ADDENDUM #2
Public Works
Hygiene Road at Foothills Reservoir Inlet
BID # 7469-23

June 2, 2023

The attached addendum supersedes the original Information and Specifications regarding BID # 7469-23 where it adds to, deletes from, clarifies or otherwise modifies. All other conditions and any previous addendums shall remain unchanged.

Please note: BIDS will only be accepted electronically by emailing purchasing@bouldercounty.org.

Note: The submittal due date has been pushed back to 2:00 p.m. Mountain Time on June 8, 2023.

1. Question: Was a soils report prepared for this project for the Shoring (Temporary)?

   ANSWER: No. Attached for inspection by bidders is the Geotechnical Engineering Investigation for the culvert replacement under Hygiene Road, Hygiene Colorado.

2. Question: I was curious about what the liquidated damages are for this Hygiene Road at Foothills Reservoir Inlet project?

   ANSWER: Liquidated damages will be in accordance with Section 108.09 of the CDOT 2021 Standard Specifications.

Submittal Instructions:

Submittals are due at the email box only, listed below, for time and date recording on or before **2:00 p.m. Mountain Time on June 8, 2023.**

Please note that email responses to this solicitation are limited to a maximum of 50MB capacity.

NO ZIP FILES OR LINKS TO EXTERNAL SITES WILL BE ACCEPTED. THIS INCLUDES GOOGLE DOCS AND SIMILAR SITES. ALL SUBMITTALS MUST BE RECEIVED AS AN ATTACHMENT (E.G. PDF, WORD, EXCEL).

Electronic submittals must be received in the email box listed below. Submittals sent to any other box will NOT be forwarded or accepted. This email box is only accessed on the due date of your questions or proposals. Please use the Delivery Receipt option to verify receipt of your email. It is the sole responsibility of the proposer to ensure their documents are received before the deadline specified above. Boulder County does not accept responsibility under any circumstance for delayed or failed email or mailed submittals.

Email purchasing@bouldercounty.org; identified as **BID # 7469-23** in the subject line.

All proposals must be received and time and date recorded at the purchasing email by the above due date and time. Sole responsibility rests with the Offeror to see that their bid is received on time at the stated location(s). Any bid received after due date and time will be returned to the bidder. No exceptions will be made.

The Board of County Commissioners reserve the right to reject any and all bids, to waive any informalities or irregularities therein, and to accept the bid that, in the opinion of the Board, is in the best interest of the Board and of the County of Boulder, State of Colorado.

RECEIPT OF LETTER
ACKNOWLEDGMENT

June 2, 2023

Dear Vendor:

This is an acknowledgment of receipt of Addendum #2 for BID #7469-23, Hygiene Road at Foothills Reservoir Inlet.

In an effort to keep you informed, we would appreciate your acknowledgment of receipt of the preceding addendum. Please sign this acknowledgment and email it back to purchasing@bouldercounty.org as soon as possible. If you have any questions, or problems with transmittal, please call us at 303-441-3525. This is also an acknowledgement that the vendor understands that **BIDS will only be accepted electronically by emailing purchasing@bouldercounty.org.**

Thank you for your cooperation in this matter. This information is time and date sensitive; an immediate response is requested.

Sincerely,

Boulder County Purchasing

Signed by: _____ Date: _____

Name of Company_____

End of Document

Martinez Associates
Geotechnical Engineering Services

March 27, 2023
File No. 22-0228

Atkins Global
4600 South Ulster Street, Suite 1100
Denver, Colorado 80237

Attn: Mr. Sean Stellish, P.E.

Subject: **Geotechnical Engineering Investigation for Culvert Replacement under Hygiene Road, Hygiene, Colorado**

Dear Mr. Stellish:

Submitted herewith is our geotechnical engineering investigation for the proposed culvert replacement project at Foothills Reservoir near Hygiene, Colorado. This report contains the results of Martinez Associates, Inc. (Martinez) findings, engineering interpretation with respect to the available project characteristics, and recommendations to aid design and construction of this project.

