

**GEOTECHNICAL/FOUNDATION EVALUATION
I-10: EARLEY ROAD TO JUNCTION I-8
TRACS NO. 010 PN 196 H7984 01D
PINAL COUNTY, ARIZONA**

PREPARED FOR:

Arizona Department of Transportation
1221 North 21st Avenue, MD068R
Phoenix, Arizona 85009

PREPARED BY:

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
3202 East Harbour Drive
Phoenix, Arizona 85034

September 29, 2015
Project No. 601808009

September 29, 2015
Project No. 601808009

Mr. Guled Ahmed, P.E.
Arizona Department of Transportation
1221 North 21st Avenue, MD068R
Phoenix, Arizona 85009

Subject: Geotechnical/Foundation Evaluation
I-10: Earley Road to Junction I-8
Pinal County, Arizona
ADOT Contract No. 07-24.06; Task Order No. 9
TRACS No. 010 PN 196 H7984 01D

Dear Mr. Ahmed:

In accordance with our revised proposal, and your authorization, Ninyo & Moore has performed a Geotechnical/Foundation Evaluation for Interstate (I-10), from Earley Road to Junction I-8 in Pinal County, Arizona. This report presents our findings, conclusions, and geotechnical and foundation recommendations for the project.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE


Jeffrey S. Rodgers, PE, R
Senior Project Engineer



JSR/SG/SDN/tlp

Distribution: (1) Addressee (Electronic Copy)



Steven D. Nowaczyk, PE
Managing Principal Engineer



TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
2. SCOPE OF SERVICES	1
3. SITE DESCRIPTION	2
4. PROJECT DESCRIPTION	3
5. GEOTECHNICAL FIELD EXPLORATION	4
6. GEOTECHNICAL LABORATORY TESTING	5
7. GEOLOGIC SETTING	5
7.1. Subsurface Conditions	6
7.1.1. Pavement over Aggregate Base	6
7.1.2. Fill	6
7.1.3. Alluvium	7
7.2. Groundwater	7
8. GEOLOGIC HAZARDS AND CONDITIONS	7
8.1. Land Subsidence and Earth Fissures	8
8.2. Faulting	9
8.3. Liquefaction Potential	9
9. RECOMMENDATIONS	9
9.1. Earthwork	10
9.1.1. Excavation and Grading	10
9.1.2. Vertical Shoring and Trench Boxes	11
9.1.3. Site and Subgrade Preparation	12
9.1.4. Fill Material and Compaction	14
9.2. Earthwork Factors	15
9.3. Design R-value	15
9.4. Seismic Design Considerations	16
9.5. Deep Foundations	17
9.5.1. Downdrag	17
9.5.2. Drilled Shafts	18
9.5.3. Lateral Load Parameters	21
9.5.4. Drilled Shaft Construction Considerations	22
9.6. Shallow Foundations	23
9.7. Lateral Earth Pressures	27
9.8. Constructed Slopes	28
9.9. Embankment Settlement	28
9.10. Embankment Slope Stability	29
9.10.1. Slope Stability Material Properties	29
9.10.2. Slope Stability Results	30
9.11. Corrosivity Information	31

9.12. Water Requirements	32
9.13. Site Drainage	32
9.14. Pre-Construction Conference.....	33
9.15. Construction Observation and Testing	33
10. LIMITATIONS.....	33
11. REFERENCES	35

Tables

Table 1 – Approximate Station Limits for Subgrade Improvement Areas.....	13
Table 2 – R-Value Summary	16
Table 3 – Seismic Design Parameters	17
Table 4 – Downdrag Idealized Soil Profile	18
Table 5 – Idealized Soil Profile for the Piers	19
Table 6 – Idealized soil profile for the Abutments.....	19
Table 7 – Soil Parameters for Lateral Load Analysis of Drilled Shafts - Piers.....	21
Table 8 – Soil Parameters for Lateral Load Analysis of Drilled Shafts - Abutments	22
Table 9 – Idealized Soil Profile for the Eastbound Foundation	25
Table 10 – Idealized Soil Profile for the Westbound Foundation	25
Table 11 – Stability Analysis Material Properties	30
Table 12 – Stability Analysis Results.....	31
Table 13 – Corrosivity Test Results	31

Figures

Figure 1 – Site Location	
Figures 2A through 2O – Exploration Locations	
Figure 3A – Strength Axial Resistance Chart in Compression – Piers	
Figure 3B – Strength Axial Resistance Chart in Tension – Piers	
Figures 4A through 4F – Service Axial Resistance Chart Piers	
Figure 5A – Strength Axial Resistance Chart in Compression – Abutments	
Figure 5B – Strength Axial Resistance Chart in Tension – Abutments	
Figure 6A through 6F – Service Axial Resistance Chart in Compression – Abutments	
Figures 7A through 7D – Factored Bearing Resistance Chart – Retaining Walls and Abutments	
Figure 8A – End of Construction, Station 2793+98, Left Face	
Figure 8B – End of Construction, Station 2793+98, Right Face	
Figure 9A – End of Construction, Station 2801+50, Left Face	
Figure 9B – End of Construction, Station 2801+50, Right Face	

Appendices

Appendix A – Boring Logs	
Appendix B – Laboratory Testing	

1. INTRODUCTION

This report presents the results of our geotechnical/foundation evaluation for planned improvements to I-10 between Earley Road and Junction I-8 in Pinal County, Arizona. This project is intended to add capacity to the existing roadway. The objectives of this evaluation were to assess the subsurface conditions along the project alignment, and provide recommendations relative to the geotechnical and foundation aspects of the planned improvements.

2. SCOPE OF SERVICES

Our scope of services for this project generally included:

- Reviewing readily available Arizona Department of Transportation (ADOT) as-built plans, subsurface data, geologic literature, reports, subsidence/earth fissure studies, aerial photographs of the area, and published maps pertaining to the highway section under study.
- Preparing an exploration plan for submittal to ADOT Materials Group for their review and environmental clearance.
- Arranging for appropriate traffic control services and obtaining an encroachment permit from ADOT.
- Conducting a field trip to mark out the exploration locations. Arizona Blue Stake was notified of the proposed boring locations prior to drilling.
- Performing a geotechnical exploration, which included drilling 38 soil borings to depths ranging from about 3 to 120 feet below ground surface (bgs). The borings were logged in general accordance with industry standard methods, and soil samples were obtained for laboratory testing. The boring logs are included in Appendix A.
- Conducting laboratory tests of representative samples obtained from the borings including, in-situ moisture content and dry density, grain-size analysis, Atterberg limits, consolidation, maximum dry density/optimum moisture relationship, R-value, and corrosivity. Laboratory test results are included in Appendix B.
- Preparing this report that presents our findings, conclusions, and geotechnical/foundation recommendations.

3. SITE DESCRIPTION

The proposed project, located within Pinal County, includes approximately 3 miles of roadway widening and reconstruction of the Jimmie Kerr Boulevard (Blvd) Overpass (OP) Traffic Interchange (TI) as well as the existing roadway. The alignment is generally orientated in a north-south direction along the existing I-10 corridor between Earley Road and Junction I-8, as depicted on Figure 1.

The existing I-10 roadway is an asphalt concrete (AC)-paved roadway that traverses in a north-south direction and is surrounded by developed commercial and residential areas, as well as agricultural and undeveloped desert areas. The existing roadway consists of two-lanes in each direction of travel with paved shoulders on either side of the travel lanes and unpaved median. The Casa Grande Canal Extension owned/operated by San Carlos Apache Tribe/San Carlo Irrigation District (SCAT/SCID) crosses under I-10 at the Jimmie Kerr Blvd OP. The Junction between I-10 and I-8 is located near the southern limits of the project.

According to the Casa Grande Mountains, Pinal County Arizona, 7.5-Minute United States Geological Survey (USGS) Topographic Quadrangle Maps (2014), the elevation of the site ranges from approximately 1,430 feet near the north end of the project to approximately 1,490 feet near the south end. Based on information from this quadrangle map, the topography in the site vicinity slopes from the southeast down to the northwest.

Various aerial photographs from the Google Earth™ were reviewed for this project. Aerial photographs from 1996 to 2002 depicted I-10 as a paved roadway bounded by agricultural areas throughout the project limits with a commercial development at Jimmie Kerr Blvd and I-10. Aerial photographs from 2003 to 2005 depicted an increase in residential development north of the project limits. Aerial photographs from 2006 to 2011 depicted an increase in residential development to the north and east of the project limits. Aerial photographs dated 2012 to 2014 depicted the site as being similar to its current conditions.

4. PROJECT DESCRIPTION

The overall project includes median widening of approximately 3.2-mile long stretch of I-10, roughly between Earley Road and Junction I-8, in Pinal County, Arizona. Improvements generally include the design and construction of one, 12-foot wide general purpose lane with shoulders in each direction divided by a concrete center barrier along the approximate 3.2-mile reach. In addition to the widening, we understand roadway and ramp improvements, including a “U-Turn” ramp, eastbound, and westbound frontage drainage improvements are also planned. We also understand that the southern embankment will be cut back for future Union Pacific Railroad track expansions. The planned widening alignment is generally at-grade except at the Jimmie Kerr OP. Retaining walls are also planned for the Jimmie Kerr OP with an approximate height of 13 feet.

As noted above, the project will also include the design and construction of the Jimmie Kerr Blvd OP TI. We understand the new bridges will be four-span structures supported on drilled shafts at the piers as well as the abutments. The reconfiguration of the northern embankment will consist of placement of engineered grade-raise fill ranging in heights from about 5 to 35 feet. The reconfiguration of the southern embankment will utilize retaining walls retaining engineered backfill with the footings placed near the current grade on top of the embankment as well as engineered grade raise fill. It is our understanding that the foundations for the bridge structures as well as the footings for the retaining walls will be designed using Load Resistance Factor Design (LRFD) methods (6th Edition American Association of State Highway Transportation Officials [AASHTO], 2012). Foundation recommendations, per the ADOT Materials Group are provided in this report.

Pavement sections will consist of an AC pavement section with a rubberized asphaltic concrete friction (AR-ACFC) overlay. We understand that ADOT Materials Group will develop pavement design recommendations provided in the Pavement Design Summary and Materials Design Report for this project.

5. GEOTECHNICAL FIELD EXPLORATION

We mobilized to the site and performed our field exploration between February 4, 2015 and February 9, 2015 and April 11, 2015 and April 24, 2015. Enviro-Drill Inc. of Phoenix, Arizona, was retained by Ninyo & Moore to drill 29 8-inch-diameter soil borings using a CME-75 truck-mounted drill rig and hollow-stem auger (HSA) drilling techniques. The borings were drilled within the existing right-of-way to depths ranging from about 5 to 120 feet bgs. Of these borings, 10 borings (denoted as BR-1 through BR-10) were drilled for the bridge structures, nine borings (denoted as RW-1 through RW-9) were drilled for the retaining walls, and 10 borings (denoted as B-1 through B-10) were drilled for the roadway. An additional nine hand-auger borings were advanced to depths of approximate 3 feet bgs for possible drainage culverts. The approximate locations of the borings are provided on Figures 2A through 2O.

Soil samples from the borings were obtained by driving a split-spoon sampler, approximately 18 inches into the soil at selected depths using a 140-pound automatic trip hammer falling approximately 30 inches. California Modified and Standard Penetration Test (SPT) split-spoon samplers were used in generally alternating intervals. Samples were typically taken at 2.5-foot to a 5.0-foot depth intervals. Relatively undisturbed ring samples were obtained with the California Modified sampler, and small bag samples were obtained using the unlined SPT sampler. The equipment and sampling methodology are described in detail in Appendix A.

Ninyo & Moore personnel logged the borings in general accordance with the Unified Soil Classification System (USCS) and American Society for Testing and Materials (ASTM) test method D 2488 by observing cuttings and split-spoon samples. The ring samples were trimmed in the field, wrapped in plastic bags, and placed in moisture-tight cylindrical plastic containers, while the SPT samples were placed in resealable bags to help preserve their natural moisture. Bulk samples were also collected from the HSA cuttings as well as the hand-auger samples and placed in large plastic bags. Field classifications and other pertinent data are presented on the boring logs in Appendix A.

It should be noted that stationing and offset noted on the boring logs are based on the stationing of mainline I-10. Also, the ground surface elevations noted on the logs were estimated from topographic information shown in the 60 percent plans that we received from the project team.

6. GEOTECHNICAL LABORATORY TESTING

Samples collected from our exploration locations were transported to the Ninyo & Moore laboratory in Phoenix, Arizona for geotechnical laboratory analyses. The laboratory analyses included in-situ moisture content and dry density, grain-size analysis, Atterberg limits, consolidation tests, maximum dry density/optimum moisture relationship, R-values, and corrosivity. Samples collected from our exploration location were transported to ADOT Materials Group laboratory in Phoenix, for corrosivity characteristics (including pH, minimum electrical resistivity, soluble sulfates, and chlorides). The results of the in-situ moisture and density testing are presented on the logs in Appendix A. A description of each test method and the remainder of the laboratory test results are presented in Appendix B.

7. GEOLOGIC SETTING

The project site is located in the Sonoran Desert subprovince of the Basin and Range physiographic province, which is typified by broad alluvial valleys separated by steep, discontinuous subparallel mountain ranges. The mountain ranges generally trend north-south and northwest-southeast. The basins consist of alluvium with thicknesses extending to several thousands of feet.

The basins and surrounding mountains were formed approximately 10 to 18 million years ago during the mid- to late-Tertiary. Extensional tectonics resulted in the formation of horsts (mountains) and grabens (basins) with vertical displacement along high-angle normal faults. Intermittent volcanic activity also occurred during this time. The surrounding basins filled with alluvium from the erosion of the surrounding mountains, as well as from deposition from rivers. Coarser-grained alluvial material was deposited at the margins of the basins near the mountains.

The surficial geology of the site is described as Quaternary age alluvium. The alluvium is generally described as deposits of sand, silt, and gravel (Bergquist and Blacet, 1978). The United States Department of Agriculture (USDA) Web Soil Survey described the site as generally containing Casa Grande fine sandy loam, Casa Grande clay, loam, Ginland clay, and Mohall clay loam. Loam is an agricultural soil classification that refers to a soil comprised of a mixture of clay, silt, and sand. A clay loam indicates a higher percentage of clay in the mixture.

7.1. Subsurface Conditions

Our knowledge of the subsurface conditions at the project site is based on our field exploration, laboratory testing, and our general experience in the area. The following sections provide generalized descriptions of the materials encountered. The boring logs contain our field and laboratory test results, as well as our interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate as the actual transition between soil types (strata) may be gradual. A key to the soil symbols and terms used on the boring logs is provided in Appendix A.

7.1.1. Pavement over Aggregate Base

We performed two borings within the paved shoulders along the project alignment. The pavement thicknesses for this project varied by location but were generally comprised of approximately 5 to 8 inches of AC supported on approximately 3 inches of AB at these locations.

7.1.2. Fill

Fill soil was encountered beneath the pavement sections or at the ground surface of many of our borings. The thickness of this fill typically ranged from about 0 to about 40 feet bgs at our boring locations. The composition of the fill material varied, typically

from medium dense to very dense silty sand to clayey sand with varying amounts of gravel. Although not observed in our borings, it is possible cobbles may be encountered within fill materials and should be anticipated.

7.1.3. Alluvium

The native alluvium was either encountered at the ground surface or immediately below the fill soils. The native alluvium generally consisted of layered strata comprised of medium dense to very dense poorly graded sand, silty sand, clayey sand with varying amounts of gravel, soft to hard sandy clay and clayey gravel and poorly graded gravel in our borings. The presence and degree of caliche (calcium carbonate) cementation was variable across the site and with depth, but generally ranged from weakly to strongly cemented.

7.2. Groundwater

Groundwater was not encountered in our exploratory borings. Historic well data obtained from the Arizona Department of Water Resources (ADWR) indicate that the groundwater level ranges from about 60 to 480 feet bgs along I-10 in the vicinity of the project. It should be noted that groundwater levels could fluctuate due to seasonal variations, irrigation, groundwater withdrawal or recharge, and other factors not apparent at the time of our fieldwork. However, we do not anticipate groundwater to be a constraint to the construction of the project.

8. GEOLOGIC HAZARDS AND CONDITIONS

The following sections describe potential geologic hazards at the site, including land subsidence and earth fissures, faulting and seismicity, and liquefaction potential.

8.1. Land Subsidence and Earth Fissures

Groundwater depletion due to groundwater pumping has caused land subsidence and earth fissures in numerous alluvial basins in Arizona. It has been estimated that subsidence has affected more than 3,000 square miles and has caused damage to a variety of engineered structures and agricultural land (Schumann and Genualdi, 1986).

In Arizona, earth fissures are generally associated with land subsidence and pose an on-going geologic hazard. Earth fissures generally form near the margins of geomorphic basins where significant amounts of groundwater depletion have occurred. Reportedly, earth fissures have also formed due to tensional stress caused by differential subsidence of the unconsolidated alluvial materials over buried bedrock ridges and irregular bedrock surfaces (Schumann and Genualdi, 1986).

According to the information from ADWR, the sections of the project alignment lie within the Picacho-Eloy land subsidence feature. The InSAR data that compared satellite passes on January 14, 2004, and September 29, 2010, indicated that about 0 to 1 centimeter of subsidence had occurred at some locations within the southern section of the project limits within the approximate 6-year timespan. The InSAR data on the most recent available imagery was obtained by comparing satellite passes on May 15, 2010, and March 31, 2014. Based on the InSAR data from ADWR, subsidence of about 0 to 2 centimeters has occurred at some locations during the approximate 4-year timespan. Therefore, within the last approximately 10 years, up to about 3 centimeters (or 1.2 inches) of subsidence has been measured in the project area. Historic subsidence may have also occurred prior to ADWR's 2004 measurements.

Based on our research of referenced materials, aerial photograph review, and geologic reconnaissance, there are no known earth fissures underlying the project site. The closest documented earth fissures to the site are less than 0.5 mile from I-10 at Junction I-8. While no documented earth fissures are present within this reach of the I-10, new fissures may be

discovered during construction. If encountered, Ninyo & Moore should be contacted immediately for further recommendations.

8.2. Faulting

The project corridor lies within the Sonoran Desert subprovince of the Basin and Range Zone, which is a relatively stable tectonic region located in southwestern Arizona, southeastern California, southern Nevada, and northern Mexico (Euge et al., 1992). This zone is characterized by sparse seismicity and few Quaternary faults. Based on our review of readily available published geological maps and literature, there are no known active faults underlying the project site or adjacent areas. The closest known Quaternary fault is located approximately 56 miles to the east of the project site and is known as the Sand Tank Fault (Pearthree, 1998). The Sand Tank Fault is a northeast striking normal faults that dip to the northwest. Recent movement along this fault was approximately 130,000 years ago during the Late Quaternary epoch. The slip-rate category of this fault is less than 0.2 millimeters per year (Pearthree, 1998). Seismic parameters recommended for design of the proposed improvements are presented in Section 9.4.

8.3. Liquefaction Potential

Based on the SPT values recorded at various depths in our exploratory borings, the density and consistency of the soils, the general lack of near-surface water, and the low ground motion hazard (relatively low peak ground accelerations), the likelihood or potential for liquefaction is considered to be negligible and, therefore, liquefaction is not a design consideration.

9. RECOMMENDATIONS

The following sections present our geotechnical recommendations for the proposed project. Ninyo & Moore should be contacted for additional recommendations if the actual design values change from those detailed or assumed in this report.

9.1. Earthwork

Earthwork and materials for grading, subgrade, sub-bases, and bases shall be in accordance with ADOT Standard Specifications for Road and Bridge Construction (Standard Specifications) and the recommendations presented in this report. The following sections provide our earthwork recommendations.

9.1.1. Excavation and Grading

Excavation and grading should be performed in accordance with Sections 203, 204, and 205 of the Standard Specifications.

It is our understanding that many of the planned improvements will be situated at or near the existing grade and that some grade-raise fill will be needed. The soil conditions below the mainline roadway are expected to consist of fills soils and native alluvium, including layers of medium dense to very dense silty or clayey sand with varying amounts of gravel. Cobbles and possible boulders, while not observed in our borings, should be anticipated during construction, particularly for the deeper excavations.

Our evaluation of the excavation characteristics of the on-site materials is based on the results of the exploratory borings, our site observations, and our experience with similar materials. In our opinion, excavation of the on-site fill and alluvium materials can generally be accomplished with conventional equipment in good operating condition. However, gravel and caliche were encountered in some of our borings, which could be more difficult to excavate and might slow the excavation rate depending on the actual particle size and degree of cementation encountered during construction.

The contractor should provide safely sloped excavations or an adequately constructed and braced shoring system in compliance with Occupational Safety and Health Administration (OSHA) Regulations for employees working in an excavation that may expose them to the danger of moving ground. Based on the soil conditions at the site,

we recommend that OSHA Soil “Type C” classification be used for excavations within the alluvial soils at the site.

In general, temporary cut slopes should be inclined no steeper than 1.5:1 (H:V) to a depth of 20 feet below the surface. Some temporary excavations may need shoring. If construction or earth material is stored or equipment is operated near an excavation, flatter slope geometry or stronger shoring should be used during construction. Care should be taken by the contractor when excavating near existing utilities to protect them from damage.

9.1.2. Vertical Shoring and Trench Boxes

Because of previously described soil conditions, the proposed depths of the excavations, and presence of existing utilities and structures (e.g., roadways, utilities, and buildings), it may be preferable to shore or brace the trenches rather than using open cuts to the base of the excavations. Temporary earth retaining systems will be subjected to lateral loads resulting from earth pressures.

Spoils from the excavation or other surcharge loads should not be placed above the excavation within a 1:1 (H:V) plane extending up and back from the base of the excavation. If spoil piles are placed closer than this to the braced excavation, the resulting surcharge loads should be considered in the bracing design. We recommend that an experienced structural engineer design the shoring system.

The contractor should anticipate repairing cracks in pavements adjacent to shored portions of the excavation due to anticipated lateral displacements of the shoring system. Horizontal and vertical movements of the shoring system should be monitored by a surveyor and the results reviewed by the project Geotechnical Engineer.

Trench boxes may also be a suitable alternative to laying back the side walls; however, due to the presence of granular soils, the excavations may not stand open long enough to install the trench boxes. The contractor should be prepared to deal with these soil

conditions and plan accordingly. Once installed, some sloughing is possible at the ends of the trench box; therefore, any loose material should be removed prior to backfilling of the trench.

9.1.3. Site and Subgrade Preparation

Vegetation and debris from the clearing operation should be removed from the site in accordance with Sections 201 of the ADOT Standard Specifications. Demolition debris and obstructions that extend below finish grade, if present, should be removed from the site in accordance with Sections 202 of the Standard Specifications.

After rough grade has been achieved and prior to placement of fill, the exposed subgrade should be visually checked for the presence of debris, organic matter and other unsuitable materials. If unsuitable soils are encountered at subgrade level during earthwork operations, these soils should be improved as noted below or removed and replaced with engineered fill.

The on-site geotechnical representative should carefully evaluate any areas of soft or wet soils, observed during the site preparation activities, prior to placement of grade-raise fill or other construction. Drying or overexcavation of some materials may be appropriate.

For the new embankment fill construction, we recommend that the subgrade soils be over-excavated to a depth of 5 feet and replaced with compacted engineered fill. Excavated soils may be used provided they do not contain organic matter and meet the project specifications as noted in Section 9.1.3. This overexcavation should extend laterally 5 or more feet horizontally beyond the edge of the embankment.

For the existing embankment receiving additional engineered fill, we recommend that the soil be overexcavated to a depth of 2 feet and replaced with compacted engineered fill. Excavated soils may be used provided they do not contain organic matter and meet

the project specifications as noted in Section 9.1.3. This over-excavation should extend laterally to the edges of the embankment.

Laboratory testing on samples obtained from our borings located near planned retaining walls exhibited a tendency to swell or collapse, from about -0.7 to 1.6 percent, when inundated with water under relatively light loads. Therefore, for retaining wall footings, we recommend that the subgrade soils be overexcavated and replaced with compacted engineered fill to a depth of 2 feet below the bottom of the planned footings. This over-excavation should extend laterally beyond the edge of the structure to the edge of the embankment.

As stated previously, the borings disclosed near-surface fill, or alluvial deposits, consisting primarily of silty sand, clayey sand or sandy clay. The laboratory testing indicates that some of the existing subgrade soils may have relatively low R-values and/or a high percentage of material passing the No. 200 sieve and/or a high plasticity. Therefore, we recommend that the roadway subgrade areas that exhibited R-values less than 20 be founded on a zone of adequately moisture-conditioned and compacted engineered fill, extending 3 feet below the bottom of the aggregate base layer. Table 1 presents the areas where R-values less than 20 were obtained within 5 feet of subgrade and where subgrade improvement beneath pavements may be needed. However, the areas noted in the table below will also need improvement as part of the subgrade preparation for areas to receive embankment fill or support roadways, as described above. As such, the areas tabulated below should be improved such that soils within 3 feet of finish subgrade have a design R-value of 20 or more.

Table 1 – Approximate Station Limits for Subgrade Improvement Areas

Boring No.	R-Value	Approximate Station Limits	Location
B-1	16	2705+80 to 2714+26±	Mainline I-10
B-3	16	2731+16 to 2748+08±	Mainline I-10

Table 1 – Approximate Station Limits for Subgrade Improvement Areas

Boring No.	R-Value	Approximate Station Limits	Location
B-5	10	2764+98 to 2781+90±	Mainline I-10
B-7	16	2800+00 to 2815+72	Mainline I-10

Improvement may be needed at other locations if the exposed subgrade material does not meet the requirements of the Subgrade Acceptance Chart provided in the Pavement Design Summary report.

Engineered fill within improved zones should be placed in horizontal lifts not exceeding 8 inches in loose thickness and compacted to 95 percent relative compaction, in accordance with Section 205 of the ADOT Standard Specifications at a moisture content generally near the optimum.

9.1.4. Fill Material and Compaction

Soils generated from on-site excavation activities, provided any oversize or deleterious materials are removed to meet the specifications in Section 203 of the ADOT Standard Specifications, are generally suitable for reuse as engineered fill. However, the on-site alluvial soils to be utilized within the top 3 feet below the proposed pavement base may need additional processing/moisture-conditioning, and are subject to additional gradation and plasticity index requirements, such that the material meets the Subgrade Acceptance Chart provided in the Materials Design Report for this project. In addition, embankment fills placed at bridge abutments shall have a Plasticity Index of no more than 15, as specified in the ADOT Standard Specifications, Section 203-10.03.

Any soils exhibiting an organic content more than about 3 percent or significant roots and other organic matter or vegetation, should not be used as engineered fill and should be removed from below settlement-sensitive structures. This material should be

disposed of offsite or may be used in non-structural areas or as topsoil, if it meets the requirements.

If borrow material is needed for this project, we recommend that it comply with Section 1001 of the Standard Specifications. The on-site geotechnical representative should evaluate the potential borrow material before it is brought to the site.

Engineered fill materials associated with this project should be placed in lifts not exceeding 8 inches in thickness and compacted in accordance with Section 203 of the Standard Specifications.

9.2. Earthwork Factors

The earthwork factors discussed below were calculated in accordance with ADOT procedures. Testing for calculation of earthwork factors included in-situ density tests performed in the laboratory. The earthwork factor was based on an average Proctor dry density of 119.9 pounds per cubic feet (pcf) and an average in-situ dry density of 107.8 pcf, resulting in an earthwork factor of 10 percent shrinkage. In accordance with ADOT procedures, the recommended earthwork factors are rounded to the nearest 5 percent. As such, for this project, we recommend an earthwork factor of 10 percent shrinkage. The earthwork factors represent an average of the material observed with varying consistencies. Potential bidders should consider this in preparing estimates and should review the available data to make their own conclusions regarding excavation conditions.

We recommend that a ground compaction factor of 0.2 feet be used for this project. The ground compaction factor given should be adjusted when constructing embankment fill sections outside the existing roadway prism.

9.3. Design R-value

Table 2 summarizes the tested and correlated R-values measured on soil samples obtained within the upper 5 feet of the planned finished roadway profile from various borings within

the project limits. The results are arranged in the order of increasing station numbers. Correlated R-values were obtained using the procedure described in the ADOT Preliminary Engineering and Design Manual (PEDM).

Table 2 – R-Value Summary

Boring No.	Approximate Station, Offset	Sample Depth (ft.)	Correlated R-value	Laboratory R-value
B-1	2705+80; 0'±	0.0-5.0	35	16
B-2	2722+71; 0'±	0.0-4.4	33	
B-3	2739+62; 0'±	0.0-5.0	26	16
B-4	2756+53; 0'±	0.0-4.8	24	
B-5	2773+44; 0'±	0.0-5.0	31	10
B-6	2790+35; 0'±	0.0-4.3	36	
B-7	2807+26; 0'±	0.0-4.0	31	16
B-8	2824+17; 0'±	0.0-4.4	22	
B-9	2841+80; 0'±	0.0-5.0	43	35
B-10	2858+00; 0'±	0.0-5.0	41	41
			R _c Mean = 32	R _t Mean = 20

Based on the procedure outlined in the PEDM, we calculated a mean R-value of 30; however, we recommend a design R-value of 20 for conservatism. We recommend that soils placed within 3 feet of finished roadway subgrade demonstrate a construction control R-value of 20 or more.

9.4. Seismic Design Considerations

Based on American Association of State Highway and Transportation Officials (AASHTO) 2007 Seismic Design Parameters, the site is located in a zone where the horizontal peak ground acceleration coefficient (PGA) of 0.057g has a 7 percent probability of being exceeded in 75 years. Short and long-period spectral acceleration coefficients, S_s and S_l , are 0.130 and 0.042, respectively. Additional seismic design parameters according to the

AASHTO Load Resistance Factor Design (LRFD) Bridge Design Specifications (6th Edition, 2012) are presented in Table 3 below.

Table 3 – Seismic Design Parameters

Parameter	Value	AASHTO LRFD Bridge Design Specifications
Site Class	C	Table 3.10.3.1-1
F_{pga}	1.20	Table 3.10.3.2-1
F_a	1.20	Table 3.10.3.2-2
F_v	1.70	Table 3.10.3.2-3
A_s	0.068	Section 3.10.4.2
S_{DS}	0.156	Section 3.10.4.2
S_{D1}	0.071	Section 3.10.4.2
Seismic Zone	1	Table 3.10.6-1

9.5. Deep Foundations

9.5.1. Downdrag

The effects of downdrag were analyzed for the drilled shafts in accordance with the methods outlined in Sections 3.11.8 and 10.8.1.6.2 of the AASHTO LRFD Bridge Design Specification (6th Edition -2012). A settlement analysis was performed using the methodology outlined above using the idealized soil profile presented Table 4. A fill surcharge of 4,750 psf, which corresponds to 35 feet of new embankment fill was also used for the settlement analysis. The results of the settlement analysis indicated the settlement within any idealized soil layer was less than 1/4 inch, which is less than the required amount to for downdrag to fully develop within the idealized soil layer. Therefore, downdrag is not considered to be a design constraint for the drilled shafts at the site.

Table 4 – Downdrag Idealized Soil Profile

Approximate Depth bgs (ft) ¹	Soil Type		Effective Unit Weight (pcf) ³	N ₆₀ (blows/ft) ²
	Density	Soil Classification		
0'-5'	Dense	Clayey Sand	110	31
5'-15'	Dense	Silty Sand	110	34
15'-25'	Very Dense	Clayey Sand	115	37
25'-35'	Very Dense	Silty Sand	115	25
35'-45'	Medium Dense to Dense	Clayey Sand	115	14
45'-55'	Medium Dense	Silty Sand	120	17
55'-65'	Medium Dense to Dense	Silty Sand	120	21
65'-70'	Dense	Clayey Sand	120	30
70'-80'	Very Dense	Silty Sand	120	36
Note: 1. Approximate depth bgs 0-ft corresponds to Elevation 1,455 ft. 2. N ₆₀ is energy-corrected Standard Penetration Test N-value. 3. No groundwater was encountered during exploration and soils exhibit drained behavior. 4. Depth of 80-ft represent the bottom of the borings.				

9.5.2. Drilled Shafts

Axial drilled shaft capacities were evaluated using side friction resistance and end bearing resistance in accordance with the methods outlined in AASHTO LRFD Bridge Design Specifications (6th Edition - 2012), Section 10.8. Specifically, the Beta Method, for drained soil conditions, was used to calculate shaft axial capacities. The upper 5 feet of soil was neglected in the capacities to account for utilities or other disturbance. The effects of downdrag loads at the abutments were not considered because of the granular nature of the subsurface materials and the analysis indicated no significant post-construction downdrag loads.

Strength Axial Resistance Charts and Service Axial Resistance Charts (with selected values of settlement at the top of the shaft) for Jimmie Kerr Blvd TI OP are presented on Figures 3A through 6F. The charts were developed in accordance with AASHTO (2012) Section 10.8.3.5.2 using averaged N-values obtained from our borings, unit

weights obtained from laboratory testing, the Beta Method for sandy soils, and with the idealized soil profiles presented in Table 5 and 6 for the piers and abutments, respectively.

Table 5 – Idealized Soil Profile for the Piers

Approximate Depth bgs (ft) ¹	Soil Type		Effective Unit Weight (pcf) ³	N ₆₀ (Blows/ft) ²
	Density	Soil Classification		
0'-5'	Medium Dense	Clayey Sand	110	19
5'-10'	Dense	Clayey Sand	110	24
10'-15'	Medium Dense	Silty Sand	115	26
15'-25'	Medium Dense to Dense	Silty Sand	115	27
25'-35'	Medium Dense to Dense	Clayey Sand	115	30
35'-50'	Medium Dense to Dense	Clayey Sand	120	27
50'-75'	Medium Dense	Silty Sand	120	20
75'-95'	Medium Dense	Silty Sand	120	13
95'-100'	Medium Dense	Clayey Sand	120	28
100'-115'	Medium Dense	Silty Sand	120	24
115'-120'	Medium Dense to Dense	Silty Sand	120	30
Note: 1. Approximate depth bgs 0 corresponds to Approximate Elevation 1,455 ft. 2. N ₆₀ is energy-corrected Standard Penetration Test N-value. 3. No groundwater was encountered during exploration and soils exhibit drained behavior. 4. Depth of 120-ft represents the bottom of the borings.				

Table 6 – Idealized soil profile for the Abutments

Approximate Depth bgs (ft) ¹	Soil Type		Effective Unit Weight (pcf) ³	N ₆₀ (Blows/ft) ₂
	Density	Soil Classification		
0'-5'	Dense	Clayey Sand	110	31
5'-15'	Dense	Silty Sand	110	34
15'-45'	Medium Dense	Clayey Sand	115	14

Table 6 – Idealized soil profile for the Abutments

Approximate Depth bgs (ft) ¹	Soil Type		Effective Unit Weight (pcf) ³	N ₆₀ (Blows/ft, 2)
	Density	Soil Classification		
45'-55'	Medium Dense	Silty Sand	120	17
55'-65'	Medium Dense to Dense	Silty Sand	120	21
65'-70'	Dense	Clayey Sand	120	30
70'-80'	Very Dense	Silty Sand	120	36
Note: 1. Approximate depth bgs 0 corresponds to Approximate Elevation 1,455 ft. 2. N ₆₀ is energy-corrected Standard Penetration Test N-value. 3. No groundwater was encountered during exploration and soils exhibit drained behavior. 4. Depth of 80-ft represents the bottom of the borings.				

These design parameters and the idealized soil profile, along with the reductions factors were used in the analyses. The charts are for a redundant shaft in a group spaced with center-to-center spacing of 4 diameters or more and are also applicable for a shaft in a group consisting of a single row of shafts. The charts are in accordance with the O'Neill and Reese (1999) method using normalized load-transfer vs. settlement curves. For our analyses, we included the effects of elastic shortening of the shaft due to the axial loads. The minimum tip elevation of the drilled shafts at Jimmie Kerr TI OP is Elevation 1,395 feet (i.e., 60 feet bgs) for the piers and Elevation 1,405 feet (i.e., 50 feet bgs) for the abutments.

In accordance with AASHTO Section 10.8, drilled shafts in a group may be considered to act individually when the center-to-center (CTC) spacing is more than 4 diameters. For a drilled shaft in a group with center-to-center spacing of 2.5B (where B is the diameter of the shaft in question), the strength limit resistances should be reduced by multiplying the strength limit chart capacity by an efficiency factor, $\eta = 0.65$. This reduction factor should linearly increase until a spacing of 4B is achieved, at which

point the reduction factor is not applied ($\eta = 1.0$). For intermediate spacing, the reduction factor may be evaluated by linear interpolation.

For a single non-redundant drilled shaft foundation (such as a single shaft supporting a bridge pier), the strength limit chart resistances should be reduced by 20 percent to account for a reduction in resistance factors for this case. Similarly, for a group of 5 or more shafts, the strength limit chart resistances may be increased by 20 percent to account for an increase in resistance factors due to increased redundancy.

9.5.3. Lateral Load Parameters

The soil parameters recommended for lateral load analyses of drilled shafts of the pier and abutments are presented in Table 7 and Table 8, respectively. We understand that lateral load analysis of drilled shafts will be performed by others. For loading either in the direction in-line with the group of drilled shafts or in the direction perpendicular to a row of shafts, the lateral resistance (p-y curves) should be modified within the COM624P or LPILE program to account for group effects. This may be accomplished by using a p-multiplier to reduce the apparent resistance to lateral movement. These multipliers for drilled shaft spacing between 3 and 5 diameters center-to-center are discussed in AASHTO (2010) Section 10.7.2.4.

Table 7 – Soil Parameters for Lateral Load Analysis of Drilled Shafts - Piers

Approx. Depth Below Existing Ground Surface(ft) ¹	Soil Type to be used in Lateral Analysis	Effective Unit Weight, (pcf) ²	Cohesion (psf)	Angle of Internal Friction (degrees)	p-y modulus, K (lb/in ³)	Strain Factor E ₅₀
0'-40'	Sand (Reese Criteria)	120	0	32	90	—
40'-80'	Sand (Reese Criteria)	120	0	33	150	—

Table 7 – Soil Parameters for Lateral Load Analysis of Drilled Shafts - Piers

Approx. Depth Below Existing Ground Surface(ft) ¹	Soil Type to be used in Lateral Analysis	Effective Unit Weight, (pcf) ²	Cohesion (psf)	Angle of Internal Friction (degrees)	p-y modulus, K (lb/in ³)	Strain Factor E ₅₀
80'-120'	Sand (Reese Criteria)	125	0	34	225	—
Note: 1. Approximate depth bgs 0 corresponds to the ground surface of the current embankment at approximate Elevation 1,455 ft. 2. No groundwater was encountered during exploration and soils exhibit drained behavior. 3. Depth of 120 ft represents the bottom of the borings.						

Table 8 – Soil Parameters for Lateral Load Analysis of Drilled Shafts - Abutments

Approx. Depth Below Existing Ground Surface(ft) ¹	Soil Type to be used in Lateral Analysis	Effective Unit Weight, (pcf) ²	Cohesion (psf)	Angle of Internal Friction (degrees)	p-y modulus, K (lb/in ³)	Strain Factor E ₅₀
0'-40'	Sand (Reese Criteria)	120	0	32	90	—
40'-80'	Sand (Reese Criteria)	120	0	33	150	—
Note: 1. Approximate depth bgs 0 corresponds to the ground surface of the current embankment at approximate Elevation 1,455 ft. 2. No groundwater was encountered during exploration and soils exhibit drained behavior. 3. Depth of 80 ft represents the bottom of the borings.						

9.5.4. Drilled Shaft Construction Considerations

The drilled shaft construction should be observed and evaluated by the project geotechnical consultant to check that competent bearing material has been reached and that the bearing surface has been adequately cleaned.

Where possible, the drilled shafts should be constructed in the “dry” (i.e., no more than 3 inches of water covering the base of the drilled shaft excavation). Also, the bottom of

the hole should be cleaned such that no more than 3 inches of loose material remains. Depending on the type of auger used and the depth of the pier excavation, alternative cleaning techniques, including hand cleaning or vacuuming, may be needed. For drilled shafts constructed in the “dry”, the concrete may be placed by the free-fall method. This method consists of using a vertical section of concrete chute to direct the concrete flow out of the truck in a vertical stream of concrete with a relatively small diameter. The stream should be aimed to avoid hitting the sides of the drilled shaft or the reinforcing cage, which could cause concrete segregation. Adequate compaction will be achieved by free-fall of the concrete up to the top 10 feet. The top 10 feet of concrete should be vibrated in order to achieve proper compaction. The concrete should be designed so that the slump during placement is in the range of 4 to 6 inches for dry, uncased conditions.

Where the drilled shafts are constructed in the “wet”, a tremie pipe connected either to a hopper or concrete pump should be used to displace the water in the drilled shaft excavation upwards as the concrete is placed. If this method is used, detailed procedures should be submitted by the contractor for review and approval by the geotechnical engineer. The top 10 feet of concrete should be vibrated in order to achieve proper compaction. The concrete should be designed so that the slump during placement is in the range of 7 to 9 inches for conditions other than a dry, uncased hole.

We recommend that the drilled shafts installation and the foundation concrete mix design be in accordance with ADOT Standard Specification 609 (2008). A requirement of this specification includes submission of a detailed installation plan to the Engineer by the drilled shaft contractor. The Geotechnical Engineer should be given the opportunity to review the plans, specifications, and the contractor’s installation plan prior to construction.

9.6. Shallow Foundations

Shallow spread footings may be utilized for support of planned retaining walls on the project. As stated previously, our exploratory borings revealed fill and alluvial soils,

consisting primarily of clayey and silty sand, with varying amounts of gravel. Due to the compressible nature of soils present near the ground surface, we recommend that the existing foundation soils be overexcavated and replaced with compacted fill, as described below.

New engineered fill should be placed in horizontal lifts no more than approximately 8 inches in loose thickness and should be compacted by appropriate mechanical methods to a relative compaction of 95 percent, in accordance with ASTM D698 at a moisture content slightly above its optimum moisture. The overexcavated zone should extend to a depth of 2 feet below the foundation footing and extend laterally to the edge of the embankment.

Following the overexcavation described above, and prior to the placement of new fill, the resulting exposed surface should be carefully evaluated by the geotechnical consultant for the presence of loose and/or unsuitable soil. Based on this evaluation, additional remediation may be needed. This could include scarification of the exposed surface. This additional remediation, if needed, should be addressed by the geotechnical consultant during the earthwork operations.

The idealized soil profiles for the eastbound and westbound footing design analysis at the Jimmy Kerr Blvd TI are presented in Tables 9 and 10, respectively. The footing design was performed in general accordance with AASHTO (2012) and supplemented with the ADOT geotechnical design policies.

Table 9 – Idealized Soil Profile for the Eastbound Foundation

Approximate Depth bgs (ft) ¹	Soil Type		Effective Unit Weight (pcf) ³	N ₆₀ (Blows/ft) ²
	Density	Soil Classification		
0'-8.5'	Medium Dense	Clayey Sand	115	19
8.5'-15'	Medium Dense to Dense	Clayey Sand	115	24
15'-22'	Very Dense	Clayey Sand	115	26
25'-25'	Very Dense	Clayey Sand	115	27
25'-32'	Dense	Clayey Sand	115	30
32'-36'	Dense	Clayey Sand	115	27
36'-40'	Medium Dense	Clayey Sand	115	20
40'-55'	Dense	Clayey Sand	115	13
Note: 1. Approximate depth bgs 0 corresponds to the ground surface of the current embankment at approximate Elevation 1,478 ft. 2. N ₆₀ is energy-corrected Standard Penetration Test N-value. 3. No groundwater was encountered during exploration and soils exhibit drained behavior. 4. Depth of 55ft represents the bottom of the borings.				

Table 10 – Idealized Soil Profile for the Westbound Foundation

Approximate Depth bgs (ft) ¹	Soil Type		Effective Unit Weight (pcf) ³	N ₆₀ (Blows/ft) ²
	Density	Soil Classification		
0'-8'	Dense	Clayey Sand	115	27
8'-16'	Dense	Clayey Sand	115	36
16'-26'	Dense	Clayey Sand	115	44
26'-30'	Very Dense	Clayey Sand	115	45
30'-35'	Very Dense	Clayey Sand	115	60
35'-40'	Dense	Clayey Sand	115	68
40'-45'	Very Dense	Clayey Sand	115	42
40'-55'	Very Dense	Clayey Sand	115	92
Note: 1. Approximate depth bgs 0 corresponds to the ground surface of the current embankment at approximate Elevation 1,480 ft. 2. N ₆₀ is energy-corrected Standard Penetration Test N-value. 3. No groundwater was encountered during exploration and soils exhibit drained behavior. 4. Depth of 55ft represents the bottom of the borings.				

For use in footing design, a Factored Bearing Resistance Chart is presented for the proposed footings on Figure 7A for the eastbound wall and Figure 7B for the westbound wall. The factored net bearing resistance on the vertical axis corresponds to the equivalent “net” uniform (Meyerhoff) stress on an equivalent footing with a calculated “effective” footing width B' based on load eccentricity (AASHTO, 2012). The weight of any soil above the footings should be added to the weight of the structure when calculating the total factored equivalent uniform vertical bearing pressure, q_{tveu} . An estimated unit weight of 120 pcf may be assumed for compacted soil density above spread footings. For computing the “net” equivalent uniform vertical bearing pressures, q_{nveu} , the weight of concrete plus soil above base-of-footing level (to finished grade) times the appropriate load factor should be subtracted from q_{tveu} . As an approximation, the difference in unit weights of concrete and soil can be neglected, i.e., the soil unit weight may substitute as for the weight of material (concrete plus soil) above base of footing level.

The assumed footing depths and lengths noted above and presented on the Factored Bearing Resistance Charts are based on design information provided to us. A minor change in footing depth or length will not significantly alter the Service Limit Settlement Curves. However, a notable change in footing depth may have a significant effect on the Strength Limit Curve. We should be contacted in the event that recommendations are needed for different footing geometry or footing depths.

It should be noted that the settlements noted on the attached design curves represent immediate elastic settlements plus estimated creep for a period of 1 year, based on the existing soil moisture conditions. Long-term ponding of water near footings may increase the post-construction settlement. It is our understanding that following excavation and construction of the footings, the area will be backfilled and graded such that water will not pond near newly constructed footings.

In accordance with AASHTO (2012), spread footings that are subject to lateral loadings may be designed using a coefficient of friction of 0.58 for cast-in-place structures for strength

limit state design. An ultimate passive resistance of up to 300 psf per foot of depth can be used up to a value of 3,000 psf.

9.7. Lateral Earth Pressures

Equivalent fluid unit weights of soil recommended below were estimated in accordance with AASHTO Section 3.11.5 for a free draining (no hydrostatic pressure) horizontal backfill, and a vertical wall. For calculation of lateral earth pressures, formed or precast concrete against granular soil was assumed. In addition, we assumed an average effective angle of internal friction of the backfill of 32 degrees and the backfill unit weight of 125 pcf.

Retaining walls that are not restrained from movement at the top and have a level backfill behind the wall may be designed using an “active” equivalent fluid unit weight of 38 pcf. This value assumes that compaction within about 5 feet of the wall will be accomplished with relatively light compaction equipment, and that very low-to-low expansive backfill will be placed behind the wall. Unrestrained retaining walls and below-grade walls should also be designed to resist a lateral surcharge pressure of $0.31q$. The value for “q” represents the vertical pressure induced by adjacent light loads, slab, or traffic loads plus any adjacent footing loads. The wall displacement required to mobilize the active pressure is approximately 5 percent of the wall height ($0.005H$).

