Appendix D

Geotechnical Investigation

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LIMITED GEOTECHNICAL INVESTIGATION

Cloverdale High School
Stadium Turf Replacement
97 School Street
Cloverdale, California

PREPARED FOR:

CLOVERDALE UNIFIED SCHOOL DISTRICT
97 SCHOOL STREET
CLOVERDALE, CALIFORNIA 95425

PREPARED BY:

GEOCON CONSULTANTS, INC.
2420 MARTIN ROAD, SUITE 380
FAIRFIELD, CALIFORNIA 94534

GEOCON PROJECT NO. E8695-04-11

JANUARY 2020

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. E8695-04-11
January 17, 2020

Cloverdale Unified School District
97 School Street
Cloverdale, California 95492

Attention: Ms. Lisa Ledet

Subject: CLOVERDALE HIGH SCHOOL
STADIUM TURF REPLACEMENT
97 SCHOOL STREET
CLOVERDALE, CALIFORNIA
LIMITED GEOTECHNICAL INVESTIGATION

Dear Ms. Ledet:

In accordance with your authorization, we have performed a limited geotechnical investigation for the turf replacement project planned at Cloverdale High School in Cloverdale, California. Our investigation was performed to observe the soil and geologic conditions that may impact site development and construction. The accompanying report presents the results of our study and conclusions and recommendations pertaining to the geotechnical aspects of the proposed project. The findings of this study indicate the site is suitable for development as planned provided the recommendations of this report are implemented during design and construction.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Sincerely,

GEOCON CONSULTANTS, INC.

DRAFT

Shane Rodacker, PE, GE
Senior Engineer

(1/e-mail) Addressee
(1/e-mail) ATI Architects
Attention: Ms. May Mohamed

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LIMITED GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our limited geotechnical investigation for a planned turf replacement project at Cloverdale High School in Cloverdale, California (see Vicinity Map, Figure 1). The purpose of this investigation was to evaluate the subsurface soil conditions in the proposed development area and provide conclusions and recommendations pertaining to the geotechnical aspects of the project design and construction, based on the encountered conditions.

The scope of this investigation included field exploration, laboratory testing, engineering analysis and the preparation of this report. Our field exploration was performed on June 28, 2019 and included 10 exploratory borings to depths of approximately 5 feet below existing grade at the site. The approximate locations of our borings are depicted on the Site Plan, Figure 2. Details of our field exploration program and boring logs are presented in Appendix A.

Laboratory tests were performed on selected soil samples obtained during the investigation to determine pertinent geotechnical parameters for engineering analyses. Appendix B presents a summary of the laboratory test results.

The recommendations presented herein are based on analysis of the data obtained during the investigation and our experience with similar soil and geologic conditions. References reviewed to prepare this report are provided in the *List of References* section.

2. SITE CONDITIONS AND PROJECT DESCRIPTION

The project site is John L. Allen Memorial Field at Cloverdale High School. The existing stadium includes a natural grass athletic field and surrounding unpaved track. Bleacher stands, a press box and paved pedestrian walkways are present on the western side of the field. Residential development abuts the western, southern and eastern sides of the site. The Cloverdale High School campus is located north of the stadium. Light standards along the western and eastern site margins will be re-used and fitted with modern lighting equipment.

Site topography is generally flat and level with site drainage by sheet flow to surrounding areas. Based on web-based topographic information, site elevation is approximately 355 to 360 feet above mean sea level (MSL). A short slope ascends the northern margin of the site to the high school campus. At the time of our May and June 2019 site visits, active seepage and ponded water were observed near the base of the slope. We understand that project grading and improvements have been designed to address the seepage condition and poor drainage in this area.

Based on information and plans provided by the project architect (ATI Architects & Engineers), the project will include a new synthetic turf system, goalposts, and associated site improvements such as storm drain, subsurface drainage system and exterior flatwork. Improvements for track and field activities are also planned – long jump pits, discus cage, shotput station, etc. The new field will be underlain by a subdrain system (designed by others) in a herringbone configuration. The subdrain system will include a new storm drain inlet at the northwestern corner of the site and will outlet to a retention basin at the southwestern corner. The retention basin will outlet to the southeast to a nearby drainage course. We understand the basin is proposed to be 8 feet deep with 2:1 (horizontal:vertical) side slopes. The project plans by ATI indicate the basin is approximately 20 feet away from the concrete path that will surround the new running track.

Aside from cuts for the planned retention basin, we anticipate finished grades will be within one foot of existing throughout the project limits. If project details differ from those described herein, we should be contacted to review the applicability of the conclusions and recommendations presented in this report.

3. SOIL AND GEOLOGIC CONDITIONS

We identified site soil conditions and geology through exploratory borings and review of published geologic literature (see *List of References*). Soil descriptions provided below include the Unified Soil Classification System (USCS) symbol where applicable. Refer to the exploratory boring logs included in Appendix A for the vertical extents of the materials encountered at each exploratory boring location.

3.1 Regional and Local Geology

Cloverdale is located within the Coast Ranges geomorphic province of California which is characterized by subparallel north- to northwest-trending mountain ranges and intermountain alluvial valleys. Based on geologic mapping by the United States Geological Survey (USGS), Quaternary age alluvium underlies the site.

3.2 Artificial Fill

We encountered suspected fill materials in our Boring B4 at the northeastern margin of the existing athletic field. The fill materials were observed as medium stiff clays (CL) with fine gravels and sands. Brick fragments were noted in the upper limits of our soil boring.

3.3 Alluvium

Alluvial deposits were encountered in 9 of our 10 borings. The alluvium extended to the maximum depth explored (5 feet) and typically consisted of medium stiff to very stiff clays (CL) and silts (ML) with minor percentages of sand and fine gravel. Our Boring B10 near the northern limit of the site encountered a distinct layer of loose gravelly sand (SM) at a depth of 1 ½ to 3 feet. Free water was observed in the sands and the layer may be associated with the localized seepage observed in this area during our site visits in May and June 2019.

Soil conditions described in the previous paragraphs are generalized. Therefore, we advise the reader to consult the exploratory boring logs included in Appendix A. Logs include soil type, color, moisture, consistency, and USCS classification of the materials encountered at specific locations and elevations.

