September 19, 2023

Pueblo County
33601 United Avenue, Room 204
Pueblo, Colorado 81001

Attn: A. Karim Ayoub, PMP

Subject: Gravel Pit Investigation
Everhart Pit
Pueblo, Colorado
CTL|T Project No. SC03657-125

As requested, we investigated subsurface conditions at the Everhart Pit site located on Siloam Road in Pueblo, Colorado (Fig. 1). Our purpose was to determine the depth and thickness of the gravel deposit and evaluate the possibility that mining of the gravel could expose the groundwater.

SITE CONDITIONS

The site of the Everhart Pit is located approximately 0.7 miles west of Siloam Road and Pope Valley Ranch Road in Pueblo, Colorado. The site is bordered by undeveloped land. The floor of the pit is generally level and contains a stockpile of material in the southwest. Unmined areas containing grass and shrubs are present on the eastern portion of the site. The western and northern portions of the site slope to the floor of the pit.

INVESTIGATION

Subsurface conditions were explored by drilling five exploratory borings within the Everhart Pit (Fig. 1). The borings were advanced to depths between 15.5 and 39 feet using a 4-inch diameter, continuous-flight auger and a truck-mounted drill rig. Practical auger drilling refusal was encountered on very hard bedrock at depths of 15.5 feet, 39 feet, and 16 feet in TH-1, TH-2, and TH-5, respectively. Our field representative observed drilling, logged the conditions encountered in the borings, and obtained samples. Graphical logs of the borings, including the results of field penetration resistance tests and some laboratory test data, are presented in the Summary Logs of Exploratory Borings (Fig. 2).

Soil samples obtained during drilling were returned to our laboratory and visually classified. Laboratory testing was then assigned and included moisture content and gradation. Results of the laboratory tests are presented in Figs. 3 through 8 and are summarized in Table 1.

Groundwater was not encountered in our borings. Water levels should be expected to fluctuate in response to seasonal precipitation and irrigation of landscaping. Figure 2 presents the graphical log of the conditions found.

SUBSURFACE CONDITIONS

Surface and subsurface soils found in our borings consist of predominately sand with varying amounts of gravel and localized clay soils, underlain by claystone and shale bedrock. The clay soils were encountered in TH-2. This boring is located northeast of the pit floor, and was at a higher elevation than the floor.

Natural Soils

The Everhart Pit contains silty sand with varying amounts of gravel, and clayey sand with varying amounts of gravel extending to depths of 12 to 31 feet. The sand soils were very loose to very dense based on the results of field penetration resistance tests. Five samples of the silty sand soils tested in our laboratory contained 17 to 36 percent silt and clay-sized particles (passing the No. 200 sieve), and up to 19 percent gravel sized particles (passing the 3-inch sieve and retained on the No. 4 sieve). One sample of the clayey sand soils tested in our laboratory contained 44 percent silt and clay-sized particles and 5 percent gravel.

Bedrock

Claystone and shale bedrock were encountered underlying the sand soils and were very hard based on the results of field penetration resistance tests.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience.

LIMITATIONS

Our borings were located to obtain a reasonably accurate indication of subsurface conditions. The borings are representative of conditions encountered only at the location drilled. Subsurface variations not indicated by our borings are possible.

We believe this investigation was conducted with that level of skill and care normally used by geotechnical engineers practicing under similar conditions. No warranty, express or implied, is made.

If we can be of further service in discussing the contents of this report or in the analysis of the influence of the subsurface conditions on the design of the project, please call.

Respectfully Submitted,

CTL|THOMPSON, INC.

