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PRELIMINARY GEOTECHNICAL ENGINEERING STUDY
CORVALLIS AT FOUNTAIN
PROPOSED ANNEXATION TO MIXED-USE DEVELOPMENT
NEAR MARKSHEFFEL ROAD AND FONTAINE BOULEVARD
FOUNTAIN, CO

Prepared By:

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Project No: 21-2-149

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SUMMARY

1. This study represents a 22-acre parcel of land that will be a part of the overall Corvallis at Fountain mixed-use development with a total footprint of just under 300 acres. Five exploratory borings were drilled for this study, and information from the forty-six borings drilled previously for the main development was referenced to evaluate the subsurface conditions at this site. The overburden soils in this area consisted of sandy lean clay with occasional zones of clayey sand. The clayey sand included gravel and was generally found in a relatively thin layer (about 2 feet thick) near the bedrock interface. The bedrock consisted of claystone and sandstone, and was encountered at widely varied depths ranging from about 8 to 33 feet in most borings, but was not encountered in Boring 2, drilled to a depth of 40 feet.

2. Groundwater was encountered in three borings at depths of 10 to 26 feet when measured the day of drilling, and in all five borings at depths of 8.6 to 37.6 feet when measured 10 days later. Groundwater is anticipated to fluctuate over time due to seasonal, climatic, or other factors. Long term groundwater monitoring was not conducted as part of the scope of this study. It is possible that seasonal high groundwater may be near or encroach upon below grade spaces such as basements or crawlspaces. This condition would require additional design considerations, and is discussed in more detail in the "Subsurface Drainage" section.

3. The swell potential of the soils tested ranged from low to high upon wetting, and two samples exhibited additional consolidation. The swell potential of the bedrock tested was high.

4. In general, we anticipate that shallow foundations will be feasible provided that sufficient over-excavation occurs. The maximum allowable bearing pressure for shallow foundations will likely be in the range of 2,000 to 2,500 psf. If the base elevations of the proposed structures are near bedrock, deep foundations or additional over-excavation will be required.

5. Deep foundations will also be feasible, with allowable end bearing pressures of 30 to 40 kips for piers bearing in unweathered bedrock.

6. Processed, moisture conditioned onsite soils will generally be suitable for re-use as fill, but processed bedrock should not be placed within developed areas unless it is at least 10 feet below the base of any structures. Imported fill materials should consist of granular soils with less than 35 percent passing the No. 200 sieve, a liquid limit less than 30 and a plasticity index less than 15.

7. Roadways will require moisture conditioning to a depth of at least 4 feet below the base of proposed pavement sections for low speed roadways. Based on the expected traffic volumes, we estimate that full depth asphalt pavement sections will be on the order of 8 to 10 inches thick, and composite sections can consist of 5 to 7 inches of asphalt over 12 inches of aggregate base.

PURPOSE AND SCOPE OF STUDY

This report presents the results of a preliminary geotechnical engineering study for the 22-acre parcel of land being considered for development, located in Fountain's Third Ward, west of Marksheffel Road, and south of Fontaine Boulevard. The project site is shown on Fig. 1. The study was conducted in general accordance with the scope of work in our Proposal No. C21-203, dated March 31, 2021 for the purpose of providing preliminary recommendations for site grading and to provide conceptual discussion regarding suitable foundation type or types, depths and allowable bearing pressures. It has been revised to exclude the option for the use of full depth asphalt, and to include the date of the field work conducted in the body of the report based on the comments received by the City of Fountain Community Services Planning Department.

This report has been prepared to summarize the data obtained during this study and to present our conclusions and preliminary recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations related to the proposed construction are included in the report. It is anticipated that additional study would be performed once grading and site layout details have been finalized to develop design level recommendations.

PROPOSED CONSTRUCTION

We understand the Corvallis at Fountain mixed-use development will consist of a total area of just under 300 acres including the subject site, and will include residential lots, asphalt paved roadways, open spaces, commercial lots, and a school site. The subject site is a 22-acre parcel referred to as the "Lacy Parcel", and is proposed to be annexed to the larger development. The Lacy Parcel will include medium to high density residential lots, roadways, and open space. Grading plans have not been provided, but site grading is anticipated to include cuts and fills up to about 10 feet in depth.

SITE CONDITIONS

The proposed subdivision is located within an undeveloped area of the northeastern portion of Fountain, Colorado. The topography includes gently rolling hills and valleys. The overall slope trends down to the east. Medium to high density residential lots border the south side of the site, and undeveloped land borders the remaining sides. The west tributary of Jimmy Camp Creek flows along the east border of the site within the proposed open space area. Several irrigation ditches run north to south along the west portion of the site, each about 2 feet in depth. Some erosional features including headward eroding gullies are located within this parcel. Vegetation is mainly composed of grasses, with shrubs and some small trees, with larger cottonwood trees near the streams and irrigation canal. Bedrock was exposed along the banks of the rivers in some locations, most notably within a cut bank near the southeast corner of the subject site.

SUBSURFACE CONDITIONS

Preliminary information on the subsurface conditions was obtained by drilling five borings at the approximate locations shown on Fig. 1. The borings were drilled on April 27, 2021. Information from the 46 borings drilled for the larger development was also considered. Graphic logs of the borings and the corresponding legend and notes are presented on Fig. 2 and 3. The results of laboratory testing performed on selected soil samples from the borings are presented on Figs. 4 through 7, and are summarized on Table I. The laboratory testing was conducted in general accordance with applicable ASTM standards. The following subsurface descriptions are of a generalized nature to highlight the major stratification features in the borings drilled for this study. The boring logs should be reviewed for more detailed information.

The overburden soils consisted of sandy lean clay with occasional zones of clayey sand. The clayey sand included gravel and was generally found in a relatively thin layer (about 2 feet thick) near the bedrock interface. Although not shown on the logs, sand is likely to be present in varying quantities at shallower depths as well given the relatively shallow cave depths measured within some borings. The clayey sand was fine to coarse grained with gravel, was loose, wet, and brown in color. The sandy lean clay possessed a medium plasticity, was soft to hard, slightly moist to wet, and light brown to brown in color. The clay tested exhibited potential for additional consolidation in two samples, and a low to moderate swell potential in the remaining samples when wetted under 1,000 and 200 psf surcharge pressures.