4. GROUNDWATER

Groundwater was encountered at approximate depths of 1½ feet Boring B10 and 3½ feet in Boring B4. Fluctuations of groundwater levels may occur due to variations in precipitation, temperature, and other factors. Depth to groundwater can also vary significantly due to localized pumping, irrigation practices, and seasonal fluctuations. Therefore, it is possible that groundwater may be higher or lower than the levels observed during our investigation.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 General

5.1.1 It is our opinion that neither soil nor geologic conditions were encountered during the investigation that would preclude the project provided the recommendations presented herein are followed and implemented during design and construction. Primary geotechnical considerations are the presence of shallow seepage in the northern portion of the site and the expansive nature of the alluvium that mantles most of the site.

5.1.2 All references to relative compaction and optimum moisture content in this report are based on ASTM D 1557 (latest edition).

5.1.3 The conclusions and recommendations provided in this report are based on our review of the referenced literature, analysis of data obtained from our field exploration, laboratory testing program, and our understanding of the proposed development at this time.

5.1.4 We should be retained to review the project plans as they develop further, provide engineering consultation as-needed, and perform geotechnical observation and testing services during construction.

5.2 Soil and Excavation Characteristics

5.2.1 The in-situ soils can be excavated with moderate effort using conventional grading and excavation equipment.

5.2.2 Temporary excavations, such as footing excavations or utility trench sidewalls in native clayey alluvium should remain near vertical to depths of about 4 feet, although, some sloughing and caving may occur particularly within sandy/gravelly material. It is the contractor's responsibility to provide sufficient and safe excavation support as well as protecting nearby utilities, structures, and other improvements, which may be damaged by earth movements. Excavation operations should comply with applicable California Occupational Safety and Health Administration (Cal OSHA) requirements.

5.2.3 In general, our laboratory testing indicates the site soils encountered in our field exploration are considered expansive (Expansion Index more than 20) as defined by 2019 California Building Code (CBC) Section 1803A.5.3. The recommendations herein and based on our experience in the area and the results of our laboratory testing and reflect the presence of low to moderately expansive soils.

5.3 Materials for Fill

5.3.1 Excavated soils generated from cut operations at the site are suitable for use as engineered fill in structural areas provided they do not contain deleterious matter, organic material, or oversize materials (i.e. cementations larger than 6 inches in maximum dimension). We do not expect that excavations in the onsite soils will generate oversize materials. However, artificial fills are present in some areas of the site and may contain constituents not encountered in our borings and reported herein.

5.3.2 Import fill material should be primarily granular with an Expansion Index less than 20, a Plasticity Index less than 15, be free of organic material and construction debris, and not contain rock larger than 3 inches in greatest dimension.

5.3.3 Environmental characteristics and corrosion potential of import soil materials may also be considered. Proposed import materials should be sampled, tested, and approved by Geocon prior to its transportation to the site.

5.4 Wet Weather Grading Conditions

5.4.1 If grading commences in winter or spring, or in periods of precipitation, excavated and in-place soils will likely be wet. Earthwork contractors should be aware of moisture sensitivity of fine-grained soils and potential compaction/workability difficulties.

5.4.2 Earthwork operations in these conditions will likely be difficult with low productivity. Often, a period of at least one month of warm and dry weather is necessary to allow the site to dry sufficiently so that heavy grading equipment can operate effectively. Conversely, during the dry summer and fall months, dry clay soils may require additional grading effort (discing or other means) to attain proper moisture conditioning. Consideration should be given to performing grading operations outside of the typical rainy season.

5.5 Grading

5.5.1 All earthwork should be observed and all fills tested for recommended compaction and moisture content by representatives of Geocon Consultants (Geocon).

5.5.2 Prior to commencing grading, a pre-construction conference with representatives of the client, grading contractor, and Geocon should be held at the site. Site preparation, soil handling and/or the grading plans should be discussed at that time.

5.5.3 Site preparation should begin with removal of any surface and subsurface structures and the stripping of organic-laden surficial soils. Abandoned utilities should be completely removed and properly backfilled with native clayey soils. Existing fills in areas of planned improvement should be over-excavated to depths necessary to expose native alluvial soils. The resulting over-excavation bottom should be scarified and recompacted prior to placing fill materials. Our representative should be present during site preparation activities to identify subsurface conditions and potentially unsuitable materials. Over-excavation requirements may be relaxed at the sole discretion of our field representatives based on soils conditions encountered during grading.

5.5.4 Excavations or depressions resulting from site clearing operations, or other existing excavations or depressions, should be restored with engineered fill in accordance with the recommendations of this report.

5.5.5 The upper 1 foot of soil below the turf subsurface drainage blanket or below subgrade in planned flatwork areas adjacent to the track should be lime-treated to mitigate the shrink-swell potential of the clayey soils and to establish a relatively uniform subgrade support characteristic. We should perform additional analyses to determine the percent lime required to mitigate the expansion potential of the native soils. Approximately 5 percent quicklime (by weight) should be assumed for estimating purposes. Lime treatment would require an initial application and mixing followed by a subsequent mixing and compaction operation approximately 24 hours later. Care should be taken to contain lime-treatment operations such that lime is not applied to areas where vegetation is planned.

5.5.6 All structural fill (including scarified ground surfaces and backfill) should be placed in layers no thicker than will allow for adequate bonding and compaction (typically 8 to 12 inches). Fill soils should be placed, moisture conditioned to at least two percent above optimum moisture content (near optimum for predominantly sandy material or lime-treated soils), and compacted to at least 90% relative compaction.

5.5.7 Areas to receive fill should be scarified to at least 12 inches, uniformly moisture-conditioned to at least 2% above optimum moisture content, and compacted to at least 90% relative compaction.

5.5.8 We note that slopes comprised of clayey soils can be susceptible to shallow sloughing and/or slope creep that can adversely impact improvements at or near the top of slopes. The cut slopes for the retention basin should be observed by Geocon at the time of grading. Supplemental recommendations and remedial grading may be required.

5.6 Underground Utilities

5.6.1 Underground utility trenches should be backfilled with properly compacted material. The material excavated from the trenches should be adequate for use as backfill provided it does not contain deleterious matter, vegetation or rock larger than six inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding eight inches and should be compacted to at least 90% relative compaction at least 2% above optimum moisture (near optimum where backfill materials are predominantly sands and/or gravels).

