APPENDIX C

GEOTECHNICAL ENGINEERING INVESTIGATION

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED OSGOOD INDUSTRIAL BUILDING
43800 OSGOOD ROAD
FREMONT, CALIFORNIA

KA PROJECT NO. 042-24030
OCTOBER 10, 2024

Prepared for:

MR. MATTHEW KENNEDY
ARCO/MURRAY NATIONAL CONSTRUCTION
3110 WOODCREEK DRIVE
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GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

October 10, 2024

KA Project No. 042-24030

Mr. Matthew Kennedy
ARCO/Murray National Construction
3110 Woodcreek Drive
Downers Grove, Illinois 60515

RE: Geotechnical Engineering Investigation
Proposed Osgood Industrial Building
43800 Osgood Road
Fremont, California

Dear Mr. Kennedy:

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the above-referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (925) 307-1160.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

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October 10, 2024 KA Project No. 042-24030

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED OSGOOD INDUSTRIAL BUILDING
43800 OSGOOD ROAD
FREMONT, CALIFORNIA

INTRODUCTION

This report presents the results of our Geotechnical Engineering Investigation for the proposed Osgood industrial building to be located at 43800 Osgood Road in Fremont, California. Discussions regarding site conditions are presented herein, together with conclusions and recommendations pertaining to site preparation, Engineered Fill, utility trench backfill, drainage and landscaping, foundations, concrete floor slabs and exterior flatwork, retaining walls, pavement design and soil cement reactivity.

A site plan showing the approximate boring locations is presented following the text of this report. A description of the field investigation, boring logs, and the boring log legend are presented in Appendix A. Appendix A also contains a description of the laboratory testing phase of this study, along with the laboratory test results. Appendices B and C contain guides to earthwork and pavement specifications. When conflicts in the text of the report occur with the general specifications in the appendices, the recommendations in the text of the report have precedence.

PURPOSE AND SCOPE

This investigation was conducted to evaluate the soil and groundwater conditions at the site, to make geotechnical engineering recommendations for use in design of specific construction elements, and to provide criteria for site preparation and Engineered Fill construction.

Our scope of services was outlined in our proposal dated June 27, 2024 (KA Proposal No. P493-24) and included the following:

- A site reconnaissance by a member of our engineering staff to evaluate the surface conditions at the project site.
- A field investigation consisting of drilling 10 borings to depths ranging from approximately 4½ to 50 feet for evaluation of the subsurface conditions at the project site.
- Performing laboratory tests on representative soil samples obtained from the borings to evaluate the physical and index properties of the subsurface soils.

- Evaluation of the data obtained from the investigation and an engineering analysis to provide recommendations for use in the project design and preparation of construction specifications.

- Preparation of this report summarizing the results, conclusions, recommendations, and findings of our investigation.

PROPOSED CONSTRUCTION

We understand that design of the proposed development is currently underway; structural load information and other final details pertaining to the structures are unavailable. On a preliminary basis, it is understood that development will include the construction of tenant improvements to the existing building. The modifications will include new foundations and slabs. Foundation loads are anticipated to be light to moderate. On-site paved areas and landscaping are also planned for the development of the project.

In the event these structural or grading details are inconsistent with the final design criteria, the Soils Engineer should be notified so that we may update this writing as applicable.

SITE LOCATION, SITE HISTORY AND SITE DESCRIPTION

The site is irregular in shape and encompasses approximately 11.9 acres. The site is located at the northeast corner of Osgood Road and Auto Mall Parkway in Fremont, California. The site has a street address of 43800 Osgood Road. The site is predominately surrounded by commercial developments. Highway 680 is located east of the site.

Site history was obtained by reviewing historical aerial photographs taken in 1993, 2002, 2012, and 2022. Review of the 1993 aerial photograph indicates that the project site predominately consisted of a commercial development located in the northern portion of the site. The remainder of the site consisted of asphalt pavement and landscaping. Trees were located along the south, east and west edges of the site.

Review of the 2002, 2012 and 2022 aerial photographs indicate that the conditions on the project site were similar to those noted in the 1993 aerial photograph.

Presently, the conditions on the subject site are similar to those noted in the aerial photographs. A large building (approximately 144,000 spare feet) is located in the northern portion of the site. The remainder of the site is covered by asphaltic concrete or concrete surfaces. Trees are located along the edges of the site. Buried utilities are located along the edges of the site and extend into portions of the site. The site is relatively level with no major changes in grade.

GEOLOGIC SETTING

The project area is located within the City of Fremont, in the southeastern portion of the San Francisco Bay Area, within the central portion of the Coast Ranges Geomorphic Province of California. Fremont is bound by the San Leandro hills on the north, on the west by San Francisco Bay, on the east by the

Diablo Range, and on the south by Santa Clara Valley. The Coast Ranges generally consist of an alternating series of parallel mountains and valleys located adjacent to the Pacific Coast. The bedrock units that form the range have been disrupted by intense folding, faulting, and crushing that occurred when the range was formed by the processes of plate tectonics. During the Jurassic and Cretaceous Periods (about 150 to 80 million years ago), the Pacific Oceanic Plate, which was progressively moving towards the east, collided with the North American Continental Plate, which was moving toward the west. This collision caused the less rigid Pacific Oceanic Plate to be subducted beneath the North American Continental Plate. The colliding motion of the two plates caused portions of the Pacific Oceanic Crust and overlying marine sediments to be piled onto the North American Continental Plate along the west coast of California. The resulting chaotic jumble of bedrock units scraped off onto the North American Plate, is known as the "Franciscan Assemblage" and comprises a large portion of the Coast Range Province. Subsequent development of a series of northwest-trending fault zones has further contributed to the deformation of the Coast Ranges.

During the Pleistocene Epoch ("Ice Age"), the San Francisco Bay depression was formed by down faulting (down warping) of the earth's crust. During this time, sea levels lowered by as much as 350 feet, leading to increased erosion by the streams and rivers discharging into the bay. With the melting of the last ice sheets, beginning about 12,000 years ago, the sea level gradually rose to its present level. Much of the clay and silt carried by the river flood waters were deposited within the quiet bay waters, resulting in significant accumulations of "bay mud" in marshlands and mudflats.

The site lies within the limits of Fremont in an alluvial flatland between to the tidal marshes and salt evaporation ponds along the eastern margins of San Francisco Bay and the Diablo Range to the west. The project site is mapped as underlain by latest Holocene Inundated Alluvial Fan deposits, with Bay Mud deposits mapped about 1½ miles to the west.

The San Francisco Bay region is tectonically dominated by horizontal shear caused by the relative motion of the Pacific and North American plates. The northwest-southeast shear, probably with some other superposed influences, produces right-lateral strike-slip, plus a variety of other types of crustal movements. Since the boundary of the plates is generally diffuse, the various structural responses occur over a relatively broad band from the foot of the continental slope to the Central Valley. Transform-type plate movement did not begin at the latitude of San Francisco until about 10 to 7 million years ago, a time interval of transition in tectonics and sedimentation. The recent and current transform movement has superimposed a structural fabric on the pre-existing highly deformed structure created by Jurassic and Cretaceous subduction and emplacement of the Franciscan Formation.

Active faults in the region of the subject site are predominately characterized by strike-slip motion (right-lateral). Major nearby faults showing evidence of earthquake activity within historic time (past 200 years) in relation to the site include the Hayward (1.2 miles southwest), the Calaveras (5.2 miles east), the Monte Vista (15 miles southwest), the Mount Diablo (16 miles east), the San Andreas (17 miles west), and the Greenville (18 miles east) faults. These faults are considered to be active, as they have demonstrated geologic displacement with the past 10,000 years.

The Alquist-Priolo Geologic Hazards Zones Act went into effect in March, 1973. Since that time, the act has been amended 11 times (Hart, 2007). The purpose of the Act, as provided in CGS Special Publication 42 (SP 42), is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate thereby the hazard of fault-rupture." The act was renamed the Alquist-Priolo Earthquake Fault Zoning Act in 1994, and at that time, the originally designated "Special Studies Zones" was renamed the "Earthquake Fault Zones."

The area of the subject site is included on the Earthquake Fault Zones Map entitled "Newark Quadrangle", Revised Official Map, dated January 1, 1982. The site is not within a Fault-Rupture Hazard Zone. The nearest zoned faults are a portion of the Hayward fault located more than 2.8 miles east of the subject site.

In 1990, the California State Legislature passed the Seismic Hazard Mapping Act to protect public safety from the effects of strong shaking, liquefaction, landslides, or other ground failure, and other hazards caused by earthquakes. The Act requires that the State Geologist delineate various seismic hazards zones on Seismic Hazards Zones Maps. Specifically, the maps identify areas where soil liquefaction and earthquake-induced landslides are most likely to occur. A site-specific geotechnical evaluation is required prior to permitting most urban developments within the mapped zones. The Act also requires sellers of real property within the zones to disclose this fact to potential buyers. The area of the subject site is included on the Seismic Hazard Zone Map entitled "Newark Quadrangle", Official Map dated July 2, 2003. The site is located within areas identified as susceptible to liquefaction hazards.

FIELD AND LABORATORY INVESTIGATIONS

Subsurface soil conditions were explored by drilling 10 borings to depths ranging from approximately 4½ to 50 feet below existing site grade, using a truck-mounted drill rig. In addition, 2 bulk subgrade samples were obtained from the site for laboratory R-value testing. The approximate boring and bulk sample locations are shown on the site plan. During drilling operations, penetration tests were performed at regular intervals to evaluate the soil consistency and to obtain information regarding the engineering properties of the subsoils. Soil samples were retained for laboratory testing. The soils encountered were continuously examined and visually classified in accordance with the Unified Soil Classification System. A more detailed description of the field investigation is presented in Appendix A.

Laboratory tests were performed on selected soil samples to evaluate their physical characteristics and engineering properties. The laboratory testing program was formulated with emphasis on the evaluation of natural moisture, density, gradation, shear strength, consolidation potential, expansion potential, plasticity, R-value and moisture-density relationships of the materials encountered. In addition, chemical tests were performed to evaluate the soil-cement reactivity. Details of the laboratory test program and results of the laboratory tests are summarized in Appendix A. This information, along with the field observations, was used to prepare the final boring logs in Appendix A.

SOIL PROFILE AND SUBSURFACE CONDITIONS

Based on our findings, the subsurface conditions encountered appear typical of those found in the geologic region of the site. In general, the majority of the site is covered with approximately 5 to 6 inches of asphaltic concrete. Aggregate base was not identified under the asphalt. The building slab consisted of approximately 6 inches of concrete.

Below the asphalt and concrete, approximately 4 to 5½ feet of fill material was encountered within the borings drilled at the site. The fill material predominately consisted of sandy silty clay, silty sand with gravel, silty sand with clay and sandy clay. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. The limited testing indicates that some compaction effort was applied to the fill material at the time of placement.

Beneath the fill material, approximately 2½ to 3 feet of stiff to very stiff sandy clay with gravel and sandy silty clay or loose clayey gravel was encountered. Field and laboratory tests suggest that these soils are moderately strong, slightly compressible, and have a moderate expansion potential. Penetration resistance ranged from 8 to 40 blows per foot. Dry densities ranged from 87 to 112 pcf. A representative soil sample consolidated approximately 2½ percent under a 2 ksf load when saturated. A representative soil sample had an angle of internal friction of 29 degrees. A representative sample of the clayey soils had an expansion index of 86.

Below 7 to 8 feet, predominately stiff to very stiff sandy silty clay and sandy clay or medium dense clayey gravel and sandy silt were encountered. These soils contained varying amounts of gravel. Field and laboratory tests suggest that these soils are moderately strong and slightly compressible. Penetration resistance ranged from 14 to 27 blows per foot. Dry densities ranged from 101 to 118 pcf. These soils had similar strength characteristics as the upper soils and extended to the termination depth of our borings.

For additional information about the soils encountered, please refer to the logs of borings in Appendix A.

GROUNDWATER

Test boring locations were checked for the presence of groundwater during and immediately following the drilling operations. Free groundwater was encountered at approximately 12 feet below existing site grade. Historic high groundwater was estimated to be 5 feet based on information obtained from the Sustainable Groundwater Management Data Viewer (SGMA).

It should be recognized that water table elevations may fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use and climatic conditions, as well as other factors. Therefore, water level observations at the time of the field investigation may vary from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of our field and laboratory investigations, along with previous geotechnical experience in the project area, the following is a summary of our evaluations, conclusions, and recommendations.

Administrative Summary

In brief, the subject site and soil conditions, with the exception of the fill material, existing development, and moderate expansion potential of the on-site clayey soils, appear to be conducive to the development of the project. Approximately 4 to 5½ feet of fill material was encountered across the project site. The fill material primarily consists of sandy clay, silty sand with clay and silty sand. Some of these soils included gravel. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. Our limited testing indicates that some compaction effort was applied to the fill material at the time of placement. It is recommended that as-built documents (e.g. compaction reports) be used, if available, and in-place density tests be performed, to verify that these soils have been compacted to at least 90 percent of ASTM D1557 maximum dry density prior to constructing the planned improvements at the site. In areas of new construction, fill soils that have not been properly compacted and certified should be excavated and stockpiled so that the native soils can be properly prepared. The clayey soils will not be suitable for reuse as non-expansive Engineered Fill. However, the clayey soils will be suitable for reuse as General Engineered Fill, provided they are cleansed of excessive organics and debris and are moisture-conditioned to a minimum of 2 percent above optimum moisture content. The on-site soils that do not contain clay will be suitable for re-use as non-expansive Engineered Fill, provided they are cleansed of excessive organics and debris. However, it may be difficult for the grading contractor to separate these materials during mass grading operations. Prior to fill placement, Krazan & Associates, Inc. should inspect the bottom of the excavation to verify no additional removal will be required.

As indicated above, the site is currently developed. Associated with the current, and any previous, site improvements could be underground utility lines and possible substructures. Demolition activities should include proper removal of any buried structures or underground utilities that will not be utilized as part of the new development. The resulting excavations should be cleaned to firm native soil and backfilled with Engineered Fill. It is suspected that demolition activities will disturb the upper soils. After demolition activities, it is recommended that these disturbed soils be removed and/or recompacted. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation.

Trees and shrubs are located within the site. Tree and shrub removal operations should include roots greater than 1 inch in diameter. The resulting excavations should be cleaned to firm native ground and backfilled with Engineered Fill compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

The on-site clayey soils have a moderate shrink/swell potential. The clayey soils in their present condition present a moderate hazard to construction in terms of possible post-construction movement of slab-on-grade construction. To reduce potential soil movement related to swell potential of the clayey soils, it is recommended that new slab-on-grade and exterior flatwork areas be supported by at least 24 inches of non-expansive Engineered Fill. The fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive soils below, which may result in soil swelling. The replacement soils and/or upper 24 inches of Imported Fill soils should meet the specifications as described under the subheading Engineered Fill. The replacement soils should extend 5 feet beyond the perimeter of slab-on-grade areas. The non-expansive replacement soils should be compacted to at least 90 percent of relative compaction based on ASTM Test Method D1557. The exposed native soils in the excavation should not be allowed to dry out and should be kept continually moist, prior to backfilling. In addition, it is recommended that slab-on-grade, continuous footings and slabs be nominally reinforced to reduce cracking and vertical off-set.

As an alternative to the use of non-expansive soils, the upper 24 inches of soil supporting the new slab areas can consist of lime-treated clayey soils. The lime-treated soils should be recompacted to a minimum of 90 percent of maximum density. Preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be at least two (2) percent over optimum moisture during the mixing operations. An acceptable alternate section is 18 inches of lime treated soil overlain by 6 inches of Class 2 aggregate base.

After completion of the recommended site preparation and over-excavation, the new structures and equipment should be suitable for shallow footing support. The proposed footings may be designed utilizing an allowable bearing pressure of 2,500 psf for dead-plus-live loads. Footings should have a minimum embedment of 24 inches.

Groundwater Influence on Structures/Construction

During our recent field investigation, groundwater was encountered at approximately 12 feet below existing site grade. Historic high groundwater level for the site was determined to be 5 feet. Therefore, dewatering and/or waterproofing may be required should structures or excavations extend below this depth. If groundwater is encountered, our firm should be consulted prior to dewatering the site. Installation of a standpipe piezometer is suggested prior to construction should groundwater levels be a concern.

In addition to the groundwater level, if earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated, "pump," or not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with dryer materials; removing and replacing the soil with an approved fill material; or mixing the soil with an approved lime or cement product. Our firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Site Preparation

General site clearing should include removal of vegetation; existing utilities; structures including foundations; basement walls and floors; existing stockpiled soil; trees and associated root systems; rubble; rubbish; and any loose and/or saturated materials. Site stripping should extend to a minimum depth of 2 to 4 inches, or until all organics in excess of 3 percent by volume are removed. Deeper stripping may be required in localized areas. These materials will not be suitable for reuse as Engineered Fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

Approximately 4 to 5½ feet of fill material was encountered across the project site. The fill material primarily consists of sandy clay, silty sand with clay and silty sand. Some of these soils included gravel. The thickness and extent of fill material was determined based on limited test borings and visual observation. Thicker fill may be present at the site. Limited testing was performed on the fill soils during the time of our field and laboratory investigations. Our limited testing indicates that some compaction effort was applied to the fill material at the time of placement. It is recommended that as-built documents (e.g. compaction reports) be used, if available, and in-place density tests be performed, to verify that these soils have been compacted to at least 90 percent of ASTM D1557 maximum dry density prior to constructing the planned improvements at the site. In areas of new construction, fill soils that have not been properly compacted and certified should be excavated and stockpiled so that the native soils can be properly prepared. The clayey soils will not be suitable for reuse as non-expansive Engineered Fill. However, the clayey soils will be suitable for reuse as General Engineered Fill, provided they are cleansed of excessive organics and debris and are moisture-conditioned to a minimum of 2 percent above optimum moisture content. The on-site soils that do not contain clay will be suitable for re-use as non-expansive Engineered Fill, provided they are cleansed of excessive organics and debris. However, it may be difficult for the grading contractor to separate these materials during mass grading operations. Prior to fill placement, Krazan & Associates, Inc. should inspect the bottom of the excavation to verify no additional removal will be required.

