January 7, 2025
File: TF24239E

Mr. Michael Vegas
Engineering Manager
Amalgamated Sugar Company
2320 Orchard East
Twin Falls, Idaho
Email: mvegas@amalsugar.com

RE: **Geotechnical Engineering Evaluation**
Evaporator Building
Amalgamated Sugar Plant
Twin Falls, Idaho

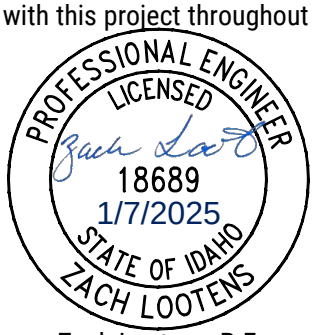
Dear Mr. Vegas,

STRATA is pleased to present our authorized Geotechnical Engineering Evaluation (GEE) Report for the planned evaporator building at the Amalgamated Sugar Plant in Twin Falls, Idaho. The purpose of our GEE was to assess the subsurface conditions at the project site and provide geotechnical engineering recommendations for planning, design, and construction of the proposed facility. The attached report summarizes our field exploration and laboratory testing and presents our geotechnical engineering opinions and recommendations.

Our services were accomplished referencing conversations with you and our proposal dated December 4, 2024, and authorized with Purchase Order #335781. Portions of this report cannot be relied upon individually without the supporting text of remaining sections, appendices, and/or plates. When providing this report to designers, estimators, contractors, etc., the report including all appendices, plates and attachments must be provided in its entirety.

We appreciate the opportunity to work with Amalgamated Sugar Company and your design team and look forward to our continued involvement with this project throughout design and construction. Please contact us if you have any questions or comments.

Sincerely,
STRATA



Carbella Medina
Staff Engineer

Zach Lootens, P.E.
Project Engineer

Dan P. Gado, P.E.
Senior Engineer

CM/ZL/DG/kb

Geotechnical Engineering Evaluation

Evaporator Building – Amalgamated Sugar Plant
Twin Falls, Idaho

January 7, 2025

Prepared for:
Michael Vegas
Engineering Manager
Amalgamated Sugar Company
2320 Orchard East
Twin Falls, ID

208.733.8200 | 2332 Eldridge Ave., Twin Falls, Idaho 83301 stratageotech.com

TABLE OF CONTENTS

REPORT TABLES

REPORT PLATES & APPENDICES

Geotechnical Engineering Evaluation Report
Evaporator Building – Amalgamated Sugar Plant
Twin Falls, Idaho

INTRODUCTION

STRATA is pleased to present our Geotechnical Engineering Evaluation Report for the proposed evaporator building at the Amalgamated Sugar Plant in Twin Falls, Idaho. The purpose of our evaluation was to evaluate the subsurface soil and groundwater conditions and to provide geotechnical engineering opinions and recommendations to assist project planning, design, and construction. We accomplished our geotechnical services referencing our proposal dated December 4, 2024, and PO #335781.

PROJECT UNDERSTANDING

Existing Site Conditions

The Evaporator Building will be located on the east side of the factory directly east of the B&W Boiler House and in close proximity to the Transformer Building to the north. The recently demolished Bag House previously occupied the proposed site location; however, the existing foundation consisting of individual spread footings overlain with a 5-inch-thick slab is still in place.

Proposed Development

We understand the proposed evaporator building will be approximately 140 feet tall with a 40 foot by 60-foot footprint. Individual column loading is variable, ranging from 20kips to 330 kips for unfactored combined dead and live loading. Based on our recent discussion with the design team, we understand the columns are planned to be supported on spread or strip footings. We also understand that the floor slab/mat will be designed for 1,500 psf loading to accommodate potential future equipment. The planned building footprint may be expanded to the east in the future. Earthwork grading of up to 1 foot is anticipated. Stormwater will be directed to the existing collection system.

FIELD EXPLORATION

Subsurface Exploration

STRATA observed two exploratory borings across the project site on December 13, 2024. Table 1 below summarizes the approximate location and depth of each boring. All depths are in reference to the existing ground surface elevation at the boring location. Latitude and longitude were established using a handheld Global Positioning System (GPS) device accurate to within 10 feet, using the WGS 84 datum. The boring locations are illustrated on Plate 1, *Exploration Location Plan*.

Table 1: Boring Location & Depth

Boring Designation	Latitude	Longitude	Depth to Basalt (ft)	Termination Depth (ft)
B1	42.43178	-114.43178	12.0	20.0
B2	42.53238	-114.43169	11.3	11.3

Borings were advanced using a Diedrich D120 drill rig equipped with an 8.25-inch-wide hollow stem auger. Soil samples were obtained via 2.0-inch standard split-spoon samplers and modified 3-inch OD split barrel samplers, driven with a 140-pound automatic hammer falling 30.0 inches. The Standard Penetration Test (SPT) N-values (in blows-per-foot) were recorded for each soil sample. N-values obtained while using the modified 3-inch OD split barrel sampler were normalized using a modification factor of 0.65 (Burmister, 1948) to obtain the equivalent 2-inch OD SPT N-values. Sampling was performed in general accordance with ASTM D1586, and soil samples were collected at 2.5 to 5-foot intervals. Rock was continuously cored in B1 using a triple tube HQ core barrel. Percent recovery and Rock Quality Designation (RQD) were measured in the field. A field engineer logged and visually classified the soil encountered in each boring in accordance with the Unified Soil Classification System (USCS) Visual-Manual Procedure (ASTM D2488) and rock core samples were classified in accordance with the Unified Rock Classification System. A key to terms presented on the boring logs is included in Appendix A. We advanced the borings to evaluate the subsurface material and to obtain samples for further evaluation and laboratory testing. The samples were packaged and labeled onsite and then transported to our laboratory.

SUBSURFACE CONDITIONS

The subsurface conditions across the site can generally be described as undocumented fill overlying native loess, underlain by basalt. A general description of each unit's stratigraphic location and properties is provided below:

Portland Cement Concrete – We observed a 5-inch-thick existing concrete slab remaining from the Bag House.

Granular Base – An 8-inch gravel section was observed below the slab. We classified the base as medium dense Poorly Graded Gravel with Silt and Sand (GP-GM).

Undocumented Fill – We estimate the undocumented fill extends from below the base layer to approximately 7 feet below ground surface (BGS). The fill composition was variable and classified as very stiff Sandy Silt (ML) and loose to dense Silty Sand (SM) with various amounts of Gravel and Silty Gravel with Sand (GM). We observed what we assume to be precipitated calcium carbonate (PCC) material in the Sandy Silt (ML) layer in B1. The fill also contained rubble (e.g., rusty nails) and basalt and caliche cobbles.

Native Loess – The native loess was classified as hard Sandy Silt (ML) and dense to very dense Silty Sand (SM) The SPT N values in this layer indicate moderate to strong cementation.

