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GEOTECHNICAL ENGINEERING SERVICES REPORT
JOB NO. 1-80608
CACTUS PONDS DRAINAGE FACILITY
CHOLLA AND NOPAL DETENTION PONDS
RIO RANCHO, NEW MEXICO

PREPARED FOR:

STANTEC CONSULTING SERVICES, INC.

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August 22, 2018
Job No. 1-80608

Stantec Consulting Services, Inc.
6100 Seagull Street NE, Suite 102B
Albuquerque, New Mexico 87109

ATTN: Charles M. Easterling, P.E.

RE: Geotechnical Engineering Services Report
Cactus Ponds Drainage Facility
Cholla and Nopal Detention Ponds
Rio Rancho, New Mexico

Dear Mr. Easterling:

Submitted herein is the Geotechnical Engineering Services Report for the above referenced project. The report contains the results of our field investigation and laboratory testing as well as embankment foundation and construction, slope stability, excavation and site grading recommendations.

It has been a pleasure to serve you on this project. If you should have any questions, please contact our Albuquerque office.

Respectfully submitted:
GEO-TEST, INC.

Patrick R. Whorton, E.I.

Reviewed by:

Robert D Booth, P.E.

ROBERT D. BOOTH
NEW MEXICO
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LICENSED PROFESSIONAL ENGINEER

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INTRODUCTION

This report presents the results of geotechnical engineering services performed by this firm for the proposed new Cactus Ponds Drainage Facility to be constructed in Rio Rancho, New Mexico.

The objectives of this investigation were to:

1) Evaluate the nature and engineering properties of the soils underlying the pond sites.

2) Provide recommendations for the design and construction of the detention ponds including embankment foundation preparation and construction, considering slope stability, settlement, seepage and erodibility.

The investigation includes subsurface exploration, representative soil sampling, laboratory testing of the samples, performing an engineering analysis and preparation of this report.

PROPOSED CONSTRUCTION

It is understood that the project consists of drainage improvements to a relatively undeveloped area in northwest Rio Rancho under the jurisdiction of the Southern Sandoval County Arroyo Flood Control Authority (SSCAFCA). The purpose of the project is to reduce stormwater flows produced by Tributary P of the Calabacillas Watershed across Northern Blvd. and to protect residences in the area. The following description and design values for the proposed drainage system were provided by the *Cactus Ponds Schematic Design and PER* prepared by David B. Thompson, P.E. with OCCAM Consulting Engineers, Inc. (now Stantec) for SSCAFCA dated June 8, 2016. The design values contained within this report were used to provide the recommendations contained herein. Should these values or project details vary, this firm should be notified as amendments to the recommendations contained in this report may be required.

The project will include the construction of a new earth embankment dam and detention pond referred to as the Cholla Pond located between 14th and 15th Avenues NW, west of 5th Street NW and east of 10th Street NW, see attached Site Location Plan, Figure 1. The Cholla Pond will have a surface area of approximately 5 acres with a maximum holding capacity of 39.2 acre-ft. An earth embankment dam will be constructed along the existing 14 Ave. NW alignment by filling a natural low-lying area. The top of the dam will be established at an elevation of 5788, the existing low point within the dam alignment is 5780 and the maximum water elevation is 5786.9 such that the dam will be constructed no greater than 8 feet above existing elevations and will detain 6.9 feet of water at maximum design capacity. Once the dam is completed, 14th Ave. will retain its original alignment with traffic passing over the top of the dam. Water detained in the pond will discharge through a 54

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inch diameter reinforced concrete pipe (RCP) beneath the dam into a natural water course south of the dam at a design flow rate of 158.6 cubic feet per second. The pond will include a shotcrete emergency spillway. For analysis purposes, a minimum dam width of 30 feet was assumed.

A second detention pond will be constructed which is referred to as the Nopal Pond located south of 12th Avenue NW, west of 5th Street NW and east of 10th Street NW, see attached Site Location Plan, Figure 1. The Nopal Pond will be mostly a cut pond with a maximum 6 foot high embankment along the south side, a surface area of about 1.1 acres and a maximum holding capacity of 7.7 acre-ft. The Nopal Pond will be twelve feet deep with a bottom elevation of 5754, a top elevation of 5766 and a maximum water surface elevation of 5765.2. Water will enter the pond through either two 48 inch culverts or one 60 inch culvert under 12th Ave. NW at a flow rate of 217 cubic feet per second and discharge to a 42 inch storm drain at a flow rate of 143.5 cubic feet per second. The pond will include a shotcrete emergency spillway.

FIELD EXPLORATION

A total of ten (10) exploratory borings were drilled, six (6) at the Cholla Pond site and four (4) at the Nopal Pond site. Borings were drilled to depths between 10 and 20 feet below existing grades. The locations of the borings are shown on the attached Boring Location Map, Figures 2 and 3. During the test drilling, the soils encountered in the borings were continuously examined, visually classified, and logged. The boring logs are presented in a following section of this report. Drilling was accomplished with a truck mounted drill rig using 5.5-inch diameter continuous flight hollow stem auger. Subsurface materials were sampled at five foot intervals or less utilizing an open tube split barrel sampler driven by a standard penetration test hammer. Bulk samples of auger cuttings were also collected.

LABORATORY TESTING

Selected samples were tested in the laboratory to determine certain engineering properties of the soils. Moisture contents were determined to evaluate the various soil deposits with depth. The results of these tests are presented on the boring logs.

Sieve analysis and Atterberg limits tests were performed on selected samples to aid in soil classification. In addition, moisture-density relationship tests were performed on selected bulk samples to determine the optimum moisture content and maximum dry density of onsite soils. Re-molded permeability testing was also performed on selected samples to determine hydraulic conductivity of the compacted soils. The results of these tests are presented in the Summary of Laboratory Results and on the individual test reports presented in a following section of this report.

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SITE CONDITIONS

The Cholla Pond site is located in an undeveloped area populated by native grasses, cacti and medium sized juniper trees. The area in the vicinity of the pond naturally slopes down from both the east and west sides of the pond to a low point at the approximate center of the pond. In addition, the greater area slopes gradually down from north to south. Within the pond area itself there is an elevation change of approximately 15 feet between the far east and west edges of the pond and the approximate center of the pond.

The Nopal Pond site is located to the south of the Cholla Pond site in a more developed area with established residential properties bordering the pond site on all sides. The Nopal site is relatively flat, slopes gradually from north to south and is populated by native grasses, cacti and small juniper trees.

SUBSURFACE SOIL CONDITIONS

As indicated by the exploratory borings, the subsurface profile underlying the Cholla Dam site consists primarily of silty sand and poorly graded sand with silt. However, there are two distinct silty sand formations present. The first, which is found in the upper 8 to 12 feet at boring locations 1, 2 and 3 consists of medium dense non-plastic aeolian (wind) deposited sand. The other formation which consists of dense to very dense silty sand is located beneath the aeolian deposits on the west side of the site but found at the surface on the east side. The denser sand is believed to be an older deposit in which light calcium carbonate cementation (caliche) was observed and extends to the full depths of the borings. Within the Cholla Pond site, loose to medium dense non-plastic silty sand and low plasticity silty, clayey sand was encountered and extended to the full depths explored. At the Nopal Pond site, loose to medium dense poorly graded sand with silt and silty sand was encountered in the upper 10 to 17 feet. Below this layer at a depth of 17 feet below existing grade in boring 8, the very dense lightly cemented silty sand encountered at the Cholla site was encountered and extended to the full depth of the boring.

No free groundwater was encountered in the borings and soil moisture contents were relatively low throughout the extent of the borings.

CONCLUSIONS AND RECOMMENDATIONS

The native soils encountered throughout both of the pond sites investigated are considered suitable for use as structural fill and may be used for the construction of both the Cholla dam and Nopal perimeter embankments.

Although the near surface soils beneath the Cholla Dam site were generally medium dense, these soils were dry and would be likely to experience settlement upon significant moisture increase. Therefore, in order to provide a stable and uniform surface for the construction of the dam, it is recommended that the dam foundation area be overexcavated to such an extent as to provide for a minimum of 3 of properly compacted structural fill

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beneath the dam and principle spillway as measured from the lowest adjacent grade and extending to a minimum distance of 3 feet beyond the perimeter of the dam. Detailed recommendations for Cholla dam design and the required site grading are presented in the following sections of this report.

Near surface soils over most of the Nopal site were also found to be loose and dry in their present condition such that perimeter embankments would likely experience settlement upon significant moisture increase. Therefore, it is recommended that the Nopal perimeter embankments also be overexcavated as recommended for the Cholla dam.

As recommendations for both the Cholla dam and Nopal perimeter embankments regarding foundations and slope stability will be identical, to avoid repetition, both the Cholla dam and Nopal perimeter embankments will be referred to as 'embankments' throughout the remainder of this report.

The native soils encountered at both pond areas may be readily excavated using normal earthmoving equipment and, as previous mentioned, may be reused as structural fill. Cut slopes may be excavated at a maximum temporary slope of 1.5:1 (H:V) and permanent slopes should be graded or created at a maximum 2:1 slope, 3:1 recommended. A discussion of acceptable cut, embankment and temporary slopes is presented in later sections of this report.

EMBANKMENT FOUNDATION

Clearing, grubbing and stripping will be required over the entire embankment foundation areas extending a distance of at least 5 feet horizontally beyond the limits of the embankment. The resulting foundation areas should then be overexcavated to provide for the minimum 3 feet of structural fill beneath the embankment as measured from the lowest adjacent grade. The overexcavation should also extend a minimum of 3 feet laterally from the embankment perimeter. Once the overexcavation has been completed, the native cut surface should be densified by scarifying and moisture conditioning to optimum moisture content or greater to a depth of 5 feet below the bottom of the overexcavation and subjected to a minimum of 20 passes with a heavy (20 ton or greater) vibratory roller. The embankment should then be placed in accordance with the Site Grading section of this report.

EMBANKMENT SETTLEMENT

Total settlement of the embankments is a function of internal embankment settlement and foundation settlement. Maximum foundation settlements are estimated to be on the order of 1½ inches, and internal embankment settlements are estimated to be on the order of 1 inch or less. However, since the vast majority of both foundation and embankment settlements will be elastic and occur during construction, only minor settlement, less than ¾ inch is anticipated upon completion of construction.

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LIQUEFACTION

The soils beneath the embankments will not be saturated and groundwater was not encountered in any of the borings. Accordingly, these soils are not considered susceptible to liquefaction.

CHOLLA DAM PRINCIPAL SPILLWAY

The principal spillway through the Cholla Dam will consist of a 54-inch diameter reinforced concrete pipe that will discharge beyond to toe of the dam and into an existing arroyo that leads south to the Nopal Pond. If the bottom of the pipe is not directly supported by the dam foundation structural fill, as described above, the native soils should be overexcavated to provide for a minimum of 3 feet of compacted structural fill beneath the pipe extending a minimum of 3 feet laterally beyond the pipe. The resulting excavated area should be moistened to the optimum moisture content or above to a minimum depth of 5 feet and subjected to a minimum of 20 passes with a minimum 20 ton vibratory compactor. The surface should then be compacted to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D-1557. The pipe should then be backfilled with structural fill meeting the requirements presented in the Site Grading section of this report.