5.6.2 Bedding and pipe zone backfill typically extends from the bottom of the trench excavations to a minimum of 6 inches above the crown of the pipe. Pipe bedding material should consist of crushed aggregate, clean sand or similar open-graded material. Proposed bedding and pipe zone materials should be reviewed by Geocon prior to construction; open-graded materials such as ¾ inch drain rock may require wrapping with filter fabric to mitigate the potential for piping. Pipe bedding and backfill should also conform to the requirements of the governing utility agency.

5.7 Drilled Shaft Foundations

5.7.1 Cast-in-place concrete, straight shaft concrete piers may be used to support new goalposts for the project. The piers should have a minimum diameter of 24 inches and minimum embedment depth of 5 feet. The upper 2 feet of soil should be neglected when calculating for vertical capacities. Allowable skin friction to resist axial compression loads may be used at 300 pounds per square foot. For uplift capacity, allowable skin friction may be assumed to be two-thirds of that in compression. The allowable axial compression and uplift capacities may be increased by one-third when considering transient wind or seismic loads.

5.7.2 Drilled shaft foundations should have a minimum center-to-center spacing of at least three pier diameters and any end bearing contribution should be ignored. Allowable passive pressure used to resist lateral movement may be assumed to be equal to a fluid weighing 250 pounds per cubic foot (pcf). The passive pressure may be applied over two pier diameters. Where not protected by pavement, passive resistance should be ignored for the upper 1 foot of site soils. Where within the limits of the planned turf system, passive resistance should be ignored from the bottom of the drainage blanket upward.

5.7.3 Pier excavations should be clear of loose soil, debris, and standing water prior to placing reinforcing steel. Temporary casings may be needed if caving conditions are encountered. Drilled shaft excavation should be observed by our representative prior to placing reinforcing steel.

5.8 Exterior Flatwork

5.8.1 Exterior slabs, not subject to traffic loads, should be at least 4 inches thick and reinforced with No. 3 steel reinforcing bars placed 24 inches on center in both horizontal directions, positioned near the slab midpoint. Due to expansive soils conditions, we recommend that at least 6 inches of Class 2 Aggregate Base (AB) compacted to at least 90% relative compaction be used below exterior concrete

slabs. Prior to placing AB, the subgrade should be moisture conditioned to at least 2% above optimum and properly compacted to at least 90% relative compaction.

5.8.2 In lieu of specific recommendations from the structural or civil engineer, we recommend that crack control joints be spaced at intervals not greater than 8 feet for 4-inch-thick slabs. Crack control joints should extend a minimum depth of one-fourth the slab thickness and should be constructed using saw-cuts or other methods as soon as practical after concrete placement.

5.8.3 The recommendations of this report are intended to reduce the potential for cracking of slabs due to soil movement. However, even with the incorporation of the recommendations presented herein, foundations and slabs-on-grade may exhibit some cracking due to soil movement. This is common for project areas that contain expansive soils since designing to eliminate potential soil movement is cost prohibitive. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

5.8.4 The performance of flatwork is highly dependent upon providing positive surface drainage away from the edge of slabs. Ponding of water on or adjacent to the flatwork will likely result in saturation of the subgrade materials and potentially subsequent cracking, subsidence and pavement distress. If irrigated areas are planned adjacent to flatwork, it is recommended that the perimeter curb be extended at least 6 inches below the bottom of the aggregate base to minimize the introduction of water beneath the flatwork. Alternatives such as plastic moisture cut-offs may also be considered in lieu of deepened curbs.

5.9 Surface Drainage and Landscaping Considerations

5.9.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change to important engineering properties. Proper drainage should be maintained at all times.

5.9.2 All site drainage should be collected and transferred to non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation. Drainage should not be allowed to flow uncontrolled over any descending slope.

5.9.3 We recommend implementing measures to reduce infiltrating surface water near foundations and exterior slabs. Such measures may include:

- Selecting drought-tolerant plants that require little or no irrigation, especially within 3 feet of foundations or exterior flatwork.
- Using drip irrigation or low-output sprinklers.
- Using automatic timers for irrigation systems.
- Appropriately spaced area drains.

5.9.4 Experience has shown that even with these provisions, subsurface seepage may develop in areas where no such water conditions existed prior to site development. This is particularly true where a substantial increase in surface water infiltration has resulted from an increase in landscape irrigation.

6. FURTHER GEOTECHNICAL SERVICES

6.1 Plan and Specification Review

6.1.1 We should review the improvement plans and specifications prior to final design submittal to assess whether our recommendations have been properly implemented and evaluate if additional analysis and/or recommendations are required.

6.2 Testing and Observation Services

6.2.1 The recommendations provided in this report are based on the assumption that we will continue as Geotechnical Engineer of Record throughout the construction phase. It is important to maintain continuity of geotechnical interpretation and confirm that field conditions encountered are similar to those anticipated during design. If we are not retained for these services, we cannot assume any responsibility for others interpretation of our recommendations, and therefore the future performance of the project.