Trees and shrubs are located within the site. Tree and shrub removal operations should include roots greater than 1 inch in diameter. The resulting excavations should be cleaned to firm native ground and backfilled with Engineered Fill compacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Within the area of new foundations, following stripping, fill removal or certification and demolition activities, it is recommended that at a minimum within building pad areas, the upper 12 inches of exposed subgrade soils whichever is deeper, be excavated, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend a minimum of 5 feet beyond structural elements. Prior to backfilling, the bottom of the excavation should be proofrolled and observed by Krazan & Associates, Inc. for stability. Soft or pliant areas encountered should be excavated to firm native ground. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation.

Following stripping, fill removal or certification, and demolition activities, it is recommended that at a minimum, the upper 12 inches of exposed subgrade soils beneath the new exterior flatwork and pavement areas be excavated/scarified, worked until uniform and free from large clods, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. Limits of recompaction should extend a minimum of 2 feet beyond flatwork and pavements. Soft or pliant areas encountered should be excavated to firm native ground. This compaction effort should stabilize the upper soils and locate any unsuitable or pliant areas not found during our field investigation.

It is recommended that the upper 24 inches of soil within proposed new conventional slab-on-grade and exterior flatwork areas consist of non-expansive Engineered Fill or lime-treated Engineered Fill. The fill placement serves two functions: 1) it provides a uniform amount of soil which will more evenly distribute the soil pressures and 2) it reduces moisture content fluctuation in the clayey material beneath the building area. The non-expansive fill material should be a well-graded silty sand or sandy silt soil. A clean sand or very sandy soil is not acceptable for this purpose. A sandy soil will allow the surface water to drain into the expansive clayey soil below, which may result in soil swelling. Imported Fill should be approved by the Soils Engineer prior to placement. The fill should be placed as specified as Engineered Fill. In addition, it is recommended footings and concrete slabs-on-grade be nominally reinforced.

The site is developed with an existing building and associated paved areas. In addition, several developments are located in the vicinity of the site. Associated with these developments are buried structures, such as utility lines and possible loosely backfilled excavations that may extend into the project site. Any buried structures, including loosely backfilled excavations, encountered during construction should be properly removed and the resulting excavation backfilled with Engineered Fill. It is suspected demolition activities will disturb the upper soils. Areas disturbed by demolition activities should be excavated to firm native ground. Excavations, depressions, or soft and pliant areas extending below planned, finished subgrade levels should be cleaned to firm, undisturbed soil and backfilled with Engineered Fill. In general, any septic tanks, debris pits, cesspools, or similar structures should be entirely removed. Concrete footings should be removed to an equivalent depth of at least 3 feet below proposed footing elevations or as recommended by the Soils Engineer. Any other buried structures should be removed in accordance with the recommendations of the Soils Engineer. The resulting excavations should be backfilled with Engineered Fill.

The upper soils, during wet winter months, become very moist due to the absorptive characteristics of the soil. Earthwork operations performed during winter months may encounter very moist unstable soils, which may require removal to grade a stable building foundation. Project site winterization consisting of placement of aggregate base and protecting exposed soils during the construction phase should be performed.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction and stability of the material. The

Soils Engineer may reject any material that does not meet compaction and stability requirements. Further recommendations of this report are predicated upon the assumption that earthwork construction will conform to recommendations set forth in this section and the Engineered Fill section.

Engineered Fill

The organic-free, on-site, upper native soils and fill material are predominately silty clays, sandy clays and silty sands. These soils contained varying amounts of gravel. These clayey soils will not be suitable for reuse as non-expansive Engineered Fill. The clayey soils will be suitable for reuse for fill placement within the upper 24 inches of conventional slab-on-grade and exterior flatwork areas, provided they are lime-treated. The preliminary application rate of lime should be 5 percent by dry weight. The lime material should be calcium oxide, commonly known as quick-lime. The clayey soils should be above optimum moisture-condition during mixing operations. Additional testing is recommended to determine the appropriate application rate of lime prior to placement. These clayey soils will be suitable for reuse as General Engineered Fill, within pavement areas and below 24 inches from finished pad grade in building areas, provided they are cleansed of excessive organics, debris, and moisture-conditioned to at least 2 percent above optimum moisture. It is recommended that additional testing be performed on the on-site soils and fill material to evaluate the physical and index properties prior to reuse as Engineered Fill. The on-site soils that do not contain clay will be suitable for re-use as non-expansive Engineered Fill, provided they are cleansed of excessive organics and debris. However, it may be difficult for the grading contractor to separate these materials during mass grading operations.

The preferred materials specified for Engineered Fill are suitable for most applications with the exception of exposure to erosion. Project site winterization and protection of exposed soils during the construction phase should be the sole responsibility of the Contractor, since he has complete control of the project site at that time.

Imported Fill should consist of a well-graded, slightly cohesive, fine silty sand or sandy silt soil, with relatively impervious characteristics when compacted. This material should be approved by the Soils Engineer prior to use and should typically possess the following characteristics:

Percent Passing No. 200 Sieve	20 to 50
Plasticity Index	10 maximum
UBC Standard 29-2 Expansion Index	15 maximum

Fill soils should be placed in lifts approximately 6 inches thick, moisture-conditioned to a minimum of 2 percent above optimum moisture content, and compacted to achieve at least 90 percent of maximum density based on ASTM D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

Drainage and Landscaping

The ground surface should slope away from building pad and pavement areas toward appropriate drop inlets or other surface drainage devices. In accordance with Section 1804 of the 2022 California Building Code, it is recommended that the ground surface adjacent to foundations be sloped a minimum of 5 percent for a minimum distance of 10 feet away from structures, or to an approved alternative means of drainage conveyance. Swales used for conveyance of drainage and located within 10 feet of foundations should be sloped a minimum of 2 percent. Impervious surfaces, such as pavement and exterior concrete flatwork, within 10 feet of building foundations should be sloped a minimum of 1 percent away from the structure. Drainage gradients should be maintained to carry all surface water to collection facilities and off-site. These grades should be maintained for the life of the project.

Slots or weep holes should be placed in drop inlets or other surface drainage devices in pavement areas to allow free drainage of adjoining base course materials. Cutoff walls should be installed at pavement edges adjacent to vehicular traffic areas; these walls should extend to a minimum depth of 12 inches below pavement subgrades to limit the amount of seepage water that can infiltrate the pavements. Where cutoff walls are undesirable, subgrade drains can be constructed to transport excess water away from planters to drainage interceptors. If cutoff walls can be successfully used at the site, construction of subgrade drains is considered unnecessary.

Utility Trench Backfill

Utility trenches should be excavated according to accepted engineering practice following OSHA (Occupational Safety and Health Administration) standards by a Contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the Contractor. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced; especially during or following periods of precipitation.

Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. The utility trench backfill placed in pavement areas should be compacted to at least 90 percent of maximum density based on ASTM Test Method D1557. Pipe bedding should be in accordance with pipe manufacturer's recommendations.

Sandy and gravelly soil conditions were encountered at the site. These cohesionless soils have a tendency to cave in trench wall excavation. Shoring or sloping back trench sidewalls may be required within these sandy and gravelly soils.

The Contractor is responsible for removing all water-sensitive soils from the trench regardless of the backfill location and compaction requirements. The Contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

Foundations - Conventional

After completion of the recommended site preparation, the site should be suitable for shallow footing support. New structures or equipment may be supported on a shallow foundation system bearing on undisturbed native soils or Engineered Fill. Spread and continuous footings can be designed for the following maximum allowable soil bearing pressures:

Load	Allowable Loading
Dead Load Only	1,875 psf
Dead-Plus-Live Load	2,500 psf
Total Load, Including Wind or Seismic Loads	3,325 psf

The footings should have a minimum embedment depth of 24 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footings should have a minimum width of 12 inches, regardless of load.

The footing excavations should not be allowed to dry out any time prior to pouring concrete. It is recommended that footings be reinforced by at least one No. 4 reinforcing bar in both top and bottom.

Resistance to lateral footing displacement can be computed using an allowable friction factor of 0.3 acting between the base of foundations and the supporting subgrade. Lateral resistance for footings can alternatively be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot acting against the appropriate vertical footing faces. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance. A ⅓ increase in the value above may be used for short duration, wind, or seismic loads.

The total movement is not expected to exceed 1 inch. Differential movement should be less than ½ inch. Most of the settlement is expected to occur during construction, as the loads are applied. However, additional post-construction movement may occur if the foundation soils are flooded or saturated.

Foundations - Drilled Caissons

The new structures can be supported on caissons using an allowable sidewall friction of 400 psf. This value is for dead-plus-live loads. This value may be increased ⅓ for short duration loads, such as wind or seismic. Uplift loads can be resisted by caissons using an allowable sidewall friction of 225 psf of the surface area and the weight of the pier. Caissons should have a minimum embedment depth of 10 feet below existing site grade. The upper 2 feet should be neglected from friction calculations. The total and differential settlement should be less than ½ inch. Most of the settlement is expected to occur during construction as the loads are applied. If drilled piers or caissons will be utilized, no over-excavation of the fill and native soils will be required.

Lateral loads for caissons may be designed using the 2022 CBC flagpole formula with a lateral bearing capacity of 150 psf/ft. This value can be doubled for allowable deflections of up to ½ inch. The lateral loading criteria is based on the assumption that the load application is applied at the ground level and flexible cap conditions apply.

Sandy and gravelly soils were encountered at the site. These sandy and gravelly soils may be subject to caving during drilling operations. Accordingly, cased caissons may be required.

Floor Slabs and Exterior Flatwork

In areas that will utilize moisture-sensitive floor coverings, new concrete slab-on-grade floors should be underlain by a water vapor retarder. The water vapor retarder should be installed in accordance with accepted engineering practice. The water vapor retarder should consist of a vapor retarder sheeting underlain by a minimum of 3 inches of compacted, clean, gravel of ¾-inch maximum size. To aid in concrete curing an optional 2 to 4 inches of granular fill may be placed on top of the vapor retarder. The granular fill should consist of damp clean sand with at least 10 to 30 percent of the sand passing the 100 sieve. The sand should be free of clay, silt, or organic material. Rock dust which is manufactured sand from rock crushing operations is typically suitable for the granular fill. This granular fill material should be compacted.

New floor slabs should be reinforced at a minimum with #3 reinforcement bars at 18 inches on-center each way within the middle one-third. Thicker floor slabs with increased concrete strength and reinforcement should be designed wherever heavy concentrated loads, heavy equipment, or machinery is anticipated.

The exterior floors should be poured separately in order to act independently of the walls and foundation system. Exterior finish grades should be sloped a minimum of 2 percent away from all interior slab areas to preclude ponding of water adjacent to the structures. All fills required to bring the building pads to grade should be Engineered Fills.

Moisture within the structure may be derived from water vapors, which were transformed from the moisture within the soils. This moisture vapor can travel through the vapor membrane and penetrate the slab-on-grade. This moisture vapor penetration can affect floor coverings and produce mold and mildew in the structure. To reduce moisture vapor intrusion, it is recommended that a vapor retarder be installed. It is recommended that the utility trenches within the structure be compacted, as specified in our report, to reduce the transmission of moisture through the utility trench backfill. Special attention to the immediate drainage and irrigation around the building is recommended. Positive drainage should be established away from the structure and should be maintained throughout the life of the structure. Ponding of water should not be allowed adjacent to the structure. Over-irrigation within landscaped areas adjacent to the structure should not be performed. In addition, ventilation of the structure (i.e. ventilation fans) is recommended to reduce the accumulation of interior moisture.

Lateral Earth Pressures and Retaining Walls

Walls retaining horizontal backfill and capable of deflecting a minimum of 0.1 percent of its height at the top may be designed using an equivalent fluid active pressure of 50 pounds per square foot per foot of depth. Walls that are incapable of this deflection or walls that are fully constrained against deflection may be designed for an equivalent fluid at-rest pressure of 70 pounds per square foot per foot per depth. Expansive soils should not be used for backfill against walls. The wedge of non-expansive backfill material should extend from the bottom of each retaining wall outward and upward at a slope of 2:1 (horizontal to vertical) or flatter. The stated lateral earth pressures do not include the effects of hydrostatic water pressures generated by infiltrating surface water that may accumulate behind the retaining walls; or loads imposed by construction equipment, foundations, or roadways.

Retaining and/or below grade walls should be drained with either perforated pipe encased in free-draining gravel or a prefabricated drainage system. The gravel zone should have a minimum width of 12 inches and should extend upward to within 12 inches of the top of the wall. The upper 12 inches of backfill should consist of native soils, concrete, asphaltic concrete or other suitable backfill to reduce surface drainage into the wall drain system. The aggregate should conform to Class 2 permeable materials graded in accordance with the CalTrans Standard Specifications (2018). Prefabricated drainage systems, such as Miradrain®, Enkadrain®, or an equivalent substitute, are acceptable alternatives in lieu of gravel, provided they are installed in accordance with the manufacturer's recommendations. If a prefabricated drainage system is proposed, our firm should review the system for final acceptance prior to installation.

Drainage pipes should be placed with perforations down and should discharge in a non-erosive manner away from foundations and other improvements. The pipes should be placed no higher than 6 inches above the heel of the wall in the center line of the drainage blanket and should have a minimum diameter of 4 inches. Collector pipes may be either slotted or perforated. Slots should be no wider than ⅛ inch in diameter, while perforations should be no more than ¼ inch in diameter. If retaining walls are less than 6 feet in height, the perforated pipe may be omitted in lieu of weep holes on 4 feet maximum spacing. The weep holes should consist of 4-inch diameter holes (concrete walls) or unmortared head joints (masonry walls) and not be higher than 18 inches above the lowest adjacent grade. Two 8-inch square overlapping patches of geotextile fabric (conforming to the CalTrans Standard Specifications for "edge drains") should be affixed to the rear wall opening of each weep hole to retard soil piping.

During grading and backfilling operations adjacent to any walls, heavy equipment should not be allowed to operate within a lateral distance of 5 feet from the wall, or within a lateral distance equal to the wall height, whichever is greater, to avoid developing excessive lateral pressures. Within this zone, only hand operated equipment ("whackers," vibratory plates, or pneumatic compactors) should be used to compact the backfill soils.

R-Value Test Results and Pavement Design

Two subgrade soil samples were obtained from the project site for R-value testing at the locations shown on the attached site plan. The samples were tested in accordance with the State of California Materials Manual Test Designation 301. Results of the tests are as follows:

Sample	Depth	Description	R-Value at Equilibrium
1	12-24"	Clayey Sand (SC)	44
2	12-24"	Clayey Sand (SC)	44

The test results are moderate and indicate moderate subgrade support characteristics under dynamic traffic loads. The following table shows the recommended pavement sections for various traffic indices.

Traffic Index	Asphaltic Concrete	Class II Aggregate Base*	Compacted Subgrade**
4.0	2.0"	4.0"	12.0"
4.5	2.5"	4.0"	12.0"
5.0	2.5"	4.0"	12.0"
5.5	3.0"	4.0"	12.0"
6.0	3.0"	5.5"	12.0"
6.5	3.5"	5.5"	12.0"
7.0	4.0"	6.0"	12.0"
7.5	4.0"	7.0"	12.0"

** 95% compaction based on ASTM Test Method D1557 or CAL 216*
*** 90% compaction based on ASTM Test Method D1557 or CAL 216*

If traffic indices are not available, an estimated (typical value) index of 4.5 may be used for light automobile traffic and an index of 7.0 may be used for light truck traffic. It is understood a full depth asphalt section may be used based on a Traffic Index of 7.0. Based on an R-value of 44, the full depth asphalt section should be 8 inches.

The following recommendations are for light-duty and heavy-duty Portland Cement Concrete pavement sections.

PORTLAND CEMENT PAVEMENT
LIGHT DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
4.5	5.0"	4.0"	12.0"

HEAVY DUTY

Traffic Index	Portland Cement Concrete***	Class II Aggregate Base*	Compacted Subgrade**
7.0	6.5"	4.0"	12.0"

**** 95% compaction based on ASTM Test Method D1557 or CAL 216***
***** 90% compaction based on ASTM Test Method D1557 or CAL 216***
******Minimum compressive strength of 3000 psi***

It is recommended that any uncertified fill material encountered within pavement areas be removed and/or recompacted. The fill material should be moisture-conditioned to near optimum moisture and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557. As an alternative, the Owner may elect not to recompact the existing fill within paved areas. However, the Owner should be aware that the paved areas may settle which may require annual maintenance. At a minimum, it is recommended that the upper 12 inches of subgrade soil be moisture-conditioned to a minimum of 2 percent above optimum moisture content and recompacted to a minimum of 90 percent of maximum density based on ASTM Test Method D1557.

Seismic Parameters – 2022 California Building Code

The Site Class per Section 1613 of the 2022 California Building Code (2022 CBC) and ASCE 7-16, Chapter 20 is based upon the site soil conditions. It is our opinion that a Site Class D is most consistent with the subject site soil conditions. For seismic design of the structures based on the seismic provisions of the 2022 CBC, we recommend the following parameters:

Seismic Item	Value	CBC Reference
Site Class	D	Section 1613.2.2
Site Coefficient F_a	1.200	Table 1613.2.3 (1)
S_s	2.209	Section 1613.2.1
S_{MS}	2.651	Section 1613.2.3
S_{DS}	1.797	Section 1613.2.4
Site Coefficient F_v	1.700	Table 1613.2.3 (2)
S_1	0.852	Section 1613.2.1
S_{M1}	1.448	Section 1613.2.3
S_{D1}	0.966	Section 1613.2.4
T_S	0.546	Section 1613.2

* Based on Equivalent Lateral Force (ELF) Design Procedure being used.

