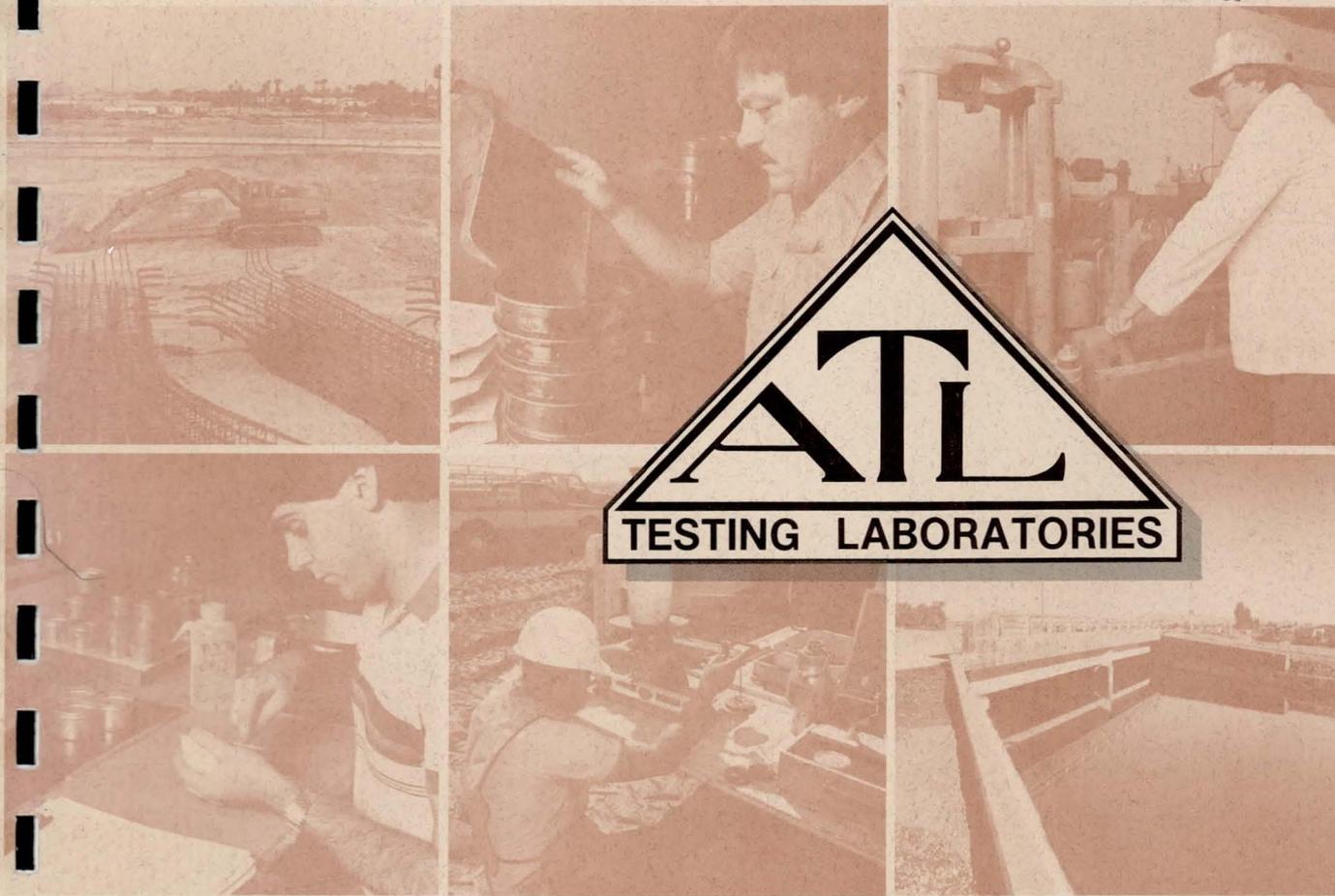


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DIBBLE & ASSOC.



BELL ROAD IMPROVEMENT PROJECT  
91ST AVENUE TO GREENWAY CHANNEL  
PEORIA, ARIZONA



7

A371-916

ATL JOB NO.: 189029

June 7, 1989

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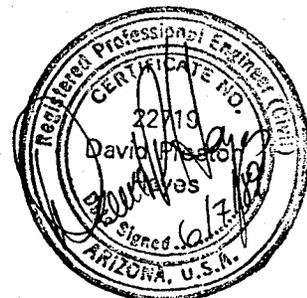
REPORT OF  
GEOTECHNICAL INVESTIGATION

FOR

DIBBLE & ASSOCIATES

PROJECT

BELL ROAD IMPROVEMENT PROJECT  
91ST AVENUE TO GREENWAY CHANNEL  
PEORIA, ARIZONA





**ATL TESTING LABORATORIES**  
GEOTECHNICAL AND MATERIALS CONSULTANTS

June 7, 1989

Dibble & Associates  
2627 East Thomas Road  
Phoenix, Arizona 85018

Attention: Mr. Ronald L. Ewing, P.E./RLS

Subject: Bell Road Improvement Project  
91st Avenue to Greenway Channel  
ATL Job No.: 189029

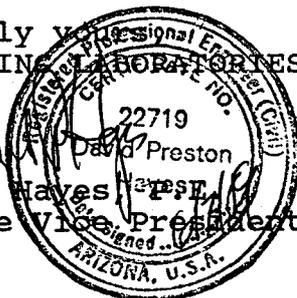
Gentlemen:

This report presents the results of the geotechnical investigation of the subject site. It includes the results of the field exploration, laboratory tests, and geotechnical engineering analysis. All work was done in accordance with ATL Proposal Number P88256. Plate No. 1 presents the guidelines for the use and interpretation of this report.