Martinez appreciates the opportunity to work with you on this project. If we can be of further assistance or you have any questions, please contact this office.

Sincerely,
MARTINEZ ASSOCIATES, INC.

Jere A. Strickland, P.E.
Principal Professional

Gregg M. Tateyama, P.E.
Senior Engineer

INTRODUCTION

Martinez Associates, Inc. (Martinez) was retained by Atkins Global to conduct a geotechnical engineering investigation for the new culvert beneath Hygiene Road at the Foothills Reservoir near Hygiene, Colorado.

The purposes of this study are to: 1) determine the general subsurface conditions by drilling a test boring, 2) evaluate the geotechnical engineering properties of the soils and bedrock encountered, 3) to provide recommendations for design and construction and 4) summarize our investigation in a report. Included are our recommendations for structure foundations, below grade construction, floor slabs, drainage, site and subgrade preparation and grading, and an evaluation of the site with respect to potential construction problems and recommendations for dealing with the earthwork and quality control during construction.

PROJECT

Based on the information provided, we understand the project includes replacement of the existing box culvert beneath Hygiene Road that carries the discharges from Foothills Reservoir. The new culvert will be at the same location as the existing culvert and there is little or no grade changes proposed for the existing roadway. The culvert will be a 16-foot by 6-foot concrete box culvert.

FIELD AND LABORATORY INVESTIGATIONS

Martinez drilled a boring for the structure to investigate the general subsurface conditions and to obtain samples to aid in the determination of engineering properties of subgrade materials.

The boring was extended to about 25 feet below ground surface at the location shown on Figure 1. Modified California barrel (2 inch inside diameter) samples were obtained from each boring in general accordance with standard penetration test procedures (ASTM D 1586). The modified California barrel sampler is typically used in order to obtain intact cohesive soil samples for laboratory tests. The penetration values reported in the Subsurface Condition section are the number of blows of a 140-lb hammer falling 30 inches, generally recorded in 6-inch intervals and counted over the lower 12 inches of sampler penetration. The actual number of blows per 12-inch interval, or a fraction there of, is reported on the test boring reports; the modified California barrel blow counts were not converted to standard penetration N-values.

The subsurface conditions encountered by the field investigation are discussed in the Subsurface Condition Section. The test boring report, which present descriptions and visual classifications of the soil and bedrock strata encountered, are included in Appendix A. Groundwater observations, sampling information and other pertinent field data and observations are also included.

Laboratory Testing:

Laboratory tests were performed on selected soil and bedrock samples to estimate their relative engineering properties. The following tests were performed in general accordance with locally recognized standards:

Description and Identification of Soils (Visual-Manual Procedure)
Moisture Determination
Unit Weight
One Dimensional Swell-Settlement
Grain Size Analysis
Atterberg Limits
Water Soluble Sulfates

The test boring report was amended as necessary to reflect laboratory test data. The results of the laboratory testing are summarized on the test boring reports and pertinent laboratory test reports are provided in Appendix B.

SUBSURFACE CONDITIONS

As presented on the boring report, the surface soils were a sandy clay which extended to a depth of about 22 feet. The surface soils were underlain by claystone bedrock to the maximum depth of exploration. Field penetration data indicates that the clays were soft to stiff in consistency and the claystone bedrock was medium hard, based on field penetration resistance. Laboratory test results indicate that the near surface clays are non-expansive at in-situ moisture contents.

Groundwater was observed in the test boring at a depth of about 13.5 feet at the time of field exploration. These observations represent only current groundwater conditions, and may not be indicative of other times, or at other locations. Groundwater levels should be expected to fluctuate with varying seasonal and weather conditions.