The bedrock consisted of claystone and sandstone, and was encountered at widely varied depths ranging from about 8 to 33 feet in most borings, but was not encountered in Boring 2, drilled to a depth of 40 feet. The claystone included occasional sandstone lenses, possessed a medium to high plasticity, included varied amounts of sand-sized grains, was hard to very hard, moist to very moist, and brown to gray in color. The sandstone possessed a low plasticity, was fined grained, very hard, moist, and brown in color. A sample of claystone tested exhibited a high swell potential upon wetting under a surcharge pressure of 1,000 psf.

Groundwater was encountered in three borings at depths of 10 to 26 feet when measured the day of drilling (April 27, 2021), and in all five borings at depths of 8.6 to 37.6 feet when measured 10 days later (May 7, 2021). Groundwater is anticipated to fluctuate over time due to seasonal, climatic, or other factors. Long term groundwater monitoring was not conducted as part of the scope of this study. It is possible that seasonal high groundwater may be near or encroach upon below grade spaces such as basements or crawlspaces. This condition would require additional design considerations, and is discussed in more detail in the “Subsurface Drainage” section.

FOUNDATION CONSIDERATIONS

As discussed in the section above, the soils encountered at this site were found to have a nil to high swell potential upon wetting under a surcharge load of 1,000 psf. In general, we anticipate that the existing clays will be suitable for the support of shallow foundations if sufficient over-excavation occurs. While processed, moisture conditioned onsite soils will most likely be suitable for re-use as fill, processed bedrock should not be placed within developed areas unless it is at least 10 feet below the base of any structures. Imported fill materials should consist of granular soils with less than 35 percent passing the No. 200 sieve, a liquid limit less than 30 and a plasticity index less than 15.

Shallow Foundations: Lightly to moderately loaded structures with column loads ranging up to about 50 kips may generally be supported on conventional shallow foundations consisting of shallow footing foundation systems supported on properly compacted structural fill. With proper site preparation, including removal, moisture conditioning and replacement of native soils with swell potential, swell risk can be mitigated to a low level. Imported structural fill may be required for support of heavier footing loads. Onsite clays that have been properly moisture-conditioned and compacted in accordance to recommendations provided in this report may be considered for structural fill, provided they are approved by the K+A Geotechnical Engineer.

Based on our limited subsurface exploration data, we anticipate that the maximum net allowable bearing pressure will be in the range of 2,000 to 3,000 psf for footings constructed over suitable fill. Footing foundations should also be designed for a minimum deadload approximately equal to 1/3 of the allowable bearing pressure. The minimum recommended footing depth will be 30 inches, based on local codes for frost protection. A modulus of subgrade reaction of about 75 pci can likely be used for mat foundations. If the base elevations of the proposed structures are near bedrock, deep foundations or additional over-excavation will be required.

Drilled Piers: Depending on the amount of fill proposed throughout this site, drilled piers will be a feasible foundation alternative as well. Drilled piers should be relatively easily to construct in these subsurface materials, and will provide high capacity for support with a low risk of excessive movement if they are extended to a sufficient depth into the bedrock. Based on our limited subsurface exploration data, we anticipate that allowable end bearing pressures on the order of 30 to 40 ksf can be achieved for piers extending into non-weathered bedrock. Allowable skin friction values of up to 2,500 psf will be achievable for the portion of the pier in non-weathered bedrock. Minimum dead load pressures of 10 ksf should be considered for preliminary design.

Relatively shallow ground water was encountered in some areas of the site indicating that dewatering will likely be necessary. Because the subsurface conditions consisted of clays over claystone in the majority of the areas, sloughing and caving are expected to occur minimally, and casing will probably not be required at the majority of the locations.

FLOOR SLAB CONSIDERATIONS

In our opinion, the most positive method for mitigating floor movements caused by potentially expansive soils/bedrock is to use a structural floor slab separated from the underlying subgrade by a well-ventilated crawl space. Considering the relative expense of a structural slab, slab-on-grade construction may be considered as an alternate to a structural slab for areas relatively tolerant of slab heave provided the increased risk of distress resulting from slab movement is accepted by the owner, and precautions are taken to reduce the effects of movement.

If soil supported slabs are considered, a zone of properly compacted non-expansive structural fill should be used to mitigate the risk of swell potential to a suitable level. As with shallow foundations, the existing soil encountered across the site or granular imported soil will be suitable for support of floor slabs if it is properly moisture conditioned and compacted. Any loose or unstable soils should be removed, where present within the building pads to provide a stable platform prior to placement of new fill. If the final grading is such that bedrock will be at the slab elevation, the zone of structural fill will need to be deepened.

To reduce the effects of some differential movement, floor slabs should be separated from all bearing walls and columns with expansion joints, which allow unrestrained vertical movement. Slab-on-grade supported partition walls and fixed structure elements should be provided with slip joints to accommodate the anticipated floor slab movement. Floor slab control joints should be used to reduce damage due to shrinkage cracking. The joint spacing and slab reinforcement should be established by the designer based on experience in concrete floor slab design using criteria such as that of the Portland Cement Association or American Concrete Institute.

SUBSURFACE DRAINAGE

The impact of shallow groundwater on the performance of the proposed structures, particularly those constructed with below-ground space, will depend to some degree on layouts and design finished grades. Underdrains should generally be planned for below-ground structures and slabs established less than three feet above the anticipated groundwater level.

For structures expected to extend below ground water, perimeter and slab subdrain systems should be planned in conjunction with pressure relief systems to prevent uplift due to buoyancy. Alternatively, structures potentially subject to buoyancy may be designed to resist hydrostatic uplift forces using drilled piers extending into bedrock.

The presence of a significant volume of shallow groundwater may preclude the practical construction of a basement. This condition should be considered on a lot-by-lot basis once the final site grading has been established. Additional long-term monitoring of groundwater levels may also be necessary at that time in order to gain a better understanding of the seasonal groundwater table and variation.

