	.100	.125	.150	.175	.200	.300	.400	.500	
1		20	35	48	55	60	64	66	68	74	81	87	5.5
2													
3													

LOCATION: 120th Ave. & US 36

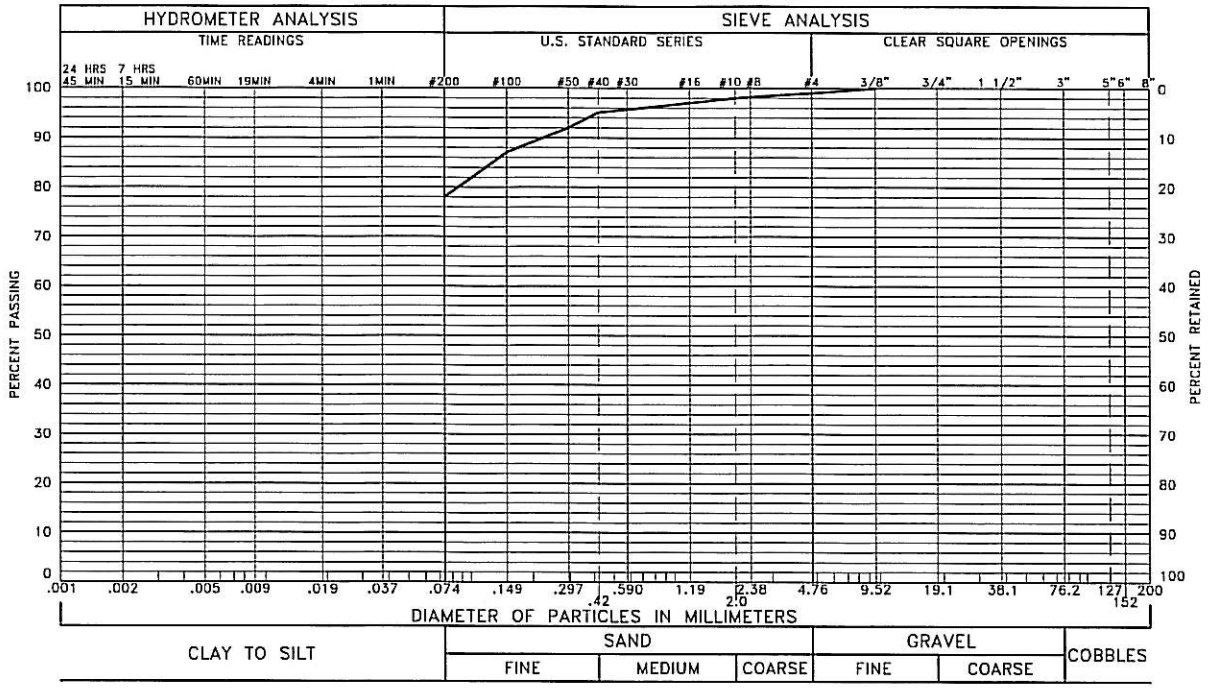
SAMPLE NO. : SB-11 DEPTH: 4-10'

PERCENT PASSING NO. 200 SIEVE: 78 LIQUID LIMIT: 40 PLASTICITY INDEX: 24

MAXIMUM DRY DENSITY: 111.9 PCF OPTIMUM MOISTURE CONTENT: 16.1 %

SOIL DESCRIPTION: A-6 (17)