NOPAL POND PRINCIPAL SPILLWAY

The principal spillway trench to the Nopal Pond should be overexcavated to provide for a minimum of 12 inches of compacted structural fill beneath the pipe and extend a minimum of 3 feet laterally beyond the pipe. The resulting excavated area should be moistened to the optimum moisture content or above to a minimum depth of 5 feet and subjected to a minimum of 20 passes with a minimum 20 ton vibratory compactor. The surface should then be compacted to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D-1557. The pipe should then be backfilled with structural fill meeting the requirements presented in the Site Grading section of this report.

SLOPE STABILITY ANALYSIS

The stability of the embankment slopes was analyzed with the two-dimensional limit equilibrium stability program STABLPRO by Ensoft by Bishop's Method of Slices to develop factors of safety against slip on a circular failure plane for both static and pseudo-static loading conditions. Based on our analysis, it is recommended that embankment and cut slopes be designed using a maximum slope of 2:1 (H:V) or flatter. These recommendations are based on the soil conditions encountered during this investigation and assuming that the embankments will be constructed in conformance with the recommendations presented in the Site Grading section of this report.

It is assumed that the native silty sands encountered will be the primary material utilized for the construction of the embankment slopes. The slope

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stability analysis was conducted using the soil characteristics of the sampled onsite material such that the calculated slope stability applies only to these materials. Should import material be required for embankment construction, the soils should conform to the structural fill requirements presented in the Site Grading section of this report.

Based on mapped acceleration parameters provided by the United States Geological Survey a design spectral response of 0.447 g is appropriate for the for the subject location. A horizontal pseudo-static coefficient of 0.224 g was utilized in this analyses based on the State of New Mexico, Office of the State Engineer, Rules and Regulations Governing Dam Design, Construction and Dam Safety, Section 19.25.12.11, C, 13, (c), (v) which states in part "The pseudo-static coefficient selected for analysis must be at least 50% of the predicted peak bedrock acceleration, but not less than 0.05g".

The results of the static and pseudo-static slope stability analysis for a 10 high embankment constructed as recommended herein are presented below in terms of factors of safety with a factor of 1 being stable, less than 1 unstable, 2 recommended for static conditions and 1.3 recommended for pseudo-static conditions.

Slope (H:V)	Static FS	Pseudo-Static FS
2:1	3.598	1.797
3:1	4.404	1.828
4:1	5.168	1.855
6:1	6.606	1.870

As shown in the table above, all of the embankment slopes listed will have factors of safety well within the recommended factors. Although steeper slopes will be stable, they will also be more susceptible to erosion, wave action or other factors which may compromise stability. Accordingly, it is recommended slopes of 3:1 or flatter be used in the design of the embankments which will provide greater stability. The embankment slopes presented above are also applicable to cut slopes not exceeding a height of 10 feet.

Should alternative embankment configurations be required which do not conform to the embankment dimensions discussed above, this firm should be notified, and additional slope stability analysis can be performed for the embankment design chosen.

ERODIBILITY

Based on laboratory testing, the soils throughout both the Cholla and Nopal sites have similar composition of fine granular sand with negligible organic content and moderate to rapid permeability with an average silt content on the order of 25 percent and an average sand content on the order of 75 percent. As such, a soil erodibility factor of 0.18 was determined for use in design by the Natural Resources Conservation Service method.

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SEEPAGE AND INTERNAL DRAINAGE

The project consists of flood control structures to be constructed on normally dry water courses. Maximum storm water detention time is 24 hours or less. Based upon the results of the laboratory tests, this is not nearly enough time to develop steady state seepage. Accordingly, seepage analysis and internal drainage design is not considered necessary. In addition, filter/drain material around the principal spillway pipes to control seepage is not required provided the embankment fill is carefully placed as recommended in the Site Grading section of this report.

SITE GRADING

The following general guidelines should be included in the project construction specifications to provide a basis for quality control during site grading. It is recommended that all structural fill and backfill be placed and compacted under engineering observation and in accordance with the following:

1) Clearing, grubbing and stripping will be required over the entire embankment foundation areas. Stumps, matted roots, or roots larger than 2 inches in diameter should be removed from within 18 inches of the dam foundation area. Stripping and preparation of embankment foundation areas should extend a minimum of 5 feet horizontally beyond embankment limits. Stripping should be achieved only by cutting, i.e., ground depressions or narrow sections of tributary arroyos should not be inadvertently filled during the foundation preparation.

2) After clearing, grubbing and required excavations, the existing site soils throughout the embankment areas should be overexcavated to such an extent as to provide for at least 3 feet of properly compacted structural fill beneath the embankments and Cholla principle spillway and a minimum of 12 inches of structural fill beneath the Nopal principle spillway pipe. The overexcavation limits should extend laterally a minimum of 3 feet beyond the embankment and pipe perimeters. The soils exposed at the base of the overexcavation should be densified before placement of structural fill.

3) Densification of native soils shall consist of moisture conditioning to the optimum moisture content or above for a minimum depth of 5 feet. This may be accomplished by ponding the excavation and allowing the ponded water to infiltrate the native soils. Once the required moisture content has been achieved to the required depth the entire area to receive structural fill should be subjected to a minimum of 20 passes with a minimum 20 ton (combined static and dynamic) vibratory compactor. The upper 12 inches should then be compacted to a minimum of 95 percent of the maximum dry density at or above the optimum moisture content as determined in accordance with ASTM D-1557.

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4) The results of this investigation indicate that most of the native soils will be suitable for use as structural fill for dam embankments and trench backfill; however, some blending may be required to meet the structural fill specifications below. Should imported fill be required, it should also meet the specifications for structural fill.

5) All structural fill and backfill should be free of vegetation and debris and contain no rocks larger than 3 inches. Gradation of the backfill material, as determined in accordance with ASTM D-422, should be as follows:

Size	Percent Passing
3 inch	100
No. 4	60 - 100
No. 200	20 - 55

6) Fill or backfill, consisting of soil approved by the geotechnical engineer, should be placed in controlled compacted layers not exceeding 8 inches (compacted) with approved compaction equipment. All structural fill material should be blended as necessary to produce a homogeneous embankment. No lifts of high permeability material or material differing substantially from the lift below should be permitted. Sheepsfoot or vibratory sheepsfoot or segmented steel wheel type compactors should be used. If the compactors "walk out" during compaction, or if it is desired to use flat wheel compactors, the upper 1 to 2 inches of the lift should be scarified prior to placing a subsequent lift. The embankment should be raised uniformly. All compaction should be accomplished to a minimum of 95 percent of maximum dry density as determined in accordance with ASTM D-1557. The moisture content of the structural fill during compaction should be at or 3 percent above the optimum moisture content. With any vibratory compactor, vibrations should be controlled or eliminated to avoid damage to adjacent structures or infrastructure.

7) Fill below and around the principal spillway as well as inlet/outlet pipes should be placed and compacted as outlined above. In the zone within 3 feet of the pipe, fill should be placed in maximum 6 inch lifts, moisture conditioned and compacted as outlined above, using manually controlled walk behind rolling compactors, vibratory plate compactors or jumping jacks capable of compacting the soil immediately adjacent to and beneath the haunches of the pipe. Continuous observation and testing should be performed by a representative of the geotechnical engineer during the backfilling process to verify proper placement and compaction around the pipes.

8) Tests for degree of compaction should be determined in accordance with ASTM D-1556 or ASTM D-6938. Continuous, full time observation and field tests should be conducted during fill and backfill placement by a representative of the geotechnical engineer to assist the contractor in evaluating the required degree of compaction. If less than the required compaction is required, additional compaction effort should be made with

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adjustment of the moisture content as necessary until 95 percent compaction is obtained.

EXCAVATIONS

The results of this investigation indicate that the surficial soils can be readily excavated using normal earth moving and excavation equipment. Temporary construction excavations should be maintained at slopes of 1.5:1 (H:V) or flatter. Surcharge loads including construction traffic and excavated spoil materials should be maintained at least 15 feet from the crest of any excavation slope. Surface water should be routed such that it does not flow down the face of the excavation slopes. Where insufficient space exists for open cut excavations, a shoring system will be required. All excavations should comply with all applicable safety regulations.

EARTHWORK FACTORS

Experience dictates shrinkage factors greater than calculated values. Stripping, subgrade preparation, hauling and wind losses, and ground compaction, both in the borrow (reservoir) areas and within the embankment foundation areas are all factors in shrinkage. We recommend using a shrinkage factor on the order of 25 percent.

REVIEW AND INSPECTION

This report has been prepared to aid in the evaluation of this site and to assist in the design of this project. It is recommended that the geotechnical engineer be provided the opportunity to review the final design drawings and specifications in order to determine whether the recommendations in this report are applicable to the final design. Review of the final design drawings and specifications should be noted in writing by the geotechnical engineer.

In order to permit correlation between the conditions encountered during construction and to confirm recommendations presented herein, it is recommended that the geotechnical engineer be retained to perform continuous observations and testing during the earthwork portion of this project. Observation and testing should be performed during construction to confirm that suitable fill soils are placed upon competent materials and properly compacted and foundation elements penetrate the recommended soils.

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CLOSURE

Our conclusions, recommendations and opinions presented herein are:

1) Based upon our evaluation and interpretation of the findings of the field and laboratory program.

2) Based upon an interpolation of soil conditions between and beyond the explorations.

3) Subject to confirmation of the conditions encountered during construction.

4) Based upon the assumption that sufficient observation will be provided during construction.

5) Prepared in accordance with generally accepted professional geotechnical engineering principles and practice.

This report has been prepared for the sole use of Stantec Consulting Services, Inc., specifically to aid in the design of the proposed Cactus Ponds Drainage Facility in Rio Rancho, New Mexico, and not for use by any third parties without consent.

We make no other warranty, either expressed or implied. Any person using this report for bidding or construction purposes should perform such independent investigation as they deem necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project. If conditions encountered during construction appear to be different than indicated by this report, this office should be notified.

All soil samples will be discarded 60 days after the date of this report unless we receive a specific request to retain the samples for a longer period of time.