SITE GRADING

The extent of site grading necessary for the project had not been determined at the time of this study. We recommend the following general criteria be used when preparing the preliminary site grading plans.

Surface Drainage: The ground surface surrounding exteriors of the buildings should be sloped to drain away from the buildings in all directions. During project planning, site development plans should attempt to place the buildings at higher elevation than the surrounding ground surface. For preliminary planning, a slope of at least 12 inches within 10 feet of the building should be used for unpaved areas adjacent to the structure, and a minimum slope of 3 inches in the first 10 feet should be considered for paved areas placed adjacent to the structure. These slopes may be changed as required for handicap access points in accordance with the Americans with Disabilities Act.

Special Publication 43 of the Colorado Geologic Survey, “A Guide to Swelling Soils for Colorado Homebuyers,” provides useful information on drainage design and landscaping on expansive soil sites. Surface diversion features should be provided around parking areas to prevent surface runoff from flowing across the paved surfaces. The likelihood of maintaining relatively stable foundations and floor slabs for the life of the project will be significantly increased by planning a well-drained site with little to no irrigation adjacent to the buildings.

Cut and Fill Slopes: Permanent cut and fill slopes should not be steeper than 3:1 (horizontal to vertical). The risk of slope instability will be significantly increased if seepage is encountered in cuts. If seepage is encountered in permanent excavations, an investigation should be conducted to determine if the seepage will adversely affect the cut stability.

Good surface drainage should be provided for all permanent cuts and fills to direct the surface runoff away from the slope faces. Cut and fill slopes and other stripped areas should be protected against erosion by revegetation or other means. Fills should be benched into hillsides exceeding 4 horizontal to 1 vertical. Site grading should be planned to provide positive surface drainage away from all building and pavement areas.

No formal stability analyses were performed to evaluate the slopes recommended above. Published literature and our experience with similar cuts and fills indicate the recommended slopes should have adequate factors of safety. If a detailed stability analysis is required, we should be notified.

Fill Material Specifications: The following material specifications are presented for fills on the project site.

1. *Fill Within Building/Structure Footprints*: The on-site soils, minus any organics or otherwise deleterious materials, will be suitable for reuse as fill. The existing claystone should not be used in developed areas unless it is at least 10 feet below the base of the proposed structures as referenced from the bottom of the foundations. Claystone should be well processed to ensure adequate and uniform moisture conditioning, and should not contain fragments bigger than about 2 inches in diameter. Import soils should consist of a non-expansive granular material with a fines content less than 35 percent, a liquid limit less than 30, and a plasticity index less than 15.

2. *Pavement Areas:* Same as # 1 above.

3. *Utility Trench Backfill*: Material excavated from the utility trenches may be used for backfill provided it does not contain unsuitable material or particles larger than 2 inches.

4. *Material Suitability*: All fill material should be free of vegetation, brush, sod, construction or demolition debris, old foundations, and other deleterious substances. The geotechnical engineer should evaluate the suitability of all proposed fill materials prior to placement.

5. *Subgrade Preparation*: The ground surface shall be stripped of vegetation/organics prior to fill placement. The resulting ground surface should be scarified to a depth of 12 inches; moisture conditioned as necessary, and compacted in a manner specified below for the subsequent layers of fill. Loose or unstable soils shall be removed, where present, in order to provide a stable platform prior to placement of fill.

<u>Compaction Requirements</u>: Some of the overburden soils may exhibit swell potential if recompacted near or below the optimum moisture content. A representative of the geotechnical engineer should observe fill placement operations on a full-time basis. We recommend the following minimum compaction criteria be used on the project.

Area	Percentage of Maximum Standard Proctor Density (ASTM D 698)
Building Pads/Structure Footprints	98%
Pavement Areas/Exterior Flatwork	95%
Foundation Backfill	95%
Landscape and Other Misc. Overlot Fill Areas	95%
Compaction of fill materials should be achieved at a moisture content between +/-2% of optimum for granular soils, and optimum to +3% for clay soils.	

WATER SOLUBLE SULFATES

Sufates were not tested in this parcel, but the concentration of water-soluble sulfates measured in samples of soil obtained from the previous exploratory borings was widely varied and ranged from less than 0.01 to 1.47 percent. This concentration of water-soluble sulfates represents a Class 0 to Class 2 severity exposure to sulfate attack on concrete exposed to these materials.

The degree of attack is based on a range of Class 0, Class 1, Class 2, and Class 3 severity exposure as presented in ACI 201, with Class 0 requiring no special cement. Based on the laboratory data and our experience, we recommend all concrete exposed to the on-site materials meet the cement requirements for Class 2 exposure as presented in ACI 201. Alternatively, the concrete could meet the Colorado Department of Transportation's (CDOT) cement requirements for Class 2 exposure as presented in Section 601.04 of the CDOT Standard Specifications for Road and Bridge Construction (2019).

In our experience, sulfates can be present in relatively concentrated veins within the upper several feet of soils, particularly in areas such as this, where a negative average annual water balance is present. If significant reprocessing of the upper soils occurs during site grading, the sulfates will be more thoroughly mixed, and are likely to be present at lower concentrations than those reported in our study. If additional testing during or after site grading shows a sulfate concentration consistently less than 0.20 percent for the soils that will be in contact with the proposed concrete structures, concrete mix meeting the cement requirements for Class 1 exposure as presented in ACI 201 may be used.

PAVEMENT CONSIDERATIONS

Full-depth asphalt or composite asphalt and base course pavement sections should be feasible at the site with proper subgrade preparation. For the anticipated low volume roadways a composite section consisting of 5 to 7 inches of asphalt pavement over 12 inches of aggregate base will likely be suitable.

Due to the low to high swell potential of the existing soils, over-excavation, moisture conditioning, and recompaction should be performed to a depth of about 4 feet below the pavement section for low speed roadways. Higher speed roadways will require additional over-excavation. Also, if higher swelling soils are present, additional over-excavation or other means of stabilization may be necessary.

EXCAVATION CONSIDERATIONS

In our opinion, the soils and bedrock encountered in the exploratory borings drilled for this study can be excavated with standard heavy duty construction equipment, but the bedrock may require the use of equipment using rippers, particularly if well cemented zones are encountered. Confined excavations such as those for utility trenches may require the use of pneumatic chisels if very hard or cemented zones are encountered.

