Civil & Environmental Consultants, Inc.

May 23, 2025

Mr. Alex Walter
Pre-Development Lead
Reframe Systems, Inc.
30 Lowell Junction Road
Andover, MA 01810

Subject: Geotechnical Engineering Report
25 Adams Circle, Devens, MA 01434
CEC Project 348-019

Dear Mr. Walter,

Civil & Environmental Consultants, Inc. (CEC) is pleased to present this Geotechnical Engineering Report for the above-referenced project. This report summarizes the results of test borings performed at the site, and laboratory test results along with our geotechnical engineering conclusions and recommendations pertaining to the proposed building foundation design and construction. CEC's conclusions and recommendations are based on the data obtained at the test boring locations and laboratory testing results, as well as our observations, geotechnical analyses, and experience with similar projects. Attachments to this letter include a test boring location plan, important information about this geotechnical-engineering report, the test boring logs, and the laboratory test results.

CEC's geotechnical services were performed in general accordance with our proposal, dated February 3, 2025, which was authorized by Reframe Systems, Inc. (the Client) on February 7, 2025. This report was prepared for the purpose of design development. Reliance on this report by any party other than Reframe Systems or their agents is expressly forbidden. Contractors should not rely on this letter for the purpose of bid development outside of the factual data provided herein.

BACKGROUND

The site is located at 25 Adams Circle in Devens, Massachusetts. The site currently consists of a grass landscaped area and is relatively flat between approximate El. 252 and 256 feet. The site previously contained several military structures as part of the previous military installation that was present in the town. The buildings at the site were razed around 2008, and the approximate footprints of these structures are presented on Figure 1. It is unknown whether below grade components of these structures remain in place. Based on discussions with the Devens Fire

Department, we understand that the presence of unexploded ordnance (UXO) may be present anywhere within the Devens enterprise zone.

CEC understands the Client intends to construct twelve single-family housing units (six split duplexes) along with associated site and utility improvements (the Proposed Development). Each housing unit will occupy a footprint of approximately 1,100 square feet (SF) in area and contain a shared carport and paved driveway. Loading conditions for the proposed structures have not been provided. A plan showing the approximate location of the proposed development is attached to this letter as Figure 1. Though grading plans have not yet been developed, CEC anticipates cuts and fills to grade the pads will be relatively minimal.

SUBSURFACE EXPLORATION

CEC coordinated and directed a subsurface exploration program consisting of twelve (12) soil test borings (CEC-1 through CEC-12). Please note that the test borings were originally located within the footprints of the proposed housing units, which have since been moved.

The test borings coordinated by CEC were performed in existing landscape areas at the approximate locations shown on Figure 1. The test borings were located at the site by CEC personnel using a Global Positioning System (GPS) unit. CEC contracted Geosearch Inc. of Sterling, MA to drill the test borings from April 28 through April 30, 2025. The test borings were advanced with a Geoprobe 7822DT track drill rig advancing hollow stem augers or direct push casing to depths ranging from approximately 12 to 39 feet below the existing ground surface (bgs). In general, the test borings were advanced through subsurface layers consisting of existing fill, glacial outwash, and glacial till.

The drill rig performing the test borings was equipped with an automatic hammer. Soil samples were obtained at intervals varying from continuous (2-foot centers) to approximate 5-foot centers, using split-spoon sampling and the standard penetration test (SPT) in accordance with ASTM D1586. A split-spoon sampler is a 2-inch outside-diameter (OD) tube, which is driven into the soil. The soil is captured in the sampler, removed, and identified. The SPT generally consists of driving the sampler using a 140-pound hammer freely falling a distance of 30 inches. The number of blows required to drive the sampler through four successive 6-inch increments is recorded. The sum of the number of blows required to drive the sampler through the second and third increments is the N-value of the soil, which can be used to estimate soil density and shear strength.

Drilling operations were performed under the observation and guidance of CEC personnel. CEC's project representative described the soil color, texture, apparent origin, and apparent moisture content of the samples obtained during drilling. Detailed subsurface descriptions, SPT N-values, and other applicable information are shown on the test boring logs in Appendix B. A summary of the definitions of standard terms and symbols used in this report and on the test boring logs is also presented in Appendix B.

CEC's representative measured subsurface water conditions at the completion of test boring advancement and soil sampling. Subsurface water (not influenced by water introduced into the hole during drilling operations) was encountered in 9 of the 12 test borings at depths ranging from approximately 9 to 15.5 feet bgs and from approximate El. 242 to 236 feet. The test borings were backfilled with drill cuttings and/or sand after drilling. The subsurface water conditions were observed at the actual times and locations of the test borings during drilling. Subsurface water may fluctuate with time and/or location across the site.

GEOTECHNICAL LABORATORY TESTING

Geotechnical laboratory testing was performed on select samples obtained during drilling to estimate engineering characteristics of the site soils. The laboratory testing included grain size analyses (mechanical sieve) and percent fines content (finer than the #200 sieve – silt and clay-sized particles). Unified Soil Classification System (USCS) designations were determined from the results of the grain size testing. A summary of the laboratory testing and the full test results are presented in Appendix C.

SUBSURFACE CONDITIONS

CEC presents the following summary of subsurface conditions based on the data obtained at the test boring locations during the subsurface exploration and our observations. The test borings performed at this site represent the subsurface conditions observed at the location and time they were completed. Soil and groundwater conditions at other locations or at other times may differ.

Existing Fill Conditions

Existing fill is soil derived from natural soil, rock, or processed materials that was placed by artificial methods, such as construction, waste disposal, or dumping. Existing fill was encountered in all test boring locations and ranged from approximately 2 to 5.5 feet in thickness. The top 1 to 2 inches of fill contained surface vegetation, but a definitive layer of topsoil did not appear present. The existing fill stratum generally consisted of brown, loose to very dense, silty sand with gravel. The fill materials were generally dry (on a scale of dry, moist, wet) and were underlain by natural glacial outwash soil. The N-values recorded for existing fill samples generally ranged from 5 to

17 blows per foot (bpf), with an outlier of 50+ bpf from 2 to 4 feet bgs in test boring CEC-12. The one sample of existing fill submitted for gradation testing indicated a well-graded and with silt and gravel, with a fines content of 10 percent.

Glacial Outwash Conditions

Glacial outwash is soil deposited by glacial streams or meltwater in a preexisting valley or over a plain. Glacial outwash was encountered below the existing fill in each of the 12 test borings. In test borings CEC-1 through CEC-6 and CEC-8, approximately 2.5 feet to 27 feet of glacial outwash was encountered to depths varying from about 8 to 30 feet bgs. Test borings CEC-7 and CEC-9 through CEC-12 terminated in glacial outwash at depths varying from approximately 18 to 27 feet bgs. The thickness of the glacial outwash encountered in the test borings increased in a southerly direction and generally consisted of tan, very loose to medium dense, moist to wet, poorly-graded sand with silt, silty sand, or silt. Eight samples of glacial outwash material were submitted for laboratory test results (three gradations and five fines content). The test results indicated the glacial outwash consisted of silt and poorly-graded sand with silt. Fines content ranged from 7.6 percent to 59.9 percent. The N-values of the glacial outwash sampled generally ranged from 2 to 23 bpf; however, most samples contained N-values ranging from 2 to 10 bpf.

Glacial Till Conditions

Glacial till is soil deposited by and underneath a glacier, generally consisting of a heterogeneous, unstratified mixture of clay, sand, gravel, and boulders. Glacial till was encountered below the glacial outwash in test borings CEC-1 through CEC-6 and CEC-8 to from 12 to 39 feet bgs before terminating in the glacial till. The glacial till consisted of medium dense to very dense, silty sand with gravel or silty gravel with sand. N-values within the glacial till ranged from approximately 13 to 63 bpf. The glacial till soils were generally moist to wet.

Subsurface Water Conditions

Subsurface water was encountered at depths of approximately 9 to 15 feet bgs (i.e. approximate El. 242 to 236 feet) in test borings CEC-2, CEC-4 through CEC-10, and CEC-12 at the time of drilling. Subsurface water conditions can fluctuate and vary based on precipitation, season, temperature, and other factors, and may be different at the time of construction than what was observed during test drilling.

GEOTECHNICAL RECOMMENDATIONS

General

CEC presents the following recommendations for building foundations, earthwork, subgrade preparation and fill placement, and seismic considerations. When the grading/site layout is finalized, and/or if the subsurface conditions encountered during construction differ from those indicated by our test borings, CEC should review the conditions to determine if our conclusions and recommendations are applicable or if revisions are required. CEC stresses our continued involvement with the project during construction to review actual subsurface conditions and reassess recommendations as necessary.

Foundations

Reframe has indicated a desire to support the proposed housing units on helical piles in an effort limit excavation and spoils generation, as practical, during property development and housing unit construction. Based on the subsurface materials encountered and Reframe Systems' requests, CEC has included recommendations for helical piles and conventional shallow foundations for supporting the proposed housing units.

Helical Pile Foundations

Helical piles appear to be a suitable foundation system for this site based on the subsurface conditions encountered and Reframe's objectives to limit spoils at the site. A helical pile is a type of deep foundation system that includes helical bearing plates welded to a central steel shaft. The helical piles transmit the loads into competent bearing material through these bearing plates. Concrete grade beams or pile caps can be used to distribute the structural loads to each individual pile, or the pile can be directly connected to structural steel.

Helical piles are installed using relatively small hydraulic equipment and are torqued to a specific value. The load capacity of helical piles are usually determined using empirical torque correlations or load tests. A variety of manufacturers offer helical piles based on either square or round shafts. In general, a round shaft helical pile offers a larger cross-sectional area than their square counterparts, resulting in higher allowable compressive loads per pile, increased resistance to buckling, and a reduction in torsional bending of the pile shaft during installation. CEC recommends that helical piles be installed using a torque- or shear-pin-based acceptance criteria to provide additional assurance that the designed allowable pile capacity has been met for each pile installed. Test piles may be used to verify the helical pile meet the performance criteria of the anticipated foundation loads.

Due to the empirical nature of helical pile design and construction, and the variety of helix configurations available, a helical pile specialty contractor with a minimum of 5 years of experience should be retained for design and installation of helical piles. Based on the results of the test borings, CEC recommends helical piles extend at least through the existing fill and sufficiently into the natural materials to provide the installation torque required to meet the specified loading requirements. The actual depth, spacing and number of the helical piles should be determined by the helical pile contractor, based on the loading conditions and pile spacing determined by the structural engineer. The helical pier contractor and the structural engineer will also need to collaborate on design of the connection between the piers and the structure.

The contractor should anticipate the presence of debris in the existing fill that may need to be removed in order to install the helical piles and pile caps. Alternatively, some helical piles may need to be relocated based on the locations of the debris material.

Shallow Foundations

If helical piles are not selected for the project, shallow foundations may also be used for the proposed housing units. Shallow foundations should be supported directly on natural glacial outwash soils or on compacted structural fill placed over natural glacial outwash soils. Shallow foundations should not be supported on existing fill. CEC recommends shallow foundations be designed using a maximum allowable bearing capacity of 1,500 psf. Use a minimum foundation width of 1.5 feet for reinforced continuous foundations and 3-foot by 3-foot for spread foundations.

Foundation excavations should be trimmed by hand following excavation to remove loose material and minimize disturbance to the subgrade soils. The foundation subgrade shall be firm, stable, and free of any loose soil, rock, mud, water, or frost. Concrete should not be placed on frozen subgrades. Soft or unstable soil should be removed and replaced with compacted structural fill. Install a lean-concrete mudmat on the foundation subgrades if the subgrades will be exposed to inclement (raining, or freezing) weather.

Frost Considerations

Regardless of the foundation system utilized, the bottom of proposed foundations should be set a minimum of 4 feet below final grade for frost protection. Alternative frost protection measures may be considered if constructing footings below the frost line is not desirable. This may include the placement of rigid foamboard insulation along the face of the foundation and extending horizontally outward from the foundation, or similar. CEC recommends consulting with your structural engineer and governing design code for integrating alternative frost protection measures into the design of the proposed housing units.

