Dave Ricker
224-1522

PRELIMINARY SUBSURFACE EXPLORATION REPORT
FOSSIL RIDGE SUBDIVISION – PHASES 4 AND 5
PROPOSED RESIDENTIAL DEVELOPMENT
APPROXIMATELY 160 LOTS
WINDSOR, COLORADO
EEC PROJECT NO. 1092072

Prepared for:

Uniprop
1117 Summit Court
Windsor, Colorado 80550

Attn: Mr. Glenn Couch

Prepared by:

Earth Engineering Consultants, Inc.
4396 Greenfield Drive
Windsor, Colorado 80550

November 30, 2009

EARTH ENGINEERING
CONSULTANTS, INC.

Uniprop
1117 Summit Ct
Windsor, Colorado 80550

Attn: Mr. Glenn Couch

Re: Preliminary Subsurface Exploration Report
Fossil Ridge Subdivision – Phases 4 and 5
Proposed Residential Development - Approximately 160 Lots
Windsor, Colorado
EEC project No. 1092072

Mr. Couch:

Earth Engineering Consultants, Inc. (EEC) personnel have completed the preliminary field exploration and laboratory testing as requested for the proposed 160 residential lots situated within the Fossil Ridge Subdivision – Phases 4 and 5 located on the east side of Highlands Meadows Parkway, north of the Highland Meadows Industrial Park and west of The Ranch at Highland Meadows in Windsor, Colorado. At the time of our field exploration, this phase of the Fossil Ridge Subdivision consisted of approximately 160 developed lots ready for residential construction. Results of the field exploration and laboratory testing are provided with this report. This study was performed in general accordance with our proposal dated November 16, 2009.

To develop the requested information on existing subsurface conditions for this phase of the subdivision, EEC personnel advanced a total of sixteen (16) preliminary soil borings within the central portion of each respective residential lot as indicated on the attached boring location diagram. The borings were extended to depths of approximately 25-1/2 to 30-feet below existing site grades. The field locations were established by estimating the locations relative to the site features including property pins, interior roadways, and sanitary sewer/utility stubs. The locations of the borings should be considered accurate only to the degree implied by the methods used to make the field measurements.

The borings were performed using a truck mounted, CME 45 drill rig equipped with a hydraulic head employed in drilling and sampling operations. The boreholes were advanced using 4-inch nominal diameter continuous flight augers and samples of the subsurface materials encountered were obtained using split barrel and California barrel sampling procedures in general accordance with ASTM Specification D-1586.

4396 GREENFIELD DRIVE
WINDSOR, COLORADO 80550
(970) 545-3908 FAX (970) 663-0282

In the split barrel and California barrel sampling procedures, standard sampling spoons are driven into the ground by means of a 140-pound hammer falling a distance of 30-inches. The number of blows required to advance the split barrel or California barrel sampler is recorded and used to estimate the in-situ relative density of cohesionless materials and, to a lesser degree of accuracy, the consistency of cohesive soils and hardness of weathered bedrock. All samples obtained in the field were sealed and returned to the laboratory for further examination, classification, and testing.

Moisture content tests were completed on each of the recovered samples. In addition, Atterberg limits and washed sieve analysis tests were completed on selected samples to evaluate the quantity and plasticity of the fines in the subgrade soils. Swell/consolidation tests were performed on selected samples to evaluate the soils tendency to change volume with variation in moisture content. Results of the outlined tests are indicated on the attached boring logs and summary sheets.

As a part of the testing program, all samples were examined in the laboratory by an engineer and classified in accordance with the attached General Notes and the Unified Soil Classification System, based on the soils texture and plasticity. The estimated group symbol for the Unified Soil Classification System is indicated on the boring logs and a brief description of that Classification System is included with this report. Classification of the bedrock was based on visual and tactual observation of disturbed samples and auger cuttings. Coring and/or petrographic analysis may reveal other rock types.

The purpose of this preliminary report is to describe the subsurface conditions encountered in the sixteen (16) preliminary borings, analyze and evaluate the test data and provide preliminary geotechnical recommendations concerning design and construction of the foundations and support of floor slabs.

SITE AND SUBSURFACE CONDITIONS

The proposed residential development is located within the Fossil Ridge Subdivision, north of Highland Meadows Industrial Park, west of The Ranch at Highland Meadows along the east side of Highland Meadows Parkway in Windsor. The majority of the infrastructure development including interior roadway, utility installation, and overlot grading has already taken place. The majority of the approximate 160 lots are "pad ready" for residential development.

Based on results of the preliminary field borings and laboratory testing, subsurface conditions can be generalized as follows. The subsoils soils at the site consisted of overlot grading/"apparent fill materials" at the surface of borings B-1, B-6, B-9, B-12, and B-14, which extended to depths of approximately 2 to 6-feet below existing site grades. The fill material generally consisted of sandy lean clay to lean clay with sand subsoils generated from the "cut-portions" of the overall development. The fill materials extended to the native soils and/or the underlying bedrock formation below. The deeper fills appeared to exist within the northern portion of the development. Below the surficial layer of topsoil within the remaining borings, and below the fill where encountered, the native sandy lean clay, lean clay with sand, and/or lean clay subsoils were encountered and extended to the depths explored or to the bedrock formation below. The cohesive soils, (i.e., the overlot grading fill material and/or the native subsoils), showed moderate plasticity and low to moderate to high swell potential at current moisture and density conditions. The soils exhibiting higher in-situ dry densities along with lower moisture contents, and higher blow counts, (i.e., the standard penetration test – SPT values), revealed higher swell potential characteristics. The bedrock formation, generally consisting of sandstone/siltstone/claystone was encountered in each of the preliminary borings with the exception of boring B-3, at approximate depths of 9 to 21-feet below existing site grades. The bedrock generally consisted of sandstone with interbedded siltstone and claystone seams. The weathered bedrock was moderately plastic and exhibited low to moderate swell potential at current moisture and density conditions. The weathered bedrock became less weathered with depth and extended to the bottom of the borings at depths of approximately 25-1/2 feet below present site grades.

The overburden clay soils were stiff to very stiff, and generally exhibited low to moderate swell potential, with an occasional high expansive zone, as measured in laboratory testing at current in-situ moisture contents and dry densities, as well as low to moderate bearing characteristics. The underlying sandstone bedrock with interbedded siltstone/claystone lenses was weathered to hard and/or cemented and generally became less weathered with increased depths. The bedrock formation also exhibited low to moderate swell potential, with an occasional high expansive zone as measured in laboratory testing at current in-situ moisture contents and dry densities, and exhibited moderate to high bearing characteristics.

The stratification boundaries indicated on the boring logs represent the approximate location of changes in soil and rock types; and in-situ, the transition of materials may be gradual and indistinct.

GROUNDWATER CONDITIONS

Observations were made while drilling and several days after completion of the borings to detect the presence and depth to hydrostatic groundwater. At the time of our field exploration and when checked several days after drilling, groundwater not observed to maximum depths of exploration, approximately 25 to 30-feet below site grades.

Fluctuations in groundwater levels can occur over time depending on variations in hydrologic conditions, and other conditions not apparent at the time of this report. Monitoring in cased borings protected from the infiltration of surface water would be required to more accurately evaluate the depths and fluctuation in groundwater levels.

Zones of perched and/or trapped groundwater may occur at times in the subsurface soils overlying bedrock, on top of the bedrock surface or within permeable fractures in the bedrock materials. The location and amount of perched water is dependent upon several factors, including hydrologic conditions, type of site development, irrigation demands on or adjacent to the site, and seasonal and weather conditions. These observations represent groundwater conditions at the time of the field exploration, and may not be indicative of other times, or at other locations.

ANALYSIS AND RECOMMENDATIONS

Swell – Consolidation Test Results

The swell-consolidation test is commonly performed to evaluate the swell or collapse potential of soils or bedrock for determining foundation, floor slab and pavement design criteria. In this test, relatively undisturbed samples obtained directly from the California sampler or thin-walled tubes are placed in a laboratory apparatus and inundated with water under a predetermined load. The swell-index is the resulting amount of swell or collapse as a percent of the sample's thickness after the inundation period. Samples obtained at approximate depths of 1 to 2-feet are generally pre-loaded at 150-psf to simulate the pavement loading conditions, while samples obtained at the 3 to 4-foot intervals are pre-loaded at 500 psf to simulate the overburden soil pressure. Samples analyzed at greater depths are generally preloaded to the approximate overburden pressure at that respective depth. All samples are inundated with water and monitored for swell and consolidation. After the inundation period additional incremental loads are applied to evaluate the swell pressure and rate of consolidation.

For this preliminary assessment, we conducted twenty one (21) swell-consolidation tests on relatively undisturbed samples obtained at various intervals/depths and loading schemes throughout the site. The swell index values for the in-situ overburden soils, (i.e., either the apparent fill materials or the native subsoils), and the underlying bedrock samples analyzed revealed low to high/very high swell characteristics on the order of (+) 1.3 to (+) 11.1%. The (+) test results indicate the soil or bedrock materials swell potential characteristics. The results of the twenty one (21) swell-consolidation tests for samples collected at varies depths across the site with the preliminary soil borings are presented below in Table I.

TABLE I Summary of Swell-Consolidation Test Results

Boring No.	Depth, Ft.	Description	Swell-Consolidation Test Results			
			In-Situ Moisture Content, %	In-Situ Dry Density, PCF	Loading Scheme, PSF	% Swell-Index
B-1	4	Fill Material: Sandy Lean Clay	15.7	116.9	500	(+) 1.3
	9	Sandy Lean Clay	9.2	116.4	500	(+) 4.7
B-2	9	Sandy Lean Clay	10.8	108.1	500	(+) 3.7
B-3	5	Sandy Lean Clay	12.7	120.4	500	(+) 4.1
B-4	9	Sandstone/Siltstone/Claystone	9.5	114.2	500	(+) 3.3
B-5	5	Sandy Lean Clay	11.5	110.5	500	(+) 4.4
B-6	9	Sandy Lean Clay	11.2	117.1	500	(+) 4.7
B-7	4	Sandy Lean Clay	10.6	117.7	500	(+) 7.2
B-8	2	Sandy Lean Clay	10.5	115.3	500	(+) 7.9
B-9	4	Sandy Lean Clay	12.4	116.5	500	(+) 11.1
	9	Sandy Lean Clay	8.7	117.9	500	(+) 10.4
B-10	2	Sandy Lean Clay	11.8	125.3	500	(+) 4.1
	9	Lean Clay	9.9	118.5	500	(+) 8.4
B-11	9	Sandy Lean Clay	10.7	118.2	500	(+) 5.5
	19	Siltstone / Sandstone Bedrock	9.9	116.1	1000	(+) 1.6
B-12	9	Sandy Lean Clay	10.3	112.1	500	(+) 5.9
B-13	4	Sandy Lean Clay	7.3	111.2	500	(+) 2.4
B-14	9	Sandy Lean Clay	10.0	114.6	500	(+) 5.7
B-15	9	Sandstone/Siltstone/Claystone	11.6	119.9	500	(+) 6.4
B-16	4	Sandy Lean Clay	9.4	107.3	500	(+) 5.6
	9	Sandstone/Siltstone/Claystone	9	125.6	500	(+) 8.9

Colorado Association of Geotechnical Engineers (CAGE) uses the following information in Table II, to provide uniformity in terminology between geotechnical engineers to provide a relative correlation of slab performance risk to measured swell. "The representative percent swell values

are not necessarily measured values; rather, they are a judgment of the swell of the soil and/or bedrock profile likely to influence slab performance." Geotechnical engineers use this information to also evaluate the swell potential risks for foundation performance based on the risk categories.

TABLE II: Recommended Representative Swell Potential Descriptions and Corresponding Slab Performance Risk Categories		
Slab Performance Risk Category	**Representative Percent Swell (500 psf Surcharge)**	**Representative Percent Swell (1000 psf Surcharge)**
Low	0 to < 3	0 < 2
Moderate	3 to < 5	2 to < 4
High	5 to < 8	4 to < 6
Very High	> 8	> 6

Based on the laboratory test results, the in-situ samples analyzed for this project generally were generally within the low to very high range. The sampling and testing completed for this preliminary evaluation was limited. A more complete testing protocol may result in a different perspective on the swell potential of the site subgrade materials.

Foundation Systems – General Considerations

The site appears suitable for the proposed construction based on the results of our limited field exploration and review of the proposed development plans. The relatively dry, stiff to very stiff overburden soils, and the underlying siltstone/claystone bedrock lenses in this area will require particular attention in the design and construction to reduce the amount of movement, should the subsoils become elevated in moisture content with increased depth. The following foundation systems were preliminarily evaluated for use on the site:

- Conventional type spread footings bearing on a layer of either on-site moisture conditioned overburden subsoils utilizing a lower bearing capacity, or a minimum 4-foot layer of imported granular structural fill material using an increased bearing capacity; or

- A deep foundation system consisting of a grade beam and straight shaft piers/caissons drilled into the bedrock.

Preliminary Foundation Systems – Conventional Type Spread Footings

With the anticipated loads, the type of residential construction proposed and the soil conditions encountered, we believe a portion of the proposed lightly to moderately loaded residential

structures could be supported using a conventional type spread footing foundation system bearing on engineered/controlled fill material. Consideration should be given for placement of a uniform zone of material placed/prepared and compacted beneath the entire building(s) footprint to minimize differential movement.

We anticipate net allowable total load soil bearing pressures in the range of 1,500 to 2,500 psf could be considered for design of footing foundations bearing on moisture conditioned engineered fill material or imported structural fill at this site. In addition, we expect footings would be designed to maintain a minimum dead load pressure of 500 psf. A higher minimum dead-load may be appropriate and should be analyzed during the "comprehensive/final" exploration for each of the residences. The net bearing pressure refers to the pressure at foundation bearing level in excess of the minimum surrounding overburden pressure. Total load would include full dead and live loads. Foundation bearing elevations for use of conventional footings should be at least 4-feet above the underlying bedrock formation and a minimum of 30-inches below finished grade for frost depth protection.

To accommodate placement of the foundation system(s) a minimum of 4-feet above the underlying bedrock formation, each building footprint would be "sub-cut" to at least 4-feet below the bottom of the foundation grade/elevation and backfilled with either moisture conditioned on-site cohesive soils or approved imported structural fill material. If an imported structural fill material is used in lieu of moisture conditioning the on-site cohesive soils, a "sub-drain" system with a deep sump pit collection basin would probably be recommended at the base of the over-excavated zone to incept the potential for surface water infiltration.

For spread footing foundation systems, all footings should be placed on similar soils to reduce the potential for differential movement between soil types. Quality control/field monitoring would include but not limited to moisture content, dry density, percent compaction, and lift thicknesses for the fill material being placed.

Exterior footings and foundations in unheated areas must be protected from frost action. The normal depth of frost protection in this location is a minimum depth of 30-inches. Continuous wall footings generally have a width of at least 12-inches. Isolated column pads generally require dimensions of at least 24-inches by 24-inches. Based upon the structural loading conditions provided, larger footing sizes may be needed to accommodate actual foundation load and design requirements.

In addition, it is imperative that positive drainage be maintained during construction and throughout the life of the facility to minimize the potential for surface water infiltration. It is EEC's opinion that sub-excavation and replacement with controlled/engineered fill material combined with good positive drainage may be considered over a portion of the site to significantly reduce the settlement/expansive potential and will create a more stable bearing stratum.

Footings should be proportioned to reduce differential foundation movement. Proportioning on the basis of equal total movement is recommended; however, proportioning to relative constant dead-load pressure will also reduce differential movement between adjacent footings.

Preliminary Foundation Systems – Drilled Piers/Caissons

An alternative to placement of any proposed residential structure(s) on an over-excavated and/or a ground-modified bearing stratum on spread footings and as a primary strategy where expansive overburden soils or bedrock is encountered at shallow depths, (i.e., less than 10-feet below existing site grades), would be to support the structure(s) on a drilled pier/caisson foundation system extending into the underlying bedrock formation. For axial compression loads, we expect the drilled piers could be designed using maximum end bearing pressures ranging between 15,000 to 25,000 pounds per square foot (psf), along with a skin-friction values ranging between 1,500 to 2,500 psf for the portion of the pier extended into the underlying firm and/or harder bedrock formation. Straight shaft piers are typically drilled a minimum of 10-feet into competent or harder bedrock and generally extend to minimum depths of 25 feet or greater below finish site grades.

Drilling caissons to design depth should be possible with conventional heavy-duty single flight power augers equipped with rock teeth on the majority of the site. However, areas of well-cemented sandstone bedrock lenses may be encountered throughout the site at various depths where specialized drilling equipment and/or rock excavating equipment may be required. Excavation penetrating the well-cemented sandstone bedrock may require the use of specialized heavy-duty equipment, together with rock augers and/or core barrels.

