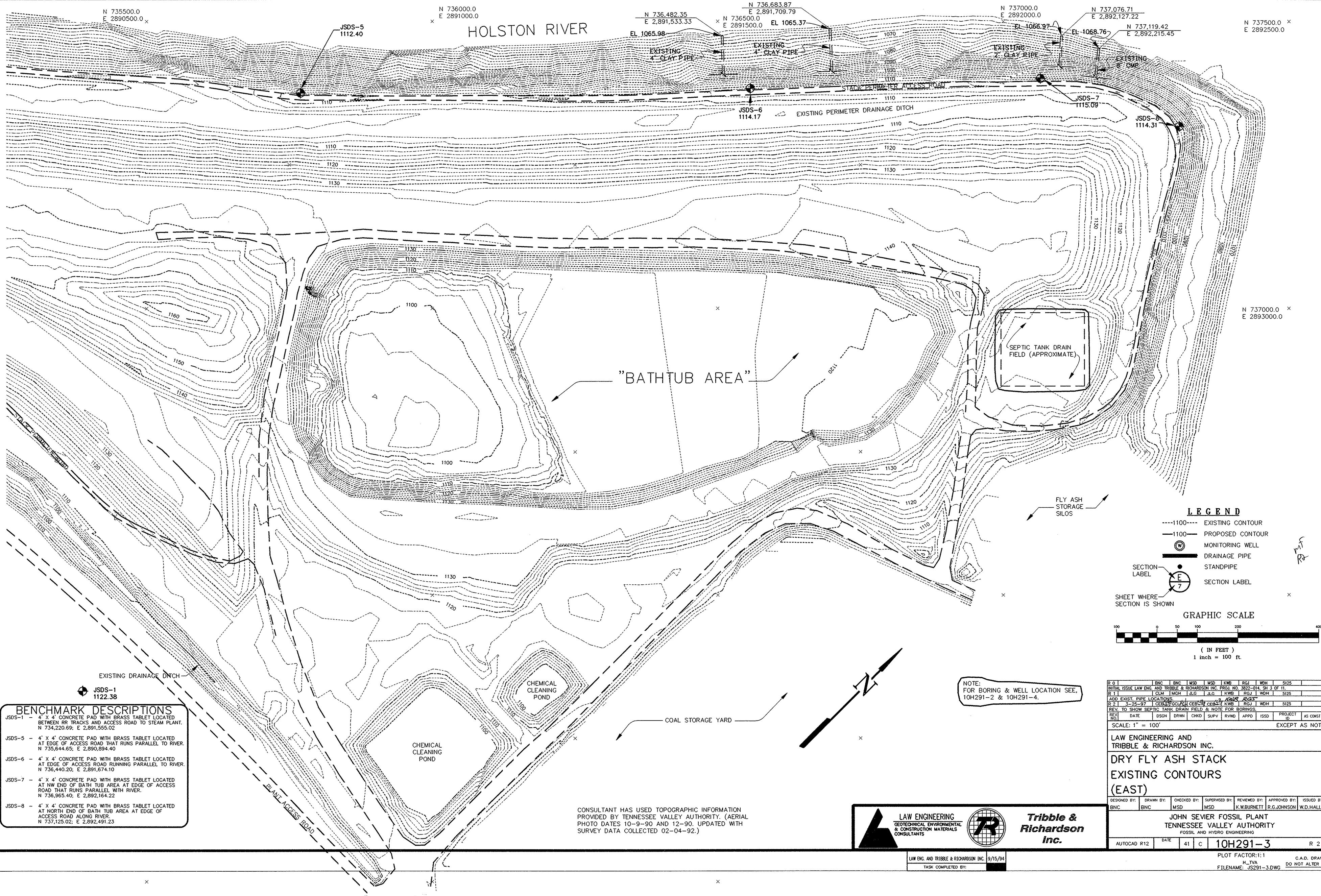


LEGEND

- ----1100---- EXISTING CONTOUR
- —1100— PROPOSED CONTOUR
- MONITORING WELL
- DRAINAGE PIPE
- STANDPIPE
- SECTION LABEL (SECTION LABEL; SHEET WHERE SECTION IS SHOWN)

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

NOTE:
FOR BORING & WELL LOCATION SEE, 10H291-2 & 10H291-4.

BENCHMARK DESCRIPTIONS

JSDS-1 – 4' X 4' CONCRETE PAD WITH BRASS TABLET LOCATED BETWEEN RR TRACKS AND ACCESS ROAD TO STEAM PLANT. N 734,220.69; E 2,891,555.02

JSDS-5 – 4' X 4' CONCRETE PAD WITH BRASS TABLET LOCATED AT EDGE OF ACCESS ROAD THAT RUNS PARALLEL TO RIVER. N 735,644.65; E 2,890,894.40

JSDS-6 – 4' X 4' CONCRETE PAD WITH BRASS TABLET LOCATED AT EDGE OF ACCESS ROAD RUNNING PARALLEL TO RIVER. N 736,440.20; E 2,891,674.10

JSDS-7 – 4' X 4' CONCRETE PAD WITH BRASS TABLET LOCATED AT NW END OF BATH TUB AREA AT EDGE OF ACCESS ROAD THAT RUNS PARALLEL WITH RIVER. N 736,965.40; E 2,892,164.22

JSDS-8 – 4' X 4' CONCRETE PAD WITH BRASS TABLET LOCATED AT NORTH END OF BATH TUB AREA AT EDGE OF ACCESS ROAD ALONG RIVER. N 737,125.02; E 2,892,491.23

CONSULTANT HAS USED TOPOGRAPHIC INFORMATION PROVIDED BY TENNESSEE VALLEY AUTHORITY. (AERIAL PHOTO DATES 10-9-90 AND 12-90, UPDATED WITH SURVEY DATA COLLECTED 02-04-92.)

LAW ENGINEERING
GEOTECHNICAL ENVIRONMENTAL & CONSTRUCTION MATERIALS CONSULTANTS

Tribble & Richardson Inc.

LAW ENG. AND TRIBBLE & RICHARDSON INC. 9/15/94
TASK COMPLETED BY:

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0		BNC	BNC	MSD	MSD	KWB	RGJ	WDH	5125		D
INITIAL ISSUE LAW ENG. AND TRIBBLE & RICHARDSON INC. PROJ. NO. 3822-014, SH 3 OF 11.											
R 1		CLM	MGH	JLG	JLG	KWB	RGJ	WDH	5125		D
ADD EXIST. PIPE LOCATIONS.											
R 2	3-25-97	CEB	GCL	CEB	CEB	KWB	RGJ	WDH	5125		D
REV. TO SHOW SEPTIC TANK DRAIN FIELD & NOTE FOR BORINGS.											

SCALE: 1" = 100' EXCEPT AS NOTED

LAW ENGINEERING AND TRIBBLE & RICHARDSON INC.

DRY FLY ASH STACK EXISTING CONTOURS (EAST)

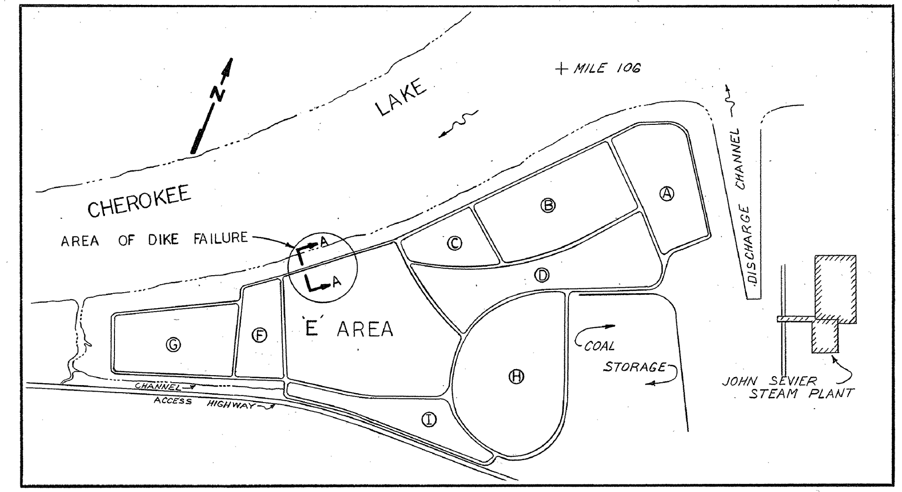
DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
BNC	BNC	MSD	MSD	K.W.BURNETT	R.G.JOHNSON	W.D.HALL

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R12 | DATE | 41 | C | 10H291-3 | R 2

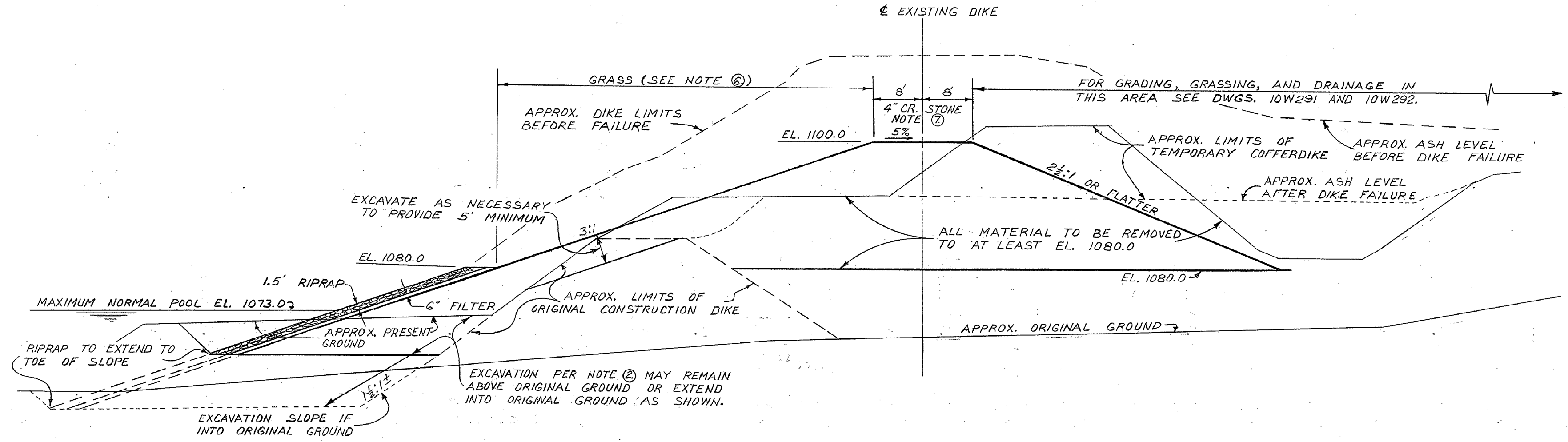
PLOT FACTOR:1:1
H_TVA
FILENAME: JS291-3.DWG

C.A.D. DRAWING
DO NOT ALTER MANUALLY



KEY PLAN

200 0 400 SCALE



SECTION A-A

SCALE 1"=10'

NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH T-1 SPECIFICATIONS, EXCEPT DIKE REPAIR SHALL BE WITH ROLLED EARTHFILL WITH FOUNDATION PREPARATION AND FILL PLACEMENT IN ACCORDANCE WITH NOTES 1 AND 2.
2. ALL WEAK FOUNDATION MATERIAL UNDER NEW FILL SHALL BE REMOVED TO A DEPTH THAT WILL SUPPORT HEAVY EARTHMOVING EQUIPMENT WITHOUT RUTTING OR HEAVING.
3. THE ROLLED EARTHFILL SHALL CONSIST OF SELECTED EARTH PLACED IN NOT MORE THAN 6" COMPACTED LAYERS, THOROUGHLY COMPACTED WITH SHEEPSFOOT ROLLERS, ROLLING EACH LAYER WITH COMPLETE COVERAGE FROM SLOPE TO SLOPE. THE ROLLING EQUIPMENT SHOULD BE AS HEAVY AS WILL COMPACT THE MATERIAL WITH LITTLE LATERAL SURFACE MOVEMENT. WHEN TYING INTO EXISTING DIKE SLOPES, THE EXISTING DIKE SLOPES SHALL BE SCARIFIED AND ROLLED WITH THE ADJACENT FILL TO PROVIDE GOOD BOND.
4. RIPRAP SHALL BE WELL GRADED AND CONSIST OF SOUND, DURABLE STONE PER SECTION 830. THE RIPRAP SHALL BE A MINIMUM OF 1.5' THICK WITH AT LEAST 50%, BY WEIGHT, BEING 100 LBS. OR MORE, AND WITH THE MAXIMUM WEIGHT OF 200 LBS., AND NOT MORE THAN 5% PASSING THE 1" SIEVE.
5. THE FILTER BLANKET SHALL BE 6" THICK AND IN ACCORDANCE WITH SECTION 836.
6. ALL CUT AND FILL SLOPES AND OTHER DISTURBED AREAS SHALL BE SEEDED WITH TYPE 7 MIXTURE. ALL GRASSED AREAS TO BE FERTILIZED AND MULCHED IN ACCORDANCE WITH SECTIONS 180 AND 182.
7. SURFACING FOR THE DIKE REPAIR SHALL CONSIST OF 4" OF CRUSHED STONE, PER SECTION 210, PLACED OVER THE ENTIRE WIDTH OF THE TOP OF THE DIKE.

W.O. P23-544-82-31401-J10

SCALE AS NOTED

MAIN PLANT

ASH DISPOSAL AREA 'E' DIKE REPAIR

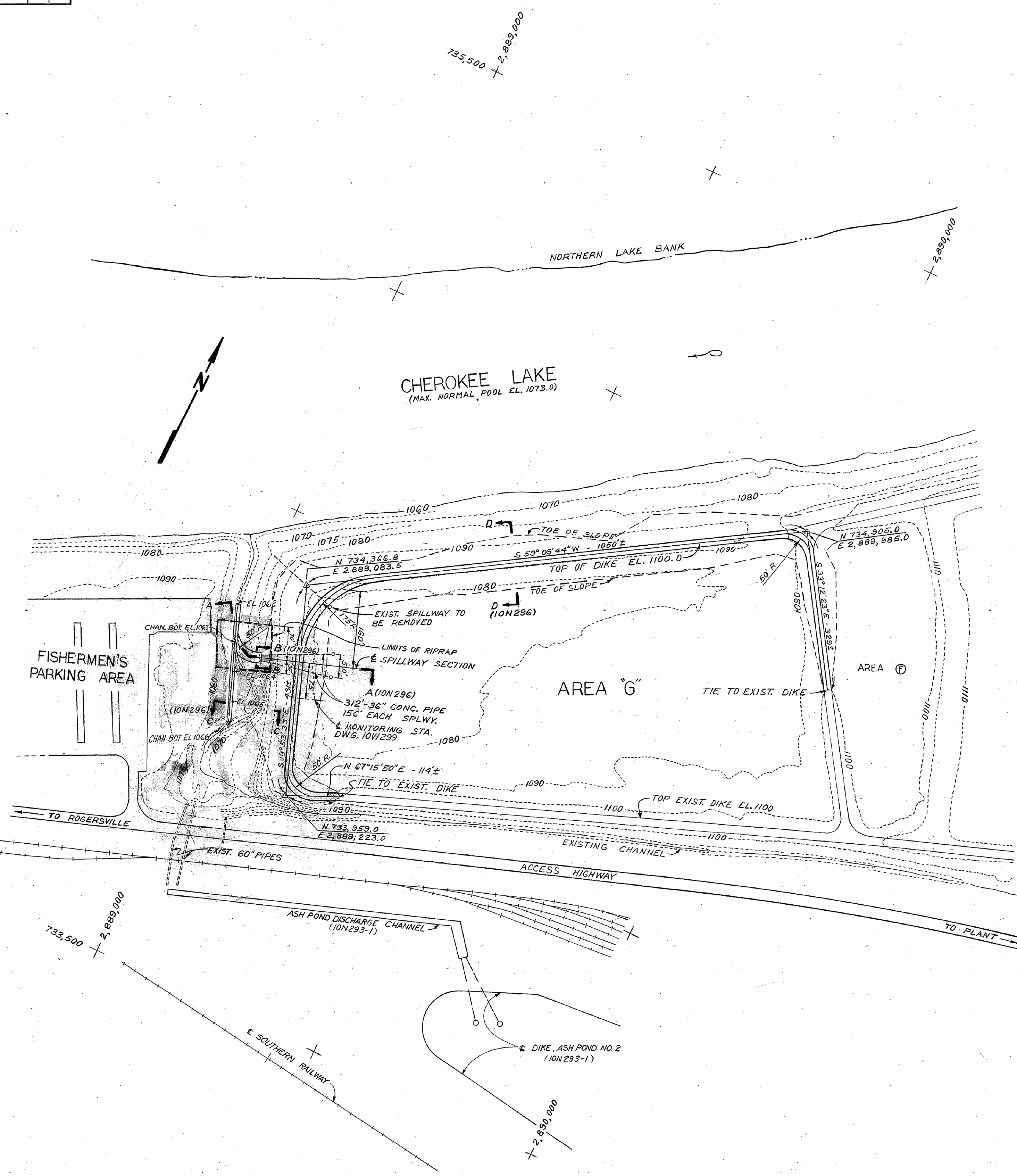
JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
F.D. Stansberry	R. G. Domer	Roy H. Dunham

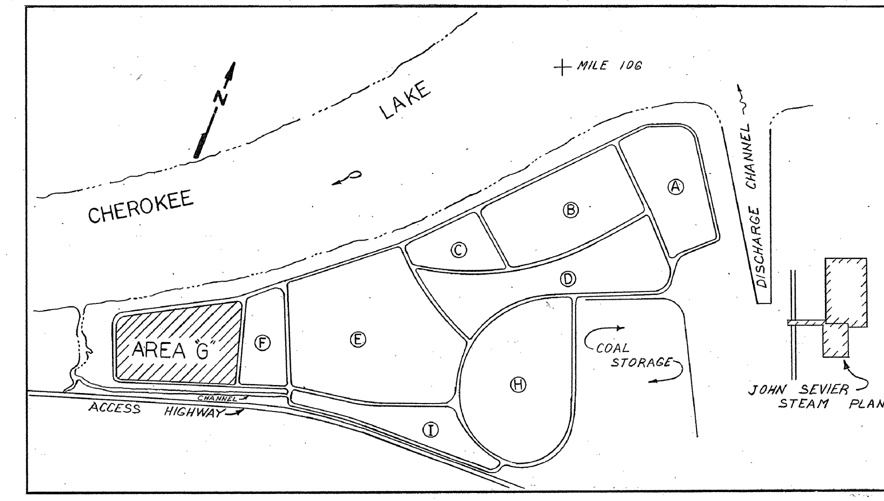
KNOXVILLE | 7-26-73 | 41 | C | 4 | 10N290 R0

RECORD DRAWING AS CONSTRUCTED 3/3/75 R0

JSF-10N290-SHT -REV 0 MAIN PLANT ASH DISPOSAL AREA E' DIKE REPAIR.cal (36% of Scale); jsf_reorg-dada-dwgs; JSF; 12/5/2009 11:52 AM



PLAN
SCALE 1" = 100'



KEY PLAN
200 0 400
SCALE

SUMMARY OF QUANTITIES		
ITEM NO.	DESCRIPTION	QUANTITY
101	CLEARING & GRUBBING	15.2 AC.
110	REMOVE EXIST. SPWLY.	L.S.
120	CHANNEL EXCAVATION	3490 C.Y.
123	EARTH BORROW	37,650 C.Y.
129	STRUCTURAL EXCAVATION	545 C.Y.
180	GRASSING	15,720 S.Y.
210	SURFACING (4" CR. STONE)	740 TONS
830	RIPRAP	690 C.Y.
836	FILTER	310 TONS
FOR BILL OF MATERIALS FOR SPLWY. SEE DWG. 10N297		

NOTES:
FOR NOTES SEE 10N296

COMPANION DWGS: 10N296, 297, 298

W.O.# P23-544-82-31401-J10

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
3		8-20-80	GRO	TAC	JLG	JLG	KWB	RJB	RJB	FDS	GLB
Revised to remove Ash Pond Discharge Channel & Relocated Polly Br. of R2; PA 3076											
2		4-25-78	ROP	LCWD	ROP	AEH	KWB		RJB		GLB
ADDED ASH POND DISCHARGE CHANNEL & RELOCATION POLLY BR.; PA 3076.											
1	-	2-7-75	DEC	DEC	PDH	PDH	PDH		RJB	JOS	GLB
REV. MONITORING STA. DWG. NO.											

DSGN D.E. CALLOWAY
DRWN D.E. CALLOWAY
CHKD J.B. CHAPMAN
SUPV J.M. HELMS
INSP OHR
ENGINEER Paul D. Herald

MAIN PLANT

FLY ASH DISPOSAL AREA "G" - PLAN

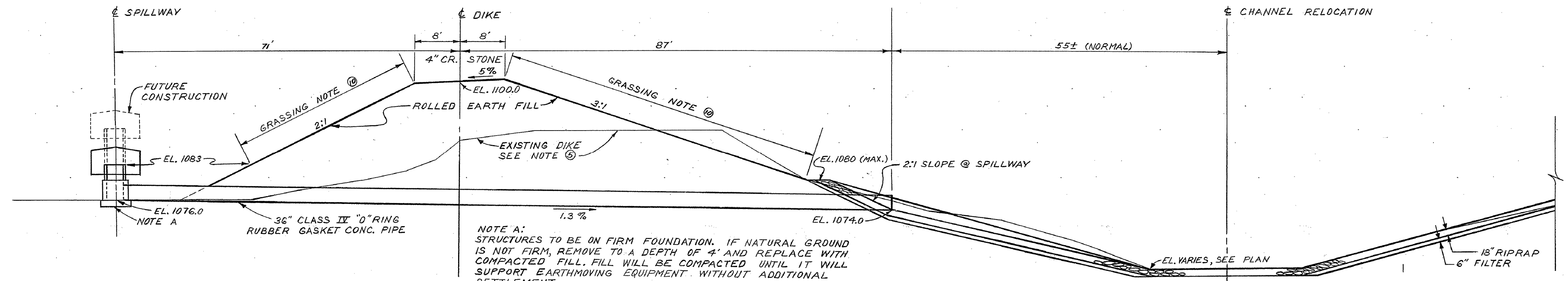
JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
R.J. Bowman	[illegible]	W.W. Engle

INSPECTED AND APPROVED FOR ISSUE
DESIGN PROJECT MANAGER

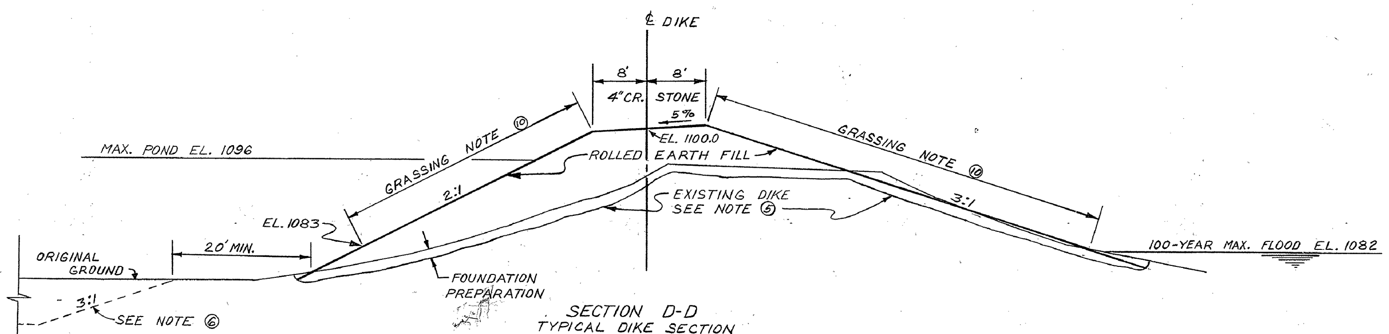
KNOXVILLE 2-1-74 41 C 10N295 R3

RECORD DRAWING AS CONSTRUCTED 3/3/75 R1

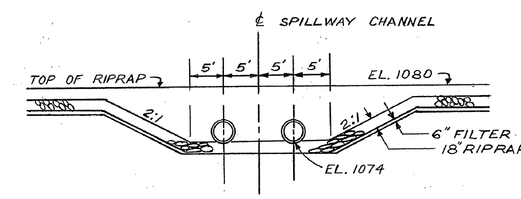


NOTE A:
STRUCTURES TO BE ON FIRM FOUNDATION. IF NATURAL GROUND IS NOT FIRM, REMOVE TO A DEPTH OF 4' AND REPLACE WITH COMPACTED FILL. FILL WILL BE COMPACTED UNTIL IT WILL SUPPORT EARTHMOVING EQUIPMENT WITHOUT ADDITIONAL SETTLEMENT.

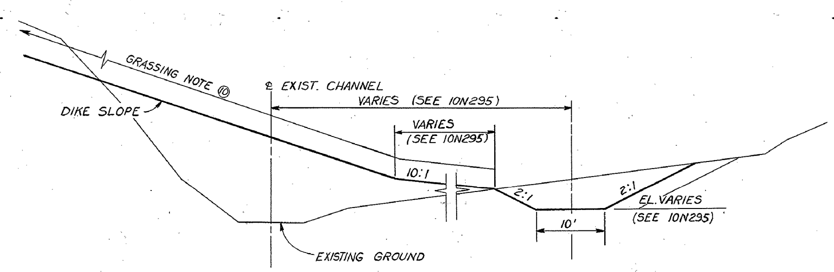
SECTION A-A
SPILLWAY SECTION



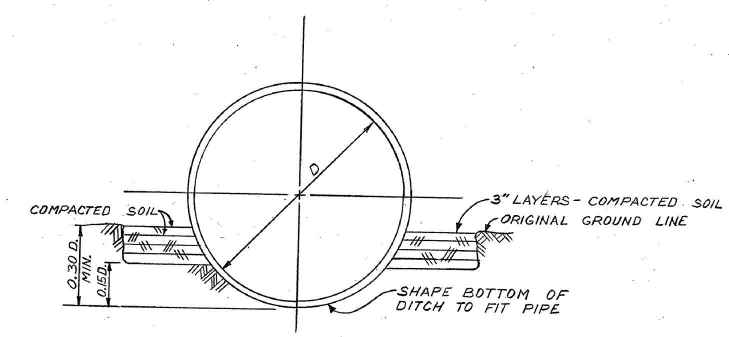
SECTION D-D
TYPICAL DIKE SECTION



SECTION B-B
SPILLWAY DISCHARGE



SECTION C-C
TYPICAL CHANNEL RELOCATION



DETAIL - CLASS "B" BEDDING
NTS

NOTES:

① SOILS EXPLORATION AND TEST RESULTS ARE IN A MEMORANDUM REPORT FROM GENE FARMER TO B.S. MONTGOMERY DATED OCT. 4, 1973. BASED ON TEST RESULTS IN THE REPORT WITH DIKE TOP EL. 1100.0, THE MINIMUM STABILITY ANALYSIS SAFETY FACTORS FOR THE MAXIMUM DIKE SECTION ON THE WEST LEG OF THE DIKE ARE AS FOLLOWS:

EXTERIOR SLOPE, END OF CONSTRUCTION, S.F. = 2.8
OPERATING CONDITION, S.F. = 2.3
INTERIOR SLOPE, END OF CONSTRUCTION, S.F. = 2.0

② THE DIKE SHALL NOT BE RAISED ABOVE EL. 1100.0 WITHOUT PRIOR APPROVAL FROM THE DIVISION OF ENGINEERING DESIGN.

③ DIKE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE PORTIONS OF GENERAL CONSTRUCTION SPECIFICATION NO. G-9 FOR ROLLED EARTHFILL FOR DAMS AND POWER PLANTS. FILL COMPACTION SHALL BE AT LEAST 95% OF MAXIMUM STANDARD DENSITY AND FILL MOISTURE CONTENT NOT MORE THAN 2% ABOVE OR BELOW OPTIMUM, AS DETERMINED BY THE CENTRAL SOILS LABORATORY.

④ ALL OTHER CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE PORTIONS OF HIGHWAY SPECIFICATIONS T-1.

⑤ THE EXISTING DIKE SHALL BE LEFT IN PLACE, REQUIRING ONLY REMOVAL OF OBJECTIONABLE SURFACE MATERIAL. THE PREPARED SURFACE SHALL BE SCARIFIED AND ROLLED BEFORE PLACING ROLLED EARTHFILL.

⑥ EARTHFILL FOR DIKE CONSTRUCTION SHALL CONSIST OF MATERIAL EXCAVATED FROM INSIDE FLY ASH DISPOSAL AREA "G". GRAVELLY, SANDY SOILS FROM THE NORTHERN PORTION OF THE DISPOSAL AREA ARE TO BE DISTRIBUTED AND BLENDED WITH THE FINER SOILS OF THE SOUTHERN PORTION. IF EXCAVATION IN THE NORTHERN HALF OF THE DISPOSAL AREA EXPOSES SAND, THE SAND SHALL BE BLANKETED WITH 2' OF IMPERVIOUS COMPACTED FILL. CUT SLOPES FOR BORROW MATERIAL ADJACENT TO THE DIKE SHALL SHALL NOT BE STEEPER THAN 3:1, AND TOP OF CUT SHALL BE A MINIMUM OF 20' FROM THE TOE OF ANY DIKE SLOPE. BASED ON THE SOILS REPORT, GROUND WATER WITHIN THE POND CAN BE EXPECTED TO BE ABOUT EL. 1080.

⑦ RIPRAP SHALL BE PLACED AT LOCATIONS SHOWN ON DRAWINGS. THE RIPRAP SHALL CONSIST OF 18" OF SOUND DURABLE STONE PER SECTION 830 WITH AT LEAST 50% BY WEIGHT BEING 200 LBS. OR MORE, AND WITH A MAXIMUM WEIGHT OF 400 LBS. WITH NOT MORE THAN 5% PASSING THE 1" SIEVE.

⑧ THE FILTER BLANKET UNDER THE RIPRAP SHALL BE 6" THICK AND IN ACCORDANCE WITH SECTION 836.

⑨ SURFACING ON TOP OF THE DIKE SHALL CONSIST OF CRUSHED STONE 4" THICK PLACED OVER THE FULL WIDTH OF THE DIKE IN ACCORDANCE WITH SECTION 210.

⑩ ALL CUT AND FILL SLOPES AND OTHER DISTURBED AREAS SHALL BE SEEDED WITH TYPE 6, MIXTURE E, FERTILIZED, AND MULCHED IN ACCORDANCE WITH SECTIONS 180 AND 182.

W.O.# P23-544-82-31401-J10

SCALE 1" = 10', EXCEPT AS NOTED
COMPANION DWG: 10N295, 297, 298

INSPECTED AND APPROVED FOR ISSUE
B.S. Montgomery
DESIGN PROJECT MANAGER

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
2		8-20-80	GRO	TAC	JLG	JLG	KWB	RJB	RJB	FDS	GLB
Revised to remove Section E-E; P.A. 3076											
1		4-25-78	RDP	LCMcD	RDP	AEH	KWB		RJB	FDS	GLB
ADDED SECTION E-E; P.A. 3076.											

DSGN D.E. CALLOWAY
DRWN D.E. CALLOWAY
CHKD J.R. CHAPMAN
SUPV J.M. HELMS
INSP
OHR.
ENGINEER Paul D. Herald

MAIN PLANT

FLY ASH DISPOSAL AREA "G" — SECTIONS & DETAILS

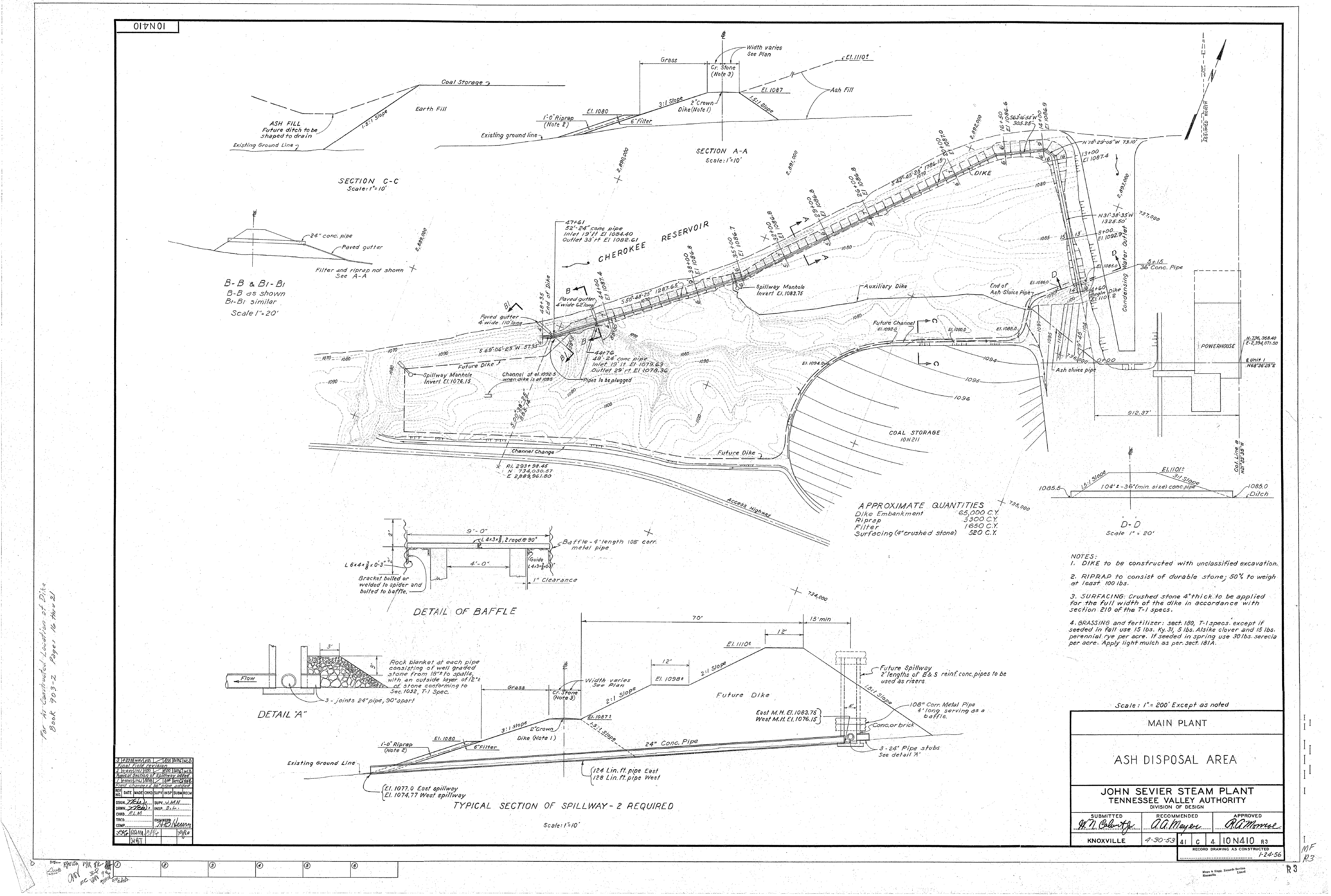
JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
R.J. Bowman	F.D. Stansbury	W.W. Engle

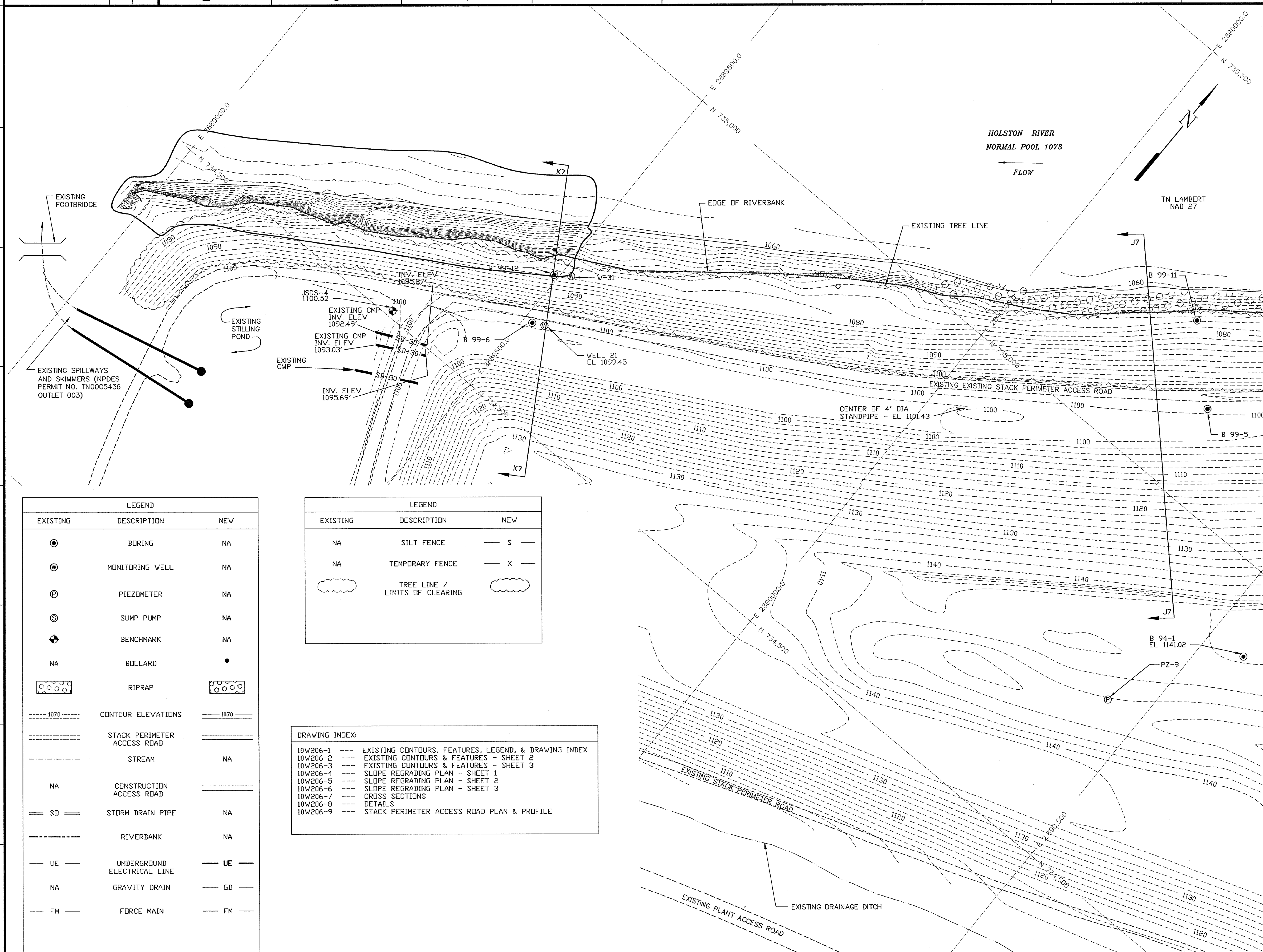
KNOXVILLE 2-1-74 | 41 | C | 10N296R2

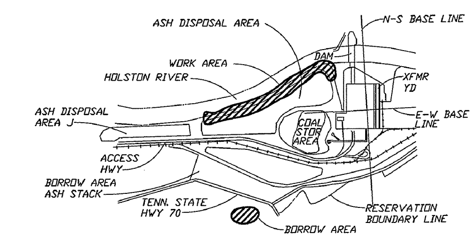
RECORD DRAWING AS CONSTRUCTED Gene Farmer 3/3/75 R0

①	②	③	④	⑤	⑥



JSF-10N410-SHT -REV 3 MN PLNT ASH DSPSL AREA.cal (36% of Scale); ash_pond-dwgs; JSF; 12/5/2009 11:53 AM





KEY PLAN
NTS

GENERAL NOTES
1. TOPOGRAPHIC CONTOUR INFORMATION AND EXISTING MONITORING WELLS, SOIL BORINGS, AND SUMP PUMP LOCATIONS WAS TAKEN FROM TVA DRAWING 10W204-9. ADDITIONAL SUPPLEMENTAL TOPOGRAPHIC INFORMATION WAS PROVIDED BY TVA WITH DATES OF SURVEY 10-4-99 AND 10-18-2000, & 12-2001.
2. SURVEY COORDINATES ARE REFERENCED TO TENNESSEE STATE PLANE COORDINATE SYSTEM, NAD 27. COORDINATES FOR UTILITY STRUCTURES AND PIPING ARE TO CENTERLINE OF STRUCTURE OR PIPE, UNLESS NOTED OTHERWISE.
3. COORDINATES AND ELEVATIONS OF EXISTING BENCHMARKS ARE AS FOLLOWS:

MONUMENT	NORTHING	EASTING	ELEVATION
JSDS-4	734509.20	2889354.05	1100.52
JSDS-5	735644.65	2890894.40	1112.40
JSDS-6	736440.20	2891674.10	1114.17
JSDS-7	736965.40	2892164.22	1115.09
JSDS-8	737125.02	2892491.23	1114.31

MONUMENTS ARE 4 FT BY 4 FT CONCRETE PAD WITH BRASS TABLET. BENCHMARK INFORMATION TAKEN FROM 10H291 SERIES DRAWINGS.

REFERENCE DRAWINGS:
17W445-SERIES ----- MECH ASH DISP STACK AREA - SUMP PUMP & PIPING - SEEPAGE CNTRL

COMPANION DRAWINGS:
10W206-2 THRU 9

LEGEND

EXISTING	DESCRIPTION	NEW
⊙	BORING	NA
Ⓦ	MONITORING WELL	NA
Ⓟ	PIEZOMETER	NA
Ⓢ	SUMP PUMP	NA
⊕	BENCHMARK	NA
NA	BOLLARD	•
(riprap symbol)	RIPRAP	(riprap symbol)
---1070---	CONTOUR ELEVATIONS	—1070—
========	STACK PERIMETER ACCESS ROAD	═══
—·—·—	STREAM	NA
NA	CONSTRUCTION ACCESS ROAD	═══
== SD ==	STORM DRAIN PIPE	NA
—·—·—·—	RIVERBANK	NA
— UE —	UNDERGROUND ELECTRICAL LINE	— UE —
NA	GRAVITY DRAIN	— GD —
— FM —	FORCE MAIN	— FM —

LEGEND

EXISTING	DESCRIPTION	NEW
NA	SILT FENCE	— S —
NA	TEMPORARY FENCE	— X —
(tree line symbol)	TREE LINE / LIMITS OF CLEARING	(tree line symbol)

DRAWING INDEX:

10W206-1 --- EXISTING CONTOURS, FEATURES, LEGEND, & DRAWING INDEX
10W206-2 --- EXISTING CONTOURS & FEATURES - SHEET 2
10W206-3 --- EXISTING CONTOURS & FEATURES - SHEET 3
10W206-4 --- SLOPE REGRADING PLAN - SHEET 1
10W206-5 --- SLOPE REGRADING PLAN - SHEET 2
10W206-6 --- SLOPE REGRADING PLAN - SHEET 3
10W206-7 --- CROSS SECTIONS
10W206-8 --- DETAILS
10W206-9 --- STACK PERIMETER ACCESS ROAD PLAN & PROFILE

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	AUG 2 6 2002	DRS	BSB	DRS	DRS	REP	JGA		JSF260		D
PCN JSF260: REVISED FOR FLY ASH POND STABILIZATION.											
R 0	3-7-01	DRS	BSB	DRS	DRS	REP	LAN		JSF260		D
PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION											

SCALE: 1" = 50' EXCEPT AS NOTED

YARD

ASH DISPOSAL-STACK AREA
EXISTING FEATURES AS OF FEBRUARY 2001
LEGEND & DRAWING INDEX

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

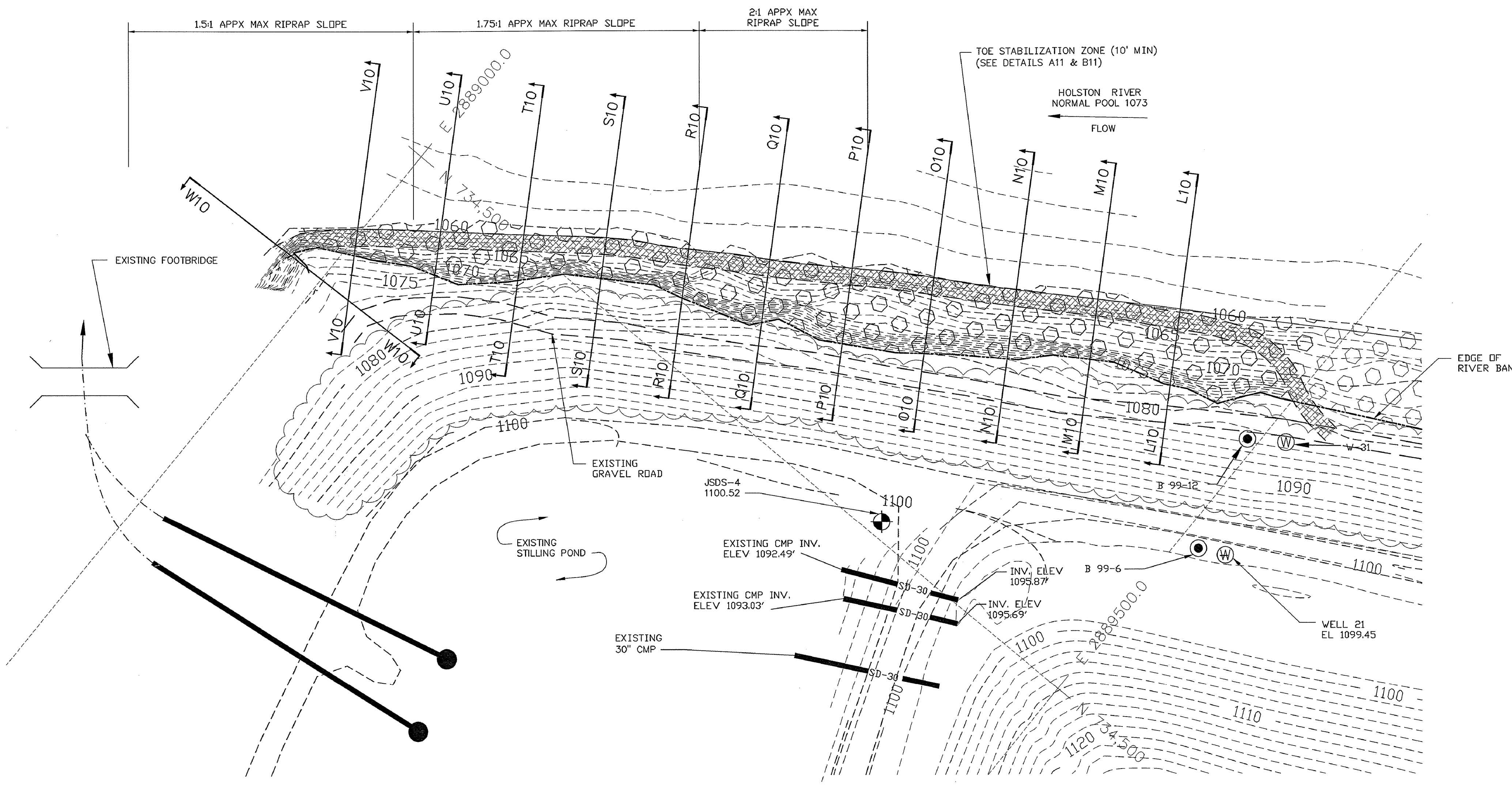
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE | 41 | C | 10W206-1 | R 1

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PARSONS 1



PARTIAL PLAN

RIPRAP ALONG RVIER BANK TOE

NOTES FOR RIPRAP CONSTRUCTION PROCEDURE:

1. CONSTRUCT AN ACCESS RAMP DOWN TO RIVER BANK TOE AT A CONVENIENT LOCATION NEAR THE UPSTREAM END AS INDICATED. THE TOE IS DEFINED AS LINE ALONG RIVER WHERE EXISTING RIVER BED LEVEL IS APPROXIMATELY AT EL. 1060.

2. STABILIZE MINIMUM 10FT WIDE AREA AT TOE. REFER TO DWG 10W206-11, DETAILS A-11 & B-11.
   A. PLACE A SUFFICIENTLY THICK LIFT OF RIPRAP ON RIVER BOTTOM AT TOE, SO THAT TOP OF LIFT IS APPROXIMATELY ONE FOOT ABOVE RIVER WATER LEVEL. PLACE LIFT FOR A CONVENIENT LENGTH (BUT NO MORE THAN 50 FEET) ALONG RIVER BY END DUMPING. IF THE SUBGRADE IS SOFT, PLACE A LIFT OF RAILROAD BALLAST NO MORE THAN ONE FOOT ABOVE RIVER WATER LEVEL PRIOR TO PLACING RIPRAP.
   B. COMPACT THE ENTIRE LENGTH AND WIDTH OF THE LIFT THOROUGHLY WITH SEVERAL PASSES OF A HEAVY CRAWLER TRACTOR UNTIL RIPRAP OR BALLAST CANNOT BE PUSHED FURTHER INTO RIVER BOTTOM SUBGRADE.
   C. REPEAT STEPS A AND B ABOVE FOR EACH SUBSEQUENT 50FT LENGTH DOWNSTREAM. (TURNAROUND AREA(S) MAY BE CONSTRUCTED AT CONVENIENT LOCATION(S) ALONG THE TOE FOR CONSTRUCTABILITY).

3. ROUGH GRADE IRREGULAR AREAS OF THE RIVER BANK ABOVE THE STABILIZED TOE TO PROVIDE MINIMUM 8 FT WIDTH FOR SUCCESSIVE RIPRAP LIFTS TO EL. 1073 AND TO PROVIDE REQUIRED FINAL RIPRAPPED FACE SLOPE. GRADE TO HEIGHT ATTAINABLE, IF NOT TO EL. 1073.

4. PLACE GEOTEXTILE AS SHOWN ON DETAILS A11 & B11. GEOTEXTILE SHALL BE PLACED ALONG THE SOIL/RIPRAP INTERFACE WITH SEAMS PARALLEL TO THE SLOPE DIRECTION (UP OR DOWN) AND ANCHORED AS SHOWN IN THE SECTION SKETCH. SEAMS SHALL OVERLAP A MINIMUM OF 2 FEET OR BE SEWN TOGETHER.

   GEOTEXTILE SHALL HAVE THE FOLLOWING PROPERTIES:
   - WOVEN CONSTRUCTION
   - PERCENT OPEN AREA BETWEEN 4 AND 6%
   - APPARENT OPENING SIZE EQUAL TO 0.212 MM (US SIEVE NO 70)
   - GRAB TENSILE/ELONGATION IN THE WEAK DIRECTION AT LEAST 250 LB/15%
   - GEOTEXTILE SHALL BE CARTHAGE 6%, TC MIRAFI FW700, OR APPROVED EQUAL

5. INSTALL SUBSEQUENT LIFTS OF RIPRAP HORIZONTALLY UP TO EL. 1073, EACH LIFT HAVING NO MORE THAN 2 FT LOOSE THICKNESS AND COMPACTED SIMILARLY AS THE BOTTOM LIFT AT TOE.

6. COMPLETE RIPRAP PLACEMENT TO APPROXIMATELY EL. 1080 (EXCEPT AS NOTED IN THE CROSS SECTIONS SHOWN ON 10W206-11) AND BLEND WITH EXISTING GROUND TOPOGRAPHY.

7. GRASS SHALL BE REMOVED OR CUT PRIOR TO PLACEMENT OF FILL MATERIAL OR GEOTEXTILE.

8. LARGE TREES WITH EXTENSIVE ROOT SYSTEMS AT THE SLOPE CREST SHALL BE LEFT IN PLACE. SMALLER TREES THAT INTERFERE WITH CONTRACTOR ACCESS MAY BE REMOVED. TREES TO BE REMOVED SHALL BE CUT JUST ABOVE THE GROUND SURFACE. STUMPS SHALL BE LEFT IN PLACE.

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R											
R 0	AUG 2 6 2002	DRS	BSB	DRS	DRS	REP	JGA		JSF260		D
PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION.											

DISCIPLINE INTERFACE 1 2 3 4

SCALE: 1"=30' EXCEPT AS NOTED

YARD

PARTIAL PLAN
NEW RIPRAP ALONG ASH DIKE TOE

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	J.G. ADAIR	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

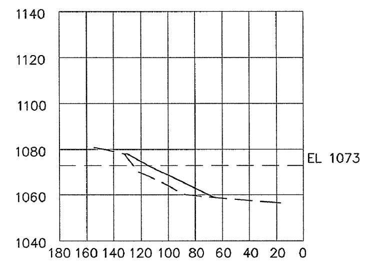
AUTOCAD R14 | DATE AUG 2 6 2002 | 41 | C | 10W206-10 | R 0

PARSONS 0
TASK COMPLETED BY: REV NO.

PLOT FACTOR:1:30
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

10W206-11 | C | 41



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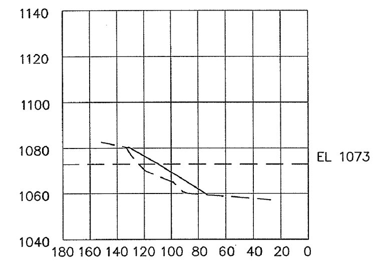

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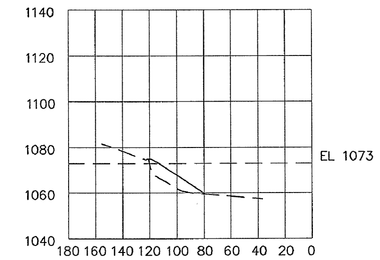

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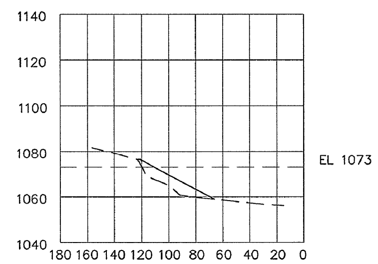
(SEE NOTE 2 THIS SHEET)



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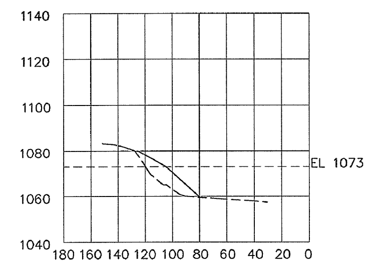

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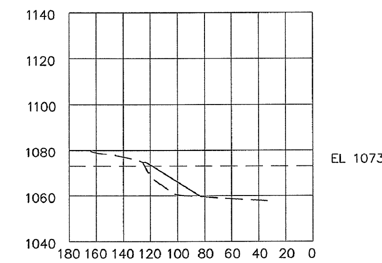

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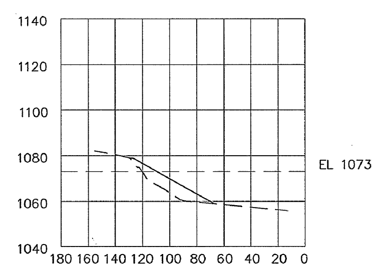

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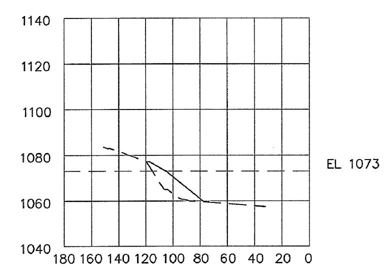

SECTION R10–R10
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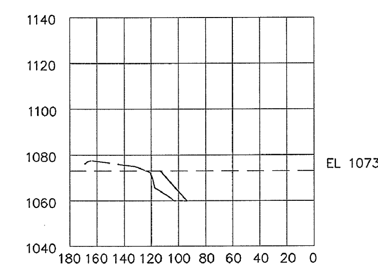

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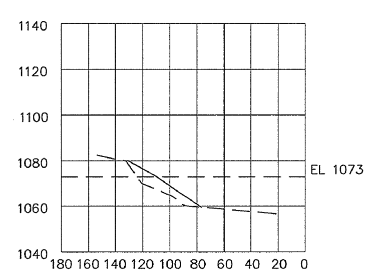
(SEE NOTE 2 THIS SHEET)



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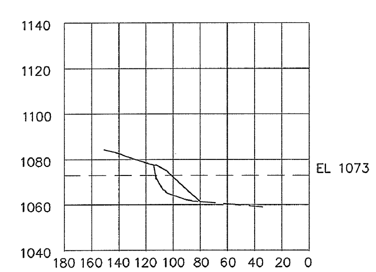

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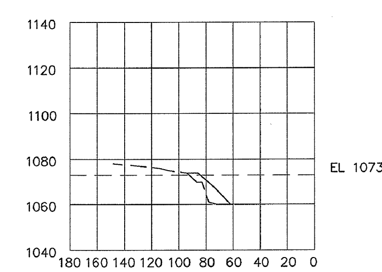
VERT 1"=30'



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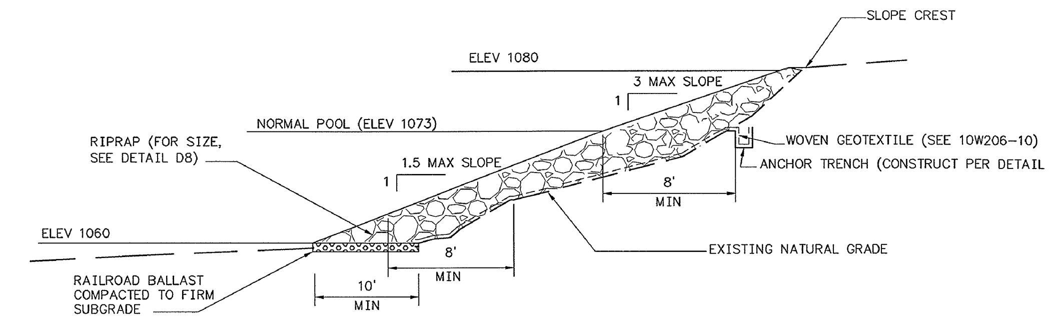
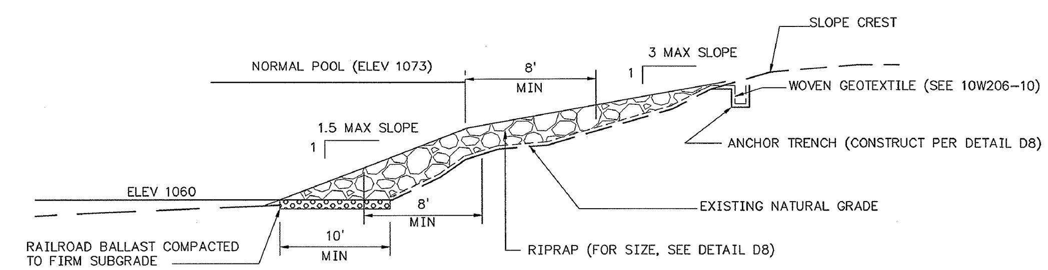
VERT 1"=30'



DETAIL A–11
TYPICAL RIPRAP PROTECTION SECTION – SLOPE CREST ABOVE EL 1073
NTS

NOTES:
1. USE THIS DETAIL WHERE SLOPE CREST IS EL 1073 OR HIGHER.
2. FOR ADDITIONAL NOTES FOR RIPRAP CONSTRUCTION, SEE 10W206–10.
3. RAILROAD BALLAST SHALL CONFORM TO SECTION 1071, SIEVE SIZE 24.



DETAIL B–11
TYPICAL RIPRAP PROTECTION SECTION – SLOPE CREST BELOW EL 1073
NTS

NOTES:
1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206–1.
2. WHERE SLOPE CREST IS EL 1073 OR LOWER, USE DETAIL B–11.

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206–1

R 0 AUG 2 6 2002 | DRS | CLC | DRS | DRS | REP | JGA | JSF260
PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION

SCALE: NONE EXCEPT AS NOTED

YARD

ASH DISPOSAL–STACK AREA CROSS SECTIONS

DESIGNED BY: D.R. SMITH | DRAWN BY: C.L. CUNNINGHAM | CHECKED BY: D.R. SMITH | SUPERVISED BY: D.R. SMITH | REVIEWED BY: R.E. PURKEY | APPROVED BY: J.G. ADAIR

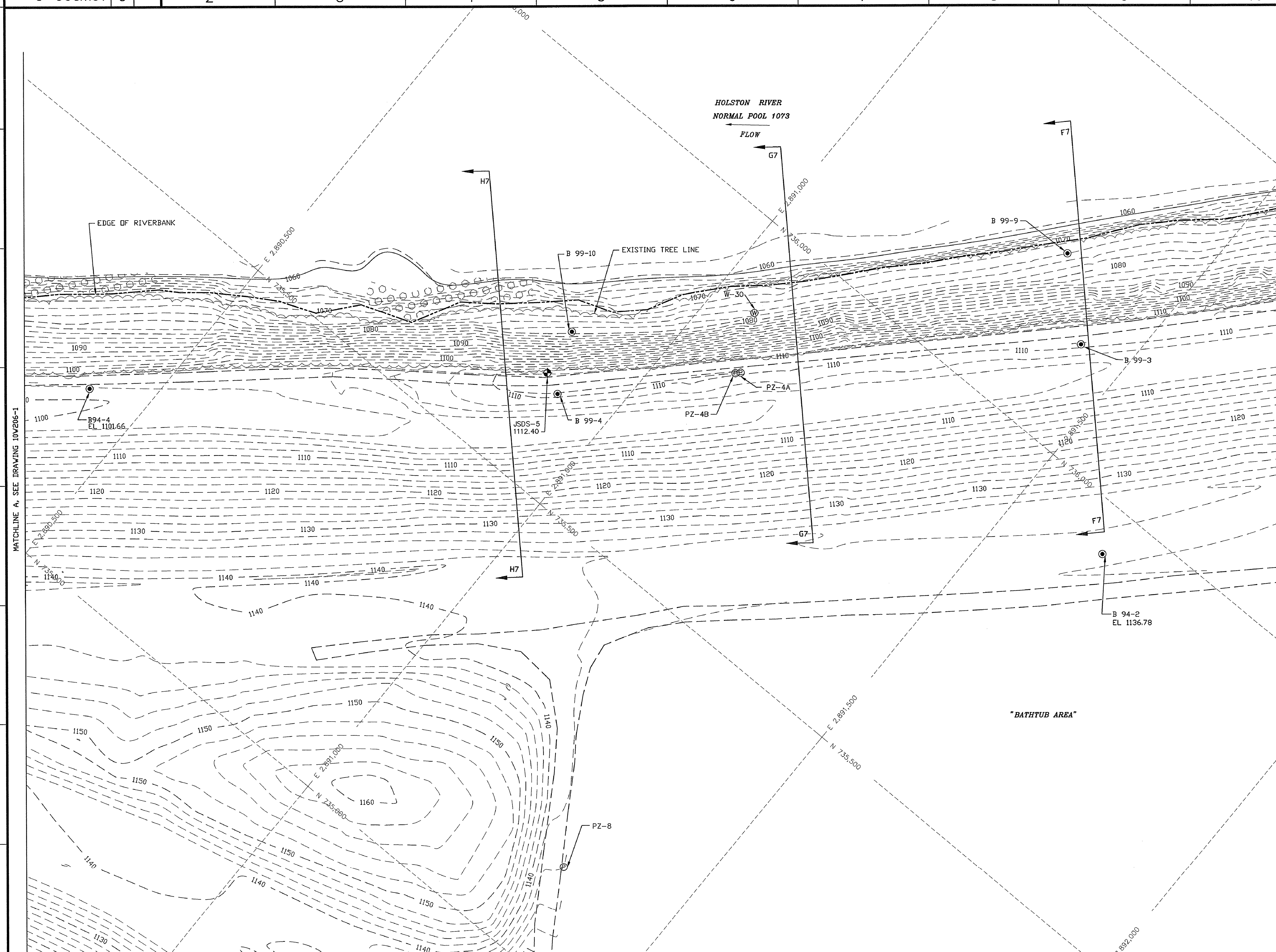
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | AUG 2 6 2002 | 41 | C | 10W206–11 | R 0

PARSONS | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206-1.