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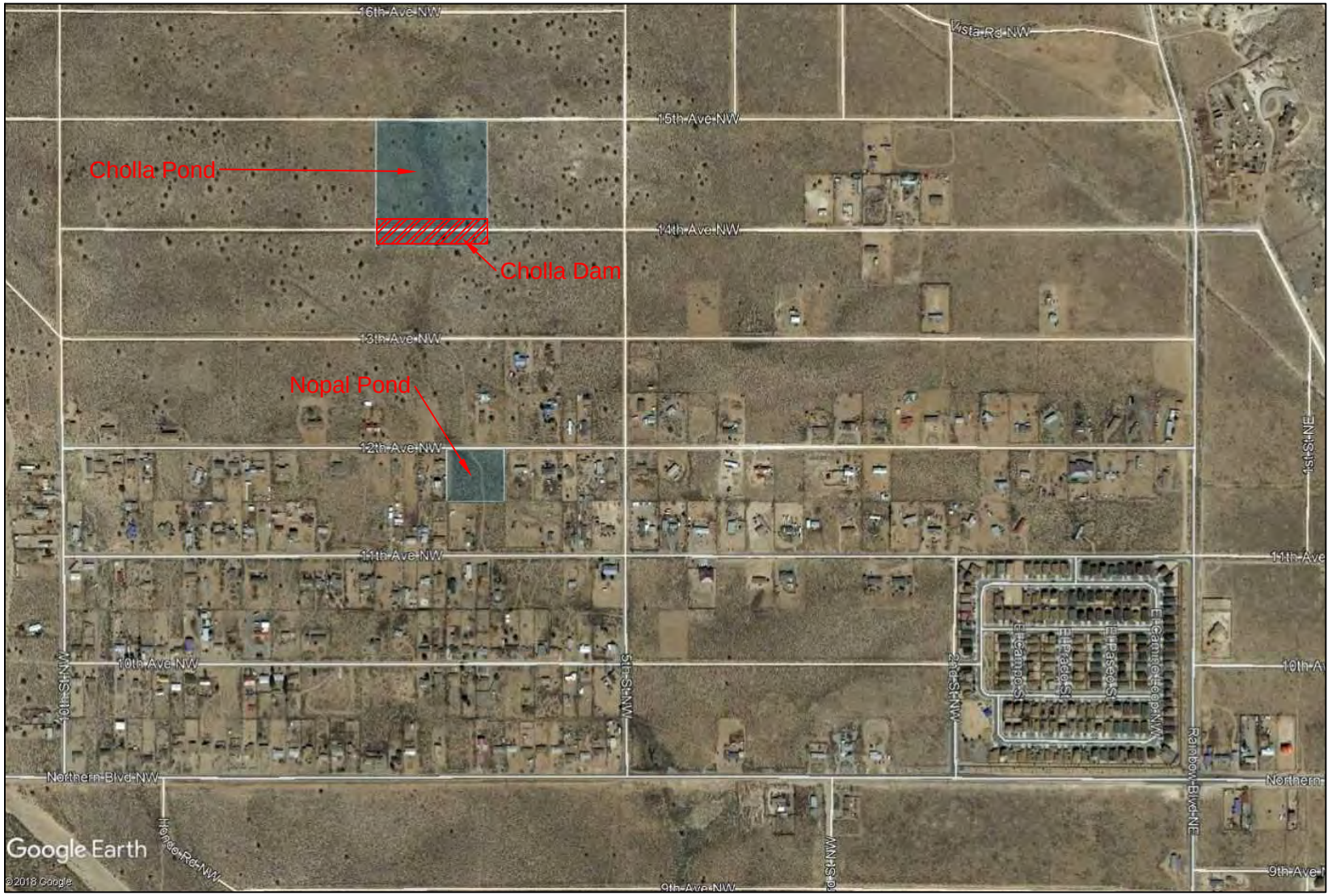
SITE LOCATION MAP



Cactus Ponds Drainage Facility
Rio Rancho, New Mexico
Job No. 1-80608

Figure 1

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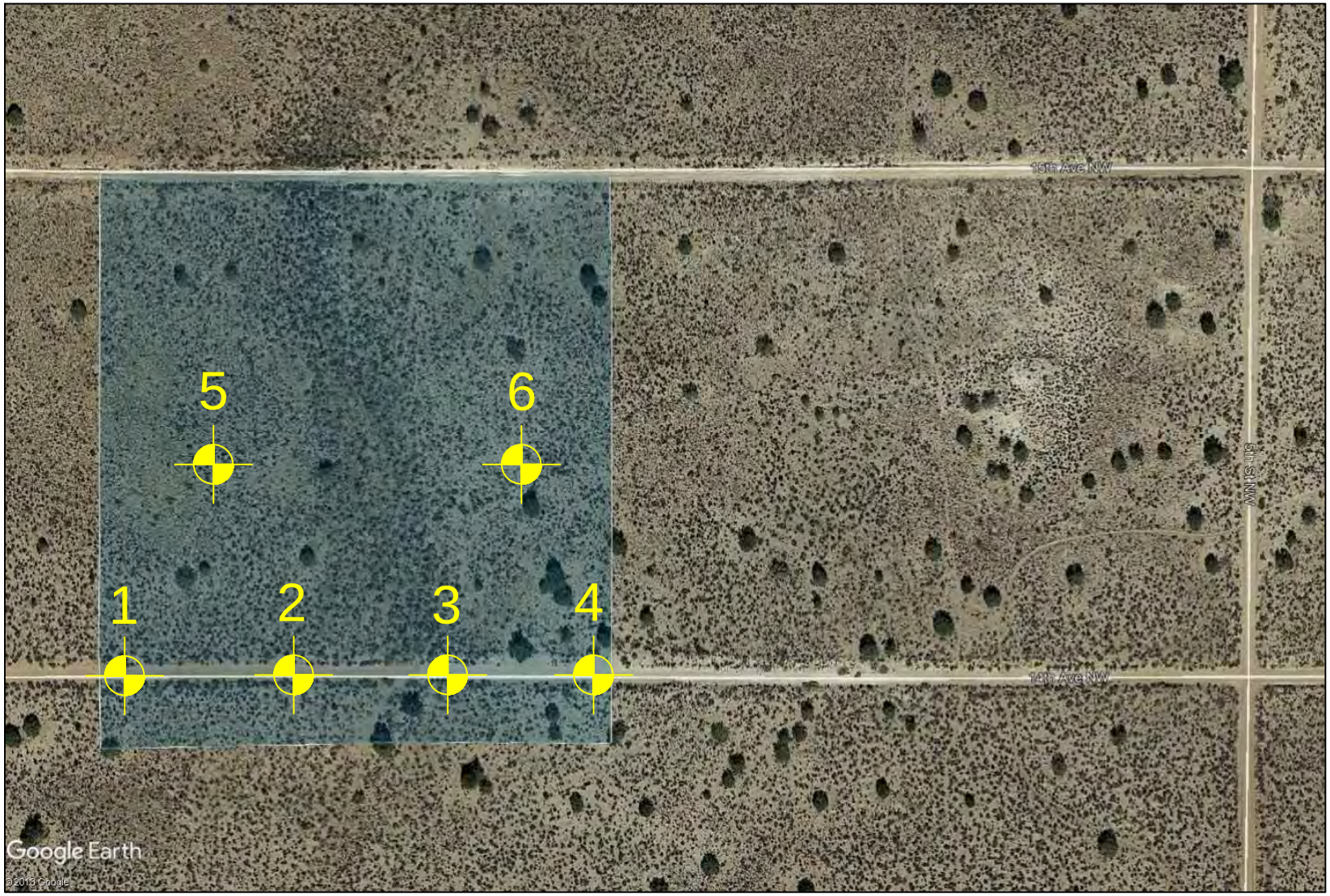
GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

BORING LOCATION MAP



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Rio Rancho, New Mexico
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Cholla Pond
Figure 2

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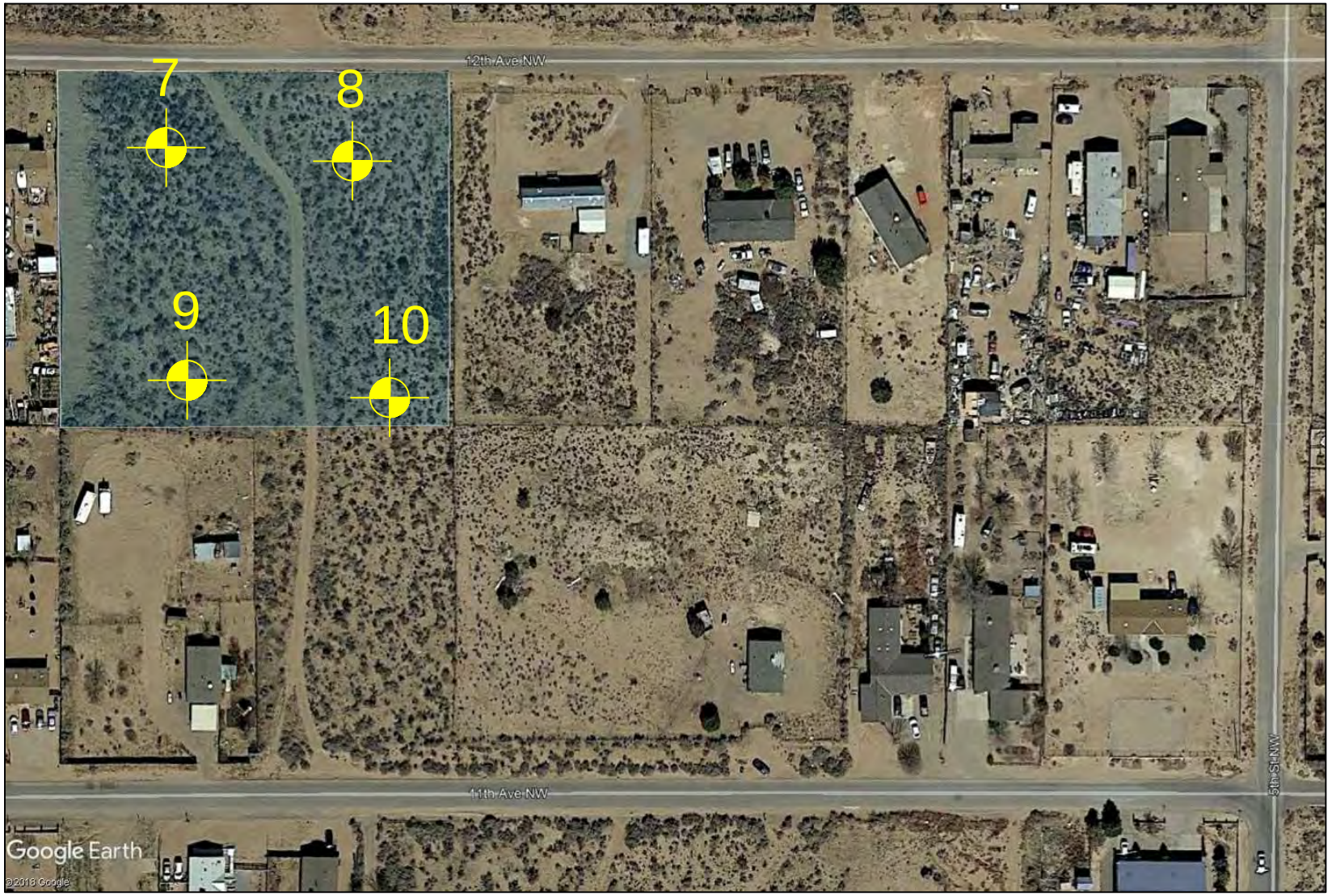
GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

BORING LOCATION MAP



Cactus Ponds Drainage Facility
Rio Rancho, New Mexico
Job No. 1-80608

Nopal Pond
Figure 3

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W E
S

GEO-TEST
GEOTECHNICAL ENGINEERING
AND MATERIAL TESTING

GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/18/2016 Project No: 1-80608
Elevation: 5790.0 Type: 5.5" OD HSA

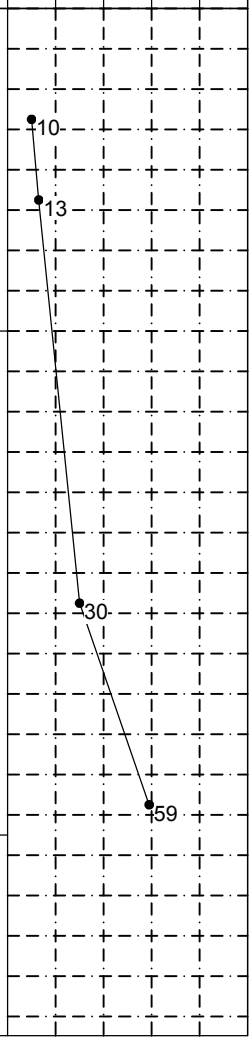
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 1

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
0			SS	5-4-6 10	5		SM	SILTY SAND, non-plastic, medium dense, dry, brown
5			SS	5-7-6 13	5			
10			SS	25-50/6" 50/6"	5		SM	SILTY SAND, non-plastic, very dense to dense, dry, light brown
15			SS	12-14-16 30	4			
20			SS	19-25-34 59	5			Stopped Auger @ 19 feet Stopped Sampler @ 20.5 feet
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

LEGEND

SS - Split Spoon
AC - Auger Cuttings
UD/SL - Undisturbed Sleeve
AMSL - Above Mean Sea Level
CS - Continuous Sampler
UD - Undisturbed
ST - Shelby Tube

Stratification lines represent approximate boundaries between soil types. Transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurments were made.

GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/18/2016 Project No: 1-80608
Elevation: 5784.0 Type: 5.5" OD HSA

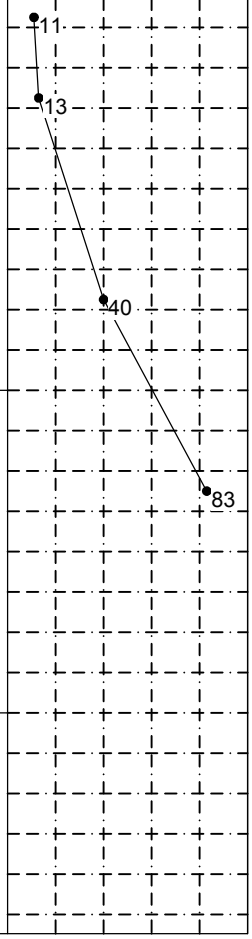
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 2

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
5			SS	4-5-6 11	3		SM	SILTY SAND, non-plastic, medium dense to dense, dry, brown
			SS	7-7-6 13	6			
10			SS	9-16-24 40	3			
15			SS	33-50 83	6		SM	SILTY SAND, non-plastic, very dense, dry, light brown
20			SS	36-50/4" 50/4"	3			Stopped Auger @ 19 feet Sampler Refusal @ 19 feet 10 inches
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

LEGEND

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/18/2016 Project No: 1-80608
Elevation: 5780.0 Type: 5.5" OD HSA

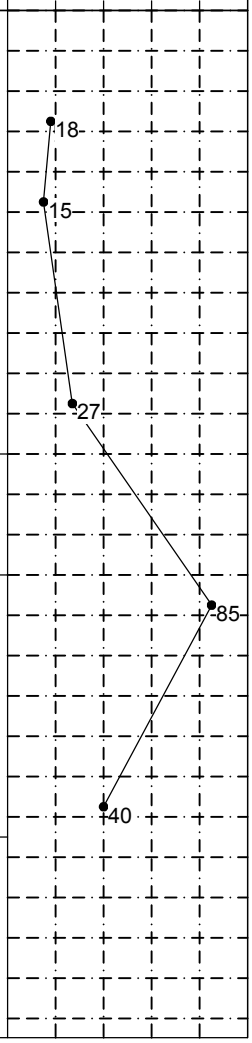
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 3

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
			SS	8-9-9 18	3		SP-SM	POORLY GRADED SAND with SILT, non-plastic, medium dense, dry, brown
5			SS	7-7-8 15	2			
10			SS	7-10-17 27	2			
			AC		6		SC-SM	CEMENTED SILTY SAND (Caliche), low plasticity, dry, white
15			SS	27-40-45 85	3		SM	SILTY SAND, non-plastic, very dense to dense, dry, light brown
20			SS	15-19-21 40	4			
								Stopped Auger @ 19 feet Stopped Sampler @ 20.5 feet
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

LEGEND

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/18/2016 Project No: 1-80608
Elevation: 5794.0 Type: 5.5" OD HSA

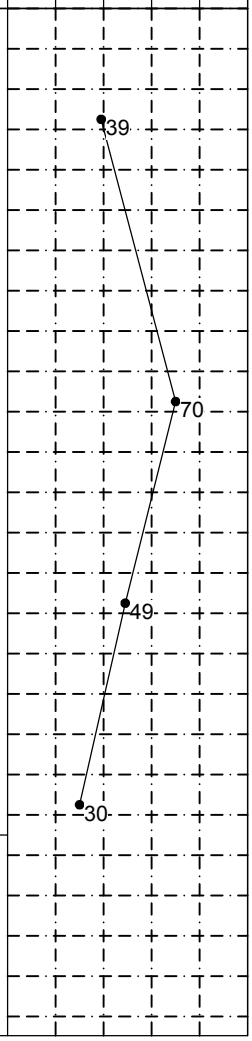
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 4

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
0			SS	15-17-22 39	3			
5			SS	23-50/4" 50/4"	5			
10			SS	16-31-39 70	3		SM	SILTY SAND, non-plastic, dense to very dense, dry, light brown
15			SS	12-23-26 49	4			
20			SS	10-14-16 30	3			
								Stopped Auger @ 19 feet Stopped Sampler @ 20.5 feet
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/18/2016 Project No: 1-80608
Elevation: 5786.0 Type: 5.5" OD HSA

LOG OF TEST BORINGS

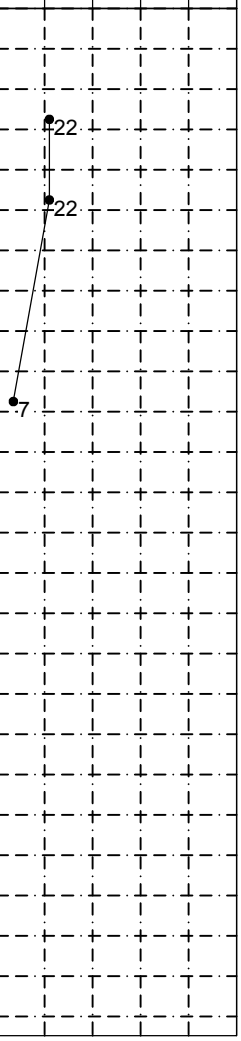
GROUNDWATER DEPTH

NO: 5

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
0			SS	7-10-12 22	5		SC-SM	SILTY, CLAYEY SAND, low plasticity, medium dense, dry, light brown
5			SS	12-11-11 22	5			
							SM	SILTY SAND, non-plastic, loose, dry, brown
10			SS	4-4-3 7	4			
								Stopped Auger @ 9 feet Stopped Sampler @ 10.5 feet
15								
20								
25								

N blows/ft: 20 40 60 80



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

LEGEND

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/18/2016 Project No: 1-80608
Elevation: 5784.0 Type: 5.5" OD HSA

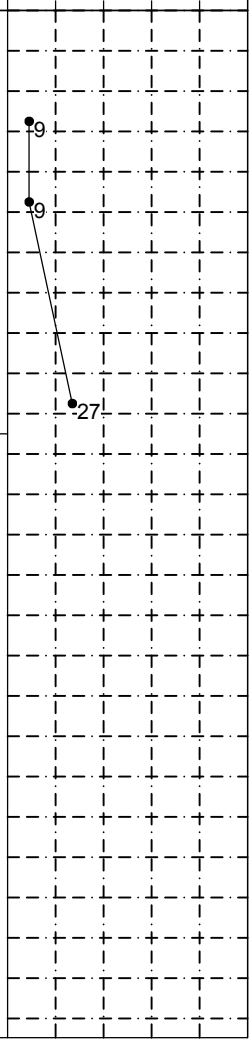
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 6

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
5			SS	3-5-4 9	3		SM	SILTY SAND, non-plastic, loose to medium dense, dry, light brown
			SS	5-4-5 9	2			
10			SS	14-14-13 27	7			
								Stopped Auger @ 9 feet Stopped Sampler @ 10.5 feet
15								
20								
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/19/2018 Project No: 1-80608
Elevation: 5764.0 Type: 5.5" OD HSA

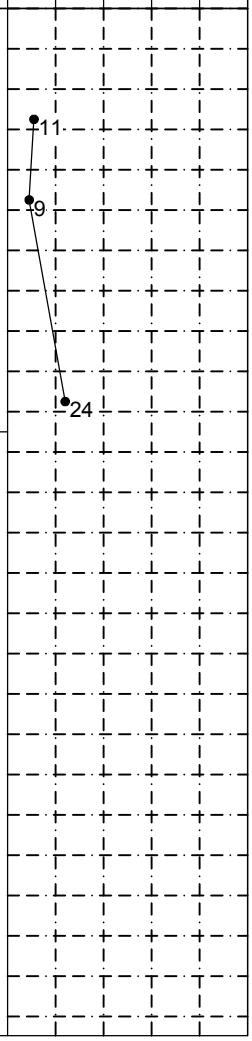
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 7

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
5			SS	5-5-6 11	2		SP-SM	POORLY GRADED SAND with SILT, non-plastic, medium dense to loose, dry, brown
			SS	6-5-4 9	2			
10			SS	7-11-13 24	3			
								Stopped Auger @ 9 feet Stopped Sampler @ 10.5 feet
15								
20								
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

LEGEND

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/19/2018 Project No: 1-80608
Elevation: 5764.0 Type: 5.5" OD HSA

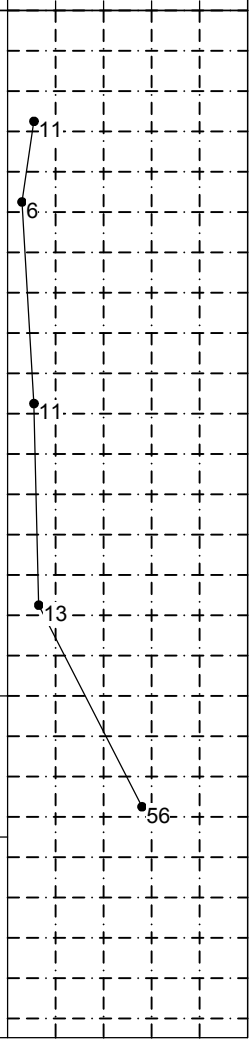
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 8

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
			SS	8-6-5 11	4			
5			SS	4-3-3 6	3			
							SP-SM	POORLY GRADED SAND with SILT, non-plastic, medium dense to loose, dry, brown
10			SS	6-4-7 11	3			
15			SS	8-6-7 13	2			
							SM	SILTY SAND, non-plastic, very dense, dry, light brown/white
20			SS	14-27-29 56	3			
								Stopped Auger @ 19 feet Stopped Sampler @ 20.5 feet
25								