Basalt Bedrock – Basalt bedrock was encountered at approximately 12 feet in B1 and 10 feet in B2. The upper basalt was completely weathered from 10 feet to 11.5 feet in B2. The cored basalt in B1 was medium strong with high vesicularity and close fracture spacing. A strongly cemented soil interbed approximately two to three feet thick was encountered between 16 and 20 feet.

Groundwater

Groundwater was not encountered at the time of exploration. Nearby well data indicates that groundwater levels are between 15 to 30 feet deep. It should be noted that groundwater levels can fluctuate seasonally and in response to precipitation events and irrigation and with proximity to Rock Creek.

LABORATORY TESTING

Soil samples collected from the explorations were returned to our laboratory for further classification and testing. Laboratory testing was accomplished in general accordance with ASTM International (ASTM) and other procedures. ("General accordance" means that certain local and common descriptive practices and methodologies have been followed.) Our laboratory testing program included:

- Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM D2216)
- Determining the Amount of Material Finer than 75-µm (No.200) Sieve in Soils by Washing (ASTM D1140)
- Standard Test Method for One-Dimensional Swell or Collapse of Soils (ASTM D4546)
- Chemistry Suite: pH, Resistivity, and Sulfates (ASTM D4972, ASTM G187, and ASTM C1580)
- Standard Test Methods for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures (ASTM D7012)

Laboratory test results are included on the exploration logs in Appendix A and summarized in Appendix B.

GEOTECHNICAL OPINIONS AND RECOMMENDATIONS

The following geotechnical engineering recommendations were developed to support design and construction of the proposed structure. Our recommendations and opinions are based on the results of our field evaluation, laboratory testing, our experience with similar soil/rock conditions, and our understanding of the proposed construction.

Geotechnical Constraints

Undocumented Fill

The proposed construction area is underlain by undocumented fill with variable consistency to approximately 7 feet BGS. Undocumented fill poses a settlement and bearing capacity risk due to the variation in composition and compaction/strength, and the potential of deleterious materials, such as organics or other degradable substances. Due to these risks, the standard practice is to remove undocumented fill by over-excavation and replace it with structural fill to mitigate differential settlement or low bearing capacity. Due to the non-uniform composition and unknown compaction of this soil layer, it is difficult to model settlement accurately. Recommendations regarding removal and replacement of undocumented fill are provided in the *Subgrade Preparation* section.

Close Proximity to Existing Structure

As discussed above, soil improvement via over excavation of undocumented fill and replacement with Granular Structural Fill will be required beneath the proposed evaporator building footings. We understand that the separation distance between the existing strip foundation for the existing transformer building to the north and the centerline of the northmost evaporator building column line is approximately 5.5 feet. Foundation drawings provided by Amalgamated Sugar show the existing transformer building strip footing is embedded four feet below grade. The two primary risks for constructing new footings next to existing footings are 1.) undermining existing foundations during over excavation for soil improvements and 2.) increasing stresses below the existing foundation to levels that results in settlement of the existing building. Recommendations for over excavation methods to mitigate undermining and settlement are provided in the *Subgrade Preparation* section.

Earthwork

Excavation Characteristics

Based on our exploration, the soil at the project site may be excavated with conventional earthwork equipment. Excavations may cave and slough and are to be sloped in accordance with Occupational Health and Safety Act (OSHA) guidelines. The on-site soils correspond to Class C since they are identified as undocumented fill consisting of silty sand. Excavations in Class C soils should be temporarily sloped no steeper than 1.5H:1Vfor excavations deeper than 4 feet. However, excavations near existing structures will require steeper temporary slopes. Steeper temporary slopes can be accomplished; however, it will be necessary to keep personnel out of the temporary excavations, as described further in the *Subgrade Preparation* section.

Surcharges must not be allowed within a horizontal distance equal to one-half the excavation depth. Construction vibrations can cause excavations to slough or cave. Ultimately, the contractor is solely responsible for site safety and excavation configurations. We recommend earthwork contractors evaluate each excavation configuration

specific to OSHA guidelines and that they seek appropriate professional guidance to ensure excavation safety and stability.

Site Stripping

Site stripping is not required for this project; however, removal of the existing slab and foundations for the bag house will be required during soil improvement operations.

Proof Compaction

Proof compaction can be used on subgrade in lieu of density testing to create a stable platform to place structural fill. Where specified in this report, proof compaction shall consist of compacting with a minimum of five passes of a 5-ton drum weight vibratory roller. STRATA should observe the proof compaction to see if any pumping or weaving of the subgrade is observed. If pumping or weaving occurs, the subgrade in question should be undercut in accordance with *Section 202, Part 3.7 Excavation of Unsuitable Material* of the Idaho Standards for Public Works Construction (ISPWC) and replaced with Granular Structural Fill as defined in the *Structural Fill* section. Where proof compaction with large compaction equipment is not possible (footing trench excavations, the exposed subgrade should be moisture conditioned as directed by STRATA and proof compacted with a hydraulic plate compactor (vibratory hoe pack). A steel probe can be used to identify potential areas with unsuitable subgrade where removal and replacement is required. Proof compaction as described in this section shall not be done within 2 feet of the existing footings. It is important that construction vibrations and movements be limited directly adjacent to exposed existing footings to help reduce potential settlement.

Subgrade Preparation

We recommend soil improvements below the proposed spread footings consisting of over-excavating undocumented fill to 6 feet BGS and replacing with Granular Structural Fill to the bottom of footing elevation. The slab/mat will require soil improvement over excavation and backfill to a depth of 4 feet BGS. The limits of over excavation should extend a minimum of 0.5-feet laterally for every 1-ft of removal depth below the proposed footing and slab elevations, beyond the edge of the foundation and slab in all directions. Following over excavation for soil improvements, and prior to placement of structural fill, the subgrade should be proof compacted.

Over-excavations for footings on the north column line of the evaporator building will require near-vertical temporary excavations to avoid undermining the existing footing for the Transformer Building, which is understood to be 4 feet BGS. In our experience, near vertical temporary excavations will be possible in the on-site Silty Sand (SM) and Sandy Silt (ML) undocumented fill provided the proposed footing excavation is oriented perpendicular to the existing building and the width of the excavation is limited to approximately 10 feet. In no case should the bottom of existing footings be exposed during construction. We recommend that excavations from 4 feet to 6 feet

BGS be backfilled with Granular Structural fill within the same working day as the excavation. Compaction of backfill shall be accomplished with a vibratory hoe pack or a remote operated vibratory roller, no workers shall enter the excavations deeper than 4 feet BGS. Placement of Granular Structural Fill will need to be accomplished via a method specification (in lieu of density testing) for fill placed greater than 4 feet BGS under the direction of STRATA. The method specification will consist of determining the required amount of time and passes with a hoe pack to achieve the required density. Compaction testing should be accomplished for fill placed within 4 feet BGS.