All excavations should be in accordance with OSHA, state and local requirements. The contractor should follow appropriate safety precautions. In accordance with OSHA guidelines, the majority of the clay soils will classify as a Type B material, but this should be verified at the time of excavation by the contractor's competent person. Per OSHA criteria, unless excavations are shored, temporary unretained excavations in Type B materials should have slopes no steeper than 1:1 (H:V). Flatter slopes will be required where groundwater seepage is encountered. OSHA regulations require that excavations greater than 20 feet in depth be designed by a professional engineer.

Depending on the type of structures built and the final grading planned, dewatering may be necessary. Specific dewatering criteria, if necessary, should be developed as part of the design level geotechnical engineering study.

LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical engineering practices in this area for use by the client for preliminary design (planning) purposes. The preliminary conclusions and recommendations submitted in this report are based upon the data obtained from the widely spaced exploratory borings drilled at the locations indicated on the exploratory boring plan, Fig. 1. Additional investigation must be conducted once building locations and floor elevations have been determined to provide final recommendations. We recommend on-site observation of site grading by a representative of the geotechnical engineer.

Swelling soils occur on this site. Such soils are stable at their natural moisture content but will undergo high volume changes with changes in moisture content. The extent and amount of perched water beneath the building site as a result of area irrigation and inadequate surface drainage is difficult, if not impossible, to foresee.

The recommendations presented in this report are based on current theories and experience of our engineers on the behavior of swelling soil in this area. Standards of practice in this area evolve over time. The owner should be aware that there is a risk in constructing a building in an expansive soil area. Following the recommendations given by a geotechnical engineer, careful construction practice and prudent maintenance by the owner can, however, decrease the risk of foundation movement due to expansive soils.

AFK/th

Rev. by DPC

VICINITY MAP
NOT TO SCALE

100 0 100 200
APPROXIMATE SCALE–FEET

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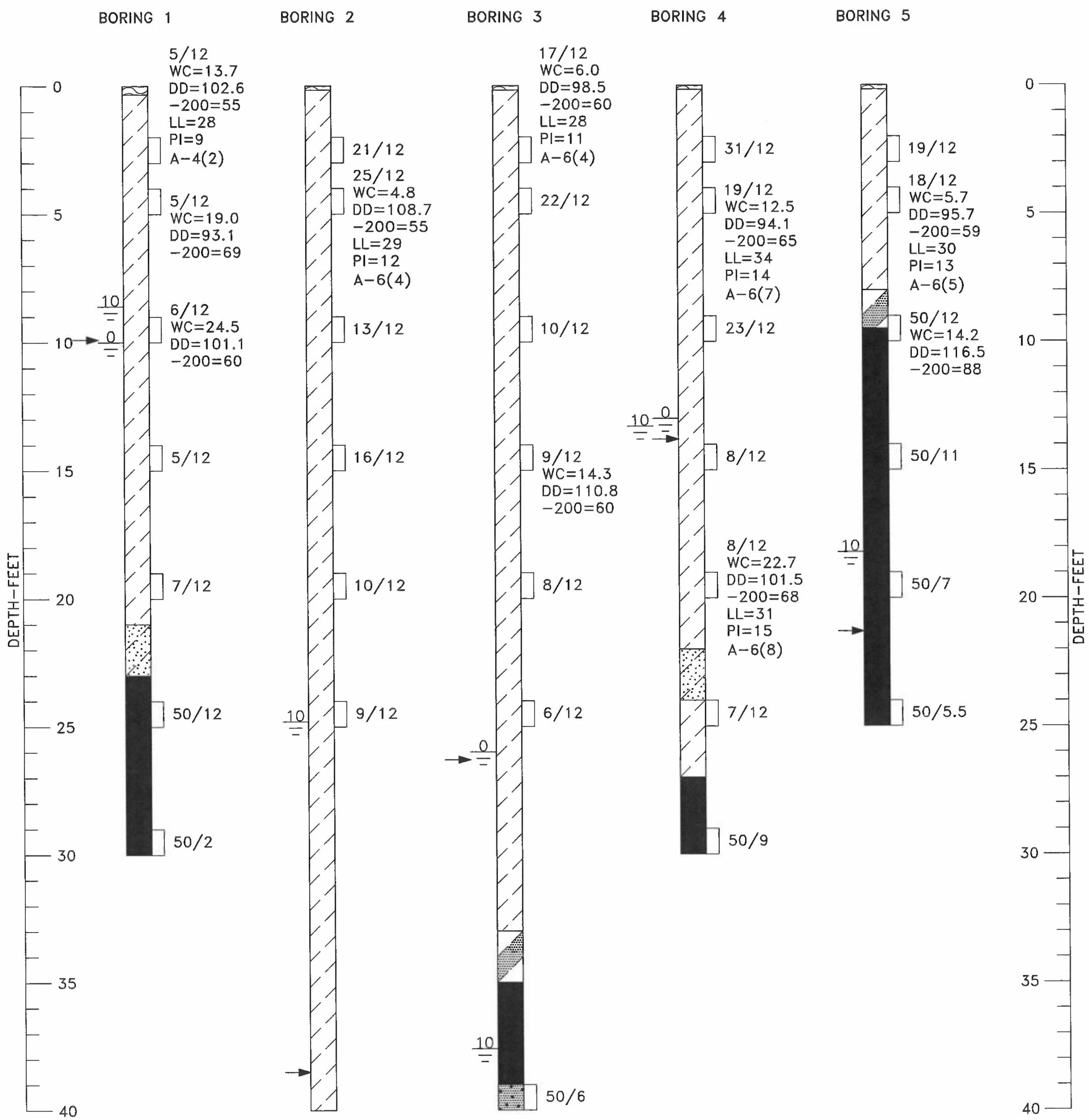
21–2–149	Kumar & Associates		LOCATION OF EXPLORATORY BORINGS	Fig. 1



LEGEND

TOPSOIL.

SANDY LEAN CLAY (CL), MEDIUM PLASTICITY, SOFT TO HARD, SLIGHTLY MOIST TO WET, LIGHT BROWN TO BROWN.