Soil Cement Reactivity

Excessive sulfate in either the soil or native water may result in an adverse reaction between the cement in concrete (or stucco) and the soil. HUD/FHA and CBC have developed criteria for evaluation of sulfate levels and how they relate to cement reactivity with soil and/or water.

Soil samples were obtained from the site and tested in accordance with State of California Materials Manual Test Designation 417. The sulfate concentrations detected in these soil samples were less than 150 ppm (94.9 ppm) and are below the maximum allowable values established by HUD/FHA and CBC. However, it is recommended that a Type II cement be used within the concrete to compensate for sulfate reactivity with the cement. Representative soil samples had a chloride concentration of 96.7 ppm and a pH 8.4.

Compacted Material Acceptance

Compaction specifications are not the only criteria for acceptance of the site grading or other such activities. However, the compaction test is the most universally recognized test method for assessing the performance of the Grading Contractor. The numerical test results from the compaction test cannot be used to predict the engineering performance of the compacted material. Therefore, the acceptance of compacted materials will also be dependent on the stability of that material. The Soils Engineer has the option of rejecting any compacted material regardless of the degree of compaction if that material is considered to be unstable or if future instability is suspected. A specific example of rejection of fill material passing the required percent compaction is a fill which has been compacted with an in-situ moisture content significantly less than optimum moisture. This type of dry fill (brittle fill) is susceptible to future settlement if it becomes saturated or flooded.

Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor.

LIMITATIONS

Soils Engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences advance. Although your site was analyzed using the most appropriate and most current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to advancements in the field of Soils Engineering, physical changes in the site, either due to excavation or fill placement, new agency regulations, or possible changes in the proposed structure after the soils report is completed may require the soils report to be professionally reviewed. In light of this, the Owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that 2 years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling

of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Soils Engineer should be notified so that supplemental recommendations may be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The Soils Engineer should be notified of any changes so the recommendations may be reviewed and re-evaluated.

This report is a Geotechnical Engineering Investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring log regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (925) 307-1160.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.



Steve Nelson
Project Engineer

David R. Jarosz, II
Managing Engineer
RGE No. 2698/RCE No. 60185

SN/DRJ:ht



APPROXIMATE BORING LOCATION

APPROXIMATE R-VALUE LOCATION

SITE MAP	**Scale:** NTS	**Date:** October 2024
Osgood Industrial Building **43800 Osgood Road** **Fremont, California**	**Drawn by:** HT	**Approved by:** DJ
	Project No. 042-24030	**Figure No.** 1

Krazan
GEOTECHNICAL ENGINEERING

APPENDIX A

FIELD AND LABORATORY INVESTIGATIONS

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploratory program. Ten 4½-inch to 6½-inch diameter exploratory borings were advanced. The boring locations are shown on the site plan.

The soils encountered were logged in the field during the exploration and with supplementary laboratory test data are described in accordance with the Unified Soil Classification System.

Modified standard penetration tests and standard penetration tests were performed at selected depths. These tests represent the resistance to driving a 2½-inch and 1½-inch diameter split barrel sampler, respectively. The driving energy was provided by a hammer weighing 140 pounds falling 30 inches. Relatively undisturbed soil samples were obtained while performing this test. Bag samples of the disturbed soil were obtained from the auger cuttings. The modified standard penetration tests are identified in the sample type on the boring logs with a full shaded in block. The standard penetration tests are identified in the sample type on the boring logs with half of the block shaded. All samples were returned to our Clovis laboratory for evaluation.

Laboratory Investigation

The laboratory investigation was programmed to determine the physical and mechanical properties of the foundation soil underlying the site. Test results were used as criteria for determining the engineering suitability of the surface and subsurface materials encountered.

In-situ moisture content, dry density, consolidation, direct shear and sieve analysis tests were completed for the undisturbed samples representative of the subsurface material. Atterberg limits, expansion index and R-value tests were completed for select bag samples obtained from the auger cuttings. These tests, supplemented by visual observation, comprised the basis for our evaluation of the site material.

The logs of the exploratory borings and laboratory determinations are presented in this Appendix.

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

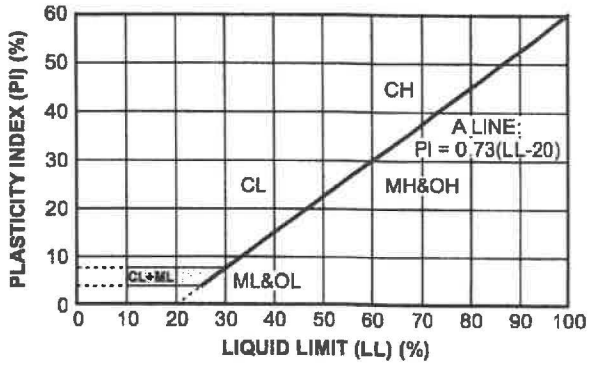
CONSISTENCY CLASSIFICATION

Description	Blows per Foot
Granular Soils	
Very Loose	< 5
Loose	5 – 15
Medium Dense	16 – 40
Dense	41 – 65
Very Dense	> 65
Cohesive Soils	
Very Soft	< 3
Soft	3 – 5
Firm	6 – 10
Stiff	11 – 20
Very Stiff	21 – 40
Hard	> 40

GRAIN SIZE CLASSIFICATION

Grain Type	*Standard Sieve Size*	*Grain Size in Millimeters*
Boulders	Above 12 inches	Above 305
Cobbles	12 to 13 inches	305 to 76.2
Gravel	3 inches to No. 4	76.2 to 4.76
Coarse-grained	3 to ¾ inches	76.2 to 19.1
Fine-grained	¾ inches to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
Coarse-grained	No. 4 to No. 10	4.76 to 2.00
Medium-grained	No. 10 to No. 40	2.00 to 0.42
Fine-grained	No. 40 to No. 200	0.42 to 0.074
Silt and Clay	Below No. 200	Below 0.074

PLASTICITY CHART



Log of Boring B1

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-1

Location: 43800 Osgood Road, Fremont, California

Logged By: Dave Adams

Depth to Water> **Initial:** 15 Feet **At Completion:** 14 Feet

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
		ASPHALTIC CONCRETE = 5 inches				
		SANDY SILTY CLAY (CL) FILL, fine- to medium-grained; dark brown, moist, drills easily With debris and GRAVEL below 2 feet	102.7	15.1		20
6		***SANDY SILTY CLAY (CL)*** Stiff, fine- to medium-grained; gray/brown, moist, drills easily	101.6	23.7		14
10			111.5	19.2		14
14		Saturated below 14 feet ▽ Very stiff below 15 feet	115.2	18.3		21
20						

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

Drill Method: Solid Flight

Drill Date: 9-10-24

Drill Rig: CME 45C-4

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 20 Feet

Sheet: 1 of 1

Log of Boring B2

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-2

Location: 43800 Osgood Road, Fremont, California

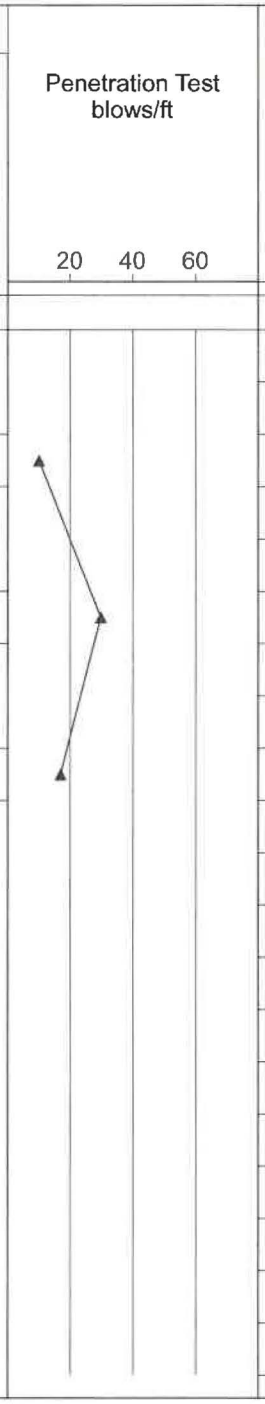
Logged By: Dave Adams

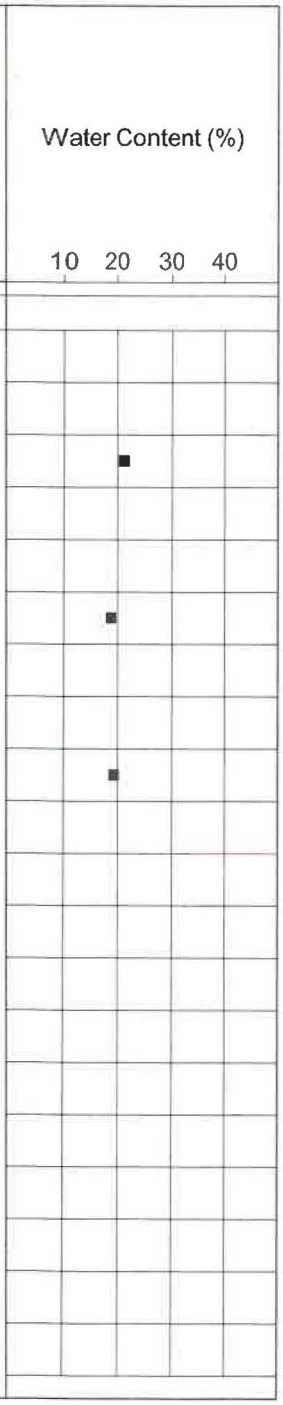
Depth to Water>

Initial: None

At Completion: None

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
		SUBSURFACE PROFILE	SAMPLE			
0		Ground Surface				
		ASPHALTIC CONCRETE = 5 inches				
		SANDY SILTY CLAY (CL) FILL, fine- to coarse-grained with trace GRAVEL; dark brown, moist, drills easily				
2			94.2	21.4		10
4						
6		***SANDY SILTY CLAY (CL)*** Very stiff, fine- to medium-grained; gray/brown, moist, drills easily	111.9	18.8		30
8		Stiff below 8 feet	101.1	19.3		17
10		Very moist below 11 feet				
12						
14						
		End of Borehole				
16						
18						
20						





Drill Method: Solid Flight

Drill Rig: CME 45C-4

Driller: Jim Watts

Krazan and Associates

Drill Date: 9-10-24

Hole Size: 4½ Inches

Elevation: 15 Feet

Log of Boring B3

Project: Osgood Industrial Building | **Project No:** 042-24030

Client: Arco/Murray National Construction | **Figure No.:** A-3

Location: 43800 Osgood Road, Fremont, California | **Logged By:** Dave Adams

Depth to Water> | **Initial:** None | **At Completion:** None

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.	20 40 60	10 20 30 40
0		Ground Surface						
		ASPHALTIC CONCRETE = 6 inches						
		SANDY SILTY CLAY (CL) FILL, fine- to medium-grained; dark brown, moist, drills easily						
2			102.3	22.6		10		■
4		***SANDY CLAY (CL)*** Stiff, fine- to medium-grained with GRAVEL; mottled, moist, drills easily						
6			86.9	19.3		13		■
8								
10		End of Borehole						
12								
14								
16								
18								
20								

Drill Method: Solid Flight | **Drill Date:** 9-10-24

Drill Rig: CME 45C-4 | **Hole Size:** 4½ Inches

Driller: Jim Watts | **Elevation:** 10 Feet

Krazan and Associates

Log of Boring B4

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-4

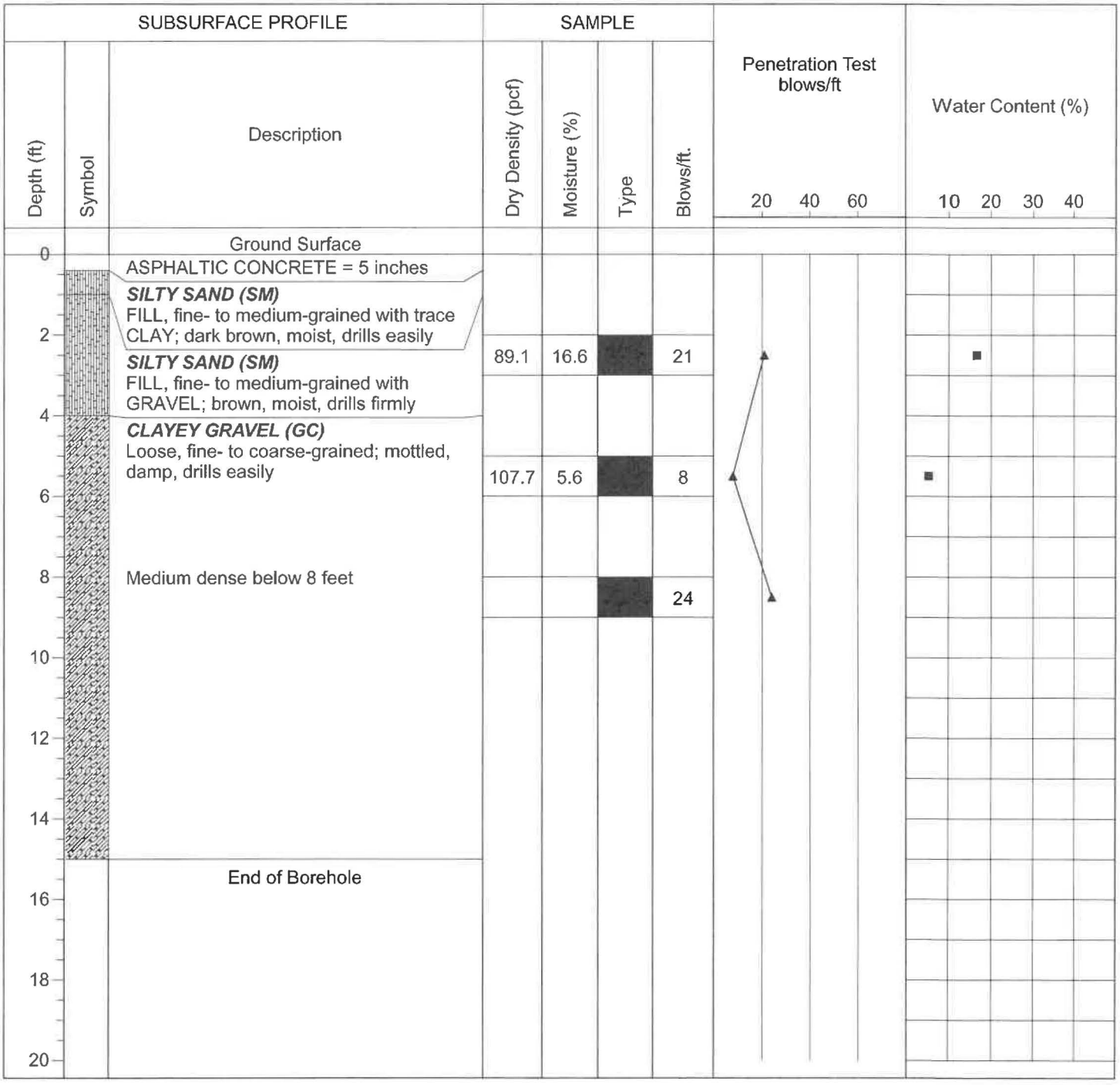
Location: 43800 Osgood Road, Fremont, California

Logged By: Dave Adams

Depth to Water>

Initial: None

At Completion: None



Drill Method: Solid Flight

Drill Date: 9-10-24

Drill Rig: CME 45C-4

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 15 Feet

Sheet: 1 of 1

Log of Boring B5

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-5

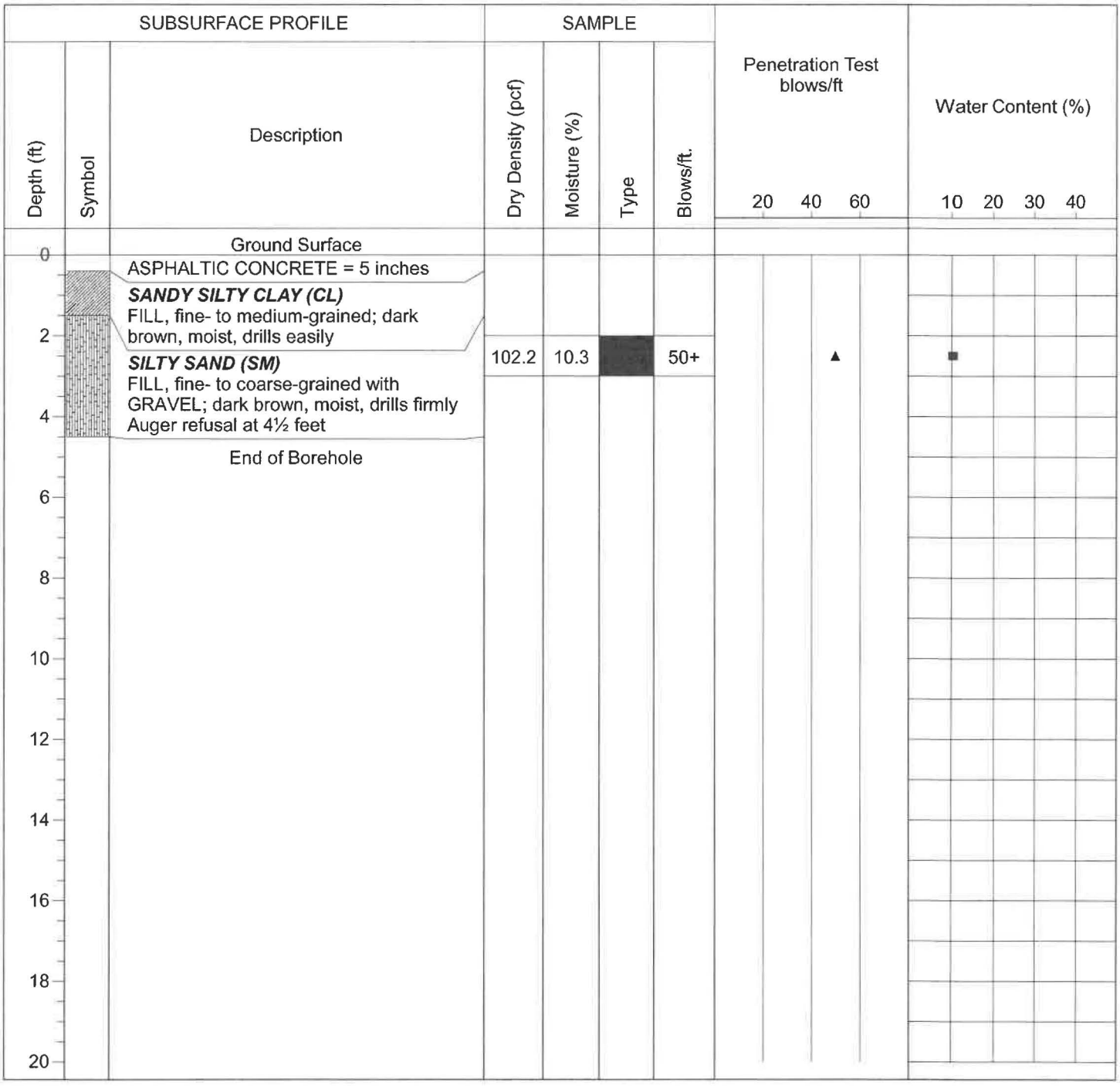
Location: 43800 Osgood Road, Fremont, California