On-Grade Slabs

The existing fill appears suitable for supporting on-grade slabs provided the subgrade is prepared in accordance with this report. Proofroll the building floor slab subgrade immediately prior to floor slab construction as indicated in Site Development and Subgrade Preparation section. Backfill over excavations of soft or deflecting subgrade material, as delineated by proofrolling, with suitable fill material placed and compacted in accordance with the recommendations contained herein.

Provide a minimum 4-inch-thick layer of non-expansive crushed stone as a porous fill beneath concrete slabs placed on grade. A minimum 10-mil thick vapor retarder should be placed immediately below the floor slab if a moisture-sensitive floor covering will be used. The vapor retarder should meet the specifications of ASTM E1745, Class A, and be placed in accordance with ASTM E1643. All seams should be taped and any penetrations should be sealed according to American Concrete Institute (ACI) guidelines. If a moisture-sensitive floor covering is proposed in a humidity-controlled area, CEC recommends that the floor covering manufacturer or installer be consulted during design of the vapor barrier system and floor slab. If a vapor retarder is placed immediately below the floor slab, CEC recommends that measures be taken to reduce the potential for slab curling, such as reduced joint spacing and/or using a concrete with low shrinkage potential. Isolate the on-grade floor slabs from columns and load-bearing walls.

Site Development and Subgrade Preparation

Prior to earthwork/foundation construction, consult with the Devens Fire Department or other Devens departments as appropriate to understand the need for UXO inspection/detection during construction operations.

Prior to the placement of fill at the site, surface vegetation should be stripped and stockpiled for future use in landscaping applications or removed from the site. Roots, vegetation, and other deleterious or compressible materials, should also be cleared and grubbed.

Exposed subgrades should be proof-rolled using a large (10-ton or heavier) vibratory roller, a fully loaded triaxle, off-road dump truck with a minimum static weight of 20 tons, or other heavy compaction equipment approved by the geotechnical engineer, prior to placing fill. The proof-roll equipment should make a minimum of ten (10) passes in two (2) perpendicular directions across the subgrade. CEC also recommends compacting slab and foundation subgrades with vibratory smooth-drum rollers, steel-plate tampers, and/or other compaction equipment making at least five passes to provide for more uniform bearing conditions and reduce differential settlement. The compacted slab subgrades should then be subject to proofroll as described above. If proof-rolled subgrades display visual deformation, instability, elasticity, and/or unsuitable soils conditions or under the weight of the construction equipment, the deflecting material should be over excavated and replaced with suitable fill material in accordance with the recommendations herein. Excavate to a depth where firm, non-yielding suitable material is encountered as determined by a CEC representative. Over excavation below shallow foundations, if used, should be backfilled with Structural Fill.

Debris, including UXO and deleterious materials generated or encountered during over excavation, are not considered to be suitable for use in on-site fills. Demolition materials should be hauled to an appropriate landfill (i.e., legally disposed). If encountered, appropriate authorities should be contacted to coordinate the removal of UXO. Existing utilities within the footprint of proposed buildings that are not re-used should be removed and backfilled with structural fill or left in-place and grouted completely. Utilities outside the footprint of the proposed buildings may be left in-place but should be grouted completely.

Structural Fill Materials

Soils suitable for use as Structural fill include soils with a USCS classification of GW, GP, GM, SW, SP, and SM (or combinations thereof) and contain less than 30% fines (silt and clay-sized particles) by weight. Structural fill materials should be free of organic material and should be submitted to a laboratory for geotechnical testing prior to use to verify its suitability and to confirm the required properties. Testing should include grain size analysis (ASTM D422) and modified Proctor (ASTM D1557) testing. Testing should be performed for each borrow source used, for each type of material used, periodically during fill placement for quality assurance, and for any changes in material noted during construction. The fill should not include material that exceeds 6 inches in maximum dimensional size, with no more than 25% exceeding 3 inches in maximum dimensional size. The on-site fill and natural glacial soils appear to be suitable for re-use as new fill. However, some of the encountered soils contain a fines content greater than 10%, which would necessitate using different compaction equipment and compaction criteria during construction as described in the Fill Placement section.

Fill Placement

Place suitable soil fill in a controlled manner in loose, horizontal lifts not exceeding 12 inches thick in areas where heavy compaction equipment will be used to compact the material. Fill material containing more than 10% fines should be compacted to at least 95% of the maximum dry density and within 3% of optimum moisture content as estimated by the modified Proctor (ASTM D1557) compaction test. Adjustments to soil moisture by wetting or drying should be made as needed. Segmented pad-type compactors should be used to compact fine-grained fill material (silts and clays). Clean coarse-grained cohesionless soil containing less than 10% fines should be compacted to non-movement using heavy smooth-drum vibratory compaction equipment. The fill should be compacted with a smooth-drum roller at the end of the workday to "seal" the fill and reduce the impact of precipitation. Scarify the fill surface prior to continuing fill placement. Do not place new fill over frozen, snow-covered, or saturated ground. Use a reduced maximum loose lift thickness of 8 inches in areas where hand-operated compaction equipment will be used. A reduced maximum particle size of 4 inches should be used in areas where hand-operated compactors are used and where foundations or utilities will be constructed.

Fill Quality Control

Density and moisture content testing should be performed on all new fill materials containing more than 10% fines placed at the site in accordance with ASTM D6938. Perform at least one density and moisture test per lift for each housing unit.

Construction Dewatering

Subsurface water was encountered between approximate El. 242 to 236 feet in the test borings. Encountered groundwater levels are generally lower than the anticipated excavation depths during earthwork operations. However, dewatering efforts to facilitate excavations may be required in select areas across the site during and after storm events. CEC anticipates sumps, channels, and similar methods can be used to control any subsurface water or surface stormwater runoff.

Temporary Excavations

CEC recommends that all excavations comply with the most recent Occupational Safety and Health Administration (OSHA) Excavation and Trench Standard, Title 29 of the Code of Federal Regulations (CFR) Part 1926, Subpart P. This federal regulation was promulgated to provide for the safety of workers entering trenches or excavations and mandates the owner and the contractor comply with OSHA guidelines to avoid substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of the excavation sides. The contractor's "competent person" as defined in 29 CFR Part 2916 should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination or excavation depth (including trench excavation depth) exceed those specified in local, state and federal safety regulations.

Site Pavements

Subgrade soil below new pavements should be prepared in accordance with this report. We recommend a crushed aggregate subbase of at least 8 inches placed to 95% of the maximum dry density in accordance with ASTM D1557 (modified proctor). The crushed aggregate should conform to MassDOT M2.01.7-1 requirements for Dense Graded Crushed stone. Asphalt binder course should be at least 2 inches thick and asphalt top course should be at least 1.5 inches thick.

Seismic Considerations

Liquefaction is a phenomenon that can occur during earthquakes in which relatively loose, granular soils below the groundwater table lose strength as upward buoyant forces in the soil rapidly increase during ground shaking. Liquefaction can result in ground motions that can result in severe structural damage to buildings. The occurrence of liquefaction is a function of subsurface soil conditions and earthquake intensity; it is independent of structure size.

Based on the subsurface conditions encountered at the site, the subsurface soils are considered susceptible to liquefaction. In specific, the glacial outwash layer between the existing fill and underlying glacial till is considered liquifiable due to the presence of groundwater, a loose relative density, and a low "fines" content (i.e. silt and clay-sized particles). The most liquefaction-susceptible soils were encountered in test borings CEC-5 through CEC-12. Test borings CEC-1 through CEC-4 contained relatively dense glacial till at shallower depths which make these areas less susceptible to liquefaction. CEC estimated that occurrence of liquefaction at test borings CEC-5 through CEC-12 would be likely from the 2,500 year earthquake event (i.e. the seismic event with a 2% chance of occurrence in 50 years). CEC estimated that liquefaction would be unlikely from higher probability events, including the 1,000 year event (i.e. the seismic event with a 5% chance of occurrence in 50 years).

Liquefaction risks can be mitigated by densifying the soil within the liquefiable layer or installing vertical drains through the potentially liquifiable layer in a closely spaced array to provide adequate drainage during an earthquake event. However, these methods can be cost-prohibitive for residential projects. As such, we recommend that future owners of the housing units where test borings CEC-5 through CEC-12 were performed be made aware of this risk for their consideration. Homeowners may be eligible for earthquake insurance.

CLOSING

The services performed by CEC were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical engineering profession practicing contemporaneously under similar conditions in the locality of the project. No warranty, express or implied, is made. Appendix A contains a document entitled “Important Information About this Geotechnical-Engineering Report.” This document further explains the realities of geotechnical engineering, and the limitations that exist in evaluating geotechnical issues.

CEC trusts this information is sufficient to support the current needs of this project, and we appreciate the opportunity to be of service to you. Please contact us if you have any questions or comments.

Sincerely,

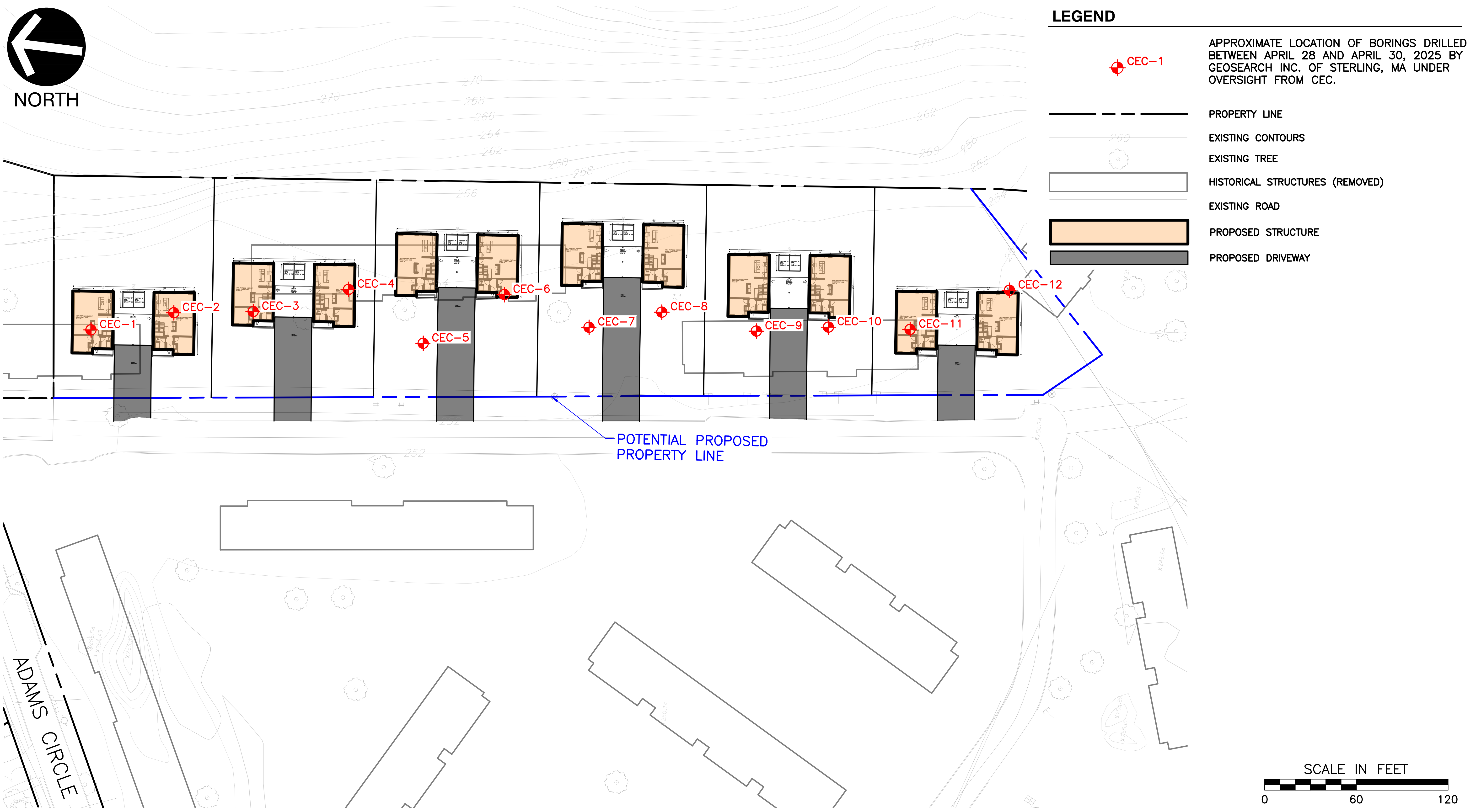
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Antonio E. Sousa, P.E.
Project Manager

Aaron W. Lavage
Principal

Attachments: Figure – Test Boring Location Plan
Appendix A – Important Information About this Geotechnical-Engineering Report
Appendix B – Test Boring Logs
Appendix C – Geotechnical Laboratory Test Results

FIGURE
TEST BORING LOCATION PLAN



LEGEND

CEC–1 APPROXIMATE LOCATION OF BORINGS DRILLED BETWEEN APRIL 28 AND APRIL 30, 2025 BY GEOSEARCH INC. OF STERLING, MA UNDER OVERSIGHT FROM CEC.