CLAYEY SAND (SC), FINE TO COARSE GRAINED WITH GRAVEL, LOOSE, WET, BROWN.

WEATHERED CLAYSTONE BEDROCK, MEDIUM PLASTICITY, MEDIUM HARD, MOIST, BROWN.

CLAYSTONE BEDROCK WITH OCCASIONAL SANDSTONE LENSES, MEDIUM TO HIGH PLASTICITY, WITH VARIED AMOUNTS OF SAND-SIZED GRAINS, HARD TO VERY HARD, MOIST TO VERY MOIST, BROWN TO GRAY.

SANDSTONE BEDROCK, LOW PLASTICITY, FINE GRAINED, VERY HARD, MOIST, BROWN.

DRIVE SAMPLE, 2-INCH I.D. CALIFORNIA LINER SAMPLE.

5/12 DRIVE SAMPLE BLOW COUNT. INDICATES THAT 5 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE THE SAMPLER 12 INCHES.

10 DEPTH TO WATER LEVEL AND NUMBER OF DAYS AFTER DRILLING MEASUREMENT WAS MADE.

→ DEPTH AT WHICH BORING CAVED.

NOTES

1. THE EXPLORATORY BORINGS WERE DRILLED ON APRIL, 27 WITH A 4-INCH-DIAMETER CONTINUOUS-FLIGHT POWER AUGER.
2. THE LOCATIONS OF THE EXPLORATORY BORINGS WERE DETERMINED APPROXIMATELY USING A HANDHELD GPS UNIT.
3. THE ELEVATIONS OF THE EXPLORATORY BORINGS WERE NOT MEASURED AND THE LOGS OF THE EXPLORATORY BORINGS ARE PLOTTED TO DEPTH.
4. THE EXPLORATORY BORING LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
5. THE LINES BETWEEN MATERIALS SHOWN ON THE EXPLORATORY BORING LOGS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES AND THE TRANSITIONS MAY BE GRADUAL.
6. GROUNDWATER LEVELS SHOWN ON THE LOGS WERE MEASURED AT THE TIME AND UNDER CONDITIONS INDICATED. FLUCTUATIONS IN THE WATER LEVEL MAY OCCUR WITH TIME.
7. LABORATORY TEST RESULTS:
   WC = WATER CONTENT (%) (ASTM D2216);
   DD = DRY DENSITY (pcf) (ASTM D2216);
   +4 = PERCENTAGE RETAINED ON NO. 4 SIEVE (ASTM D6913);
   -200= PERCENTAGE PASSING NO. 200 SIEVE (ASTM D1140);
   LL = LIQUID LIMIT (ASTM D4318);
   PI = PLASTICITY INDEX (ASTM D4318);
   A-4 (2) = AASHTO CLASSIFICATION (GROUP INDEX) (AASHTO M145);

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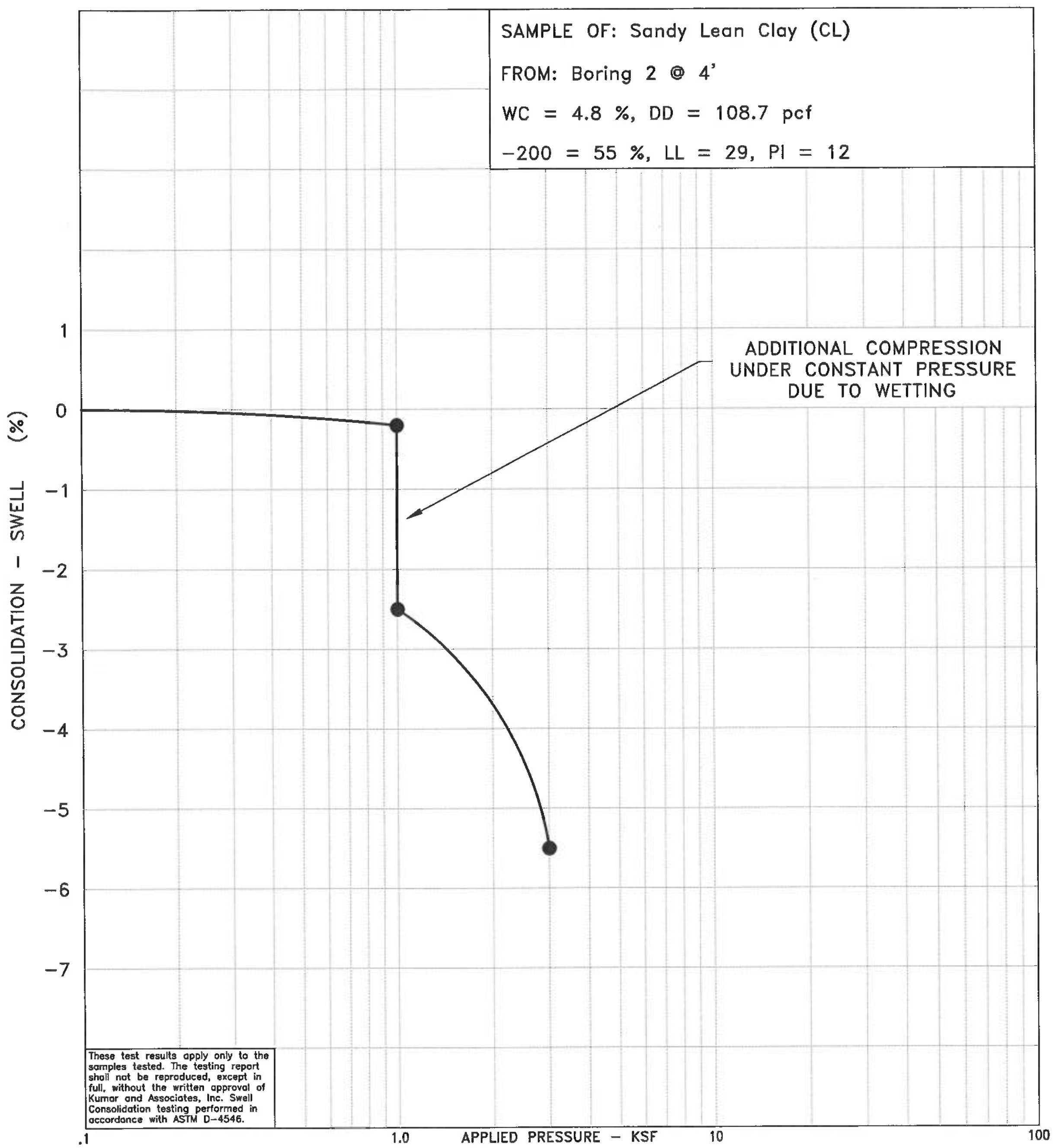
21-2-149	Kumar & Associates		LOGS OF EXPLORATORY BORINGS	Fig. 2