Structural Fill

The on-site fine-grained silty soil is moisture susceptible and can be difficult to use during inclement weather, but may be used as General Structural Fill, provided it is moisture conditioned and compacted in accordance with the *Compaction* section of this report. In general, the structural fill requirements described in Table 2 correlate to material specifications in the *Idaho Standards for Public Works Construction* (ISPWC).

The following soils are considered unsatisfactory for use in structural applications:

- Soil classified as CH, MH, OH, OL or PT.
- Soil with a moisture content greater than 3% of optimum moisture.
- Any soil containing more than 3% organics by weight or other deleterious substances (wood, metal, plastic, waste, etc.).

Table 2. Structural Fill Specifications and Allowable Use

Structural Fill Material • Allowable Use	Material Specifications
General Structural Fill • General site grading	• Soil classified as GW, GP, GP-GM, GM, SW, SP, SP-SM, SM, SP-SC, SC, ML or CL according to the USCS. • Maximum particle size must be less than 6 inches. • Soil consisting of inert earth materials with less than 3% organics or other deleterious substances (wood, metal, plastic, waste, etc.).
Granular Structural Fill • General structural fill • Over-excavations	• Soil classified as GW, GP, GP-GM, SP and SP-SM according to the USCS, and meeting the gradation of 6- inch minus and less than 10% passing #200 sieve. • Soil meeting requirements stated in the latest edition of the *Idaho Standard for Public Works Construction (ISPWC), Section 801 – Aggregate Subbase, with a maximum particle size of 6 inches.*
Utility Trench Bedding • Utility trench construction	• Soil may not contain particles larger than 1 inch in median diameter and must meet the required gradation. • Soil meeting requirements stated in the latest edition of the *Idaho Standard for Public Works Construction (ISPWC), Section 305 – Pipe Bedding.*

Structural Fill Material • Allowable Use	Material Specifications
Aggregate Base Course • Granular structural fill • Slabs-on-grade	• Soil may not contain particles larger than 1 inch in median diameter and must meet the required gradation. • Soil meeting requirements stated in the latest edition of the *Idaho Standard for Public Works Construction (ISPWC), Section 802 – Aggregate Base.*

Compaction

All structural fill should be compacted to a minimum of 95 percent of the maximum dry density of the soil as determined by ASTM D1557 (Modified Proctor). Structural fill must be moisture-conditioned to near optimum moisture content, placed in maximum 8-inch-thick loose lifts for fine grain cohesive soils, and 12 inches thick loose lifts for granular soils, then compacted using appropriate compaction equipment. If smaller or lighter compaction equipment is used, the lift thickness should be reduced to meet the compaction requirements.

Testing of structural fill shall consist of a minimum of one modified proctor, particle size distribution, and Atterberg limit (as needed) per imported material type. Density testing shall be accomplished with a nuclear density meter at a minimum frequency of two tests per lift below the slab in the building area and one test per lift for spread footings.

Wet Weather/Wet Soil Construction

We recommend earthwork be performed during dry weather conditions. Fine-grained, silty, and clayey soils are susceptible to pumping and/or rutting when the soil is above optimum moisture content and is subjected to heavy loads, such as rubber-tired equipment or vehicles. Earthwork should not be performed immediately after precipitation events until the soil has dried sufficiently to support construction traffic without disturbing the subgrade. The contractor shall take precautions to protect the subgrade from becoming saturated and/or disturbed. Use of tracked mount equipment can limit the disturbance of moisture sensitive soil. We recommend the contractor limit construction traffic on the prepared subgrade and reduce exposure of the subgrade to precipitation and water. Specifically, the contractor should:

- Slope subgrades to direct surface water away from construction areas.
- Remove subgrade soil that has become soft and/or pumping and replace it with properly compacted structural fill, as described in the Structural Fill subsection above.
- Not place structural fill during or immediately following a significant precipitation event.
- Not place structural fill on frozen or saturated subgrades.

Seismic Design Criteria

Based on our subsurface test pit, geologic data, the project location, and ASCE 7 (ASCE, 2016), we recommend Seismic Site Class C be utilized for the seismic design of the project, provided the soil improvements outlined in the Subgrade Preparation Section are accomplished beneath the shallow foundations. Seismic response criteria are presented in Table 3.

Table 3. Seismic Response Criteria

Period (seconds)	Mapped Acceleration Coefficients (g)	Site Factor for Site Class C	Modified Acceleration Coefficient for Site Class C (g)
Peak	PGA = 0.087	F_{PGA} = 1.3	PGA_M = 0.113
0.2 (Short)	S_S = 0.197	F_a = 1.3	S_{DS} = 0.170
1.0	S_1 = 0.083	F_v = 1.5	S_{D1} = 0.083

1. Values for location Latitude 42.5330°N and Longitude 114.4316 °W

Conditions required for liquefaction to occur include relatively loose, fine granular soil, shallow groundwater, and strong earthquake ground motions. Due to the absence of these conditions and the low seismic hazard at this site, it is our opinion that liquefaction is unlikely to occur.

Foundation Design Recommendations

Shallow foundations may be utilized for this project provided the soil improvement procedures outlined in the *Subgrade Preparation Section* are performed. We recommend the bottom of exterior footings be located a minimum of 24 inches below finished grade to provide frost protection.

Shallow Foundations

Shallow foundations must be structurally designed to conform to the latest edition of the International Building Code (IBC). Provided the soil improvements outlined in the *Subgrade Preparation Section* are accomplished, an allowable bearing capacity of 5,000 psf may be used for footings.

We recommend designing footings on the northmost column line to allow for a minimum separation (edge to edge) distance of 3.5 feet. With this separation distance, we estimate that induced loading below the existing foundations will be up to 500 psf.

A friction coefficient of 0.55 can be used for concrete placed on Granular Structural Fill or Aggregate Base Course. The bearing capacity may be increased 33 percent to account for transitory live loads such as seismic and wind and strength limit states.

The allowable bearing capacity provided assumes that structures can tolerate up to 1-inch of total settlement and differential settlement less than 0.002L where L is the span distance. We recommend STRATA be retained to observe the foundation installation; including subgrade preparation and structural fill placement and compaction, prior to placing concrete forms or concrete. Observing the subgrade preparation and foundation bearing surfaces allows us to confirm our allowable bearing pressure recommendations and settlement estimates and is an important part of the geotechnical engineering design process.

Concrete Slab-on-Grade Floors

The proposed concrete mat slab is planned to support equipment loading up to 1500 psf and will require soil improvement as discussed in the *Subgrade Preparation* section above. The thickness of the Aggregate Base shall be at least 4 inches below slabs. Floor slabs may be designed for the anticipated use and equipment or storage loading conditions considering a preliminary unit modulus of subgrade reaction "k" value of 300 psi/in (12-inch plate equivalent) based on the required soil improvements.

