HOHOKAM-SKY HARBOR INTERCHANGE
PROJECT NO. RAM-600-3-511
TRACS NO. H 0845 01 D
DESIGN SEGMENT 2B

GEOTECHNICAL INVESTIGATION REPORT

A999.608

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

ATL JOB NO.: 187161 June 7, 1989

GEOTECHNICAL INVESTIGATION REPORT

HOHOKAM - SKY HARBOR INTERCHANGE, SEGMENT 2B

FOR

MORRISON-KNUDSEN ENGINEERS, INC.

PROJECT

STATE ROUTE 143
HOHOKAM-SKY HARBOR INTERCHANGE, SEGMENT 2B
PROJECT NO.: RAM-600-3-314 PE
TRACS NO. H 2046 01 C
CONTRACT NO. 87-49

1.0 PROJECT CONCEPT

The project concept is to construct a new expressway beginning north of University Drive and extending north to Washington Street. The purpose of this project is to provide high capacity freeway-to-freeway access between the East Papago and Interstate 10, as well as local access to and from the Hohokam Expressway at major street intersections.

FLOOD CONTROL DISTRICT
RECEIVED
JUN 26 1989

	CH ENG		P & PM
	DEP		HYDRO
	ADMIN		LMGT
	FINANCE		FILE
	C & O		
	ENGR		

REMARKS

2.0 SCOPE

The scope of the project is to construct a new Hohokam mainline consisting of six through lanes, a twenty-two foot median with concrete barrier, and ten foot outside shoulders; bridges over the new Salt River Channel, the new Sky Harbor Boulevard, and Washington Street. In addition, the Old Cross-cut Canal from Washington Street to the new Salt River Channel will be relocated. Drainage facilities, utilities, and local streets will be improved.

The general scope of ATL Testing Laboratories participation on this project is to present geotechnical engineering findings and recommendations for the bridges within the project. This report includes logs of borings, results of laboratory tests, a description of procedures employed in the subsurface exploration and laboratory programs, a description of the geological profile and groundwater conditions, and recommended criteria for the design of foundations, earth support systems and other earthwork elements of the project. This report also includes appropriate summaries of analysis, discussions of the reasoning that led to selection of foundation and earth support systems, and other supporting information, treatments of any expansive, collapsing or other moisture sensitive soils and any special construction or quality assurance procedures that may be required.

This Segment 2B report covers the Grand Canal/SPRR Overpass and the Washington Street Traffic Interchange. An earlier report, Final Geotechnical Investigation Report for Bridges, Retaining Walls, and Other Structures: Hohokam-Sky Harbor Interchange Segment 2A dated 4-3-89 covers the other portions of the project.

3.0 INVESTIGATION

3.1 Site Location and Description

The two bridges discussed in this report are located along the alignment for the new Hohokam Expressway. This expressway runs from north of Hohokam-University overpass on the south crossing Washington Street on the north. The Grand Canal/SPRR Overpass extends along this alignment from Stations 129+18 to 134+07. The Washington Street Traffic Interchange is located from Station 146+49 to 149+86.

The project right-of-way has been cleared of most structures and vegetation. A recycling yard consisting of several metal structures remains with the project limits between Stations 128+00 and 133+00. Numerous shallow trenches were excavated across the site north of the Southern Pacific Railroad tracks by archaeologists. Most of these trenches have been filled in with little or no attempt to compact the backfill.

Washington Street crosses the alignment near the north end of the project between Stations 147+24 and 149+11. Near the south end the Grand Canal and Southern Pacific Railroad cross the alignment between Stations 129+50 and 134+00. South of the project lies the Salt River Channel with a surface of sand, gravel, and cobbles with none to light vegetation present. A box culvert is proposed underneath the proposed Sky Harbor Boulevard as an outlet for the Old Cross-Cut Canal.

3.2 Background Research

A large volume of geologic, hydrogeologic, and geotechnical data has been generated previously from work near the Salt River. ATL Testing Laboratories (ATL) has reviewed its files to assist in the formulation of this report. ATL is also familiar with work performed in the immediate project area by the Arizona Department of Transportation (ADOT), Earth Technology Corporation, Sergent, Hauskins & Beckwith (SHB), Gutierrez-Palmenberg, Inc., and Arizona State University. Specifically, three reports prepared by SHB especially for this project were reviewed during the preparation of this report. The SHB reports are entitled: (1): "The Preliminary Geotechnical Investigation Report for Design Section 2", (2) "Environmental/Hydrogeologic Evaluation RR48 Construction Debris Landfill, East Papago-Hohokam - Sky Harbor Freeways",

and (3) "Geotechnical Engineering Guidelines Manual Preliminary Draft Manual, East Papago - Hohokam - Sky Harbor Freeways". ATL also reviewed geologic and hydrogeologic maps of the Salt River Valley Area prepared by the U. S. Geological Survey. In addition, ATL reviewed: (1) A 1979 map prepared by the Arizona State University Department of Geology entitled "Geology of Papago Park Pediment, Tempe Quadrangle, Maricopa County, Arizona"; (2) Other materials prepared by the ASU Department of Geology; and (3) Other miscellaneous reports and materials.

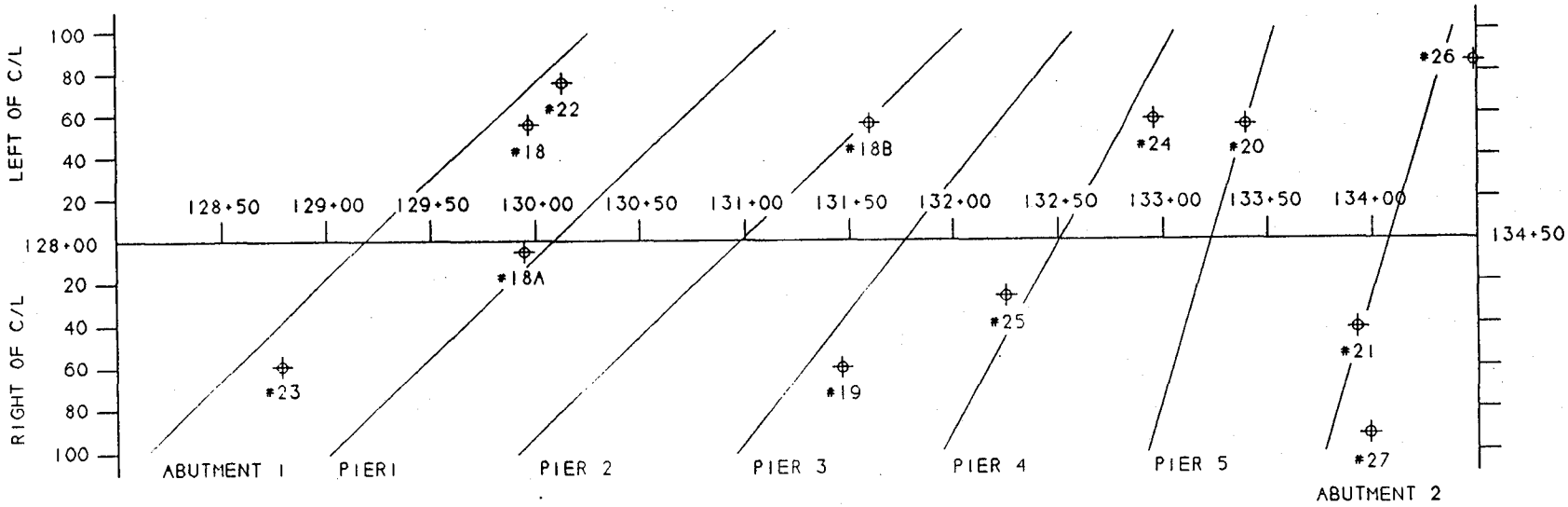
3.3 Field Investigation

Twelve (12) borings were advanced for the Grand Canal/SPRR Overpass and eight (8) borings for the Washington Street Traffic Interchange. The locations of these borings are shown on Plate Nos. 1 and 2 for the respective bridges.

Five (5) borings were advanced for retaining walls and nine (9) borings for the Old Cross-Cut Canal. In addition, two (2) borings were advanced for piezometers and one (1) bridge boring was used to install a piezometer.

Borings were advanced through soil with a Mobile B-56 drill rig using either six (6) or eight (8) inch outside diameter hollow stem auger. Selected sampling of the subsurface was achieved using a standard split spoon sampler

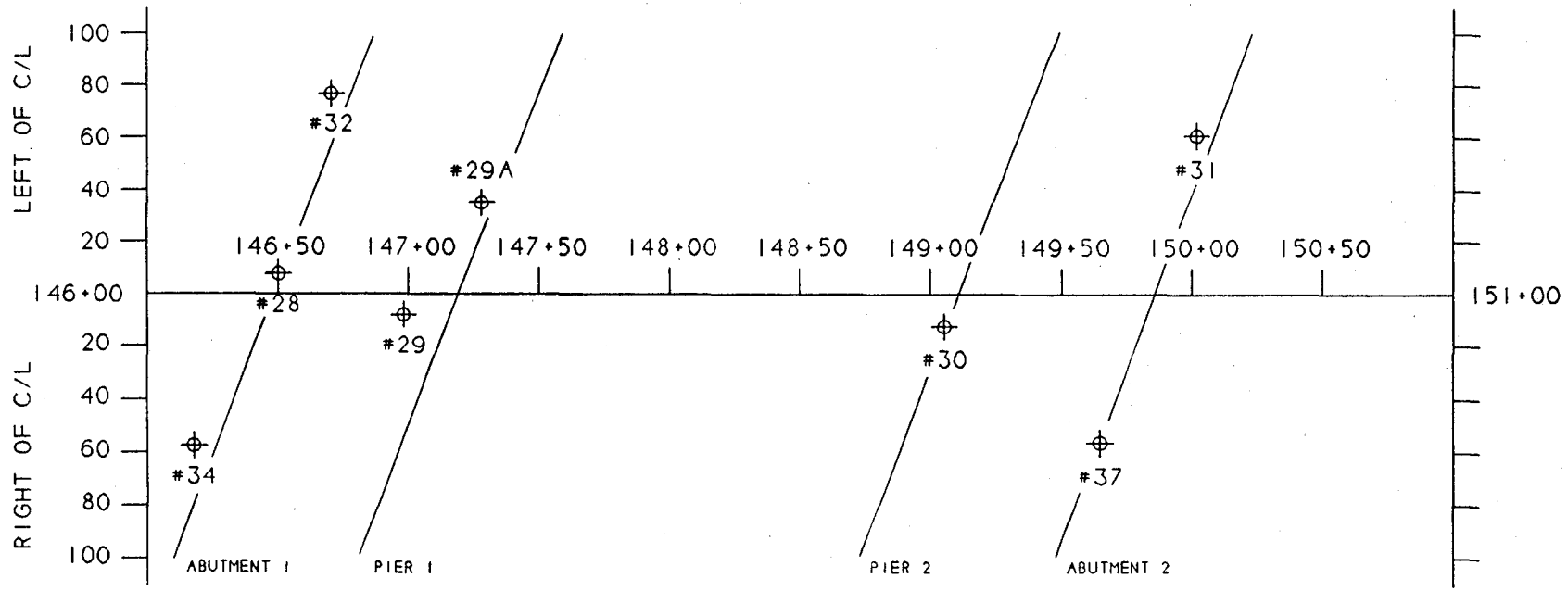
HOHOKAM-SKY HARBOR INTERCHANGE
SEGMENT 2B
GRAND CANAL/SPRR OVERPASS
BORING LOCATIONS



ATL TESTING LABORATORIES

PLATE 1

HOHOKAM-SKY HARBOR INTERCHANGE
SEGMENT 2B
WASHINGTON STREET T.I.
BORING LOCATIONS



ATL TESTING LABORATORIES

PLATE 2

driven with a 140-pound hammer falling thirty (30) inches in accordance with ASTM Standard D-1586. In addition a 2.42 inside diameter split barrel sampler lined with brass rings was similarly driven at selected locations.

Coring through underlying rock was accomplished with a conventional five-foot NX core barrel with either a carbide tipped or diamond impregnated bit. The inner barrel of the core was of the split type, permitting observation and logging of the core prior to removal and storage.

Borings were advanced through the Salt River sand, gravel, and cobbles (SGC) with a Mobile B-50 drill rig using the ODEX 90 W/T system consists of an eccentric bit which slightly overreams the hole and a percussion down-the-hole hammer which drives the steel threaded casing. Pressurized air forces the cuttings out of the test hole.

All borings were sampled and logged by a field engineer or geologist. The boring logs are presented in "Appendix A, Logs of Borings".

3.4 Laboratory Testing

Selected soil and rock samples were subjected to further examination and testing. Visual classifications were supplemented by tests such as Sieve Analyses and

Atterberg Limits. Moisture contents were also determined on selected samples. Rock cores were visually examined and four pieces were subjected to unconfined compression tests. Laboratory tests were conducted in accordance with ADOT published procedures and recommendations, and AASHTO and ASTM procedures where applicable. Results of the laboratory tests are summarized in "Appendix B, Tabulation of Test Results".

4.0 DESIGN INFORMATION

4.1 Geological Description

The study area lies in the Basin and Range physiographic province of southern and western Arizona. The Basin and Range province is characterized by short, isolated, subparallel mountain ranges, rising abruptly from broad alluvial basins. This physiography was formed as a result of mostly high-angle block faulting which began about 15 million years ago. The most recent fault systems trend northwest-southeast. Another, much older regional fault system trends northeast-southwest.

The Phoenix Basin can be described as a series of coalesced basins located in south central Arizona. The Basin is bounded to the north and east by the Mazatzal, Bradshaw, and Superstition Mountains, and to the west and southwest by the White Tank and Sierra Estrella Mountains.

The principal drainage of Phoenix Basin is the Salt River, which generally flows from east to west.

The project site lies mostly adjacent to the Salt River depositional channel that runs through the Phoenix Basin. The site soils are Quaternary to Tertiary in age. The mountain ranges and bedrock around the site are primarily Tertiary to Precambrian in age. A generalized geological profile has been prepared for the bridge sites and is summarized in Plate Nos. 3 and 4. The following is a detailed geologic description of the soils and rocks which were encountered during field explorations.

Salt River Sands, Gravels, and Cobbles (SGC): This layer consists primarily of fluvially deposited brown to gray-tan sand, gravel, cobbles, and boulders. The clasts are primarily angular to subrounded, and are composed of upstream bedrock types. In general, this layer is loose to dense, poorly sorted, and poorly stratified.

Granitic Pediment: This layer is an old (probably Tertiary Age) pediment colluvium formed from weathered granite. This stratum consists of poorly stratified clayey sand and gravel. The clasts are primarily angular to subangular. At some depth in the Granitic Pediment, the layer often becomes highly calcified.

Andesite: The Andesite is gray colored and probably Tertiary in age. The layer numerous cracks and faults resulting in a low rock quality classification. The rock does become generally more competent with depth.

Granite: This is the bottom stratum which the borings for the this segment encountered. The Granite is gray colored and is probably the Tovrea Granite. The Tovrea Unit is Tertiary and has been described by Pewe and others as a gray, medium to coarse-grained, quartz-biotite granite. The quartz occurs as gray, rounded masses up to 3/4 of an inch in size. White feldspar is the predominant mineral type and forms small phenocrysts that rarely exceed 1/8 of an inch in size. The mafics are predominantly biotite and form aggregates that often exceed 1/4 inch in size. The Tovrea Granite is considered cataclastic which indicates the rocks have a fragmental texture due to crushing and shearing.

4.2 Subsurface Description

The soil profile for the south end of the Grand Canal/SPRR Overpass consists of low density silts and silty sands overlying fractured granite. The depth to the granite is approximately 24 feet at Abutment No. 1, Station 129+18. At Pier No. 1, Station 130+08 the depth to granite is approximately 32 feet and at Pier No. 2, Station 130+98, is 14 feet.

From the center to the north end of the Grand Canal/SPRR Overpass the soil profile consists of moderate density to very dense silty clayey sands and gravels overlying fractured granite. The depth to the granite at Pier No. 3, Station 131+77 is approximately 14.5 feet. At Pier No. 4, Station 132+50.5 and Pier No. 5, Station 133+23 the depth to granite is approximately 8 and 1.5 feet respectively. The depth to granite at Abutment No. 2, Station 134+07 is approximately 11 feet.

At the Washington Street Traffic Interchange the soil profile consists of moderately dense silty or clayey sand and gravel, or weathered granite.

The soil profile at Abutment No. 1, Station 146+49 consists of approximately 10 feet of silty clayey sand overlying a very dense cemented silty clayey sand and gravel. The depth to the cemented sand and gravel at Pier No. 1, Station 147+24 is approximately 19 feet and the depth to fractured granite is approximately 44 feet.

At Pier No. 2, Station 149+11 a dense moderately cemented soil extends from the surface to highly fractured granite at 18 feet. At Abutment No. 2, Station 149+86 a dense light to moderately cemented silty sand with some gravel is present to approximately 20.5 feet, depth. At

approximately 20.5 feet a highly fractured granite is present.