The “at-rest” earth pressure against walls that are restrained at the top or braced so that they cannot yield, such as culvert walls, and with level backfill, may be taken as equivalent to the pressure exerted by a fluid weighing 59 pcf. Restrained retaining walls should also be designed to resist a lateral earth pressure of $0.47q$. The value for “q” represents the vertical pressure induced by adjacent light loads, slab, or traffic loads plus any adjacent footing loads.

Measures should be taken so that moisture does not build up behind any retaining walls. Back drainage measures should include free-draining backfill material and perforated drainpipes or weep holes. Drainpipes should outlet away from structures, and retaining walls

should be waterproofed in accordance with the recommendations of the project civil engineer or architect. To reduce the potential for water- and sulfate/salt-related damage to the retaining walls, particular care should be taken in the selection of the appropriate type of waterproofing material to be utilized and in the application of this material. Drainage should consist of free-draining granular material and could be accompanied by weep holes through the walls or corrugated, perforated pipe placed parallel to the wall or abutment bottom, wrapped in a filter fabric, and surrounded by 6 or more inches of a granular filter material (e.g., pea gravel or drain rock). In lieu of the wrapped open-graded gravel, a geocomposite drainage mat attached to the wall and discharging to a drain pipe or weep holes may be considered.

9.8. Constructed Slopes

Based on the boring information and our experience with similar projects, we recommend that temporary cut slopes associated with this project be constructed no steeper than 1.5:1 (H:V) and that permanent cut and fill slopes associated with this project be constructed no steeper than 2.5:1 (H:V). New embankment fills should be benched into existing embankments, where appropriate. Benches should be level and wide enough to allow operation of, and compaction by, construction equipment. Fill slopes should be constructed in a manner (e.g., overfilling and cutting to grade) such that the recommended degree of compaction is achieved to the finished slope face. Cut and fill slopes should be protected from erosion.

9.9. Embankment Settlement

Embankment fills up to approximately 35 feet in height are planned. Based on our analysis, these fills may settle up to about 2 inches beneath the center of the fills. This estimate includes the overexcavation recommendations provided above. A majority of this settlement is anticipated to occur during placement of the fill. Therefore, if structural elements or other rigid features are planned to be constructed within the influence zone of the embankment fills and prior to placement of the fill, they should be designed to accommodate differential

settlement on the order of 1 inch over a distance of about 40 feet for the higher embankments. Post-construction settlement of the embankment fills is anticipated to be less than 1 inch, provided the fill is placed as required by the Standard Specifications and recommendations contained in this report. Preloading of select sites could be considered to reduce the amount of settlement under embankment loads.

Calculated settlements were estimated using the Schmertmann method for sands. The settlement was calculated using E_s modulus values based on correlation to the N_{60} SPT blow count values, using methods presented in Foundation Design, by Donald P. Coduto, Section 7.6. For large loaded areas, such as embankments or mat foundations, Coduto recommends progressively increasing the E_s values with depth such that E_s at a depth of 100 feet is 3 times that calculated from SPT correlations. We used the depth-adjusted values of E_s to calculate the embankment and retaining wall settlements presented in this report.

9.10. Embankment Slope Stability

Slope stability was evaluated using SVSlope™ software, which is part of SVOOffice 2009, Version 2.4.21, from SoilVision Systems Ltd. SVSlope can be used to estimate slope stability using a variety of methods. For this project, the Spencer method, one of several limit equilibrium method of slices, and circular failure surfaces, were used. For the Spencer method, it is assumed that the ratio of interslice shear force to the interslice normal force is constant throughout the sliding mass.

9.10.1. Slope Stability Material Properties

A summary of the material properties used in the analysis are presented in Table 11. The shear strength and unit weight parameters were estimated using from SPT correlations, unit weights obtained from laboratory testing, and our experience with similar materials.

Table 11 – Stability Analysis Material Properties

Material	Unit Weight (pcf)	Shear Strength Parameters	
		phi' (deg.)	C' (psf)
Alluvium	115.0	30	0
Existing embankment fill	130.0	35	0
New embankment fill	135.0	35	0
Concrete	150.0	0	12,500*
Note: * Concrete strength per SVSLOPE Slope Stability Modeling Software.			

The critical embankment sections evaluated for the final design configuration were located at Station 2793+98 and Station 2801+50. The two cases evaluated were as follows: (1) End of construction Station 2793+98, left and right face; and (2) End of construction Station 2801+50, left and right face. For the evaluation performed for Section 2793+98, we assumed that the new embankment fill would be founded on 5 feet of engineered fill and the over-excavation extended 5 feet laterally. For the evaluation performed for Station 2801+50, we assumed the retaining wall had a base width of 8-feet, were embedded 2-feet below the existing embankment surface, and wall terminated at elevation 1,489 feet.

9.10.2. Slope Stability Results

A summary of the slope stability analyses results, for the critical sections at Station 2793+98 and Station 2801+50 is presented in Table 6.

Table 12 – Stability Analysis Results

Design Case	Station	Minimum Factor of Safety*	Calculated Factor of Safety
End of Construction, Left face	2793+98	1.5	1.8
End of Construction, Right face	2793+98	1.5	1.7
End of Construction, Left face	2801+50	1.5	1.5
End of Construction, Right face	2801+50	1.5	1.5
Note: * Minimum factor of safety per FHWA 2013.			

Based on the tabulated results, the planned embankment configuration meets the requirements for minimum slope stability factor of safety for the design cases analyzed. Each case analyzed produced surficial slope failure such that the critical slip surface and the additional 250 most critical failure surfaces penetrated into the slope faces no more than 8 feet, as depicted in Figures 8A through 8B.

9.11. Corrosivity Information

The corrosivity information given below is based on the corrosivity tests performed on select soil samples obtained from our explorations. For details with respect to these tests, please refer to Appendix B.

Table 13 – Corrosivity Test Results

Test Location	Approximate Station, Offset	Sample Depth (ft).	Water Soluble Sulfate Content in Soil, %	Chloride Content, ppm	pH	Resistivity (ohm-cm)
HA-3	2719+70;10'R±	0.0-3.0	0.006	40	7.9	1,680
HA-4	2746+40;10'R±	0.0-3.0	0.008	40	7.6	1,210
HA-5	2759+80;10'R±	0.0-3.0	0.011	60	7.5	680
HA-6	31+60; 10'R±	0.0-3.0	0.013	90	7.7	1,010

Table 13 – Corrosivity Test Results

Test Location	Approximate Station, Offset	Sample Depth (ft).	Water Soluble Sulfate Content in Soil, %	Chloride Content, ppm	pH	Resistivity (ohm-cm)
HA-7	13+80; 10'R±	0.0-3.0	0.008	20	7.3	1,680
HA-8	11+50; 10'R±	0.0-3.0	0.008	10	7.7	5,100
HA-9	2812+70;10'R±	0.0-3.0	0.013	150	7.7	940
HA-10	2828+50;10'R±	0.0-3.0	0.008	20	7.5	4,030
HA-11	2847+80;10'R±	0.0-3.0	0.005	30	7.4	5,230

9.12. Water Requirements

Approximately 90 gallons of water per cubic yard may be estimated for compaction of embankment materials, and approximately 70 gallons of water per cubic yard for compaction of AB materials. This includes a conservative overrun for losses due to seepage, evaporation, inadequate mixing, spillage, etc. Precipitation during and/or before construction may also reduce the amount of water significantly.

9.13. Site Drainage

Drainage should be provided to divert water away from the paved surfaces and foundation elements. Surface water should not be permitted to pond on pavement areas. Positive drainage is defined as a slope of 2 percent or more for a distance of 5 feet or more away from the pavements.

Erosion protection may be needed for the new soil embankments. These protection measures may include grading, riprap, gravel mulch, geotextiles, gabion mats, concrete lining, soil-cement lining, bio-reinforcement, or methods considered appropriate by the design engineer.

9.14. Pre-Construction Conference

We recommend that a pre-construction conference be held. Representatives of the owner, the civil engineer, the geotechnical consultant, and the contractor should be in attendance to discuss the project plans and schedule. Our office should be notified if the project description included herein is incorrect, or if the project characteristics are significantly changed.

9.15. Construction Observation and Testing

We recommend that the on-site geotechnical representative perform construction-phase observation and testing services for the project. These services should be performed to evaluate exposed subgrade conditions, including the extent and depth of overexcavation (if needed), to evaluate the suitability of proposed borrow materials for use as fill, and to observe placement and test compaction of fill soils. Qualified subcontractors utilizing appropriate techniques and construction materials should perform construction of the proposed improvements.

10. LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

11. REFERENCES

- American Association of State Highway and Transportation Officials (AASHTO), 2007, Seismic Design Parameters Application, Version 2.10.
- American Association of State Highway and Transportation Officials (AASHTO), 2012, LRFD Bridge Design Specifications, 6th Edition.
- American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards.
- Arizona Department of Transportation (ADOT), 1989, Preliminary Engineering and Design Manual, Materials Section, ADOTM-XII-TWO-C, 3rd Edition, March.
- Arizona Department of Transportation (ADOT), 2008, Standard Specifications for Road and Bridge Construction.
- Arizona Department of Water Resources (ADWR), 2010, Land Subsidence in the Eloy Sub-Basin, Pinal County, January 14, 2004 – September 29, 2010.
- Arizona Department of Water Resources (ADWR), 2013, Land Subsidence in the Eloy Sub-Basin, Pinal County, May 15, 2010 – March 31, 2014.
- Arizona Department of Water Resources (ADWR), Well Registry Application, <https://gisweb.azwater.gov/waterresourcedata/>.
- Bergquist, J.R., and Blacet, P.M., 1978, Preliminary reconnaissance bedrock geologic map of part of the Casa Grande Mountains quadrangle, Pinal County, Arizona: U.S. Geological Survey, Open-File Report OF-78-547, scale 1:24,000.
- Coduto, Donald P., 1993, Foundation Design: Principles and Practices, 720pp.
- Euge, K.M., Schell, B.A., and Lam, I.P., 1992, Development of Seismic Acceleration Contour Maps for Arizona: Arizona Department of Transportation Report No. AZ pp. 92-344: dated September.
- Federal Highway Administration (FHWA), 2013, Deep Mixing for Embankment and Foundation Support.
- Ninyo & Moore, In-house proprietary information.
- Occupational Safety and Health Administration (OSHA), Title 29 of the Code of Federal Regulations (CFR), Part No. 1926 - Safety and Health Regulations for Construction, Subpart P - Excavations.
- Pearthree, P.A., 1998, Quaternary Fault Data and Map for Arizona: Arizona Geological Survey, Open-File Report.

Schumann, H.H. and Genualdi, R., 1986, Land Subsidence, Earth Fissures, and Water level Changes in Southern Arizona: Arizona Geological Survey OFR 86-14, Scale 1:500,000.

SoilVision Systems Ltd., 2012, SVSlopeTM, 2D/3D Slope Stability Analysis.

SoilVision Systems Ltd., 2012, SVOOffice 2009, Next Generation Geotechnical Software.

United States Department of Agriculture Web Soil Survey,
<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.

United States Geological Survey (USGS), 2014, Humboldt Quadrangle, Yavapai Arizona, 7.5-Minute Series (Topographic): Scale 1:24000.

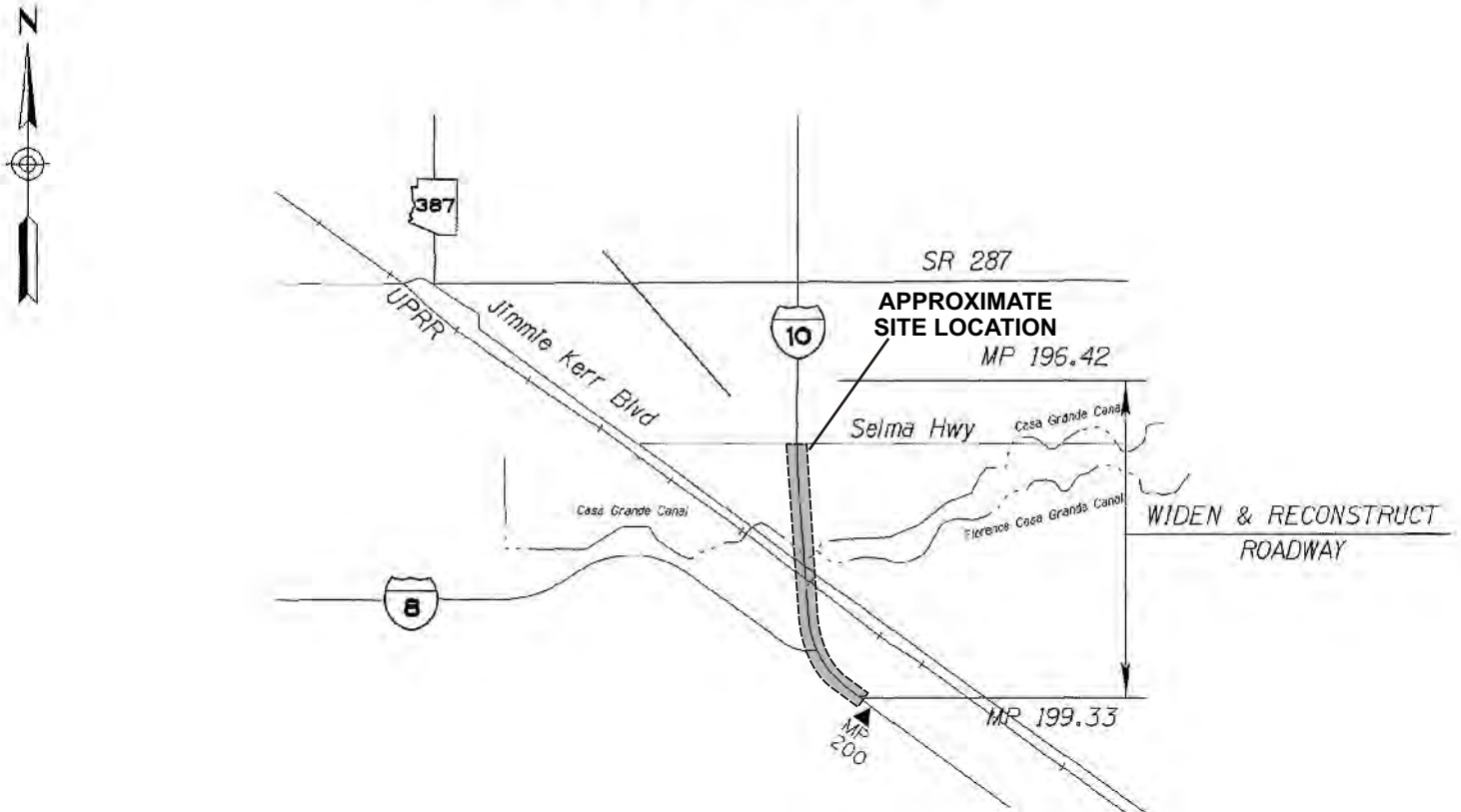
Aerial Photographs Reviewed

Source	Date(s)
Google Earth TM	1992,1996,2002, 2003 – 2007, 2010 – 2014

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

PROJECT PLANS

STATE HIGHWAY
CASA GRANDE - TUCSON HWY
INTERSTATE 10



EARLEY RD - JCT I-8

PROJECT NO. 010 PN 196 H7984 01C
FEDERAL AID NO. NH-010-C(206)A

Ninyo & Moore

SITE LOCATION

FIGURE

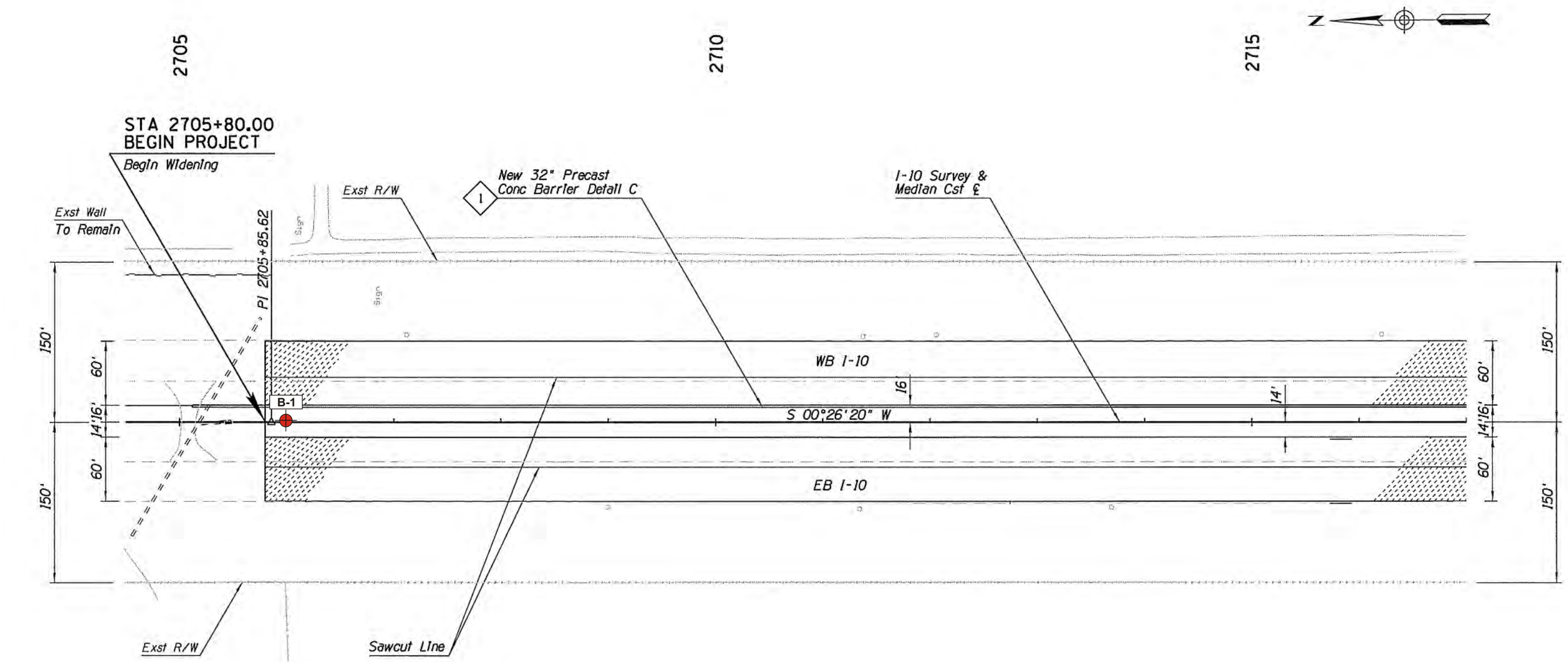
PROJECT NO:
601808009

DATE:
9/15

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

1

file no.: 1808bm0515c



LEGEND

- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location

0 100
Approximate Scale:
1 inch = 100 feet

Source: Parsons Brinckerhoff, 09/14.
Note: Dimensions, directions, and locations are approximate.

Ninyo & Moore

PROJECT NO:
601808009

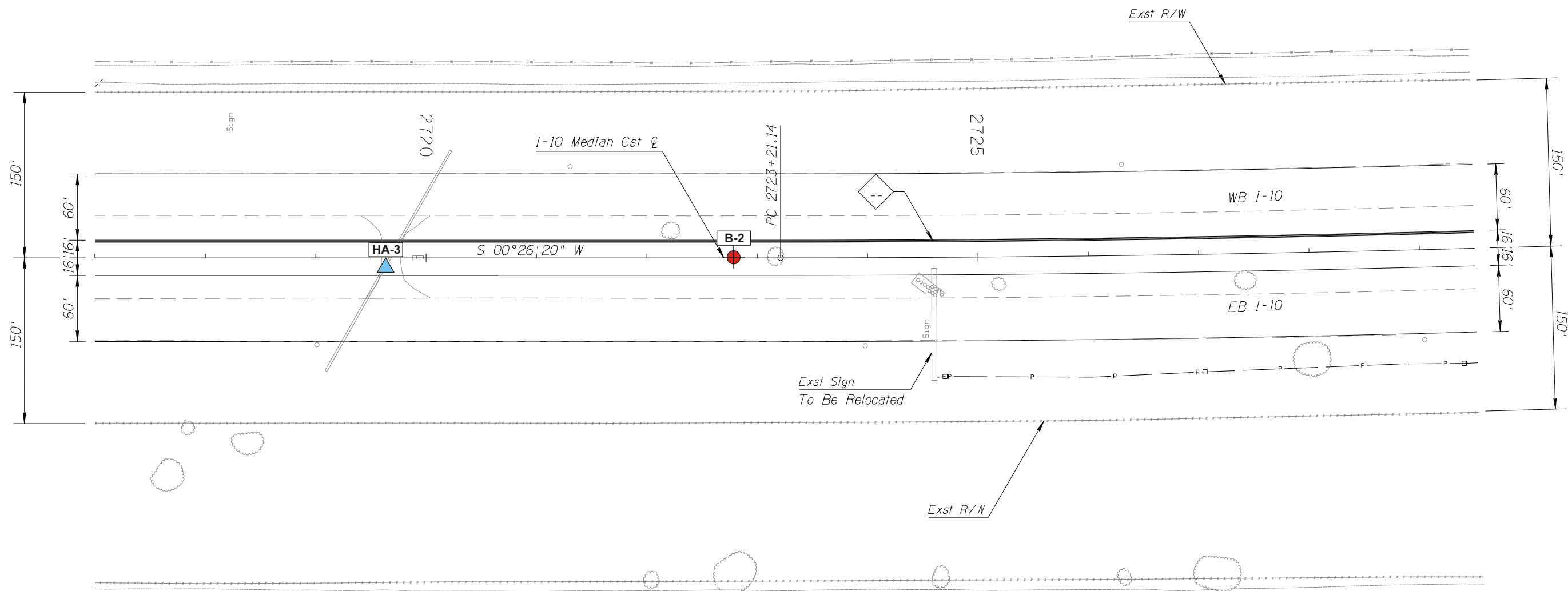
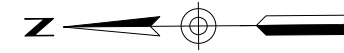
DATE:
9/15

EXPLORATION LOCATIONS

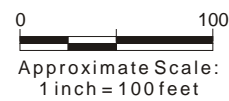
I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

2A



LEGEND	
B-1	Boring Location
RW-1	Boring Location
BR-1	Bridge Boring Location
HA-3	Hand Auger Location

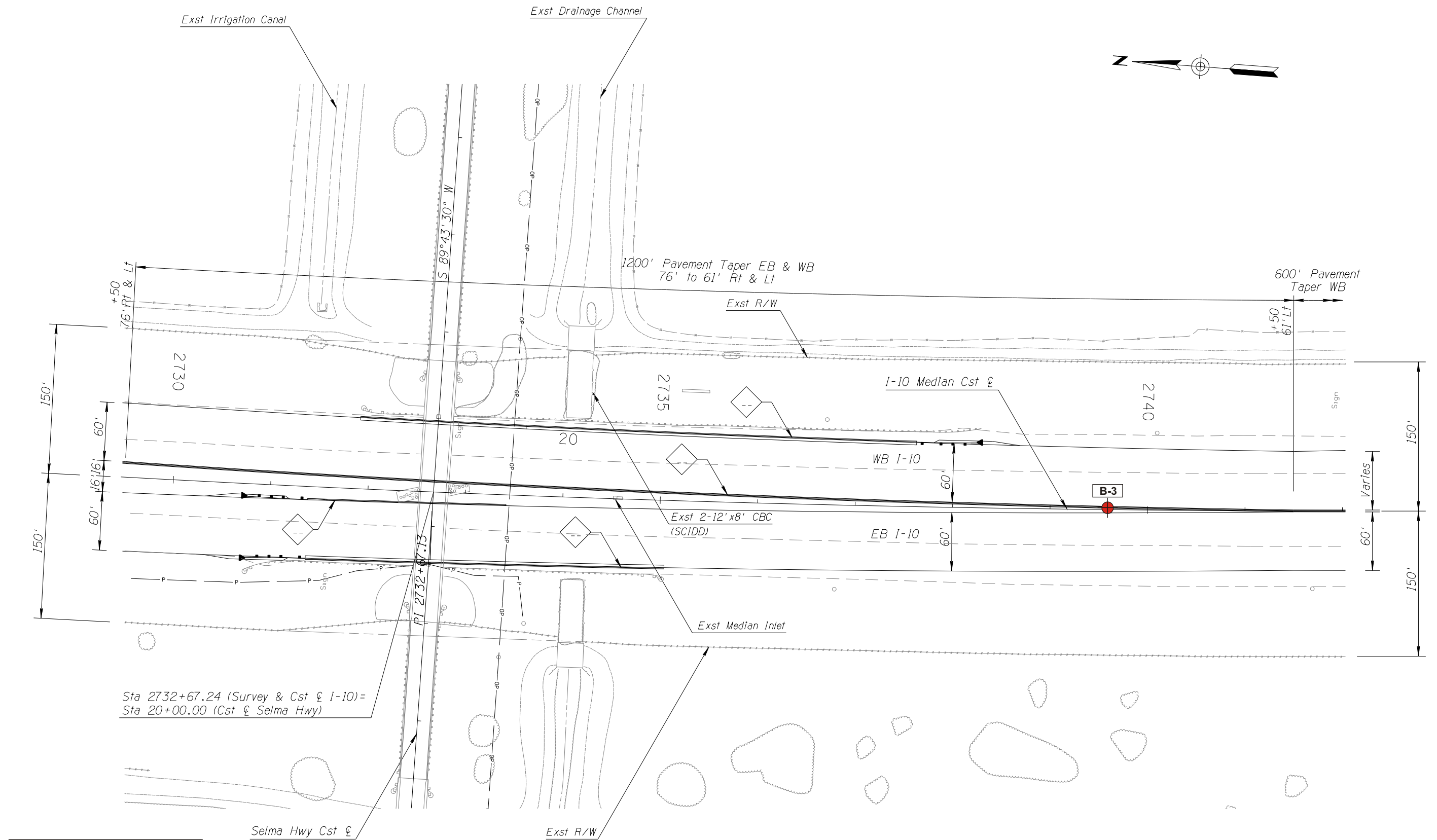


Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

		EXPLORATION LOCATIONS	FIGURE 2B
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	

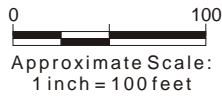
file no.: 1808bm0515d

file no.: 1808bm0515e



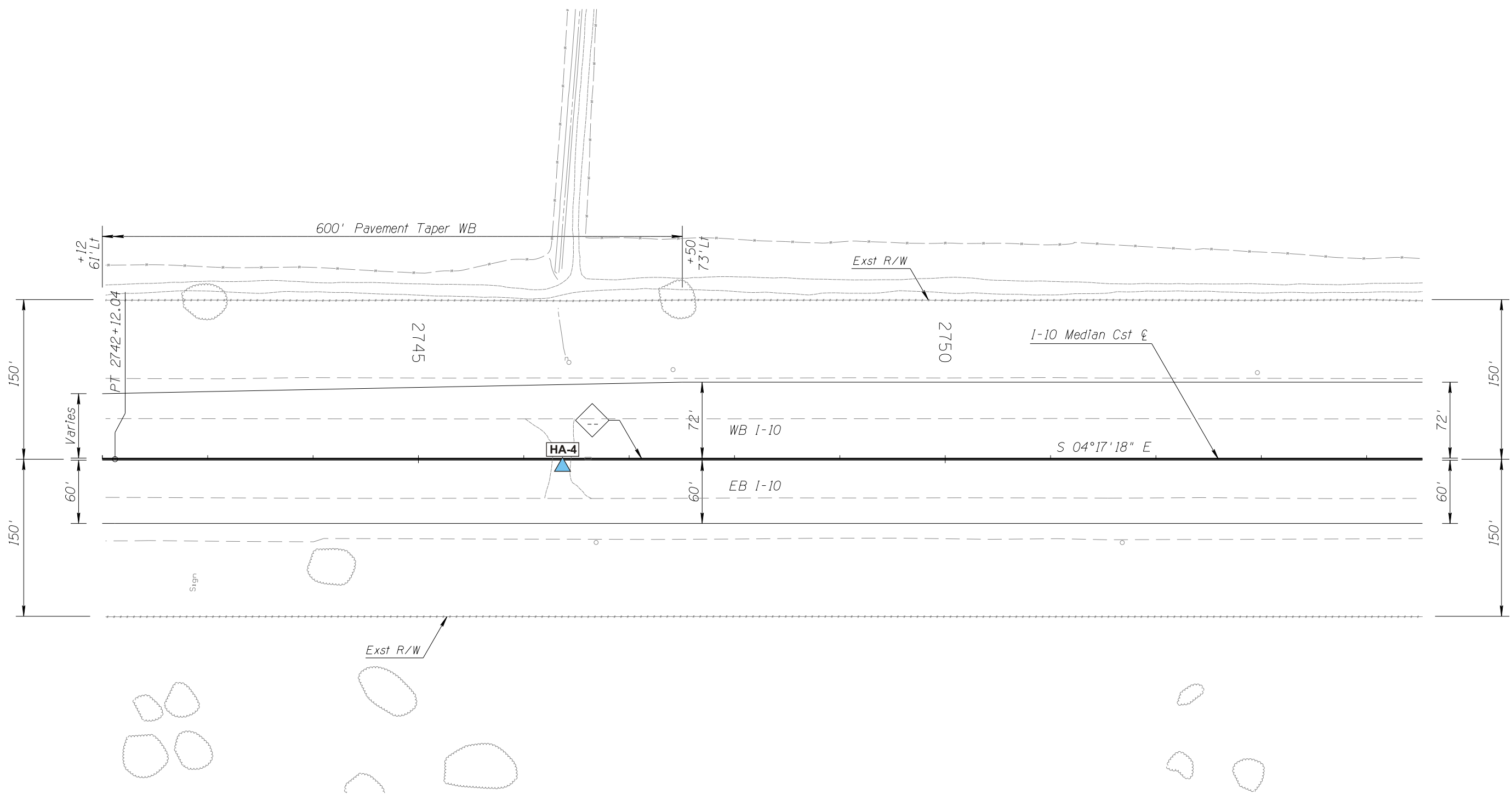
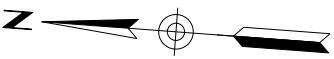
LEGEND

B-1		Boring Location
RW-1		Boring Location
BR-1		Bridge Boring Location
HA-3		Hand Auger Location



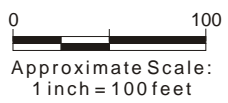
Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

		EXPLORATION LOCATIONS	FIGURE 2C
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	



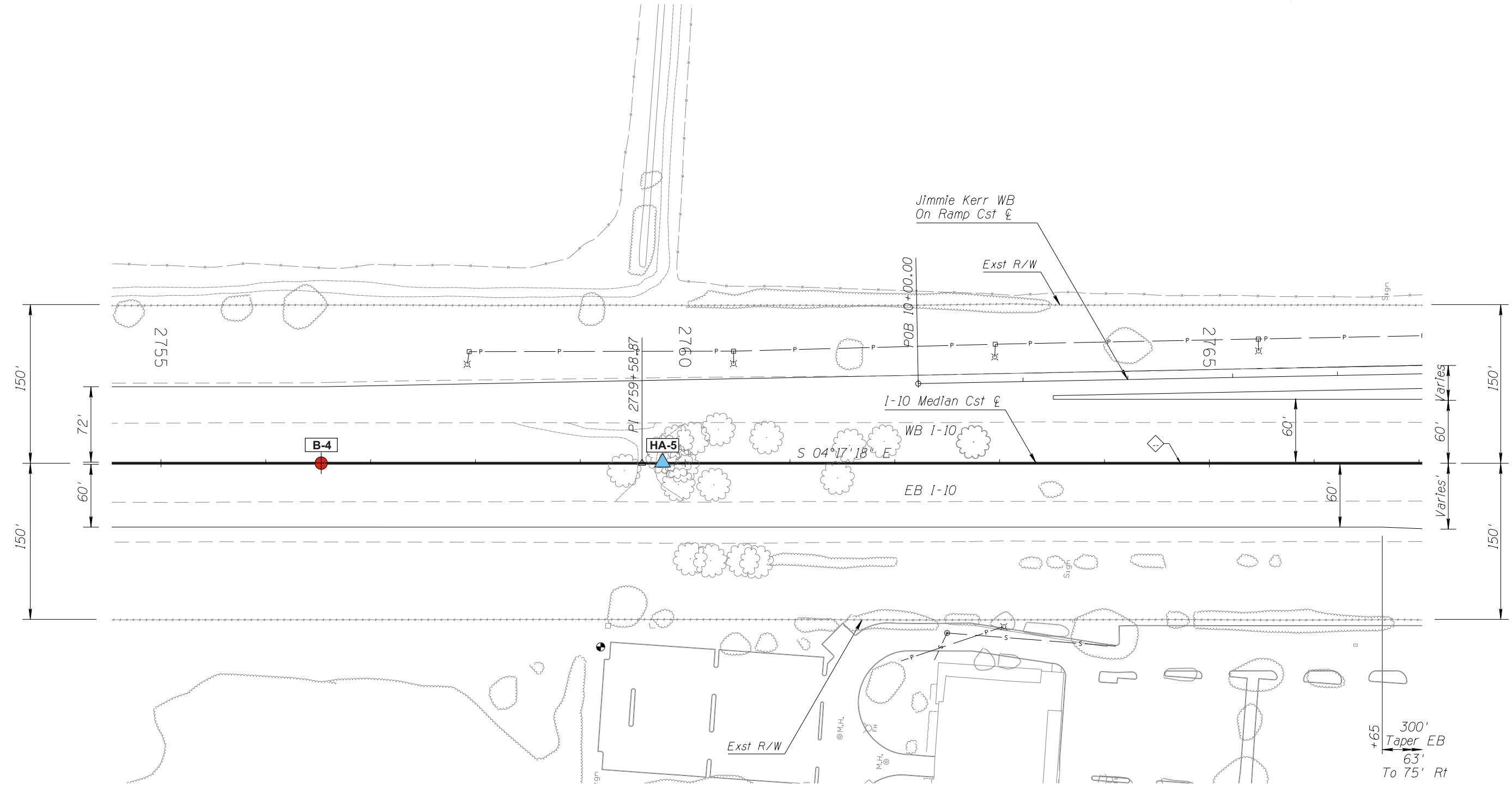
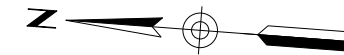
LEGEND

- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location



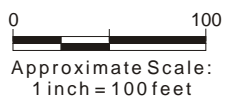
Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

		EXPLORATION LOCATIONS	FIGURE 2D
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	



LEGEND

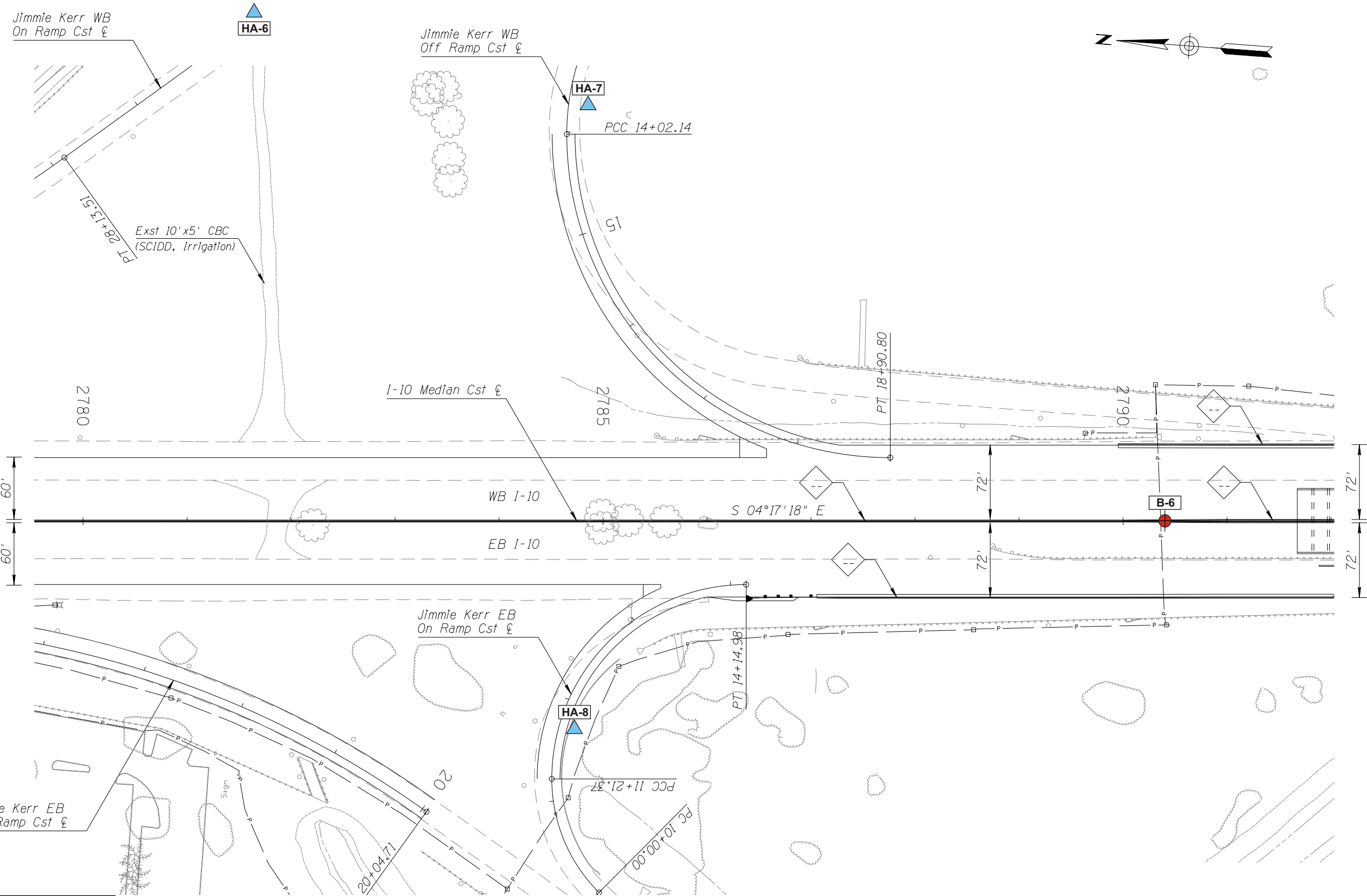
- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location



Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

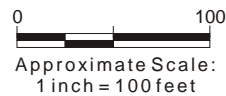
		EXPLORATION LOCATIONS	FIGURE 2E
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	

file no.: 1808bm0515g



LEGEND

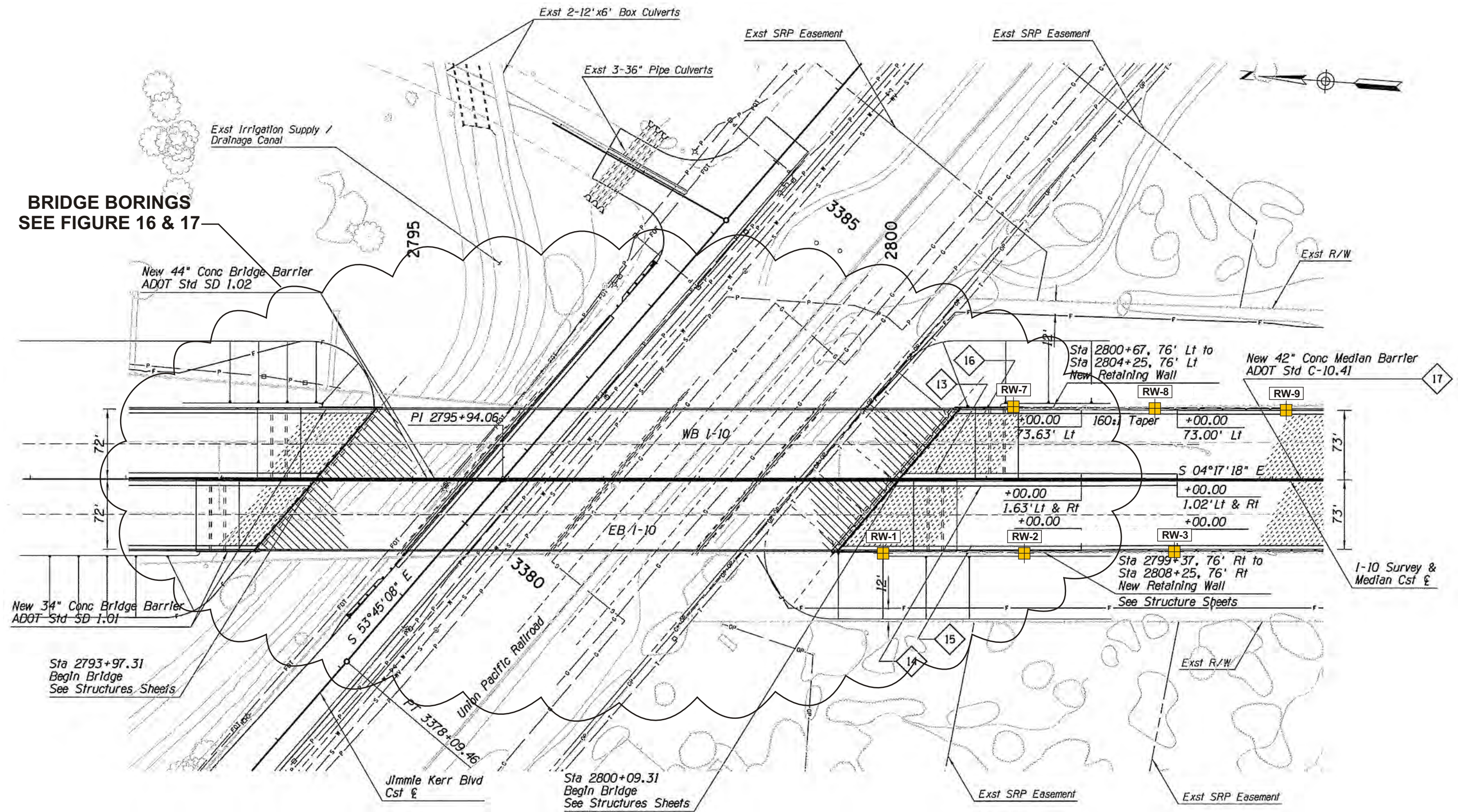
- B-1** Boring Location
- RW-1** Boring Location
- BR-1** Bridge Boring Location
- HA-3** Hand Auger Location



Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

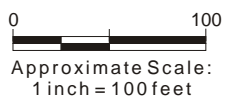
		EXPLORATION LOCATIONS	FIGURE 2G
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	

BRIDGE BORINGS
SEE FIGURE 16 & 17



LEGEND

- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location



Source: Parsons Brinckerhoff, 09/14.
Note: Dimensions, directions, and locations are approximate.

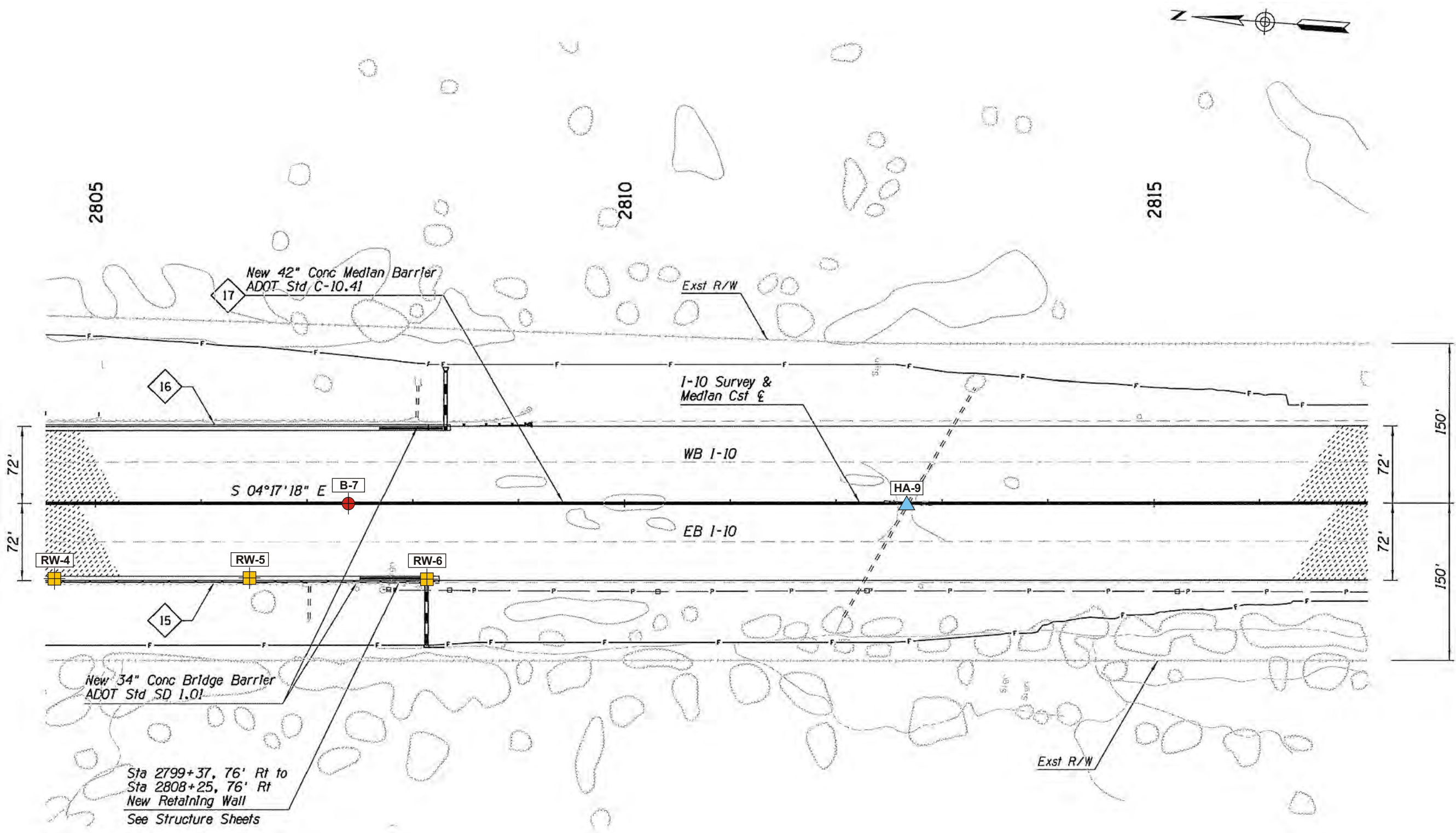
Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

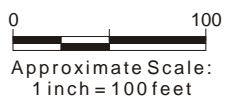
EXPLORATION LOCATIONS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA



LEGEND

- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location

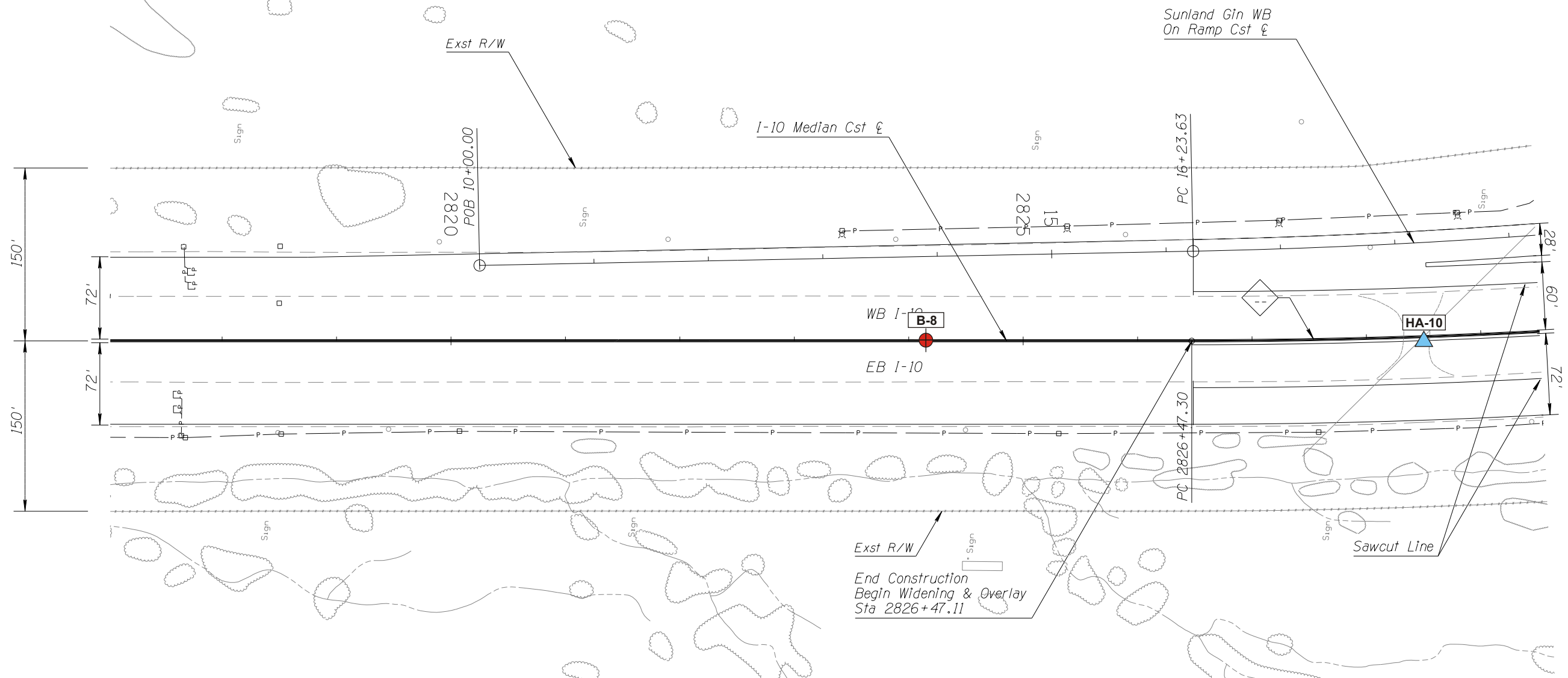
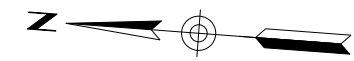


Source: Parsons Brinckerhoff, 09/14.
 Note: Dimensions, directions, and locations are approximate.