Utility Trench Backfill

Trenches for utilities should conform to the specifications of the Idaho Standards for Public Works Construction (ISPWC) Section 305 and 306 (ISPWC 2017). Trench backfills below the building foundation should be imported trench backfill, per Section 306.2.3, and compacted to Type A-1 compaction. Loose soil must be removed from the base of trenches prior to placing utility trench bedding. In addition, if water is encountered, it must be removed from the base of the trench before placing bedding.

Soil Corrosivity

The upper undocumented fill at this site has a moderately to extremely aggressive corrosivity based on the soil resistivity test result of 970 ohm-cm and a pH of 8.02 for the sandy silt fill. Based on our experience local imported granular structural fill will likely have low to moderate corrosivity. Code minimums should be maintained for steel reinforcement and underground piping should be selected to resist corrosive soils.

Site Drainage

We understand that grading for the project will involve the cut and fill of less than approximately 2 feet to achieve finished grades. We recommend that finish grades be sloped at a minimum of 2 percent away from the proposed structure for a minimum of 10 feet and be directed to an acceptable collection area/facility located 30 feet or more away from any structure. Recommendations for stormwater facilities and design infiltration rates were outside of our scope of work for this project.

GEOTECHNICAL DESIGN CONTINUITY

Geotechnical design continuity will be an important aspect of this project's successful completion. In our opinion, geotechnical continuity can occur in the planning, design, and construction project aspects. Specifically, we recommend STRATA maintain the geotechnical design continuity in the following aspects:

Plan and Specification Review

Once project drawings have been produced, STRATA should be notified in order to review the site plan layout and grading plans. We recommend STRATA be retained to review final design, construction plans, and specifications to verify our geotechnical recommendations are incorporated into project bidding and construction documents, as well as to provide additional recommendations based on the final design concepts. These efforts can help provide document continuity across the engineering disciplines and reduce the potential for errors as the project concepts evolve.

Geotechnical Design Confirmation

We recommend STRATA be retained to provide geotechnical engineering oversight during site grading, foundation installation, soil improvements and excavation to observe the potential variability in the soil conditions and provide consultation regarding potential impacts on foundation construction.

Construction Observation and Testing

We recommend STRATA be retained to observe foundation soil improvement, excavation, grading, and concrete placement operations for floor slab preparation and shallow foundations. Having STRATA provide inspection and oversight during this process will reduce the potential for any unforeseen construction errors, which may ultimately impact the project. STRATA can also provide construction material testing and special inspections for concrete, masonry, reinforcement, steel/welding, and asphalt. If we are not retained to perform the recommended services, we cannot be responsible for related construction errors or omissions.

EVALUATION LIMITATIONS

This geotechnical engineering evaluation report was prepared to assist in the design, planning, and construction of the proposed Evaporator Building at the Amalgamated Sugar Plant in Twin Falls, Idaho. Our services and this report are not applicable to other sites. Our services consist of professional opinions and recommendations made in accordance with generally accepted geotechnical engineering principles and practices as they exist in southern Idaho at the time of this report. This report has been prepared under the premise that STRATA will review the geotechnical aspects of the plans and specifications and will provide geotechnical observation and design verification during construction.

Soil and geologic materials, including groundwater, are variable in nature and conditions can change between exploration locations. These changes can impact construction timing and costs. STRATA's exploration identified the conditions at the time of our site reconnaissance and subsurface evaluation and in the discrete locations explored. This acknowledgment is in lieu of all warranties either express or implied.

This report has been prepared specifically for Amalgamated Sugar Company and their design team. STRATA cannot be held responsible for unauthorized duplication or reliance upon this report or its contents without written authorization.

REFERENCES

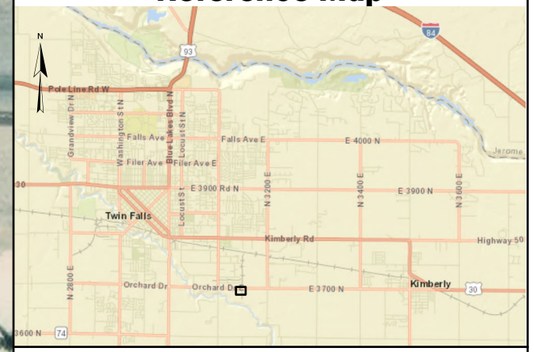
ASCE. (2016). Minimum Design Loads for Buildings and Other Structures. ASCE/SEI Standard 7-16.

ISPWC. (2020). "IDAHO STANDARDS for PUBLIC WORKS CONSTRUCTION, 2020 Edition". Local Highway Technical Assistance Council (LHTAC), Boise, Idaho

Maxar, Microsoft, Bureau of Land Management, Esri, HERE, Garmin, NGA, USGS, NPS

Path: F:\Clients\A\Amalgamated Sugar - Nampa & Paul Minicassia PO's reqd\2024\TF24239E - Evaporator Building\CAD & GIS\Exploration Location Plan\ELP TF24239E\ELP TF24239E.aprx

Reference Map



Legend

B1	Approximate location of boring observed by STRATA on December 13, 2024
R	Depth to Rock (Feet)

0 40 80 160 Feet

Scale: 1" = 80'

STRATA

EXPLORATION LOCATION PLAN

Evaporator Building
2320 Orchard Dr E
Twin Falls, Idaho

Client: Amalgamated Sugar Company	
Client File No.: N/A	File No.: TF24239E
Drawn By: B. Pogson	Checked By: C. Medina
Date: 12/27/2024	Plate: 1