Dennis E. Pelham, E.I.
Staff Engineer

Reviewed By,

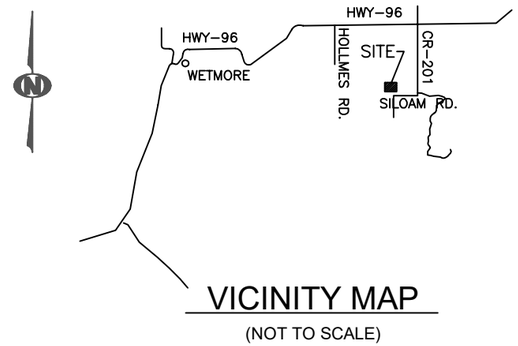
COLORADO LICENSED JEFFREY MARK JONES 47539 PROFESSIONAL ENGINEER 9/19/23

Jeffrey M. Jones, P.E.
Associate Engineer

DEP:JMJ:cw

Attachments: Fig. 1 – Location of Exploratory Borings
Fig. 2 – Summary Log of Exploratory Borings
Figs. 3 through 8 – Gradation Test Results
Table 1 – Summary of Laboratory Test Results

Via email: karima@pueblocounty.us

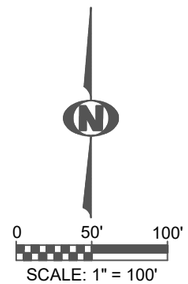


VICINITY MAP

(NOT TO SCALE)

LEGEND:

TH-1 ● APPROXIMATE LOCATION OF EXPLORATORY BORING.