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206-1

R 0 | DRS | BSB | DRS | DRS | REP | LAN | JSF260

PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION

SCALE: 1" = 50' EXCEPT AS NOTED

YARD

ASH DISPOSAL–STACK AREA
EXISTING FEATURES AS OF FEBRUARY 2001
SHEET 2

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

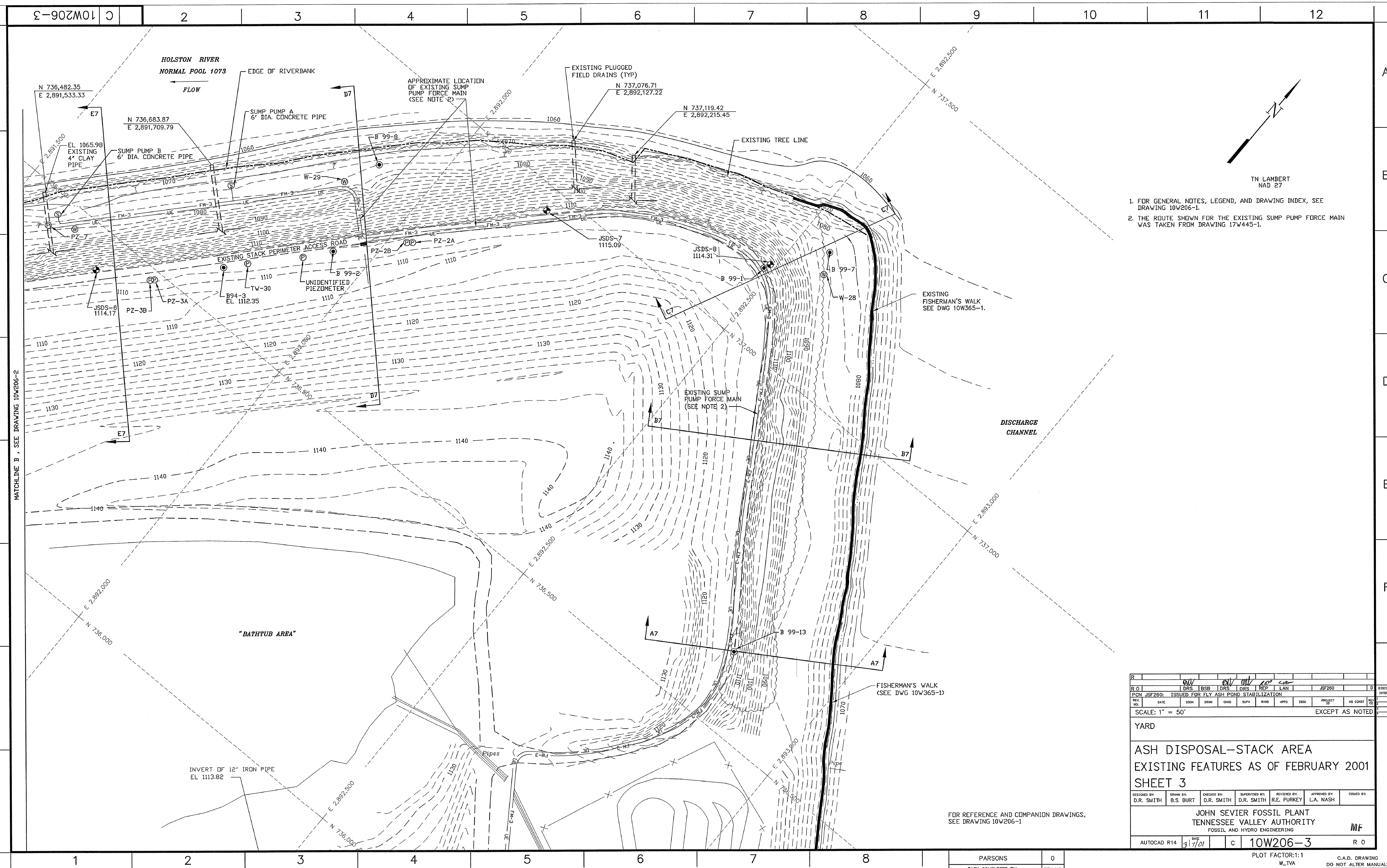
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE 3/7/01 | C | 10W206-2 | R 0

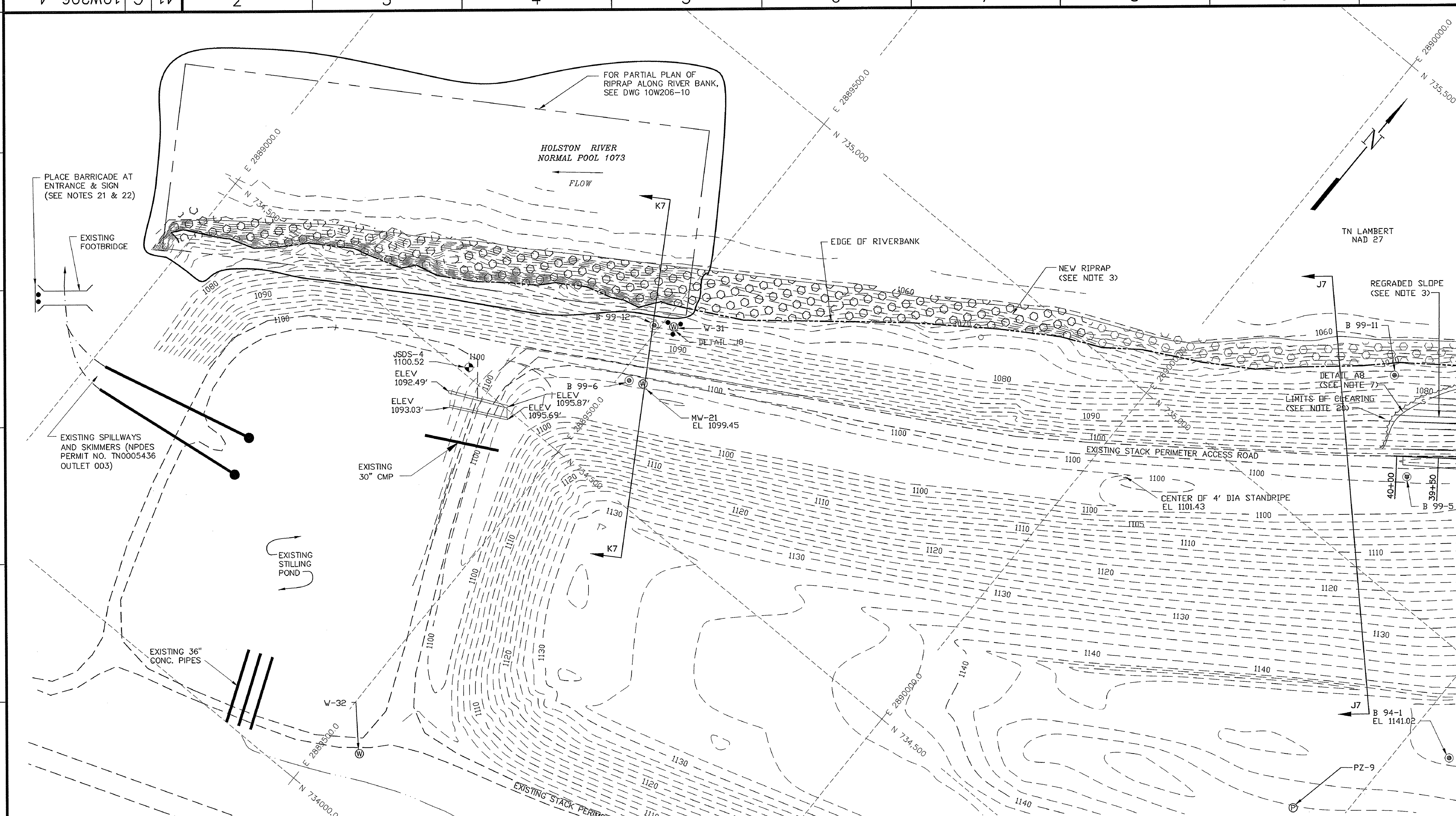
PARSONS | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



JSF-10W206-3-SHT -REV 0 YARD ASH DISPOSAL-STACK AREA EXISTING FEATURES AS OF FEBRUARY 2001 SHEET 3.cal (35% of Scale); jsf_reorg-dada-dwgs; JSF; 12/5/2009 11:49 AM



EXISTING DRAINAGE DITCH

EXISTING PLANT ACCESS ROAD

NOTES:

1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206-1.

2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH TVA SPECIFICATION T-1. SECTION NUMBERS REFER DIRECTLY TO TVA SPECIFICATION T-1, UNLESS NOTED OTHERWISE.

3. PROPOSED CONTOUR ELEVATIONS ARE FINISHED SURFACE ELEVATIONS (INCLUDING 18 INCH THICK SOIL COVER), EXCEPT FOR RIPRAP PLACED ALONG THE RIVERBANK.

4. THE FOLLOWING SURVEY MONUMENTS WILL BE IMPACTED BY CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT: JSDS-5, JSDS-6, JSDS-7, AND JSDS-8. TVA SURVEYING SERVICES WILL REESTABLISH BENCHMARKS AWAY FROM AREAS IMPACTED BY CONSTRUCTION PRIOR TO COMMENCEMENT OF CONSTRUCTION. COORDINATE LOCATIONS AND ELEVATIONS OF RELOCATED BENCHMARKS MAY BE OBTAINED FROM TVA SURVEYING SERVICES, 1101 MARKET ST. MR 4B-C, CHATTANOOGA, TN 37402-2801.

5. THE FOLLOWING 8 PIEZOMETERS WILL BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO COMMENCEMENT OF GRADING ACTIVITIES: PZ-2A; PZ-2B; PZ-3A; PZ 3B; PZ-4A; PZ 4B; TW-30 AND UNIDENTIFIED PIEZOMETER.

6. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EXISTING MONITORING WELLS AND UTILITY STRUCTURES.

7. INSTALL DOUBLE ROW OF SILT FENCE SHOWN ON THE DRAWINGS PRIOR TO EXCAVATION AND GRADING ACTIVITIES. SILT FENCES SHALL BE INSPECTED AFTER STORM EVENTS, AND MAINTAINED IN GOOD CONDITION, AND SHALL REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED ON ALL DISTURBED AREAS.

8. SEED ALL DISTURBED AREAS IN ACCORDANCE WITH SECTION 580.

TEMPORARY SEEDING:
19-19-19 FERTILIZER – 100 LBS. PER ACRE
AGRICULTURAL LIMESTONE – 1 TON PER ACRE
RED CLOVER – 20 LBS. PER ACRE
WEEPING LOVEGRASS – 10 LBS. PER ACRE

FINAL SEEDING:
19-19-19 FERTILIZER – 315 LBS. PER ACRE
AGRICULTURAL LIMESTONE – 4 TONS PER ACRE
AMMONIUM NITRATE – 35 LBS. PER ACRE
KENTUCKY 31 TALL FESCUE – 60 LBS. PER ACRE
WHITE CLOVER – 20 LBS. PER ACRE

9. PLACE EROSION CONTROL MATTING ON ALL SLOPES 3:1 AND STEEPER AS AREAS ARE SEEDED. EROSION CONTROL MATTING MATERIALS AND INSTALLATION SHALL CONFORM TO NORTH AMERICAN GREEN S75BN OR APPROVED EQUAL.

10. PRIOR TO PLACEMENT OF RIPRAP AT THE RIVERBANK, INSTALL A SINGLE ROW OF SILT FENCE ALONG THE ENTIRE LENGTH OF THE DIKE. PLACE SILT FENCE BETWEEN THE EDGE OF RIVERBANK AND ANY AREAS LIKELY TO BE DISTURBED DURING RIPRAP PLACEMENT.

11. PROTECT EXCAVATIONS BY SHORING, BRACING, SHEET PILING, OR OTHER METHODS AS REQUIRED TO PREVENT CAVE-IN OF LOOSE SOIL INTO EXCAVATION IN ACCORDANCE WITH OSHA 29 CFR 1926, SUBPART P – EXCAVATION.

12. EXISTING FORCE MAIN PIPE SHALL BE REROUTED AS SHOWN TO AVOID NEW CONSTRUCTION. FOR DETAILS OF PIPING REROUTE, SEE 10W445-1 SERIES.

13. NEW FILL PLACED TO ACHIEVE THE GRADES SHOWN FOR REGRADING THE SLOPE ALONG THE DISCHARGE CHANNEL AND BENEATH THE REALIGNED STACK PERIMETER ACCESS ROAD, AND CONSTRUCTION ACCESS ROADS SHALL CONSIST OF THE FOLLOWING UNIFIED SOIL CLASSIFICATION DESIGNATIONS: ML, CH, OR CL. SOIL SHALL BE OBTAINED FROM DESIGNATED BORROW SOURCE. PLACE NEW BACKFILL IN COMPACTED LIFTS NOT EXCEEDING 6 INCHES IN THICKNESS AND COMPACT TO 95% STANDARD PROCTOR DENSITY AT 3% OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D 698. MOISTURE AND DENSITY TESTING SHALL BE IN ACCORDANCE WITH ASTM D 2922, AT A FREQUENCY OF NOT LESS THAN 2 TESTS PER DAY FILL IS PLACED OR 2 TESTS PER 5000 CY OF MATERIAL PLACED WITH A MINIMUM OF 2 TESTS PER 6" LIFT. SCARIFY EXISTING SOIL TO A DEPTH OF 3 INCHES PRIOR TO PLACEMENT OF THE FIRST LIFT.

14. THE SOIL COVER SHALL BE A 12 INCH LAYER OF COMPACTED SOIL OVERLAIN BY A 6 INCH THICK VEGETATIVE LAYER, AND SHALL CONSIST OF THE FOLLOWING UNIFIED SOIL CLASSIFICATION DESIGNATIONS: ML, CH, OR CL. SOIL SHALL BE OBTAINED FROM DESIGNATED BORROW SOURCE. PLACE THE 12 INCH THICK LAYER IN COMPACTED LIFTS USING TRACKED CONSTRUCTION EQUIPMENT. THE FINAL 6 INCH THICK VEGETATIVE LAYER SHALL BE PLACED TO SUPPORT VEGETATIVE GROWTH.

NOTES (CONT.):

15. PLACE SPOIL MATERIAL IN THE BATHTUB AREA AS SHOWN ON THE DRAWINGS. MATERIAL PLACEMENT WITHIN THE BATHTUB AREA SHALL BE SEQUENCED SO THAT POSITIVE DRAINAGE IS MAINTAINED, AND THE EXISTING OUTLET DRAINAGE PIPE REMAINS FUNCTIONAL.

16. PLACE SPOIL MATERIAL IN 12" COMPACTED LIFTS COMPACTED TO 90 % STANDARD PROCTOR DENSITY IN ACCORDANCE WITH ASTM D698. MOISTURE & DENSITY TESTING SHALL BE PERFORMED AT RANDOM LOCATIONS (MINIMUM 4 PER LIFT) PER ASTM D2922.

17. COORDINATE GEOMETRY AND STATIONING FOR REALIGNED STACK PERIMETER ACCESS ROAD IS REFERENCED TO THE OUTSIDE EDGE OF ROADWAY. SEE DETAIL C8 ON DRAWING 10W206-8, AND ROAD PROFILE ON DRAWING 10W206-9. ALL GRADING IS REFERENCED TO OUTSIDE EDGE OF EXISTING AND/OR REALIGNED STACK PERIMETER ACCESS ROAD.

18. MATERIAL FOR CRUSHED STONE BASE ROAD SURFACING SHALL CONFORM TO SECTION 1032. COMPACT CRUSHED STONE BASE TO ACHIEVE A SUITABLE WEARING SURFACE FOR ALL NEW ROADS.

19. REROUTE NEW FORCE MAIN AND GRAVITY DRAIN PIPING SO THAT IT IS NOT PLACED DIRECTLY BENEATH NEW CONSTRUCTION ACCESS ROADS.

NOTES (CONT.):

20. REMOVE TREES AND VEGETATION WITHIN THE LIMITS OF CLEARING SHOWN IN ACCORDANCE WITH SECTION 101. VEGETATION MAY BE CONSOLIDATED AND BURNED ON THE EXISTING SLOPE PRIOR TO GRADING. OBTAIN ANY NECESSARY BURN PERMITS AS REQUIRED PRIOR TO CLEARING. PRESERVE ANY TREES ALONG EDGE OF RIVERBANK THAT ARE OUTSIDE ACTUAL WORK AREAS. DO NOT GRUB TREES ALONG THE EDGE OF RIVERBANK.

21. PLACE BARRICADE AND SIGN AT ENTRANCE TO FOOT BRIDGE WHERE SHOWN. SIGN SHALL STATE "DANGER – DO NOT ENTER CONSTRUCTION AREA. AREA IS UNSAFE FOR ENTRY. SLOPES MAY BECOME UNSTABLE DURING CONSTRUCTION. TVA WILL NOTIFY WHEN AREA IS TO BE RE-OPENED. FISHING IS ALLOWED ON THE EAST SIDE OF THE DISCHARGE CHANNEL."

22. A COPY OF THE STORMWATER NOTICE OF COVERAGE, NPDES PERMIT NUMBER, NAME AND PHONE NUMBER OF LOCAL CONTACT PERSON, AND PROJECT DESCRIPTION SHALL BE POSTED ON THE SIGN.

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206-1

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	AUG 2 6 2002	DRS	BSB	DRS	DRS	REP	JGA		JSF260		D
PCN JSF260: REVISED FOR FLY ASH POND STABILIZATION.											
R 0	3-7-01	DRS	BSB	DRS	DRS	REP	LAN		JSF260		D
PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION											

DISCIPLINE INTERFACE

SCALE: 1" = 50' EXCEPT AS NOTED

YARD

ASH DISPOSAL-STACK AREA SLOPE REGRADING PLAN SHEET 1

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

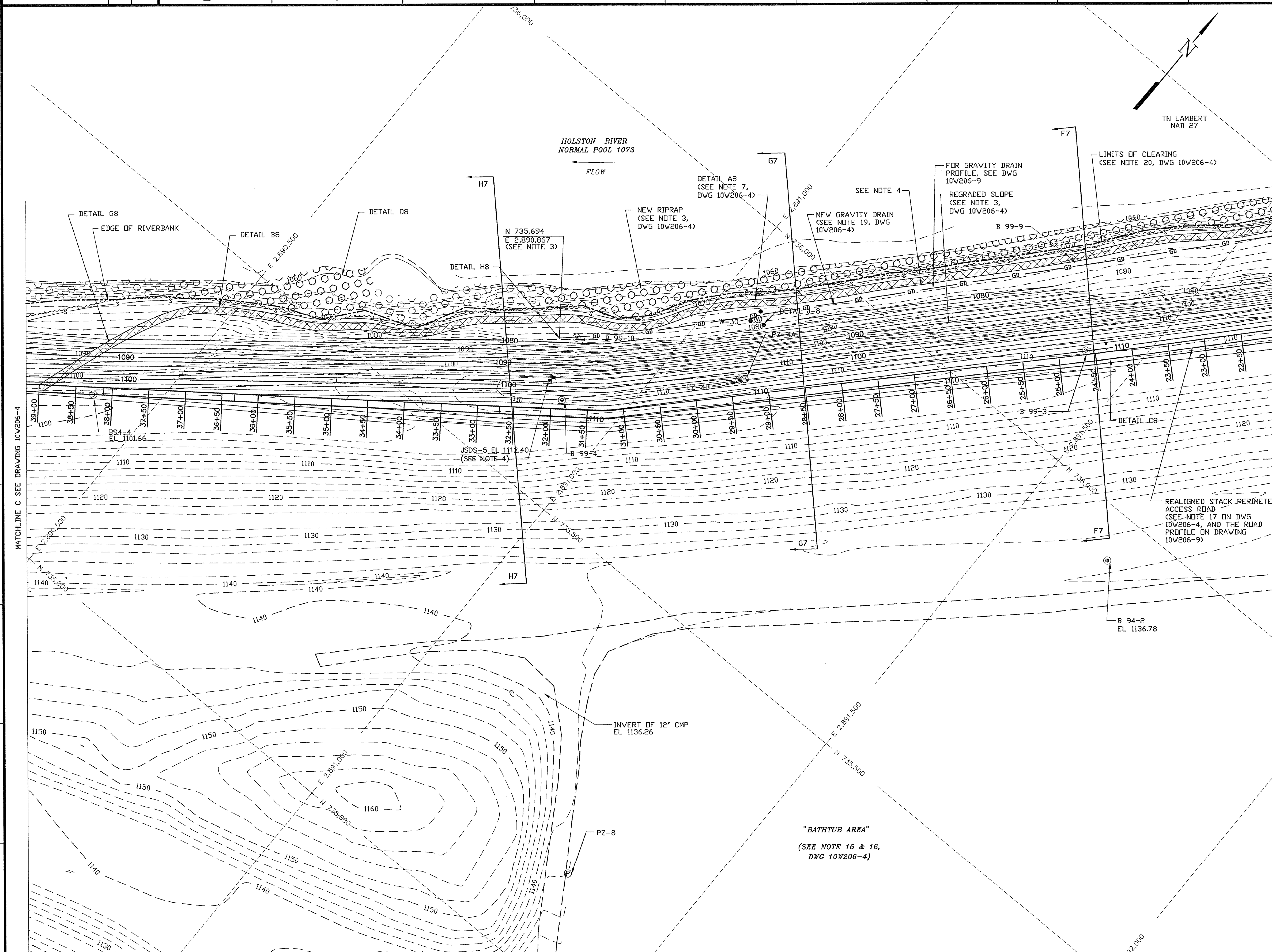
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14	DATE	41	C	10W206-4	R 1

PARSONS | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



NOTES:

1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206-1.

2. FOR SPECIFIC CONSTRUCTION NOTES, SEE DRAWING 10W206-4.

3. COORDINATES FOR INSTALLATION OF SEEP ARE APPROXIMATE. CONSTRUCTION PARTNER SHALL INSTALL SEEP INTERCEPTION AT ACTUAL SEEP LOCATION.

4. PIPE BEDDING FOR GRAVITY DRAIN SHALL BE IN ACCORDANCE WITH DETAIL N2 ON DRAWING 17W445-2.

5. BASELINE GEOMETRY IS SHOWN ON SHEET 9.

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206-1

REV	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	PROJECT
R 0	DRS	BSB	DRS	DRS	REP	LAN	JSF260

PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION

SCALE: 1" = 50' EXCEPT AS NOTED

YARD

ASH DISPOSAL-STACK AREA
SLOPE REGRADING PLAN
SHEET 2

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

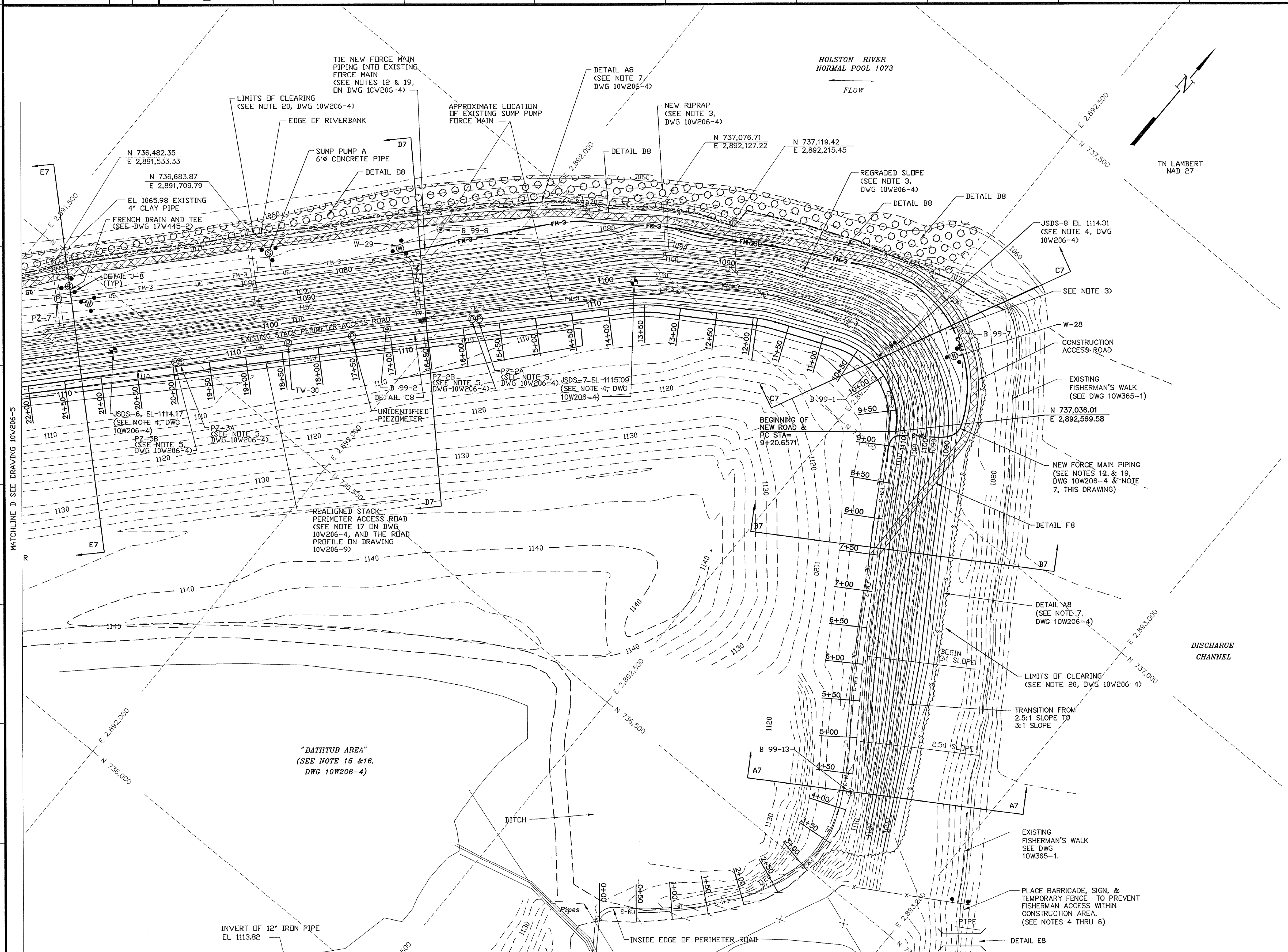
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE 3/7/01 | C | 10W206-5 | R 0

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PARSONS | 0
TASK COMPLETED BY: | REV NO.



NOTES:

1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206-1.

2. FOR SPECIFIC CONSTRUCTION NOTES, SEE DRAWING 10W206-4.

3. GRADE SLOPE IN THIS AREA FLATTER THAN 3:1 TO TIE INTO EXISTING GRADE.

4. PLACE BARRICADE AND SIGN WHERE SHOWN. SIGN SHALL STATE "DANGER – DO NOT ENTER CONSTRUCTION AREA. AREA IS UNSAFE FOR ENTRY. SLOPES MAY BECOME UNSTABLE DURING CONSTRUCTION. TVA WILL NOTIFY WHEN AREA IS TO BE RE-OPENED. FISHING IS ALLOWED ON THE EAST SIDE OF THE DISCHARGE CHANNEL."

5. A COPY OF THE STORMWATER NOTICE OF COVERAGE, NPDES PERMIT NUMBER, NAME AND PHONE NUMBER OF LOCAL CONTACT PERSON, AND PROJECT DESCRIPTION SHALL BE POSTED ON THE SIGN.

6. CONSTRUCTION PARTNER TO INSTALL TEMPORARY CONSTRUCTION FENCING TO PREVENT UNAUTHORIZED ACCESS WITHIN CONSTRUCTION AREA.

7. THE FORCE MAIN ROUTE SHALL BE WITHIN THE FILL SECTION OF THE SLOPE. SLEEVE THE 3"Ø FORCE MAIN PIPE USING A 6"Ø SCHEDULE 40 CARBON STEEL PIPE. WELD PIPE SECTIONS TO MAKE A CONTINUOUS SLEEVE. THE SLEEVE SHALL EXTEND BEYOND THE LIMITS OF NEW FILL.

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206-1

REV		DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	
R 0		DRS	BSB	DRS	DRS	REP	LAN		JSF260	D
PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION										

SCALE: 1" = 50' EXCEPT AS NOTED

YARD

ASH DISPOSAL-STACK AREA SLOPE REGRADING PLAN SHEET 3

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

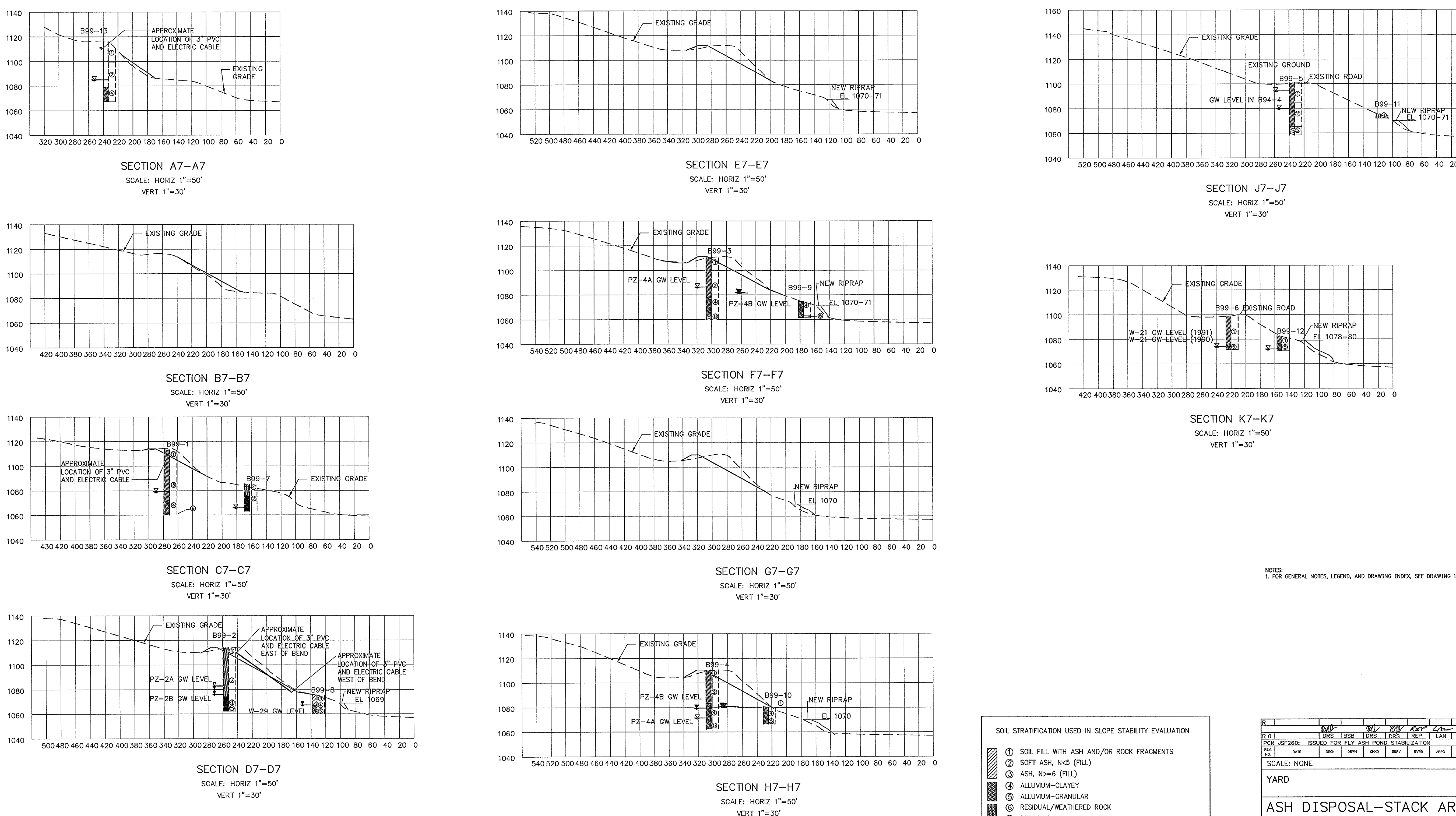
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE 3/7/01 | C | 10W206-6 | R 0

PARSONS | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



NOTES:
1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206–1.

SOIL STRATIFICATION USED IN SLOPE STABILITY EVALUATION

① SOIL FILL WITH ASH AND/OR ROCK FRAGMENTS
② SOFT ASH, N<5 (FILL)
③ ASH, N>=6 (FILL)
④ ALLUVIUM–CLAYEY
⑤ ALLUVIUM–GRANULAR
⑥ RESIDUAL/WEATHERED ROCK
⑦ BEDROCK

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206–1

R0 — DRS BSB DRS DRS REP LAN — JSF260
PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION

SCALE: NONE — EXCEPT AS NOTED

YARD

ASH DISPOSAL–STACK AREA CROSS SECTIONS

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

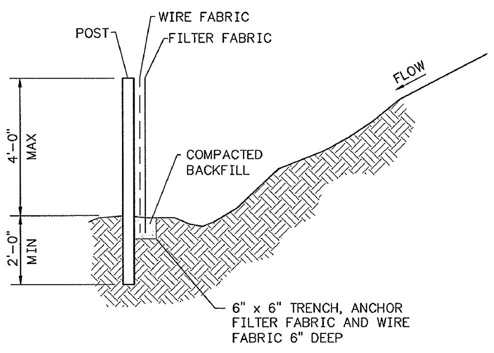
AUTOCAD R14 — 3/7/01 — C 10W206–7 — R0

PARSONS — 0
TASK COMPLETED BY: — REV NO.

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

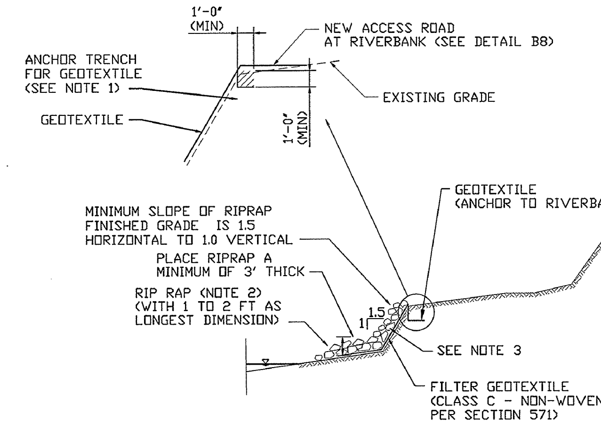
C 10W206–7



DETAIL A8
TEMPORARY SILT FENCE

NOTES:

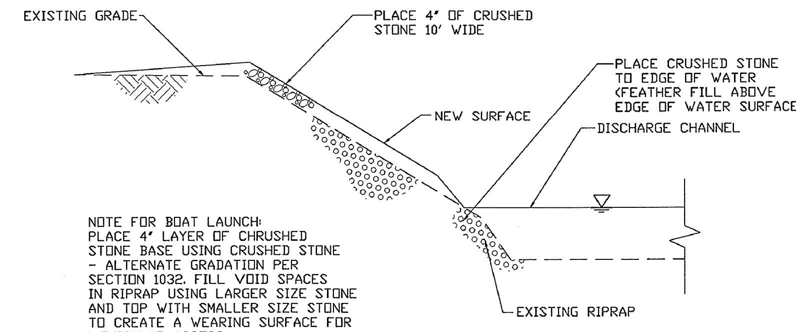
1. FILTER FABRIC FENCE TO BE PLACED PRIOR TO THE START OF ROUGH GRADING.
2. STEEL POSTS SHALL BE METAL "T" POSTS – 6'-0" LONG.
3. WOOD POSTS SHALL BE 2" x 4" MIN (CCA TREATED)
4. POSTS SHALL BE PLACED AT 4' INTERVALS MAX.
5. WIRE FABRIC AND FILTER FABRIC SHALL BE SECURELY BOUND TO POSTS WITH EITHER STAPLES OR WIRE TIES.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING CONDITION OF FILTER FABRIC FENCE IN A CONDITION THAT IS SATISFACTORY TO TVA UNTIL FINAL ACCEPTANCE OF WORK. REMOVE SEDIMENT WHEN SEDIMENT HEIGHT IS ONE-THIRD THE HEIGHT OF THE FENCE.
7. FILTER FABRIC SHALL BE A CLASS A FABRIC IN ACCORDANCE WITH TVA SPECIFICATION T-1, SECTION 571.



DETAIL D8
RIPRAP SLOPE PROTECTION

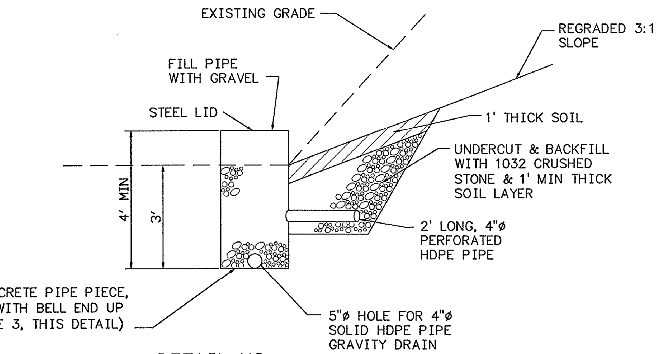
NOTES FOR RIPRAP DETAIL:

1. CONSTRUCT ANCHOR TRENCH AS SHOWN TO ANCHOR GEOTEXTILE. BACKFILL TRENCH WITH EXCAVATED MATERIAL USING HAND-HELD MOTORIZED COMPACTION EQUIPMENT.
2. RIPRAP SHALL CONFORM TO SECTION 575, WITH SIZE AND THICKNESS AS INDICATED.
3. WHERE EXISTING SLOPE IS STEEPER THAN 1.5 HORIZONTAL TO 1 VERTICAL, PLACE RIPRAP TO ACHIEVE A MINIMUM SLOPE OF 1.5 HORIZONTAL TO 1 VERTICAL.



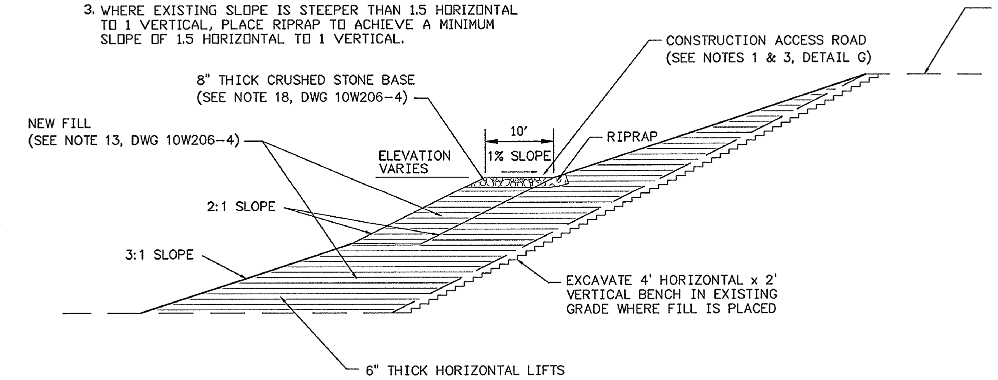
NOTE FOR BOAT LAUNCH:
PLACE 4' LAYER OF CHRUSHED STONE BASE USING CRUSHED STONE – ALTERNATE GRADATION PER SECTION 1032. FILL VOID SPACES IN RIPRAP USING LARGER SIZE STONE AND TOP WITH SMALLER SIZE STONE TO CREATE A WEARING SURFACE FOR VEHICULAR ACCESS.

DETAIL E8
BOAT LAUNCH

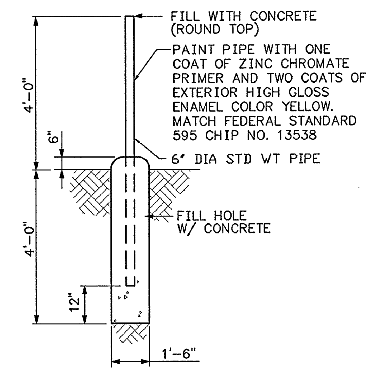


DETAIL H8
SEEP INTERCEPT DETAIL

NOTES FOR SEEP INTERCEPT DETAIL:
1. PIPE AND FITTINGS USED TO CONSTRUCT GRAVITY DRAIN SHALL BE HIGH-DENSITY POLYETHYLENE (HDPE) PE 3408 PIPE, CELL CLASSIFICATION 345444C, IN ACCORDANCE WITH ASTM D 3350. ALL PIPING AND FITTINGS SHALL BE OF THE SAME MATERIAL AND HAVE A DIMENSION RATIO OF 13.5, IN ACCORDANCE WITH ASTM D 714. ALL HDPE PIPING AND FITTINGS SHALL BE JOINED BY BUTT FUSION WELDING, IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
2. FILL ANNULAR SPACE BETWEEN HOLE IN CONCRETE PIPE AND SOLID HDPE PIPE WITH NON-SHRINK GROUT, PER MANUFACTURER'S INSTRUCTIONS.
3. CONCRETE PIPE SHALL BE CLASS 2 CONCRETE PIPE IN ACCORDANCE WITH SECTION 1250.

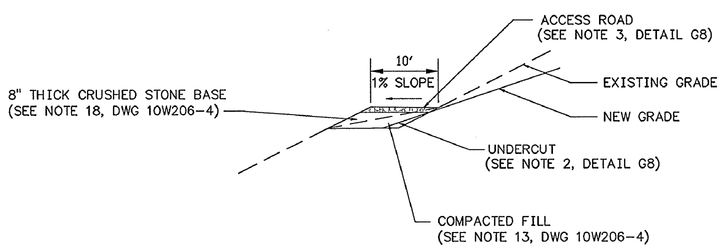


DETAIL F8
(FILL SLOPE CONSTRUCTION)

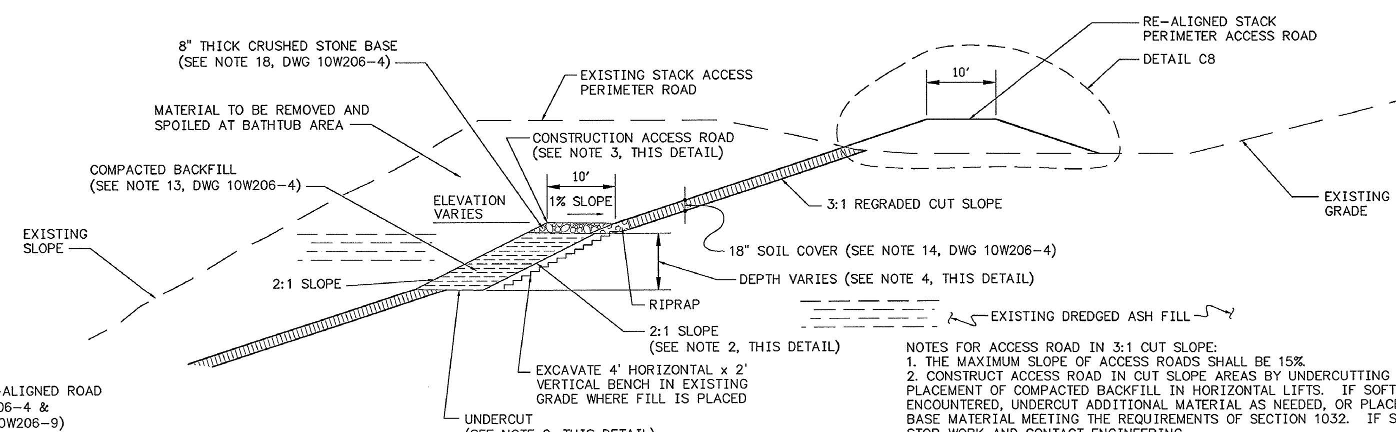


DETAIL J8
PIPE BOLLARD

NOTE FOR DETAIL J-8:
PLACE 3 BOLLARDS AROUND EACH MONITORING WELL 5 FT FROM WELL

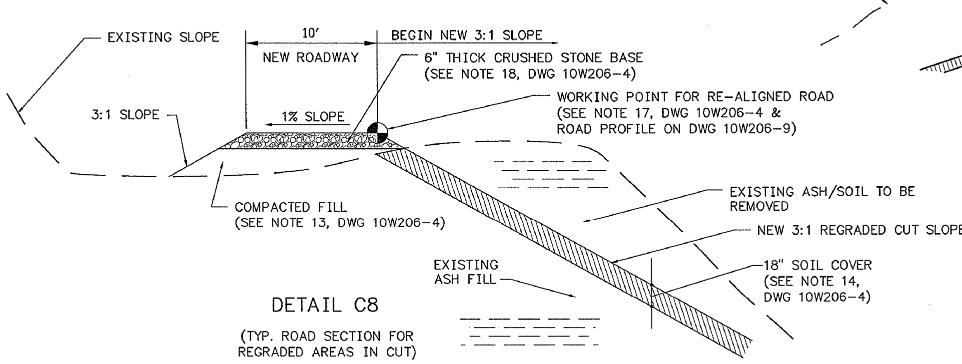


DETAIL B8
(ACCESS ROAD AT RIVERBANK)



DETAIL G8
(CONSTRUCTION ACCESS ROAD FOR 3:1 CUT SLOPE)

NOTES FOR ACCESS ROAD IN 3:1 CUT SLOPE:
1. THE MAXIMUM SLOPE OF ACCESS ROADS SHALL BE 15%.
2. CONSTRUCT ACCESS ROAD IN CUT SLOPE AREAS BY UNDERCUTTING MATERIAL AS SHOWN TO ALLOW PLACEMENT OF COMPACTED BACKFILL IN HORIZONTAL LIFTS. IF SOFT OR SPONGY MATERIAL IS ENCOUNTERED, UNDERCUT ADDITIONAL MATERIAL AS NEEDED, OR PLACE COMPACTED CRUSHED STONE BASE MATERIAL MEETING THE REQUIREMENTS OF SECTION 1032. IF SEEPAGES ARE ENCOUNTERED, STOP WORK AND CONTACT ENGINEERING.
3. AFTER COMPLETION OF CONSTRUCTION ACCESS ROAD, PROOFROLL ROAD IN 2 PASSES. THE FIRST PASS SHALL BE WITH AN UNLOADED TANDEM AXLE DUMP TRUCK. CAREFULLY INSPECT THE ACCESS ROADWAY AFTER THE FIRST PASS FOR AREAS OF EXCESSIVE RUTTING OR HEAVING OF SOIL. REPAIR UNSTABLE AREAS BY REMOVING SOIL AND BACKFILLING WITH CRUSHED STONE BACKFILL MATERIAL CONFORMING TO SECTION 1032. IF UNSTABLE AREAS ARE DUE TO EXCESSIVE SEEPAGE, STOP WORK AND CONTACT ENGINEERING. THE SECOND PASS SHALL BE MADE WITH A LOADED TANDEM AXLE DUMP TRUCK, AND THE SAME INSPECTION/REPAIR PROCESS REPEATED, IF NECESSSARY. ALL REPAIRED AREAS SHALL BE SUCCESSFULLY PROOFROLLED PRIOR TO USE AS A HAUL ROAD FOR DUMPING RIPRAP. DURING USE, ALL CONSTRUCTION ACCESS ROADS SHALL BE INSPECTED DAILY FOR EXCESSIVE RUTTING OR HEAVING. PERFORM REPAIRS AS NEEDED TO MAINTAIN ROADWAY DURING CONSTRUCTION.
4. AT THE BASE OF THE SLOPE, THE DEPTH OF COMPACTED FILL WILL VARY AS THE ACCESS ROAD TIES INTO THE EXISTING GRADE.



DETAIL C8
(TYP. ROAD SECTION FOR REGRADED AREAS IN CUT)

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206-1

R0 | PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION | DRS | BSB | DRS | DRS | REP | LAN | JSF260

SCALE: NONE EXCEPT AS NOTED

DIKE EMBANKMENT STABILITY EVALUATION

ASH DISPOSAL-STACK AREA DETAILS

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | 3/7/01 | C | 10W206-8 | R 0

PARSONS | 0
TASK COMPLETED BY: | REV NO.

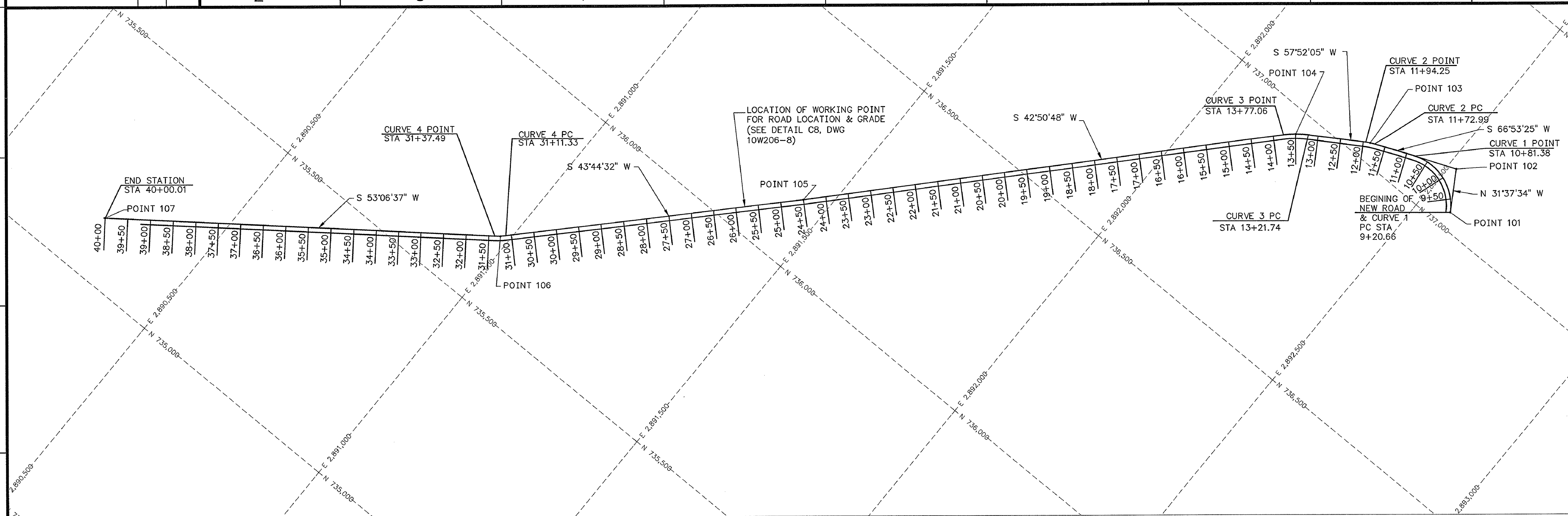
PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

C 10W206-8

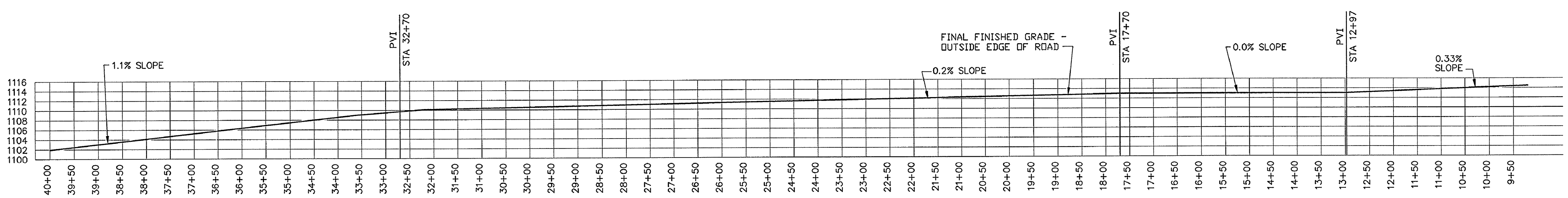
JSF-10W206-8-SHT -REV 0 DIKE EMBANKMENT STABILITY EVALUATION ASH DISPOSAL-STACK AREA DETAILS.cal (35% of Scale); jsf_reorg-dada-dwgs; JSF; 12/5/2009 11:50 AM

C 10W206-9



REALIGNED STACK PERIMETER ACCESS ROAD PLAN VIEW

NOTES:
1. FOR GENERAL NOTES, LEGEND, AND DRAWING INDEX, SEE DRAWING 10W206-1.
2. FOR SPECIFIC CONSTRUCTION NOTES, SEE DRAWING 10W206-4.



REALIGNED STACK PERIMETER ACCESS ROAD PROFILE

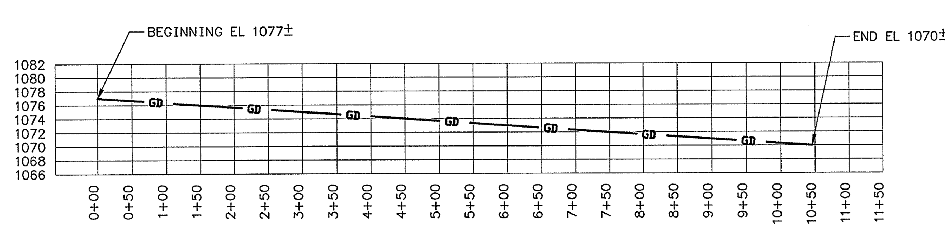
HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

CURVE DATA

CURVE	L(FT)	T(FT)	Δ(DMS)	R(FT)
1	160.72	97.34	81°29'01"	113
2	21.26	10.65	9°01'20"	135
3	55.32	27.82	15°01'17"	211
4	26.16	13.11	9°22'05"	160

COORDINATE POINT LIST

POINT	NORTHING	EASTING	DESCRIPOINTION
101	707,036.01	2,892,569.58	BEGINNING STATION & PC FOR CURVE 1
102	737,118.89	2,892,518.54	PI FOR CURVE 1
103	737,040.55	2,892,334.96	PI FOR CURVE 2
104	736,952.28	2,892,194.42	PI FOR CURVE 3
105	736,143.85	2,891,444.58	PI
106	735,657.95	2,890,979.56	PI FOR CURVE 4
107	735,132.33	2,890,279.24	PI EXISTING ROAD & END STATION



GRAVITY DRAIN PROFILE

HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

FOR REFERENCE AND COMPANION DRAWINGS, SEE DRAWING 10W206-1

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R											
R 0		DRS	BSB	DRS	DRS	REP	LAN		JSF260		D

PCN JSF260: ISSUED FOR FLY ASH POND STABILIZATION

DISCIPLINE INTERFACE

SCALE: 1" = 100' EXCEPT AS NOTED

YARD

ASH DISPOSAL–STACK AREA SLOPE REGRADING ROAD PLAN & PROFILE

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.R. SMITH	B.S. BURT	D.R. SMITH	D.R. SMITH	R.E. PURKEY	L.A. NASH	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

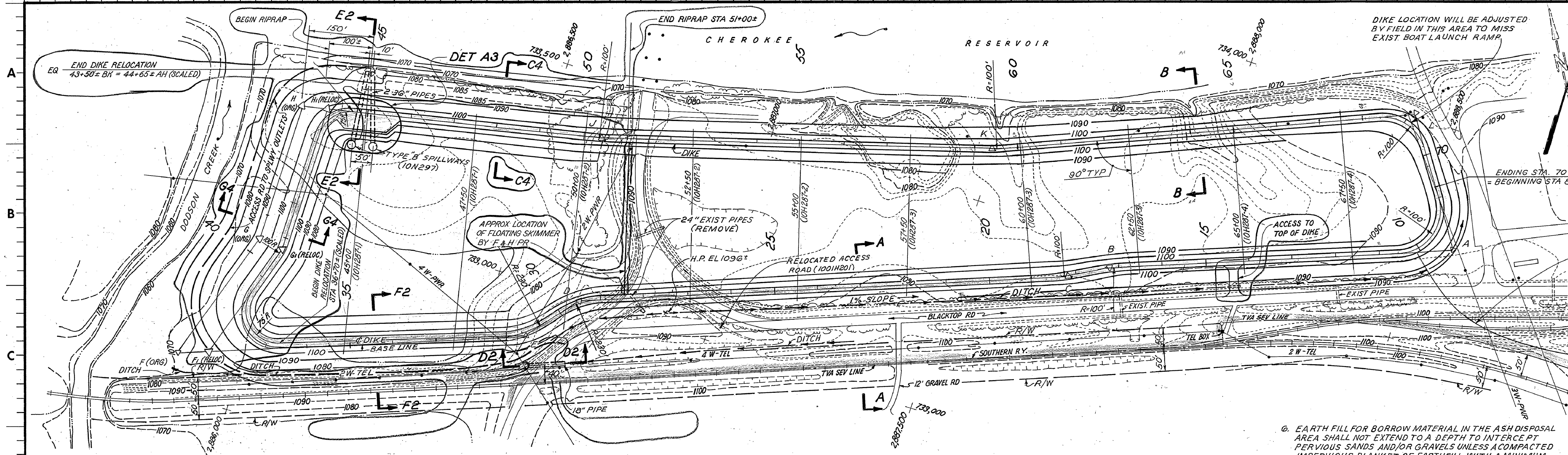
MF

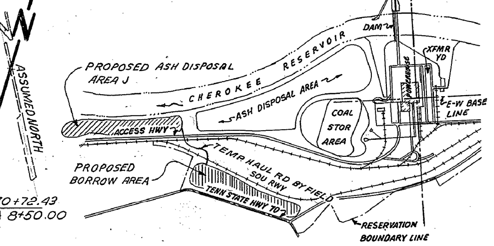
AUTOCAD R14 | DATE 3/7/01 | C | 10W206-9 | R 0

PLOT FACTOR:1:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PARSONS | 0
TASK COMPLETED BY: | REV NO.





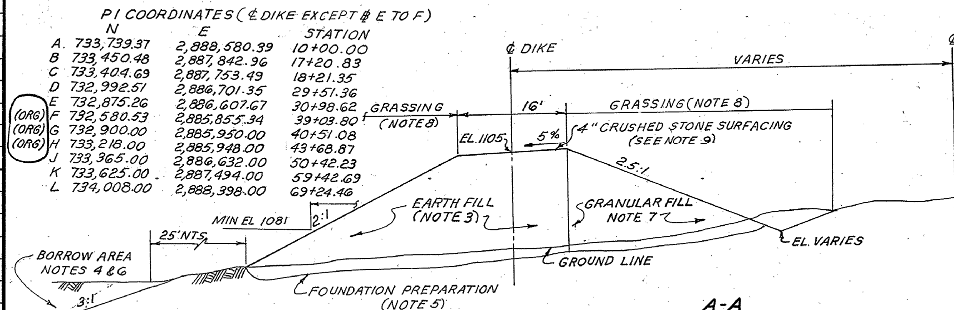
KEY PLAN

NTS

TEMPORARY HAUL ROAD FROM BORROW AREA BY FIELD

PI COORDINATES (℄ DIKE EXCEPT ℄ E TO F)

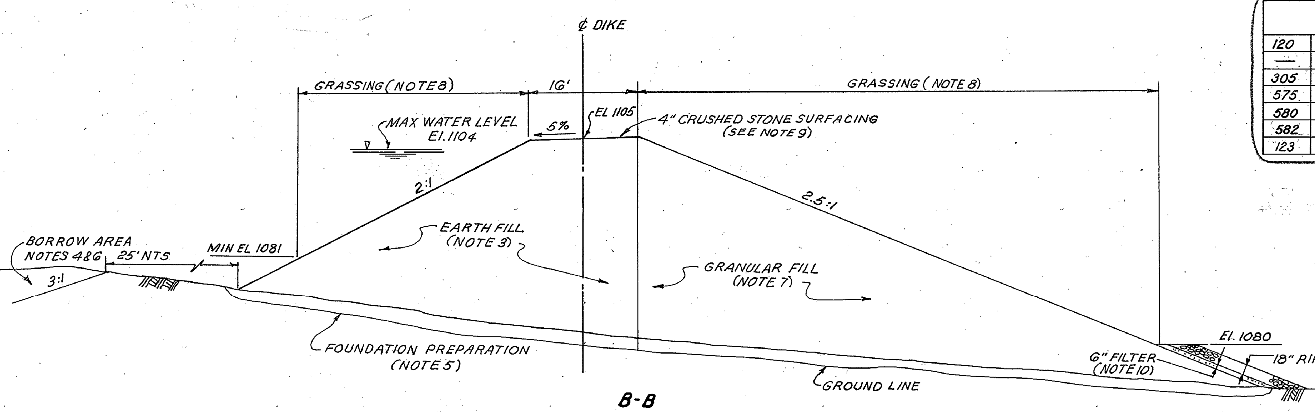
		N	E	STATION
	A.	733,739.37	2,888,580.39	10+00.00
	B	733,450.48	2,887,842.96	17+20.83
	C	733,404.69	2,887,753.49	18+21.35
	D	732,992.51	2,886,701.35	29+51.36
	E	732,875.26	2,886,607.67	30+98.62
(ORG)	F	732,580.53	2,885,855.34	39+03.80
(ORG)	G	732,900.00	2,885,950.00	40+51.08
(ORG)	H	733,218.00	2,885,948.00	43+68.87
	J	733,365.00	2,886,632.00	50+42.23
	K	733,625.00	2,887,494.00	59+42.69
	L	734,008.00	2,888,398.00	69+24.46



A-A
TYPICAL SECTION
STA. 69+00± FORWARD TO STA. 31+00±
1" = 10'

PI COORDINATES

	N	E	STATION
(RELOC) F_1	732,606.88	2,885,922.60	38+25±
(RELOC) G_1	732,891.91	2,886,007.05	39+75±
(RELOC) H_1	733,230.23	2,886,004.92	43+15±



B-B
TYPICAL SECTION
STA. 50+00± TO STA. 69+00±
1" = 10'

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNIT
101	CLEARING & GRUBBING	35	AC.
123	EARTH BORROW	471,000	CY
125	EXCAVATION FOR STRUCTURES	303	CY
305	CRUSHED STONE SURFACING	1855	TON
570	FILTER BLANKET	1500	TON
575	RIPRAP	2650	CY
580	SEEDING	72,000	SY
582	MULCHING	72,000	SY
510	STONE GUTTER	100	LF
	FOUNDATION PREPARATION	55,000	CY
463 481 491	18" PIPE CULVERT	86	LF
464	36" CONC PIPE CLASS IV "O" RING	340	LF

QUANTITIES FOR REVISION 3

ITEM	DESCRIPTION	QUANTITY	UNIT
120	UNCLASSIFIED EXCAVATION	17,000	CY
—	COMPACTED ASH FILL	21,200	CY
305	CRUSHED STONE SURFACING	1,500	TON
575	RIPRAP	44,000	TON
580	SEEDING	13,500	SY
582	MULCHING	13,500	SY
123	EARTH BORROW	1,000	CY

STORAGE CAPACITY *

ELEVATION	QUANTITY	ACCUM QUANTITY
1071 & BELOW	10,600 CY	10,600 CY
1076 TO 1071	59,200 CY	69,800 CY
1081 TO 1076	107,600 CY	177,400 CY
1086 TO 1081	127,800 CY	305,200 CY
1091 TO 1086	137,600 CY	442,800 CY
1096 TO 1091	147,400 CY	590,200 CY
1101 TO 1096	157,200 CY	747,000 CY ‡

* ASSUME ASH LEVEL

‡ RELOCATION OF THE WEST DIKE REDUCED THE ASH STORAGE CAPACITY BY 27,000 CY±.

NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE T-1 SPECIFICATIONS, UNLESS OTHERWISE NOTED.
2. THE SOLID CONTOURS REPRESENT FINISHED GRADE; DASHED CONTOURS INDICATE EXISTING GROUND.
3. THE RESULTS OF THE SOIL INVESTIGATION FOR THE ASH DISPOSAL AREA DIKES ARE REPORTED IN A MEMO FROM FRANK VANMETER TO G.L. BUCHANAN DATED JULY 22, 1981 (CSB 810724 301), JOHN SEVIER STEAM PLANT, ASH DISPOSAL AREA, SOIL EXPLORATION AND TESTING, EN DES SOIL SCHEDULE NO. 6.2.
   ALL ROLLED EARTH FILL SHALL BE IN ACCORDANCE WITH CONSTRUCTION SPECIFICATION G-9, ROLLED EARTH FILL FOR DAMS AND POWER PLANTS. ROLLED EARTHFILL SHALL CONSIST OF SOIL PLACED IN LAYERS NOT EXCEEDING 6" AFTER COMPACTION AND SHALL BE UNIFORMLY COMPACTED TO AT LEAST 95% OF STANDARD MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698 PROCEDURES. MOISTURE CONTENT OF EARTHFILL SHALL BE WITHIN ±3% OF OPTIMUM MOISTURE CONTENT.
4. BORROW MATERIAL AS MUCH AS PRACTICAL FOR THE DIKE SHALL BE OBTAINED FROM INSIDE THE DISPOSAL AREA. CUT SLOPES ADJACENT TO EMBANKMENTS SHALL NOT BE EXCAVATED STEEPER THAN 3:1 AND TOP OF CUT SHALL BE A MINIMUM OF 25 FEET FROM TOE OF EMBANKMENT. REMAINING BORROW MATERIAL SHALL BE OBTAINED FROM DESIGNATED BORROW AREA LOCATED SE OF DIKE AND BETWEEN SOUTHERN RAILWAY AND TENNESSEE HIGHWAY 70.
5. FOUNDATION PREPARATION FOR EARTH EMBANKMENTS SHALL CONSIST OF CLEARING AND REMOVING ALL ROOTS, VEGETATION, AND ORGANIC TOPSOIL. FOUNDATION AREA SHALL BE COMPACTED BY USING SHEEP'S FOOT ROLLER FOLLOWED BY A FLAT WHEELED ROLLER UNTIL DISTURBED AREA WILL SUPPORT HEAVY EQUIPMENT WITHOUT RUTTING INTO THE GROUND SO AS TO REDUCE ITS STABILITY. PRIOR TO PLACING FILL THE FOUNDATION MUST BE SCARIFIED SO THERE WILL BE GOOD BOND BETWEEN FOUNDATION AND FILL. THE SOIL INVESTIGATION PROGRAM INDICATED THE PRESENCE OF SOFT SOILS DIRECTLY BENEATH THE TOPSOIL AT STATION 9+50± AND STATION 34+00± IN THE DIKE FOUNDATION. SUCH SOFT AND SHALLOW SOILS DETECTED DURING THE FOUNDATION PREPARATION AT THESE LOCATIONS OR ANY OTHER LOCATION IN THE DIKE AREA SHALL BE REMOVED AND REPLACED BY IMPERVIOUS EARTH FILL COMPACTED IN LAYERS.
6. EARTH FILL FOR BORROW MATERIAL IN THE ASH DISPOSAL AREA SHALL NOT EXTEND TO A DEPTH TO INTERCEPT PERVIOUS SANDS AND/OR GRAVELS UNLESS A COMPACTED IMPERVIOUS BLANKET OF EARTHFILL WITH A MINIMUM THICKNESS OF 3FT. IS PLACED OVER EXPOSED SANDS AND/OR GRAVELS. IF THIN LAYERS OR POCKETS OF SAND AND/OR GRAVEL, ENCOUNTERED WITHIN FINE-GRAINED BORROW SOILS, ARE EXPOSED ON THE EXCAVATED SLOPE, THEY SHOULD BE BLANKETED WITH COMPACTED IMPERVIOUS EARTHFILL WITH A MINIMUM WIDTH OF 3FT.
7. IN VIEW OF A POTENTIAL FOR BORROW SHORTAGE, SAND AND GRAVEL MATERIALS, IF ENCOUNTERED DURING BORROW EXCAVATION OR DIKE FOUNDATION PREPARATION, SHALL NOT BE WASTED. IF SHORTAGE OF FINE-GRAINED BORROW SOIL OCCURS, SANDS AND GRAVELS MAY BE USED BENEATH THE OUTER SLOPE OF THE DIKE.
   GRANULAR FILL WITH LESS THAN 20% FINES SHALL BE COMPACTED TO AN AVERAGE RELATIVE DENSITY OF 85% OR GREATER WITH A MINIMUM RELATIVE DENSITY OF 80% AS DETERMINED BY ASTM D2049 PROCEDURES. GRANULAR MATERIAL WITH MORE THAN 20% FINES SHALL BE COMPACTED TO AT LEAST 95% OF STANDARD MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 (METHOD D) PROCEDURES.
8. DIKE SLOPES SHALL BE SEEDED WITH TYPE 6 MIXTURE 5. SEEDED AREAS ARE TO BE FERTILIZED AND MULCHED IN CONFORMENCE WITH SECTIONS 580 AND 582.
9. CRUSHED STONE SURFACING, 4 INCHES THICK, SHALL BE APPLIED FOR THE FULL WIDTH OF THE TOP OF THE DIKE IN ACCORDANCE WITH SECTION 305.
10. RIPRAP SHALL BE SOUND, DURABLE STONE, 18 INCHES THICK, WITH A MINIMUN OF 50% BY WEIGHT CONSISTING OF STONES AT LEAST 100 LBS. EACH. RIPRAP SHALL CONFORM TO SECTION 575. FILTER BLANKET, 6 INCHES THICK, SHALL CONFORM TO SECTION 570.
11. THE ASH DISPOSAL AREA SHALL BE CLEARED IN ACCORDANCE WITH SECTION 101. NO GRUBBING IS REQUIRED EXCEPT FOR AREAS OF DIKE FOUNDATIONS.
12. STONE GUTTER SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 510.
13. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 PLAIN FINISH AND SHALL HAVE A MINIMUM LAP DISTANCE OF 8 INCHES.
14. FAMILY OF COMPACTION CURVES DEVELOPED FOR BORROW AREAS A AND B BY SME AS PER EN DES SOIL SCHEDULE NO. 6.2 (CSB 810724 301) SHALL BE USED TO CONTROL THE EARTHFILL COMPACTION. IN-PLACE DENSITY TESTS USING THE SAND CONE (ASTM D1556) OR RUBBER BALLOON (ASTM D2167) TEST METHODS SHALL BE MADE AT A RATE OF AT LEAST 1 TEST FOR EACH 2000 CUBIC YARDS OF EARTHFILL PLACED (IN-PLACE VOLUME), OR A MINIMUM OF 1 PER DAY.
15. COMPACTED ASH FILL SHALL BE CONSTRUCTED THE SAME WAY THE EARTHFILL IS CONSTRUCTED. THE FAMILY-OF-COMPACT CURVES DEVELOPED FOR THE ASH FILL BY SME PER EN DES SOIL SCHEDULE NO. 6.4 (SME 84 1127 002) SHALL BE USED TO CONTROL THE COMPACTED ASH FILL. COMPACTION OF ASH FILL SHALL BE DONE WITH SMOOTH SURFACE STEEL WHEEL VIBRATORY ROLLERS.

FIRST ISSUE FOR W.O. 544-30-31401-J0084

COMPANION DWG: 10N297, 298
10W286-2, -3, -4

REV NO.	PA NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPD	DPM
3	WO # 20656	12/24/84	ROP	PRC			MHM		MHM	REH	ROB	OPT
	RELOC WEST DIKE. ADD NOTES, FLOAT SKIM, AND ACCESS RD & RAMP.											
2		12/6/83		DGG			MHM		MHM	REH	OPT	
	ADDED SECTIONS & STORAGE CAPACITY – WO 544-30-31401-J0084											
1		9/28/83					MHM		MHM	REH	OPT	
	ADD DET A3 & REV SUMMARY OF QUANTITIES – WO 544-30-31401-J0084											

DSGN R. D. MARONEY
DRWN V. R. LEE - A. H. SPEBBER
CHKD J. L. GLOVER
SUPV J. L. GLOVER
INSP J. R. Fox
ENGINEER K. W. Burnett

SCALE 1" = 100' EXCEPT AS NOTED

MAIN PLANT

FLY ASH DISPOSAL AREA "J" SHEET 1

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED Robert J. Bowman — RECOMMENDED — APPROVED

INSPECTED AND APPROVED FOR ISSUE

KNOXVILLE 7-28-82 | 41 | C | 10W286-1 R3

RECORD DRAWING AS CONSTRUCTED

10W286-2

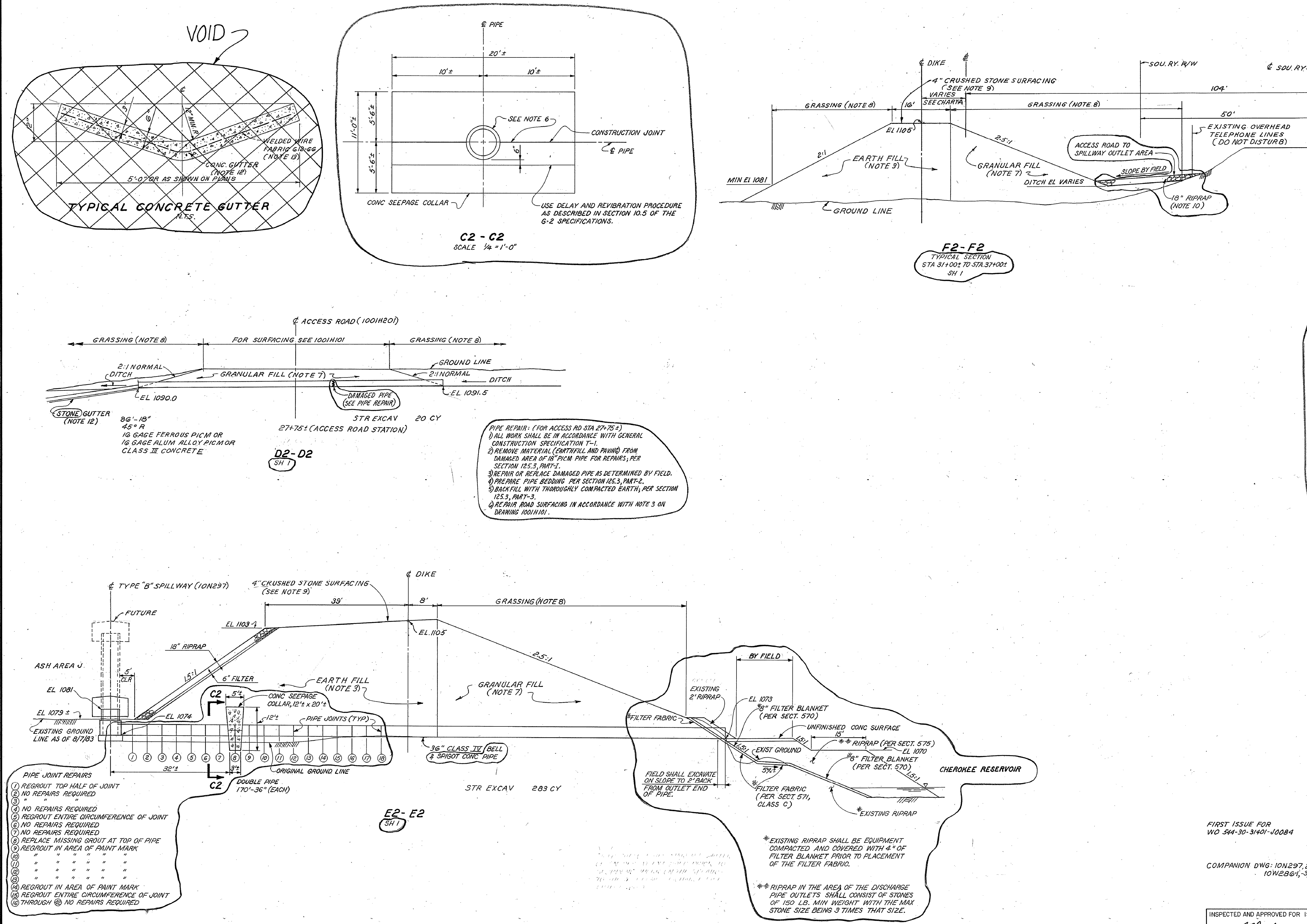


CHART A

℄ DIKE OFFSET FROM ℄ E-F

STATION	DISTANCE
32+00	14'
33+00	14'
34+00	BY FIELD
35+00	BY FIELD
36+00	21'
37+00	BY FIELD

NOTES:
1. FOR GENERAL NOTES SEE DWG 10W286-1.

NOTES FOR CONCRETE SEEPAGE COLLAR:
1. ALL WORK SHALL BE IN ACCORDANCE WITH GENERAL CONSTRUCTION SPECIFICATIONS T-1.
2. EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 125.
3. CONCRETE FOR THE SEEPAGE COLLAR SHALL BE "CLASS B" PER SECTION 400.
4. THE CONCRETE FOR THE SEEPAGE COLLAR SHALL BE POURED IN 2 LIFTS WITH A MINIMUM WAIT OF 24 HOURS BETWEEN LIFTS. THE FIRST LIFT SHALL BE POURED TO THE ELEVATION OF THE CENTERLINE OF THE PIPE.
5. BACKFILL SHALL BE COMPACTED TO 95% OF STANDARD MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698 PROCEDURES. MOISTURE CONTENT SHALL BE WITHIN ±3% OF OPTIMUM. SEE EN DES SOIL SCHEDULE NO. 6.2 FOR SOILS INVESTIGATION RESULTS. HAND HELD COMPACTORS SHALL BE USED WHERE NECESSARY TO OBTAIN THE REQUIRED COMPACTION.
6. SURFACES OF THE CONCRETE PIPE AND CONSTRUCTION JOINT SHALL BE CLEANED AND ROUGHENED BY APPROPRIATE METHODS. IMMEDIATELY PRIOR TO PLACING THE CONCRETE THE CLEANED AND ROUGHENED SURFACES SHALL BE COATED WITH AN EPOXY BONDING COMPOUND.
7. THE SEEPAGE COLLAR SHALL BE FORMED BY POURING THE CONCRETE DIRECTLY AGAINST THE SIDES AND BOTTOM OF THE EARTH EXCAVATION. NO WOOD OR METAL FORMS SHALL BE USED.

FIRST ISSUE FOR WO 544-30-31401-J0084

COMPANION DWG: 10N297, 298, 10W286-1, -3, -4

REV NO.	
2	WO # 20656 — REV E2-E2, ADD PIPE, PIPE JT & RD REPAIRS, ADD C2-C2 AND NOTES, MINOR REV
1	REV E2-E2

DSGN R.D. MARONEY — DRWN R.H. SPERBER — CHKD J.L. GLOVER — SUPV J.L. GLOVER — INSP J.R. FOX — ENGINEER K.W. BURNETT

SCALE: 1"=10' EXCEPT AS NOTED

MAIN PLANT

FLY ASH DISPOSAL AREA "J"
SHEET 2

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED — RECOMMENDED — APPROVED

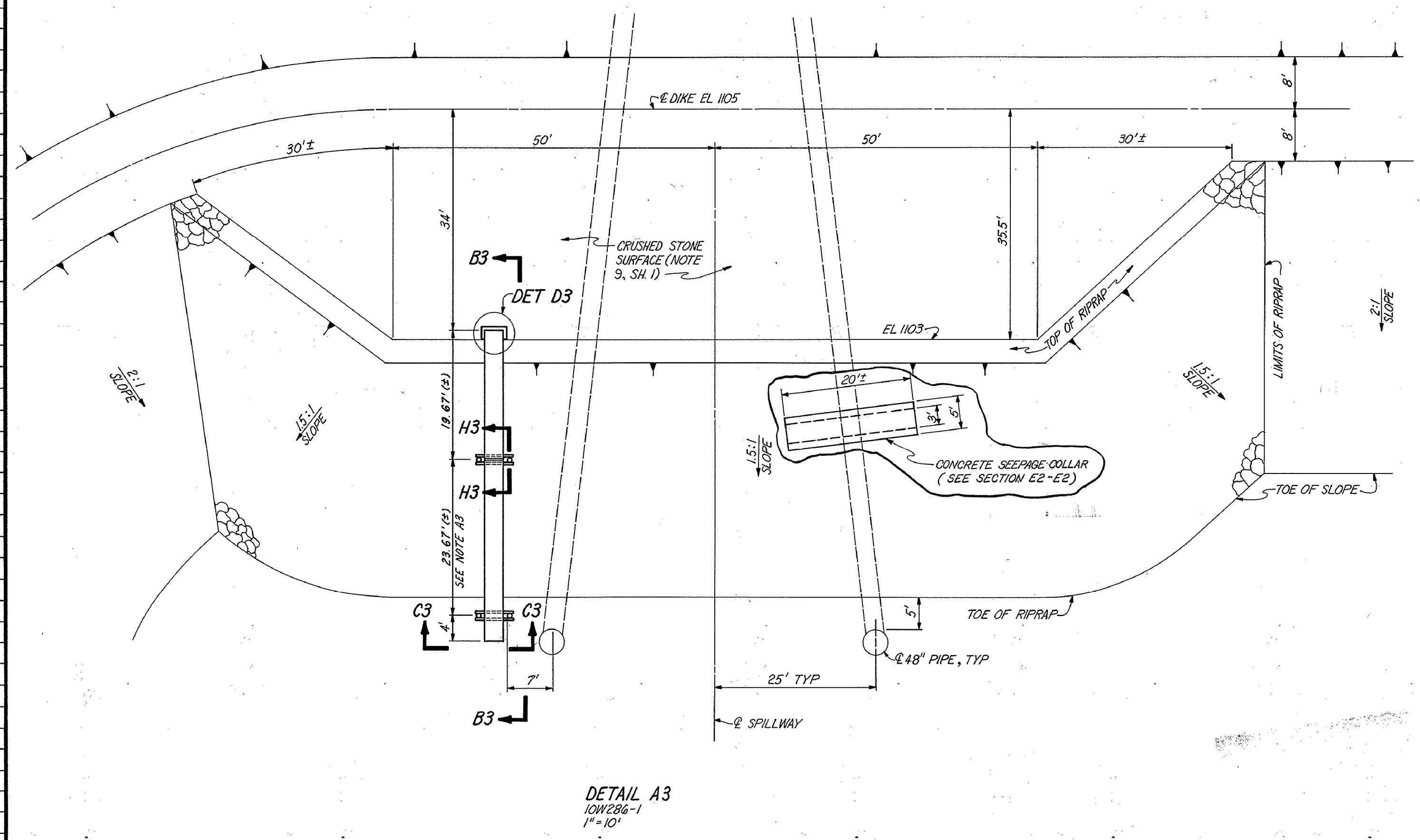
INSPECTED AND APPROVED FOR ISSUE

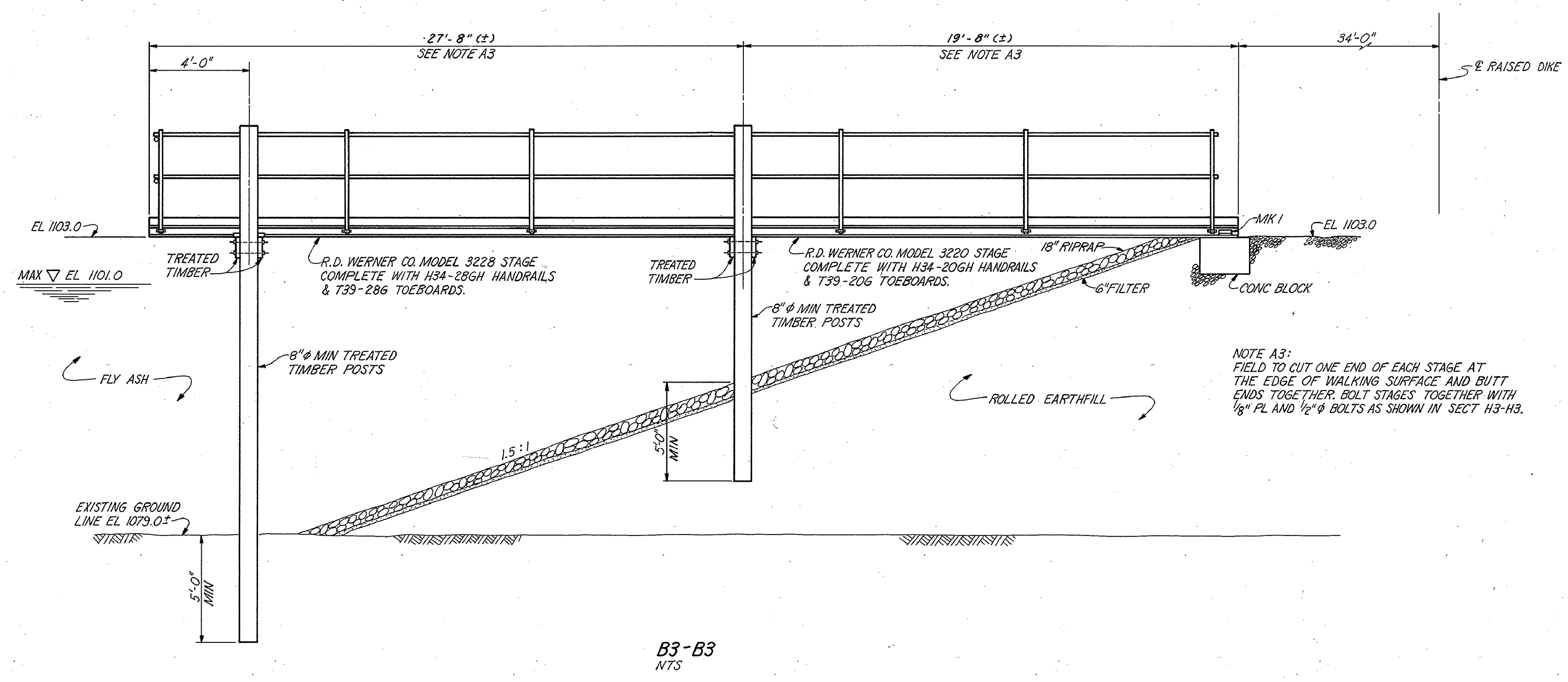
KNOXVILLE 7-28-82 41 C 10W286-2 R2

RECORD DRAWING AS CONSTRUCTED

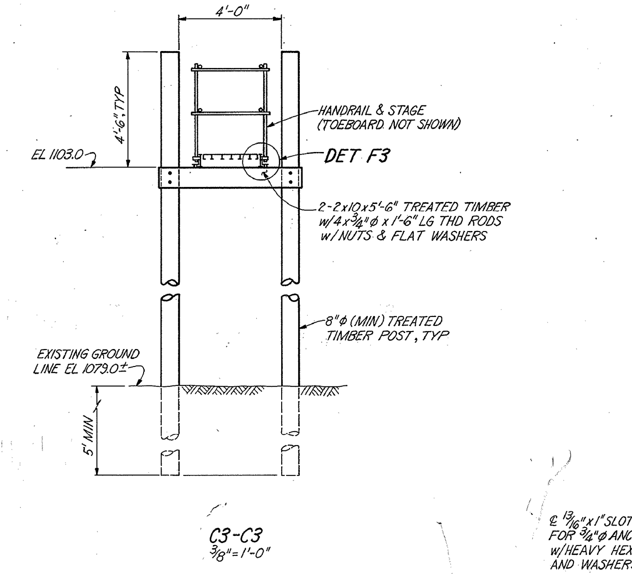
JSF-10W286-2-SHT -REV 2 MAIN PLANT FLY ASH DISPOSAL AREA J SHEET 2.cal (35% of Scale); ash_pond-dwgs; JSF; 10/22/2009 10:35 AM

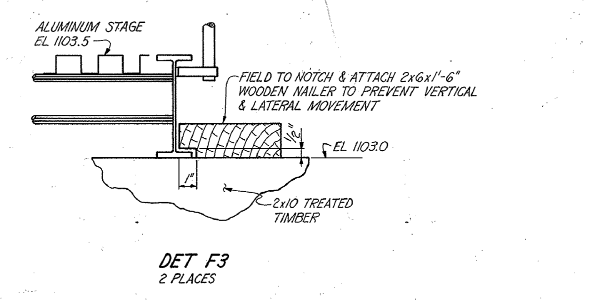
18773 RO
35380 R1

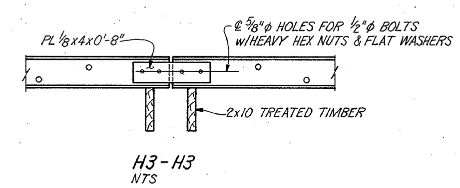


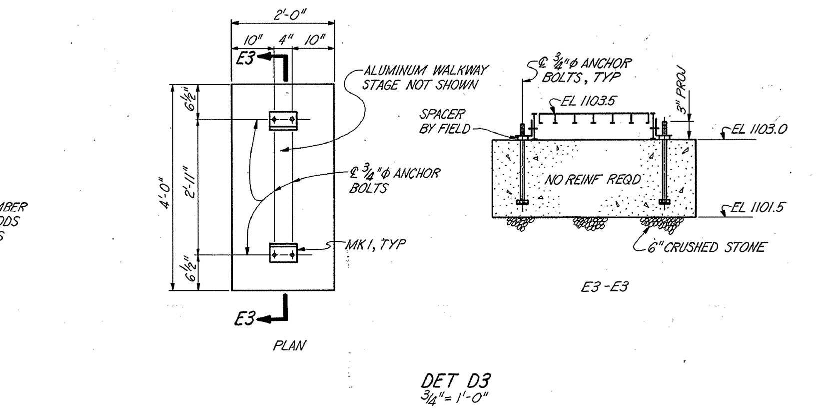


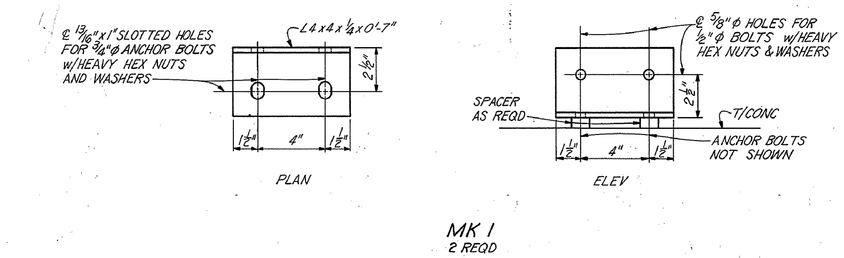
NOTE A3:
FIELD TO CUT ONE END OF EACH STAGE AT THE EDGE OF WALKING SURFACE AND BUTT ENDS TOGETHER. BOLT STAGES TOGETHER WITH 1/8" PL AND 1/2"φ BOLTS AS SHOWN IN SECT H3-H3.











NOTES:
1. ALL MATERIAL TO BE BY FIELD.
2. THREADED RODS AND L4x4 ANGLES SHALL BE ASTM A36.
3. ALL BOLTS AND NUTS SHALL BE ASTM A307.
4. FOR ADDITIONAL NOTES SEE 10W286-1.

SUMMARY OF QUANTITIES

DESCRIPTION	QUANTITY	UNITS
ALUMINUM WALKWAY STAGES COMPLETE w/HANDRAILS AND TOEBOARDS.	2	
2"x10" TREATED TIMBER PLANKING.	22	LF
8"φ (MIN) TREATED TIMBER POSTS.	115	LF
3/4"φ x 1'-6" THREADED RODS w/HEAVY HEX HEAD NUTS AND FLAT WASHERS.	8	EA
2"x6" WOODEN NAILER w/NAILS AS REQD.	3	LF
L4x4x1/4x0'-7"	2	EA
3/4"φ x 1'-4" ANCHOR BOLT w/3" PROJ.	4	EA
1/2"φ x 0'-3" BOLTS w/HEAVY HEX HEAD NUTS AND WASHERS.	12	EA
3000 PSI CONCRETE.	12	CF
1/8x4x0'-8" STEEL PL.	2	EA

FIRST ISSUE FOR
W.O. 544-30-31401-J0084

COMPANION DWGS:
10W286-1, 2, 8-4, 10N297, 298

REV NO.	PA. NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPD
1	WO # 20656	12/24/84	RDP	PRC			MHM		MHM	RERA	ROB
	ADDED CONC SEEPAGE COLLAR										

DSGN Donald Galloway
DRWN Sherry Caro
CHKD J. Hillis Stevens
SUPV J. Hillis Stevens
INSP
ENGINEER M. H. Miller

SCALE: 3" = 1'-0" EXCEPT AS NOTED

MAIN PLANT

FLY ASH DISPOSAL AREA "J" SHEET 3

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
M. H. Miller	R. E. Harris	O. P. Thornton

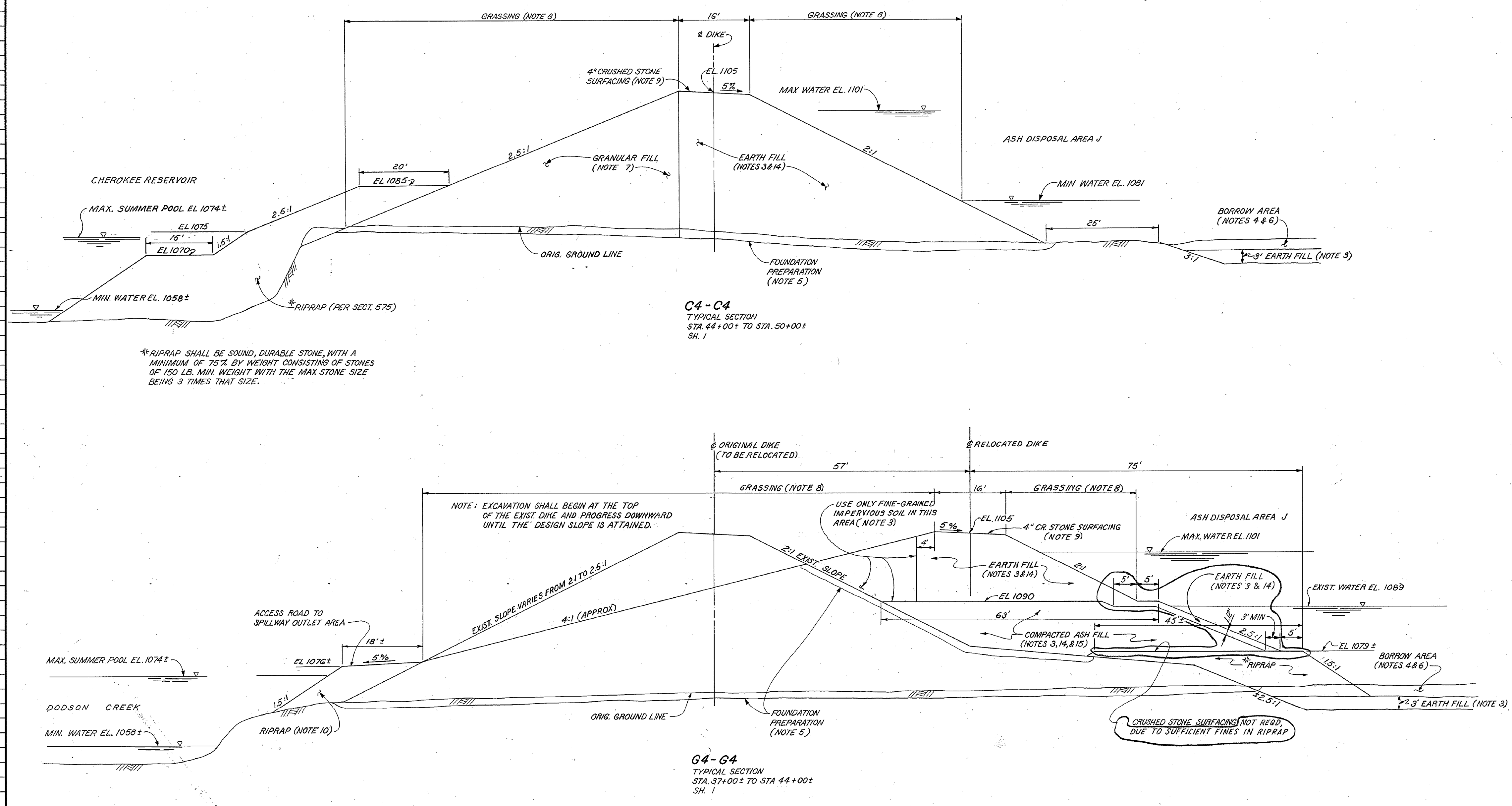
INSPECTED AND APPROVED FOR ISSUE

KNOXVILLE 9/28/83 41 C 10W286-3 R1

RECORD DRAWING AS CONSTRUCTED

TECHNICAL INFORMATION CENTER INDEXED KNOXVILLE

PRINT H
SIZE F
BR OR PROJ ME EE CE AD CD ED MD TP EP SW BL HP YC
PRINTS REQD-R 0



NOTES:
1. FOR GENERAL NOTES SEE DWG 10W286-1.

FIRST ISSUE FOR
WO 544-30-31401-J0084

COMPANION DRAWINGS:
10N297,298
10W286-1,-2,4-3

REV NO.	ECN NO.	DATE	
1	WOW 20656	7/10/85	REV G4-G4 TO ADD EARTH COVER ON FACE OF ASH FILL

ENGINEER M. H. Mills

SCALE: 1" = 10' EXCEPT AS NOTED

MAIN PLANT

FLY ASH DISPOSAL AREA "J"
SHEET 4

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED RECOMMENDED APPROVED

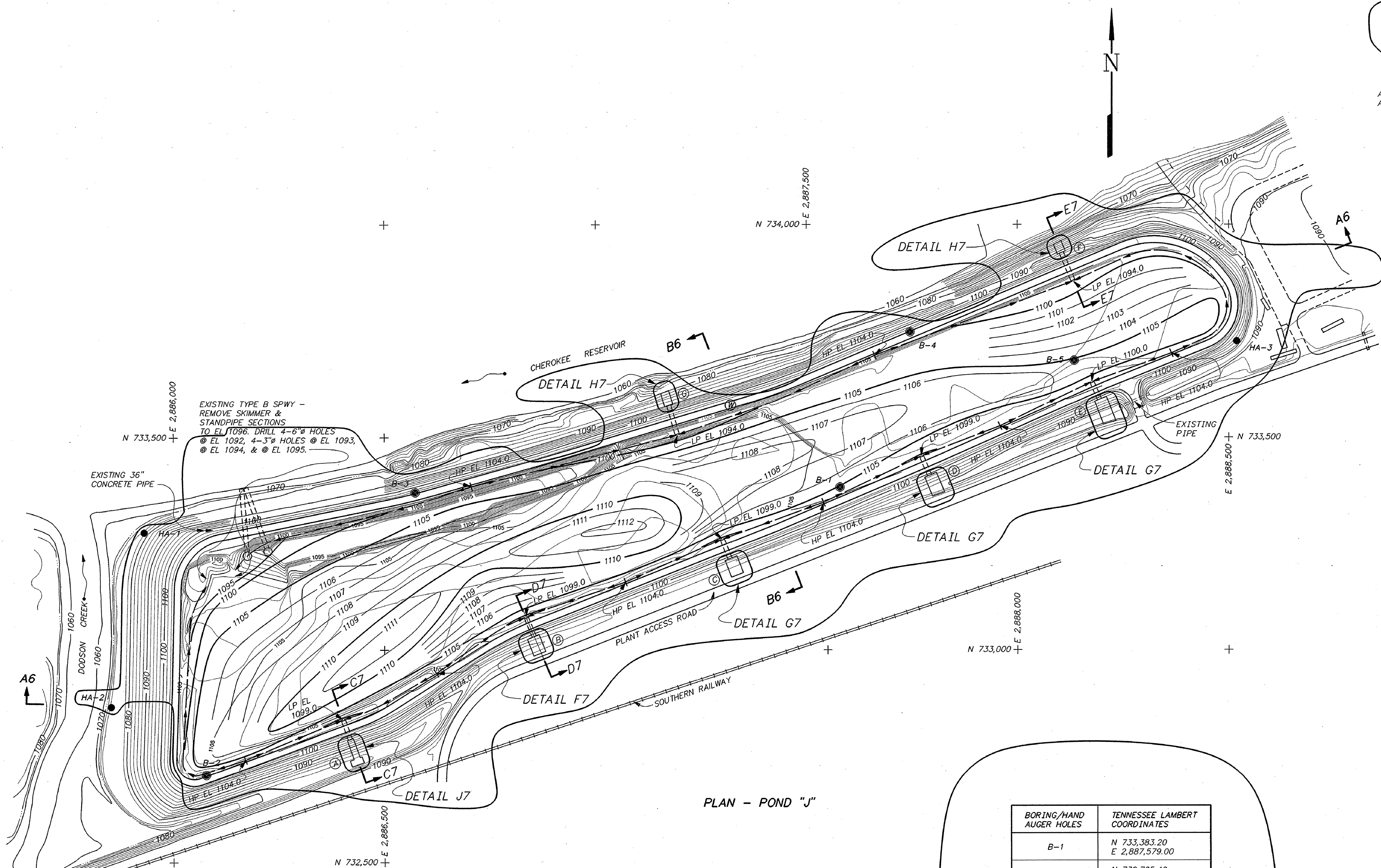
INSPECTED AND APPROVED FOR ISSUE

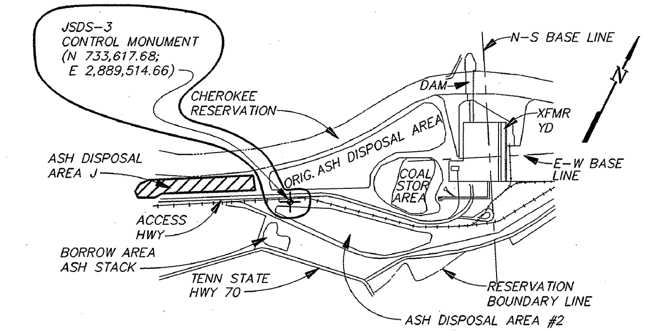
KNOXVILLE 12/24/84 41 C 10W286-4 R1

RECORD DRAWING AS CONSTRUCTED

JSF-10W286-4-SHT -REV 1 MAIN PLANT FLYASH DISPOSAL AREA J SHEET 4.cal (35% of Scale); ash_pond-dwgs; JSF; 10/22/2009 10:36 AM

41	C	10W286-5





KEY PLAN

NOTES:

1. ALL WORK FOR CLOSURE OF FLY ASH DISPOSAL AREA "J" SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN THE "CLOSURE/POST CLOSURE PLAN, POND "J" ASH DISPOSAL FACILITY, TENNESSEE VALLEY AUTHORITY, JOHN SEVIER FOSSIL PLANT", PREPARED FOR THE TENNESSEE VALLEY AUTHORITY BY TRIBBLE & RICHARDSON, INC. AND LAW ENGINEERING, INC. THIS DOCUMENT SHALL BE REFERRED TO AS THE "CLOSURE PLAN".
2. THE EXISTING ASH SHALL BE GRADED TO BRING THE ASH SURFACE TO WITHIN 2 FEET OF THE FINISHED GRADE AS SHOWN ON THE PLAN. THE ASH FILL SHALL BE PLACED & SPREAD IN HORIZONTAL LAYERS OF 8 TO 12 INCHES WITH A MAXIMUM 12 INCH LOOSE THICKNESS AND SHALL BE TRACKED WITH A DOZER OR SUITABLE HAULING EQUIPMENT. THE ASH FILL SHALL BE ROLLED A MINIMUM OF 4 PASSES, IMMEDIATELY AFTER SPREADING, BY SMOOTH SURFACE STEEL WHEEL VIBRATORY ROLLERS (6 TO 10 TONS) FOR COMPACTION.
3. THE 12" MINIMUM THICKNESS COMPACTED CLAY SOIL LAYER SHALL BE CONSTRUCTED IN ACCORDANCE WITH AND MEET THE REQUIREMENTS OF SECTION III.B OF THE CLOSURE PLAN.
4. THE 12" MINIMUM THICKNESS VEGETATIVE SUPPORT LAYER SHALL MEET THE REQUIREMENTS OF SECTION III.B.4.e OF THE CLOSURE PLAN.
5. FERTILIZING, SEEDING, AND MULCHING SHALL BE IN ACCORDANCE WITH SECTION III.B.4.e. AND APPENDIX B OF THE CLOSURE PLAN. PERMANENT SEEDING SHALL BE TYPE 8. TEMPORARY SUMMER SEEDING SHALL BE TYPE 10.
6. RIPRAP SHALL BE 12" THICK AND IN ACCORDANCE WITH SECTION 575 OF THE T-1 SPECIFICATION. A MINIMUM OF 50% BY WEIGHT OF THE STONES SHALL BE 100 LB. EACH. FIELD SHALL EXCAVATE AS NECESSARY TO INSURE THAT TOP OF RIPRAP SURFACE DOES NOT PROTRUDE ABOVE SURROUNDING DITCH ELEVATION. SEE DRAWING 10W286-7 FOR DRAINAGE DITCH DETAILS.

LEGEND:

- 1080 — EXISTING CONTOURS
- 1105 / 1109 — PROPOSED CONTOURS
- Ⓦ MONITORING WELL
- ◉ BORING LOCATION
- ● HAND AUGER BORING LOCATION

BORING/HAND AUGER HOLES	TENNESSEE LAMBERT COORDINATES
B-1	N 733,383.20 E 2,887,579.00
B-2	N 732,705.40 E 2,886,077.50
B-3	N 733,370.90 E 2,886,573.00
B-4	N 733,747.80 E 2,887,744.70
B-5	N 733,680.50 E 2,888,134.60
HA-1	N 733,277.00 E 2,885,931.00
HA-2	N 732,865.60 E 2,885,852.60
HA-3	N 733,726.00 E 2,888,518.90

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST
R 1	1-18-95	BKE	MGH	JLG	JLG	KWB	RGJ	WDH	5126	
REV. NOTE 2, PROP. CONTOURS, & DRAINAGE. ADD NOTE 6 & HAND AUGER BORING SYMBOL.										
R 0	11-18-92	RDP	MGH	JLG	JLG	KWB	RGJ			
INITIAL ISSUE										

DISCIPLINE INTERFACE

SCALE: 1" = 100' EXCEPT AS NOTED

MAIN PLANT

FLY ASH DISPOSAL AREA "J"
CLOSURE PLAN
SHEET 5

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
R.D.POWELL	M.G.HRANEK	J.L.GLOVER	J.L.GLOVER	K.W.BURNETT	R.G.JOHNSON	

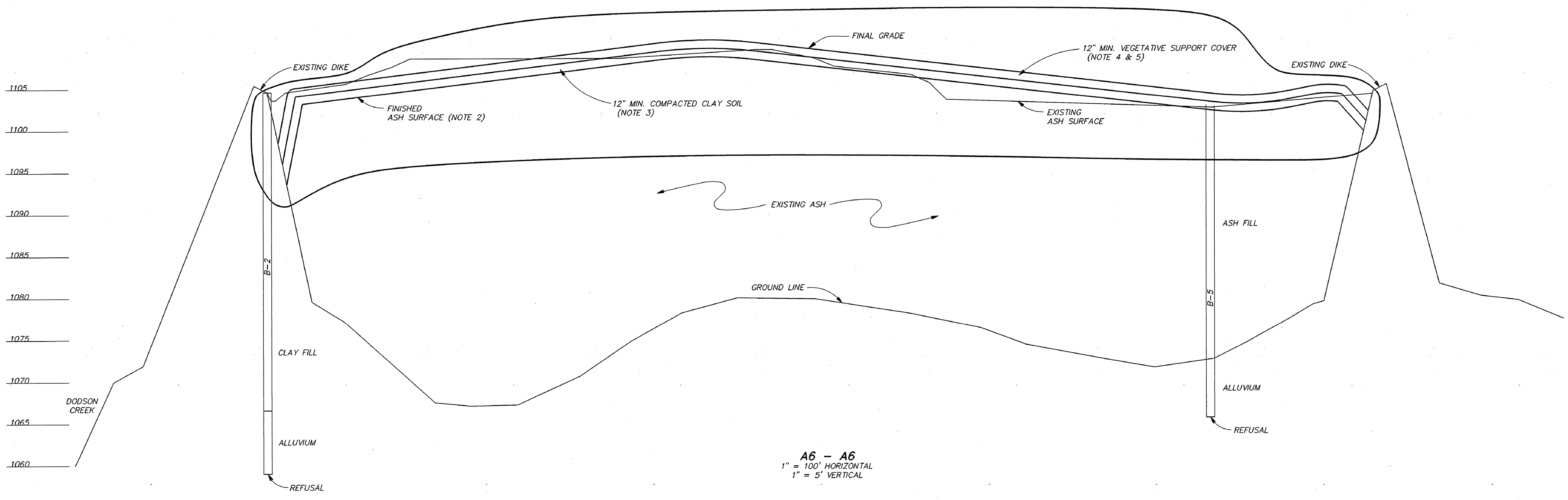
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R12	DATE 11-18-92	41	C	10W286-5	R 1

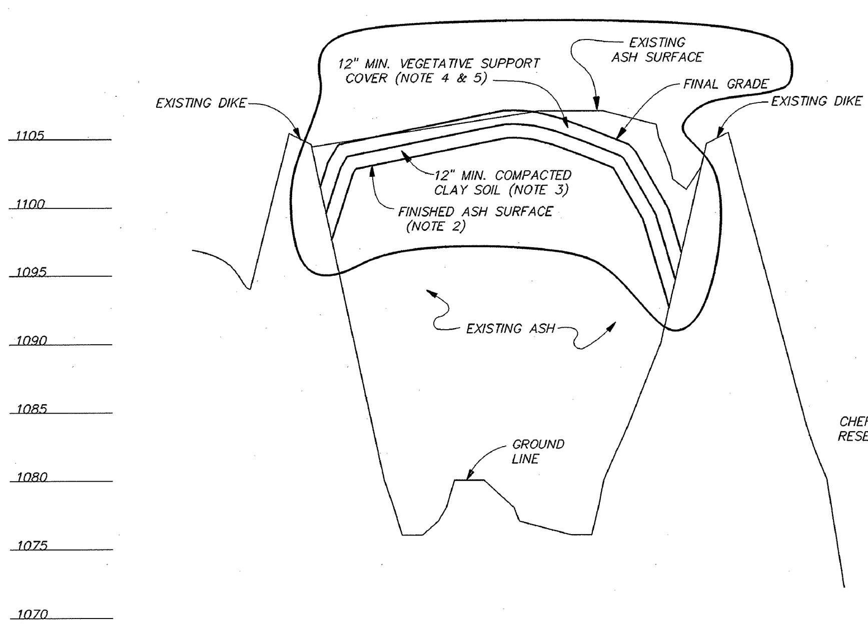
PLOT FACTOR:1200
W-SIZE
FILENAME: JSPONDJ.DWG

C.A.D. DRAWING
DO NOT ALTER MANUALLY

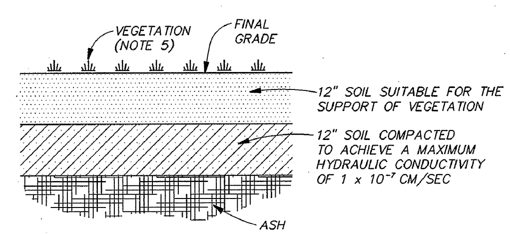
TASK COMPLETED BY: | REV NO.



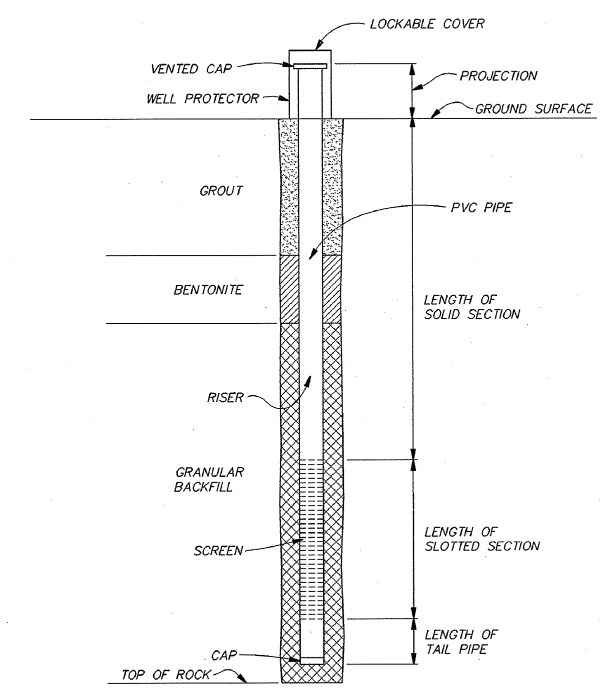
A6 – A6
1" = 100' HORIZONTAL
1" = 5' VERTICAL



B6 – B6
1" = 50' HORIZONTAL
1" = 5' VERTICAL



TYPICAL FINAL CAP SECTION
NTS



TYPICAL MONITORING WELL
NTS

NOTES:
1. FOR GENERAL NOTES SEE 10W286-5.

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	1-18-95	BKE	MGH	JLG	JLG	KWB	RGJ	WDH	5126		
REVISED FINAL GRADE.											
R 0	11-18-92	RDP	MGH	JLG	JLG	KWB	RGJ	WDH			
INITIAL ISSUE.											

DISCIPLINE INTERFACE

SCALE: AS SHOWN EXCEPT AS NOTED

MAIN PLANT

ASH DISPOSAL AREA "J"
CLOSURE – SECTIONS
SHEET 6

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
R.D.POWELL	M.G.HRANEK	J.L.GLOVER	J.L.GLOVER	K.W.BURNETT	K.W.BURNETT	

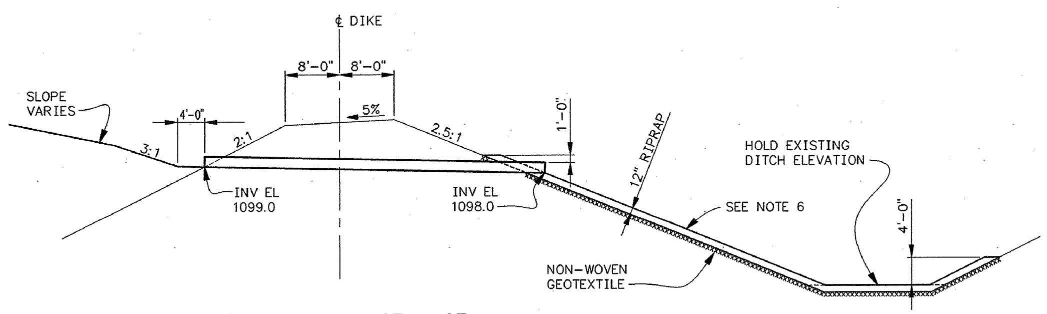
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R12 | DATE 11-18-92 | 41 | C | 10W286-6 | R 1

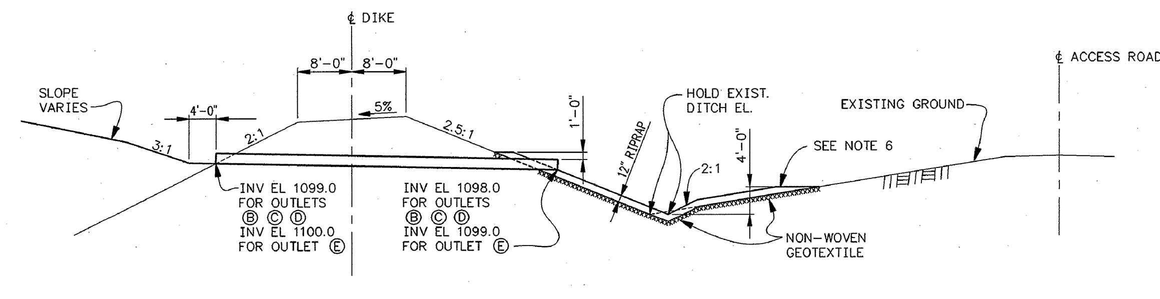
PLOT FACTOR:60
W-SIZE
FILENAME: JSSECTJ.DWG

C.A.D. DRAWING
DO NOT ALTER MANUALLY

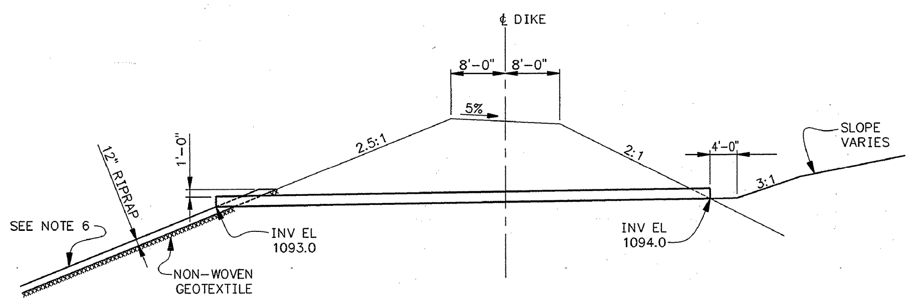
TASK COMPLETED BY: | REV NO.



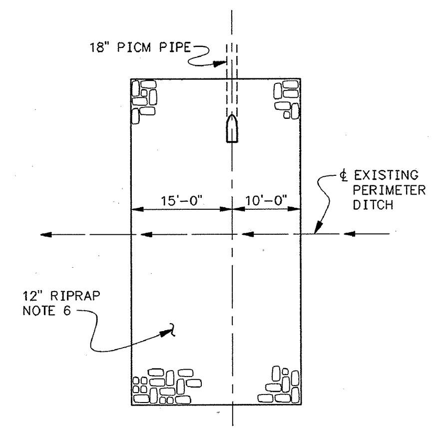
C7 – C7



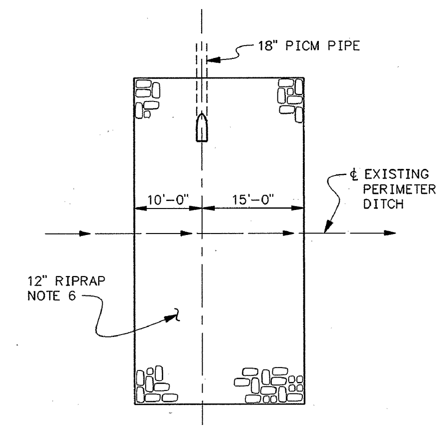
D7 – D7



E7 – E7

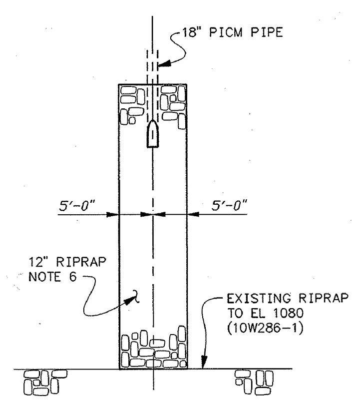


DETAIL F7

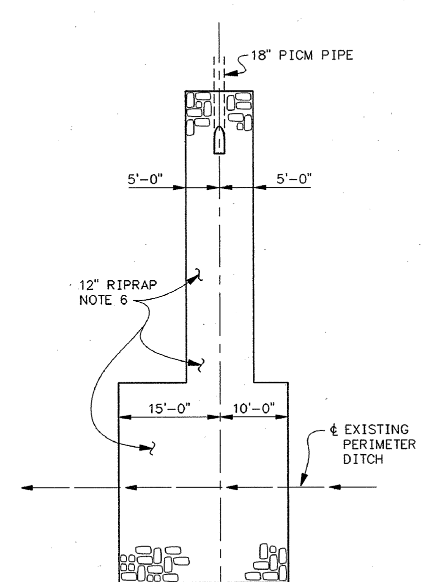


DETAIL G7

NOTES:
1. FOR GENERAL NOTES SEE 10W286-5.



DETAIL H7



DETAIL J7

R								WDH		
R 0	1-18-95	BKE	MGH	JLG	JLG	KWB	RGJ	WDH	5126	
INITIAL ISSUE.										
REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST

SCALE: 1" = 10' EXCEPT AS NOTED

MAIN PLANT

FLY ASH DISPOSAL AREA "J" CLOSURE PLAN – SECTIONS AND DETAILS – SHEET 7

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
B.K.ELDER	M.G.HRANEK	J.L.GLOVER	J.L.GLOVER	K.W.BURNETT	R.G.JOHNSON	W.D.HALL

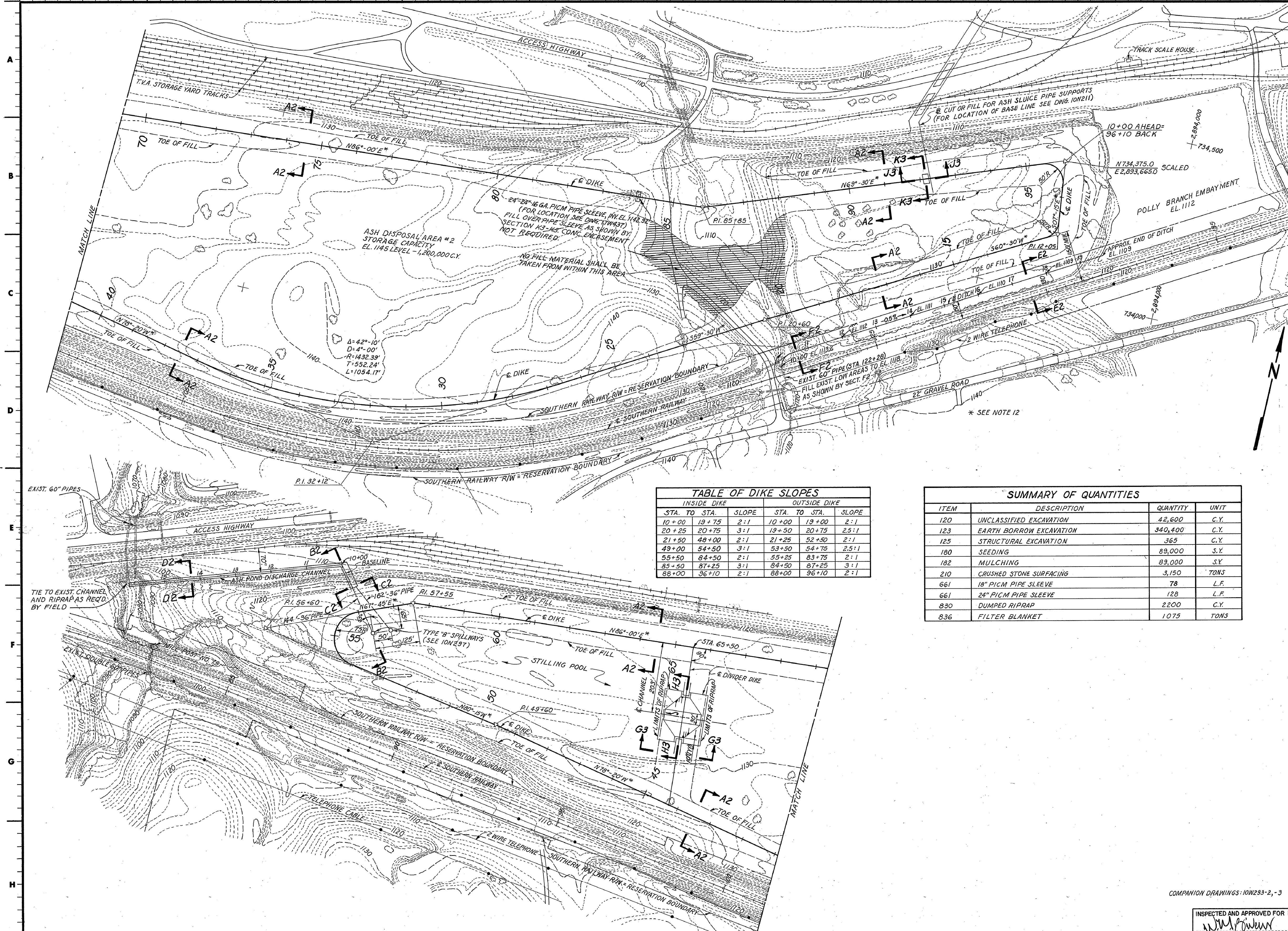
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R12 | DATE 1-18-95 | 41 | C | 10W286-7 | R 0

TASK COMPLETED BY: | REV NO.