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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/19/2018 Project No: 1-80608
Elevation: 5761.0 Type: 5.5" OD HSA

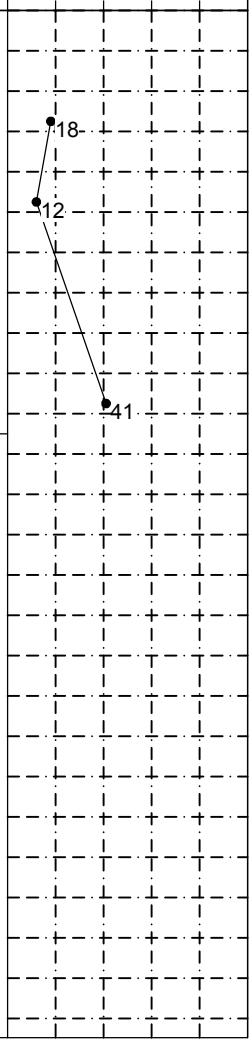
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 9

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
5			SS	9-9-9 18	4			
			SS	7-6-6 12	2		SM	SILTY SAND, non-plastic, medium dense to dense, dry, brown to light brown/white
10			SS	17-20-21 41	3			
								Stopped Auger @ 9 feet Stopped Sampler @ 10.5 feet
15								
20								
25								



LOG OF TEST BORING 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/7/18

LEGEND

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GEO-TEST

Project: Cactus Ponds Drainage Facility
Date: 07/19/2018 Project No: 1-80608
Elevation: 5761.0 Type: 5.5" OD HSA

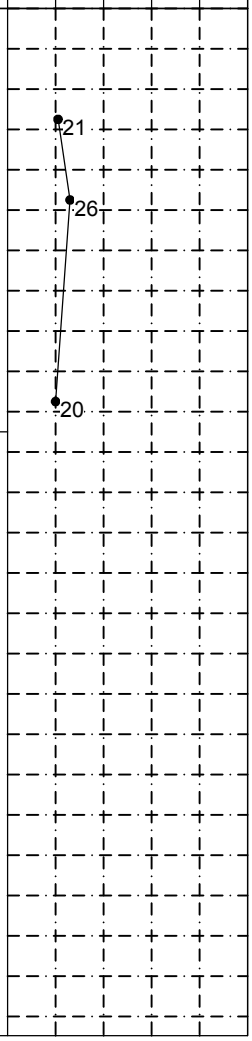
LOG OF TEST BORINGS

GROUNDWATER DEPTH

NO: 10

During Drilling: none After 24 Hours:

DEPTH (Ft)	LOG	SAMPLE INTERVAL	TYPE	N. BLOWS/FT	MOISTURE %	DRY DENSITY (pcf)	USC	DESCRIPTION
5			SS	9-10-11 21	4			
			SS	14-11-15 26	3		SP-SM	POORLY GRADED SAND with SILT, non-plastic, medium dense, dry, brown
10			SS	4-6-14 20	2			
								Stopped Auger @ 9 feet Stopped Sampler @ 10.5 feet
15								
20								
25								



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SUMMARY OF LABORATORY RESULTS

						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
1	3.0	SM	4.7	NP	NP	24	42	81	100								
1	5.0		5.5														
1	10.0	SM	5.2	NP	NP	27	54	90	97	99	100						
1	15.0		4.2														
1	20.0		4.8														
2	3.0		2.7														
2	5.0	SM	5.6	NP	NP	39	71	94	97	98	99	99	100				
2	10.0		2.9														
2	15.0	SM	5.8	NP	NP	40	70	89	98	99	100						
2	20.0		2.8														
3	3.0	SP-SM	2.9	NP	NP	11	30	86	100								
3	5.0		1.6														
3	10.0		2.5														
3	13.0	SC-SM	6.4	21	4	36	42	88	97	99	100						
3	15.0		2.8														
3	20.0	SM	4.4	NP	NP	23	39	81	95	97	98	99	100				
4	3.0		2.9														
4	5.0	SM	5.3	NP	NP	39	82	96	100								
4	10.0		2.7														

GEO-TEST

LL = LIQUID LIMIT
PI = PLASTICITY INDEX
NP = NON PLASTIC or NO VALUE

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

SUMMARY OF LABORATORY RESULTS 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18

SUMMARY OF LABORATORY RESULTS

						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
4	15.0	SM	3.9	NP	NP	23	38	76	92	95	97	98	100				
4	20.0		2.9														
5	3.0		4.5														
5	5.0	SC-SM	4.5	20	4	48	78	98	100								
5	10.0		3.8														
6	3.0	SM	3.0	NP	NP	17	39	84	95	97	100						
6	5.0		2.0														
6	10.0		6.8														
7	3.0	SP-SM	1.8	NP	NP	9	27	69	99	100							
7	5.0		1.7														
7	10.0		2.7														
8	3.0		3.7														
8	5.0	SP-SM	2.8	NP	NP	12	45	86	100								
8	10.0		3.2														
8	15.0		2.1														
8	20.0	SM	2.7	NP	NP	19	45	78	89	99	100						
9	3.0	SM	3.8	NP	NP	18	46	80	99	100							
9	5.0		2.4														
9	10.0		3.3														

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SUMMARY OF LABORATORY RESULTS 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18

SUMMARY OF LABORATORY RESULTS

						SIEVE ANALYSIS PERCENT PASSING											
TEST HOLE	DEPTH (FEET)	UNIFIED CLASS	(%) MOIST	LL	PI	NO 200	NO 100	NO 40	NO 10	NO 4	3/8"	1/2"	3/4"	1"	1 1/2"	2"	4"
10	3.0		3.6														
10	5.0		2.7														
10	10.0	SP-SM	1.6	NP	NP	5	27	81	97	99	100						
Cholla Dam Bulk	5.0	SM		NP	NP	18	42	87	99	100							
Cholla Pond Bulk	5.0	SM		NP	NP	26	49	85	96	99	100						
Nopal Pond Bulk	5.0	SP-SM		NP	NP	10	43	75	89	100							

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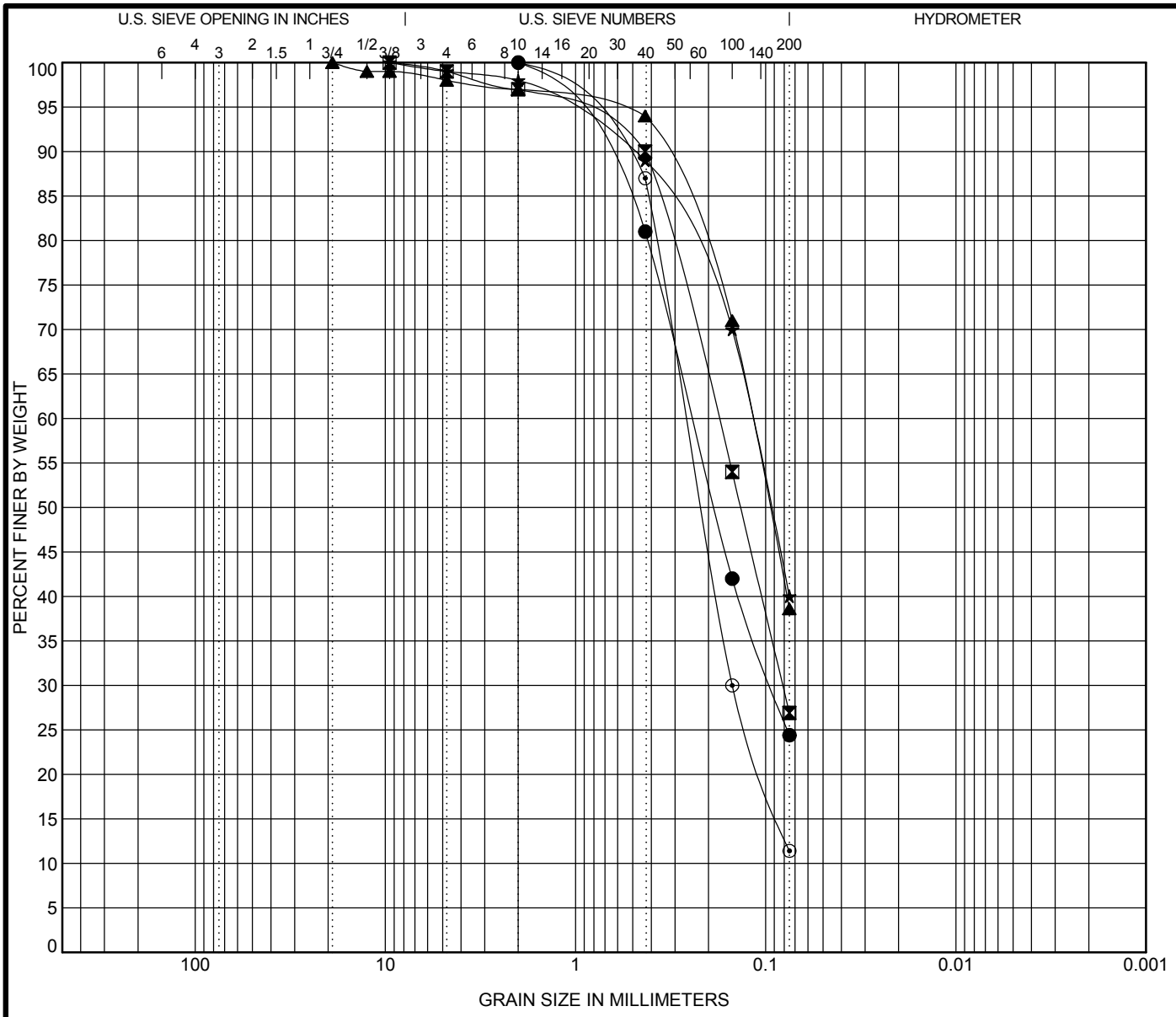
Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

SUMMARY OF LABORATORY RESULTS 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	1	3.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊠	1	10.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
▲	2	5.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
★	2	15.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊙	3	3.0	**POORLY GRADED SAND with SILT(SP-SM)**	**NP**	**NP**	**NP**	**1.21**	**3.67**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	1	3.0	**2**	**0.244**	**0.094**		**0.0**	**75.6**	**24.4**	
⊠	1	10.0	**9.5**	**0.179**	**0.081**		**1.0**	**72.1**	**26.9**	
▲	2	5.0	**19**	**0.119**			**2.0**	**59.4**	**38.6**	
★	2	15.0	**9.5**	**0.119**			**1.0**	**59.0**	**40.0**	
⊙	3	3.0	**2**	**0.261**	**0.15**		**0.0**	**88.6**	**11.4**	