Drilled shafts will probably remain open without stabilizing measures. However, pier concrete should be placed soon after completion of drilling and cleaning. Groundwater was not encountered to maximum depths of exploration, approximately 25 to 30-feet below existing site grades at the time of our drilling operations. Therefore temporary casing may not be required to adequately/properly drill and clean piers prior to concrete placement.

Preliminary Floor Slab Design and Construction

The variability of the existing low to moderately expansive overburden soils, with intermittent highly expansive zones, as well as the shallow depth to the moderately expansive bedrock formation in close proximity to the slab(s) subgrade elevation, could result in differential movement of slabs should these materials become elevated in moisture content. As presented on the boring logs and the swell-consolidation test results, the subsurface soils and bedrock profile on the site exhibited low to high expansive potential with occasional very high expansive intervals. Therefore, subgrade modifications and positive drainage away from the building footprint(s) to reduce the potential for surface water infiltration from impacting the underlying slab subgrade material will likely be needed as a minimum. Use of structural floors in highly expansive overburden subsoil areas and in areas of relatively shallow moderately expansive bedrock may be needed.

A structural floor system is structurally supported independent of the subgrade soils as a positive means of reducing the potentially detrimental effects of floor movement. As opposed to the use of a structural floor slab, assuming a greater potential risk for movement, an overexcavation and replacement procedure could be selected by the project owners if recommended by their geotechnical engineering consultant.

It is our opinion, an over excavation and replacement/backfill procedure could probably be used to develop a subgrade support for the floor slab areas in portions of the site, although some movement would be expected on the overlying improvements. For this approach, we expect areas beneath the floor slab(s) to be undercut to a minimum depth of four (4) feet and backfilled with moisture conditioned on-site clay soil materials, as previously described, to reduce the swell potential. Deeper overexcavation of subgrades may be needed in areas located in expansive bedrock zones. An underslab gravel layer or thin leveling course could be used underneath the concrete floor slabs and concrete pavement areas to provide a leveling course for the concrete placement.

Based on the site-specific swell-consolidation test results and using the swell-index and swell pressures results, we have evaluated the predicted heave potential using the "Oedometer – Heave Prediction" theory. We note that the analyses are of heave potential, or the heave that would occur if subsurface moisture increases sufficiently. When subsurface moisture does not increase, or increases only nominally, the full heave potential would not be realized. For this reason, it is extremely important that the surface slope and drainage recommendations to reduce the potential

for surface water infiltration be implemented. With appropriate surface drainage, we would not expect the full amount of potential heave to occur.

The following information, Table III, provides the anticipated amount of movement which could be expected for a range of overexcavation depths for the proposed residential structures within a portion of the property in which low to moderately expansive subsoils are present, assuming overexcavation and replacement with either on-site cohesive materials or approved imported structural fill materials are used, should the underlying cohesive stratum or bedrock below the over-excavated zone become elevated in moisture content to a reasonable depth. Greater depths of over-excavation and replacement should be considered in areas where higher swells were revealed. This information is being provided as "preliminary estimates" and should be verified/confirmed during the "comprehensive/final" field exploration conducted on a lot-by-lot basis. Variations may exist across the site.

Table III – Residential Structures – Floor Slab Over-Excavation		
Depth of Over-Excavation, Ft	Estimated Potential Movement, Inches	
	On-Site Cohesive Soils	Imported Structural Fill Material
2	< 4	<3
4	< 2-1/2	<2
6	< 1-1/2	<1

With the overexcavation and replacement procedure, if imported structural fill material is used as the backfill material, an over-excavation perimeter drainage system/"sub-drain" should be placed in the bottom of the excavation prior to backfilling, to minimize the "bath-tub" effect which could be created if surface water infiltrates through the imported granular material would likely be necessary. The drainage system should consist of an adequately sized pipe, either 4 or 6-inch diameter perforated rigid PVC pipe exhibiting positive drainage around the perimeter, approximately 1/8-inch per foot, and emptying into a sump pit accessible from the finished grade or day-lighted away from the structure.

We expect the floor slabs could be designed using a modulus of subgrade support (k-value) of 100 pci for the site clay soils prepared as previously outlined or 200 pci for granular type soils.

Care should be taken after preparation of the subgrades to avoid disturbing the subgrade materials. Materials which are loosened or disturbed by the construction activities or materials which become dry and desiccated or wet and softened should be removed and replaced prior to

placement of the overlying floor slabs. Care should be taken to maintain proper moisture contents in the subgrade soils prior to placement of any overlying improvements.

GENERAL COMMENTS

The preliminary analysis and recommendations presented in this report are based upon the limited data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations, which may occur between borings or across the site. This preliminary report is not considered sufficient for final design or construction on the referenced Fossil Ridge Subdivision – Phases 4 and 5. A more thorough exploration should be completed prior to final design on a lot-by-lot basis.

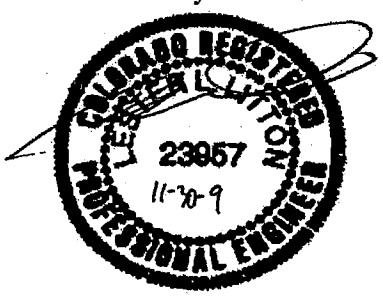
This report has been prepared for the exclusive use of Uniprop, for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, express or implied, is made.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we can be of further service to you in any other way, please do not hesitate to contact us.

Very truly yours,
Earth Engineering Consultants, Inc.

David A. Richer, P.E.
Senior Geotechnical Engineer

Reviewed by:



Lester L. Litton, P.E.
Principal Engineer

DAR/LLL/dla

cc: Uniprop – Mr. Glenn Couch: glenn@exchange.uniprop.com

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group names Using Laboratory Tests				Soil Classification: Group Symbol	Soil Classification: Group Name
Coarse-Grained Soils more than 50% retained on No. 200 sieve	Gravels more than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	$Cu \geq 4$ and $1 < Cc \leq 3$ [E]	GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly-graded gravel [F]
		Gravels with Fines more than 12% fines	Fines classify as ML or MH	GM	Silty gravel, G,H
			Fines classify as CL or CH	GC	Clayey Gravel [F,G,H]
	Sands 50% or more coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	$Cu \geq 6$ and $1 < Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	SP	Poorly-graded sand [I]
		Sands with Fines more than 12% fines	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	inorganic	PI > 7 and plots on or above "A" Line [J]	CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" Line [J]	ML	Silt [K,L,M]
		organic	Liquid Limit - oven dried / Liquid Limit - not dried < 0.75	OL	Organic clay [K,L,M,N] / Organic silt [K,L,M,O]
	Silts and Clays Liquid Limit 50 or more	inorganic	PI plots on or above "A" Line	CH	Fat clay [K,L,M]
			PI plots below "A" Line	MH	Elastic Silt [K,L,M]
		organic	Liquid Limit - oven dried / Liquid Limit - not dried < 0.75	OH	Organic clay [K,L,M,P] / Organic silt [K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines required dual symbols:
GW-GM well graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly-graded gravel with silt
GP-GC poorly-graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_1$ $Cc = \frac{(D_{30})}{D \times D}$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name

[I] If soil contains >15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plots shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy to group name.

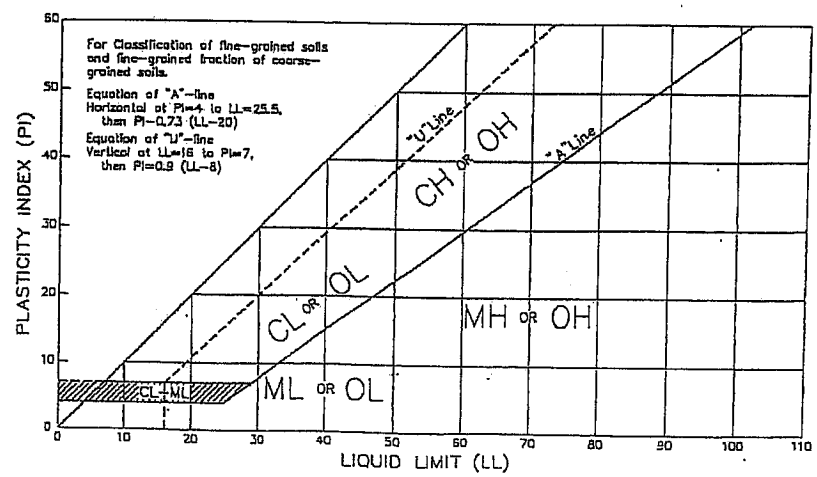
[M] If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravely" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI ≤ 4 or plots below "A" line.

[P] Pi plots on or above "A" line.

[Q] PI plots below "A" line.



DRILLING AND EXPLORATION

DRILLING & SAMPLING SYMBOLS:

SS: Split Spoon - 13/8" I.D., 2" O.D., unless otherwise noted
ST: Thin-Walled Tube - 2" O.D., unless otherwise noted
R: Ring Barrel Sampler - 2.42" I.D., 3" O.D. unless otherwise noted
PA: Power Auger
HA: Hand Auger
DB: Diamond Bit = 4", N, B
AS: Auger Sample
HS: Hollow Stem Auger
PS: Piston Sample
WS: Wash Sample
FT: Fish Tail Bit
RB: Rock Bit
BS: Bulk Sample
PM: Pressure Meter
WB: Wash Bore

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. split spoon, except where noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level
WCI: Wet Cave in
DCI: Dry Cave in
AB : After Boring
WS : While Sampling
WD : While Drilling
BCR: Before Casing Removal
ACR: After Casting Removal

Water levels indicated on the boring logs are the levels measured in the borings at the time indicated. In pervious soils, the indicated levels may reflect the location of ground water. In low permeability soils, the accurate determination of ground water levels is not possible with only short term observations.

DESCRIPTIVE SOIL CLASSIFICATION

Soil Classification is based on the Unified Soil Classification system and the ASTM Designations D-2488. Coarse Grained Soils have move than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as : clays, if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse grained soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their consistency. Example: Lean clay with sand, trace gravel, stiff (CL); silty sand, trace gravel, medium dense (SM).

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Consistency
< 500	Very Soft
500 - 1,000	Soft
1,001 - 2,000	Medium
2,001 - 4,000	Stiff
4,001 - 8,000	Very Stiff
8,001 - 16,000	Very Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS:

N-Blows/ft	Relative Density
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80	Very Dense
80 +	Extremely Dense

PHYSICAL PROPERTIES OF BEDROCK

DEGREE OF WEATHERING:

Slight	Slight decomposition of parent material on joints. May be color change.
Moderate	Some decomposition and color change throughout.
High	Rock highly decomposed, may be extremely broken.

HARDNESS AND DEGREE OF CEMENTATION:

Limestone and Dolomite:

Hard	Difficult to scratch with knife.
Moderately Hard	Can be scratched easily with knife.
Soft	Can be scratched with fingernail.

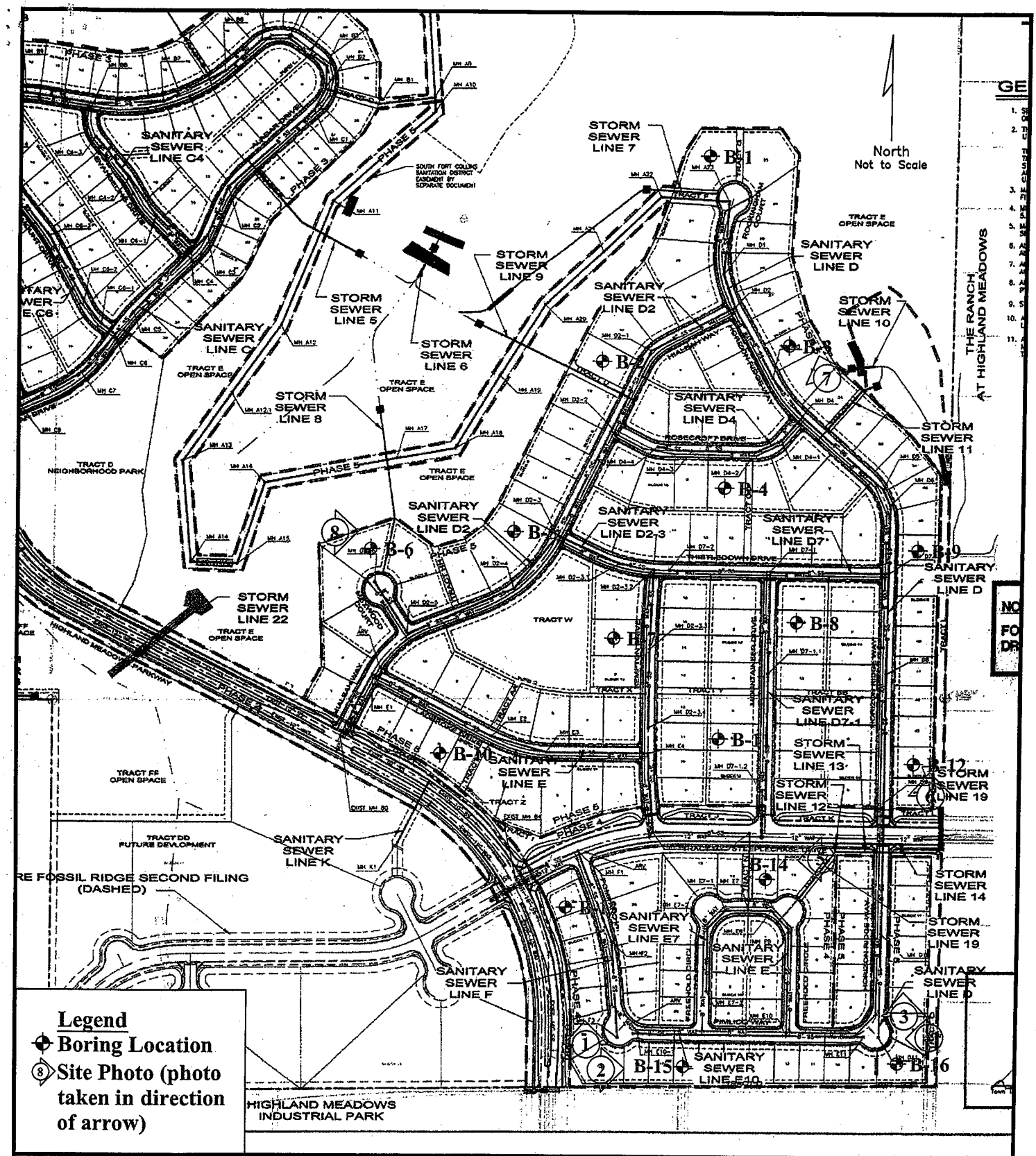
Shale, Siltstone and Claystone:

Hard	Can be scratched easily with knife, cannot be scratched with fingernail.
Moderately Hard	Can be scratched with fingernail.
Soft	Can be easily dented but not molded with fingers.

Sandstone and Conglomerate:

Well Cemented	Capable of scratching a knife blade.
Cemented	Can be scratched with knife.
Poorly Cemented	Can be broken apart easily with fingers.