Logged By: Dave Adams

Depth to Water>

Initial: None

At Completion: None



Drill Method: Solid Flight

Drill Date: 9-10-24

Drill Rig: CME 45C-4

Krazan and Associates

Hole Size: 4½ Inches

Driller: Jim Watts

Elevation: 4½ Feet

Sheet: 1 of 1

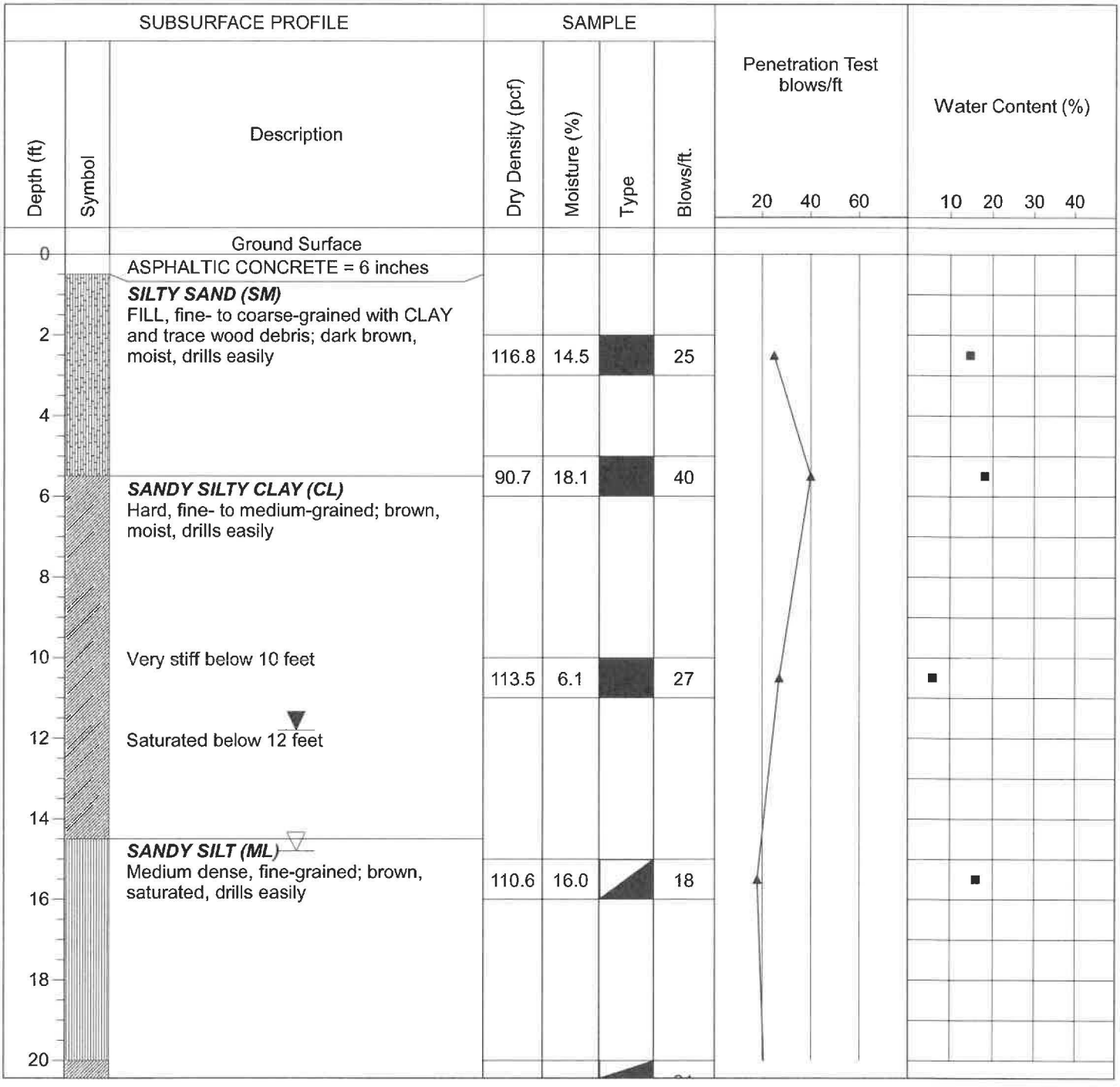
Log of Boring B6

Project: Osgood Industrial Building | **Project No:** 042-24030

Client: Arco/Murray National Construction | **Figure No.:** A-6

Location: 43800 Osgood Road, Fremont, California | **Logged By:** Dave Adams

Depth to Water> **Initial:** 15 Feet | **At Completion:** 12 Feet



Drill Method: Hollow Stem | **Drill Date:** 9-10-24

Drill Rig: CME 45C-4 | **Hole Size:** 6½ Inches

Driller: Jim Watts | **Elevation:** 50 Feet

Krazan and Associates

Log of Boring B6

Project: Osgood Industrial Building | **Project No:** 042-24030

Client: Arco/Murray National Construction | **Figure No.:** A-6

Location: 43800 Osgood Road, Fremont, California | **Logged By:** Dave Adams

Depth to Water> **Initial:** 15 Feet | **At Completion:** 12 Feet

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
22		***SANDY CLAY (CL)*** Very stiff, fine- to medium-grained; brown, saturated, drills easily	116.7	17.4		21
24						
26			106.2	17.6		24
28						
30			118.1	15.5		20
32						
34						
36		Stiff below 35 feet	111.9	17.1		14
38						
40		Very stiff below 40 feet				

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

Drill Method: Hollow Stem | **Drill Date:** 9-10-24

Drill Rig: CME 45C-4 | **Hole Size:** 6½ Inches

Driller: Jim Watts | **Elevation:** 50 Feet

Krazan and Associates

Log of Boring B6

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-6

Location: 43800 Osgood Road, Fremont, California

Logged By: Dave Adams

Depth to Water> **Initial:** 15 Feet **At Completion:** 12 Feet

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.	20 40 60	10 20 30 40
42			114.2	17.1		23		
44								
46			107.3	18.8		18		
48								
50		End of Borehole						
52								
54								
56								
58								
60								

Drill Method: Hollow Stem

Drill Date: 9-10-24

Drill Rig: CME 45C-4

Krazan and Associates

Hole Size: 6½ Inches

Driller: Jim Watts

Elevation: 50 Feet

Sheet: 3 of 3

Log of Boring B7

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-7

Location: 43800 Osgood Road, Fremont, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
0		CONCRETE = 6 inches				
		SILTY SAND (SM) FILL, fine- to medium-grained with GRAVEL; brown, moist, drills easily				
2			109.3	9.6	■	
		SANDY SILTY CLAY (CL) FILL, fine-grained; dark brown-black, very moist				
4				12.2	■	
		End of Borehole				
6						
8						
10						
12						
14						
16						
18						
20						

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

Drill Method: Solid Flight

Drill Rig: Hand Auger

Driller: Michael Rupright

Krazan and Associates

Drill Date: 9-19-24

Hole Size: 4½ Inches

Elevation: 4½ Feet

Sheet: 1 of 1

Log of Boring B8

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-8

Location: 43800 Osgood Road, Fremont, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None

SUBSURFACE PROFILE			SAMPLE				Penetration Test blows/ft	Water Content (%)
Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.	20 40 60	10 20 30 40
0		Ground Surface						
		CONCRETE = 6 inches						
		SILTY SAND (SM) FILL, fine- to medium-grained with GRAVEL; brown, moist, drills easily						
2				10.7	■			■
		SANDY SILTY CLAY (CL) FILL, fine-grained; dark brown-black, very moist						
4				16.5	■			■
		End of Borehole						
6								
8								
10								
12								
14								
16								
18								
20								

Drill Method: Solid Flight

Drill Date: 9-19-24

Drill Rig: Hand Auger

Krazan and Associates

Hole Size: 4½ Inches

Driller: Michael Rupright

Elevation: 4½ Feet

Sheet: 1 of 1

Log of Boring B9

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-9

Location: 43800 Osgood Road, Fremont, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
		CONCRETE = 6 inches				
		SILTY SAND (SM) FILL, fine- to medium-grained with GRAVEL; brown, moist, drills easily				
2			103.4	19.9	■	
		SANDY SILTY CLAY (CL) FILL, fine-grained with GRAVEL; dark brown-black, very moist				
4				18.3	■	
		End of Borehole				
6						
8						
10						
12						
14						
16						
18						
20						

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

Drill Method: Solid Flight

Drill Rig: Hand Auger

Driller: Michael Rupright

Krazan and Associates

Drill Date: 9-19-24

Hole Size: 4½ Inches

Elevation: 4½ Feet

Sheet: 1 of 1

Log of Boring B10

Project: Osgood Industrial Building

Project No: 042-24030

Client: Arco/Murray National Construction

Figure No.: A-10

Location: 43800 Osgood Road, Fremont, California

Logged By: Michael Rupright

Depth to Water>

Initial: None

At Completion: None

Depth (ft)	Symbol	Description	Dry Density (pcf)	Moisture (%)	Type	Blows/ft.
0		Ground Surface				
		CONCRETE = 6 inches				
		SILTY SAND (SM) FILL, fine- to medium-grained with GRAVEL; brown, moist, drills easily				
2				23.7	■	
		SANDY SILTY CLAY (CL) FILL, fine-grained; dark brown-black, very moist				
4				19.1	■	
		End of Borehole				
6						
8						
10						
12						
14						
16						
18						
20						

Penetration Test blows/ft: 20 40 60

Water Content (%): 10 20 30 40

Drill Method: Solid Flight

Drill Rig: Hand Auger

Driller: Michael Rupright

Krazan and Associates

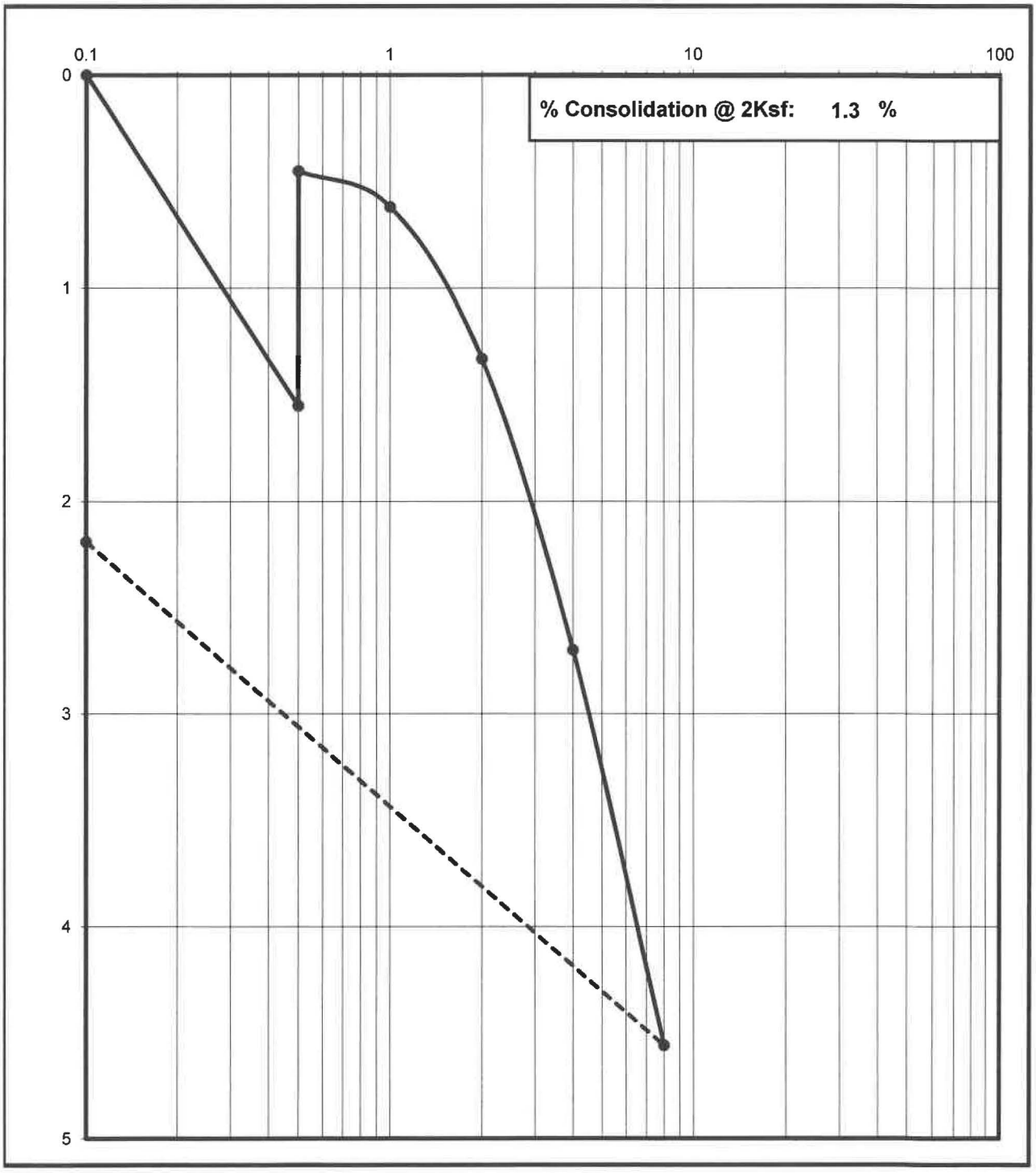
Drill Date: 9-19-24

Hole Size: 4½ Inches

Elevation: 4½ Feet

Consolidation Test

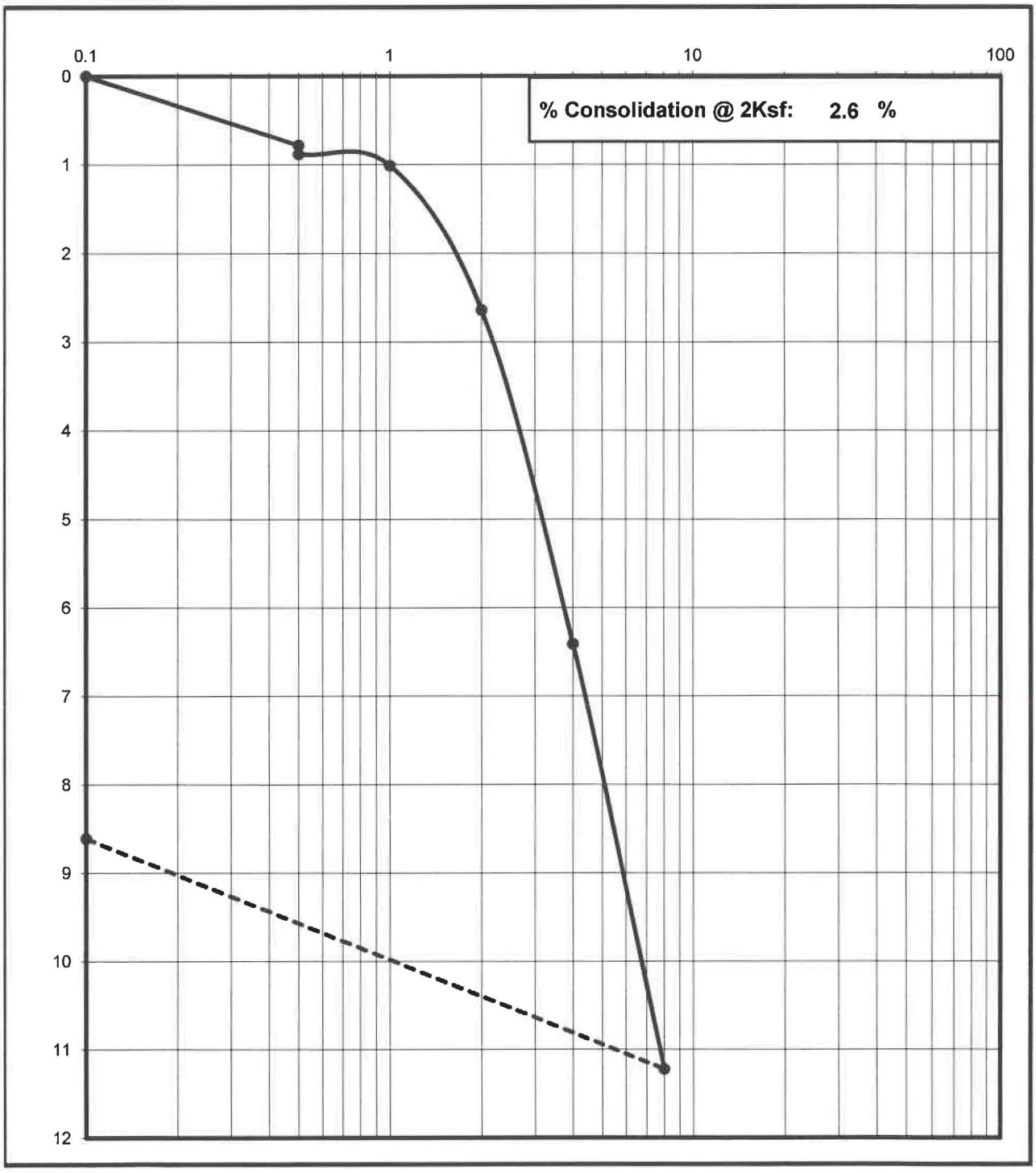
Project No	Boring No. & Depth	Date	Soil Classification
042-24030	B1 @ 5-6'	9/18/2024	CL