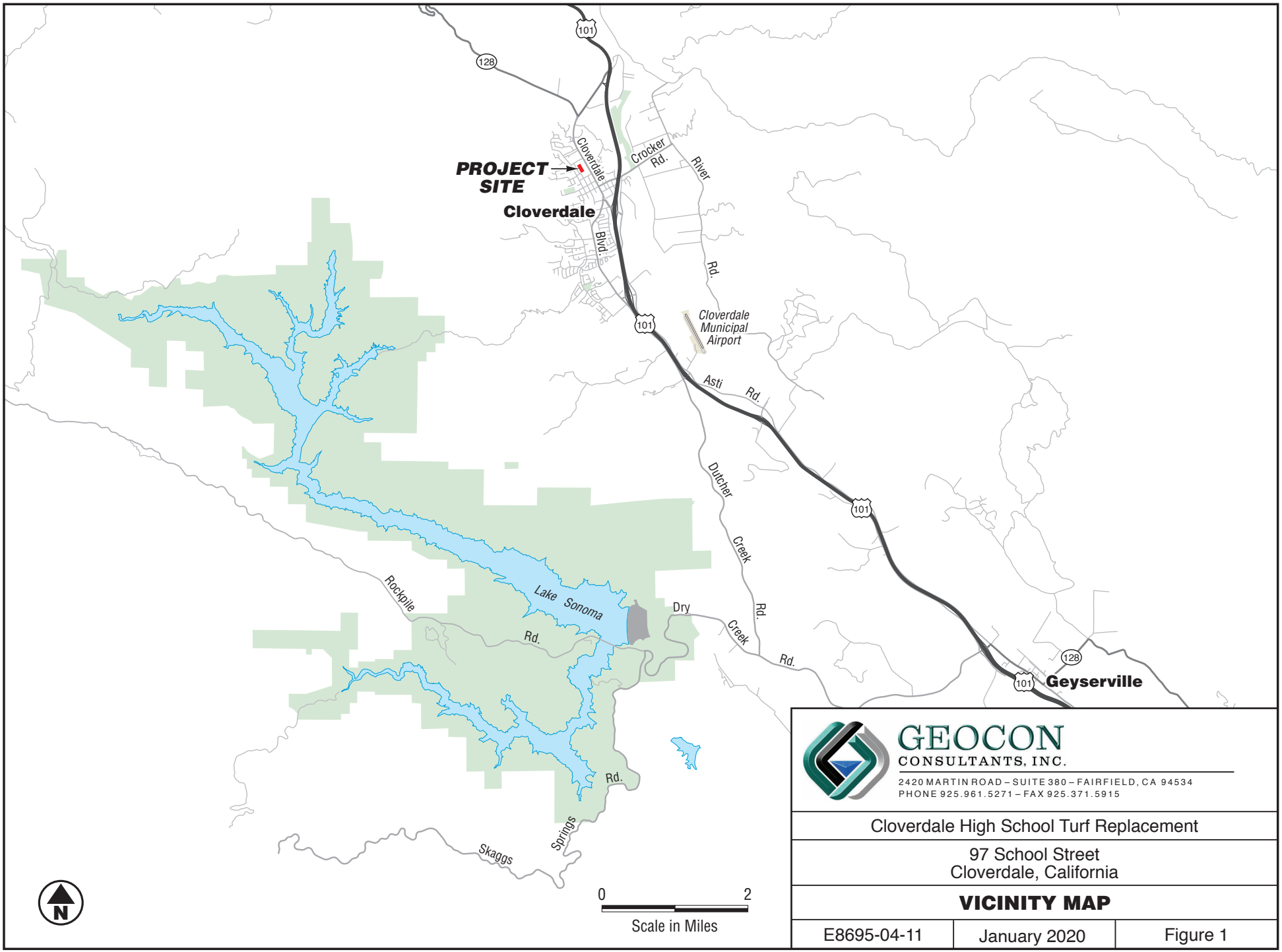
LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Consultants, Inc. should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Consultants, Inc.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices used in the site area at this time. No warranty is provided, express or implied.



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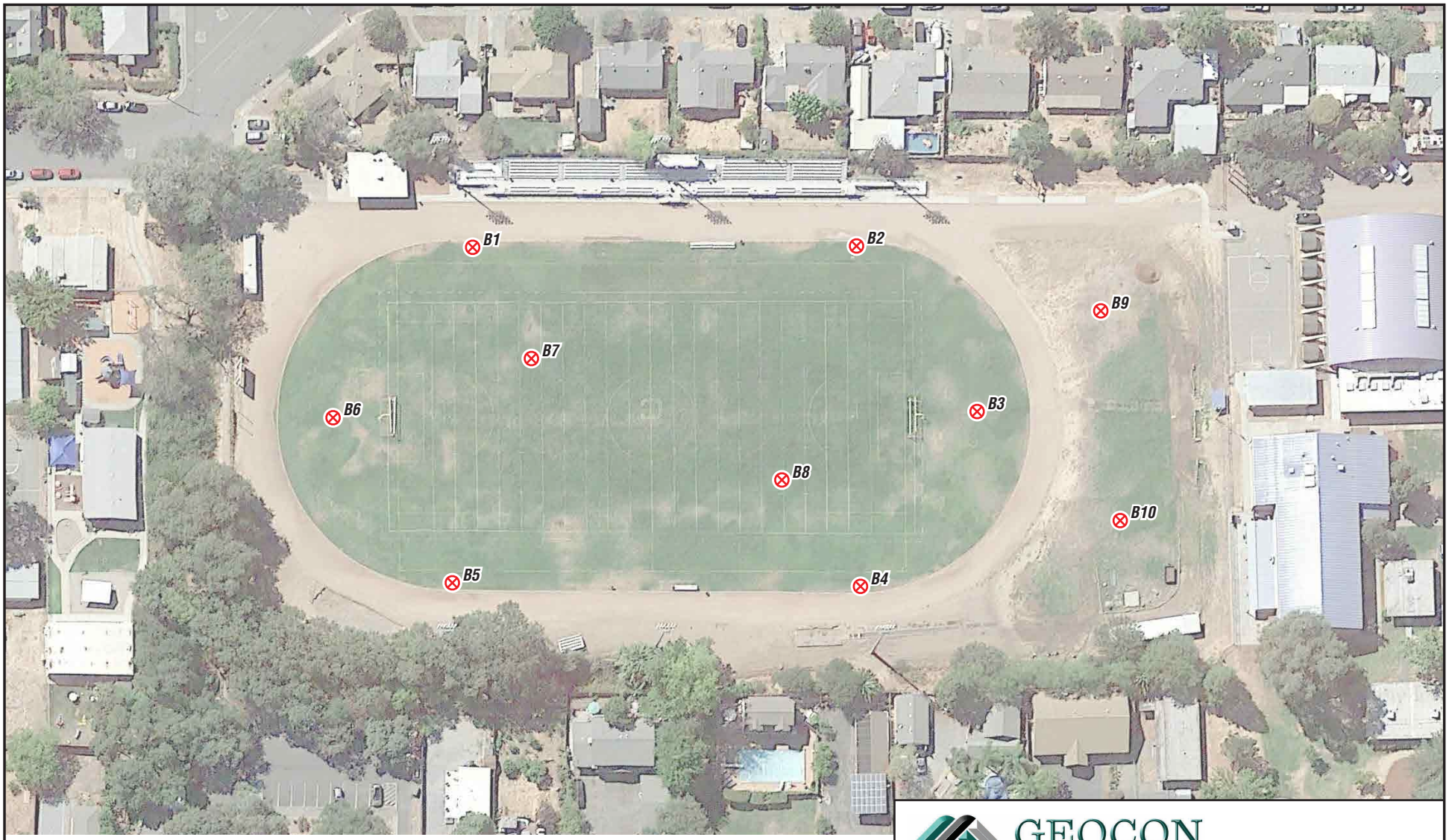
Cloverdale High School Turf Replacement