SITE EXCAVATIONS

Excavations into the on-site soils will encounter a variety of conditions. Excavations into the clays and bedrock can be expected to stand on relatively steep temporary slopes during construction. However, caving soils may also be encountered. All excavations must comply with the applicable local, State, and Federal safety regulations, and particularly with the excavation standards of the Occupational Safety and Health Administration (OSHA). Construction site safety, including excavation safety, is the sole responsibility of the Contractor as part of its overall responsibility for the means, methods, and sequencing of construction operations. Martinez recommendations for excavation support are provided for the Client's sole use in planning the project, in no way do they relieve the Contractor of its responsibility to construct, support, and maintain safe slopes. Under no circumstances should the following recommendations be interpreted to mean that Martinez is assuming responsibility for either construction site safety or the Contractor's activities.

We believe the overburden clays encountered on this site will classify as Type B materials using OSHA criteria. OSHA requires that unsupported cuts be no steeper than 1:1 for Type B material for unbraced excavations up to 20 feet in height. In general, we believe that these slope ratios will be temporarily stable under unsaturated conditions. Flattened slopes may be required if excavations extend into the groundwater or the slopes will be exposed for an extended period of time. Please note that an OSHA-qualified "competent person" must make the actual determination of soil type and allowable sloping in the field.

The soils encountered by the proposed excavations may vary significantly across the site. The preliminary classifications presented above are based solely on the materials encountered in widely spaced exploratory test borings. The contractor should verify that similar conditions exist throughout the proposed area of excavation.

As a safety measure, it is recommended that all vehicles and soil piles be kept to a lateral distance equal to at least the depth of the excavation from the crest of the slope. The exposed slope face should be protected against the elements and monitored by the contractor on at least a daily basis.

FOUNDATION RECOMMENDATIONS

Based on our understanding of the project, the culvert can be placed on the native soils at the site. The culvert base may be designed for a maximum allowable bearing pressure of 5,500 pounds per square foot (psf). The design bearing pressure applies to dead loads plus design live load conditions.

If unsuitable bearing soils are encountered in excavations, the excavations should be extended deeper to suitable soils and the excavation backfilled with gravel to create a working platform for the culvert installation.

Foundation excavations should be observed by the geotechnical engineer. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

LATERAL EARTH PRESSURES

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

- Active:
  Cohesive soil backfill (on-site clay)..... 45 psf/ft
  Cohesionless soil backfill (imported sand) ..... 35 psf/ft
- Passive:
  Cohesive soil backfill (on-site clay)..... 275 psf/ft

Cohesionless soil backfill (imported sand) ..... 455 psf/ft

- Coefficient of base friction 0.35

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest:
  Cohesive soil backfill (on-site clay) ..... 65 psf/ft
  Cohesionless soil backfill (imported sand) ..... 55 psf/ft

The lateral earth pressures herein do not include increased loading due to sloping backfill or surcharge loads. Lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if submerged conditions are to be included in the design.

Fill against walls should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over compaction may cause excessive lateral earth pressures, which could result in wall movement.

The magnitude of settlement of the deep fill zones associated with the culvert will be directly related to the type of fill material used, the degree of compaction and the thickness of the fill zone. If imported granular fill is used as backfill, settlement of fill zones 10 feet or less is estimated to be less than 1 inch. The use of granular backfill material will also decrease the amount of time required for settlement to occur. Use of on-site clay as backfill material will increase the amount of settlement and significantly extend the time period for settlement to occur.

EARTHWORK

The following presents recommendations for site preparation, excavation, subgrade preparation and placement of engineered fills on the project.

Earthwork on the project should be observed and evaluated by Martinez Associates. The evaluation of earthwork should include observation and testing of engineered fills, subgrade preparation, foundation bearing soils and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove existing vegetation and other deleterious materials from proposed culvert area. All exposed surfaces should be free of mounds and depressions, which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be wasted from the site or used to revegetate landscaped areas or exposed slopes after completion of grading operations.

All exposed areas which will receive fill, once properly cleared and benched, should be scarified to a minimum depth of 8 inches, moisture conditioned and compacted as an engineered fill.