We have appreciated the opportunity to be of service to you on this project and look forward to a continued association on future projects. Should any questions arise, please do not hesitate to contact us at your earliest convenience.

Very truly yours,  
ATL TESTING LABORATORIES

  
David P. Hayes, P.E.  
Executive Vice President



DPH/bs



REPORT OF GEOTECHNICAL INVESTIGATION

FOR

DIBBLE & ASSOCIATES  
2627 EAST THOMAS ROAD  
PHOENIX, ARIZONA 85018

1.0 PROJECT DESCRIPTION

The 91st Avenue to Greenway Road drainage project is approximately 9000 feet in length and consists of a graded, open channel section paralleling 91st Avenue, from Bell Road to Greenway Road. From Greenway Road, the channel turns east (a new box culvert is proposed at the turn) and continues to New River. A new outlet structure is proposed at New River. In addition, it is intended that the existing channel will be widened.

2.0 SCOPE OF WORK

ATL was responsible for performing a geotechnical investigation of the proposed channel widening, box culvert and outlet structure at New River.

5

### 3.0 LOCATION AND SITE DESCRIPTION

At ten locations along the length of the channels, four-inch diameter test borings were drilled with a Mobile B-50 drill rig using a continuous flight auger. For the channel widening, seven borings were drilled to a maximum depth of twelve (12) feet. For the box culvert, two borings were drilled to a maximum depth of 25 feet, and for the outlet structure, one boring was drilled to a depth of twelve feet.

Selected sampling of the subsurface was achieved using a standard split-spoon sampler driven with a 140-pound hammer falling thirty (30) inches, in accordance with ASTM Standard D-1586. In addition, a 2.42 inch I.D. split-spoon ring-lined sampler was driven at selected locations in order to obtain undisturbed samples for strength tests.

### 4.0 FIELD INVESTIGATION

The site is located south of Bell Road, at the intersection of 91st Avenue and Bell Road. The existing channel location is along the west and south borders of cultivated fields. The Greenway Channel empties into New River at its east end.

The existing channels are in cultivated fields. Outside the boundaries of the cultivated fields are developed areas consisting of residences and apartments. The channel is bordered by tall grass, brush, and weeds.

#### 5.0 LABORATORY TESTING

Representative (bag) and brass ring soil samples were returned to the ATL laboratory for further examination and testing. Visual classifications were supplemented by index tests such as sieve analyses and Atterberg Limits on representative samples. Moisture, swell, direct shear, and consolidation tests were also performed on selected samples. Results of all laboratory test samples are presented in Appendix No. 2, Tabulation of Test Results.

#### 6.0 SUMMARY OF SUBSURFACE CONDITIONS

Subsurface soils encountered in the borings along Greenway Road Channel consisted mostly of non-uniform layers of silty clays and clayey sands. Also encountered were silty sands and poorly graded sand and gravel layers. Soils were moist, but a gravel and cobble layer encountered at a depth of nine feet in Boring No. 1, near New River, was very moist. The silty sands were mostly very dense. Weak cementation was encountered in Boring No. 3 at a depth of three to five feet.

Along 91st Avenue Channel, the borings encountered mostly clayey sands and silty sands. Silty clays were encountered in Boring Nos. 6 and 9. Soils were typically weakly cemented below a depth of three to five feet.

For details of the subsurface soil conditions, refer to Appendix No. 1, Logs of Boring.

#### 7.0 DISCUSSIONS AND RECOMMENDATIONS

From a cross-section provided by Dibble and Associates, the box culvert will be founded at elevation 1,185 feet. This elevation places the founding depth on very dense gravel with clay and sand. This material will provide an acceptable founding layer providing the bearing pressure is not over 1500 psf. Settlements of less than 1/2 inch are anticipated.

The gunite lined trapezoidal channel with slopes of 2:1 (H:V:) will be constructed at the location of an existing channel. This slope configuration will be acceptable during construction. The on-site soil in the vicinity of the open channel will be suitable as backfill providing it is cleared of cobbles and boulders larger than 3" in diameter, and all vegetation and organic matter.

The outlet structure may be founded on sand, gravel, and cobbles at the intended elevation of 1,167 feet. An allowable bearing capacity of 2000 psf shall be used. Settlements of less than 1/2 inch are anticipated.

Laboratory results for soil resistivity testing, chloride contents, and sulfate contents indicate that subsurface soil conditions do not have excessive corrosion potential.

#### 8.0 CONSTRUCTION GUIDELINES

All fill, scarified soil, and backfill for this project shall be compacted in six (6) inch lifts and compacted to a minimum of 95% of its ASTM D-698 maximum dry density. Compacted soils and fills should have a moisture content at the time of compaction between optimum  $\pm$  2 percent.

The founding soil for the box culvert should be scarified to a depth of one foot and compacted to a minimum of 95% of its maximum dry density.

The soil underneath the gunite lined trapezoidal channel and the access road shall be compacted to a minimum of 95% of maximum dry density as determined by ASTM D-698. If fill is required during construction, it should be placed in lifts of not over 6" in thickness and compacted. Where

fill is not required, the top one foot of soil should be scarified and compacted.

The founding soil for the outlet structure is to be undisturbed sand, gravel, and cobbles. The soil should be scarified to a depth of one foot and compacted to a minimum of 95% of maximum dry density as determined by ASTM D-698.