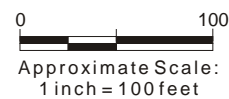
		EXPLORATION LOCATIONS		FIGURE
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		21

file no.: 1808bm0515k

file no.: 1808bm05151

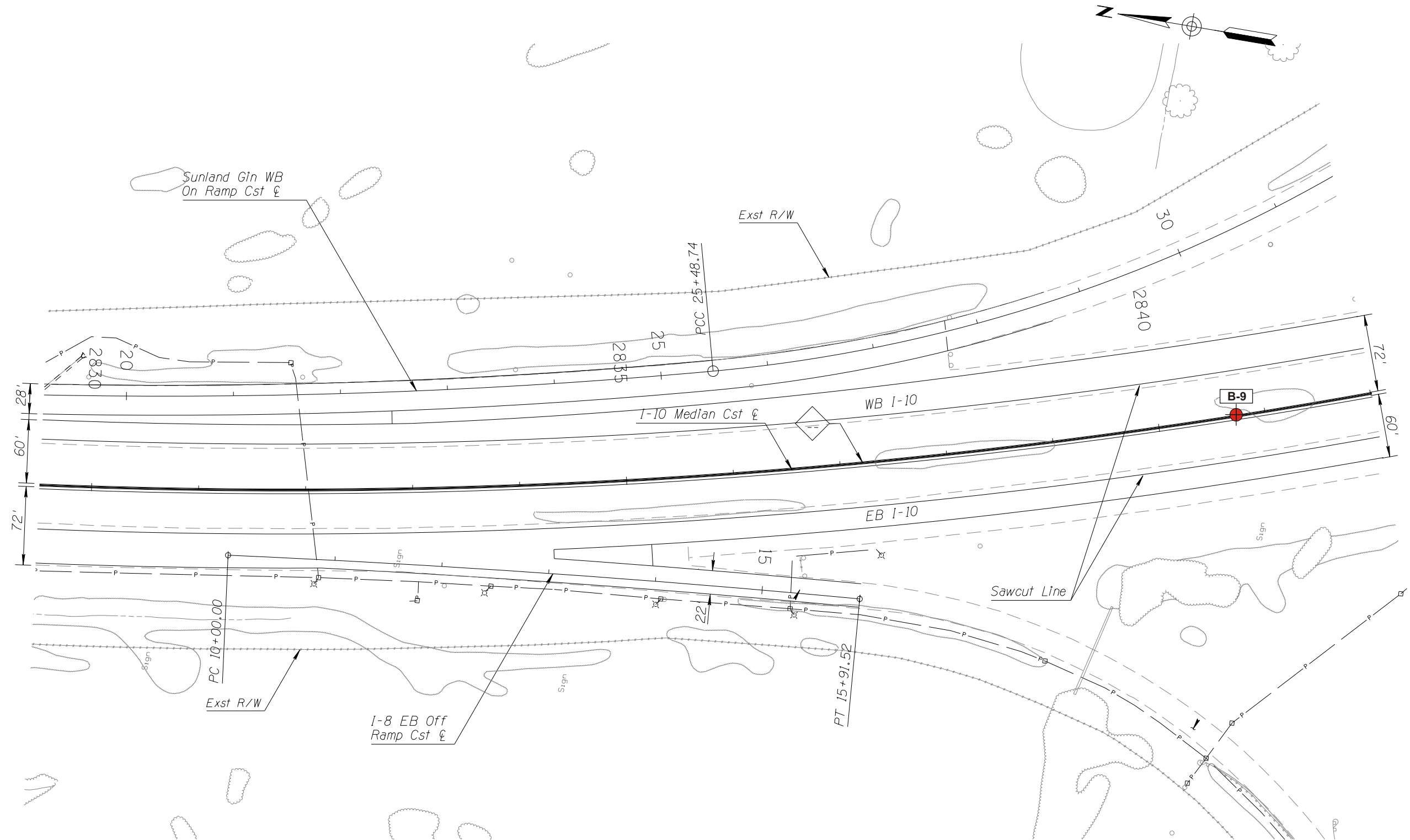


LEGEND	
B-1	Boring Location
RW-1	Boring Location
BR-1	Bridge Boring Location
HA-3	Hand Auger Location



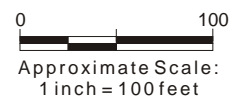
Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

Ninyo & Moore		EXPLORATION LOCATIONS	FIGURE 2J
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	



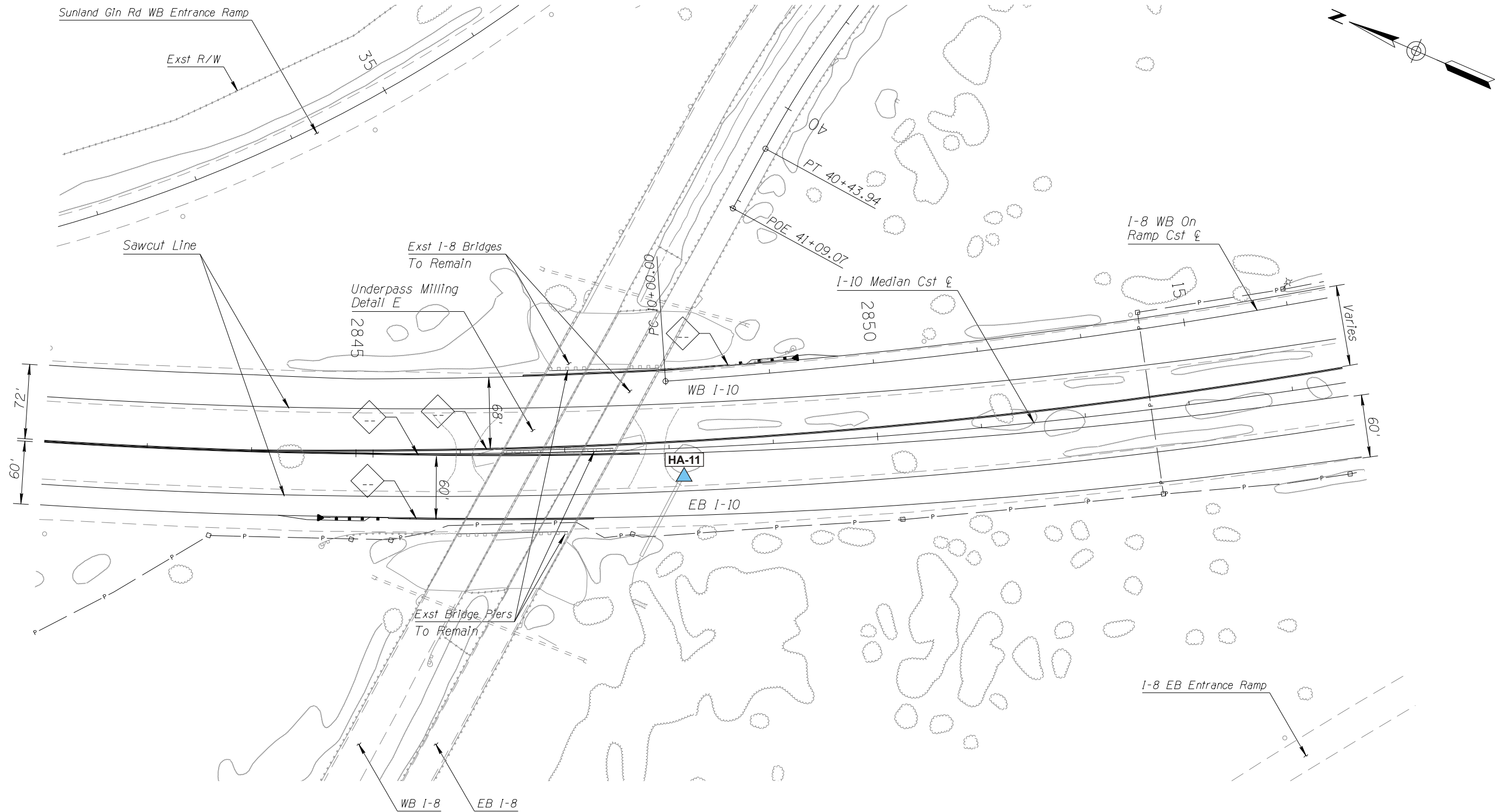
LEGEND

- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location



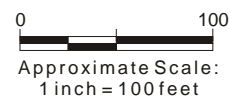
Source: Parsons Brinckerhoff, 04/14.
 Note: Dimensions, directions, and locations are approximate.

		EXPLORATION LOCATIONS	FIGURE 2K
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	



LEGEND

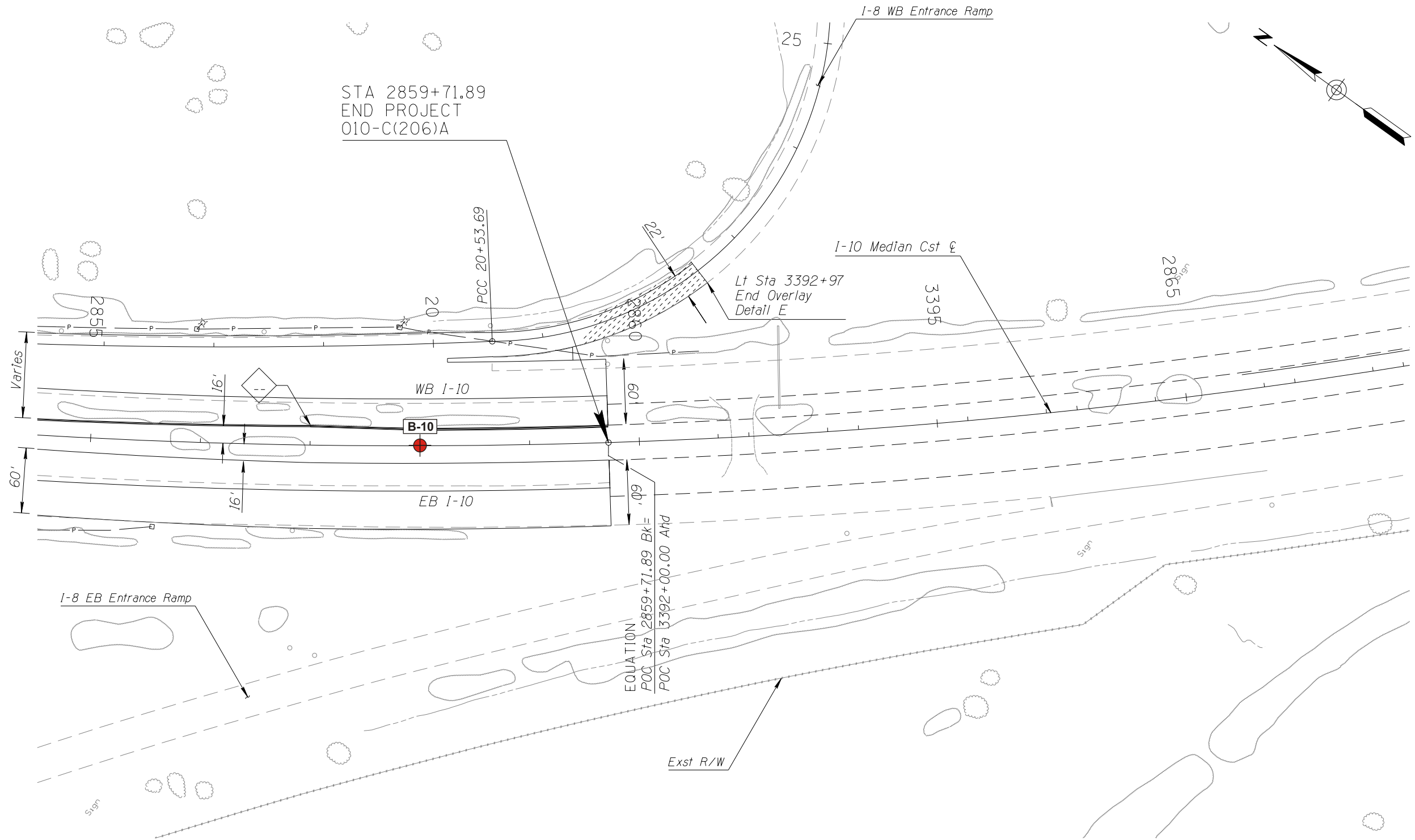
- B-1 Boring Location
- RW-1 Boring Location
- BR-1 Bridge Boring Location
- HA-3 Hand Auger Location



Source: Parsons Brinckerhoff, 04/14.
 Note: Dimensions, directions, and locations are approximate.

		EXPLORATION LOCATIONS	FIGURE 2L
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	

file no.: 1808bm0515n



LEGEND

- Boring Location
- Boring Location
- Bridge Boring Location
- Hand Auger Location

0 100
Approximate Scale:
1 inch = 100 feet

Source: Parsons Brinckerhoff, 04/14.
Note: Dimensions, directions, and locations are approximate.

Ninyo & Moore

PROJECT NO:
601808009

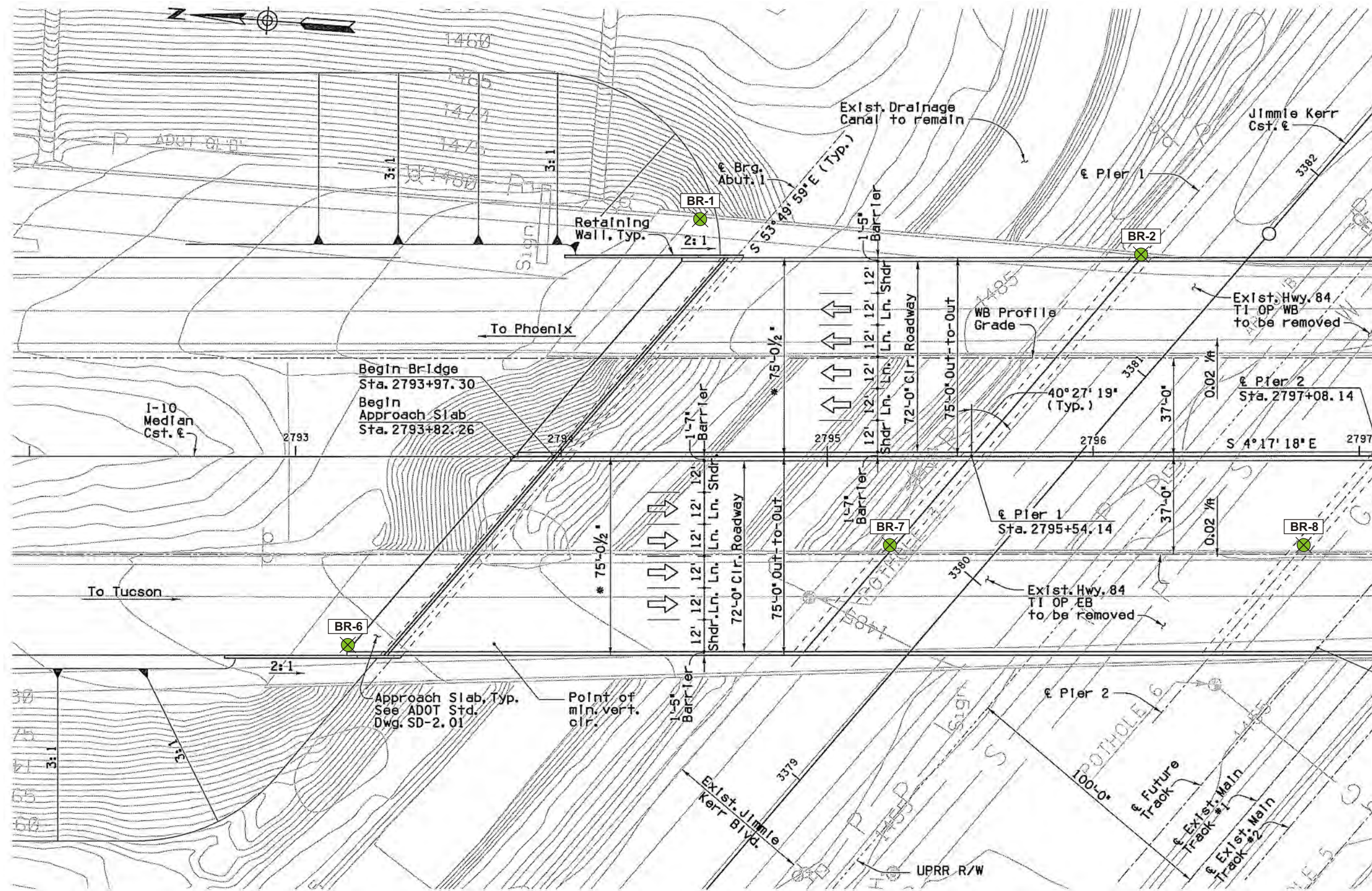
DATE:
9/15

EXPLORATION LOCATIONS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

2M



Note:
 "Distance measured from I-10 Median Cst. to edge of deck."

LEGEND	
B-1	Boring Location
RW-1	Boring Location
BR-1	Bridge Boring Location
HA-3	Hand Auger Location

0 100
 Approximate Scale:
 1 inch = 100 feet

Source: Structural Grace, Inc., 09/14.
 Note: Dimensions, directions, and locations are approximate.

Ninyo & Moore

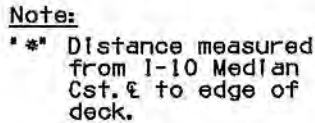
PROJECT NO:
 601808009





DATE:
 9/15

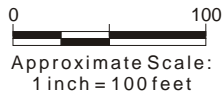
EXPLORATION LOCATIONS

I-10: EARLEY ROAD TO JUNCTION I-8
 PINAL COUNTY, ARIZONA

FIGURE
2N



B-1		Boring Location
RW-1		Boring Location
BR-1		Bridge Boring Location
HA-3		Hand Auger Location



Source: Structural Grace, Inc., 09/14.
Note: Dimensions, directions, and locations are approximate

Ninyo & Moore

PROJECT NO:
601808009

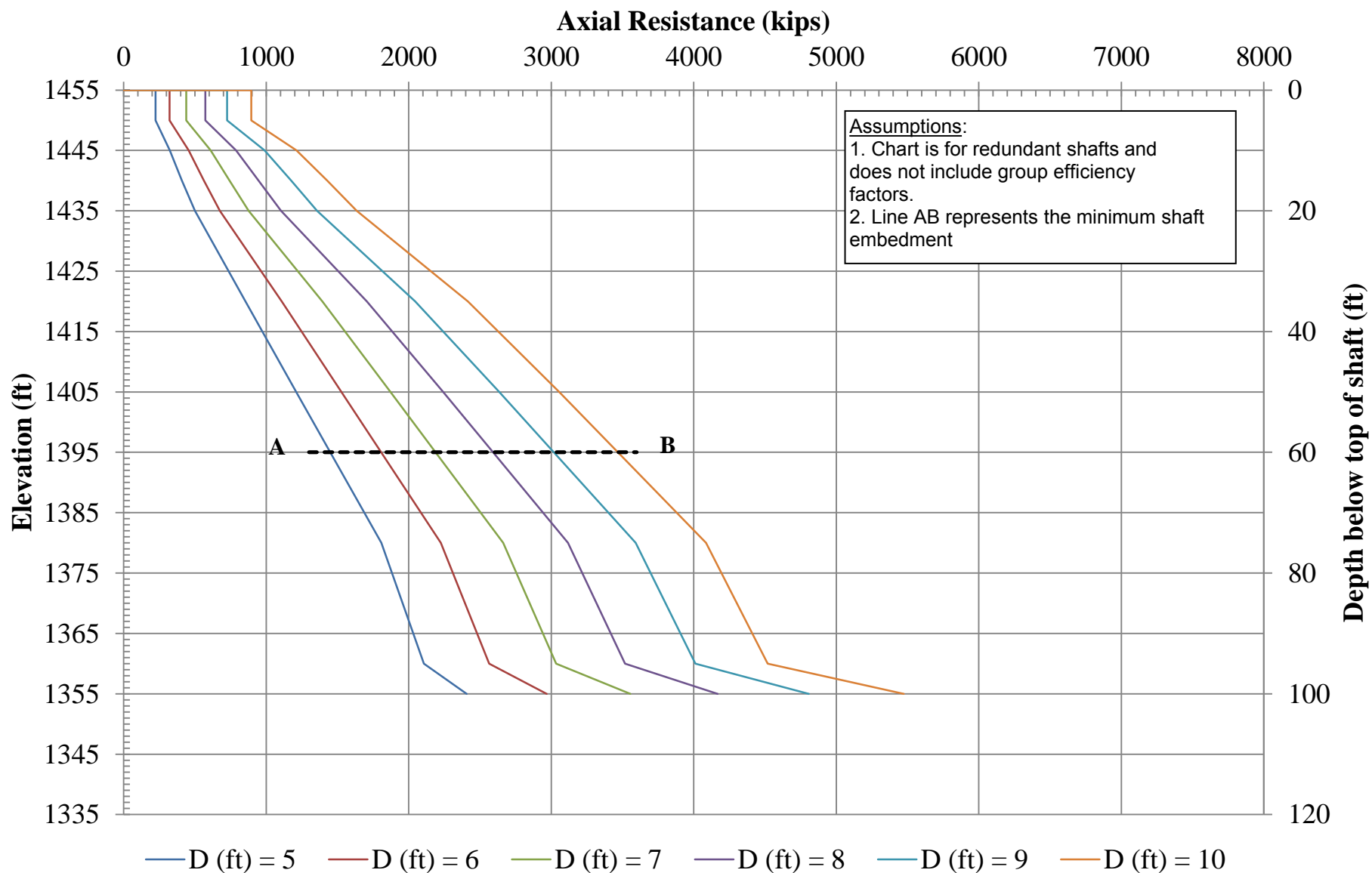
DATE:
9/15

EXPLORATION LOCATIONS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

20



Ninyo & Moore

PROJECT NO:
601808009

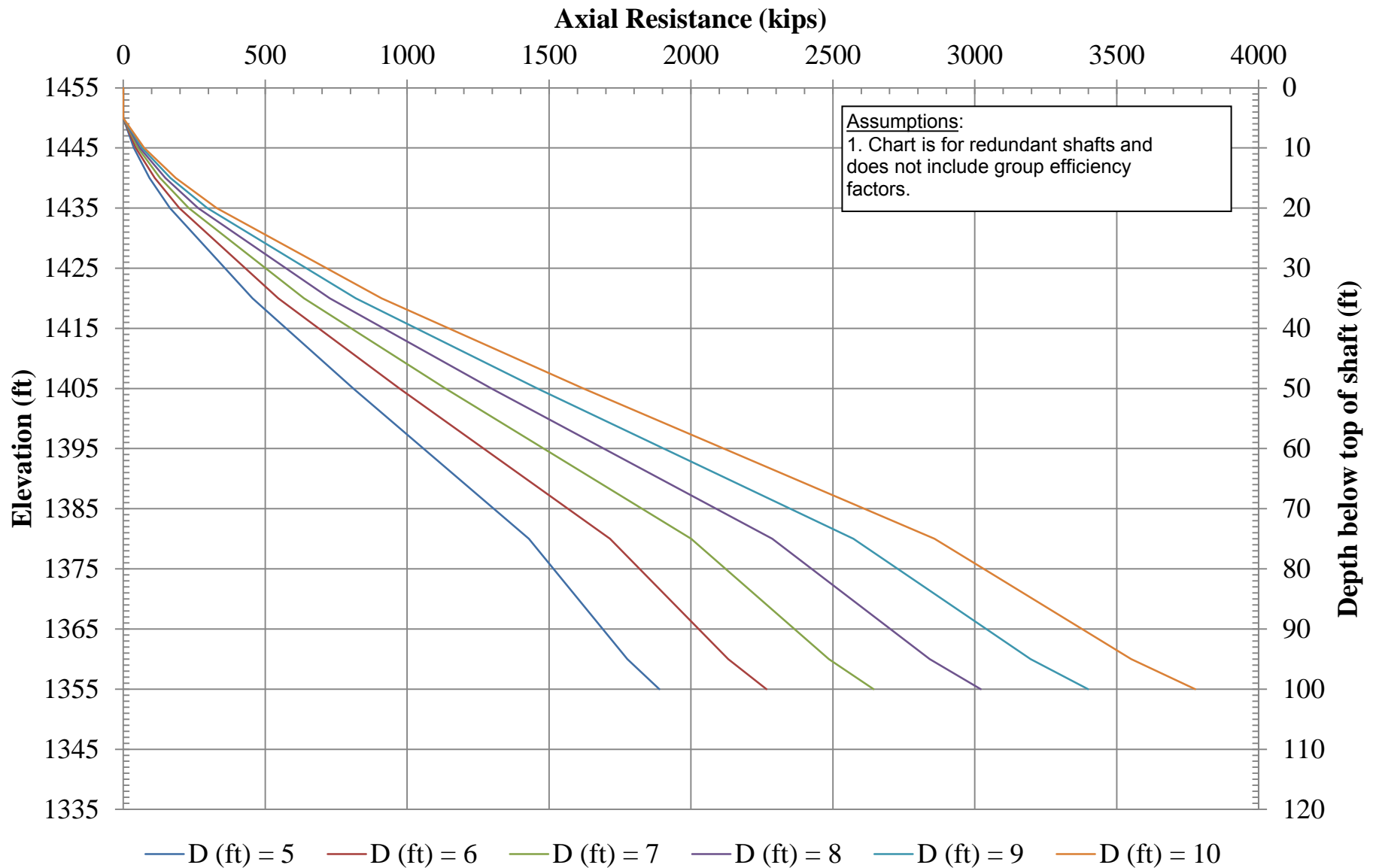
DATE:
9/15

**STRENGTH AXIAL RESISTANCE CHART
IN COMPRESSION - PIERS**

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

3A



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

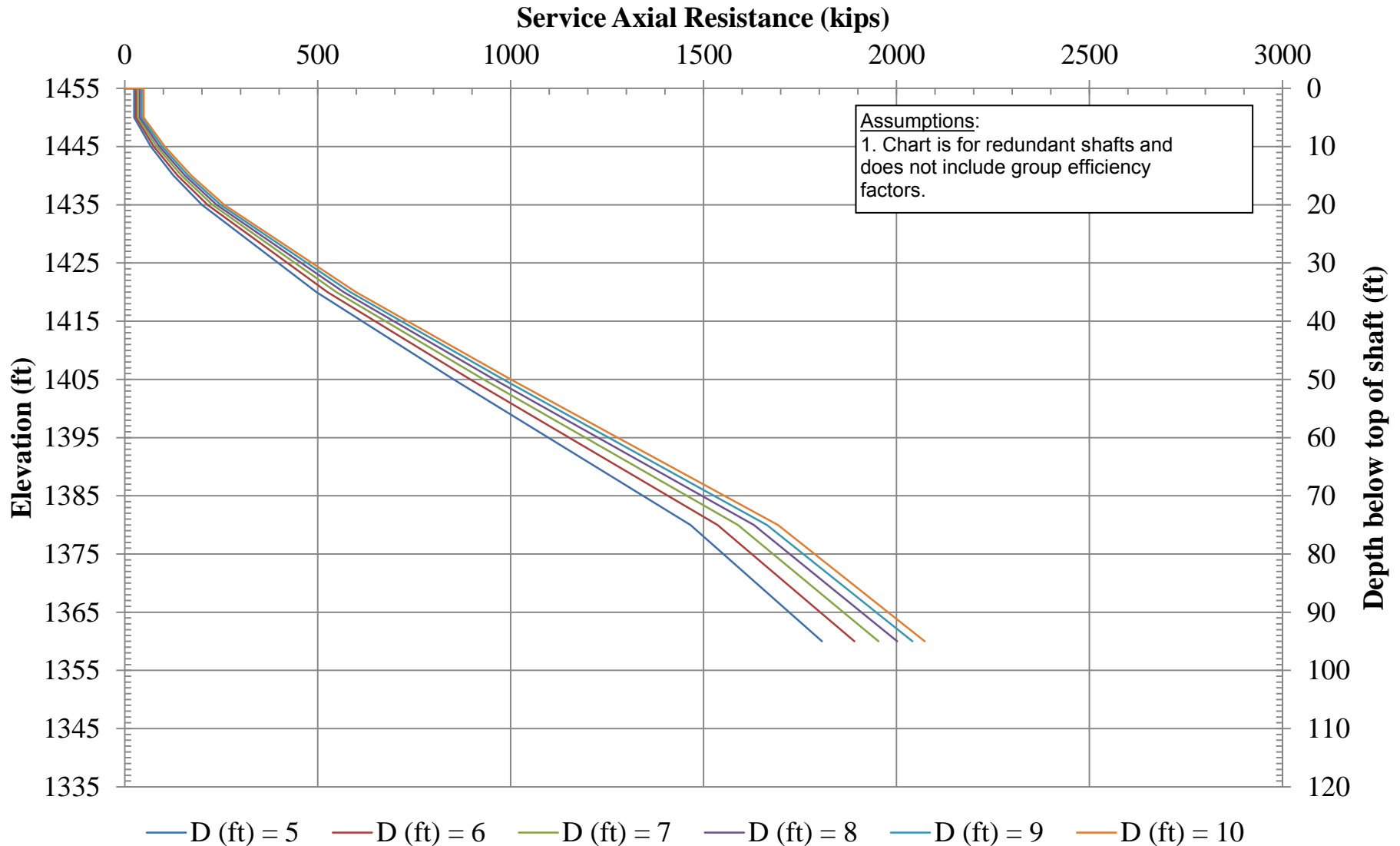
**STRENGTH AXIAL RESISTANCE CHART
IN TENSION - PIERS**

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

3B

Service Axial Resistance Chart for wt = 0.1"



Ninyo & Moore

SERVICE AXIAL RESISTANCE CHART PIERS

FIGURE

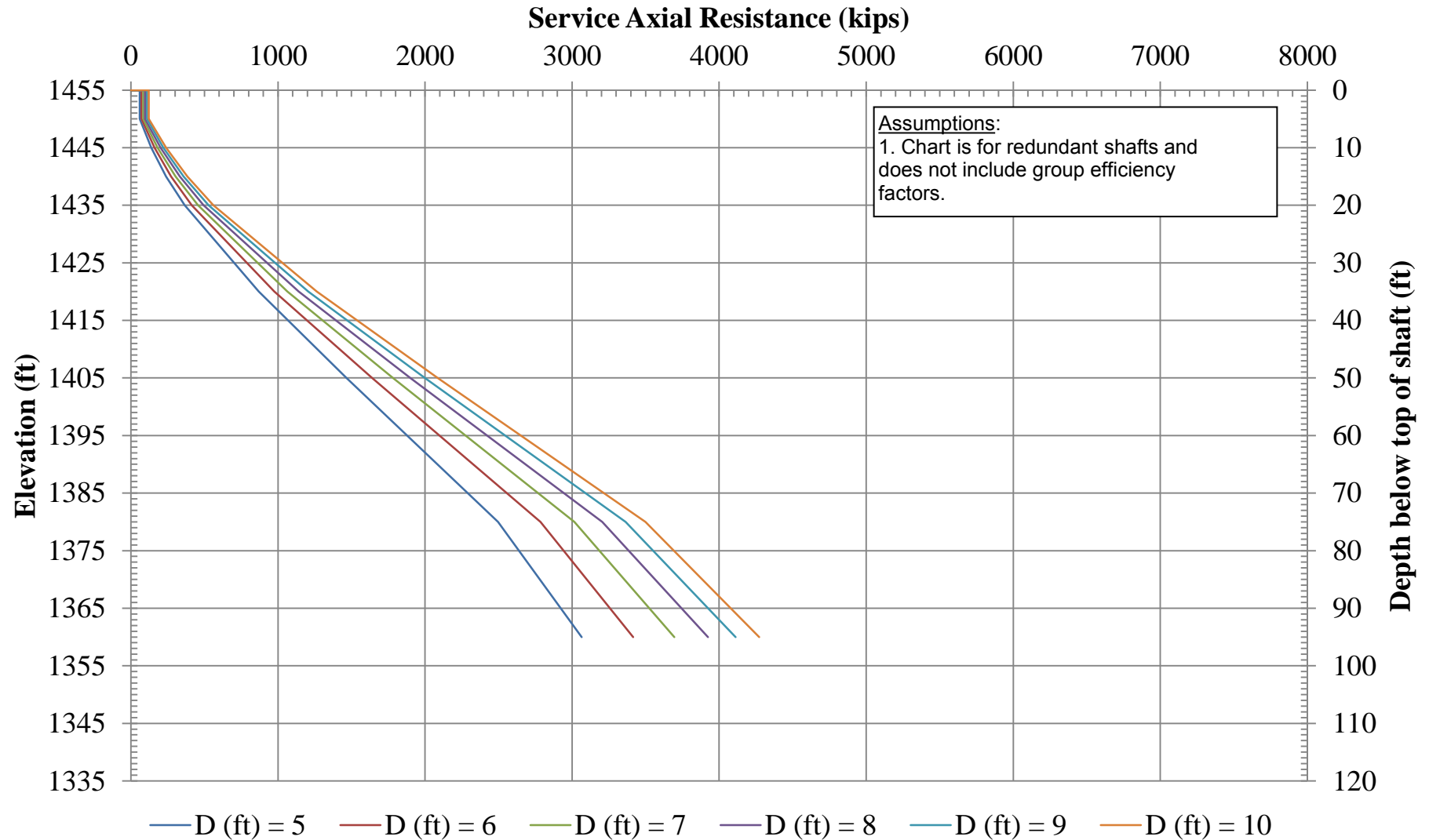
PROJECT NO:
601808009

DATE:
9/15

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

4A

Service Axial Resistance Chart for wt = 0.25"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

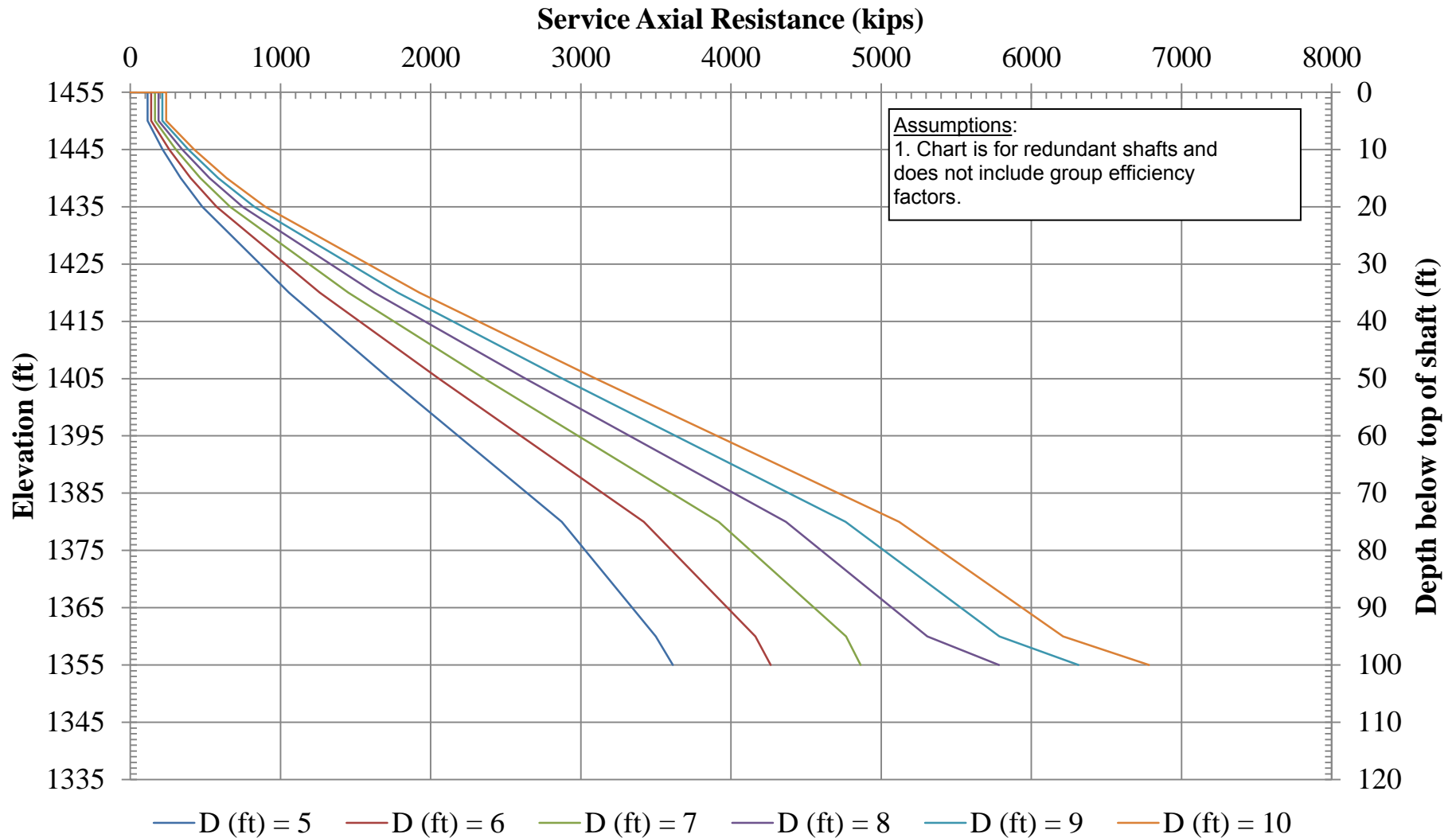
SERVICE AXIAL RESISTANCE CHART PIERS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

4B

Service Axial Resistance Chart for wt = 0.5"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

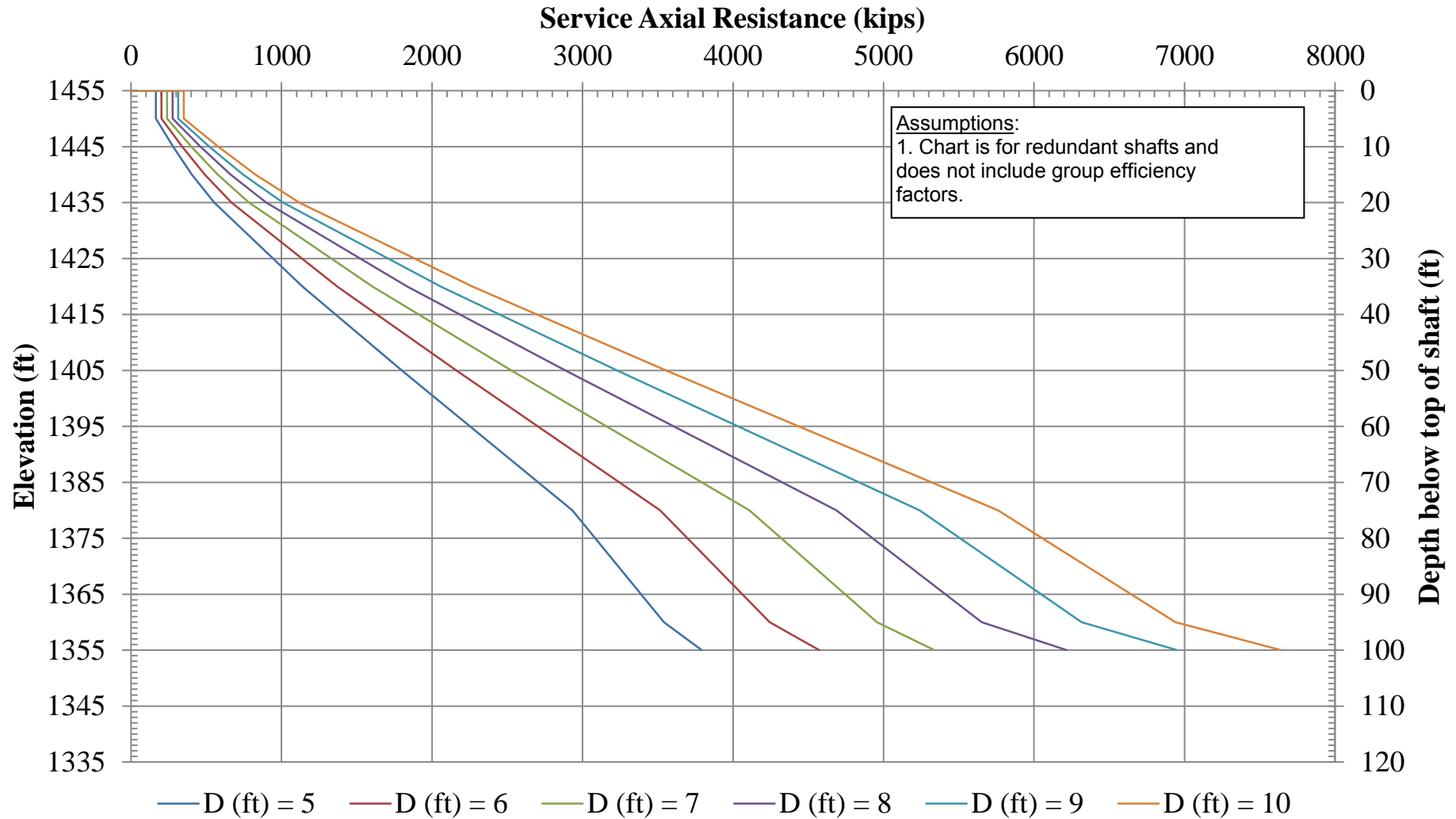
SERVICE AXIAL RESISTANCE CHART PIERS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

4C

Service Axial Resistance Chart for wt = 0.75"



Ninyo & Moore

SERVICE AXIAL RESISTANCE CHART PIERS

FIGURE

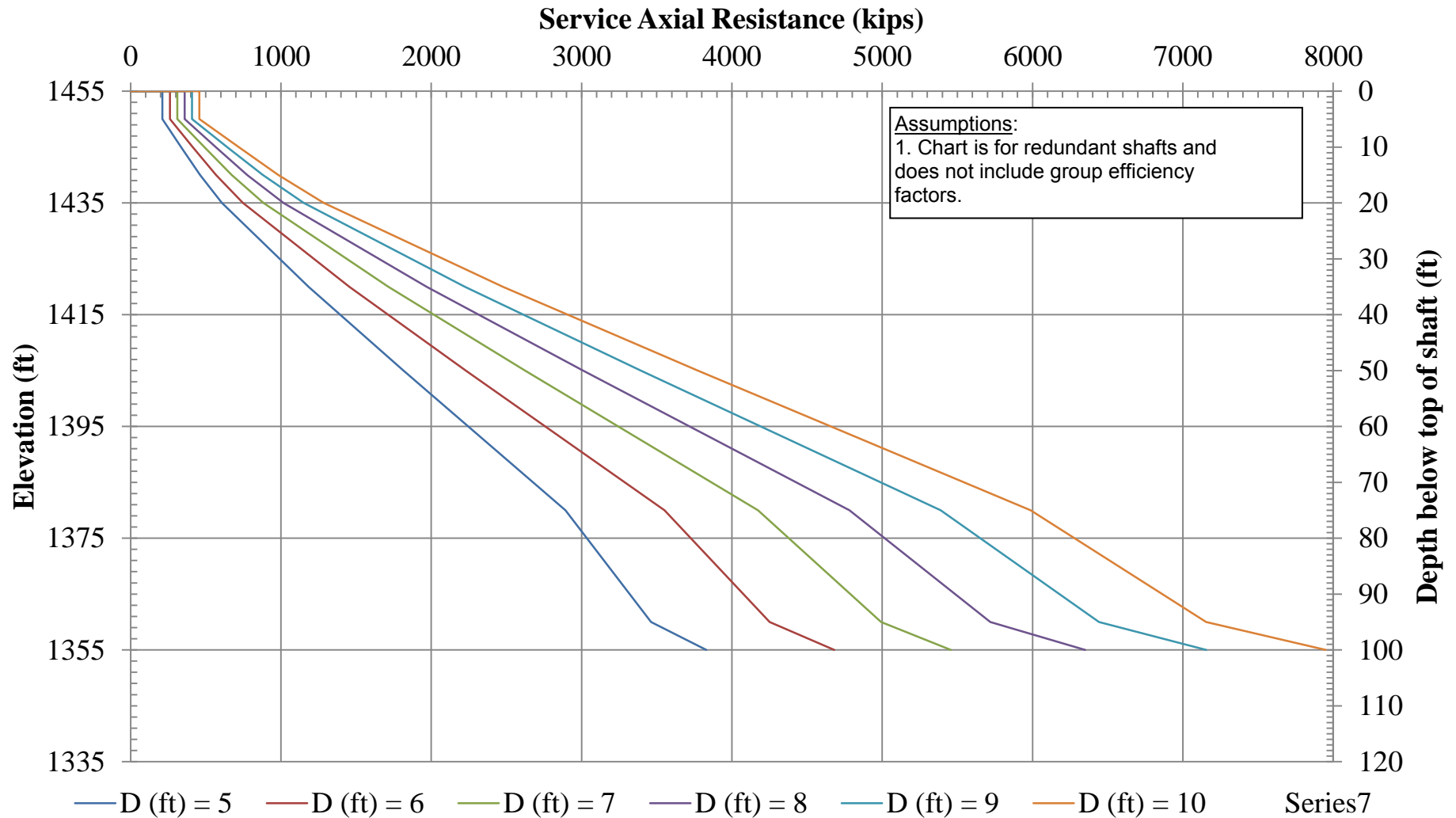
PROJECT NO:
601808009

DATE:
9/15

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

4D

Service Axial Resistance Chart for wt = 1"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