GEO-TEST

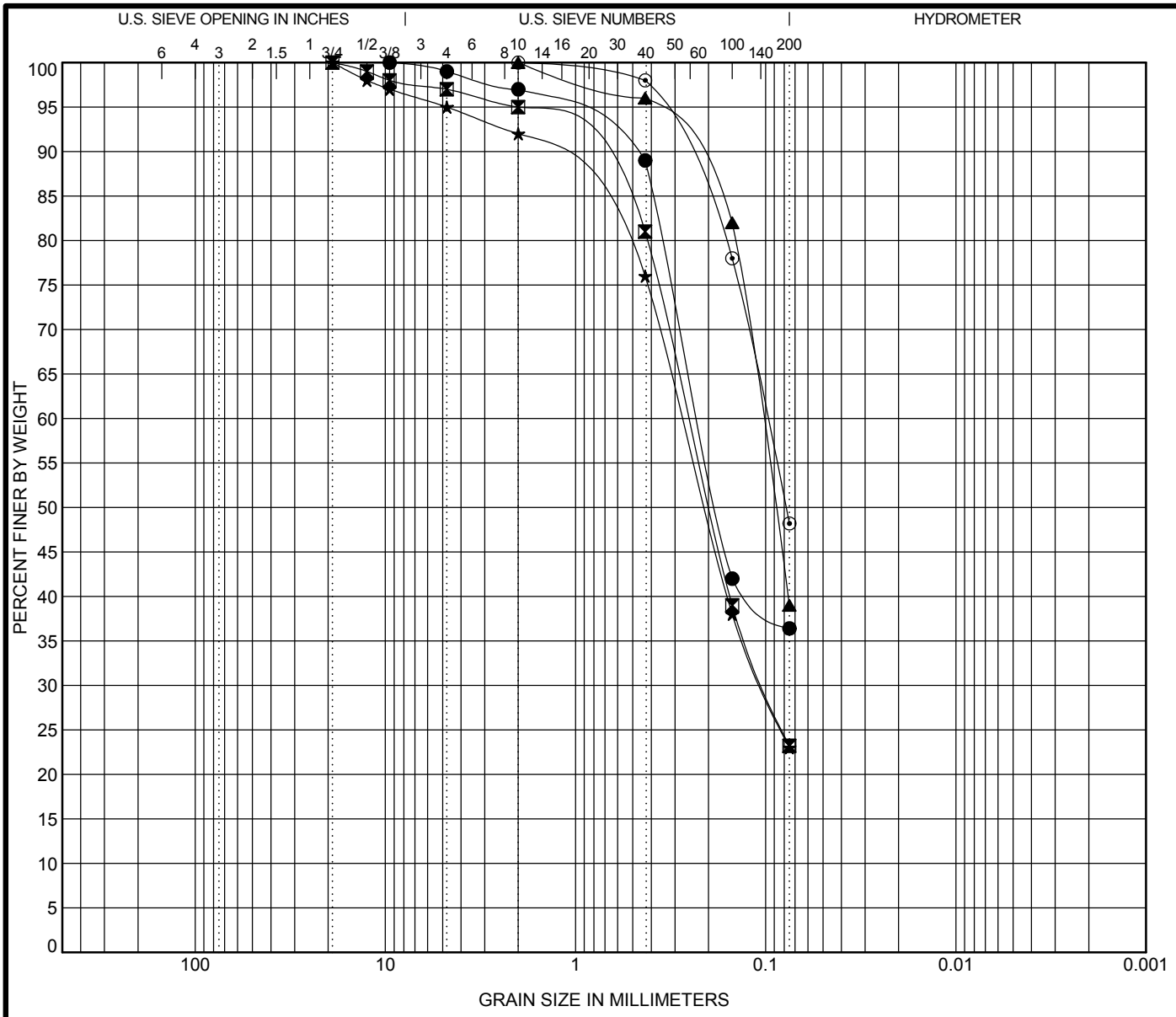
GRAIN SIZE DISTRIBUTION

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US GRAIN SIZE 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	3	13.0	**SILTY, CLAYEY SAND(SC-SM)**	**21**	**17**	**4**		
⊠	3	20.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
▲	4	5.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
★	4	15.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊙	5	5.0	**SILTY, CLAYEY SAND(SC-SM)**	**20**	**16**	**4**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	3	13.0	**9.5**	**0.225**			**1.0**	**62.6**	**36.4**	
⊠	3	20.0	**19**	**0.254**	**0.101**		**3.0**	**73.8**	**23.2**	
▲	4	5.0	**2**	**0.105**			**0.0**	**61.0**	**39.0**	
★	4	15.0	**19**	**0.276**	**0.104**		**5.0**	**72.0**	**23.0**	
⊙	5	5.0	**2**	**0.099**			**0.0**	**51.8**	**48.2**	

GEO-TEST

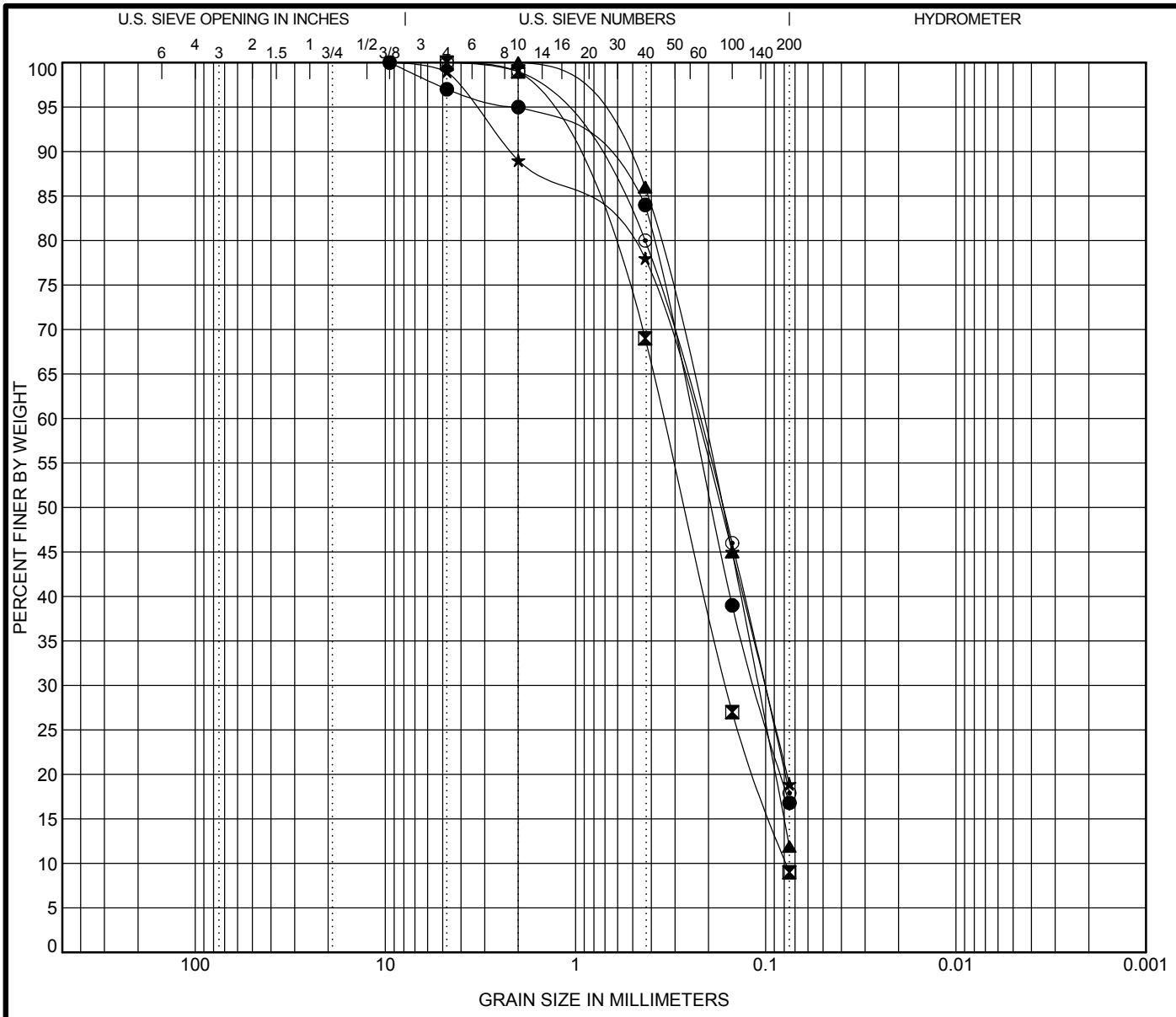
GRAIN SIZE DISTRIBUTION

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US GRAIN SIZE 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	6	3.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊠	7	3.0	**POORLY GRADED SAND with SILT(SP-SM)**	**NP**	**NP**	**NP**	**0.98**	**4.40**
▲	8	5.0	**POORLY GRADED SAND with SILT(SP-SM)**	**NP**	**NP**	**NP**	**0.76**	**3.06**
★	8	20.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
⊙	9	3.0	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	6	3.0	**9.5**	**0.245**	**0.113**		**3.0**	**80.2**	**16.8**	
⊠	7	3.0	**4.75**	**0.343**	**0.162**	**0.078**	**0.0**	**91.0**	**9.0**	
▲	8	5.0	**2**	**0.221**	**0.11**		**0.0**	**88.1**	**11.9**	
★	8	20.0	**9.5**	**0.242**	**0.101**		**1.0**	**80.1**	**18.9**	
⊙	9	3.0	**4.75**	**0.231**	**0.101**		**0.0**	**82.1**	**17.9**	