PLOT FACTOR:120
W-SIZE
FILENAME: JS286-7.DWG

C.A.D. DRAWING DO NOT ALTER MANUALLY



NOTES:

1. ALL CONSTRUCTION, EXCEPT ROLLED EARTHFILL, SHALL BE IN ACCORDANCE WITH T-1 SPEC.
2. THE RESULTS OF THE SOIL INVESTIGATION FOR THE CONSTRUCTION OF THE ASH DISPOSAL AREA DIKES ARE REPORTED IN A MEMO FROM GENE FARMER TO G.L. BUCHANAN DATED DECEMBER 10, 1976, JOHN SEVIER STEAM PLANT - NEW ASH DISPOSAL AREA - SOILS INVESTIGATION, EN. DES. SOIL SCHEDULE NO. 6.
3. ALL ROLLED EARTHFILL SHALL BE IN ACCORDANCE WITH CONSTRUCTION SPEC. G-9, ROLLED EARTHFILL FOR DAMS AND POWER PLANTS. ROLLED EARTHFILL SHALL CONSIST OF SOIL PLACED IN LAYERS NOT EXCEEDING 6" AFTER COMPACTION AND SHALL BE UNIFORMLY COMPACTED TO AT LEAST 95% OF STD. MAX. DRY DENSITY AS DETERMINED BY ASTM D-698 PROCEDURES (STANDARD PROCTOR). MOISTURE CONTENT OF EARTHFILL SHALL BE WITHIN ±3% OF OPTIMUM MOISTURE CONTENT.
4. FROM STA. 19+50 TO STA. 21+50 AND FROM STA. 84+00 TO STA. 88+00 (APPROXIMATELY BETWEEN EL. 1125 CONTOURS), A NARROW INSPECTION TRENCH SHALL BE EXCAVATED TO A DEPTH OF 10'. IN ANY AREA WHERE GRAVEL STRATUM IS EXPOSED, A CUTOFF TRENCH IS TO BE EXCAVATED THROUGH THE PERVIOUS STRATUM AND BACKFILLED WITH COMPACTED IMPERVIOUS EARTHFILL MATERIAL AS SHOWN BY SECT. A2-A2. WHERE A CUTOFF TRENCH IS NOT REQUIRED, THE INSPECTION TRENCH IS TO BE IMMEDIATELY BACKFILLED, AFTER INSPECTION, WITH THE EXCAVATED MATERIALS AND THOROUGHLY COMPACTED.
5. BORROW MATERIAL SHALL BE EXCAVATED TO A DEPTH OF 10' BENEATH THE EXISTING GROUND SURFACE OR 2' MINIMUM BENEATH GRAVEL STRATUM WHERE ENCOUNTERED, EXCEPT AT LOCATIONS WHERE INSPECTION TRENCH IS REQUIRED. WHERE GRAVEL STRATUM IS EXPOSED, THE EXCAVATED SLOPE SHALL BE BLANKETED WITH COMPACTED IMPERVIOUS EARTHFILL MATERIAL AS SHOWN BY SECTION A2-A2.
6. WHERE A CUTOFF TRENCH IS REQUIRED ADJACENT TO BLANKETED EXCAVATION SLOPE, THE CUTOFF TRENCH SHALL BE EXTENDED ACROSS THE WIDTH OF THE DIKE TO TIE INTO THE BLANKETED EXCAVATION SLOPE.
7. EARTHFILL FOR DIKE CONSTRUCTION SHALL CONSIST OF MATERIAL EXCAVATED FROM INSIDE ASH DISPOSAL AREA NO. 2. PERVIOUS GRANULAR SOILS COMPARABLE TO BORROW SOIL CLASS VII, AS DEFINED BY THE MEMO PER NOTE 2, SHALL NOT BE USED AS EARTHFILL FOR DIKE CONSTRUCTION. CUT SLOPES FOR BORROW MATERIAL ADJACENT TO THE DIKE SHALL BE 3:1 OR FLATTER, AND THE TOP OF CUT SHALL BE A MINIMUM OF 25' FROM THE TOE OF DIKE SLOPE.
8. THE MINIMUM FACTOR OF SAFETY FOR ALL LOADING CONDITIONS INVESTIGATED BY STABILITY ANALYSIS FOR THE ASH DISPOSAL DIKES IS 1.21. THIS FACTOR OF SAFETY IS FOR THE SUDDEN DRAWDOWN CONDITION.
9. CRUSHED STONE OR GRAVEL SURFACING, 4" THICK, SHALL BE APPLIED FOR THE FULL WIDTH OF THE TOP OF DIKE IN ACCORDANCE WITH SECTION 210.
10. ALL CUT AND FILL SLOPES AND OTHER DISTURBED AREAS SHALL BE SEEDED WITH TYPE 6, MIXTURE E, IN ACCORDANCE WITH SECTION 180. DEPENDING ON THE TIME OF CONSTRUCTION, IT MAY BE NECESSARY TO PROVIDE A TEMPORARY COVER ON THE DIKE SLOPES. ALL GRASSED AREAS SHALL BE FERTILIZED AND MULCHED IN ACCORDANCE WITH SECTIONS 180 AND 182 RESPECTIVELY.
11. RIPRAP SHALL BE PLACED AS SHOWN ON THE DRAWINGS WITH A MINIMUM OF 50%, BY WEIGHT, CONSISTING OF STONES OF AT LEAST 150 LB. EACH. RIPRAP SHALL CONFORM TO SECTION 830.
12. FILTER SHALL CONFORM TO SECTION 836.
13. ALL CENTERLINE BEARINGS ARE APPROXIMATE SCALED BEARINGS.

TABLE OF DIKE SLOPES

INSIDE DIKE			OUTSIDE DIKE		
STA.	TO STA.	SLOPE	STA.	TO STA.	SLOPE
10+00	19+75	2:1	10+00	19+00	2:1
20+25	20+75	3:1	19+50	20+75	2.5:1
21+50	48+00	2:1	21+25	52+50	2:1
49+00	54+50	3:1	53+50	54+75	2.5:1
55+50	84+50	2:1	55+25	83+75	2:1
85+50	87+25	3:1	84+50	87+25	3:1
88+00	96+10	2:1	88+00	96+10	2:1

SUMMARY OF QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNIT
120	UNCLASSIFIED EXCAVATION	42,600	C.Y.
123	EARTH BORROW EXCAVATION	340,400	C.Y.
125	STRUCTURAL EXCAVATION	365	C.Y.
180	SEEDING	89,000	S.Y.
182	MULCHING	89,000	S.Y.
210	CRUSHED STONE SURFACING	3,150	TONS
661	18" PICM PIPE SLEEVE	78	L.F.
661	24" PICM PIPE SLEEVE	128	L.F.
830	DUMPED RIPRAP	2200	C.Y.
836	FILTER BLANKET	1075	TONS

COMPANION DRAWINGS: 10W293-2, -3

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPD
2		8-20-80	GRO	TAC	JLG	JLG	KWB	RJB	RJB	FDS	GLB
RECORD AS CONSTRUCTED; P.A. 3312											
1		4-25-78	ROP	B.S.W.	ROP	AEH	KWB	—	RJB	JDS	GLB
REV. NOTES, TABLE OF DIKE SLOPES, & EXCAV. QUANTITIES; MINOR REVISIONS; P.A. 3312.											

DSGN R.D. POWELL
DRWN B.S. WAYCASTER
CHKD R.D. POWELL
SUPV J.L. GLOVER
INSP
ENGINEER K.W. Burnett

SCALE: 1" = 100' EXCEPT AS NOTED

MAIN PLANT

ASH DISPOSAL AREA NO. 2 PLAN

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

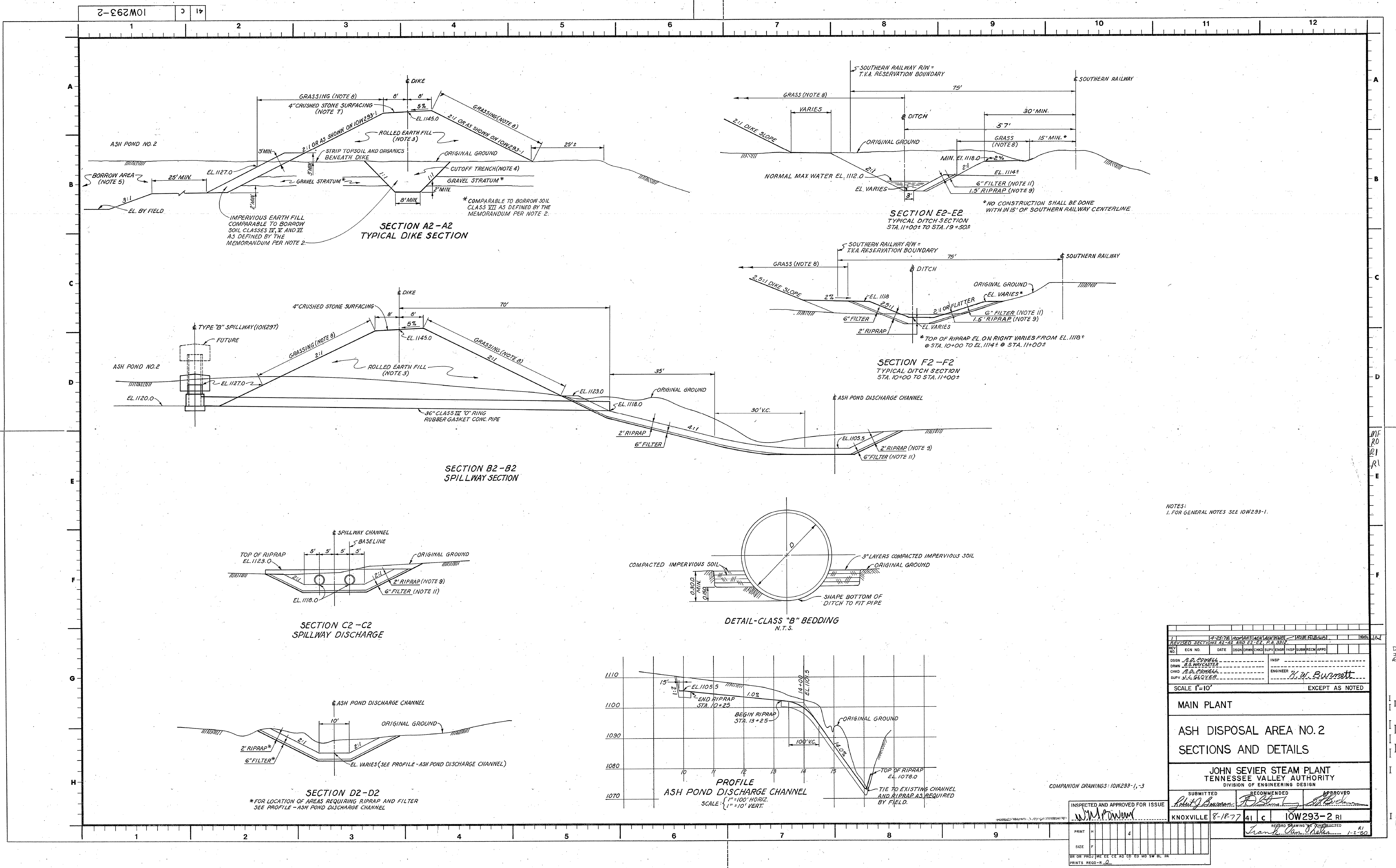
SUBMITTED Robert J. Bowman | RECOMMENDED [signature] | APPROVED [signature]

INSPECTED AND APPROVED FOR ISSUE W.M. Bowen

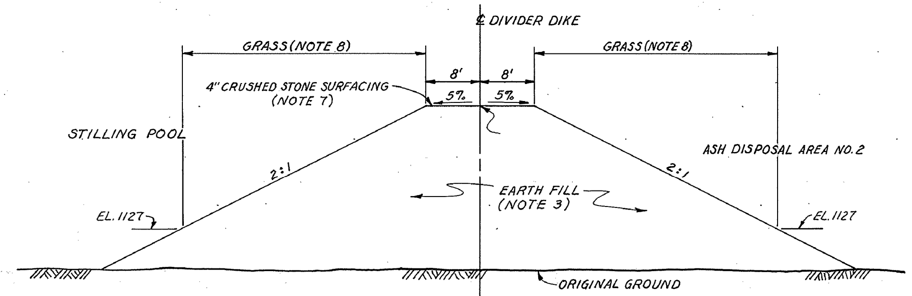
KNOXVILLE 8-18-77 | 41 | C | 10W293-1 R2

RECORD DRAWING AS CONSTRUCTED 1-20-80 Frank Van Meter R2

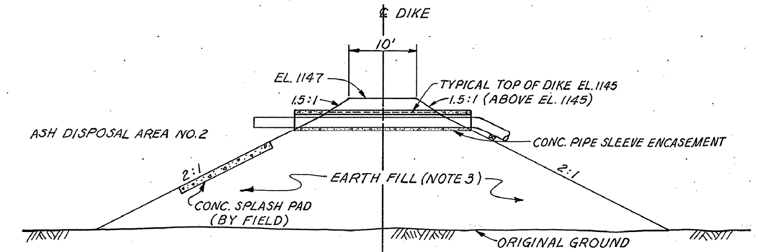
PRINT H 4
SIZE F
BR OR PROJ ME EE CE AD CD ED MD SW BL PA
PRINTS REQD-R 0



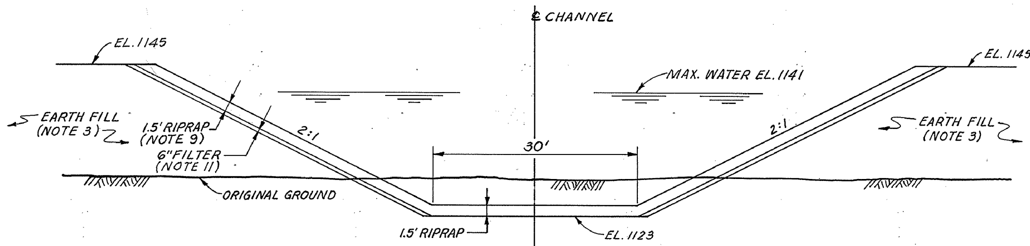
JSF-10W293-2-SHT -REV 1 MAIN PLANT ASH DISPOSAL AREA NO. 2 SECTIONS AND DETAILS.cal (35% of Scale); ash_pond-dwgs; JSF; 10/22/2009 10:38 AM



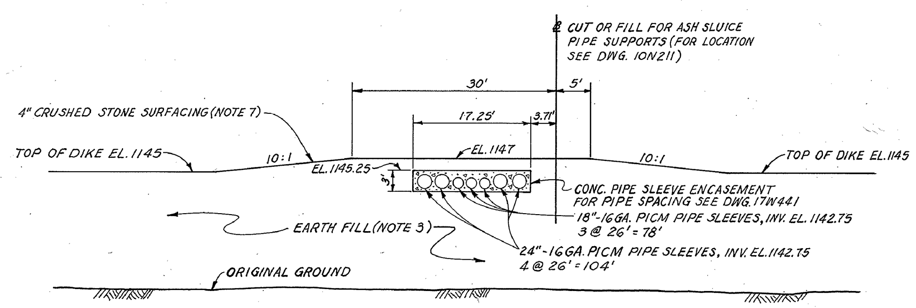
SECTION G3-G3
TYPICAL DIVIDER DIKE SECTION



SECTION K3-K3



SECTION H3-H3



SECTION J3-J3

NOTES:
1. FOR GENERAL NOTES SEE 10W293-1.

COMPANION DRAWINGS: 10W293-1, -2

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPD

DSGN R.O. POWELL
DRWN B.S. HAYCAFTER
CHKD R.O. POWELL
SUPV J.L. GLOVER
INSP
ENGINEER K. W. Burnett

SCALE 1" = 10' EXCEPT AS NOTED

MAIN PLANT

ASH DISPOSAL AREA NO. 2
SECTIONS AND DETAILS

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED Robert J. Bowman | RECOMMENDED | APPROVED

INSPECTED AND APPROVED FOR ISSUE

KNOXVILLE 8-18-77 | 41 | C | 10W293-3 R0

RECORD DRAWING AS CONSTRUCTED

PRINTS REQD - R 0

Tennessee Valley Authority
Division of Water Control Planning
Geologic Branch

PRELIMINARY GEOLOGIC INVESTIGATIONS FOR THE JOHN SEVIER STEAM PLANT

John M. Kellberg
Charles P. Benziger

Knoxville, Tennessee
September 3, 1952

PRELIMINARY GEOLOGIC INVESTIGATIONS
FOR THE JOHN SEVIER STEAM PLANT

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2	Geologic Sections, Sections 26+00 Through 32+00	41 GE 1 822K1146
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4	Geologic Sections, Ranges G, J, L, N, and O	41 GE 1 822K1148
5	Geologic Sections, Ranges P, R, and T	41 GE 1 822K1149

PRELIMINARY GEOLOGIC INVESTIGATIONS FOR THE JOHN SEVIER STEAM PLANT

John M. Kellberg
Charles P. Benziger

INTRODUCTION

Location and Scope of the Investigation

Preliminary geologic investigations for a steam plant site near the head of the Cherokee Reservoir were carried on during April and May of 1952. The site examined occupies the left bank of the Holston River from mile 106.1 to mile 106.4. Sixty exploratory holes totaling 2378.8 linear feet were drilled on a 100-foot grid extending for 1600 feet along ranges roughly parallel to the river and 1200 feet back from the bank of the river along sections. Of this drilling 1214.5 linear feet were in overburden and 1164.3 linear feet were in rock (exhibit 1).

General Physiography

The John Sevier site is located in the Valley and Ridge Province of the Appalachian Highlands. This province extends from New York to Alabama and varies in width from 20 to 75 miles. It is bounded on the east by the steep slopes of the Blue Ridge front and on the west by the abrupt escarpment of the Cumberland Plateau. The Appalachian Valley subregion, confined largely to East Tennessee, but occupying small portions of Alabama and Virginia, extends northeastward across the Tennessee Basin. It has an area of slightly more than 11,000 square miles.

Physiographically, this sub-region is characterized by long narrow ridges and somewhat broader intervening valleys with a northeast-southwest trend. The ridges are roughly parallel and fairly even topped. They are held up by the resistant sandstones and the less soluble limestones and dolomites. The valleys are excavated on the easily weathered shales and the more soluble limestones.

The elevation of the ridge summits and valley floors decrease progressively from the northeast to the southwest. In the extreme northeastern portion of the region the valleys are narrow and gorge-like, ranging in elevation from 2000 to 2500 feet in the valley floors up to 4000 to 4500 feet for the summits of the ridges. In the vicinity of the John Sevier site the Holston River flows at an elevation of approximately 1070 feet, while the tributary valleys range in elevation from 1120 to 1300 feet. Comparative elevations become progressively lower to the southwest.

General Geology

The Appalachian Valley is a region of highly deformed but unmetamorphosed sedimentary rocks of Paleozoic age. The rocks consist mostly of limestones, dolomites, and calcareous shales, but arenaceous and argillaceous shales and sandstones are present. They range in age from earliest Cambrian to Pennsylvanian, but Cambrian and Ordovician rocks are by far the most abundant.

The various formations in the valley outcrop at the surface in relatively narrow, linear belts of northeast-southwest trend, each formation being repeated at the surface several times from the southeast to the northwest. This outcrop pattern is the result of the folding and faulting of originally nearly horizontal strata followed by erosion of the upper portions of the resulting structures. Apparently the strata were folded and faulted by compressive forces acting from the southeast. Individual folds were compressed tightly, then overturned to the northwest and finally broken by faults along their axial planes. The structure of the valley, therefore, is characterized very largely by a series of overlapping linear fault blocks which dip to the southeast. The topographic expression of the structural phenomena is very marked, and any deviation from it is a clue to variations in the geologic structure or the formational sequence.

Joints are abundantly developed in the rocks of the valley. These minor structures are controlled by the major systems of faulting and folding, but they occur in sets and systems, and may be classified generally as strike joints, dip joints, and oblique joints.

DETAILED GEOLOGY

Site Topography and Detailed Physiography

The John Sevier site is located on the left bank of Cherokee Reservoir, approximately five miles below its head, at river mile 106.2. The area for the plant occupies the floodplain and adjacent terrace formed by the present and past channels of the Holston River. The floodplain, composed predominantly of river alluvium, extends the whole length of the site parallel to the river and averages 800 feet in width. It has an average elevation of 1080. Immediately to the southeast of the floodplain an old river terrace rises to an average elevation of 1100 feet and extends for an average width of 2000 feet southeastward to the base of a ridge of low hills. The old terrace is presently being dissected by tributary streams, but the river edge is a fairly abrupt slope.

Stratigraphy

Three geologic formations are present at or near the surface at the site. These consist of recent deposits of river alluvium; older terrace deposits; and the bedrock formation, the Athens shale. To the northwest the Athens is underlain by the Knox group, while to the southeast it is overlain by the Sevier formation. The Knox group and the Sevier formation are not involved in the foundation of the plant and will not be described. The three formations found at the site are described in detail.

Alluvium and Terrace--The entire site is covered with a mantle of alluvial and terrace deposits. These deposits vary in thickness from nothing in beds of several small creeks where bedrock is exposed, to a maximum of 31 feet encountered in several of the exploratory drill holes. The average depth as determined by the exploratory drilling is 20.2 feet.

The alluvium is composed predominantly of brown, slightly sandy silt containing few interspersed pebbles and cobbles. It occupies the floodplain of the Holston River extending back from the bank an average of 800 feet to the foot of the terrace bench.

The terrace deposits are older and are marked by a topographic bench roughly 800 feet southeast of the present river channel. These deposits consist of light tan clayey silt thoughout which are scattered pebbles and cobbles ranging in size up to a maximum of six inches. In both the alluvium and terrace there is a marked lack of coarse sand and small pebbles, the minimum size of the pebbles seen being in the neighborhood of one inch.

Athens Shale--The bedrock at the site is the Athens shale of Ordovician age. In this area the Athens consists of a dark gray to black, slightly calcareous shale, with thin interbeds of limestone ranging from three or four inches in thickness to less than a tenth of an inch thick. Unidentified graptolites were seen on some of the bedding planes in the shale, while some of the limestone beds contain brachiopods and ostracods. There is a slight development of pyrite along some of the bedding planes and joints.

Two variations from the normal lithology were encountered in a few of the exploratory holes. One phase consisted of black, massive shale containing tabular, rounded limestone nodules up to four inches in their maximum dimension. The other phase is made up of breccia-like, angular limestone fragments in a shale matrix. The present drilling program was not carried on in sufficient detail to prove whether or not these two different rock types would serve as key horizons which would be useable in determining the detailed geologic structure.

Structure

The belt of outcrop of the Athens shale on which the steam plant will be located extends in width from the right bank of the Holston River southeastward well beyond the limits of the general site area. In length, the formation extends for several miles both to the northeast and the southwest parallel to the axis of the Valley of East Tennessee.

The attitude of the bedrock varies from place to place over the site. In general, the strike is northeast-southwest and the dip is to the southeast. However, there is evidence of much minor folding and some faulting. In the present drilling program the exploratory holes were not spaced on close enough centers to develop all the structural details known to be present. It is expected that the geologic structure exposed in construction excavations will be very similar to that exposed in the foundations at the Kingston Steam Plant consisting of many small, tightly folded, steeply pitching anticlines and synclines. Such folds have little influence on the bearing strength of the rock.

In some of the drill cores small faults were noticed intersecting the bedding at various angles. These faults are the result of shearing along the limbs of the small folds during periods of regional deformation. These faults and shears are all ancient structures and have been recemented with calcite until they are as strong as the surrounding rock. There is no reason to anticipate futher movement along any of these structures.

Foundation Conditions

When exposed, the Athens shale weathers rapidly, due in large part to the effects of alternating cycles of freezing and thawing. As a result, surface outcrops are found only in comparatively recent road cuts and in the beds of streams. The shale portion breaks down into thin, buff-colored, platy chips, while the more resistant limestone beds are less affected. However, when the surface is protected, as at the John Sevier site, by a mantle of terrace and alluvial deposits, the shale is not subjected to the intermittent frost action and, therefore, is not weathered to any great extent.

It is believed that during the drilling operations the fishtail bit, in most holes, penetrated a foot or slightly more of weathered shale before encountering material too hard to be drilled in this manner. In the geologic sections (exhibits 2,3,4, and 5) this weathered material is lumped in with the overburden. In normal construction procedures this weathered shale could be removed by pans in the same manner as the overlying material.

The results of the exploratory drilling show that, in general, the rock surface follows the contours of the land. Under the floodplain, from Ranges N northward to Range G (see exhibit 1) the top of bedrock has an average elevation of 1064 (exhibits 2,3,4, and 5). Under the higher topographic bench southward from Range N to Range T the top of bedrock has an average elevation of 1074.5. There is a slight tendency for the rock surface to become lower towards Range T as the surface drops into the valley of the small spring branch in this vicinity.

In order to check the character of the rock surface underlying the topographic break along the front edge of the river terrace several supplemental fishtail holes were drilled to the top of rock on Section 32+00 between Ranges N and O (exhibit 2). These holes showed that the slope of the bedrock surface had the same general configuration as did the ground surface.

Very little evidence of serious weathering was apparent in any of the drill cores. In a few instances some of the thin limestone interbeds within a foot or two of the top of rock had been dissolved and were represented by small clay filled cavities, but, in general, evidences of weathering were limited to a few rusty beds and joints occuring in the top few feet of the core. The top of rock as shown on the accompanying exhibits 2, 3, 4, and 5 will correspond very closely to the top of sound rock suitable for foundation purposes.

Physical Character of the Rocks

No compressive strength determinations have been made on rock samples taken from this site. However, when fresh and unweathered, all the bedrock material is capable of supporting any of the intended loads. One precaution will have to be taken in foundation preparation. The Athens shale will tend to disintegrate upon prolonged exposure to air; therefore, either the final cleanup should be made immediately prior to the pouring of concrete, or the cleaned area should be protected by a thin coating of grout as was done at the Kingston Steam Plant to prevent undue slaking of the shale.

Constructions Materials

No specific search was made at this time for supplies of suitable construction materials for the project. There are, however, areas in the Knox outcrop belt on the north side of the Holston River which would provide adequate quarry sites both as to quantity and quality of materials available. The rock formations on the south side of the river consist mostly of interbedded shales, siltstones, and thin sandstones which would not provide aggregate of suitable quality.

The alluvial and terrace materials should be subjected to laboratory tests to prove whether or not they would be suitable for rolled fill. From surficial appearance it seems possible that there might not be sufficient clay in them to give the desired compaction.

CONCLUSIONS

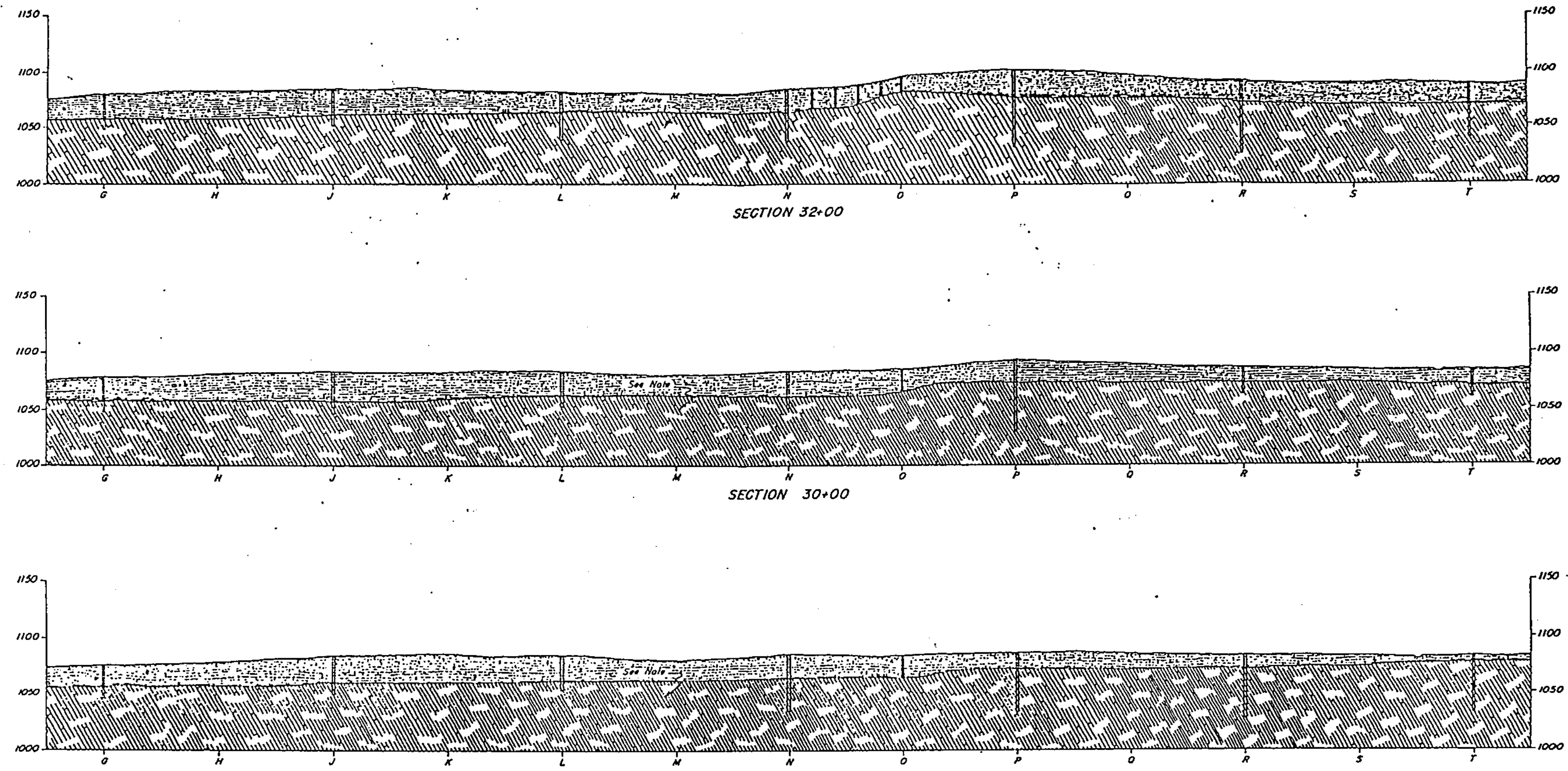
The exploratory drilling program over a relatively large area at the John Sevier Steam Plant site has resulted in the delineation of an area of suitable size for the plant structures that appears to be free from serious foundation defects. The overburden is comparatively tight and serious leakage through it is not expected.

Further investigations will have to be made to locate possible sources of construction materials.

ACKNOWLEDGEMENTS

All geologic work connected with the preliminary investigations of the John Sevier Steam Plant site was done by the writers under the direct supervision of Berlen C. Moneymaker, Chief Geologist, and the general supervision of Mr. James S. Bowman, Chief Water Control Planning Engineer.

Exhibit 2



SECTION 32+00

SECTION 30+00

SECTION 28+00

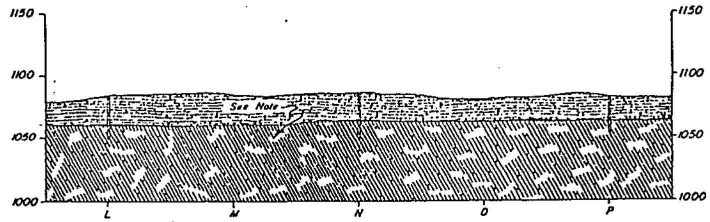
NOTES:

The details of the geologic structure in this area could not be determined due to the homogeneity of the lithology and the wide spacing of the drill holes. The general dip is 50° to 70° to the southeast, however the strata are intricately folded and faulted.

The top of rock as shown on the sections will correspond closely to the top of sound rock suitable for foundation purposes, as very little weathering was found in any of the drill cores.

For other geologic sections see companion drawings 41 0E I 822 K 1147, 1148, and 1149

For location of drill holes see drawing 41 0E I 822 N 1151



SECTION 26+00

LEGEND:

- Overburden - Silt, sand, and cobbles. Terrace and alluvial deposits.
- Athens Shale - Dark gray to black, graptolitic, with thin beds of light gray limestone

SCALE:

50 0 50 100 Feet

FOUNDATION EXPLORATION

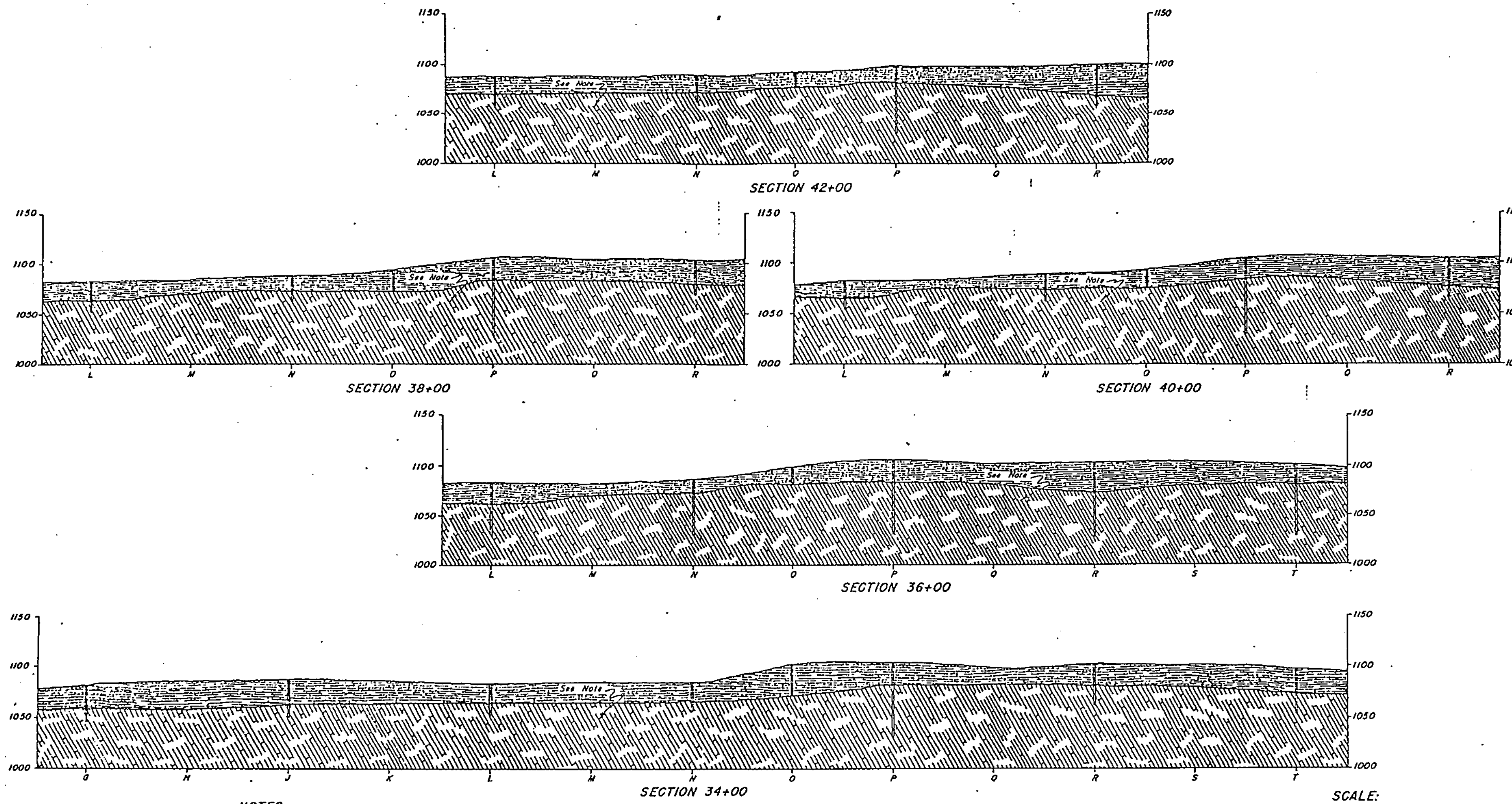
GEOLOGIC SECTIONS

SECTIONS 26+00 THROUGH 32+00

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
[signature]		[signature]

Exhibit 3



NOTES:

The details of the geologic structure in this area could not be determined due to the homogeneity of the lithology and the wide spacing of the drill holes. The general dip is 50° to 70° to the southeast, however the strata are intricately folded and faulted.

The top of rock as shown on the sections will correspond closely to the top of sound rock suitable for foundation purposes, as very little weathering was found in any of the drill holes.

For other geologic sections see companion drawings 41 ᴋC1 822 K 1146, 1148, and 1149.

For location of drill holes see drawing 41 ᴋC1 822 M 1151

LEGEND:

- Overburden - Silt, sand, and cobbles - Terrace and alluvium.
- Athens Shale - Dark gray to black, graptolitic, with thin beds of light gray limestone

SCALE: 50 0 50 100 Feet

FOUNDATION EXPLORATION

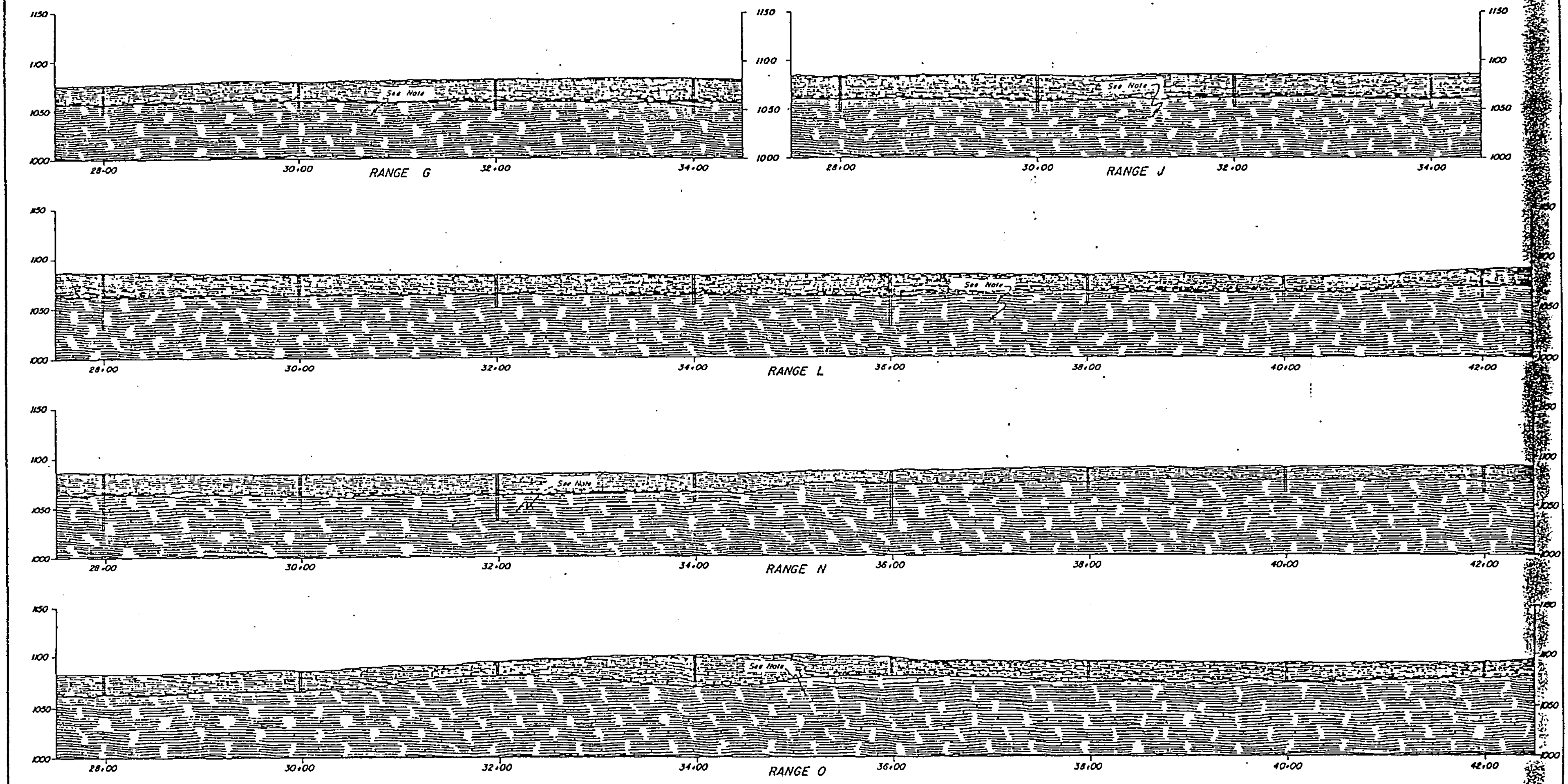
GEOLOGIC SECTIONS

SECTIONS 34+00 THROUGH 42+00

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
[signature]	....	[signature]

Exhibit 4



SCALE: 50 0 50 100 Feet

NOTES:

The details of geologic structure in this area could not be determined due to the homogeneity of the lithology and the wide spacing of the drill holes. The general dip is 50° to 70° to the southeast; however, the strata are intricately folded and faulted.

The top of rock as shown on the sections will correspond closely to the top of sound rock suitable for foundation purposes, as very little weathering was found in any of the drill holes.

For other geologic sections see companion drawings 41 KE 1 822 K 1146, 1147, and 1149

For location of drill holes see drawing

LEGEND:

- Overburden – Silt, sand, and cobbles – Terrace and alluvium.
- Athens Shale – Dark gray to black, graptolitic, with thin beds of light gray limestone.

FOUNDATION . EXPLORATION

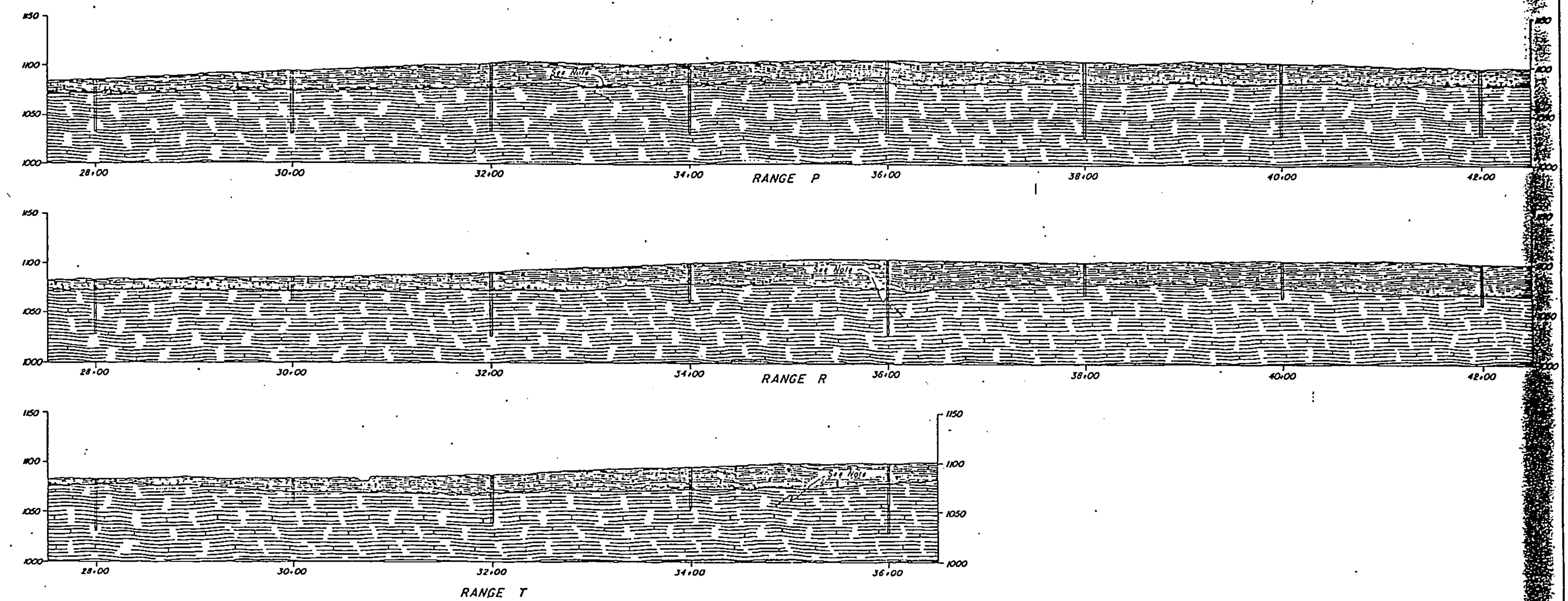
GEOLOGIC SECTIONS

RANGES G, J, L, N, AND O

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
Charles P. Benziger		Rubin ...

Exhibit 5



NOTES:

The details of the geologic structure in this area could not be determined due to the homogeneity of the lithology and the wide spacing of the drill holes. The general dip is 50° to 70° to the southeast; however, the strata are intricately folded and faulted.

The top of rock as shown on the sections will correspond closely to the top of sound rock suitable for foundation purposes, as very little weathering was found in any of the drill holes.

For other geologic sections see companion drawings 41 6E 1 822 K 1146, 1147, and 1148.

For location of drill holes see drawing 41 6E 1 822 M 1151

LEGEND:

- Overburden - Silt, sand, and cobbles - Terrace and alluvium.
- Athens Shale - Dark gray to black, graptolitic, with thin beds of light gray limestone.

SCALE: 50 0 50 100 Feet

FOUNDATION EXPLORATION

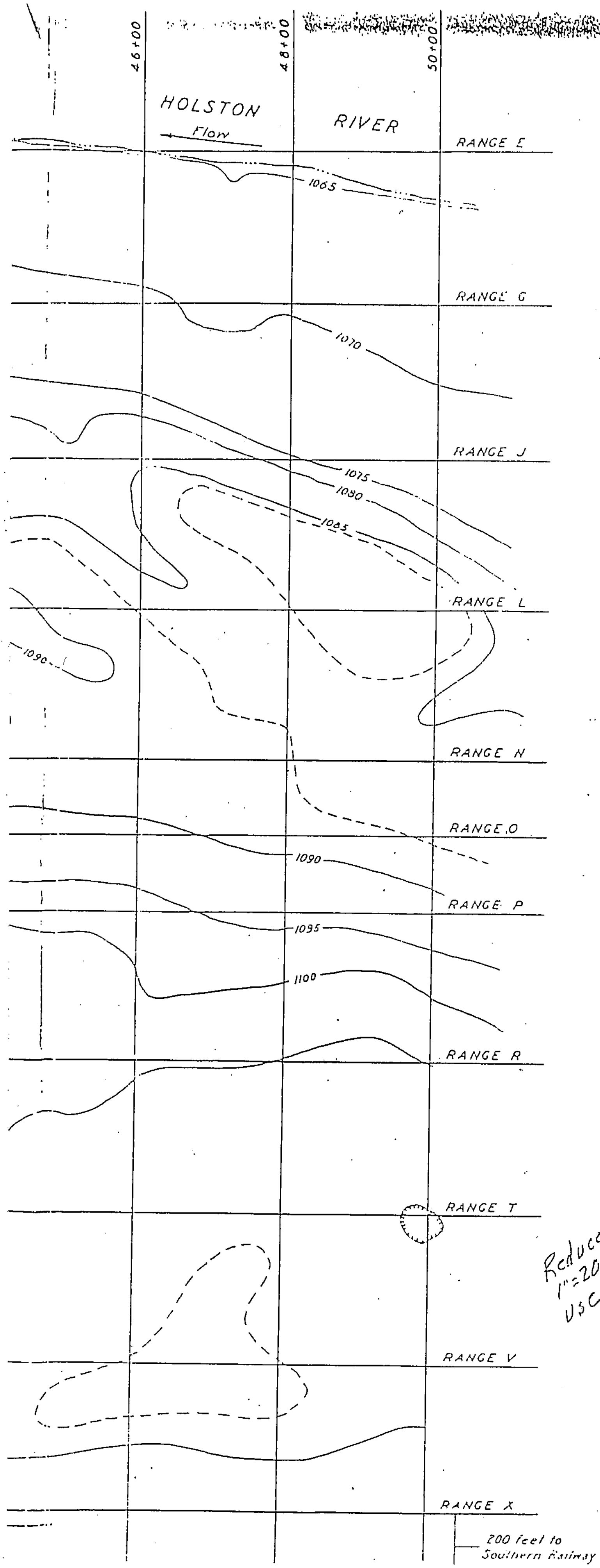
GEOLOGIC SECTIONS

RANGES P, R, AND T

JOHN SEVIER STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED | RECOMMENDED | APPROVED

EXHIBIT 1



SUMMARY OF CORE DRILLING

HOLE NUMBER	ELEVATION			
	SURFACE	TOP OF ROCK	BOTTOM OF SERIOUS WEATHERING	BOTTOM OF HOLE
G- 28+00	1070.2	1056.4	1055.0	1045.7
G- 30+00	1079.0	1058.6	1058.6	1048.4
G- 32+00	1080.6	1057.8	1057.8	1047.8
G- 34+00	1080.5	1057.5	1057.5	1045.5
J- 28+00	1084.4	1060.3	1060.3	1048.5
J- 30+00	1084.6	1057.1	1055.6	1046.6
J- 32+00	1085.0	1061.7	1058.5	1051.7
J- 34+00	1086.1	1061.7	1061.7	1050.5
L- 26+00	1084.1	1060.4	1060.4	1049.1
L- 28+00	1084.9	1061.6	1061.6	1029.9
L- 30+00	1084.6	1063.0	1063.0	1052.9
L- 32+00	1083.9	1064.4	1064.4	1039.6
L- 34+00	1082.7	1062.9	1062.9	1052.1
L- 36+00	1083.3	1061.8	1060.3	1030.7
L- 38+00	1083.4	1063.8	1063.8	1052.4
L- 40+00	1091.0	1065.2	1065.2	1054.6
L- 42+00	1087.4	1070.0	1065.2	1059.3
N- 26+00	1086.4	1064.1	1062.1	1053.9
N- 28+00	1095.1	1064.1	1064.1	1028.4
N- 30+00	1093.8	1061.1	1061.1	1050.8
N- 32+00	1084.2	1063.0	1063.0	1037.2
N- 34+00	1084.4	1065.2	1065.2	1055.5
N- 36+00	1085.9	1073.3	1073.3	1029.9
N- 38+00	1088.6	1073.6	1073.0	1062.9
N- 40+00	1089.9	1074.3	1073.0	1063.1
N- 42+00	1089.3	1073.8	1073.8	1062.9
N+20-32+00	1085.0	1065.0	20.0	1065.0
N+40-32+00	1086.5	1065.8	20.7	1065.8
N+60-32+00	1088.5	1070.0	18.5	1070.0
N+80-32+00	1092.0	1078.2	17.8	1078.2
O- 28+00	1083.9	1063.7	20.2	1063.7
O- 30+00	1085.3	1065.3	20.0	1065.3
O- 32+00	1095.1	1080.0	15.1	1080.0
O- 34+00	1101.5	1070.5	31.6	1070.5
O- 36+00	1098.4	1080.2	17.2	1080.2
O- 38+00	1094.8	1073.5	21.3	1073.5
O- 40+00	1093.0	1074.5	17.5	1074.5
O- 42+00	1092.3	1075.6	16.7	1075.6
P- 26+00	1082.7	1064.3	1062.7	1052.7
P- 28+00	1085.3	1071.3	1071.3	1032.0
P- 30+00	1094.8	1073.8	1073.8	1029.9
P- 32+00	1103.2	1078.2	1078.2	1032.8
P- 34+00	1103.1	1080.4	1075.0	1030.0
P- 36+00	1105.6	1082.6	1062.6	1030.1
P- 38+00	1106.2	1082.3	1065.7	1028.7
P- 40+00	1105.2	1084.2	1084.2	1029.4
P- 42+00	1097.8	1081.4	1081.4	1028.8
R- 28+00	1083.7	1072.1	1072.1	1027.4
R- 30+00	1086.3	1072.5	1072.5	1062.0
R- 32+00	1091.5	1072.0	1072.0	1026.5
R- 34+00	1101.0	1079.7	1079.7	1061.5
R- 36+00	1104.6	1073.6	1066.1	1028.0
R- 38+00	1103.0	1079.5	1076.5	1069.3
R- 40+00	1104.1	1076.2	1076.2	1066.0
R- 42+00	1100.9	1069.9	1069.9	1059.6
T- 28+00	1083.1	1076.6	1076.6	1030.1
T- 30+00	1084.3	1070.0	1070.0	1059.3
T- 32+00	1088.1	1069.1	1069.1	1037.8
T- 34+00	1096.3	1073.1	1073.1	1054.3
T- 36+00	1100.6	1080.7	1080.7	1029.0

NOTES:

Topography by plane table. Contour interval 5 feet.
Half interval contours shown by dashed lines.
For geologic sections see drawings 41-GE-1-822K1146 thru 1149.

SYMBOLS:

- ○ Holes drilled to top of rock
- ● Holes drilled into rock

Reduced — 1"=200' USC 20 scale

Scale 100 0 100 200 300 Feet

FOUNDATION EXPLORATION

LOCATION AND SUMMARY OF CORE DRILLING

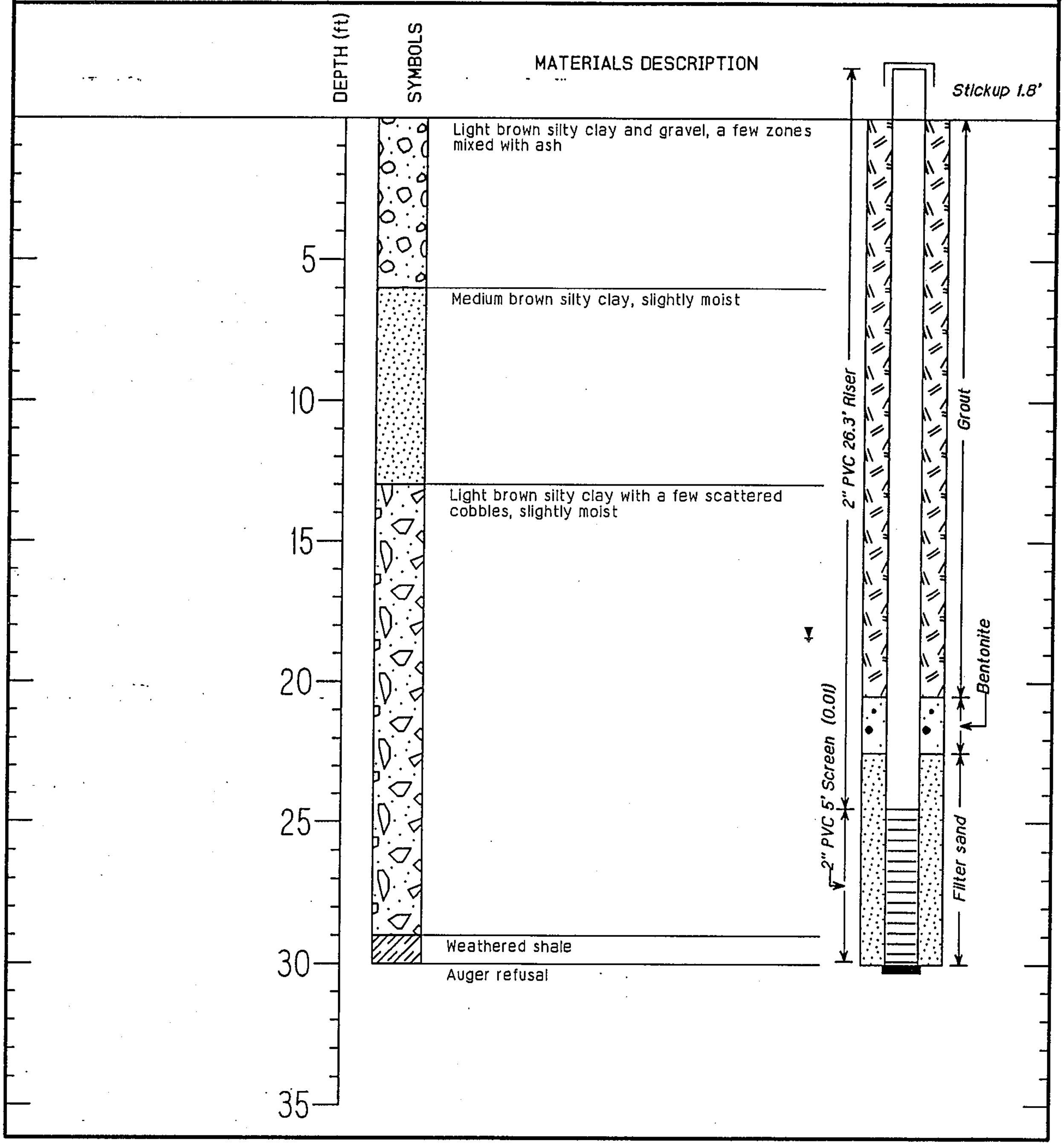
ROGERSVILLE STEAM PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
H. M. Miller		[signature]

Tennessee Valley Authority

MONITORING WELL W-5

WELL CONSTRUCTION DETAIL



PROJECT John Sevier Steam Plant

LOCATION John Sevier

DRILL RIG Hollow Stem Auger

LOGGER/ENGINEER

WATER LEVEL (INITIAL)

DRILLING COMPANY

DATE DRILLED November 20, 1986

SURFACE ELEVATION 1113.4 feet-msl

T.O.C. ELEVATION feet-msl

WATER LEVEL (24-HOUR) 18.4 feet

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA

SOILS EXPLORATION AND TESTING

EN DES SOILS SCHEDULE NO. 6.2

TENNESSEE VALLEY AUTHORITY
DIVISION OF CONSTRUCTION
SINGLETON MATERIALS ENGINEERING LABORATORY

Knoxville, Tennessee

CSB 810724 301

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA

SOILS EXPLORATION AND TESTING

EN DES SOILS SCHEDULE NO. 6.2

FEP - KWB

Table 1

JOHN SEVIER STEAM PLANT

PROPOSED NEW DIKE FOUNDATION

FOUNDATION INVESTIGATION

SUMMARY OF LABORATORY TEST DATA

Elevation	Soil Symbol	Soil Type *	Nat. Moist. %	Nat. Moist. % Sat.	Grain-Size Analysis Gravel %	Sand %	Silt %	Clay %	D_{10} mm	Atterb. Limits Liq. Limit %	Plastic Index %	Dry Dens. pcf	Void Ratio	Triaxial Q Undisturbed ϕ deg	Undisturbed c tsf	Remolded ϕ deg	Remolded c tsf	Saturated Triaxial R Apparent ϕ deg	Apparent c tsf	Effective ϕ deg	Effective c tsf	Coefficient of Permeability K_h cm/sec	K_v cm/sec
Boring No. US-1 Sta.	Surface Elev. 1094.4																						
1093.4-1091.1	CL-ML	CA	14.9	75.8	1	42	35	22	--	19	6	110.0	.529	27.4	0.05			17.7	0.32	28.6	0.22		
1090.4-1088.0	SC	GA	21.5	96.9	0	52	20	28	--	39	22	104.8	.592										
1087.4-1085.5	SC	GA	16.0	67.6	0	73	12	15	--	28	10	102.1	.633	27.9	0.27			12.0	1.63	32.0	0.18	**	$4.69x10^{-5}$
1083.4-1081.2	GM	WS	29.4	94.9	31	31	26	12	--	45	15	94.0	.873										
1080.4-1078.0	SM-SC	WS	27.8	90.4	18	41	27	14	--	39	13	93.3	.852										
1077.4-1075.0	SM-SC	WS	24.1	82.5	38	39	16	7	--	39	13	95.7	.811										
1074.4-1072.2	CL-ML	WS	27.9	100	1	44	41	14	--	41	16	97.4	.775										
1071.4-1069.5	GM-GC	WS	24.3	83.0	49	36	10	5	--	37	13	95.1	.806										
1068.4-1066.7	SM-SC	WS	23.7	78.1	26	47	20	7	--	36	12	93.8	.837										
1065.4-1064.6	GM-GC	WS	24.3	95.7	50	37	9	4	--	36	12	101.2	.702										
Boring No. US-4 Sta.	Surface Elev. 1089.6																						
1088.6-1086.2	CL	CA	18.4	81.7	1	26	47	26	--	31	15	104.1	.603	19.6	0.71			26.4	0.40	30.5	0.12		
1085.6-1083.3	CL	CA	19.3	93.8	2	25	49	24	--	29	11	108.4	.557										
1082.6-1081.4	CL	CA	19.5	91.8	1	24	45	30	--	32	16	106.6	.569										
1079.6-1078.5	CL	CA	21.7	84.8	0	38	38	24	--	28	12	99.8	.694										
Boring No. US-4A Sta	Surface Elev. 1089.6																						
1082.6-1080.2	CL	CA	21.8	91.7	0	17	47	36	--	38	19	102.5	.641										
Boring No. US-8 Sta.	Surface Elev. 1087.0																						
1086.0-1083.6	CL-CH	CA	22.7	89.2	0	19	38	43	--	49	30	99.7	.687	22.7	0.58			16.7	0.35	26.1	0.24		
1083.0-1080.8	CL	CA	15.7	96.5	0	24	45	31	--	33	18	114.8	.460										
1080.0-1077.6	CL	CA	19.7	92.2	0	23	43	34	--	39	22	107.2	.579	17.8	0.79			20.5	0.51	28.4	0.00		
1077.0-1075.7	CL	CA	18.9	88.8	1	27	38	34	--	31	18	107.4	.579										
Boring No US-12	Surface Elev. 1071.2																						
1070.2-1067.9	CL	CA	26.3	76.0	0	24	39	37	--	40	20	86.6	.946	6.2	0.42			11.2	0.55	24.7	0.31		
1067.2-1064.9	CL	CA	23.8	95.0	0	18	40	42	--	39	19	100.7	.667										
1064.2-1063.1	CL	CA	23.4	100	0	18	42	40	--	38	18	103.0	.630										
1061.2-1060.7	CL	WS	28.8	98.3	2	43	30	25	--	32	14	94.6	.800										
1060.7-1059.0	SM	WS	26.0	84.0	37	46	17	0	--	NP	NP	91.3	.826										
Boring No. US-15	Surface Elev. 1077.3																						
1076.3-1074.2	CL	CA	19.5	83.0	0	28	41	31	--	32	12	102.4	.627										
1073.3-1070.9	CL	CA	20.2	93.0	0	31	40	29	--	30	13	106.1	.588										
1070.3-1068.6	CL	CA	20.9	90.0	0	31	42	27	--	28	11	103.2	.623										
1067.3-1065.7	CL	CA	21.8	87.7	0	22	46	32	--	31	13	100.9	.677	0.0	0.87			13.7	0.59	29.7	0.05		
1064.3-1063.2	CL	CA	21.3	93.4	0	24	46	30	--	29	12	104.0	.611										
1061.3-1060.4	CL-ML	CA	18.8	92.3	0	44	36	20	--	21	7	107.7	.541										

*CA Cohesive Alluvium GA Granular Alluvium WS Weathered Shale

**Machine Malfunction

JOHN SEVIER STEAM PLANT

BORROW AREAS A & B

SUMMARY OF LABORATORY TEST DATA

BORROW SOIL CLASSES

Class	I	III	IV	V	VI
Symbol	SC	CL	CL	CL	CH-MH
Mechanical and Hydrometer Analysis					
Gravel, percent	0	0	0	0	0
Sand, percent	53	26	19	20	12
Silt, percent	23	40	42	36	39
Clay, percent	24	34	39	44	49
Atterberg Limits					
Liquid limit, percent	26	36	42	48	56
Plastic limit, percent	14	17	19	25	29
Plasticity index, percent	12	19	23	23	27
Shrinkage limit, percent	--	--	--	--	--
Standard Proctor Compaction					
Optimum moisture, percent	11.5	16.2	18.2	21.2	18.2
Maximum density, pcf	120.0	111.3	107.3	101.7	107.3
Penetration resistance, psi	1650	685	705	675	790
Shear Strength at 3% Wet of Optimum Moisture and at 95% of Maximum Unit Weight					
Triaxial Q: ϕ degrees	10.0	4.8	3.3	10.6	10.1
c tsf	0.99	0.88	1.00	0.98	0.98
Triaxial Q: ϕ degrees	9.6	4.0	6.6	7.8	10.9
c tsf	0.98	0.83	0.89	1.12	0.96
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maxium Unit Weight					
Triaxial R: ϕ degrees	14.9	16.1	18.6	18.2	16.1
c tsf	0.08	0.16	0.05	0.05	0.16
Triaxial R: ϕ degrees	16.9	16.2	17.9	17.8	17.4
c tsf	0.01	0.11	0.15	0.04	0.11
Triaxial $\bar{R}$ ϕ	31.2	27.5	28.8	25.0	23.8
c	0.03	0.12	0.06	0.08	0.16
Triaxial $\bar{R}$ ϕ	32.7	26.4	27.5	24.8	26.1
c	0.00	0.13	0.12	0.13	0.09

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE LEGEND AND SYMBOLS

DEPTH 1"=5'	EL	SPT (N)	LOG	W	LL	PI	X	REMARKS OR TEST RESULTS
Boring Depth and Scale	Elevation	Blows/Foot (SS Boring)	Lab Soil Type	Moisture Content	Liquid Limit	Plasticity Index	Soil Letter	

LEGEND

Topsoil

CL,etc — Soil Type (Unified Classification)

Mat'l — Notation of Soil Not Sampled (SS, PA, HA Logs)

(Core) Type — Bedrock (Note Core if Cored)

Assumed Material — Refusal (Impractical to Penetrate with Boring Equipment Used)

Watertable (Date)

Explanation of UD Sampling Limits if Applicable

BORING SYMBOLS

SS - 2" OD Splitspoon Boring
SPT - Standard Penetration Test Blows Per Foot with 2" Splitspoon
UD - Undisturbed Sample Boring
PA - Power Auger Boring
HA - Hand Auger Boring
TP - Test Pit or Trench

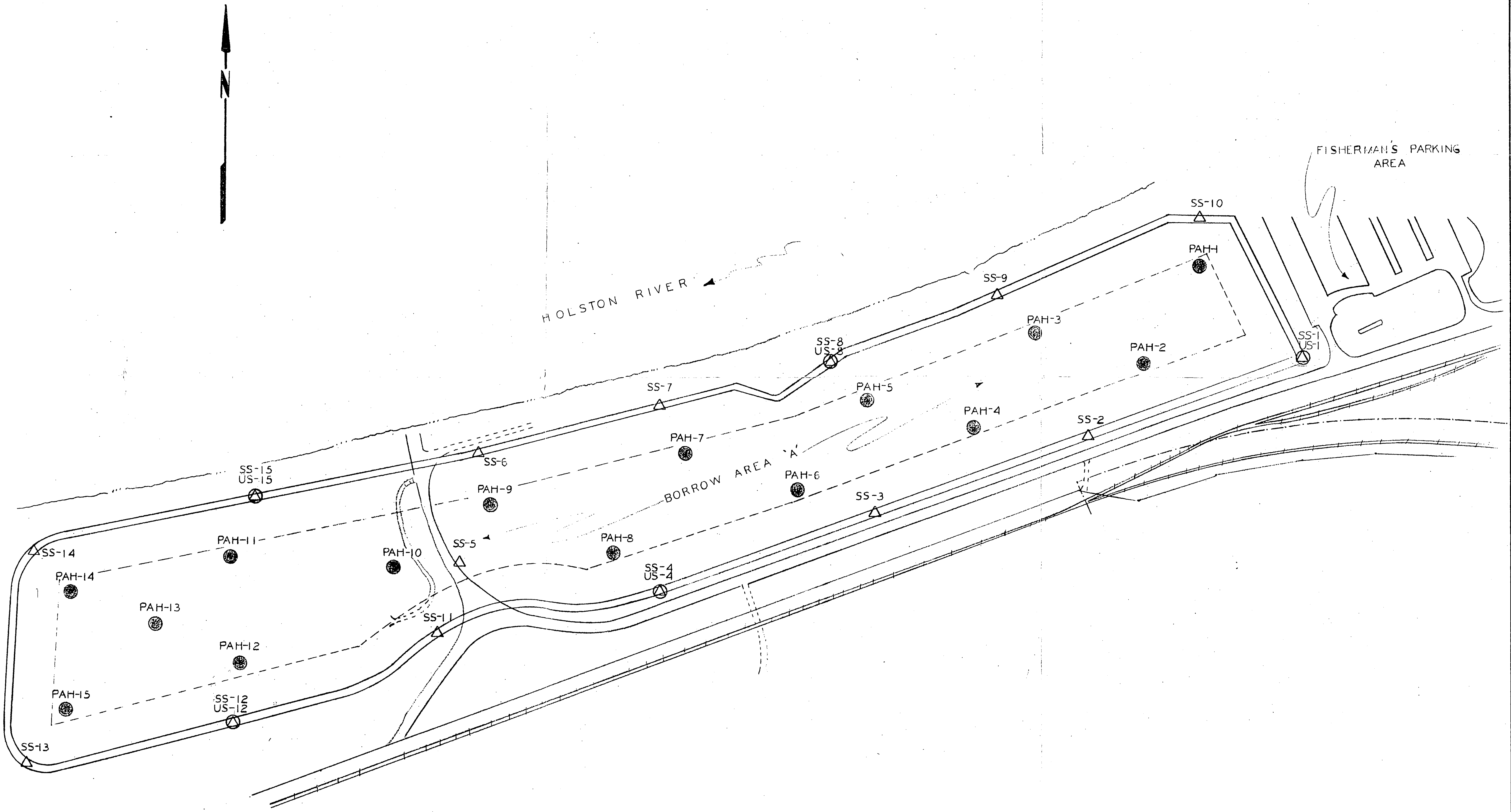
IN BLOCKS BESIDE UD BORING SAMPLES		
Test	Engineering Test Results	
Q, R, R̄, S	Friction Angle (Degrees)	Cohesion (tsf)
UC	Unconfined Compressive Strength (tsf)	Sensitivity Ratio
C	Compression Index	Preconsolidation Pressure (tsf)
k	Coefficient of Permeability (cm/sec x 10^{-4})	

Example: Blocks as Required:

Q	12.0	0.62	R	19.6	0.21	S	34.0	0
UC	4.0	2.6	C	0.27	2.0	k	5.6	

SOIL TEST SYMBOLS

Q - Unconsolidated-Undrained Triaxial Compression
R - Consolidated-Undrained Triaxial Compression
R̄ - Effective Consolidated-Undrained Triaxial Compression
S - Consolidated-Drained Direct Shear
UC - Unconfined Compression
C - Consolidation
k - Permeability
X - Letter Identification of Soil Type. Lower Case (a, etc.), By Index Tests. Capital (A, etc.), Subjected to Additional Tests.