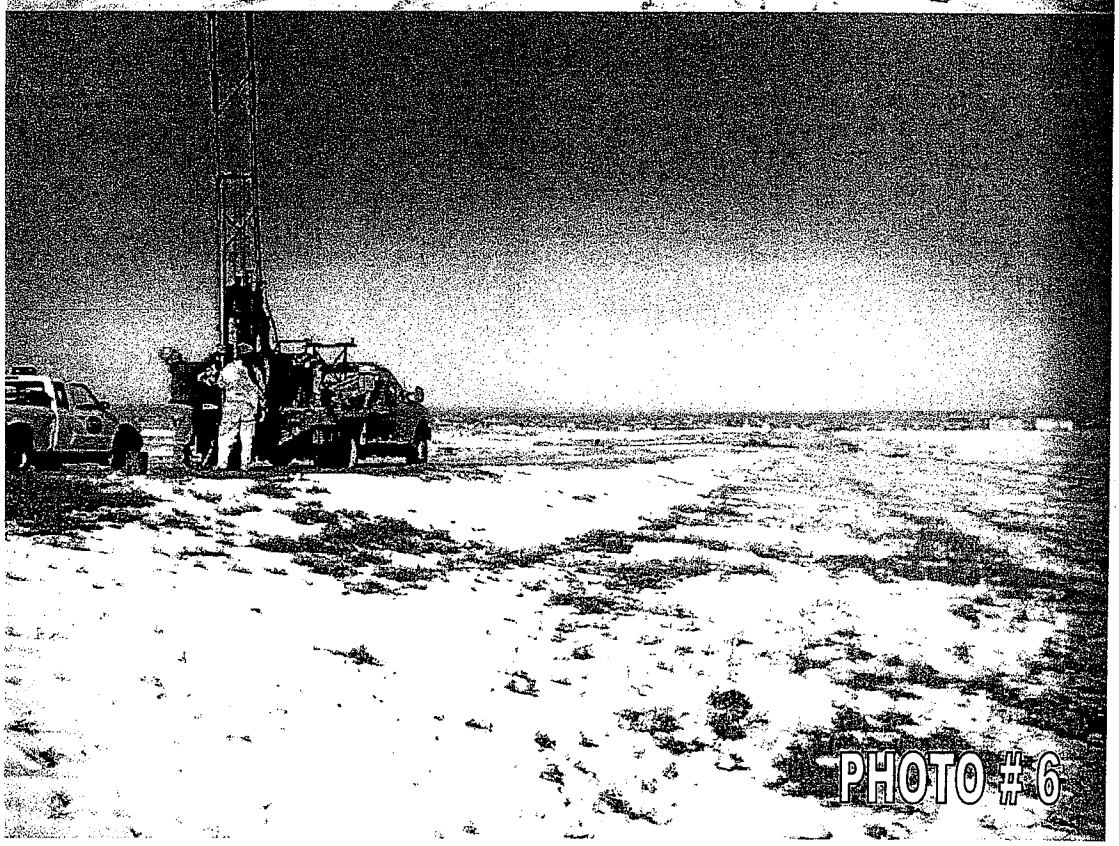
EEC



BORING LOCATION DIAGRAM
FOSSIL RIDGE SUBDIVISION - PHASES 4 & 5
WINDSOR, COLORADO
EEC PROJECT NUMBER: 1092072 DATE: NOVEMBER 2009

FOSSIL RIDGE SUBDIVISION – PHASES 4 & 5
WINDSOR, COLORADO
EEC PROJECT NO. 1092072
NOVEMBER 2009

FOSSIL RIDGE SUBDIVISION – PHASES 4 & 5
WINDSOR, COLORADO
EEC PROJECT NO. 1092072
NOVEMBER 2009



FOSSIL RIDGE SUBDIVISION – PHASES 4 & 5
WINDSOR, COLORADO
EEC PROJECT NO. 1092072
NOVEMBER 2009

FOSSIL RIDGE SUBDIVISION – PHASES 4 & 5
WINDSOR, COLORADO
EEC PROJECT NO. 1092072
NOVEMBER 2009

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-1 (PIEZOMETER)		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL											
APPARENT FILL: SANDY LEAN CLAY (CL) brown		1 2 3 4									
	CS	5	13	9000+	17.7	112.6	36	21	72.4	2500 psf	1.3%
SANDY LEAN CLAY (CL) brown stiff to very stiff with calcareous deposits & organics		6 7 8 9									
	CS	10	23	9000+	10.1	109.9				6500 psf	4.7%
		11 12 13 14									
	SS	15	15	9000+	10.8						
		16 17 18 19									
	CS	20	40	9000+	9.3	125.1					
SANDSTONE / SILTSTONE / CLAYSTONE brown, gray, rust		21 22 23 24									
	SS	25	50/3"	--	7.2						
BOTTOM OF BORING DEPTH 24.5'		26 27 28 29 30									
		31 32 33 34 35									
		36									

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-1a		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
APPARENT FILL: SANDY LEAN CLAY (CL) brown		2									
	CS	3	39								
	SS	4	21								
	SS	5	21								
	SS	6	13								
SANDY LEAN CLAY (CL) brown with organics	SS	7	27								
	CS	8	21								
		9									
	CS	10	23								
		11									
		12									
		13									
		14									
	SS	15	15								
		16									
		17									
		18									
		19									
	CS	20	40								
		21									
SANDSTONE / SILTSTONE / CLAYSTONE brown, gray, rust		22									
		23									
		24									
	SS	25	50/3"								
BOTTOM OF BORING DEPTH 24.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-2		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL)		2									
brown, calcareous											
stiff to very stiff	CS	3	24	9000+	9.4	108.1					
dry											
	SS	4	24	9000+	10.2						
	SS	5	26	9000+	10.2	104.4					
		6									
		7									
		8									
		9									
	CS	10	24	9000+	9.7	108.1				4700 psf	3.7%
		11									
		12									
		13									
		14									
	SS	15	8	--	9.4						
SANDSTONE / SILTSTONE		16									
brown, gray, rust		17									
		18									
		19									
NO RECOVERY	CS	20	50/2"	--	9.8						
		21									
		22									
		23									
		24									
	SS	25	50/3"	9000+	13.6	111.5					
BOTTOM OF BORING DEPTH 24.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072	LOG OF BORING B-3		DATE: NOVEMBER 2009
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL)		2									
brown, calcaroeus											
stiff to very stiff	CS	3	22	9000+	11.8	116.9					
	SS	4	14	9000+	14.6						
	SS	5	20	9000+	13.8	115.7					
	CS	6	18	9000+	10.2	120.4					4.1%
		7									
		8									
		9									
	SS	10	4	9000+	10.2						
		11									
		12									
		13									
		14									
	CS	15	11	9000+	13.1	108.7					
		16									
		17									
		18									
		19									
	SS	20	17	9000+	14.0						
		21									
		22									
		23									
		24									
brown, rust	CS	25	22	9000+	11.1	123.2					
		26									
		27									
		28									
		29									
increase in sand with depth	SS	30	19	9000	10.3						
BOTTOM OF BORING DEPTH 30.5'		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-4		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL)		2									
brown, calcareous											
stiff to very stiff	CS	3	12	9000+	13.6	111.5					
dry											
	SS	4	8	9000+	16.0						
	SS	5	8								
		6									
		7									
		8									
		9									
SANDSTONE / SILTSTONE / CLAYSTONE	CS	10	26	7500	9.5	114.2	33	9	65.3	5000 psf	3.3%
brown, gray, rust											
(classified as SANDY LEAN CLAY (CL)		11									
		12									
		13									
		14									
	SS	15	50/4"	--	12.8						
		16									
		17									
		18									
		19									
Cemented Lense and 19.5' to 20'	CS	20	50/2"	9000+	9.8						
		21									
		22									
		23									
		24									
	SS	25	50/3"	--	8.4						
BOTTOM OF BORING DEPTH 24.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-5		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
		2									
SANDY LEAN CLAY (CL)											
brown											
stiff to very stiff	CS	3	45	9000+	12.6	117.0					
with calcareous deposits & organics		4									
	SS	5	36	9000+	10.3						
	CS	6	24	9000+	11.3	112.5				5500 psf	4.4%
		7									
		8									
		9									
	SS	10	8	7000	16.1						
		11									
SANDSTONE		12									
grey / brown / rust		13									
		14									
	CS	15	50/2"	9000+	8.4						
		16									
		17									
		18									
		19									
	SS	20	50/3"	--	10.0						
		21									
		22									
		23									
		24									
	SS	25	50/3"	--	7.1						
BOTTOM OFBORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-6 (PIEZOMETER)		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	11/25/2009: None

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL											
APPARENT FILL: SANDY LEAN CLAY (CL) brown / rust / grey stiff to very stiff	CS	3	27	9000+	12.2	113.0					
	SS	4	24/4"	9000	12.7						
SANDY LEAN CLAY (CL) brown / rust / grey stiff to very stiff		5									
	CS	6	32	9000+	14.0	117.1					
	SS	7	42	9000+	12.6						
		8									
		9									
	CS	10	24	9000+	11.2	108.4				6500 psf	4.7%
		11									
		12									
		13									
		14									
	SS	15	10	9000+	14.1						
		16									
		17									
		18									
		19									
	CS	20	28	9000+	11.0	115.6					
SANDSTONE / SILTSTONE / CLAYSTONE brown / rust / grey		21									
		22									
		23									
		24									
	SS	25	50/4"	--	7.7						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-7 (PIEZOMETER)		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	11/25/2009: None

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
LEAN CLAY with SAND (CL) brown stiff to very stiff with calcareous deposits		2									
		3									
		4									
	CS	5	31	9000+	10.9	117.7	39	22	84.3		7.2%
		6									
		7									
		8									
		9									
	CS	10	25	9000+	11.0	108.5					
		11									
SANDSTONE / CLAYSTONE / SILTSTONE brown / grey / rust		12									
		13									
poorly cemented		14									
	SS	15	50/8"	--	14.1						
		16									
		17									
		18									
		19									
	CS	20	50/4"	9000+	12.9						
		21									
		22									
		23									
cemented lense at 24'		24									
	SS	25	Bounce								
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-8		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL)		2									
brown											
stiff to very stiff	CS	3	30	9000+	12.1	115.3					7.9%
with calcareous deposits		4									
	SS	5	16	--	10.5						
		6									
		7									
		8									
		9									
	CS	10	13	9000+	10.7	100.3					
		11									
		12									
SANDSTONE / SILTSTONE		13									
brown / grey / rust		14									
	SS	15	50/9"	--	12.9						
		16									
		17									
		18									
		19									
	CS	20	50/3"	9000+	12.0						
		21									
		22									
		23									
		24									
	SS	25	50/4"	--	11.2						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-9 (PIEZOMETER)		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	11/20/2009: None

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
APPARENT FILL		1									
		2									
SANDY LEAN CLAY (CL) brown stiff to very stiff		3									
		4									
	CS	5	34	9000+	14.6	116.5					11.1%
		6									
		7									
		8									
		9									
with calcareous deposits	CS	10	22	9000+	11.1	115.1					10.4%
		11									
		12									
		13									
		14									
	SS	15	14	9000+	8.4						
		16									
		17									
		18									
		19									
	CS	20	28	9000+	8.8	116.4					
		21									
		22									
SANDSTONE / CLAYSTONE / SILTSTONE brown / grey / rust with calcareous deposits		23									
		24									
	SS	25	50/5"	--	12.0						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-10		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
LEAN CLAY (CL)		2									
brown											
stiff to very stiff	CS	3	38	9000+	11.5	125.3					4.1%
with calcareous deposits		4									
	SS	5	19	9000+	12.3						
		6									
		7									
		8									
		9									
	SS	10	25	9000+	10.3	109.3	41	23	87.6		8.4%
		11									
		12									
		13									
		14									
	SS	15	15	9000+	10.8						
		16									
SANDSTONE / SILTSTONE		17									
brown / grey / rust		18									
		19									
cemented lense - 19.5' - 20'	CS	20	50/1"								
		21									
		22									
		23									
		24									
	SS	25	50/2"	--	7.4						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-11		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 1000 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL) brown stiff to very stiff with calcareous deposits		2									
		3									
		4									
	CS	5	17	9000+	12.2	105.2					
		6									
		7									
		8									
		9									% @ 500 PSF
	CS	10	28	9000+	10.1	112.5					5.5%
POORLY CEMENTED SILTSTONE / SANDSTONE brown / grey / rust		11									
		12									
		13									
		14									
	SS	15	50/7"	--	12.1						
		16									
		17									
		18									
		19									
	CS	20	50/3"	9000+	10.6	116.1					1.6%
		21									
		22									
		23									
		24									
	SS	25	50/2"	--	11.1						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-12		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
APPARENT FILL: SANDY LEAN CLAY (CL) brown		1									
		2									
	CS	3	22	9000+	10.0	109.1					
SANDY LEAN CLAY (CL) brown stiff to very stiff with calcareous deposits		4									
	SS	5	18	9000+	12.0						
	CS	6	19	9000+	12.1	112.6					
		7									
		8									
		9									
	CS	10	20	9000+	11.5	109.4					5.9%
		11									
		12									
		13									
		14									
	SS	15	18	9000+	11.7						
		16									
		17									
		18									
		19									
CLAYSTONE / SANDSTONE / SILTSTONE brown /grey / rust	CS	20	50/6"	9000+	12.0	120.7					
		21									
		22									
		23									
		24									
	SS	25	Bounce	--	9.9						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-13		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL) brown medium dense		2									
		3									
		4									
intermittent CLAYEY SAND (SC) lense	CS	5	16	9000+	7.8	107.1	30	14	44.6	2300 psf	2.4%
		6									
		7									
		8									
		9									
	CS	10	11	9000+	12.8	108.0					
increase in sand with depth		11									
		12									
		13									
CLAYSTONE / SANDSTONE / SILTSTONE brown /rust / grey		14									
	SS	15	50	9000+	16.7						
		16									
		17									
		18									
		19									
	CS	20	50/7"	9000+	7.3	127.5					
		21									
		22									
		23									
		24									
	SS	25	50/9"	9000+	15.2						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-14		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: N/A
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
APPARENT FILL: SANDY LEAN CLAY (CL) brown	CS	3	26	9000+	10.1	109.9					
SANDY LEAN CLAY (CL) brown stiff to very stiff with calcareous deposits	SS	4	21	9000+	10.7						
	CS	10	24	9000+	11.0	113.7					5.7%
HIGHLY WEATHERED SANDSTONE / CLAYSTONE brown / rust with calcareous deposits	CS	15	20	9000+	11.6	111.5					
SANDSTONE / CLAYSTONE / SILTSTONE brown / grey / rust with calcareous deposits	SS	20	50/7"	--	9.7						
cemented lense 21.5' to 22.5'	CS	25	50/3"	9000+	9.8						
BOTTOM OF BORING DEPTH 25.0'											

Earth Engineering Consultants

FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-15 (PIEZOMETER)		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: None
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
		2									
SANDY LEAN CLAY (CL) brown stiff to very stiff with calcareous deposits	CS	3	14	9000+	13.3						
		4									
	SS	5	10	--	10.6						
		6									
		7									
		8									
		9									
CLAYSTONE / SANDSTONE / SILTSTONE brown / grey / rust with calcareous deposits	CS	10	50/9"	9000+	11.6	119.9	39	19	68.0		6.4%
		11									
		12									
		13									
		14									
	SS	15	50/6"	--	11.0						
		16									
		17									
		18									
		19									
	CS	20	50/5"	9000+	10.3	121.0					
		21									
		22									
		23									
		24									
	SS	25	50/5"	9000+	12.1						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

Earth Engineering Consultants

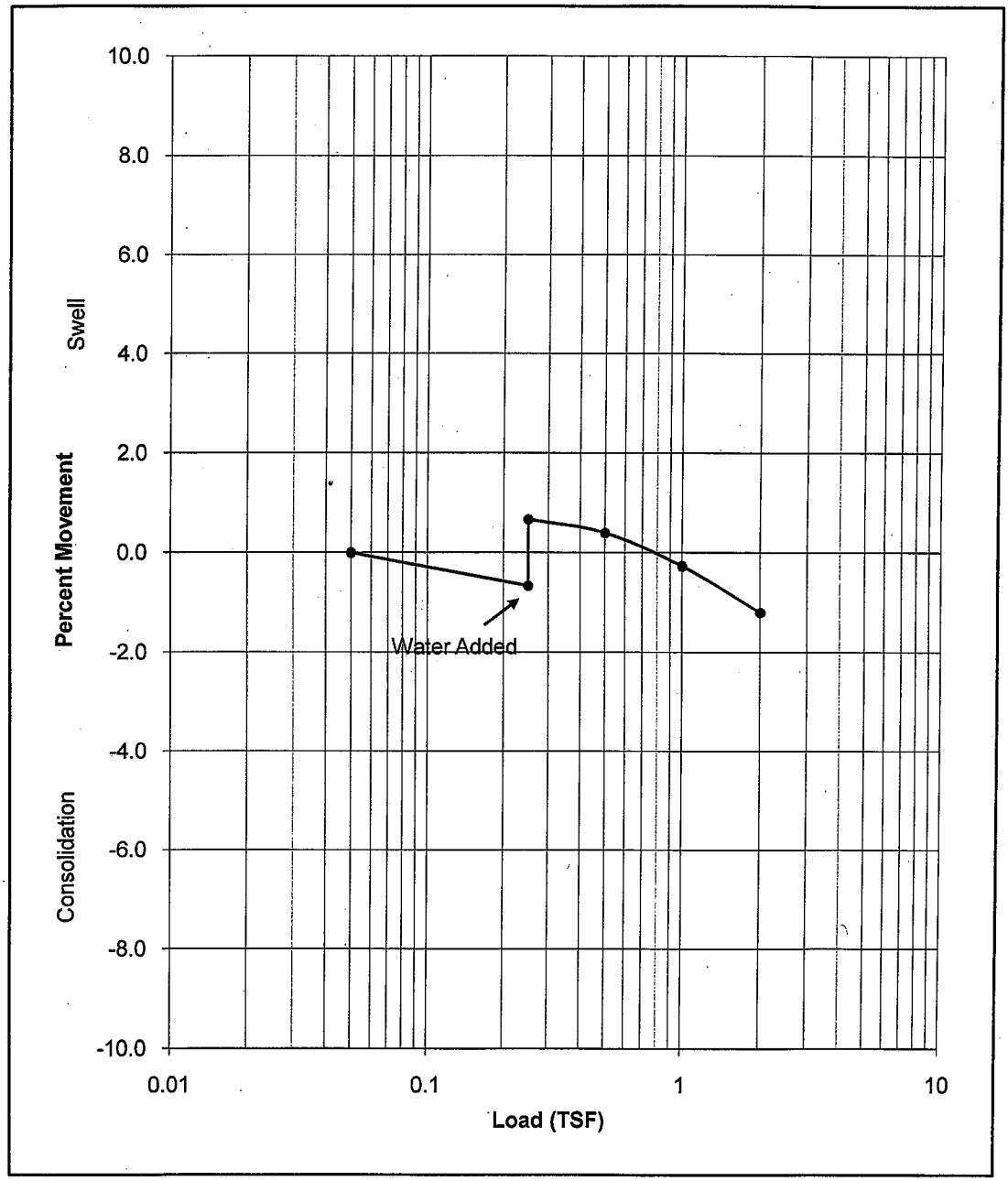
FOSSIL RIDGE SUBDIVISION
WINDSOR, COLORADO

PROJECT NO: 1092072			DATE: NOVEMBER 2009
	LOG OF BORING B-16 (PIEZOMETER)		
RIG TYPE: CME45	SHEET 1 OF 1		WATER DEPTH
FOREMAN: DG	START DATE	11/19/2009	WHILE DRILLING: None
AUGER TYPE: 4" CFA	FINISH DATE	11/20/2009	AFTER DRILLING: None
SPT HAMMER: MANUAL	SURFACE ELEV	N/A	24 HOUR: N/A