Two retaining walls are proposed along the new alignment of the old cross-cut canal. OC-1 is located south of the Grand Canal/SPRR Overpass between Station 123+90 and 127+40. The soil profile underneath this wall consists of approximately 10 feet of low density silty sand underlain by moderately dense to very dense silty sands with some gravel. OC-2 is located between the Grand Canal/SPRR Overpass and the Washington Street Traffic Interchange between Station 134+00 and 145+00. The soil profile underneath this wall consists of very dense silty sand with gravel underlain by weathered fractured granite at approximately 10 feet depth.

The proposed Old Cross Cut Canal alignment runs along the east side of the project. The soil profile at the northern end of the canal between approximately Station 50+00 and 60+75 consists of 10 feet of very dense lightly cemented silty sand with gravel. Underneath this is a highly weathered fractured granite extending to the end of the exploratory borings at approximately 25 feet. In the south central section of the alignment between approximately Station 41+00 and 50+00 highly weathered and fractured granite can be found on the surface with fractured granite found as shallow as 9.5 feet in the exploratory borings. At

the south end of the canal alignment between approximately Station 30+00 and 41+00 dense silty sands to gravelly sands were encountered to the end of the boring at 30 feet.

A box culvert will drain a detention basin at the end of the Old Cross-Cut Canal in the Salt River underneath Sky Harbor Blvd. The soil profile there consists of approximately eight feet of loose to moderately dense sand, gravel, and cobbles underlain by very dense sand, gravel, and cobbles.

Depth to ground water varies throughout the project. The groundwater level at the site of the culvert under the Sky Harbor Boulevard is dependant on the in-flow of water into the Salt River Channel. The water level at the time of the investigation was approximately 14 feet below ground surface. At the locations of Abutment No. 1 and Piers No. 1 and No. 2 of the Washington Street Traffic interchanges, the depth to ground water at the time of the field investigation was between 24 and 30.5 feet. The borings for the section of the canal adjacent to the Washington Street Traffic Interchange had ground water levels of approximately 20 feet depth. The south end of the SPRR Overpass and the adjacent canal had groundwater depths of between 18 and 30 feet at the time of field investigation.

Three borings had piezometers installed and were read monthly. The results of these reading are:

Boring	Location	Date	Elevation (ft)
Piezometer 1	Sta 102 & 70, 200 LT 4L	3-30-89 5-03-89 6-01-89	1097.5 1095.8 1095.7
Piezometer 2 at boring location 29A	Sta 147 & 28, 15 LT C/L	4-16-89 5-03-89 6-01-89	1123.5 1122.9 1121.9
Piezometer 3 at boring location 21	Sta 133 & 93.5 42' RT of C/L	4-13-89 5-03-89 6-01-89	Dry at bottom of boring at 1124.7 in granite

4.3 Bridge Foundations

4.3.1 General Design & Understandings

It is understood that Pier Nos. 1, 2, 3, and 5 along with Abutment No. 2 of the Grand Canal/SPRR Overpass need to be constructed within a limited space. The anticipated loading for the Grand Canal/SPRR Overpass is as follows:

Anticipated Total Load (kips)

	Northbound	Southbound
Abutment 1	6600	5500
Pier 1	3100	3875
Pier 2	3300	4125
Pier 3	3000	3000
Pier 4	3300	3300
Pier 5	3400	3400
Abutment 2	9750	9750

The anticipated loading for the Washington Street Traffic Interchange is as follows:

Anticipated Total Load (kips)	
Abutment 1	5500
Pier 1	11140
Pier 2	11140
Abutment 2	7700

Both bridge structures can accept maximum total and differential settlements of 0.5 inch.

4.3.2 Grand Canal/SPRR Overpass

The canal and railroad tracks underneath the proposed structure require the use of drilled shafts for Pier Nos. 1, 2 and 3. A railroad spur underneath the proposed structure makes drilled shafts desirable for pier 5 and abutment 2.

An unconfined compressive strength test on the granite at the bridge location gave a strength of 5,785 pounds per square inch. One-eighth of the unconfined compressive strength may be used as the allowable bearing value for rock of the quality observed in the rock cores[1]. The allowable bearing value for drilled shafts socketed 1 1/2 shaft

---

1 D'Appolonia, Elio, et al. "Drilled Piers" in Foundation Engineering Handbook, Ed Hans Winterkorn and Hsai-Yang Fang New York; Van Nostrand Reinhold Co., 1975, pp. 601-615.

diameters into the granite at the Grand Canal/SPRR Overpass is 104 kips per square foot.

Grand Canal/SPRR Overpass
Drilled Pier Foundation Data

	Minimum Tip Diameter (FT)	Estimated Tip Elevation (FT)
Abutment 1	3	1111.7
Pier 1	3.5	1107.3
Pier 2	3.5	1125.8
Pier 3	3.5	1121.8
Pier 4	3.5	1113.9
Pier 5	3.5	1123.9
Abutment 2	3.5	1121.6

Spread footings may prove an economical alternative to drilled shafts at Pier Nos. 4 and 5 and Abutment No. 2. Spread footings at these locations would bear on a lightly cemented very dense silty sand and gravel or a lightly cemented highly weathered granite. Both materials have standard penetration test numbers in excess of 100 blows per foot. An allowable bearing value of 10 kips per square foot may be used for these materials at the Grand Canal/SPRR Overpass. Due to the poor soil conditions at Abutment No. 1, a spread footing alternate can not be provided.

Grand Canal/SPRR Overpass
Spread Footing Founding Elevations

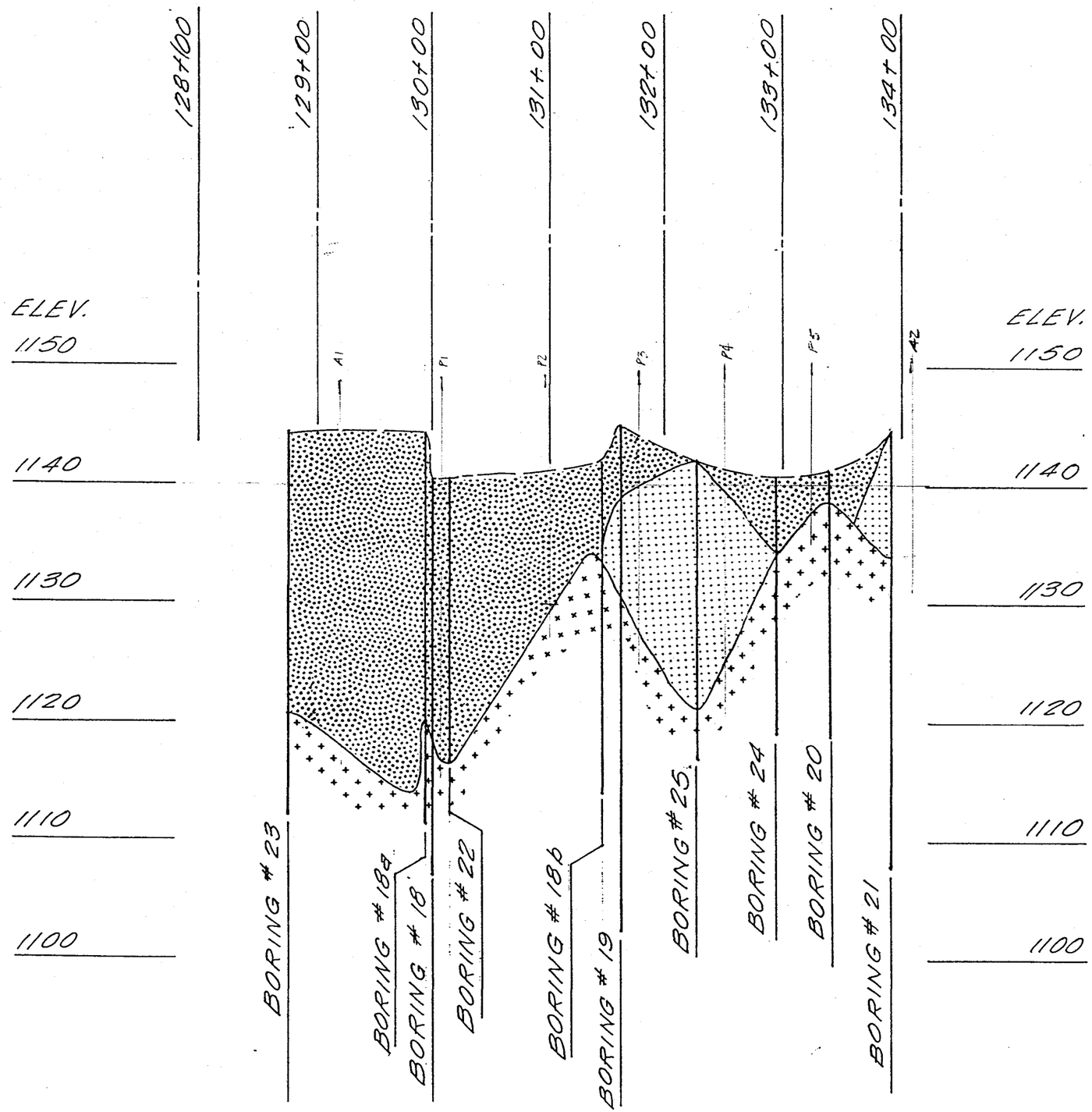
	Estimated Bearing Elevation (FT)
Abutment 1	Not applicable
Pier 1	Not applicable
Pier 2	Not applicable
Pier 3	Not applicable
Pier 4	1132.6
Pier 5	1135.6
Abutment 2	1138.8

4.3.3 Washington Street Traffic Interchange

The close proximity of Washington Street to Pier Nos. 1 and 2 makes the use of drilled shafts desirable.

An unconfined compressive strength test on the highly cemented silty sand and gravel (conglomerate) at the bridge location gave a strength of 4,586 pounds per square inch. Using the previous reference, one-eighth of the unconfined compressive strength may be used as the allowable bearing value for rock of the quality observed in the rock cores. The allowable bearing value for drilled shafts socketed 1 1/2 shaft diameters into the conglomerate at the Washington Street Traffic Interchange is 82 kips per square foot.

An unconfined compressive strength test on the highly fractured and weathered granite at the bridge location gave a strength of 1,992 pounds per square inch. Using the previous reference, one-eighth of the unconfined compressive strength may be used as the allowable bearing value for rock



LEGEND

- Silty Clayey Sand
- Conglomerate / Highly Weathered Granite
- Cataclastic Granite
- Andesite
- Fractured Granite

NOTE:

The location of the Geological stratum are approximate and based on isolated Test Borings, conducted especially for thsi project. The existence of the layers are unknown except at the precise locations of the borings. This profile is for engineering purposes only and is based upon our tests and engineering judgement.

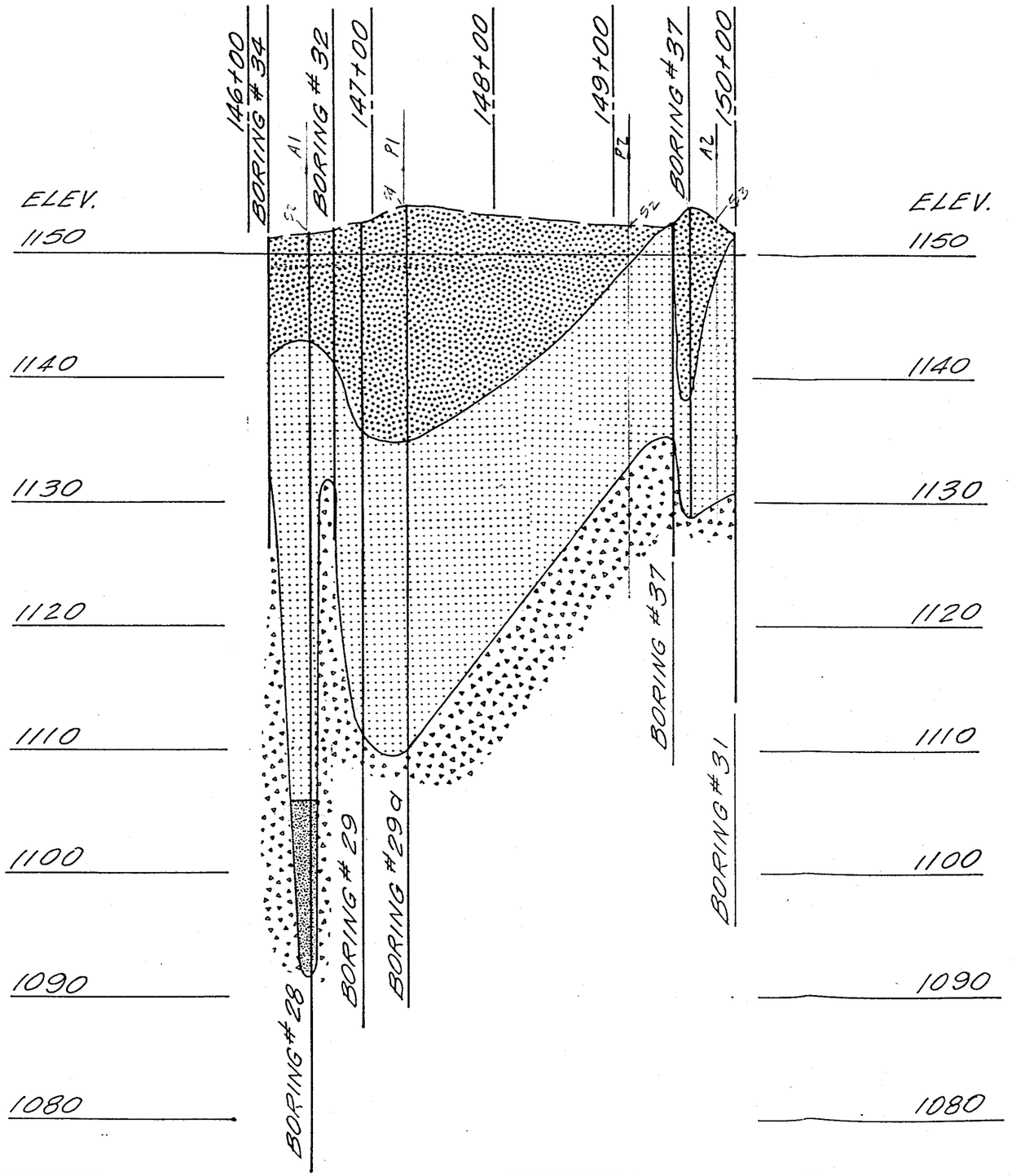
ATL Testing Laboratories

GRAND CANAL/ SPRR OVERPASS

GENERALIZED GEOLOGICAL CROSS-SECTION

ATL JOB NO. 187161

ADOT PROJECT NO. RAM-600-3-311PE



LEGEND

- Silty Clayey Sand
- Conglomerate / Highly Weathered Granite
- Catalastic Granite
- Andesite
- Fractured Granite

NOTE:

The location of the Geological stratum are approximate and based on isolated Test Borings, conducted especially for thsi project. The existence of the layers are unknown except at the precise locations of the borings. This profile is for engineering purposes only and is based upon our tests and engineering judgement.

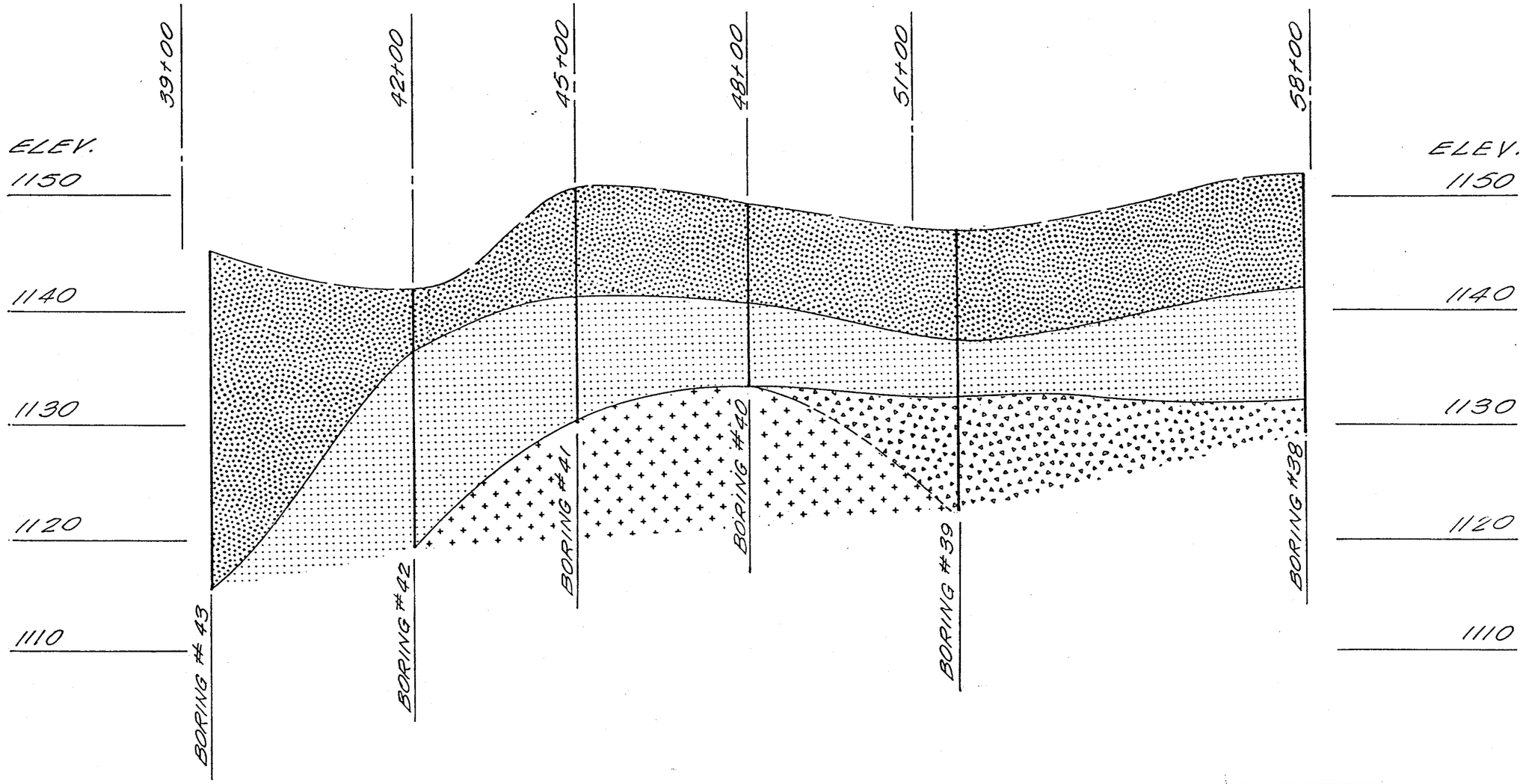
ATL Testing Laboratories

WASHINGTON STREET T.I.