SYMBOLS

- ● - AUGER BORINGS
- △ - SPLITSPOON BORINGS
- ○ - UNDISTURBED BORINGS

SCALE: 1" = 163.6'

JOHN SEVIER STEAM PLANT				
PROPOSED NEW ASH DISPOSAL AREA PLAN OF SOIL INVESTIGATION				
TENNESSEE VALLEY AUTHORITY MATERIALS ENGINEERING LABORATORY				
SUBMITTED HFM	RECOMMENDED			APPROVED
KNOXVILLE	6-10-81	41	CS	3	604G1095R0

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-1 Station 60+32W Range 5+12S Surface El 1094.4

Date Drilled 3-3-81 To 3-3-81 Prepared By JLB Checked By HPM

Depth 1"=5'	El	SPT (N)	Log	W	LL	PI	X	Remarks
0								
		5	CL	14.7	21	7		COHESIVE ALLUVIUM
	1090	9		18.2	32	16		
5		22	SC	15.7				
					28	11		
		24		16.2				GRANULAR ALLUVIUM
10	1085	42	SM	8.1	NP	NP		
		17	GC	7.9	42	17		
15	1080	36	SM	25.3	39	13		
		25	SM-SC	27.1	41	15		
		19	GM-GC	25.3	39	15		
20	1075	20	SM-SC	20.7	36	12		WEATHERED SHALE
		6	GMGC	26.4	39	15		▽ ▼
25	1070	19		—	32	11		
		7	SC	28.4				
		12		24.4				
					34	12		
30	1065	28		19.6				
		50		11.3				
								BEDROCK
35	1060							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-2 Station 66+22W Range 4+99S Surface El 1092.0

Date Drilled 3-4-81 To 3-4-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								COHESIVE ALLUVIUM
	1090	23	CL	19.5	34	15		
		50		19.5	42	18		
5		26	SC	14.6				
					28	10		
	1085	23		12.9				GRANULAR ALLUVIUM
10		43		10.4	26	8		
			SM-SC					
	1080	36		23.2	37	12		
		50+	SM	2.8	NP	NP		WEATHERED SHALE
15		50+		12.5	—	—		
								BEDROCK
	1075							
20								
	1070							
25								
	1065							
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-3 Station 70+55W Range 5+00S Surface El 1089.4

Date Drilled 3-4-81 To 3-4-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
		18	CL	15.8				COHESIVE ALLUVIUM
					26	11		
	1085	20		17.5				
5		50+	SC	12.9	26	9		GRANULAR ALLUVIUM
		38	SM	31.9				
	1080				42	14		WEATHERED SHALE
10		30		35.4				
		50+	GM	8.2	NP	NP		
								BEDROCK
15	1075							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-4 Station 75+09W Range 4+92S Surface El 1089.6

Date Drilled 3-5-81 To 3-5-81 Prepared By JLB Checked By HPM

Depth 1"=5'	El	SPT (N)	Log	W	LL	PI	X	Remarks
0								
		14	CL	18.3	32	15		
		18		17.2				
5	1085	24		19.6	31	14		COHESIVE ALLUVIUM
		26		19.8				▼ ▽
10	1080	19		21.8				
					27	11		
		13		22.1				
		11	SM-SC	21.5	22	6		GRANULAR ALLUVIUM
15	1075	41	GP-GM	9.6	NP	NP		
								DISCONTINUED
20	1070							
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-5 Station 78+70W Range 3+32S Surface El 1082.9

Date Drilled 3-5-81 To 3-5-81 Prepared By JLB Checked By HPM

Depth (1"=5')	El	SPT (N)	Log	W	LL	PI	X	Remarks
0								
		27	CL	19.3	37	17		
	1080							
		35	CL	16.4	33	16		▽ ▽ COHESIVE ALLUVIUM
5		20	CL	18.3				
					37	20		
	1075	27	CL	20.8				
10		43	SC	14.1	28	15		GRANULAR ALLUVIUM
		50+	SC	13.9	—	—		WEATHERED SHALE
	1070							
		50+	SC	6.8	—	—		
15								BEDROCK
	1065							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project: JOHN SEVIER S. P. Feature: NEW ASH DISPOSAL AREA

Boring: SS-6 Station: 78+21W Range: 0+60S Surface El: 1085.0

Date Drilled: 3-5-81 To: 3-5-81 Prepared By: JLB Checked By: HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	1085							
		35		18.3				
					35	16		
		31		17.7				COHESIVE ALLUVIUM
5	1080	34		19.0	37	18		
			CL					
		30		19.3				
					32	16		
10	1075	21		18.4				
		50+		4.9	—	—		
								BEDROCK
15	1070							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-7 Station 72+92W Range 1+28S Surface El 1073.8

Date Drilled 3-9-81 To 3-9-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								WEATHERED SHALE
		50+	CL	—	31	12		
			CL-ML	26.9	40	25		
	1070	50+		—	29	11		
								BEDROCK
5								
	1065							
10								
15								
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-8 Station 70+13W Range 1+56S Surface El 1087.0

Date Drilled 3-6-81 To 3-6-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
	1085	19	CH	23.2	52	31		COHESIVE ALLUVIUM
		34		18.0	45	25		
5		26		14.2				
	1080		CL					
		25		18.5	38	22		
10		15		17.0				
		50+	GP-GM	5.2				GRANULAR ALLUVIUM
	1075				NP	NP		
		50+	GW-GM	4.6				
15		50+		15.1				WEATHERED SHALE
	1070		SC		35	12		
		25		16.8				DISCONTINUED
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring SS-9 Station 66+05W Range 1+49S Surface El 1080.8

Date Drilled 3-9-81 To 3-9-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
	1080							COHESIVE ALLUVIUM
		8	CL	17.7	33	16		
		35		18.0				
5	1075	50+	GM	8.3	NP	NP		GRANULAR ALLUVIUM
								WEATHERED SHALE
10		50+	SC	18.3	32	12		
	1070	50+		7.4				
								BEDROCK
15	1065							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S.P. Feature NEW ASH DISPOSAL AREA

Boring SS-10 Station 61+43W Range 1+48S Surface El 1091.4

Date Drilled 3-3-81 To 3-3-81 Prepared By JLB Checked By HPM

Depth (1"=5')	El	SPT (N)	Log	W	LL	PI	X	Remarks
0								
	1090	13	CL	17.9	37	20		COHESIVE ALLUVIUM
		25	CL	22.9				
5					41	24		
	1085	27	CL	19.2				
		14	SC	25.2	29	14		
10		12	SM-SC	18.5	22	6		GRANULAR ALLUVIUM
	1080	22	SM	12.2				
		20	SM	12.2	NP	NP		
15	1075	31	SM	14.3				DISCONTINUED
20	1070							
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE NEW ASH DISPOSAL AREA

BORING SS-11 STATION 80+35W RANGE 4+40S SURFACE El 1084.3

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0							
		9	CL	20.0			
					35	16	COHESIVE ALLUVIUM
	1080	15		19.6			
5		18		22.6			
					38	19	
		32		19.0			
	1075		SC				
10		20		18.6	24	8	▽ GRANULAR ALLUVIUM
		50+		7.8	—	—	
	1070	35		20.1			WEATHERED SHALE
15					37	14	
		29		23.2			
							BEDROCK
	1065						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S.P. FEATURE: NEW ASH DISPOSAL AREA

BORING: SS-12 STATION: 85+39W RANGE: 4+68S SURFACE El: 1071.2

DATE DRILLED: 4-22-81 TO 4-22-81 PREPARED BY: JLB CHECKED BY: HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1070	5		23.9			▼
		6		25.2			▽ COHESIVE ALLUVIUM
5					38	19	
	1065	10	CL	21.5			
		5		24.6			
10		3		23.4	28	11	
	1060		SC	51.3	28	8	WEATHERED SHALE
		22		9.8	29	10	
			GC				BEDROCK
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S.P. FEATURE NEW ASH DISPOSAL AREA

BORING SS-13 STATION 90+27W RANGE 4+67S SURFACE El 1069.3

DATE DRILLED 4-22-81 TO 4-22-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
		15	CL	25.3			COHESIVE ALLUVIUM
	1065	12	CL	22.2	42	21	
5							
		9	CL	21.9			
		7	CL-ML	17.5	21	6	
	1060						WEATHERED SHALE
10		17	SC	16.7	30	10	
							BEDROCK
	1055						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S. P. FEATURE: NEW ASH DISPOSAL AREA

BORING: SS-14 STATION: 87+69 W RANGE: 0+84 N SURFACE El: 1073.1

DATE DRILLED: 4-23-80 TO 4-23-80 PREPARED BY: JLB CHECKED BY: HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
		8	CL	19.1			
	1070	7	CL	20.5	32	14	
5		7	CL	21.2			COHESIVE ALLUVIUM
	1065	13	CL	23.4			
10		9	CL	23.1	39	20	
		11	CL	24.1			▽ ▼
	1060	11	CL	23.9	31	13	
15		23	GC	24.6	34	12	WEATHERED SHALE
							BEDROCK
	1055						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S. P. FEATURE: NEW ASH DISPOSAL AREA

BORING: SS-15 STATION: 82 + 71 W RANGE: 0 + 17 S SURFACE El: 1077.3

DATE DRILLED: 4-23-81 TO 4-23-81 PREPARED BY: JLB CHECKED BY: HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1075	12		18.3	30	11	
		13		18.7			
5							
		9		19.7	31	12	COHESIVE ALLUVIUM
	1070						
		6		20.5			
			CL				
10		6		21.7			
					30	12	▼
	1065	9		23.1			
		12		23.7	36	17	▽
15							
		7		20.6	23	9	
	1060						GRANULAR ALLUVIUM
		9	SM	21.9	19	4	
		28		20.6	NP	NP	WEATHERED SHALE
			GM				BEDROCK
20							
	1055						
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UD BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring US-1 Station 60 + 32 W Range 5 + 17S Surface El 1094.4

Date Drilled 3-11-81 To 3-11-81 Prepared By JLB Checked By HPM

Depth (1"=5')	El	Log	W	LL	PI	X	Engineering Test Results
0							
		CL-ML	14.9	19	6		Q 27.4 0.05 | R 17.7 0.32
5	1090	SC	21.5	39	22		
		SC	16.0	28	10		Q 27.9 0.27 | R 12.0 1.63 | Kv 4.69X10^{-5}
10	1085						
		GM	29.4	45	15		
15	1080	SM-SC	27.8	39	13		
		SM-SC	24.1	39	13		
20	1075	CL-ML	27.9	41	16		
		GM-GC	24.3	37	13		
25	1070						
		SM-SC	23.7	36	12		
30	1065	GM-GC	24.3	36	12		DISCONTINUED
35	1060						

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UD BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring US-4 Station 75 + 09 W Range 4 + 97 S Surface El 1089.6

Date Drilled 3-10-81 To 3-10-81 Prepared By JLB Checked By HPM

Depth 1"=5'	El	Log	W	LL	PI	X	Engineering Test Results
0							
		CL	18.4	31	15		Q 19.6 0.71 | R 26.4 0.40
5	1085	CL	19.3	29	11		
		CL	19.5	32	16		
10	1080	CL	21.7	28	12		
							NO RECOVERY
15	1075						REFUSAL
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UD BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring US - 4A Station 75 + 04 W Range 4 + 92 S Surface El 1089.6

Date Drilled 3-14-81 To 3-14-81 Prepared By JLB Checked By HPM

Depth (1"=5')	El	Log	W	LL	PI	X	Engineering Test Results
0							
5	1085						
		CL	21.8	38	19		
10	1080						NO RECOVERY
							NO RECOVERY
15	1075						REFUSAL
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UD BORING)

Project JOHN SEVIER S. P. Feature NEW ASH DISPOSAL AREA

Boring US-8 Station 70+13W Range 1+61S Surface El 1087.0

Date Drilled 3-10-81 To 3-10-81 Prepared By JLB Checked By HPM

Depth (1"=5')	El	Log	W	LL	PI	X	Engineering Test Results
0							
	1085	CL-CH	22.7	49	30		Q 22.7 0.58 | R 16.7 0.35
5		CL	15.7	33	18		
	1080						
		CL	19.7	39	22		Q 17.8 0.79 | R 20.5 0.51
10		CL	18.9	31	18		
	1075						NO RECOVERY
15							REFUSAL
	1070						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UD BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S.P. FEATURE NEW ASH DISPOSAL AREA

BORING US-12 STATION 85+34W RANGE 4+68S SURFACE El 1071.2

DATE DRILLED 4-28-81 TO 4-28-81 PREPARED BY JLB CHECKED BY HPM

DEPTH 1"=5'	El	LOG	W	LL	PI	ENGINEERING TEST RESULTS
0						
	1070	CL	26.3	40	20	Q 6.2 0.42 | R 11.2 0.55
5		CL	23.8	39	19	
	1065	CL	23.4	38	18	
10		CL	28.8	32	14	
	1060	SM	26.0	NP	NP	
						DISCONTINUED
15	1055					
20	1050					
25	1045					
30	1040					
35						

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UD BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE NEW ASH DISPOSAL AREA

BORING US-15 STATION 82+66 W RANGE 0+17S SURFACE El 1077.3

DATE DRILLED 4-28-81 TO 4-28-81 PREPARED BY JLB CHECKED BY HPM

DEPTH 1"=5'	El	LOG	W	LL	PI	ENGINEERING TEST RESULTS
0						
	1075	CL	19.5	32	12	
5		CL	20.2	30	13	
	1070	CL	20.9	28	11	
10		CL	21.5	31	13	Q 0.0 0.87 / R 13.7 0.59
	1065	CL	21.3	29	12	
15		CL-ML	18.8	21	7	
	1060					DISCONTINUED
20						
25						
30						
35						

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-1 Station 62+22 W Range 2+34 S Surface El 1090.0

Date Drilled 2-27-81 To 2-27-81 Prepared By JLB Checked By HPM

Depth 1"=5'	El	SPT (N)	Log	W	LL	PI	X	Remarks
0	1090							
				24.2	45	27		
5	1085		CL	19.4	42	24		
10	1080			21.7	43	24		
15	1075							POOR RECOVERY
20	1070							SAPROLITIC RESIDUUM
25	1065							DISCONTINUED
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-2 Station 64+10W Range 3+87S Surface El 1088.2

Date Drilled 2-27-81 To 2-27-81 Prepared By JLB Checked By HPM

Depth (1"=5')	El	SPT (N)	Log	W	LL	PI	X	Remarks
0								
			CL	19.9	42	25		
	1085		CL	15.5	34	18		
5			GC	18.3	37	20		
			CL	21.3	34	18		
	1080							
10			SC	17.3	26	11		
	1075							
			CL	26.1	42	24		
15								WEATHERED SHALE
								DISCONTINUED
	1070							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-3 Station 66+37W Range 2+415 Surface El 1087.1

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
	1085			21.7	45	27		
5				19.8				
	1080		CL		43	24		
10				16.2				
	1075							
				22.7	45	27		
15								WEATHERED SHALE
	1070							
								BEDROCK
20								
	1065							
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-4 Station 68+22W Range 3+97S Surface El 1087.7

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
				19.0	45	27		
	1085							
				20.0	42	24		
5			CL					
	1080			17.2	34	18		
				16.3	42	24		
10								
	1075		SC	18.1	26	11		
								▽ ▼
15								
				20.4	39	18		
	1070		CL					
20				16.9	39	18		
	1065							WEATHERED SHALE
25								BEDROCK
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S.P. Feature BORROW AREA 'A'

Boring PAH-5 Station 70+41W Range 2+49S Surface El 1083.0

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
			CL	17.6	42	25		
	1080							
5				20.0	42	24		▽ ▼
	1075		SC	21.1	26	11		
10								
	1070							
15								WEATHERED SHALE
								BEDROCK
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-6 Station 72+27W Range 4+04S Surface El 1086.8

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
	1085			21.2	40	21		
5			CL	22.7	43	24		▽ ▼
	1080							
10				21.4	35	19		
	1075							WET SOIL
15								DISCONTINUED
	1070							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA "A"

Boring PAH-7 Station 74 + 43 W Range 2 + 28 S Surface El 1084.6

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
			CL	22.6	40	21		
5	1080		CL	25.0	45	27		▽ ▼
			CL	19.5	35	19		
10	1075		GC	7.8	37	20		
15	1070							WEATHERED SHALE
								BEDROCK
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-8 Station 76 + 33 W Range 4 + 12 S Surface El 1085.0

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	1085							
				23.0	35	19		
			CL	20.4	43	24		
5	1080							
								▽ ▼
				19.8	35	19		
10	1075							
								WEATHERED SHALE
								DISCONTINUED
15	1070							
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project JOHN SEVIER S. P. Feature BORROW AREA 'A'

Boring PAH-9 Station 78 + 33W Range 2 + 10S Surface El 1083.3

Date Drilled 3-2-81 To 3-2-81 Prepared By JLB Checked By HPM

Depth 1"=5'	El	SPT (N)	Log	W	LL	PI	X	Remarks
0								
			CL	20.6	43	24		
	1080		CL	20.3				
5			CL		45	27		
			CL	20.8				
	1075		CL					
10			CL	15.9	35	19		
	1070		GC	16.8	37	20		▽ ▼
15								WEATHERED SHALE
	1065							DISCONTINUED
20								
25								
30								
35								

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF [illegible]

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'A'

BORING PAH-10 STATION 80+99W RANGE 1+86S SURFACE El 1075.1

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0	1075						
			CL	23.7	36	14	
5	1070		CL	24.4	34	14	▼
10	1065		CL	22.7	38	20	
15	1060		CL	28.6	39	18	
							DISCONTINUED
20	1055						
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'A'

BORING PAH-11 STATION 83+62 W RANGE 1+74S SURFACE El 1075.4

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0	1075						
			CL	24.5	37	16	
5	1070		CL	22.4	40	19	
							▼
10	1065			23.5	41	20	
							DISCONTINUED
15	1060						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'A'

BORING PAH-12 STATION 83 + 71W RANGE 3 + 64S SURFACE El 1071.9

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1070		CL	29.1	39	15	▼
5				26.4	44	24	
	1065						
							DISCONTINUED
10							
	1060						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'A'

BORING PAH-13 STATION 86 + 06 W RANGE 1 + 56 S SURFACE El 1076.2

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1075			21.9	37	16	
5			CL	22.9	44	23	
	1070						
10				20.7	31	14	▼
	1065						
							DISCONTINUED
15							
	1060						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'A'

BORING PAH-14 STATION 87+28W RANGE 0+07S SURFACE El 1074.4

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
				24.4	35	16	
5	1070		CL	23.5	40	19	
10	1065			23.6	43	21	
							DISCONTINUED
15	1060						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'A'

BORING PAH-15 STATION 88 + 80W RANGE 3 + 62 S SURFACE El 1071.8

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0			TS				
	1070		CL	22.6	35	16	
5				23.0	45	24	
	1065						
							DISCONTINUED
10							
	1060						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-1 STATION 57+53 W RANGE 16+83 S SURFACE El 1137.2

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1135		CL	14.1	27	9	
5			GC	15.3	42	22	
	1130		GC				
			GC	5.4	49	28	▽
10							
	1125		CL	32.7	46	23	
15							DISCONTINUED
	1120						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-2 STATION 55 + 67 W RANGE 17 + 57 S SURFACE El 1136.6

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1135		CH	22.1	60	36	
5				23.5			
	1130		CL		49	24	▽
10				17.5			
	1125						DISCONTINUED
15							
	1120						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-3 STATION 53 + 81W RANGE 18 + 32 S SURFACE El 1140.9

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0	1140						
				20.2	31	15	
5	1135		CL	24.8			
					37	19	∇
10	1130			19.9			
							DISCONTINUED
15	1125						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-4 STATION 51 + 96W RANGE 19 + 06 S SURFACE El 1138.3

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			CL	15.9	25	12	
	1135						
5				20.4			
			GC		49	28	
	1130						
10				16.9			
	1125						DISCONTINUED
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-5 STATION 50 + 10W RANGE 19 + 80S SURFACE El 1134.8

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			CL	18.8	25	12	
	1135						
5				18.2	32	20	
	1130						DISCONTINUED
10							
	1125						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S. P. FEATURE: BORROW AREA 'B'

BORING: PAH-6 STATION: 48 + 24 W RANGE: 20 + 54 S SURFACE El: 1130.4

DATE DRILLED: 4-29-81 TO 4-29-81 PREPARED BY: JLB CHECKED BY: HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0	1130						LIMESTONE GRAVEL ROADBED
5	1125		CL	17 2	32	20	▽
							BEDROCK
10	1120						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-7 STATION 46 + 38W RANGE 21 + 28S SURFACE El 1129.8

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			CL	16.0	39	16	
				16.3	37	19	
5	1125						
				21.3	49	24	
10	1120						DISCONTINUED
15	1115						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING SS-8 STATION 44 + 53W RANGE 22 + 02S SURFACE El 1131.1

DATE DRILLED 4-27-81 TO 4-27-81 PREPARED BY JLB CHECKED BY HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0							
	1130		CH	33.3	60	36	
5			CL	37.4	49	24	▽
	1125						
10				36.4	46	23	
	1120						
							DISCONTINUED
15							
	1115						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-9 STATION 42 + 67W RANGE 22 + 76 S SURFACE El 1129.5

DATE DRILLED 4-29-81 TO 4-29-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			CL	17.6	31	15	▽
5	1125			21.7	46	23	
							DISCONTINUED
10	1120						
15	1115						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-10 STATION 40 + 81W RANGE 23 + 50S SURFACE El 1137.9

DATE DRILLED 4-30-81 TO 4-30-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
				20.8	31	15	
	1135						
			CL	21.3			
5					46	23	
				21.1			
	1130						
10							DISCONTINUED
	1125						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-11 STATION 56 + 79 W RANGE 14 + 98 S SURFACE El 1130.9

DATE DRILLED 4-30-81 TO 4-30-81 PREPARED BY JLB CHECKED BY HPM

Scale: 1"=5'

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
0	1130						
			ML	25.9	39	9	
			CL	23.0	48	23	
5	1125						
			SM-SC	25.8			
			SM-SC		53	25	
10	1120						
			SM-SC	26.7			
15	1115						WEATHERED ROCK
							BEDROCK
20	1110						
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-12 STATION 54 + 93W RANGE 15 +72S SURFACE El 1121.5

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1120		CL	16.3	25	12	
							HEAVY GRAVEL
5							
	1115		CH MH	26.1	52	23	
10							
	1110		CL	18.9	40	18	
							BEDROCK
15							
	1105						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-13 STATION 53 + 07W RANGE 16 + 46S SURFACE El 1131.3

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0			TOPSOIL				
	1130			12.5	31	15	
5			CL	35.2	49	24	
	1125						
10				34 4	46	23	
	1120						
							DISCONTINUED
15							
	1115						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF

PROJECT	JOHN SEVIER S. P.			FEATURE	BORROW AREA 'B'		
BORING	PAH-14	STATION	51 + 22 W	RANGE	17 + 20 S	SURFACE El	1139.4
DATE DRILLED	5-4-81	TO	5-4-81	PREPARED BY	JLB	CHECKED BY	HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0							
			CL	20.2	25	12	
5	1135		CL	23.0	37	19	
10	1130		CL	23.4	37	19	▽
							DISCONTINUED
15	1125						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-15 STATION 49 + 36S RANGE 17 + 94S SURFACE El 1136.5

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1135		ML	24.0	39	9	
5				23.3			
	1130		CL				
10				10.5	37	19	
	1125						
15			CL-CH	29.2			
	1120						BEDROCK
20							
	1115						
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-16 STATION 47+50W RANGE 18+68S SURFACE El 1135.8

DATE DRILLED 5-5-81 TO 5-5-81 PREPARED BY JLB CHECKED BY HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0	1135						
			CL	22.5	27	9	
5	1130		CL	21.2	37	19	
			GC	10.6	34	17	
10	1125						
			CL	31.3	46	23	
15	1120						BEDROCK
20	1115						
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S.P. FEATURE BORROW AREA 'B'

BORING PAH-17 STATION 45+64W RANGE 19+42S SURFACE El 1131.7

DATE DRILLED 5-5-81 TO 5-5-81 PREPARED BY JLB CHECKED BY HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0							
	1130		CL	17.6	36	15	
			CL	19.7	46	23	
5							
	1125		CL-ML	15.7	22	7	
10							DISCONTINUED
	1120						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-19 STATION 41 + 93 W RANGE 20 + 91 S SURFACE El 1129.8

DATE DRILLED 4-30-81 TO 4-30-81 PREPARED BY JLB CHECKED BY HPM

DEPTH 1"=5'	El	SPT (N)	LOG	W	LL	PI	REMARKS
0							
			CL	11.6	36	16	
							GRAVEL LAYER
5	1125						
			CL	29.3	49	24	
10	1120						
			CH-MH	28.5	52	23	
							DISCONTINUED
15	1115						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-20 STATION 40 + 12W RANGE 21 + 63S SURFACE El 1134.3

DATE DRILLED 4-30-81 TO 4-30-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			CL	15.1	36	16	
5	1130		CL-CH	21.7	50	27	
	1125		CL	30.6	46	23	
10							BEDROCK
15	1120						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF ___

PROJECT: JOHN SEVIER S. P. FEATURE: BORROW AREA `B'

BORING: PAH-21 STATION: 56 + 05W RANGE: 13+12S SURFACE El: 11~~2~~34.4

DATE DRILLED: 5-4-81 TO 5-4-81 PREPARED BY: JLB CHECKED BY: HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0			(hatched)				
			CL	17.1	31	15	
	1130						
5			CL-CH	34.1			
			CL-CH		50	27	
10	1125		CL-CH	41.3			
							DISCONTINUED
15	1120						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-22 STATION 54 + 19 W RANGE 13 + 86 S SURFACE El 1125.2

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0	1125						
			CL	41.6	36	15	
5	1120			38.5			
			CH-MH		52	23	
10	1115			35.6			
							DISCONTINUED
15	1110						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-23 STATION 52 + 33W RANGE 14 + 60S SURFACE El 1117.7

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			CL	30.2	39	16	
	1115						
5				34.0	46	23	
	1110						DISCONTINUED
10							
	1105						
15							
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-24 STATION 50 + 47W RANGE 15 + 34 S SURFACE El 1129.8

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
			SC	16.6	32	15	
5	1125		CL	28.7	48	23	
10	1120		CH-MH	26.5	58	28	
15	1115		CH-MH	29.0	52	23	
							DISCONTINUED
20	1110						
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-25 STATION 48 + 62W RANGE 16 + 08S SURFACE El 1122.0

DATE DRILLED 5-4-81 TO 5-4-81 PREPARED BY JLB CHECKED BY HP[illegible]

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1"=5'							
0							
	1120		CL	31.2	36	16	
5				32.6			
	1115		CH-MH		58	28	
10				31.1			
	1110						
							BEDROCK
15							
	1105						
20							
25							
30							
35							

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT JOHN SEVIER S. P. FEATURE BORROW AREA 'B'

BORING PAH-26 STATION 46+76W RANGE 16+82S SURFACE El 1122.8

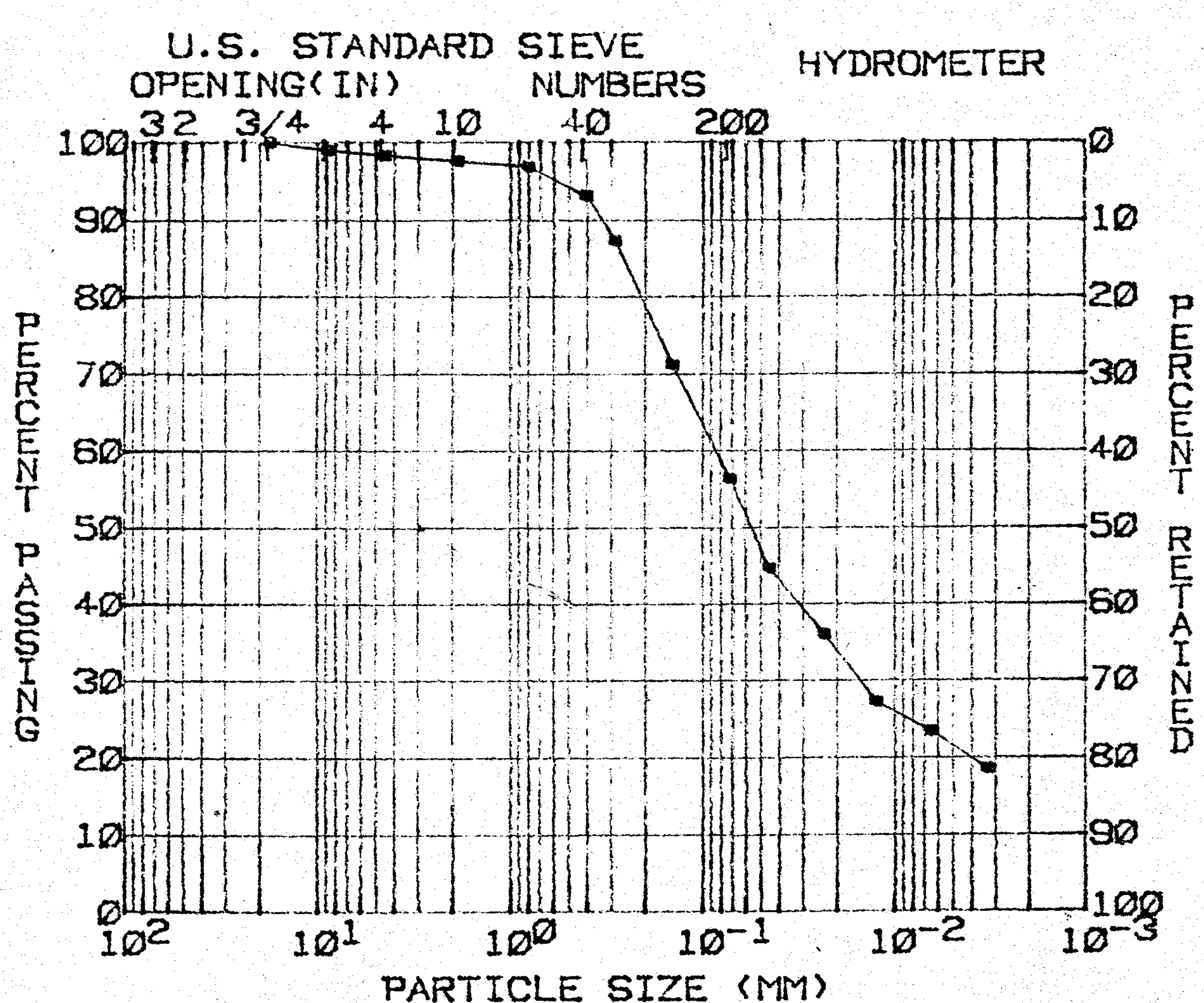
DATE DRILLED 5-5-81 TO 5-5-81 PREPARED BY JLB CHECKED BY HPM

DEPTH (1"=5')	El	SPT (N)	LOG	W	LL	PI	REMARKS
0							
	1120		CL	22.6	39	16	
5			CH-MH	29.7			
	1115						
10			CH-MH	28.6	52	23	
	1110						
15				29 2			
	1105						DISCONTINUED
20							
	1100						
25							
30							
35							

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-1
EL. :1094.4
SAMPLE:1
DATE :3-24-81



GRAVEL(%)= 1
SAND(%) =42
SILT(%) =35
CLAY(%) =22

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

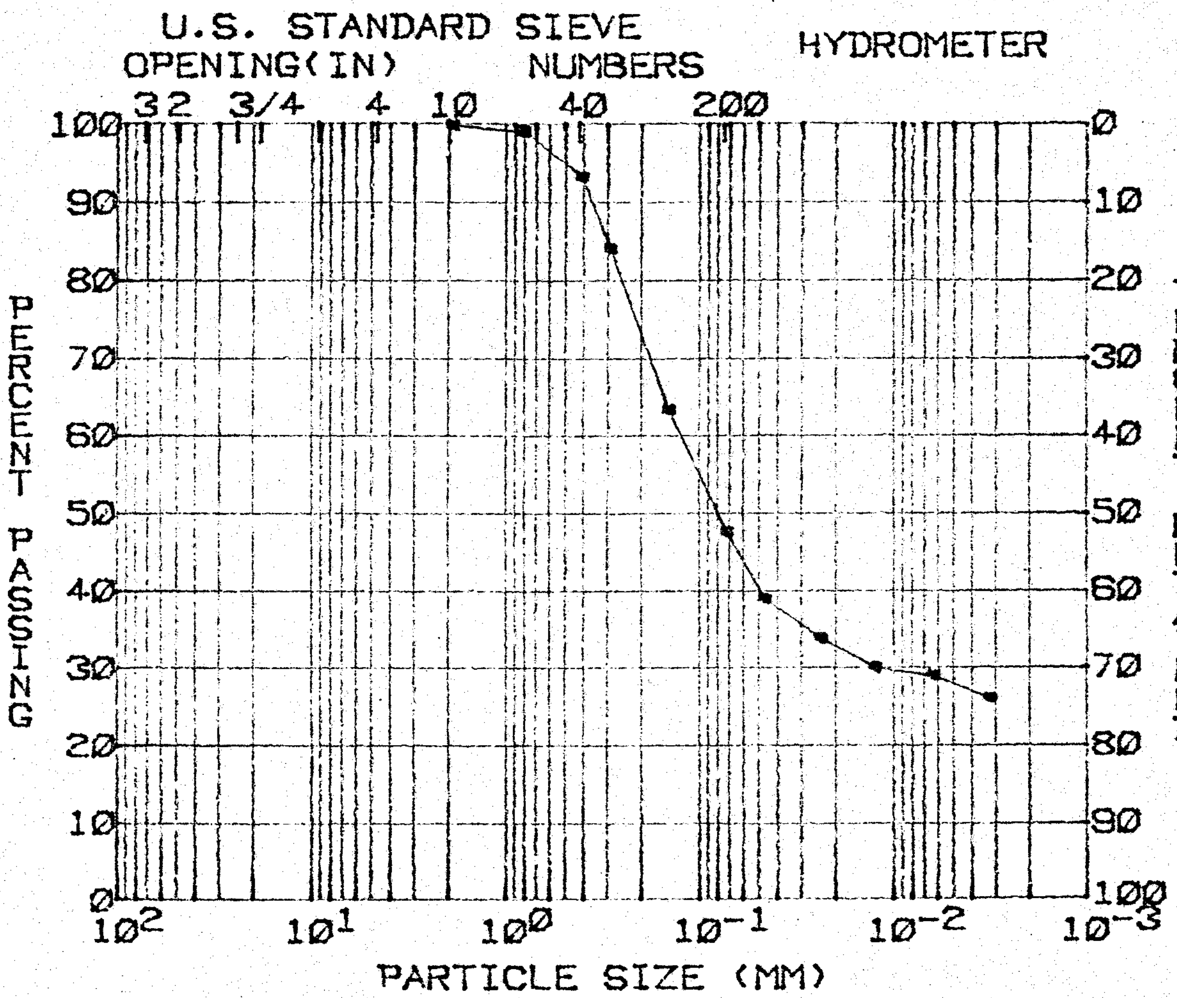
SOIL SYMBOL=CL-ML
MOISTURE(%)=13.5
SP. GR. =2.69

L.L.(%) = 19
P.I.(%) = 6

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-1
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:2
RANGE : DATE :3-24-81



GRAVEL(%)= 0
SAND(%) =52
SILT(%) =20
CLAY(%) =28

D10(MM) = 0.0001
D30(MM) = 0.0110
D60(MM) = 0.1271
COEF UNIF> 100

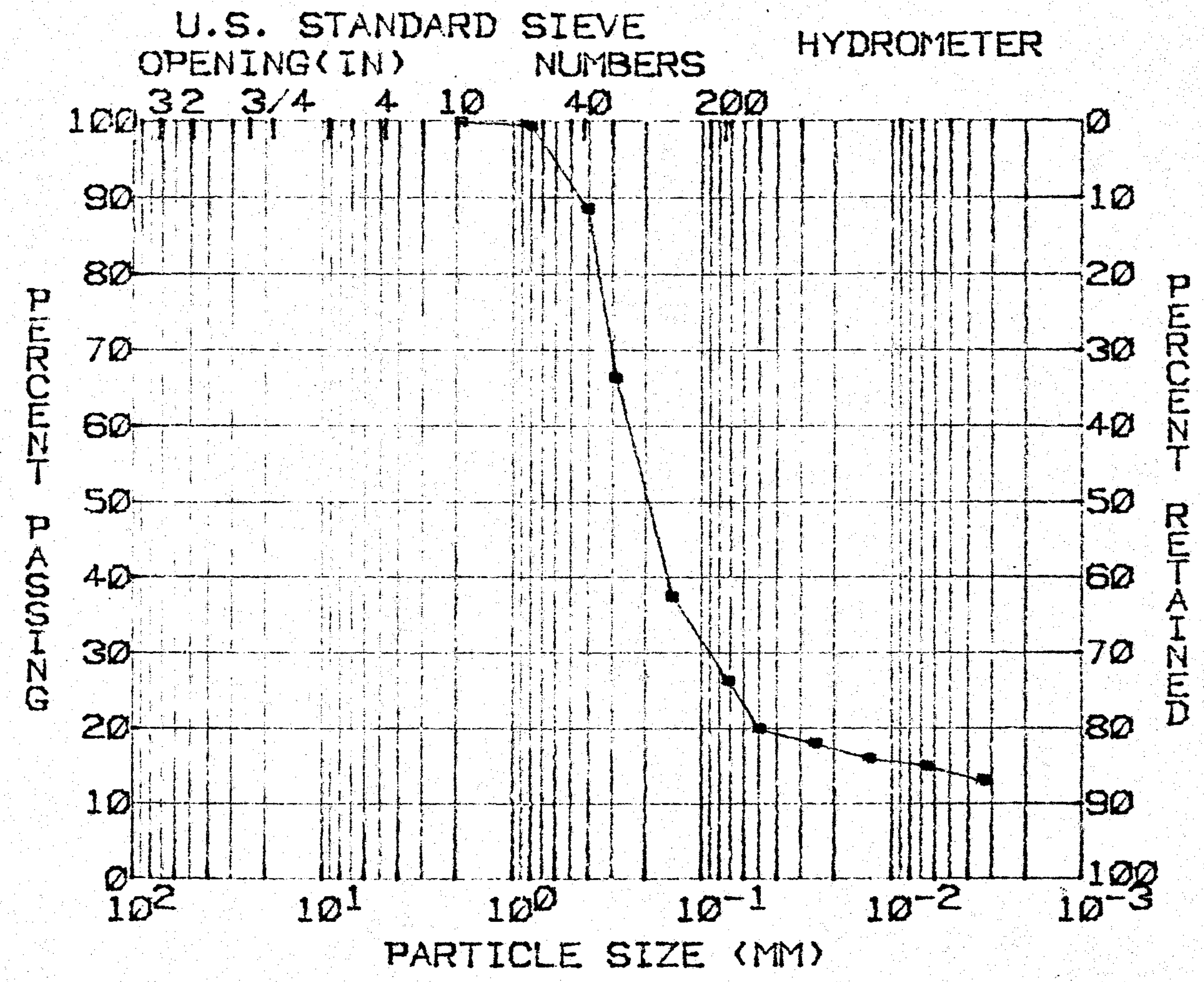
SOIL SYMBOL=SC
MOISTURE(%)=21.5
SP. GR. =2.67

L.L.(%) = 39
P.I.(%) = 22

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-1
FEATURE:ASH DIKE   EL. :
STATION: SAMPLE:3
RANGE :   DATE :3-24-81



GRAVEL(%)= 0   D10(MM) = 0.0012
SAND(%) =73   D30(MM) = 0.0931
SILT(%) =12   D60(MM) = 0.2561
CLAY(%) =15   COEF UNIF> 100

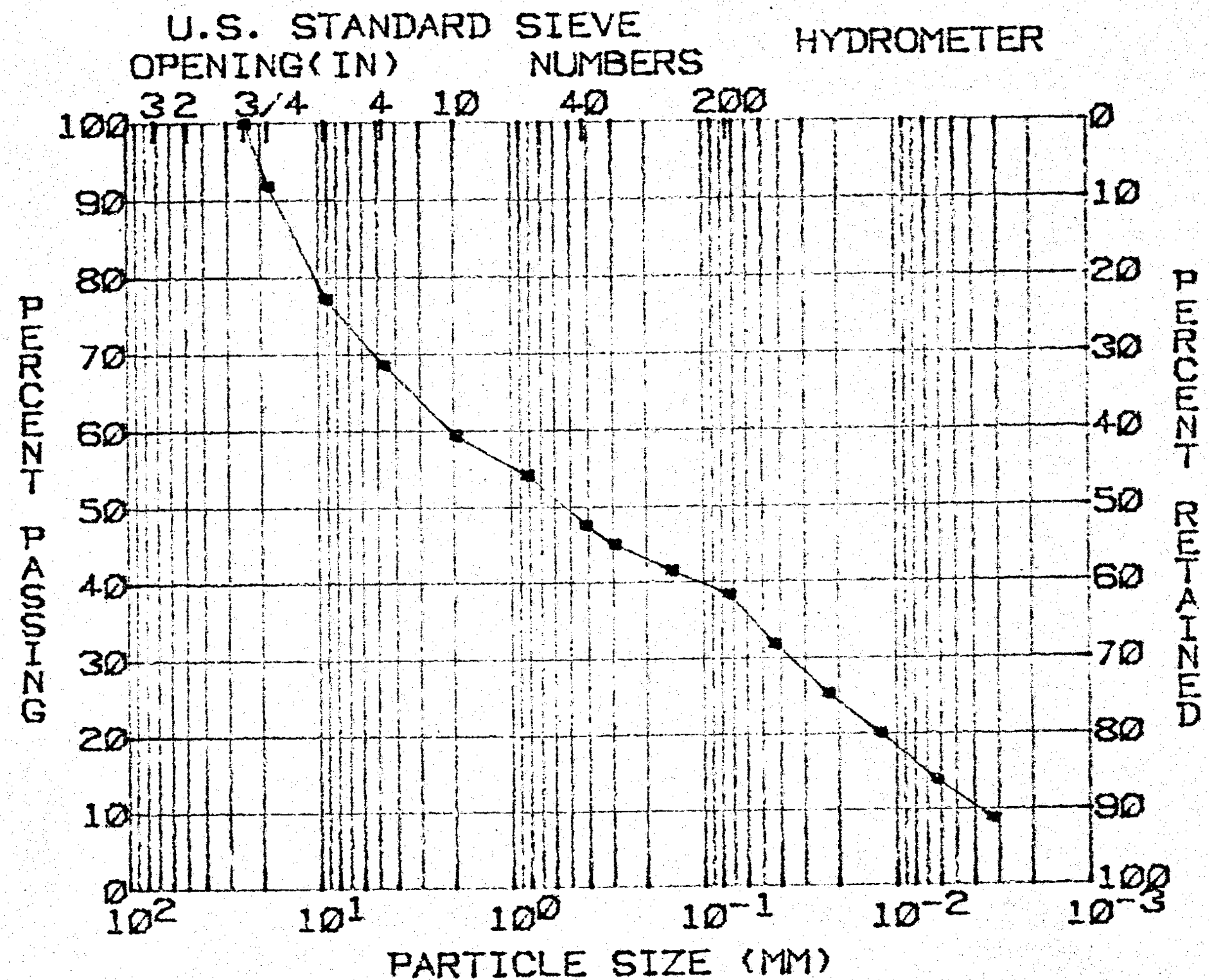
SOIL SYMBOL=SC   L.L.(%) = 28
MOISTURE(%)=15.9   P.I.(%) = 10
SP. GR. =2.67

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-1
EL. :
SAMPLE:4
DATE :3-24-81



GRAVEL(%)=31
SAND(%) =31
SILT(%) =26
CLAY(%) =12

D10(MM) = 0.0037
D30(MM) = 0.0354
D60(MM) = 2.0069
COEF UNIF> 100

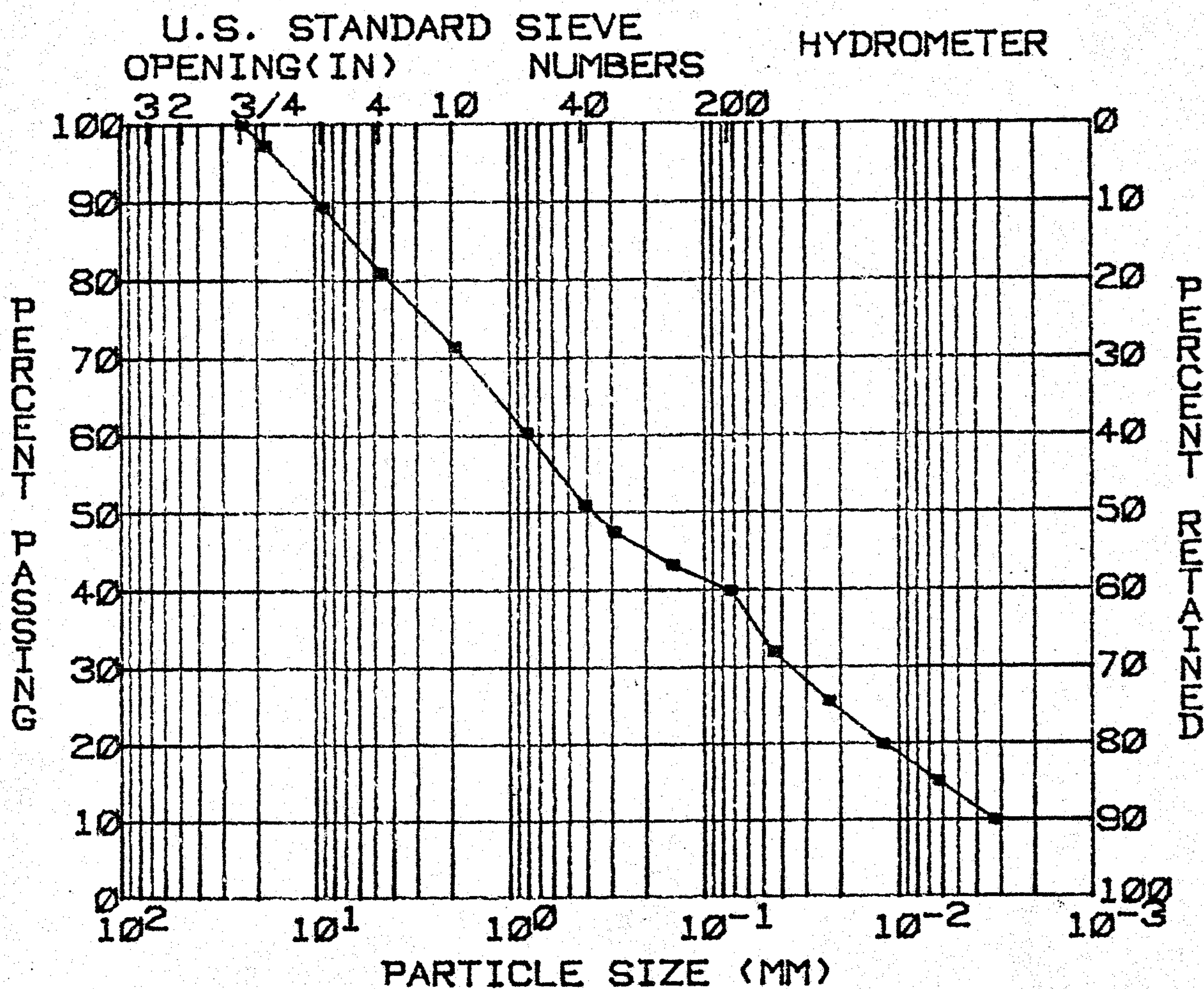
SOIL SYMBOL=GM
MOISTURE(%)=29.4
SP. GR. =2.82

L.L.(%) = 45
P.I.(%) = 15

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-1
FEATURE:ASH DIKE   EL. :
STATION: SAMPLE:5
RANGE :   DATE :3-24-81



GRAVEL(%)=18
SAND(%) =41
SILT(%) =27
CLAY(%) =14

D10(MM) = 0.0032
D30(MM) = 0.0359
D60(MM) = 0.7996
COEF UNIF> 100

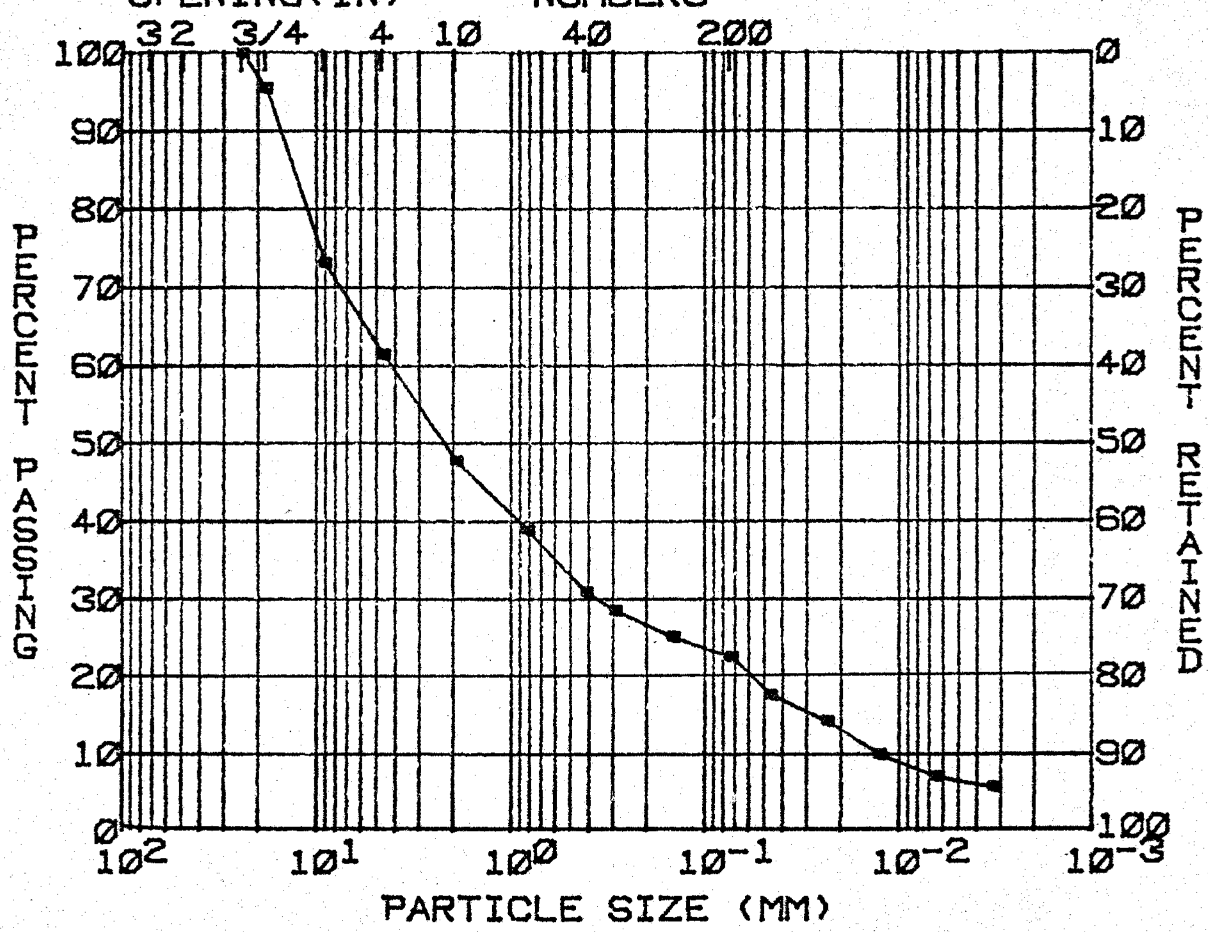
SOIL SYMBOL=SM-SC
MOISTURE(%)=27.8
SP. GR. =2.80

L.L.(%) = 39
P.I.(%) = 13

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-1
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:6
RANGE : DATE :3-24-81



GRAVEL(%)=38
SAND(%) =39
SILT(%) =16
CLAY(%) = 7

D10(MM) = 0.0121
D30(MM) = 0.3451
D60(MM) = 4.1421
COEF UNIF> 100

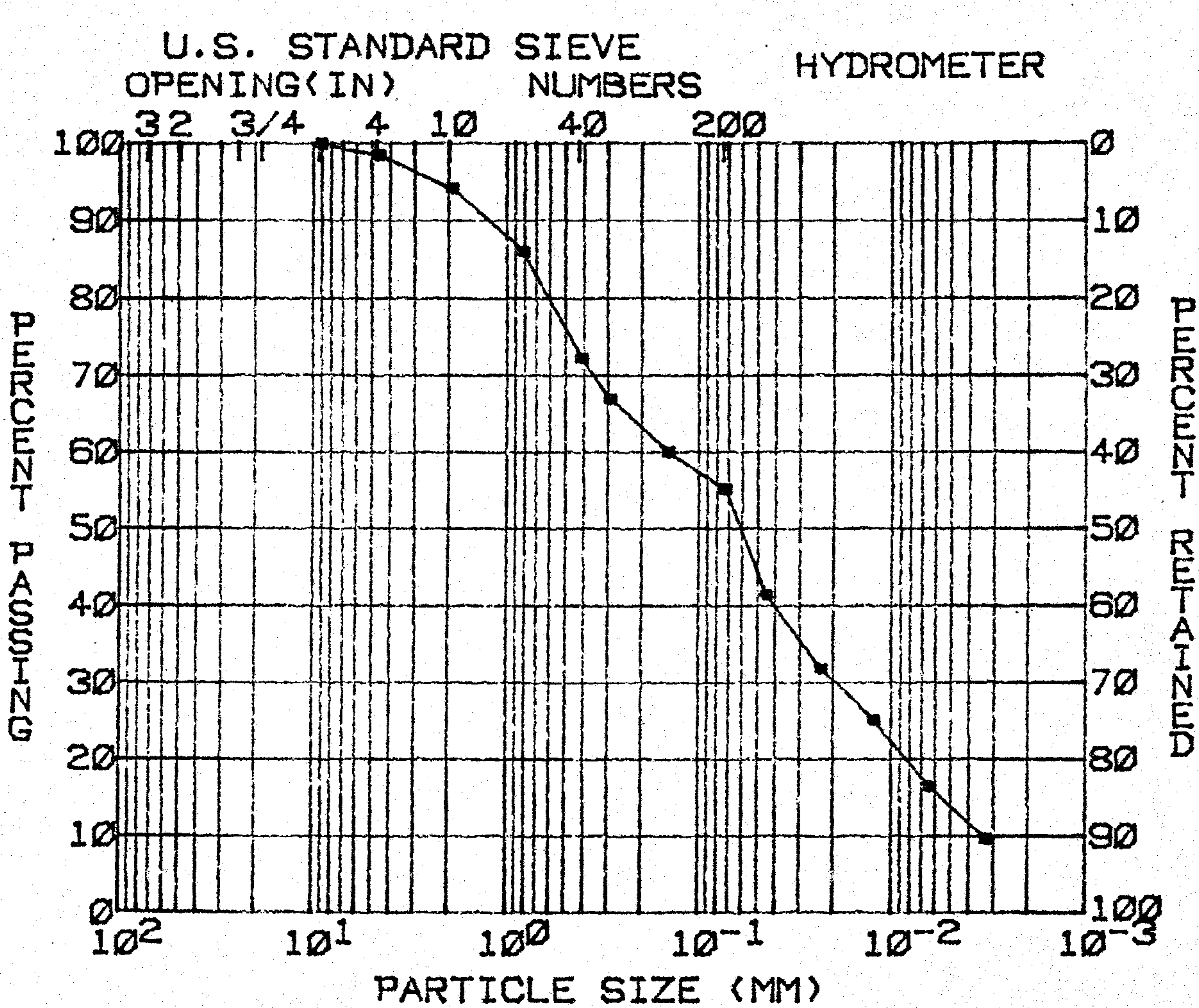
SOIL SYMBOL=SM-SC
MOISTURE(%)=24.1
SP. GR. =2.79

L.L.(%) = 39
P.I.(%) = 13

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-1
FEATURE:ASH DIKE   EL. :
STATION: SAMPLE:7
RANGE :   DATE :3-24-81