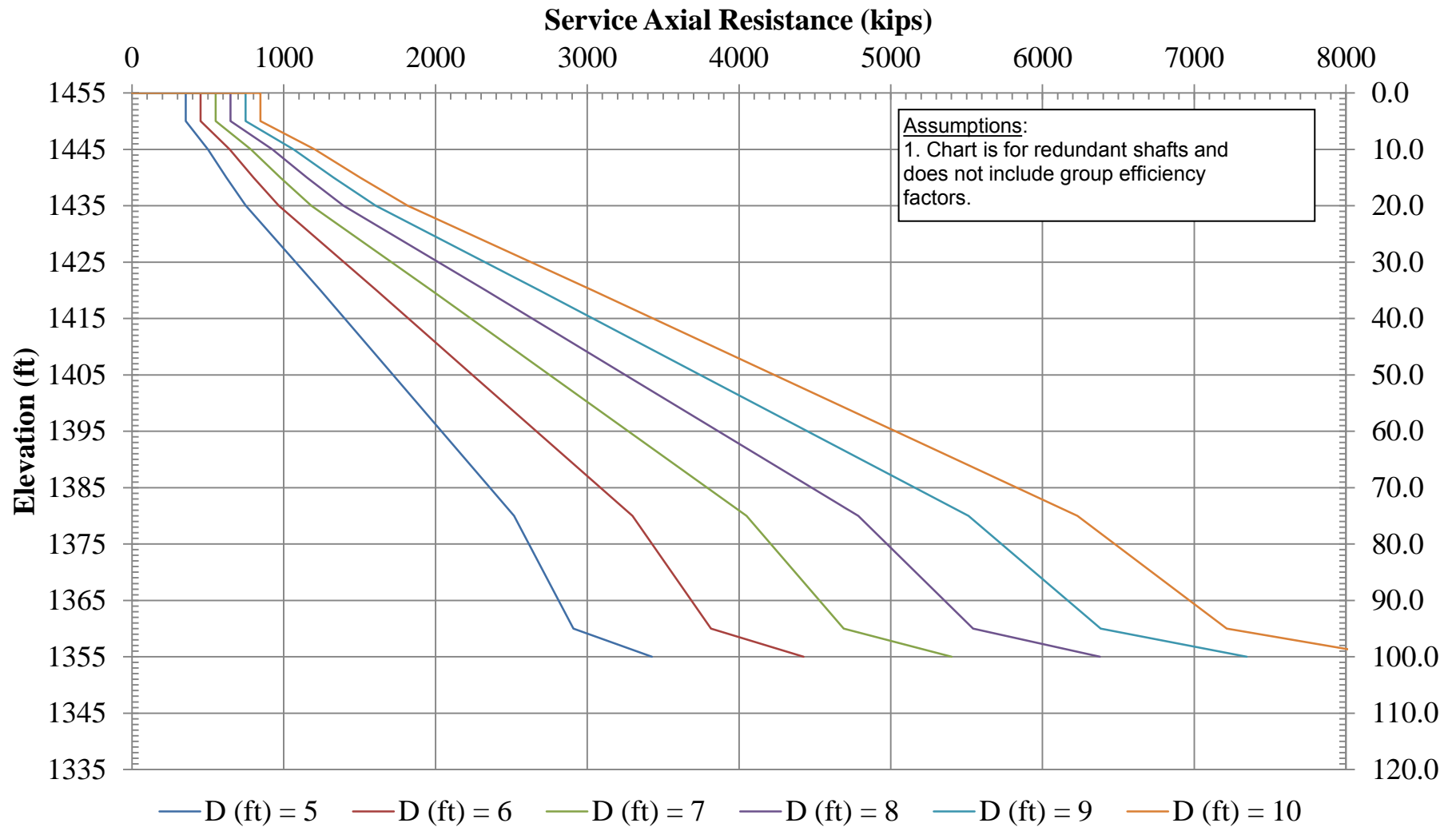
SERVICE AXIAL RESISTANCE CHART PIERS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

4E

Service Axial Resistance Chart for wt = 2"



Ninyo & Moore

PROJECT NO:
601808009

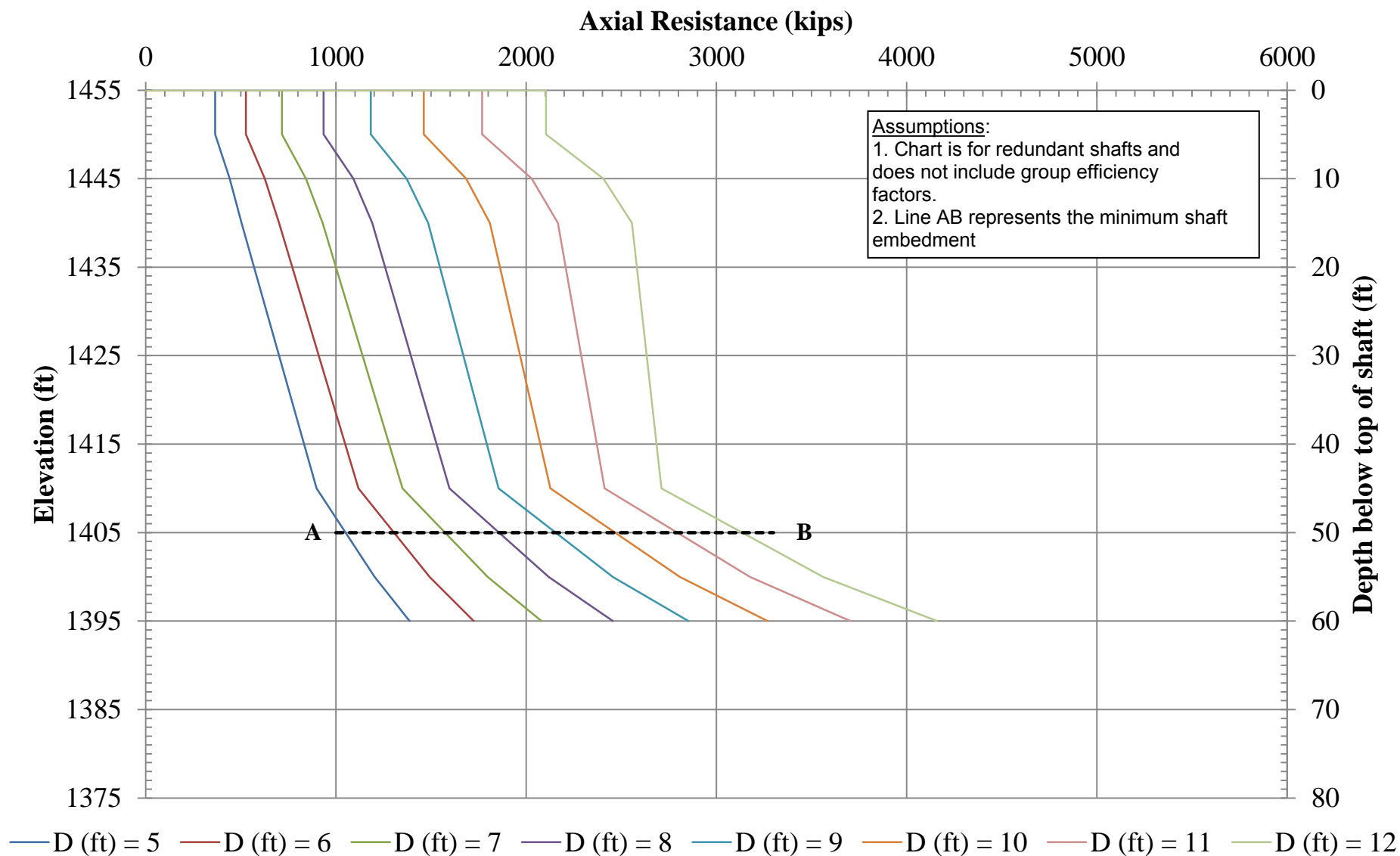
DATE:
9/15

SERVICE AXIAL RESISTANCE CHART PIERS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

4F



Ninyo & Moore

PROJECT NO:
601808009

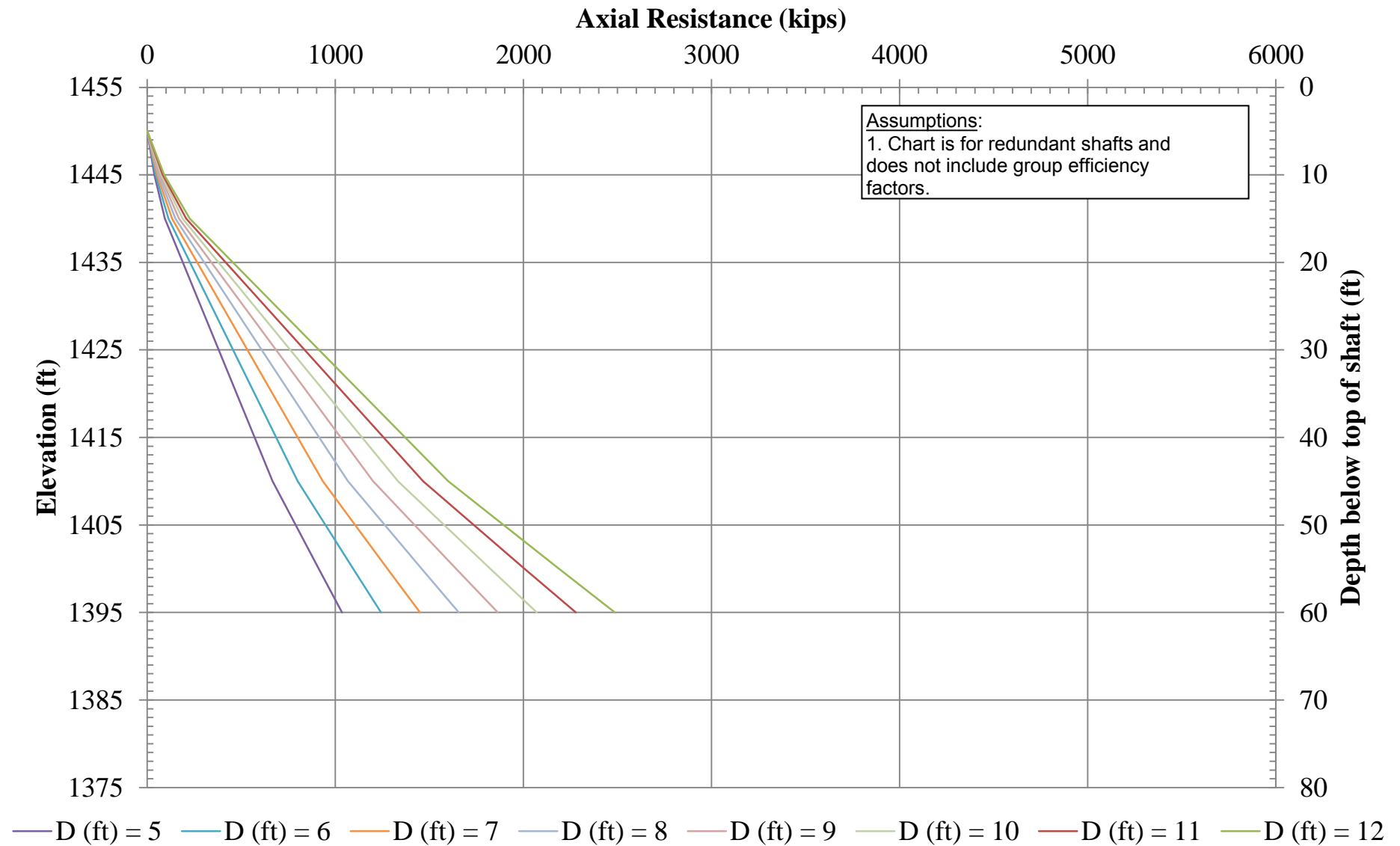
DATE:
9/15

**STRENGTH AXIAL RESISTANCE CHART
IN COMPRESSION - ABUTMENTS**

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

5A



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

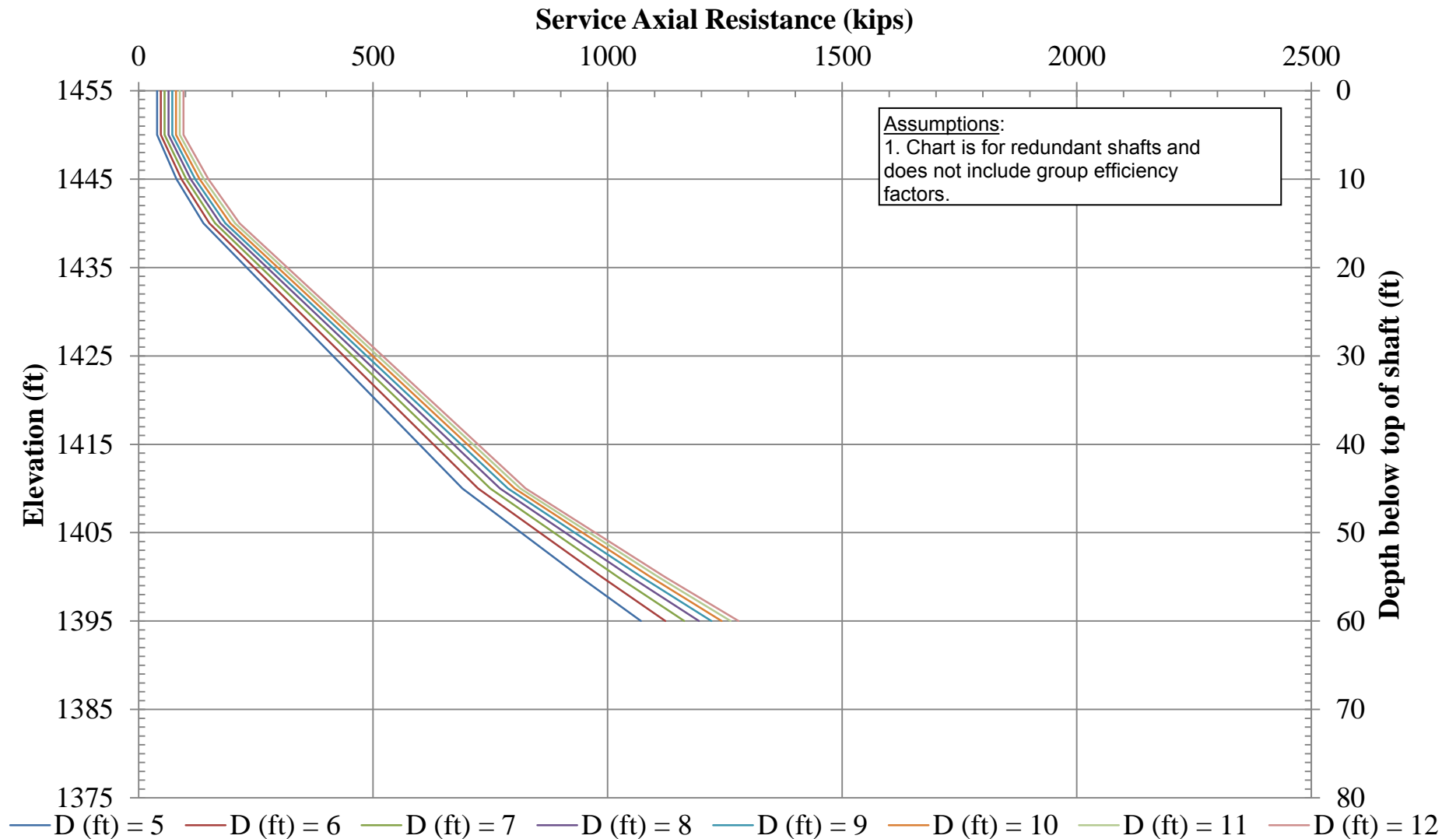
**STRENGTH AXIAL RESISTANCE CHART
IN TENSION - ABUTMENTS**

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

5B

Service Axial Resistance Chart for wt = 0.1"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

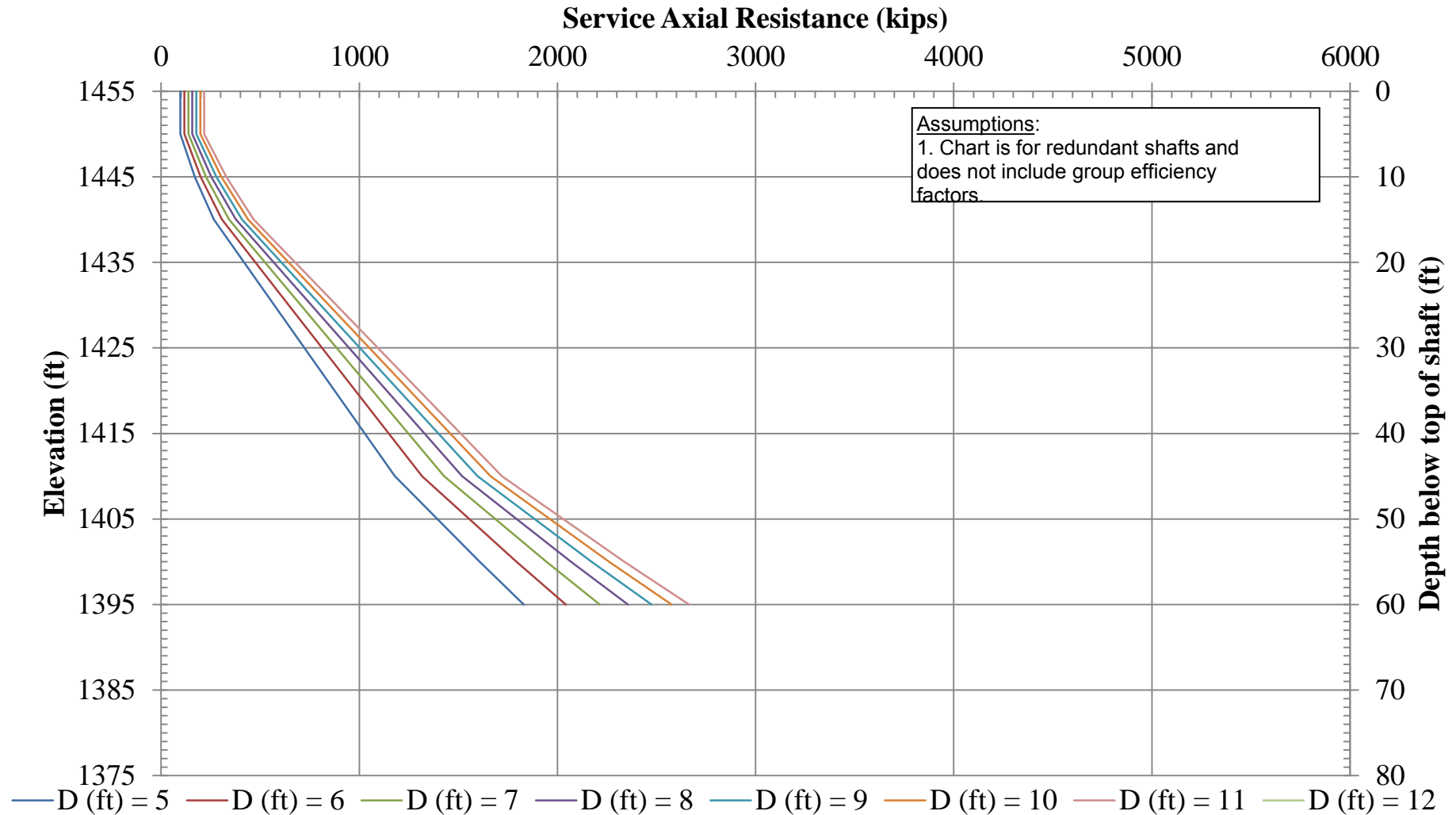
SERVICE AXIAL RESISTANCE CHART ABUTMENTS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

6A

Service Axial Resistance Chart for wt = 0.25"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

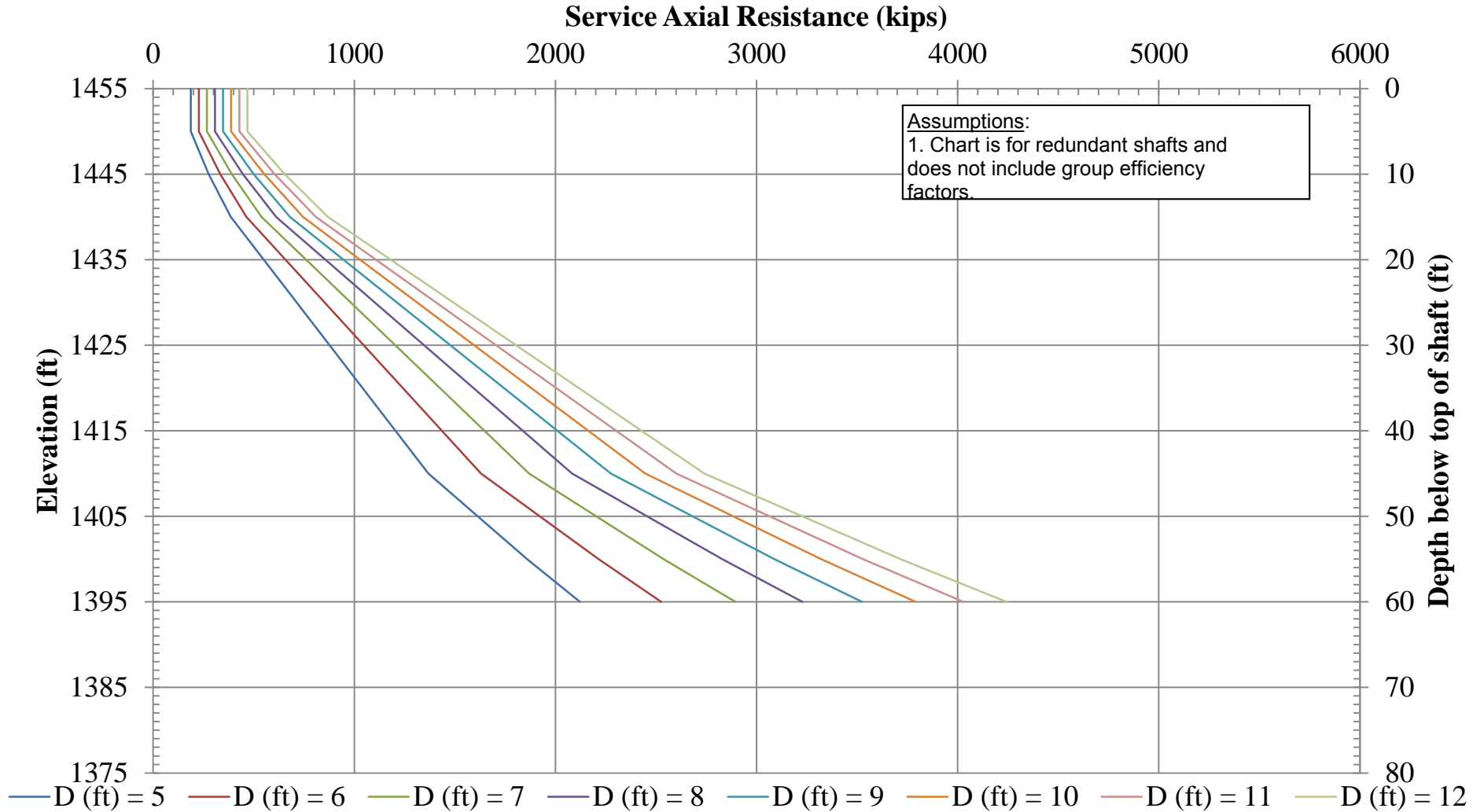
SERVICE AXIAL RESISTANCE CHART ABUTMENTS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

6B

Service Axial Resistance Chart for wt = 0.5"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

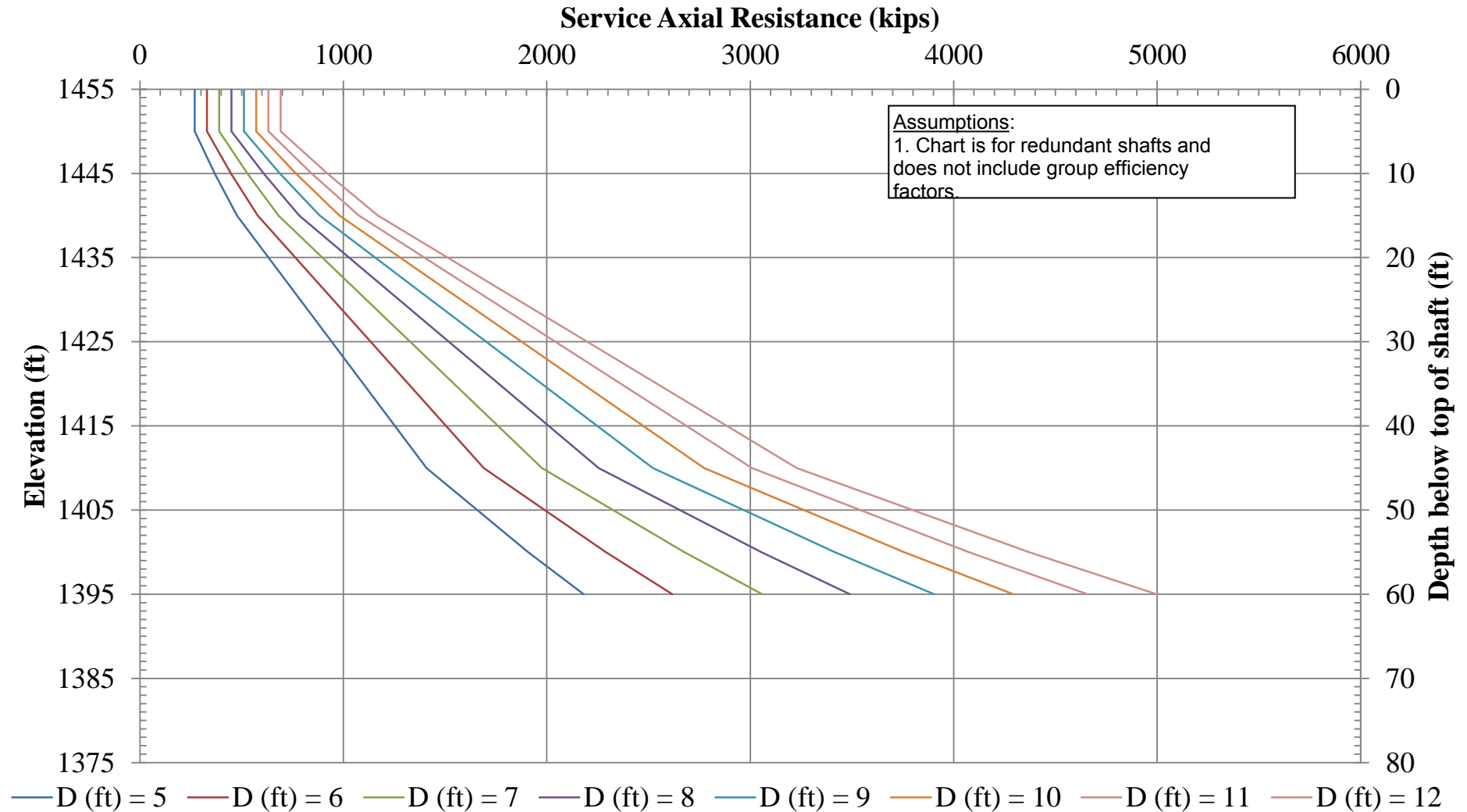
SERVICE AXIAL RESISTANCE CHART ABUTMENTS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

6C

Service Axial Resistance Chart for wt = 0.75"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

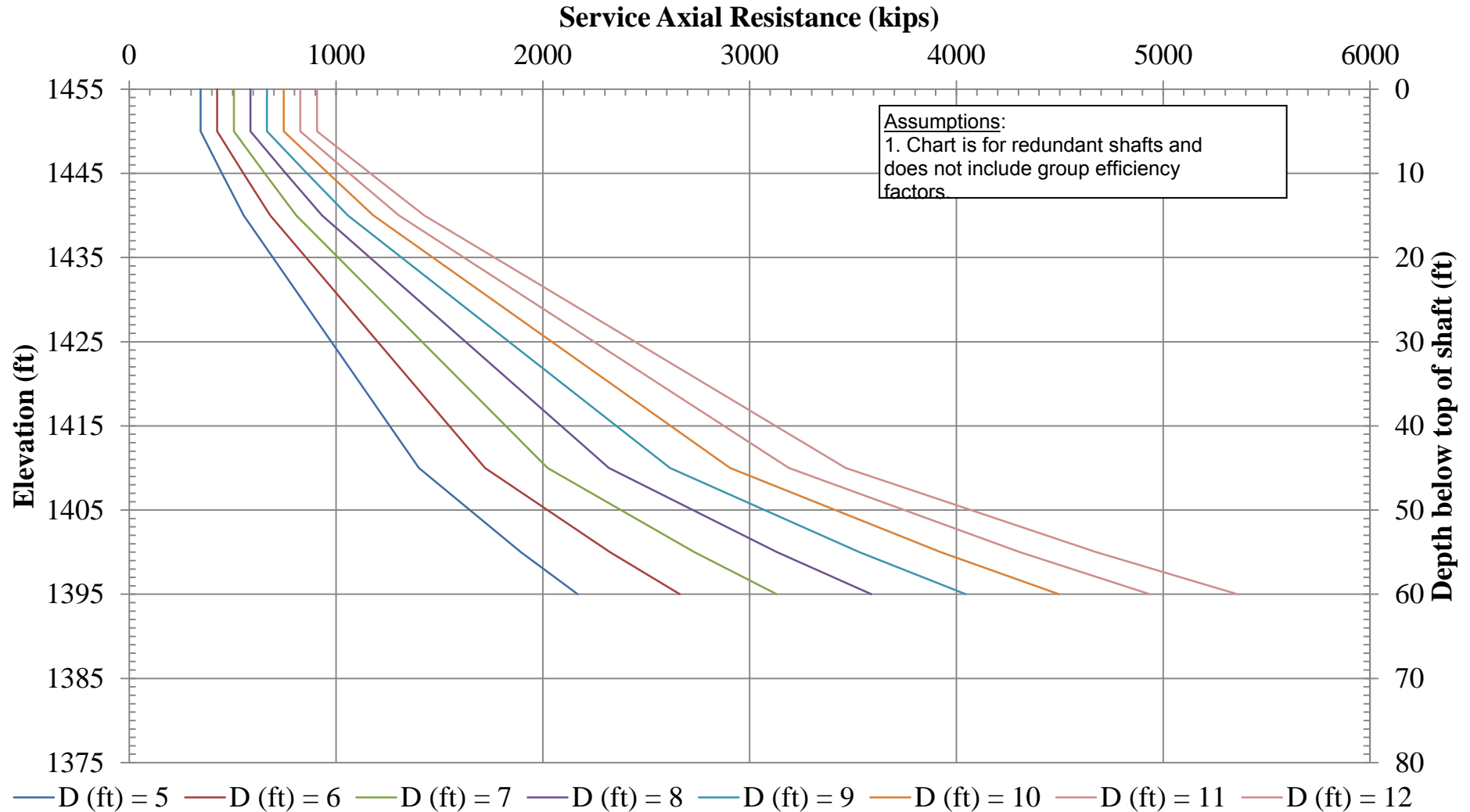
SERVICE AXIAL RESISTANCE CHART ABUTMENTS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

6D

Service Axial Resistance Chart for wt = 1"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

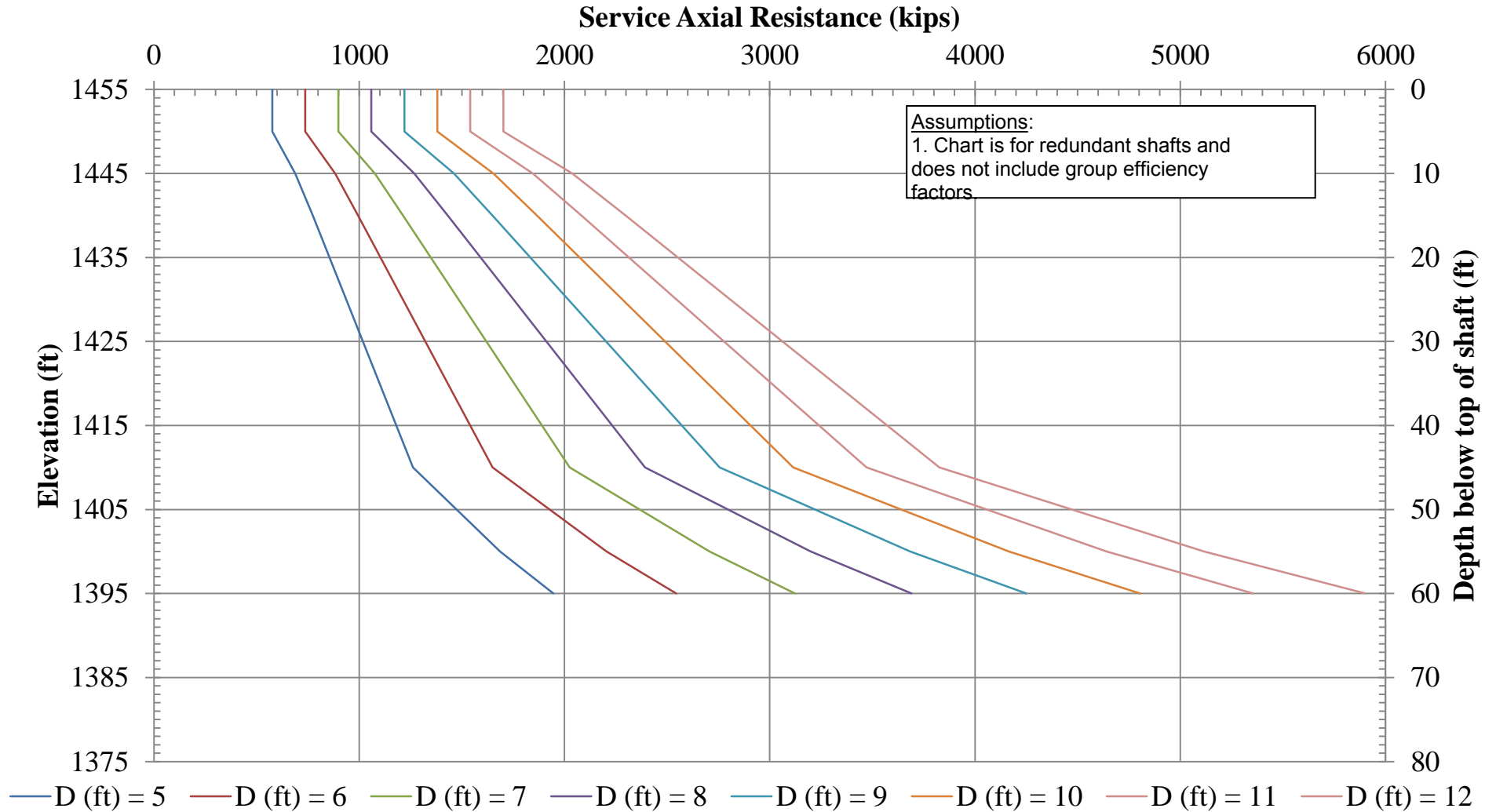
SERVICE AXIAL RESISTANCE CHART ABUTMENTS

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

6E

Service Axial Resistance Chart for wt = 2"



Ninyo & Moore

PROJECT NO:
601808009

DATE:
9/15

SERVICE AXIAL RESISTANCE CHART ABUTMENTS

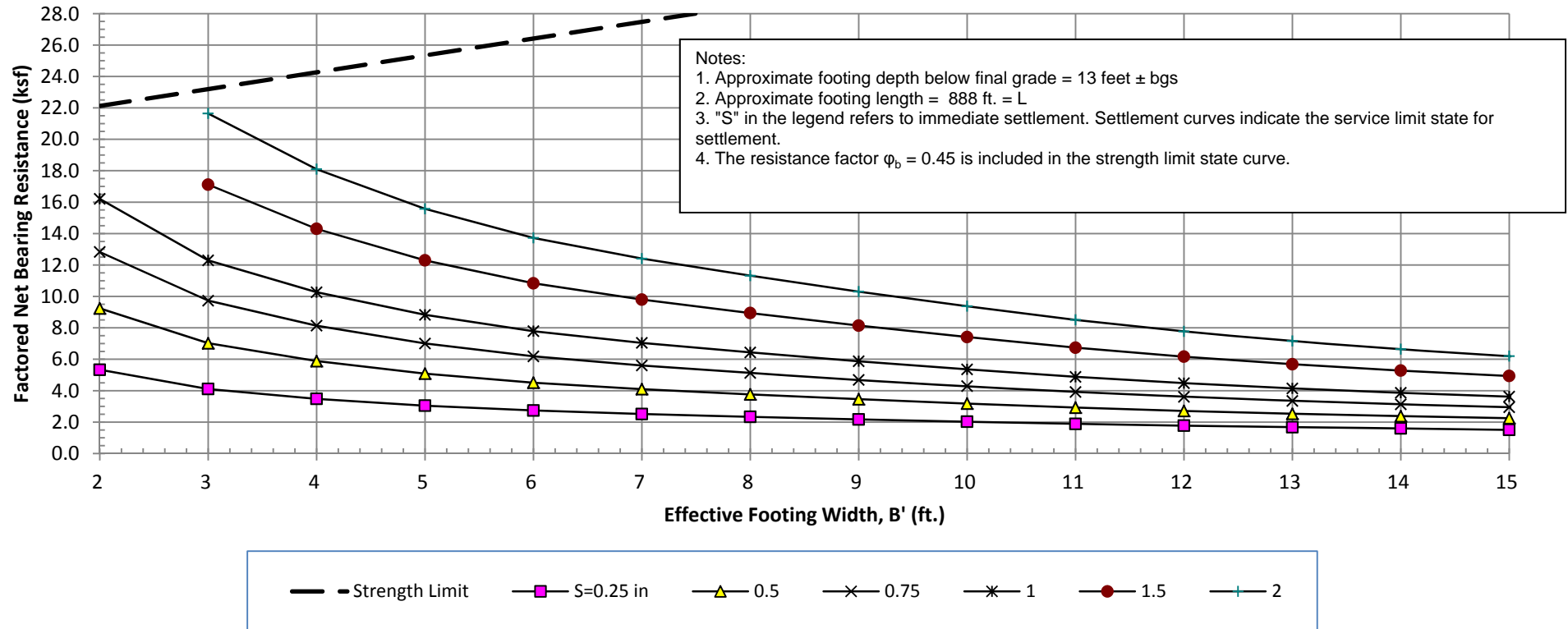
I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

6F

EASTBOUND I-10

STATION 2799+37 TO STATION 2808+25



Ningo & Moore

PROJECT NO:
601808009

DATE:
4/15

FACTORED BEARING RESISTANCE CHART

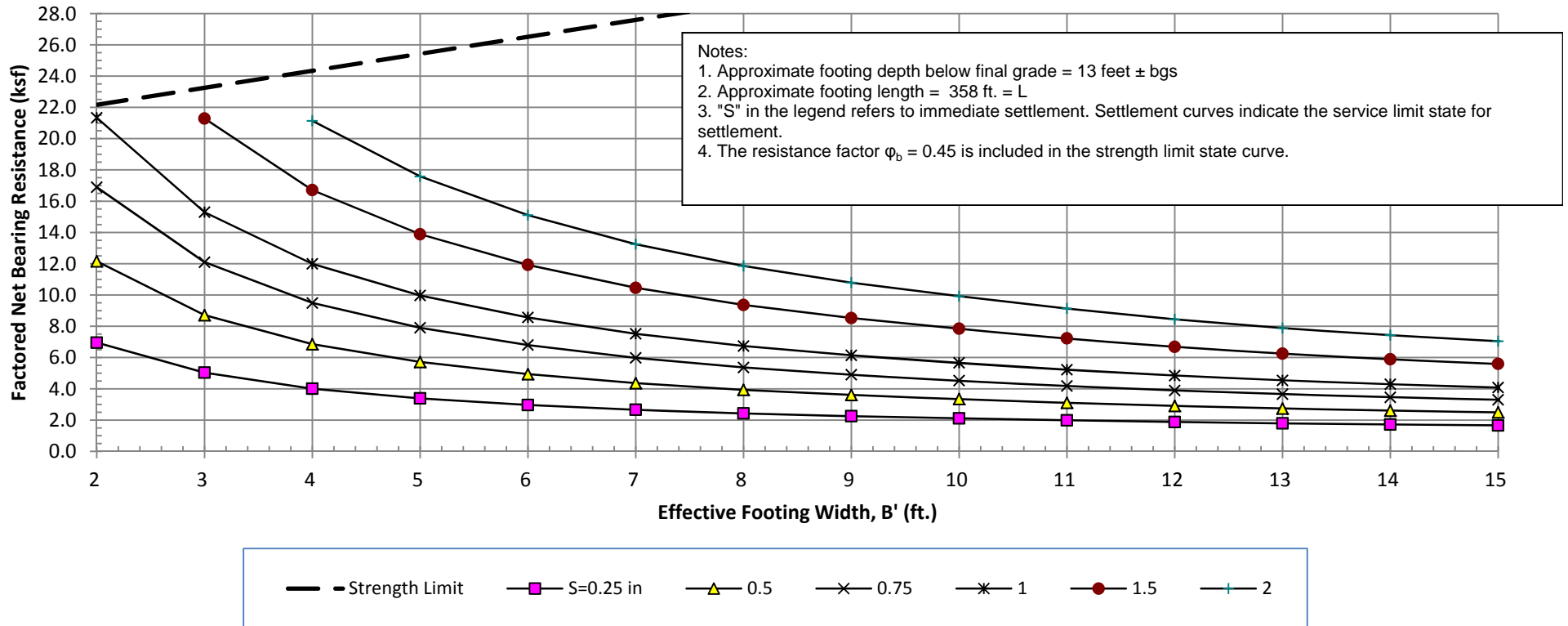
I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