Krazan Testing Laboratory

Consolidation Test

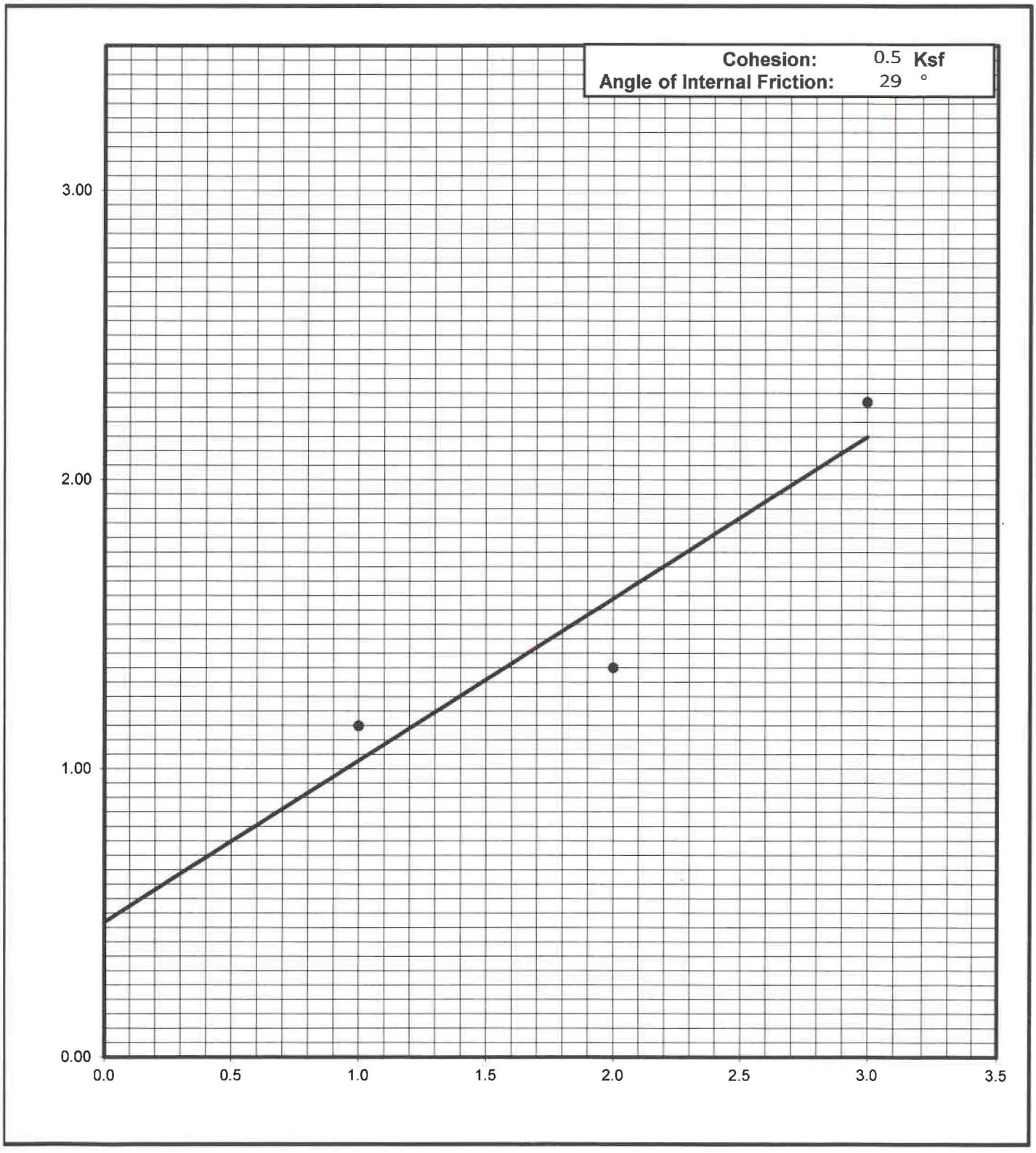
Project No	Boring No. & Depth	Date	Soil Classification
042-24030	B2 @ 2-3'	9/18/2024	CL



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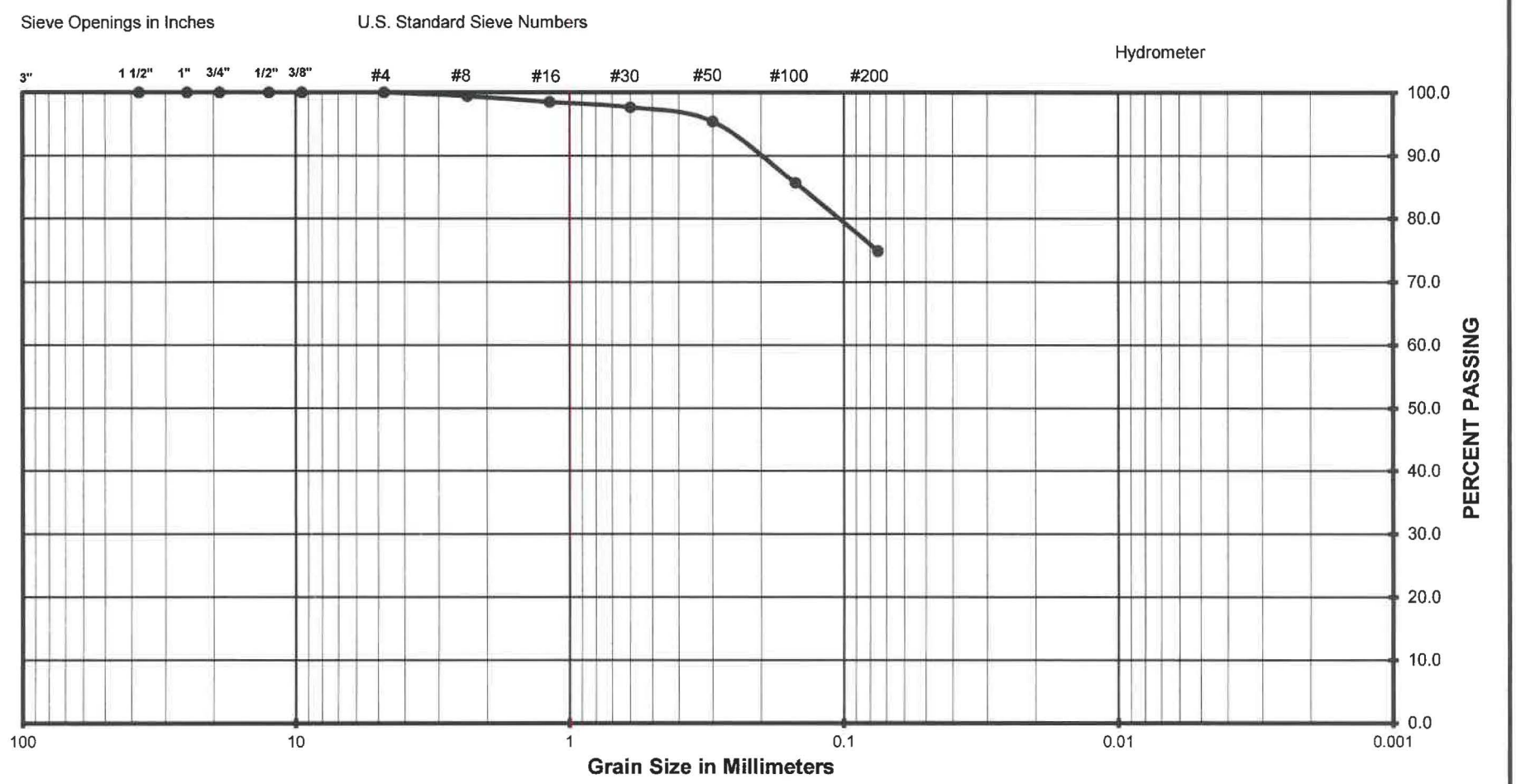
Shear Strength Diagram (Direct Shear)
ASTM D - 3080 / AASHTO T - 236

Project Number	Boring No. & Depth	Soil Type	Date
042-24030	B3 @ 2-3'	CL w/ grvl	9/18/2024



Krazan Testing Laboratory

Grain Size Analysis

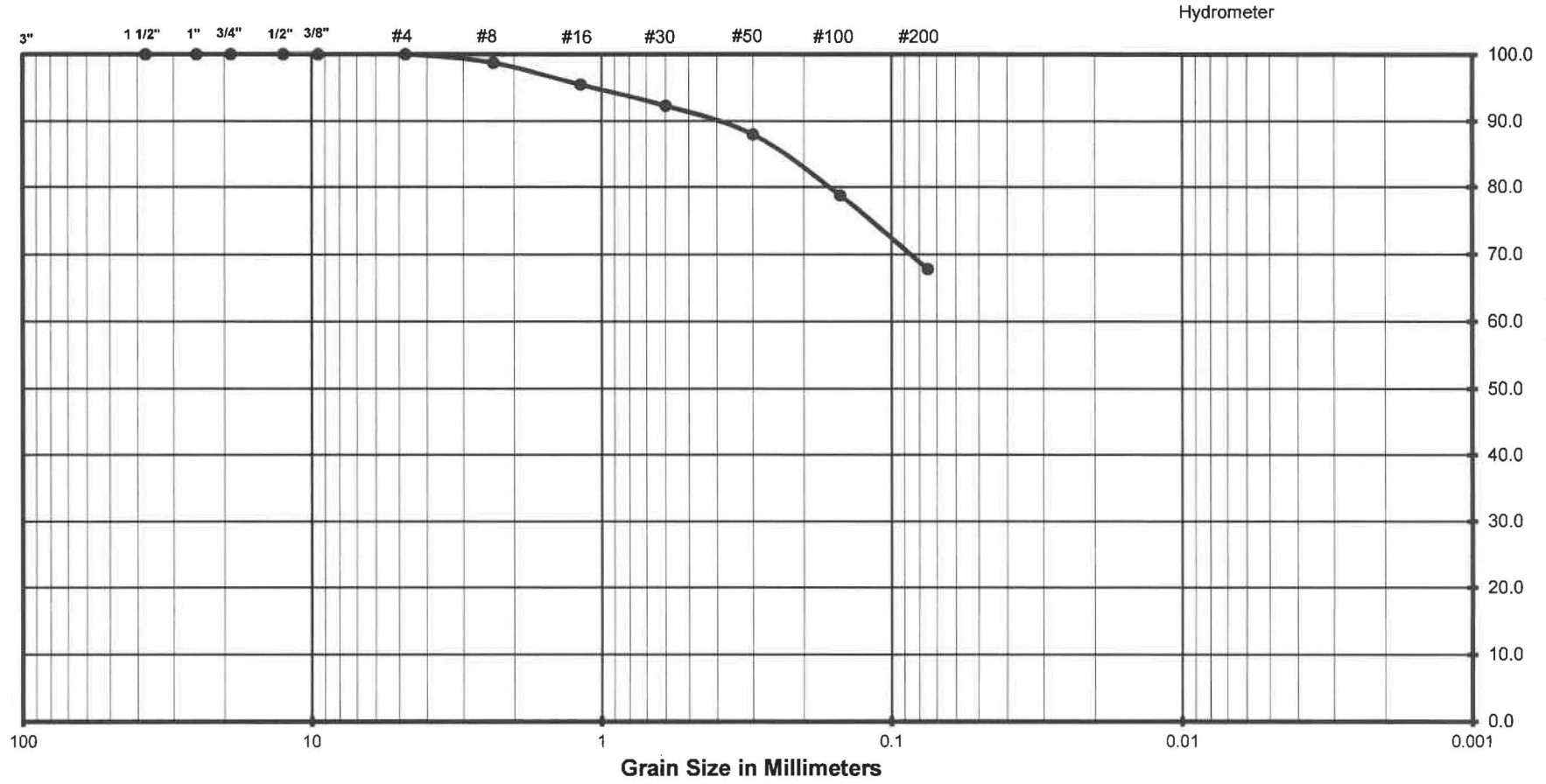


(Unified Soils Classification)

Project Name	Osgood Industrial Building
Project Number	042-24030
Soil Classification	CL
Sample Number	B1 @ 5-6'

Krazan Testing Laboratory

Grain Size Analysis



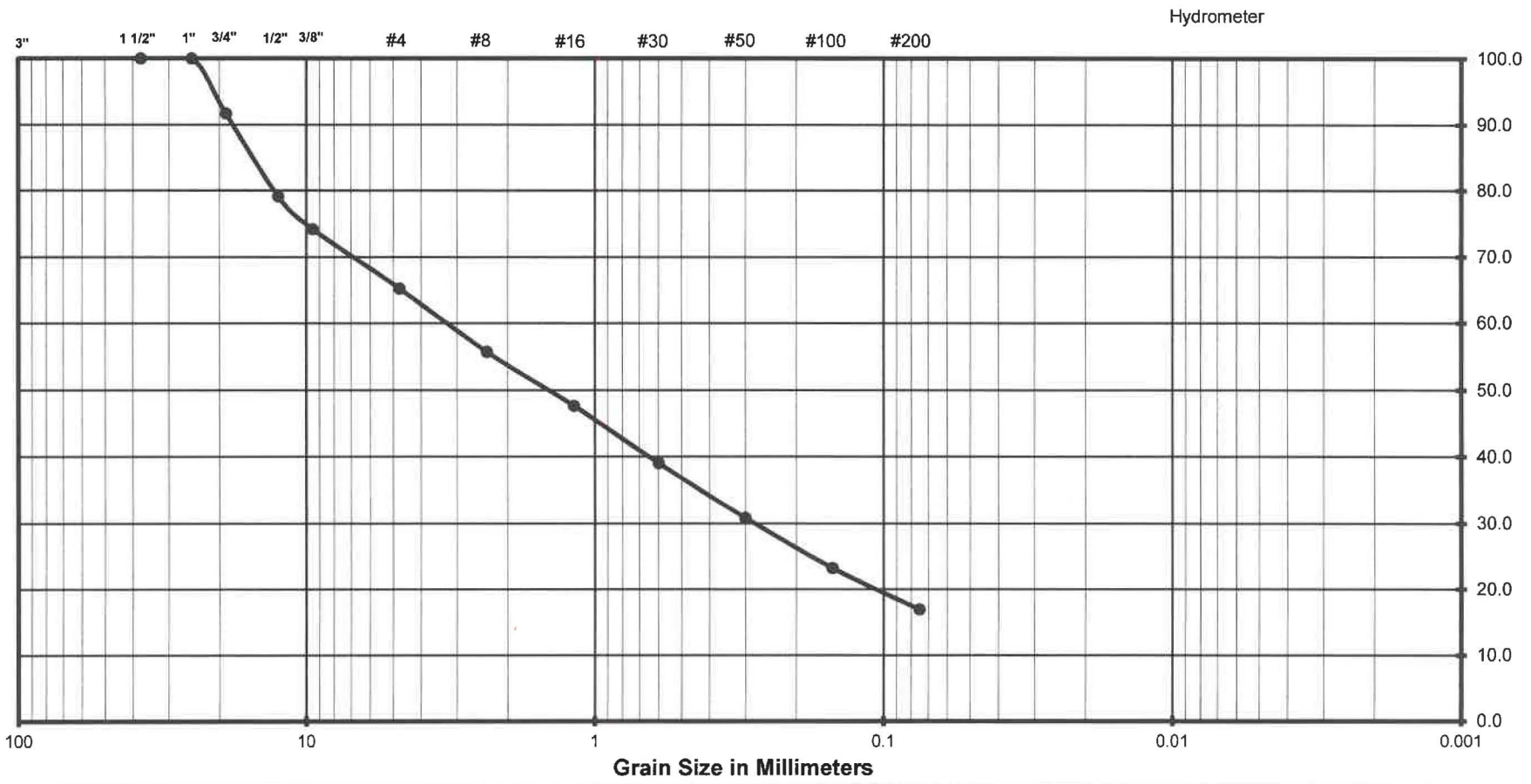
Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Osgood Industrial Building
Project Number	042-24030
Soil Classification	CL
Sample Number	B2 @ 2-3'

Krazan Testing Laboratory

Grain Size Analysis



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

(Unified Soils Classification)

Project Name	Osgood Industrial Building
Project Number	042-24030
Soil Classification	SM w/ grvl
Sample Number	Bulk 1 @ 0.5-1.5'

Krazan Testing Laboratory

Expansion Index Test

ASTM D - 4829

Project Number	: 042-24030
Project Name	: Osgood Industrial Building
Date	: 9/18/2024
Sample location/ Depth	: B3 @ 0-5'
Sample Number	: C1
Soil Classification	: CL