08-1-424	Kumar & Associates	CALIFORNIA BEARING RATIO TEST RESULTS	6964



SIEVE SIZE	PERCENT PASSING	SPECIFIED PERCENT PASSING
3/8"	100	
#4	99	
#10	98	
#16	97	
#40	95	
#50	92	
#100	87	
#200	78	

GRAVEL 2 % SAND 20 % SILT AND CLAY 78 %

LIQUID LIMIT 40 PLASTICITY INDEX 24

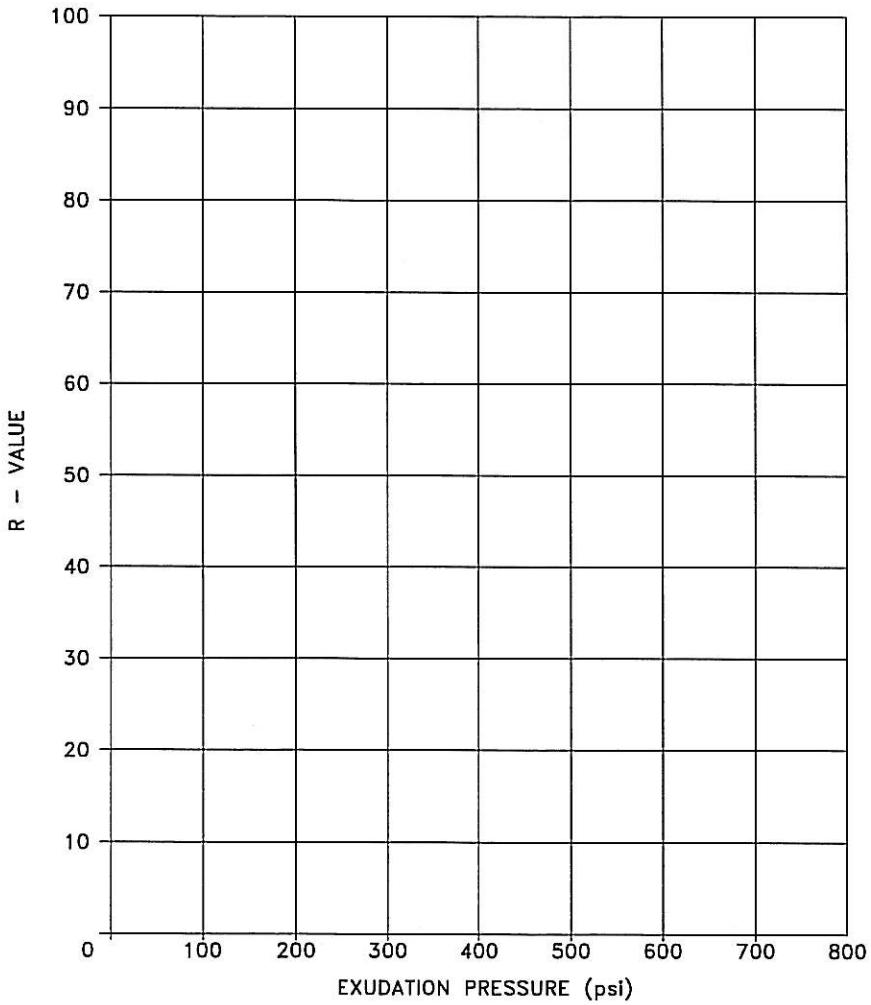
SAMPLE OF: A-6 (17)

FROM: SB-11 @ 4-10'

DATE SAMPLED: 09-30-08 DATE RECEIVED: 09-30-08 DATE TESTED: 10-03-08

TEST SPECIMEN	1	2	3	4	R –VALUE (300 psi)
MOISTURE CONTENT (%)					
DENSITY (pcf)					
EXPANSION PRESSURE (psi)					
EXUDATION PRESSURE (psi)					
R VALUE					LESS THAN 5*

*SAMPLE EXTRUDED AROUND FOLLOWER. PER ASTM STANDARDS, THE SAMPLE IS LABELED WITH AN R–VALUE OF LESS THEN 5



SOIL TYPE: A–6 (17)

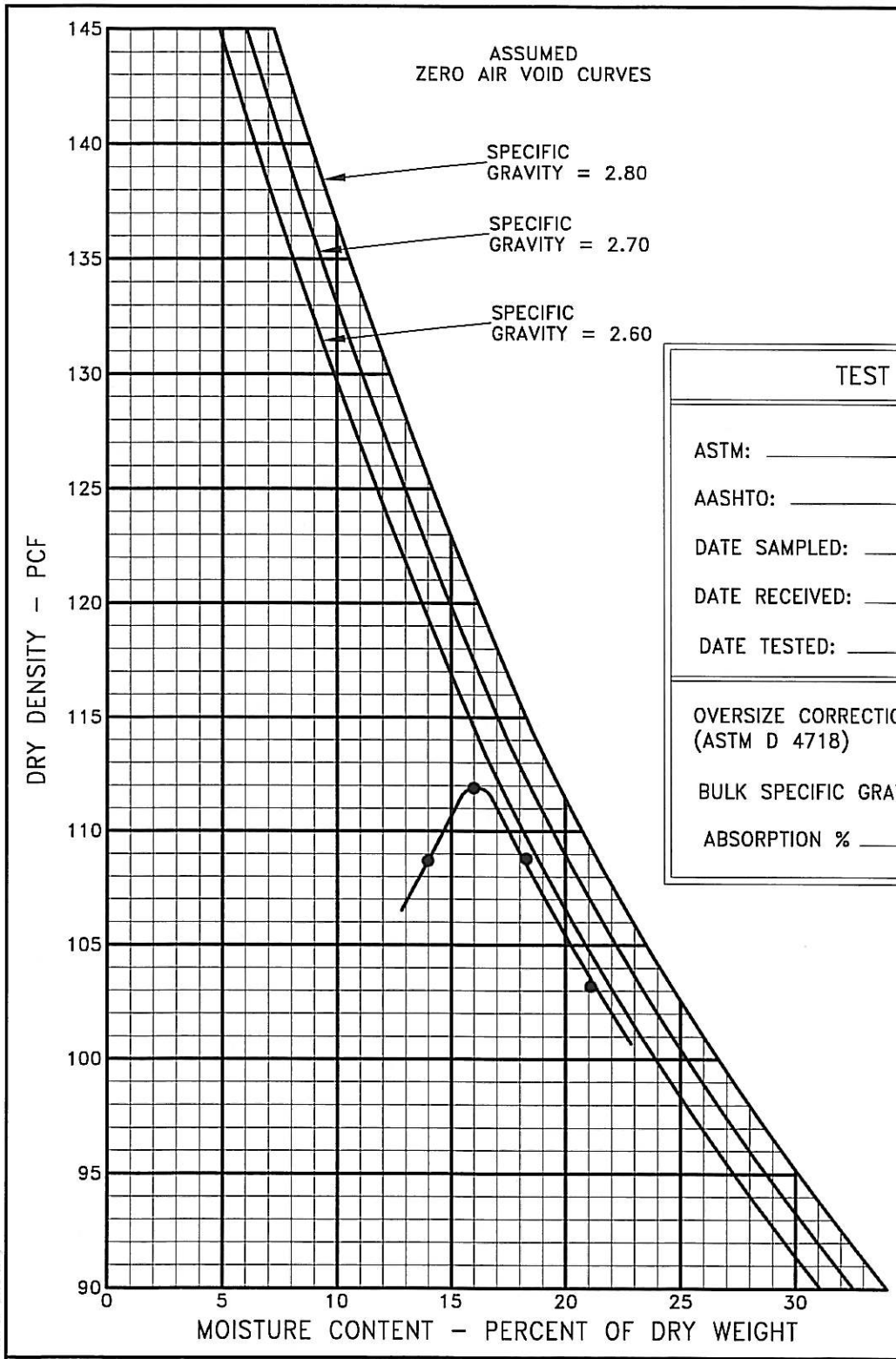
LOCATION: SB–11 @ 4–10'