21-2-149	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULT	Fig. 3

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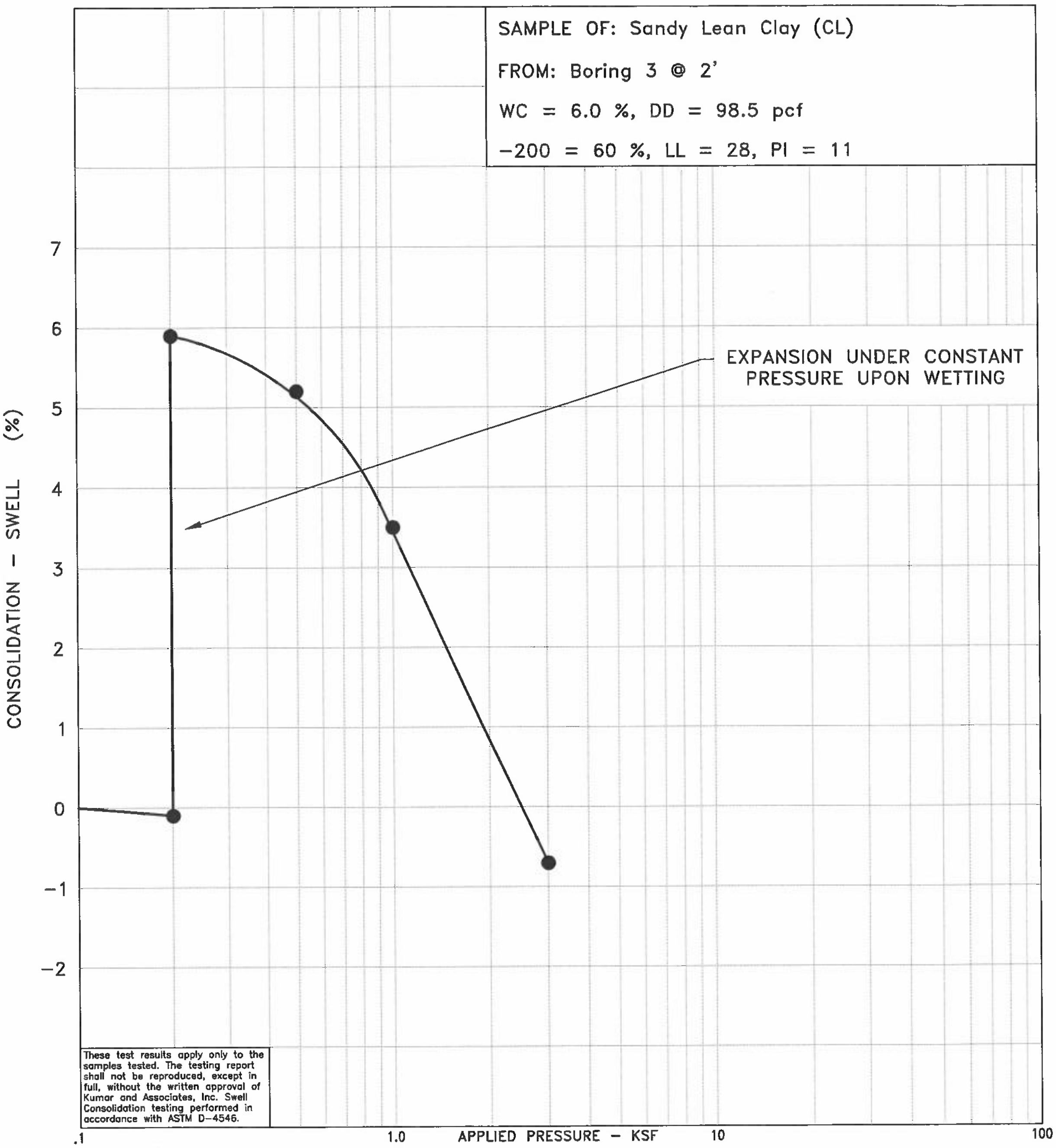