Appendix A
Exploration Logs

EXPLORATION LOG KEY - SOIL

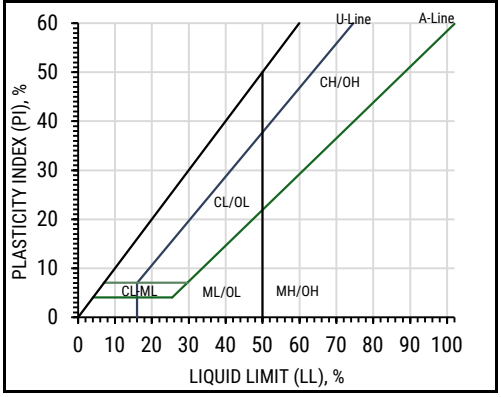
UNIFIED SOIL CLASSIFICATION SYSTEM PER ASTM D2487

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			SYMBOL	GROUP NAME
COARSE GRAINED SOIL MORE THAN 50% RETAINED ON THE #200 SIEVE	GRAVELS >50% COARSE FRACTION RETAINED ON #4 SIEVE	GRAVELS WITH <5% FINES	GW	WELL-GRADED GRAVEL
			GP	POORLY GRADED GRAVEL
		GRAVELS WITH 5 TO 12% FINES	GW-GM	WELL-GRADED GRAVEL WITH SILT
			GP-GM	POORLY GRADED GRAVEL WITH SILT
			GW-GC	WELL-GRADED GRAVEL WITH CLAY
			GP-GC	POORLY GRADED GRAVEL WITH CLAY
		GRAVELS WITH >12% FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
			GC-GM	SILTY, CLAYEY GRAVEL
	SANDS >50% COARSE FRACTION PASSES THE #4 SIEVE	SANDS WITH <5% FINES	SW	WELL-GRADED SAND
			SP	POORLY GRADED SAND
		SANDS WITH 5 TO 12% FINES	SW-SM	WELL-GRADED SAND WITH SILT
			SP-SM	POORLY GRADED SAND WITH SILT
			SW-SC	WELL-GRADED SAND WITH CLAY
			SP-SC	POORLY GRADED SAND WITH CLAY
		SANDS WITH >12% FINES	SM	SILTY SAND
			SC	CLAYEY SAND
			SC-SM	SILTY, CLAYEY SAND
FINE GRAINED SOIL 50%, OR MORE, PASSING THE #200 SIEVE	SILT AND CLAY LL<50%	INORGANIC	CL	LEAN CLAY
			ML	SILT
			CL-ML	SILTY CLAY
		ORGANIC	OL	ORGANIC CLAY OR SILT
	SILT AND CLAY LL>50%	INORGANIC	CH	FAT CLAY
			MH	ELASTIC SILT
		ORGANIC	OH	ORGANIC CLAY OR SILT
	HIGHLY ORGANIC SOILS		PT	PEAT

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
BOULDERS		>12"	>12"	LARGER THAN BASKETBALL-SIZED
COBBLES		3 - 12"	3 - 12"	FIST TO BASKETBALL-SIZED
GRAVEL	COARSE	3/4 - 3"	3/4 - 3"	THUMB TO FIST-SIZED
	FINE	#4 - 3/4"	0.19-0.75"	PEA TO THUMB-SIZED
SAND	COARSE	#10 - #4	0.079-0.19"	ROCK-SALT TO PEA-SIZED
	MEDIUM	#40 - #10	0.017-0.079"	SUGAR TO ROCK-SALT-SIZED
	FINE	#200 - #40	0.0029-0.017"	FLOUR TO SUGAR-SIZED
FINES		<#200	<0.0029"	FLOUR-SIZED AND SMALLER

PLASTICITY CHART



SAMPLE SYMBOLS

	SPT	STANDARD PENETRATION TEST
	MC	MODIFIED CALIFORNIA
	SH	RING (SHELBY TUBE OR SIMILAR)
	BK	BULK OR GRAB BAG
	RC	ROCK CORE

OTHER MATERIAL SYMBOLS

	FL	UNDOCUMENTED FILL
	AC	ASPHALT CONCRETE PAVEMENT
	CC	PORTLAND CEMENT CONCRETE
	CRABS	CRABS
	CTB	CEMENT TREATED BASE

GRAIN SIZE MODIFIERS

<5%	TRACE
5%-10%	FEW
15%-25%	LITTLE
30%-45%	SOME
50%-100%	MOSTLY

SHORTHAND NOTATIONS

UC	UNCONFINED COMPRESSION	MC	MOISTURE CONTENT
BGS	BELOW GROUND SURFACE	DD	DRY DENSITY
N.E.	NOT ENCOUNTERED	WD	WET DENSITY

GROUNDWATER

	GROUNDWATER LEVEL AT TIME OF DRILLING (ATD)
	GROUNDWATER LEVEL AFTER DRILLING (AD)
	PERCHED GROUNDWATER LEVEL

ADDITIONAL DESCRIPTIONS

———	DISTINCT LAYER TRANSITION
- - - -	APPROXIMATE LAYER TRANSITION

EXPLORATION LOG KEY - SOIL

APPARENT RELATIVE DENSITY OF COARSE-GRAINED SOIL			
APPARENT DENSITY	**SPT (blows/ft)**	**RELATIVE DENSITY (%)**	**FIELD TEST**
VERY LOOSE	<4	0-15	EASILY PENETRATED WITH 1/2" REINFORCING ROD PUSHED BY HAND
LOOSE	5-10	15-35	DIFFICULT TO PENETRATE WITH 1/2" REINFORCING ROD PUSHED BY HAND
MEDIUM DENSE	11-30	35-65	EASILY PENETRATED A FOOT WITH 1/2" REINFORCING ROD DRIVEN WITH 5-LB HAMMER
DENSE	31-50	65-85	DIFFICULT TO PENETRATE A FOOT WITH 1/2" REINFORCING ROD DRIVEN WITH 5-LB HAMMER
VERY DENSE	>50	85-100	PENETRATED ONLY A FEW INCHES WITH 1/2" REINFORCING ROD DRIVEN WITH 5-LB HAMMER

CONSISTENCY OF FINE-GRAINED SOIL			
CONSISTENCY	**SPT (blows/ft)**	**UC STRENGTH (tsf)**	**FIELD TEST**
VERY SOFT	<2	<0.25	EASILY PENETRATED SEVERAL INCHES BY THUMB. EXTRUDES BETWEEN THUMB AND FINGER WHEN SQUEEZED BY HAND
SOFT	2-4	0.25-0.50	PENETRATED ABOUT 1/2" BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE
FIRM	5-8	0.50-1.0	PENETRATED ABOUT 1/4" BY THUMB WITH MODERATE EFFORT. MOLDED BY STRONG FINGER PRESSURE
STIFF	9-15	1.0-2.0	INDENTED ABOUT 1/4" BY THUMB ONLY WITH GREAT EFFORT
VERY STIFF	16-30	2.0-4.0	READILY INDENTED WITH DIFFICULTY BY THUMBNAIL
HARD	>30	>4.0	INDENTED WITH DIFFICULTY BY THUMBNAIL

MOISTURE CONTENT	
DRY	ABSENCE OF MOISTURE, DUSTY, DRY TO THE TOUCH
MOIST	DAMP BUT NO VISIBLE WATER
WET	VISABLE FREE WATER, USUALLY SOIL IS BELOW WATER TABLE

ANGULARITY			
ROUNDED		SUBANGULAR	
SUBROUNDED		ANGULAR	

REACTION WITH HCl	
NONE	NO VISIBLE REACTION
WEAK	SOME REACTION, WITH BUBBLES FORMING SLOWLY
STRONG	VIOLENT REACTION, WITH BUBBLES FORMING IMMEDIATELY

CEMENTATION	
WEAK	CRUMBLES OR BREAKS WITH HANDLING OR LITTLE FINGER PRESSURE
MODERATE	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE
STRONG	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE

STRUCTURE	
STRATIFIED	ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH LENSES AT LEAST 1/4" THICK
LAMINATED	ALTERNATING LAYERS OF VARYING MATERIAL OR COLOR WITH PARTING LESS THAN 1/4" THICK
FISSURED	BREAKS ALONG DEFINITE PLANES OF FRACTURE WITH LITTLE RESISTANCE TO FRACTURING
SLICKENSIDED	FRACTURE PLANES APPEAR POLISHED OR GLOSSY, SOMETIMES STRIATED
BLOCKY	COHESIVE SOIL THAT CAN BE BROKEN DOWN INTO SMALL ANGULAR LUMPS WHICH RESIST FURTHER BREAKDOWN
LENSED	INCLUSION OF SMALL POCKETS OF DIFFERENT SOIL, SUCH AS SMALL LENSES OF SAND SCATTERED THROUGH A MASS OF CLAY
HOMOGENEOUS	SAME COLOR AND THICKNESS THROUGHOUT

STRATIFICATION	
DESCRIPTION	THICKNESS
PARTING	1/16" - 1/4"
LENSE	1/4" - 4"
LAYER	4" - 12"
OCCASIONAL	ONE OR LESS PER FOOT OF THICKNESS
FREQUENT	MORE THAN ONE PER FOOT OF THICKNESS

EXPLORATION LOG KEY - ROCK

ROCK TYPE SYMBOLS	
	BEDROCK
	BASALT
	RHYOLITE
	TUFF
	LIMESTONE
	SANDSTONE
	SILTSTONE
	CLAYSTONE
	GRANITE

ROCK STRENGTH			
GRADE (DESCRIPTION)		FIELD IDENTIFICATION	APPROXIMATE UNCONFINED COMPRESSIVE STRENGTH (PSI)
R0	EXTREMELY WEAK ROCK	CAN BE INDENTED BY THUMBNAIL	35 - 150
R1	VERY WEAK ROCK	CAN BE PEELED BY POCKET KNIFE	150 - 725
R2	WEAK ROCK	CAN BE PEELED WITH DIFFICULTY BY POCKET KNIFE	725 - 3,500
R3	MEDIUM STRONG ROCK	CAN BE INDENTED 3/16" (5mm) WITH SHARP END OF PICK	3,500 - 7,000
R4	STRONG ROCK	REQUIRES ONE BLOW OF GEOLOGIST'S HAMMER TO FRACTURE	7,000 - 15,000
R5	VERY STRONG ROCK	REQUIRES MANY BLOWS OF GEOLOGIST'S HAMMER TO FRACTURE	15,000 - 36,000
R6	EXTREMELY STRONG ROCK	CAN ONLY BE CHIPPED WITH BLOWS OF GEOLOGIST'S HAMMER	>36,000

ROCK QUALITY DESIGNATION (RQD, %)	
0 - 25	VERY POOR
25 - 50	POOR
50 - 75	FAIR
75 - 90	GOOD
90 - 100	EXCELLENT

ROUGHNESS OF DISCONTINUITY SURFACE	
TERM	DESCRIPTION
SLICKENSIDED	SURFACE HAS SMOOTH, GLASSY FINISH WITH VISUAL EVIDENCE OF STRIATIONS
SMOOTH	SURFACE APPEARS SMOOTH AND FEELS SO TO THE TOUCH
SLIGHTLY ROUGH	ASPERITIES ON THE DISCONTINUITY SURFACE ARE DISTINGUISHABLE AND CAN BE FELT
ROUGH	SOME RIDGES AND SIDE-ANGLE STEPS ARE EVIDENT; ASPERITIES ARE CLEARLY VISABLE, SURFACE FEELS VERY ABRASIVE
VERY ROUGH	NEAR VERTICAL STEPS AND RIDGES OCCUR ON THE DISCONTINUITY SURFACE

DISCONTINUITY SPACING (FT)	
EXTREMELY WIDE	>19.7
VERY WIDE	6.6 - 19.7
WIDE	2.0 - 6.6
MODERATE	0.7 - 2.0
CLOSE	0.2 - 2.0
VERY CLOSE	0.07 -0.2
EXTREMELY CLOSE	<0.07

ROCK WEATHERING AND ALTERATION		
GRADE (TERM)		DESCRIPTION
I	FRESH	ROCK SHOWS NO DISCOLORATION, LOSS OF STRENGTH, OR OTHER EFFECTS OF WEATHERING
II	SLIGHTLY WEATHERED	ROCK IS SLIGHTLY DISCOLORED, BUT NOT NOTICEABLY LOWER IN STRENGTH THAN FRESH ROCK
III	MODERATELY WEATHERED	ROCK IS DISCOLORED AND NOTICEABLY WEAKENED, BUT LESS THAN HALF IS DECOMPOSED; A MINIMUM 2" DIAMETER SAMPLE CANNOT BE BROKEN READILY BY HAND ACROSS THE ROCK FABRIC
IV	HIGHLY WEATHERED	MORE THAN HALF THE ROCK IS DECOMPOSED; A MINIMUM 2" DIAMETER SAMPLE CAN BE BROKEN READILY BY HAND ACROSS THE ROCK FABRIC
V	COMPLETELY WEATHERED	ROCK HAS BEEN ALMOST ENTIRELY DECOMPOSED TO SECONDARY MINERALS EVEN THOUGH THE ORIGINAL FABRIC MAY BE INTACT; MATERIAL CAN BE GRANULATED BY HAND
VI	RESIDUAL SOIL	ROCK HAS BEEN ENTIRELY DECOMPOSED TO SECONDARY MINERALS AND ROCK FABRIC IS NOT APPARENT; MATERIAL CAN BE EASILY BROKEN BY HAND

SOIL BORING NUMBER: B-1

PROJECT Evaporator Building
DATE COMPLETED 12/23/2024
PROJECT NO. TF24239E
CLIENT Amalgamated Sugar Company
LOGGED BY C. Medina
LATITUDE / LONGITUDE 42.53238, -114.43178
BORING DIAMETER 8 in
DEPTH TO GROUNDWATER (FEET) N/A
EQUIPMENT Diedrich D-120

Elevation (ft)	Depth (ft)	Material Description	Graphic	Sample Type	Recovery (in or %)	Blow Counts/6" or %RQD	Uncorrected N-Value	Pocket Penetrometer (TSF)	Moisture Content (%)	Dry Density (pcf)	Passing No. 200 (%)	Liquid Limit &	Remarks
0		**Portland Cement Concrete**											5 in. slab, 8 in. base
		Fill (base) - **Poorly Graded Gravel with Silt** (**GP-GM**), dark brown, moist, medium dense, subrounded to angular, fine to coarse-grained sand, fine to coarse-grained gravel	GP-GM										
		Fill - **Sandy Silt** (**ML**), medium brown to dark brown, moist, very stiff, fine-grained sand, with PCC material	ML										hand excavated to 2.5ft to check for unmarked utilities
-5	5				15"	15 20 8	28	1.0	21.10		58		
		Sandy Silt (**ML**), dark brown, moist, hard, fine-grained sand	ML		8"	15 22 23	45	1.0	27.40		59		Basalt and caliche cobbles from 6 to 7 feet BGS.
-10	10				15"	11 22 25	47	1.0					
		Silty Sand (**SM**), orangish brown, moist, dense, moderate cementation, fine-grained sand	SM										