SOIL DESCRIPTION	TYPE	D (FEET)	N (BLOWS/FT)	QU (PSF)	MC (%)	DD (PCF)	A-LIMITS LL	A-LIMITS PI	-200 (%)	SWELL PRESSURE	SWELL % @ 500 PSF
SPARSE VEGETATION AND TOPSOIL		1									
SANDY LEAN CLAY (CL) brown stiff to very stiff with calcareous deposits		2									
		3									
		4									
	CS	5	19	9000+	9.6	97.5					5.6%
		6									
		7									
		8									
		9									
SANDSTONE / CLAYSTONE / SILTSTONE brown / grey / rust	CS	10	50/9"	9000+	9.9	121.5					8.9%
		11									
		12									
		13									
		14									
	SS	15	50/7"	--	10.9						
		16									
		17									
		18									
		19									
	CS	20	50/5"	9000+	10.2	107.8					
		21									
		22									
		23									
		24									
	SS	25	50/5"	--	10.8						
BOTTOM OF BORING DEPTH 25.5'		26									
		27									
		28									
		29									
		30									
		31									
		32									
		33									
		34									
		35									
		36									

SWELL / CONSOLIDATION TEST RESULTS

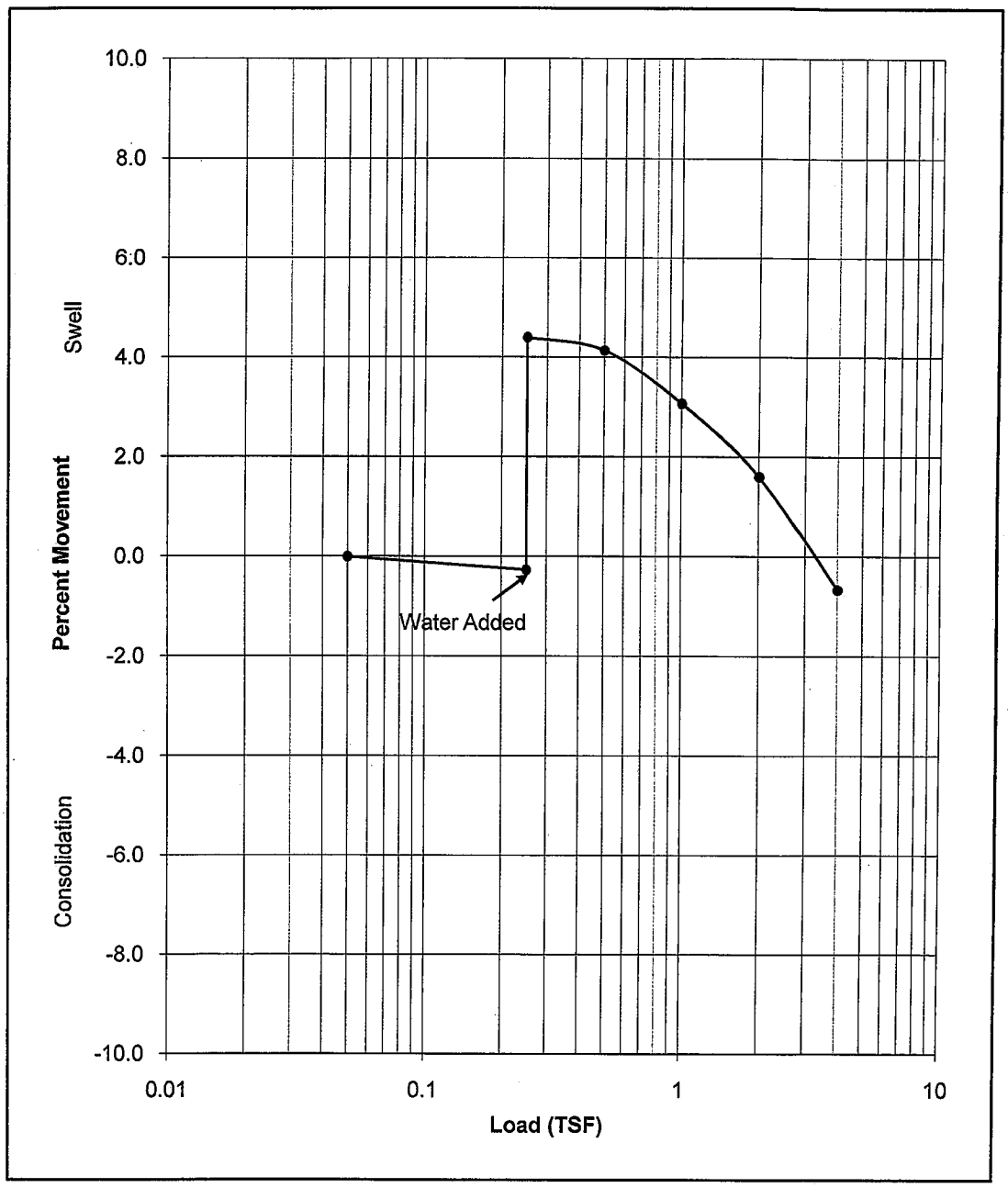
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 1, Sample 1, Depth 4'		
Liquid Limit: 36	Plasticity Index: 21	% Passing #200: 72.4%	
Beginning Moisture: 15.7%	Dry Density: 116.9 psf	Ending Moisture: 17.6%	
Swell Pressure: 2500 psf	% Swell @ 500: 1.3%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

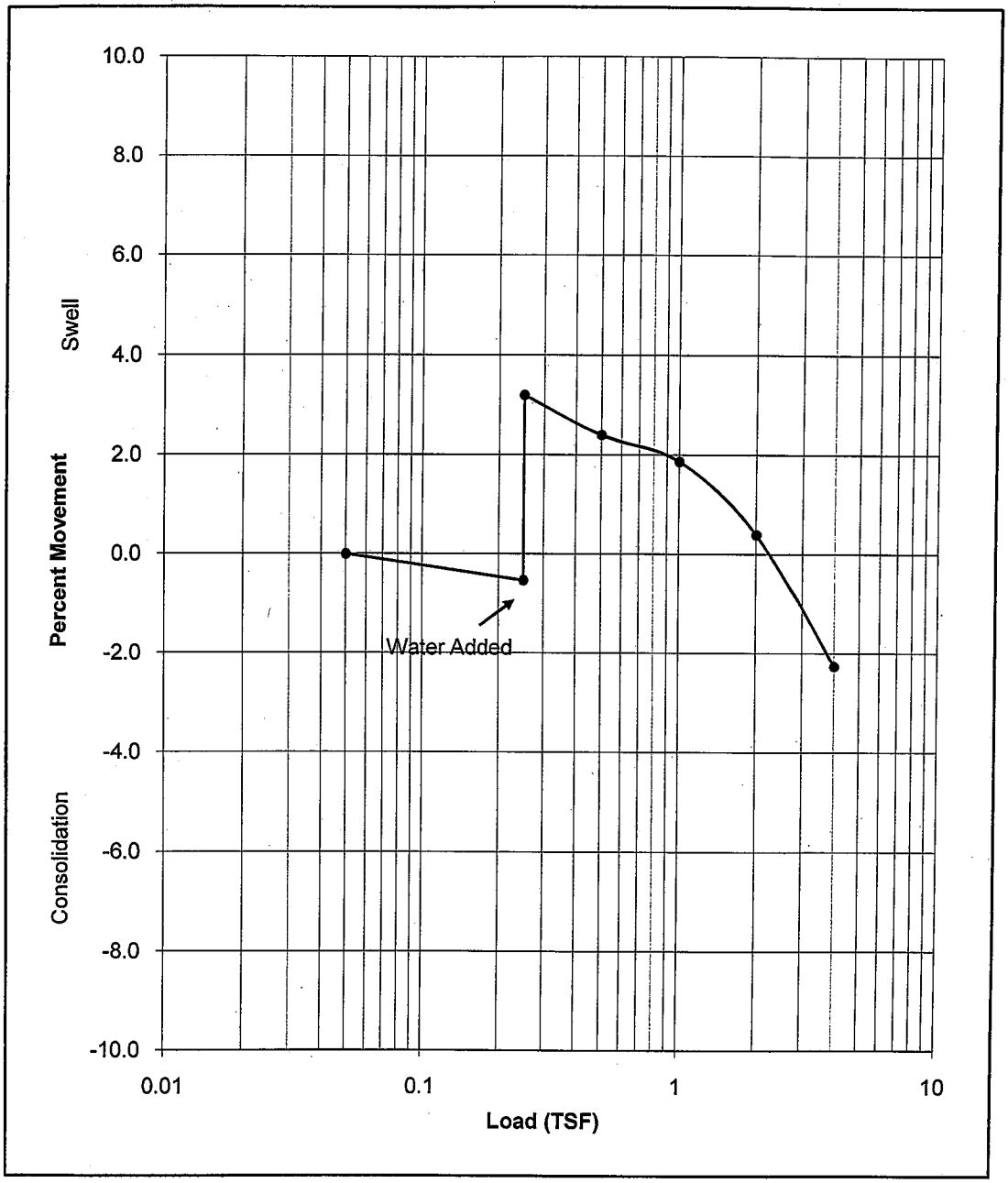
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 1, Sample 2, Depth 9'		
Liquid Limit: - -	Plasticity Index: - -	% Passing #200: - -	
Beginning Moisture: 9.2%	Dry Density: 116.4 psf	Ending Moisture: 17.8%	
Swell Pressure: 6500 psf	% Swell @ 500: 4.7%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

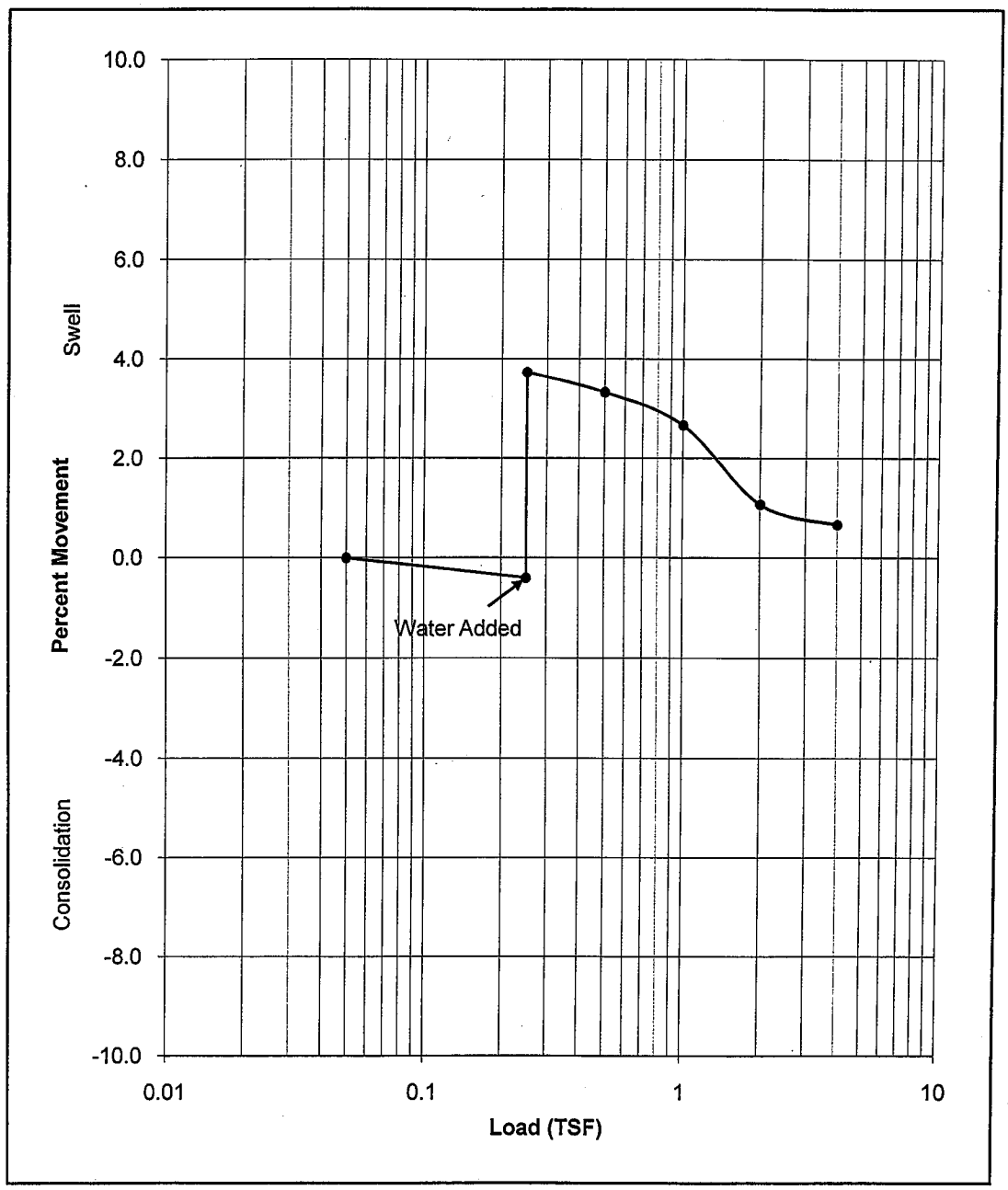
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 2, Sample 4, Depth 9'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 10.8%	Dry Density: 108.1 psf	Ending Moisture: 21.8%	
Swell Pressure: 4700 psf	% Swell @ 500: 3.7%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

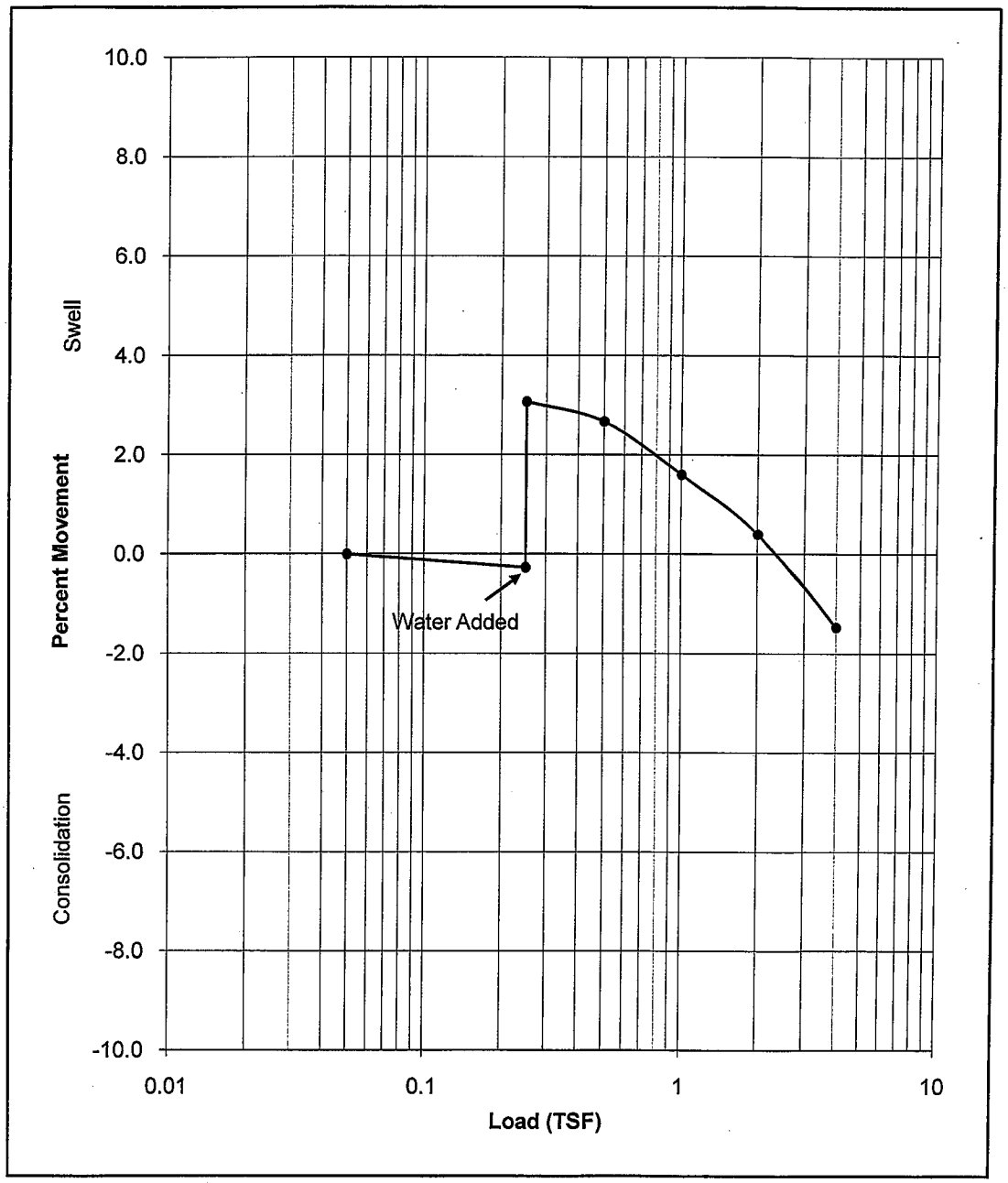
Material Description:	Brown Sandy Lean Clay (CL)	
Sample Location:	Boring 3, Sample 4, Depth 5'	
Liquid Limit: - -	Plasticity Index: - -	% Passing #200: - -
Beginning Moisture: 12.7%	Dry Density: 120.4 psf	Ending Moisture:
Swell Pressure:	% Swell @ 500: 4.1%	