PROPERTY LINE

EXISTING CONTOURS

EXISTING TREE

HISTORICAL STRUCTURES (REMOVED)

EXISTING ROAD

PROPOSED STRUCTURE

PROPOSED DRIVEWAY

REFERENCES

1. EXISTING CONDITIONS INFORMATION OBTAINED FROM CAD FILE PROVIDED BY MASS DEVELOPMENT. DATE UNKNOWN.
2. PROPOSED BUILDING FOOTPRINTS PROVIDED BY REFRAME SYSTEMS. LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.

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REFRAME SYSTEMS INC.
PROPOSED RESIDENTIAL DEVELOPMENT
25 ADAMS CIRCLE
DEVENS, MASSACHUSETTS

TEST BORING LOCATION PLAN

DRAWN BY:	AMB	CHECKED BY:	TES	APPROVED BY:	AWL	FIGURE NO.:	1
DATE:	MAY 2025	DWG SCALE:	1"=60'	PROJECT NO:	348-019		

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APPENDIX A
IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept* *responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are <u>Not</u> Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are <u>not</u> building-envelope or mold specialists.***

GBA
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BUSINESS
ASSOCIATION

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APPENDIX B
TEST BORING LOGS

Rock Types

Rock Name	Characteristics	Symbol
Claystone	Clay sized particles that are consolidated, lacking fissility.	▨
Coal	Black and shiny, can break into cubes or conchoidally.	■
Conglomerate	Gravel sized grains and larger held together by finer material, called a breccia if clasts are angular.	▩
Limestone	Effervesces w/ diluted HCl, can be composed of clay up to gravel particles (fossils).	▦
Sandstone	Primarily sand sized particles modified w/ the descriptor fine, medium, or coarse.	⁘
Shale	Clay sized particles, shale has fissility which is a horizontal sheet-like or laminated feature.	☰
Siltstone	Composed of silt, normally breaks as irregular chunks.	⊠

Rock Quality Descriptions

Weathering

Completely Weathered: All rock material is decomposed and/or disintegrated. The original rock structure may still be intact.

Highly Weathered: More than half of the rock material is decomposed. Fresh rock is present only as a discontinuous framework or as corestones.

Moderately Weathered: Less than half of the rock material is decomposed. Fresh rock is present at a discontinuous framework or as corestones.

Slightly Weathered: Discoloration or staining indicates weathering of rock material on discontinuity surfaces. Rock may be discolored and softened.

Fresh: No visible signs of rock material weathering.

RQD

Descriptor	%
Very Poor	<25
Poor	25-50
Fair	50-75
Good	75-90
Excellent	>90

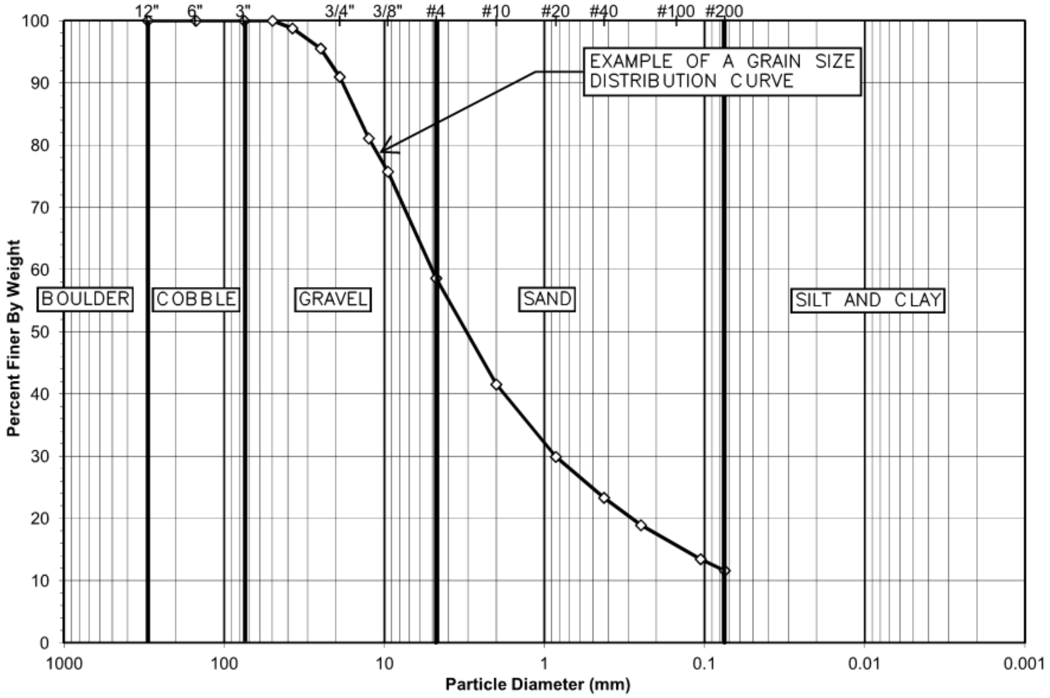
Brokenness

Descriptor	Fracture Spacing (in & ft)
Very Broken	<1 (<0.08)
Broken	1-3 (0.08-0.25)
Moderately Broken	3-6 (0.25-0.5)
Slightly Broken	>6 (>0.5)

Rock Hardness

Descriptor	Field Criterion	Relative Unconfined Compressive Strength
Very Hard	Difficult to break w/ Hammer	> 30,000 psi
Hard	Hand-held sample breaks w/ Hammer	8,000 to 30,000 psi
Medium Hard	Cannot scrape surface w/ knife	2,000 to 8,000 psi
Soft	Cutting or scraping w/ knife difficult	500 to 2,000 psi
Very Soft	Can be cut w/ knife	< 500 psi

Grain Size Distribution Curve



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

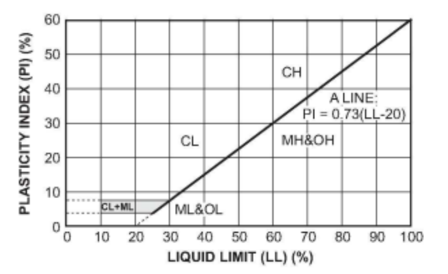
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent .... GW, GP, SW, SP
More than 12 percent .... GM, GC, SM, SC
5 to 12 percent .... Borderline cases requiring dual symbols

PLASTICITY CHART



Glossary

Alluvial Soil or Alluvium: Soil deposited by water in a river, stream, floodplain, or delta.

Bedrock: Materials underlying soil or other unconsolidated surficial materials in which refusal is consistently encountered on lithified, undisturbed, natural bedrock.

Colluvial Soil or Colluvium: Incoherent soil on or at the base of a slope deposited by gravity or slope movement.

Fill: Soil derived from natural soil, rock, or processed materials that was placed by artificial methods, such as construction, waste disposal, or dumping.

Glacial Outwash: Soil, typically sand and gravel, deposited by glacial streams or meltwater in a preexisting valley or over a plain.

Glacial Till: Soil deposited by and underneath a glacier, generally consisting of a heterogeneous, unstratified mixture of clay, sand, gravel, and boulders.

N-Value: The blow count representation of the penetration resistance of the soil determined by the Standard Penetration Test (SPT). It is the sum of the number of blows required to drive the sampler the second and third 6-inch increments (sample depth interval of 6 to 18 inches) and is recorded in blows per foot (bpf). The N-value is considered to be an indication of the relative density of coarse-grained soils (sand and gravel) or consistency of fine-grained soils (silt and clay).

Pocket Pen (PP): Field penetration test performed using a hand-held penetrometer that estimates unconfined compressive strength of cohesive soil in tons per square foot (tsf).

Recovery %: Total length of rock core or soil sample retrieved divided by the total length of the core run or sample interval, expressed as a percentage.

Refusal: The depth at which greater than 50 SPT hammer blows are required to drive the sampling spoon 6 inches or less.

Residual Soil or Residuum: Soil derived from the physical or chemical weathering of the underlying parent bedrock, generally with N-values less than 30 and 50 bpf in cohesive and cohesionless materials, respectively.

Rock Quality Designation (RQD): The sum of the length of intact rock core pieces longer than 4 inches (excluding mechanical breaks) divided by the total length of the core run, expressed as a percentage.

Shelby Tube: A 2" to 3" diameter, thin walled sampling tube that is pushed into the soil to obtain a relatively undisturbed soil sample for geotechnical laboratory tests.

Split Spoon Sampler: A soil sampling tube which is driven, retrieved, and split-open lengthwise for removal and visual inspection, and testing of the soil obtained.

Standard Penetration Test (SPT) ASTM D1586 : Field penetration test consisting of driving a 2-inch outside diameter split-spoon sampler 18 inches using a 140-pound hammer free falling a distance of 30 inches. The number of blows required to advance the spoon through successive 6-inch increments is recorded to determine the N-value.

Weathered Rock: Materials derived from lithified, undisturbed, natural bedrock which are able to be sampled with a split-spoon. Cohesive and cohesionless materials generally have N-values greater than 30 and 50 bpf, respectively.

N-Value Rating

Fine-Grained Soils (Silt and Clay)

Consistency	Blows/ft	PP (tsf)
Very Soft	0-2	<0.25
Soft	3-4	0.25-0.5
Medium Stiff	5-8	0.5-1
Stiff	9-15	1-2
Very Stiff	16-32	2-4
Hard	>32	>4

Coarse-Grained Soils (Sand and Gravel)

Relative Density	Blows/ft
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	>50

Unconsolidated Material

Term	Grain Size in mm (in)	Approximate Example Size
Clay and Silt	<.075	can't see grains to barely visible
Fine Sand	0.075 – 0.4	table salt to sugar
Med. Sand	0.4-2.0 (~<1/16)	openings in a window screen
Coarse Sand	2.0 - 4.75 (~1/16 – 1/8)	sidewalk salt
Gravel	4.75 – 75 (~1/8 – 3)	pea to tennis ball
Cobble	75 – 300 (3 – 12)	tennis ball to basketball
Boulder	>300 (>12)	larger than a basketball

Other Features – Used to describe other identifiable, pertinent features (e.g., angularity of coarse-grained soils, organics, construction debris, etc.)

Term	%
Trace	< 5
Few	5-15
Some	15-45

Moisture Content

Dry: Sample is dusty or obviously dry.
Moist: Anything that does not fit the definition of dry or wet.
Wet: Sample contains free water.