#### 9.0 ADDITIONAL SERVICES

It is recommended that ATL provide a general review of the final design and specifications to verify that the excavation and construction recommendations have been properly interpreted and implemented in the design and specifications.

It is also recommended that ATL be retained to provide geotechnical services during construction. This is to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event subsurface conditions differ from those anticipated prior to the start of construction, or a rainstorm or other hazard-increasing event occur. Paragraph (d) of Subpart P, Section 1926.651 of OSHA Bulletin 2207 is quoted: "(d) Excavations shall be inspected by a competent person after every rainstorm or other hazardous-increasing occurrence, and the protection against slides and cave-ins shall be increased if necessary".

## Guidelines in the Use and Interpretation of This Geotechnical Report

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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.

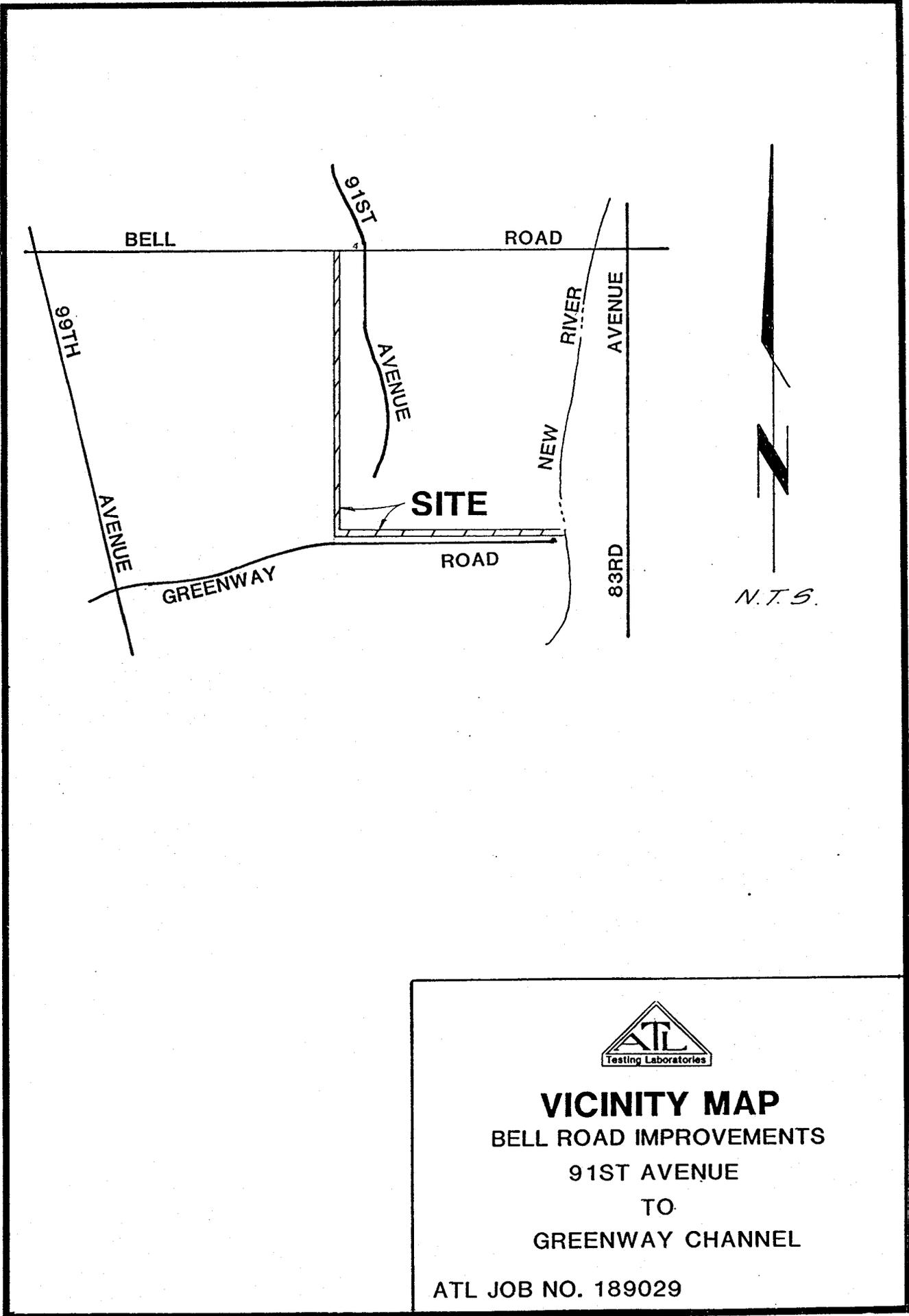
The Summary Boring Logs are our opinion of the subsurface conditions revealed by periodic sampling of the ground as the borings progressed. The soil descriptions and interfaces between strata are interpretive and actual changes may be gradual.

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.