DATE SAMPLED: 09–30–08 DATE RECEIVED: 09–30–08 DATE TESTED: 10–02–08

GRAVEL: 2 % SAND: 20 % SILT AND CLAY: 78 %

LIQUID LIMIT: 40 PLASTICITY INDEX: 24

08–1–424	Kumar & Associates	HVEEM STABILOMETER TEST RESULTS	6964



TEST METHOD	
ASTM:	
AASHTO:	T99-01A
DATE SAMPLED:	09-30-08
DATE RECEIVED:	09-30-08
DATE TESTED:	10-03-08
OVERSIZE CORRECTION (ASTM D 4718)	N/A
BULK SPECIFIC GRAVITY	
ABSORPTION %	

MAXIMUM DRY DENSITY: 111.9 pcf OPTIMUM MOISTURE CONTENT: 16.1 %

SOIL TYPE: A-6 (17)

SAMPLE NO.:

GRAVEL: 2 %

SAND: 20 %

SILT AND CLAY(-200): 78 %

LIQUID LIMIT: 40

PLASTICITY INDEX: 24

LOCATION: 120th Ave. & US 36

BORING NO.: SB-11 DEPTH: 4-10'

08-1-424	Kumar & Associates	MOISTURE-DENSITY RELATIONSHIPS	6964

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

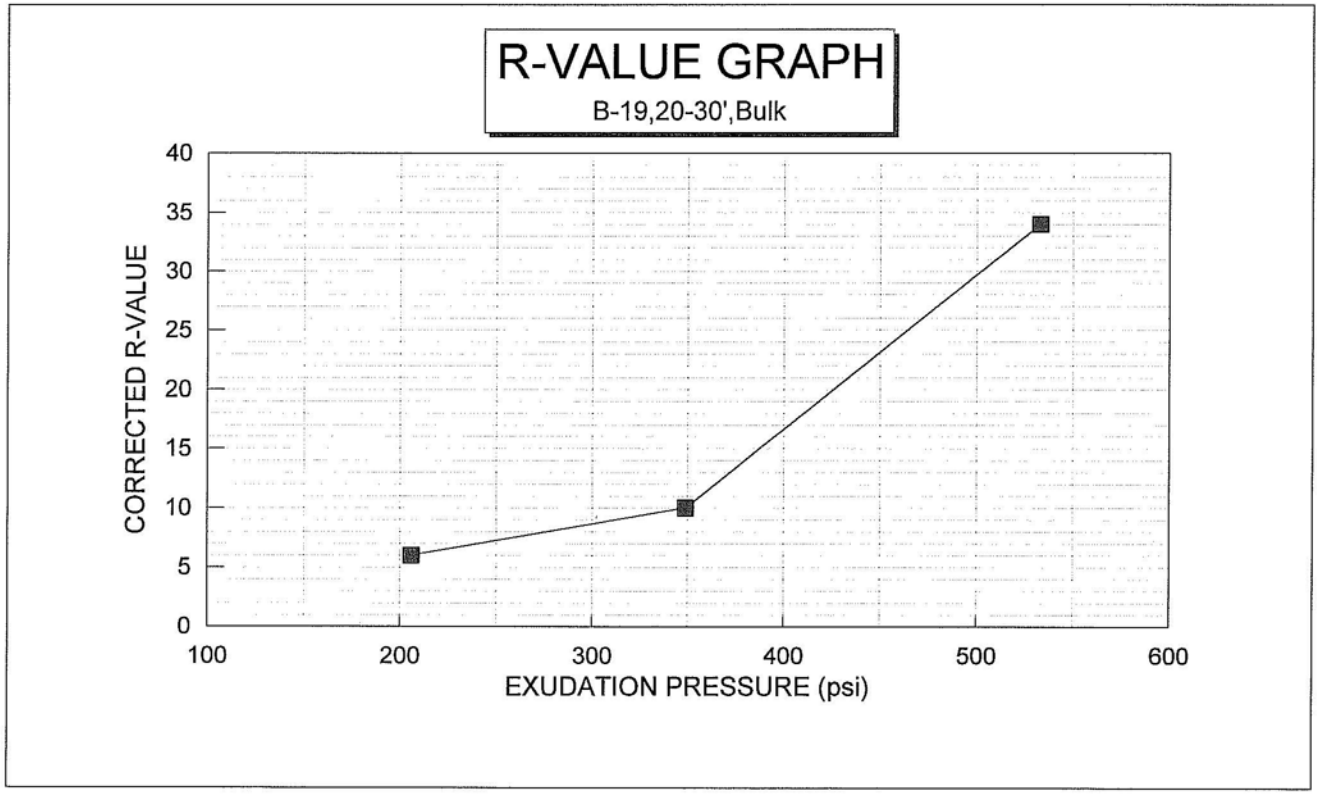
BORING NO. B-19 SAMPLED --
DEPTH 20-30' DATE TESTED 11/20/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	18	3	1
WEIGHT OF WET SOIL & DISH (g)	1125.88	1136.72	1059.96
WEIGHT OF DRY SOIL & DISH (g)	993.57	1015.23	959.40
WEIGHT OF LOST MOISTURE (g)	132.31	121.49	100.56
WEIGHT OF DISH (g)	14.02	15.09	13.93
WEIGHT OF DRY SOIL (g)	979.55	1000.14	945.47
MOISTURE CONTENT (%)	13.51	12.15	10.64
SAMPLE HEIGHT (in.)	2.54	2.53	2.51
TOTAL WEIGHT OF WET SAMPLE (g)	1128.30	1133.60	1047.90
WET DENSITY (PCF)	134.7	135.8	126.6
DRY DENSITY (PCF)	118.6	121.1	114.4
EXUDATION PRESSURE (PSI)	206	349	533
2000 LB. LOAD DIAL READING (PSI)	145	137	91
DISPLACEMENT TURNS	4.06	3.99	3.74
CALCULATED R-VALUE	6	10	34
CORRECTED R-VALUE	6	10	34