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

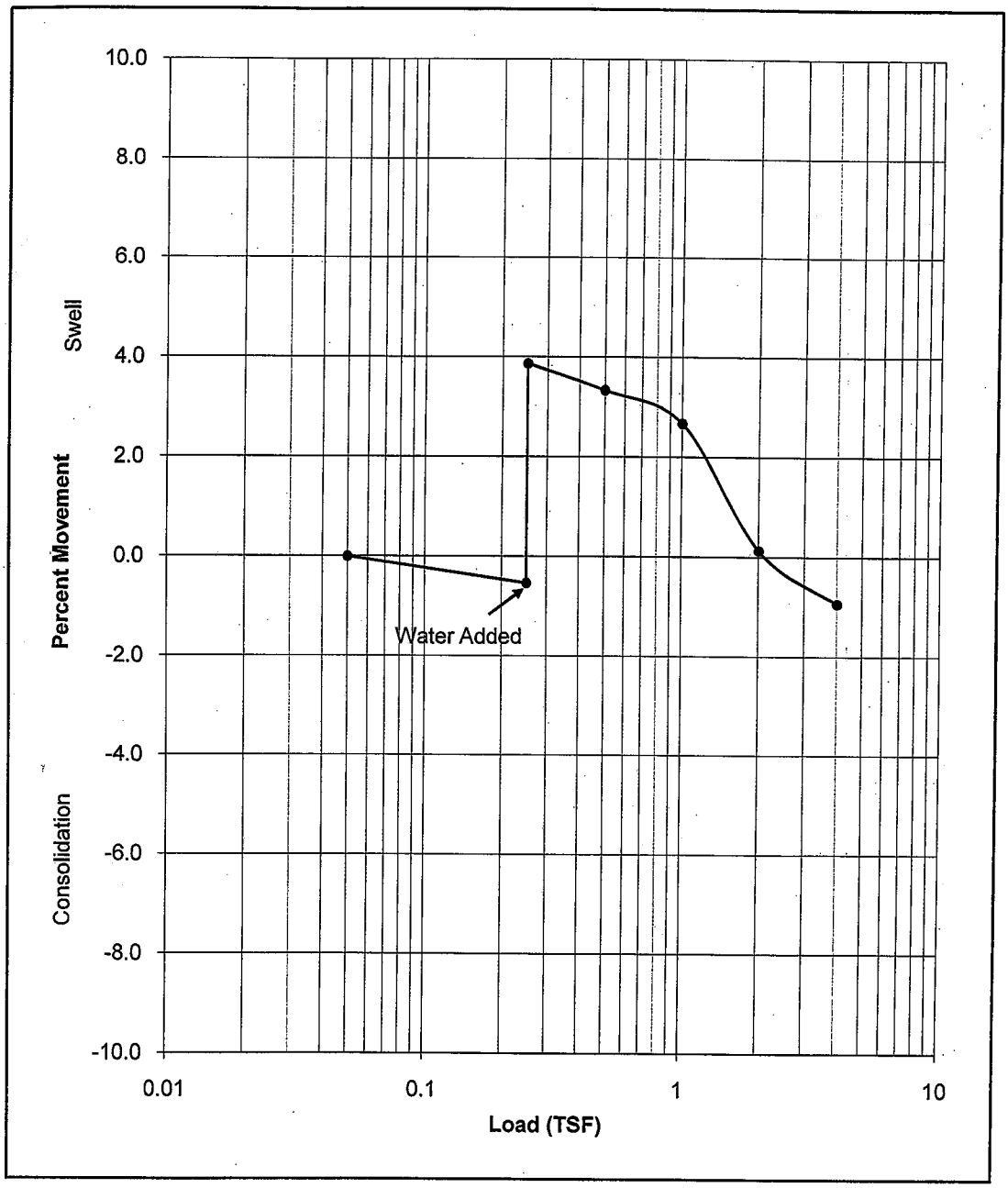
Material Description:	Sandstone / Siltstone / Claystone	
Sample Location:	Boring 4, Sample 4, Depth 9'	
Liquid Limit: 33	Plasticity Index: 9	% Passing #200: 65.3%
Beginning Moisture: 9.5%	Dry Density: 114.2 psf	Ending Moisture: 19.1%
Swell Pressure: 5000 psf	% Swell @ 500: 3.3%	



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

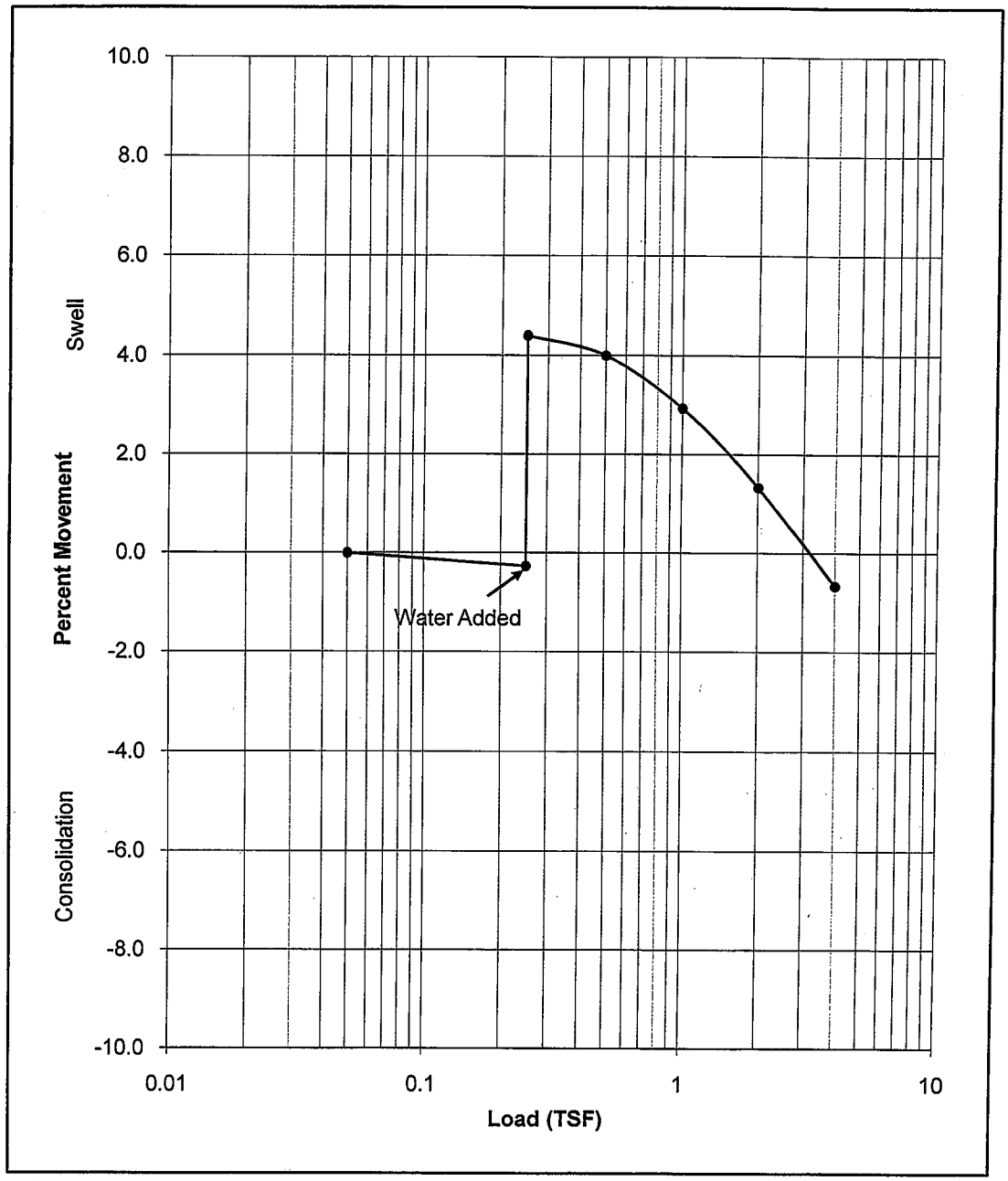
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 5, Sample 3, Depth 5'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 11.5%	Dry Density: 110.5 psf	Ending Moisture:	
Swell Pressure: 5500 psf	% Swell @ 500: 4.4%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

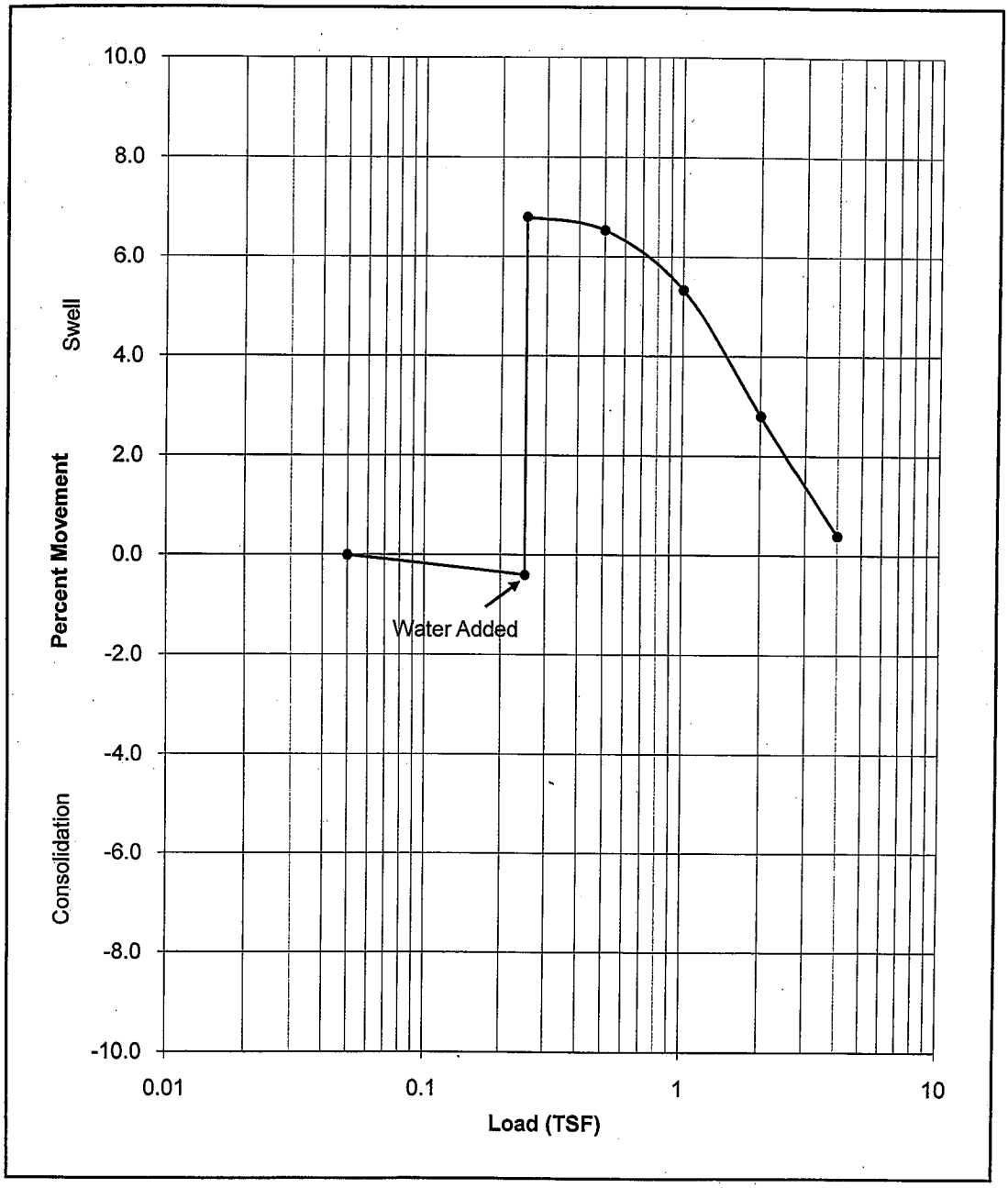
Material Description:	Brown / Rust / Grey Sandy Lean Clay (CL)		
Sample Location:	Boring 6, Sample 5, Depth 9'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 11.2%	Dry Density: 117.1 psf	Ending Moisture: 18.2%	
Swell Pressure: 6500 psf	% Swell @ 500: 4.7%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

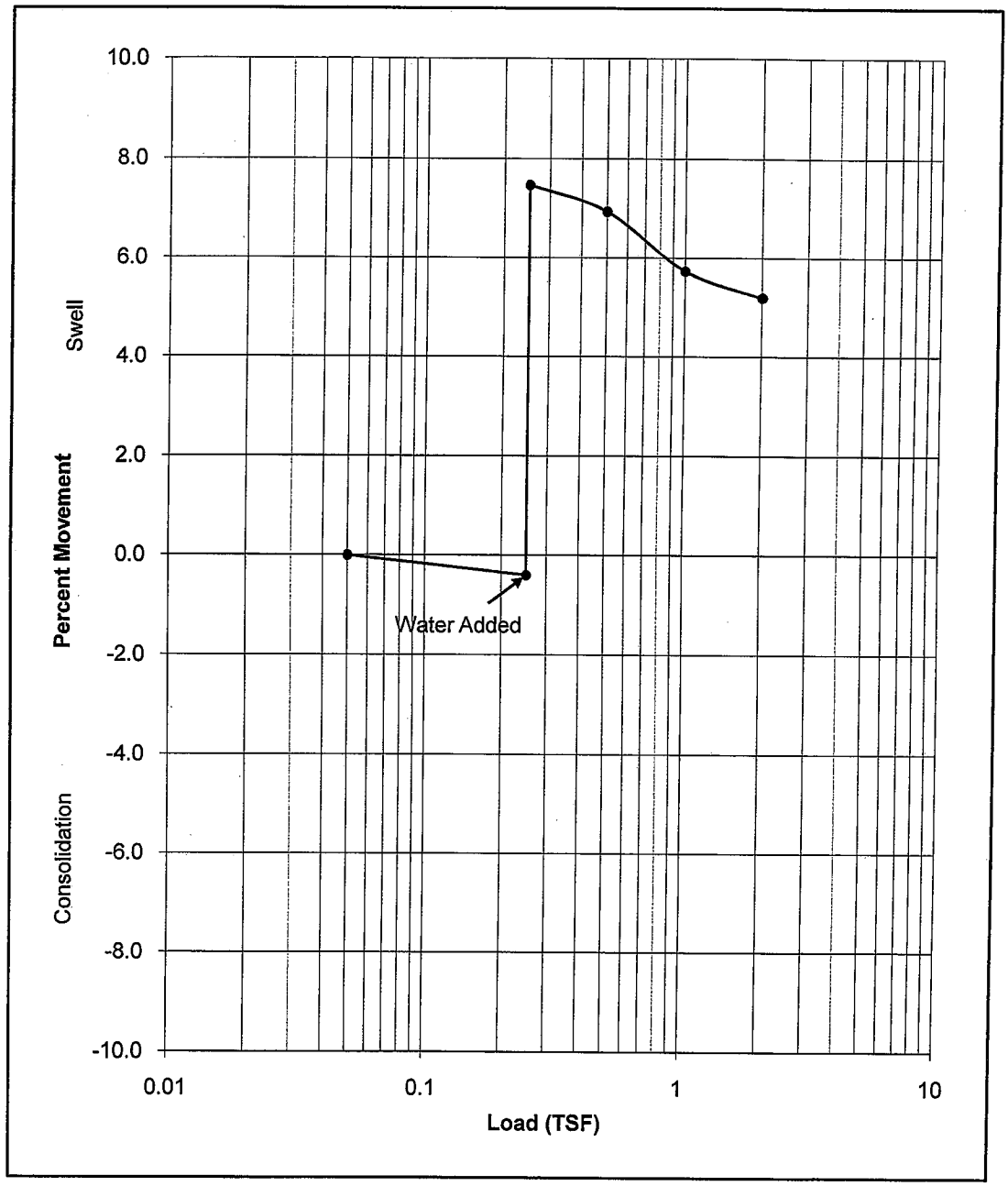
Material Description:	Brown Lean Clay with Sand (CL)		
Sample Location:	Boring 7, Sample 1, Depth 4'		
Liquid Limit: 39	Plasticity Index: 22	% Passing #200: 84.3%	
Beginning Moisture: 10.6%	Dry Density: 117.7 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 7.2%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