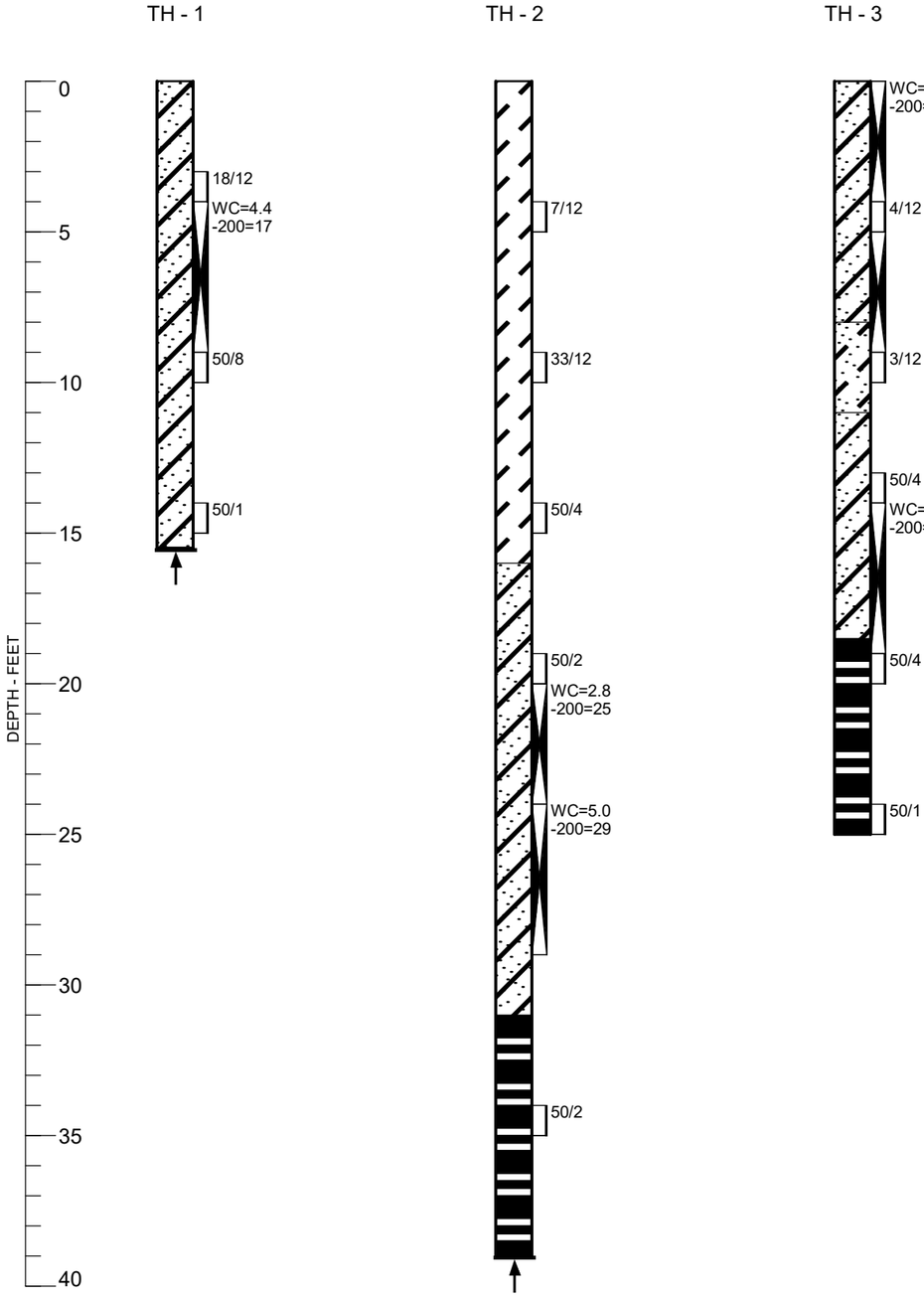


SCALE: 1" = 100'

PUEBLO COUNTY
EVERHART PIT
CTL|T PROJECT NO. SC03657-125

Location of Exploratory Borings

FIG. 1



LEGEND:

- CLAY, SANDY, MEDIUM STIFF, SLIGHTLY MOIST, PINK (CL).
- SAND, CLAYEY TO VERY CLAYEY, SLIGHTLY GRAVELLY, LOOSE TO MEDIUM DENSE, SLIGHTLY MOIST, PINK (SC).
- SAND, SILTY, SLIGHTLY GRAVELLY TO GRAVELLY, MEDIUM DENSE, MOIST, BROWN, PINK (SM).