Demolition of the existing culvert should include complete removal of all foundation systems within the proposed construction area. This includes removal of any loose backfill found adjacent to existing foundations. Materials derived from the demolition of existing structures and pavements should be removed from the site and should not be allowed for use in any on-site fills.

It is anticipated that excavations for the proposed construction can be accomplished with conventional heavy earthmoving equipment.

Depending upon the depth of excavation, location of the bedrock surface and seasonal conditions, groundwater may be encountered in excavations on the site. Pumping from sumps may be utilized to control water within excavations. Well points may be required if significant groundwater flow is encountered or where excavations penetrate groundwater to a significant depth.

Based upon the subsurface conditions encountered, subgrade soils exposed during construction are anticipated to be relatively stable. However, the stability of the subgrade may be affected by the historic presence of the existing irrigation channel and by drainage, precipitation, repetitive construction traffic and other factors. If unstable conditions are encountered or develop during construction, stability may be improved by scarifying and drying the subgrade soils. Over excavation of wet zones and replacement with granular materials may be necessary. Use of lime, fly ash, kiln dust, cement or geotextiles could also be considered as stabilization techniques. Laboratory evaluation is recommended to determine the effect of chemical stabilization on subgrade soils prior to construction. Lightweight excavation equipment may also be required to reduce subgrade pumping.

Subgrade Preparation

Subgrade soils beneath pavements should be scarified to a minimum depth of 8 inches, moisture conditioned and compacted as an engineered fill. The moisture content and compaction of subgrade soils should be maintained until pavement construction.

Fill Materials and Placement

Clean on-site soils or approved imported materials may be used as fill material. Imported soils (if required) should be granular soils with no more than 35 percent passing the No. 200 sieve and having a Liquid Limit of no more than 30 and a Plasticity Index of no more than 15. Import fill material should be reviewed by the geotechnical engineer prior to importing to the site.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce a uniform fill with the recommended moisture contents and densities throughout the lift. Recommended compaction criteria for engineered fill is 95 percent of the maximum dry density (ASTM

D698). In fill areas where the fill depth exceeds 10 feet, the fill placed greater than 10 feet below finished grade should be compacted to 98 percent of the maximum dry density (ASTM D698).

On-site clay soils should be compacted within a moisture content within 2 percent of optimum. Imported soils should be compacted within a moisture content within 3 percent of optimum unless modified by the project geotechnical engineer.

The recommendations for placement and compaction criteria presented herein, assume that fill depths will be less than 10 feet. Fills less than 10 feet, when placed and compacted as recommended in this report, will experience some settlement (generally about 1 inch or less). The amount and rate of settlement will be increased if water is introduced into the fill.

Foundation Concrete

The concentration of water-soluble sulfates measured in the laboratory on the shallow sample was negligible. This concentration of water-soluble sulfates represents a Class 0 degree of sulfate attack on concrete exposed to these geologic materials. The degree of attack is based on a range of Class 0 (negligible) to Class 3 (very severe) as described in the American Concrete Institute (ACI) Standard 201.2R, "Guide to Durable Concrete". Based on these sulfate tests, the soils present a very low potential for sulfate attack on concrete. Therefore, sulfate resistant concrete mix designs are not required per ACI.