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	752.5		
Weight of Mold, gms	367.8		
Weight of Soil, gms	384.7		
Wet Density, Lbs/cu.ft.	116.0		
Weight of Moisture Sample (Wet), gms	200.0		
Weight of Moisture Sample (Dry), gms	178.9		
Moisture Content, %	11.8		
Dry Density, Lbs/cu.ft.	103.8		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	51.1		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0.0857

Expansion Index $_{measured}$ = 85.7

Expansion Index = **86**

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

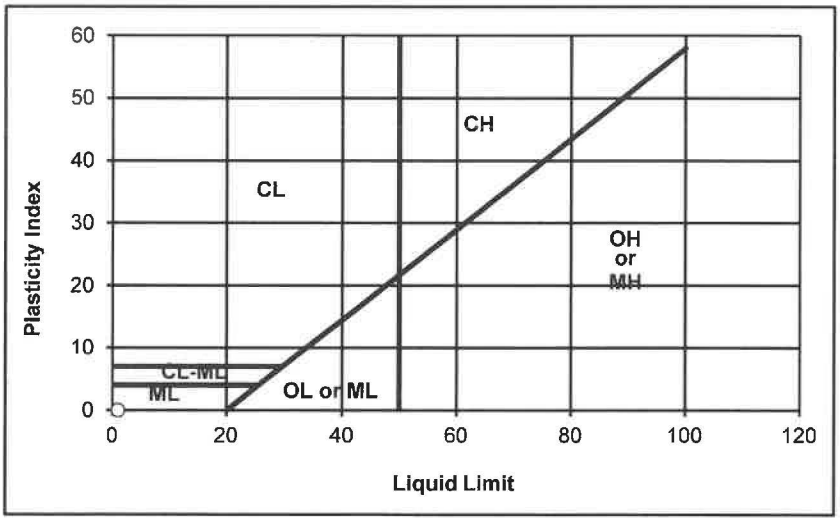
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B4 @ 2-3'
Sample Description: SM w/ grvl

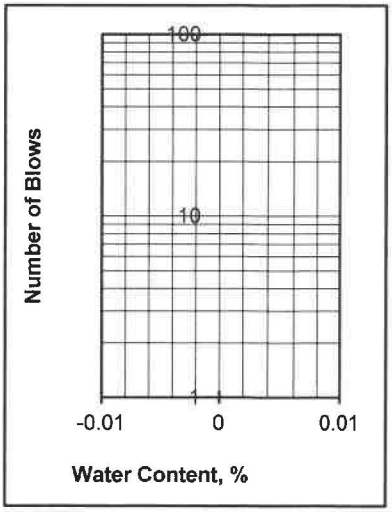
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D **Liquid Limit : N/D**

Plasticity Index : NON-PLASTIC
Unified Soil Classification : NON-PLASTIC **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Expansion Index Test

ASTM D - 4829

Project Number	: 042-24030
Project Name	: Osgood Industrial Building
Date	: 10/3/2024
Sample location/ Depth	: 0.5-1.5'
Sample Number	: Bulk #1
Soil Classification	: SM

Trial #	**1**	**2**	**3**
Weight of Soil & Mold, gms	801.2		
Weight of Mold, gms	366.8		
Weight of Soil, gms	434.4		
Wet Density, Lbs/cu.ft.	131.0		
Weight of Moisture Sample (Wet), gms	200.0		
Weight of Moisture Sample (Dry), gms	186.9		
Moisture Content, %	7.0		
Dry Density, Lbs/cu.ft.	122.4		
Specific Gravity of Soil	2.7		
Degree of Saturation, %	50.3		

Time	Inital	30 min	1 hr	6hrs	12 hrs	24 hrs
Dial Reading	0	--	--	--	--	0

Expansion Index $_{measured}$ = 0

Expansion Index = **0**

Expansion Potential Table	
Exp. Index	Potential Exp.
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Krazan Testing Laboratory

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

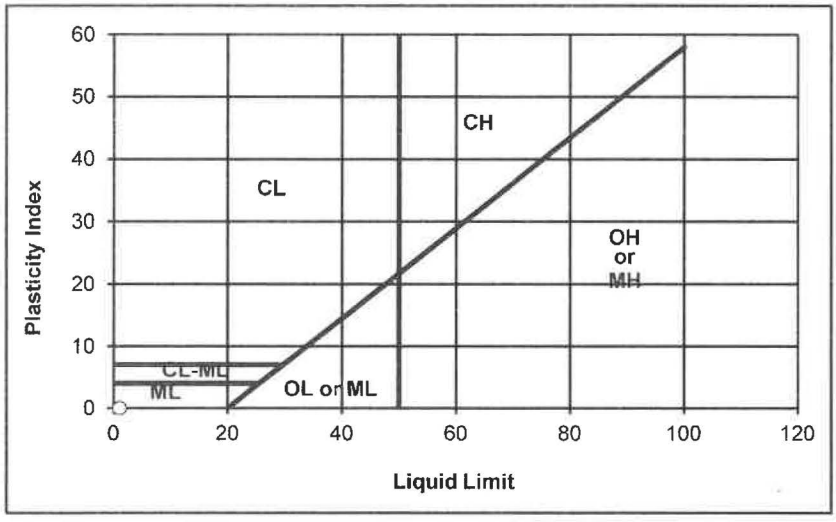
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 5-6'
Sample Description: SM

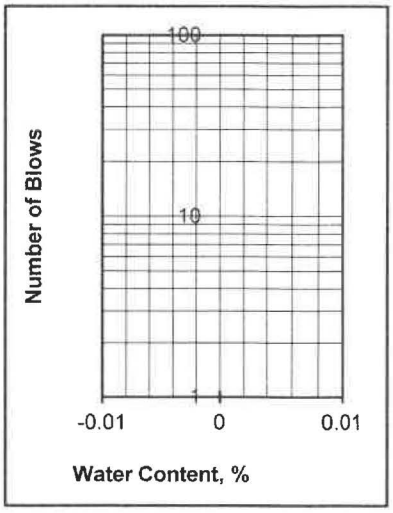
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D **Liquid Limit : N/D**

Plasticity Index : NON-PLASTIC
Unified Soil Classification : NON-PLASTIC **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

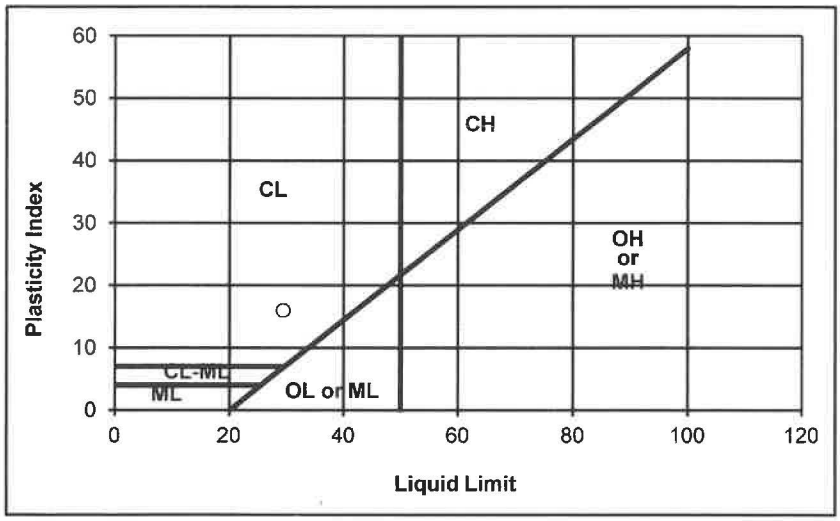
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 10-11'
Sample Description: CL

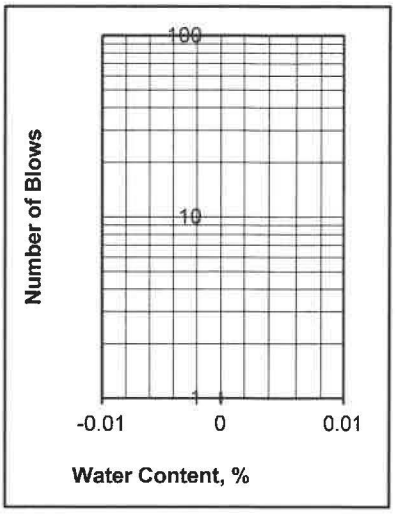
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	35.88	38.00		49.17	51.60	
Weight of Dry Soil & Tare (g)	34.98	36.93		44.49	46.31	
Weight of Tare (g)	28.21	28.54		28.50	28.49	
Weight of water (g)	0.90	1.07		4.68	5.29	
Weight of Dry Soil (g)	6.77	8.39		15.99	17.82	
Water Content (% of dry wt.)	13.3%	12.8%		29.3%	29.7%	
Number of Blows				25	25	

Plastic Limit : 13 **Liquid Limit : 29**

Plasticity Index : 16
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

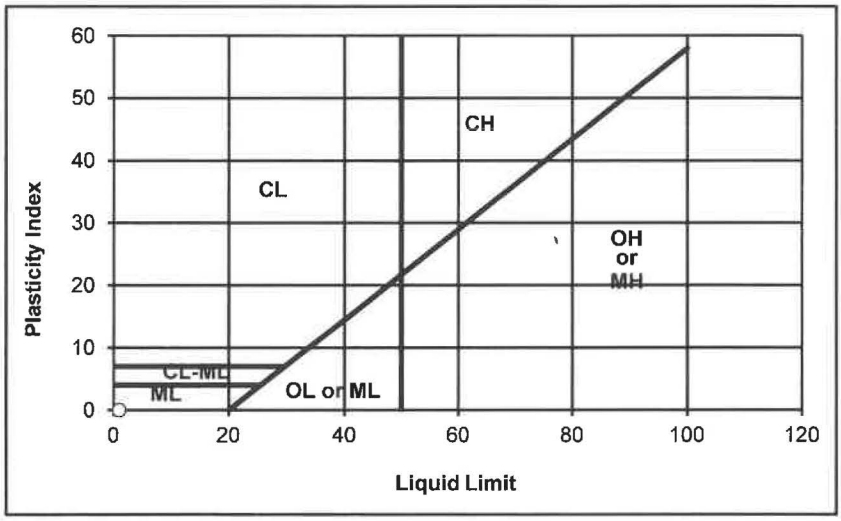
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 15-16'
Sample Description: ML

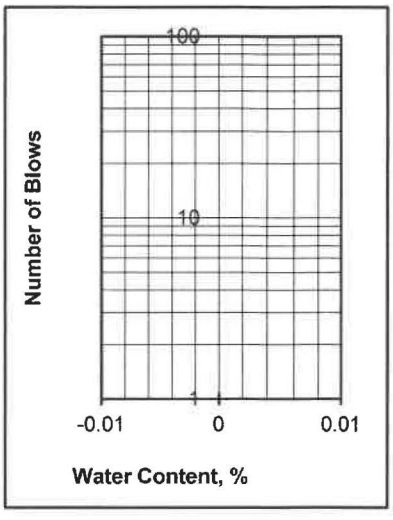
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D **Liquid Limit : N/D**

Plasticity Index : NON-PLASTIC
Unified Soil Classification : NON-PLASTIC **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

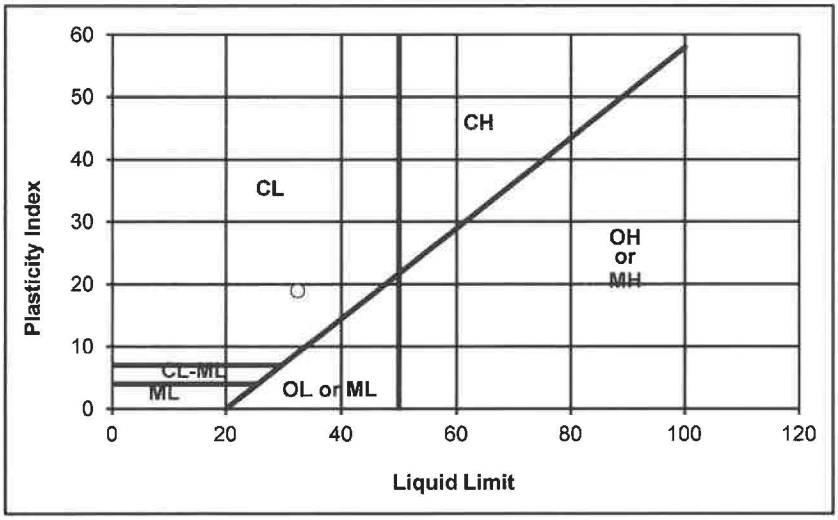
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 20-21'
Sample Description: CL

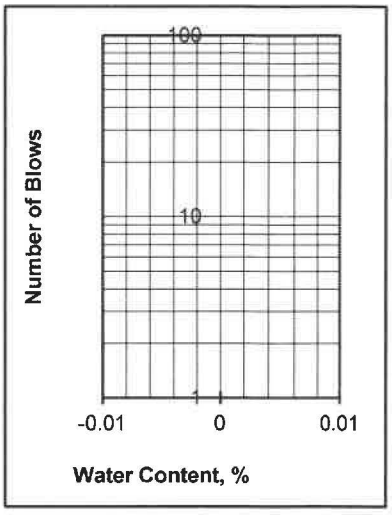
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	41.65	39.01		44.14	43.55	
Weight of Dry Soil & Tare (g)	40.09	37.79		40.29	39.85	
Weight of Tare (g)	28.61	28.58		28.41	28.49	
Weight of water (g)	1.56	1.22		3.85	3.70	
Weight of Dry Soil (g)	11.48	9.21		11.88	11.36	
Water Content (% of dry wt.)	13.6%	13.2%		32.4%	32.6%	
Number of Blows				25	25	

Plastic Limit : 13 **Liquid Limit : 32**

Plasticity Index : 19
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

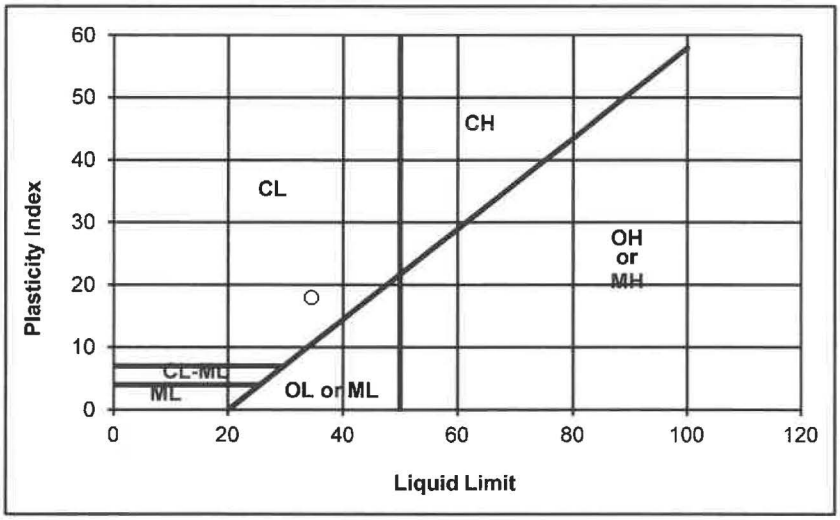
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 25-26'
Sample Description: CL

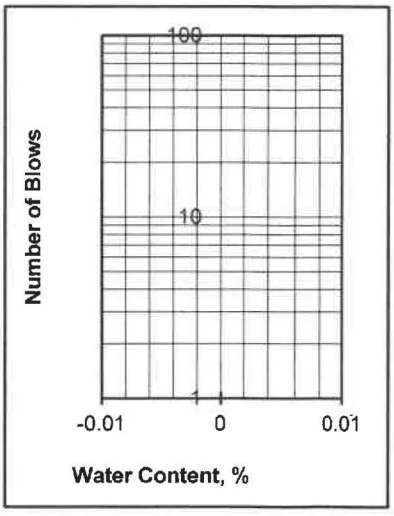
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	42.58	41.55		43.85	45.50	
Weight of Dry Soil & Tare (g)	40.49	39.63		39.91	41.12	
Weight of Tare (g)	28.20	28.54		28.48	28.48	
Weight of water (g)	2.09	1.92		3.94	4.38	
Weight of Dry Soil (g)	12.29	11.09		11.43	12.64	
Water Content (% of dry wt.)	17.0%	17.3%		34.5%	34.7%	
Number of Blows				25	25	

Plastic Limit : 17 **Liquid Limit : 35**

Plasticity Index : 18
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

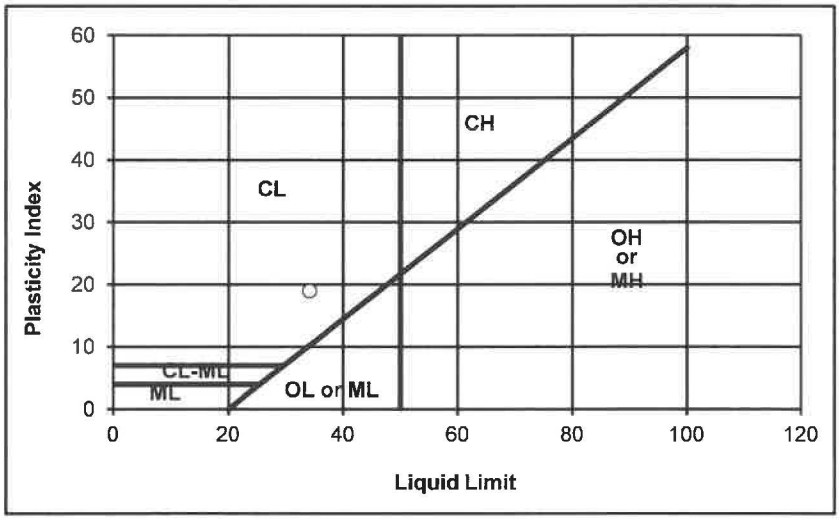
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 30-31'
Sample Description: CL