CORRECTED R-VALUE AT 300 PSI: 9

Data entered by: KR Date: 11/26/2007
Data checked by: WAH Date: 11/26/07
FileName: rsrv1920

ADVANCED TERRA TESTING, INC.


R-VALUE GRAPH
B-19,20-30',Bulk
CORRECTED R-VALUE
40
35
30
25
20
15
10
5
0
100
200
300
400
500
600
EXUDATION PRESSURE (psi)

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

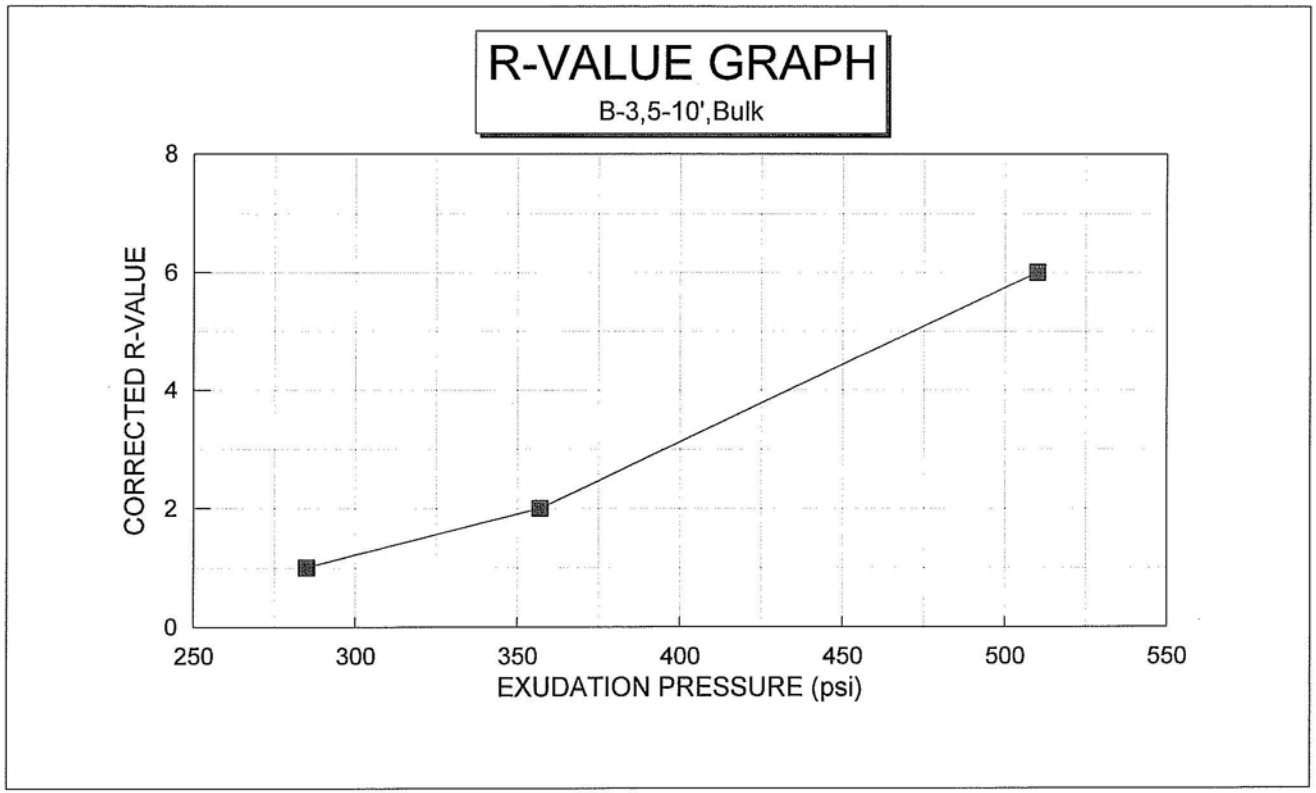
BORING NO. B-3 SAMPLED --
DEPTH 5-10' DATE TESTED 11/15/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	18	1	3
WEIGHT OF WET SOIL & DISH (g)	1073.08	1000.25	1091.35
WEIGHT OF DRY SOIL & DISH (g)	911.4	834.7	943.21
WEIGHT OF LOST MOISTURE (g)	161.68	165.55	148.14
WEIGHT OF DISH (g)	13.91	14.03	13.98
WEIGHT OF DRY SOIL (g)	897.49	820.67	929.23
MOISTURE CONTENT (%)	18.01	20.17	15.94
SAMPLE HEIGHT (in.)	2.48	2.53	2.50
TOTAL WEIGHT OF WET SAMPLE (g)	1053.60	1042.40	1018.30
WET DENSITY (PCF)	128.8	124.9	123.5
DRY DENSITY (PCF)	109.1	103.9	106.5
EXUDATION PRESSURE (PSI)	510	357	285
2000 LB. LOAD DIAL READING (PSI)	137	153	157
DISPLACEMENT TURNS	6.76	4.64	4.14
CALCULATED R-VALUE	6	2	1
CORRECTED R-VALUE	6	2	1