7A

WESTBOUND I-10

STATION 2800+67 TO STATION 2804+



Ningo & Moore

PROJECT NO:
601808009

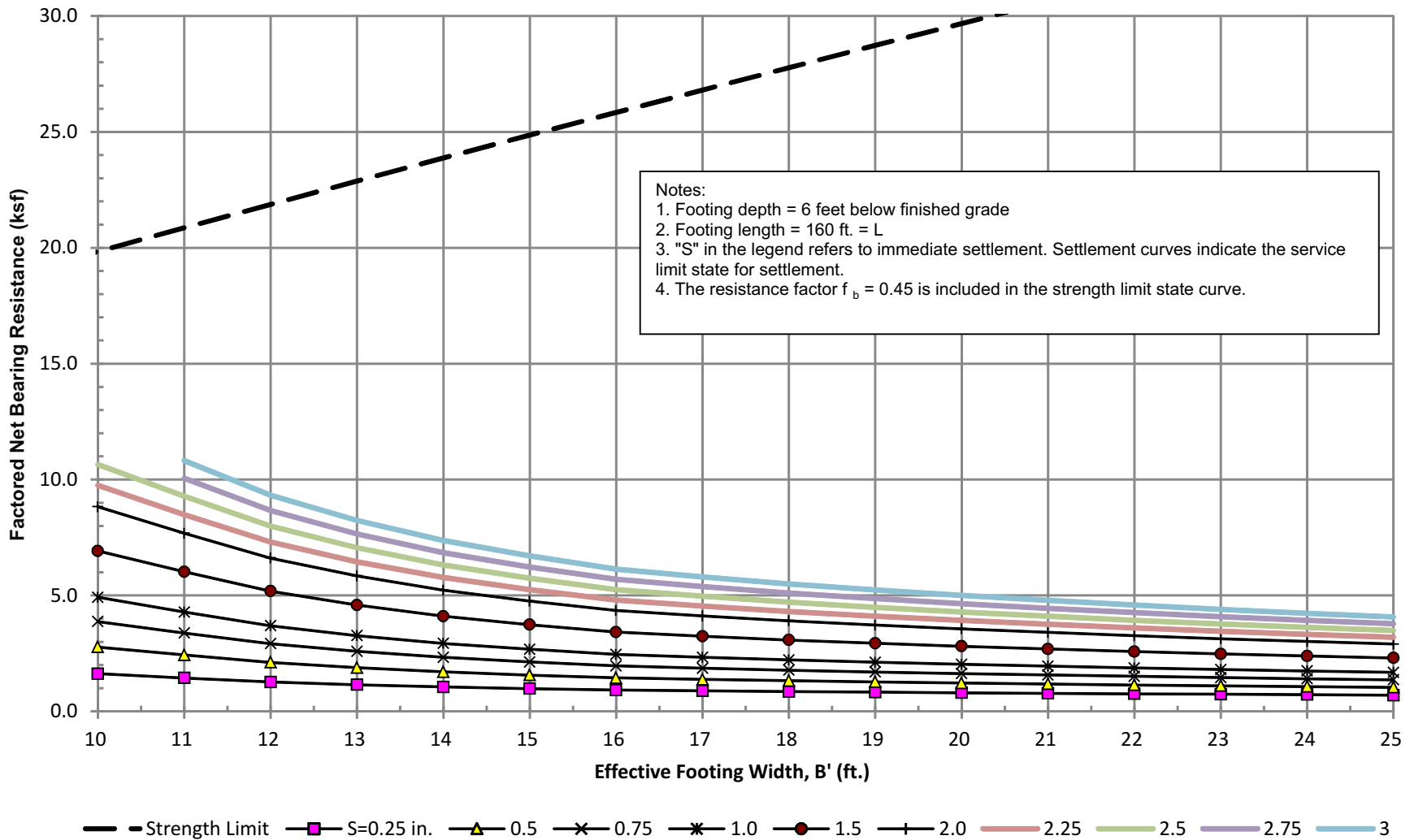
DATE:
9/15

FACTORED BEARING RESISTANCE CHART

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

7B



Ninyo & Moore

PROJECT NO:
601808009

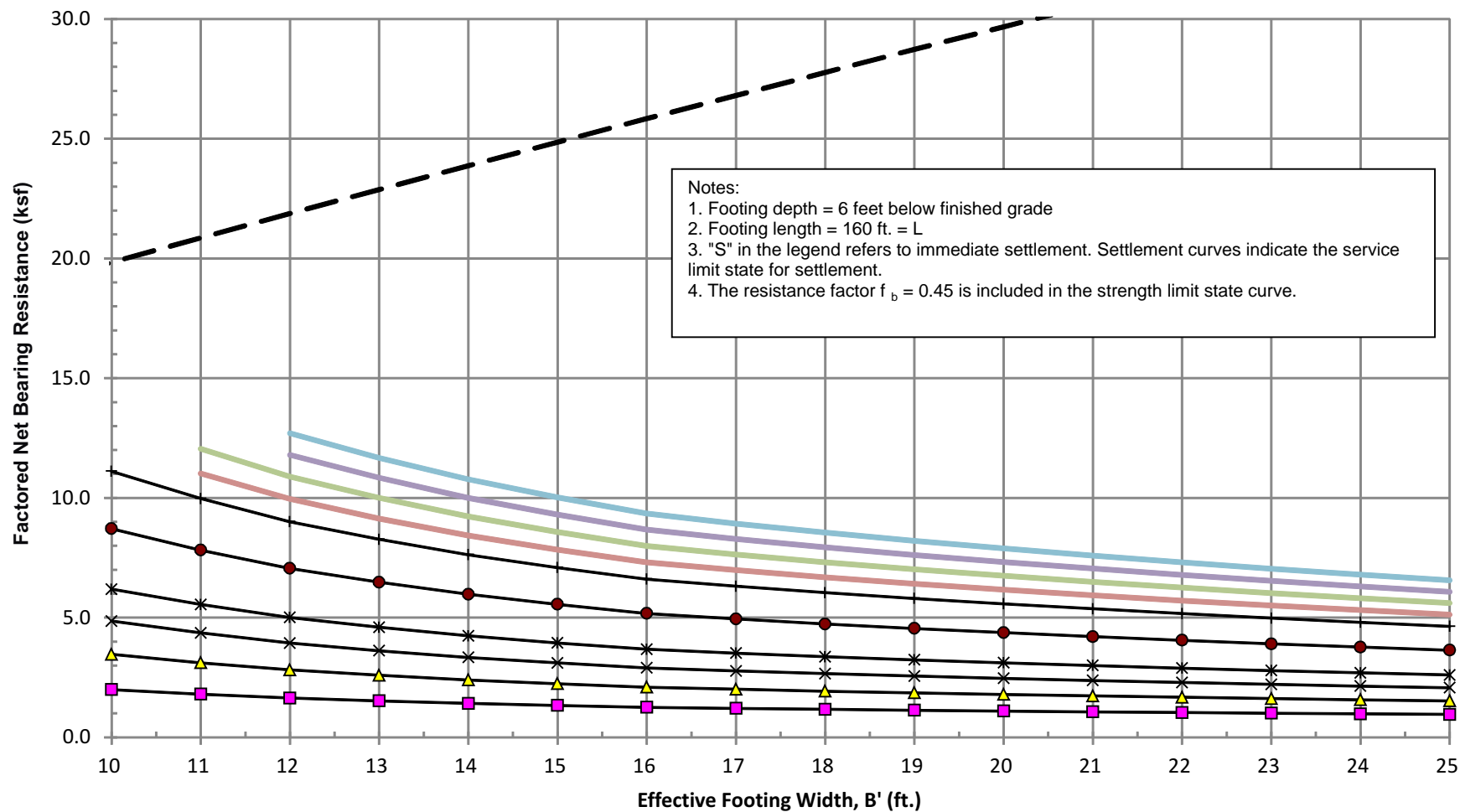
DATE:
9/15

FACTORED BEARING RESISTANCE CHART -
NORTH ABUTMENT

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

7C



Ninyo & Moore

PROJECT NO:
601808009

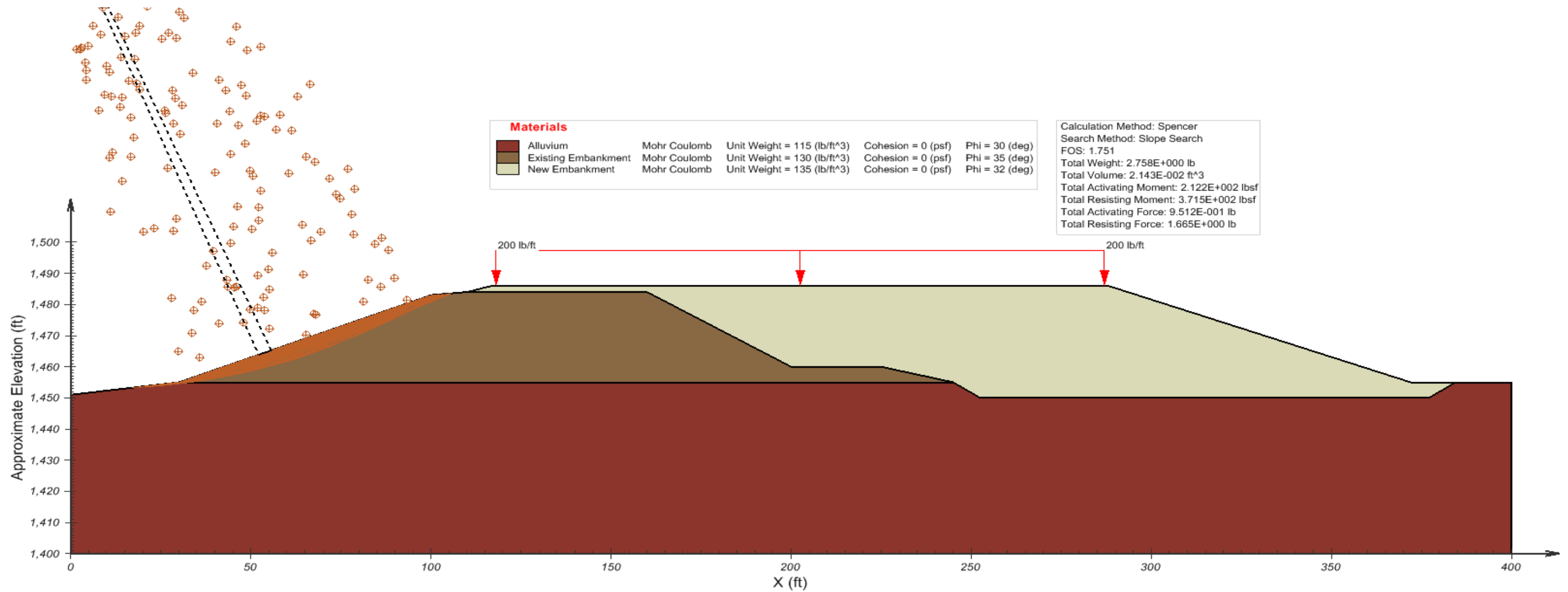
DATE:
9/15

FACTORED BEARING RESISTANCE CHART - SOUTH ABUTMENT

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

7D



Ninyo & Moore

PROJECT NO:
601808009

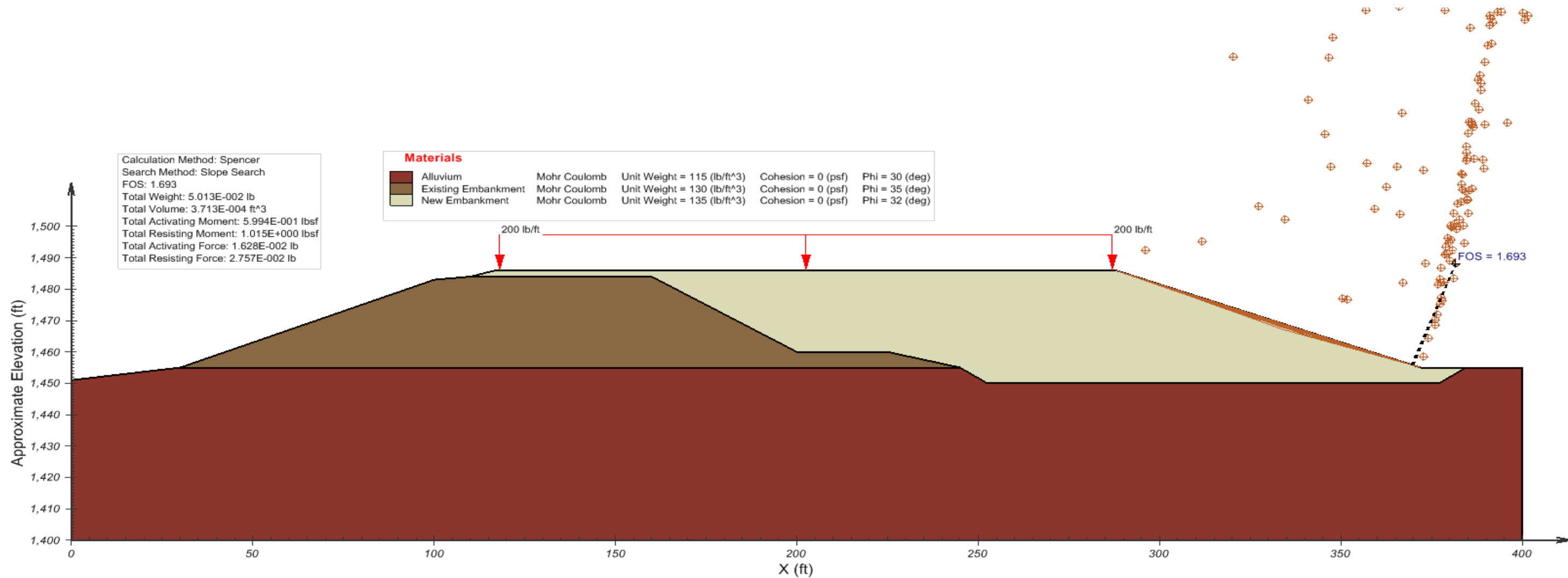
DATE:
9/15

END OF CONSTRUCTION, STATION 2793+98, LEFT FACE

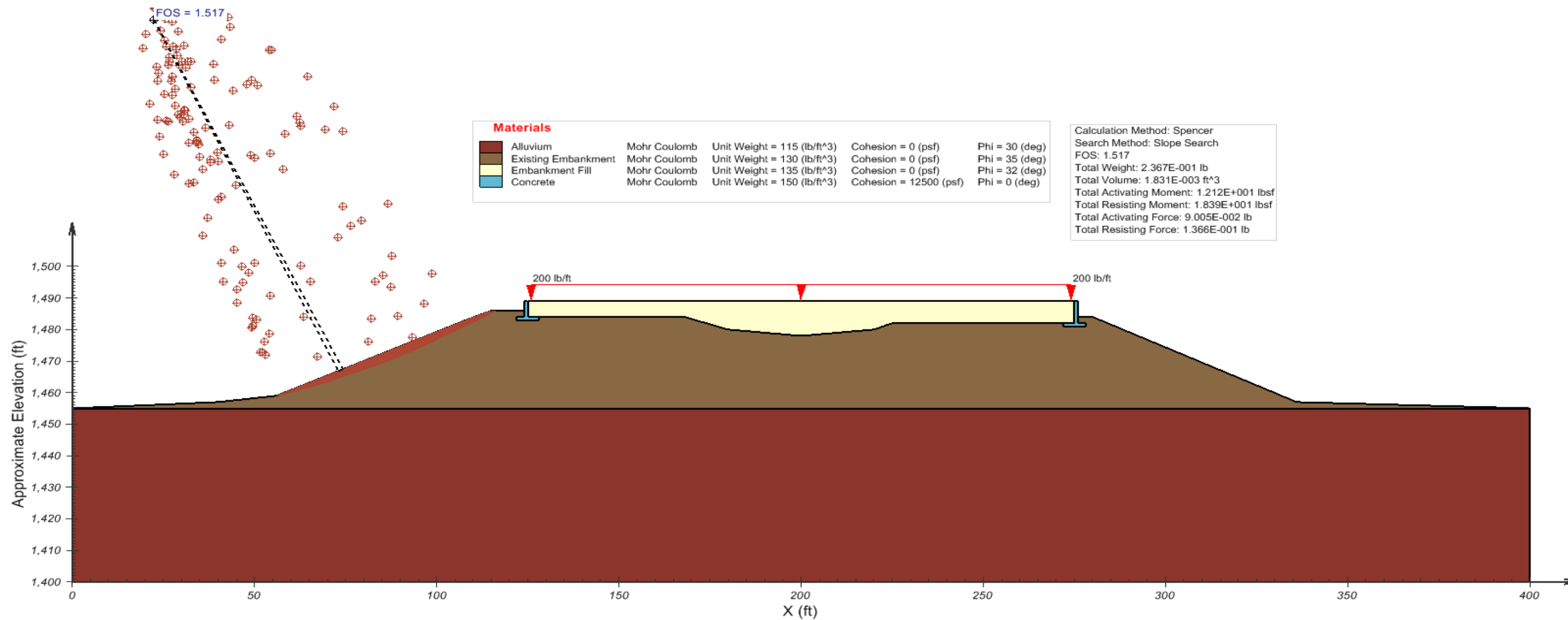
I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

FIGURE

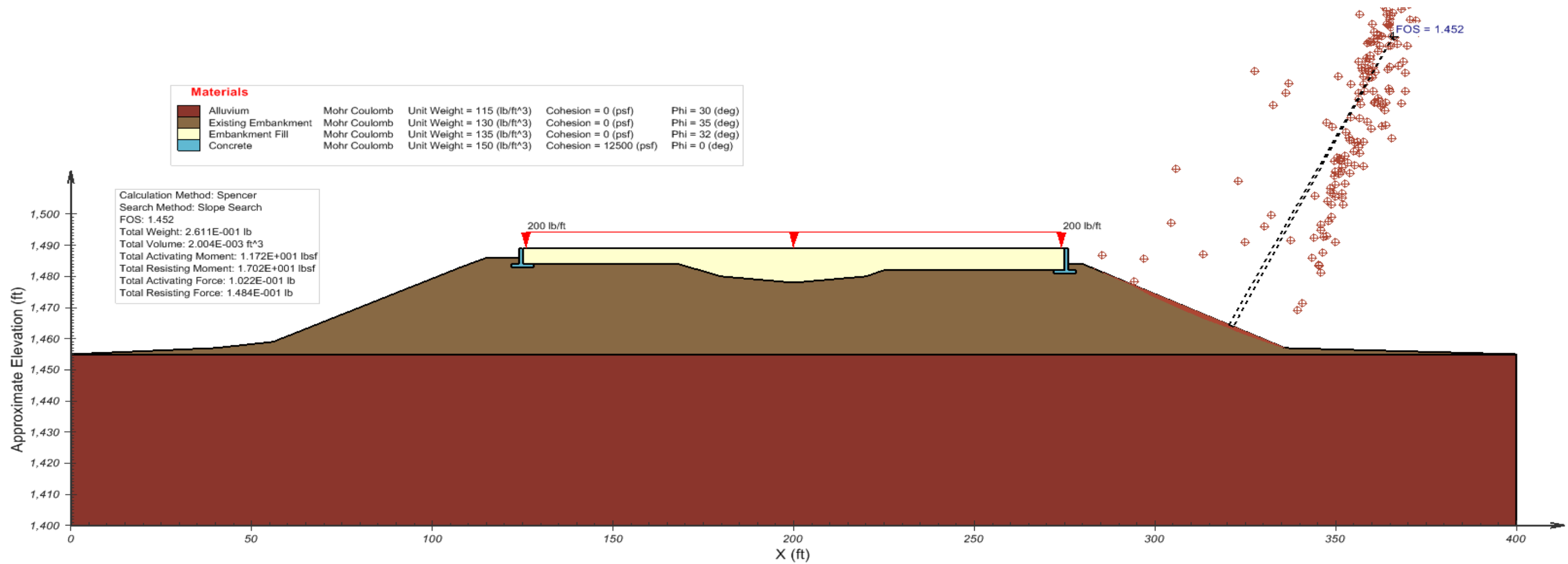
8A



Ninyo & Moore		END OF CONSTRUCTION, STATION 2793+98, RIGHT FACE	FIGURE 8B
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	



Ninyo & Moore		END OF CONSTRUCTION, STATION 2801+50, LEFT FACE	FIGURE 9A
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	



Ninyo & Moore		END OF CONSTRUCTION, STATION 2801+50, RIGHT FACE		FIGURE 9B
PROJECT NO: 601808009	DATE: 9/15	I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following methods.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer or the Kelly bar of the drill rig in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer or bar, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

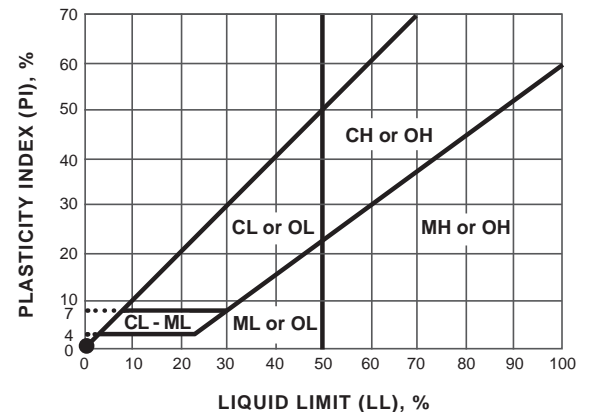
SOIL CLASSIFICATION CHART PER ASTM D 2488

PRIMARY DIVISIONS			SECONDARY DIVISIONS	
			GROUP SYMBOL	GROUP NAME
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines		GW well-graded GRAVEL
				GP poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 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
		GRAVEL with FINES more than 12% fines		GM silty GRAVEL
				GC clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines		SW well-graded SAND
				SP poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 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
		SAND with FINES more than 12% fines		SM silty SAND
				SC clayey SAND
				SC-SM silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC		CL lean CLAY
				ML SILT
				CL-ML silty CLAY
		ORGANIC		OL (PI > 4) organic CLAY
				OL (PI < 4) organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC		CH fat CLAY
				MH elastic SILT
		ORGANIC		OH (plots on or above "A"-line) organic CLAY
				OH (plots below "A"-line) organic 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-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

PLASTICITY CHART



APPARENT DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPOOLING CABLE OR CATHEAD		AUTOMATIC TRIP HAMMER	
	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)	SPT (blows/foot)	MODIFIED SPLIT BARREL (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

Ninyo & Moore

USCS METHOD OF SOIL CLASSIFICATION

Explanation of USCS Method of Soil Classification

PROJECT NO.


DATE

FIGURE

DEPTH (feet)		SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	BORING LOG EXPLANATION SHEET		
		Bulk Driven								
0										Bulk sample.
										Modified split-barrel drive sampler.
										No recovery with modified split-barrel drive sampler.
										Sample retained by others.
										Standard Penetration Test (SPT).
5										No recovery with a SPT.
			XX/XX							Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
										No recovery with Shelby tube sampler.
										Continuous Push Sample.
10										Seepage.
										Groundwater encountered during drilling.
										Groundwater measured after drilling.
							SM	<u>MAJOR MATERIAL TYPE (SOIL):</u> Solid line denotes unit change.		
							CL	Dashed line denotes material change.		
15								Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Shear Bedding Surface		
20								The total depth line is a solid line that is drawn at the bottom of the boring.		


BORING LOG		
Explanation of Boring Log Symbols		
PROJECT NO.	DATE	FIGURE

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/15/15 and 4/16/15</u> BORING NO. <u>BR-1</u> GROUND ELEVATION <u>1,483' ± (MSL)</u> SHEET <u>2</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2794+90</u> OFFSET = <u>75'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
40							SC	<u>ALLUVIUM: (Continued)</u> Brown, dry, dense, clayey SAND.		
			80/11"				SM	Brown, dry, very dense, silty SAND; trace gravel.		
			28					Dense.		
50							GP	Brown, dry, very dense, poorly graded GRAVEL with sand.		
			50/5"							
			32				GC	Brown, dry, dense, clayey GRAVEL with sand.		
60							SC	Brown, dry, dense, clayey SAND.		
			55							
			81/11"					Very dense.		
70										
			61					Dense; scattered caliche nodules.		
80			50					Very dense; moderately cemented.		




BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-2

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/15/15 and 4/16/15</u> BORING NO. <u>BR-1</u> GROUND ELEVATION <u>1,483' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2794+90</u> OFFSET = <u>75'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
80							SC	<u>ALLUVIUM: (Continued)</u> Brown, dry, very dense, clayey SAND; scattered caliche nodules; moderately cemented.		
			38				SM	Brown, dry, medium dense, silty SAND.		
								Dense.		
90			21							
								Very dense.		
			93							
								Dense.		
100			38							
			42							
110			33							
			48							
120			25							



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-3

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/15/15 and 4/16/15</u> BORING NO. <u>BR-1</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,483' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u>	
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2794+90</u> OFFSET = <u>75'L</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
120								<p>Total Depth = 120 feet. Groundwater not encountered during drilling. Backfilled, grouted top 5 feet, and asphalt patched on 4/16/15 shortly after completion of drilling.</p> <p><u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.</p> <p>The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.</p>	
130									
140									
150									
160									

			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO.	DATE	FIGURE
			601808009	9/15	A-4

DEPTH (feet)	Bulk Samples Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/20/15</u> BORING NO. <u>BR-2</u> GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2796+00</u> OFFSET = <u>55'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>			
							DESCRIPTION/INTERPRETATION			
0							ASPHALT CONCRETE: Approximately 6 inches thick. AGGREGATE BASE: Approximately 3 inches thick. ALLUVIUM: Brown, dry, dense, silty SAND; few gravel. Medium dense.			
27						SM				
35										
36						SC	Brown, dry, very dense, clayey SAND; scattered caliche nodules.			
36							Dense.			
32						SM	Brown, dry, dense, silty SAND; trace gravel.			
39			3.0	110.8		SW-SM	Brown, dry, very dense, well graded SAND with silt; trace gravel.			
44						SM	Brown, moist, very dense, silty SAND.			
50						CL	Brown, moist, hard, sandy lean CLAY.			
42						SC	Brown, dry, very dense, clayey SAND; few gravel.			
73						SP	Brown, dry, very dense, poorly graded SAND; few gravel.			



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009

DATE
9/15

FIGURE
A-5

DEPTH (feet)	Bulk Samples Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/20/15</u> BORING NO. <u>BR-2</u> GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>2</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2796+00</u> OFFSET = <u>55'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
							DESCRIPTION/INTERPRETATION		
40						SP	<u>ALLUVIUM: (Continued)</u> Brown, dry, very dense, poorly graded SAND; few gravel.		
		50/5"				SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules.		
		46				SM	Dense. Brown, moist, dense, silty SAND.		
50									
		24							
						SP	Brown, dry, very dense, poorly graded SAND.		
60		80/11"							
		31				SC	Brown, moist, dense, clayey SAND; scattered caliche nodules; weakly to moderately cemented.		
						SP	Brown, moist, dense, poorly graded SAND; trace gravel.		
70		62							
		18				SM	Brown, moist, medium dense, silty SAND.		
						SC	Brown, moist, medium dense, clayey SAND; scattered caliche nodules.		
80		33							

BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-6
--------------------------	--------------	---------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/20/15</u> BORING NO. <u>BR-2</u> GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2796+00</u> OFFSET = <u>55'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>			
	Bulk	Driven						DESCRIPTION/INTERPRETATION			
80							SC	<u>ALLUVIUM: (Continued)</u> Brown, moist, medium dense, clayey SAND; scattered caliche nodules.			
			18				SM	Brown, moist, medium dense, silty SAND.			
							SC	Brown, moist, dense, clayey SAND; trace gravel; scattered caliche nodules; weakly cemented.			
90			48				SM	Brown, moist, dense, silty SAND.			
			26				SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules; weakly cemented.			
			50/4"				CL	Brown, moist, hard, sandy lean CLAY.			
100							SM	Brown, moist, very dense, silty SAND.			
			87/10"								
			69								
			50/5"								
120								Total Depth = 119.4 feet.			

Ningo & Moore

BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009

DATE
9/15

FIGURE
A-7

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/20/15</u> BORING NO. <u>BR-2</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2796+00</u> OFFSET = <u>55'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
120								Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/20/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
130									
140									
150									
160									




			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8		
			PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-8


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/05/15</u> BORING NO. <u>BR-3</u> GROUND ELEVATION <u>1,455' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2797+50</u> OFFSET = <u>40'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION			
	Bulk	Driven									
0							CL	<u>ALLUVIUM:</u> Brown, dry, hard, sandy lean CLAY; trace gravel.			
			51	6.3	104.7						
			38				SC	Brown, dry, very dense, clayey SAND. Light brown; medium dense; scattered caliche nodules.			
			90/11"								
10			20				SM	Light brown, dry, very dense, silty SAND; scattered caliche nodules; weakly cemented. Dense.			
			77								
20			27					Few gravel.			
			44								
30			50/3"				SC	Brown, dry, very dense, clayey SAND; scattered caliche nodules.			
			59				SM	Brown, dry, very dense, silty SAND; few gravel.			
40			50/5"				SC	Brown, dry, very dense, clayey SAND; scattered caliche nodules; weakly to moderately cemented.			

BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-9
--------------------------	--------------	---------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.				
	Bulk	Driven						2/05/15	BR-3				
								GROUND ELEVATION	1,455' ± (MSL)	SHEET	2	OF	4
								METHOD OF DRILLING CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)					
								BASELINE STATION =	2797+50	OFFSET =	40'L		
								SAMPLED BY	DM	LOGGED BY	DM	REVIEWED BY	JSR
								DESCRIPTION/INTERPRETATION					
40			50/5"				SC	ALLUVIUM: (Continued) Brown, dry, very dense, clayey SAND; scattered caliche nodules; weakly to moderately cemented.					
50			23				SM	Brown, moist, dense, silty SAND.					
60			63/10"					Very dense.					
			94/11"					Few gravel.					
70			29					Dense.					
			50/5"					Very dense.					
80			24				SM	Brown, moist, dense, silty SAND; scattered caliche nodules.					



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-10
--------------------------	--------------	----------------





DEPTH (feet)		SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.	
Bulk	Driven									
									2/05/15	BR-3
									1,455' ± (MSL)	SHEET 3 OF 4
									CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)	
									2797+50	OFFSET = 40'L
									DM	LOGGED BY DM REVIEWED BY JSR
									DESCRIPTION/INTERPRETATION	
80			93/9"				SM	ALLUVIUM: (Continued) Brown, moist, dense, silty SAND; scattered caliche nodules. Very dense.		
90			55					Dense.		
100			27					Very dense; trace gravel; moderately to strongly cemented.		
110			67/11"					Dense.		
120			50/5"							


Ninyo & Moore

BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-11
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/09/15</u> BORING NO. <u>BR-4</u> GROUND ELEVATION <u>1,462' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+65</u> OFFSET = <u>100'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel. Very dense; scattered caliche filaments. Dense; scattered caliche nodules. Very dense.		
13										
39										
26										
10			94/11"	6.3	113.0					
15							SM	Brown, dry, medium dense, silty SAND; few gravel. Very dense.		
41										
52										
90/12"										
30							SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules.		
84/11"										
40			70				SP	Brown, moist, dense, poorly graded SAND; few gravel.		



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-13
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/09/15</u> BORING NO. <u>BR-4</u> GROUND ELEVATION <u>1,462' ± (MSL)</u> SHEET <u>2</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+65</u> OFFSET = <u>100'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>			
	Bulk	Driven						DESCRIPTION/INTERPRETATION			
40							SP	<u>ALLUVIUM: (Continued)</u> Brown, moist, dense, poorly graded SAND; few gravel.			
			50/4"				SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules.			
								Medium dense.			
			39								
50											
			18				SM	Brown, moist, medium dense, silty SAND.			
							SP	Light brown, dry, very dense, poorly graded SAND.			
			69/11"				SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules.			
60											
							SP	Brown, moist, very dense, poorly graded SAND; trace gravel.			
			50/5"								
							SM	Brown, moist, very dense, silty SAND; few gravel.			
			50/5"								
70											
			24					Dense.			
							SC	Brown, moist, medium dense, clayey SAND.			
			36								
80											



BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009

DATE
9/15


FIGURE
A-14

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/09/15</u> BORING NO. <u>BR-4</u> GROUND ELEVATION <u>1,462' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+65</u> OFFSET = <u>100'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
	Bulk	Driven						DESCRIPTION/INTERPRETATION	
80							SC	<u>ALLUVIUM: (Continued)</u> Brown, moist, medium dense, clayey SAND.	
			33				SM	Brown, moist, very dense, silty SAND.	
								Dense.	
90			61					Dense.	
								Medium dense.	
			15					Medium dense.	
								Dense.	
100			58					Dense.	
								Dense.	
			30					Dense.	
								Dense.	
110			49					Dense.	
								Dense.	
			86/11"					Very dense.	
								Very dense.	
120			45					Very dense.	



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-15

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/09/15</u> BORING NO. <u>BR-4</u> GROUND ELEVATION <u>1,462' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+65</u> OFFSET = <u>100'L</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
120								Total depth = 120 feet. Groundwater not encountered during drilling. Backfilled on 2/09/15 shortly after completion of drilling. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
130										
140										
150										
160										

			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-16

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/23/15</u> BORING NO. <u>BR-5</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,484' ± (MSL)</u>	SHEET <u>3</u> OF <u>4</u>
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2800+30</u> OFFSET = <u>30'L</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
80							SM	<u>ALLUVIUM</u> : (Continued) Brown, dry, very dense, silty SAND; few gravel.	
			33				CL	Brown, moist, hard, sandy lean CLAY.	
			50/5"						
90							SP	Brown, moist, very dense, poorly graded SAND; few gravel.	
			59						
			50/4"				SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules; moderately cemented.	
100									
			42				CL	Brown, moist, hard, sandy lean CLAY; trace gravel; scattered caliche nodules; moderately cemented.	
			50/5"						
110							SC	Brown, moist, very dense, clayey SAND.	
			36						
			50/4"						
120								Total Depth = 119.3 feet.	

Ningo & Moore

BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009


DATE
9/15

FIGURE
A-19

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/23/15</u> BORING NO. <u>BR-5</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2800+30</u> OFFSET = <u>30'L</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
120								Groundwater not encountered during drilling. Backfilled on 4/23/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
130									
140									
150									
160									


			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO.	DATE	FIGURE
			601808009	9/15	A-20

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/11/15 and 4/12/15		BORING NO. BR-6	
	Bulk	Driven						GROUND ELEVATION 1,481' ± (MSL)		SHEET 1 OF 4	
METHOD OF DRILLING CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)								METHOD OF DRILLING CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)			
BASELINE STATION = 2793+90								OFFSET = 75'R			
SAMPLED BY DM								LOGGED BY DM		REVIEWED BY JSR	
								DESCRIPTION/INTERPRETATION			
0							SC	ASPHALT CONCRETE: Approximately 8 inches thick. FILL: Brown, dry, clayey SAND.			
10											
20											
30											
40			61				SM	ALLUVIUM: Brown, dry, very dense, silty SAND.			



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO.	DATE	FIGURE
601808009	9/15	A-21

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.	
	Bulk	Driven						4/11/15 and 4/12/15	BR-6	
								GROUND ELEVATION	SHEET	OF
								METHOD OF DRILLING		
								BASELINE STATION =	OFFSET =	
								SAMPLED BY	LOGGED BY	REVIEWED BY
								DESCRIPTION/INTERPRETATION		
40							SM	ALLUVIUM: (Continued) Brown, dry, very dense, silty SAND		
			78					Trace gravel.		
								50/5"		
								51		
							SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules.		
			79/11"							
							SM	Brown, moist, very dense, silty SAND.		
			77/11"							
							SC	Brown, moist, dense, clayey SAND.		
			26							
								Medium dense.		
			37							
								Very dense.		
			40							
80										




BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-22
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/11/15 and 4/12/15</u> BORING NO. <u>BR-6</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,481' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2793+90</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
80							SC	<u>ALLUVIUM: (Continued)</u> Brown, moist, very dense, clayey SAND; scattered caliche nodules. Medium dense.	
			21						
90									
			20						
			25						
			24					Dense.	
100									
			32					Medium dense.	
			20				CL	Brown, moist, very stiff, sandy lean CLAY.	
110									
			56					Hard.	
			33				SM	Brown, moist, very dense, silty SAND.	
120									



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-23
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/11/15 and 4/12/15</u> BORING NO. <u>BR-6</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,481' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2793+90</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
120								Total Depth = 120 feet. Groundwater not encountered during drilling. Backfilled on 4/12/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
130									
140									
150									
160									




		BORING LOG	
		I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
		PROJECT NO. 601808009	DATE 9/15


FIGURE A-24

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/21/15</u> BORING NO. <u>BR-7</u> GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2795+10</u> OFFSET = <u>50'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ASPHALT CONCRETE</u> : Approximately 6 inches thick <u>AGGREGATE BASE</u> : Approximately 3 inches thick <u>ALLUVIUM</u> : Brown, moist, medium dense, clayey SAND.		
26										
12										
42										
24								Dense; scattered caliche nodules.		
10										
50							SM	Brown, dry, dense, silty SAND.		
23										
58								With gravel.		
25										
30										
80/10"				20.7	103.9		SC	Brown, moist, very dense, clayey SAND; trace gravel.		
85										
40								With gravel; scattered caliche nodules.		



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO.	DATE	FIGURE
601808009	9/15	A-25

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/21/15</u> BORING NO. <u>BR-7</u>		
	Bulk	Driven						GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>2</u> OF <u>4</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2795+10</u> OFFSET = <u>50'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION		
40							SC	<u>ALLUVIUM: (Continued)</u> Brown, moist, very dense, clayey SAND with gravel; scattered caliche nodules.		
			50/3"							
50			17						Medium dense.	
							SP	Very dense. Brown, moist, very dense, poorly graded SAND; few gravel.		
			50/5"							
60			39							
							SC	Brown, moist, dense, clayey SAND; scattered caliche nodules.		
			46							
70			36					Very dense; few gravel.		
			30					Medium dense.		
80			18							



BORING LOG
 I-10: EARLEY ROAD TO JUNCTION I-8
 PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-26
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/21/15</u> BORING NO. <u>BR-7</u> GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2795+10</u> OFFSET = <u>50'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
80							SC	<u>ALLUVIUM: (Continued)</u> Brown, moist, medium dense, clayey SAND.		
90			40							
			32				SM	Brown, moist, dense, silty SAND.		
			23				SC	Brown, moist, medium dense, clayey SAND.		
			21				SM	Brown, moist, dense, silty SAND.		
100										
			82/11"					Very dense.		
			24					Dense.		
110										
			40					Medium dense.		
			27					Dense.		
120										

BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA







PROJECT NO. 601808009	DATE 9/15	FIGURE A-27
--------------------------	--------------	----------------


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/04/15</u> BORING NO. <u>BR-8</u> GROUND ELEVATION <u>1,455' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2796+80</u> OFFSET = <u>35'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>			
	Bulk	Driven						DESCRIPTION/INTERPRETATION			
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND. Very dense.			
39											
15								Light brown, dry, dense, silty SAND; weakly cemented. Brown.			
80											
21							SM	Trace gravel.			
63											
30							SC	Brown, moist, dense, clayey SAND with gravel.			
70				7.0	121.21						
19							CL	Brown, moist, very stiff, sandy lean CLAY.			
44							SM				
50/5"							CL	Brown, moist, hard, sandy lean CLAY.			
40											

BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
601808009	9/15	A-29

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/04/15</u> BORING NO. <u>BR-8</u> GROUND ELEVATION <u>1,455' ± (MSL)</u> SHEET <u>2</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2796+80</u> OFFSET = <u>35'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
40							CL	<u>ALLUVIUM: (Continued)</u> Brown, moist, hard, sandy lean CLAY.		
			20				SM	Brown, moist, medium dense, silty SAND.		
			18							
50								Dense.		
			62							
							SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules; weakly cemented.		
60			39							
			55				SM	Brown, moist, dense, silty SAND; few gravel.		
							SC	Brown, moist, very dense, clayey SAND; trace gravel.		
70			40							
			37				SM	Medium dense. Brown, moist, medium dense, silty SAND; few gravel.		
80			29					Dense; scattered caliche nodules.		



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-30
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/04/15</u> BORING NO. <u>BR-8</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,455' ± (MSL)</u>	SHEET <u>3</u> OF <u>4</u>
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2796+80</u> OFFSET = <u>35'R</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
80							SM	<u>ALLUVIUM: (Continued)</u> Brown, moist, dense, silty SAND; scattered caliche nodules. Medium dense.	
			33						
							CL	Brown, moist, firm, sandy lean CLAY.	
90			5						
							SM	Brown, moist, medium dense, silty SAND.	
			20						
			19						
100									
			88					Very dense; trace gravel; moderately cemented.	
							SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules; moderately cemented.	
110			41						
			50/3"					No recovery.	
							SM	Brown, moist, medium dense, silty SAND.	
120			20						



BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA





PROJECT NO.
601808009


DATE
9/15

FIGURE
A-31

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/04/15</u> BORING NO. <u>BR-8</u> GROUND ELEVATION <u>1,455' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2796+80</u> OFFSET = <u>35'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
120								Total depth = 120 feet. Groundwater not encountered during drilling. Backfilled on 2/04/15 shortly after completion of drilling. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
130										
140										
150										
160										

			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-32

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/06/15</u> BORING NO. <u>BR-9</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,457' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u>	
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2797+10</u> OFFSET = <u>110'R</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
0			27				SC	<u>ALLUVIUM:</u> Brown, dry, dense, clayey SAND. Very dense.	
			88						
			61						
			79						
10									
			19				SM	Brown, dry, medium dense, silty SAND. Dense; few gravel.	
			56						
20									
			87/11"				GP	Brown, dry, very dense, poorly graded GRAVEL with sand.	
			94/11"						
30							SC	Light brown, dry, very dense, clayey SAND; scattered caliche nodules; weakly to moderately cemented.	
			34			SM	Light brown, dry, very dense, silty SAND; trace gravel.		
			50/2"				SC	Brown, dry, very dense, clayey SAND; trace gravel; scattered caliche nodules; moderately cemented.	
40									




BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA


PROJECT NO. 601808009	DATE 9/15	FIGURE A-33
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/06/15</u> BORING NO. <u>BR-9</u> GROUND ELEVATION <u>1,457' ± (MSL)</u> SHEET <u>2</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2797+10</u> OFFSET = <u>110'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
40							SC	<u>ALLUVIUM: (Continued)</u> Brown, dry, very dense, clayey SAND; trace gravel; scattered caliche nodules; moderately cemented.		
54										
56							SM	Brown, dry, dense, silty SAND; few gravel.		
57										
59							SP	Brown, dry, very dense, poorly graded SAND; trace gravel.		
60										
69							CL	Brown, moist, hard, sandy lean CLAY; trace gravel; scattered caliche nodules.		
70										
76							SP	Brown, dry, very dense, poorly graded SAND; few gravel.		
77										
79							SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules; weakly cemented.		
80										
87							SM	Brown, moist, dense, silty SAND.		





BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-34

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>2/06/15</u> BORING NO. <u>BR-9</u> GROUND ELEVATION <u>1,457' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2797+10</u> OFFSET = <u>110'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
80							SM	<u>ALLUVIUM: (Continued)</u> Brown, moist, dense, silty SAND. Very dense.		
			26							
90										
							SC	Brown, moist, very dense, clayey SAND; scattered caliche nodules.		
100							SM	Brown, moist, very dense, silty SAND.		
							SC	Brown, moist, dense, clayey SAND.		
							SM	Brown, moist, very dense, silty SAND.		
110										
							SC	Brown, moist, dense, clayey SAND.		
							SM	Brown, moist, very dense, silty SAND.		
120										
			96/11"							



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-35

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/22/15</u> BORING NO. <u>BR-10</u> GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>1</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+75</u> OFFSET = <u>35'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>FILL:</u> Brown, dry, clayey SAND.		
40			55							




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA


PROJECT NO. 601808009	DATE 9/15	FIGURE A-37
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/22/15</u> BORING NO. <u>BR-10</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,484' ± (MSL)</u>	SHEET <u>2</u> OF <u>4</u>
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2799+75</u> OFFSET = <u>35'R</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
40							SM	<u>ALLUVIUM:</u> (Continued) Brown, dry, very dense, silty SAND; few gravel.	
			86/11"						
			82/11"						
50									
			50/4"				SC	Brown, dry, very dense, clayey SAND.	
			85/11"					Moderately cemented.	
60									
			50/4"						
			50/4"						
70									
			50/2"					Light brown; moist; numerous caliche nodules.	
			50/3"					Scattered caliche nodules.	
80									



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-38

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/22/15</u> BORING NO. <u>BR-10</u> GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>3</u> OF <u>4</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+75</u> OFFSET = <u>35'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
80							SC	<u>ALLUVIUM: (Continued)</u> Brown, moist, very dense, clayey SAND; scattered caliche nodules. Strongly cemented. Trace gravel.		
			50/5"							
			66							
90										
			50/5"							
			34				SM	Brown, dry, very dense, silty SAND.		
100										
			50/4"							
			38				SC	Brown, dry, very dense, clayey SAND; scattered caliche nodules.		
110										
			50/4"				SM	Brown, moist, very dense, silty SAND; scattered caliche nodules.		
			24				SC	Brown, dry, dense, clayey SAND; scattered caliche nodules.		
120										




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-39
--------------------------	--------------	----------------


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/22/15</u> BORING NO. <u>BR-10</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>4</u> OF <u>4</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2799+75</u> OFFSET = <u>35'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
120								Total Depth = 120 feet. Groundwater not encountered during drilling. Backfilled on 4/22/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
130									
140									
150									
160									


			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8		
			PINAL COUNTY, ARIZONA		
			PROJECT NO.	DATE	FIGURE
601808009	9/15	A-40			

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/12/15 BORING NO. RW-1	
	Bulk	Driven						GROUND ELEVATION 1,484' ± (MSL) SHEET 1 OF 2	METHOD OF DRILLING CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)
								BASELINE STATION = 2799+37 OFFSET = 75'R SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR	
								DESCRIPTION/INTERPRETATION	
0							SC	<u>ASPHALT CONCRETE</u> : Approximately 5" thick. <u>FILL</u> : Brown, dry, medium dense, clayey SAND.	
38				8.4	117.3			Moist; trace gravel.	
18								Dense.	
39									
27									
10									
62									
55								Very dense; trace gravel.	
20									
84/11"									
59								Scattered caliche nodules.	
30									
95/11"								<u>ALLUVIUM</u> : Brown, moist, very dense, clayey SAND.	
43							SM	Brown, dry, very dense, silty SAND.	
40									




BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-41

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/12/15</u> BORING NO. <u>RW-1</u> GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2799+37</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
40							SM	<u>ALLUVIUM:</u> (Continued) Brown, dry, very dense, silty SAND. Trace gravel.		
80								Total Depth = 45 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/12/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
50										
60										
70										
80										





BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-42

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/12/15 BORING NO. RW-2	
	Bulk	Driven						GROUND ELEVATION 1,482' ± (MSL) SHEET 1 OF 2	METHOD OF DRILLING CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)
								BASELINE STATION = 2801+10 OFFSET = 75'R SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR	
								DESCRIPTION/INTERPRETATION	
0							SM	ASPHALT CONCRETE: Approximately 5" thick. FILL: Brown, dry, medium dense, silty SAND; few gravel.	
17							CL	Brown, moist, hard, sandy lean CLAY.	
33							SC	Brown, moist, dense, clayey SAND.	
31								Very dense.	
74									
49									
50/5"									
90/12"							SC	ALLUVIUM: Brown, moist, very dense, clayey SAND; scattered caliche nodules.	
52								Dense.	
27							SM	Brown, dense, silty SAND; trace gravel.	
50/5"								Very dense; trace to few gravel.	



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-43

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/12/15</u> BORING NO. <u>RW-2</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,482' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2801+10</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
40							SM	<u>ALLUVIUM: (Continued)</u> Brown, dry, very dense, silty SAND; trace to few gravel.	
45								Total Depth = 45 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/12/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
50									
60									
70									
80									




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
601808009	9/15	A-44

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/13/15</u> BORING NO. <u>RW-3</u> GROUND ELEVATION <u>1,480' ± (MSL)</u> SHEET <u>1</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2802+80</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ASPHALT CONCRETE</u> : Approximately 5" thick. <u>FILL</u> : Brown, dry, dense, clayey SAND; few gravel. Very dense.		
44										
36										
50/5"										
10							SC			
38										
50/5"										
58										
20							SC	<u>ALLUVIUM</u> : Brown, moist, very dense, clayey SAND; scattered caliche filaments. Scattered caliche nodules.		
50/5"										
32										
Dense.										
30							SM	Brown, dry, very dense, silty SAND.		
86/11"										
86/11"										
Trace to few gravel.										
40										




BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-45

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/13/15</u> BORING NO. <u>RW-3</u> GROUND ELEVATION <u>1,480' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2802+80</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
40							SM	<u>ALLUVIUM:</u> (Continued) Brown, dry, very dense, silty SAND; trace to few gravel.		
48										
50								Total Depth = 50 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/12/15 shortly after completion of drilling.		
52								<u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.		
54								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
60										
70										
80										



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-46

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/13/15</u> BORING NO. <u>RW-4</u> GROUND ELEVATION <u>1,477' ± (MSL)</u> SHEET <u>1</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2804+58</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>
	Bulk	Driven						
0								DESCRIPTION/INTERPRETATION
51				9.3	117.3		SC	<u>ASPHALT CONCRETE</u> : Approximately 5" thick. <u>FILL</u> : Brown, moist, dense, clayey SAND; trace to few gravel. Scattered caliche nodules; trace gravel. Very dense. Medium dense.
67								
39								
88/12"								
10								
18								
20								
50/5"							SC	<u>ALLUVIUM</u> : Brown, moist, very dense, clayey SAND. Scattered caliche nodules.
33								
30							SM	Brown, dry, dense, silty SAND; trace gravel. Very dense; moderately cemented. Few gravel.
64/11"								
82/9"								
50/5"								
40								






BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009

DATE
9/15

FIGURE
A-47

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/13/15</u> BORING NO. <u>RW-4</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,477' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2804+58</u> OFFSET = <u>75'R</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
40							SM	<u>ALLUVIUM: (Continued)</u> Brown, dry to moist, very dense, silty SAND; few gravel.	
47							GP	Brown, dry, very dense, poorly graded GRAVEL with sand.	
50/3"							SC	Brown, dry, very dense, clayey SAND; trace gravel.	
50								Total Depth = 49.3 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/14/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
60									
70									
80									



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-48
--------------------------	--------------	----------------


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/14/15 BORING NO. RW-5	
	Bulk	Driven						GROUND ELEVATION 1,443' ± (MSL) SHEET 1 OF 2	METHOD OF DRILLING CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)
								BASELINE STATION = 2806+30 OFFSET = 75'R SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR	
								DESCRIPTION/INTERPRETATION	
0							CL	ASPHALT CONCRETE: Approximately 5" thick. FILL: Brown, moist, hard, sandy lean CLAY; trace to few gravel. Very dense.	
			64	3.4	131.7				
			49						
			50/4"						
			46						
10									
			78						
							SC	ALLUVIUM: Brown, dry, very dense, clayey SAND; scattered caliche nodules.	
			78						
20									
			70				SM	Brown, dry, dense, silty SAND; very dense, trace few gravel.	
			45						
30									
			50/5"						
			43						
40									

BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-49
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/14/15</u> BORING NO. <u>RW-5</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,443' ± (MSL)</u>	SHEET <u>2</u> OF <u>2</u>
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2806+30</u> OFFSET = <u>75'R</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
40							SM	<u>ALLUVIUM:</u> (Continued) Brown, dry, very dense, silty SAND with gravel.	
			50/5"				SC	Brown, dry to moist, very dense, clayey SAND; moderately cemented.	
50			50/5"						
			50/5"					Total Depth = 54 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/14/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
60									
70									
80									




BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA


PROJECT NO.	DATE	FIGURE
601808009	9/15	A-50

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/14/15</u> BORING NO. <u>RW-6</u> GROUND ELEVATION <u>1,469' ± (MSL)</u> SHEET <u>1</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2808+25</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>			
	Bulk	Driven						DESCRIPTION/INTERPRETATION			
0							SC	ASPHALT CONCRETE: Approximately 5" thick. FILL: Brown, dry to moist, dense clayey SAND. Very dense.			
24			86/11"				SC	ALLUVIUM: Brown, dry to moist, very dense, clayey SAND. Scattered caliche filaments, strong cementation.			
35			77/11"				SC	Scattered caliche nodules.			
52				6.0	104.3		SC	Scattered caliche nodules.			
50/5"							SC	Scattered caliche nodules.			
20							SM	Brown, dry, medium dense, silty SAND.			
20							SM	Brown, dry, medium dense, silty SAND.			
58							SM	Dense with gravel.			
50							SM	Very dense.			
84							SM	Very dense.			
40							SM	Very dense.			