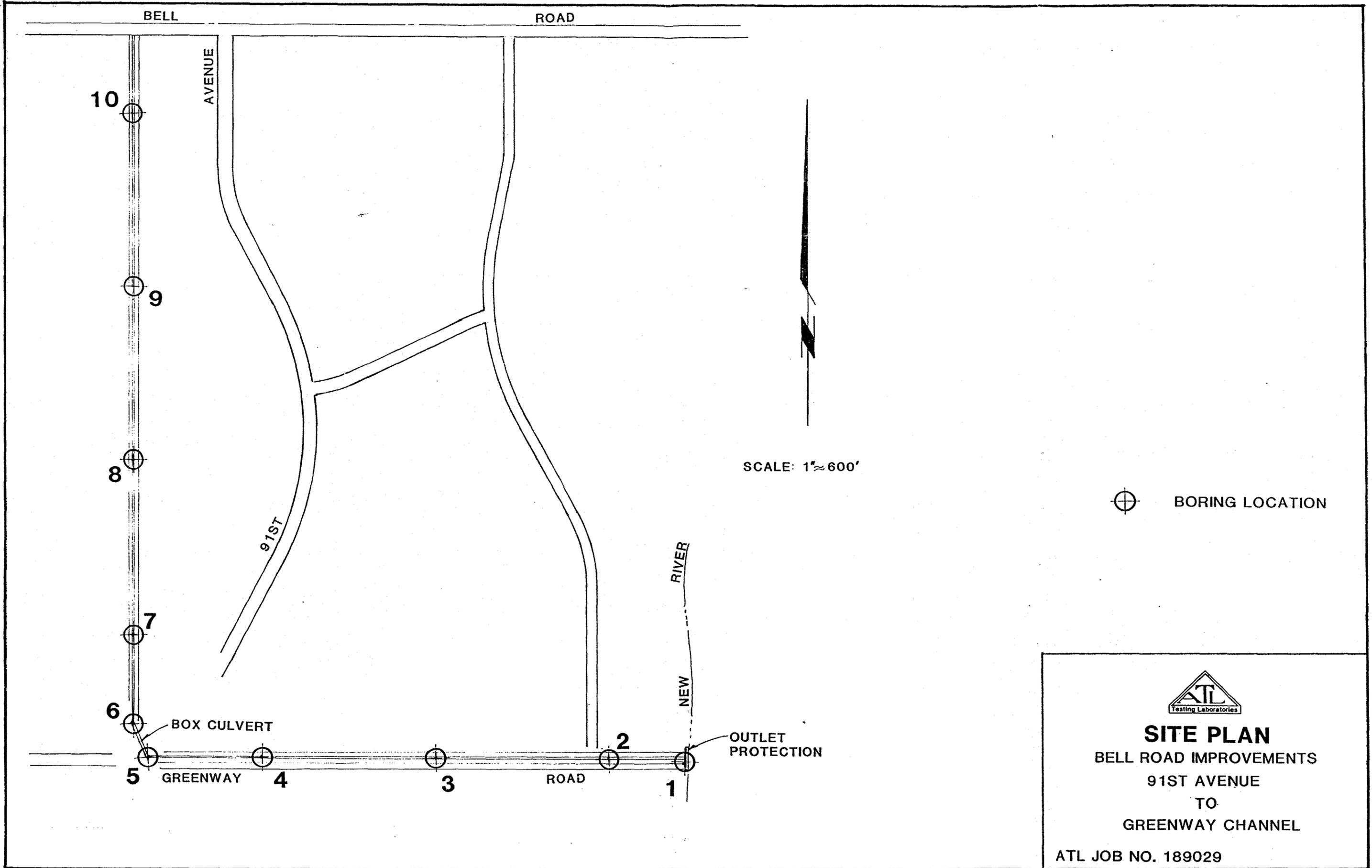
Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples, borings or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. It is recommended 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.



**VICINITY MAP**  
**BELL ROAD IMPROVEMENTS**  
**91ST AVENUE**  
**TO**  
**GREENWAY CHANNEL**

**ATL JOB NO. 189029**



  
**SITE PLAN**  
 BELL ROAD IMPROVEMENTS  
 91ST AVENUE  
 TO  
 GREENWAY CHANNEL  
 ATL JOB NO. 189029

A P P E N D I X   N O .   1  
L O G S   O F   B O R I N G S



# 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	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, MOSTLY ONE SIZE OR MISSING SIZES			
				GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, WIDE RANGE OF SIZES			
		GRAVELS WITH SOME FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES			
				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	WELL GRADED SANDS, GRAVELLY SANDS, WIDE RANGE OF SIZES		
					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	SILTY SANDS, SAND-SILT MIXTURES		
					SC	CLAYEY SANDS, SAND-CLAY MIXTURES		
			FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, CLAYEY SILTS WITH SLIGHT PLASTICITY
							CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
MORE THAN 50% MATERIAL SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY			
				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SOILS, ELASTIC SILTS			
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS			
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS			
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS, TOP SOIL WITH HIGH ORGANIC CONTENTS			
ROCK					GRANITE			
					ANDESITE			
					SANDSTONE			
					LIMESTONE			
FILLS					UNENGINEERED FILL WITH HIGHLY VARIABLE CONSTITUENTS			



	ML-CL ml-cl	LOW PLASTICITY SILT AND CLAY MIXTURES
	SM-SC sm-sc	SILTY CLAYEY SAND
	SW-SA 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:**

- 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.
- 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 (eg. SANDY, SILTY)	15 - 35%
"AND"	35 - 50%



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 1  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 5-1-89  
 ELEVATION OF BORING: 1170.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	0	BROWN SAND AND GRAVEL. (sp-sw). MOIST. SUB-ANGULAR TO ROUNDED				12.4	
	3	LAYER OF COBBLES 3 FT - 4 FT					
	5	GRAY CLAYEY SAND WITH SOME GRAVEL. (SC). MOIST. ROUNDED. VERY DENSE		50			
	10	GRAY COURSE GRAVEL AND COBBLES. (gp). VERY MOIST. VERY DENSE					
	15						
	20						
	25						
BORING STOPPED AT 10.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 169029