97 School Street
Cloverdale, California

VICINITY MAP

E8695-04-11	January 2020	Figure 1



LEGEND:

B1 ⊗ Approximate Boring Location

0 100

Scale in Feet

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Cloverdale High School Turf Replacement

97 School Street
Cloverdale, California

SITE PLAN

E8695-04-11	January 2020	Figure 2

APPENDIX A

APPENDIX A
FIELD INVESTIGATION

Fieldwork for our investigation included a site visit, subsurface exploration, and soil sampling. The locations of our exploratory borings are shown on the Site Plan, Figure 2. Soil boring logs for our exploration are presented as figures following the text in this appendix. The borings were located by pacing from existing reference points and the exploration locations shown on Figure 2 are therefore approximate.

Our field exploration included 10 exploratory soil borings to depths of approximately 5 feet. Our borings were performed on June 28, 2019 using a truck-mounted Mobile B-53 drill rig equipped with 6-inch solid flight augers. Sampling in the borings was accomplished using an automatic-trip 140-pound hammer with a 30-inch drop. Samples were obtained with a 3-inch outside-diameter (OD), split spoon (California Modified) sampler. The number of blows required to drive the sampler the last 12 inches (or fraction thereof) of the 18-inch sampling interval were recorded on the boring logs. The blow counts shown on the boring logs should not be interpreted as standard SPT "N" values; corrections have not been applied.

Subsurface conditions encountered in the exploratory boring were visually examined, classified and logged in general accordance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual-Manual Procedure D2488). This system uses the Unified Soil Classification System (USCS) for soil designations. The log depicts soil and geologic conditions encountered and depths at which samples were obtained. The log also includes our interpretation of the conditions between sampling intervals. Therefore, the logs contain both observed and interpreted data. We determined the lines designating the interface between soil materials on the logs using visual observations, drill rig penetration rates, excavation characteristics and other factors. The transition between materials may be abrupt or gradual. Where applicable, the field logs were revised based on subsequent laboratory testing.

Upon completion, our boreholes were backfilled with compacted cuttings, or compacted aggregate base where shallow groundwater was encountered.

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
	HIGHLY ORGANIC SOILS		PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

BORING/TRENCH LOG LEGEND

- No Recovery
- Shelby Tube Sample
- Bulk Sample
- SPT Sample
- Modified California Sample
- Groundwater Level (At Completion)
- Groundwater Level (Seepage)

PENETRATION RESISTANCE

SAND AND GRAVEL			SILT AND CLAY			
RELATIVE DENSITY	BLOWS PER FOOT (SPT)*	BLOWS PER FOOT (MOD-CAL)*	CONSISTENCY	BLOWS PER FOOT (SPT)*	BLOWS PER FOOT (MOD-CAL)*	COMPRESSIVE STRENGTH (tsf)
VERY LOOSE	0 - 4	0 - 6	VERY SOFT	0 - 2	0 - 3	0 - 0.25
LOOSE	5 - 10	7 - 16	SOFT	3 - 4	4 - 6	0.25 - 0.50
MEDIUM DENSE	11 - 30	17 - 48	MEDIUM STIFF	5 - 8	7 - 13	0.50 - 1.0
DENSE	31 - 50	49 - 79	STIFF	9 - 15	14 - 24	1.0 - 2.0
VERY DENSE	OVER 50	OVER 79	VERY STIFF	16 - 30	25 - 48	2.0 - 4.0
			HARD	OVER 30	OVER 48	OVER 4.0

*NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE LAST 12 INCHES OF AN 18-INCH DRIVE

MOISTURE DESCRIPTIONS

FIELD TEST	APPROX. DEGREE OF SATURATION, S (%)	DESCRIPTION
NO INDICATION OF MOISTURE; DRY TO THE TOUCH	S<25	DRY
SLIGHT INDICATION OF MOISTURE	25≤S<50	DAMP
INDICATION OF MOISTURE; NO VISIBLE WATER	50≤S<75	MOIST
MINOR VISIBLE FREE WATER	75≤S<100	WET
VISIBLE FREE WATER	100	SATURATED

QUANTITY DESCRIPTIONS

APPROX. ESTIMATED PERCENT	DESCRIPTION
<5%	TRACE
5 - 10%	FEW
11 - 25%	LITTLE
26 - 50%	SOME
>50%	MOSTLY

GRAVEL/COBBLE/BOULDER DESCRIPTIONS

CRITERIA	DESCRIPTION
PASS THROUGH A 3-INCH SIEVE AND BE RETAINED ON A NO. 4 SIEVE (#4 TO 3")	GRAVEL
PASS A 12-INCH SQUARE OPENING AND BE RETAINED ON A 3-INCH SIEVE (3"-12")	COBBLE
WILL NOT PASS A 12-INCH SQUARE OPENING (>12")	BOULDER

BEDDING SPACING DESCRIPTIONS

THICKNESS/SPACING	DESCRIPTOR
GREATER THAN 10 FEET	MASSIVE
3 TO 10 FEET	VERY THICKLY BEDDED
1 TO 3 FEET	THICKLY BEDDED
3 ⅜-INCH TO 1 FOOT	MODERATELY BEDDED
1 ¼-INCH TO 3 ⅜-INCH	THINLY BEDDED
⅜-INCH TO 1 ¼-INCH	VERY THINLY BEDDED
LESS THAN ⅜-INCH	LAMINATED

STRUCTURE DESCRIPTIONS

CRITERIA	DESCRIPTION
ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LAYERS AT LEAST ¼-INCH THICK	STRATIFIED
ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LAYERS LESS THAN ¼-INCH THICK	LAMINATED
BREAKS ALONG DEFINITE PLANES OF FRACTURE WITH LITTLE RESISTANCE TO FRACTURING	FISSURED
FRACTURE PLANES APPEAR POLISHED OR GLOSSY, SOMETIMES STRIATED	SLICKENSIDED
COHESIVE SOIL THAT CAN BE BROKEN DOWN INTO SMALLER ANGULAR LUMPS WHICH RESIST FURTHER BREAKDOWN	BLOCKY
INCLUSION OF SMALL POCKETS OF DIFFERENT SOIL, SUCH AS SMALL LENSES OF SAND SCATTERED THROUGH A MASS OF CLAY	LENSED
SAME COLOR AND MATERIAL THROUGHOUT	HOMOGENOUS