GENERALIZED GEOLOGICAL CROSS-SECTION

ATL JOB NO. 187161

ADOT PROJECT NO. RAM-600-3-311PE



LEGEND

- Silty to Clayey Sand and Gravel
- Weathered Granite or Conglomerate
- Fractured Granite
- Cataclastic Granite

NOTE:

The location of the Geological stratum are approximate and based on isolated Test Borings, conducted especially for this project. The existence of the layers are unknown except at the precise locations of the borings. This profile is for engineering purposes only and is based upon our tests and engineering judgement.

ATL Testing Laboratories

OLD CROSSCUT CANAL

GEOLOGICAL CROSS-SECTION
AND
BORING LOCATIONS

ATL JOB NO. 187161
ADOT PROJECT NO. RAM-600-3-311PE

Three borings had piezometers installed and were read monthly. The results of these reading are:

Boring	Location	Date	Elevation (ft)
Piezometer 1	Sta 102 & 70, 200 LT 4L	3-30-89 5-03-89 6-01-89	1097.5 1095.8 1095.7
Piezometer 2 at boring location 29A	Sta 147 & 28, 15 LT C/L	4-16-89 5-03-89 6-01-89	1123.5 1122.9 1121.9
Piezometer 3 at boring location 21	Sta 133 & 93.5 42' RT of C/L	4-13-89 5-03-89 6-01-89	Dry at bottom of boring at 1124.7 in granite

4.3 Bridge Foundations

4.3.1 General Design & Understandings

It is understood that Pier Nos. 1, 2, 3, and 5 along with Abutment No. 2 of the Grand Canal/SPRR Overpass need to be constructed within a limited space. The anticipated loading for the Grand Canal/SPRR Overpass is as follows:

Anticipated Total Load (kips)

	Northbound	Southbound
Abutment 1	6600	5500
Pier 1	3100	3875
Pier 2	3300	4125
Pier 3	3000	3000
Pier 4	3300	3300
Pier 5	3400	3400
Abutment 2	9750	9750

The anticipated loading for the Washington Street Traffic Interchange is as follows:

Anticipated Total Load (kips)	
Abutment 1	5500
Pier 1	11140
Pier 2	11140
Abutment 2	7700

Both bridge structures can accept maximum total and differential settlements of 0.5 inch.

4.3.2 Grand Canal/SPRR Overpass

The canal and railroad tracks underneath the proposed structure require the use of drilled shafts for Pier Nos. 1, 2 and 3. A railroad spur underneath the proposed structure makes drilled shafts desirable for pier 5 and abutment 2.

An unconfined compressive strength test on the granite at the bridge location gave a strength of 5,785 pounds per square inch. One-eighth of the unconfined compressive strength may be used as the allowable bearing value for rock of the quality observed in the rock cores[1]. The allowable bearing value for drilled shafts socketed 1 1/2 shaft

---

1 D'Appolonia, Elio, et al. "Drilled Piers" in Foundation Engineering Handbook, Ed Hans Winterkorn and Hsai-Yang Fang New York; Van Nostrand Reinhold Co., 1975, pp. 601-615.

diameters into the granite at the Grand Canal/SPRR Overpass is 104 kips per square foot.

Grand Canal/SPRR Overpass
Drilled Pier Foundation Data

	Minimum Tip Diameter (FT)	Estimated Tip Elevation (FT)
Abutment 1	3	1111.7
Pier 1	3.5	1107.3
Pier 2	3.5	1125.8
Pier 3	3.5	1121.8
Pier 4	3.5	1113.9
Pier 5	3.5	1123.9
Abutment 2	3.5	1121.6

Spread footings may prove an economical alternative to drilled shafts at Pier Nos. 4 and 5 and Abutment No. 2. Spread footings at these locations would bear on a lightly cemented very dense silty sand and gravel or a lightly cemented highly weathered granite. Both materials have standard penetration test numbers in excess of 100 blows per foot. An allowable bearing value of 10 kips per square foot may be used for these materials at the Grand Canal/SPRR Overpass. Due to the poor soil conditions at Abutment No. 1, a spread footing alternate can not be provided.

Grand Canal/SPRR Overpass
Spread Footing Founding Elevations

	Estimated Bearing Elevation (FT)
Abutment 1	Not applicable
Pier 1	Not applicable
Pier 2	Not applicable
Pier 3	Not applicable
Pier 4	1132.6
Pier 5	1135.6
Abutment 2	1138.8

4.3.3 Washington Street Traffic Interchange

The close proximity of Washington Street to Pier Nos. 1 and 2 makes the use of drilled shafts desirable.

An unconfined compressive strength test on the highly cemented silty sand and gravel (conglomerate) at the bridge location gave a strength of 4,586 pounds per square inch. Using the previous reference, one-eighth of the unconfined compressive strength may be used as the allowable bearing value for rock of the quality observed in the rock cores. The allowable bearing value for drilled shafts socketed 1 1/2 shaft diameters into the conglomerate at the Washington Street Traffic Interchange is 82 kips per square foot.

An unconfined compressive strength test on the highly fractured and weathered granite at the bridge location gave a strength of 1,992 pounds per square inch. Using the previous reference, one-eighth of the unconfined compressive strength may be used as the allowable bearing value for rock

of the quality observed in the rock cores. The allowable bearing value for drilled shafts socketed 1 1/2 shaft diameters into the highly fractured and weathered granite at the Washington Street Traffic Interchange is 35.5 kips per square foot.

Washington Street Traffic Interchange
Drilled Pier Foundation Data

	Minimum Tip Dia. (FT)	Estimated Tip Elevation (FT)	Type of Founding Material
Abutment 1	4.5	1117.7	Highly fractured and weathered granite
Pier 1	7	1122.1	Conglomerate
Pier 2	10	1124.2	Highly fractured and weathered granite
Abutment 2	5.0	1126.5	Highly fractured and weathered granite

Spread footings may provide an economical alternative to drilled shafts at Abutment No. 1 and Pier No. 2. Spread footings at these locations would bear on a lightly cemented very dense silty sand and gravel or a highly weathered granite. Both materials have Standard Penetration Test numbers in excess of 100 blows per foot. An allowable bearing value of 10 kips per square foot may be used for these materials at the Washington Street Traffic Interchange.

Washington Street Traffic Interchange
Spread Footing Founding Elevations

	Estimated Bearing Elevation (Ft)
Abutment 1	1131.9
Pier 1	Not applicable
Pier 2	1147.7
Abutment 2	Not applicable

4.4 Old Cross-Cut Canal Design Information

The soil profile at the boring locations for the new alignment of the Old Cross-Cut Canal consists of silty to clayey sands and gravels overlying weathered or fractured granite.

Hard fractured granite was encountered at Boring Nos. 40, 41, and 42 above the channel invert elevation. Plate No. 4, "Old Cross-Cut Geotechnical Profile," shows the estimated extent of the hard formation.

The equivalent fluid pressures for the silty or clayey sand behind the channel walls are:

Active	24 pcf
At Rest	40 pcf
Passive	506 pcf

4.5 Retaining Wall Foundations

4.5.1 Retaining Walls Founding Within an Embankment

Retaining walls founded within an embankment but bearing a minimum of one footing width above the undisturbed natural ground, have the following allowable bearing values:

Depth of Structural Fill Beneath Footing (Ft)	Allowable Bearing Value (psf)
0	3000
2	5000

If the bearing elevation results in less than one footing width but greater than one-half footing width of embankment material underneath the footing the following bearing values may be used:

Depth of Structural Fill Beneath Footing (Ft.)	Allowable Bearing Value (psf)
0	2000
2	3000
5	5000

If the depth to natural soil underneath the footing is less than one-half the footing width use the recommendations under section 4.5.2.

4.5.2 Retaining Walls Founding on the Native Soil

Two retaining walls are planned to support the roadway embankment along the Old Cross-Cut Canal. Retaining wall OC-1 is located south of the Grand Canal. Retaining wall OC-2 runs between the Grand Canal/SPRR Overpass and the Washington Street Traffic Interchange.

The existing soil at OC-1 is low in density and potentially susceptible to collapse upon wetting under loading. Hohokam-Sky Harbor Interchange Segment 2A construction plans call for the removal of the low density soils and their replacement as embankment. If this has not been done then the low density soil should be removed and replaced as embankment. The allowable bearing values for the retaining wall OC-1 founded on embankment soil are:

Thickness of Structural Fill Under Footing (Ft)	Allowable Bearing Value (psf)
0	2000
2	3000
6	5000

The existing soil at OC-2 consists of up to 10 feet of moderately dense to dense clayey to silty sands overlying very dense soils and rock. The allowable bearing values for the OC-2 retaining wall are:

Thickness of Structural Fill Under Footing (Ft)	Allowable Bearing Value (psf)
0	2000
3*	3000
6*	5000

* If the excavation exposes the very dense cemented silty clayey sand and gravel at a depth shallower than the desired thickness of structural fill the structural fill may extend from this material to the elevation of the footing base instead of the thickness given.

4.6 Excavations and Slopes

Hohokam-Sky Harbor Interchange, Segment 2B is located north of the Salt River Channel. The subsurface generally consists of fine to coarse grained aluminum overlying conglomerate or granite bedrock. In general, the top 5 feet of the subsurface is loose. In some areas the top 30 feet is loose. The Old Cross-Cut Canal outlet under Sky Harbor Boulevard is located within the Salt River bed in sand, gravel, and cobbles. In general, the top 5 to 10 feet of the subsurface is loose at this location.

The following are general recommendations pertaining to excavations and slopes. They should be verified by the responsible geotechnical engineer in the field during construction.

4.6.1 Construction Slopes

Temporary slopes during construction can typically be slightly steeper than slopes which must remain stable during the design life of the structure. The table below presents the recommendations for unbraced construction slopes above the groundwater table:

Soil Type	Slope (Horizontal:Vertical)
Uncemented Silty sands (typically 0-5 depth)	1:1
Cemented silty sand and gravel	1/2:1
Loose Sand, gravel, and cobbles	1 1/4:1
Dense sand, gravel, and cobbles	1:1
Controlled Fill	1:1
Uncontrolled Fill	Due to the variability of this material the slope will need to be determined during construction operations.

Uncemented soils exposed in the excavation should be kept damp with occasional light water spray to reduce sloughing. In the event groundwater is encountered during excavation the field engineer will need to determine the allowable slope.

The placement and compaction of fill embankments should conform to Section 203-10.03 of the ADOT Standard Specifications. Fill soils should be placed within ± 2 percent of optimum moisture and compacted to a minimum of 95 percent of the maximum dry density when determined in accordance with Arizona Test Method 226.

4.6.2 Permanent Slopes

Permanent slopes must remain stable during the life of the project and resist erosion.

Untreated slopes of the SGC can be designed to remain structurally stable provided stream erosion is not a factor. However, the embankments located in the Salt River Channel, for the Old Cross Cut Canal Outlet and may need to resist stream erosion.

Embankments constructed of sand, gravel, and cobble material can be designed using a slope of 1 horizontal to 1 vertical.

The placement and compaction of fill embankment materials should conform to Section 203-10.03 of the ADOT Standard Specifications. Fill soils should be placed within ± 2 percent of optimum moisture and compacted to a minimum

of 95 percent of maximum dry density when determined in accordance with Arizona Test Method 226.

4.7 Earth Support Systems

If the slope angles recommended above are not sufficient to accommodate project goals, then the slopes can be reinforced or supported in some way to allow steeper slope angles. Typical methods of earth support that been used in the past include conventional retaining walls, soil tiebacks, retained earth, and fabric-wrapped walls. The following subsections describe these methods and present design criteria where applicable, or appropriate.

4.7.1 Embankment Retaining Walls

A) Low Walls - Rigid walls less than 12 feet high that are used to provide support to free-draining soils can be designed using the concept of Earth Pressures. This concept considers the wall backfill to be represented by an equivalent fluid.

The following chart presents the recommended earth pressures for the walls supporting the SGC. Wall backfill must be either free-draining or accommodate drainage through the use of geotextile fabrics.

Earth Forces	Earth Pressure (pounds/square foot)
Active	35
At-rest	50
Passive	350

B) Conventional Walls - Conventional reinforced concrete retaining walls can be designed to support soils behind walls higher than 12 feet. The design methodology requires the input of intended dimensions of the wall and backfill. There are many possible design methods for these walls, but two which are suitable for designing walls to restrain backfill composed of compacted SGC are the Rankine Theory or the Coulomb Theory. Conventional walls can be designed as rigid or flexible, as free-standing or anchored, with spread footing bases, or as sheet piles with no base. Walls may also be constructed of anchored soldier piles.

4.7.2 Soil Tiebacks

Soil tiebacks are grouted anchors embedded into the soil upon which a concrete or other suitable facing (e.g. wire mesh reinforced shotcrete) can be attached. Tiebacks can either be drilled or driven into soil. Driven tiebacks are commonly used where the presence of boulders and cobbles prohibits the use of the drilling method. Driven tiebacks

are generally more expensive than other methods of supporting the soil slope.

The following formula can be used to approximate the capacity of grouted tiebacks in granular soils.

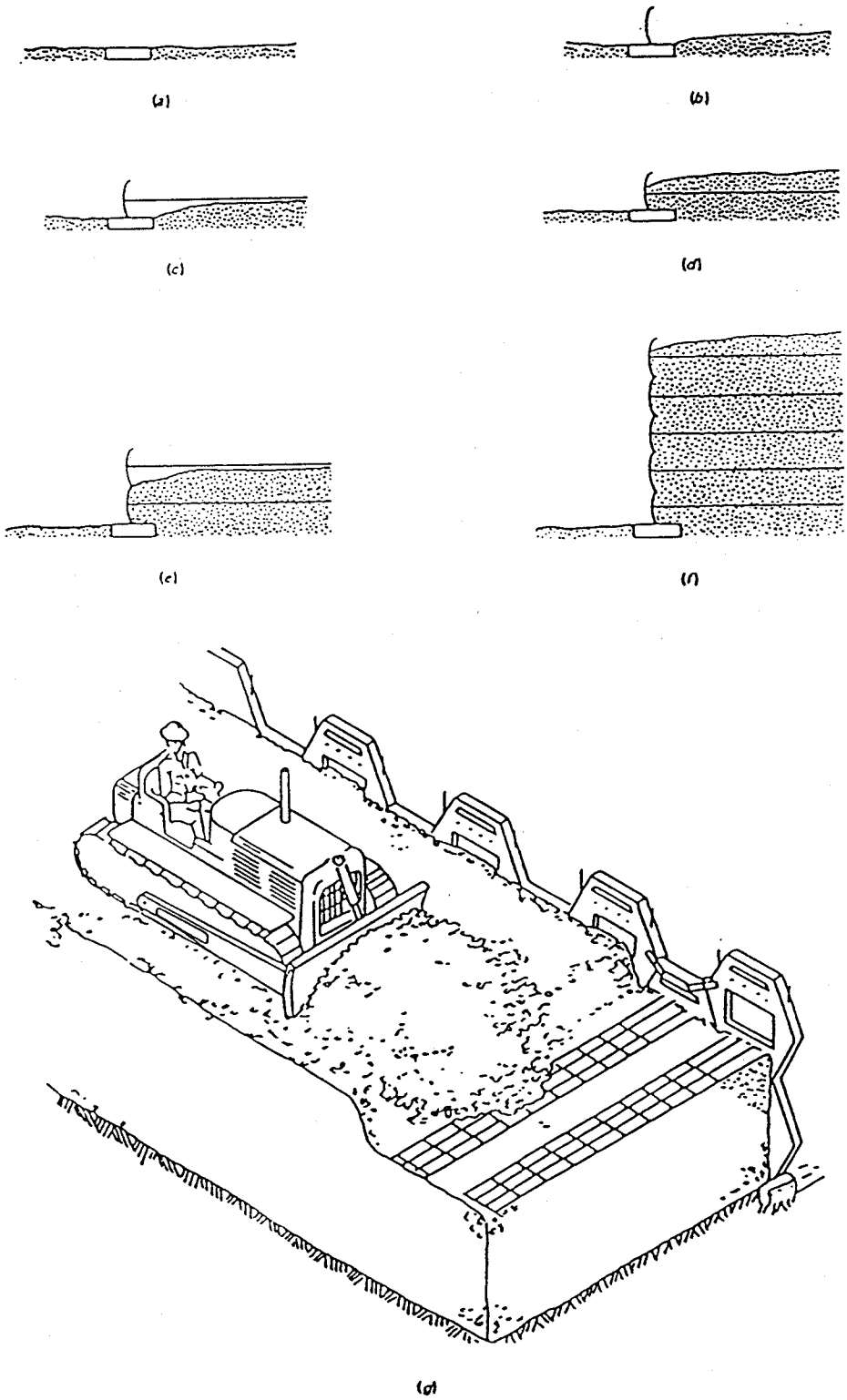
$$P = 3.14 * D * L * (c + s * \tan(d))$$

where:
- P = Ultimate tieback capacity
- D = Tieback shaft diameter
- L = Length of tieback in active zone
- c = Adhesion of grout to soil
- s = Normal stress in the shear plane
- d = Friction angle between the grout and soil

Because of the relative high degree of uncertainty in the design of soil tiebacks, specifications should state that each installed tieback should be tested to a minimum of 20% over its design load.