BORING NUMBER: 2  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50.  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-17-89  
 ELEVATION OF BORING: 1178.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
[Hatched Pattern]	0	LIGHT BROWN SILTY CLAY WITH SOME SAND AND GRAVEL. (CL). SLIGHTLY MOIST				6.7	
[Dotted Pattern]	5	LIGHT BROWN SAND AND GRAVEL. (sp-sw). MOIST. VERY DENSE		60			
	10						
	15						
	20						
	25						
BORING STOPPED AT 10.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 3  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-17-89  
 ELEVATION OF BORING: 1176.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (Feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		LIGHT BROWN SILTY FINE SAND. (sm)					
		TAN CLAYEY SAND WITH SOME GRAVEL. (CL) SLIGHTLY MOIST. WEAK CEMENTATION				5.8	
	5	TAN SANDY GRAVEL AND CLAY. (sp-gp). SLIGHTLY MOIST. VERY DENSE (CONTAINS SMALL COBBLES)			103 6		
	10						
	15						
	20						
	25						
BORING STOPPED AT 11.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 4  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-14-89  
 ELEVATION OF BORING: 1176.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
LOG	0	LIGHT BROWN CLAYEY SAND. (sc). SLIGHTLY MOIST					
	5	TAN CLAYEY SAND WITH SOME GRAVEL. (SC). DRY TO SLIGHTLY MOIST					
	5	ENCOUNTERED FINE COBBLES FROM 5 TO 10 FT			28	2.6	
	10						
	15						
	20						
	25						
BORING STOPPED AT 10.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 5  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-17-89  
 ELEVATION OF BORING: 1175.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)	
[Hatched pattern]	5	LIGHT BROWN SILTY CLAY WITH SOME SAND. (CL). SLIGHTLY MOIST. MEDIUM DENSE	19		11	9.8		
	17							
	16							
	13							
	11							
	13							
	17							
	22							
	17							
	19							
[Dotted pattern]	10	LIGHT BROWN GRAVEL AND SMALL COBBLES WITH SOME CLAY AND SAND. (gp)	19					
	10							
	10							
[Dotted pattern]	15	LIGHT BROWN CLAYEY SAND WITH SOME GRAVEL. (sc)	19					
	15							
[Dotted pattern]	20	COBBLE AND GRAVEL LAYER AT 20-21 FT	19					
	20							
[Dotted pattern]	25	BORING STOPPED AT 25.0 FEET BELOW EXISTING GRADES	GROUNDWATER					
			DEPTH	HOUR	RATE			
			NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 6  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-14-89  
 ELEVATION OF BORING: 1176.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (pcf)
	0	BROWN SILTY CLAY WITH SOME SAND AND GRAVEL. (cl). SLIGHTLY MOIST.	22	56		7.9	
	18						
	19						
	30						
	31						
	5	TAN SILTY CLAY AND GRAVEL WITH SOME COBBLES. (cl). SLIGHTLY MOIST. HARD	100				
	6		6				
	10		64				
	15						
	20						
	15	BROWN SILTY SAND WITH SOME GRAVEL. (sm). SLIGHTLY MOIST. WEAK CEMENTATION					
	20						
	25						
BORING STOPPED AT 21.5 FEET BELOW EXISTING GRADES		GROUNDWATER					
	DEPTH	HOUR	RATE				
	NONE						

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 7  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-14-89  
 ELEVATION OF BORING: 1179.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		TAN CLAYEY SAND WITH SOME GRAVEL. (SC). SLIGHTLY MOIST. VERY HARD					
	5	WEAK CEMENTATION FROM 1-10 FT COBBLES ENCOUNTERED FROM 5-10 FT			53	4.1	
	10						
	15						
	20						
	25						
BORING STOPPED AT 10.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 8  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-14-89  
 ELEVATION OF BORING: 1185.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
		BROWN CLAYEY SAND WITH SOME GRAVEL. (SC). DRY TO SLIGHTLY MOIST				5.5	
	5	TAN SILTY SAND AND GRAVEL. (sm). SLIGHTLY MOIST. WEAK CEMENTATION. VERY DENSE			67		
	10						
	15						
	20						
	25						
BORING STOPPED AT 12.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 9  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-14-89  
 ELEVATION OF BORING: 1187.0

DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (pcf)
	5	BROWN SILTY CLAY WITH SOME SAND AND GRAVEL. (CL). SLIGHTLY MOIST. VERY FIRM			32		
	5	WEAK CEMENTATION AT APPROX. 5-10 FT				8.2	
	10	LT BROWN SILTY SAND AND GRAVEL. (sm) SLIGHTLY MOIST. WEAK CEMENTATION					
	15						
	20						
	25						
BORING STOPPED AT 12.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
	DEPTH	HOUR	RATE				
	NONE						

THE ABOVE DATA FOR DESIGN PURPOSES ONLY



91st AVENUE TO GREENWAY ROAD CHANNEL

ATL JOB NUMBER: 189029

BORING NUMBER: 10  
 LOCATION OF BORING: SEE SITE PLAN

DRILLING EQUIPMENT: MOBILE B-50  
 DRILL RIG WITH 4 INCH OUTSIDE  
 DIAMETER HOLLOW STEM AUGER

DATE OF BORING: 4-14-89  
 ELEVATION OF BORING: 1196.0

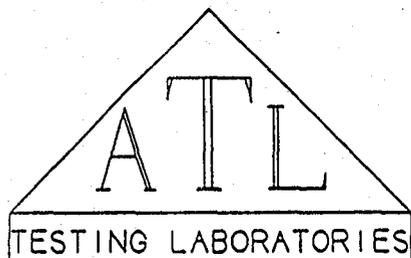
DRILLER: TOM KULIK  
 FIELD ENGINEER: STEVE ANASTOS  
 REVIEWED BY: ERIC STANFORD