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-51

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/14/15</u> BORING NO. <u>RW-6</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,469' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2808+25</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
40							SM	<u>ALLUVIUM:</u> (Continued) Brown, dry, very dense, silty SAND with gravel. Dense. Few gravel. Coarse gravel.	
			70/9"						
			50/2"						
50								Total Depth = 54.3 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/15/15 shortly after completion of drilling.	
			50/4"					<u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
60									
70									
80									



BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-52
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/17/15</u> BORING NO. <u>RW-7</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,484' ± (MSL)</u>	SHEET <u>1</u> OF <u>2</u>
								METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>	
								BASELINE STATION = <u>2800+67</u> OFFSET = <u>75'R</u>	
								SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
0			31				SC	<u>ASPHALT CONCRETE</u> : Approximately 5" thick. <u>FILL</u> : Brown, dry, dense, clayey SAND.	
			24						
			51	14.1	117.3		CL	Brown, moist, hard, lean sandy CLAY.	
			32						
10							SC	Brown, moist, dense, clayey SAND.	
			50						
			33						
20			82/11"					Very dense.	
			40				SC	<u>ALLUVIUM</u> : Brown, moist, very dense, clayey SAND.	
30									
			45				SM	Brown, dry, dense, silty SAND.	
			28						
40									




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009

DATE
9/15

FIGURE
A-53

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/17/15</u> BORING NO. <u>RW-7</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2800+67</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
40			50/5"				SM	<u>ALLUVIUM: (Continued)</u> Brown, dry, dense, silty SAND. Very dense, few gravel.	
50			69					Total Depth = 50 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/17/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
60									
70									
80									




BORING LOG

I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO. 601808009	DATE 9/15	FIGURE A-54
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/16/15</u> BORING NO. <u>RW-8</u> GROUND ELEVATION <u>1,482' ± (MSL)</u> SHEET <u>1</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2802+45</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ASPHALT CONCRETE</u> : Approximately 8" thick. <u>FILL</u> : Brown, dry, dense, clayey SAND.		
30										
58										
24										
44										
10										
29										
75				9.5	119.7		CL	Brown, moist, hard, lean sandy CLAY; trace gravel.		
20										
30										
50/4"							SC	<u>ALLUVIUM</u> : Brown, dry to moist, dense clayey SAND. Very dense; scattered caliche nodules.		
50/5"								Possible cobbles.		
80/9"							SM	Brown, dry, very dense, silty SAND; few gravel.		
40										



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-55

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/16/15</u> BORING NO. <u>RW-8</u> GROUND ELEVATION <u>1,482' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2802+45</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
40							SM	<u>ALLUVIUM</u> : (Continued) Brown, dry, very dense, silty SAND; few gravel.		
41										
50			50/4"					Total Depth = 49.8 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/17/15 shortly after completion of drilling.		
Notes:									Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.	
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
60										
70										
80										

BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-56

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/16/15</u> BORING NO. <u>RW-9</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,480' ± (MSL)</u> SHEET <u>1</u> OF <u>2</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2804+25</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>	
								DESCRIPTION/INTERPRETATION	
0							SC	<u>ASPHALT CONCRETE</u> : Approximately 5" thick. <u>FILL</u> : Brown, dry to moist, dense, clayey SAND; trace gravel.	
49									
33									
44							CL	Brown, moist, hard, sandy lean CLAY; trace gravel.	
25									
10							SC	Brown, moist, dense, clayey SAND.	
86								Very dense.	
36									
20							SC	<u>ALLUVIUM</u> : Brown, dry, very dense, clayey SAND.	
50/5"								Scattered caliche nodules.	
68									
30							SM	Brown, dry, very dense, silty SAND; trace gravel.	
86/11"									
64								Few gravel.	
40									




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

PROJECT NO.
601808009

DATE
9/15

FIGURE
A-57


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/16/15</u> BORING NO. <u>RW-9</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,480' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2804+25</u> OFFSET = <u>75'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
40							SM	<u>ALLUVIUM: (Continued)</u> Brown, dry, very dense, silty SAND; trace to few gravel.	
50								Total Depth = 50 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 4/16/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
60									
70									
80									




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA


PROJECT NO. 601808009	DATE 9/15	FIGURE A-58
--------------------------	--------------	----------------

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-1</u> GROUND ELEVATION <u>1,437' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2705+80</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0			33	9.4	106.9		SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel. Very dense.		
46								Total Depth = 5 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
10										
20										
30										
40										





BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-59

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-2</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,438' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2722+71</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
0			19	10.3	99.3		SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.	
50/4"								Total Depth = 4.4 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
10									
20									
30									
40									





BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-60

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-3</u> GROUND ELEVATION <u>1,442' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2739+62</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0			50/4"	5.7	104.9		CL	<u>ALLUVIUM:</u> Brown, dry, hard, lean sandy CLAY; scattered caliche nodules; moderately cemented.		
61								Total Depth = 5 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
10										
20										
30										
40										





BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-61

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-4</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,447' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2756+53</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
0			26				CL	<u>ALLUVIUM:</u> Brown, dry, hard, lean sandy CLAY; scattered caliche nodules.	
82/10"			6.4	106.8				Total Depth = 4.8 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
10									
20									
30									
40									





BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-62

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-5</u> GROUND ELEVATION <u>1,449' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2773+44</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0			43	5.8	103.4		CL	<u>ALLUVIUM:</u> Brown, dry, hard, lean sandy CLAY; scattered caliche nodules.		
39								Total Depth = 5 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
10										
20										
30										
40										






BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-63

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-6</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,472' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2790+35</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
0			31				SC	<u>ALLUVIUM:</u> Brown, dry, dense, clayey SAND.	
			50/4"	7.4	110.2			Very dense; weakly to moderately cemented. Total Depth = 4.3 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling.	
10								<u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.	
20								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
30									
40									



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-64



DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-7</u> GROUND ELEVATION <u>1,466' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2807+26</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>			
	Bulk	Driven						DESCRIPTION/INTERPRETATION			
0							CL	<u>ALLUVIUM:</u> Brown, dry, hard, lean sandy CLAY. Weakly to moderately cemented. Total Depth = 4 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.			
50/5"		50/5"	6.0	110.6							
50/5"											
10											
20											
30											
40											




BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA


PROJECT NO.	DATE	FIGURE
601808009	9/15	A-65

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-8</u> GROUND ELEVATION <u>1,463' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2824+17</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							CL	<u>ALLUVIUM:</u> Brown, dry, hard, lean sandy CLAY.		
30								Moderately cemented. Total Depth = 4.4 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling.		
50/5"			5.7	101.4				Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
10										
20										
30										
40										






BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-66

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-9</u>	
	Bulk	Driven						GROUND ELEVATION <u>1,469' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u>	METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u>
								BASELINE STATION = <u>2841+80</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u> DESCRIPTION/INTERPRETATION	
0			30	2.9	125.3		CL	<u>ALLUVIUM:</u> Brown, dry, hard, clayey SAND. Trace gravel; scattered caliche nodules.	
46								Total Depth = 5 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
10									
20									
30									
40									



BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-67


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/24/15</u> BORING NO. <u>B-10</u> GROUND ELEVATION <u>1,484' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>CME-75, 8" Diameter Hollow-Stem Auger (Enviro-Drill, Inc.)</u> BASELINE STATION = <u>2858+00</u> OFFSET = <u>0</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>FILL:</u> Brown, dry, loose, clayey SAND with gravel.		
6								Very dense; scattered caliche nodules.		
14			6.2	109.4				Total Depth = 5 feet. Groundwater not encountered during drilling. Backfilled on 4/24/15 shortly after completion of drilling.		
10								<u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.		
20								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
30										
40										





BORING LOG


I-10: EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA


PROJECT NO.	DATE	FIGURE
601808009	9/15	A-68


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-3</u> GROUND ELEVATION <u>1,443' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>2719+70</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										


			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-69


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-4</u> GROUND ELEVATION <u>1,448' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>2746+40</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										


			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-70


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-5</u> GROUND ELEVATION <u>1,457' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>2759+80</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										

			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-71


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-6</u> GROUND ELEVATION <u>1,456' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>31+60</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										


			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO.	DATE	FIGURE
			601808009	9/15	A-72


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-7</u> GROUND ELEVATION <u>1,462' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>13+80</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										




BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-73

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-8</u> GROUND ELEVATION <u>1,463' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>11+50</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										


			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-74


DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-9</u> GROUND ELEVATION <u>1,462' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>2812+70</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										




BORING LOG		
I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
PROJECT NO. 601808009	DATE 9/15	FIGURE A-75

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-10</u> GROUND ELEVATION <u>1,467' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>2828+50</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SM	<u>ALLUVIUM:</u> Brown, dry, medium dense, silty SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										

			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		
			PROJECT NO. 601808009	DATE 9/15	FIGURE A-76

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/7/15</u> BORING NO. <u>HA-11</u> GROUND ELEVATION <u>1,480' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Sample</u> BASELINE STATION = <u>2847+80</u> OFFSET = <u>10'R</u> SAMPLED BY <u>DM</u> LOGGED BY <u>DM</u> REVIEWED BY <u>JSR</u>		
	Bulk	Driven						DESCRIPTION/INTERPRETATION		
0							SC	<u>ALLUVIUM:</u> Brown, dry, medium dense, clayey SAND; trace gravel.		
10								Total Depth = 3 feet. Groundwater not encountered during drilling. Backfilled on 4/7/15 shortly after completion of drilling. <u>Notes:</u> Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.		
20										
30										
40										

			BORING LOG		
			I-10: EARLEY ROAD TO JUNCTION I-8		
			PINAL COUNTY, ARIZONA		
			PROJECT NO.	DATE	FIGURE
601808009	9/15	A-77			

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with AASHTO T265. These test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-25. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

Atterberg Limits

Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the USCS. The test results and classifications are shown on Figures B-26 through B-29.

Consolidation Tests

Consolidation tests were performed on selected relatively undisturbed soil samples in general accordance with ASTM D 2435. The samples were inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the test are summarized on Figures B-30 through B-36.

Maximum Dry Density and Optimum Moisture Content Tests

The maximum dry density and optimum moisture content of selected representative soil samples were evaluated in general accordance with ASTM D 698. The results of these tests are summarized on Figures B-37 through B-40.

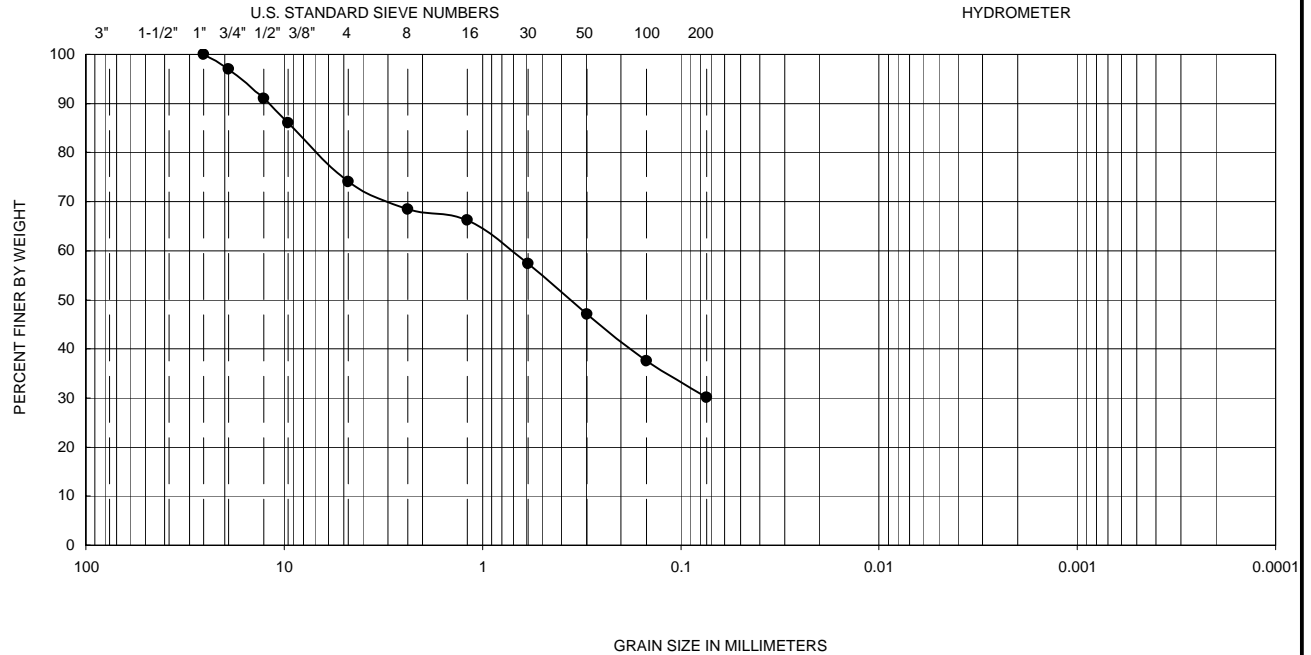
R-value

The resistance value, or R-value, for site soils was evaluated in general accordance with ASTM D 2844. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results. The test results are shown on Figure B-41.

Soil Corrosivity Tests

Soil pH and minimum resistivity tests were performed on representative samples in general accordance with Arizona Test 236c. The chloride content of the selected samples was evaluated in general accordance with Arizona Test 736. The sulfate content of the selected samples was evaluated in general accordance with Arizona Test 733. The test results are presented on Figures B-42 and B-43.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

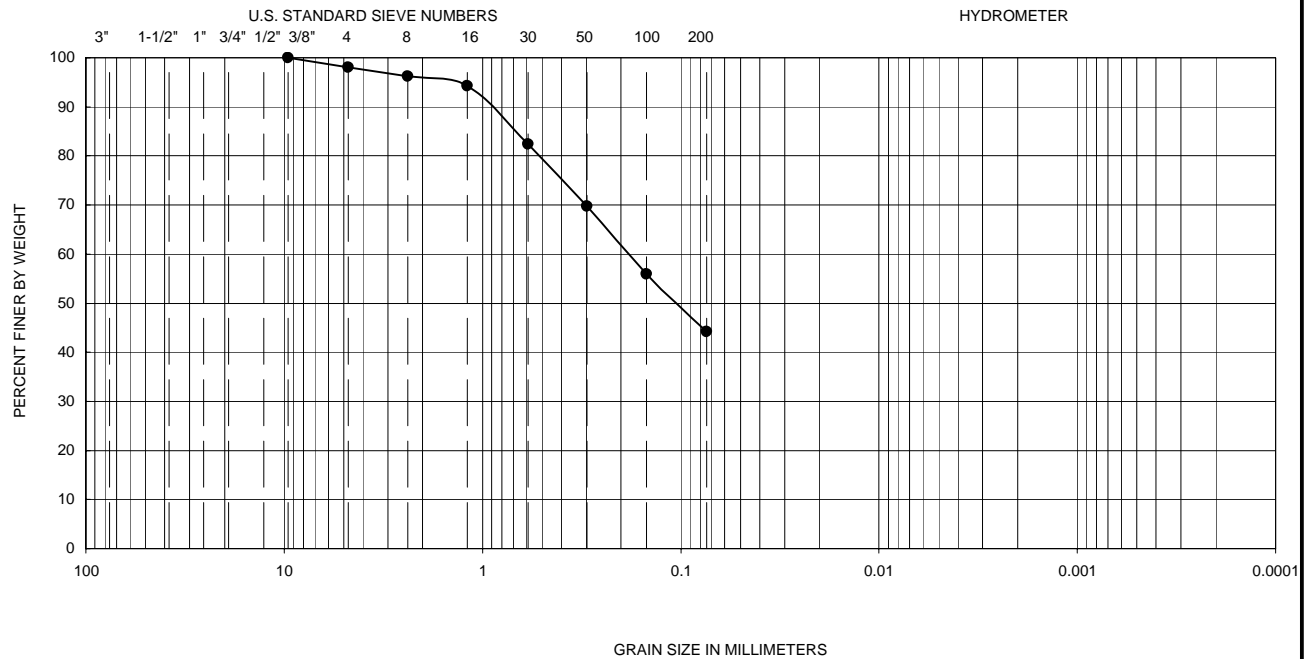


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-1	0.0-5.0	29	13	16	--	--	--	--	--	30	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	<div>FIGURE</div> <div>B-1</div>
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

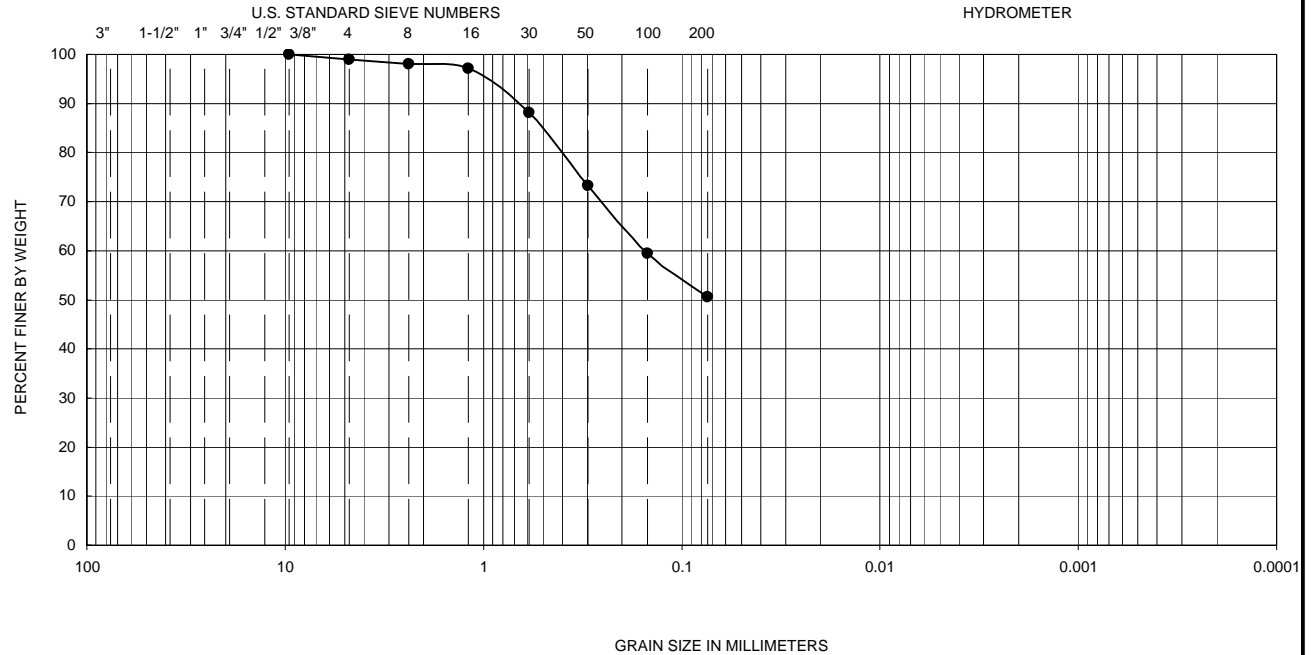


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-2	0.0-4.4	28	15	13	--	--	--	--	--	44	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-2
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

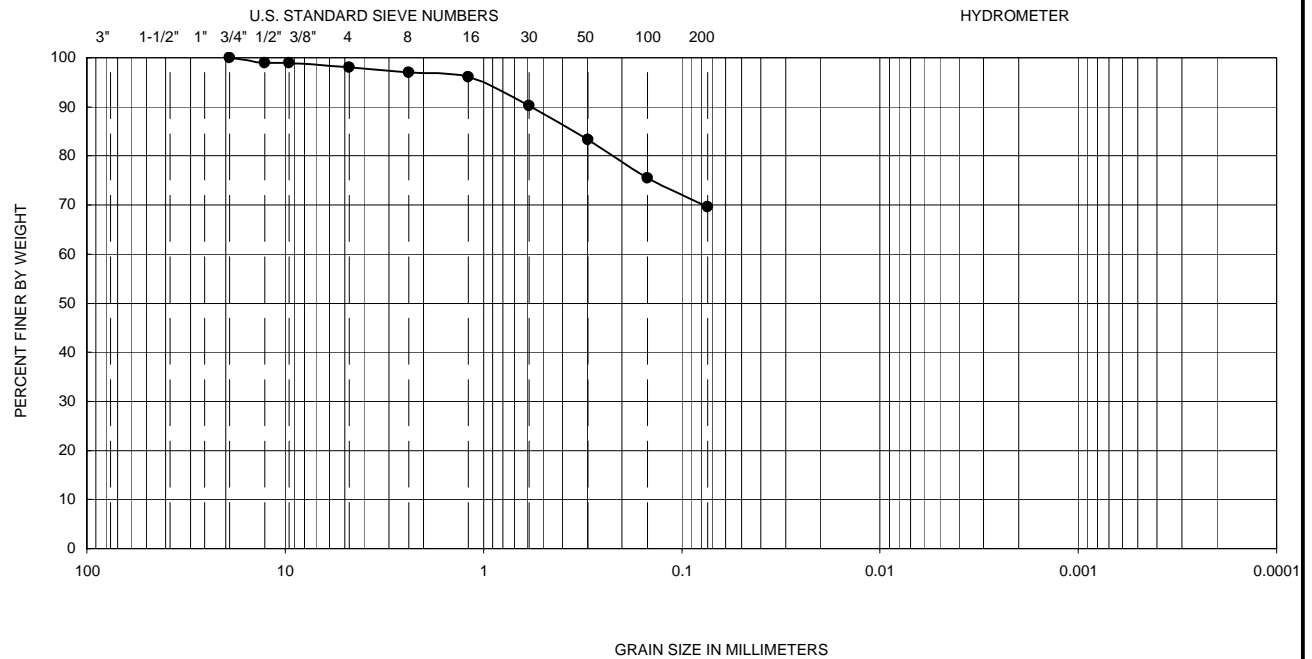


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-3	0.0-5.0	32	16	16	--	--	--	--	--	51	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-3
PROJECT NO.	DATE		
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

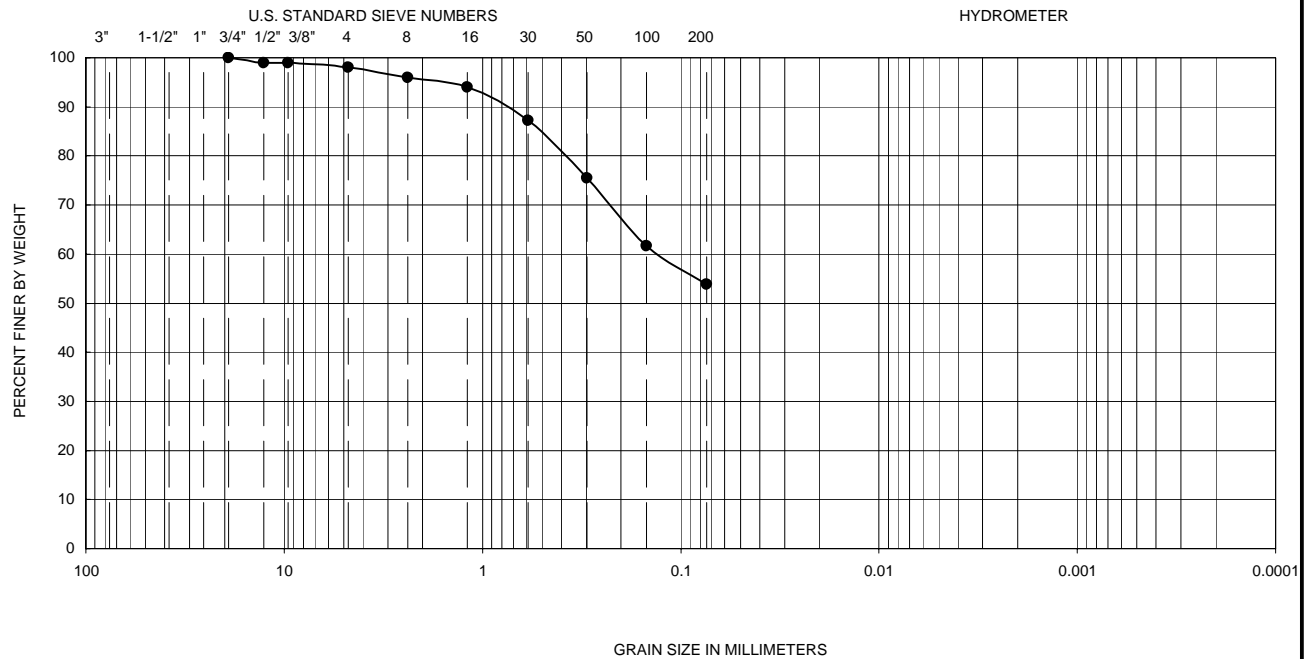


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-4	0.0-4.8	28	16	12	--	--	--	--	--	70	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-4
PROJECT NO.	DATE		
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

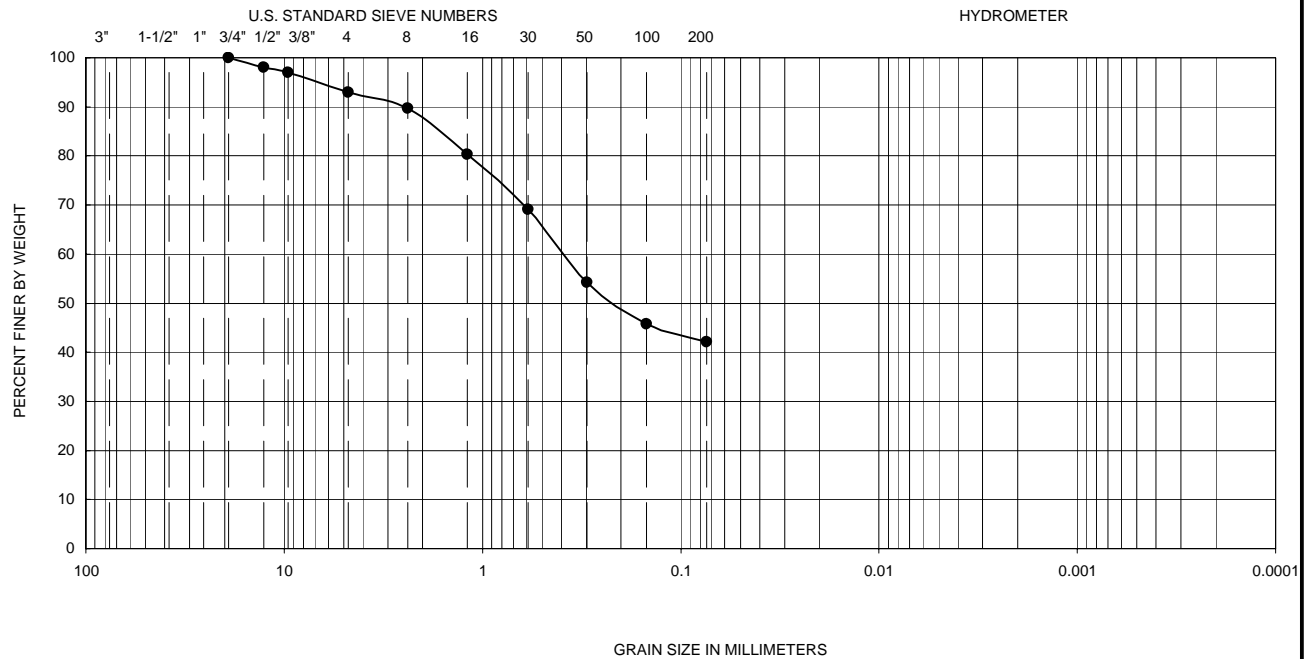


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-5	0.0-5.0	28	17	11	--	--	--	--	--	54	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-5
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

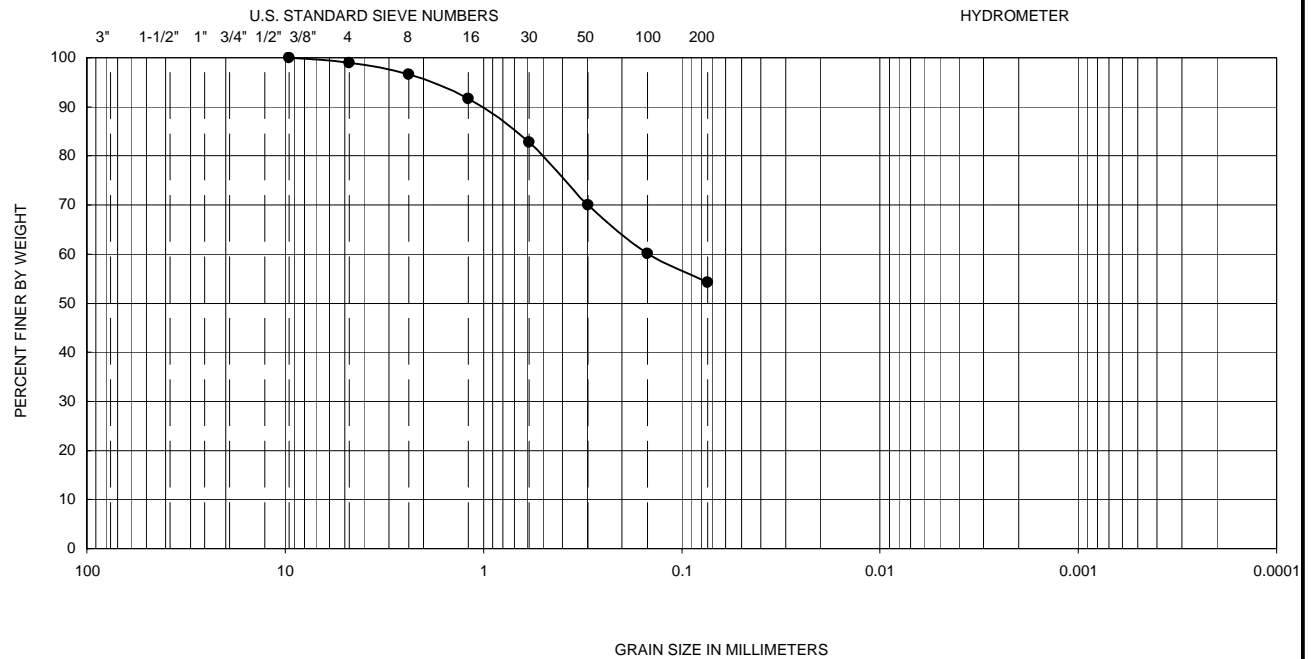


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-6	0.0-4.4	26	15	11	--	--	--	--	--	42	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-6
PROJECT NO.	DATE		
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

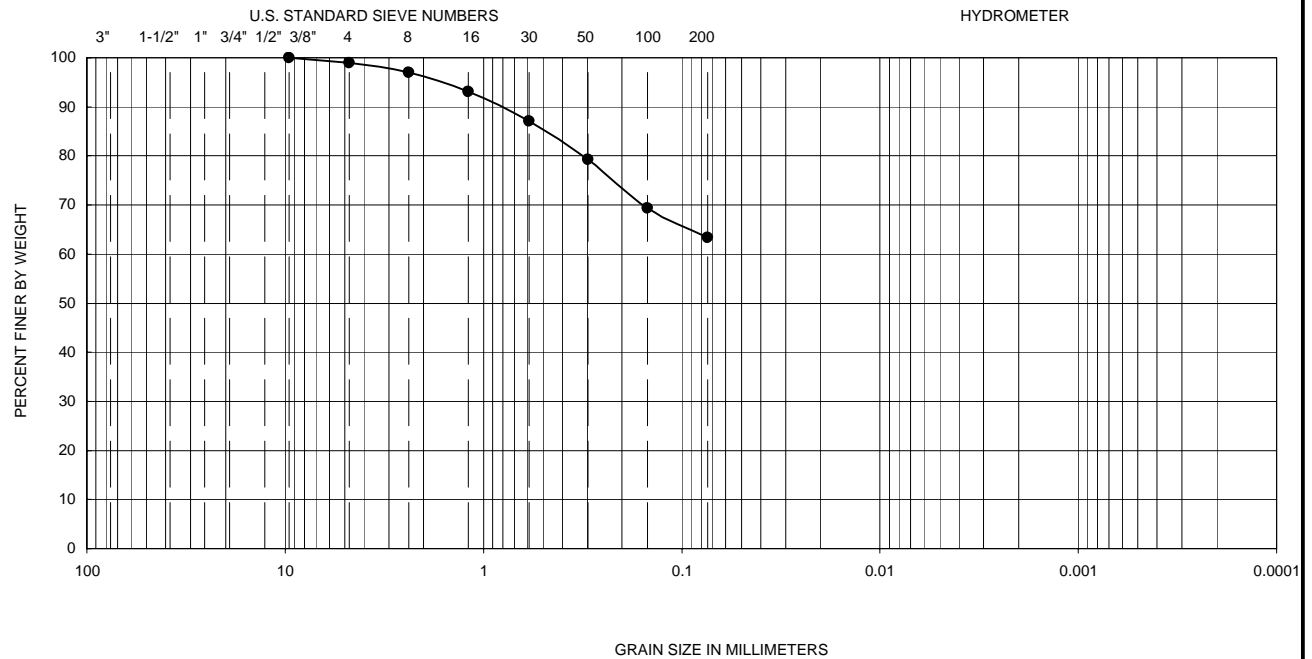


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-7	0.0-4.0	27	16	11	--	--	--	--	--	54	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-7
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

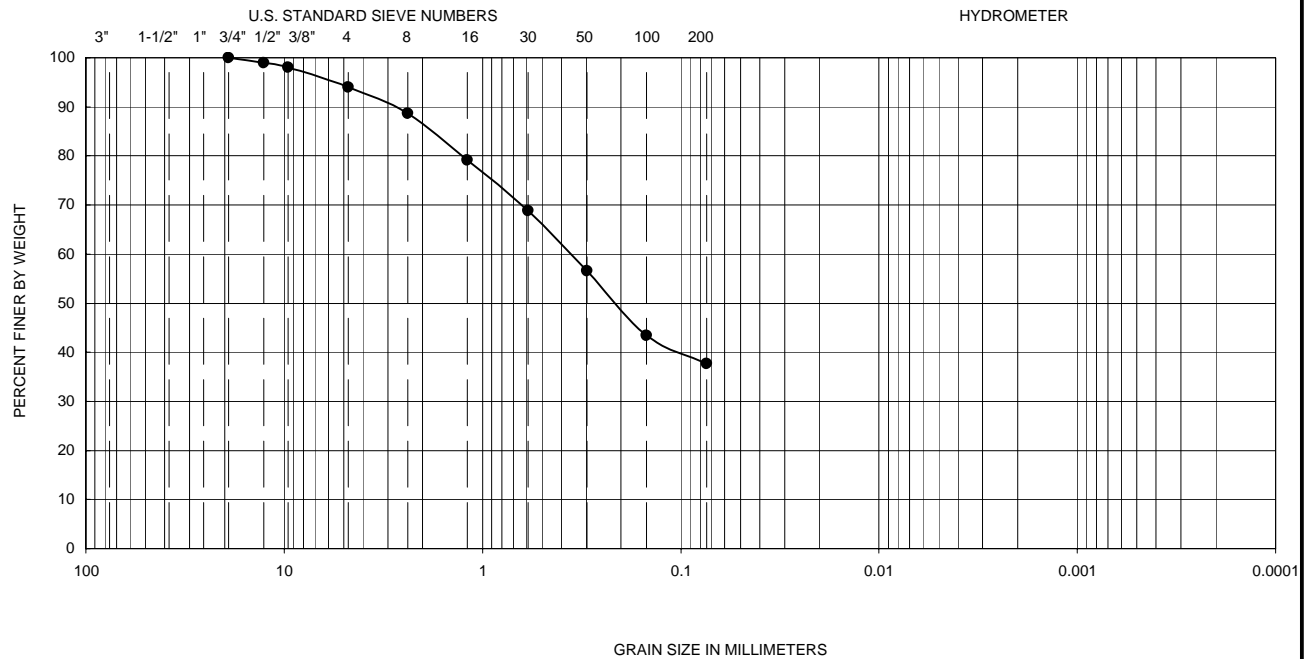


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-8	0.0-4.4	30	14	16	--	--	--	--	--	63	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-8
PROJECT NO.	DATE		
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

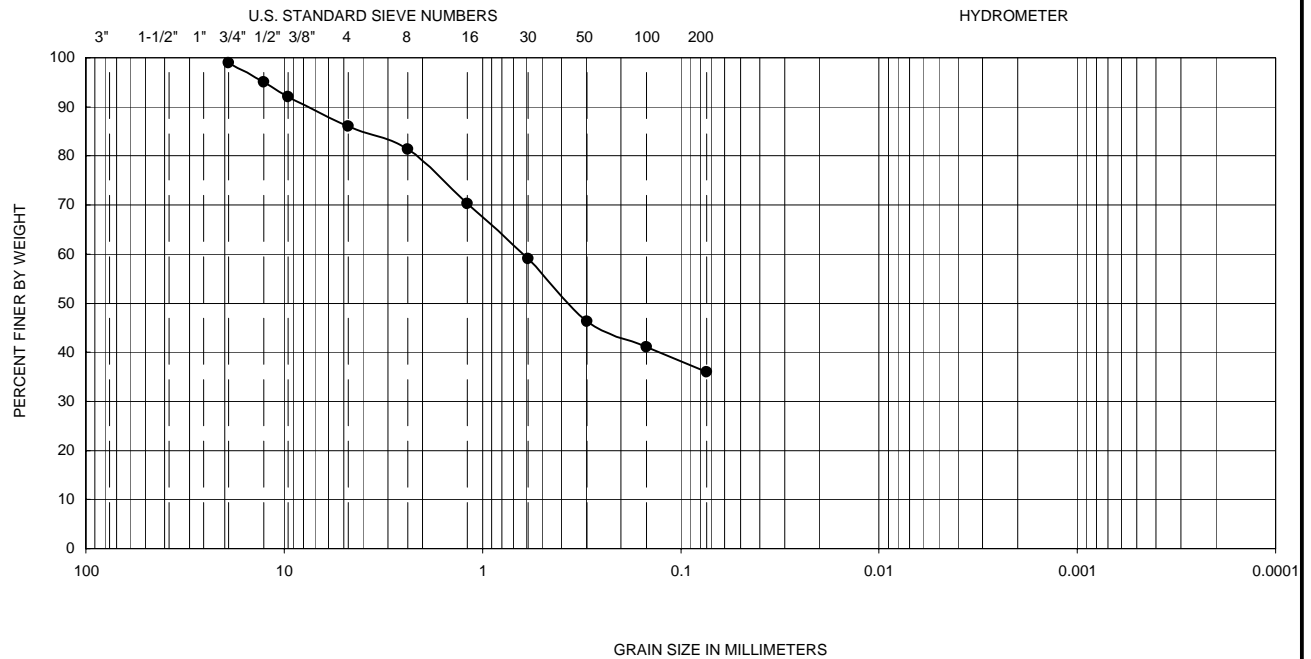


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-9	0.0-5.0	22	14	8	--	--	--	--	--	38	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-9
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

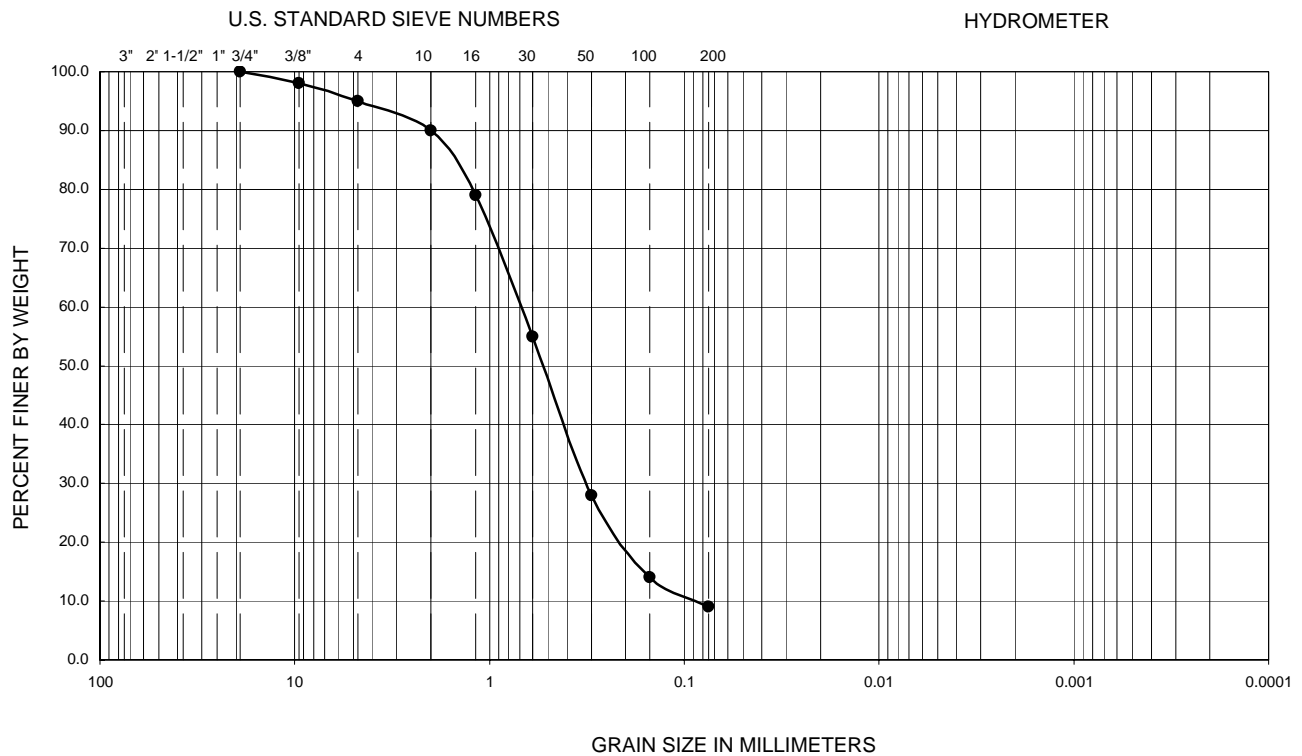


Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-10	0.0-5.0	27	17	10	--	--	--	--	--	36	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS		FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		B-10
601808009	9/15			

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



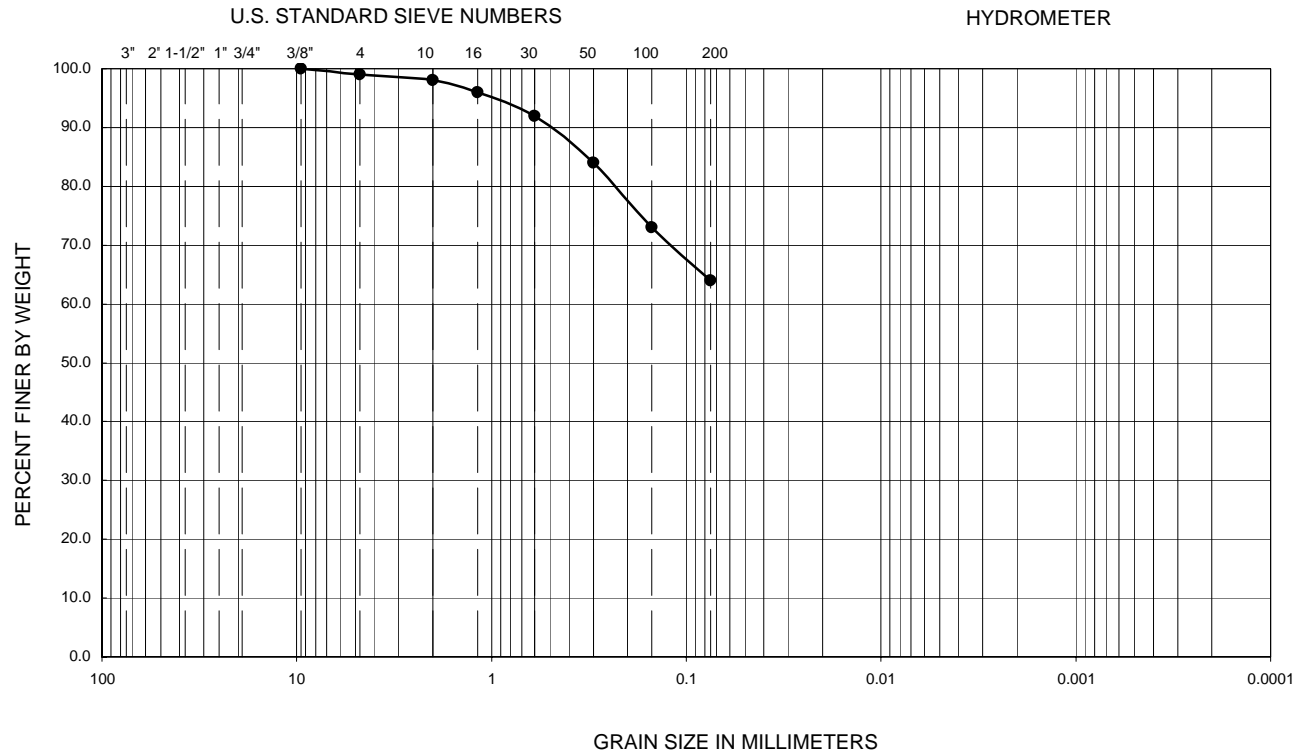
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-2	18.5-20.0	--	--	NP	0.09	0.32	0.69	7.7	1.6	9	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

NP - INDICATES NON-PLASTIC

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-11
PROJECT NO.	DATE		
601808009	9/15		
		I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

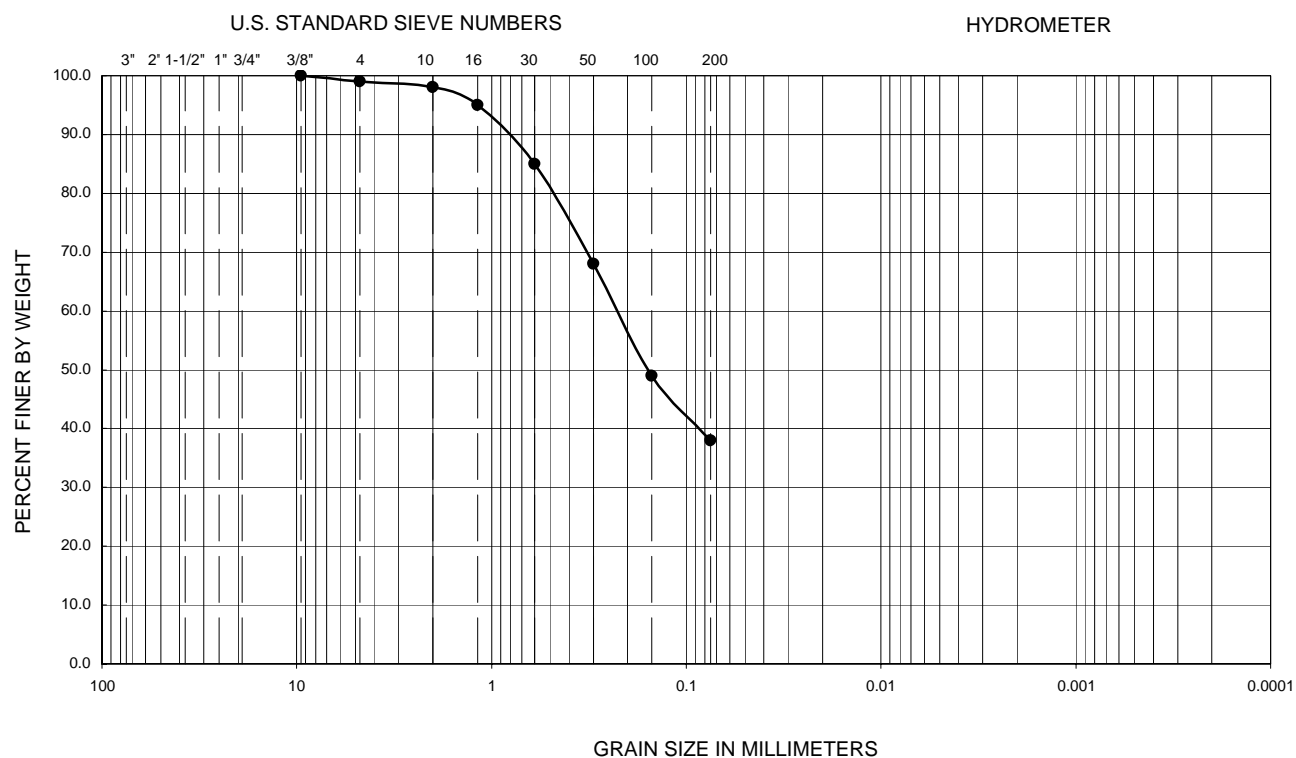


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-3	1.0-2.5	32	16	16	--	--	--	--	--	64	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-12
PROJECT NO.	DATE		
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