4.7.3 Reinforced Earth

Reinforced earth is a soil support system which utilizes the concept of mobilizing friction and/or cohesion to "grip" metallic reinforcements, thereby restraining a facing element and eventually forming a wall. Metallic reinforcements include anchors, metal strips, or wire mesh.



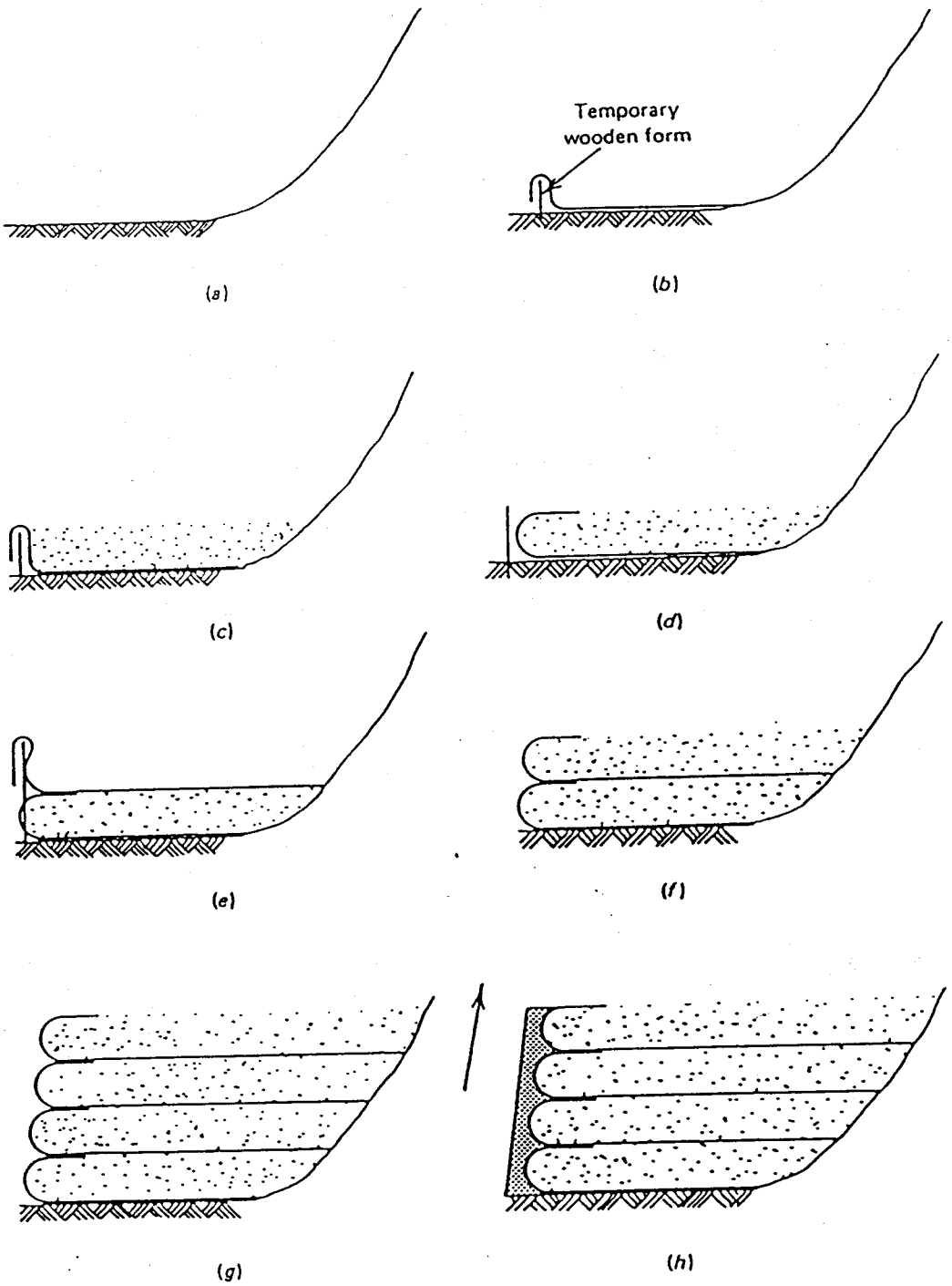
Construction sequence for forming a reinforced earth wall. (*a*) Place footing and prepare subgrade. (*b*) Place first row of facing elements using temporary supports if necessary. (*c*) Connect reinforcing tie strips or mesh to facing elements. (*d*) Backfill to next level of reinforcing ties. (*e*) Repeat process for second level. (*f*) Continue until wall is complete. (*g*) Isometric of construction using wire mesh reinforcement.

Construction procedures consist of placing a layer of strips at one elevation, backfilling with granular soil, and then repeating this process to the final wall height. This procedure is illustrated in the figure on the following page, Plate 6 (Koerner, 1984).

A stress applied to the reinforced soil mass causes strains or deformations which are transferred to the metallic reinforcements as tensile stresses. Displacements are restrained in the direction of the stripe and the soil mass behaves as a cohesive, anisotropic unit.

Advantages of the reinforced earth soil support method include: (1) Possible use on less than ideal foundation soils, (2) Ease of construction and savings in material costs, (3) The ability of the structure to accommodate relatively large deformations with no structural damage, and (4) A finished wall with attractive facing panels.

The use of reinforced earth appears ideal for steep walls constructed of sand, gravel, and cobbles from the Salt River Channel. More precise data on the design of these walls can be formulated once wall locations and heights have been determined.



General construction procedures for using geotextiles in fabric wall construction. (*a*) Prepare working surface and staging area. (*b*) Place initial geotextile on ground surface. (*c*) Backfill over geotextile, grade, and compact. (*d*) Place loose geotextile end over backfill. (*e*) Place second geotextile sheet over backfill, as with step *b*. (*f*) Backfill, grade, compact, and lay loose end over backfill. (*g*) Continue to top of wall. (*h*) Place protection on wall face.

4.7.4 Fabric-Wrapped Walls

This earth support system utilizes geotextiles as reinforcement. The construction methodology is similar to that of reinforced earth, as discussed in Section 4.5.3. The following figure, Plate 7, demonstrates the general construction methodology for fabric wrapped walls (Koerner, 1984).

The geotextile walls must be protected from both ultraviolet light and vandalism. Both shotcrete and gunite have proven effective. Wall locations and heights should be determined before more precise design data can be formulated.

5.0 CONSTRUCTION MATERIALS

5.1 Borrow Source

Excavation from the Salt River Channel and floodplain will provide borrow for this project. The haul distance to the project should be estimated to be 1.0 miles.

5.2 Water Source

Construction water may be obtained from the Salt River Project's Grand Canal. The Grand Canal crosses the project near the south end.

Guidelines in the Use and Interpretation of This Geotechnical Report

ATL JOB NO.: 187161

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The geotechnical report was prepared for the use of the Owner in the design of the subject facility and should be made available to potential contractors and/or the Contractor for information on factual data only. This report should not be used for contractual purposes as a warranty of interpreted subsurface conditions such as those indicated by the interpretive boring and test pit logs, cross sections, or discussion of subsurface conditions contained herein.

The analyses, conclusions and recommendations contained in the report are based on site conditions as they presently exist and assume that the exploratory borings, test pits, and/or probes are representative of the subsurface conditions of the site. If, during construction, subsurface conditions are found which are significantly different from those observed in the exploratory borings and test pits, or assumed to exist in the excavations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, this report should be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

The Summary Boring Logs are our opinion of the subsurface conditions revealed by periodic sampling of the ground as the borings progressed. The soil descriptions and interfaces between strata are interpretive and actual changes may be gradual.

The boring logs and related information depict subsurface conditions only at these specific locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the soil conditions at these boring locations.

Groundwater levels often vary seasonally. Groundwater levels reported on the boring logs or in the body of the report are factual data only for the dates shown.

Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples, borings or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. It is recommended that the Owner consider providing a contingency fund to accommodate such potential extra costs.

This firm cannot be responsible for any deviation from the intent of this report including, but not restricted to, any changes to the scheduled time of construction, the nature of the project or the specific construction methods or means indicated in this report; nor can our firm be responsible for any construction activity on sites other than the specific site referred to in this report.

REFERENCES

* American Society for Testing and Materials, 1987, "1987 Annual Book of ASTM Standards, Section 4, Construction," Volume 04.08, Soil and Rock; Building Stones, Geotextiles.

* Arizona Department of Transportation, 1987, "Standard Specifications for Road and Bridge Construction, Arizona Department of Transportation, Phoenix, Arizona.

* Bell, F.G., Editor, 1987. "Ground Engineer's Reference Book," Butterworth and Company, Great Britain.

* Clark, Donald, 1982, "Earth Pressures on Retaining Walls," unpublished Engineering Manual, Phoenix, Arizona.

* D'Appolonia, Elio, et al. "Drilled Piers." In Foundation Engineering Handbook, Ed. Hans Winterkorn and Hsai-Yang Fang. New York: Van Nostrand Reinhold Co., 1975, pp. 601-615.

REFERENCES

(Continued)

* Hirany, Anwar, and Beckwith, George H., 1988, "Draft Geotechnical Engineering Guidelines Manual, East Papago - Hohokam - Sky Harbor Freeways," Project No. RAM 600-3-309 prepared for the Arizona Department of Transportation by Sergent Hauskins & Beckwith Geotechnical Engineers Inc.

* Hirany, Anwar; Wetz, Norman H., and Beckwith, George H., 1988, "Preliminary Geotechnical Investigation Report for Design Section 2, East Papago - Hohokam-Sky Harbor Freeways," Project No. RAM 600-3-309 prepared for the Arizona Department of Transportation by Sergent, Hauskins, & Beckwith Geotechnical Engineers Inc.

* Hough, B.K. Basic Soils Engineering. New York: The Ronald Press Co., 1969.

* Koerner, Robert M., 1984, "Construction and Geotechnical Methods in Foundation Engineering," McGraw-Hill, Inc., U.S.A.

* Williams, A.F., and Pells, P.J.N., 1981, "Side Resistance Rock Sockets in Sandstone, Mudstone, and Shale," Canadian Geotechnical Journal, 18.

REFERENCES

(Continued)

* Laney, Robert L., and Hahn, Mary Ellen, 1986, "Hydrogeology of The Eastern Part of The Salt River Valley Area, Maricopa and Pinal Counties, Arizona," USGS Water Resources Investigation 86-4147.

* Naval Facilities Engineering Command, 1986, "Foundations & Earth Structures, Design Manual 7.02," U.S. Government Printing Office, Washington, D.C.

* Pells, P.J.N., and Turner, R.M., 1979, "Elastic Solutions for the Design and Analysis of Rock-Socketed Piles," Canadian Geotechnical Journal, 16.

* Pewe, Troy L., Schulten, Cathy S., and Bales, James T., 1979, "Geology of The Papago Park Pediment, Arizona," Map prepared by the Arizona State University Department of Geology.

* Rowe, R.K., and Armitage H.H., 1987, "A Design Method for Drilled Piers in Soft Rock," Canadian Geotechnical Journal, 24.

APPENDIX A

LOGS OF BORINGS

ATL
TESTING LABORATORIES

LEGEND
TEST PIT AND BORING LOGS

MAJOR DIVISIONS			GRAPHIC SYMBOLS	USCS	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS LITTLE OR NO FINES		GP / gp	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, MOSTLY ONE SIZE OR MISSING SIZES
				GW / gw	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, WIDE RANGE OF SIZES
	MORE THAN 50% COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH SOME FINES		GM / gm	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC / gc	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% MATERIAL LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND LITTLE OR NO FINES		SW / sw	WELL GRADED SANDS, GRAVELLY SANDS, WIDE RANGE OF SIZES
				SP / sp	POORLY GRADED SANDS, GRAVELLY SANDS, MOSTLY ONE SIZE OR MISSING SIZES
	MORE THAN 50% COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH SOME FINES		SM / sm	SILTY SANDS, SAND-SILT MIXTURES
				SC / sc	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML / ml	INORGANIC SILTS, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL / cl	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
				OL / ol	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% MATERIAL SMALLER THAN NO. 200 SEIVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH / mh	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SOILS, ELASTIC SILTS
				CH / ch	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH / oh	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT / pt	PEAT, HUMUS, SWAMP SOILS, TOP SOIL WITH HIGH ORGANIC CONTENTS
ROCK					GRANITE
					ANDESITE
					SANDSTONE
					LIMESTONE
FILLS					UNENGINEERED FILL WITH HIGHLY VARIABLE CONSTITUENTS

ATL
TESTING LABORATORIES

ML-CL	ml-cl	LOW PLASTICITY SILT AND CLAY MIXTURES
SM-SC	sm-sc	SILTY CLAYEY SAND
SW-SM	sw-sm	WELL GRADED SAND WITH SILT
SW-SC	sw-sc	WELL GRADED SAND WITH CLAY
SP-SM	sp-sm	WELL GRADED SAND WITH SILT
SP-SC	sp-sc	POORLY GRADED SAND WITH CLAY
GC-GM	gc-gm	SILTY CLAYEY GRAVEL
GW-GM	gw-gm	WELL GRADED GRAVEL WITH SILT
GW-GC	gw-gc	WELL GRADED GRAVEL WITH CLAY
GP-GM	gp-gm	POORLY GRADED GRAVEL WITH SILT
GP-GC	gp-gc	POORLY GRADED GRAVEL WITH CLAY

NOTES:

1) DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATION. UPPER CASE LETTER SYMBOLS DESIGNATE SAMPLE CLASSIFICATIONS BASED UPON LABORATORY TESTING: LOWER CASE LETTER SYMBOLS DESIGNATE CLASSIFICATIONS NOT VERIFIED BY LABORATORY TESTING.

2) THE DISCUSSION OF THE TEXT OF THIS REPORT IS NECESSARY FOR A PROPER UNDERSTANDING OF THE NATURE OF THE MATERIAL PRESENTED IN THE ATTACHED LOGS.

PENETRATION RESISTANCE GUIDE

RING # - 3.0" O.D. SPLIT BARREL SAMPLER DRIVEN WITH 140 LB. HAMMER FALLING 30". NUMBERS ARE BLOWS PER LAST FOOT PENETRATION.

SPT # - 2.0" O.D. SPLIT BARREL SAMPLER (ASTM D-1586) DRIVEN WITH 140 LB. HAMMER FALLING 30". NUMBERS ARE BLOWS PER LAST FOOT PENETRATION.

BULLNOSE - 2.0" O.D. CLOSED END PIPE DRIVEN WITH 140 LB. HAMMER FALLING 30". NUMBERS ARE BLOWS PER FOOT PENETRATION.