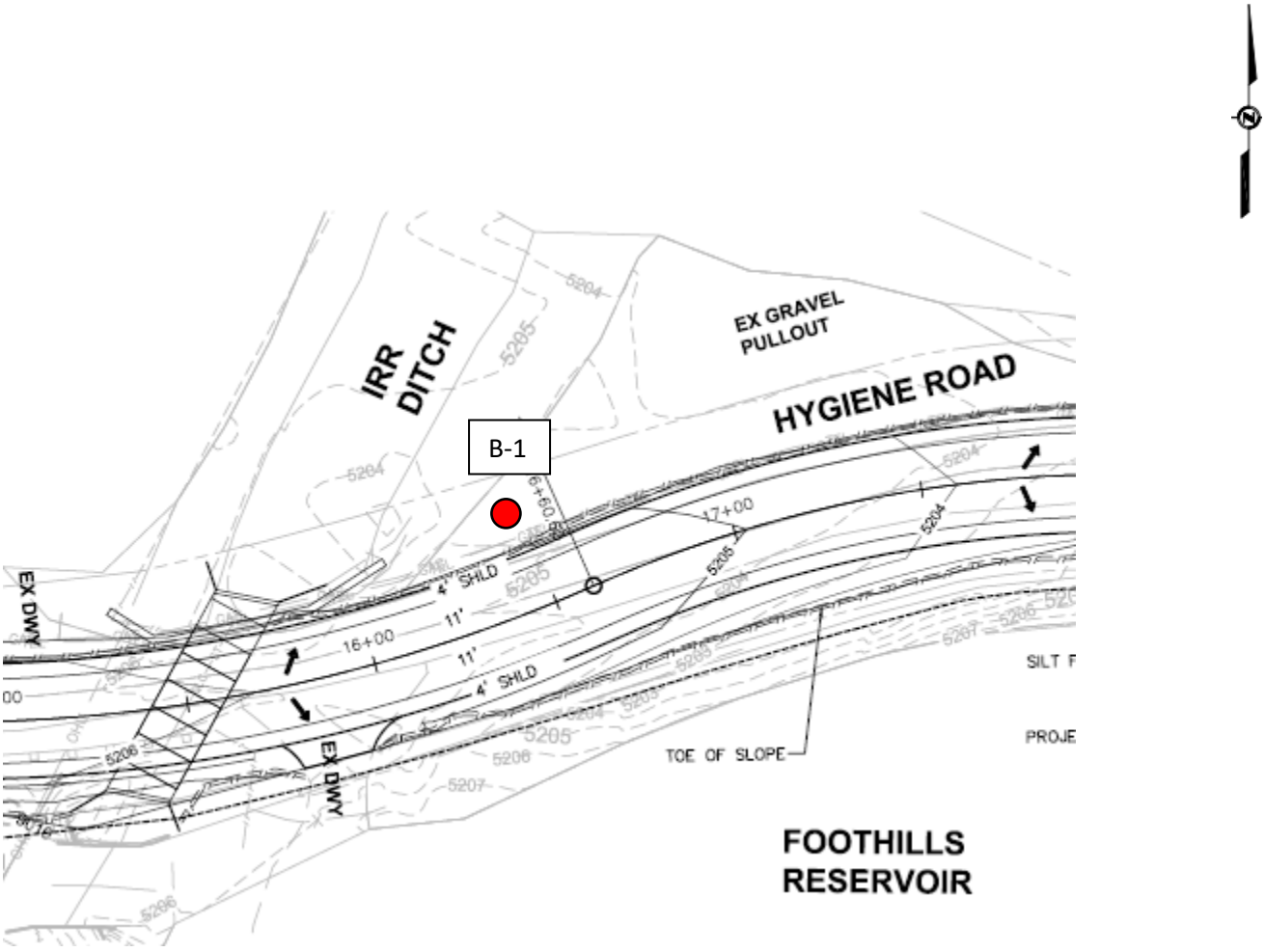
LIMITATIONS

The analyses and recommendations presented in this report are based upon our data obtained from the borings at the indicated locations, field observations, laboratory testing, our understanding of the proposed construction and other information discussed in this report. It is possible that subsurface conditions may vary between or beyond the points explored. The nature and extent of such variations may not become evident until construction. If variations appear, we should be contacted immediately so we can review our report in light of the variations and provide supplemental recommendations as necessary. We should also review the report if the scope of the proposed construction, including the proposed loads, finished elevations or structure locations, change from those described in this report. The conclusions and recommendations contained in this report shall not be considered valid unless Martinez Associates reviews the changes and either verifies or modifies the conclusions of this report in writing.