CORRECTED R-VALUE AT 300 PSI: 2

Data entered by: KR Date: 11/26/2007
Data checked by: WHC Date: 11/26/07
FileName: rsrv510b

ADVANCED TERRA TESTING, INC.


R-VALUE GRAPH
B-3,5-10',Bulk
CORRECTED R-VALUE
0
2
4
6
8
250
300
350
400
450
500
550
EXUDATION PRESSURE (psi)

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

BORING NO. B-1 SAMPLED --
DEPTH 5-10' DATE TESTED 11/20/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	18		
WEIGHT OF WET SOIL & DISH (g)	999.99		
WEIGHT OF DRY SOIL & DISH (g)	833.02		
WEIGHT OF LOST MOISTURE (g)	166.97		
WEIGHT OF DISH (g)	14.11		
WEIGHT OF DRY SOIL (g)	818.91		
MOISTURE CONTENT (%)	20.39		
SAMPLE HEIGHT (in.)	2.46		
TOTAL WEIGHT OF WET SAMPLE (g)	992.00		
WET DENSITY (PCF)	122.2		
DRY DENSITY (PCF)	101.5		
EXUDATION PRESSURE (PSI)	>800		
2000 LB. LOAD DIAL READING (PSI)	--		
DISPLACEMENT TURNS	--		
CALCULATED R-VALUE	<5		
CORRECTED R-VALUE	<5		

CORRECTED R-VALUE AT 300 PSI: <5

Sample leafing out from base of mold and around follower ram.
Less than 5 lights illuminated, and 800 psi load criteria achieved.
Per the standard, R-value reported as <5.

Data entered by: KR Date: 11/26/2007
Data checked by: VVR Date: 11/26/07
FileName: rsrv1510

ADVANCED TERRA TESTING, INC.