- BEDROCK, CLAYSTONE, SLIGHTLY SANDY, VERY HARD, SLIGHTLY MOIST, BROWN.
- SHALE, HARD, SLIGHTLY MOIST, BROWN.
- DRIVE SAMPLE. THE SYMBOL 7/12 INDICATES 7 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- INDICATES BULK SAMPLE OBTAINED FROM AUGER CUTTINGS.
- INDICATES DRILL RIG REFUSAL.

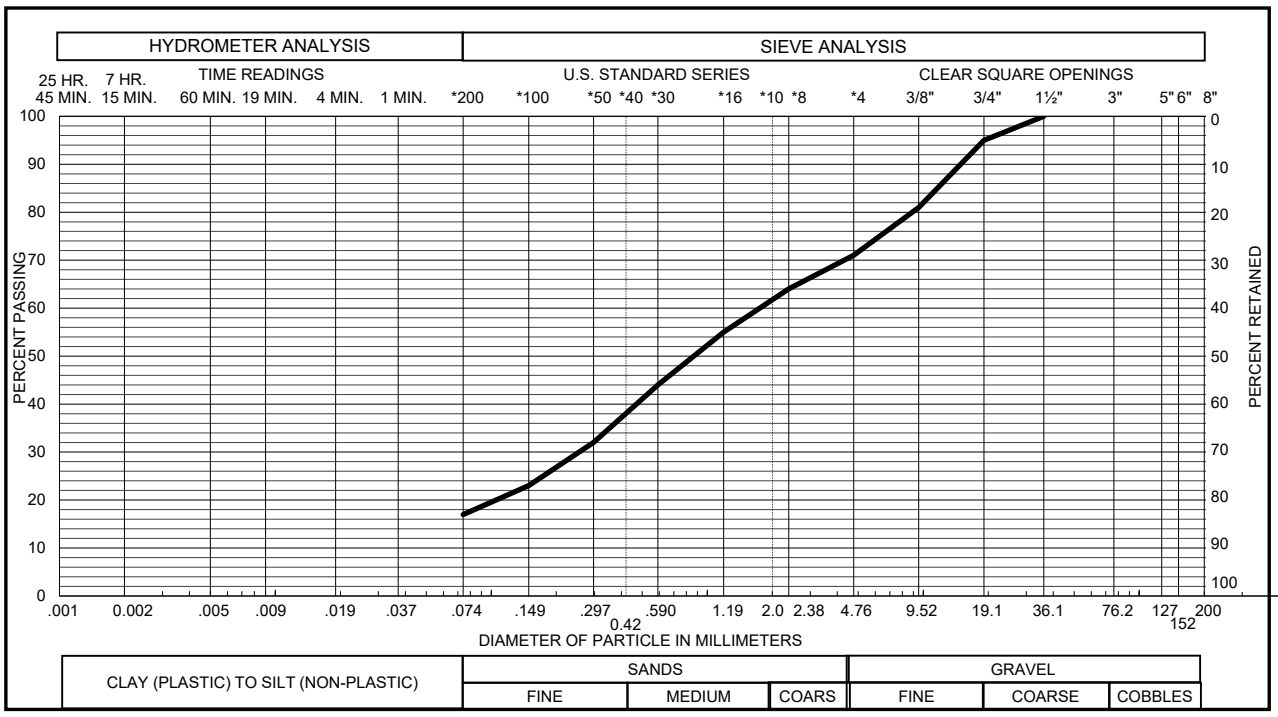
NOTES:

1. THE BORINGS WERE DRILLED AUGUST 31, 2023 USING A 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A TRUCK-MOUNTED CME-45 DRILL RIG.
2. GROUNDWATER WAS NOT ENCOUNTERED DURING THIS INVESTIGATION.
3. WC - INDICATES MOISTURE CONTENT. (%)
   -200 - INDICATES PASSING NO. 200 SIEVE. (%)
4. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS, AND CONCLUSIONS AS CONTAINED IN THIS REPORT.

PUEBLO COUNTY
EVERHART PIT
CTL|T PROJECT NO. SC03657-125

Summary Logs of Exploratory Borings

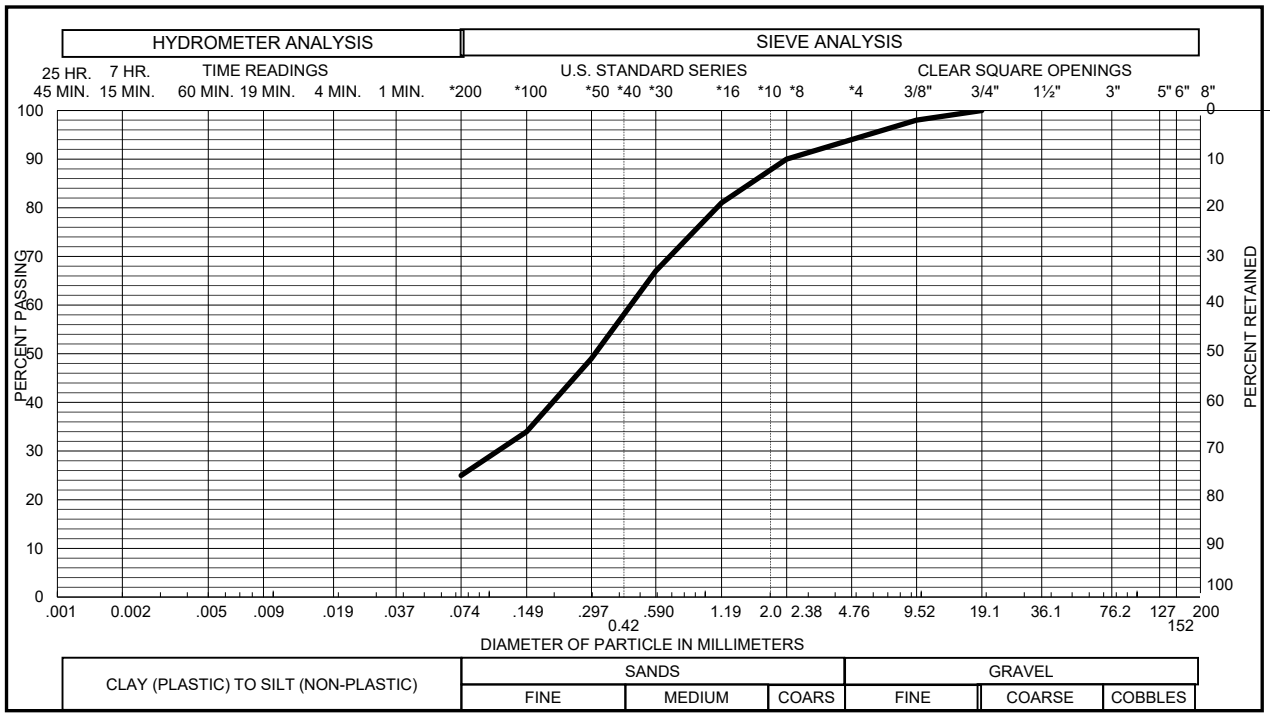
FIG. 2



Sample of SAND, SILTY, GRAVELLY (SM) GRAVEL 29 % SAND 54 %

From TH - 1 AT 4-9 FEET SILT & CLAY 17 % LIQUID LIMIT

PLASTICITY INDEX



Sample of SAND, SILTY, SLIGHTLY GRAVELLY (SM) GRAVEL 6 % SAND 69 %

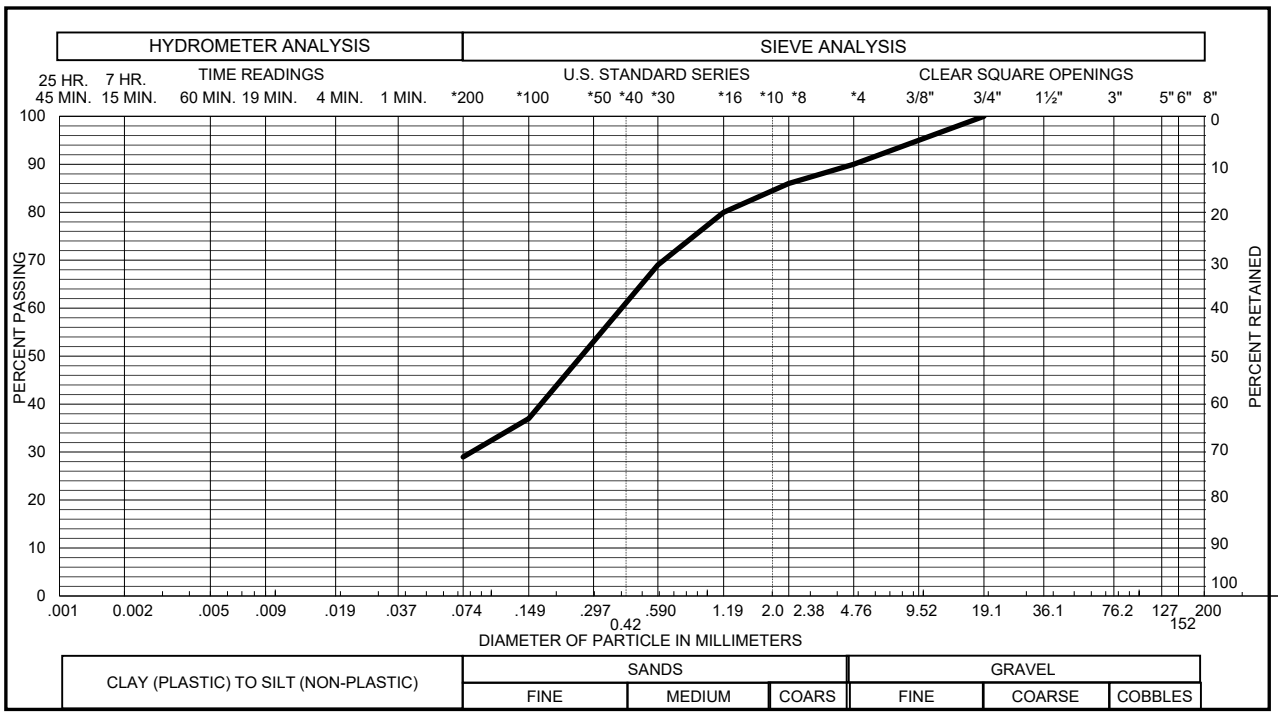
From TH - 2 AT 20-24 FEET SILT & CLAY 25 % LIQUID LIMIT