We have prepared this report for the exclusive use of Atkins Global for the proposed culvert in Hygiene, Colorado. The report was prepared in substantial accordance with the generally accepted standards of practice for geotechnical engineering as exist in the site area at the time of our investigation. No warranties, express or implied, are intended or made. The recommendations in this report are based on the assumption that Martinez Associates will conduct an adequate program of construction testing and observation to evaluate compliance with our recommendations.

Adequate testing and observation are essential to successful and economical completion of a construction project. Testing and observation allow us to verify that our recommendations are being followed. They also make it possible to identify varied conditions that require us to modify our recommendations. Construction testing and observation should be scheduled in advance so that our personnel can plan to be available for the work. It is also desirable that we receive a set of project plans and specifications at the time our work is first scheduled.

Martinez
Associates
Geotechnical Engineering Services



Approximate Boring Location

Project No. 22-0228	Figure 1 Boring Location Plan

APPENDIX A- TEST BORING REPORT

Martinez Associates — TEST BORING REPORT

Boring No. B-1
Sheet No. 1 of 1

Project: Hygiene Road
Client: Atkins Global
Contractor:

File No.	22-0228
Start:	2/2/23
Finish:	2/2/23
Driller:	Custom Auger Drilling
MA Rep.:	Felix Diaz
Elevation:	
Datum:	
Location:	

	Casing	Sampler	Barrel
Type		Modified California	
Inside Diameter (in.)		2 inches	
Hammer Weight (lb.)		140 pounds	
Hammer Fall (in.)		30 inches	

Drilling Equipment and Procedures
Rig Make & Model: CME-45
Drill Method: Solid Stem Auger
Bit Type: Casing:
Hoist/Hammer: Auto-hammer

Water Level Data

Date	Time	Elapsed Time	Bottom of Casing	Bottom of Hole	Depth to Water
2/2/23					13.5

Sample Identification

CS Continuous Sampler — C California Barrel, R Core
S Split Spoon — B Bulk
G Geoprobe — T Thin Wall Tube

Notes

Visual-Manual Identification and Description

Soil: GROUP NAME, density/consistency, color, max. particle size, structure, moisture, optional descriptions, odor

Depth (ft.)	Elevation	Blows/6 in.	Stratigraphy (USCS)	Visual-Manual Identification and Description	Water Level	Laboratory Results: M/c (%)	Gravel(%)	Sand(%)	Fines(%)	LL(%)	PI(%)	Well
0				sandy CLAY, soft to stiff, brown to reddish brown, moist to wet, calcareous								
5		5 7				14.0			54.9	31	17	
10		5 6				15.2						
15		1 2			▼	21.6						
20		6 9				17.6			71.8	39	22	
				22 ft.								
				CLAYSTONE, medium hard, dark brown, wet								
25		10 20				10.1						
				25 ft.								
30												

Maximum particle size is determined by direct observation within the limitations of the sampler.
NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Martinez Associates, Inc.

APPENDIX B- SUMMARY OF LABORATORY TESTS

Martinez Associates
14025 W. 66th Avenue
Arvada, Colorado 80004
Phone: (303) 459-2216
Fax: (303) 482-2230

Martinez Associates

One Dimensional Swell/Consolidation (ASTM D 4546)

(Denver Area Swell/Consolidation Test)

Client Project No.: | Proj. Name: Hygiene Rd | Sampled By: F. Diaz
Martinez Job No.: 22-0228 | Lab Tech: RSK | Test Date: 2/10/23 | Sample Date: 2/3/23
Sample ID: 11769 | Reviewed By: K. Runner
Sample Location: B-1 @ 4'
Soil Description:
USCS:

Sample Data:

Ring No:	A	Dish No:	SUN
Ring Mass (g):	237.6	Dish Mass (g):	8.2
Sample Height (in):	0.75	Swell Machine #:	1