COMPONENT LISTING

COMPONENT	SIZE RANGE
BOULDER	ABOUT 12"
COBBLES	3" TO 12"
GRAVEL	#4 SIEVE TO 3"
SAND	#200 TO #4 SIEVE
SILT OR CLAY	BELOW #200 SIEVE

SOIL DESCRIPTION GUIDE

PERCENTAGE DESCRIPTION OF EACH COMPONENT

DESCRIPTIVE TERM	PERCENTAGE RANGE
"TRACE"	0 - 5%
"SOME"	5 - 15%
ADJECTIVE(e.g. SANDY, SILTY)	15 - 35%
"AND"	35 - 50%

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 18
LOCATION OF BORING:
STATION 129+97
56 FT LEFT OF C/L

DATE OF BORING: 12-30-88
ELEVATION OF BORING: 1140.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. LOOSE					
	5	BROWN SILTY SAND WITH SOME CLAY. (SM-SC). SLIGHTLY MOIST. LOOSE		7			
	10	BROWN SILTY SAND. (SM). SLIGHTLY MOIST. LOOSE		7			
	15	BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. MODERATELY DENSE		17			
	20	HIGHLY WEATHERED WHITE GRANITE		47			
	25	CONTINUED ON NEXT PAGE					

BORING STOPPED AT 33.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 167161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 18 (CONT) LOCATION OF BORING: STATION 129+97 56 FT LEFT OF C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 12-30-88 ELEVATION OF BORING: 1140.7	DRILLER: TOM KULIK FIELD ENGINEER: STEVE ANASTOS REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		EIGHT INCH OUTSIDE DIAMETER AUGER REFUSAL AT 24 FT DEPTH - SWITCHED TO NX CORE.					

BORING STOPPED AT 33.5 FEET BELOW EXISTING GRADES	GROUNDWATER		
	DEPTH	HOUR	RATE
	NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 18
CORE LOCATION:
STATION 129+97-
56 FT LEFT OF C/L

DATE OF CORING: 2-8-89
CORE ELEVATION: 1140.7

CORING EQUIPMENT: MOBILE B-50 DRILL RIG WITH NX CORE BARREL

DRILLERS: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
NONE	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY(%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
24	WHITE GRANITE		HIGHLY FRACTURED WITH SOME CLAY IN FRACTURES	24'0"					
25									
26					73	10	0.14		
27									
28				28'0"					
29									
30					99	00	0.15		
31									
32				32'8"					
33									

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 18A
LOCATION OF BORING:
STATION 129+93
7 FT RIGHT OF C/L

DATE OF BORING: 5-1-89
ELEVATION OF BORING: 1144.5

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		LIGHT BROWN SILTY SAND. (SM). SLIGHTLY MOIST. LOOSE					
		BROWN LEAN CLAY WITH SAND. (CL). SLIGHTLY MOIST. SOFT					
	5	DARK BROWN SILTY CLAY. (CL-ML). SLIGHTLY MOIST. SOFT		3			
		DARK BROWN SILTY SAND. (SM). SLIGHTLY MOIST. LOOSE					
	10			3			
		BROWN SILTY SAND. (SM). SLIGHTLY MOIST. LOOSE					
	15			3			
	20	BROWN GRAVELLY SAND WITH SOME SILT. (SM). MOIST TO SATURATED. MODERATELY DENSE		13			
	25						

BORING STOPPED AT 33.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
23 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES ATL JOB NUMBER: 187161	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B ADOT PROJECT NO. RAM-600-3-311PE
BORING NUMBER: 18A (CONT) LOCATION OF BORING: STATION 129+93 7 FT RIGHT OF C/L DATE OF BORING: 5-1-89 ELEVATION OF BORING: 1144.5	DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER DRILLER: TOM KULIK FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (Feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE		21			
	30	VERY DENSE		73/11"			
		WHITE GRANITE					
	35						

BORING STOPPED AT 33.0 FEET BELOW EXISTING GRADES	GROUNDWATER		
	DEPTH	HOUR	RATE
	23 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 18B
LOCATION OF BORING:
STATION 131+60
53 FT LEFT OF C/L

DATE OF BORING: 5-1-89
ELEVATION OF BORING: 1145.0

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		LIGHT BROWN SILTY SAND. (SM). SLIGHTLY MOIST. LOOSE					
		DARK BROWN SANDY SILTY CLAY. (CL-ML). SLIGHTLY MOIST. LOOSE					
	5			3			
	10	GRAY GRANITE. SLIGHTLY WEATHERED		68			
	15	AUGER REFUSAL AT 14 FT DEPTH CHANGED TO NX CORE AT 14 FT DEPTH					
	20						
	25						

BORING STOPPED AT 42.7 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGEMNT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 18B
CORE LOCATION:
STATION 131+60
53 FT LEFT OF C/L

DATE OF CORING: 5-1-89
CORE ELEVATION: 1145.0

CORING EQUIPMENT: MOBILE B-50 DRILL RIG WITH NX CORE BARREL

DRILLERS: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
NONE	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY(%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
14				14'0"					TRICONE BIT USED TO CLEAR HOLE NX CORE BARREL USED
15	WHITE GRANITE		WELL FRACTURED	15'0"					
16					89	00	0.19		
17									
18				18'0"					
19			WELL FRACTURED WITH SILTS AND CLAYS IN FRACTURES						
20					100	18	0.14		
21									
22									
23				23'0"					
24									
25					100	18	0.23		
26									
27									
28				28'0"					
29									
30					100	18	0.24		
31									
32									
33				33'0"					
34									
35					95	95	0.22		
36									
37									
38				38'0"					
39			HIGHLY FRACTURED						

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 18B CONT.
CORE LOCATION:
STATION 131+60
53 FT LEFT OF C/L

DATE OF CORING: 5-1-89
CORE ELEVATION: 1145.0

CORING EQUIPMENT: MOBILE B-50 DRILL RIG WITH NX CORE BARREL

DRILLERS: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
NONE	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY(%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
39									
40					89	00	0.21		
41									
42									
43				42.7'					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 19
LOCATION OF BORING:
STATION 131+47
60 FT RIGHT OF C/L

DATE OF BORING: 12-28-88
ELEVATION OF BORING: 1142.0

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER AND HALCO HAMMER

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (Feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		DARK BROWN SAND WITH SOME GRAVEL. (SP). MOIST. LOOSE					
		LIGHT BROWN CLAYEY SAND WITH GRAVEL. (SC). MOIST. DENSE. GRANITIC					
	5	BROWN SAND WITH SOME CLAY AND GRAVEL. (SC). MOIST. VERY DENSE. LIGHT CEMENTATION. GRANITIC		100/6.5"			
		BROWN SAND AND GRAVEL WITH SOME CLAY. (SC). MOIST. VERY DENSE. LIGHT CEMENTATION. GRANITIC					
	10			50/0"			
		EIGHT INCH DIAMETER HOLLOW STEM AUGER REFUSAL AT 14.5 FT DEPTH					
	15	WHITE GRANITE DRILLED WITH HALCO HAMMER. FOUL ODER FROM BORING					
		WATER ENCOUNTERED AT 18 FT DEPTH					
	20						
	25						

BORING STOPPED AT 28.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
18 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 19 (CONT)
LOCATION OF BORING:
STATION 131+47
60 FT RIGHT OF C/L

DATE OF BORING: 12-28-88
ELEVATION OF BORING: 1142.0

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER AND HALCO HAMMER

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE					
	30						
	35						
	40						
	45						
	50						

BORING STOPPED AT 28.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
18 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 20
LOCATION OF BORING:
STATION 133+39
53 FT LEFT OF C/L

DATE OF BORING: 12-16-88/12-28-88
ELEVATION OF BORING: 1140.6

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER AND TRICONE ROCK BIT

DRILLER: TOM KULIK/GARVIN SCAGGS
FIELD ENGINEER: S ANASTOS/T KULIK
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST. LOOSE					
		GRAY WEATHERED GRANITE					
	5			100/1"			
	10	EIGHT INCH DIAMETER HOLLOW STEM AUGER REFUSAL AT 11.5 FT DEPTH BEGIN TRICONE ROCK BIT WHITE GRANITE DRILLING TIME: 11.5'-13' 15 MIN. 13'-14.7' 42 MIN. 14.7'-16' 49 MIN. 16'-22.7' 76 MIN.		100/2"			
	15						
	20						
	25						

BORING STOPPED AT 22.7 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 21
LOCATION OF BORING:
STATION 133+93.5
42 FT RIGHT OF C/L

DATE OF BORING: 11-29-88
ELEVATION OF BORING: 1144.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SCAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION					
	5				156		
	10			200/2"			
		EIGHT INCH OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 11 FT DEPTH ON GRANITE - SWITCHED TO NX CORE SEE CORE SHEET					
	15						
	20						
	25						

BORING STOPPED AT 37.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 21
CORE LOCATION:
STATION 133+93.5-
42 FT RIGHT OF C/L

DATE OF CORING: 1-4-89
CORE ELEVATION: 1144.7

CORING EQUIPMENT: JOY 12-B DRILL RIG WITH NX CORE BARREL AND TRICONE BIT

DRILLERS: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
NONE	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY (%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
10	WHITE GRANITE		HIGHLY WEATHERED AND FRACTURED WITH CLAY IN SOME FRACTURES						TRICONE 12 FT DEPTH USING NX CORE BARREL WITH CARBIDE BIT
11									
12				12'0"					
13									
14									
15					73	00			
16									
17				17'0"					
18									
19									
20					100	00			
21									
22				22'0"					
23									
24									
25					93	00			
26									
27				27'0"					
28									
29									
30					95	33			
31									
32				32'0"					
33									
34									
35					95	46			

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 21 CONT.
CORE LOCATION:
STATION 133+93.5-
42 FT RIGHT OF C/L

DATE OF CORING: 1-4-89
CORE ELEVATION: 1144.7

CORING EQUIPMENT: JOY 12-B DRILL RIG WITH NX CORE BARREL AND TRICONE BIT

DRILLERS: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
NONE	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY(%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
36	CONTINUED FROM PREVIOUS PAGE								
37				37'0"					
38									
39									
40									

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 22
LOCATION OF BORING:
STATION 130+12
77 FT LEFT OF C/L

DATE OF BORING: 12-29-88
ELEVATION OF BORING: 1140.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 6 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (Feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND WITH SOME CLAY. (SM-SC). SLIGHTLY MOIST. LOOSE					
	5	BROWN SILTY SAND. (SM). SLIGHTLY MOIST. LOOSE		7			
	10			6			
	15	BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. MODERATELY DENSE		15			
	20	BROWN GRAVEL WITH SOME SILTY SAND. (GM). SLIGHTLY MOIST. MODERATELY DENSE		28			
		8 IN OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 24 FT ON WHITE WEATHERED GRANITE		50/1"			
	25						

BORING STOPPED AT 24.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 23
LOCATION OF BORING:
STATION 128+77.5
59 FT RIGHT OF C/L

DATE OF BORING: 12-29-88
ELEVATION OF BORING: 1144.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN FILL SOIL SILTY SAND WITH SOME TRASH FRAGMENTS					
	5	BROWN SILTY SAND AND GRAVEL, (SM), SLIGHTLY MOIST, LOOSE TO MODERATELY DENSE					
	10			16			
	15	BROWN SILTY SAND WITH SOME GRAVEL, (SM), SLIGHTLY MOIST, VERY DENSE		92			
	20	BROWN SAND, (SP), SLIGHTLY MOIST, MODERATELY DENSE		28			
		GRAY WEATHERED GRANITE, MOIST					
	25						

BORING STOPPED AT 32.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 23 (CONT) LOCATION OF BORING: STATION 128+77.5 59 FT RIGHT OF C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 12-29-88 ELEVATION OF BORING: 1144.7	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE	100/5"				
	30		125/6"				
		EIGHT INCH OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 32 FT DEPTH	100/1.5"				
	35						
	40						
	45						
	50						

BORING STOPPED AT 32.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 24
LOCATION OF BORING:
STATION 132+97
96.5 FT LEFT OF C/L

DATE OF BORING: 12-16-88
ELEVATION OF BORING: 1140.6

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND WITH SOME CLAY. (SM-SC). SLIGHTLY MOIST. LIGHT CEMENTATION					
	5	BROWN SILTY SAND WITH SOME CLAY AND GRAVEL. (SM-SC). SLIGHTLY MOIST. LIGHT CEMENTATION. GRANITIC			57		
		GRAY WEATHERED GRANITE. SLIGHTLY MOIST. LIGHT CEMENTATION					
	10			100/5"			
	15			100/1"			
	20			100/1.5"			
		EIGHT INCH OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 21.5 FT DEPTH					
	25						

BORING STOPPED AT 21.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 25
LOCATION OF BORING:
STATION 132+25.5
25 FT RIGHT OF C/L

DATE OF BORING: 12-15-88
ELEVATION OF BORING: 1142.1

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		DARK BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. LIGHT LIGHT CEMENTATION. DENSE. GRANITIC SOIL					
	5			200/5"		8.1	
		REDDISH BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST. LIGHT CEMENTATION. VERY DENSE. HIGHLY WEATHERED GRANTIE					
	10			200/0.13"			
	15			200/3"			
		REDDISH BROWN HIGHLY WEATHERED GRANITE. SLIGHTLY MOIST. FOUL ODER FROM BORING					
	20			200/3"		2.8	
		GRAY SLIGHTLY WEATHERED GRANITE.					
		AUGER REFUSAL AT 25 FT DEPTH		200/2"			
	25						

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 26
LOCATION OF BORING:
STATION 134+48.5
84 FT LEFT OF C/L

DATE OF BORING: 11-29-88
ELEVATION OF BORING: 1143.8

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. MODERATELY DENSE TO VERY DENSE. LIGHT CEMENTATION GRANITIC SOIL			80	5.1	
	10	BROWN SILTY SANDY GRAVEL. (GM). SLIGHTLY MOIST. VERY DENSE. GRANITIC SOIL TO HIGHLY WEATHERED GRANITE - SOME WIRE PRESENT IN AUGER CUTTINGS FROM 10-20 FEET DEPTH		165/6"			
	15				200/2"		
	20	BROWNISH GRAY GRANITE		200/1" 200/0.5"			
	25	EIGHT INCH OUTSIDE DIAMETER AUGER REFUSAL AT 22.5 FT DEPTH					

BORING STOPPED AT 22.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 27
LOCATION OF BORING:
STATION 133+98
91 FT RIGHT OF C/L

DATE OF BORING: 11-29-88
ELEVATION OF BORING: 1147.1

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT CEMENTATION - SOME WIRE FRAGMENTS IN AUGER CUTTINGS					
	5				200/5"		
	10			200/2"			
		BROWN TO REDDISH BROWN HIGHLY WEATHERED GRANITE. SLIGHTLY MOIST					
	15			200/1"			
	20	GRAY WEATHERED GRANITE		200/1"			
		EIGHT INCH OUTSIDE DIAMETER AUGER REFUSAL AT 21 FEET DEPTH					
	25						

BORING STOPPED AT 21.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 28
LOCATION OF BORING:
STATION 146+50
4 FT LEFT OF C/L

DATE OF BORING: 11-28-88/12-6-88
ELEVATION OF BORING: 1151.9

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SILTY SAND WITH SOME SMALL GRAVEL. (SM). SLIGHTLY MOIST. LOOSE TO MODERATELY DENSE. LIGHT CEMENTATION			32		
	10	LIGHT BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. VERY DENSE. LIGHT TO MODERATE CEMENTATION		96			
	15				200/6"		
						9.4	
	20	GRAYISH LIGHT BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST TO SATURATED. VERY DENSE. MODERATE CEMENTATION		342			
	25						

BORING STOPPED AT 78.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
24 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 28 (CONT)
LOCATION OF BORING:
STATION 146+50
4 FT LEFT OF C/L

DATE OF BORING: 11-28-88/12-6-88
ELEVATION OF BORING: 1151.9

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE		200/2"			
	30	LIGHT BROWN SAND AND GRAVEL WITH SOME CLAY. (SC). SATURATED. VERY DENSE. MODERATE CEMENTATION		200/2"		30.8	
		EIGHT INCH DIAMETER AUGER REFUSAL AT 31 FEET DEPTH - SWITCHED TO TRICONE ROCK BIT AND NX CORE - SEE CORE SHEET					
	35						
	40						
	45						
	50						

BORING STOPPED AT 78.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
24 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 28
CORE LOCATION:
STATION 146+50-
4FT LEFT OF C/L

DATE OF CORING: 12-6-88
CORE ELEVATION: 1151.9

CORING EQUIPMENT: JOY 12-B DRILL RIG WITH NX CORE BARREL AND TRICONE BIT

DRILLERS: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
24 FT	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY(%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
30	REDDISH BROWN HIGHLY CEMENTED SAND AND GRAVEL-CONGLOMERATE			30'0"					
31									
32					97	52	0.21		
33									
34									
35				35'0"					
36									
37					77	58	0.23		
38									
39									
40			CLAY IN FRACTURES. VERY MOIST	40'0"					NO WATER RETURN BELOW 39 FEET
41					69	00	0.17		
42									
43				43'0"					
44					17	00	NT		
45				45'6"					
46	BLACK ANDESITE		HIGHLY FRACTURED						CORE BARREL BLOCKED WITH CLAY AT 45'6"
47									
48					56	00	0.16		
49									
50				50'0"					
51									
52					18	00	0.20		
53									
54									
55				55'0"					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 28 CONT.
CORE LOCATION:
STATION 146+50-
4FT LEFT OF C/L