SOIL BORING NUMBER: B-1

PROJECT Evaporator Building
DATE COMPLETED 12/23/2024
PROJECT NO. TF24239E
CLIENT Amalgamated Sugar Company
LOGGED BY C. Medina
LATITUDE / LONGITUDE 42.53238, -114.43178
BORING DIAMETER 8 in
DEPTH TO GROUNDWATER (FEET) N/A
EQUIPMENT Diedrich D-120

Elevation (ft)	Depth (ft)	Material Description	Graphic	Sample Type	Recovery (in or %)	Blow Counts/6" or %RQD	Uncorrected N-Value	Pocket Penetrometer (TSF)	Moisture Content (%)	Dry Density (pcf)	Passing No. 200 (%)	Liquid Limit &	Remarks
-15	15	**Basalt**, dark gray, r3: medium strong, close fracture spacing, highly vesicular, moderately weathered			100% 36"	RQD: 56							
					100% 12"	RQD: 100				148.50			
-20	20				48% 20"	RQD: 0							
		Terminated at 20 feet BGS.											

SOIL BORING NUMBER: B-2

PROJECT Evaporator Building
PROJECT NO. TF24239E
LOGGED BY C. Medina
BORING DIAMETER 8 in
EQUIPMENT Diedrich D-120

DATE COMPLETED 12/23/2024
CLIENT Amalgamated Sugar Company
LATITUDE / LONGITUDE 42.53238, -114.43169
DEPTH TO GROUNDWATER (FEET) N/A

Elevation (ft)	Depth (ft)	Material Description	Graphic	Sample Type	Recovery (in or %)	Blow Counts/6" or %RQD	Uncorrected N-Value	Pocket Penetrometer (TSF)	Moisture Content (%)	Dry Density (pcf)	Passing No. 200 (%)	Liquid Limit &	Remarks
0		**Portland Cement Concrete**											
		Fill (base) - **Poorly Graded Gravel with Silt** (**GP-GM**), gray, moist, dense, angular, fine to coarse-grained sand, fine to coarse-grained gravel	GP-GM										5 in. slab, 8 in. base
		Fill - **Silty Sand** (**SM**), brown, moist, loose, subangular, fine to coarse-grained sand, fine to coarse-grained gravel, with basalt cobbles	SM		13"	5 3 5	8	0.5	16.90		40		hand excavated to 2.5ft to check for unmarked utilites
-5	5	**Fill** - **Silty Gravel with Sand** (**GM**), brown, moist, dense, fine-grained sand	GM		12"	22 36 39	75		10.60		15		rusted nail observed in 5.5-6ft sample
		Silty Sand (**SM**), orangish brown, moist, dense, with basalt fragments and cobbles	SM										
-10	10	**Basalt**, dark gray, highly to completely weathered, fractured			15"	14 38 28	66						

Terminated on Basalt at 11.25 feet BGS.

Appendix B
Laboratory Test Results

STRATA

Summary of Laboratory Test Results

Project: Evaporator Building
Client: Amalgamated Sugar Co.

Project Number: TF24239E
Date: 12/17/2024

Sample Source	Depth (Feet)	Lab Number	Soil Classification	Resistivity (Ohm-cm)	pH	Sulfates (ppm)	In Situ Moisture, %	Passing No. 200,%	Fines Class.
24-STR-B-1	5.0-6.5	57995	Sandy Silt (ML)	-	-	-	21.2	58	ML
24-STR-B-1	7.5-9.0	57996	Sandy Silt (ML)	970	8.02	271	27.4	59	ML
24-STR-B-1	15.0-16.0	57997	(Basalt Rock)	-	-	-	-	-	-
24-STR-B-2	2.5-4.0	57998	Silty Sand (SM)	-	-	-	16.9	40	ML
24-STR-B-2	5.0-6.5	57999	Silty Sand with Gravel (SM)	-	-	-	10.6	15	ML

Reviewed By: Keith Wildman
Keith Wildman
Laboratoy Services Coordinator

8653 West Hackamore Drive, Boise, Idaho 83709 Phone 208.376.8200 Fax 208.376.8201
www.stratageotech.com

ASTM D7012 (Method C)