CEMENTATION/INDURATION DESCRIPTIONS

FIELD TEST	DESCRIPTION
CRUMBLES OR BREAKS WITH HANDLING OR LITTLE FINGER PRESSURE	WEAKLY CEMENTED/INDURATED
CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE	MODERATELY CEMENTED/INDURATED
WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE	STRONGLY CEMENTED/INDURATED

IGNEOUS/METAMORPHIC ROCK STRENGTH DESCRIPTIONS

FIELD TEST	DESCRIPTION
MATERIAL CRUMBLES WITH BARE HAND	WEAK
MATERIAL CRUMBLES UNDER BLOWS FROM GEOLOGY HAMMER	MODERATELY WEAK
⅛-INCH INDENTATIONS WITH SHARP END FROM GEOLOGY HAMMER	MODERATELY STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **ONE** BLOW FROM GEOLOGY HAMMER	STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **COUPLE** BLOWS FROM GEOLOGY HAMMER	VERY STRONG
HAND-HELD SPECIMEN CAN BE BROKEN WITH **MANY** BLOWS FROM GEOLOGY HAMMER	EXTREMELY STRONG

IGNEOUS/METAMORPHIC ROCK WEATHERING DESCRIPTIONS

DEGREE OF DECOMPOSITION	FIELD RECOGNITION	ENGINEERING PROPERTIES
SOIL	DISCOLORED, CHANGED TO SOIL, FABRIC DESTROYED	EASY TO DIG
COMPLETELY WEATHERED	DISCOLORED, CHANGED TO SOIL, FABRIC MAINLY PRESERVED	EXCAVATED BY HAND OR RIPPING (Saprolite)
HIGHLY WEATHERED	DISCOLORED, HIGHLY FRACTURED, FABRIC ALTERED AROUND FRACTURES	EXCAVATED BY HAND OR RIPPING, WITH SLIGHT DIFFICULTY
MODERATELY WEATHERED	DISCOLORED, FRACTURES, INTACT ROCK-NOTICEABLY WEAKER THAN FRESH ROCK	EXCAVATED WITH DIFFICULTY WITHOUT EXPLOSIVES
SLIGHTLY WEATHERED	MAY BE DISCOLORED, SOME FRACTURES, INTACT ROCK-NOT NOTICEABLY WEAKER THAN FRESH ROCK	REQUIRES EXPLOSIVES FOR EXCAVATION, WITH PERMEABLE JOINTS AND FRACTURES
FRESH	NO DISCOLORATION, OR LOSS OF STRENGTH	REQUIRES EXPLOSIVES

IGNEOUS/METAMORPHIC ROCK JOINT/FRACTURE DESCRIPTIONS

FIELD TEST	DESCRIPTION
NO OBSERVED FRACTURES	UNFRACTURED/UNJOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 1 TO 3 FOOT INTERVALS	SLIGHTLY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 4-INCH TO 1 FOOT INTERVALS	MODERATELY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT 1-INCH TO 4-INCH INTERVALS WITH SCATTERED FRAGMENTED INTERVALS	INTENSELY FRACTURED/JOINTED
MAJORITY OF JOINTS/FRACTURES SPACED AT LESS THAN 1-INCH INTERVALS; MOSTLY RECOVERED AS CHIPS AND FRAGMENTS	VERY INTENSELY FRACTURED/JOINTED

GEOCON CONSULTANTS, INC.
2420 Martin Road, Suite 380 – FAIRFIELD, CA 94534
PHONE 925.337.9533 – FAX 925.371.5915

Cloverdale High School Turf Replacement
97 School Street
Cloverdale, California

KEY TO LOGS

E8695-04-11 | January 2020 | Figure A1

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B1

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-0-5			CL	ALLUVIUM Stiff, damp to moist, brown and orange-brown CLAY with little (f-c) sand and few (f) gravels -grass at surface and rootlets to approximately 3 inches			
1								
2								
3	B1-2.5 B1-3				-pp=2-3	15	121.0	13.4
4								
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A2, Log of Boring B1, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B2

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B2-0-5			CL	ALLUVIUM Very stiff, damp, brown to orange brown with gray CLAY with little (f-m) sand -grass at surface and rootlets to approximately 3 inches			
1								
2								
3	B2-2.5 B2-3				-pp>4½	25	103.7	22.6
4								
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A3, Log of Boring B2, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B3

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-0-5			CL	ALLUVIUM Stiff, moist, brown, orange and gray CLAY with few (f) sands -grass at surface and rootlets to approximately 6 inches			
1								
2	B3-1.5 B3-2				-pp=3-3¾	17	107.4	19.8
3								
4								
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A4, Log of Boring B3, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B4

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B4-0-5			CL	FILL Medium stiff, moist to wet, brown and black CLAY with little (f-c) sand and few (f) gravels and brick fragments -grass at surface and rootlets to approximately 3 inches			
1								
2								
3	B4-2.5 B4-3		▼		-pp=1-2	13	109.9	17.9
4								
5					END OF BORING AT APPROXIMATELY 5 FEET GROUNDWATER INITIALLY ENCOUNTERED AT 3 ½ FEET BACKFILLED WITH COMPACTED AGGREGATE BASE			

Figure A5, Log of Boring B4, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B5

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B5-0-5			CL	ALLUVIUM Stiff, damp to moist, brown, gray-brown, and orange-brown CLAY with little (f) sand and few (f) sub-angular to sub-rounded gravels -grass at surface and rootlets to approximately 3 inches			
1								
2	B5-1.5 B5-2				-pp=3-3½	14	111.7	11.6
3					-more gravels			
4					-less gravels			
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A6, Log of Boring B5, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B6

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-0-5			CL	ALLUVIUM Stiff, damp, brown CLAY with little (f-c) sand and trace (f) sub-rounded to rounded gravels -grass at surface and rootlets to approximately 3 inches			
1								
2	B6-1.5 B6-2				-pp>4½	24	113.2	10.9
3								
4					-black, with little silt			
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A7, Log of Boring B6, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B7