DATE OF CORING: 12-6-88
CORE ELEVATION: 1151.9

CORING EQUIPMENT: JOY 12-B DRILL RIG WITH NX CORE BARREL AND TRICONE BIT

DRILLERS: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
24 FT	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY(%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
55	CONTINUED FROM PREVIOUS PAGE		HIGHLY WEATHERED AND FRACTURED WITH CLAY IN SOME FRACTURES	55'0"					
56									
57									
58					85	16	0.22		
59									
60	GRAY GRANITE		HIGHLY FRACTURED	60'0"					
61									
62									
63					35	00	0.16		
64									
65				65'0"					
66									
67					67	00	0.16		
68				68'0"					
69					11	00	0.07		
70				69'6" 70'6"	50	00	0.07		
71									
72					11	00	0.12		
73									
74				73'6"					
75					92	18	0.11		
76			CLAY IN FRACTURES	75'6"					
77					57	00	0.10		
78				78'0"					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 167161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 29
LOCATION OF BORING:
STATION 146+98
13.5 FT RT OF C/L

DATE OF BORING: 11-16-88
ELEVATION OF BORING: 1152.6

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILT AND SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. LOOSE TO MODERATELY DENSE. LIGHT CEMENTATION BETWEEN 5 & 6.5 FT DEPTH				9.0	
	5			11		13.6	
	10	LIGHT BROWN CLAYEY GRAVELLY SAND. (SC). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT TO MODERATE CEMENTATION		20			
						7.1	
	15			19			
						5.5	
	20	LIGHT TAN CLAYEY GRAVELLY SAND. (SC). SLIGHTLY MOIST. VERY DENSE. MODERATE CEMENTATION. GRANITIC		136/3.5"		9.4	
	25						

BORING STOPPED AT 65.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
28 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 29 (CONT)
LOCATION OF BORING:
STATION 146+98
13.5 FT RT OF C/L

DATE OF BORING: 11-16-88
ELEVATION OF BORING: 1152.6

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE		113/10.5"			
		WATER ENCOUNTERED AT 28 FEET					
	30			100/3.5"			
	35	BROWN SILTY SAND AND GRAVEL. (SM). SATURATED. VERY DENSE. HIGHLY CEMENTED. WEATHERED GRANITE		200/2.5"			
				105/2.0"			
	40						
	45			200/1.0"		12.8	
	50						

BORING STOPPED AT 65.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
28 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 29 (CONT) LOCATION OF BORING: STATION 146+98 13.5 FT RT OF C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 11-16-88 ELEVATION OF BORING: 1152.6	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		RED BROWN CLAYEY SAND WITH SMALL GRAVEL. (SC). SATURATED. VERY DENSE. WEATHERED GRANITE		200/2.5"			
	55	LIGHT GRAY SILTY SAND. (SM). SATURATED. VERY DENSE. WEATHERED GRANITE SOME RED BROWN CLAY PRESENT		200/4"		3.8	
	60	BROWN CLAYEY SAND. (SC). SATURATED. VERY DENSE. WEATHERED GRANITE		200/4"			
	65					10.5	
	70						
	75						

BORING STOPPED AT 65.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
28 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 167161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 29A - PIEZ 2
LOCATION OF BORING:
STATION 147+28
15 FT LEFT OF C/L

DATE OF BORING: 4-6-89
ELEVATION OF BORING: 1154

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 6 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST. LOOSE					
	5	LIGHT BROWN GRAVELLY SAND. (SM). SLIGHTLY MOIST. LOOSE TO MODERATELY DENSE		5			
	10			15			
		LIGHT BROWN SLITY GRAVEL. (GM). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT CEMENTATION					
	15	LIGHT BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT CEMENTATION		18			
	20	LIGHT BROWN GRAVELLY SAND AND SILT. (SM). SLIGHTLY MOIST. VERY DENSE. MODERATE CEMENTATION		50/3"			
	25						

BORING STOPPED AT 65.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
30.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 29A - PIEZ 2
LOCATION OF BORING:
STATION 147+28
15 FT LEFT OF C/L

DATE OF BORING: 4-6-89
ELEVATION OF BORING: 1154

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 6 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		HEAVY CEMENTATION		50/4"			
	30	WATER ENCOUNTERED AT 30.5 FT DEPTH		50/3"			
	35			50/5"			
	40			50/2"			
		WHITE-GRAY WEATHERED GRANITE					
	45			50/1"			
	50						

BORING STOPPED AT 65.0 FEET
BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
30.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 29A - PIEZ 2 LOCATION OF BORING: STATION 147+28 15 FT LEFT OF C/L	DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 6 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
	DRILLER: TOM KULIK
DATE OF BORING: 4-6-89	FIELD ENGINEER: MARK REISIG
ELEVATION OF BORING: 1154	REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (Feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE		50/1"			
	55			50/1"			
	60			50/1"			
	65						

BORING STOPPED AT 65.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
30.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 30
LOCATION OF BORING:
STATION 149+05.5
13.5 FT RT OF C/L

DATE OF BORING: 11-23-88
ELEVATION OF BORING: 1152.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY GRAVEL AND SAND. (GM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION					
	5				196		
	10	REDDISH BROWN SILTY SAND AND GRAVEL. (GM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION		97			
	15				225		
	20	REDDISH GRAVEL AND SAND WITH SOME SILT. (GM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION. WEATHERED GRANITE		200/6"			
	25						

BORING STOPPED AT 27.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
27 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 30 (CONT) LOCATION OF BORING: STATION 149+05.5 13.5 FT RT OF C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 11-23-88 ELEVATION OF BORING: 1152.7	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE		155/6"			
		WATER ENCOUNTERED AT 27 FT DEPTH					
		EIGHT INCH OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 27 FT DEPTH		200/1"			
	30						
	35						
	40						
	45						
	50						

BORING STOPPED AT 27.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
27 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 31
LOCATION OF BORING:
STATION 150+01
41 FT LEFT OF C/L

DATE OF BORING: 11-23-88
ELEVATION OF BORING: 1151.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN TO LIGHT BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. DENSE TO VERY DENSE. LT CEMENTATION					
	5				168		
	10			152			
	15				200/3"		
	20	LIGHT BROWN GRAVEL AND SAND WITH SOME SILT. (GM). SLIGHTLY MOIST. VERY DENSE. MODERATE CEMENTATION. WEATHERED GRANITE					
		REDDISH GRAY TO RED GRAVELLY CLAYEY GRAVEL. (SC). SLIGHTLY MOIST TO SATURATED. VERY DENSE. MODERATE CEMENTATION. WEATHERED GRANITE		200/2"			
	25						

BORING STOPPED AT 46.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
24 FT 10 IN		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 31 (CONT)
LOCATION OF BORING:
STATION 150+01
41 FT LEFT OF C/L

DATE OF BORING: 11-23-88
ELEVATION OF BORING: 1151.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE		200/4"		18.0	
		EIGHT INCH OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 26.5 FT DEPTH CHANGED TO NX CORE. SEE CORE SHEET					
	30						
	35						
	40						
	45						
	50						

BORING STOPPED AT 46.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
24 FT 10 IN		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 PHASE IIB

ATL TESTING LABORATORIES

CORE NUMBER: 31
CORE LOCATION:
STATION 150+01-
41 FT LEFT OF C/L

DATE OF CORING: 2-6-89
CORE ELEVATION: 1151.7

CORING EQUIPMENT: JOY 12-B DRILL RIG WITH NX CORE BARREL AND TRICONE BIT

DRILLERS: TOM KULIK
FIELD ENGINEER: TOM KACZMAROSKI
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
24.8 FT	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY (%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
25	GRAY GRANITE		HIGHLY FRACTURED WITH RED CLAY IN FRACTURES	25'0"					
26									
27				26'6"					
28									
29					90	00	0.23		
30									
31				31'6"					
32									
33									
34					60	00	0.24		
35									
36				36'6"					
37									
38									
39					87	52	0.15		
40									
41				41'6"					
42									
43									
44					70	00	0.17		
45									
46				46'6"					
47									
48									
49									
50									

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 32
LOCATION OF BORING:
STATION 146+70.5
57 FT LEFT OF C/L

DATE OF BORING: 11-18-88
ELEVATION OF BORING: 1152.2

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT CEMENTATION					
	5				31		
	10	BROWN GRAVELLY SAND WITH SOME CLAY. (SC). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION. WEATHERED GRANITE		60		6.9	
	15				156		
						6.5	
	20	BROWN AND GRAY		200/.1'			
	25	GRAY		200/.1'		6.0	

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 33
LOCATION OF BORING:
STATION 145+54.5
9 FT RIGHT OF C/L

DATE OF BORING: 11-21-88
ELEVATION OF BORING: 1151.5

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN CLAYEY SAND. (SC). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT CEMENTATION					
	5	BROWN GRAVELLY CLAYEY SAND. (SC). SLIGHTLY MOIST. VERY DENSE. LIGHTLY CEMENTED			61		
	10	GRAY AND BROWN		200/3"			
		BROWN					
	15	GRAY		200/6"		7.6	
	20	GRAYISH TAN SILTY GRAVELLY SAND. (SM) SLIGHTLY MOIST. VERY DENSE. WEATHERED GRANITE		200/2"		7.1	
		LT GRAY SILTY CLAYEY GRAVELLY SAND. (SM). SLIGHTLY MOIST. VERY DENSE. WEATHERED GRANITE -				6.2	
	25					8.9	

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 34
LOCATION OF BORING:
STATION 146+19
57 FT RIGHT OF C/L

DATE OF BORING: 11-18-88
ELEVATION OF BORING: 1151.5

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN TO REDDISH BROWN SAND AND GRAVEL WITH SOME SILT. (SP-SM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION				3.9	
	5				124		
	10	GRAY CLAYEY GRAVELLY SAND. (SC). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION. WEATHERED GRANITE		281			
	15			200/1.5"		7.2	
	20			164/6"			
	25			150/6"		7.5	

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 35 LOCATION OF BORING: STATION 150+38 57.5 FT LEFT OF C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 11-22-88 ELEVATION OF BORING: 1151.7	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SILTY SAND, (SM), SLIGHTLY MOIST, VERY DENSE, LIGHT CEMENTATION			132		
	10	REDDISH BROWN SILTY SAND WITH SOME GRAVEL, (SM), VERY DENSE, LIGHT CEMENTATION		73			
	15	REDDISH BROWN SILTY SAND WITH SOME GRAVEL, (SM), VERY DENSE, MODERATE CEMENTATION			98		
	20	GRAYISH BROWN SILTY SAND WITH SOME GRAVEL, (SM), SLIGHTLY MOIST, VERY DENSE WEATHERED GRANITE		95			
	25			200/2"			

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 36
LOCATION OF BORING:
STATION 151+59.5
58.5 FT LEFT OF C/L

DATE OF BORING: 11-22-88
ELEVATION OF BORING: 1152.0

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. DENSE LIGHT CEMENTATION					
	5				109		
	10			165			
		REDDISH GRAY TO BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST.VERY DENSE. MODERATE TO HEAVY CEMENTATION					
	15				180/6"		
	20			200/4"			
		WATER ENCOUNTERED AT 20 FT DEPTH BROWN TO GRAY SILTY SAND AND GRAVEL. (SM). SATURATED. VERY DENSE. WEATHERED GRANITE					
	25			200/3"			

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
20 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 37
LOCATION OF BORING:
STATION 149+64
57 FT RIGHT OF C/L

DATE OF BORING: 11-21-88
ELEVATION OF BORING: 1154.0

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SANDY SILT WITH SOME GRAVEL. (ML). SLIGHTLY MOIST. MODERATELY DENSE TO DENSE. LIGHT CEMENTATION					
	5				28		
						3.4	
	10			42			
	15	BROWN SILTY SAND AND GRAVEL. (SM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION		76			
	20			200/3.5"		7.4	
	25	LIGHT TAN CLAYEY SAND AND GRAVEL. (SC) SLIGHTLY MOIST. VERY DENSE. MODERATE CEMENTATION. WEATHERED GRANITE				6.0	

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 38 LOCATION OF BORING: OLD CROSS CUT CANAL STATION 57+85, C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 11-28-88 ELEVATION OF BORING: 1152.1	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND. (SM). SLIGHTLY MOIST. MODERATELY DENSE. LIGHT CEMENTATION					
	5	BROWN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION.			55		
	10	TANNISH GRAY WEATHERED GRANITE. SLIGHTLY MOIST. LIGHT CEMENTATION		200/2"			
	15	MODERATE CEMENTATION BELOW 14 FT			368	7.5	
	20	GRAY GRANITE. SLIGHTLY MOIST. HEAVY CEMENTATION		200/3" 200/1"		4.5	
	25						

BORING STOPPED AT 23.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 39 LOCATION OF BORING: OLD CROSS CUT CANAL STATION 51+77, C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 12-9-88 ELEVATION OF BORING: 1147.0	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		TAN SILTY SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION				7.3	
	5			115			
	10	TAN HIGHLY WEATHERED GRANITE. SLIGHTLY MOIST. LIGHT CEMENTATION		100/0.5"		6.0	
	15	TAN TO GRAY WEATHERED GRANITE. SLIGHTLY MOIST TO SATURATED. LIGHT CEMENTATION		200/5"			
	20			200/5"		4.9	
	25			200/4"			

BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
20 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 40

LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 48+00. C/L

DATE OF BORING: 12-9-88

ELEVATION OF BORING: 1149.0

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS

FIELD ENGINEER: MARK REISIG

REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SILTY GRAVELLY SAND. (SM). SLIGHTLY MOIST. VERY DENSE. LIGHT CEMENTATION		158		3.4	
	10	GRAY WEATHERED GRANITE. SLIGHTLY MOIST. LIGHT CEMENTATION		195/6"			
	15			100/1"		6.6	
	20	EIGHT INCH DIAMETER HOLLOW STEM AUGER REFUSAL AT 16 FT DEPTH					
	25						

BORING STOPPED AT 16.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 41
LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 44+90, C/L

DATE OF BORING: 12-9-89
ELEVATION OF BORING: 1150.5

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWNISH GRAY WEATHERED GRANITE. SLIGHTLY MOIST. MOIST. LIGHT CEMENTATION				3.6	
	5	GRAY		100/1"			
		GRAYISH BROWN					
	10	EIGHT INCH OUTSIDE DIAMETER HOLLLOW STEM AUGER REFUSAL AT 9.5 FT DEPTH SWITCHED TO JOY 12B DRILL RIG AND NX CORE - SEE CORE SHEET					
	15						
	20						
	25						

BORING STOPPED AT 20.3 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B

ATL TESTING LABORATORIES

CORE NUMBER: 41
CORE LOCATION:
OLD CROSS CUT CANAL
STATION 44+90. C/L

DATE OF CORING: 1-3-89
CORE ELEVATION: 1150.5

CORING EQUIPMENT: JOY 12-B DRILL RIG WITH NX CORE BARREL AND TRICONE BIT

DRILLERS: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH
ATL JOB NUMBER: 187161

GROUNDWATER	
DEPTH	HOUR
NONE	

DEPTH (FT)	DESCRIPTION OF ROCK MATERIAL	GRAPHIC LOG	DESCRIPTION OF ROCK DEFECTS	CORE DEPTH	CORE RECOVERY (%)	RQD (%)	PENETRATION RATE-FT/MIN	FRACTURES (#/FT)	NOTES ON DRILLING CONDITIONS
09	GRAYISH BROWN WEATHERED GRANITE		FRACTURES AT APPROXIMATELY 3-6 INCH INTERVALS WITH CLAY PRESENT IN FRACTURES	09'0"					TRICONE TO 10'4" DEPTH
10				10'4"					
11									
12									
13					100	41	0.10		BEGIN NX CORE AT 10'4" NO WATER LOSS
14									
15									
16				15'4"					
17									
18					100	59	0.18		
19									
20									
21				20'4"					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 42
LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 42+00, C/L

DATE OF BORING: 12-15-88
ELEVATION OF BORING: 1141.7

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER AND HALCO HAMMER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN GRAVELLY SILTY SAND. (SM). SLIGHTLY MOIST. DENSE. LIGHT CEMENTATION					
	5					8.5	
		REDDISH BROWN WEATHERED GRANITE. SLIGHTLY MOIST. DENSE. LIGHT CEMENTATION				6.0	
		EIGHT INCH OUTSIDE DIAMETER HOLLOW STEM AUGER REFUSAL AT 8 FT DEPTH SWITCHED TO HALCO HAMMER					
	10	DRILLING TIME: 8'8"-18' 23 MIN. 18'-23.2' 10 MIN.					
	15	PINKISH WHITE GRANITE BETWEEN 15'5" TO 16'5"					
		WHITE GRANITE. DRY					
	20						
		WHITE SLIGHTLY WEATHERED GRANITE. SLIGHTLY MOIST					
	25						

BORING STOPPED AT 23.2 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 167161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 43
LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 38+50. C/L