GRAPHICAL LOG	DEPTH (feet)	SOIL DESCRIPTION	BULLNOSE	SPT NO.	RING NO.	WATER CONTENT %	DRY DENSITY (PCF)
	0 - 4.9	BROWN CLAYEY SAND WITH SOME GRAVEL. (SC). DRY TO SLIGHTLY MOIST				4.9	
	4.9 - 13.0	LT TAN CLAYEY SAND WITH SOME GRAVEL. (SC). DRY TO SLIGHTLY MOIST. WEAK CEMENTATION. VERY DENSE			92+		
	13.0 - 25						
BORING STOPPED AT 13.0 FEET BELOW EXISTING GRADES		GROUNDWATER					
		DEPTH	HOUR	RATE			
		NONE					

THE ABOVE DATA FOR DESIGN PURPOSES ONLY

A P P E N D I X   N O .   2

L A B O R A T O R Y   T E S T   R E S U L T S



PROJECT: 91st Avenue to Greenway Channel DATE: 5-1-89

LOCATION: Peoria, Arizona

MATERIAL: Subsurface Soil DATE OF SAMPLE: 4-21-89

REQUESTED BY: ATL/E. Stanford ATL Job No.: 189026

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
1	4-9	12.4	SC	50	35	36	40	45	49	55	66	72	74	82	86	93	97	100		
2	0-3	6.7	CL	32	15	53	62	70	75	80	87	91	92	95	97	99	100			
3	3-5	5.8	SC	33	16	48	56	63	67	71	78	83	85	92	95	99	99	100		
4	5-10	2.6	SC	28	11	19	22	27	31	36	52	66	69	81	85	92	96	100		
5	5-10	9.8	CL	34	17	62	68	74	78	83	92	97	97	99	99	100				
6	0-5	7.9	CL	37	19	60	67	73	77	82	90	94	95	97	97	98	99	100		
7	5-10	4.1	SC	31	14	26	30	33	35	38	44	50	53	64	72	80	87	95	98	100
8	0-3	5.5	SC	33	16	46	54	62	66	71	79	83	85	89	91	95	97	99	100	
9	5-8	8.2	CL	42	25	59	67	74	77	81	86	89	90	94	96	98	99	100		
10	3-10	4.9	SC	33	12	46	52	57	60	63	71	79	81	91	94	97	99	100		

ATL TESTING  
LABORATORIES

PLATE

PROJECT: 91st Avenue to Greenway Channel  
LOCATION: Peoria, Arizona  
ATL JOB NO.: 189029  
DATE: June 7, 1989