PLASTICITY INDEX

PUEBLO COUNTY
EVERHART PIT
CTL|T PROJECT NO. SC03657-125

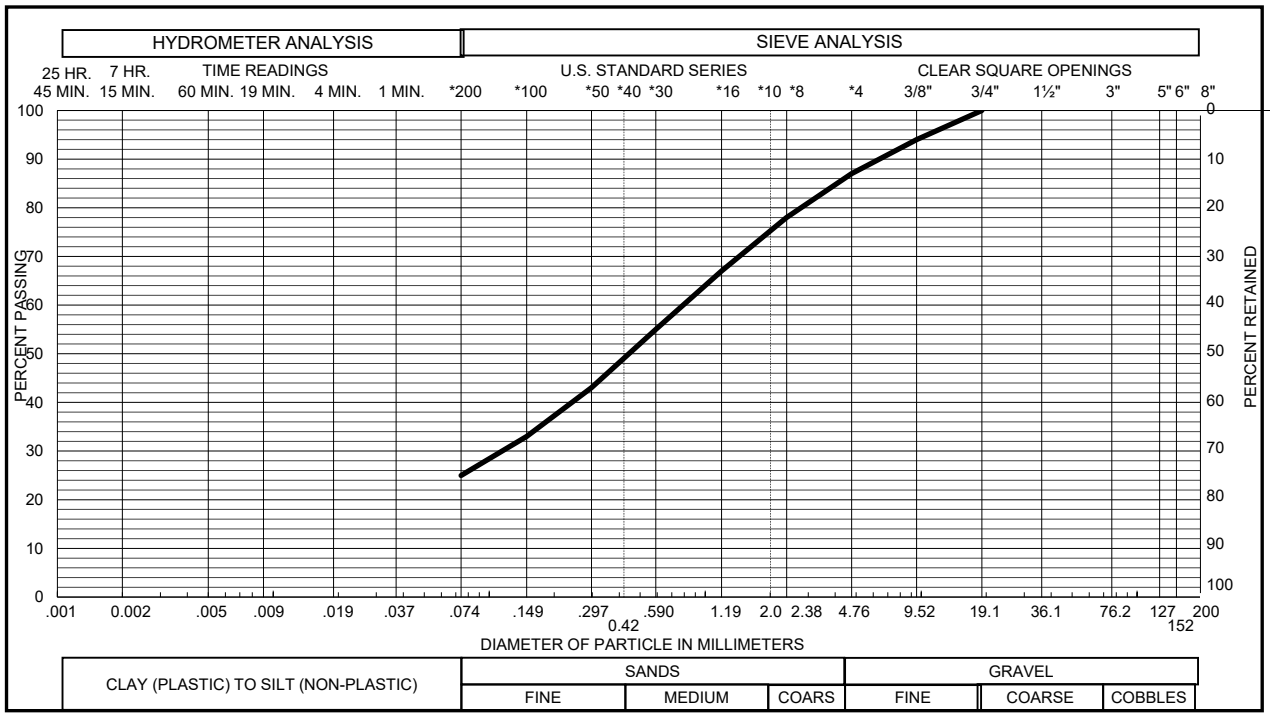
Gradation Test Results

FIG. 3



Sample of SAND, SILTY, SLIGHTLY GRAVELLY (SM)
From TH - 2 AT 24-29 FEET

GRAVEL 10 % SAND 61 %
SILT & CLAY 29 % LIQUID LIMIT
PLASTICITY INDEX



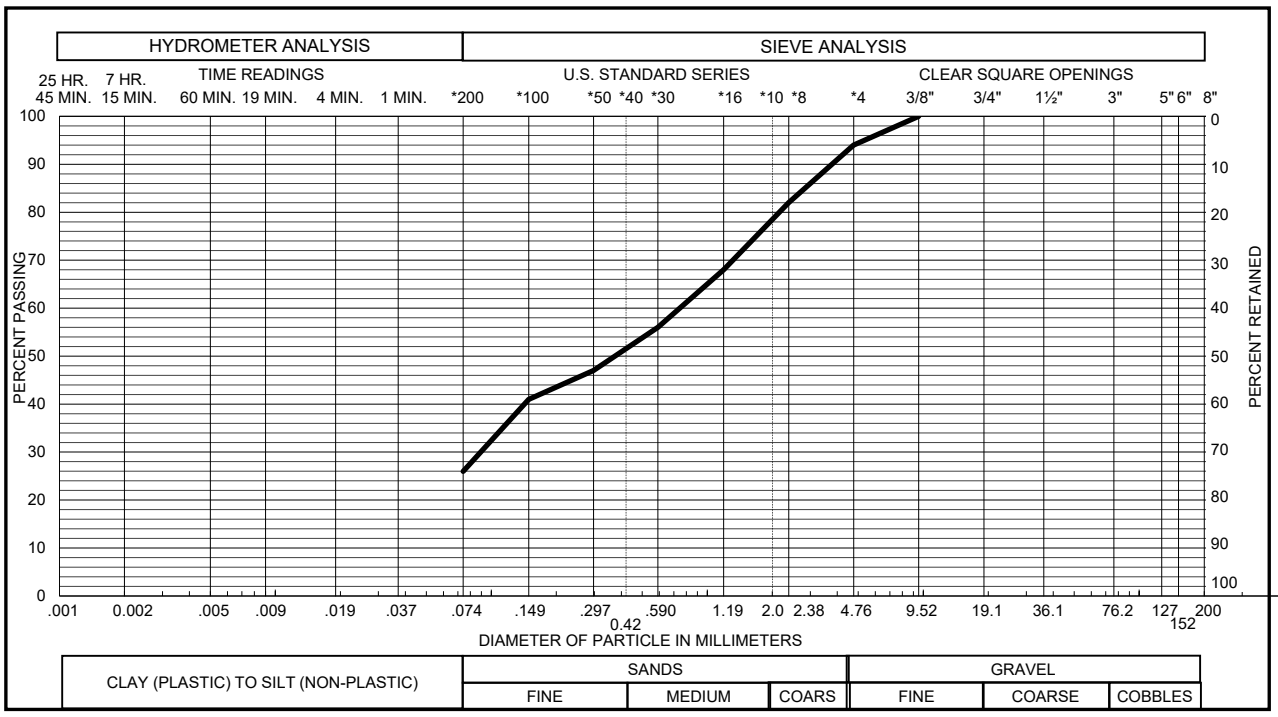
Sample of SAND, SILTY, GRAVELLY (SM)
From TH - 3 AT 0-9 FEET