DATE OF BORING: 12-29-88
ELEVATION OF BORING: 1145.0

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: GARVIN SKAGGS
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SAND WITH SOME TRASH. (SM). SLIGHTLY MOIST. FILL					
	10	BROWN SILTY SAND. (SM). SLIGHTLY MOIST. MODERATELY DENSE TO VERY DENSE		68			
	15			25			
	20	BROWN GRAVELLY SAND WITH SOME SILT. (GM). SLIGHTLY MOIST. VERY DENSE		79			
	25						

BORING STOPPED AT 30.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B
ATL JOB NUMBER: 187161	ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 43 (CONT) LOCATION OF BORING: OLD CROSS CUT CANAL STATION 38+50, C/L	DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER
DATE OF BORING: 12-29-88 ELEVATION OF BORING: 1145.0	DRILLER: GARVIN SKAGGS FIELD ENGINEER: MARK REISIG REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE					
	30						
	35						
	40						
	45						
	50						

BORING STOPPED AT 30.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES ATL JOB NUMBER: 187161	HOHOKAM - SKY HARBOR INTERCHANGE STATE ROUTE 143 CONTRACT NO. 87-49 SEGMENT 2B ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 44 LOCATION OF BORING:	DRILLING EQUIPMENT:
DATE OF BORING: ELEVATION OF BORING:	DRILLER: TOM KULIK FIELD ENGINEER: STEVE ANASTOS REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BORING NUMBER NOT USED					
	5						
	10						
	15						
	20						
	25						

BORING STOPPED AT 00.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 45
LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 73+50. C/L

DATE OF BORING: 12-21-88
ELEVATION OF BORING: 1124.0

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH ODEX SYSTEM

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		GRAY SAND AND GRAVEL. (SP). SLIGHTLY MOIST. LOOSE					
		GRAY COBBLES. GRAVEL. AND SAND. (GP). SLIGHTLY MOIST. MODERATELY DENSE					
	5	BROWN SAND. (SP). MOIST. LOOSE DRILLING TIME: 0-5' 17 MIN 5-10' 8 MIN 38 SEC		9			
		GRAY BROWN COBBLES AND GRAVEL. (GP). MOIST. MODERATELY DENSE					
	10	GRAY BROWN SAND AND GRAVEL. (SP). MOIST. DENSE DRILLING TIME: 10-15' 1 MIN 57 SEC		31			
	15	BROWN SAND. (SP). SATURATED. MODERATELY DENSE. WATER ENCOUNTERED AT 15 FT DEPTH DRILLING TIME: 15-21' 3 MIN 55 SEC		17			
	20			50/6"			
	25						

BORING STOPPED AT 21.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
15 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 46
LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 75+02. C/L

DATE OF BORING: 12-21-88
ELEVATION OF BORING: 1121.8

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH ODEX SYSTEM

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	GRAY BROWN COBBLES, GRAVEL, AND SAND, (GP), MOIST, LOOSE DRILLING TIME: 0-5' 3 MIN. 22 SEC.		26			
	10	BROWN SAND WITH GRAVEL AND COBBLES, (SP), MOIST, MODERATELY DENSE DRILLING TIME: 5-10' 21 MIN. 34 SEC.		32			
		BROWN SAND AND GRAVEL, (SP), MOIST, DENSE					
	15	BROWN GRAVEL AND SAND, (GP), SATURATED, MODERATELY DENSE, WATER ENCOUNTERED AT 14 FT DEPTH DRILLING TIME: 10-15' 6 MIN. 41 SEC. 15-20.5' 31 MIN. 51 SEC.		14			
	20	COBBLES AND GRAVEL, (GP), SATURATED, VERY DENSE		50/6"			
	25						

BORING STOPPED AT 20.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
14 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: 47
LOCATION OF BORING:
OLD CROSS CUT CANAL
STATION 76+53. C/L

DATE OF BORING: 12-21-88
ELEVATION OF BORING: 1127.6

DRILLING EQUIPMENT: MOBILE B-56 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN SILTY SAND. (SM). MOIST. LOOSE					
	5	BROWN SILTY SAND. GRAVEL. AND COBBLES. (GM). SLIGHTLY MOIST. DENSE		34			
	10			42			
	15						
	20						
	25						

BORING STOPPED AT 12.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: RW-1
LOCATION OF BORING:
STATION 144+50.
204 RIGHT OF C/L

DATE OF BORING: 5-3-89
ELEVATION OF BORING: 1151

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		LIGHT BROWN GRAVELLY SAND AND CLAY. (SC). SLIGHTLY MOIST. MODERATELY DENSE					
	5	BROWN GRAVELLY SAND AND CLAY. (SC). SLIGHTLY MOIST. MODERATELY DENSE		14			
		TAN CLAYEY SAND WITH GRAVEL. (SC). SLIGHTLY MOIST. VERY DENSE					
	10			75/3"			
	15			85/6"			
	20			100/6"			
	25						

BORING STOPPED AT 21.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
20.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: RW-2
LOCATION OF BORING:
STATION 141+50.
140 RIGHT OF C/L

DATE OF BORING: 5-4-89
ELEVATION OF BORING: 1149

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 8 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: MARK REISIG
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		LIGHT BROWN CLAYEY SAND WITH GRAVEL (SC). SLIGHTLY MOIST. LIGHT CALCAREOUS CEMENTATION. DENSE					
	5			32			
		LIGHT BROWN GRAVELLY SAND WITH SOME CLAY. (SC). SLIGHTLY MOIST. HEAVY CALCAREOUS CEMENTATION. VERY DENSE					
	10			50/1"			
	15			50/2"			
	20						
	25						

BORING STOPPED AT 21.5 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: PIEZOMETER 1
LOCATION OF BORING:
STATION 102+70
200 FT LEFT OF C/L

DATE OF BORING: 3-30-89
ELEVATION OF BORING: 1129

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 4 INCH ODEX SYSTEM AND 3.5 INCH TRICONE BIT

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SAND WITH SOME GRAVEL. (SP). MOIST. LOOSE					
	10	LIGHT BROWN SILTY FINE SAND WITH SOME GRAVEL. (SM). SLIGHTLY MOIST. LOOSE					
	15 20 25	GRAY COBBLES. GRAVEL. AND SAND. (GP). SLIGHTLY MOIST. DENSE					

BORING STOPPED AT 84.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
31.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: PIEZOMETER 1
LOCATION OF BORING:
STATION 102+70
200 FT LEFT OF C/L

DATE OF BORING: 3-30-89
ELEVATION OF BORING: 1129.0

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 4 INCH ODEX SYSTEM AND 3.5 INCH TRICONE BIT

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE					
	30	GROUNDWATER ENCOUNTERED AT 31.5 FT DEPTH ON 3-30-89					
		TAN GRAVELLY CLAYEY SAND, (SC), SATURATED, MODERATELY DENSE					
	35						
	40						
	45						
	50						

BORING STOPPED AT 84.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
31.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: PIEZOMETER 1
LOCATION OF BORING:
STATION 102+70
200 FT LEFT OF C/L

DATE OF BORING: 3-30-89
ELEVATION OF BORING: 1129.0

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 4 INCH ODEX SYSTEM AND 3.5 INCH TRICONE BIT

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CHANGED TO TRICONE BIT AT 50 FT DEPTH					
	55						
	60	WHITE GRANITE. HIGHLY FRACTURED WITH CLAY IN FRACTURES. SATURATED					
	65						
	70						
	75						

BORING STOPPED AT 84.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
31.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: PIEZOMETER 1
LOCATION OF BORING:
STATION 102+70
200 FT LEFT OF C/L

DATE OF BORING: 3-30-89
ELEVATION OF BORING: 1129.0

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 4 INCH ODEX SYSTEM AND 3.5 INCH TRICONE BIT

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		CONTINUED FROM PREVIOUS PAGE					
	80						
	85						

BORING STOPPED AT 84.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
31.5 FT		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

ATL TESTING LABORATORIES

ATL JOB NUMBER: 187161

HOHOKAM - SKY HARBOR INTERCHANGE
STATE ROUTE 143
CONTRACT NO. 87-49 SEGMENT 2B
ADOT PROJECT NO. RAM-600-3-311PE

BORING NUMBER: PIEZOMETER 3
LOCATION OF BORING:
STATION 133+93.5
42 FT RIGHT OF C/L

DATE OF BORING: 4-13-89
ELEVATION OF BORING: 1144.7

DRILLING EQUIPMENT: MOBILE B-50 DRILL RIG WITH 6 INCH OUTSIDE DIAMETER HOLLOW STEM AUGER

DRILLER: TOM KULIK
FIELD ENGINEER: STEVE ANASTOS
REVIEWED BY: RANDY SMITH

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	5	BROWN SILTY FINE SAND WITH GRAVEL. (SM). SLIGHTLY MOIST. LOOSE					
	10	GRAY SILTY FINE SAND WITH GRAVEL. (SM). SLIGHTLY MOIST. GRANITIC. LOOSE					
	15	WHITE GRANITE. WEATHERED					
	20						
	25						

BORING STOPPED AT 20.0 FEET BELOW EXISTING GRADES

GROUNDWATER		
DEPTH	HOUR	RATE
NONE		

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

APPENDIX B

TABULATION OF TEST RESULTS

ATL TESTING LABORATORIES

ATL
TESTING LABORATORIES

PROJECT: Hohokam - Sky Harbor Interchange DATE: 4-10-89

LOCATION:

MATERIAL: Auger Cuttings DATE OF SAMPLE: Various

REQUESTED BY: ATL/R. Smith

LOG	DEPTH	MOISTURE	USCS	LL	PI	SIEVE ANALYSIS-PERCENT PASSING														
						200	100	50	40	30	16	10	8	4	1/4	3/8	1/2	3/4	1	1 1/2
18a	1.5-5	--	CL	31	11	75	83	86	87	89	91	94	95	98	99	100				
18a	13-19	--	ML		NP	63	88	96	96	97	98	98	99	100						
18a	19-25	--	SM		NP	48	63	68	69	70	72	73	74	75	77	79	81	86	90	96
18b	2-10	--	CL-ML	27	7	65	75	82	84	85	87	89	90	94	96	99	99	100		
25	3-5	8.1	SM		NP	32	36	41	44	47	57	69	72	89	94	98	100			
25	18-20	2.8	SM		NP	19	25	34	39	45	57	69	71	83	86	89	91	94	97	100
26	8-10	5.1	GM		NP	13	17	21	22	24	27	32	34	43	49	82	89	93	93	96
28	18-20	9.4	SM		NP	21	27	33	37	41	52	63	66	80	86	93	95	99	99	100
28	31	30.8	SC	36	12	25	29	32	34	37	44	52	56	78	88	96	98	99	99	100
29	0-4	9.0	SM		NP	40	50	55	57	59	65	72	76	85	89	93	96	98	100	

ATL TESTING LABORATORIES

ATL
TESTING LABORATORIES

PROJECT: Hohokam - Sky Harbor Interchange DATE: 4-10-89

LOCATION:

MATERIAL: Auger Cuttings DATE OF SAMPLE: Various

REQUESTED BY: ATL/R. Smith

LOG	DEPTH	MOISTURE	USCS	LL	PI	SIEVE ANALYSIS-PERCENT PASSING														
						200	100	50	40	30	16	10	8	4	1/4	3/8	1/2	3/4	1	1 1/2
29	4-10	13.6	SM		NP	43	51	55	57	58	63	71	74	84	89	94	95	97	97	97
29	10-17	7.1	SC	37	16	17	20	22	23	26	33	43	47	63	71	84	89	94	98	100
29	17-20	5.5	SC	40	19	13	15	16	17	19	25	38	45	70	81	91	93	97	99	100
29	20-25	9.4	SC	40	18	18	21	24	26	30	42	55	60	76	83	91	95	99	100	
29	45	12.8	--	--	--	16	18	23	26	32	46	63	69	88	92	94	95	95	95	100
29	55	3.8	SM		NP	36	39	44	48	54	68	80	85	96	98	100				
29	60	---	--	--	NP	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
29	65	10.5	SM		NP	43	46	51	54	60	71	81	84	91	94	96	97	98	99	100
31	26.5	18.0	SC	39	19	32	38	44	47	52	66	84	93	94	98	99	100			
32	10	6.9	SC	32	14	16	19	22	23	25	32	42	47	64	76	90	95	99	100	

ATL TESTING LABORATORIES

ATL
TESTING LABORATORIES

PROJECT: Hohokam - Sky Harbor Interchange DATE: 4-10-89

LOCATION:

MATERIAL: Auger Cuttings DATE OF SAMPLE: Various

REQUESTED BY: ATL/R. Smith

LOG	DEPTH	MOISTURE	USCS	LL	PI	SIEVE ANALYSIS-PERCENT PASSING														
						200	100	50	40	30	16	10	8	4	1/4	3/8	1/2	3/4	1	1 1/2
32	18-20	6.5	SC	38	17	17	20	22	26	37	49	54	72	81	89	93	96	97	100	
32	23-25	6.0	SC	52	29	11	13	14	15	17	22	33	39	66	76	91	96	100		
33	13-15	7.6	SC	44	17	17	21	25	27	30	38	48	53	73	84	93	97	99	100	
33	20	7.1	SM	29	3	16	20	24	26	29	36	47	53	75	83	91	94	97	99	100
33	20-23	6.2	SM	46	16	12	14	15	16	16	17	22	28	62	82	96	99	100		
33	23-25	8.9	SM-SC	29	7	33	39	47	52	58	73	84	89	99	99	100				
34	2-5	3.9	SP-SM		NP	9	11	15	17	21	30	41	45	63	71	81	86	92	93	100
34	15-20	7.2	SC	43	17	18	21	25	27	30	39	49	53	70	77	85	88	93	94	100
34	20-25	7.5	SC	44	17	13	15	17	19	21	27	36	41	61	74	89	95	99	99	100
37	5-10	3.4	ML		NP	53	61	64	65	67	71	76	79	87	91	96	97	98	100	

ATL TESTING LABORATORIES

ATL
TESTING LABORATORIES

PROJECT: Hohokam - Sky Harbor Interchange DATE: 4-10-89

LOCATION:

MATERIAL: Auger Cuttings DATE OF SAMPLE: Various

REQUESTED BY: ATL/R. Smith

LOG	DEPTH	MOISTURE	USCS	LL	PI	SIEVE ANALYSIS-PERCENT PASSING														
						200	100	50	40	30	16	10	8	4	1/4	3/8	1/2	3/4	1	1 1/2
37	19-20	7.4	SM		NP	19	23	26	27	28	31	34	36	43	48	57	63	73	76	88
37	23-25	6.0	SC	40	16	16	19	21	22	23	26	34	39	64	80	93	97	98	99	100
38	13-15	7.5	SM		NP	16	20	24	27	30	38	50	54	73	82	91	95	98	99	100
38	20-22	4.5	SM		NP	15	18	20	22	24	30	39	43	60	70	83	90	95	98	100
39	2-5	7.3	SM	39	11	34	39	43	45	48	56	67	73	87	92	97	99	100		
39	12-14	6.0	SM		NP	18	21	24	26	29	35	45	49	70	79	87	90	92	94	97
39	18-20	4.9	SM		NP	21	26	32	36	41	52	64	69	83	88	94	96	96	97	100
40	3-5	3.4	SM		NP	22	29	35	38	42	49	56	59	70	76	84	88	93	97	100
40	12-15	6.6	SM		NP	21	26	32	35	39	49	61	65	80	88	95	98	99	100	
41	2-3	3.6	SM		NP	15	20	26	30	34	44	55	60	75	82	91	94	96	96	97

ATL TESTING LABORATORIES

ATL
TESTING LABORATORIES

PROJECT: Hohokam - Sky Harbor Interchange DATE: 4-10-89

LOCATION:

MATERIAL: Auger Cuttings DATE OF SAMPLE: Various

REQUESTED BY: ATL/R. Smith

LOG	DEPTH	MOISTURE	USCS	LL	PI	SIEVE ANALYSIS-PERCENT PASSING														
						200	100	50	40	30	16	10	8	4	1/4	3/8	1/2	3/4	1	1 1/2
42	3-5	8.5	SM		NP	27	32	35	36	38	43	51	54	71	81	94	98	100		
42	5-7	6.0	SM		NP	18	22	27	30	33	40	49	52	69	79	92	96	99	100	
RW 1	8-18	-	SC	38	17	16	21	25	28	30	38	47	50	64	76	89	95	100		
RW 1	0-9	-	SC	36	17	31	39	44	46	48	54	62	65	84	91	97	99	100		

PROJECT: Hohokam - Sky Harbor Interchange Segment 2B
ADOT Project No.: RAM-600-3-311 PE

CLIENT: Morrison-Knudsen Engineers

DATE: June 6, 1989

ATL JOB NO.: 187161

BOX RESISTIVITY AND pH
TEST RESULTS (ARIZ 236a)

BORING NO.	DEPTH (FT.)	LOCATION	RESISTIVITY (OHMS/CM)	pH
30	2 - 5	Sta. 149+05.5 13.5 Ft. Rt. of C/L	874	8.0
30	5 - 10	Sta. 149+05.5 13.5 Ft. Rt. of C/L	2016	8.0
31	3 - 5	Sta. 150+01 41 Ft. Lt. of C/L	4368	8.8