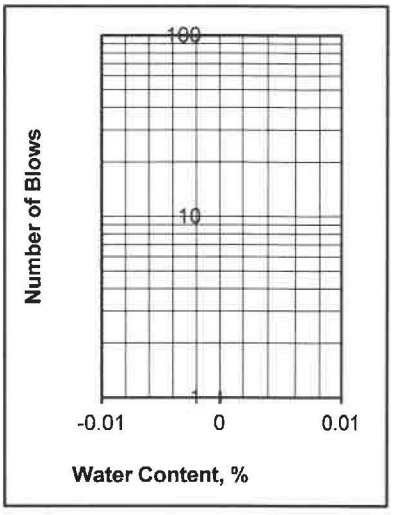
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	40.74	39.53		51.93	52.06	
Weight of Dry Soil & Tare (g)	39.11	38.14		45.98	46.05	
Weight of Tare (g)	28.11	28.46		28.49	28.49	
Weight of water (g)	1.63	1.39		5.95	6.01	
Weight of Dry Soil (g)	11.00	9.68		17.49	17.56	
Water Content (% of dry wt.)	14.8%	14.4%		34.0%	34.2%	
Number of Blows				25	25	

Plastic Limit : 15 **Liquid Limit : 34**

Plasticity Index : 19
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

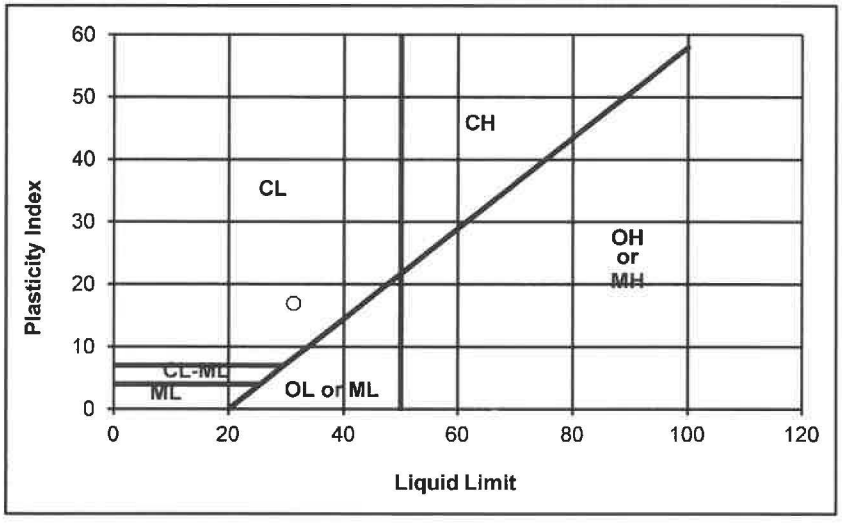
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 35-36'
Sample Description: CL

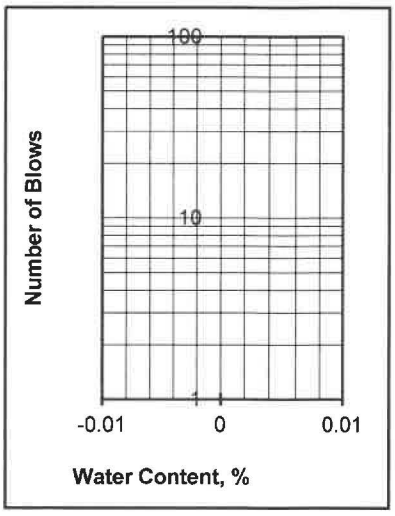
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	40.12	42.03		51.51	46.90	
Weight of Dry Soil & Tare (g)	38.71	40.45		45.98	42.51	
Weight of Tare (g)	28.59	28.56		28.41	28.49	
Weight of water (g)	1.41	1.58		5.53	4.39	
Weight of Dry Soil (g)	10.12	11.89		17.57	14.02	
Water Content (% of dry wt.)	13.9%	13.3%		31.5%	31.3%	
Number of Blows				25	25	

Plastic Limit : 14 **Liquid Limit : 31**

Plasticity Index : 17
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

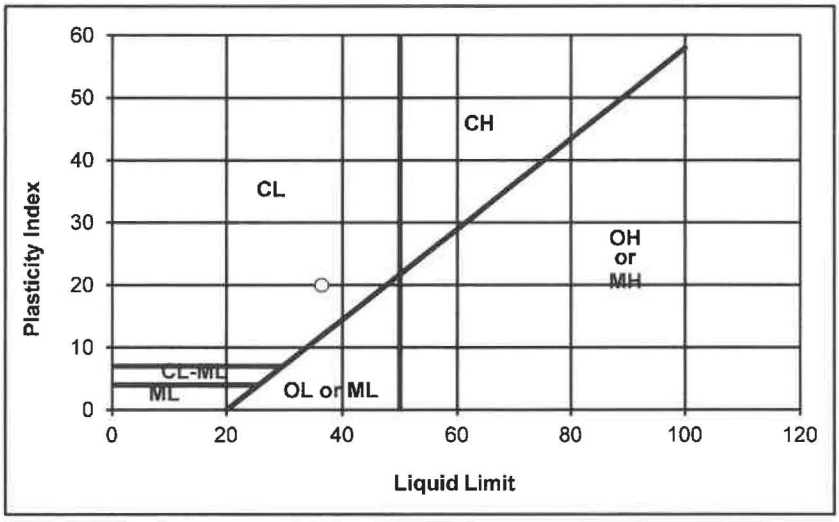
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 40-41'
Sample Description: CL

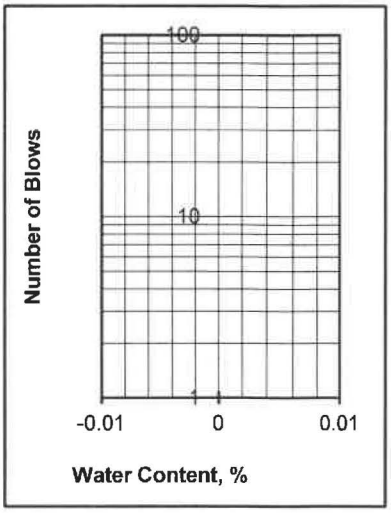
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	39.01	36.94		44.95	43.76	
Weight of Dry Soil & Tare (g)	37.51	35.73		40.57	39.67	
Weight of Tare (g)	28.25	28.24		28.53	28.46	
Weight of water (g)	1.50	1.21		4.38	4.09	
Weight of Dry Soil (g)	9.26	7.49		12.04	11.21	
Water Content (% of dry wt.)	16.2%	16.2%		36.4%	36.5%	
Number of Blows				25	25	

Plastic Limit : 16 **Liquid Limit : 36**

Plasticity Index : 20
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

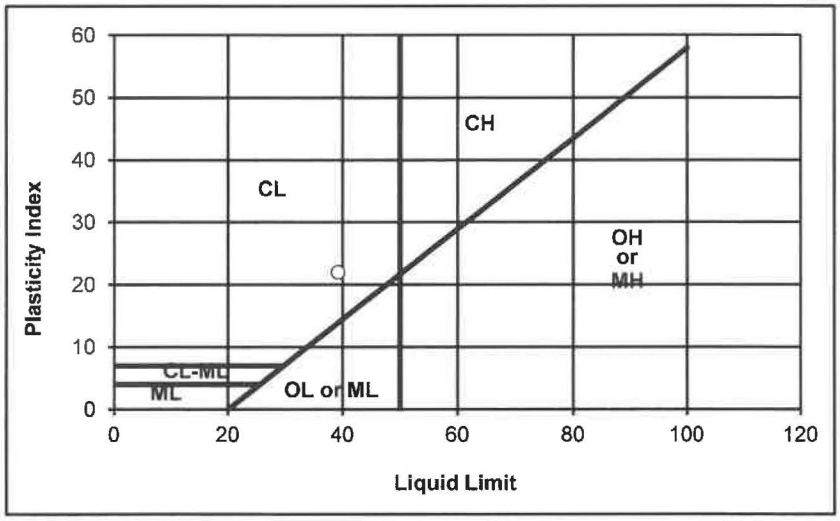
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/10/2024
Sampled By: DA
Sample Number: -
Sample Location: B6 @ 45-46'
Sample Description: CL

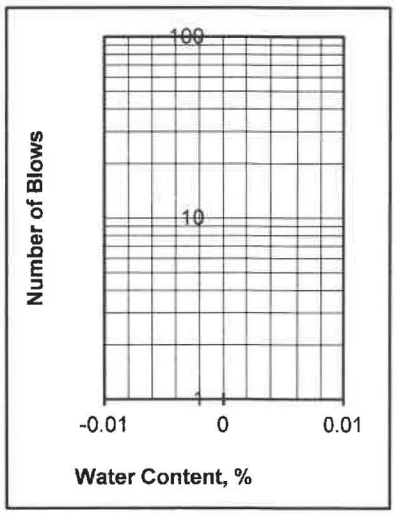
Date Tested: 9/16/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	37.23	35.11		46.95	39.22	
Weight of Dry Soil & Tare (g)	35.88	34.11		41.72	36.22	
Weight of Tare (g)	28.26	28.24		28.54	28.46	
Weight of water (g)	1.35	1.00		5.23	3.00	
Weight of Dry Soil (g)	7.62	5.87		13.18	7.76	
Water Content (% of dry wt.)	17.7%	17.0%		39.7%	38.7%	
Number of Blows				25	25	

Plastic Limit : 17 **Liquid Limit : 39**

Plasticity Index : 22
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

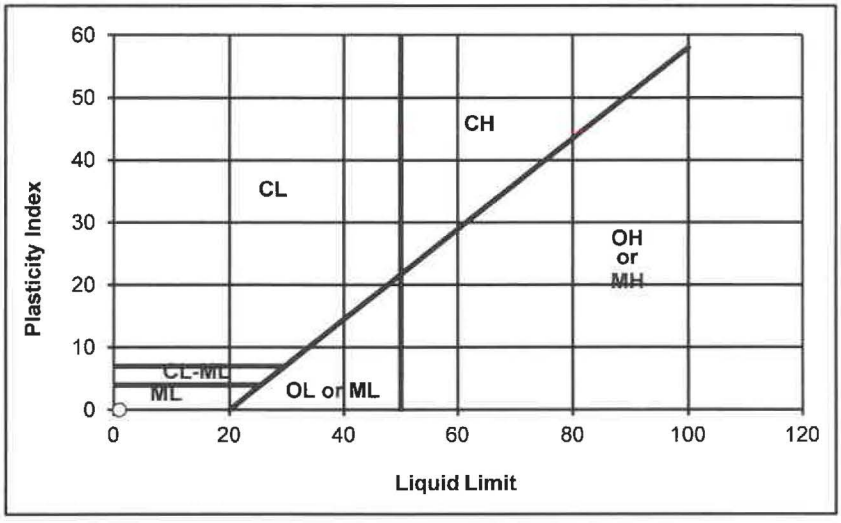
ASTM D4318/AASHTO T89 T90/CT 204

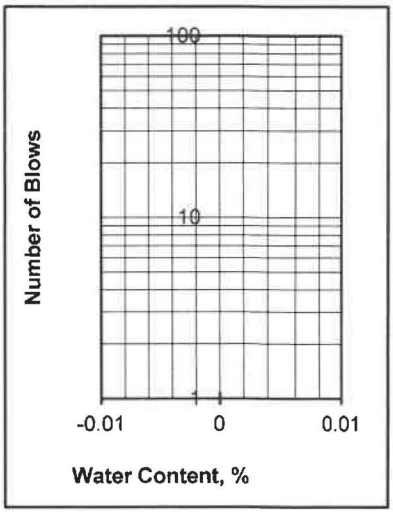
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/19/2024
Date Tested: 9/27/2024
Sampled By: MR
Tested By: JM
Sample Number: Bulk #1
Verified By: JG
Sample Location: 0.5-1.5'
Sample Description: SM w/ grvl

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)						
Weight of Dry Soil & Tare (g)						
Weight of Tare (g)						
Weight of water (g)						
Weight of Dry Soil (g)						
Water Content (% of dry wt.)						
Number of Blows						

Plastic Limit : N/D **Liquid Limit : N/D**

Plasticity Index : NON-PLASTIC
Unified Soil Classification : NON-PLASTIC **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

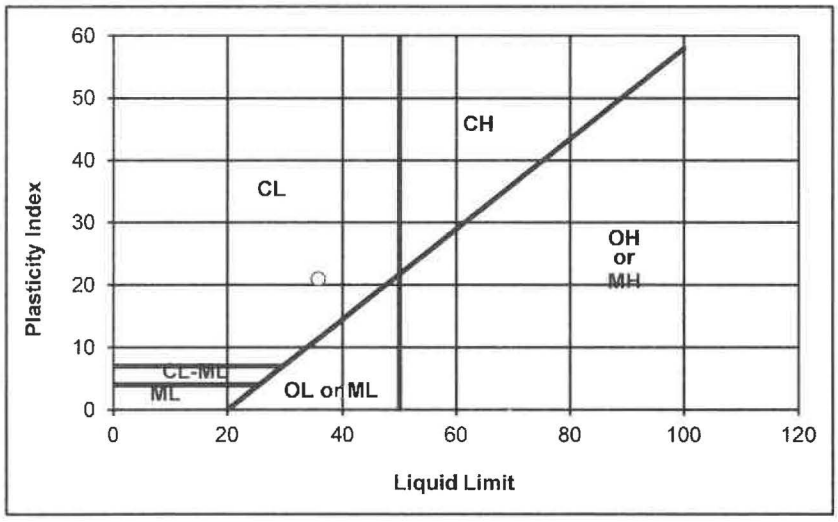
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/19/2024
Sampled By: MR
Sample Number: -
Sample Location: B7 @ 2-2.5'
Sample Description: CL w/ grvl

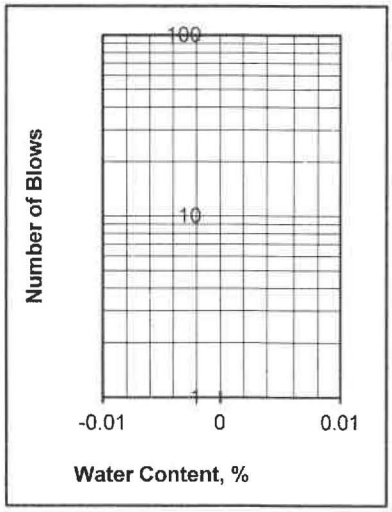
Date Tested: 9/27/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	43.74	43.48		44.72	43.14	42.68
Weight of Dry Soil & Tare (g)	41.75	41.52		40.27	39.28	38.99
Weight of Tare (g)	28.70	28.66		28.47	28.55	28.25
Weight of water (g)	1.99	1.96		4.45	3.86	3.69
Weight of Dry Soil (g)	13.05	12.86		11.80	10.73	10.74
Water Content (% of dry wt.)	15.2%	15.2%		37.7%	36.0%	34.4%
Number of Blows				16	23	35

Plastic Limit : 15 **Liquid Limit : 36**

Plasticity Index : 21
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

Unusual Conditions, Other Notes:

Plasticity Index of Soils

ASTM D4318/AASHTO T89 T90/CT 204

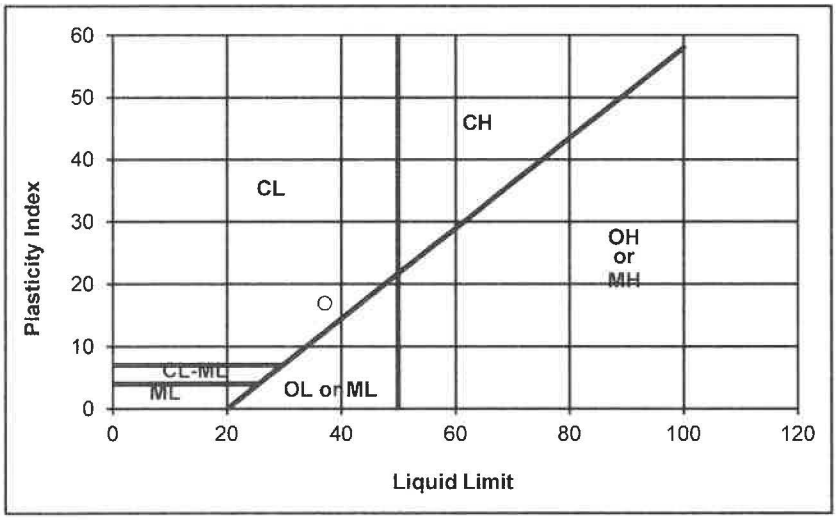
Project: **Osgood Industrial Building**
Project Number: **042-24030**
Date Sampled: 9/19/2024
Sampled By: MR
Sample Number: -
Sample Location: B9 @ 2-2.5'
Sample Description: CL w/ grvl

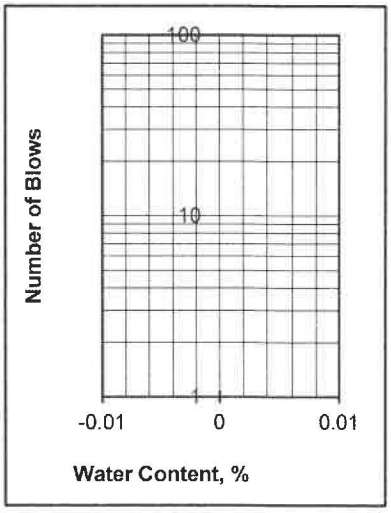
Date Tested: 9/27/2024
Tested By: JM
Verified By: JG

	Plastic Limit			Liquid Limit		
Trial Number	1	2	3	1	2	3
Weight of Wet Soil & Tare (g)	37.28	39.64		54.17	47.97	
Weight of Dry Soil & Tare (g)	35.84	37.82		47.20	42.65	
Weight of Tare (g)	28.58	28.54		28.48	28.25	
Weight of water (g)	1.44	1.82		6.97	5.32	
Weight of Dry Soil (g)	7.26	9.28		18.72	14.40	
Water Content (% of dry wt.)	19.8%	19.6%		37.2%	36.9%	
Number of Blows				25	25	