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Definitions of Standard Terms and Symbols

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31 Bellows Road
Raynham, MA 02767

BORING NUMBER CEC-1

PAGE 1 OF 1

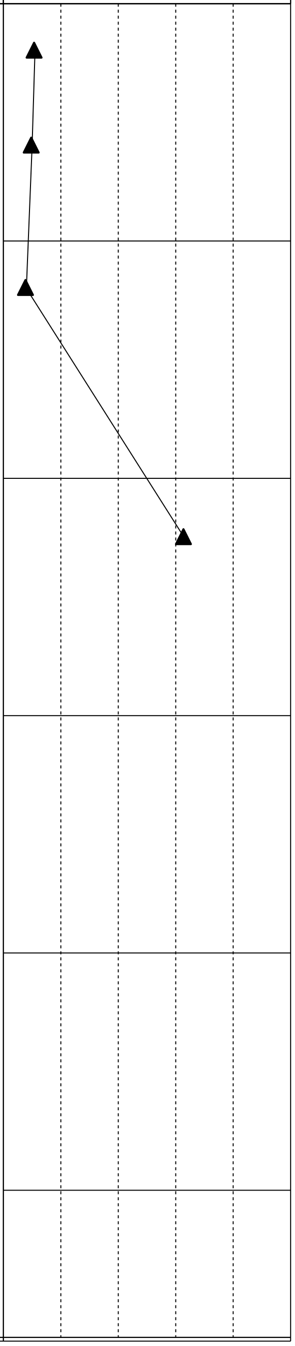
CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/30/2025 **DATE COMPLETED** 04/30/2025
GROUND ELEVATION 252 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.542848 **LONGITUDE** -71.604653
SAMPLING METHOD Direct Push + SPT
WATER LEVELS
▽ **AT END OF SOIL SAMPLING** Not Encountered
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

DEPTH (ft)	GRAPHIC LOG	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUES)
0			Brown, Poorly-Graded Sand with Silt and Gravel, Dry, Medium Dense, SP-SM, **(FILL)**	252	SS S-1	50	4-5-6-7 (11)
					SS S-2	66	6-5-5-6 (10)
3.0 ft			Tan, Poorly-Graded Sand with Silt, Dry to Moist, Loose to Medium Dense, SP-SM, **(GLACIAL OUTWASH)**	249.0			
5					SS S-3	100	5-5-3-3 (8)
10.0 ft		Split spoon refusal encountered at 10 ft bgs on possible boulder. Boring was offset 15 ft east.	Brown, Silty Sand with Gravel, Dry, Very Dense, SM, **(GLACIAL TILL)**	242.0			
10				242	SS S-4	100	50-32-31-23/ 0' (63)
12.0 ft			End of boring at 12.0 feet	240.0			
15							
20				232			
25							

▲ SPT N VALUE ▲
20 40 60 80

PL MC LL
20 40 60 80

☐ FINES CONTENT (%) ☐
20 40 60 80



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BORING NUMBER CEC-2

PAGE 1 OF 1

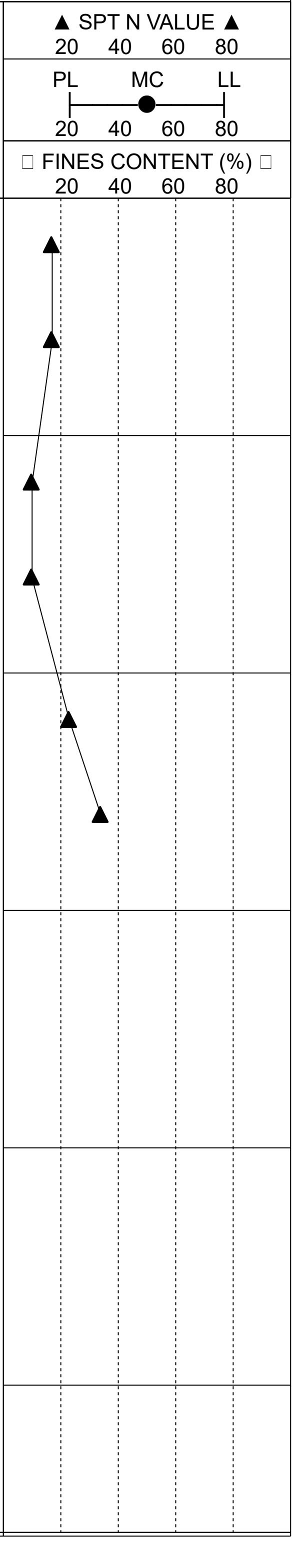
CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/30/2025 **DATE COMPLETED** 04/30/2025
GROUND ELEVATION 252 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.542705 **LONGITUDE** -71.604584
SAMPLING METHOD Direct Push + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/30/2025 10.5 ft / Elev 241.5 ft
▼ **AT END OF CORING** Not Applicable
▼ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)
0 – 5.0 ft	No Recovery - Presumed Fill	247.0
5.0 – 7.0 ft	Tan, Poorly-Graded Sand, Dry, Loose to Medium Dense, SP, **(GLACIAL OUTWASH)**	245.0
7.0 – 10.0 ft	Tan, Silty Sand, Moist, Loose to Medium Dense, SM, **(GLACIAL OUTWASH)**	242.0
10.0 – 11.5 ft	▽ Tan to Gray, Well-Graded Gravel with Silt and Sand, Dry, to Wet, Medium Dense, GW-GM, **(GLACIAL OUTWASH)**	240.0
11.5 – 14.0 ft	Brown, Silty Sand with Gravel, Moist, Dense, SM, **(GLACIAL TILL)**	238.0

End of boring at 14.0 feet

SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
SS S-1	0	4-8-9-9 (17)
SS S-2	0	11-9-8-14 (17)
SS S-3	66	7-5-5-7 (10)
SS S-4	79	7-5-5-5 (10)
SS S-5	66	3-7-16-18 (23)
SS S-6	66	16-15-19-9 (34)



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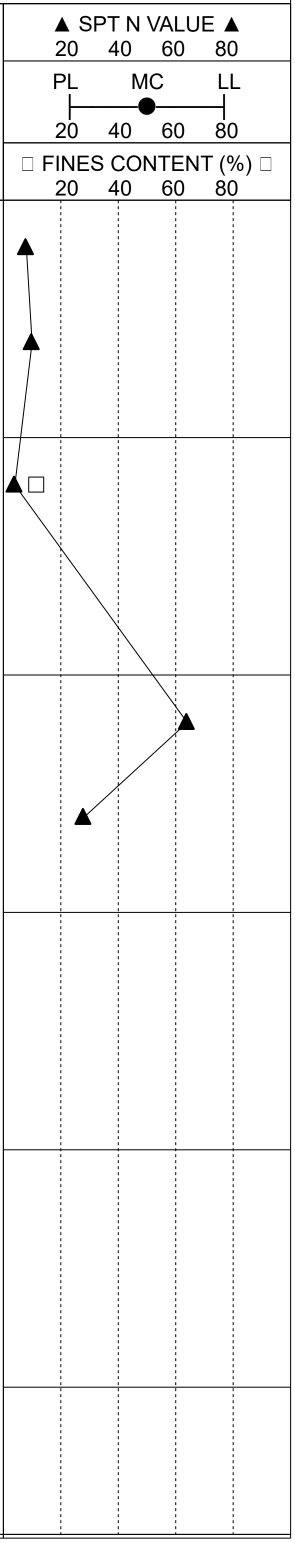
BORING NUMBER CEC-3

PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/30/2025 **DATE COMPLETED** 04/30/2025
GROUND ELEVATION 252 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.542564 **LONGITUDE** -71.604554
SAMPLING METHOD Direct Push + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** Not Encountered
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0	Brown, Poorly-Graded Sand with Silt and Gravel, Dry, Loose, SP-SM, **(FILL)**	252	SS S-1	66	2-4-4-6 (8)
2.5 ft	Tan, POORLY-GRADED SAND WITH SILT, Dry, Very Loose to Medium Dense, SP, **(GLACIAL OUTWASH)**	249.5	SS S-2 SS S-3	88 75	6-5-5-5 (10) 4-3-1-3 (4)
11.0 ft	Tan, Silty Gravel with Sand, Moist, Very Dense, GM, **(GLACIAL TILL**	241.0	SS S-4	66	12-31-33-20 (64)
12.0 ft	Brown, Silty Sand with Gravel, Moist, Medium Dense, SM, **(GLACIAL TILL)**	240.0	SS S-5	88	21-14-14-13 (28)
14.0 ft	End of boring at 14.0 feet	238.0			



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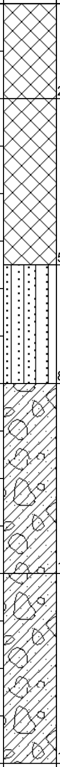
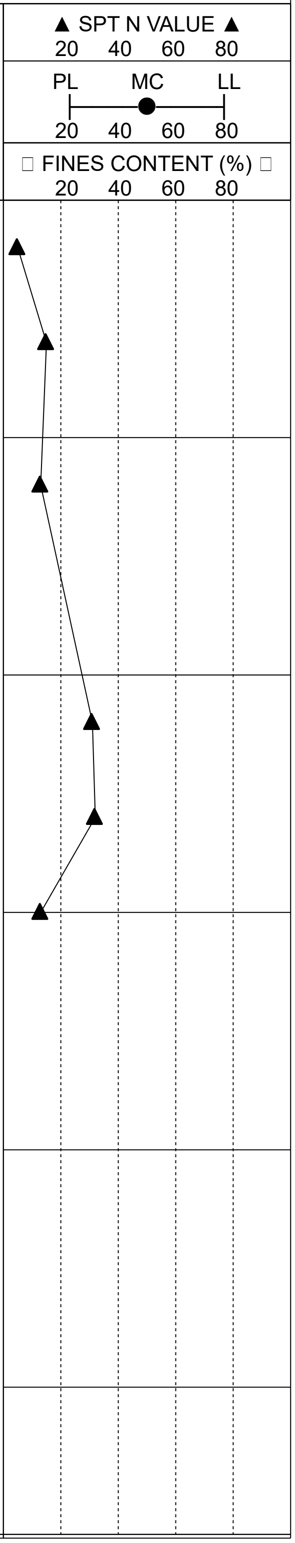
BORING NUMBER CEC-4

PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/30/2025 **DATE COMPLETED** 04/30/2025
GROUND ELEVATION 253 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.542400 **LONGITUDE** -71.604469
SAMPLING METHOD Direct Push + SPT
WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/30/2025 11.4 ft / Elev 241.6 ft
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES



DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0	Brown, Silty Sand with Gravel, Dry, Loose, SM, **(FILL)**	253	SS S-1	54	3-3-2-4 (5)
2.0 ft	Brown, Poorly-Graded Sand with Silt and Gravel, Dry, Medium Dense, SP-SM, **(FILL)**	251.0	SS S-2	58	7-9-6-6 (15)
5					
5.5 ft	Tan, Silty Sand, Dry, Medium Dense, SM, **(GLACIAL OUTWASH)**	247.5	SS S-3	79	6-6-7-5 (13)
8.0 ft	Brown, Silty Sand with Gravel, Moist, Dense, SM, **(GLACIAL TILL)**	245.0			
10	▽	243	SS S-4	62	23-17-14-12 (31)
12.0 ft	Brown, Silty Gravel with Sand, Moist to Wet, Medium Dense to Dense, GM, **(GLACIAL TILL)**	241.0	SS S-5	25	7-11-21-14 (32)
15			SS S-6	50	7-6-7-5 (13)
16.0 ft	End of boring at 16.0 feet	237.0			
20		233			
25					



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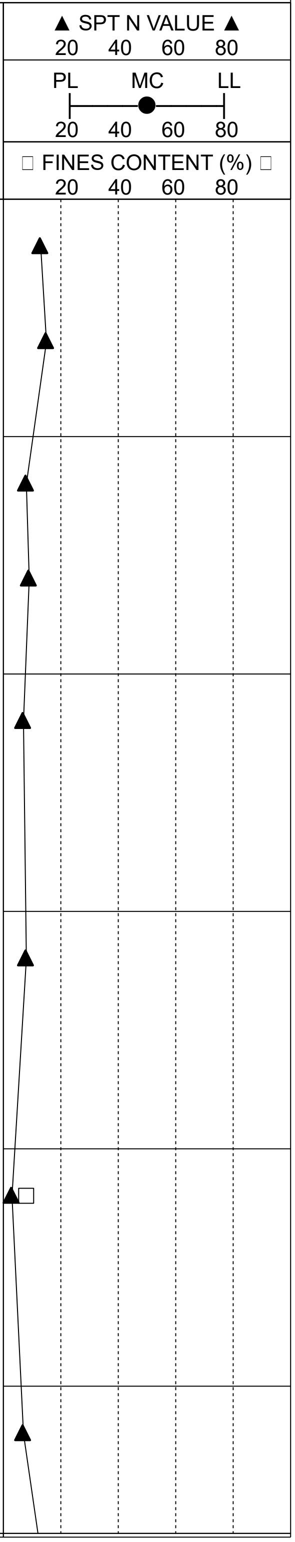
BORING NUMBER CEC-5