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

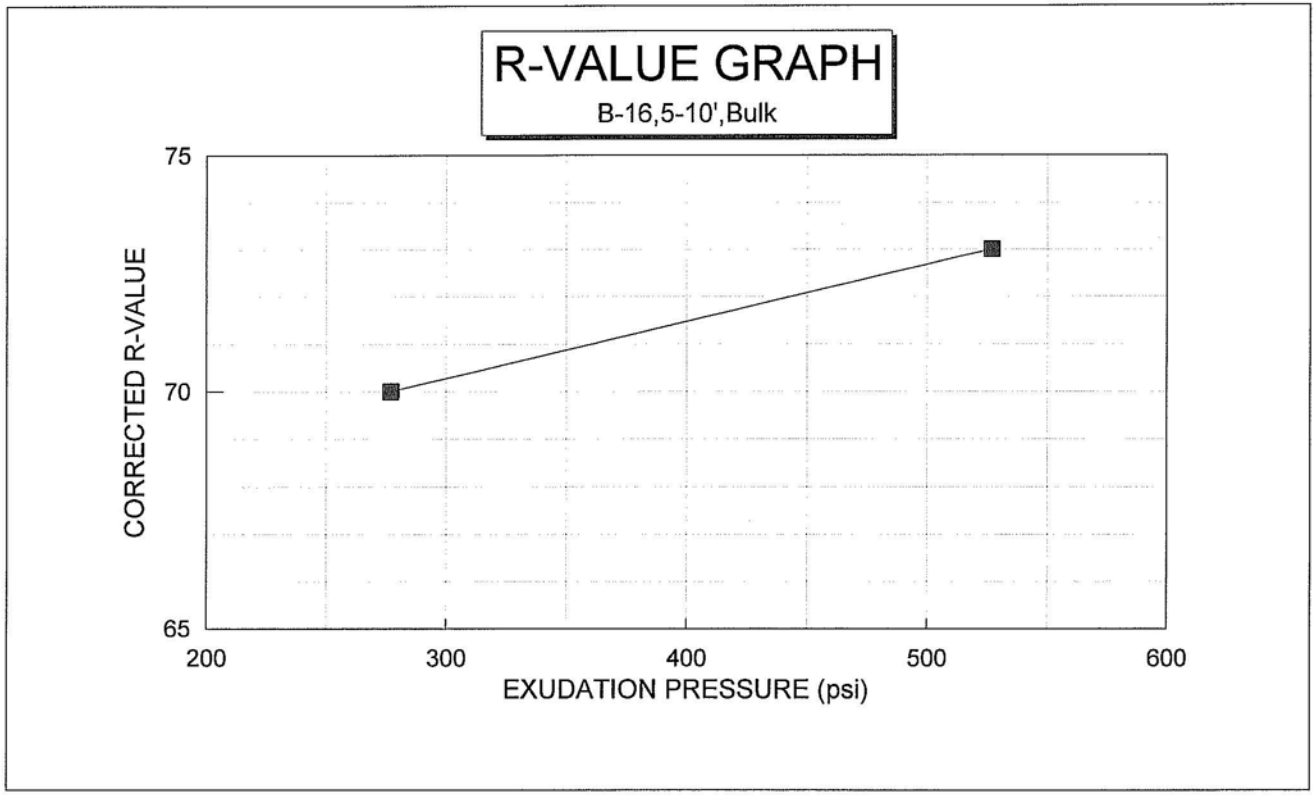
BORING NO. B-16 SAMPLED --
DEPTH 5-10' DATE TESTED 11/19/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	2	16	
WEIGHT OF WET SOIL & DISH (g)	1041.33	1052.37	
WEIGHT OF DRY SOIL & DISH (g)	924.04	936.49	
WEIGHT OF LOST MOISTURE (g)	117.29	115.88	
WEIGHT OF DISH (g)	14.02	15.15	
WEIGHT OF DRY SOIL (g)	910.02	921.34	
MOISTURE CONTENT (%)	12.89	12.58	
SAMPLE HEIGHT (in.)	2.50	2.51	
TOTAL WEIGHT OF WET SAMPLE (g)	1047.80	1051.80	
WET DENSITY (PCF)	127.1	127.0	
DRY DENSITY (PCF)	112.6	112.8	
EXUDATION PRESSURE (PSI)	277	527	
2000 LB. LOAD DIAL READING (PSI)	31	27	
DISPLACEMENT TURNS	4.42	4.51	
CALCULATED R-VALUE	70	73	
CORRECTED R-VALUE	70	73	

CORRECTED R-VALUE AT 300 PSI: 70

Data entered by: KR Date: 11/26/2007
Data checked by: WAT Date: 11/26/07
FileName: rsrv1651

ADVANCED TERRA TESTING, INC.


R-VALUE GRAPH
B-16,5-10',Bulk
75
70
65
CORRECTED R-VALUE
200
300
400
500
600
EXUDATION PRESSURE (psi)