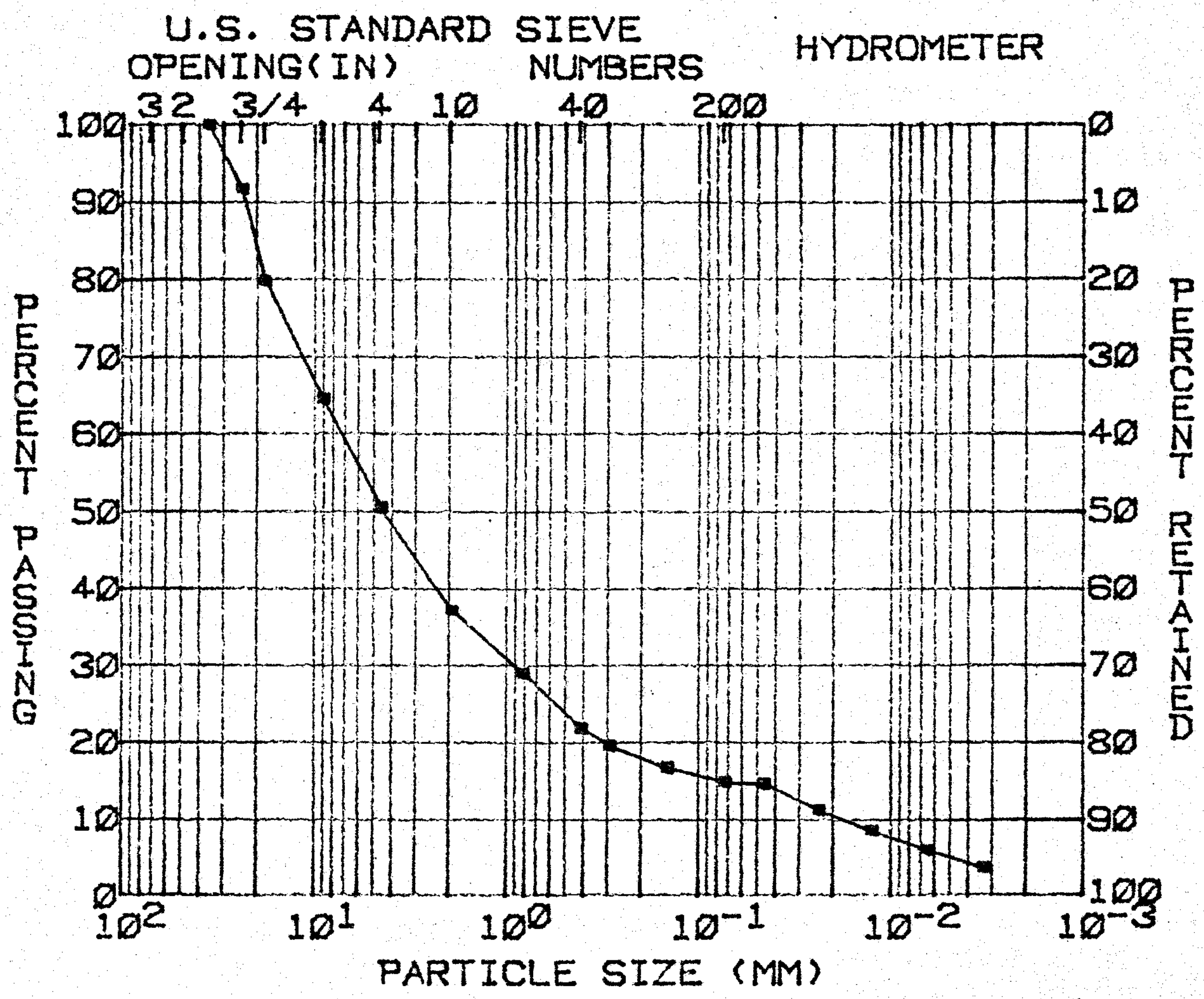
GRAVEL(%)= 1   D10(MM) =--
SAND(%) =44   D30(MM) =--
SILT(%) =41   D60(MM) =--
CLAY(%) =14   COEF UNIF=--

SOIL SYMBOL=CL-ML   L.L.(%) = 41
MOISTURE(%)=27.9   P.I.(%) = 16
SP. GR. =2.80

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-1
FEATURE:ASH DIKE   EL. :
STATION: SAMPLE:8
RANGE :   DATE :3-24-81



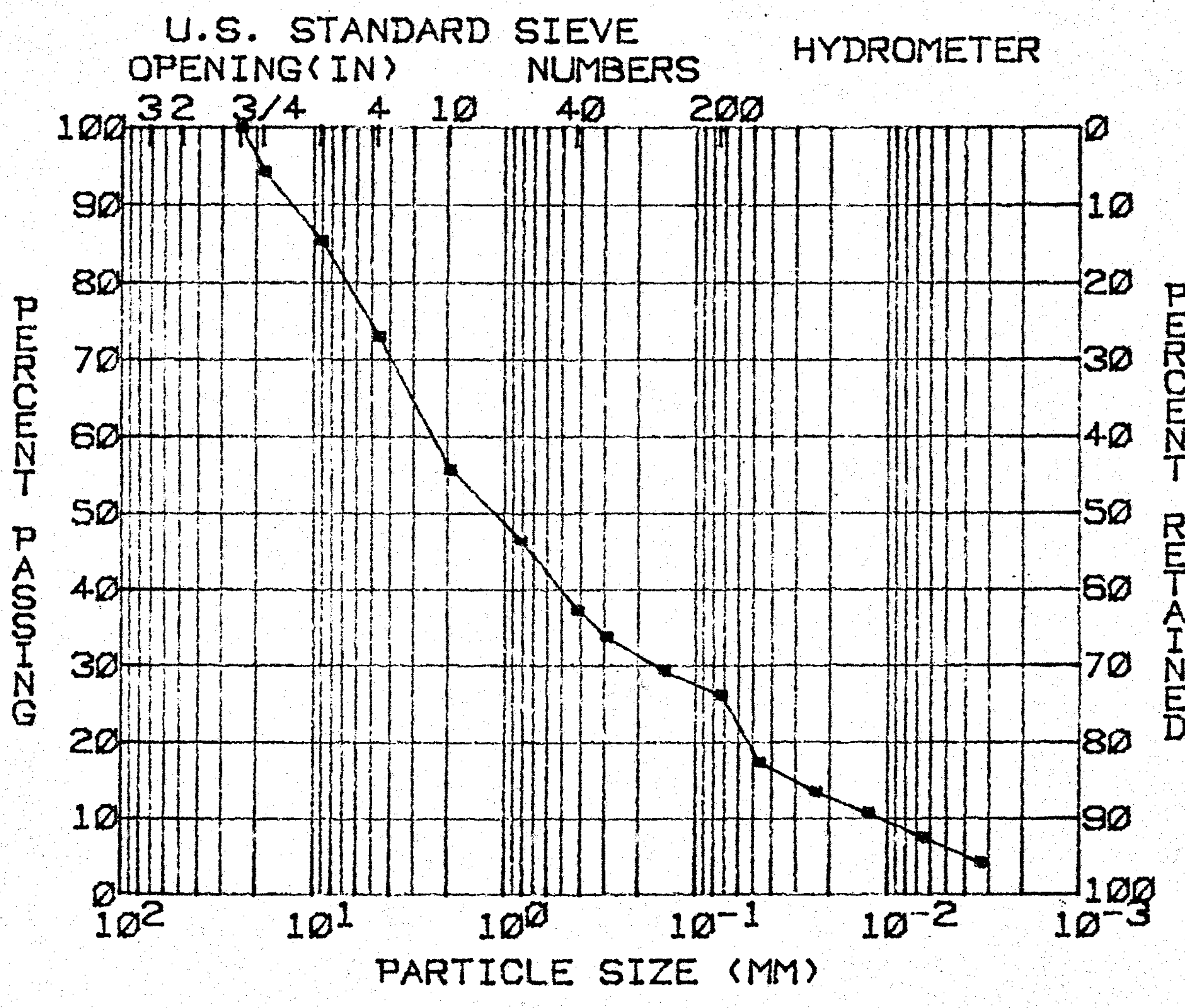
GRAVEL(%)=49   D10(MM) = 0.0170
SAND(%) =36   D30(MM) = 0.8846
SILT(%) =10   D60(MM) = 7.2941
CLAY(%) = 5   COEF UNIF> 100

SOIL SYMBOL=GM-GC   L.L.(%) = 37
MOISTURE(%)=24.3   P.I.(%) = 13
SP. GR. =2.78

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-1
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:9
RANGE : DATE :3-24-81



GRAVEL(%)=26
SAND(%) =47
SILT(%) =20
CLAY(%) = 7

D10(MM) = 0.0099
D30(MM) = 0.1474
D60(MM) = 2.3796
COEF UNIF> 100

SOIL SYMBOL=SM-SC
MOISTURE(%)=23.7
SP. GR. =2.80

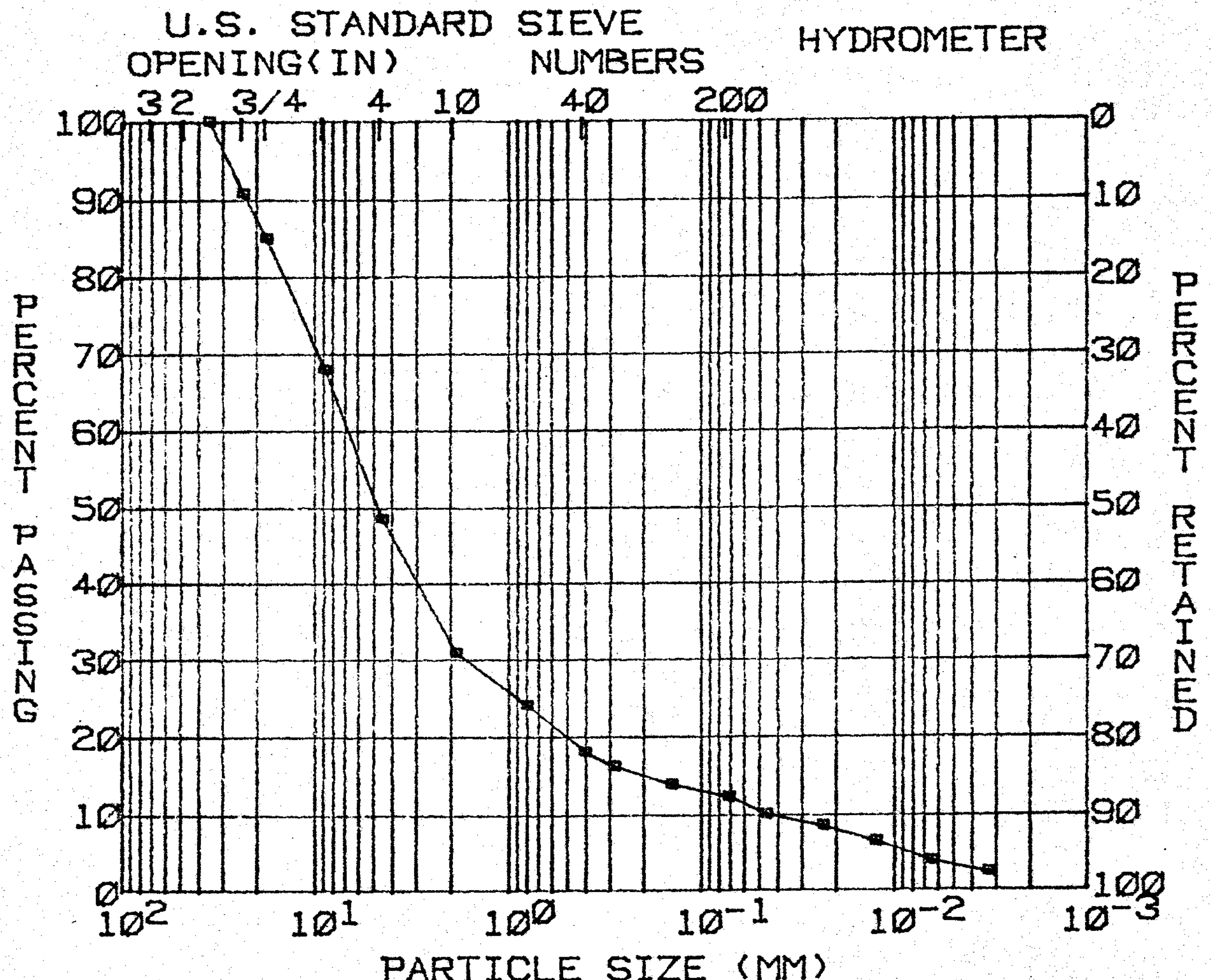
L.L.(%) = 36
P.I.(%) = 12

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-1
EL. :
SAMPLE:10
DATE :3-25-81



GRAVEL(%)=50
SAND(%) =37
SILT(%) = 9
CLAY(%) = 4

D10(MM) = 0.0379
D30(MM) = 1.5434
D60(MM) = 6.9246
COEF UNIF> 100

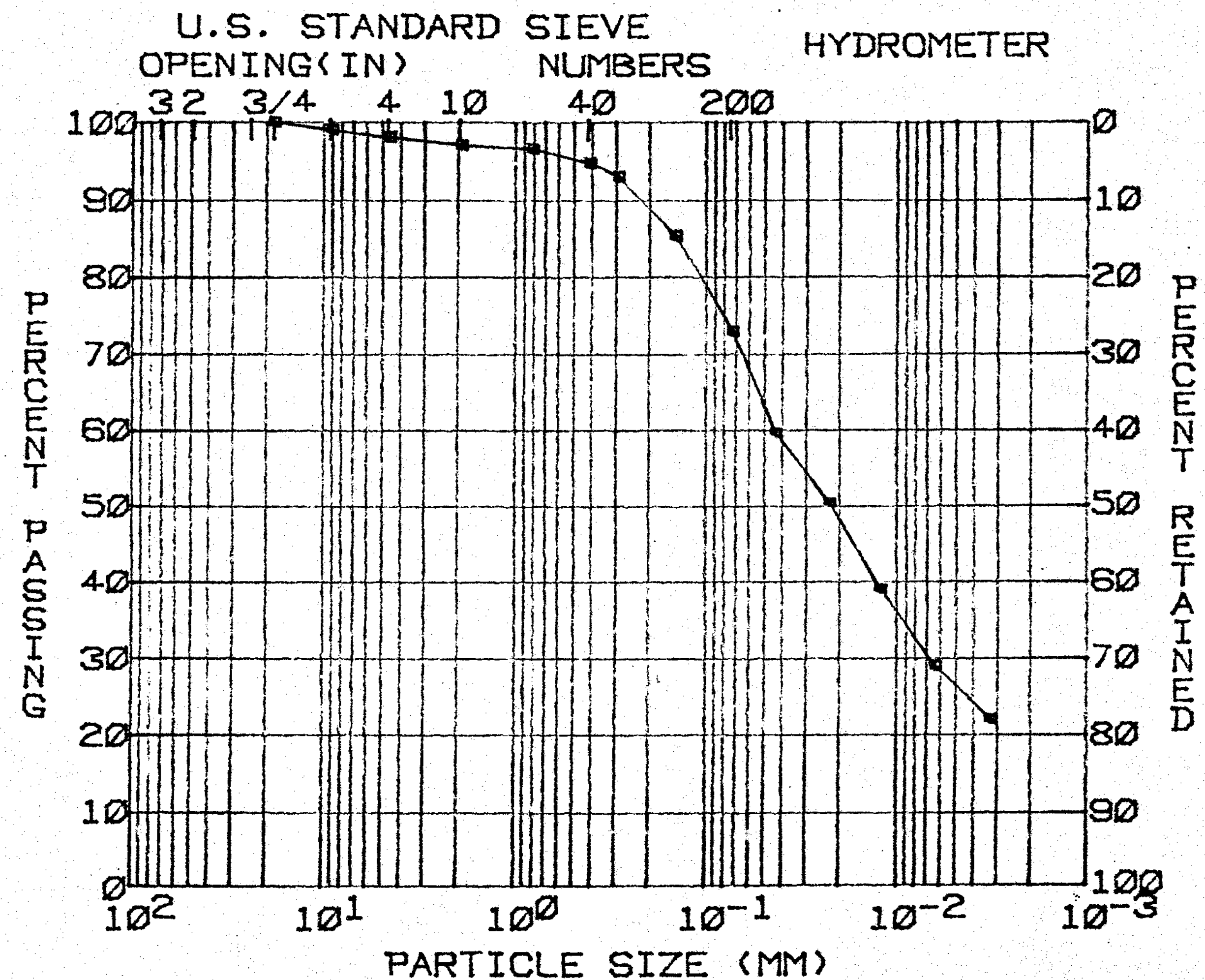
SOIL SYMBOL=GM-GC
MOISTURE(%)=24.3
SP. GR. =2.76

L.L.(%) = 36
P.I.(%) = 12

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-4
FEATURE:ASH DIKE   EL. :
STATION: SAMPLE:1
RANGE :   DATE :3-25-81



GRAVEL(%)= 1   D10(MM) =--
SAND(%) =26   D30(MM) =--
SILT(%) =47   D60(MM) =--
CLAY(%) =26   COEF UNIF=--

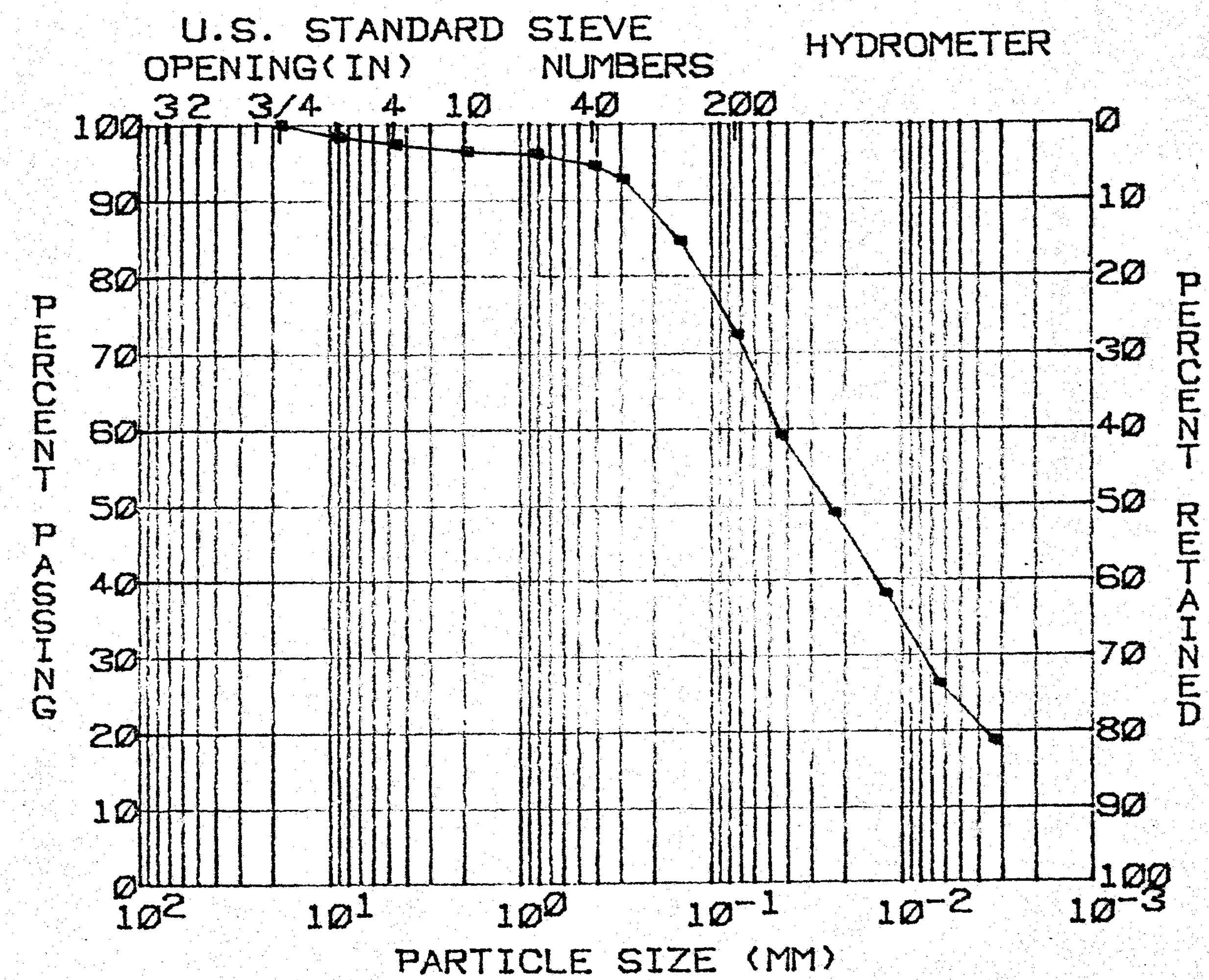
SOIL SYMBOL=CL   L.L.(%) = 31
MOISTURE(%)=17.9   P.I.(%) = 15
SP. GR. =2.67

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-4
EL. :
SAMPLE:2
DATE :3-25-81



GRAVEL(%)= 2
SAND(%) =25
SILT(%) =49
CLAY(%) =24

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

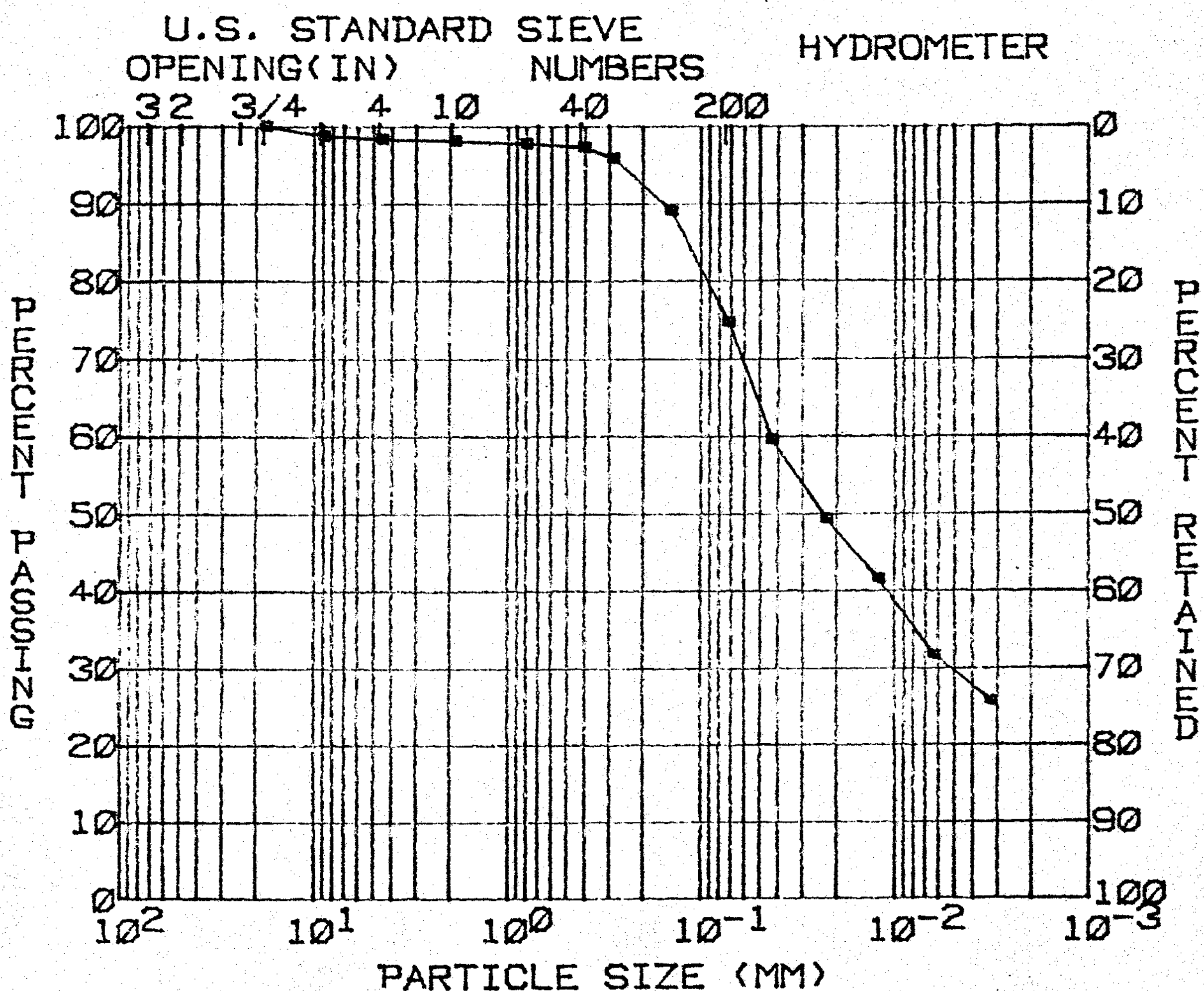
SOIL SYMBOL=CL
MOISTURE(%)=19.3
SP. GR. =2.71

L.L.(%) = 29
P.I.(%) = 11

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-4
FEATURE:ASH DIKE   EL. :
STATION: SAMPLE:3
RANGE :   DATE :3-25-81



GRAVEL(%)= 1
SAND(%) =24
SILT(%) =45
CLAY(%) =30

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

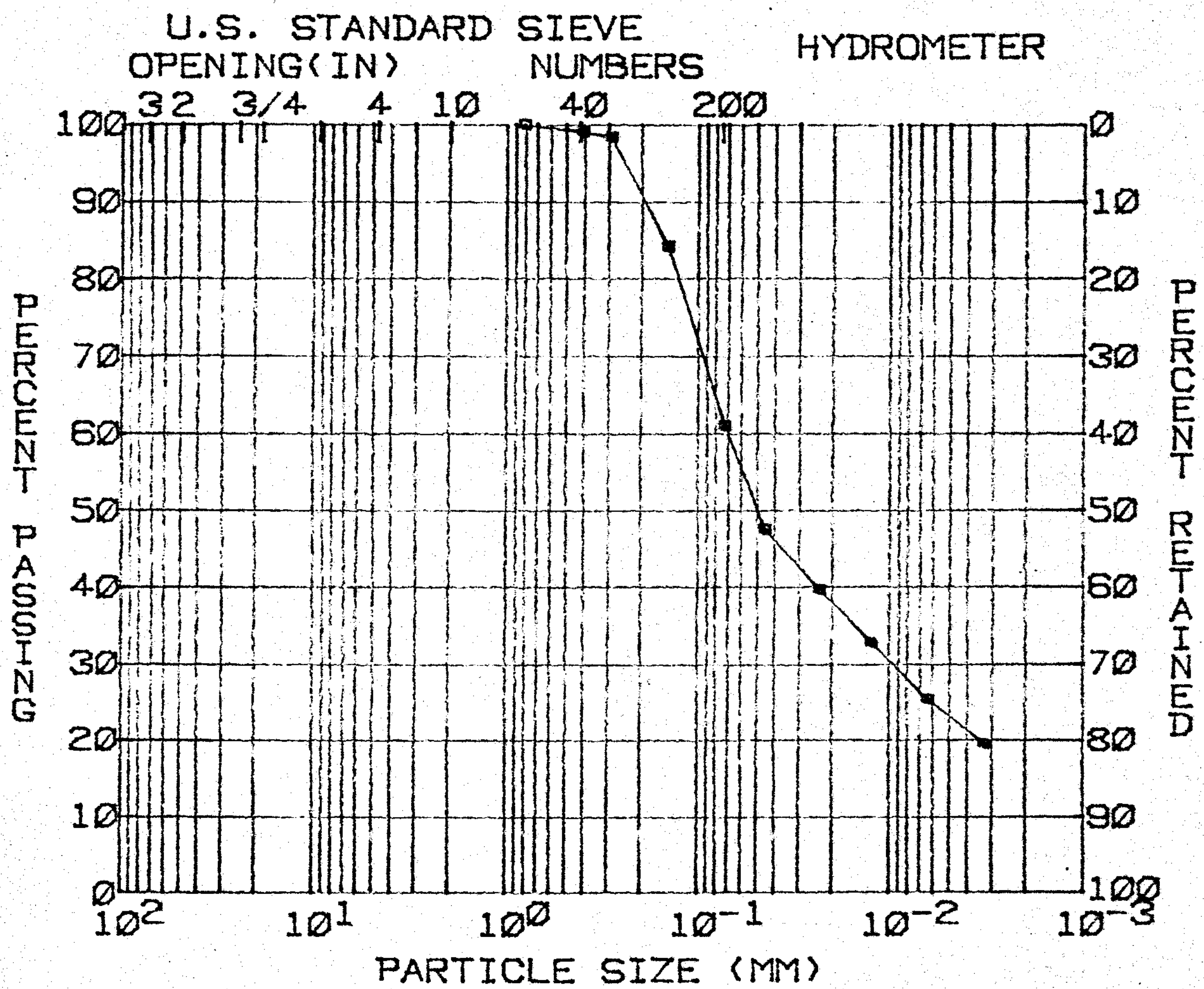
SOIL SYMBOL=CL
MOISTURE(%)=19.5
SP. GR. =2.68

L.L.(%) = 32
P.I.(%) = 16

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-4
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:4
RANGE : DATE :3-25-81



GRAVEL(%)= 0 D10(MM) =--
SAND(%) =38 D30(MM) =--
SILT(%) =38 D60(MM) =--
CLAY(%) =24 COEF UNIF=--

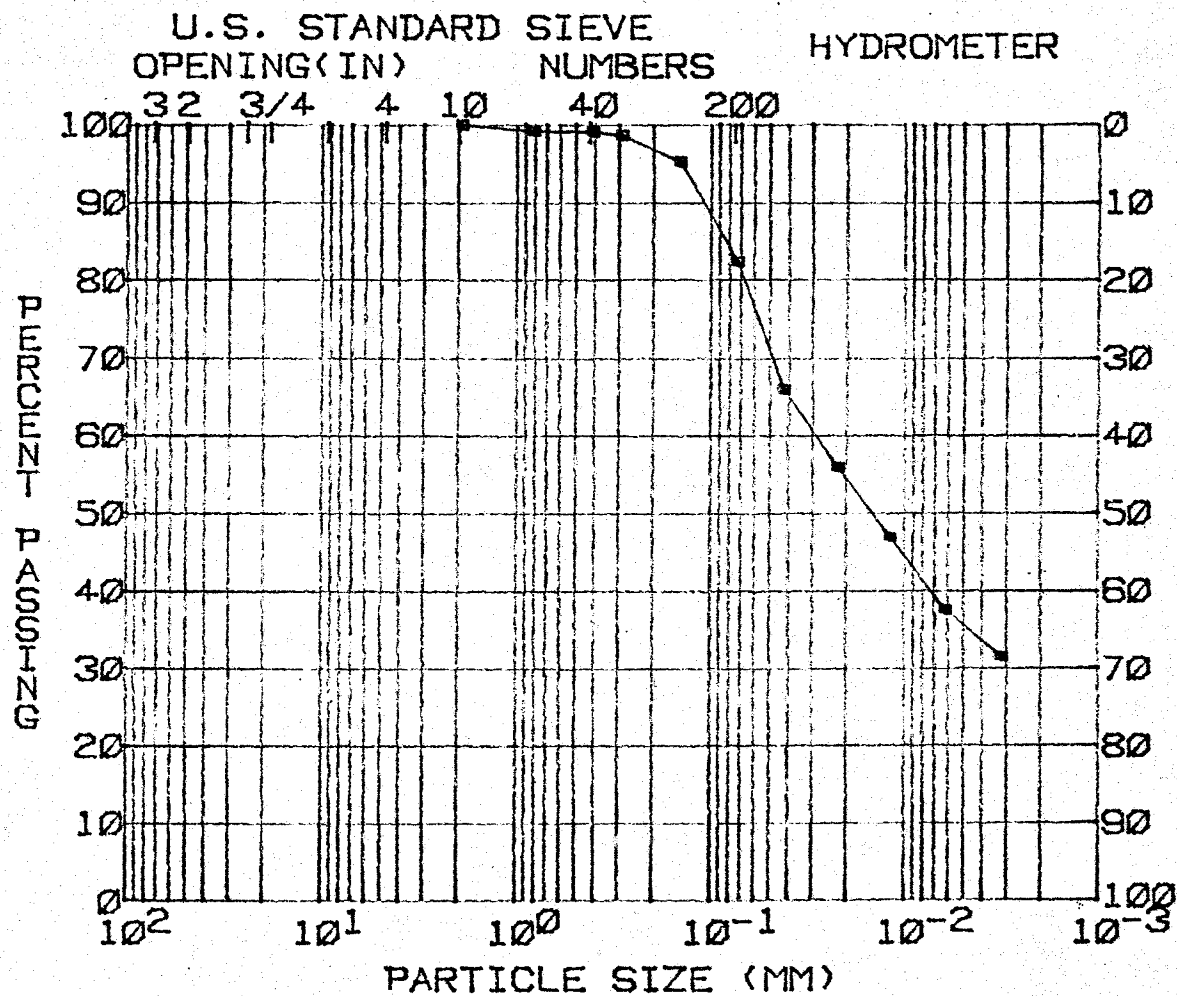
SOIL SYMBOL=CL L.L.(%) = 28
MOISTURE(%)=21.7 P.I.(%) = 12
SP. GR. =2.71

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-4A
EL. :.
SAMPLE:1
DATE :3-25-81



GRAVEL(%)= 0
SAND(%) =17
SILT(%) =47
CLAY(%) =36

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

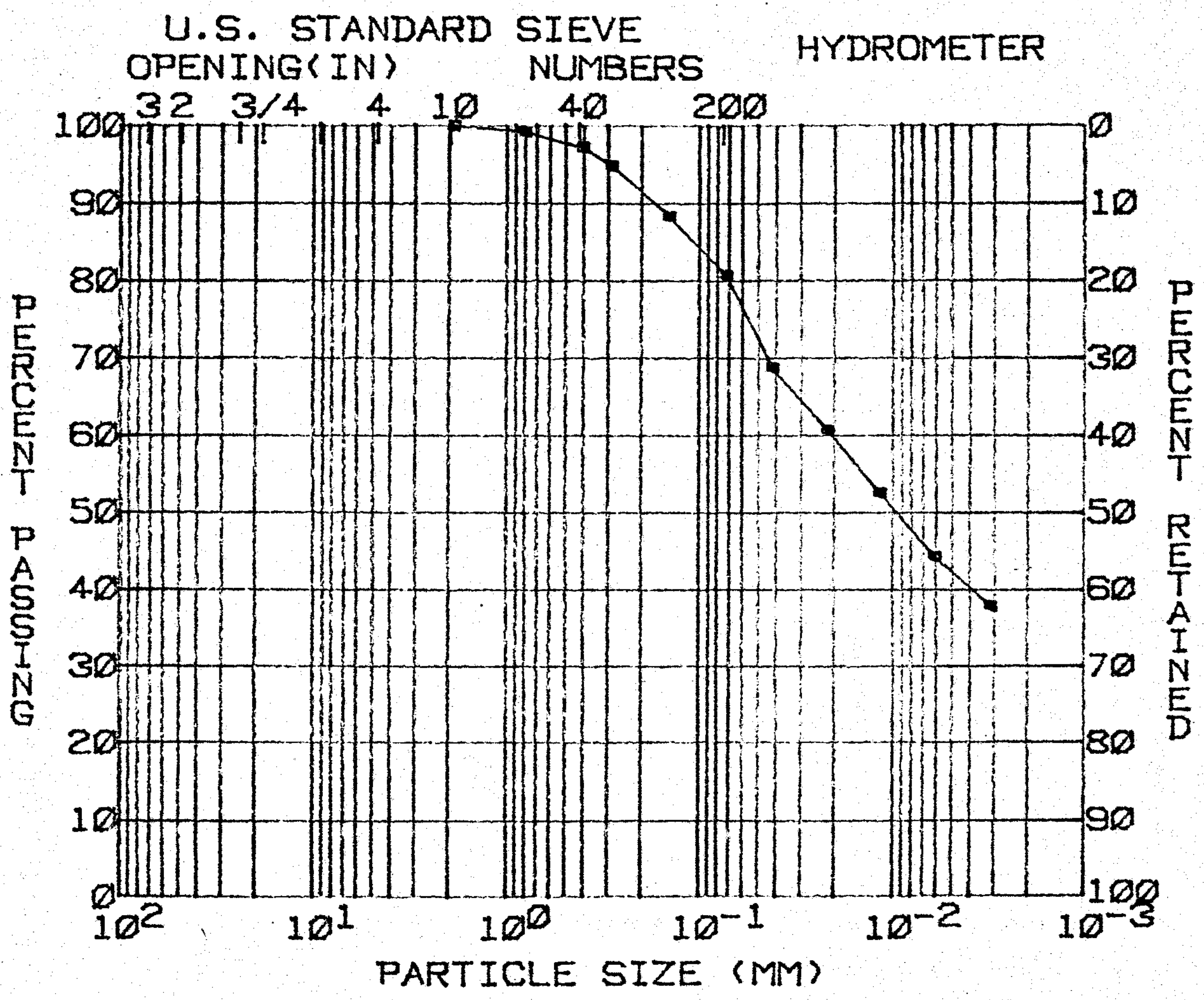
SOIL SYMBOL=CL
MOISTURE(%)=21.8
SP. GR. =2.70

L.L.(%) = 38
P.I.(%) = 19

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-8
FEATURE: ASH DIKE EL. :
STATION: SAMPLE: 1
RANGE : DATE : 3-25-81



GRAVEL(%) = 0
SAND(%) = 19
SILT(%) = 38
CLAY(%) = 43

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF = --

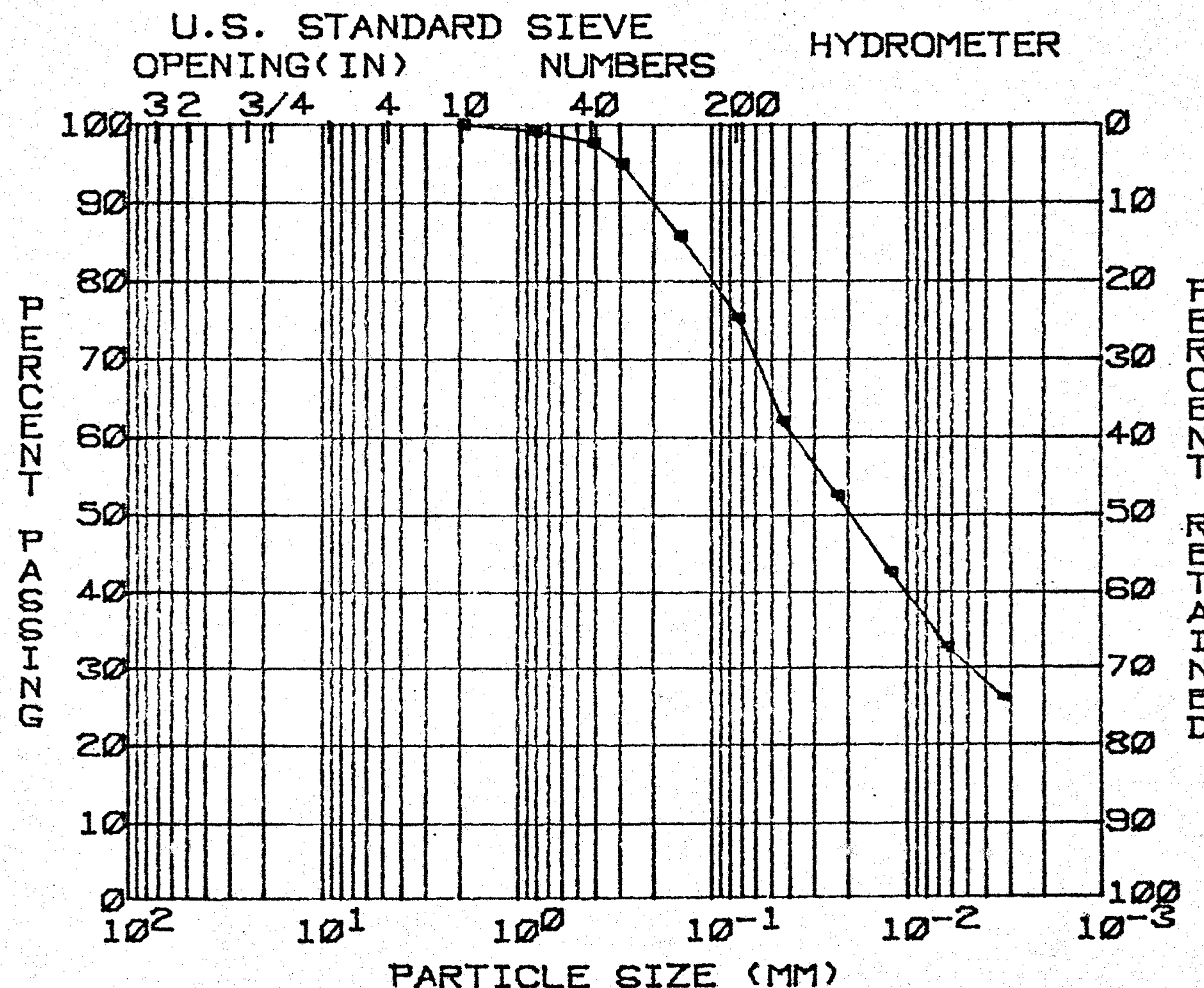
SOIL SYMBOL = CL-CH
MOISTURE(%) = 20.7
SP. GR. = 2.69

L.L.(%) = 49
P.I.(%) = 30

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-8
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:2
RANGE : DATE :3-25-81



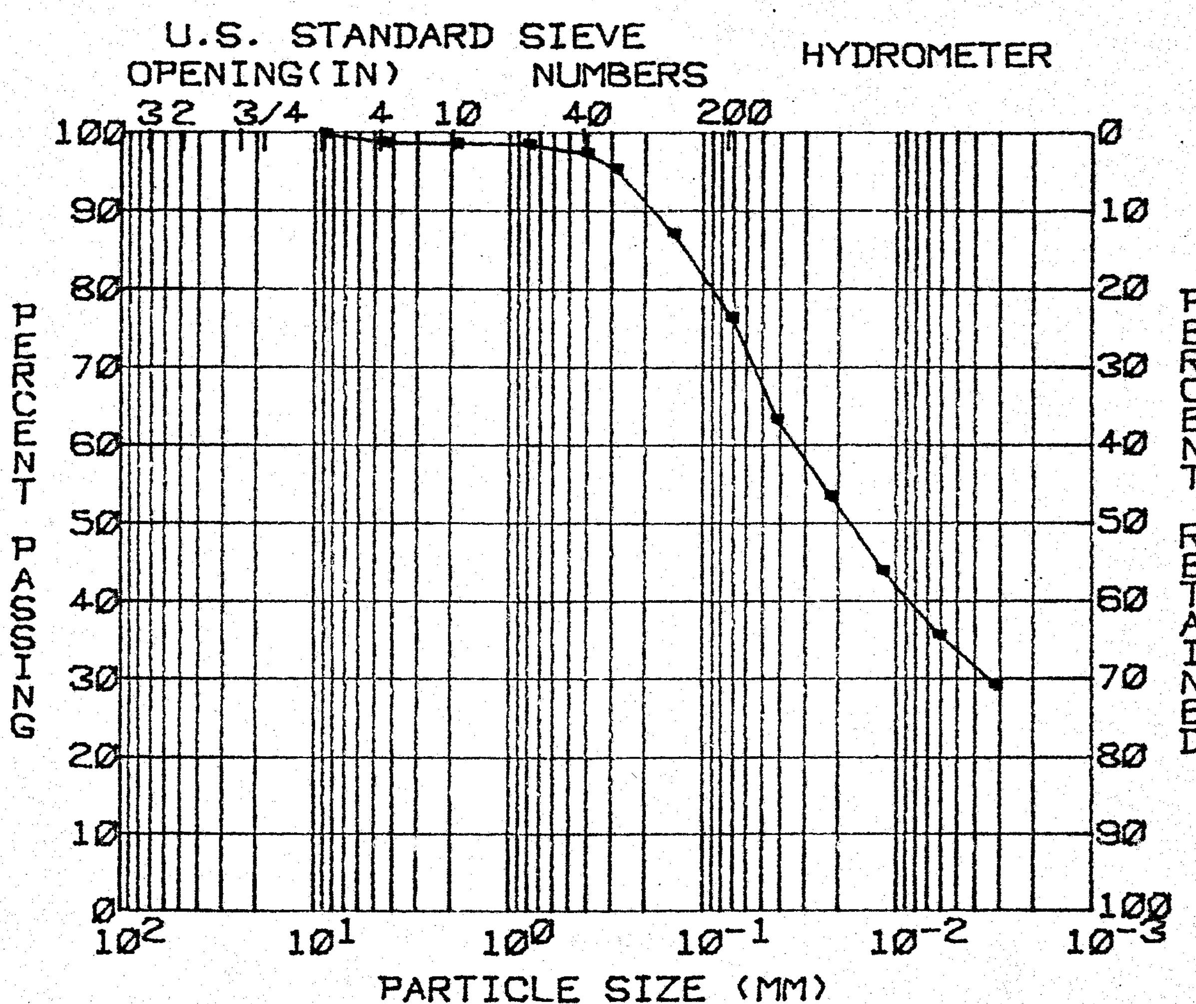
GRAVEL(%)= 0 D10(MM) =--
SAND(%) =24 D30(MM) =--
SILT(%) =45 D60(MM) =--
CLAY(%) =31 COEF UNIF=--

SOIL SYMBOL=CL L.L.(%) = 33
MOISTURE(%)=15.7 P.I.(%) = 18
SP. GR. =2.65

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-8
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:3
RANGE : DATE :3-26-81



GRAVEL(%)= 0
SAND(%) =23
SILT(%) =43
CLAY(%) =34

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

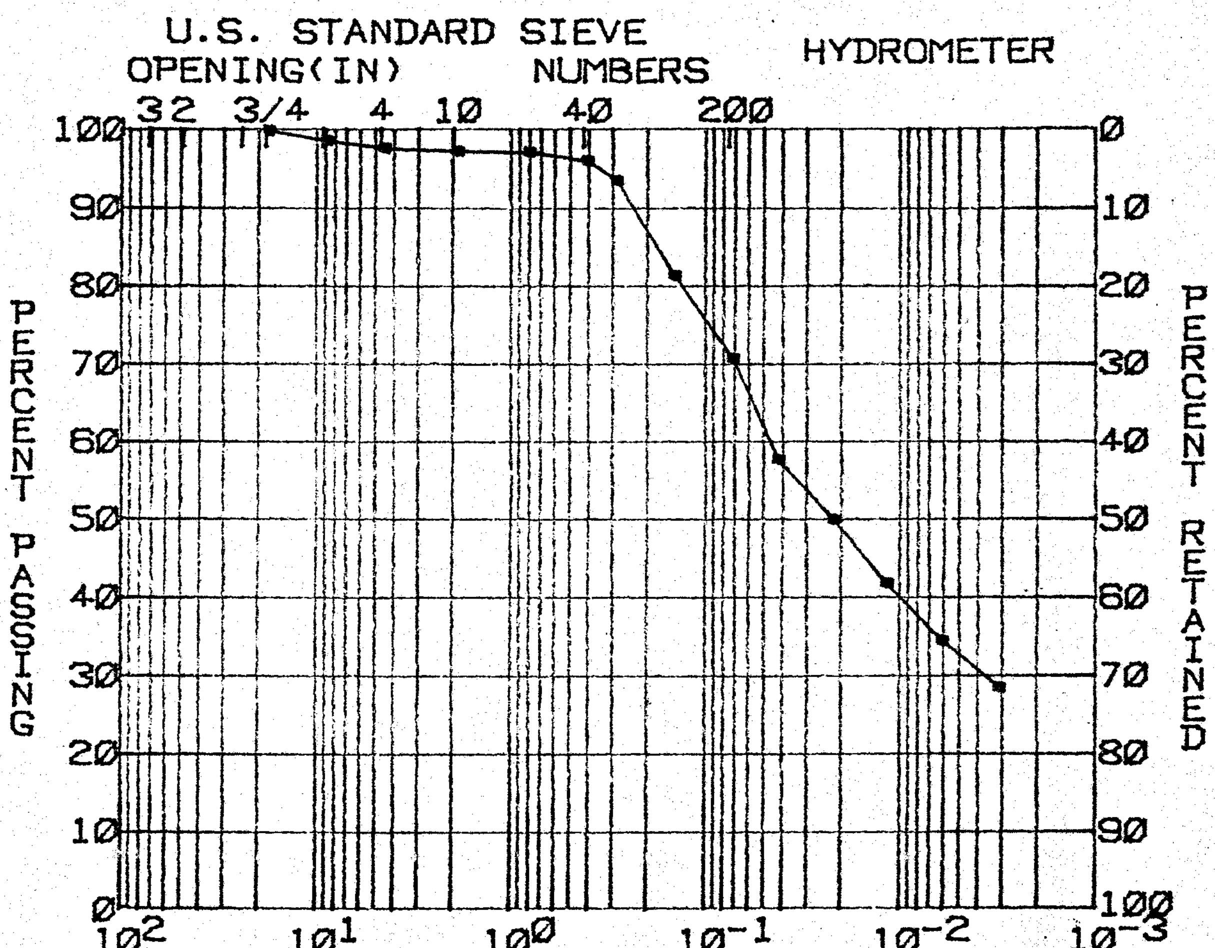
SOIL SYMBOL=CL
MOISTURE(%)=20.3
SP. GR. =2.71

L.L.(%) = 39
P.I.(%) = 22

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-8
FEATURE:ASH DIKE EL. :
STATION: SAMPLE:4
RANGE : DATE :3-26-81



GRAVEL(%)= 1 D10(MM) =--
SAND(%) =27 D30(MM) =--
SILT(%) =38 D60(MM) =--
CLAY(%) =34 COEF UNIF=--

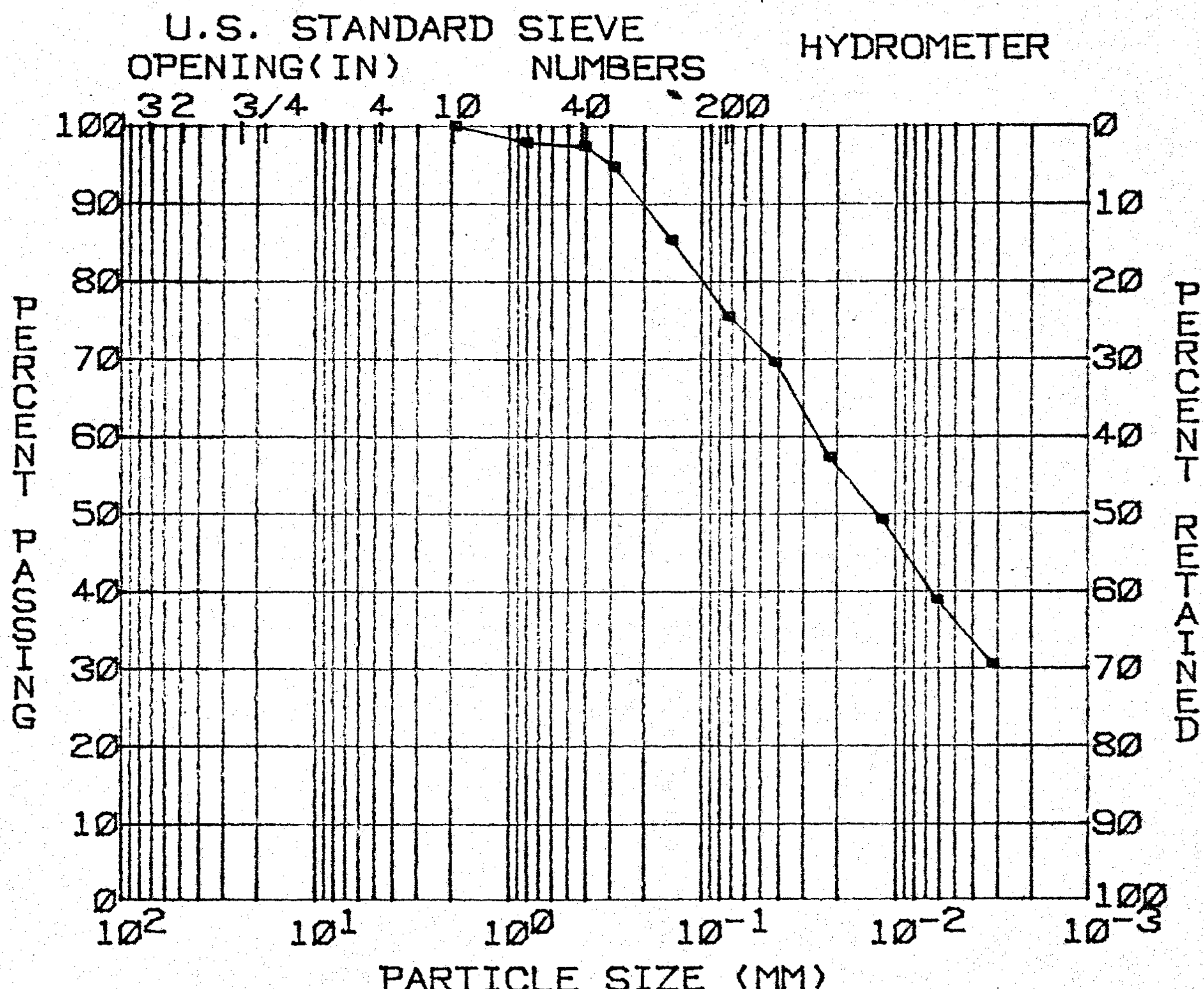
SOIL SYMBOL=CL L.L.(%) = 31
MOISTURE(%)=18.9 P.I.(%) = 18
SP. GR. =2.72

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-12
EL. :1070.2-1067.9
SAMPLE:1
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =24
SILT(%) =39
CLAY(%) =37

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

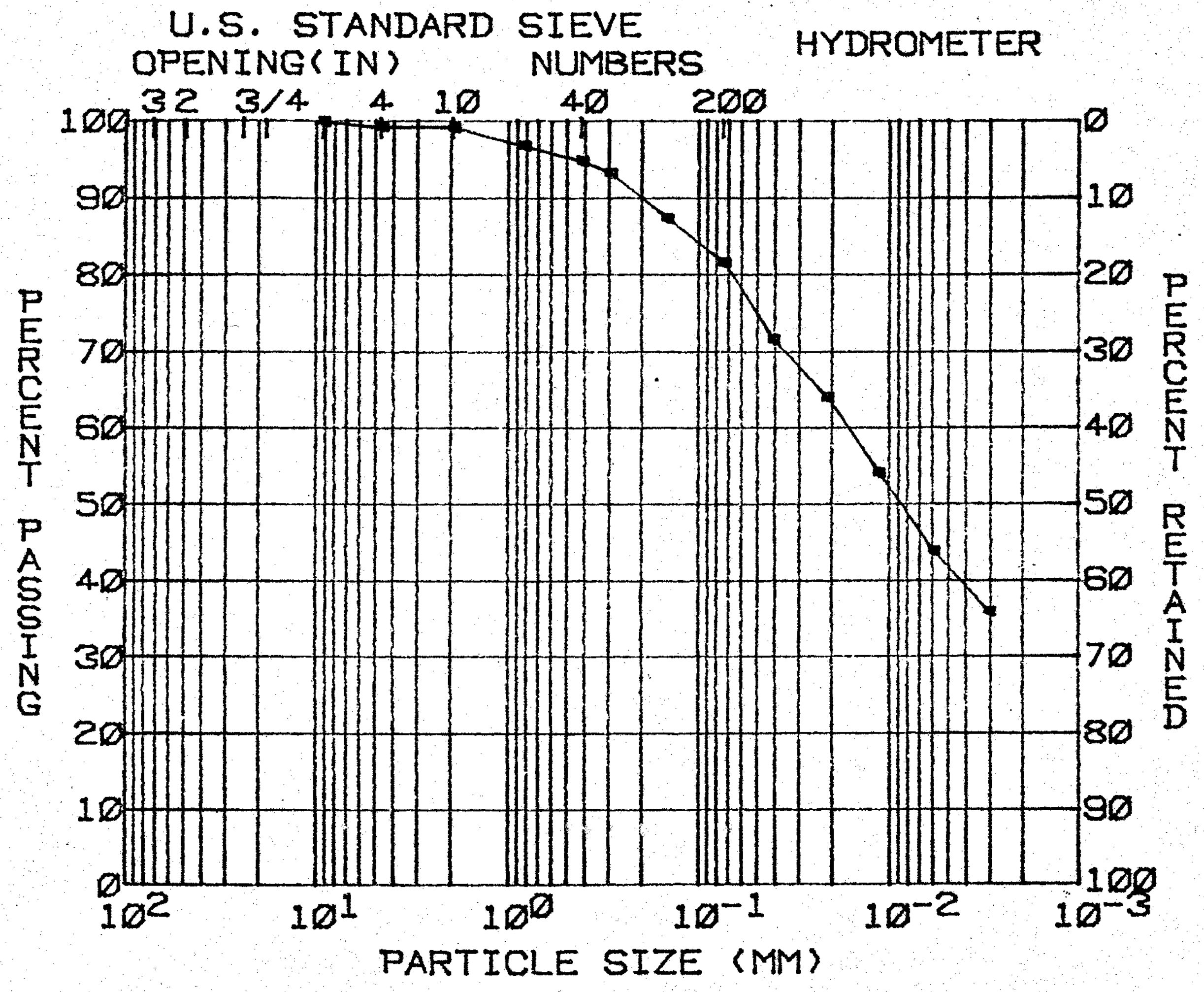
SOIL SYMBOL=CL
MOISTURE(%)=26.7
SP. GR. =2.69

L.L.(%) = 40
P.I.(%) = 20

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-12
FEATURE:ASH DIKE EL. :1067.2-1064.9
STATION: SAMPLE:2
RANGE : DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =18
SILT(%) =40
CLAY(%) =42

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

SOIL SYMBOL=CL
MOISTURE(%)=23.8
SP. GR. =2.73

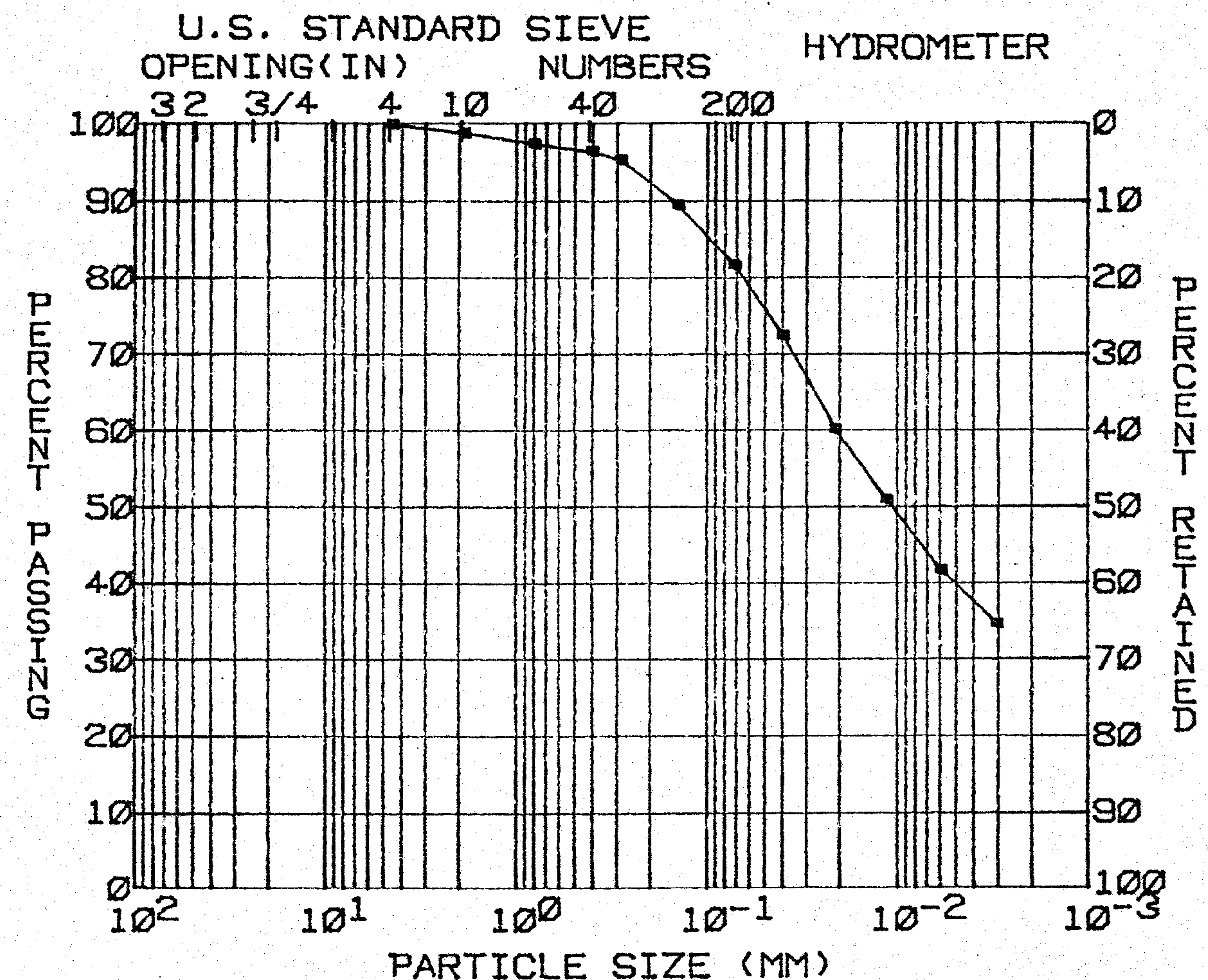
L.L.(%) = 39
P.I.(%) = 19

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-12
EL. :1064.2-1063.1
SAMPLE:3
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =18
SILT(%) =42
CLAY(%) =40