PAGE 1 OF 2

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/29/2025 **DATE COMPLETED** 04/29/2025
GROUND ELEVATION 252 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.542256 **LONGITUDE** -71.604547
SAMPLING METHOD Direct Push + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/29/2025 10.5 ft / Elev 241.5 ft
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0		Brown, Silty Sand with Gravel, Dry, Medium Dense, SM, **(FILL)**	252	SS S-1	70	2-5-8-9 (13)
2.7 ft		Tan, POORLY-GRADED SAND WITH SILT, Dry to Wet, Very Loose to Medium Dense, SP-SM, **(GLACIAL OUTWASH)**	249.3	SS S-2	72	10-9-6-3 (15)
5				SS S-3	84	6-4-4-5 (8)
				SS S-4	84	5-4-5-5 (9)
10	▽		242	SS S-5	84	3-3-4-4 (7)
15				SS S-6	58	6-4-4-4 (8)
20			232	SS S-7	100	2-2-1-2 (3)
25				SS S-8	75	5-3-4-5 (7)



(Continued Next Page)

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BORING NUMBER CEC-5

PAGE 2 OF 2

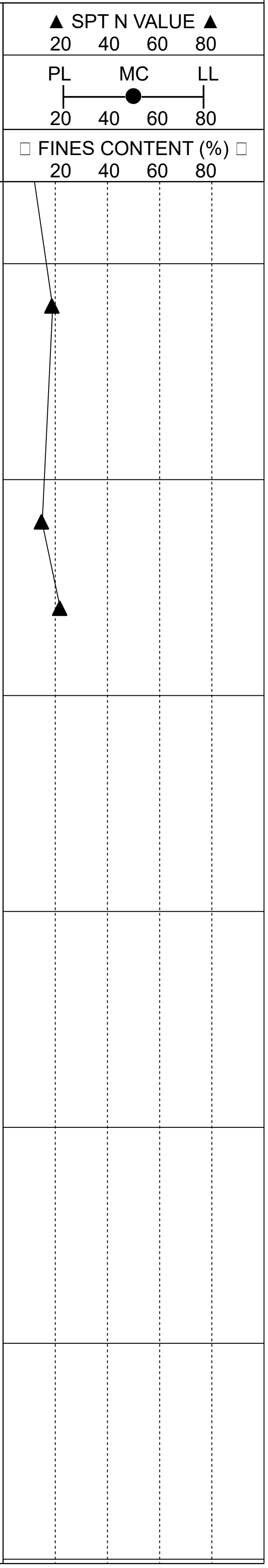
CLIENT Reframe Systems, Inc.

PROJECT NAME Proposed Single Family Development

PROJECT NUMBER 348-019

PROJECT LOCATION 25 Adams Circle, Devens MA

DEPTH (ft)	GRAPHIC LOG	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
			Tan, POORLY-GRADED SAND WITH SILT, Dry to Wet, Very Loose to Medium Dense, SP-SM, **(GLACIAL OUTWASH)**				
30			30.0 ft — 222.0 Brown, Silty Gravel with Sand, Moist to Wet, Medium Dense, GM, **(GLACIAL TILL)**	222			
					SS S-9	50	30-16-3-2 (19)
35							
					SS S-10	12	6-6-9-13 (15)
					SS S-11	50	5-9-13-50 (22)
		Split spoon refusal at 39 ft bgs.	39.0 ft — 213.0 End of boring at 39.0 feet				
40				212			
45							
50				202			
55							
60				192			



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Raynham, MA 02767

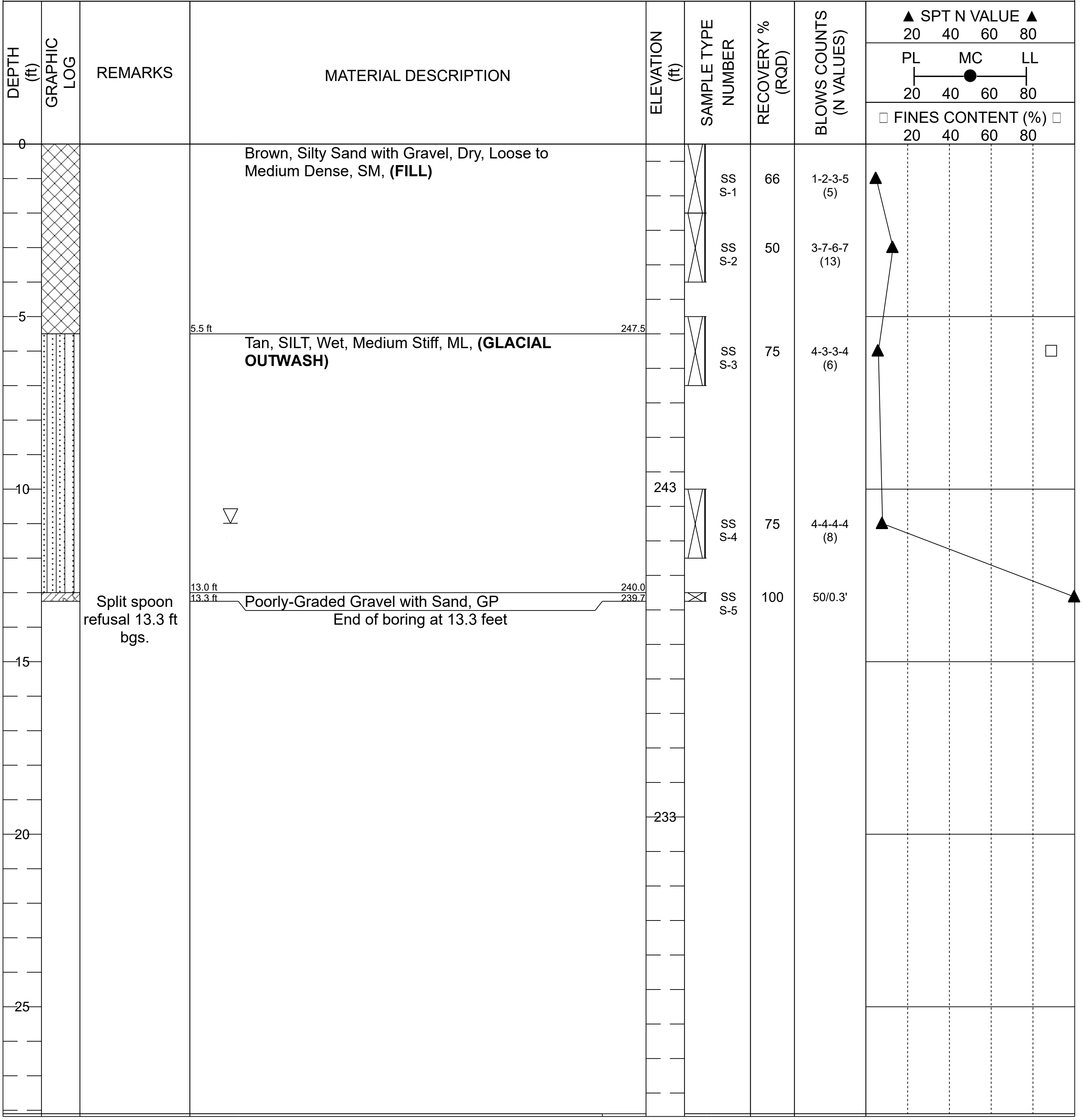
BORING NUMBER CEC-6

PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/29/2025 **DATE COMPLETED** 04/29/2025
GROUND ELEVATION 253 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.542122 **LONGITUDE** -71.604428
SAMPLING METHOD Direct Push + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/29/2025 11.0 ft / Elev 242.0 ft
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0		Brown, Silty Sand with Gravel, Dry, Loose to Medium Dense, SM, **(FILL)**		SS S-1	66	1-2-3-5 (5)
				SS S-2	50	3-7-6-7 (13)
5.5 ft		Tan, SILT, Wet, Medium Stiff, ML, **(GLACIAL OUTWASH)**	247.5	SS S-3	75	4-3-3-4 (6)
10	▽		243	SS S-4	75	4-4-4-4 (8)
13.0 ft			240.0			
13.3 ft	Split spoon refusal 13.3 ft bgs.	Poorly-Graded Gravel with Sand, GP End of boring at 13.3 feet	239.7	SS S-5	100	50/0.3'
15						
20			233			
25						



Civil & Environmental Consultants, Inc.
31 Bellows Road
Raynham, MA 02767

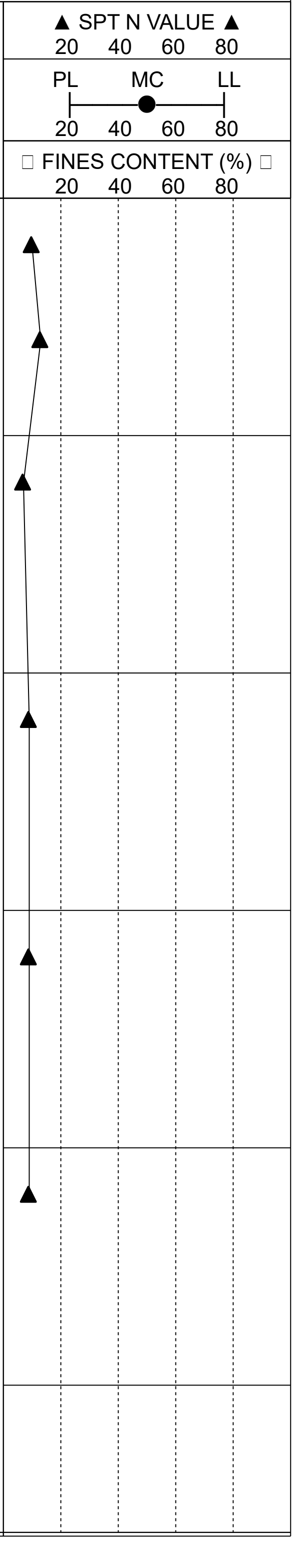
BORING NUMBER CEC-7

PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/29/2025 **DATE COMPLETED** 04/29/2025
GROUND ELEVATION 252 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.541963 **LONGITUDE** -71.604478
SAMPLING METHOD Direct Push + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/29/2025 10.4 ft / Elev 241.6 ft
▼ **AT END OF CORING** Not Applicable
▼ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0	Brown, Poorly-Graded Sand with Silt and Gravel, Dry, Loose to Medium Dense, SP-SM, **(FILL)**	252	SS S-1	70	2-5-5-6 (10)
2.7 ft	Tan, Silty Sand, Dry, Loose to Medium Dense, SM, **(GLACIAL OUTWASH)**	249.3	SS S-2	75	5-6-7-5 (13)
5			SS S-3	84	5-3-4-5 (7)
10.0 ft	▽ Tan, Sandy Silt, Moist to Wet, Stiff, ML, **(GLACIAL OUTWASH)**	242.0	SS S-4	58	4-4-5-4 (9)
15.0 ft	Tan, Silty Sand, Moist to Wet, Loose, SM, **(GLACIAL OUTWASH)**	237.0	SS S-5	79	7-5-4-4 (9)
20		232	SS S-6	62	6-5-4-6 (9)
22.0 ft	End of boring at 22.0 feet	230.0			
25					