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

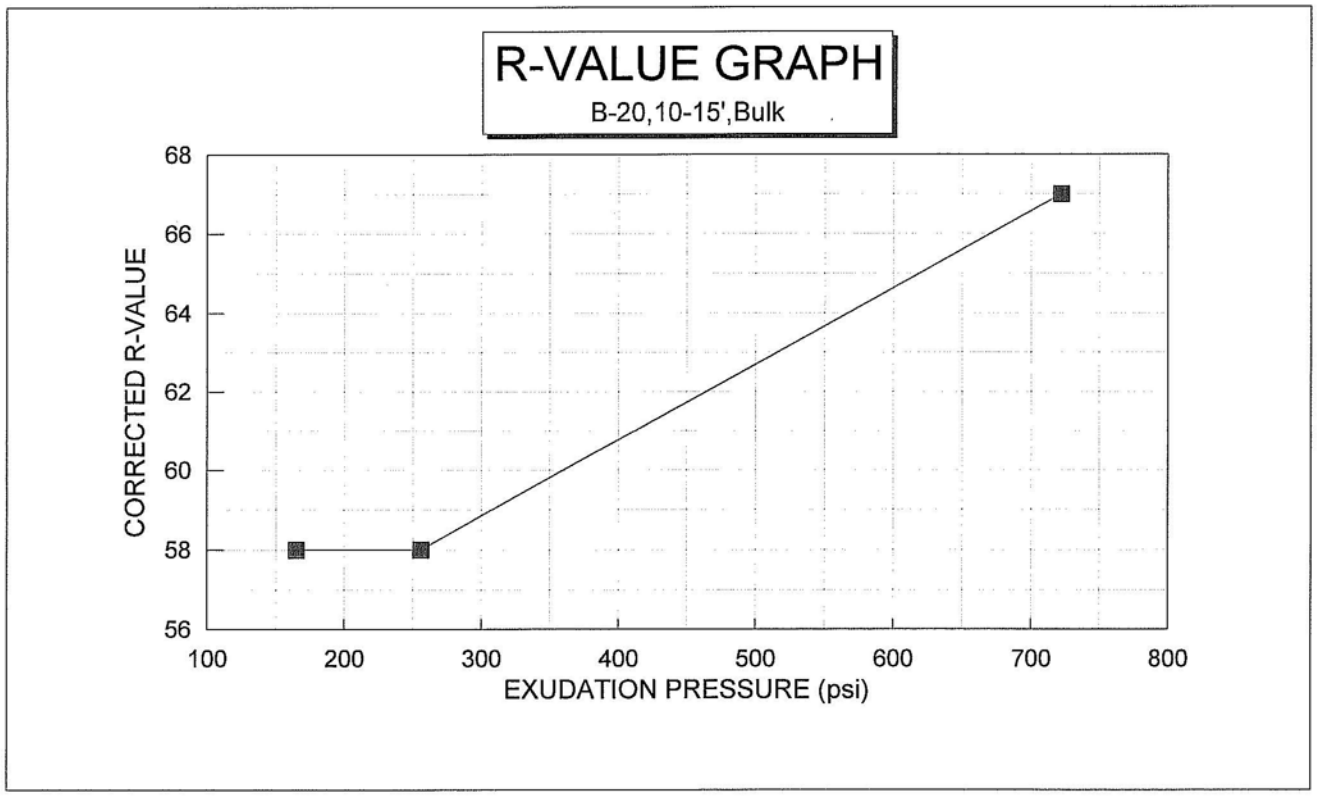
BORING NO. B-20 SAMPLED --
DEPTH 10-15' DATE TESTED 11/20/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	14	16	2
WEIGHT OF WET SOIL & DISH (g)	1086.53	1119.79	1104.62
WEIGHT OF DRY SOIL & DISH (g)	967.85	1004.00	997.76
WEIGHT OF LOST MOISTURE (g)	118.68	115.79	106.86
WEIGHT OF DISH (g)	15.03	14.00	16.12
WEIGHT OF DRY SOIL (g)	952.82	990.00	981.64
MOISTURE CONTENT (%)	12.46	11.70	10.89
SAMPLE HEIGHT (in.)	2.47	2.52	2.48
TOTAL WEIGHT OF WET SAMPLE (g)	1084.40	1117.10	1092.10
WET DENSITY (PCF)	133.1	134.4	133.5
DRY DENSITY (PCF)	118.4	120.3	120.4
EXUDATION PRESSURE (PSI)	165	256	722
2000 LB. LOAD DIAL READING (PSI)	45	48	39
DISPLACEMENT TURNS	4.54	4.28	3.81
CALCULATED R-VALUE	58	58	67
CORRECTED R-VALUE	58	58	67

CORRECTED R-VALUE AT 300 PSI: 59

Data entered by: KR Date: 11/26/2007
Data checked by: Date: 11/26/07
FileName: rsrv2010

ADVANCED TERRA TESTING, INC.


R-VALUE GRAPH
B-20,10-15',Bulk
CORRECTED R-VALUE
68
66
64
62
60
58
56
100
200
300
400
500
600
700
800
EXUDATION PRESSURE (psi)