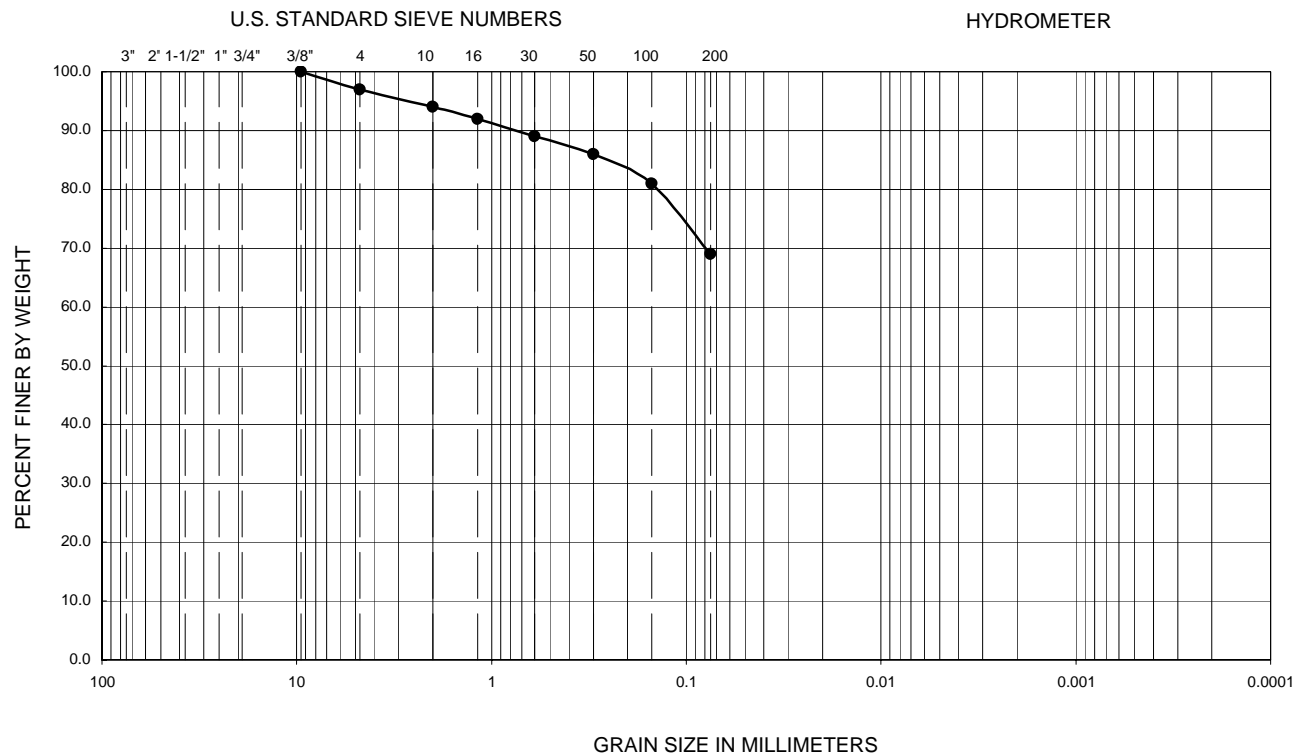


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-4	8.5-10.0	31	14	17	--	--	--	--	--	38	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-13
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

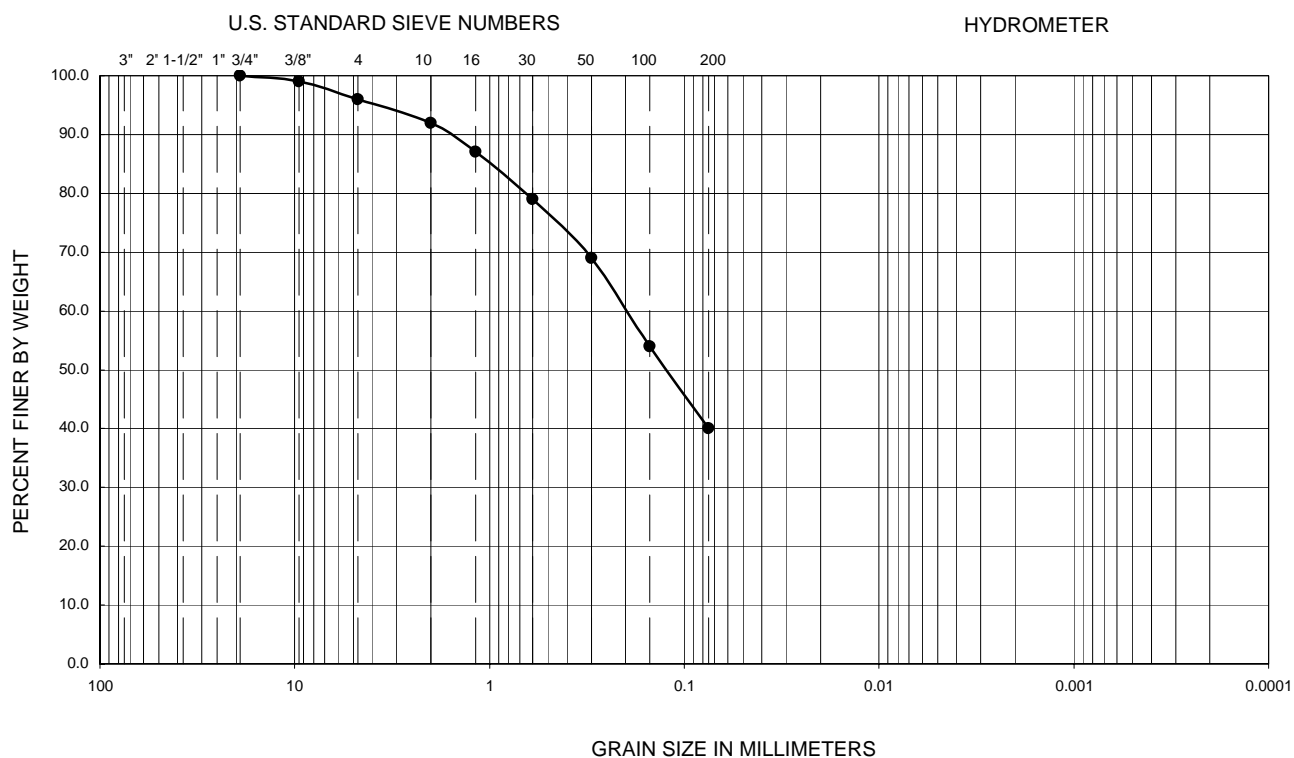


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-5	108.5-109.4	35	17	18	--	--	--	--	--	69	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	<div>FIGURE</div> <div>B-14</div>
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

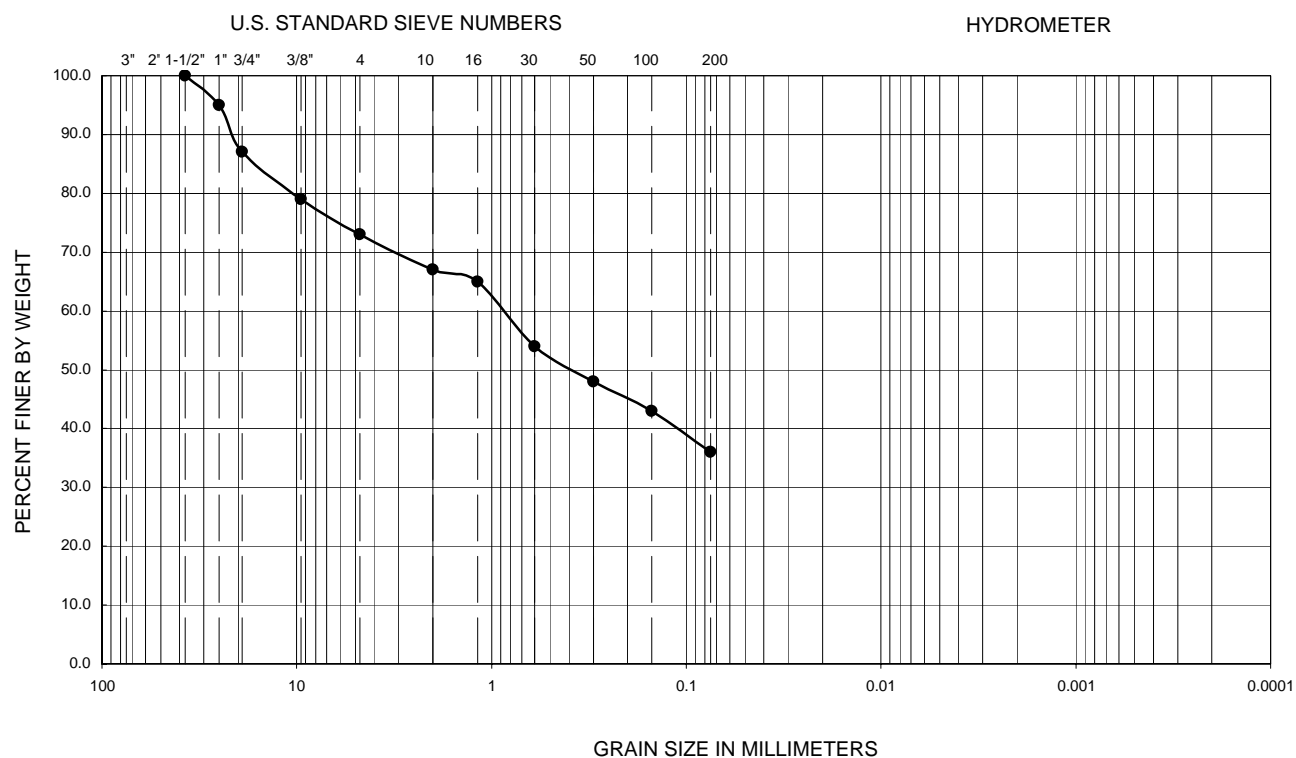


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-7	33.5-34.8	39	21	18	--	--	--	--	--	40	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-15
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

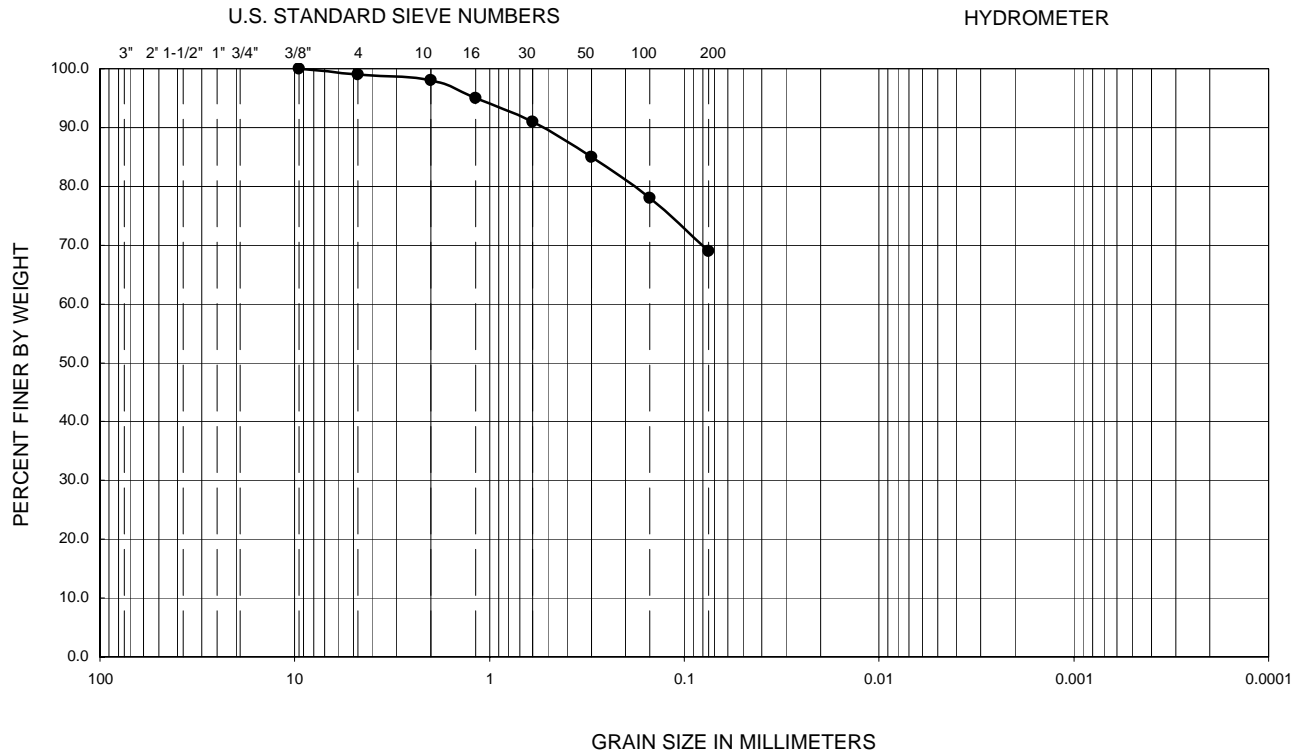


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-8	23.5-25.0	26	18	8	--	--	--	--	--	36	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-16
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

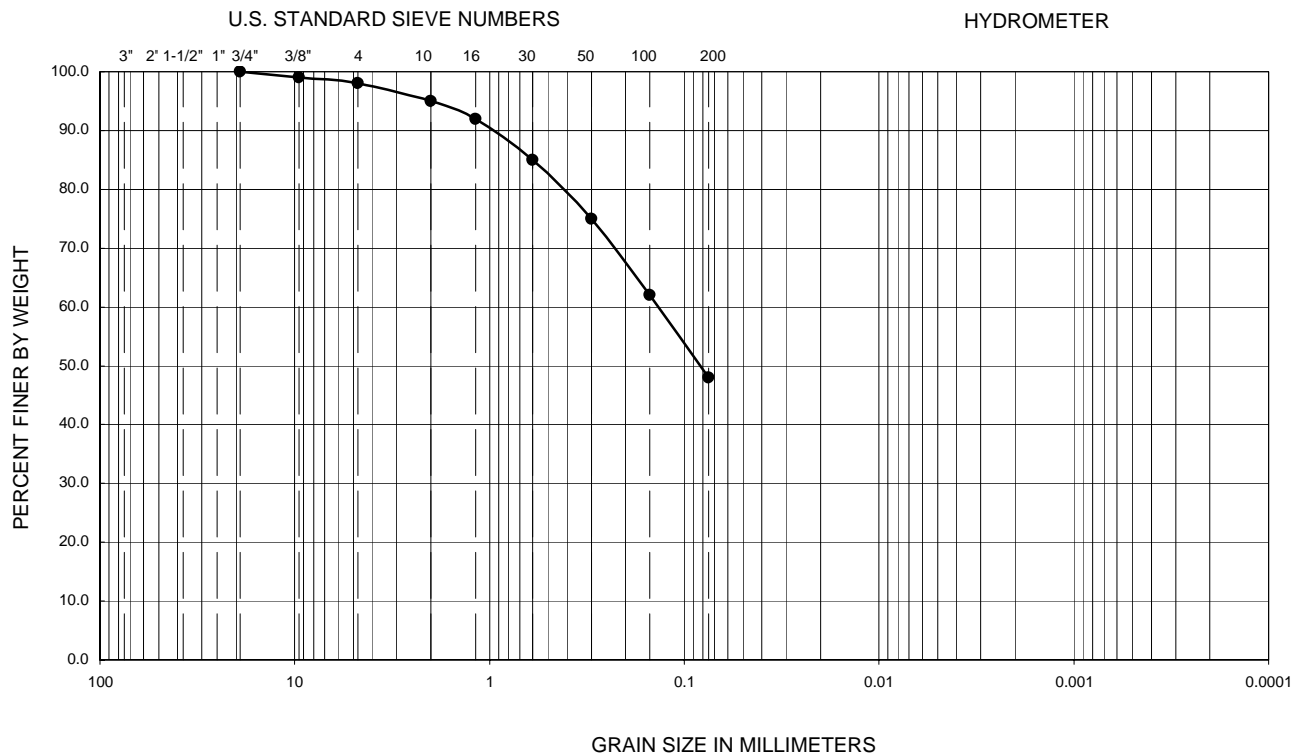


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	BR-9	58.5-60.0	34	16	18	--	--	--	--	--	69	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-17
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

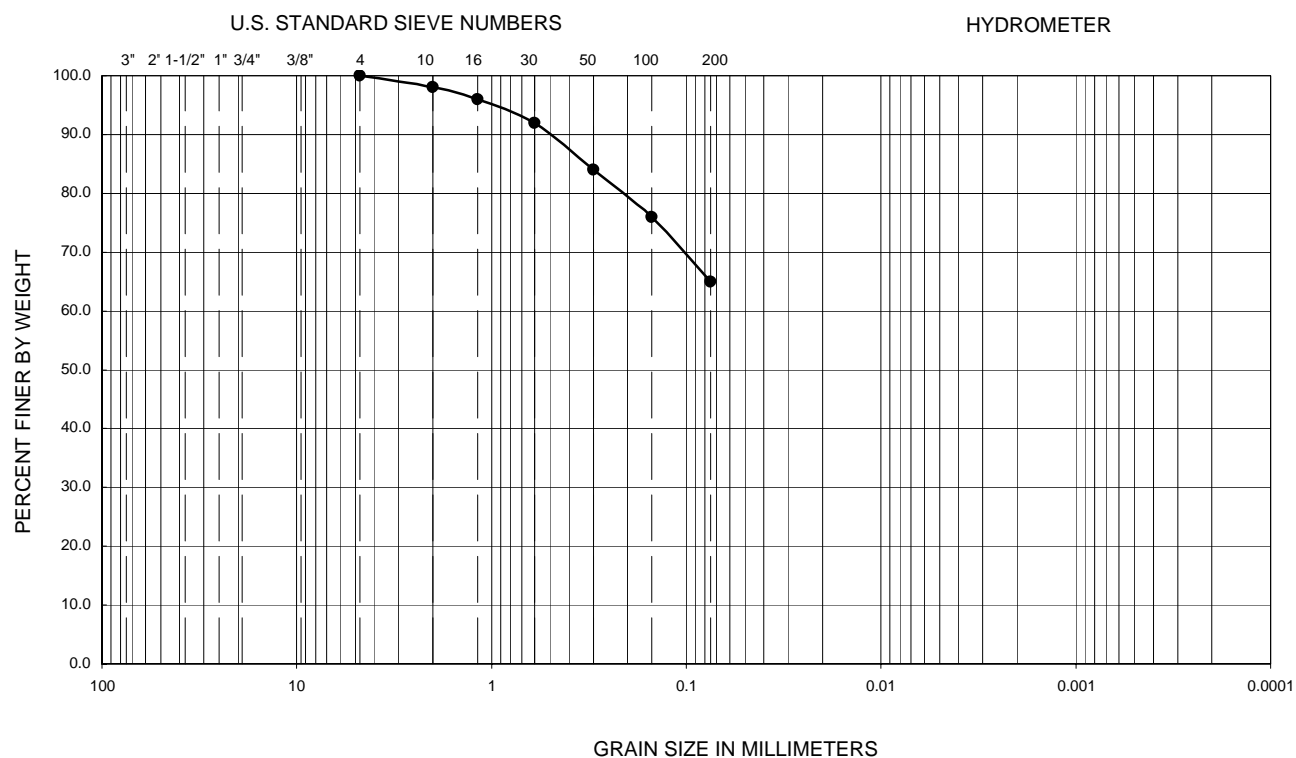


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-1	6.0-7.5	32	15	17	--	--	--	--	--	48	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-18
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

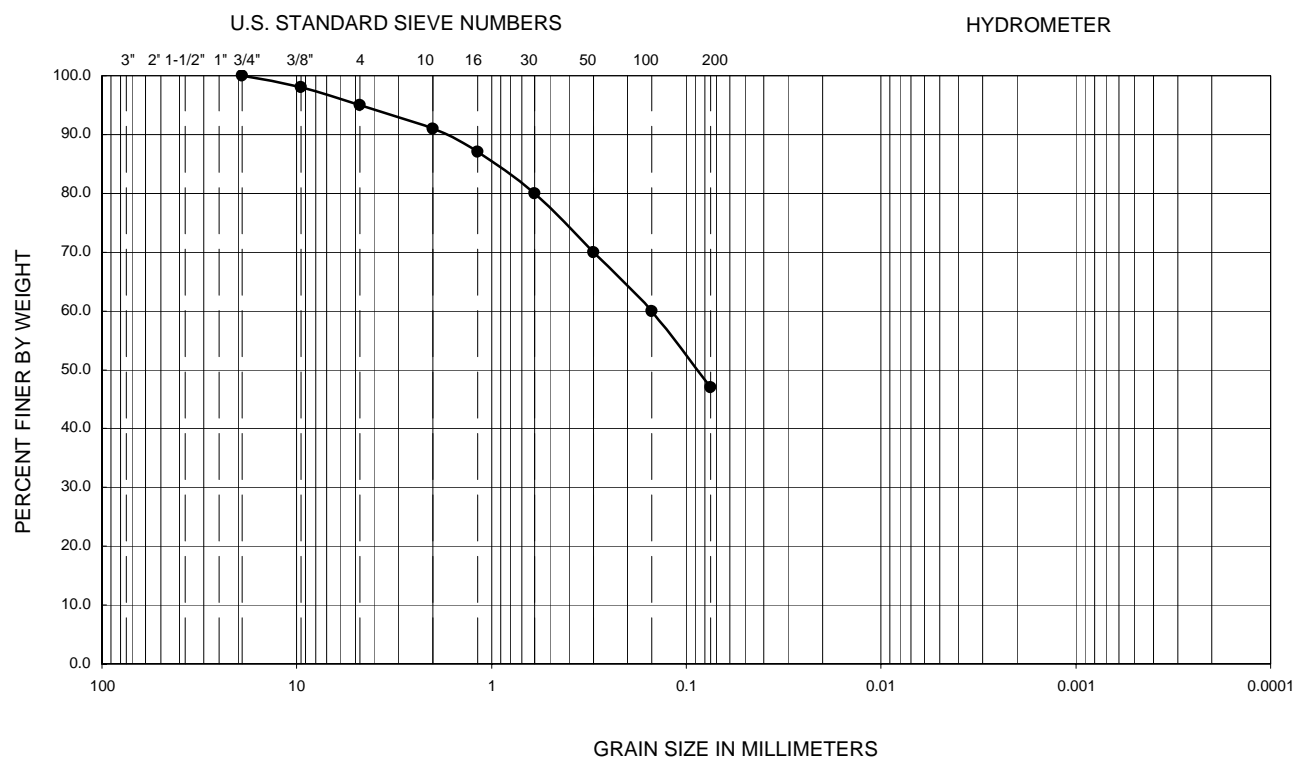


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-2	3.5-5.0	36	16	20	--	--	--	--	--	65	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-19
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

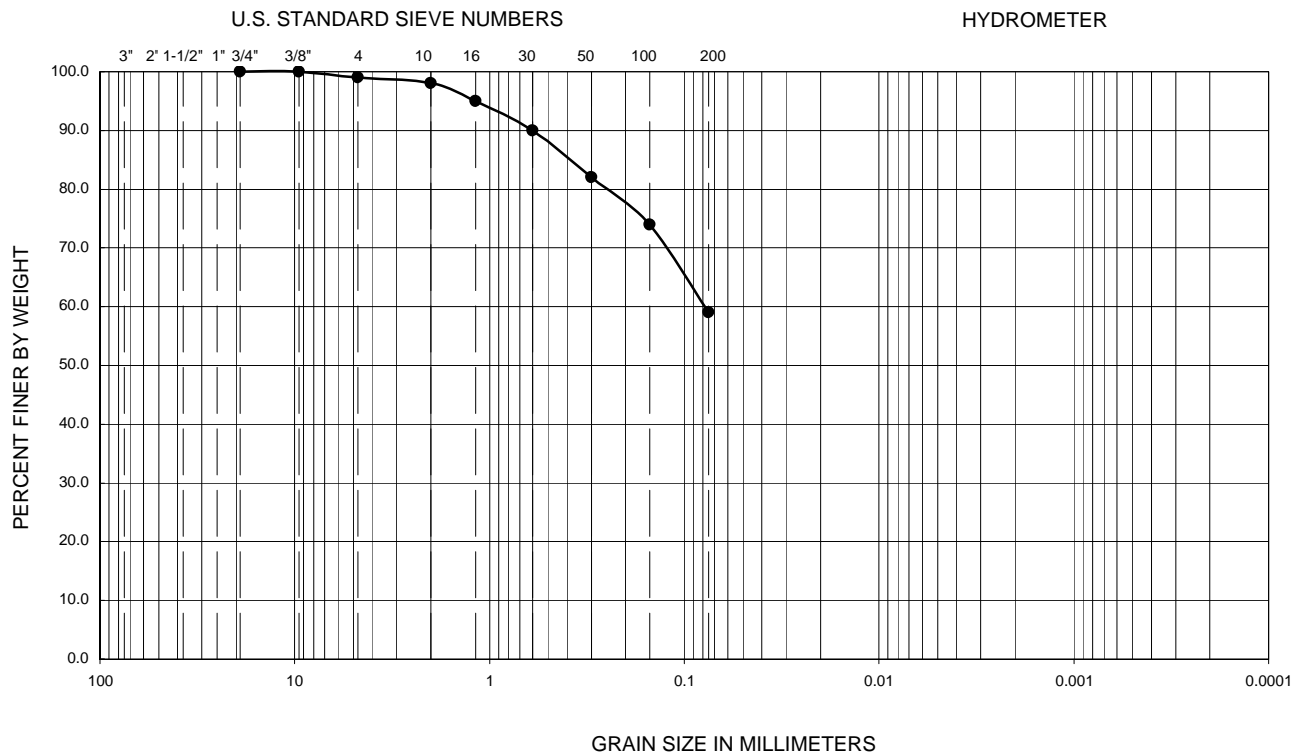


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-4	3.5-5.0	35	17	18	--	--	--	--	--	47	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-20
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

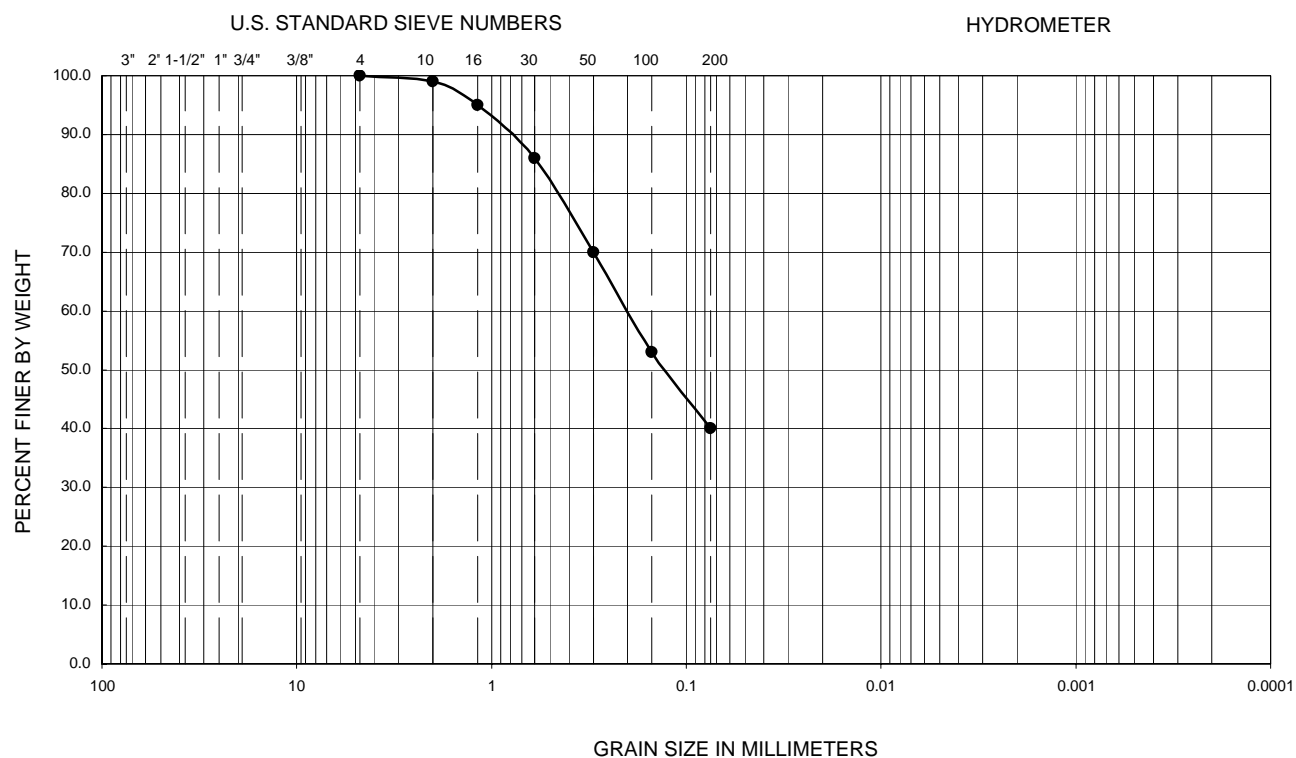


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-5	1.0-2.5	33	16	17	--	--	--	--	--	59	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-21
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

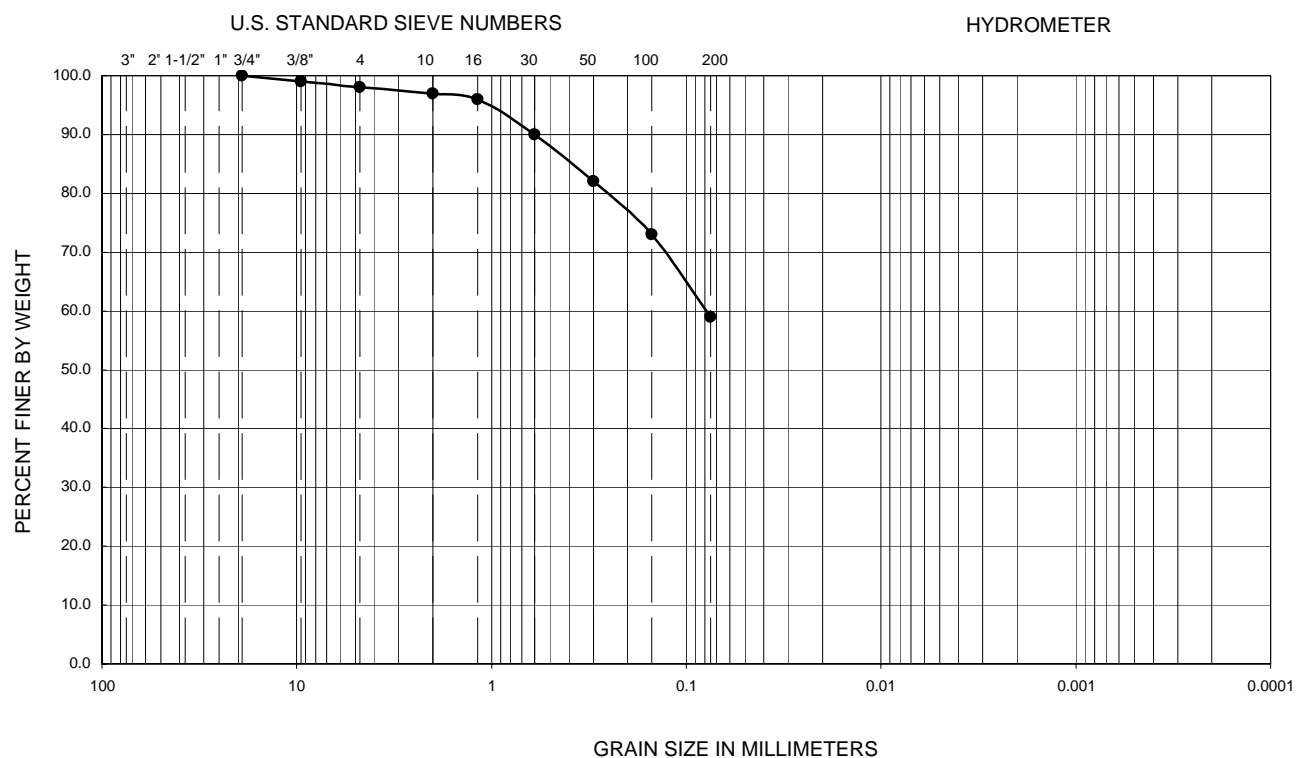


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-6	18.5-19.4	31	15	16	--	--	--	--	--	40	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-22
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

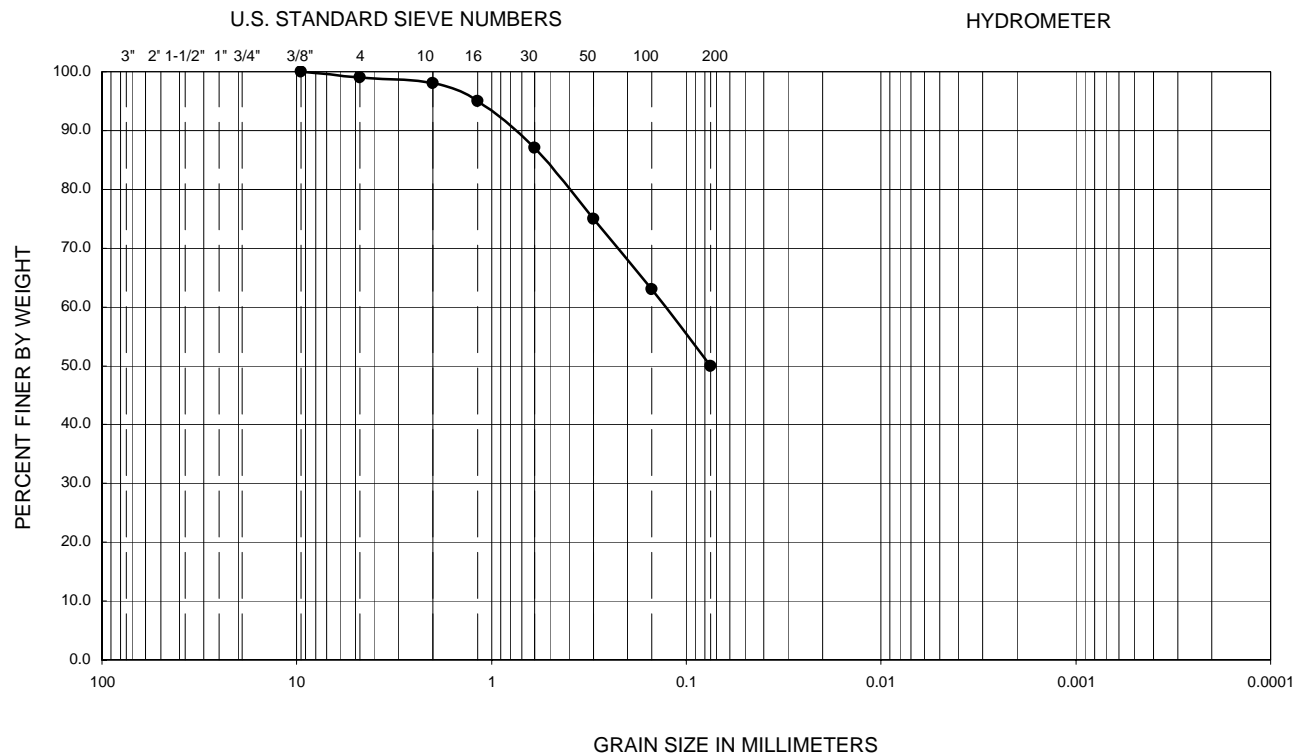


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-7	6.0-7.5	37	16	21	--	--	--	--	--	59	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	FIGURE B-23
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

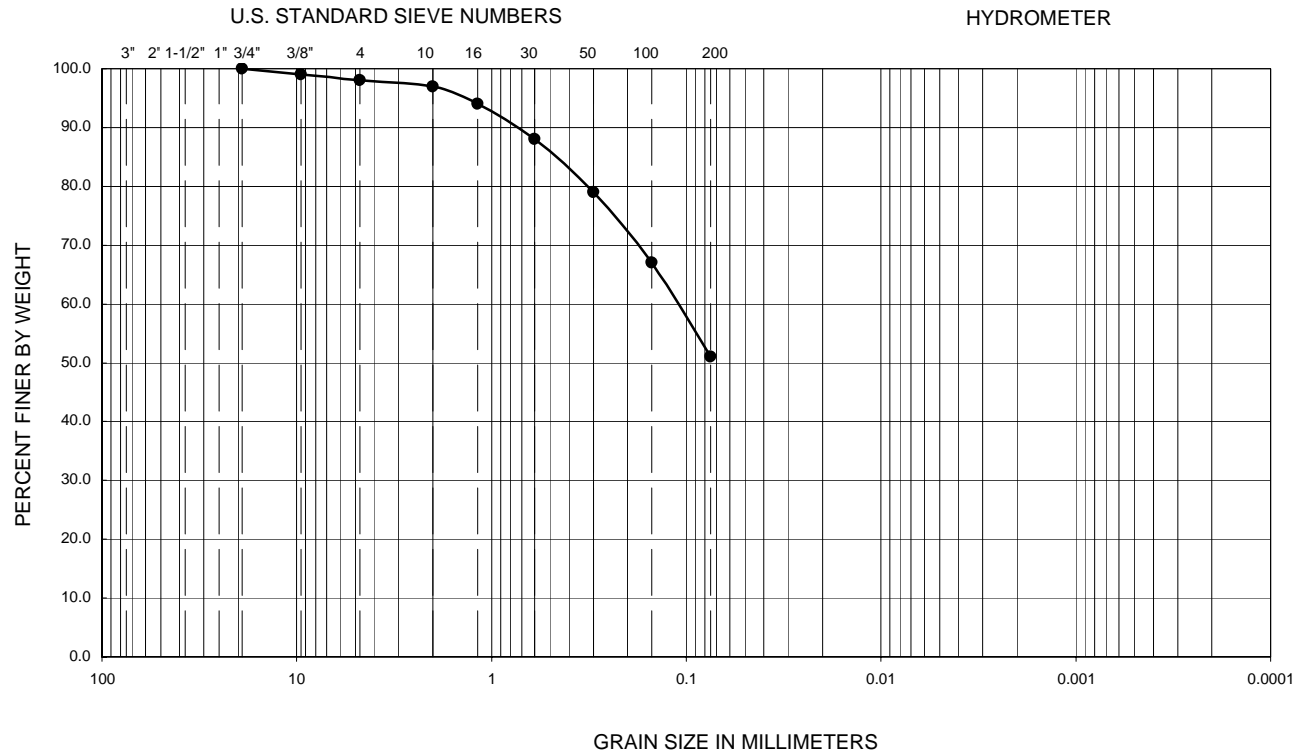


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-8	18.5-20.0	40	15	25	--	--	--	--	--	50	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

<i>Ninyo & Moore</i>		GRADATION TEST RESULTS	<div>FIGURE</div> <div>B-24</div>
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



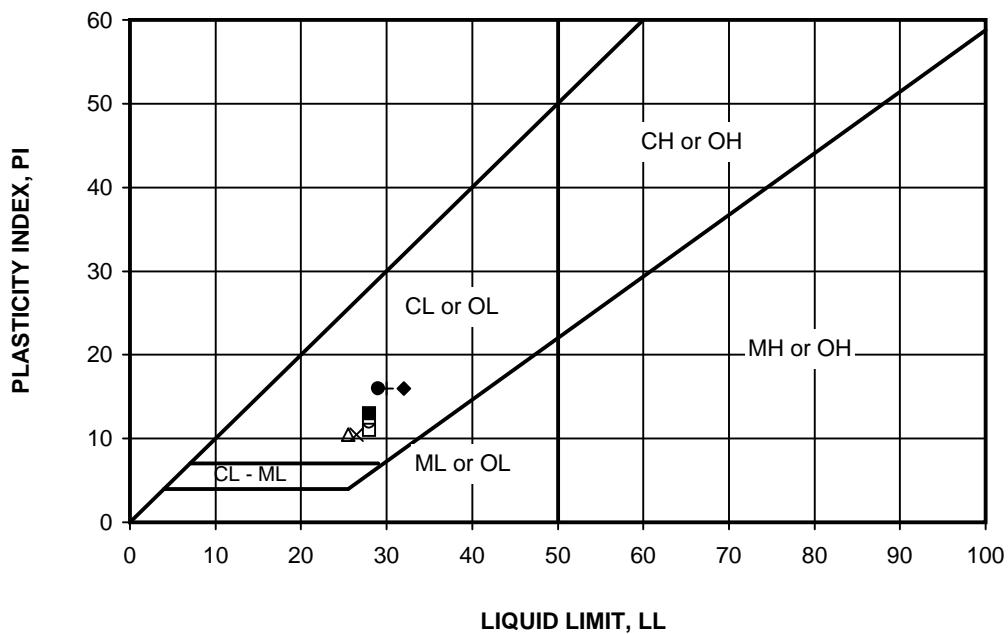
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	RW-9	6.0-7.5	36	16	20	--	--	--	--	--	51	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE B-25
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	0.0-5.0	29	13	16	CL	SC
■	B-2	0.0-4.4	28	15	13	CL	SC
◆	B-3	0.0-5.0	32	16	16	CL	CL
○	B-4	0.0-4.8	28	16	12	CL	CL
□	B-5	0.0-5.0	28	17	11	CL	CL
△	B-6	0.0-4.4	26	15	11	CL	SC
x	B-7	0.0-4.0	27	16	11	CL	CL
+	B-8	0.0-4.4	30	14	16	CL	CL

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

Ninyo & Moore

ATTERBERG LIMITS TEST RESULTS

FIGURE

PROJECT NO.
601808009

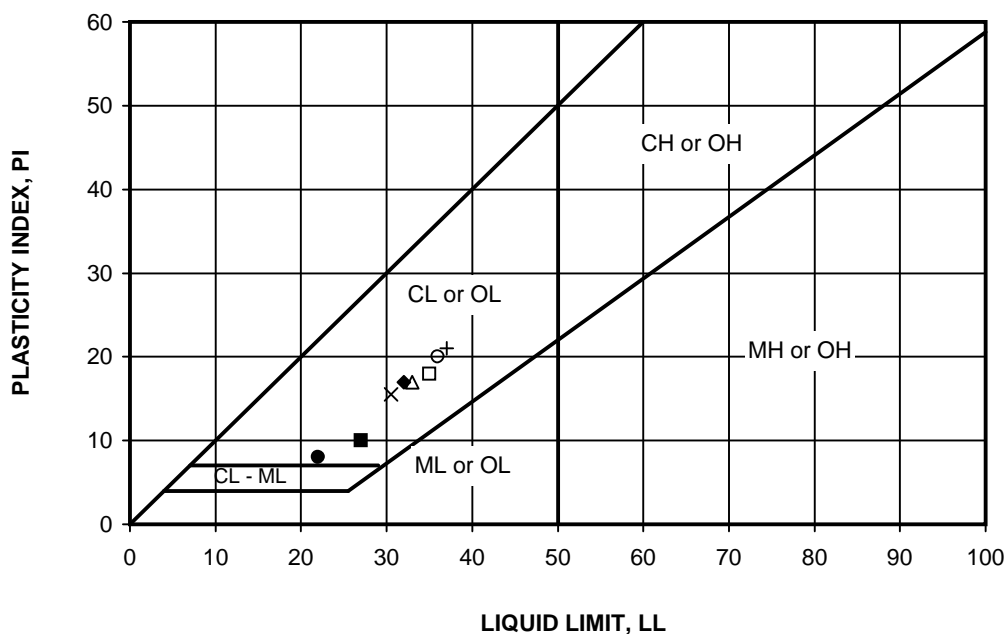
DATE
9/15

I-10, EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

B-26

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-9	0.0-5.0	22	14	8	CL	SC
■	B-10	0.0-5.0	27	17	10	CL	SC
◆	RW-1	6.0-7.5	32	15	17	CL	SC
○	RW-2	3.5-5.0	36	16	20	CL	CL
□	RW-4	3.5-5.0	35	17	18	CL	SC
Δ	RW-5	1.0-2.5	33	16	17	CL	CL
x	RW-6	18.5-19.4	31	15	16	CL	SC
+	RW-7	6.0-7.5	37	16	21	CL	CL

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

Ninyo & Moore

ATTERBERG LIMITS TEST RESULTS

FIGURE

PROJECT NO.
601808009

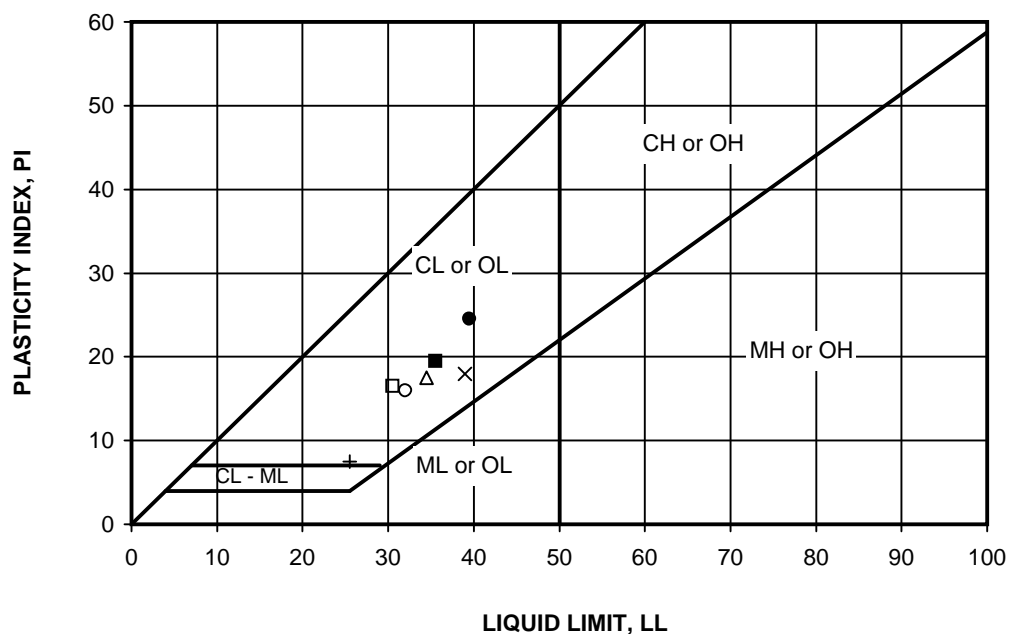
DATE
9/15

I-10, EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

B-27

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	RW-8	18.5-20.0	40	15	25	CL	CL
■	RW-9	6.0-7.5	36	16	20	CL	CL
◆	BR-2	18.5-20.0	--	--	NP	ML	SW-SM
○	BR-3	1.0-2.5	32	16	16	CL	CL
□	BR-4	8.5-10.0	31	14	17	CL	SC
Δ	BR-5	108.5-109.4	35	17	18	CL	CL
x	BR-7	33.5-34.8	39	21	18	CL	SC
+	BR-8	23.5-25.0	26	18	8	CL	SC