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Raynham, MA 02767

BORING NUMBER CEC-8

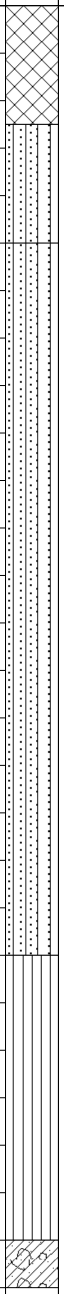
PAGE 1 OF 1

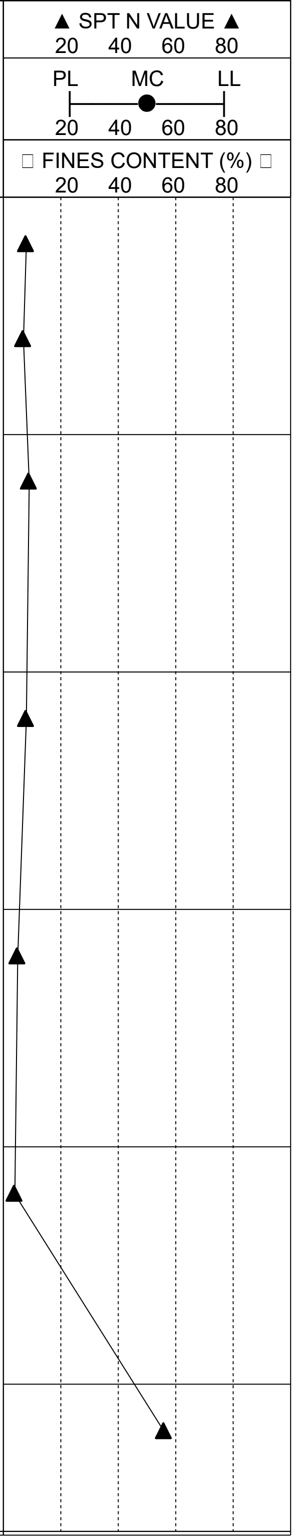
CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/29/2025 **DATE COMPLETED** 04/29/2025
GROUND ELEVATION 252 ft **BACKFILL** with Sand
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.541838 **LONGITUDE** -71.604417
SAMPLING METHOD Direct Push + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/29/2025 9.3 ft / Elev 242.7 ft
▼ **AT END OF CORING** Not Applicable
▼ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)
0		Brown, Silty Sand with Gravel, Trace Roots, Dry, Loose, SM, **(FILL)**	252
2.5 ft		Tan, Sandy Silt, Moist, Medium Dense, ML, **(GLACIAL OUTWASH)**	249.5
5.0 ft		Tan, Silty Sand, Moist to Wet, Loose, SM, **(GLACIAL OUTWASH)**	247.0
20.0 ft		Tan, Sandy Silt, Moist to Wet, Very Soft to Medium Stiff, ML, **(GLACIAL OUTWASH)**	232.0
26.0 ft	Split spoon refusal at 27 ft bgs.	Tan, Silty Sand with Gravel, Wet, Very Dense, SM, **(GLACIAL TILL)**	226.0
27.0 ft		End of boring at 27.0 feet	225.0

SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
SS S-1	96	2-4-4-5 (8)
SS S-2	88	4-3-4-4 (7)
SS S-3	90	6-5-4-5 (9)
SS S-4	75	4-3-5-5 (8)
SS S-5	88	3-2-3-2 (5)
SS S-6	92	1-2-2-2 (4)
SS S-7	40	1-6-50-50 (56)





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31 Bellows Road
Raynham, MA 02767

BORING NUMBER CEC-9

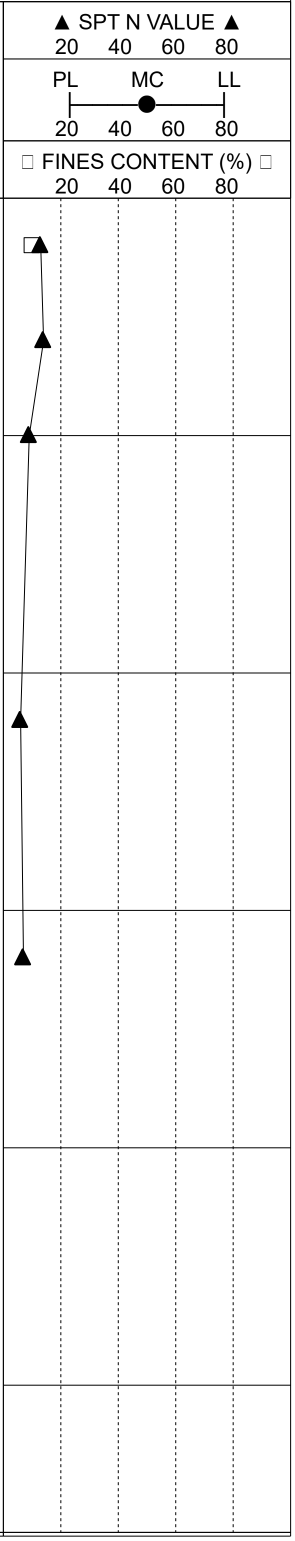
PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/28/2025 **DATE COMPLETED** 04/28/2025
GROUND ELEVATION 252 ft **BACKFILL** with Cuttings
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.541665 **LONGITUDE** -71.604431
SAMPLING METHOD 4-1/4-in Hollow Stem Auger + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/28/2025 12.3 ft / Elev 239.7 ft
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)
0–3.0 ft		Brown, WELL-GRADED SAND WITH SILT AND GRAVEL, Dry, Medium Dense, SM, **(FILL)**	249.0
3.0–4.0 ft		Tan, Poorly-Graded Sand with Silt, Dry, Medium Dense, SP-SM, **(GLACIAL OUTWASH)**	248.0
4.0–20.0 ft	▽ (12.3 ft)	Tan, Silty Sand, Moist, Loose, SM, **(GLACIAL OUTWASH)**	231.5
20.0 ft	Augered down to 20 ft bgs and encountered 3 ft of blowing sand. Boring terminated.	End of boring at 20.0 feet	

SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
SS S-1	75	2-6-7-6 (13)
SS S-2	84	6-7-7-8 (14)
SS S-3	79	4-4-5-5 (9)
SS S-4	84	2-3-3-4 (6)
SS S-5	100	2-3-4-5 (7)



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31 Bellows Road
Raynham, MA 02767

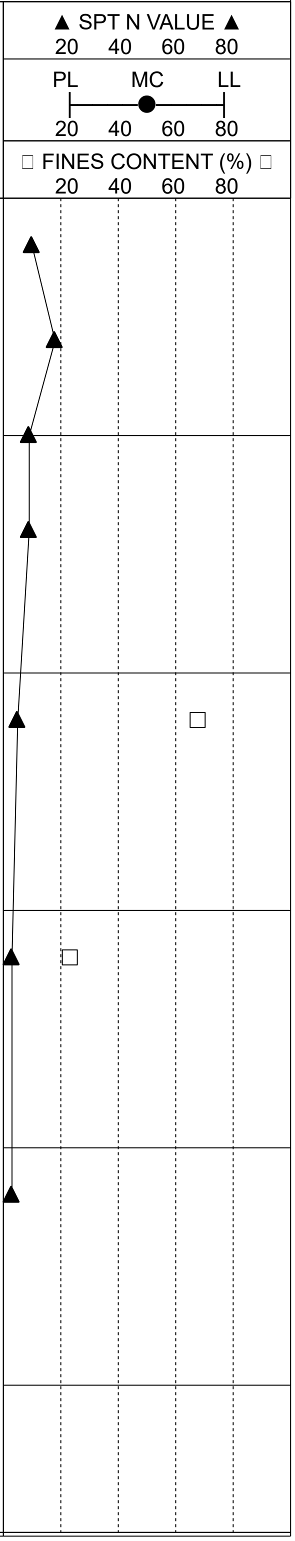
BORING NUMBER CEC-10

PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/28/2025 **DATE COMPLETED** 04/28/2025
GROUND ELEVATION 252 ft **BACKFILL** with Cuttings
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.541538 **LONGITUDE** -71.604396
SAMPLING METHOD 4-1/4-in Hollow Stem Auger + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/28/2025 15.1 ft / Elev 236.9 ft
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0	Brown, Silty Sand with Gravel, Dry, Loose to Medium Dense, SM, **(FILL)**		SS S-1	66	2-4-6-10 (10)
3.0 ft	Brown, Poorly-Graded Sand with Silt and Gravel, Dry, Medium Dense, SP-SM, **(FILL)**	249.0	SS S-2	84	9-10-8-7 (18)
4.2 ft	Tan, Silty Sand, Moist to Wet, Loose, SM, **(GLACIAL OUTWASH)**	247.7	SS S-3 SS S-4	88 92	3-5-4-6 (9) 4-4-5-6 (9)
10.0 ft	Tan, SANDY SILT, Moist, Loose, ML, **(GLACIAL OUTWASH)**	242.0	SS S-5	79	2-2-3-3 (5)
13.0 ft	Tan, SILTY SAND, Moist, Very Loose, SM, **(GLACIAL OUTWASH)** ▽	239.0	SS S-6	75	1-1-2-2 (3)
20.0 ft	Tan, Sandy Silt, Wet, Loose, ML, **(GLACIAL OUTWASH)**	232.0	SS S-7	100	2-2-1-6 (3)
22.0 ft	End of boring at 22.0 feet	230.0			



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31 Bellows Road
Raynham, MA 02767

BORING NUMBER CEC-11

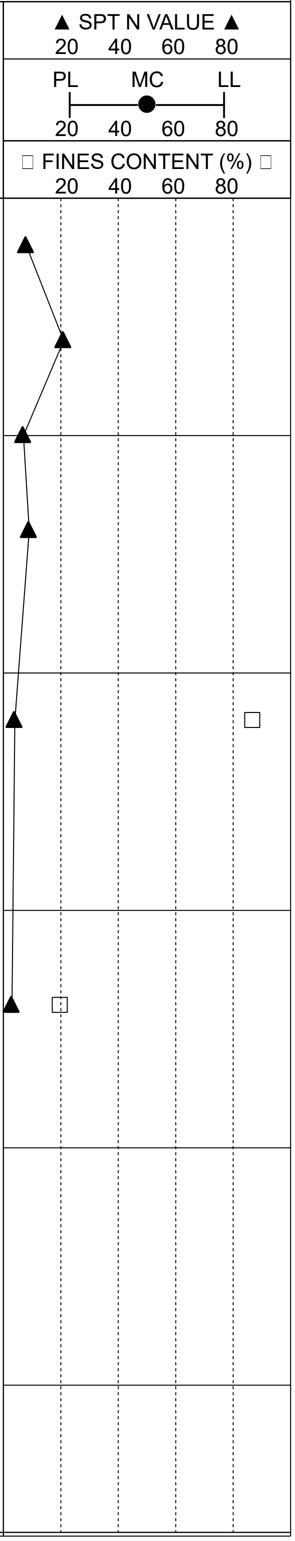
PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/28/2025 **DATE COMPLETED** 04/28/2025
GROUND ELEVATION 252 ft **BACKFILL** with Cuttings
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.541393 **LONGITUDE** -71.604374
SAMPLING METHOD 4-1/4-in Hollow Stem Auger + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
NOTES

WATER LEVELS
▽ **AT END OF SOIL SAMPLING** See Remarks
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained

DEPTH (ft)	GRAPHIC LOG	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0	▨		Brown, Silty Sand with Gravel, Dry, Loose to Medium Dense, SM, **(FILL)**	252	SS S-1	58	1-3-5-6 (8)
					SS S-2	66	8-11-10-7 (21)
4.5 ft			Tan, Poorly-Graded Sand with Silt, Moist, Loose, SP-SM, **(GLACIAL OUTWASH)**	247.5	SS S-3	75	3-2-5-5 (7)
6.0 ft			Tan, Sandy Silt, Moist to Wet, Loose, ML, **(GLACIAL OUTWASH)**	246.0	SS S-4	75	5-4-5-6 (9)
10.0 ft		Groundwater not discernable due to water added to the hole to maintain stability during drilling.	Tan, SILT, Moist, Medium Stiff, ML, **(GLACIAL OUTWASH)**	242.0	SS S-5	72	2-2-2-3 (4)
16.0 ft			Tan, SILTY SAND, Wet, Very Loose, SM, **(GLACIAL OUTWASH)**	236.0	SS S-6	100	1-1-2-2 (3)
18.0 ft			End of boring at 18.0 feet	234.0			

Depth scale: 0, 5, 10, 15, 20, 25. Elevation scale: 252, 242, 232.