GEO-TEST

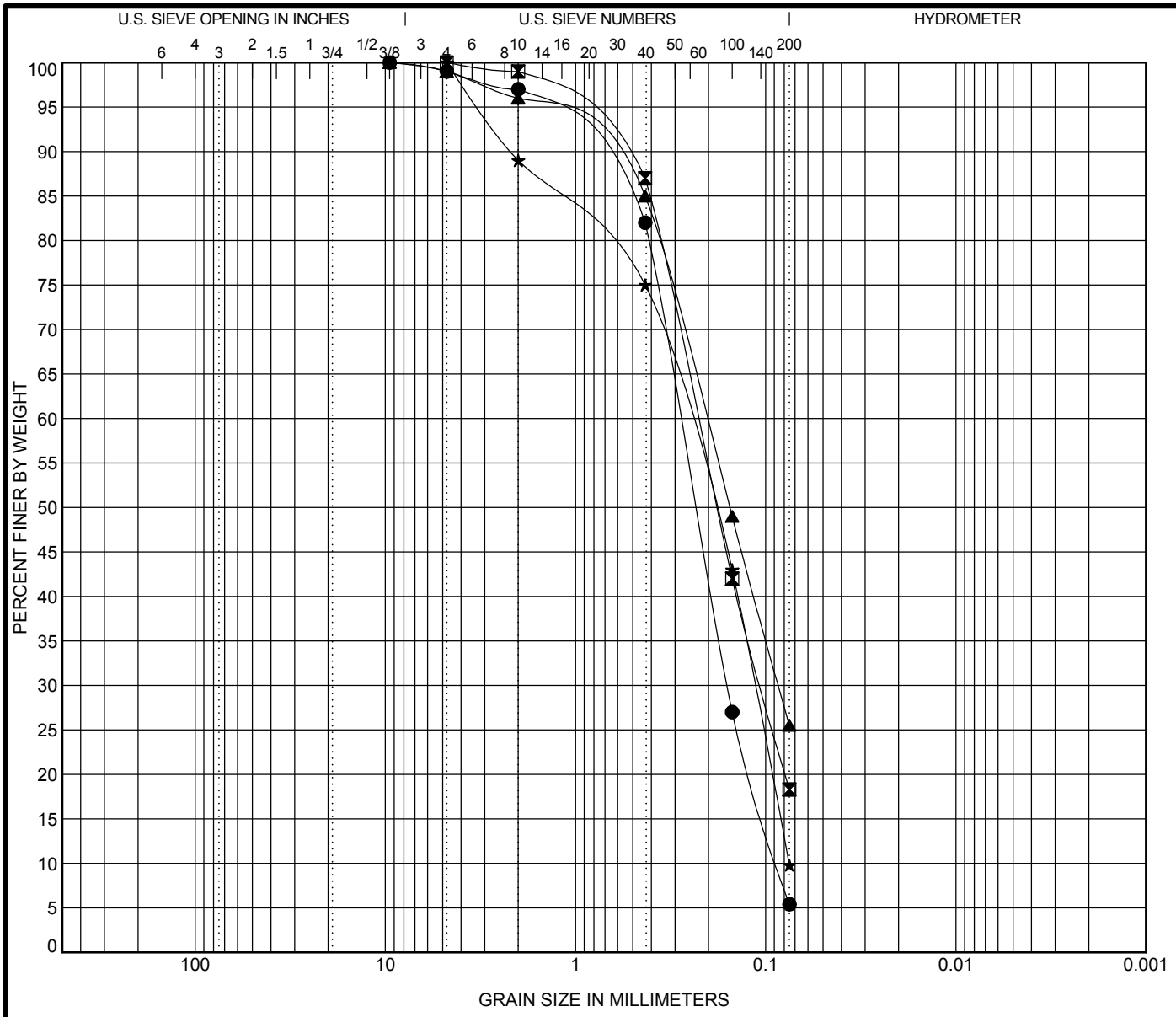
GRAIN SIZE DISTRIBUTION

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US GRAIN SIZE 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**10**	**10.0**	**POORLY GRADED SAND with SILT(SP-SM)**	**NP**	**NP**	**NP**	**1.03**	**3.25**
⊠	**Cholla Dam Bulk**	**5.0**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
▲	**Cholla Pond Bulk**	**5.0**	**SILTY SAND(SM)**	**NP**	**NP**	**NP**		
★	**Nopal Pond Bulk**	**5.0**	**POORLY GRADED SAND with SILT(SP-SM)**	**NP**	**NP**	**NP**	**0.66**	**3.48**

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**10**	**10.0**	**9.5**	**0.282**	**0.159**	**0.087**	**1.0**	**93.6**	**5.4**	
⊠	**Cholla Dam Bulk**	**5.0**	**4.75**	**0.229**	**0.106**		**0.0**	**81.7**	**18.3**	
▲	**Cholla Pond Bulk**	**5.0**	**9.5**	**0.207**	**0.086**		**1.0**	**73.5**	**25.5**	
★	**Nopal Pond Bulk**	**5.0**	**4.75**	**0.262**	**0.114**	**0.075**	**0.0**	**90.2**	**9.8**	

GEO-TEST

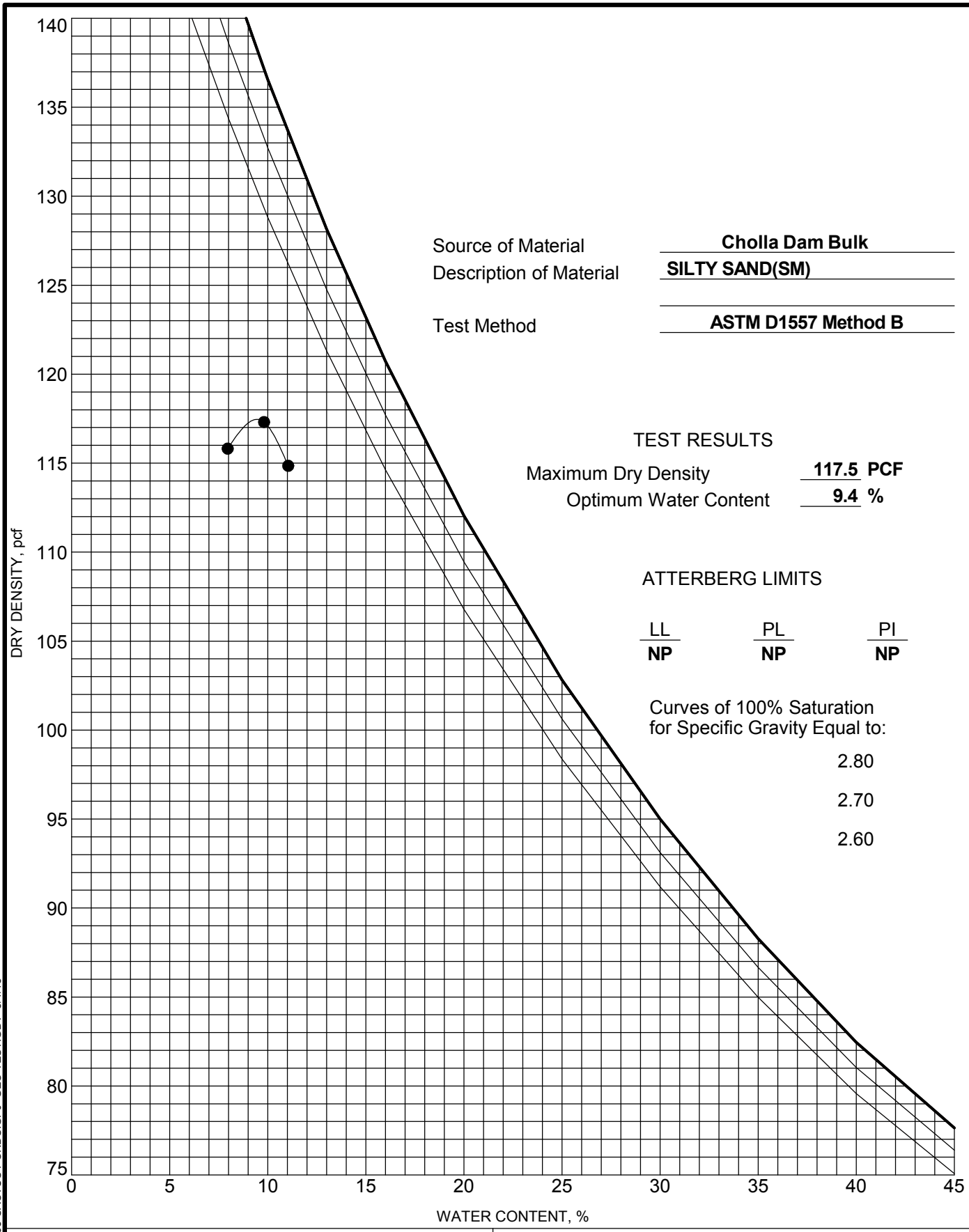
GRAIN SIZE DISTRIBUTION

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US GRAIN SIZE 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



Source of Material: **Cholla Dam Bulk**

Description of Material: **SILTY SAND(SM)**

Test Method: **ASTM D1557 Method B**

TEST RESULTS

Maximum Dry Density: **117.5 PCF**

Optimum Water Content: **9.4 %**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

GEO-TEST

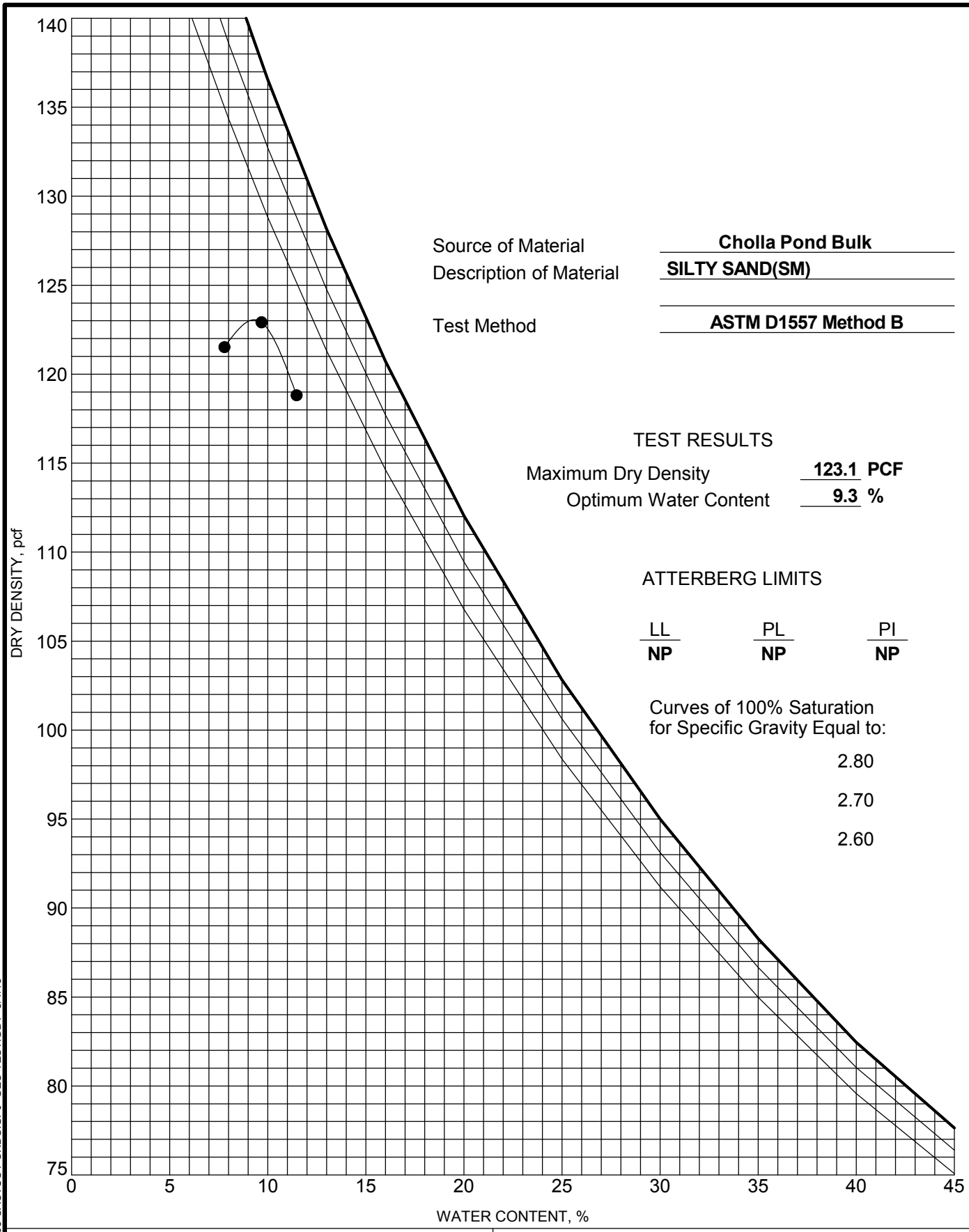
MOISTURE-DENSITY RELATIONSHIP

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US COMPACTION 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