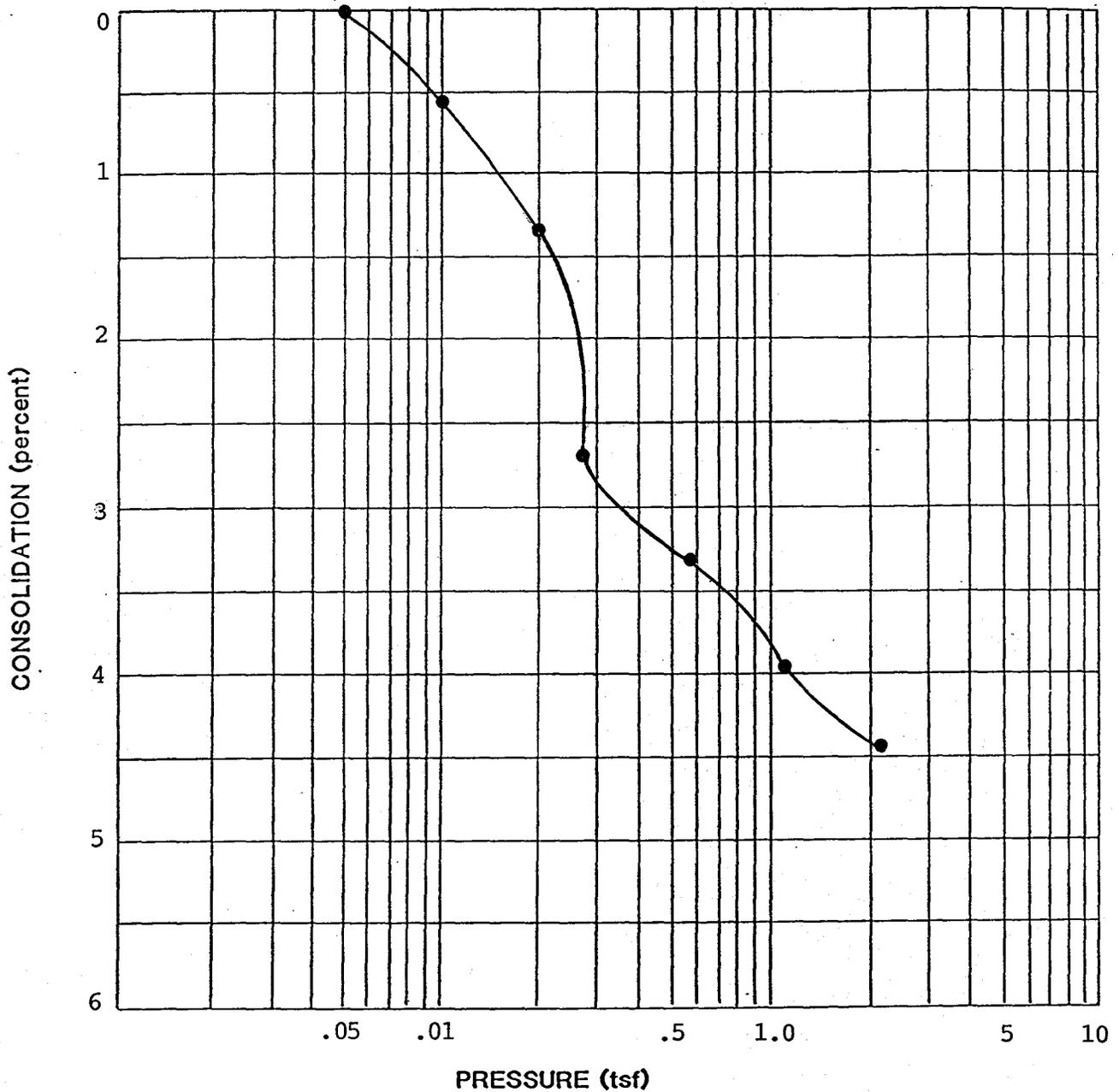
RESISTIVITY TEST RESULTS

<u>LOCATION</u>	<u>DEPTH (FT.)</u>	<u>SOIL RESISTIVITY (OHMS/CM)</u>
Boring 2	3-10	3562
Boring 7	5-10	2957

PROJECT: 91st Avenue to Greenway Channel  
LOCATION: Peoria, Arizona  
ATL JOB NO.: 189029  
DATE: June 7, 1989

CHLORIDES AND SULFATES CONTENTS

<u>LOCATION</u>	<u>DEPTH (FT.)</u>	<u>CHLORIDES (PPM)</u>	<u>SULFATES (PPM)</u>
Boring 2	3-10	25	50
Boring 7	5-10	70	70

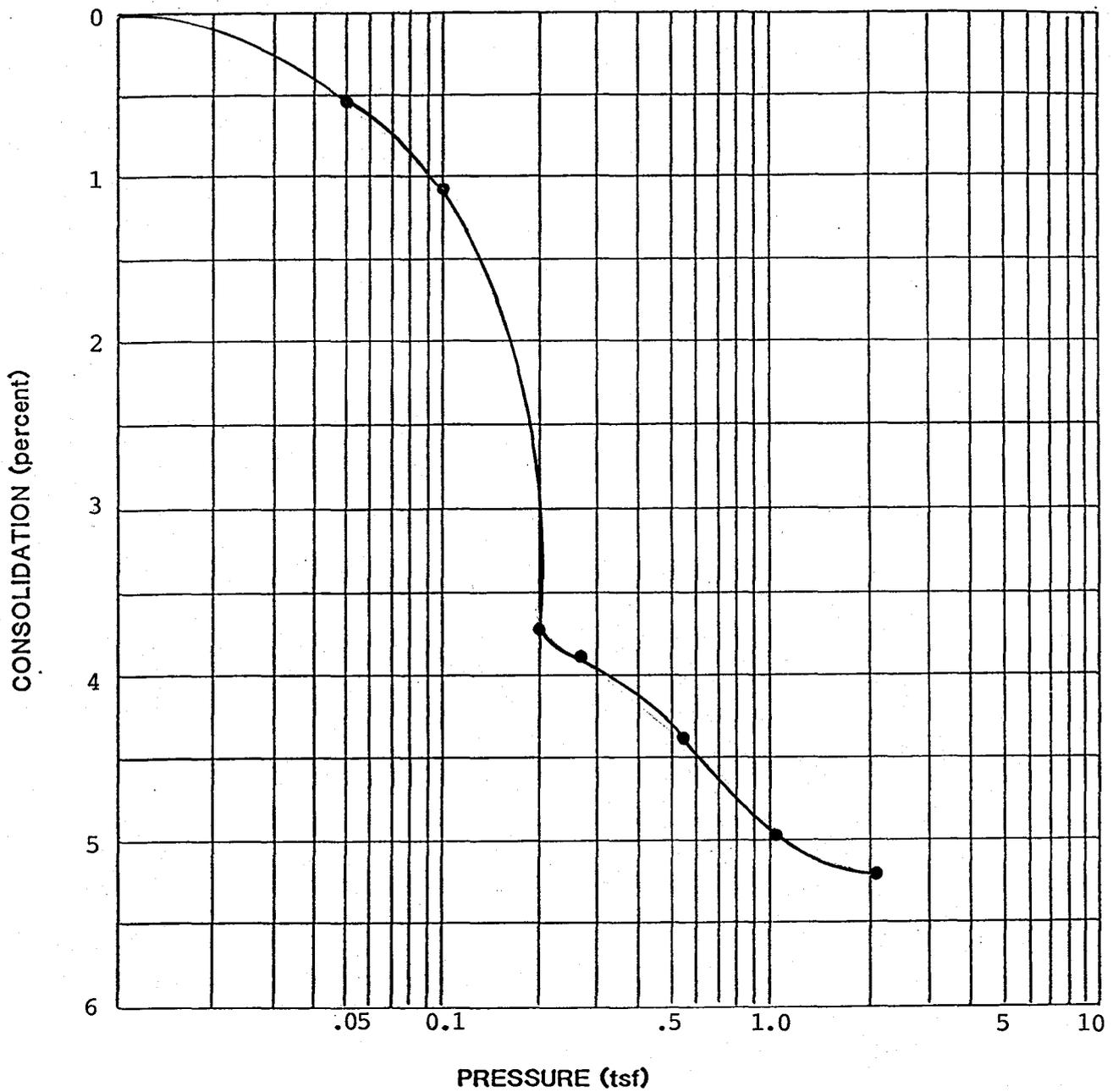


Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)		Dry Density (pcf)
							Before	After	
	20	2 to 3	CL	Light brown silty clay with some sand and gravel	32	15	6.7	--	--