Report Date: 12/31/2024

Boise
8653 West Hackamore Drive
Boise, ID 83709
Phone: 208.376.8200

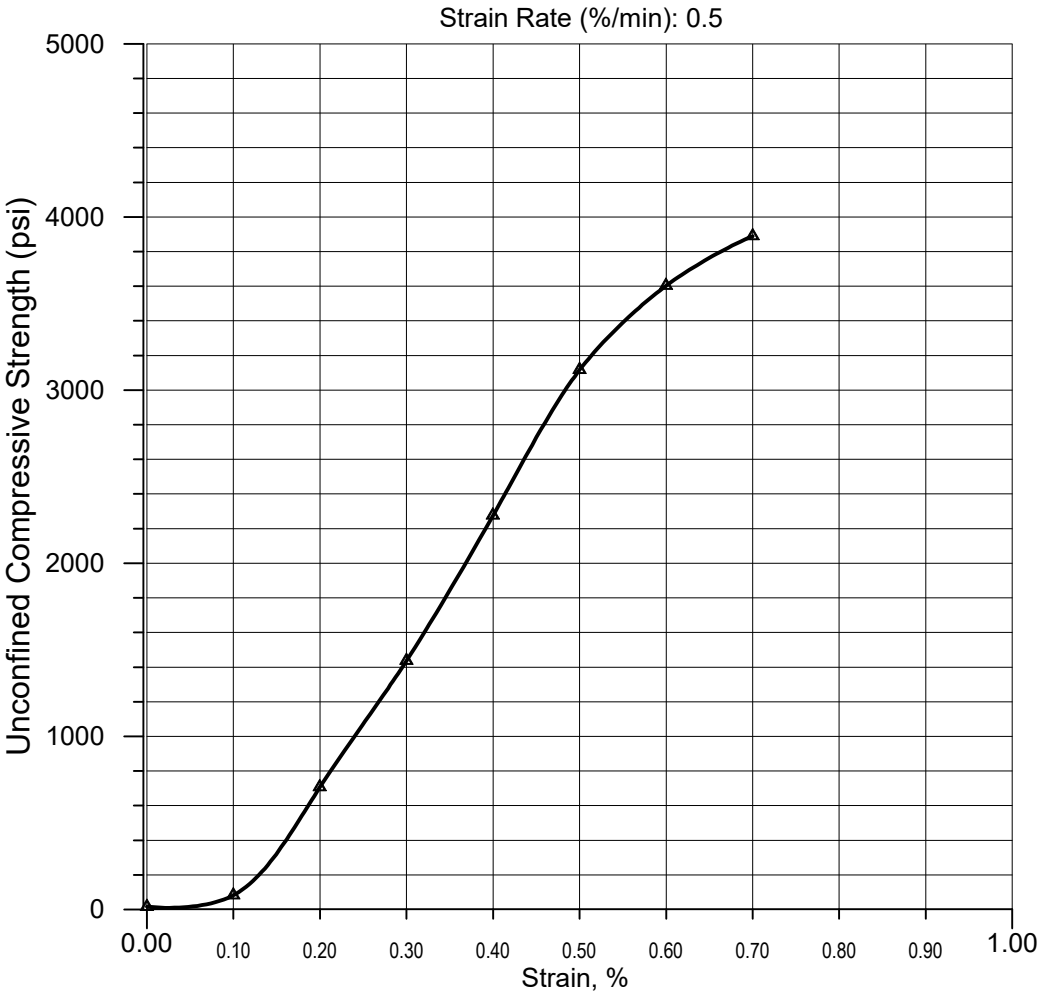
Client
Amalgamated Sugar Company

Project
TF24239E
Evaporator Building
2320 Orchard Dr
Twin Falls, ID 83301

SAMPLE INFORMATION

SAMPLE No.:	57997	**SAMPLE DATE:**	12/16/2024	**BORING No.:**	24-STR-B1
SPECIMEN SIZE:	Core	**TEST DATE:**	12/31/2024	**DEPTH (FT):**	15.0 - 16.0
		SAMPLED BY:	C. Medina	**SAMPLE CONDITION:**	Good
		TESTED BY:	J. Bingaman		
APPARATUS:	Tinius	**MOISTURE CONTENT:**	N/A	**UNIT WEIGHT:**	148.5 pcf
SAMPLE PREP:	Intact	**L/D RATIO:**	1.77		

METHOD: ASTM D2113 - Coring and Sample Rock Cores



Diameter (in): 2.4 Height (in): 4.25 Area (in²): 4.524

Unconfined Compressive Strength = 3890 psi (560 ksf) @ 0.7% Strain

Reviewed by Keith Wildman
Laboratory Services Coordinator

ASTM D2435

Report Date: 12/31/2024

Boise
8653 W. Hackamore Dr
Boise, ID 83709
Phone: 208.376.8200

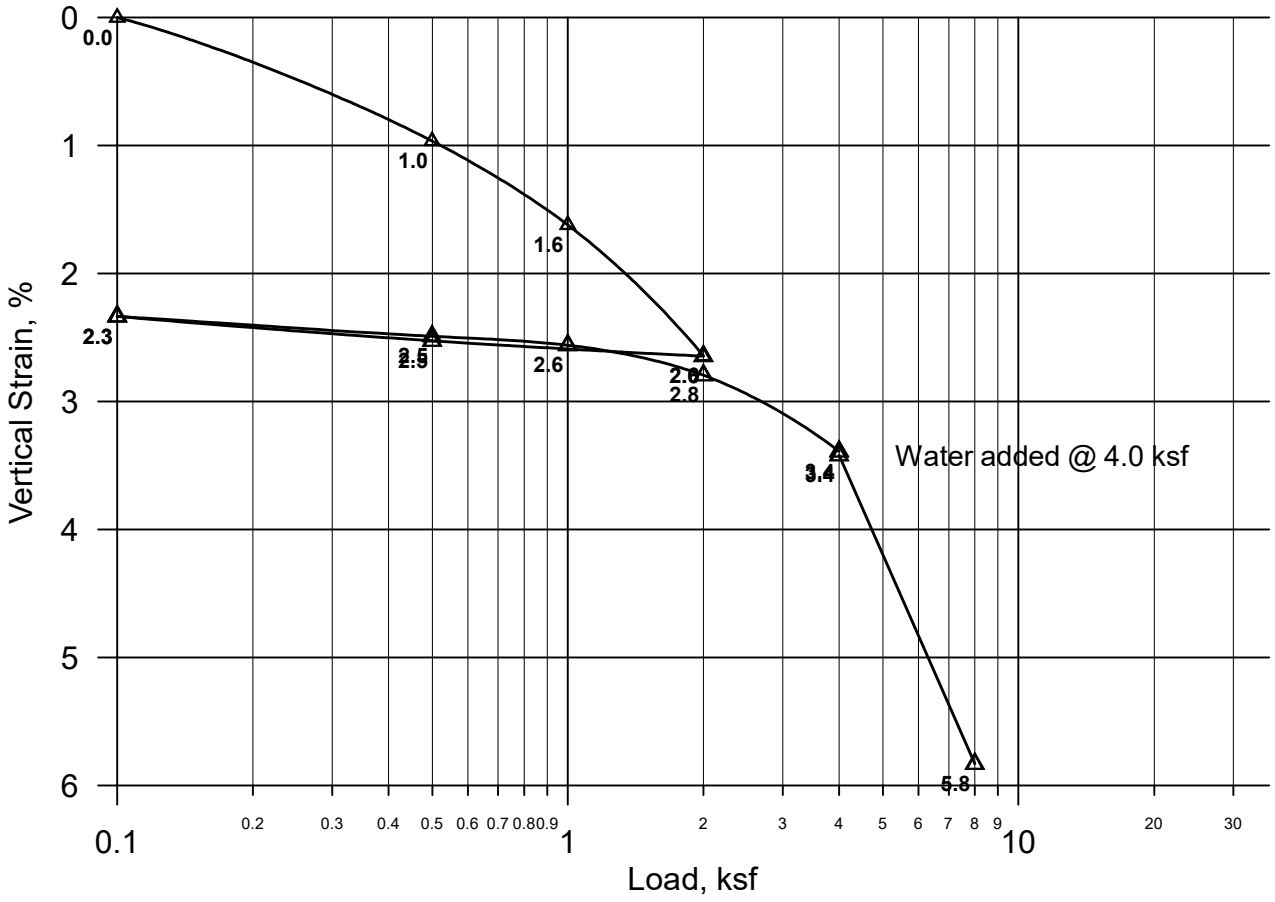
Client
Amalgamated Sugar Company

Project
TF24239E
Evaporator Building

SAMPLE INFORMATION

SAMPLE No.:	57999	**SAMPLE DATE:**	12/13/2024	**BORING No.:**	24-STR-B2
SPECIMEN SIZE:	Shelby Tube	**TEST DATE:**	12/18/2024	**DEPTH (FT):**	5.0-6.5
USCS CLASSIFICATION:	Silty Sand with Gravel (SM)	**SAMPLED BY:**	C. Medina	**SAMPLE CONDITION:**	Good
		TESTED BY:	V. Barinaga		

APPARATUS:	Humboldt Load Frame	**INITIAL MOISTURE CONTENT:**	10.6%
SAMPLE PREP:	Intact	**FINAL MOISTURE CONTENT:**	16.3%
TEST WATER:	Tap	**DRY UNIT WEIGHT:**	110.4 pcf



REMARKS: None

Reviewed by Keith Wildman
Laboratory Services Coordinator