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

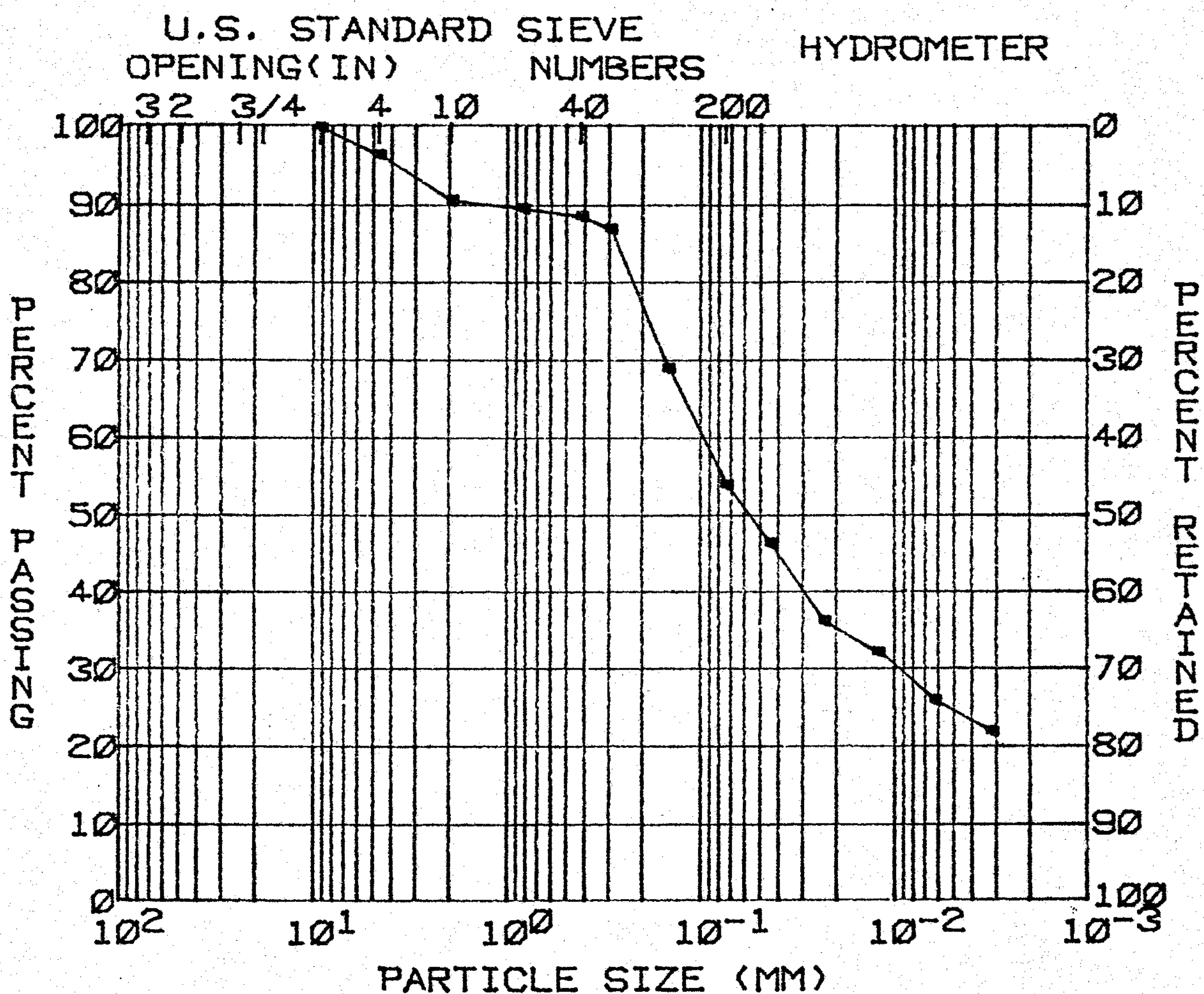
SOIL SYMBOL=CL
MOISTURE(%)=23.4
SP. GR. =2.72

L.L.(%) = 38
P.I.(%) = 18

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-12
FEATURE: ASH DIKE EL. :
STATION: SAMPLE: 4
RANGE : DATE : 5-11-81



GRAVEL(%) = 2
SAND(%) =43
SILT(%) =30
CLAY(%) =25

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

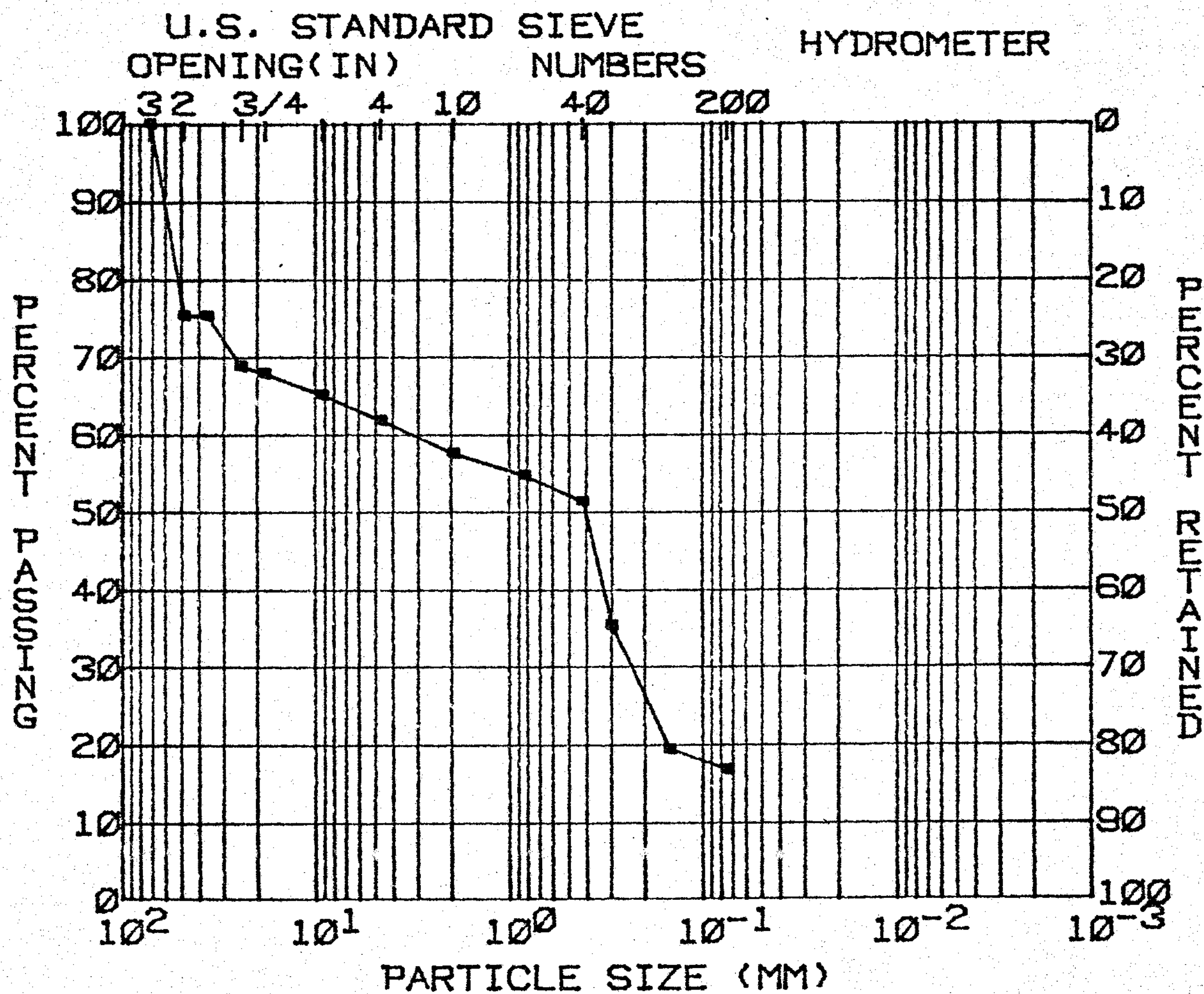
SOIL SYMBOL=CL
MOISTURE(%)=28.8
SP. GR. =2.74

L.L.(%) = 32
P.I.(%) = 14

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-12
FEATURE:ASH DIKE EL. :1061.2-1059.0
STATION: SAMPLE:4
RANGE : DATE :5-12-81



GRAVEL(%)=37
SAND(%) =46
SILT(%) =17
CLAY(%) = 0

D10(MM) = 0.0124
D30(MM) = 0.2339
D60(MM) = 2.8254
COEF UNIF> 100

SOIL SYMBOL=SM
MOISTURE(%)=26.0
SP. GR. =2.67

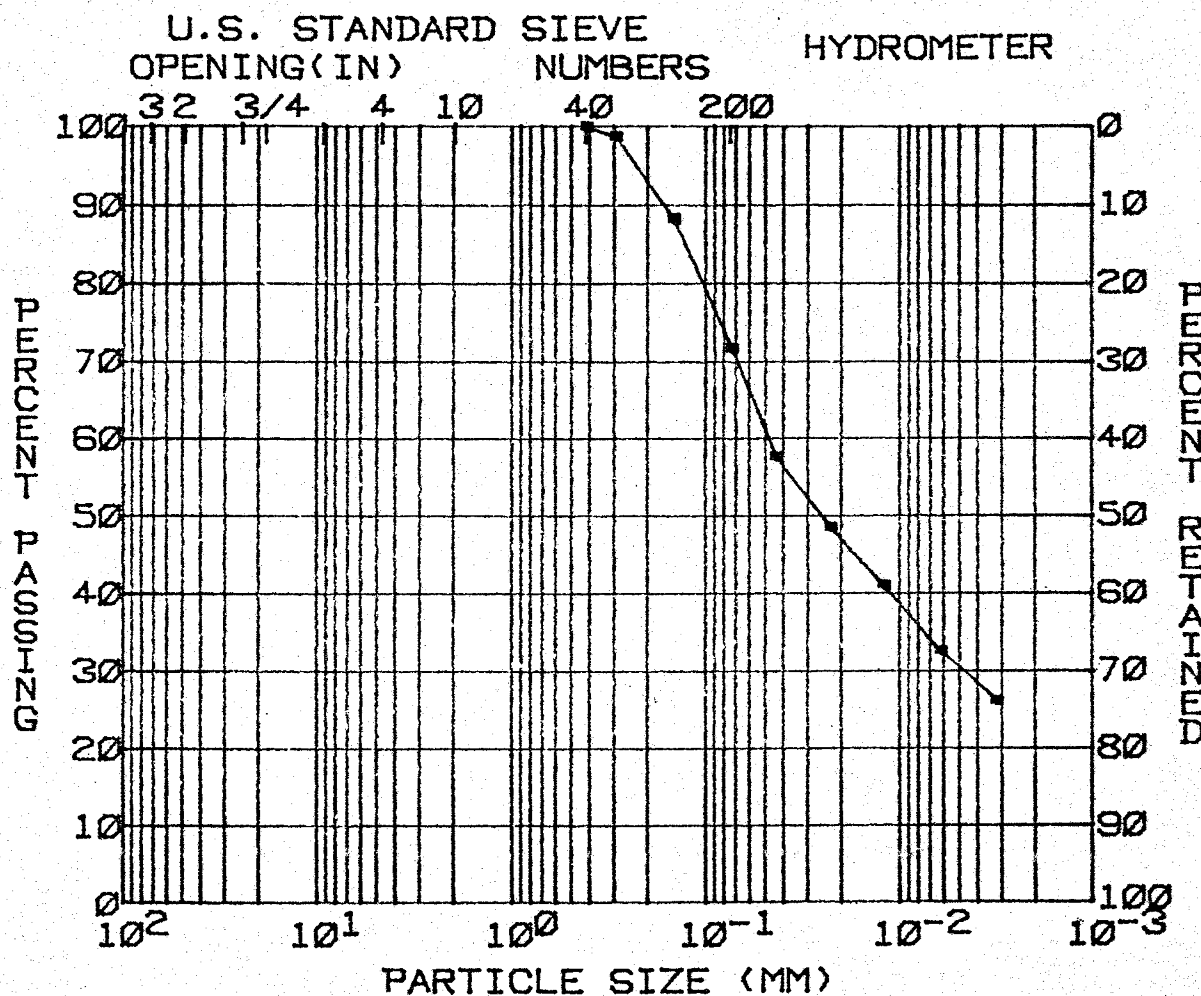
L.L.(%) = NP
P.I.(%) = NP

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-15
EL. :1076.3-1074.2
SAMPLE:1
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =28
SILT(%) =41
CLAY(%) =31

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

SOIL SYMBOL=CL
MOISTURE(%)=19.5
SP. GR. =2.67

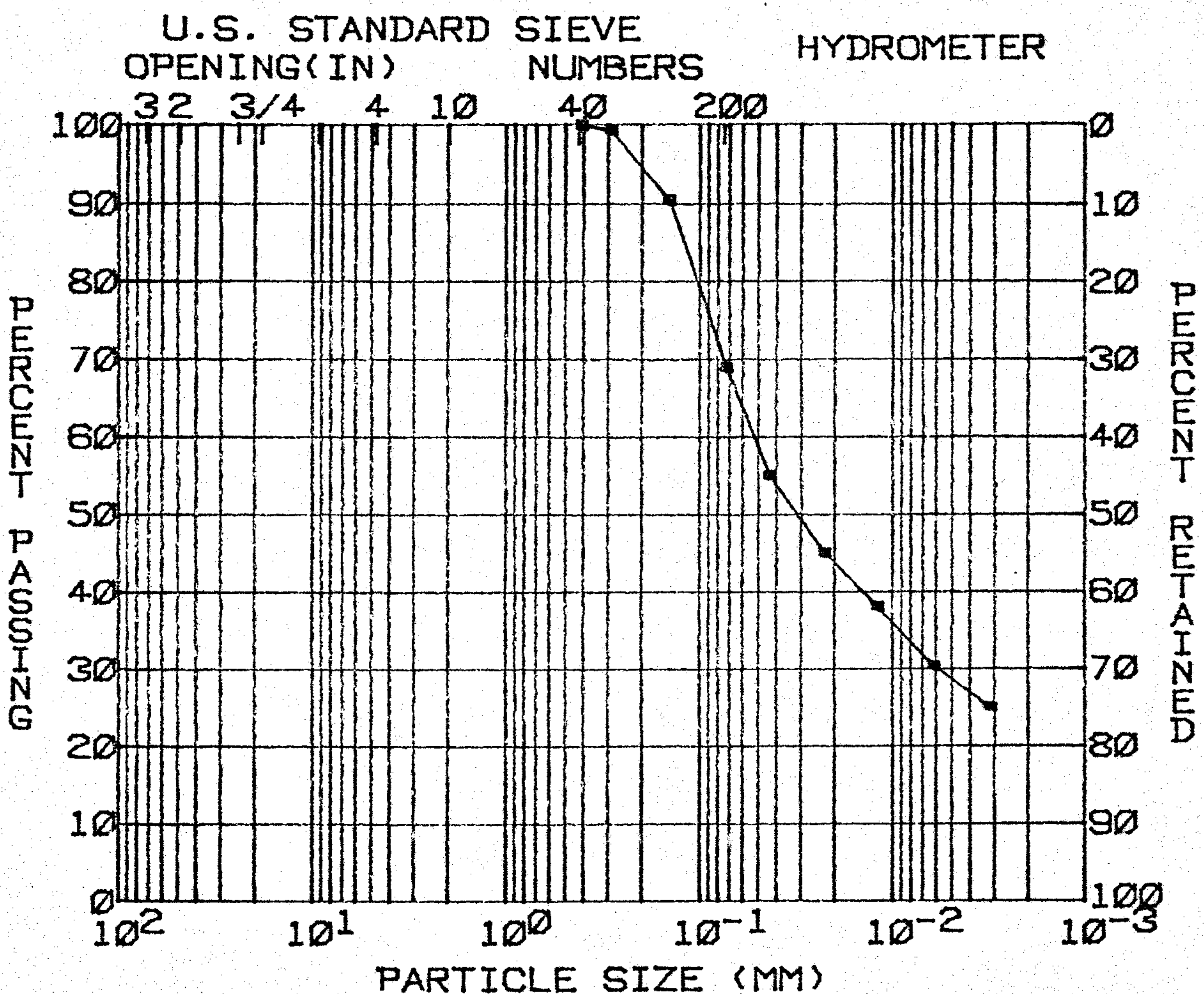
L.L.(%) = 32
P.I.(%) = 12

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-15
EL. :1073.3-1070.7
SAMPLE:2
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =31
SILT(%) =40
CLAY(%) =29

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

SOIL SYMBOL=CL
MOISTURE(%)=20.2
SP. GR. =2.70

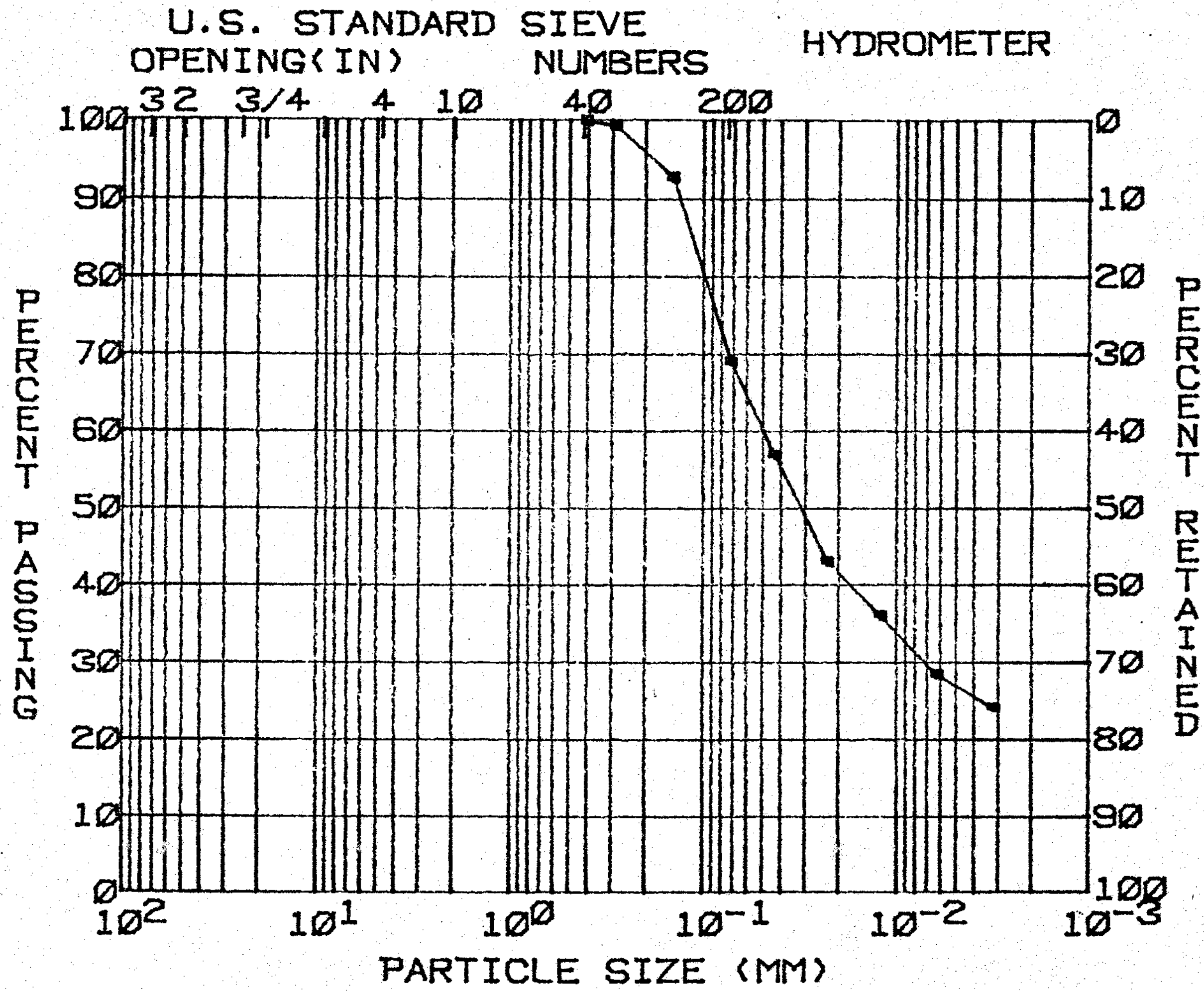
L.L.(%) = 30
P.I.(%) = 13

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-15
EL. :1070.3-1068.6
SAMPLE:3
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =31
SILT(%) =42
CLAY(%) =27

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

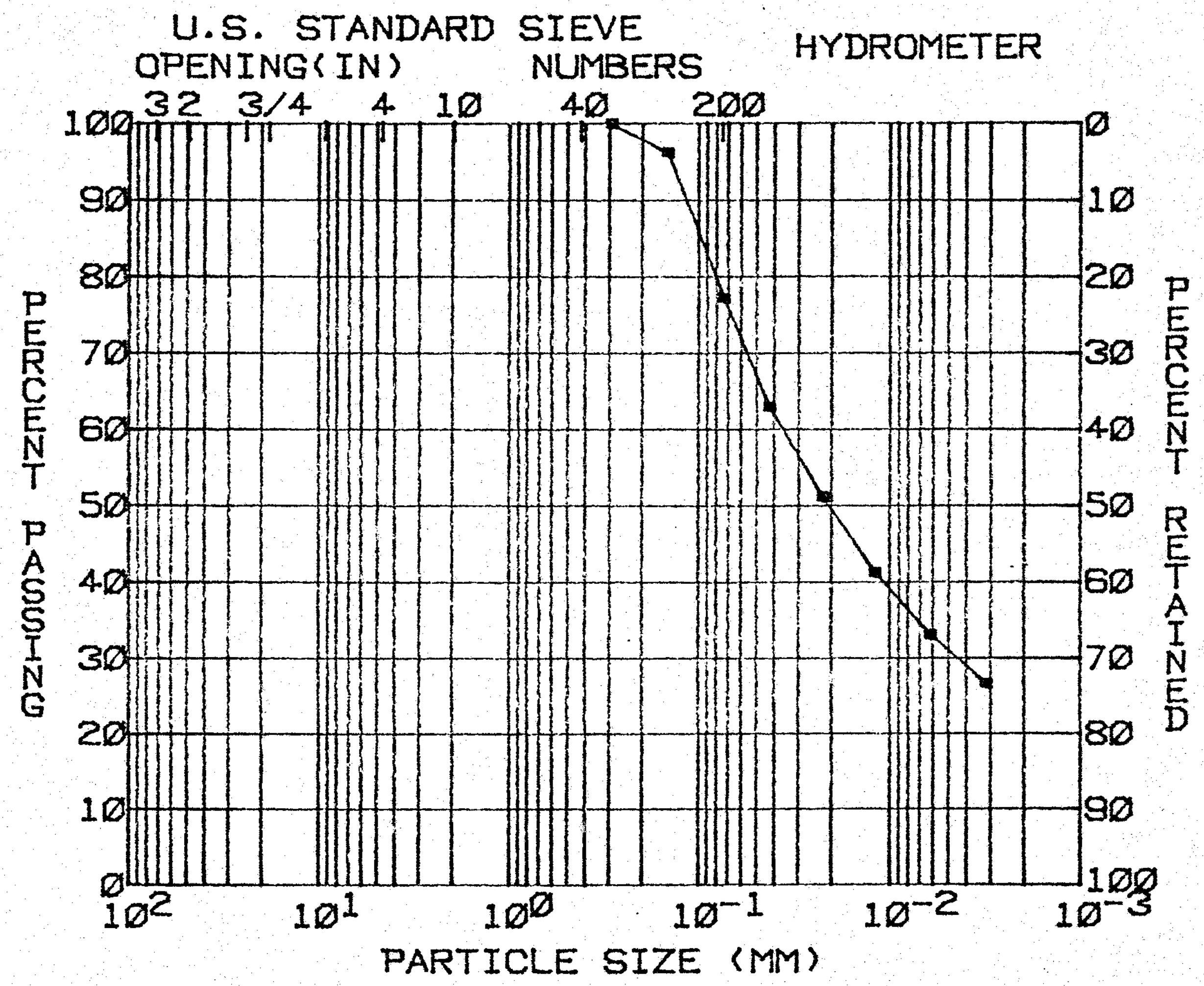
SOIL SYMBOL=CL
MOISTURE(%)=20.9
SP. GR. =2.68

L.L.(%) = 28
P.I.(%) = 11

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-15
FEATURE: ASH DIKE EL. : 1067.3-1065.7
STATION: SAMPLE: 4
RANGE : DATE : 5-11-81



GRAVEL(%) = 0 D10(MM) =--
SAND(%) =22 D30(MM) =--
SILT(%) =46 D60(MM) =--
CLAY(%) =32 COEF UNIF=--

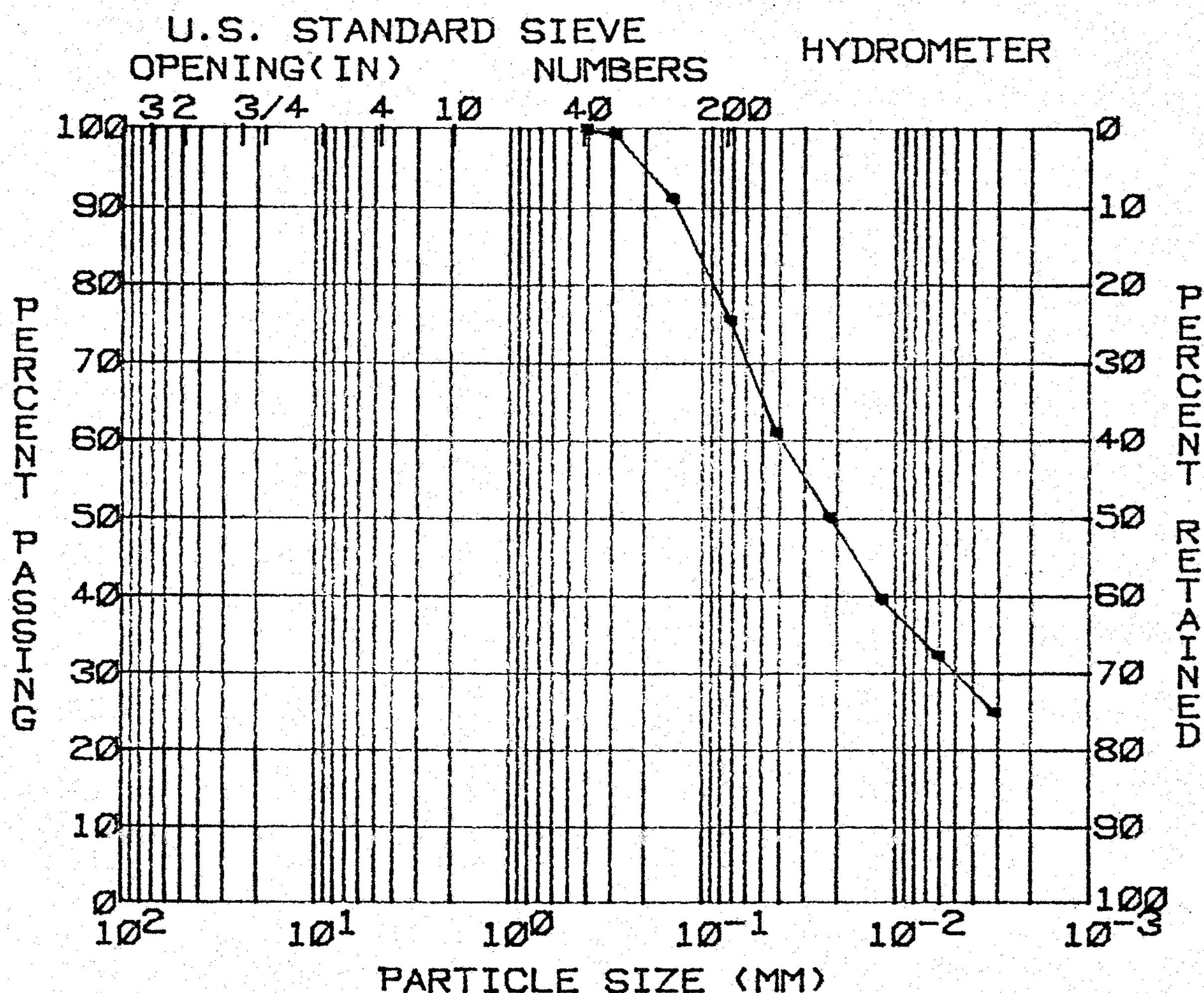
SOIL SYMBOL=CL L.L.(%) = 31
MOISTURE(%)=21.5 P.I.(%) = 13
SP. GR. =2.71

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-15
EL. :1064.3-1063.2
SAMPLE:5
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =24
SILT(%) =46
CLAY(%) =30

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

SOIL SYMBOL=CL
MOISTURE(%)=21.3
SP. GR. =2.69

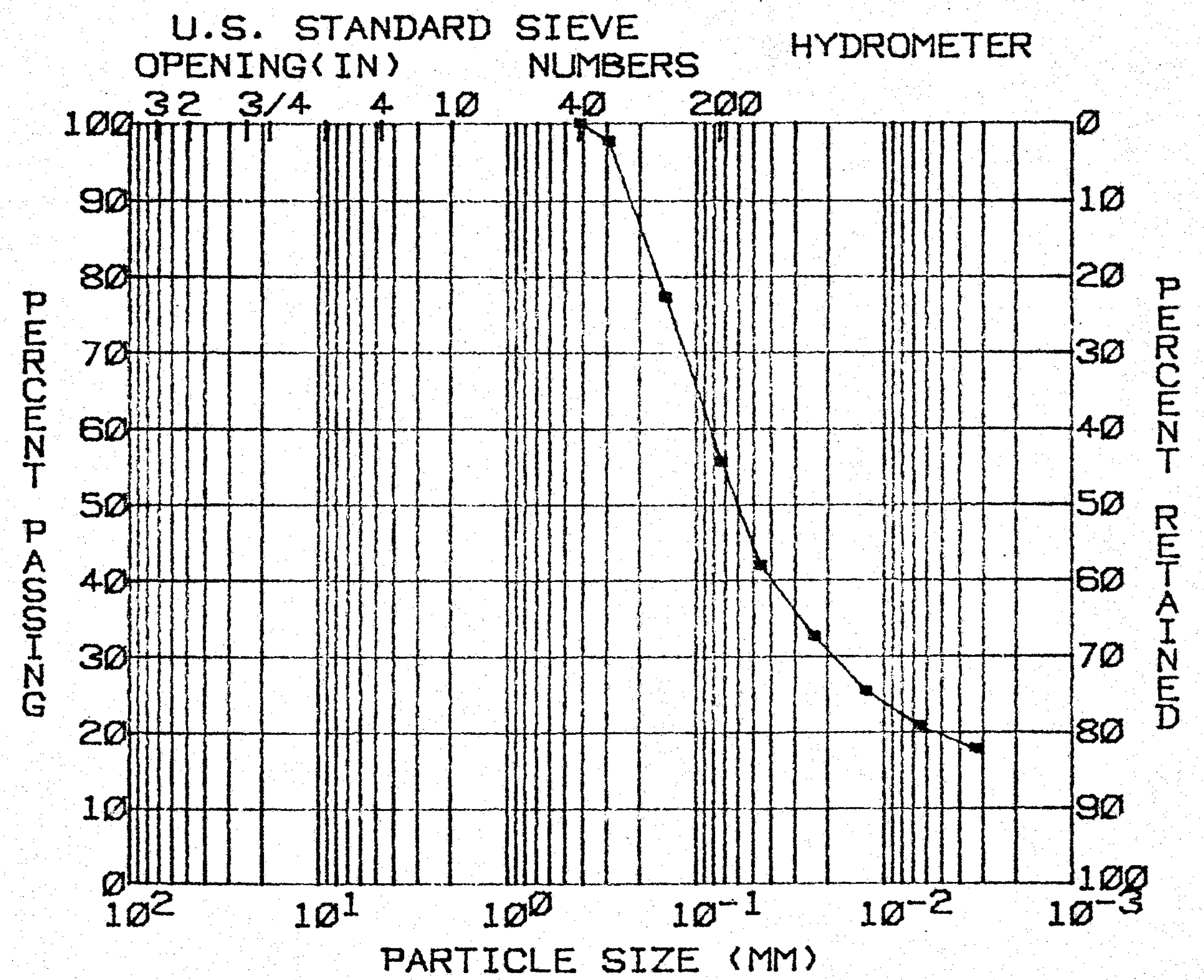
L.L.(%) = 29
P.I.(%) = 12

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH DIKE
STATION:
RANGE :

BORING:US-15
EL. :1061.3-1060.4
SAMPLE:6
DATE :5-11-81



GRAVEL(%)= 0
SAND(%) =44
SILT(%) =36
CLAY(%) =20

D10(MM) =--
D30(MM) =--
D60(MM) =--
COEF UNIF=--

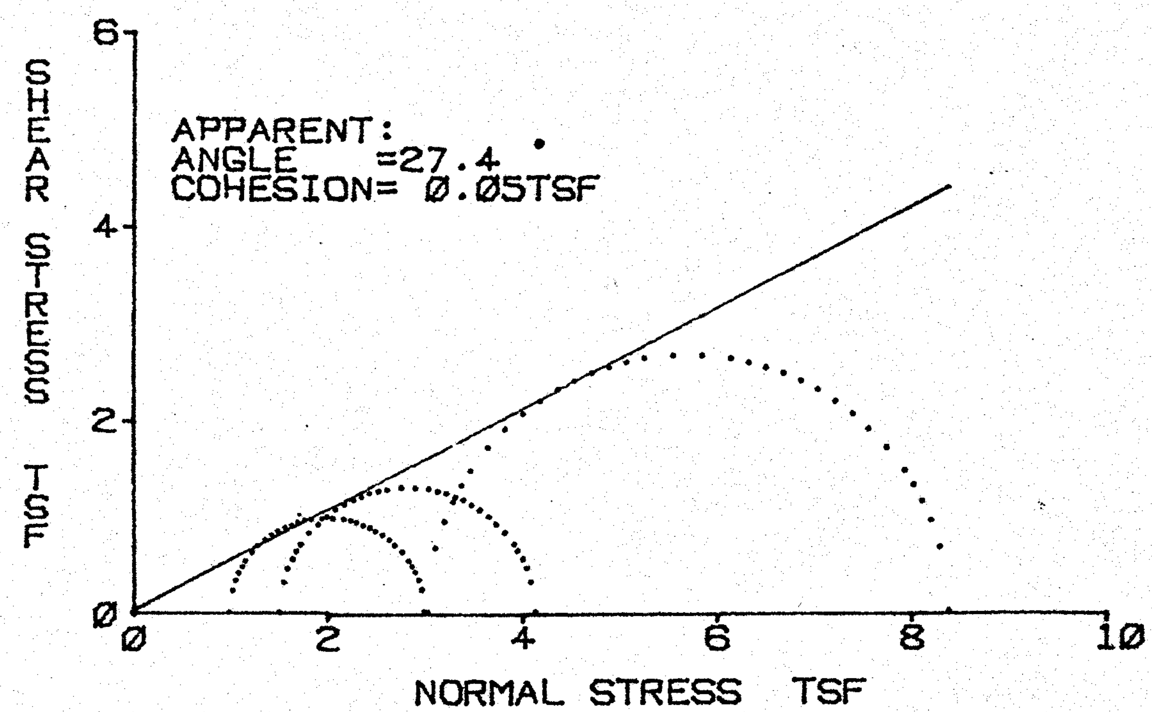
SOIL SYMBOL=CL-ML
MOISTURE(%)=18.8
SP. GR. =2.66

L.L.(%) = 21
P.I.(%) = 7

REMARKS:

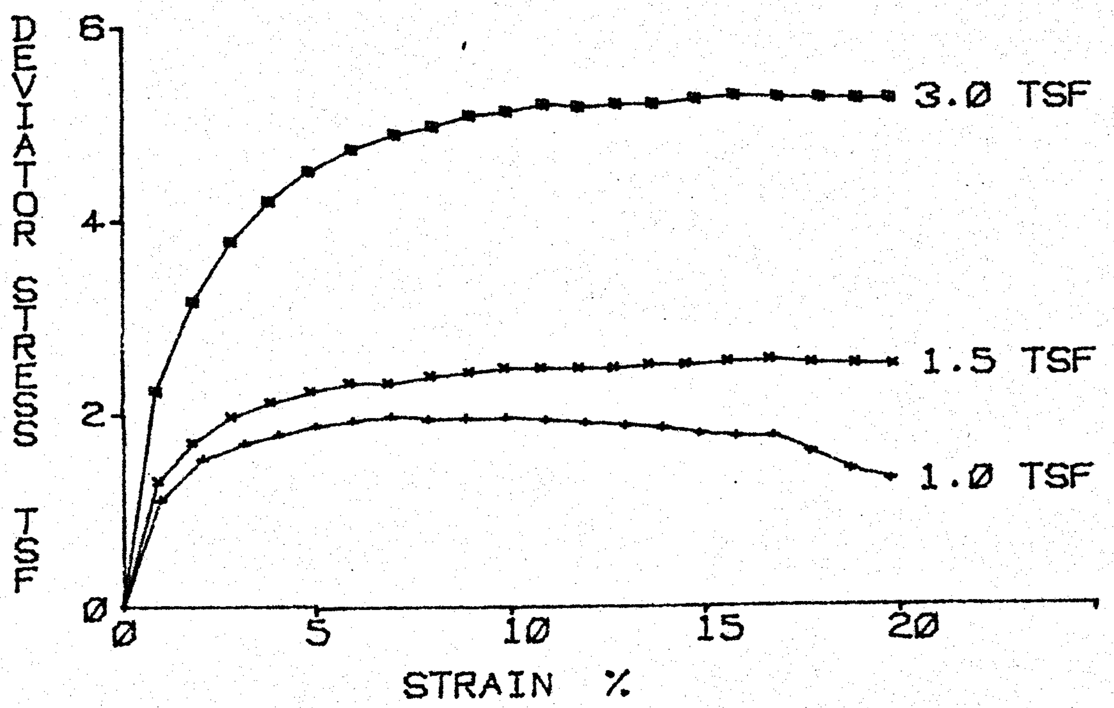
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :1092.4-1091.9
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :3
RANGE : SOIL SYM:CL-ML
BORING :US-1 DATE :3-26-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P. EL. :1092.4-1091.9
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :3
RANGE : SOIL SYM:CL-ML
BORING :US-1 DATE :3-26-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DIKE
Station:
Range :
Boring : US-1

El. : 1092.4-1091.9
Sample: 1
Part : 3

Tested By : RA
Computed By: MHD
Checked By : CBG
Report Date: 3-26-81

Soil Sybmbol= CL-ML
Sp. Gr. = 2.69

L.L.(%)= 19
D10(mm)= 0

P.I.(%)= 6

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	13.2	14.4	13.6	0.0
Dry Density(pcf)	106.9	111.4	110.4	0.0
Void Ratio	0.571	0.508	0.521	0.000
Saturation(%)	62.1	76.1	70.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	13.5	14.3	13.3	0.0
Minor Principal Stress(tsf)	1.01	1.51	3.02	0.00
Major Principal Stress(tsf)	3.00	4.13	8.39	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	10	17	16	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.39	1.39	1.39	1.39

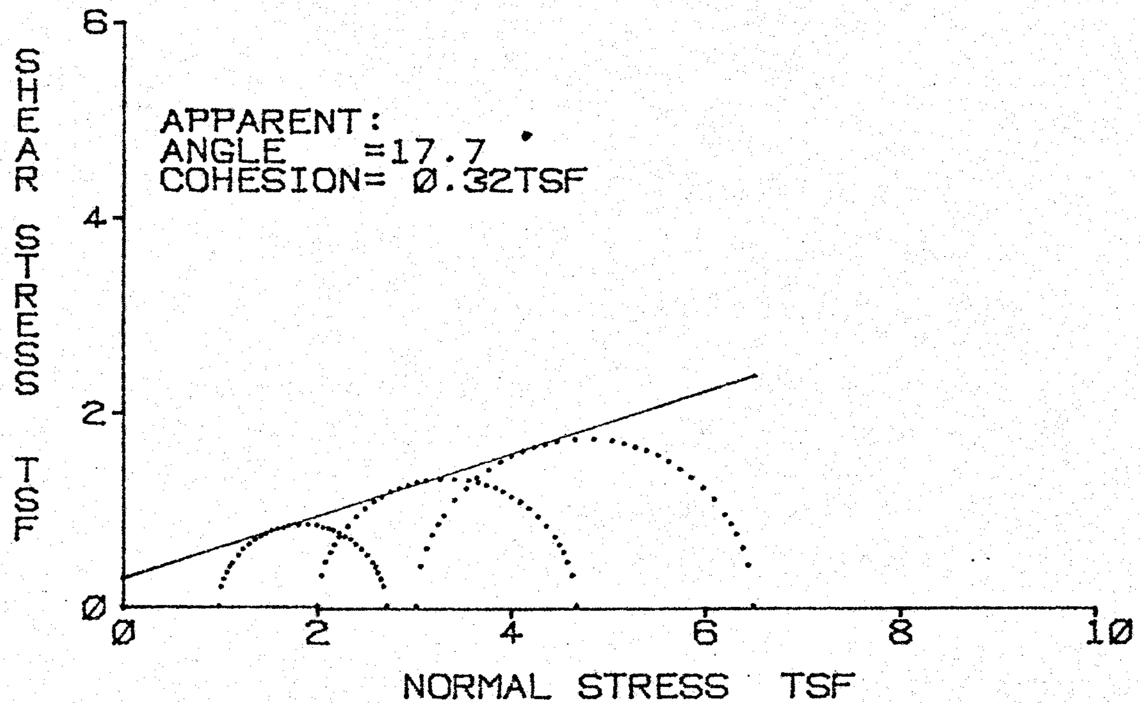
Shear Strength	Deg.	c(tsf)
Apparent	27.4	0.05
Effective	--	--

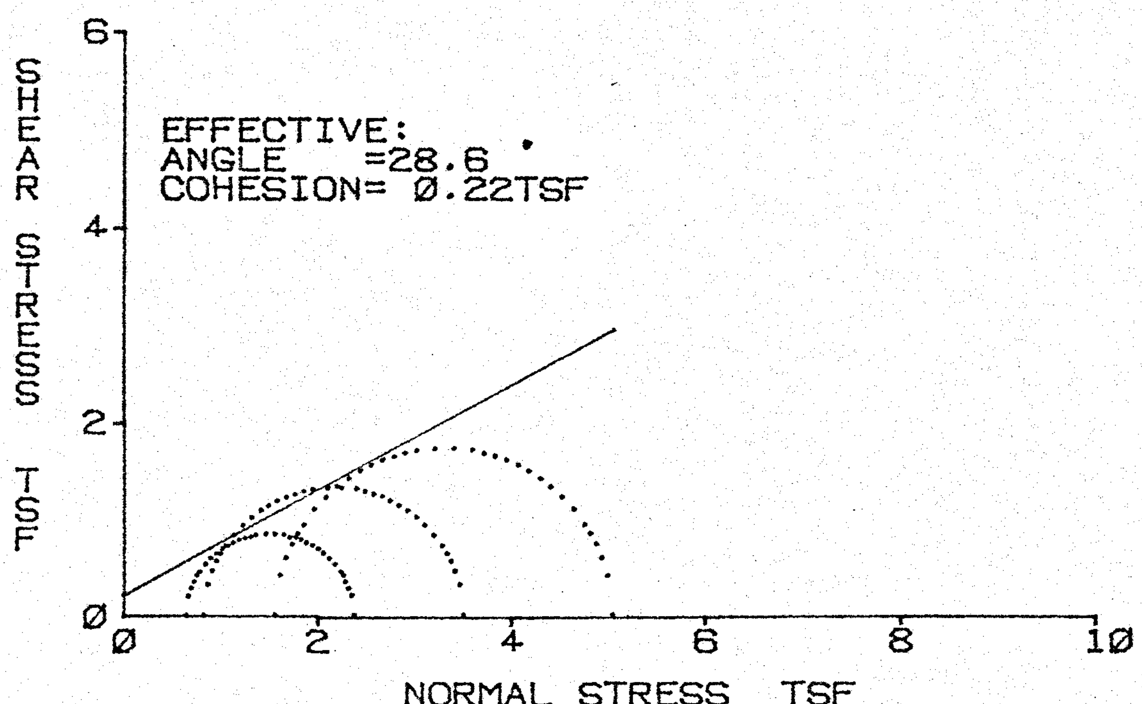
Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1091.9-1091.4
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :4
RANGE : SOIL SYM:CL-ML
BORING :US-1 DATE :4-16-81

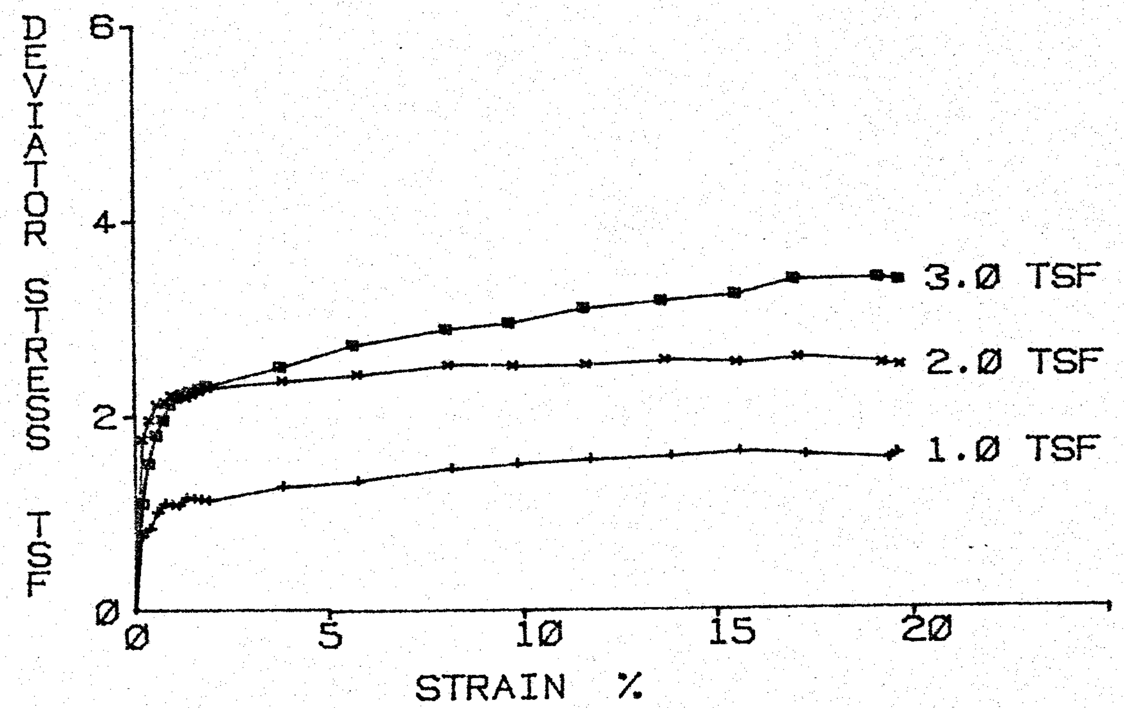


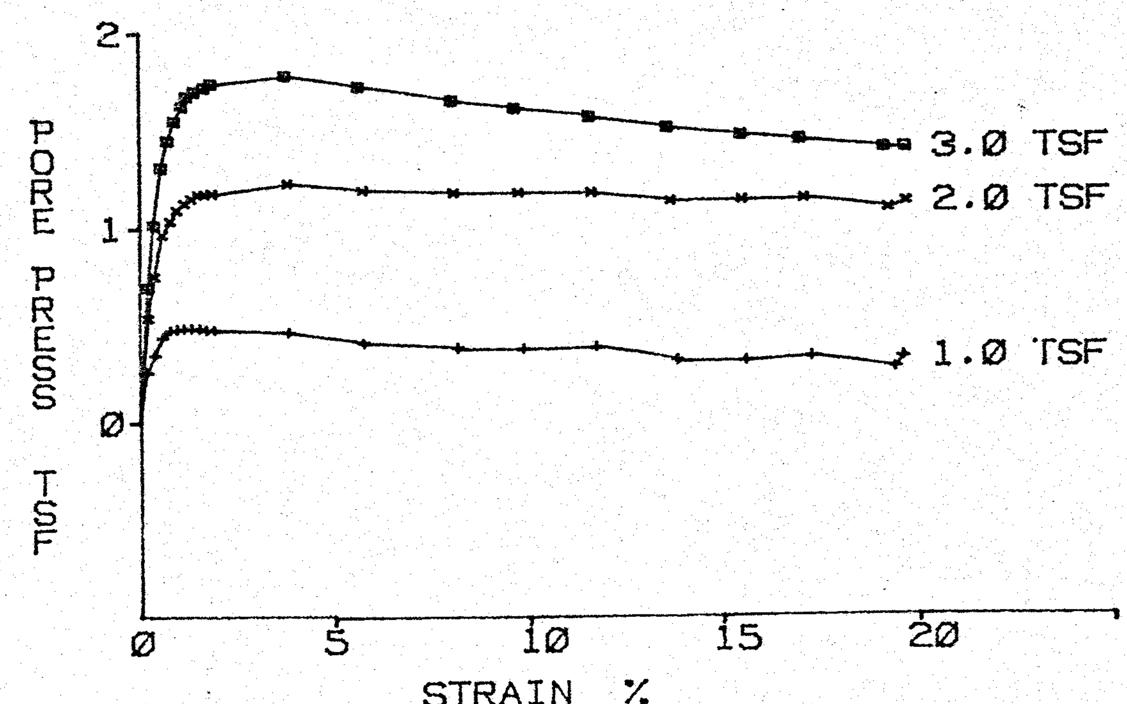


TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1091.9-1091.4
FEATURE:ASH DIKE
STATION:
RANGE :
BORING :US-1

SAMPLE :1
PART :4
SOIL SYM:CL-ML
DATE :4-16-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: ASH DIKE
Station:
Range :
Boring : US-1

El. : 1091.9-1091.4
Sample: 1
Part : 4

Tested By : GMD
Computed By: MHD
Checked By : CBG
Report Date: 4-16-81

Soil Sybmbol= CL-ML
Sp. Gr. = 2.69

L.L.(%)= 19
D10(mm)= 0

P.I.(%)= 6

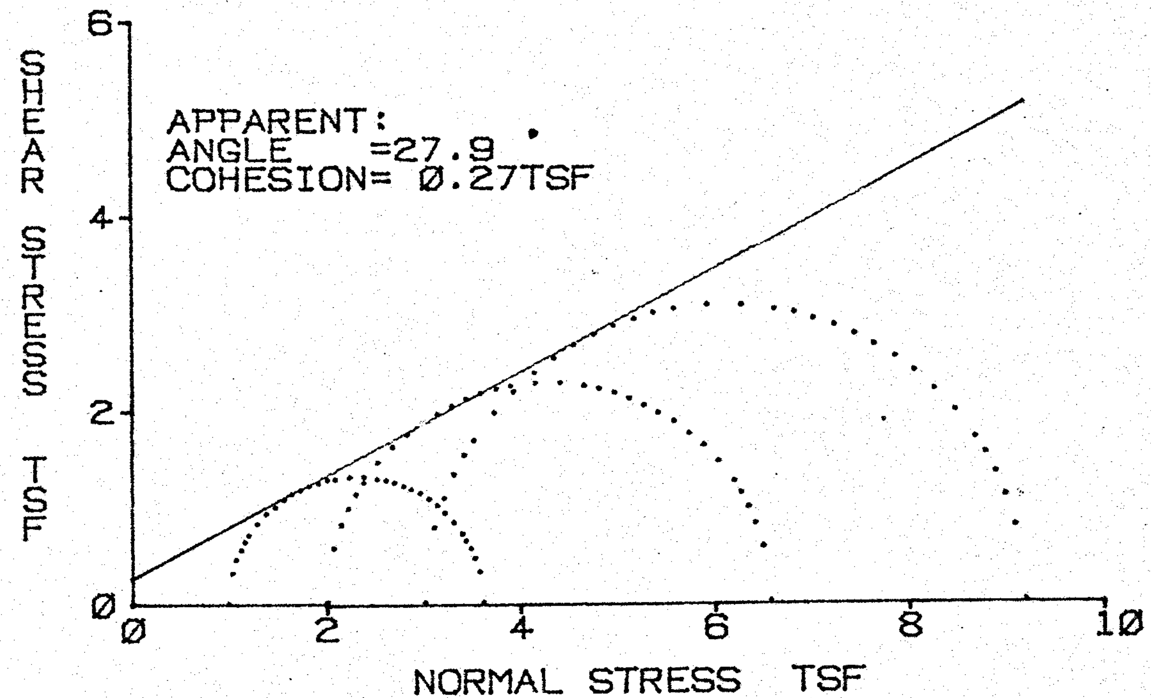
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	16.1	17.4	15.9	0.0
Dry Density(pcf)	109.3	106.7	108.7	0.0
Void Ratio	0.537	0.574	0.546	0.000
Saturation(%)	80.8	81.6	78.5	0.0
Before Shearing:				
Moisture(%) (after satur.)	19.9	21.3	20.3	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	19.9	22.8	20.1	20.1
Void Ratio (after cons.)	0.537	0.612	0.541	0.000
Final Moisture Content(%)	17.2	17.5	16.1	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.73	4.69	6.51	0.00
Eff. Minor Prin. Stress(tsf)	0.67	0.85	1.58	0.00
Eff. Major Prin. Stress(tsf)	2.40	3.53	5.07	0.00
Time to Failure(min.)	80	90	100	0
Rate of Strain(%/min.)	0.20	0.19	0.19	0.00
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	17.7	0.32
Effective	28.6	0.22

Remarks:

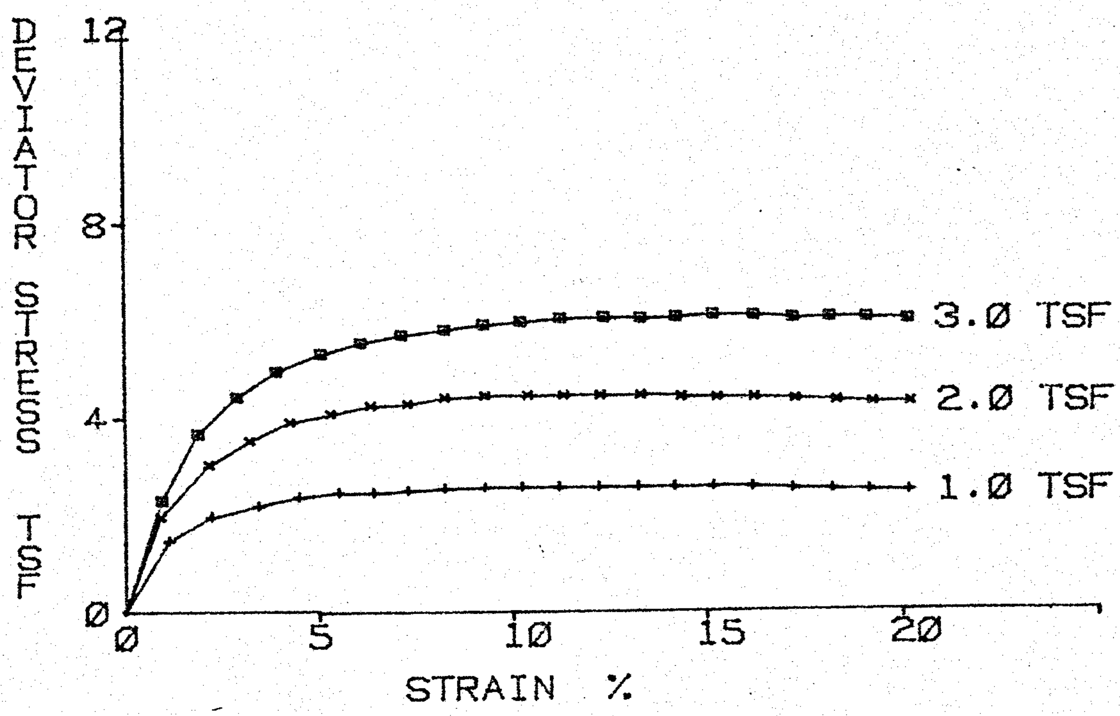
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P. EL. :1Ø86.8-1Ø86.3
FEATURE:ASH DIKE SAMPLE :3
STATION: PART :2
RANGE : SOIL SYM:SC
BORING :US-1 DATE :4-16-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :1Ø86.8-1Ø86.3
FEATURE:ASH DIKE SAMPLE :3
STATION: PART :2
RANGE : SOIL SYM:SC
BORING :US-1 DATE :4-16-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DIKE
Station:
Range :
Boring : US-1

El. : 1086.8-1086.3
Sample: 3
Part : 2

Tested By : JHD
Computed By: MHD
Checked By : [handwritten initials]
Report Date: 4-16-81

Soil Sybmbol= SC
Sp. Gr. = 2.67

L.L.(%)= 28
D10(mm)= 1.20000000E-03

P.I.(%)= 10

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	15.3	15.2	14.7	0.0
Dry Density(pcf)	99.4	100.7	101.5	0.0
Void Ratio	0.676	0.655	0.641	0.000
Saturation(%)	60.4	61.9	61.3	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	15.2	15.1	14.6	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.64	6.59	9.21	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	15	13	15	0
Rate of Strain(%/min.)	1.03	1.04	1.03	0.00
Specimen Height(in.)	3.08	3.08	3.08	3.08
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

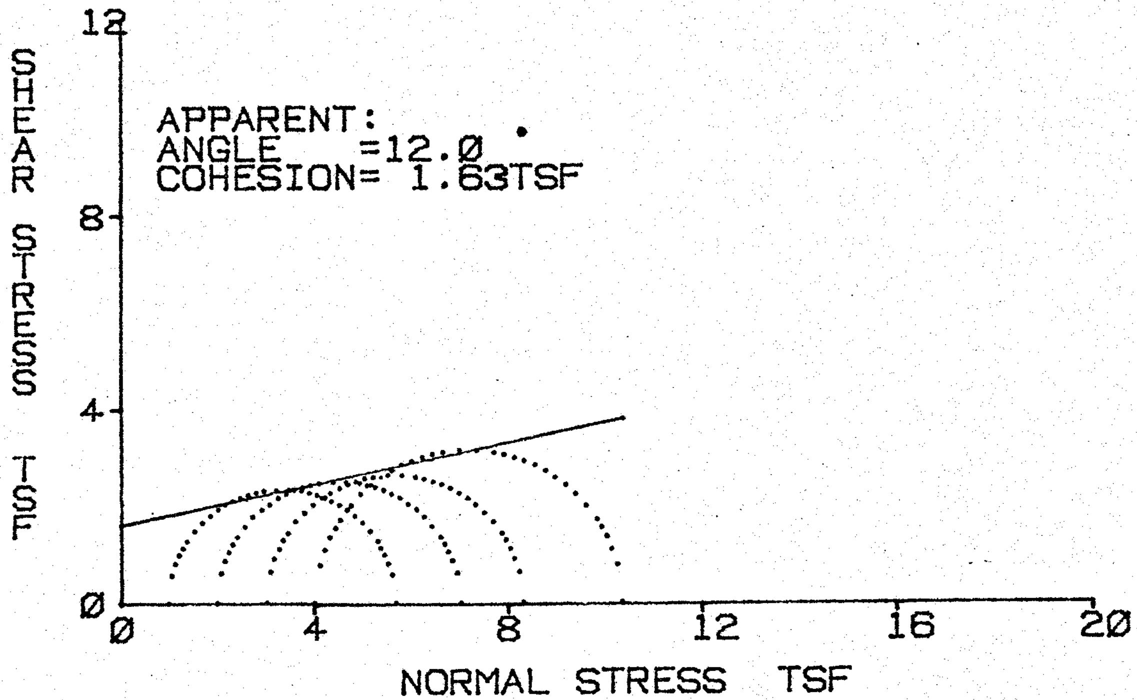
Shear Strength	Deg.	c(tsf)
Apparent	27.9	0.27
Effective	--	--

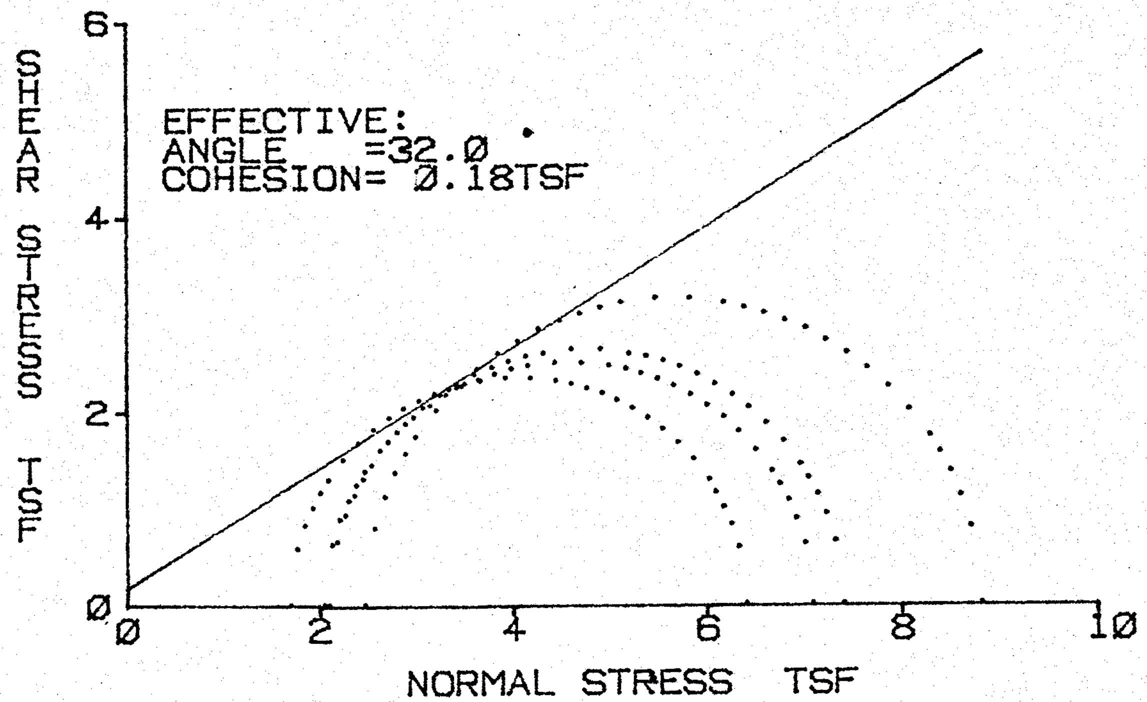
Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER SP
FEATURE:ASH DIKE
STATION:W60+32
RANGE :S5+17
BORING :US-1