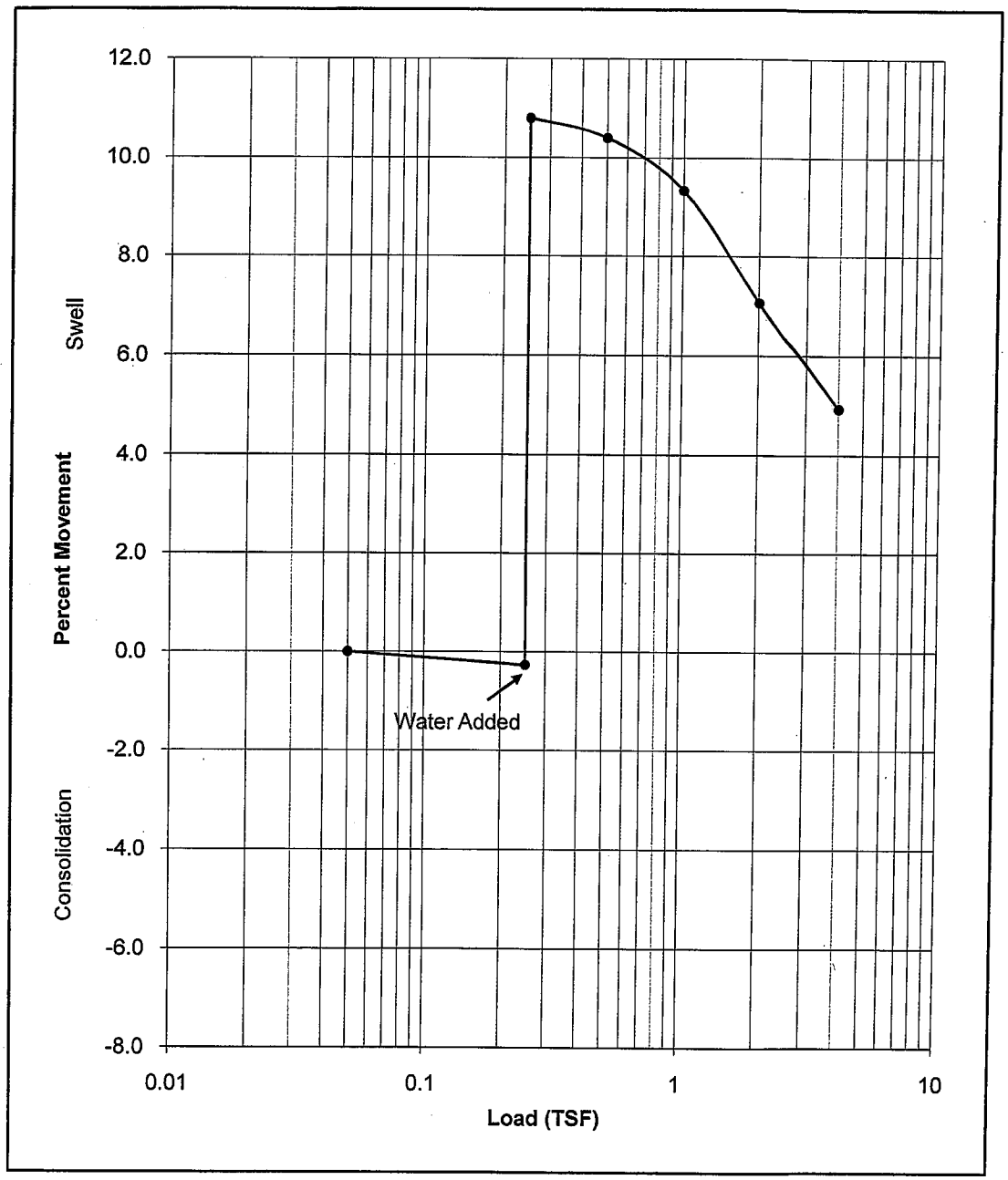
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 8, Sample 1, Depth 2'		
Liquid Limit: - -.	Plasticity Index: - -	% Passing #200: - -	
Beginning Moisture: 10.5%	Dry Density: 115.3 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 7.9%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

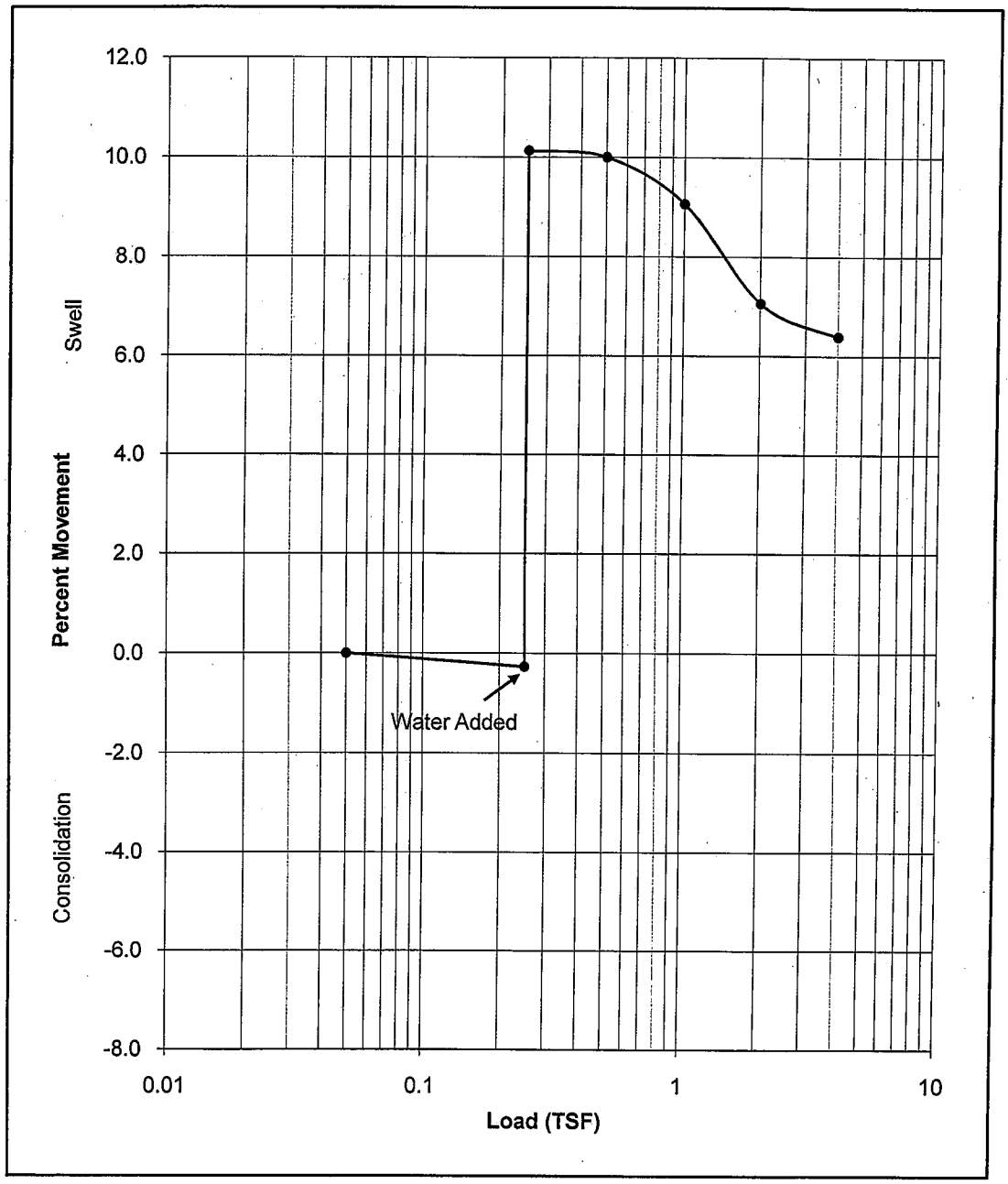
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 9, Sample 1, Depth 4'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 12.4%	Dry Density: 116.5 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 11.1%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

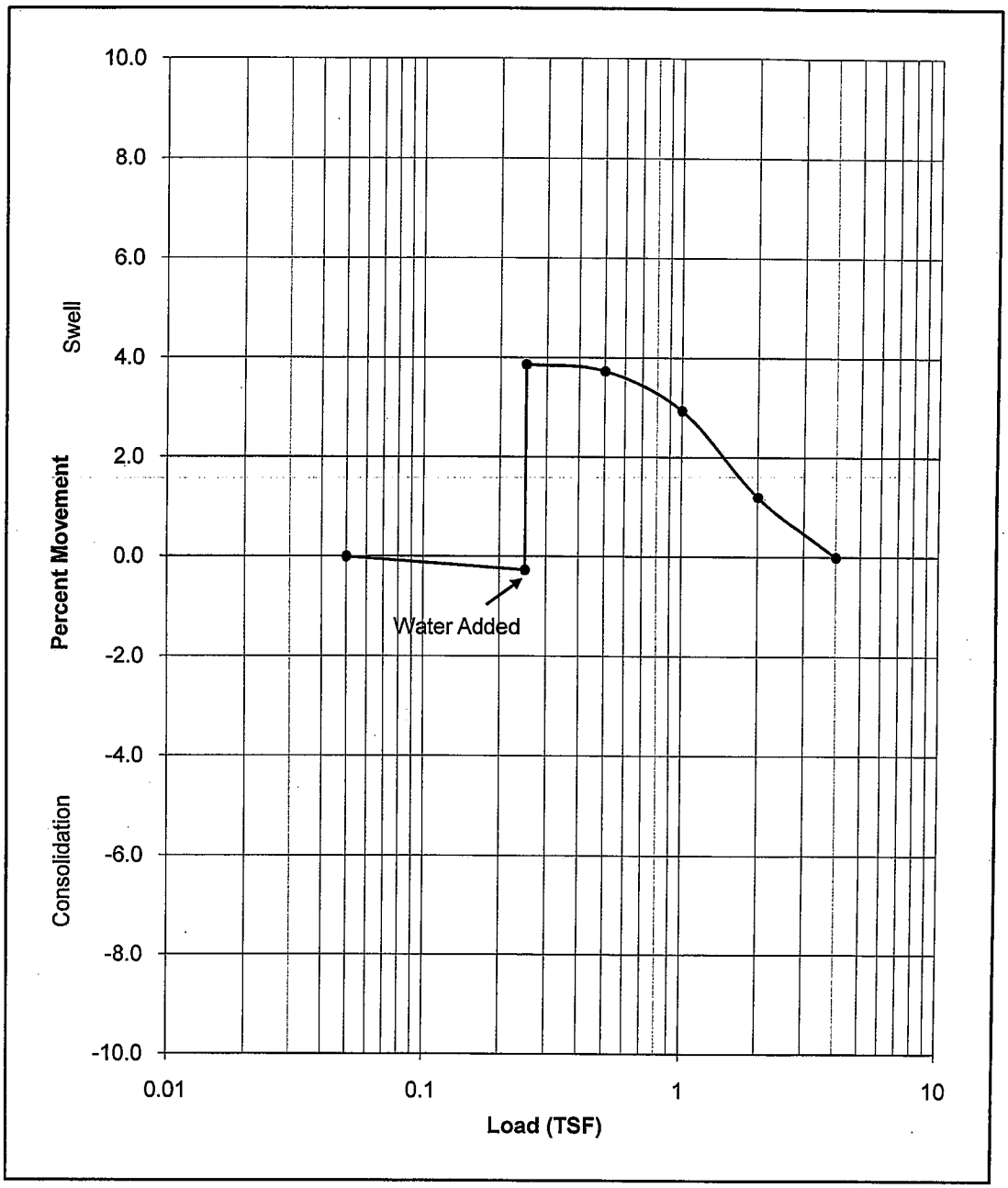
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 9, Sample 2, Depth 9'		
Liquid Limit: - -	Plasticity Index: - -	% Passing #200: - -	
Beginning Moisture: 8.7%	Dry Density: 117.9 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 10.4%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

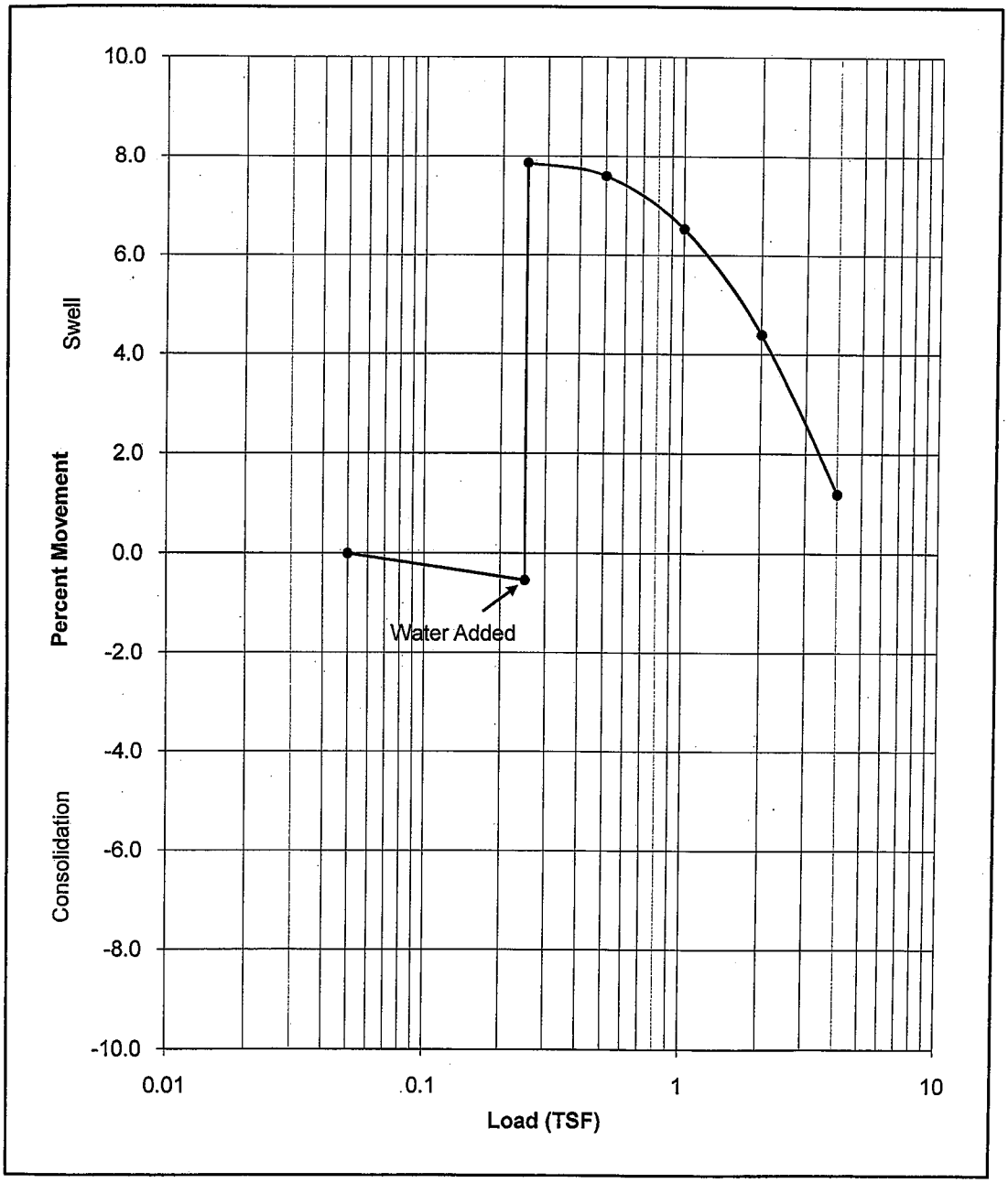
Material Description:	Brown Lean Clay (CL)		
Sample Location:	Boring 10, Sample 1, Depth 2'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 11.8%	Dry Density: 125.3 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 4.1%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