21−2−149	Kumar & Associates	SWELL−CONSOLIDATION TEST RESULT	Fig. 4

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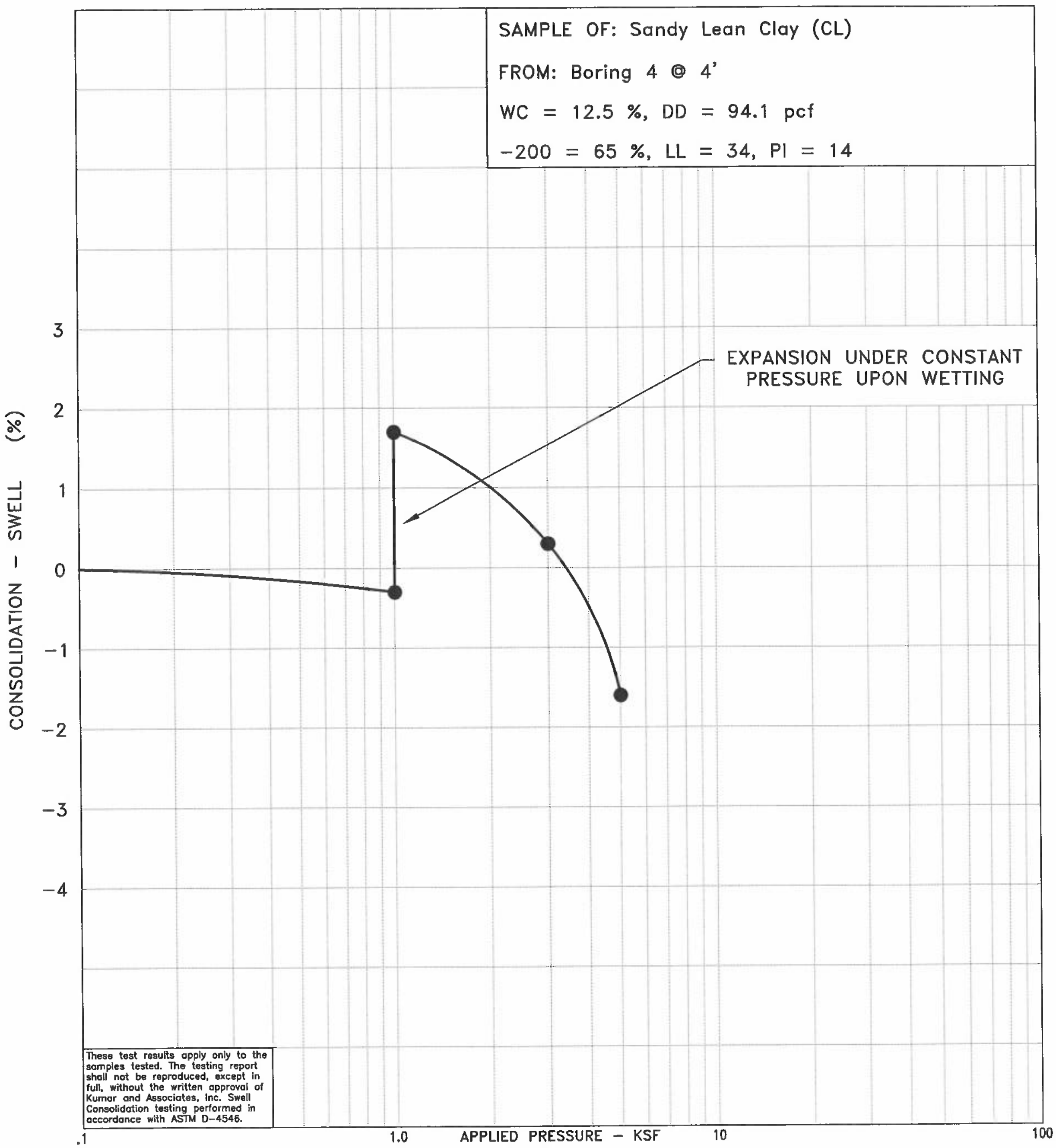

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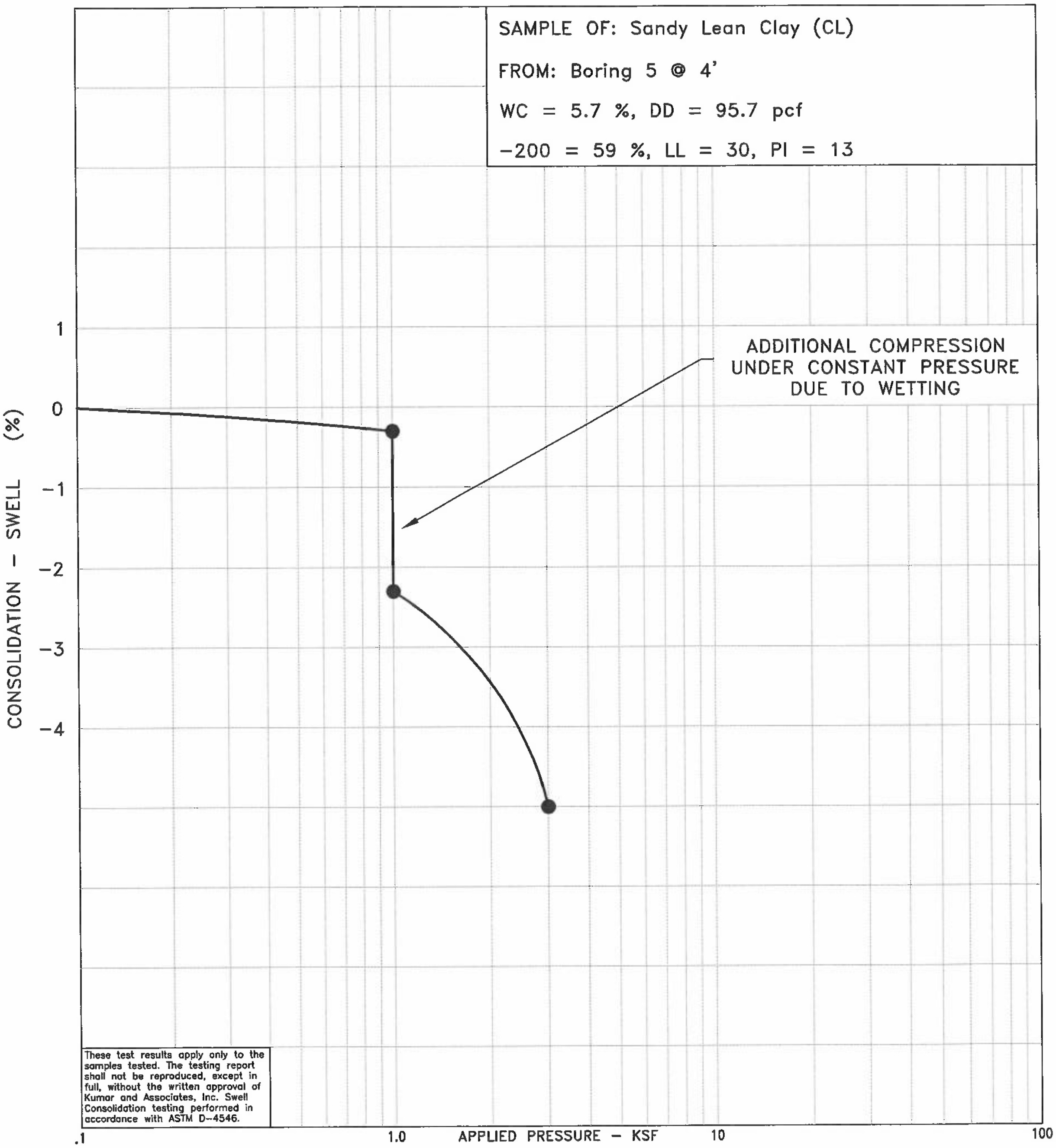
21-2-149	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULT	Fig. 5