PROJECT: Hohokam - Sky Harbor Interchange Segment 2B
ADOT Project No.: RAM-600-3-311 PE

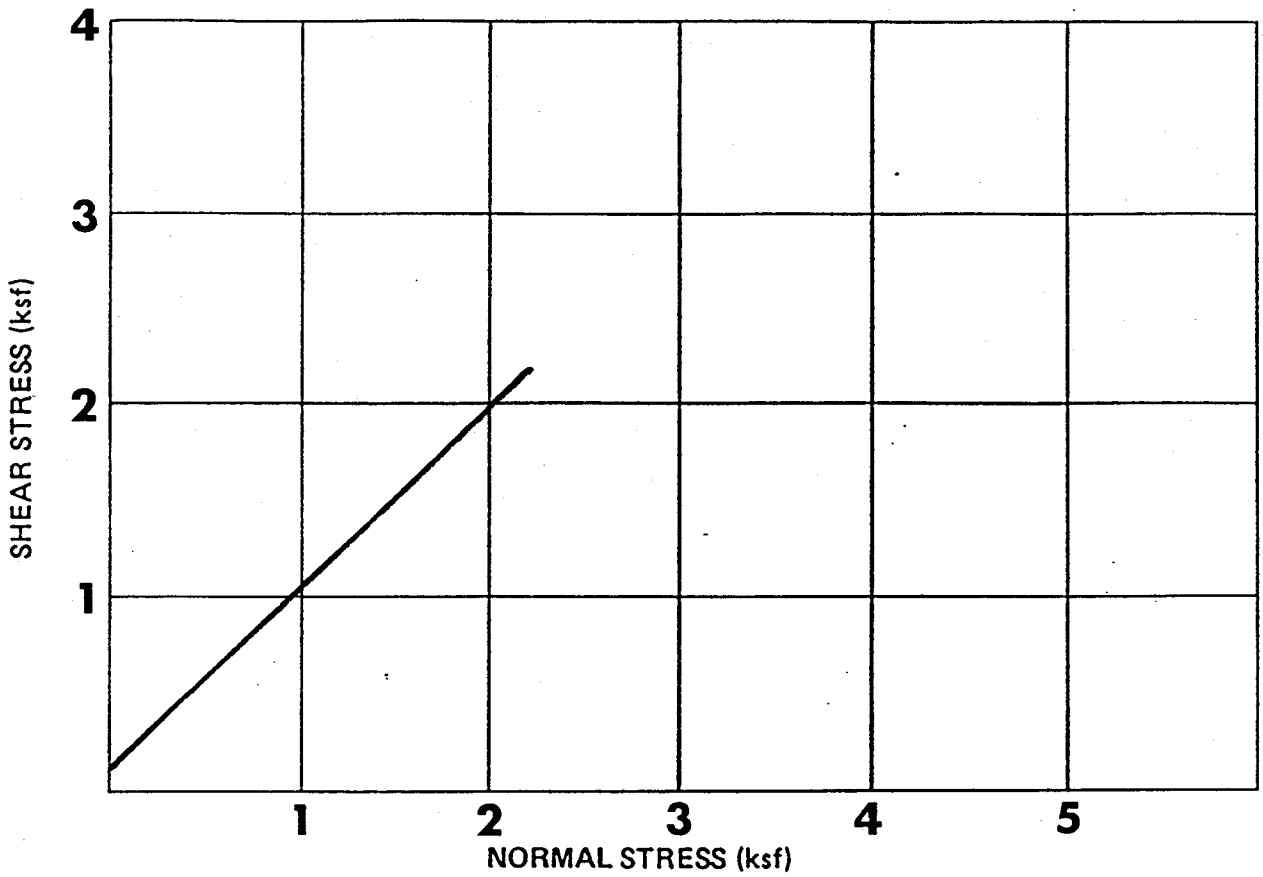
CLIENT: Morrison-Knudsen Engineers

DATE: June 6, 1989

ATL JOB NO.: 187161

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORES (ASTM D 2938)

BORING NO.	DEPTH (FT.)	LOCATION	LENGTH (INCH)	DIAMETER (INCH)	MOISTURE CONDITION	UNCONFINED COMPRESSIVE STRENGTH (PSI)
18	31	Sta. 129+97 56 Ft. Lt. of C/L	3.563	1.997	Laboratory Air Dry	5785
28	33.5	Sta. 146+50 4 Ft. Lt. of C/L	3.515	1.976	Laboratory Air Dry	4586
31	26.5	Sta. 150+01 41 Ft. Lt. of C/L	3.123	1.987	Laboratory Air Dry	1992

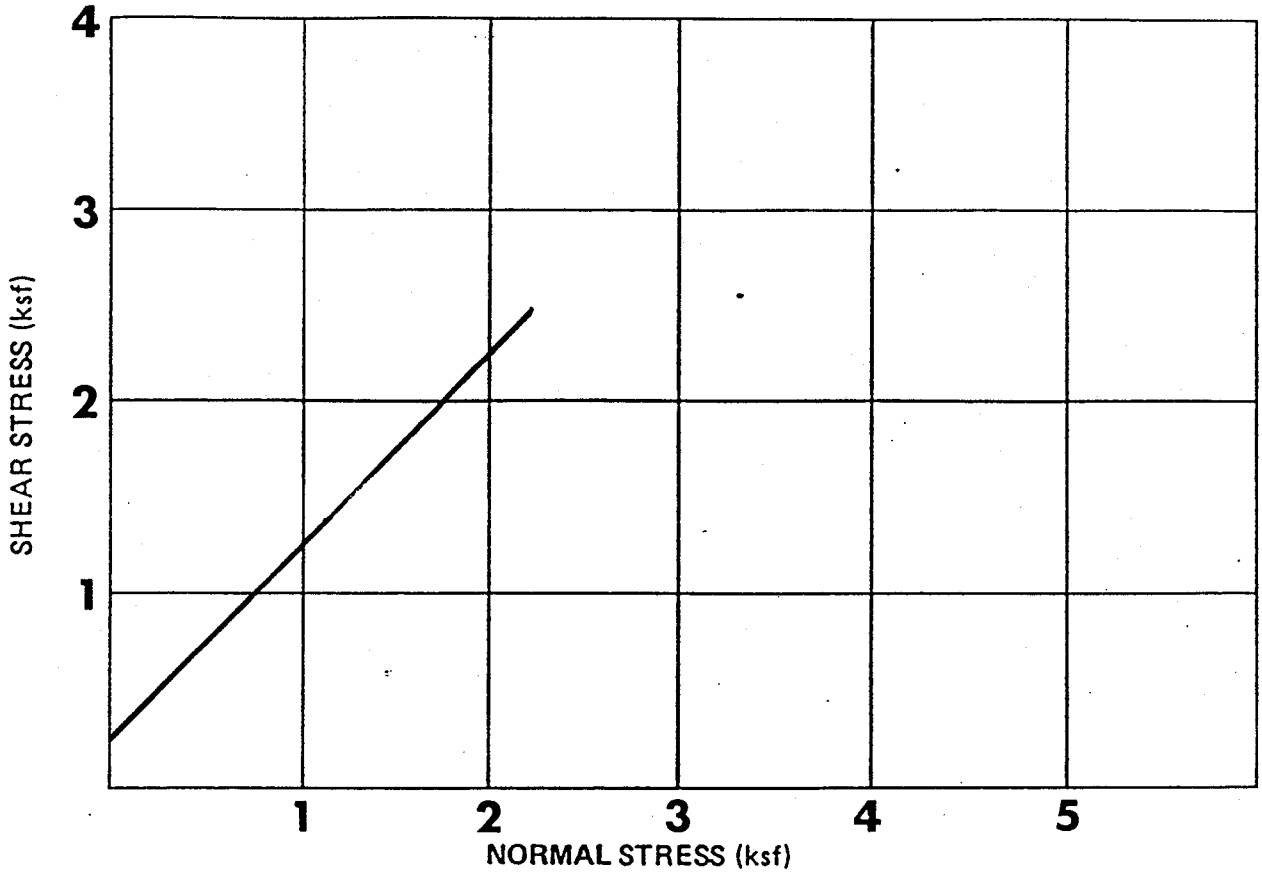


Boring or Test Pit No.	Depth (ft.)	USCS	Soil Description	Cohesive Strength (ksf)	Internal Friction Angle	Moisture Content (%)	Dry Density (pcf)
21	5-6.5	SM	Silty sand with some gravel	0.12	42.5	10.05	112.6

DIRECT SHEAR TEST DATA

Hohokam - Sky Harbor Interchange
Segment 2B

JOB NO. 187161

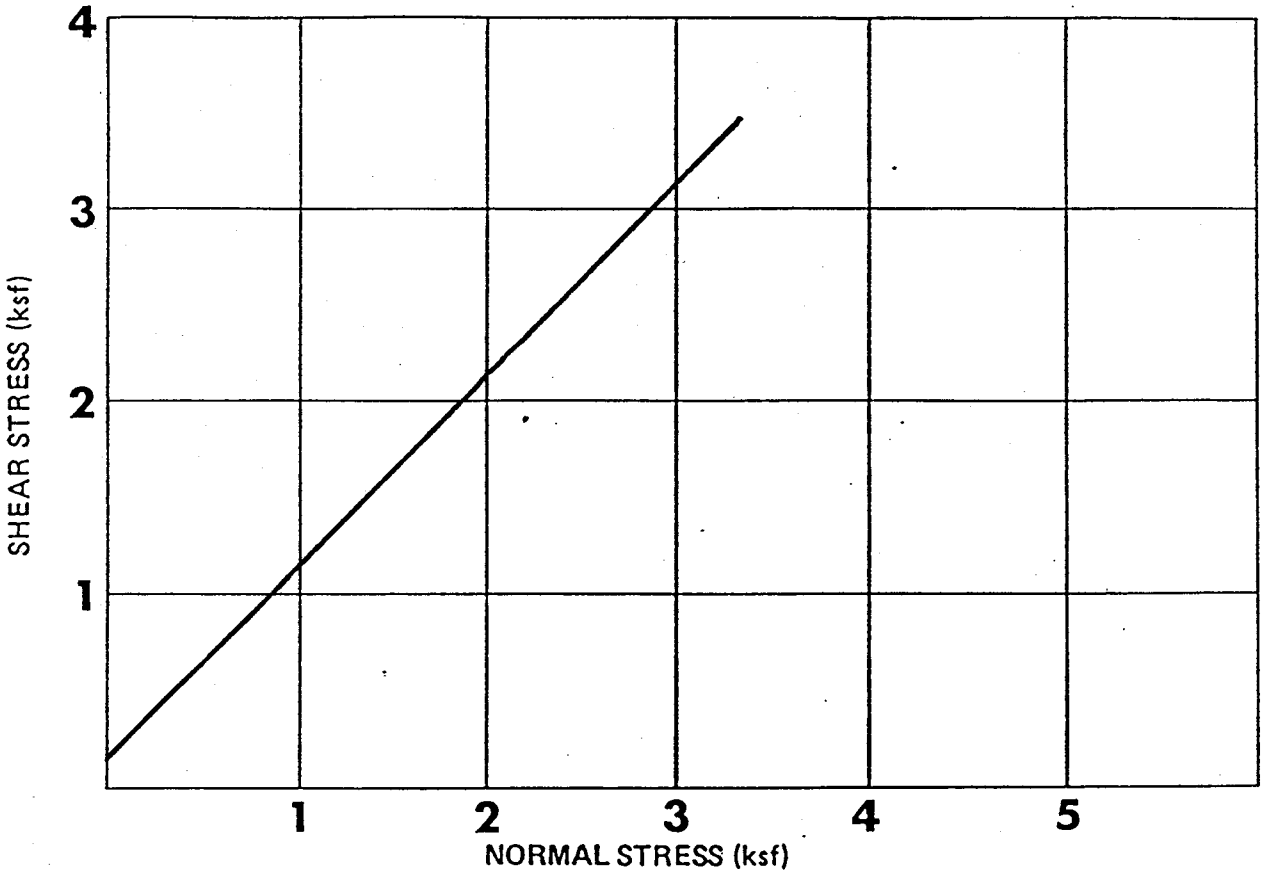


Boring or Test Pit No.	Depth (ft.)	USCS	Soil Description	Cohesive Strength (ksf)	Internal Friction Angle	Moisture Content (%)	Dry Density (pcf)
31	5-6.5	SM	Silty sand with some gravel	0.25	44	4.5	99.8

DIRECT SHEAR TEST DATA

Hohokam - Sky Harbor Interchange
Segment 2B

JOB NO. 187161

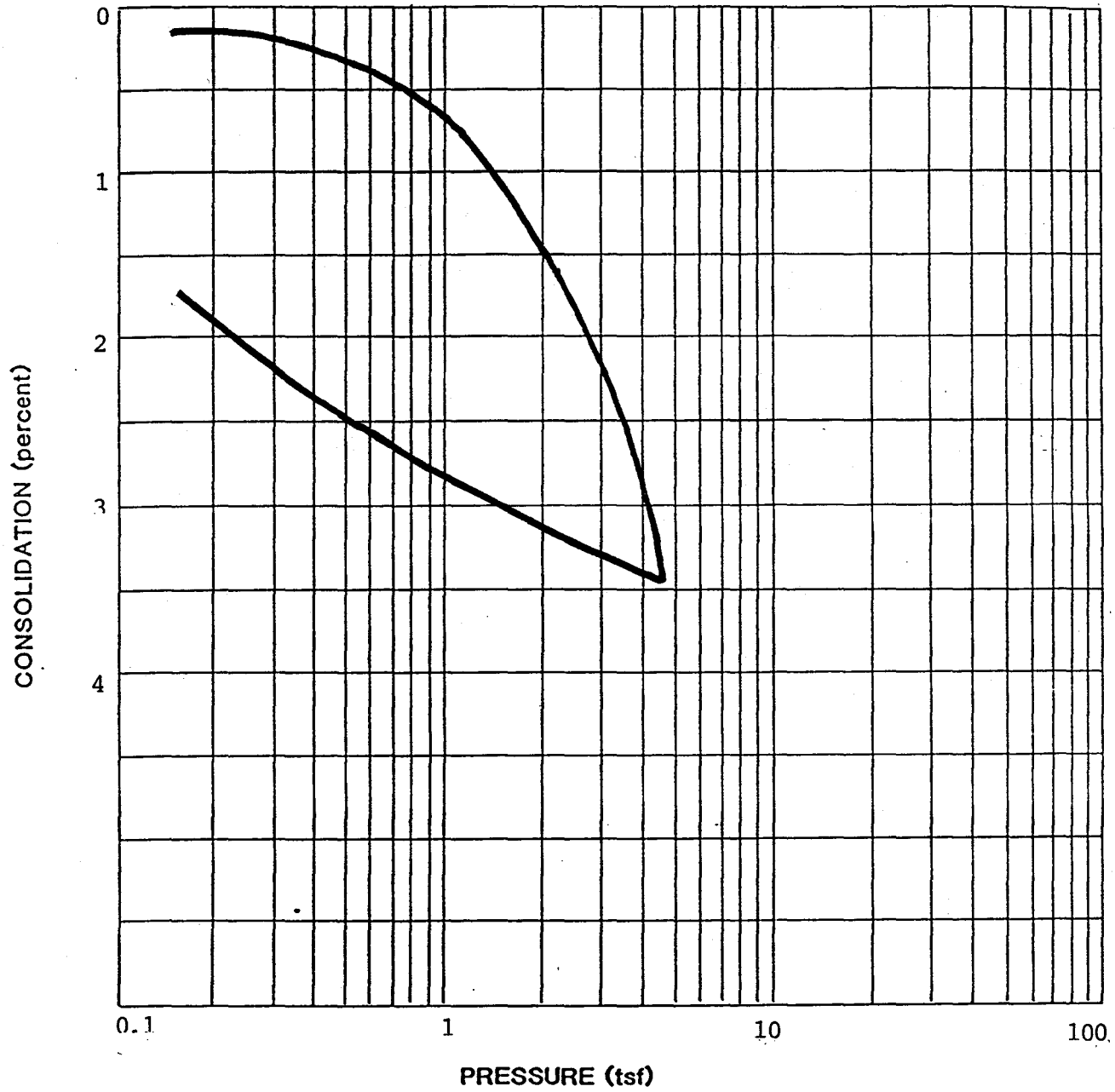


Boring or Test Pit No.	Depth (ft.)	USCS	Soil Description	Cohesive Strength (ksf)	Internal Friction Angle	Moisture Content (%)	Dry Density (pcf)
36	5-6.5	SM	Silty sand with some gravel	0.76	40	17.5	96.7

DIRECT SHEAR TEST DATA

Hohokam - Sky Harbor Interchange
Segment 2B

JOB NO. 187161



Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)		Dry Density (pcf)
							Before	After	
	35	5-6.5	SM	Silty sand		NP	7.7	--	104.3

Hohokam - Sky Harbor Interchange
Segment 2B

CONSOLIDATION TEST DATA

Proj. No. 187161 | Date 6-5-89 | B-11