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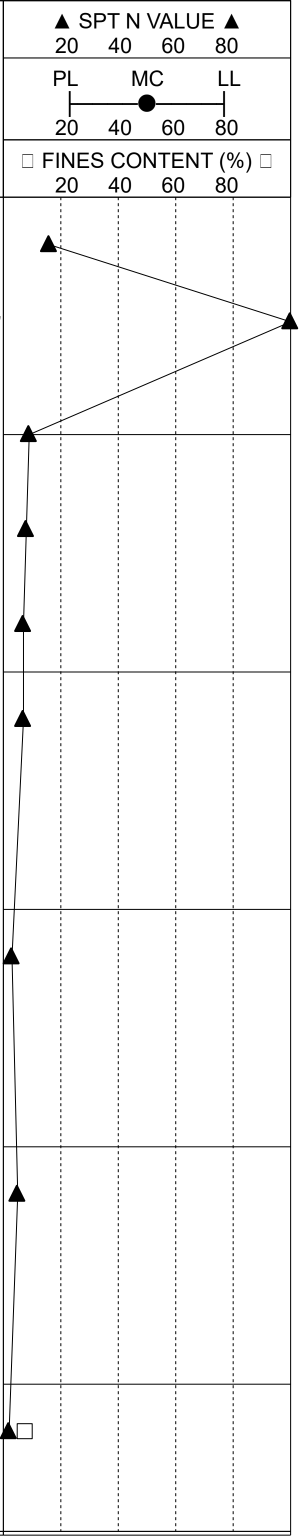
31 Bellows Road
Raynham, MA 02767

BORING NUMBER CEC-12

PAGE 1 OF 1

CLIENT Reframe Systems, Inc.
PROJECT NAME Proposed Residential Development
PROJECT NUMBER 348-019
PROJECT LOCATION 25 Adams Circle, Devens MA
DATE STARTED 04/28/2025 **DATE COMPLETED** 04/28/2025
GROUND ELEVATION 252 ft **BACKFILL** with Cuttings
SAMPLING CONTRACTOR Geosearch, Inc.
LATITUDE 42.541226 **LONGITUDE** -71.604246
SAMPLING METHOD 4-1/4-in Hollow Stem Auger + SPT
CEC REP Amanda Bucco **CHECKED BY** Tony Sousa, PE
WATER LEVELS
▽ **AT END OF SOIL SAMPLING** 04/28/2025 15.5 ft / Elev 236.5 ft
▼ **AT END OF CORING** Not Applicable
▽ **24 HRS AFTER DRILLING** Not Obtained
NOTES

DEPTH (ft)	REMARKS	MATERIAL DESCRIPTION	ELEVATION (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOWS COUNTS (N VALUES)
0		Brown, Silty Sand with Gravel, Trace Roots, Moist, Medium Dense, SM, **(FILL)**		SS S-1	27	3-6-10-18 (16)
	Split spoon refusal at 3.3 ft. Augered to 4 ft bgs.			SS S-2	0	18-20-50/0.3'
3.5 ft		Tan, Poorly-Graded Sand, Moist, Loose, SP, **(GLACIAL OUTWASH)**	248.5			
5				SS S-3	71	3-4-5-5 (9)
				SS S-4	100	6-4-4-4 (8)
8.0 ft		Tan, Poorly-Graded Sand with Silt and Gravel, Moist, Loose, SP-SM, **(GLACIAL OUTWASH)**	244.0	SS S-5	72	1-2-5-5 (7)
10.0 ft		Tan, Silty Sand, Moist to Wet, Very Loose to Loose, SM, **(GLACIAL OUTWASH)**	242.0 242	SS S-6	75	1-2-5-3 (7)
15	▽			SS S-7	79	3-1-2-4 (3)
20.0 ft		Tan, Sandy Silt, Moist to Wet, Loose, ML, **(GLACIAL OUTWASH)**	232.0 232	SS S-8	100	2-2-3-6 (5)
25.0 ft		Tan, Silty Sand, Wet, Very Loose, SM, **(GLACIAL OUTWASH)**	227.0	SS S-9	75	WOH-1-1-1 (2)
27.0 ft		End of boring at 27.0 feet	225.0			



APPENDIX C
GEOTECHNICAL LABORATORY TEST RESULTS

Thielsch
DIVISION OF THE RISE GROUP

195 Frances Avenue
Cranston RI, 02910
Phone: (401)-467-6454
Fax: (401)-467-2398
cts.thielsch.com
Let's Build a Solid Foundation

Client Information:
Civil and Environmental Consultants
Raynham, MA
(774) 501-2176
Project Contact: Tony Sousa
Collected By: Tony Sousa

Project Information:
Reframe Devens
25 Adams Circle, Devens MA
Project Number: 348-019
Summary Page: 1 of 1
Report Date: 5/8/2025

LABORATORY TESTING DATA SHEET, Report No.: 7425-E-103, Rev 1

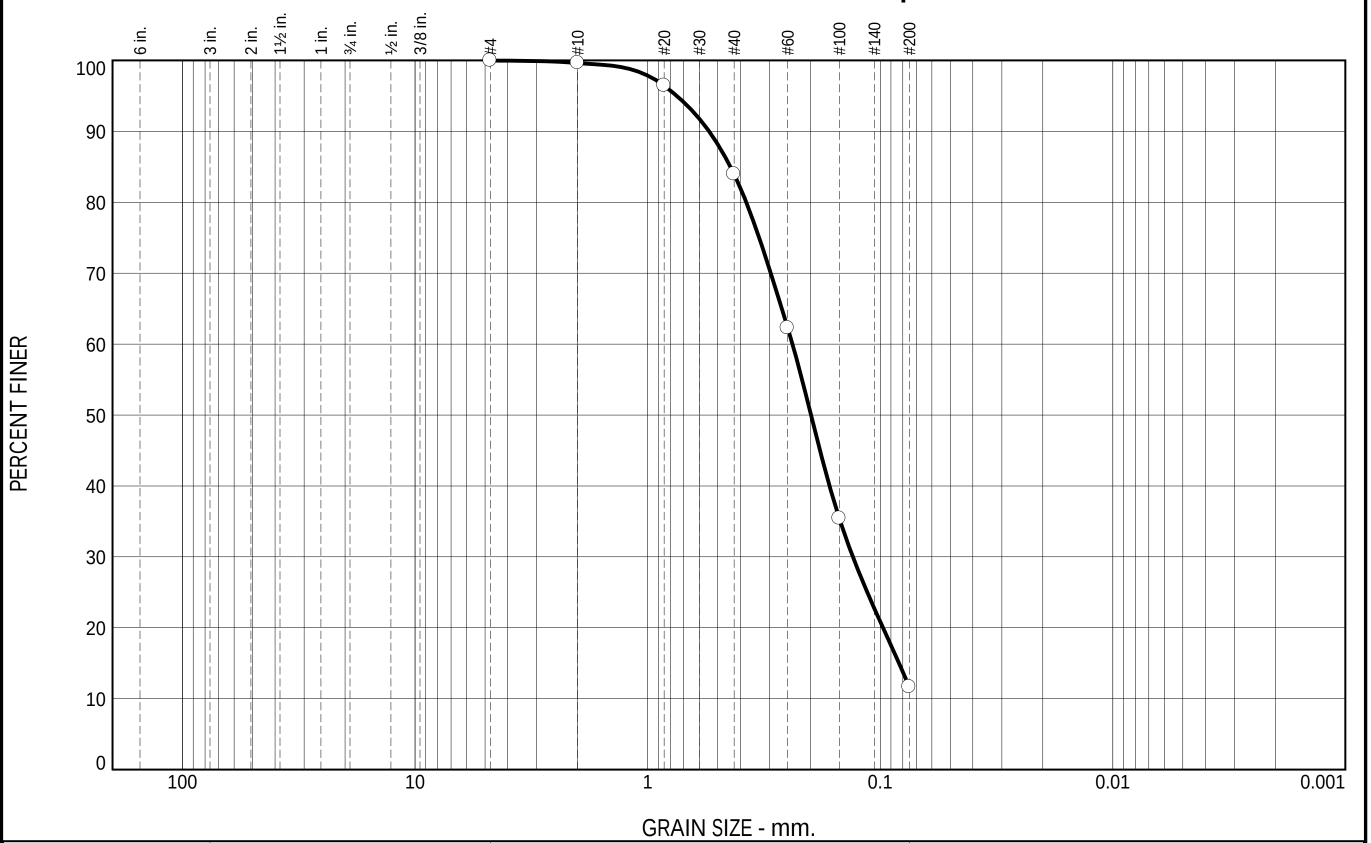
Boring No.	Sample ID	Depth (ft)	Laboratory No.	Identification Tests									Proctor / CBR / Permeability Tests								Laboratory Log and Soil Description
				As Rcvd Moisture Content %	LL %	PL %	OD LL	Gravel %	Sand %	Fines %	Finer Than No. 200 %	pH	g_d MAX (pcf) W_{opt} (%)	g_d MAX (pcf) W_{opt} (%) (Corr.)	Dry unit wt. (pcf)	Test Moisture Content %	Target Test Setup as % of Proctor	CBR @ 0.1"	CBR @ 0.2"	Permeability cm/sec	
				D2216	D4318			D6913			D1140	D4792	D1557								
CEC-3	S-3	5-7	25-S-1566					0.0	88.4	11.6											Light Brown poorly graded sand with silt
CEC-5	S-7	20-22	25-S-1567					0.0	91.9	8.1											Brown poorly graded sand with silt
CEC-6	S-3	5-7	25-S-1568					0.0	10.1	89.9											Light Brown silt
CEC-9	S-1	0-2	25-S-1569					18.2	71.8	10.0											Brown well-graded sand with silt and gravel
CEC-10	S-5	10-12	25-S-1570								67.8										Percent Finer Only
CEC-10	S-6	15-17	25-S-1571								23.3										Percent Finer Only
CEC-11	S-5	10-12	25-S-1572								86.8										Percent Finer Only
CEC-11	S-6	16-18	25-S-1573								19.8										Percent Finer Only
CEC-12	S-9	25-27	25-S-1574								7.6										Percent Finer Only
Report Revised 05-09-25 to correct a clerical error. KR																					
Percent Finer than No. 200 tested by TG 05-05-25.																					

Date Received: **5/1/2025**

Reviewed By:

Date Reviewed: **5/8/2025**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.4	15.6	72.4	11.6	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.6		
#20	96.4		
#40	84.0		
#60	62.3		
#100	35.4		
#200	11.6		

* (no specification provided)

Soil Description

Light Brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.5442	D_{85}= 0.4405	D_{60}= 0.2385
D_{50}= 0.1984	D_{30}= 0.1311	D_{15}= 0.0830
D_{10}=	C_u=	C_c=