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

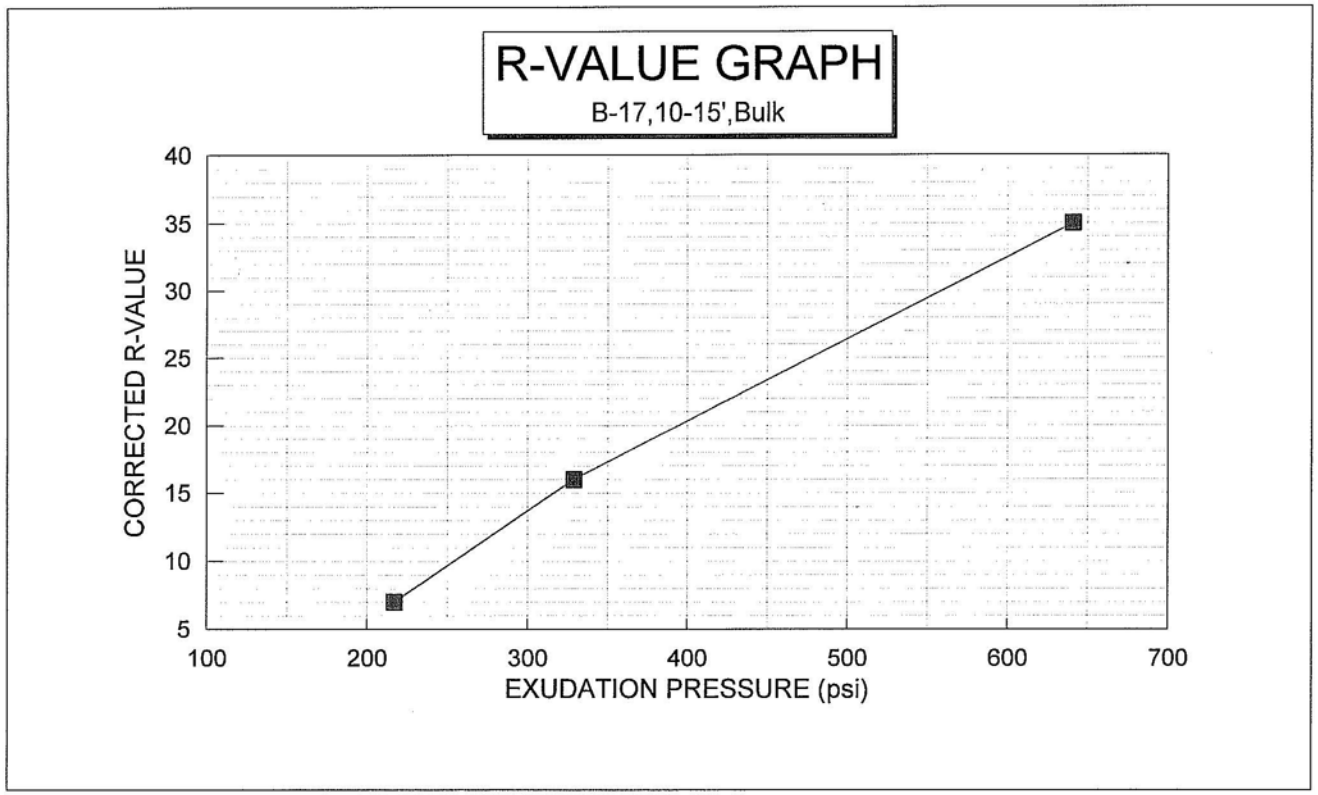
BORING NO. B-17 SAMPLED --
DEPTH 10-15' DATE TESTED 11/19/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	15	12	6
WEIGHT OF WET SOIL & DISH (g)	1109.29	1142.56	1157.71
WEIGHT OF DRY SOIL & DISH (g)	978.95	1027.22	1050.67
WEIGHT OF LOST MOISTURE (g)	130.34	115.34	107.04
WEIGHT OF DISH (g)	15.27	14.04	15.73
WEIGHT OF DRY SOIL (g)	963.68	1013.18	1034.94
MOISTURE CONTENT (%)	13.53	11.38	10.34
SAMPLE HEIGHT (in.)	2.48	2.50	2.50
TOTAL WEIGHT OF WET SAMPLE (g)	1103.80	1132.70	1147.70
WET DENSITY (PCF)	134.9	137.4	139.2
DRY DENSITY (PCF)	118.9	123.3	126.1
EXUDATION PRESSURE (PSI)	217	329	641
2000 LB. LOAD DIAL READING (PSI)	142	123	86
DISPLACEMENT TURNS	4.41	3.99	4.04
CALCULATED R-VALUE	7	16	35
CORRECTED R-VALUE	7	16	35

CORRECTED R-VALUE AT 300 PSI: 14

Data entered by: KR Date: 11/26/2007
Data checked by: VAD Date: 11/26/07
FileName: rsrv1710

ADVANCED TERRA TESTING, INC.


R-VALUE GRAPH
B-17,10-15',Bulk
CORRECTED R-VALUE
40
35
30
25
20
15
10
5
100
200
300
400
500
600
700
EXUDATION PRESSURE (psi)

R-VALUE
ASTM D 2844

CLIENT RockSol JOB NO. 2633-13

BORING NO. B-4 SAMPLED --
DEPTH 5-10' DATE TESTED 11/16/07
SAMPLE NO. Bulk
SOIL DESCR. RS-196.01
LOCATION: US 36 & 120th Ave

MOLD #	14		
WEIGHT OF WET SOIL & DISH (g)	963.94		
WEIGHT OF DRY SOIL & DISH (g)	815.35		
WEIGHT OF LOST MOISTURE (g)	148.59		
WEIGHT OF DISH (g)	14.05		
WEIGHT OF DRY SOIL (g)	801.30		
MOISTURE CONTENT (%)	18.54		
SAMPLE HEIGHT (in.)	2.50		
TOTAL WEIGHT OF WET SAMPLE (g)	1033.80		
WET DENSITY (PCF)	125.4		
DRY DENSITY (PCF)	105.8		
EXUDATION PRESSURE (PSI)	>800		
2000 LB. LOAD DIAL READING (PSI)	--		
DISPLACEMENT TURNS	--		
CALCULATED R-VALUE	<5		
CORRECTED R-VALUE	<5		

CORRECTED R-VALUE AT 300 PSI: <5

Sample leafing out from base of mold and around follower ram.
Less than 5 lights illuminated, and 800 psi load criteria achieved.
Per the standard, R-value reported as <5.

Data entered by: KR Date: 11/20/2007
Data checked by: WAP Date: 11/21/07
FileName: rsrvb451

ADVANCED TERRA TESTING, INC.