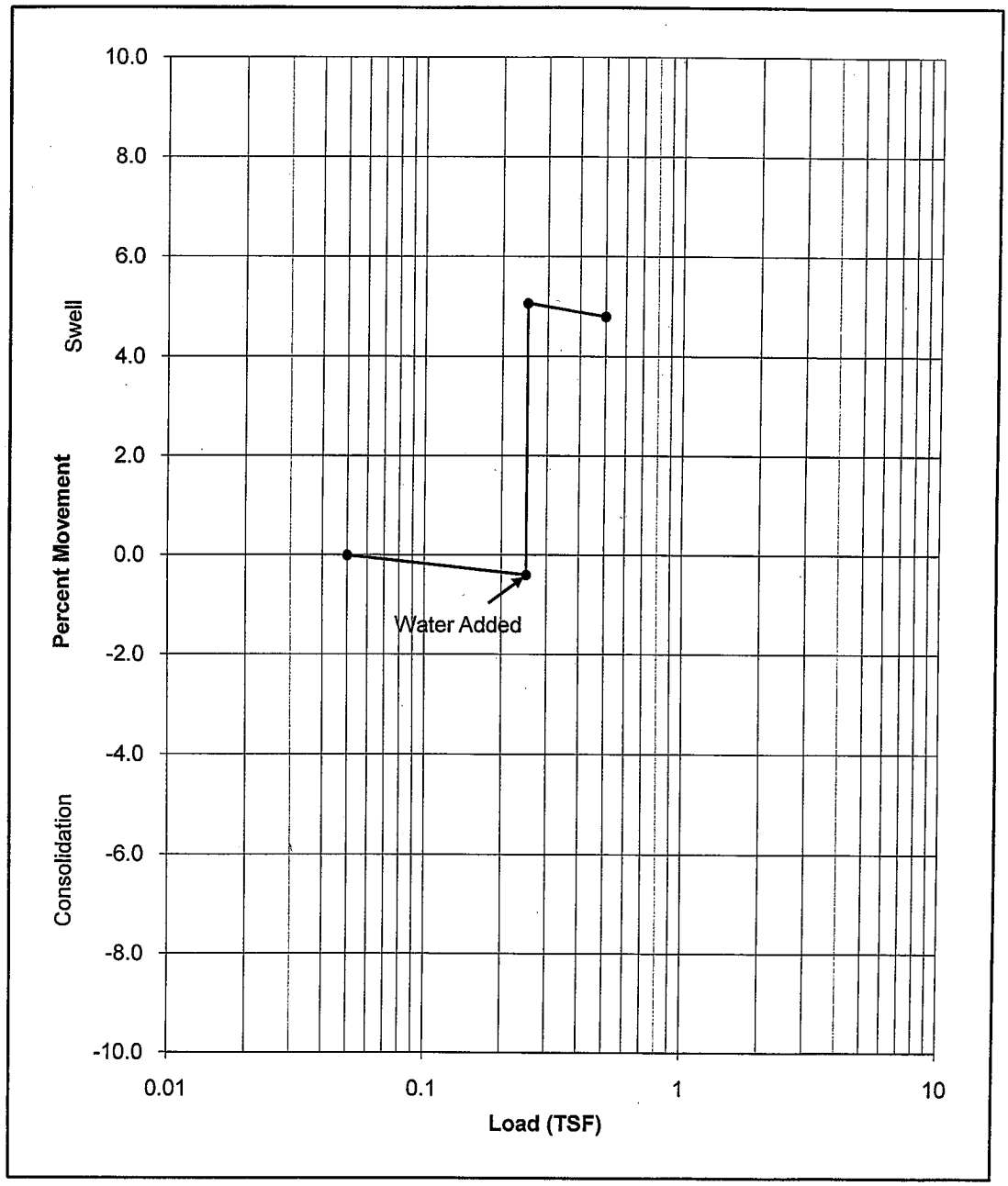
Material Description:	Brown Lean Clay (CL)		
Sample Location:	Boring 10, Sample 3, Depth 9'		
Liquid Limit: 41	Plasticity Index: 23	% Passing #200: 87.6%	
Beginning Moisture: 9.9%	Dry Density: 118.5 psf	Ending Moisture: 19.0%	
Swell Pressure:	% Swell @ 500: 8.4%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

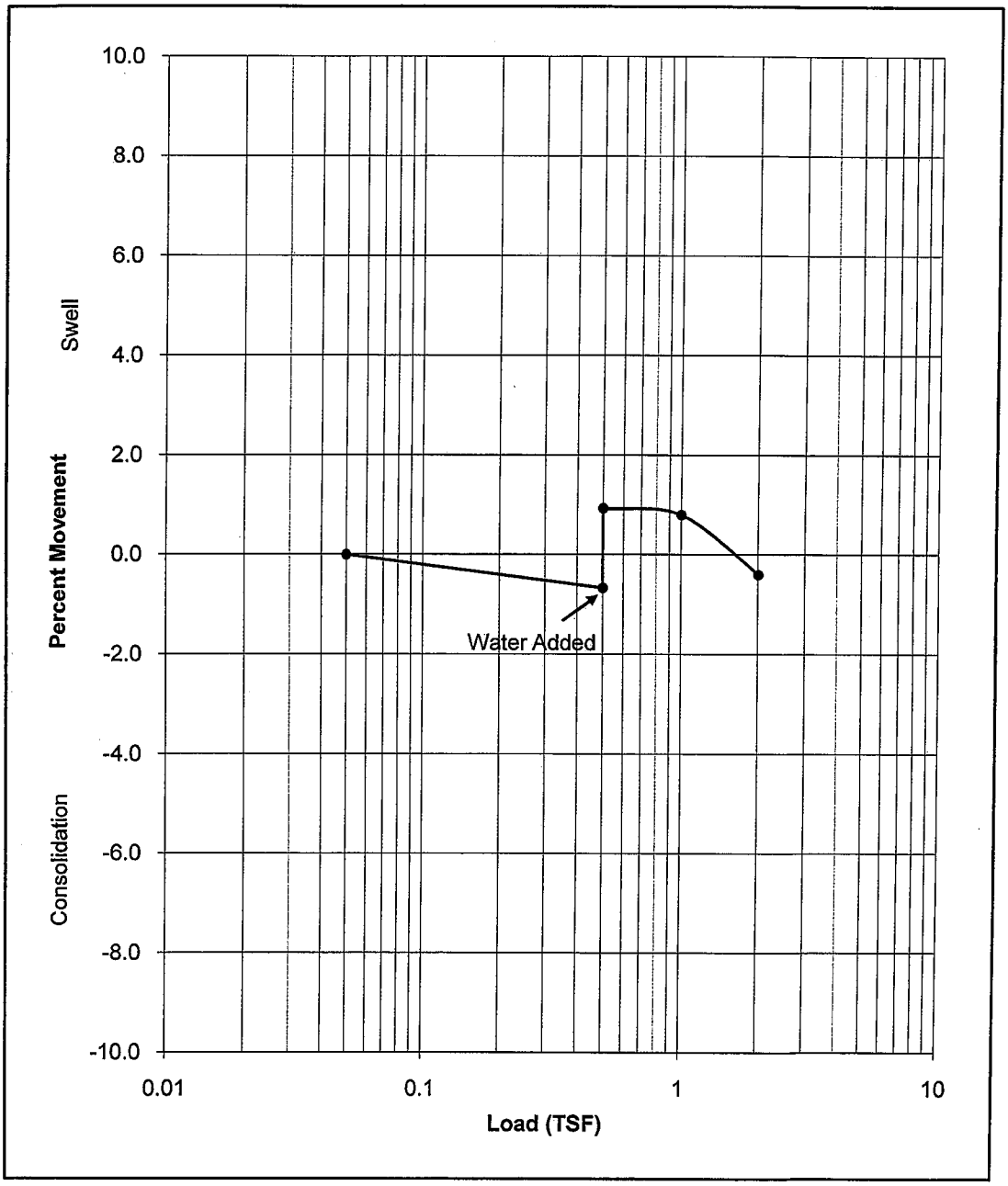
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 11, Sample 2, Depth 9'		
Liquid Limit: - -	Plasticity Index: - -	% Passing #200: - -	
Beginning Moisture: 10.7%	Dry Density: 118.2 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 5.5%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

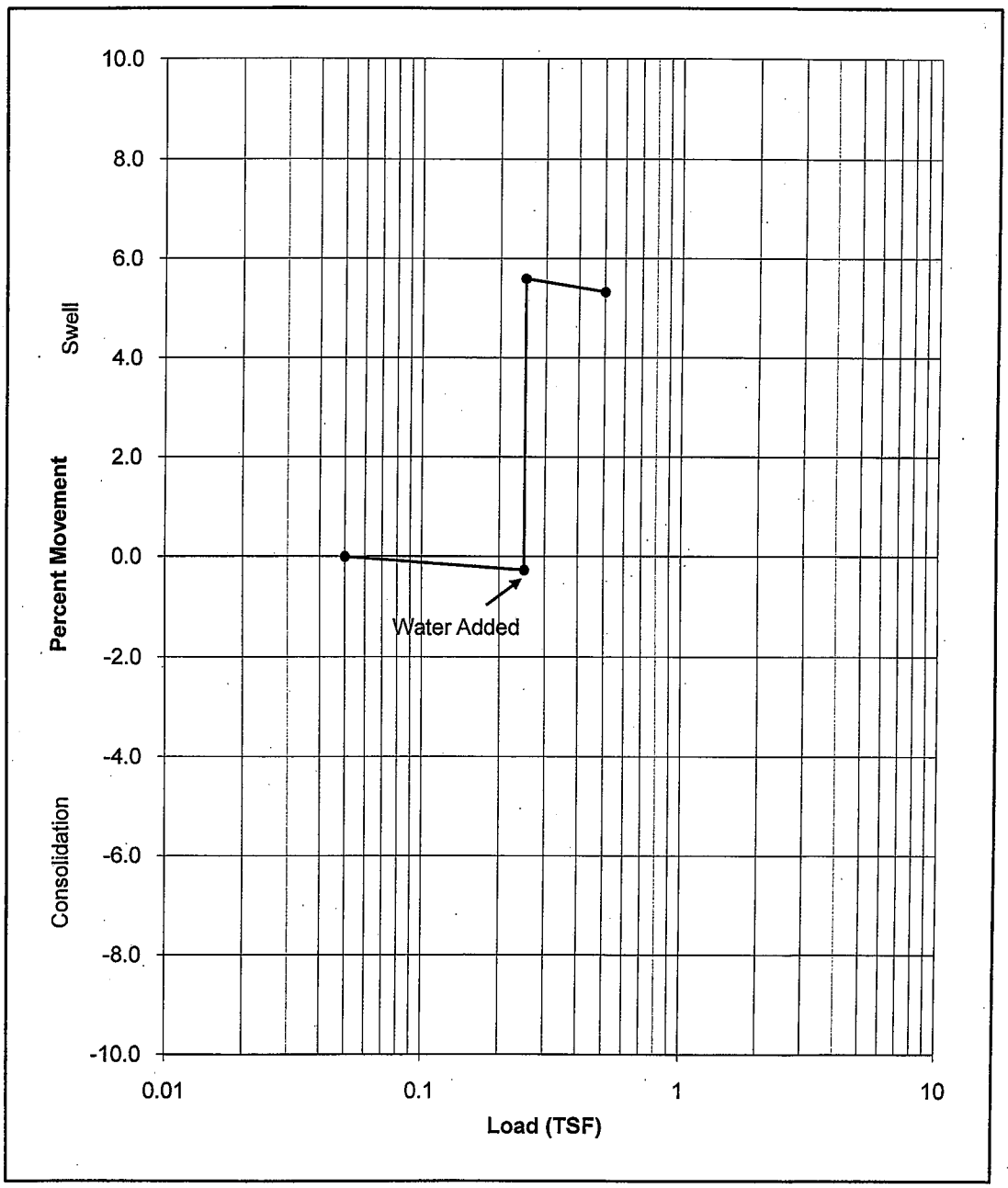
Material Description:	Sandsonte / Siltstone / Bedrock	
Sample Location:	Boring 11, Sample 4, Depth 19'	
Liquid Limit: --	Plasticity Index: --	% Passing #200: --
Beginning Moisture: 9.9%	Dry Density: 116.1 psf	Ending Moisture: 17.6%
Swell Pressure:	% Swell @ 1000: 1.6%	



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

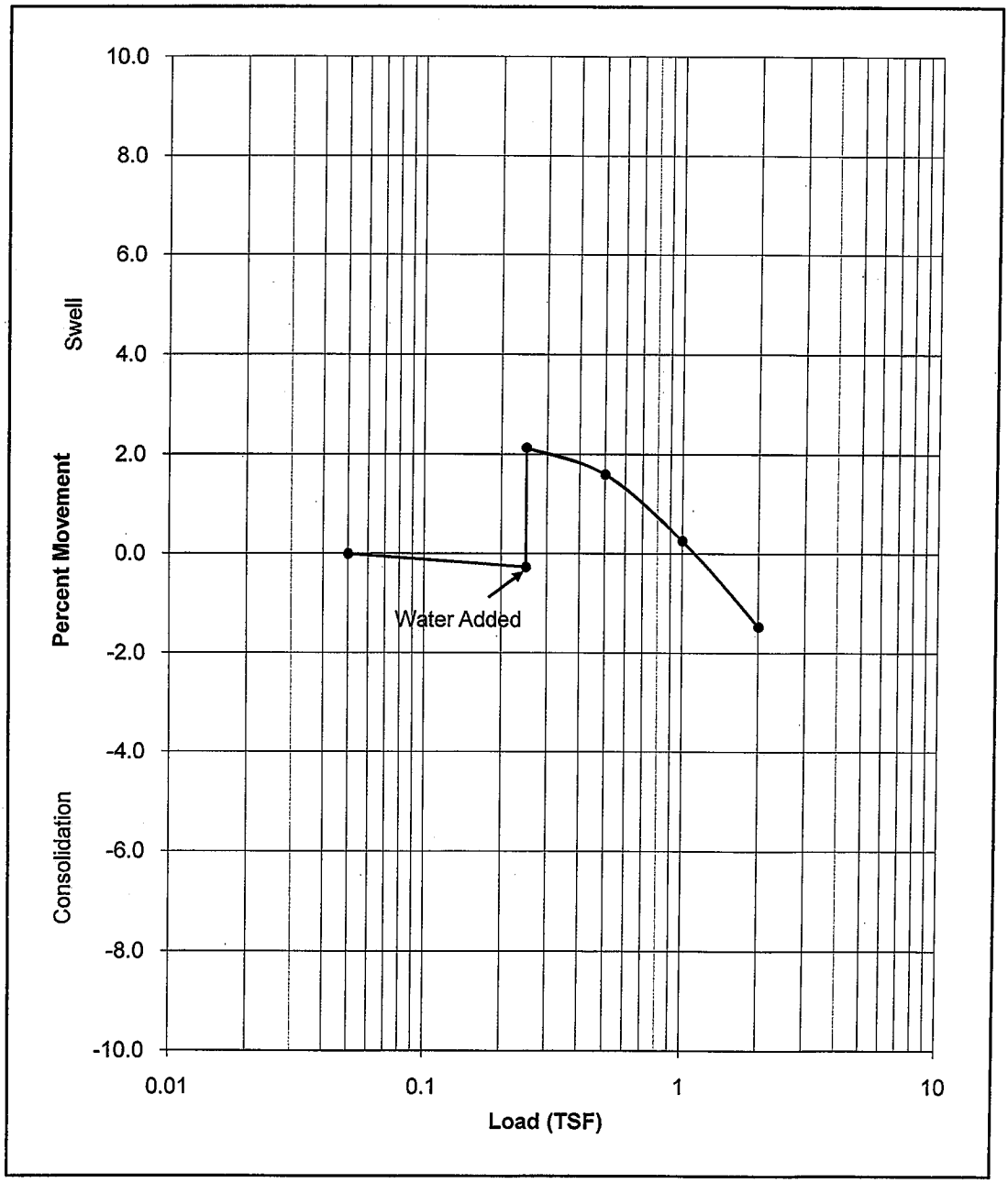
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 12, Sample 4, Depth 9'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 10.3%	Dry Density: 112.1 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 5.9%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