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B71-0-5			CL	ALLUVIUM Medium stiff, damp, brown CLAY with little (f) sand and trace (f) gravels -grass at surface and rootlets to approximately 3 inches			
1								
2								
3	B7-2.5 B7-3				-pp=2-3	9	99.1	18.9
4								
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A8, Log of Boring B7, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B8

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B8-0-5			CL	ALLUVIUM Stiff, moist, brown CLAY with few (f) sands -grass at surface and rootlets to approximately 3 inches			
1								
2								
3								
4	B8-3.5 B8-4				-pp=2-3	18	100.0	24.0
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A9, Log of Boring B8, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B9

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B9-0-5			ML	ALLUVIUM Medium stiff, moist, orange-brown mottled brown and gray-brown Clayey SILT with little (f-c) sand and trace (f) gravels -grass at surface and rootlets to approximately 3 inches			
1								
2								
3	B9-2.5 B9-3				-pp=1-1½	11		
4								
5					END OF BORING AT APPROXIMATELY 5 FEET NO FREE WATER ENCOUNTERED BACKFILLED WITH COMPACTED CUTTINGS			

Figure A10, Log of Boring B9, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. **E8695-04-11** PROJECT NAME: **Cloverdale H.S. Turf Replacement**

BORING B10

ELEV. (MSL.) _____ DATE COMPLETED **6/28/2019**

ENG./GEO. **JBM** DRILLER **Pearson Exploration**

EQUIPMENT **Mobile B53 w/ 6-inch SFA** HAMMER TYPE **Autohammer**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B10-0-5			CL	ALLUVIUM Medium stiff, moist, brown with orange-brown and gray-brown, CLAY with little (f) sand			
1			▼					
2	B10-2			SM	Loose, wet, brown, (f-c) sub-angular to sub-rounded Gravelly (f-c) SAND with little silt and few clays	14		
3	B10-2.5							
4				CL	Medium stiff, moist, brown and orange-brown CLAY with little (f-m) sand			
5					END OF BORING AT APPROXIMATELY 5 FEET GROUNDWATER INITIALLY ENCOUNTERED AT APPROXIMATELY 1 ½ FEET BACKFILLED WITH COMPACTED AGGREGATE BASE			

Figure A11, Log of Boring B10, Page 1 of 1

GEOCON BORING LOG E8695-04-11 BORING LOGS.GPJ 01/16/20

GEOCON

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

APPENDIX B
LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected samples were tested for grain size analysis, Atterberg limits, in-situ moisture content and dry density, and expansion index. The results of the laboratory tests are summarized in tabular format below and the following figures, or are presented on the boring logs in Appendix A.

TABLE B-I
SUMMARY OF LABORATORY PARTICLE SIZE ANALYSES WITH HYDROMETER
ASTM D 422

Boring No.	Sample Depth (feet)	% Gravel	% Sand	% Silt	% Clay
B9	2.5	0.2	24.4	41.8	33.6
B10	2	27.0	54.2	12.2	6.6