Pre-test Sample		Post-test Sample	
Ring + Sample (g):	313.4	Ring + Sample (g):	315.0
Dish wt:	8.2	Dish wt:	8.1
Wet wt (g):	347.6	Wet wt (g):	84.9
Dry wt (g):	306.0	Dry wt (g):	73.3

Results:

Pre-test Sample		Post-test Sample	
Moisture Content:	14.0%	Moisture Content:	17.9%
Wet Density (pcf):	130.8	Wet Density (pcf):	136.2
Dry Density (pcf):	114.8	Dry Density (pcf):	115.5

Swell/Consolidation

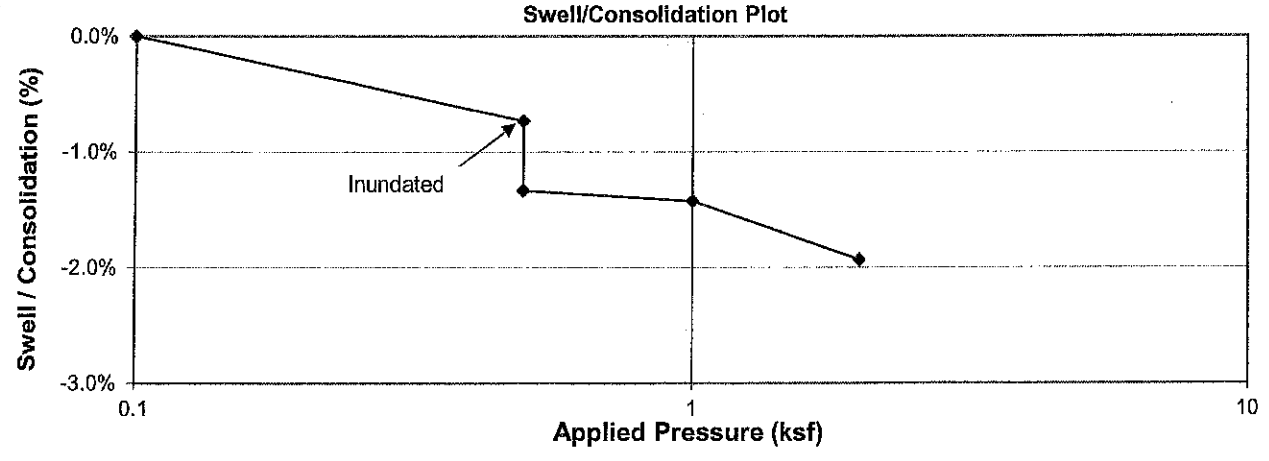
Load (ksf):	0.1	0.5	Add Water	0.5	1	2			
Correction (x 10-4):	0	16		16	38	89			
Dial Reading (x 10-4):	5649	5578		5533	5504	5415			
Swell/Consolidation %:	**0.0%**	**-0.7%**		**-1.3%**	**-1.4%**	**-1.9%**			

Results:

Settlement Upon Wetting @ 500 psf: **-0.6%**

Swell Pressure (psf): **N/A**

Tested By: R. S. Kay
Checked By K. Runner



Martinez Associates

LABORATORY TEST SUMMARY

TABLE I

PROJECT - Hygiene Road
PROJECT NO. 22-0228

Sample Location		Sample Moisture (%)	Dry Density (pcf)	Gravel (%)	Sand (%)	-200 (%)	Atterberg Limits		Unconfined Compressive Strength (psf)	Swell/Settlement		Water Soluble Sulfates (%)	pH	Soil Resistivity ohm.cm	Soil or Rock Description- USCS and AASHTO
Boring No.	Depth (feet)						LL (%)	PI (%)		%	Pressure (psf)				
B-1	4	14.0	115.1			54.9	31	17		-0.6	-				CL A-6(6)
	9	15.2	114.3									<0.001			
	14	21.6	114.4												
	19	17.6	120.5			71.8	39	22							CL A-6(14)
	24	10.1	126.4												