NP - INDICATES NON-PLASTIC



Ninyo & Moore

ATTERBERG LIMITS TEST RESULTS

FIGURE

PROJECT NO.
601808009

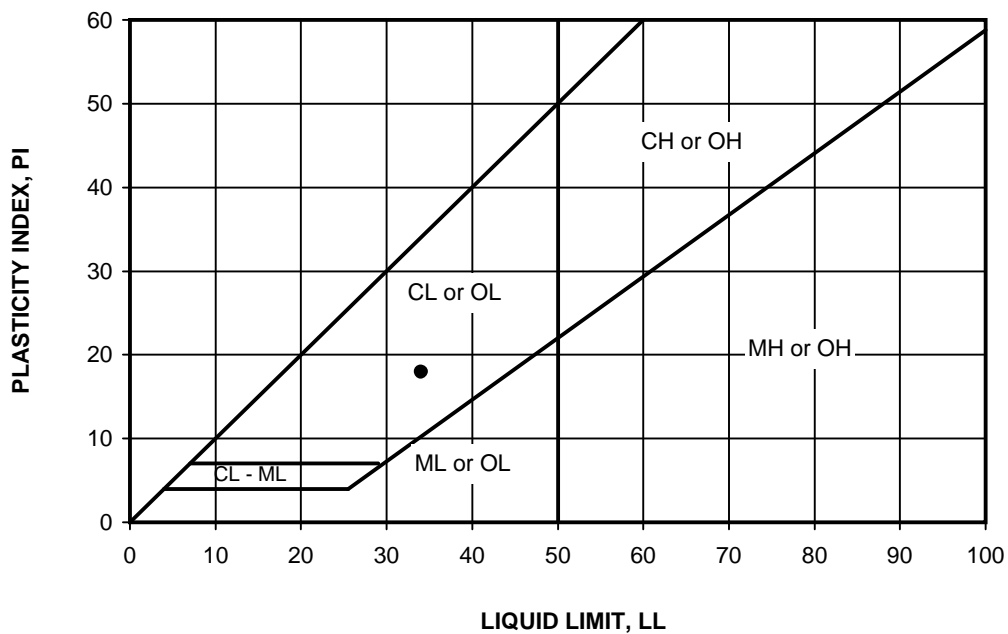
DATE
9/15

I-10, EARLEY ROAD TO JUNCTION I-8
PINAL COUNTY, ARIZONA

B-28

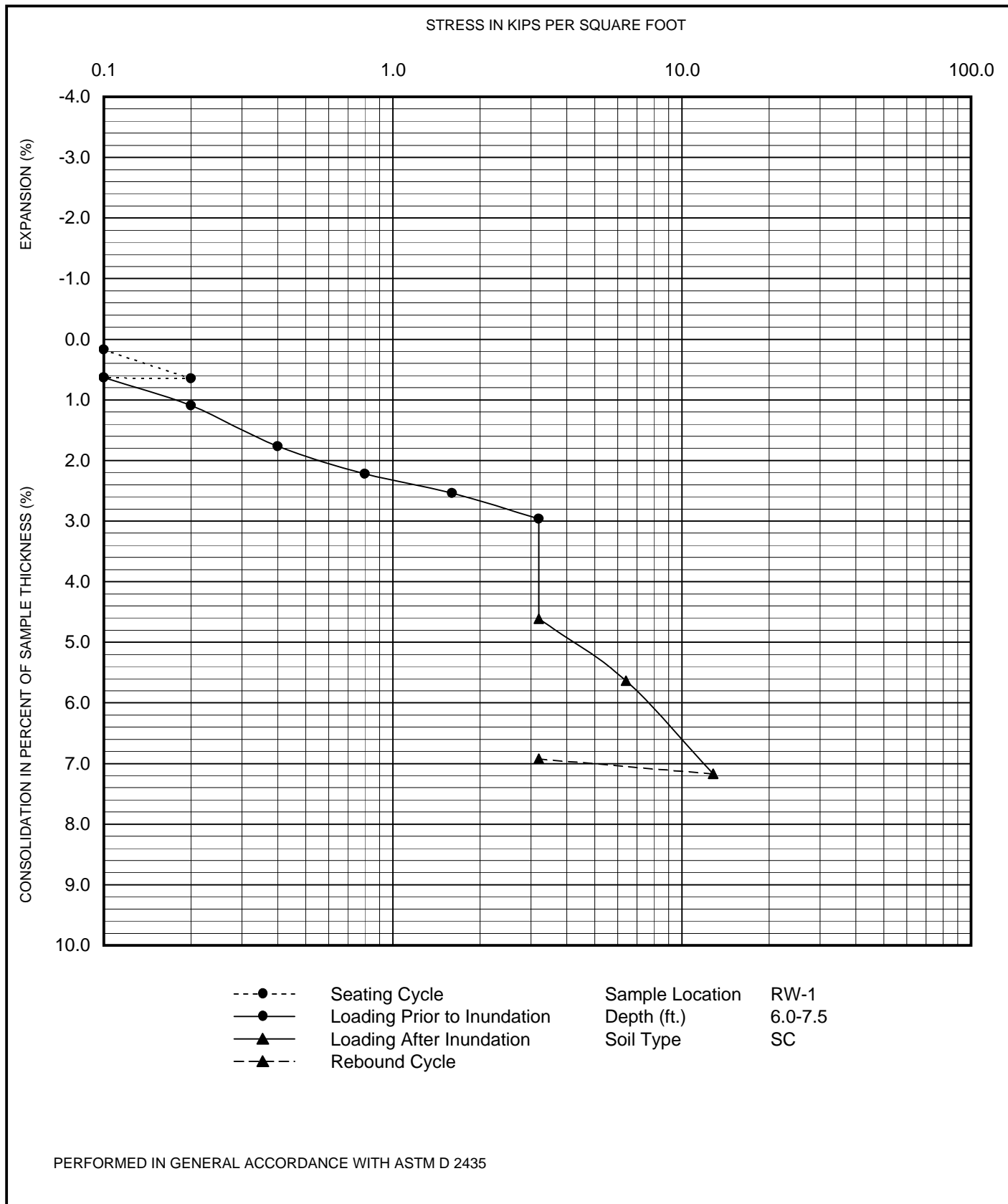
SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
•	BR-9	58.5-60.0	34	16	18	CL	CL

NP - INDICATES NON-PLASTIC

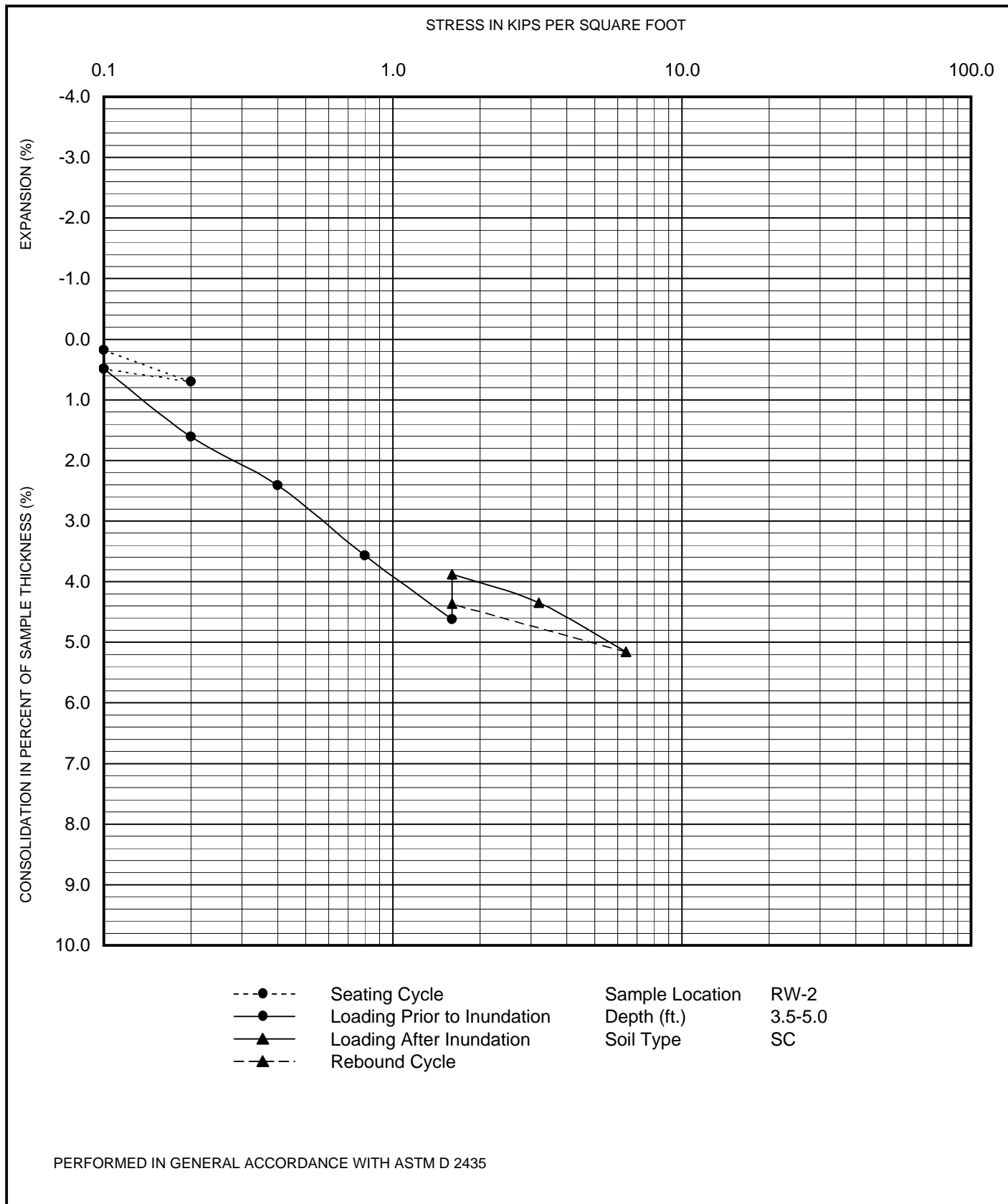


PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

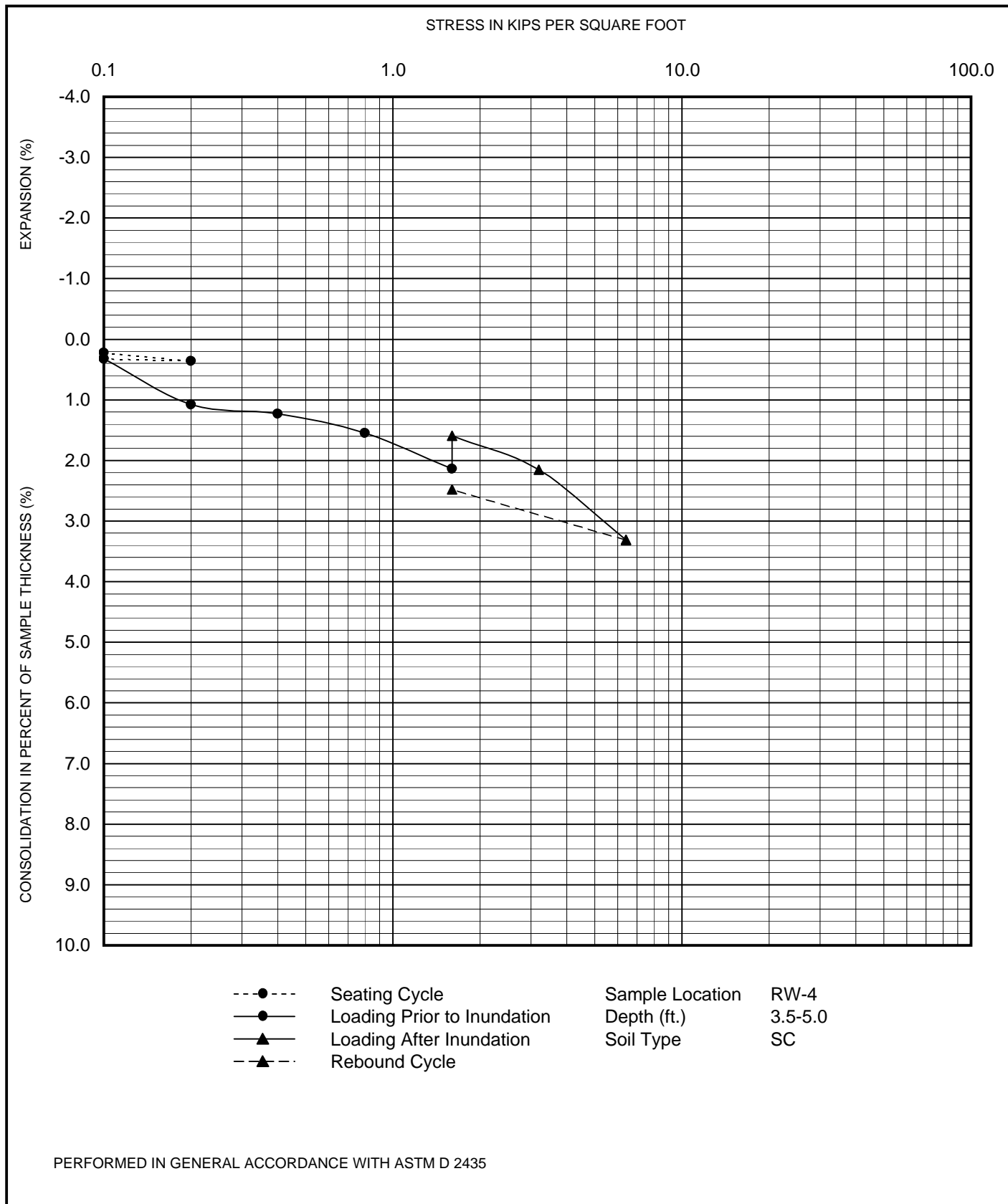
Ninyo & Moore		ATTERBERG LIMITS TEST RESULTS		FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA		B-29
601808009	9/15			



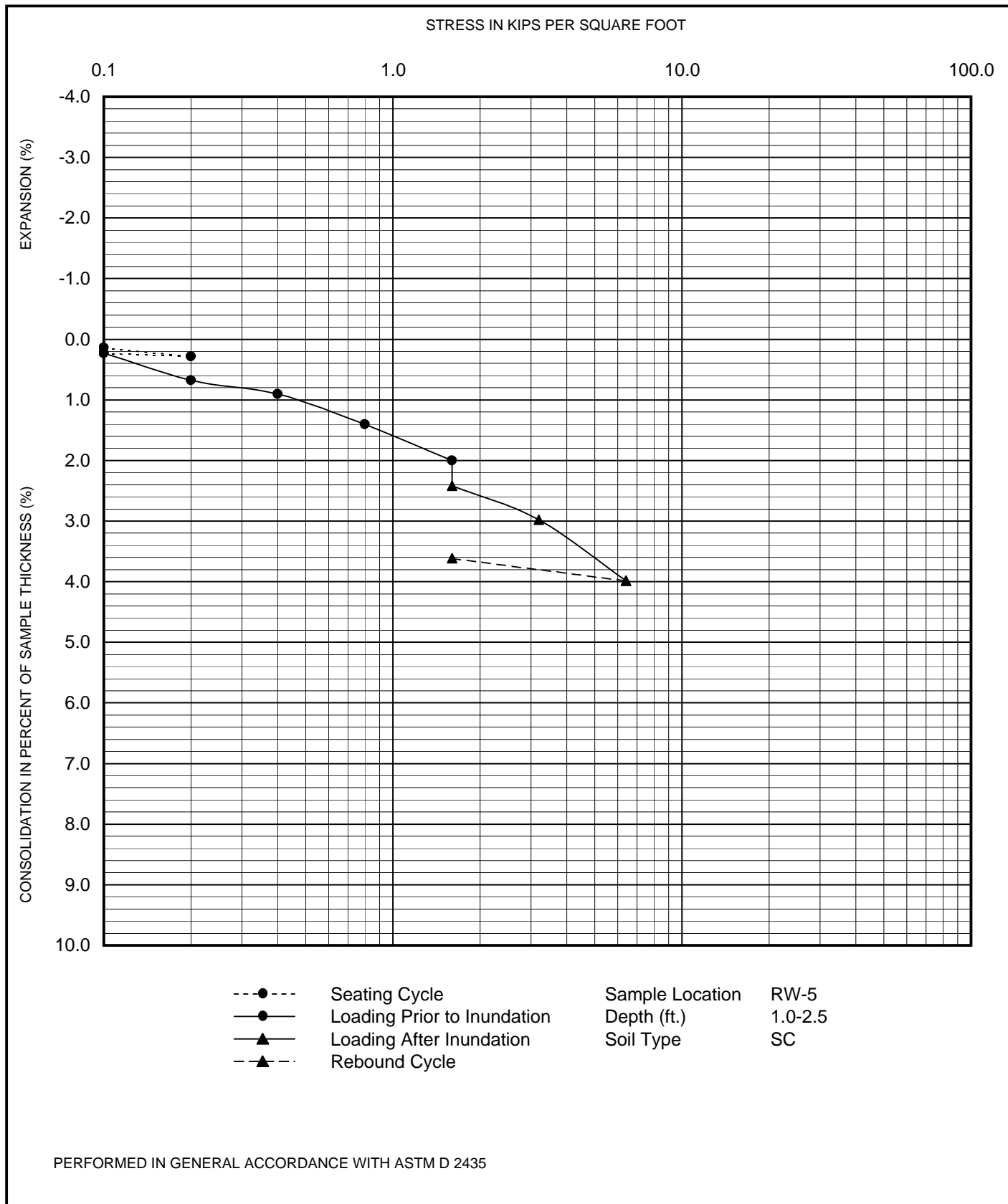
<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	B-30
601808009	9/15		



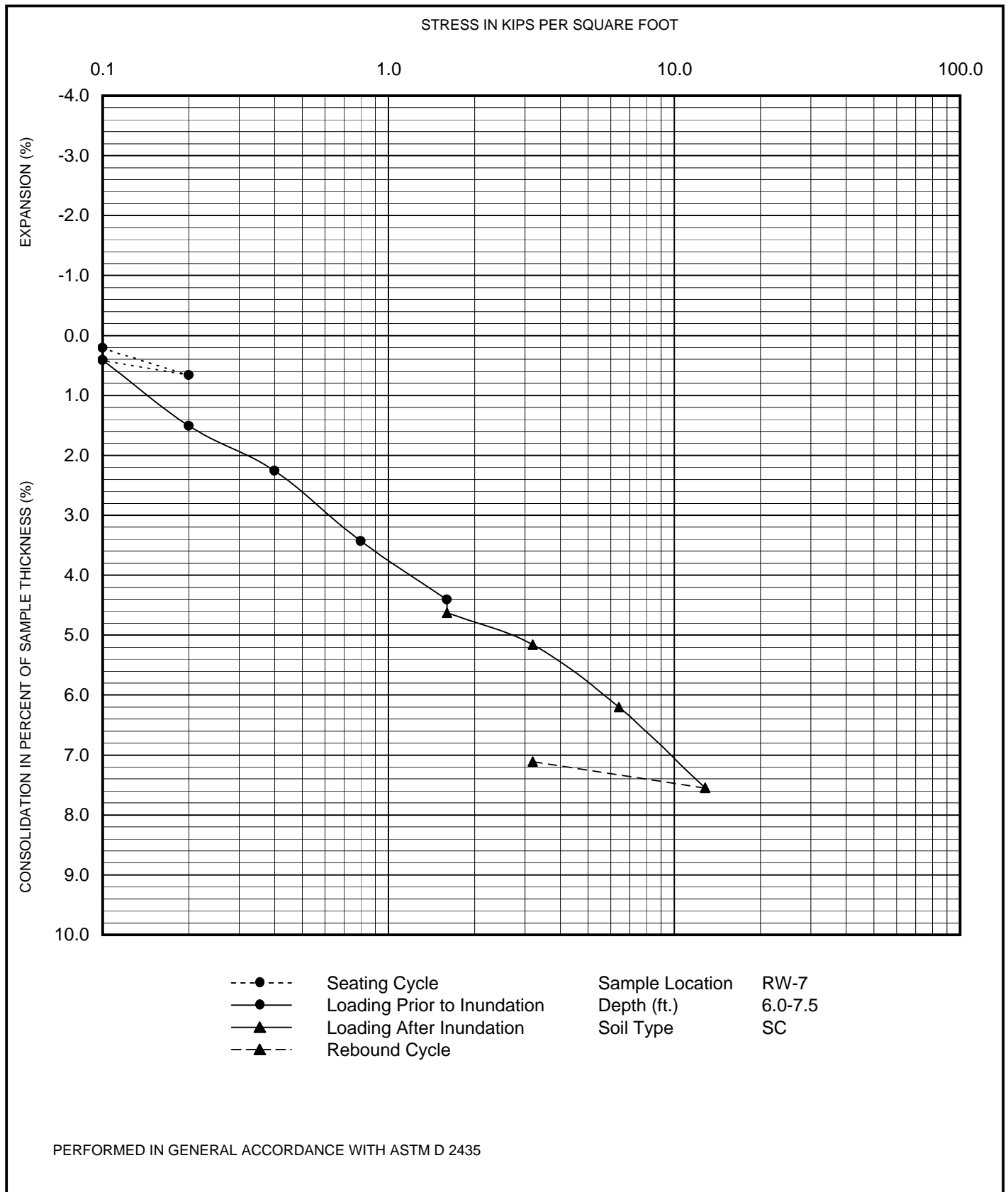
<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE B-31
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		



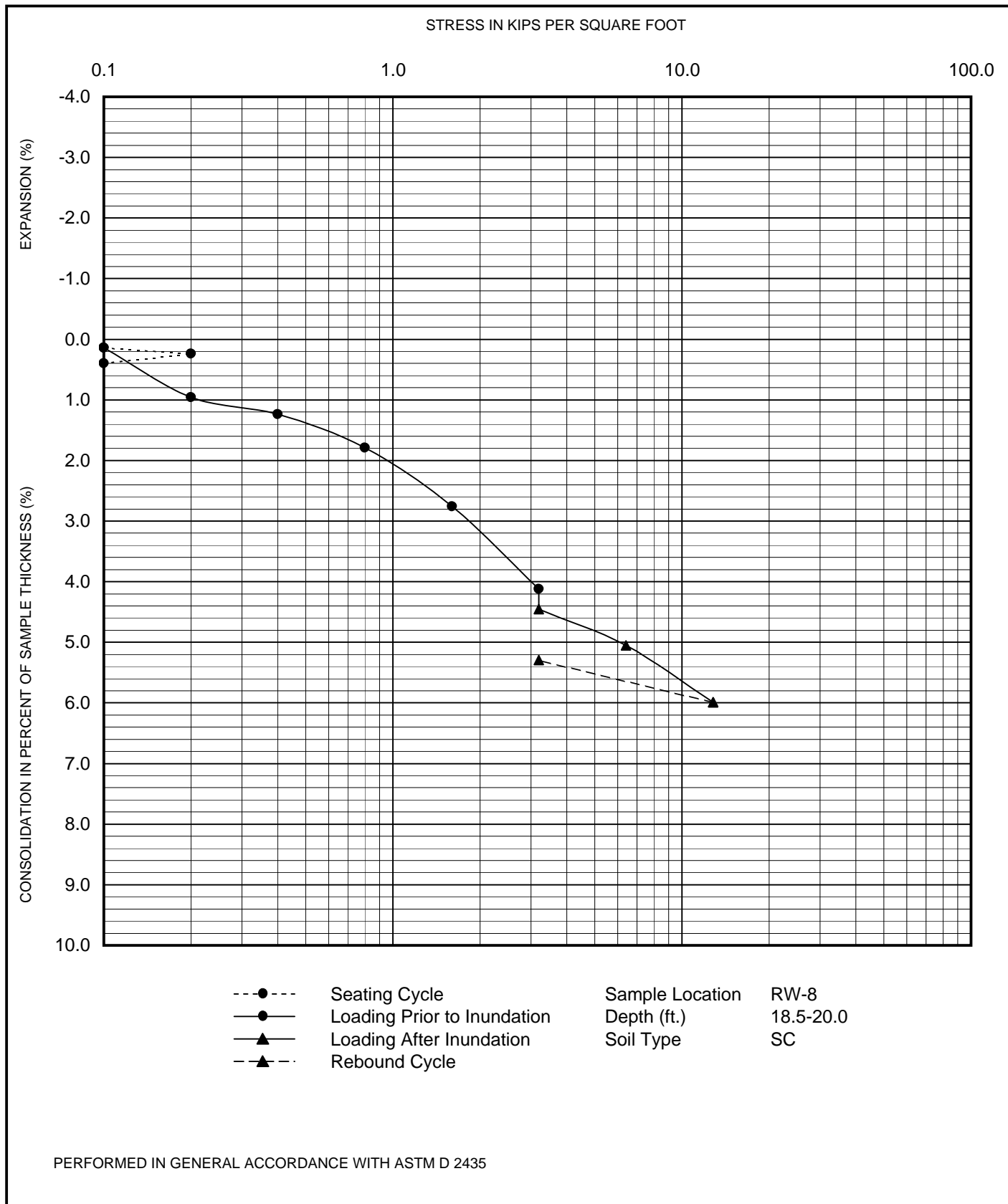
<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE B-32
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		



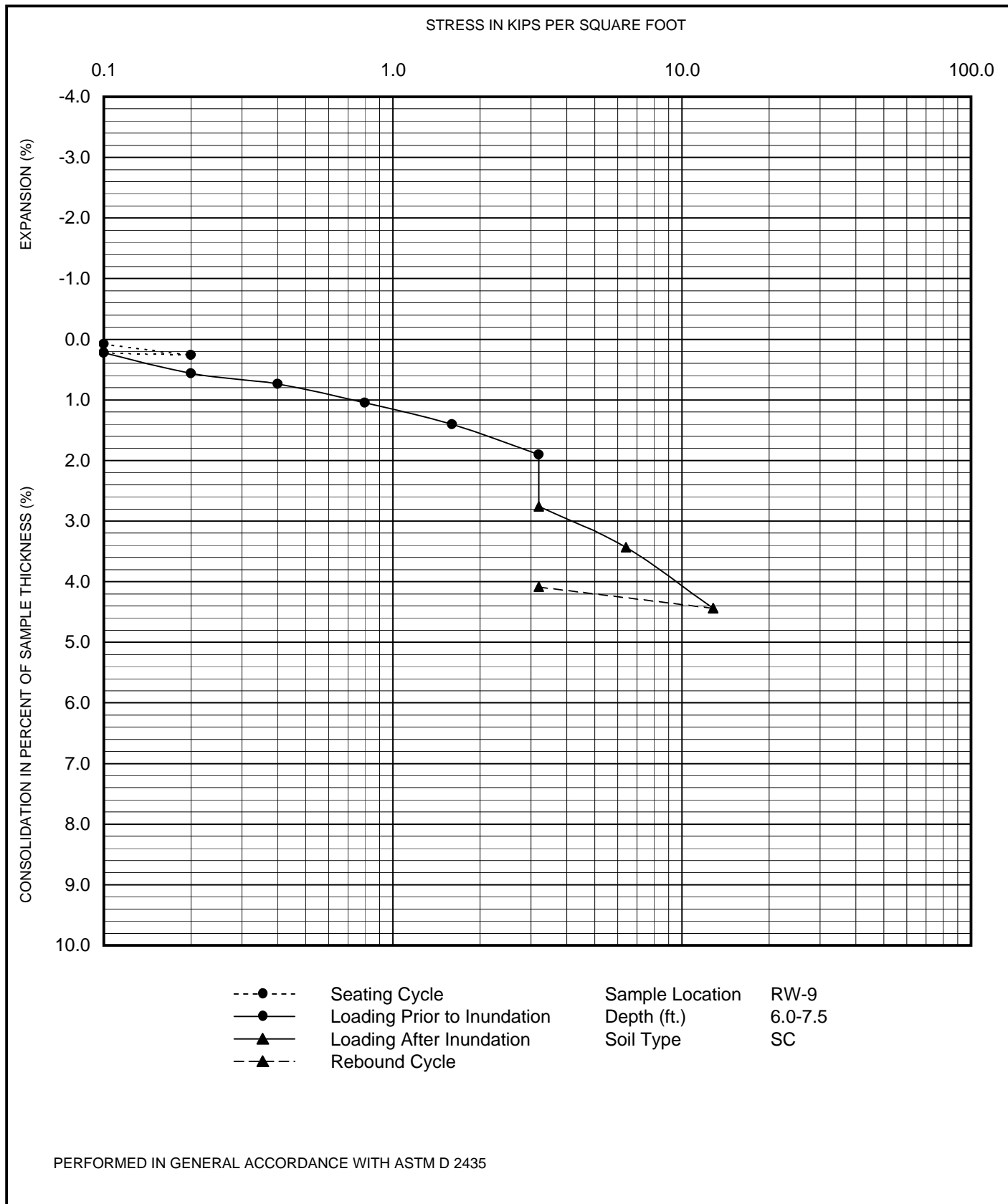
<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	B-33
601808009	9/15		



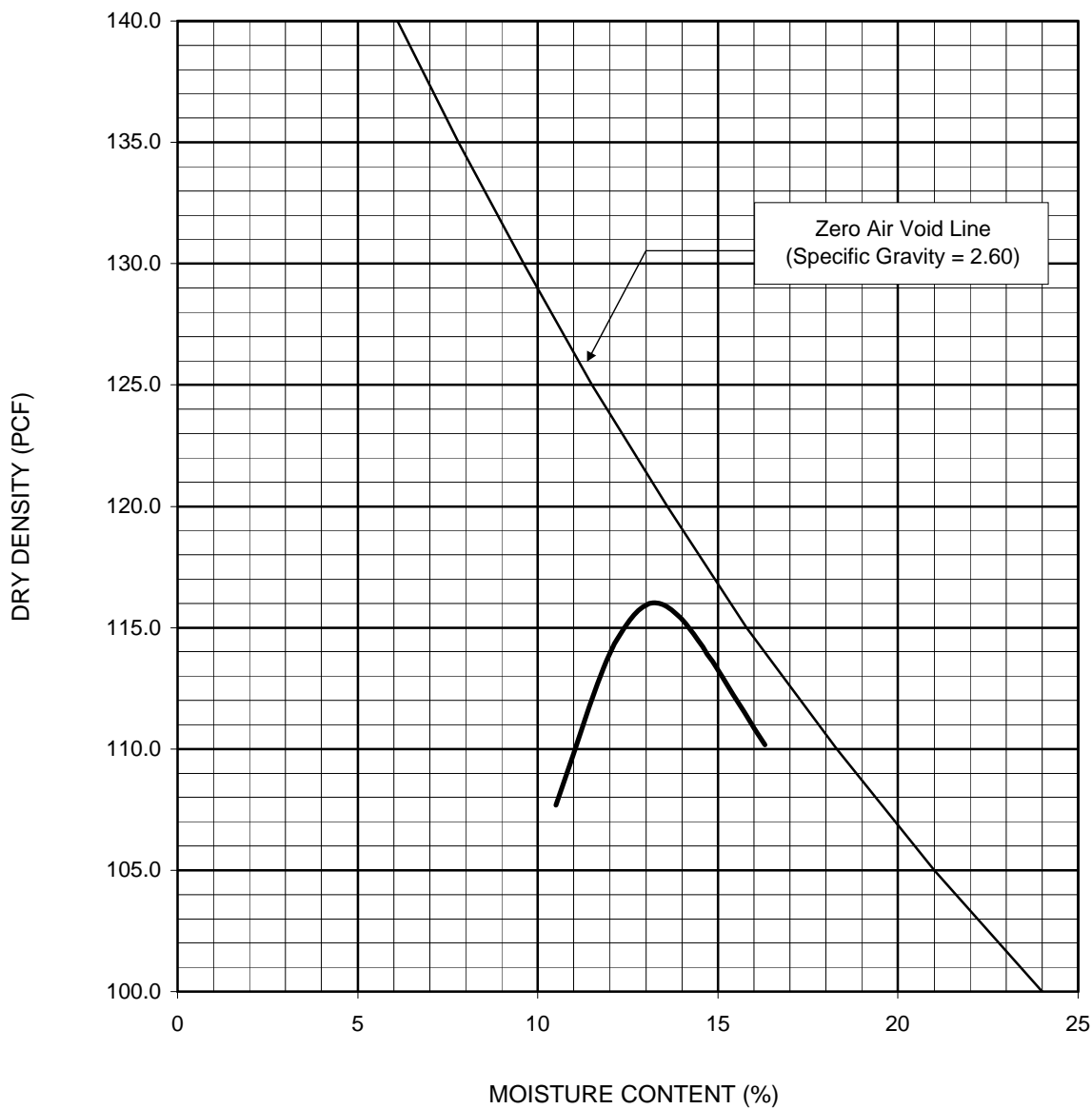
<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	B-34
601808009	9/15		



<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	B-35
601808009	9/15		



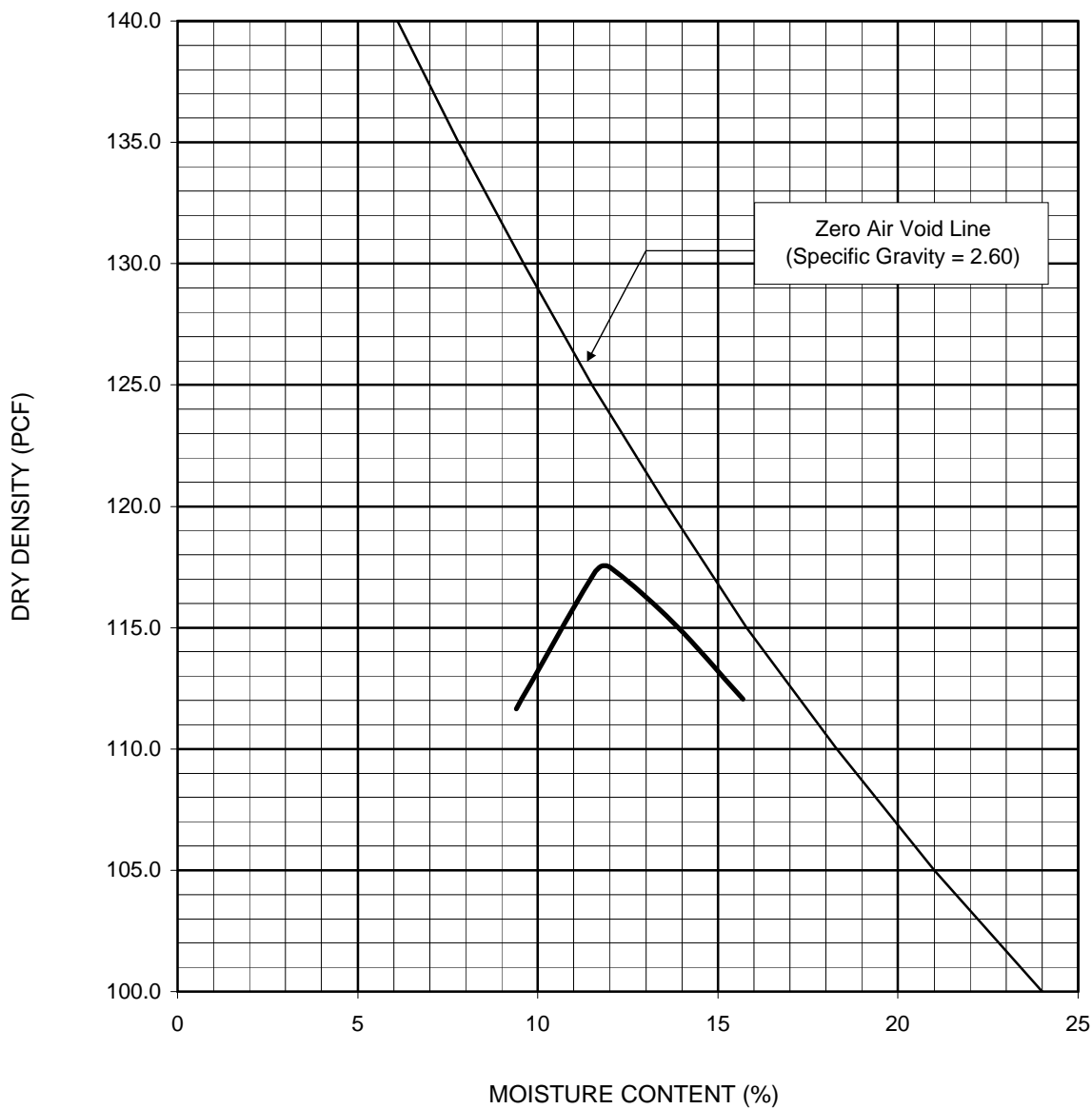
<i>Ninyo & Moore</i>		CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	B-36
601808009	9/15		



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-2	0.0-5.0	CLAYEY SAND	116.0	13.1
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718-87)			N/A	N/A

PERFORMED IN GENERAL ACCORDANCE WITH ☐ ASTM D 1557 ☒ ASTM D 698 METHOD ☒ A ☐ B ☐ C

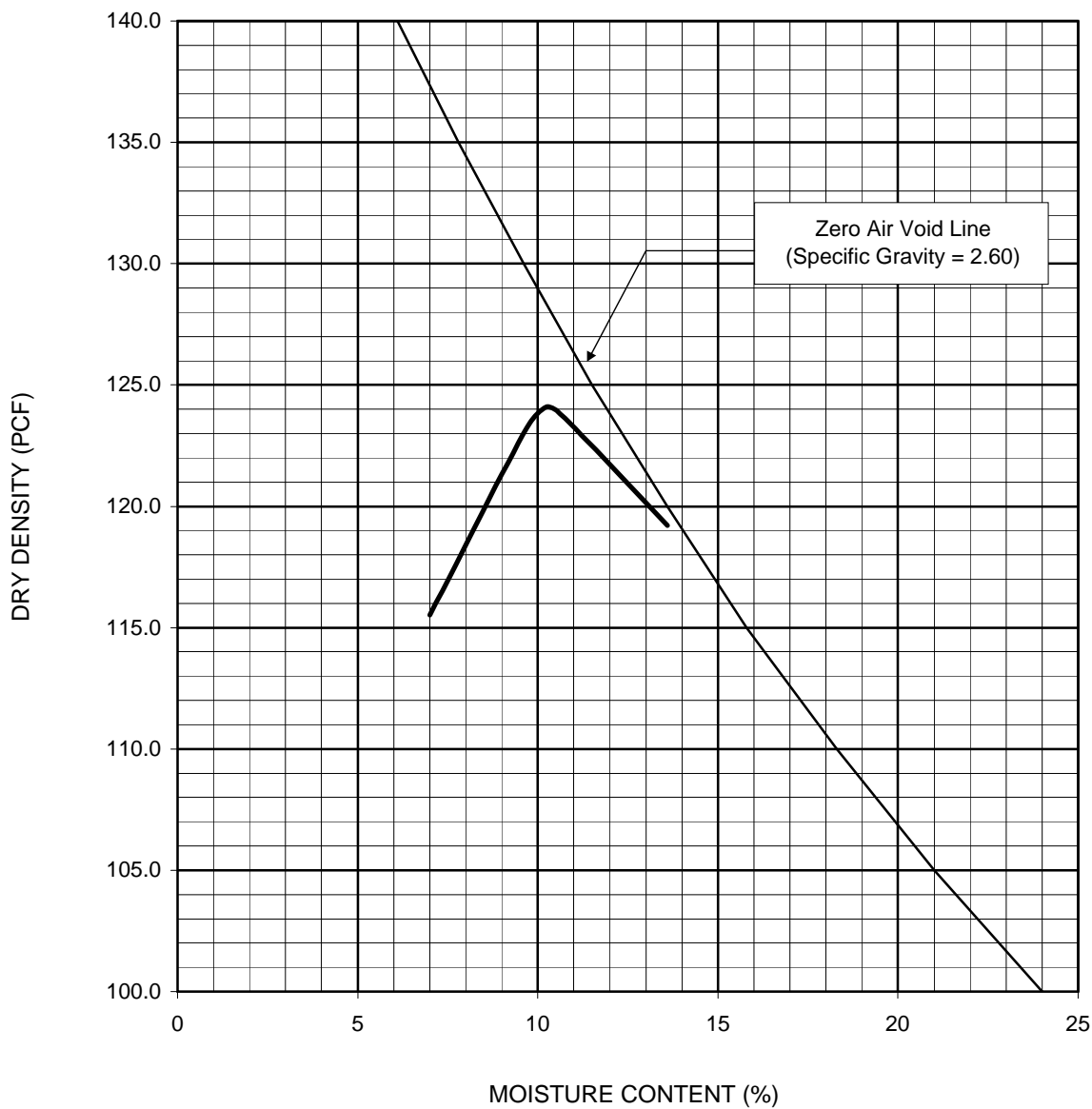
Ninyo & Moore		PROCTOR DENSITY TEST RESULTS	FIGURE B-37
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8	
601808009	9/15	PINAL COUNTY, ARIZONA	



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-4	0.0-4.8	LEAN CLAY WITH SAND	117.5	12.0
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718-87)			N/A	N/A

PERFORMED IN GENERAL ACCORDANCE WITH ☐ ASTM D 1557 ☒ ASTM D 698 METHOD ☒ A ☐ B ☐ C

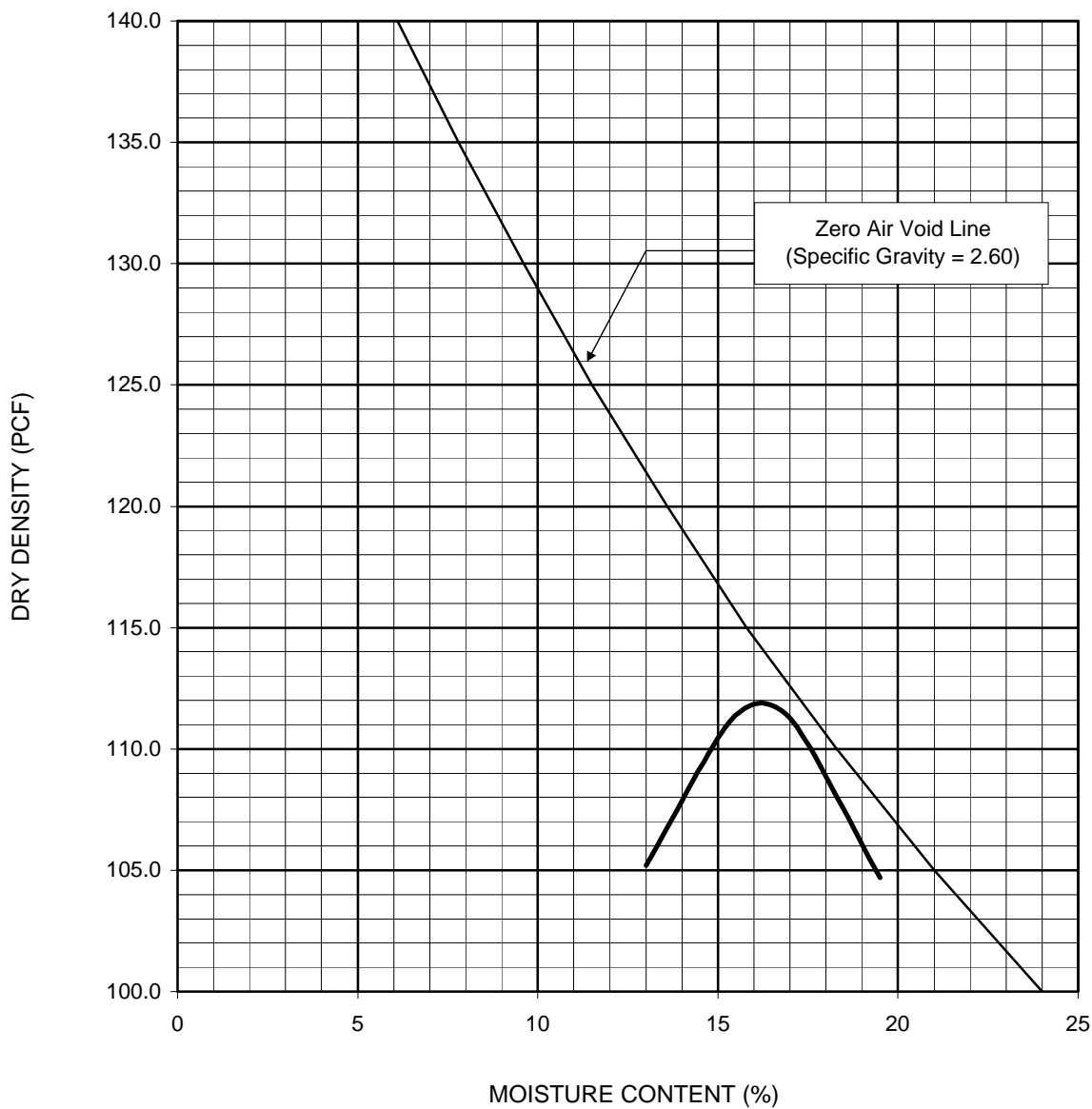
Ninyo & Moore		PROCTOR DENSITY TEST RESULTS	FIGURE B-38
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8	
601808009	9/15	PINAL COUNTY, ARIZONA	



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B -6	0.0-4.4	CLAYEY SAND	124.1	10.3
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718-87)			126.0	9.5

PERFORMED IN GENERAL ACCORDANCE WITH ☐ ASTM D 1557 ☒ ASTM D 698 METHOD ☒ A ☐ B ☐ C

Ninyo & Moore		PROCTOR DENSITY TEST RESULTS	FIGURE B-39
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8	
601808009	9/15	PINAL COUNTY, ARIZONA	



Sample Location	Depth (ft)	Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
B-8	0.0-4.4	SANDY LEAN CLAY	111.9	16.2
Dry Density and Moisture Content Values Corrected for Oversize (ASTM D 4718-87)			N/A	N/A

PERFORMED IN GENERAL ACCORDANCE WITH ☐ ASTM D 1557 ☒ ASTM D 698 METHOD ☒ A ☐ B ☐ C

<i>Ninyo & Moore</i>		PROCTOR DENSITY TEST RESULTS	FIGURE B-40
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	SOIL TYPE	R-VALUE
B-1	0.0-5.0	SC	16
B-3	0.0-5.0	CL	16
B-5	0.0-5.0	CL	10
B-7	0.0-4.0	CL	16
B-9	0.0-5.0	SC	35
B-10	0.0-5.0	SC	41

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844/CT 301

<i>Ninyo & Moore</i>		R-VALUE TEST RESULTS	FIGURE B-41
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH ¹	RESISTIVITY ¹ (Ohm-cm)	SULFATE CONTENT ²		CHLORIDE CONTENT ³ (ppm)
				(ppm)	(%)	
HA-3	0.0-3.0	7.9	1,680	60	0.006	40
HA-4	0.0-3.0	7.6	1,210	80	0.008	40
HA-5	0.0-3.0	7.5	680	110	0.011	60
HA-6	0.0-3.0	7.7	1,010	130	0.013	90
HA-7	0.0-3.0	7.3	1,680	80	0.008	20
HA-8	0.0-3.0	7.7	5,100	80	0.008	10
HA-9	0.0-3.0	7.7	940	130	0.013	150
HA-10	0.0-3.0	7.5	4,030	80	0.008	20

¹ PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 236c

² PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 733

³ PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 736

<i>Ninyo & Moore</i>		CORROSIVITY TEST RESULTS	FIGURE
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	B-42
601808009	9/15		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH ¹	RESISTIVITY ¹ (Ohm-cm)	SULFATE CONTENT ²		CHLORIDE CONTENT ³ (ppm)
				(ppm)	(%)	
HA-11	0.0-3.0	7.4	5,230	50	0.005	30

¹ PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 236c

² PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 733

³ PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 736

<i>Ninyo & Moore</i>		CORROSIVITY TEST RESULTS	FIGURE B-43
PROJECT NO.	DATE	I-10, EARLEY ROAD TO JUNCTION I-8 PINAL COUNTY, ARIZONA	
601808009	9/15		