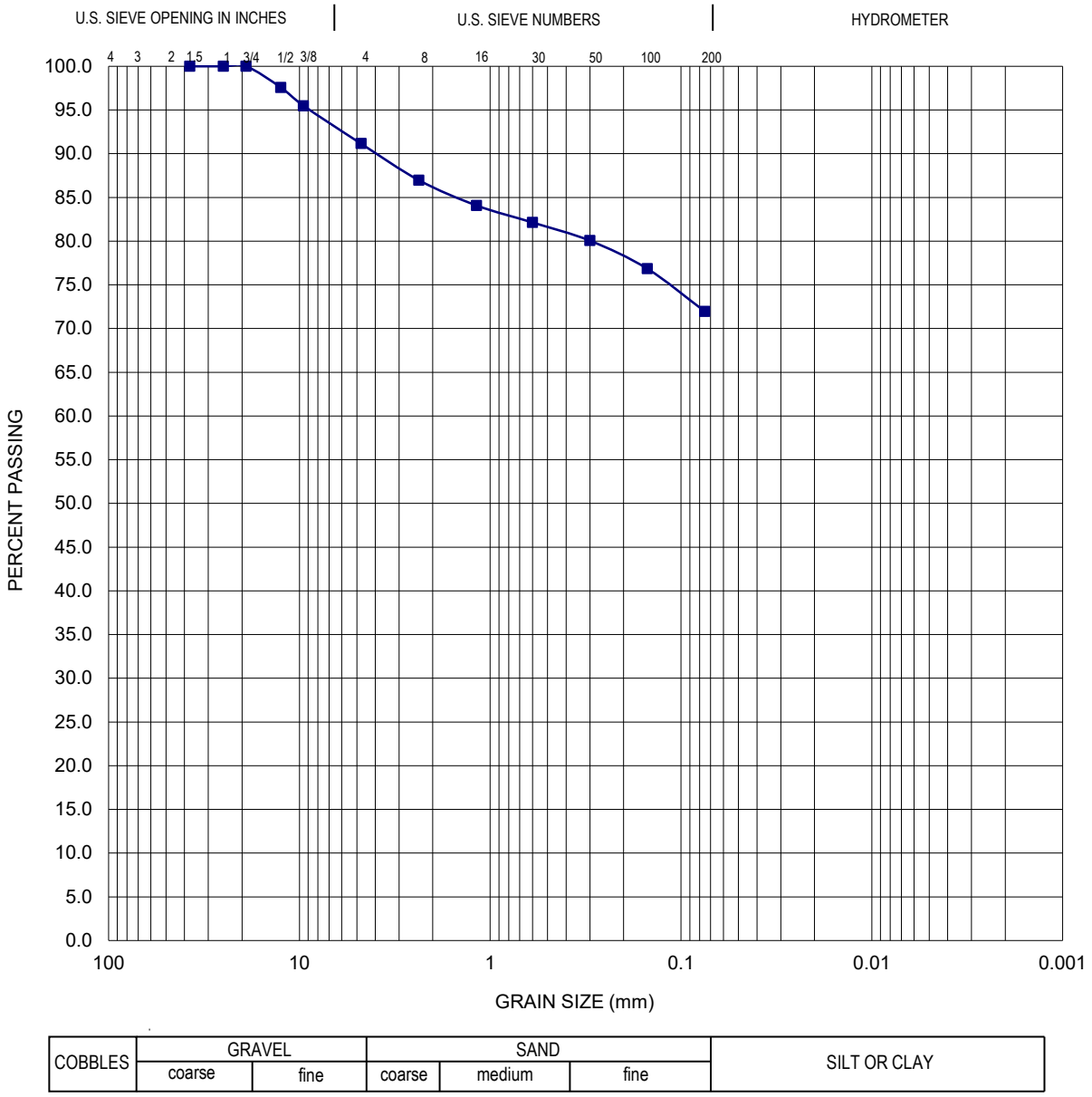
TABLE B-II
SUMMARY OF LABORATORY ATTERBERG LIMITS TEST RESULTS
ASTM D 4318

Sample No.	Liquid Limit	Plastic Limit	Plasticity Index
B6-1.5	31	19	12
B8-3.5	44	20	24

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content		Dry Density* (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B7-0-5	10.7	23.2	107.5	29

*before saturation



Boring: B1

Sieve Date: 7/31/19

Depth To Sample: 2.5'

Tested and Computed by: AC

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	100	97.6	95.5	91.1	87.0	84.1	82.1	80.1	76.8	72.0

Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
Telephone: (925) 371-5900
Fax: (925) 371-5915

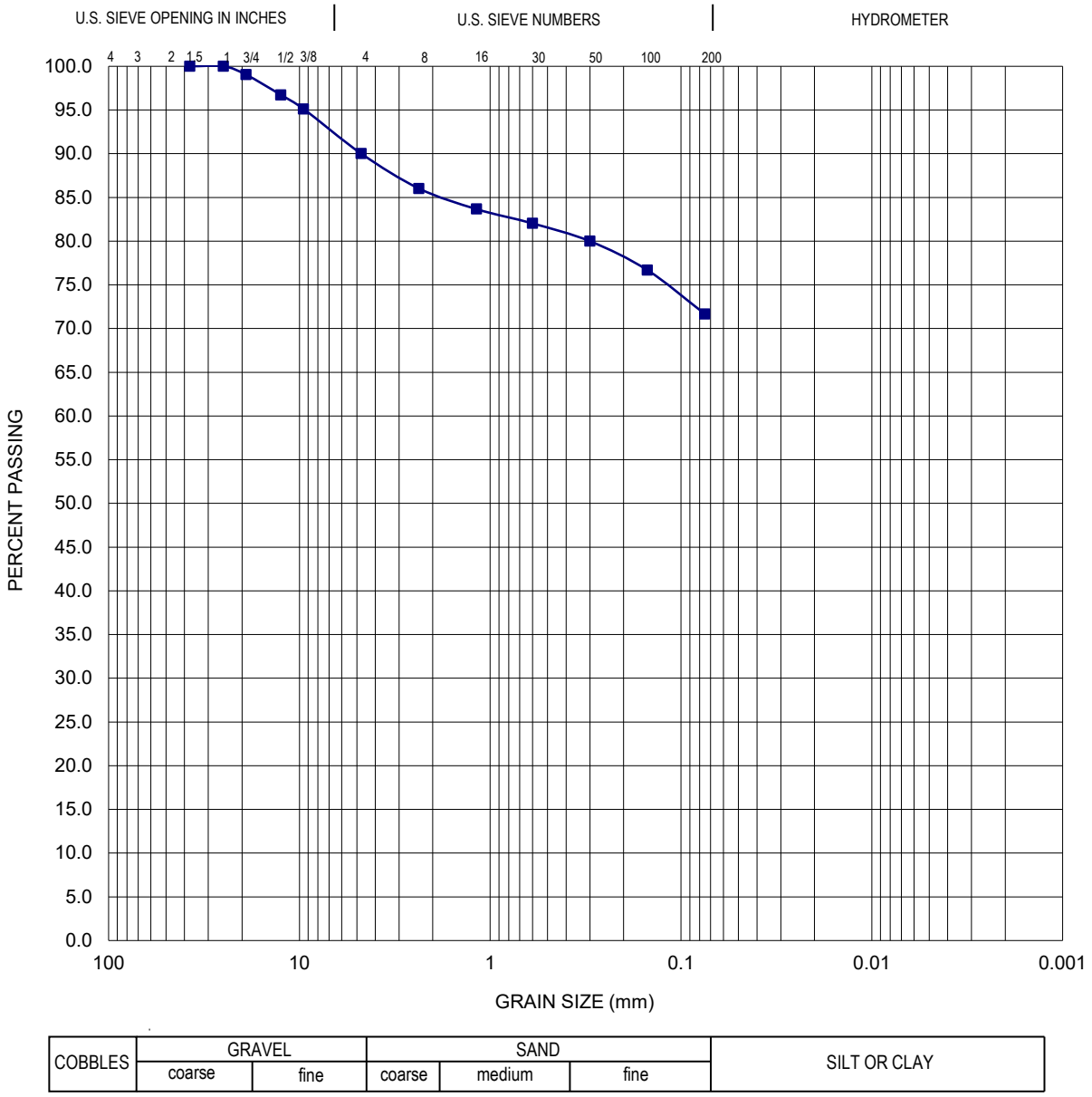
Particle Size Analysis - ASTM D422

Project: Cloverdale HS Turf Replacement

Location: Cloverdale, CA

Project No.: E8695-04-11

Figure B1



Boring: B4

Sieve Date: 7/31/19

Depth To Sample: 2.5'

Tested and Computed by: AC

Test Data

Sieve Number	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
% Passing	100	100	99	96.7	95.1	90.0	86.0	83.7	82.0	80.0	76.7	71.7

Geocon Consultants, Inc.
6671 Brisa Street
Livermore, CA 94550
Telephone: (925) 371-5900
Fax: (925) 371-5915

Particle Size Analysis - ASTM D422

Project: Cloverdale HS Turf Replacement

Location: Cloverdale, CA

Project No.: E8695-04-11

Figure B2

LIST OF REFERENCES

American Society of Civil Engineers, *Minimum Design Loads for Buildings and Other Structures, ASCE Standard ASCE/SEI 7-10,* 2010.

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