91st Avenue to Greenway Channel  
Peoria, Arizona

CONSOLIDATION TEST DATA

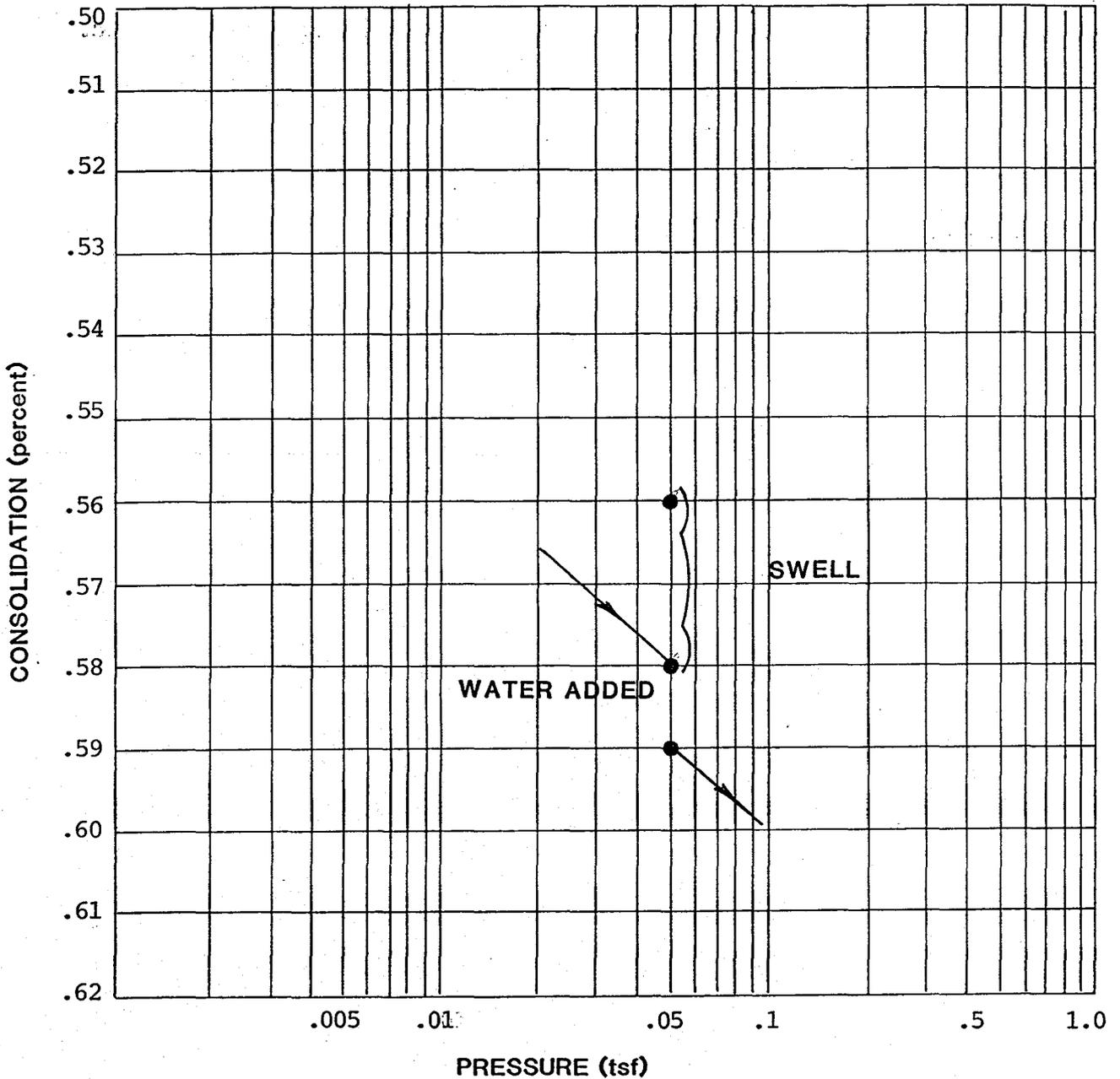
Proj. No. 189029    Date 5-15-89    Plate



Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)		Dry Density (pcf)
							Before	After	
	4	5 to 6 1/2	SC	Tan clayey sand with some gravel	28	11	2.6	-	-

91st Avenue to Greenway Channel  
Peoria, Arizona

**CONSOLIDATION TEST DATA**



Key	Boring No.	Depth (ft.)	USCS	Soil Description	Liquid Limit (%)	Plastic Limit (%)	Moisture Content (%)		Dry Density (pcf)
							Before	After	
	5	5 to	CL	Light brown silty clay with some sand			5.5	27.7	109.8

91st Avenue to Greenway Road Channel  
Peoria, Arizona

**SWELL TEST DATA**

Proj. No. 189029

Date 5-15-89

Plate