GRAVEL 13 % SAND 62 %
SILT & CLAY 25 % LIQUID LIMIT
PLASTICITY INDEX

PUEBLO COUNTY
EVERHART PIT
CTL|T PROJECT NO. SC03657-125

Gradation Test Results

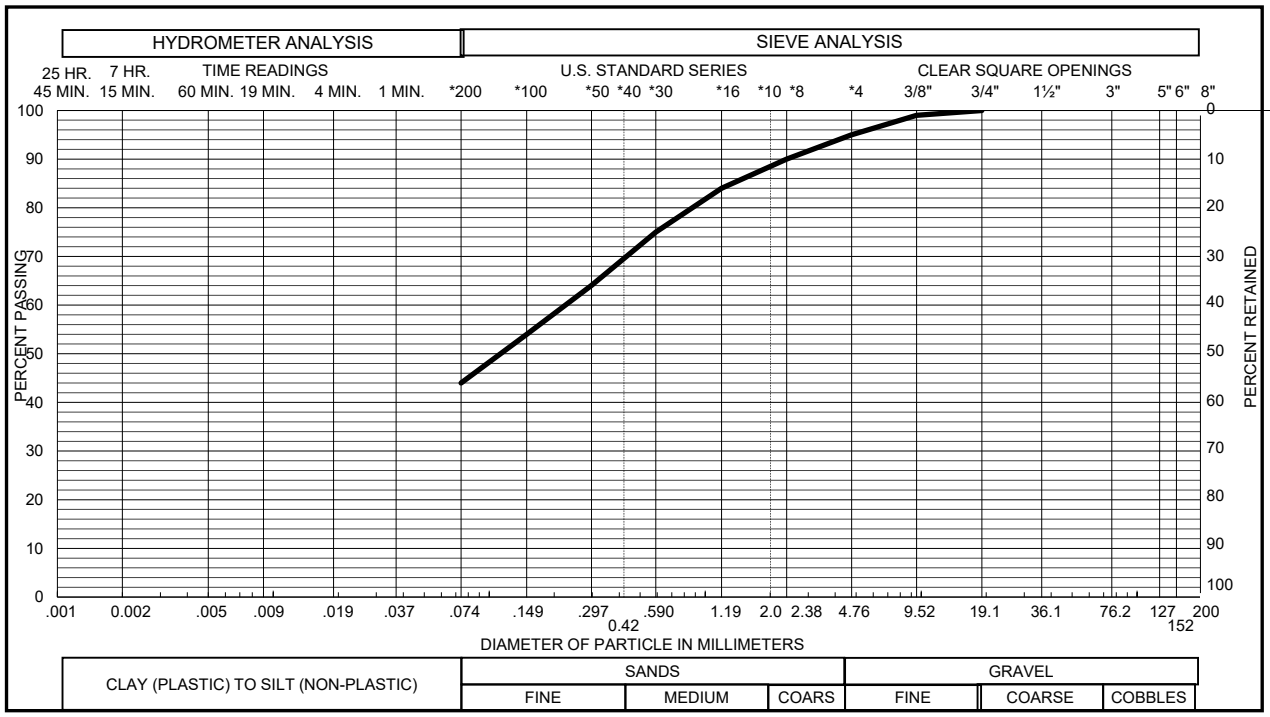
FIG. 4



Sample of SAND, VERY SILTY, SLIGHTLY GRAVELLY (SM) GRAVEL 6 % SAND 68 %

From TH - 3 AT 14-19 FEET SILT & CLAY 26 % LIQUID LIMIT

PLASTICITY INDEX



Sample of SAND, VERY CLAYEY, SLIGHTLY GRAVELLY (SC) GRAVEL 5 % SAND 51 %

From TH - 4 AT 0-9 FEET SILT & CLAY 44 % LIQUID LIMIT

PLASTICITY INDEX

PUEBLO COUNTY
EVERHART PIT
CTL|T PROJECT NO. SC03657-125

Gradation Test Results

FIG. 5

TABLE 1

SUMMARY OF LABORATORY TESTING
CTL|T PROJECT NO. SC03657-125

BORING	DEPTH (FEET)	MOISTURE CONTENT (%)	SWELL TEST RESULTS*			PASSING NO. 200 SIEVE (%)	WATER SOLUBLE SULFATES (%)	DESCRIPTION
			SWELL (%)	APPLIED PRESSURE (PSF)	SWELL PRESSURE (PSF)			
TH-1	4-9	4.4				17		SAND, SILTY, GRAVELLY (SM)
TH-2	20-24	2.8				25		SAND, SILTY, SLIGHTLY GRAVELLY (SM)
TH-2	24-29	5.0				29		SAND, SILTY, SLIGHTLY GRAVELLY (SM)
TH-3	0-9	6.2				25		SAND, SILTY, GRAVELLY (SM)
TH-3	14-19	5.9				36		SAND, VERY SILTY, SLIGHTLY GRAVELLY (SM)
TH-4	0-9	14.9				44		SAND, VERY CLAYEY, SLIGHTLY GRAVELLY (SC)

* SWELL MEASURED UNDER ESTIMATED IN-SITU OVERBURDEN PRESSURE.
NEGATIVE VALUE INDICATES COMPRESSION.