Source of Material: **Cholla Pond Bulk**

Description of Material: **SILTY SAND(SM)**

Test Method: **ASTM D1557 Method B**

TEST RESULTS

Maximum Dry Density: **123.1 PCF**

Optimum Water Content: **9.3 %**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

GEO-TEST

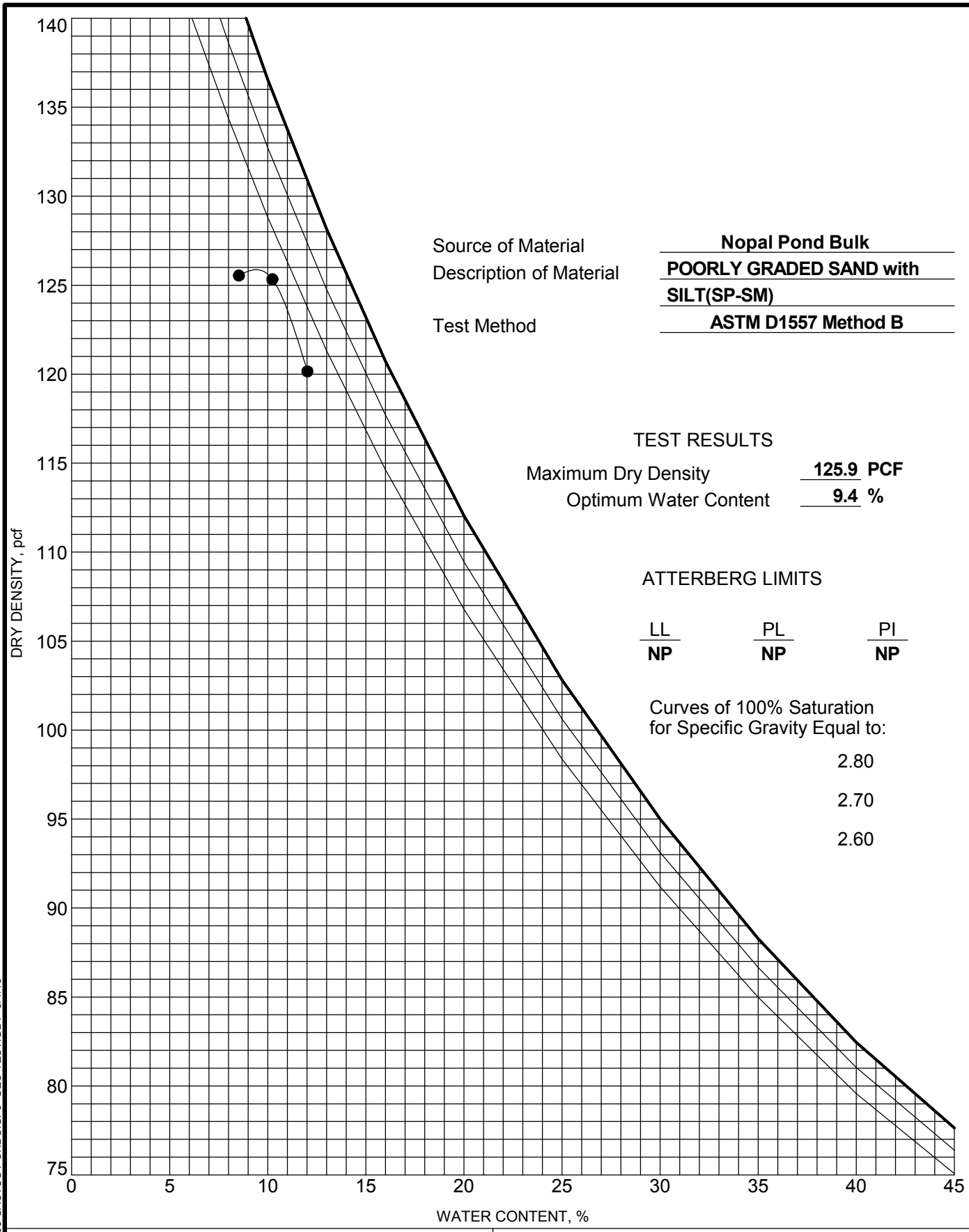
MOISTURE-DENSITY RELATIONSHIP

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US COMPACTION 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18



Source of Material: **Nopal Pond Bulk**

Description of Material: **POORLY GRADED SAND with SILT(SP-SM)**

Test Method: **ASTM D1557 Method B**

TEST RESULTS

Maximum Dry Density: **125.9** **PCF**

Optimum Water Content: **9.4** **%**

ATTERBERG LIMITS

LL	PL	PI
NP	**NP**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

2.80

2.70

2.60

MOISTURE-DENSITY RELATIONSHIP

GEO-TEST

Project: Cactus Ponds Drainage Facility

Location: Rio Rancho, New Mexico

Number: 1-80608

US COMPACTION 1-80608 CACTUS PONDS.GPJ GEO TEST.GDT 8/1/18

Rigid Wall Constant Head
Remold Permeability

GEO-TEST

Project:	Cactus Ponds Drainage Facility
Job #:	1-80608
Boring/Location:	Boring 2 - Cholla Dam Site
Sample Depth:	0 - 10 feet (5784 - 5774)
Soil Description:	Silty Sand - Auger Cuttings
Remolded to:	95% of Maximum Density

Aparatus Weight Empty:	253.9	grams	Weight of Sample:	422.5	grams
Apararatus Weight + Soil:	676.4	grams	Weight of Sample:	0.931437	lb
Mold Diameter:	6.322	cm	Mold Area:	31.39055	cm^2
Pipe Diameter:	1.27	cm	Pipe Area:	1.266769	cm^2
Length of Sample	6.87	cm	Area Factor:	0.040355	
Pressure Head Applied 1psi = 70.34 cm:	0		Volume of Sample:	215.653	cm^3
Can #:			Volume of Sample:	0.007616	ft^3
Wet Weight:	164.9	grams	**Unit Weight:**	**122.3**	**lb/ft^3**
Dry Weight:	150.5	grams	**Moisture Content:**	**9.6**	**%**
			Dry Unit Weight:	**111.6**	**lb/ft^3**

Time	Trial 1	Trial 2	Trial 3
Hour	0	0	0
Minute	2	2	2
Second	34	37	42
Total (hr)	0.042778	0.043611	0.045
h_0	65 cm	65 cm	65 cm
h_1	10 cm	10 cm	10 cm
$Head_0$	71.87 cm	71.87 cm	71.87 cm
$Head_1$	16.87 cm	16.87 cm	16.87 cm
Ks (cm/hour)	9.39 cm/hr	9.21 cm/hr	8.93 cm/hr
Ks (cm/sec)	2.61E-03 cm/s	2.56E-03 cm/s	2.48E-03 cm/s

Saturated Hydraulic Conductivity, K_s:	**9.18 cm/hr**
Saturated Hydraulic Conductivity, K_s:	**2.55E-03 cm/s**

Rigid Wall Constant Head
Remold Permeability

GEO-TEST

Project:	Cactus Ponds Drainage Facility
Job #:	1-80608
Boring/Location:	Boring 5 - Cholla Pond Site
Sample Depth:	0 - 10 feet (5786 - 5776)
Soil Description:	Silty, Clayey Sand - Auger Cuttings
Remolded to:	95% of Maximum Density

Aparatus Weight Empty:	254.4	grams	Weight of Sample:	440.9	grams
Apararatus Weight + Soil:	695.3	grams	Weight of Sample:	0.972002	lb
Mold Diameter:	6.322	cm	Mold Area:	31.39055	cm^2
Pipe Diameter:	1.27	cm	Pipe Area:	1.266769	cm^2
Length of Sample	6.87	cm	Area Factor:	0.040355	
Pressure Head Applied 1psi = 70.34 cm:	0		Volume of Sample:	215.653	cm^3
Can #:			Volume of Sample:	0.007616	ft^3
Wet Weight:	142	grams	**Unit Weight:**	**127.6**	**lb/ft^3**
Dry Weight:	129.8	grams	**Moisture Content:**	**9.4**	**%**
			Dry Unit Weight:	**116.7**	**lb/ft^3**

Time	Trial 1	Trial 2	Trial 3
Hour	0	0	0
Minute	10	10	10
Second	29	17	5
Total (hr)	0.174722	0.171389	0.168056
h_0	65 cm	65 cm	65 cm
h_1	10 cm	10 cm	10 cm
$Head_0$	71.87 cm	71.87 cm	71.87 cm
$Head_1$	16.87 cm	16.87 cm	16.87 cm
Ks (cm/hour)	2.30 cm/hr	2.34 cm/hr	2.39 cm/hr
Ks (cm/sec)	6.39E-04 cm/s	6.51E-04 cm/s	6.64E-04 cm/s

Saturated Hydraulic Conductivity, K_s:	**2.35 cm/hr**
Saturated Hydraulic Conductivity, K_s:	**6.51E-04 cm/s**

Rigid Wall Constant Head
Remold Permeability

GEO-TEST

Project:	Cactus Ponds Drainage Facility
Job #:	1-80608
Boring/Location:	Boring 8 - Nopal Pond Site
Sample Depth:	5 -15 feet (5759 - 5749)
Soil Description:	Poorly Graded Sand with Silt
Remolded to:	95% of Maximum Density

Aparatus Weight Empty:	254.3	grams	Weight of Sample:	453	grams
Apararatus Weight + Soil:	707.3	grams	Weight of Sample:	0.998677	lb
Mold Diameter:	6.322	cm	Mold Area:	31.39055	cm^2
Pipe Diameter:	1.27	cm	Pipe Area:	1.266769	cm^2
Length of Sample	6.87	cm	Area Factor:	0.040355	
Pressure Head Applied 1psi = 70.34 cm:	0		Volume of Sample:	215.653	cm^3
Can #:			Volume of Sample:	0.007616	ft^3
Wet Weight:	236.4	grams	**Unit Weight:**	**131.1**	**lb/ft^3**
Dry Weight:	216.2	grams	**Moisture Content:**	**9.3**	**%**
			Dry Unit Weight:	**119.9**	**lb/ft^3**

Time	Trial 1	Trial 2	Trial 3
Hour	0	0	7
Minute	3	4	3
Second	55	8	58
Total (hr)	0.065278	0.068889	7.066111
h_0	65 cm	65 cm	65 cm
h_1	10 cm	10 cm	10 cm
$Head_0$	71.87 cm	71.87 cm	71.87 cm
$Head_1$	16.87 cm	16.87 cm	16.87 cm
Ks (cm/hour)	6.16 cm/hr	5.83 cm/hr	0.06 cm/hr
Ks (cm/sec)	1.71E-03 cm/s	1.62E-03 cm/s	1.58E-05 cm/s

Saturated Hydraulic Conductivity, K_s:	**4.01 cm/hr**
Saturated Hydraulic Conductivity, K_s:	**1.12E-03 cm/s**