Plastic Limit : 20 **Liquid Limit : 37**

Plasticity Index : 17
Unified Soil Classification : CL **Requirement:**
Approx. % of Material Retained on # 40 Sieve:





Departures from Outlined Procedure:

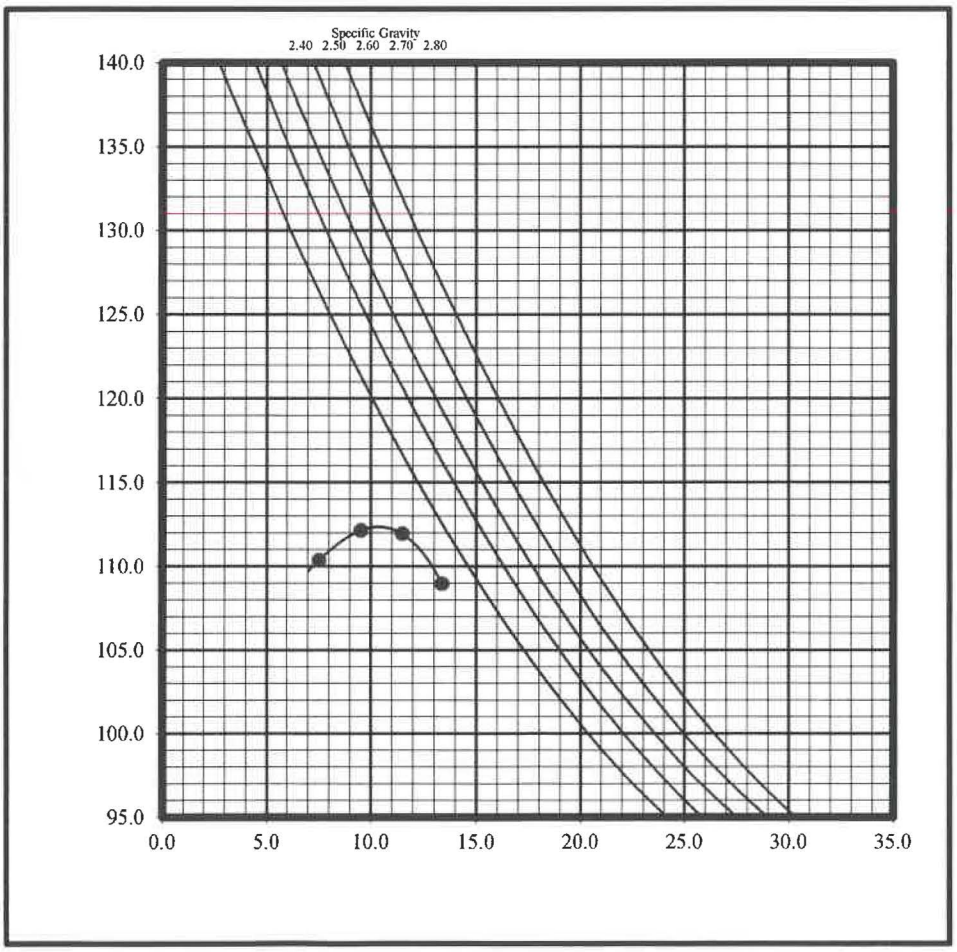
Unusual Conditions, Other Notes:

Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft. - lbf/ft^3)

ASTM D1557

Project Number	042-24030	Sample Number	C1
Project Name	Osgood Industrial Building	Soil Classification	CL
Technician	LF	Soil Description	Brn Sandy Clay
Date	9/10/2024	Method	D1557b
Sample Location	B3 @ 0-5'		

	1	2	3	4
Mass of Moist Specimen & Mold, gm	3777.8	3840.6	3870.4	3851.7
Mass of Compaction Mold, gm	1985.3	1985.3	1985.3	1985.3
Mass of Moist Specimen, gm	1792.5	1855.3	1885.1	1866.4
Volume of Mold, cu./ft.	0.0333	0.0333	0.0333	0.0333
Wet Density, lbs./cu.ft.	118.7	122.8	124.8	123.6
Mass of Moisture (Wet), gm	200.0	200.0	200.0	200.0
Mass of Moisture (Dry), gm	186.0	182.6	179.4	176.4
Moisture Content (%)	7.5	9.5	11.5	13.4
Dry Density, lbs/cu.ft.	110.4	112.1	111.9	109.0



Maximum Dry Density, lbs.cu.ft.

112.4

Optimum Moisture Content

10.4%

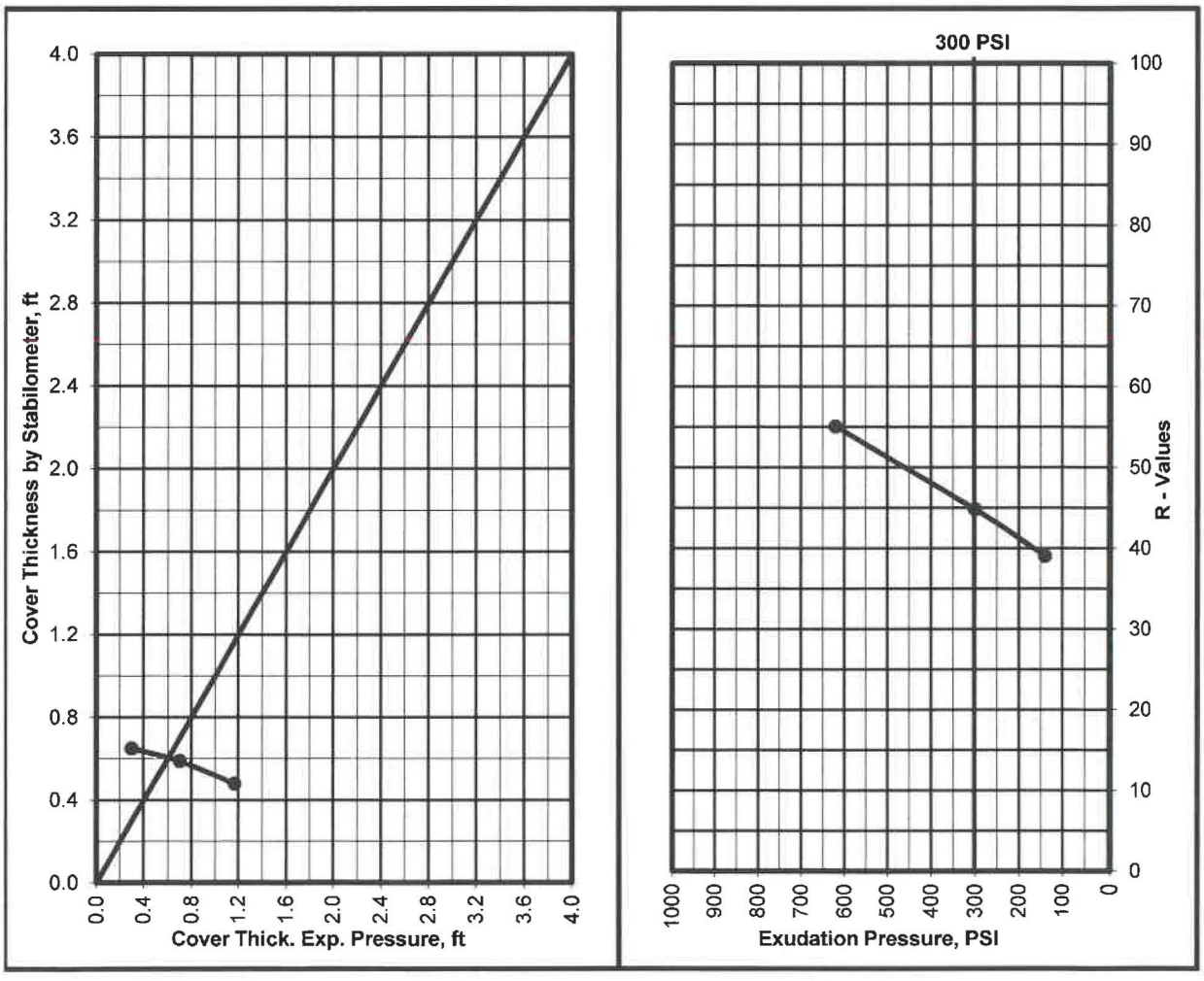
SDS#: -

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	042-24030
Project Name	:	Osgood Industrial Building
Date	:	9/13/2024
Sample Location/Curve Number	:	RV#1
Soil Classification	:	SC

TEST	A	B	C
Percent Moisture @ Compaction, %	14.3	13.0	12.3
Dry Density, lbm/cu.ft.	111.7	113.5	114.8
Exudation Pressure, psi	140	300	620
Expansion Pressure, (Dial Reading)	9	21	35
Expansion Pressure, psf	39	91	152
Resistance Value R	39	45	55

R Value by Expansion Pressure (TI =): 5	**44**
R Value at 300 PSI Exudation Pressure	**45**



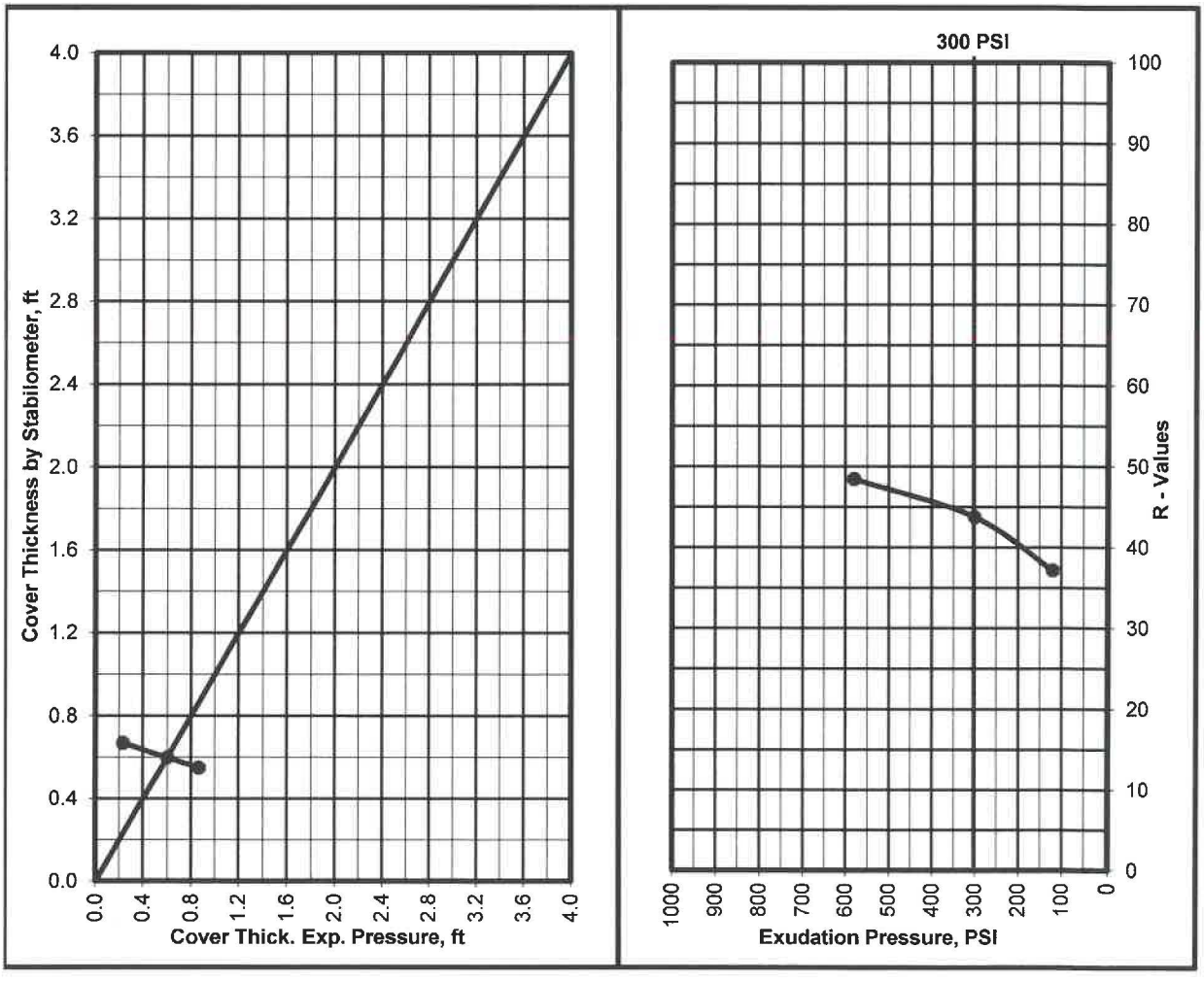
Krazan Testing Laboratory

R - VALUE TEST
ASTM D - 2844 / CAL 301

Project Number	:	042-24030
Project Name	:	Osgood Industrial Building
Date	:	9/13/2024
Sample Location/Curve Number	:	RV#2
Soil Classification	:	SC

TEST	A	B	C
Percent Moisture @ Compaction, %	15.9	15.1	14.5
Dry Density, lbm/cu.ft.	110.6	111.3	111.7
Exudation Pressure, psi	120	300	580
Expansion Pressure, (Dial Reading)	7	18	26
Expansion Pressure, psf	30	78	113
Resistance Value R	37	44	48

R Value by Expansion Pressure (TI =): 5	**44**
R Value at 300 PSI Exudation Pressure	**44**



Krazan Testing Laboratory

APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Soils Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified by the project Civil Engineer. Both the Soils Engineer and the Civil Engineer are the Owner's representatives. If the Contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Soils Engineer and the Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Soils Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Soils Engineer. The Contractor shall notify the Soils Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner or the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to a density not less than 90 percent relative compaction based on ASTM Test Method D1557 or CAL-216, as specified in the technical portion of the Soil Engineer's report. The location and frequency of field density tests shall be as determined by the Soils Engineer. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged by the Soils Engineer.

SOILS AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the Contract documents for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

SITE PREPARATION

Site preparation shall consist of site clearing and grubbing and the preparations of foundation materials for receiving fill.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Soils Engineer to be deleterious or otherwise unsuitable. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots larger than 1 inch. Tree roots removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill of tree root excavations should not be permitted until all exposed surfaces have been inspected and the Soils Engineer is present for the proper control of backfill placement and compaction. Burning in areas which are to receive fill materials shall not be permitted.

SUBGRADE PREPARATION: Surfaces to receive Engineered Fill, building or slab loads shall be prepared as outlined above, excavated/scarified to a depth of 12 inches, moisture-conditioned as necessary, and compacted to 90 percent relative compaction.

Loose soil areas, areas of uncertified fill, and/or areas of disturbed soils shall be moisture-conditioned as necessary and recompacted to 90 percent relative compaction. All ruts, hummocks, or other uneven surface features shall be removed by surface grading prior to placement of any fill materials. All areas which are to receive fill materials shall be approved by the Soils Engineer prior to the placement of any of the fill material.

EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over-excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Soils Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Soils Engineer. All materials utilized for constructing site fills shall be free from vegetation or other deleterious matter as determined by the Soils Engineer.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Soils Engineer.

Both cut and fill areas shall be surface-compacted to the satisfaction of the Soils Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Soils Engineer indicates that the moisture content and density of previously placed fill are as specified.

APPENDIX C

PAVEMENT SPECIFICATIONS

1. DEFINITIONS - The term "pavement" shall include asphaltic concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

The term "Standard Specifications": hereinafter referred to is the 2018 Standard Specifications of the State of California, Department of Transportation, and the "Materials Manual" is the Materials Manual of Testing and Control Procedures, State of California, Department of Public Works, Division of Highways. The term "relative compaction" refers to the field density expressed as a percentage of the maximum laboratory density as defined in the applicable tests outlined in the Materials Manual.

2. SCOPE OF WORK - This portion of the work shall include all labor, materials, tools, and equipment necessary for, and reasonably incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically noted as "Work Not Included."

3. PREPARATION OF THE SUBGRADE - The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum relative compaction of 90 percent. The finished subgrades shall be tested and approved by the Soils Engineer prior to the placement of additional pavement courses.

4. UNTREATED AGGREGATE BASE - The aggregate base material shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base material shall conform to the requirements of Section 26 of the Standard Specifications for Class 2 material, 1½ inches maximum size. The aggregate base material shall be spread and compacted in accordance with Section 26 of the Standard Specifications. The aggregate base material shall be spread in layers not exceeding 6 inches and each layer of aggregate material course shall be tested and approved by the Soils Engineer prior to the placement of successive layers. The aggregate base material shall be compacted to a minimum relative compaction of 95 percent.

5. AGGREGATE SUBBASE - The aggregate subbase shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate subbase material shall conform to the requirements of Section 25 of the Standard Specifications for Class 2 material. The aggregate subbase material shall be compacted to a minimum relative compaction of 95 percent, and it shall be spread and compacted in accordance with Section 25 of the Standard Specifications. Each layer of aggregate subbase shall be tested and approved by the Soils Engineer prior to the placement of successive layers.

6. ASPHALTIC CONCRETE SURFACING - Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at a central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades and dimensions shown on the plans. The viscosity grade of the asphalt shall be PG 64-10. The mineral aggregate shall be Type B, ½ inch maximum size, medium grading and shall conform to the requirements set forth in Section 39. The drying, proportioning and mixing of the materials shall conform to Section 39.

The prime coat, spreading and compacting equipment and spreading and compacting mixture shall conform to the applicable chapters of Section 39, with the exception that no surface course shall be placed when the atmospheric temperature is below 50° F. The surfacing shall be rolled with a combination of steel wheel and pneumatic rollers, as described in Section 39-6. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

7. FOG SEAL COAT - The fog seal (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of Section 37.