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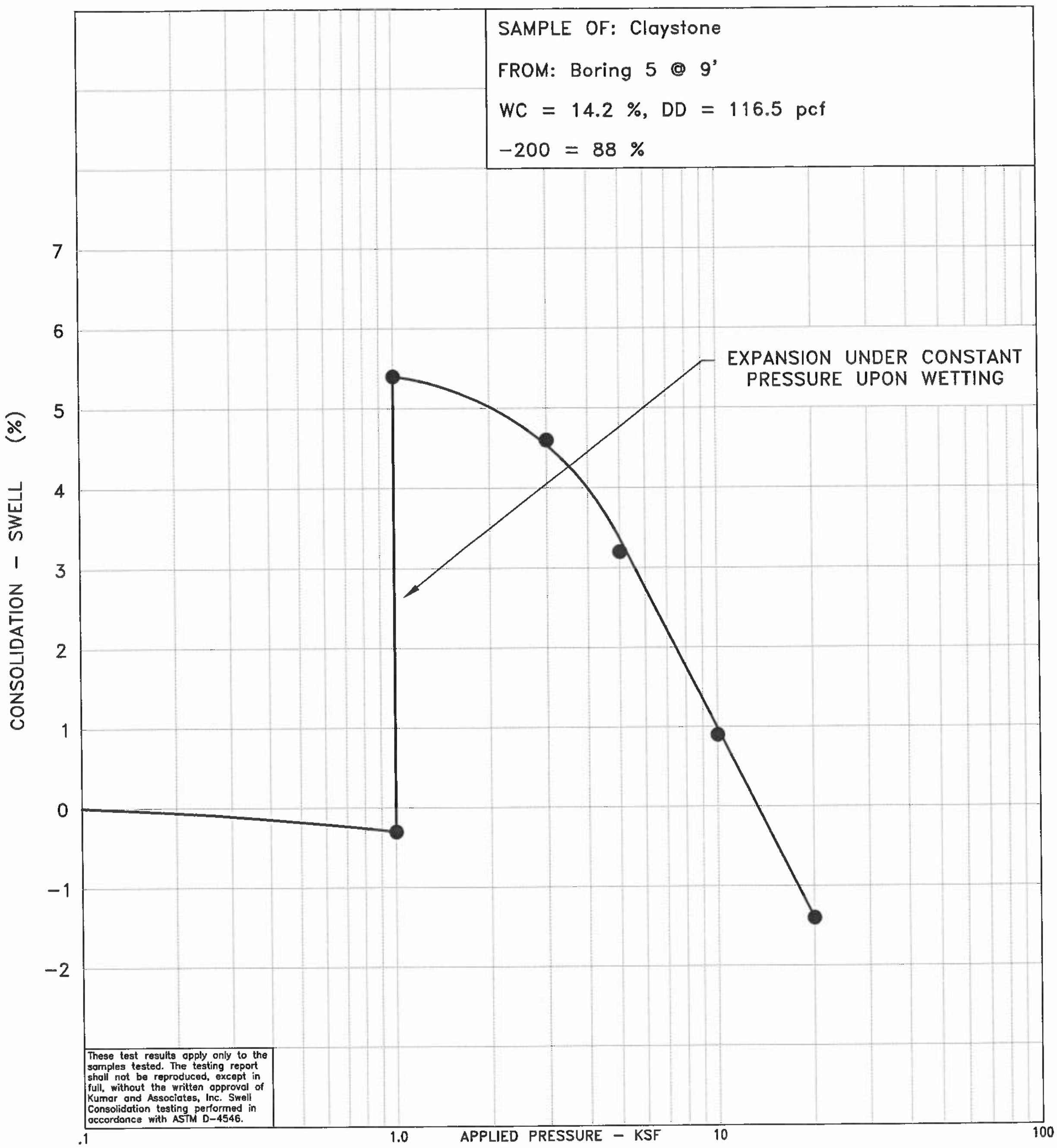
21-2-149	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULT	Fig. 6



21-2-149	Kumar & Associates	SWELL-CONSOLIDATION TEST RESULT	Fig. 7

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Kumar and Associates, Inc.

TABLE I

SUMMARY OF LABORATORY TEST RESULTS

Project No.: 21-2-149
Project Name: Corvallis
Date Sampled: 4/27/2021
Date Received: 4/29/2021

SAMPLE LOCATION		DATE TESTED	NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	GRADATION		PERCENT PASSING NO. 200 SIEVE	ATTERBERG LIMITS		WATER SOLUBLE SULFATES (%)	AASHTO CLASSIFICATION (Group Index)	SOIL OR BEDROCK TYPE (Unified Soil Classification)
BORING	DEPTH (ft)				GRAVEL (%)	SAND (%)		LIQUID LIMIT	PLASTICITY INDEX			
1	2	5/6/21	13.7	102.6			55	28	9		A-4 (2)	Sandy Lean Clay (CL)
1	4	5/6/21	19.0	93.1			69					Sandy Lean Clay (CL)
1	9	5/6/21	24.5	101.1			60					Sandy Lean Clay (CL)
2	4	5/6/21	4.8	108.7			55	29	12		A-6 (4)	Sandy Lean Clay (CL)
3	2	5/6/21	6.0	98.5			60	28	11		A-6 (4)	Sandy Lean Clay (CL)
3	14	5/6/21	14.3	110.8			60					Sandy Lean Clay (CL)
4	4	5/6/21	12.5	94.1			65	34	14		A-6 (7)	Sandy Lean Clay (CL)
4	19	5/6/21	22.7	101.5			68	31	15		A-6 (8)	Sandy Lean Clay (CL)
5	4	5/6/21	5.7	95.7			59	30	13		A-6 (5)	Sandy Lean Clay (CL)
5	9	5/6/21	14.2	116.5			88					Claystone