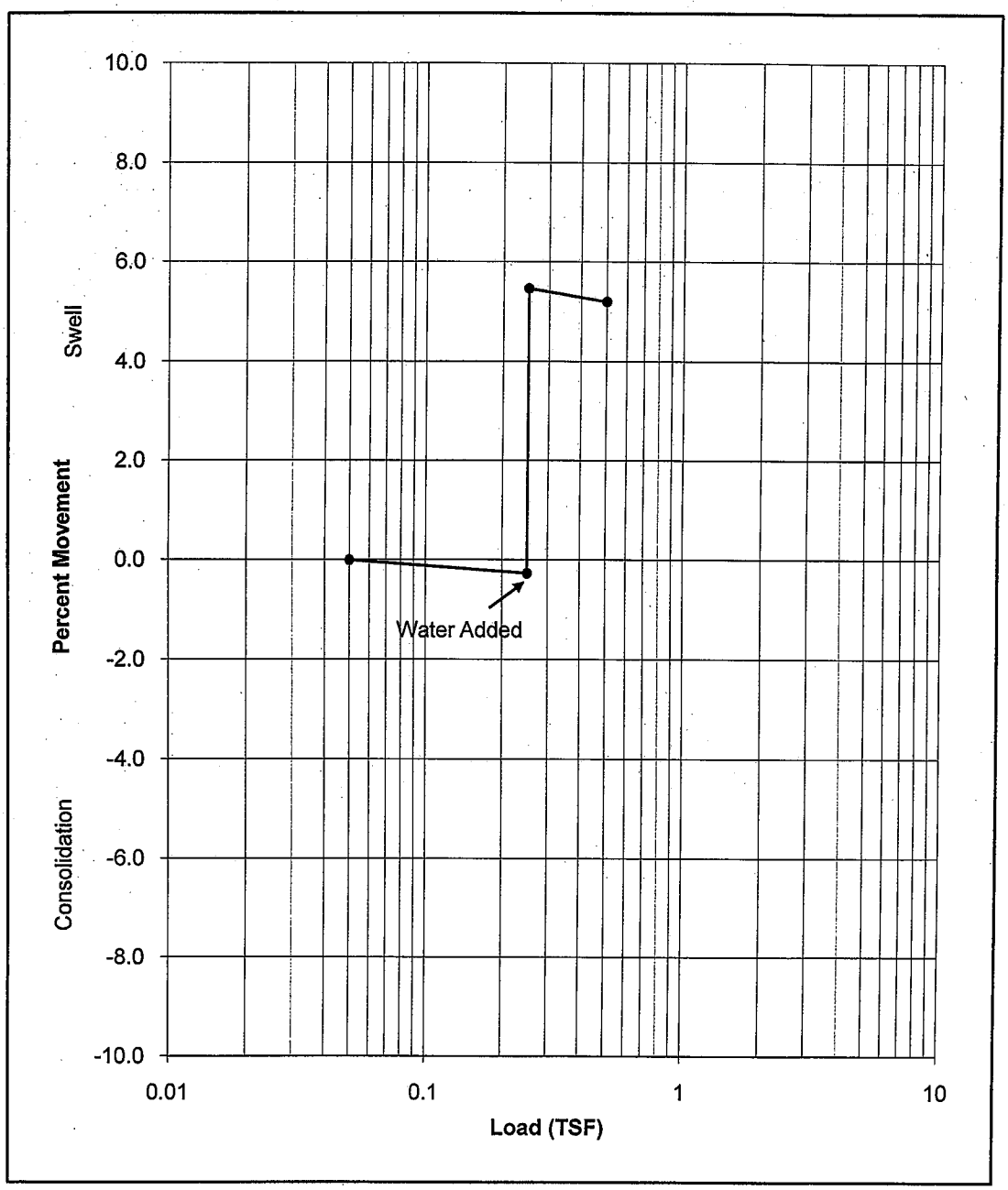
Material Description:	Brown Clayey Sand (SC)	
Sample Location:	Boring 13, Sample 1, Depth 4'	
Liquid Limit: 30	Plasticity Index: 14	% Passing #200: 44.6%
Beginning Moisture: 7.3%	Dry Density: 111.2 psf	Ending Moisture: 17.8%
Swell Pressure: 2300 psf	% Swell @ 500: 2.4%	



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 14, Sample 3, Depth 9'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 10.0%	Dry Density: 114.6 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 5.7%		

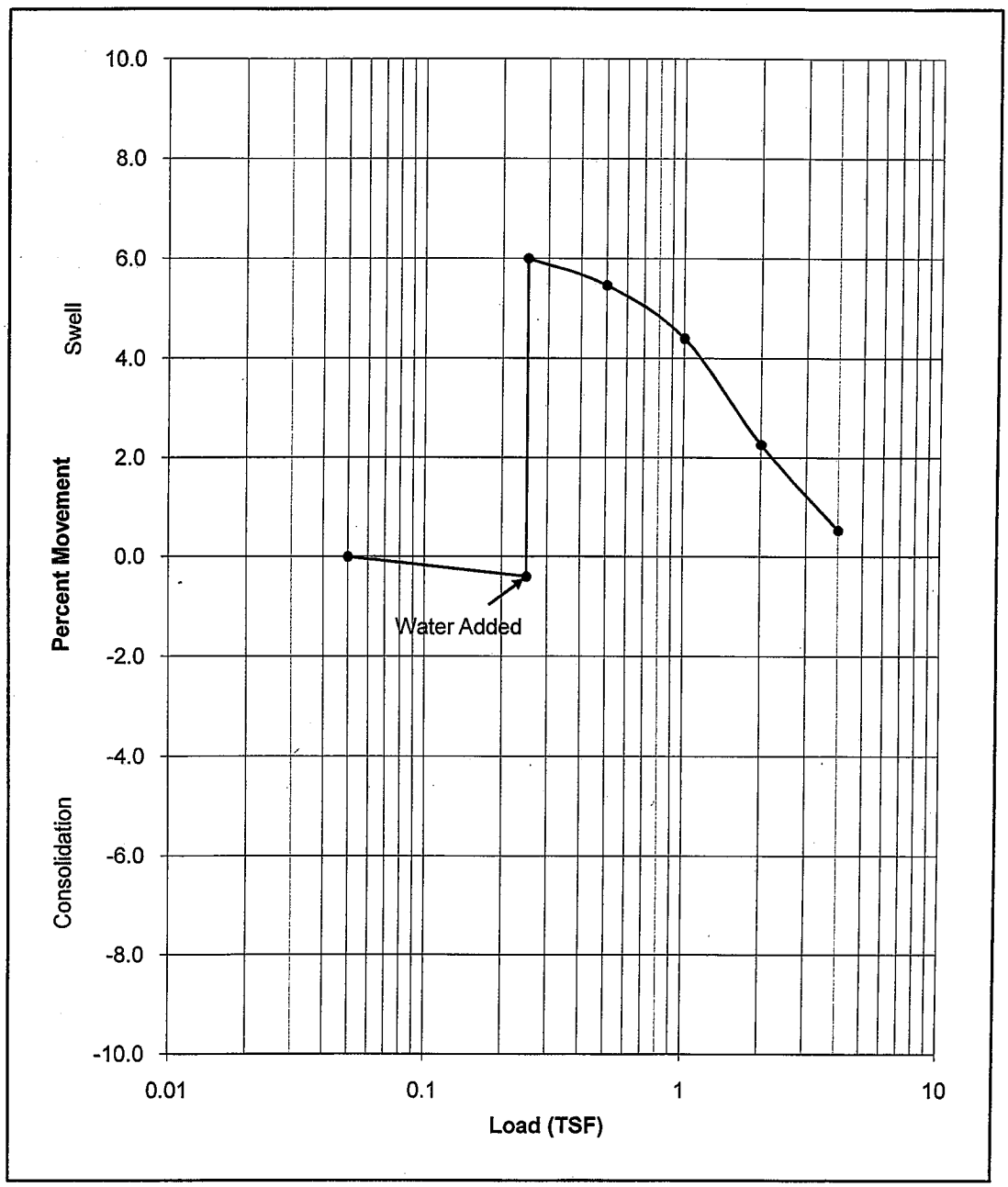


Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

EEC

SWELL / CONSOLIDATION TEST RESULTS

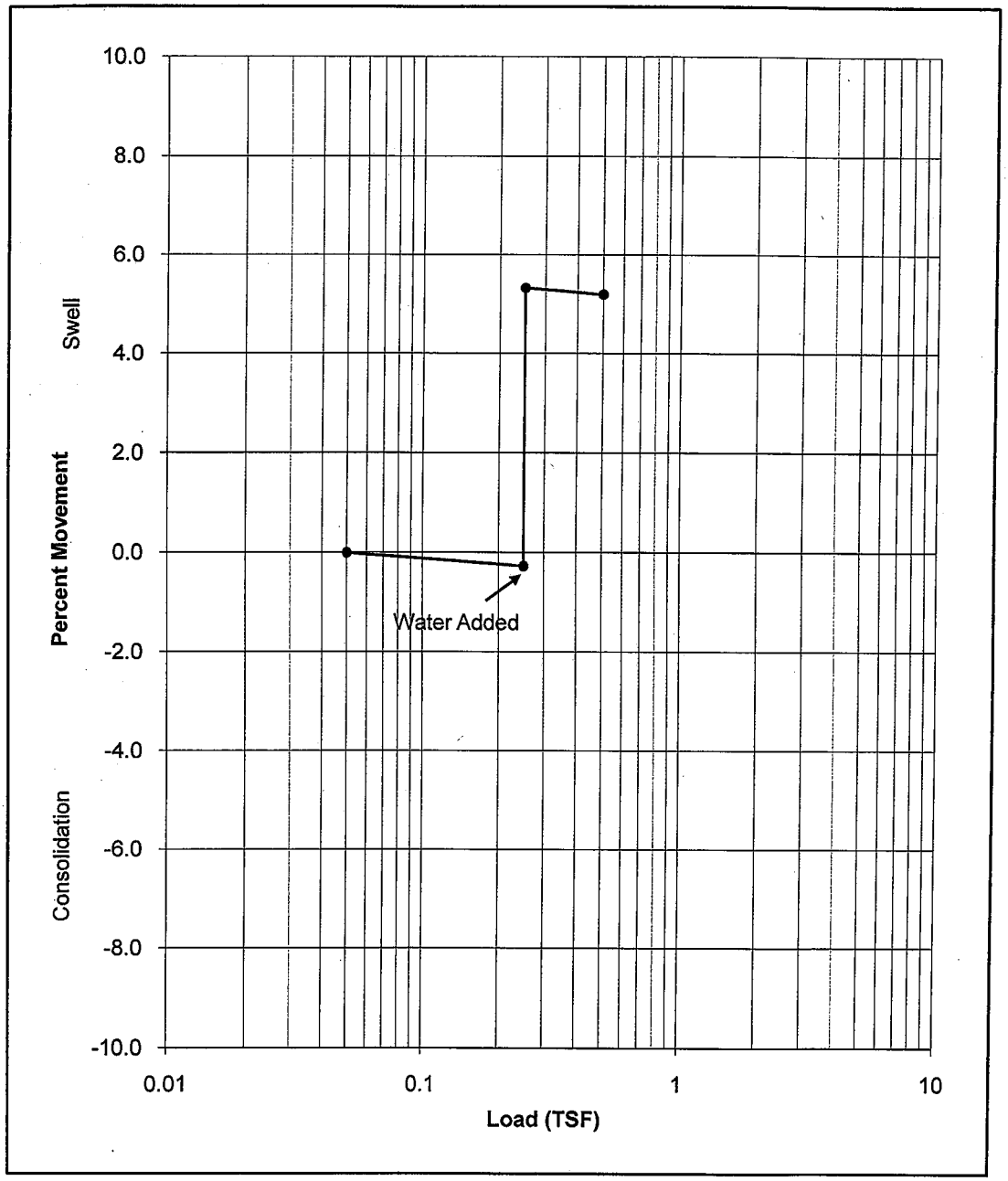
Material Description:	Brown Sandy Lean Clay (CL)	
Sample Location:	Boring 15, Sample 3, Depth 9'	
Liquid Limit: 39	Plasticity Index: 19	% Passing #200: 68.0%
Beginning Moisture: 11.6%	Dry Density: 119.9 psf	Ending Moisture: 16.9%
Swell Pressure:	% Swell @ 500: 6.4%	



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

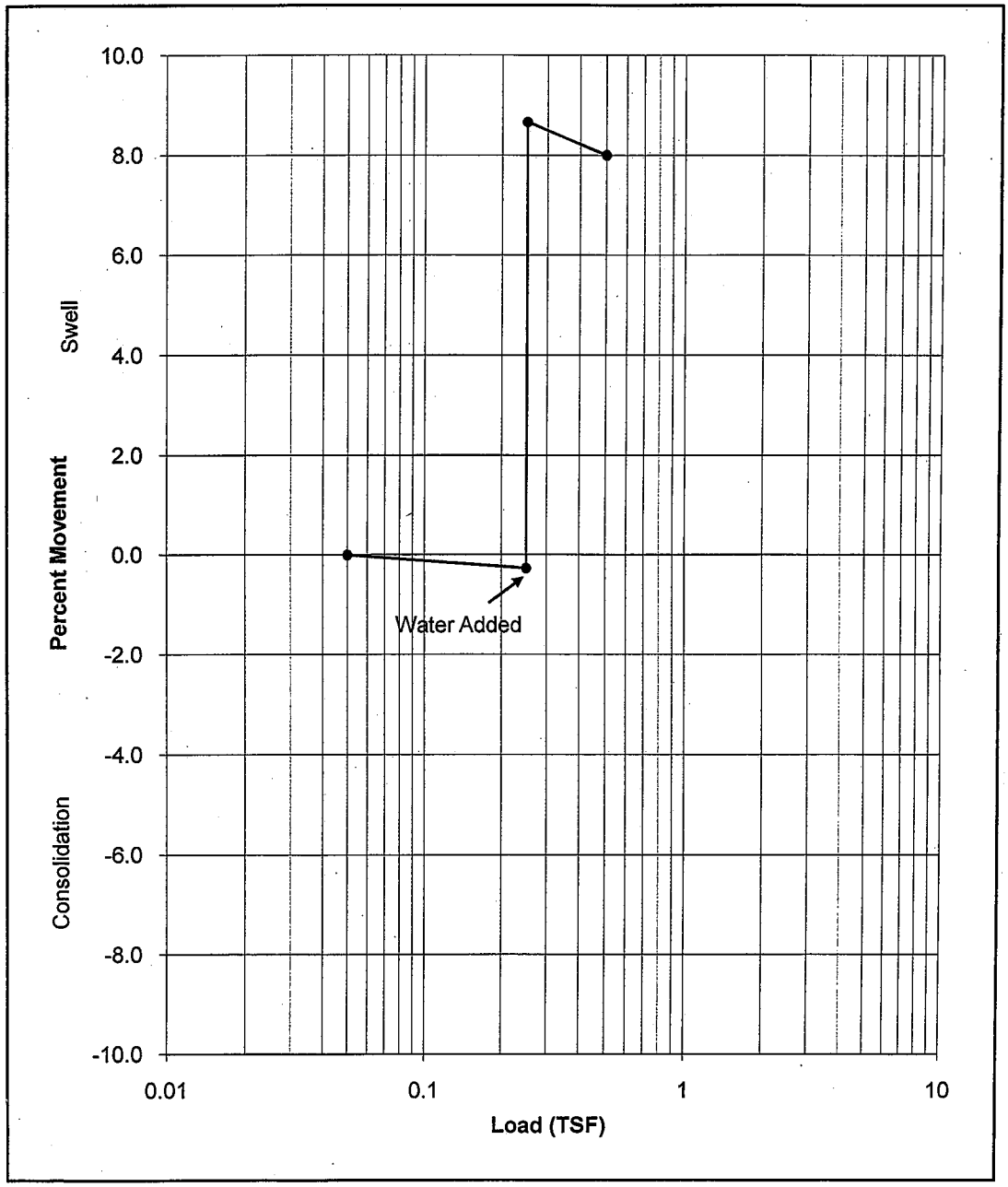
Material Description:	Brown Sandy Lean Clay (CL)		
Sample Location:	Boring 16, Sample 1, Depth 4'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 9.4%	Dry Density: 107.3 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 5.6%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

SWELL / CONSOLIDATION TEST RESULTS

Material Description:	Sandstone / Claystone / Siltstone		
Sample Location:	Boring 16, Sample 2, Depth 9'		
Liquid Limit: --	Plasticity Index: --	% Passing #200: --	
Beginning Moisture: 9.0%	Dry Density: 125.6 psf	Ending Moisture:	
Swell Pressure:	% Swell @ 500: 8.9%		



Project: Fossil Ridge Subdivision
Windsor, Colorado
Project #: 1092072
Date: November 2009

EEC