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

Source of Sample: Boring Depth: 5-7'
Sample Number: CEC-3 / S-3

Date: 5.8.25

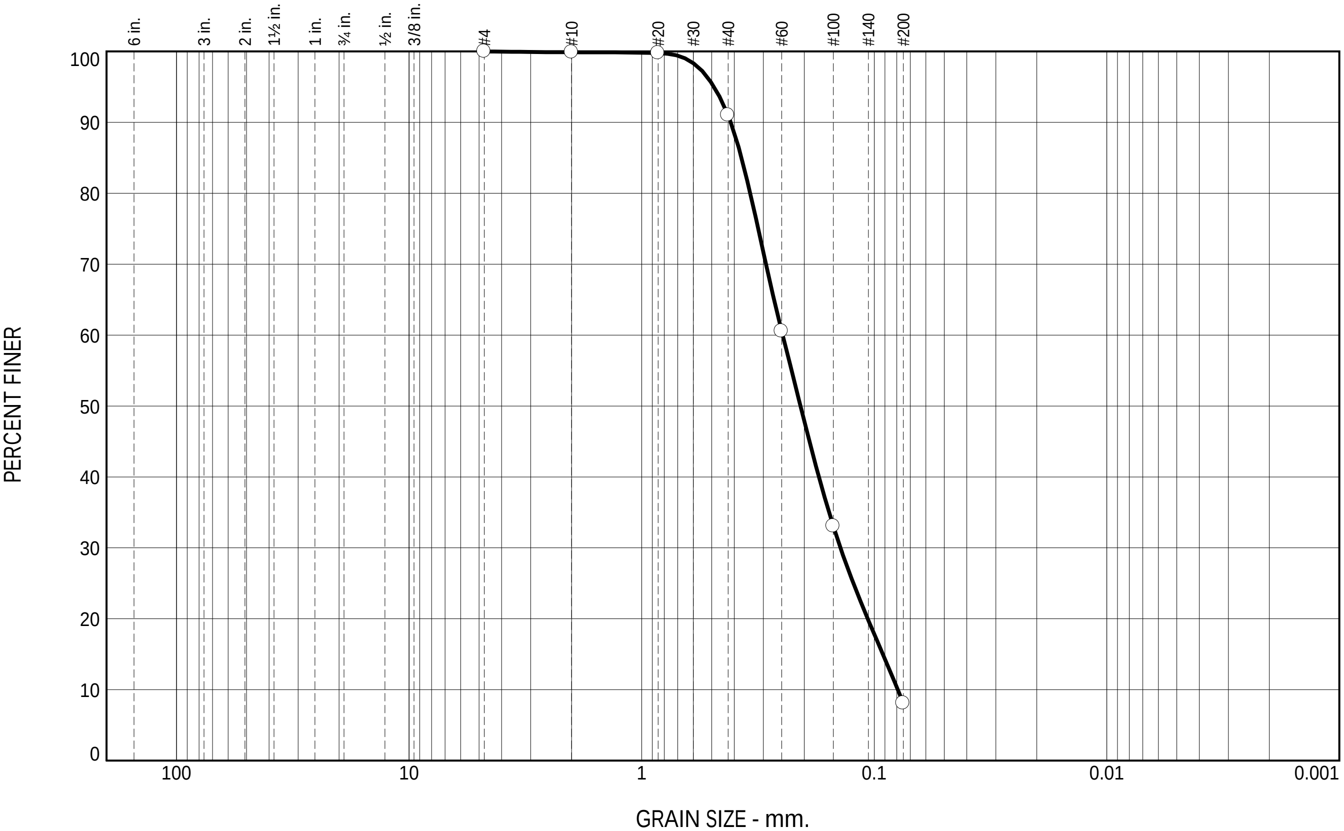
Thielsch Engineering Inc.

Cranston, RI

Client: Civil & Environmental Consultants, Inc
Project: Reframe Devens
25 Adam Circle, Devens MA
Project No: 348-019 Fig. 25-S-1566

Tested By: AB/TG Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	8.9	82.9	8.1	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.8		
#40	91.0		
#60	60.5		
#100	33.1		
#200	8.1		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.4138	D_{85}= 0.3722	D_{60}= 0.2476
D_{50}= 0.2075	D_{30}= 0.1397	D_{15}= 0.0918
D_{10}= 0.0792	C_u= 3.13	C_c= 1.00

Classification

USCS= SP-SM AASHTO= A-3

Remarks

Source of Sample: Boring Depth: 20-22'
Sample Number: CEC-5 / S-7

Date: 5.8.25

Thielsch Engineering Inc.

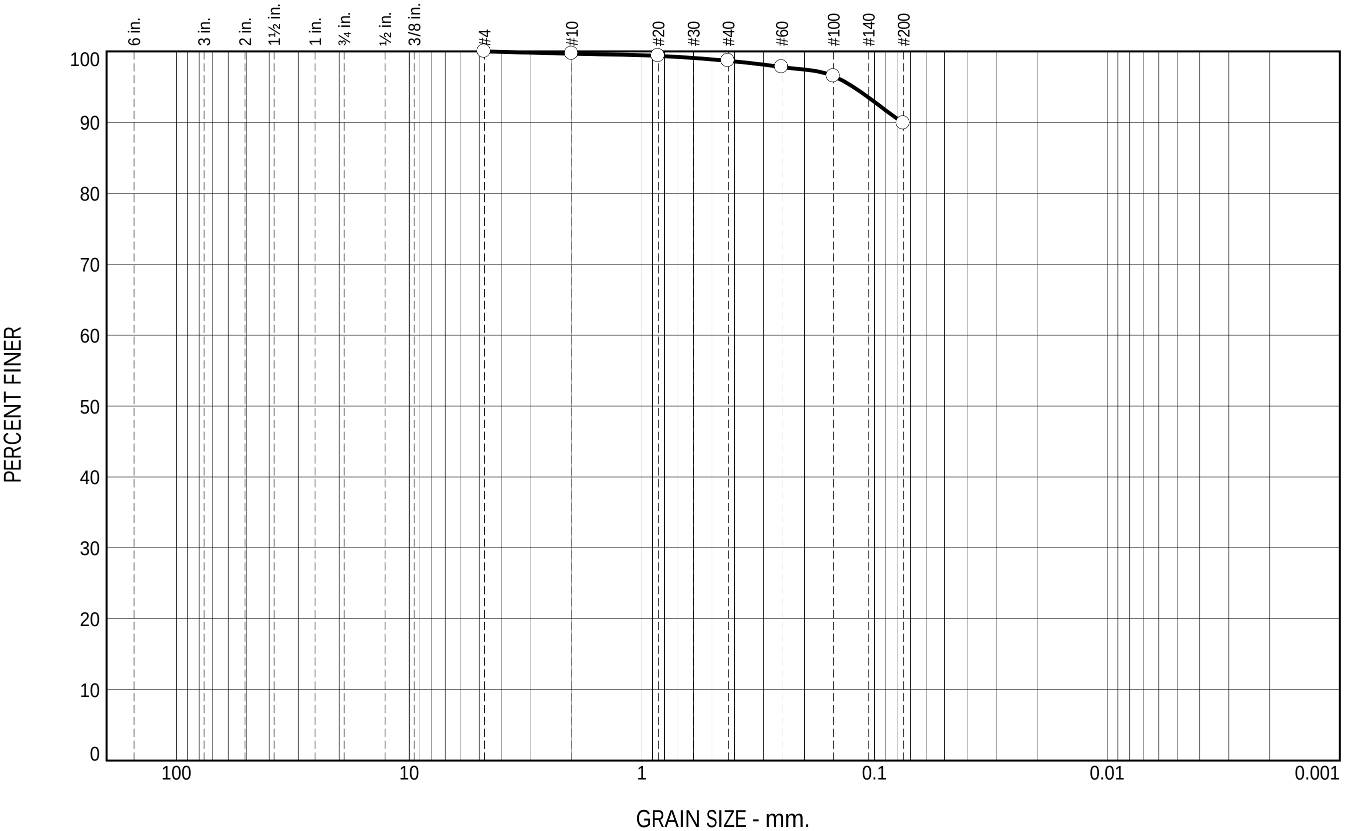
Cranston, RI

Client: Civil & Environmental Consultants, Inc
Project: Reframe Devens
25 Adam Circle, Devens MA
Project No: 348-019 Fig. 25-S-1567

Tested By: AB/TG Checked By: Kris Roland

These results are for the exclusive use of the client for whom they were obtained. This report only relates to items inspect and/or tested. No warranty, expressed or implied, is made.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	1.0	8.8	89.9	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#20	99.4		
#40	98.7		
#60	97.8		
#100	96.5		
#200	89.9		

* (no specification provided)

Soil Description

Light Brown silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.0759 D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Sample visually classified as non-plastic. Sample could not be rolled to 1/4".

Source of Sample: Boring Depth: 5-7'
Sample Number: CEC-6 / S-3

Date: 5.8.25

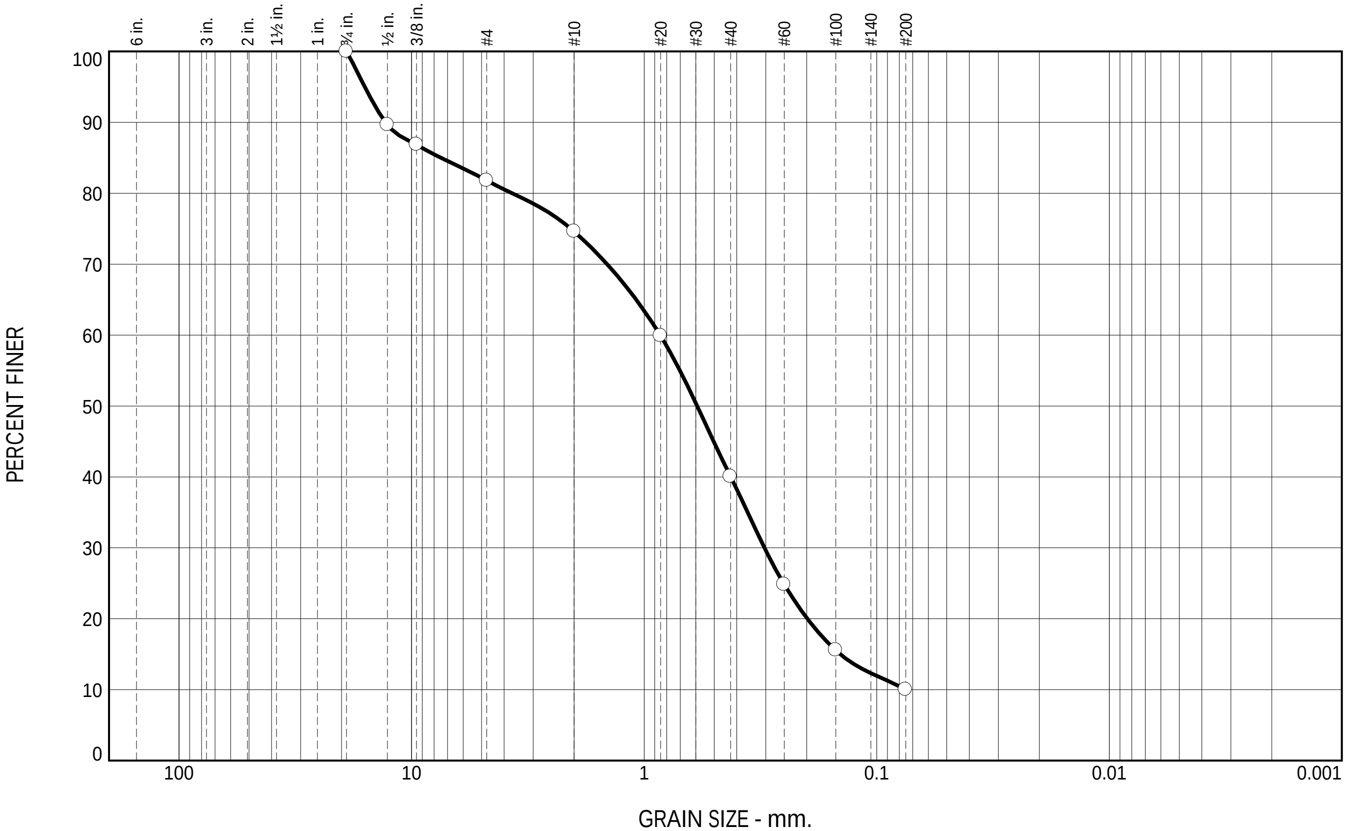
Thielsch Engineering Inc.

Cranston, RI

Client: Civil & Environmental Consultants, Inc
Project: Reframe Devens
25 Adam Circle, Devens MA
Project No: 348-019 Fig. 25-S-1568

Tested By: AB/TG Checked By: Kris Roland

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.2	7.2	34.6	30.0	10.0	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
1/2"	89.6		
3/8"	86.9		
#4	81.8		
#10	74.6		
#20	59.9		
#40	40.0		
#60	24.8		
#100	15.6		
#200	10.0		

* (no specification provided)

Soil Description

Brown well-graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 12.9563 D_{85}= 7.4757 D_{60}= 0.8532
D_{50}= 0.5917 D_{30}= 0.3038 D_{15}= 0.1435
D_{10}= 0.0751 C_u= 11.36 C_c= 1.44

Classification

USCS= SW-SM AASHTO= A-1-b

Remarks

Source of Sample: Boring Depth: 0-2'
Sample Number: CEC-9 / S-1

Date: 5.8.25

Thielsch Engineering Inc.

Cranston, RI

Client: Civil & Environmental Consultants, Inc
Project: Reframe Devens
25 Adam Circle, Devens MA
Project No: 348-019
Fig. 25-S-1569

Tested By: AB/TG Checked By: Kris Roland