EL. :1087.4-1086.9
SAMPLE :3
PART :1
SOIL SYM:SC
DATE :7/15/81

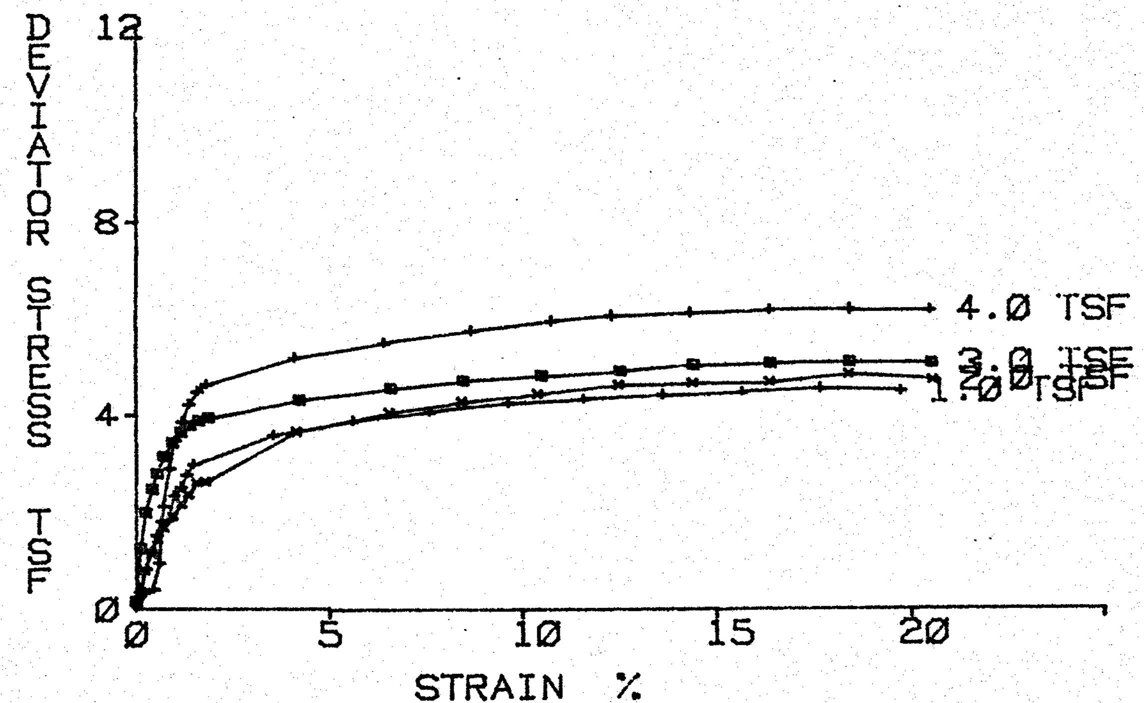


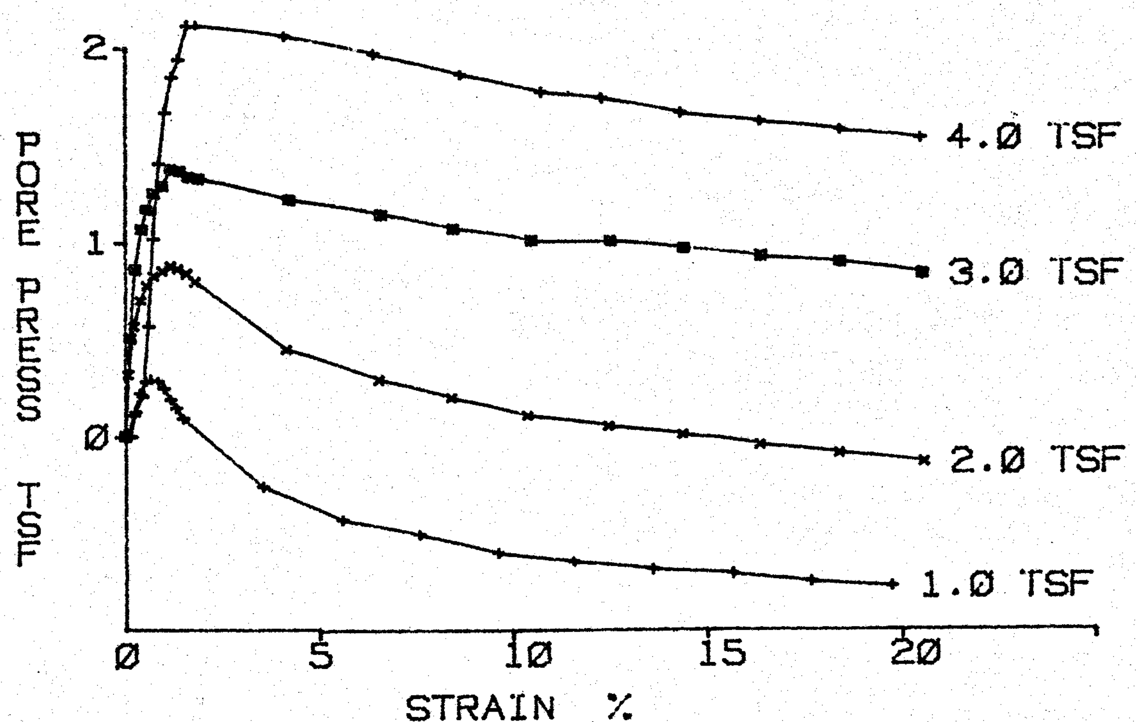


TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER SP
FEATURE:ASH DIKE
STATION:W60+32
RANGE :S5+17
BORING :US-1

EL. :1087.4-1086.9
SAMPLE :3
PART :1
SOIL SYM:SC
DATE :7/15/81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP		
Feature: ASH DIKE		Tested By : JHD
Station: W60+32	El. : 1087.4-1086.9	Computed By: CRF
Range : S5+17	Sample: 3	Checked By : TAL
Boring : US-1	Part : 1	Report Date: 7/15/81

Soil Sybmbol= SC	L.L.(%)= 28	P.I.(%)= 10
Sp. Gr. = 2.67	D10(mm)= 1.20000000E-03	

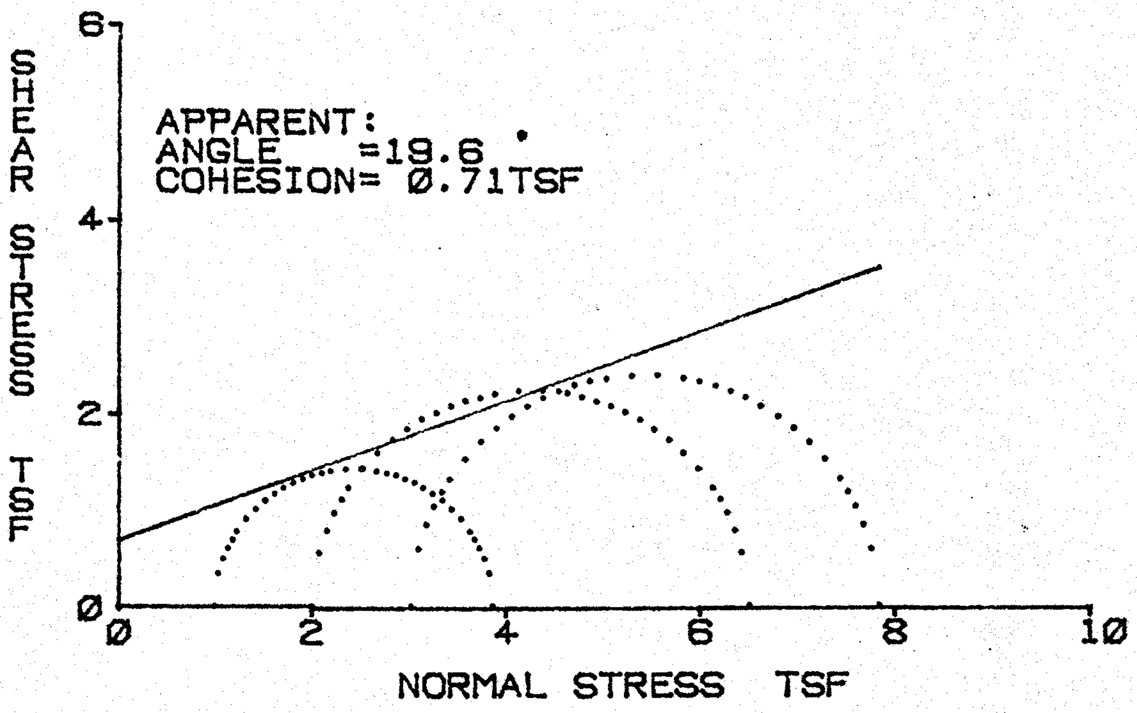
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	16.3	16.8	16.9	16.8
Dry Density(pcf)	103.4	104.1	102.7	103.0
Void Ratio	0.612	0.602	0.623	0.618
Saturation(%)	71.0	74.4	72.5	72.5
Before Shearing:				
Moisture(%) (after satur.)	22.9	22.5	23.3	23.2
Saturation(%)	100.0	100.0	100.0	100.0
Moisture(%) (after cons.)	21.9	21.2	23.3	23.3
Void Ratio (after cons.)	0.585	0.566	0.623	0.584
Final Moisture Content(%)	21.7	20.9	21.2	21.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	5.72	7.06	8.33	10.38
Eff. Minor Prin. Stress(tsf)	1.71	2.06	2.10	2.48
Eff. Major Prin. Stress(tsf)	6.42	7.10	7.41	8.83
Time to Failure(min.)	90	90	90	100
Rate of Strain(%/min.)	0.20	0.21	0.21	0.21
Specimen Height(in.)	3.08	3.08	3.08	3.08
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	12.0	1.63
Effective	32.0	0.18

Remarks:

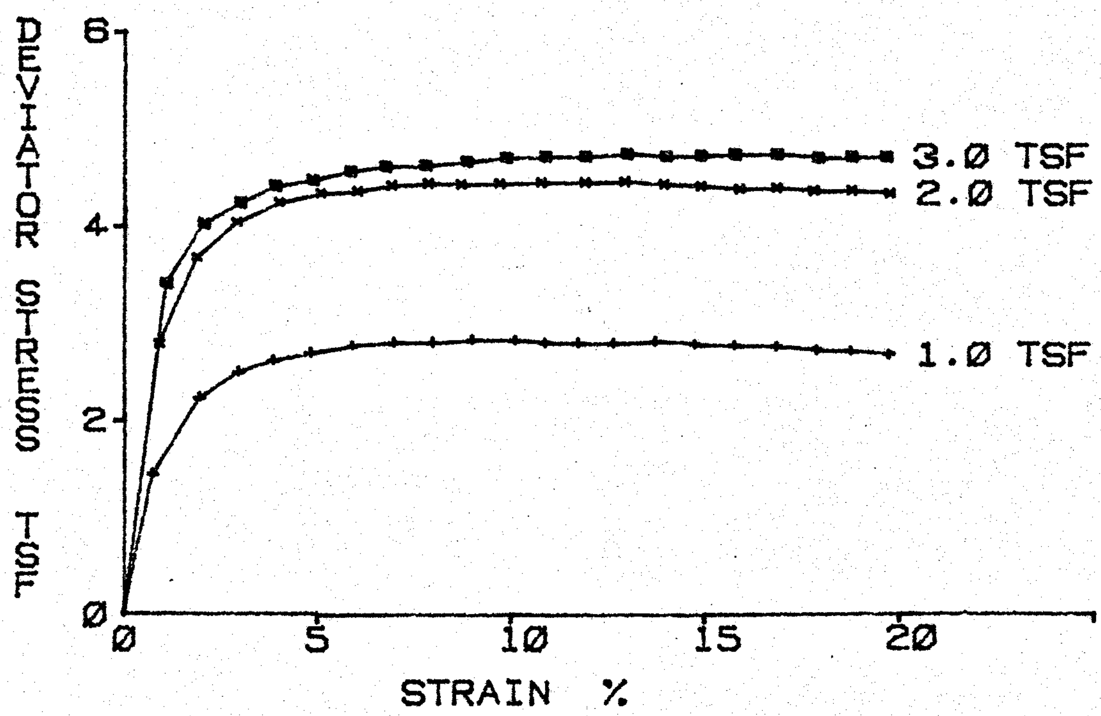
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER N.P. EL. :1087.0-1087.1
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :3
RANGE : SOIL SYM:CL
BORING :US-4 DATE :6-1-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER N.P.EL. :1087.0-1087.1
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :3
RANGE : SOIL SYM:CL
BORING :US-4 DATE :6-1-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER N.P.		
Feature: ASH DIKE		Tested By : RA
Station:	El. : 1087.0-1087.1	Computed By: MHD
Range :	Sample: 1	Checked By : [signature]
Boring : US-4	Part : 3	Report Date: 6-1-81

Soil Sybmbol= CL	L.L.(%)= 31	P.I.(%)= 15
Sp. Gr. = 2.67	D10(mm)= 0	

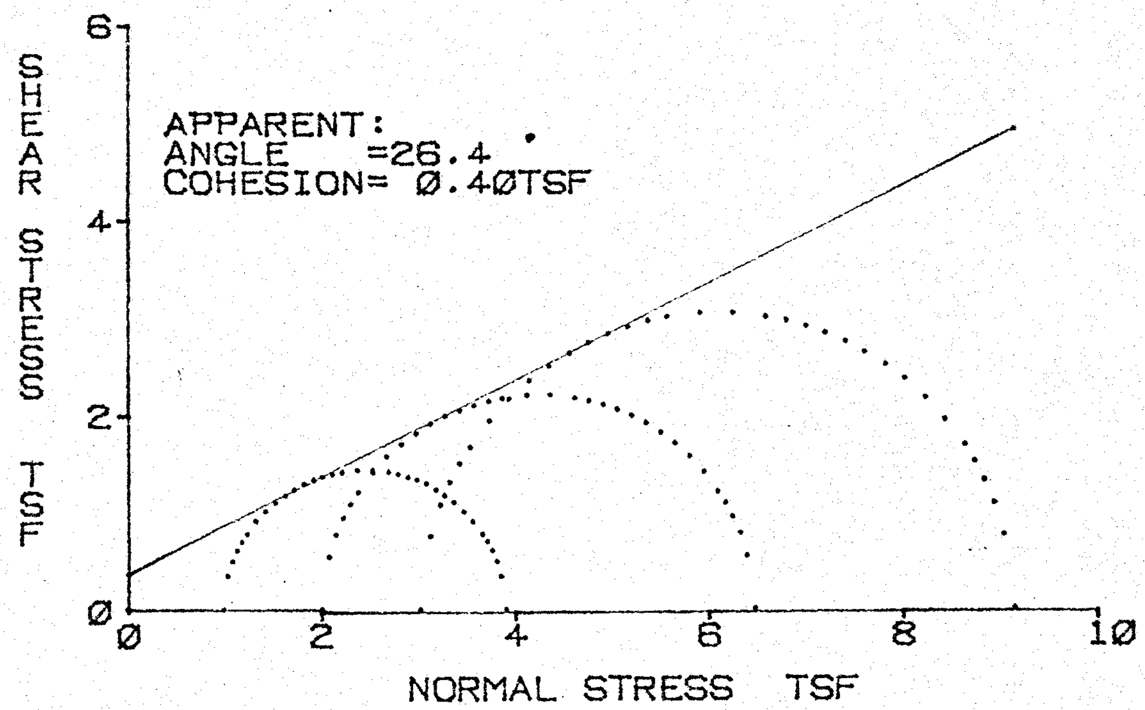
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	20.5	19.2	19.3	0.0
Dry Density(pcf)	100.4	102.1	101.6	0.0
Void Ratio	0.659	0.632	0.641	0.000
Saturation(%)	83.0	81.2	80.2	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	20.3	19.2	19.1	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.89	6.52	7.85	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	14	13	13	0
Rate of Strain(%/min.)	0.99	1.01	1.01	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.39	1.39	1.39	1.39

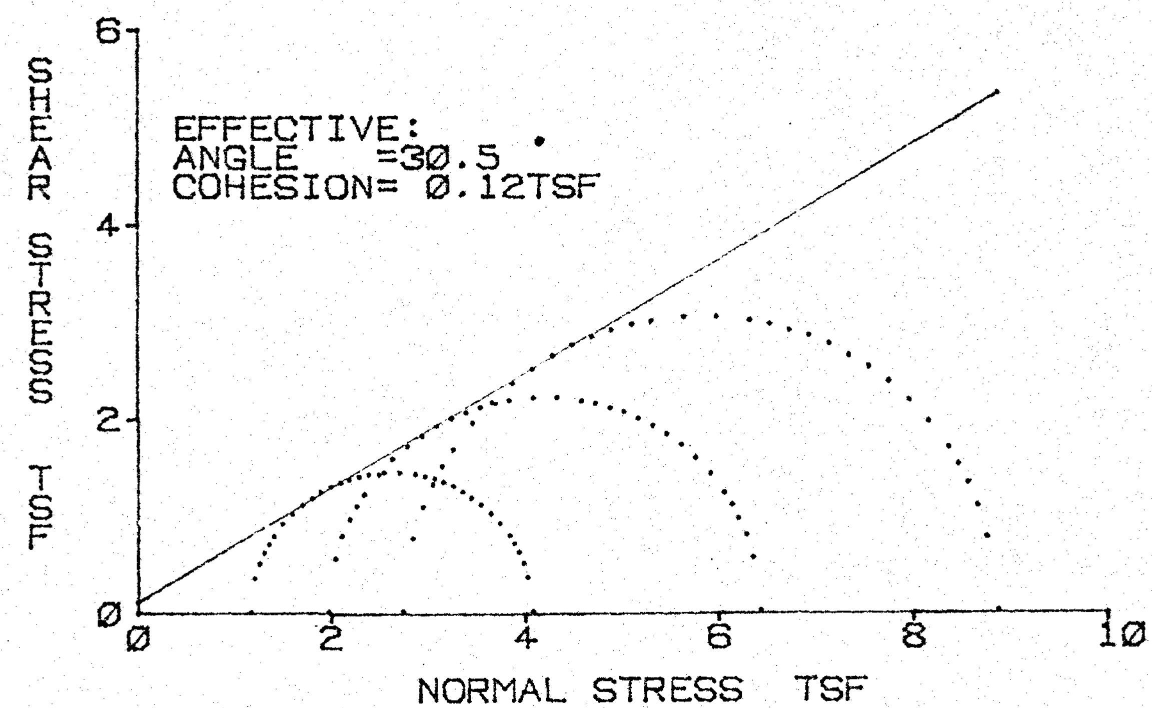
Shear Strength	Deg.	c(tsf)
Apparent	19.6	0.71
Effective	--	--

Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

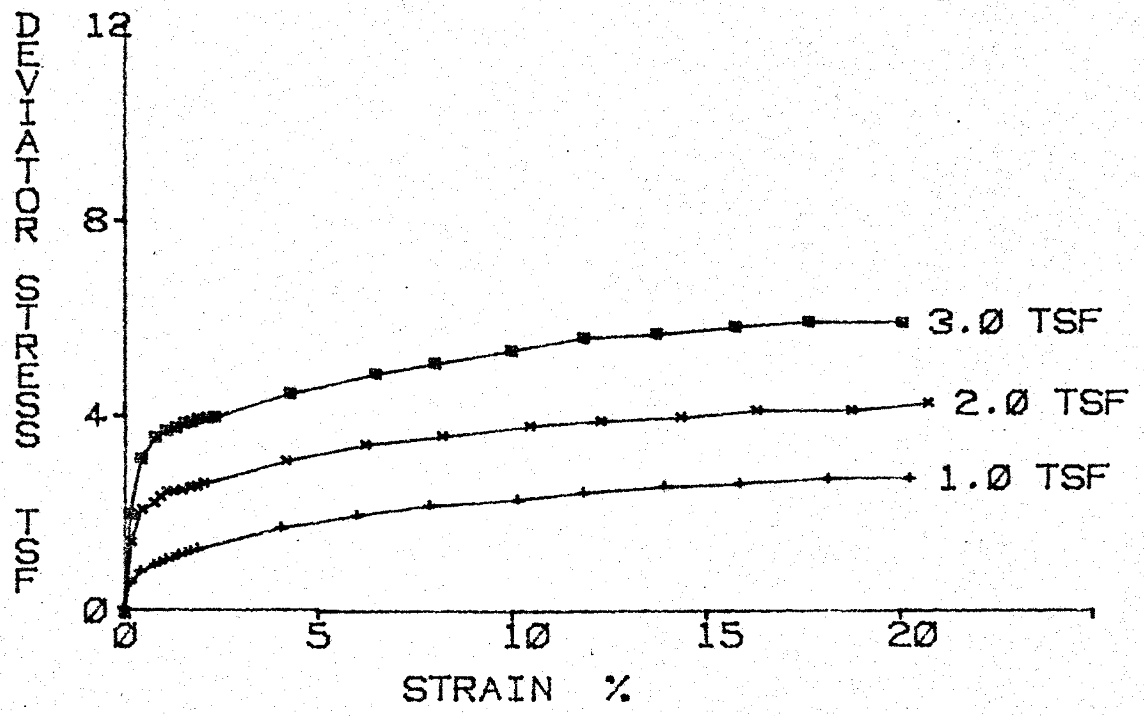
PROJECT:JOHN SEVIER S.P.EL. :1Ø87.1-1Ø86.6
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :4
RANGE : SOIL SYM:CL
BORING :US-4 DATE :4-28-81

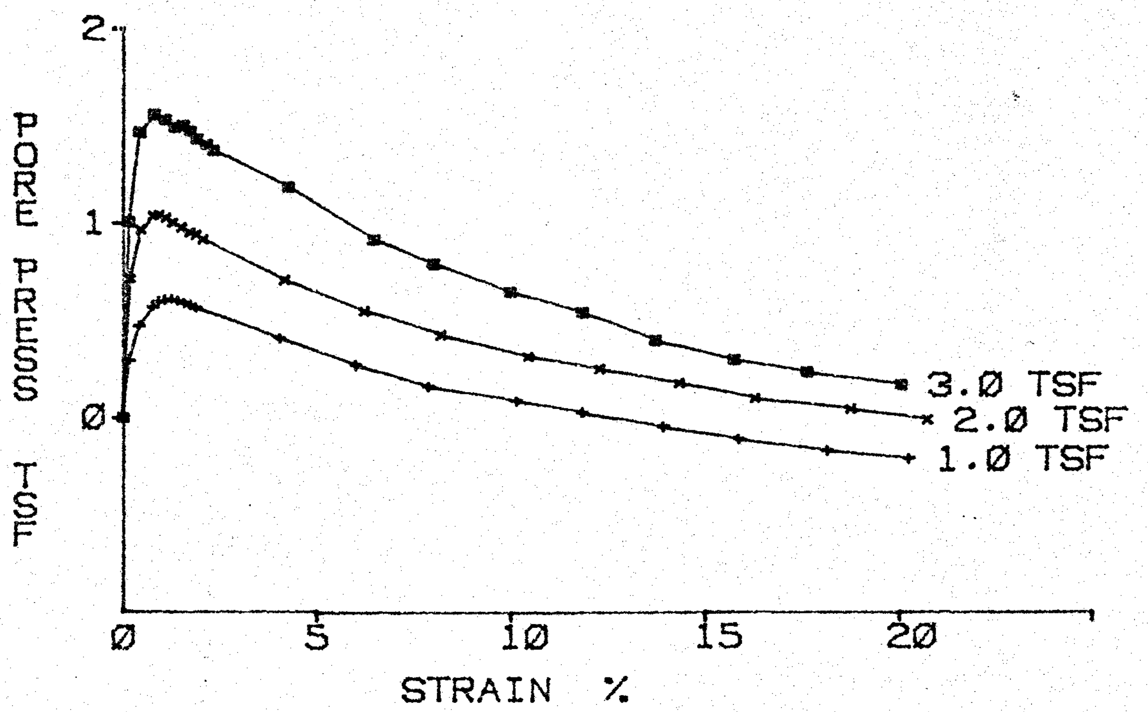




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1087.1-1086.6
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :4
RANGE : SOIL SYM:CL
BORING :US-4 DATE :4-28-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DIKE		Tested By : JHD
Station:	El. : 1087.1-1086.6	Computed By: MHD
Range :	Sample: 1	Checked By : TAL
Boring : US-4	Part : 4	Report Date: 4-28-81

Soil Sybmbol= CL	L.L.(%)= 31	P.I.(%)= 15
Sp. Gr. = 2.67	D10(mm)= 0	

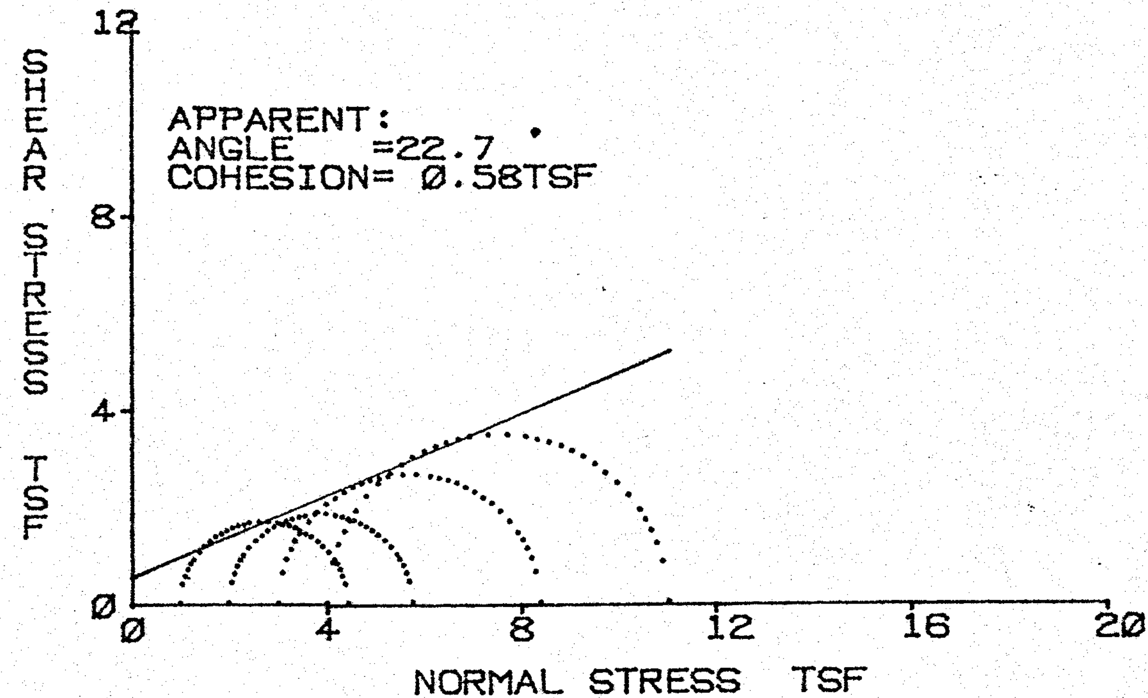
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	17.4	16.4	16.3	0.0
Dry Density(pcf)	106.6	109.6	111.0	0.0
Void Ratio	0.563	0.520	0.502	0.000
Saturation(%)	82.7	84.4	86.8	0.0
Before Shearing:				
Moisture(%) (after satur.)	21.1	19.5	18.8	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	20.2	18.3	18.2	18.2
Void Ratio (after cons.)	0.540	0.488	0.487	0.000
Final Moisture Content(%)	20.1	18.7	18.4	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.92	6.48	9.16	0.00
Eff. Minor Prin. Stress(tsf)	1.19	1.99	2.75	0.00
Eff. Major Prin. Stress(tsf)	4.10	6.45	8.88	0.00
Time to Failure(min.)	100	100	90	0
Rate of Strain(%/min.)	0.21	0.21	0.20	0.00
Specimen Height(in.)	3.08	3.08	3.08	3.08
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	26.4	0.40
Effective	30.5	0.12

Remarks:

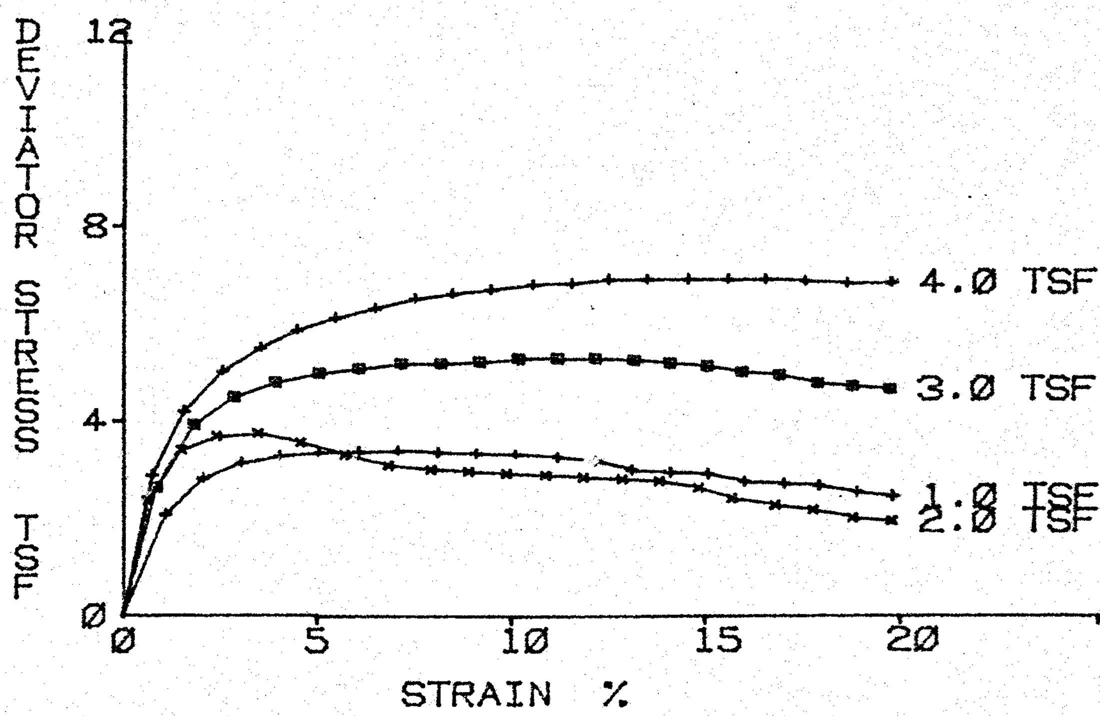
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P. EL. :1084.5-1084.0
FEATURE:ASH DIKE SAMPLE :1
STATION: PART :4
RANGE : SOIL SYM:CL-CH
BORING :US-8 DATE :4-7-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:	JOHN SEVIER S.P.	EL.	:1084.5-1084.0
FEATURE:	ASH DIKE	SAMPLE	:1
STATION:		PART	:4
RANGE :		SOIL SYM	:CL-CH
BORING :	US-8	DATE	:4-7-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DIKE
Station:
Range :
Boring : US-8

El. : 1084.5-1084.0
Sample: 1
Part : 4

Tested By : EL
Computed By: MHD
Checked By : GMD
Report Date: 4-7-81

Soil Sybmbol= CL-CH
Sp. Gr. = 2.69
L.L.(%)= 49
D10(mm)= 0
P.I.(%)= 30

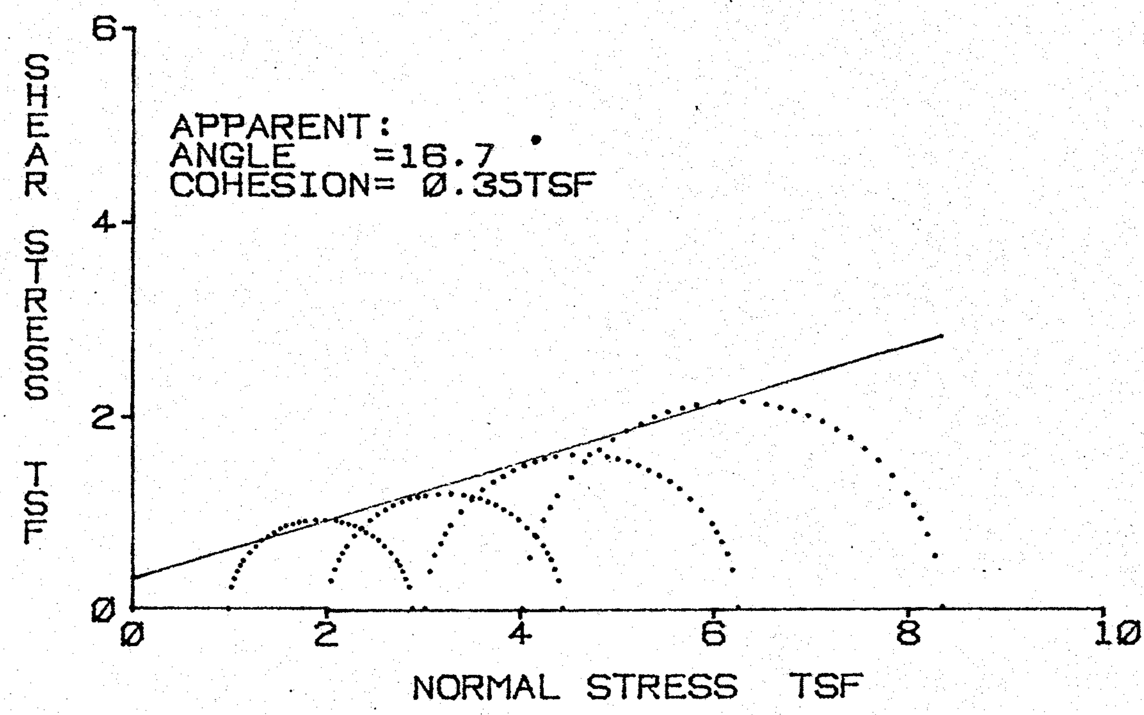
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	25.2	22.1	23.8	21.5
Dry Density(pcf)	98.5	102.8	100.1	104.1
Void Ratio	0.706	0.634	0.678	0.613
Saturation(%)	96.2	93.8	94.5	94.5
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	25.2	21.8	23.6	21.4
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	4.46	5.79	8.40	11.06
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	7	4	12	17
Rate of Strain(%/min.)	1.02	0.88	1.03	0.98
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

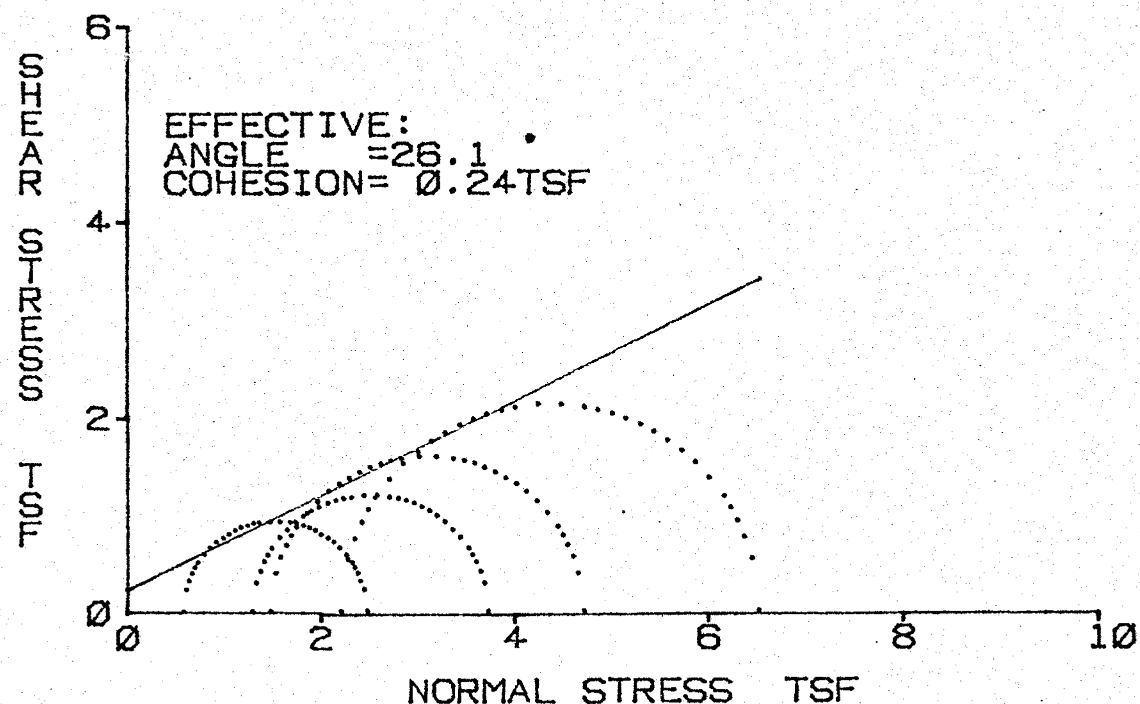
Shear Strength	Deg.	c(tsf)
Apparent	22.7	0.58
Effective	--	--

Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P. EL. :1085.5-1085.0
FEATURE:ASH DIKE SAMPLE :1
STATION:W70+92 PART :2
RANGE :S1+55.8 SOIL SYM:CL-CH
BORING :US-8 DATE :6-24-81

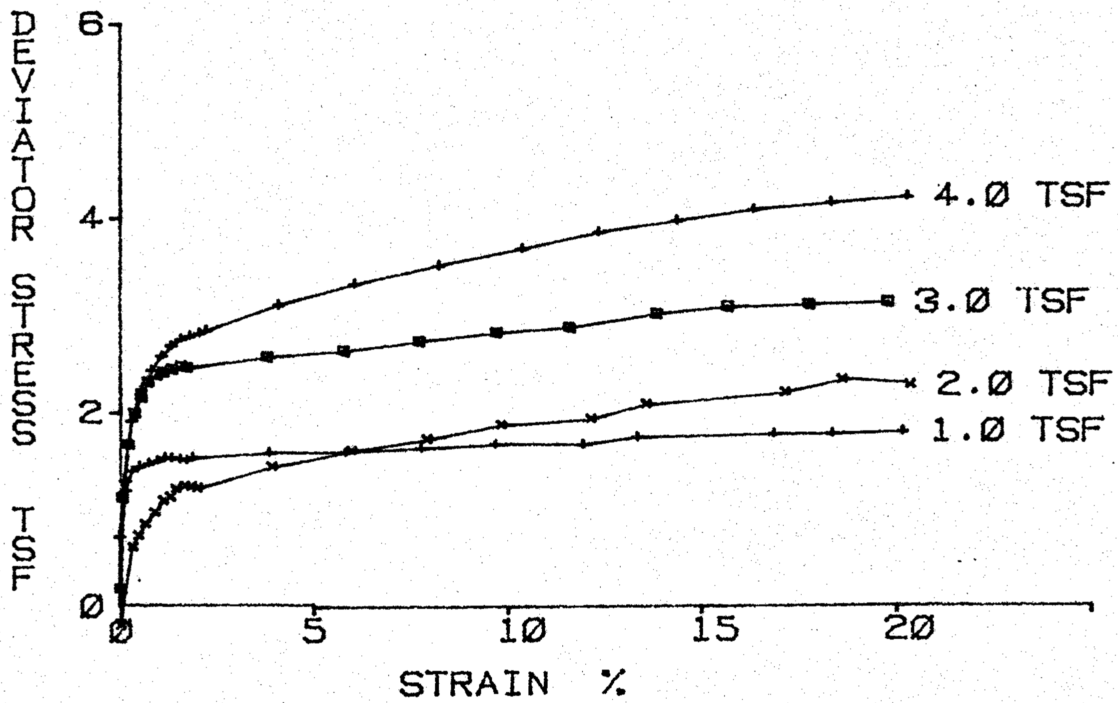


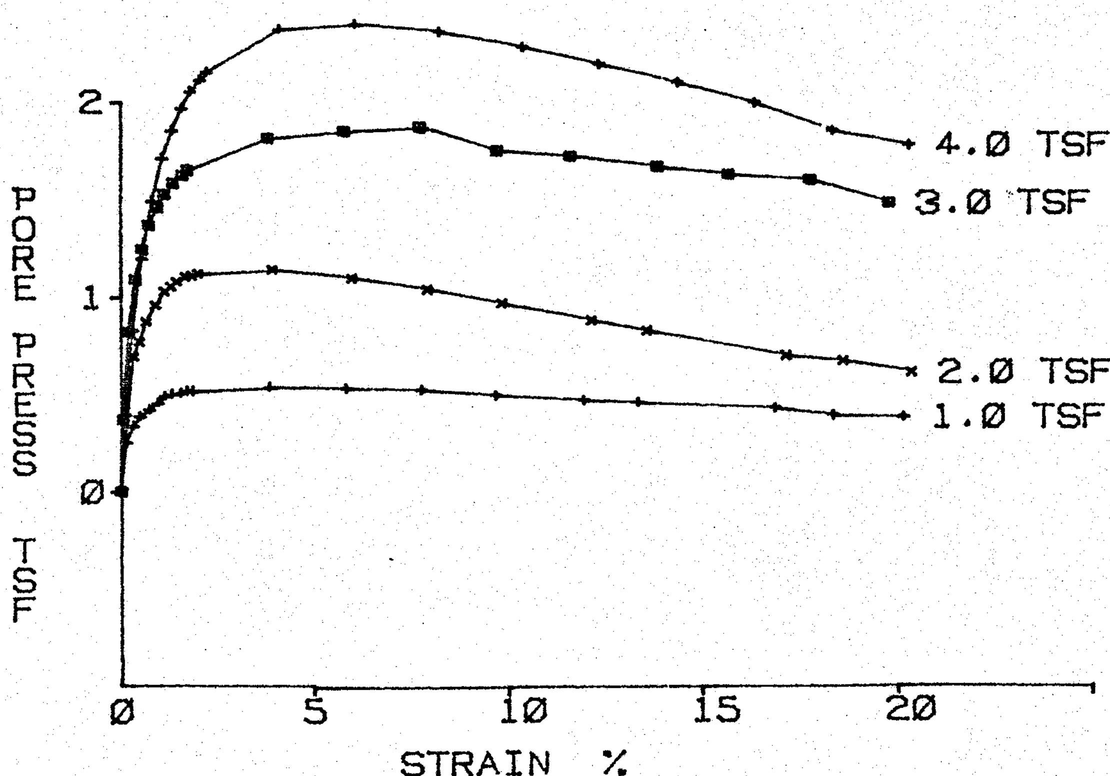


TVA SINGLETON MATERIALS ENGINEERING LABORATORY

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1085.5-1085.0
FEATURE:ASH DIKE SAMPLE :1
STATION:W70+92 PART :2
RANGE :S1+55.8 SOIL SYM:CL-CH
BORING :US-8 DATE :6-24-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DIKE		Tested By : JHD
Station: W70+92	El. : 1085.5-1085.0	Computed By: MHD
Range : S1+55.8	Sample: 1	Checked By : GMD
Boring : US-8	Part : 2	Report Date: 6-24-81

Soil Sybmbol= CL-CH	L.L.(%)= 49	P.I.(%)= 30
Sp. Gr. = 2.69	D10(mm)= 0	

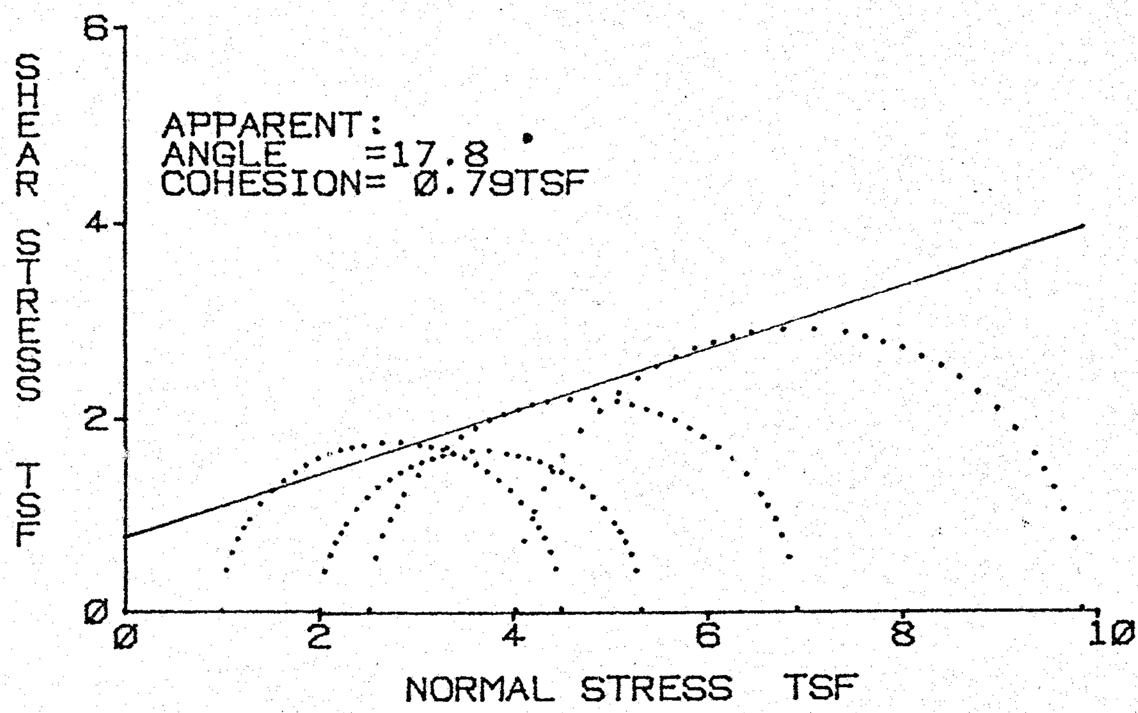
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	24.0	23.3	22.1	21.6
Dry Density(pcf)	94.3	96.2	99.0	98.6
Void Ratio	0.781	0.745	0.697	0.704
Saturation(%)	82.7	84.0	85.1	82.4
Before Shearing:				
Moisture(%) (after satur.)	29.0	27.7	25.9	26.2
Saturation(%)	100.0	100.0	100.0	100.0
Moisture(%) (after cons.)	28.9	26.5	22.9	22.9
Void Ratio (after cons.)	0.778	0.712	0.616	0.674
Final Moisture Content(%)	27.2	25.0	22.8	22.6
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	2.90	4.45	6.26	8.35
Eff. Minor Prin. Stress(tsf)	0.60	1.30	1.50	2.22
Eff. Major Prin. Stress(tsf)	2.49	3.74	4.73	6.53
Time to Failure(min.)	100	90	100	100
Rate of Strain(%/min.)	0.20	0.21	0.20	0.21
Specimen Height(in.)	3.08	3.08	3.08	3.08
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	16.7	0.35
Effective	26.1	0.24

Remarks:

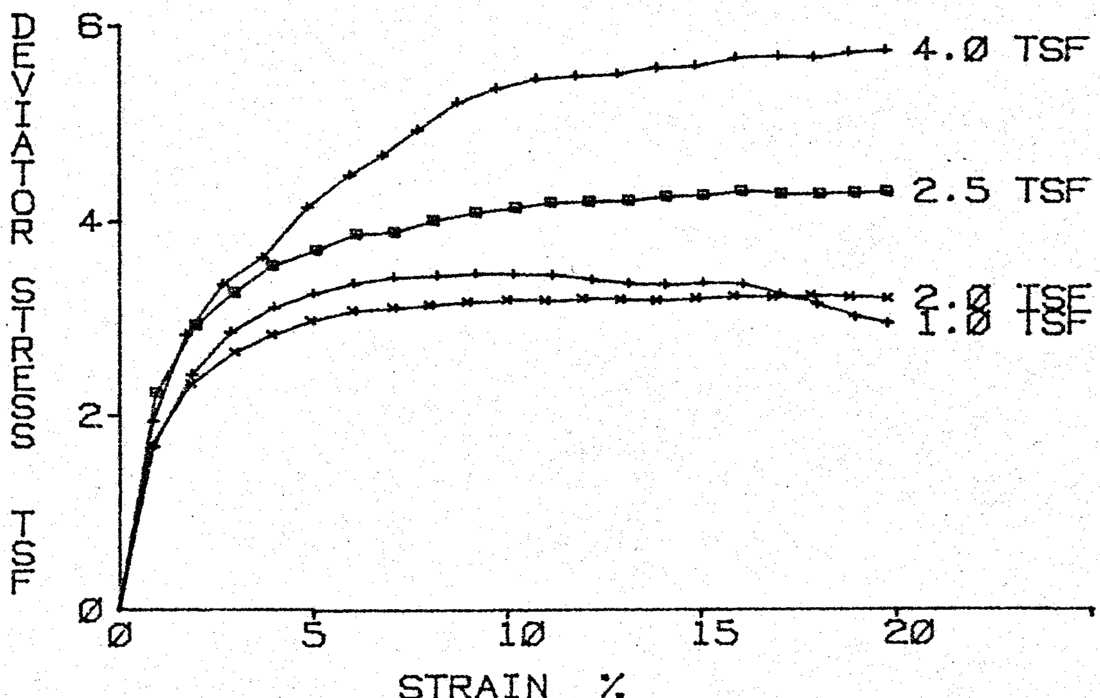
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P. EL. :1Ø78.9-1Ø78.4
FEATURE:ASH DIKE SAMPLE :3
STATION: PART :3
RANGE : SOIL SYM:CL
BORING :US-8 DATE :4-16-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.	EL. :1078.9-1078.4
FEATURE:ASH DIKE	SAMPLE :3
STATION:	PART :3
RANGE :	SOIL SYM:CL
BORING :US-8	DATE :4-16-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DIKE
Station:
Range :
Boring : US-8

El. : 1078.9-1078.4
Sample: 3
Part : 3

Tested By : EL
Computed By: MHD
Checked By : [signature]
Report Date: 4-16-81

Soil Sybmbol= CL
Sp. Gr. = 2.71

L.L.(%)= 39
D10(mm)= 0

P.I.(%)= 22

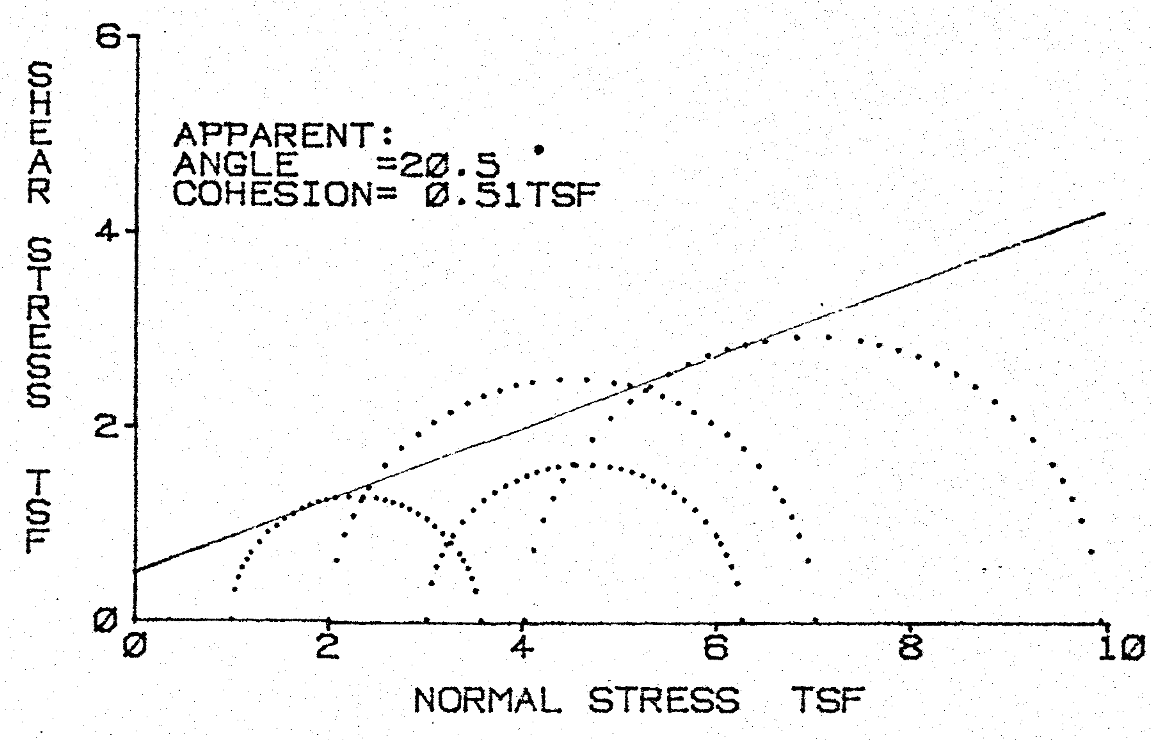
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	19.6	20.2	20.8	20.1
Dry Density(pcf)	107.2	105.4	105.0	106.3
Void Ratio	0.578	0.606	0.612	0.592
Saturation(%)	91.9	90.5	92.3	91.9
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	19.4	20.1	20.5	19.7
Minor Principal Stress(tsf)	1.01	2.02	2.52	4.03
Major Principal Stress(tsf)	4.52	5.34	6.92	9.86
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	9	18	20	20
Rate of Strain(%/min.)	1.04	1.00	1.00	1.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

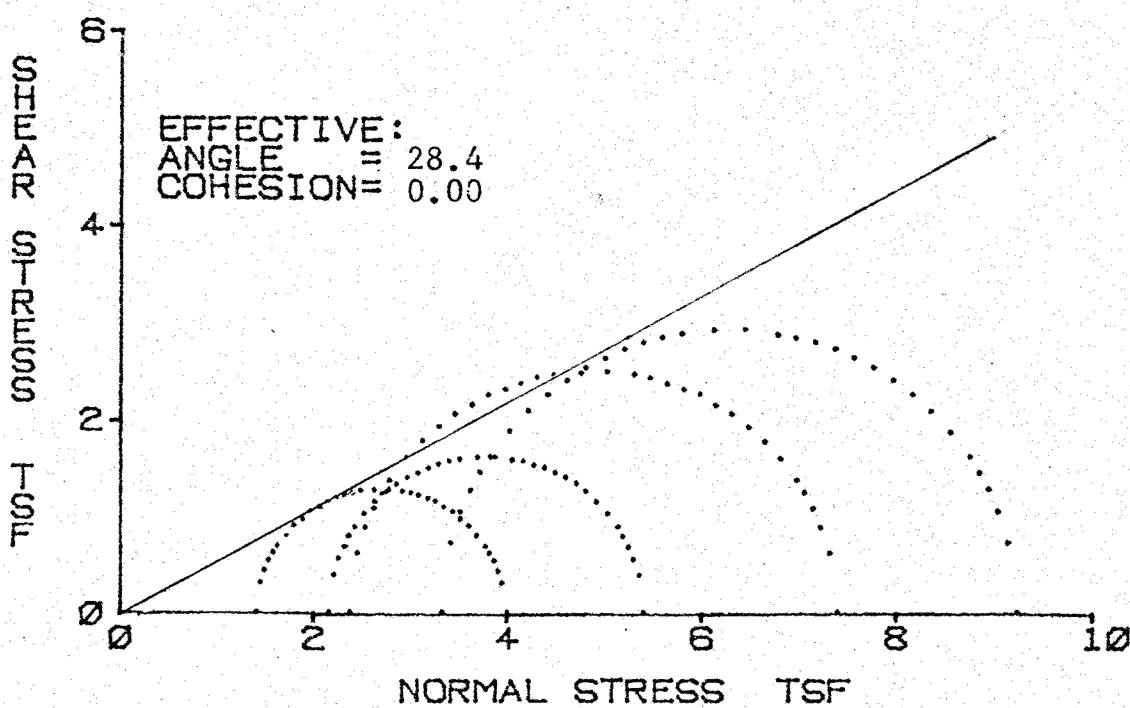
Shear Strength	Deg.	c(tsf)
Apparent	17.8	0.79
Effective	--	--

Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

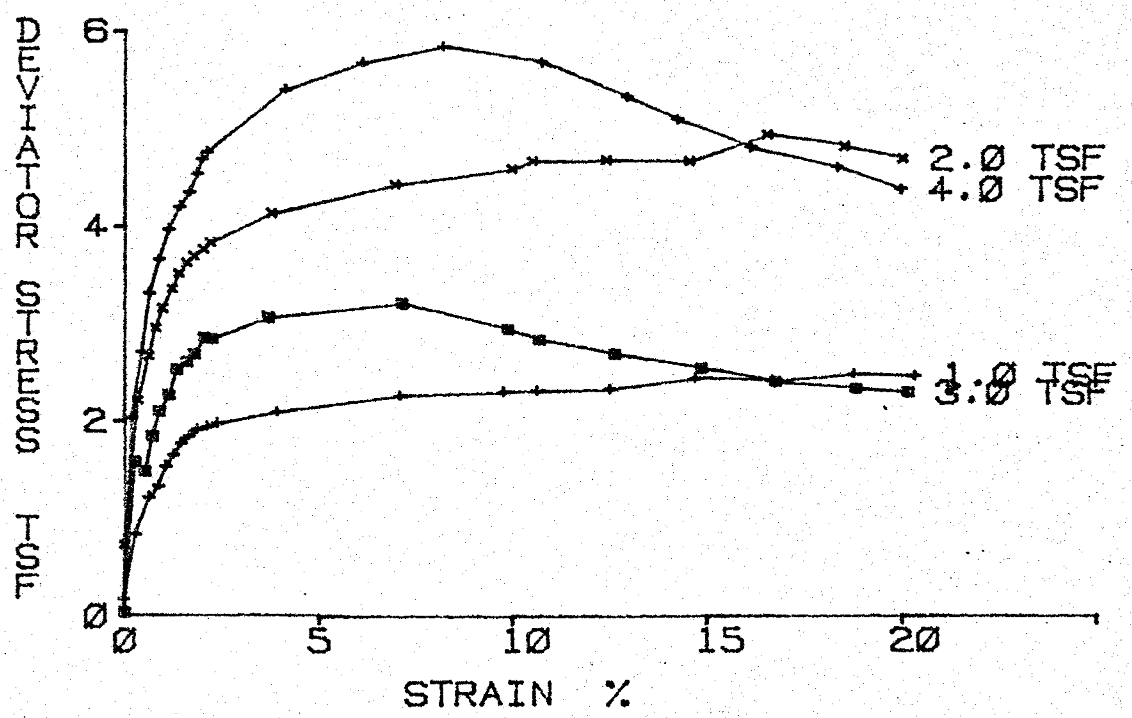
PROJECT	:JOHN SEVIER S.P.	EL.	:1Ø78.4-1Ø77.9
FEATURE	:ASH DIKE	SAMPLE	:3
STATION	:W7Ø+12.7	PART	:4
RANGE	:S1+55.8	SOIL SYM	:CL
BORING	:US-8	DATE	:4-28-81

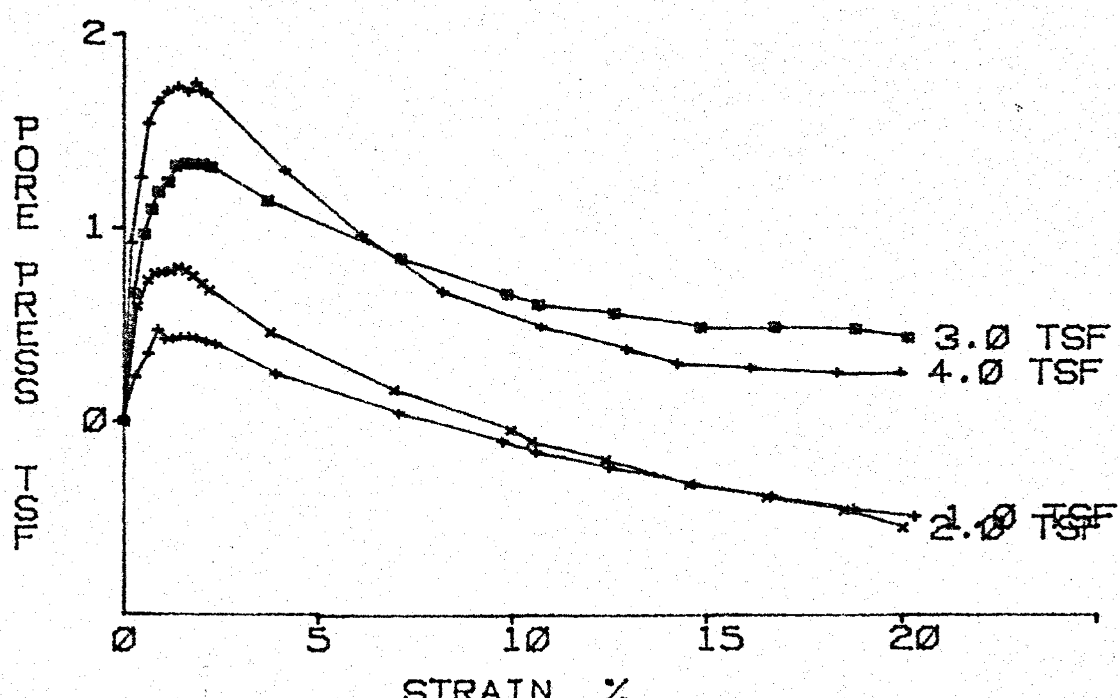




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1078.4-1077.9
FEATURE:ASH DIKE SAMPLE :3
STATION:W70+12.7 PART :4
RANGE :S1+55.8 SOIL SYM:CL
BORING :US-8 DATE :4-28-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DIKE		Tested By : TAL JHD
Station: W70+12.7	El. : 1078.4-1077.9	Computed By: MHD
Range : S1+55.8	Sample: 3	Checked By : BMD
Boring : US-8	Part : 4	Report Date: 4-28-81

Soil Sybmbol= CL	L.L.(%)= 39	P.I.(%)= 22
Sp. Gr. = 2.71	D10(mm)= 0	

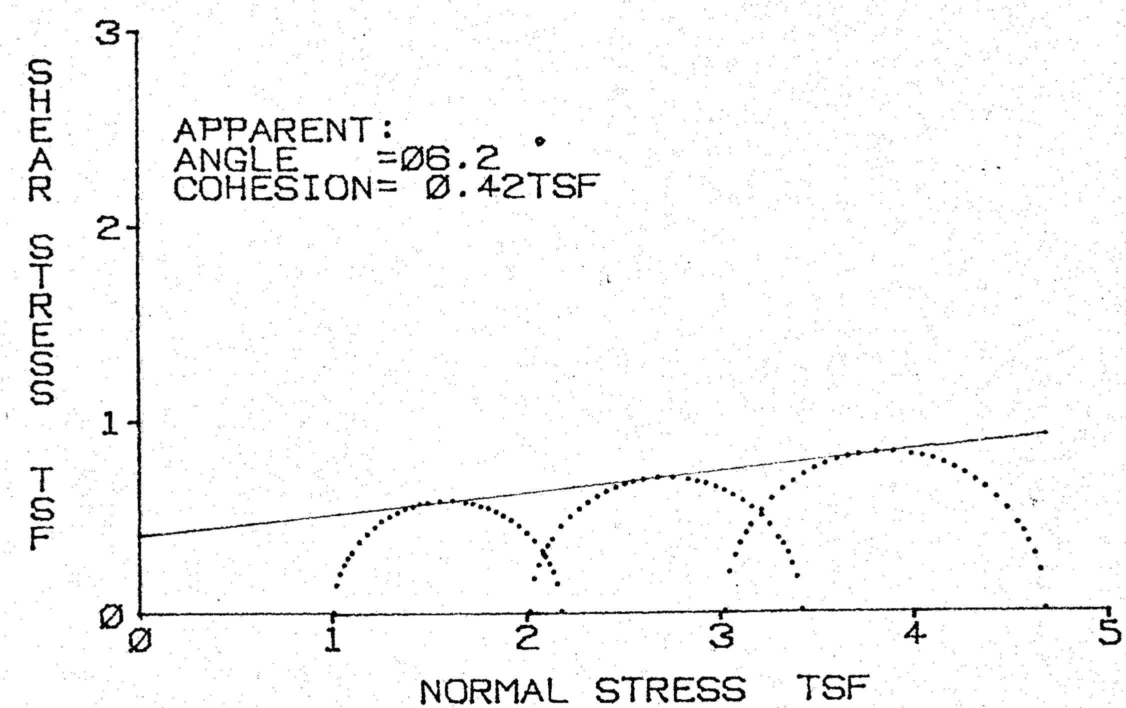
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	19.2	18.6	19.8	18.6
Dry Density(pcf)	108.4	109.0	107.7	109.0
Void Ratio	0.560	0.553	0.571	0.551
Saturation(%)	92.6	91.0	94.0	91.5
Before Shearing:				
Moisture(%) (after satur.)	20.7	20.4	21.1	20.3
Saturation(%)	100.0	100.0	100.0	100.0
Moisture(%) (after cons.)	20.6	20.2	20.2	20.2
Void Ratio (after cons.)	0.559	0.548	0.548	0.545
Final Moisture Content(%)	21.0	20.0	19.8	18.8
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	3.59	7.04	6.28	9.95
Eff. Minor Prin. Stress(tsf)	1.43	2.38	2.16	3.33
Eff. Major Prin. Stress(tsf)	4.01	7.41	5.42	9.25
Time to Failure(min.)	90	80	30	40
Rate of Strain(%/min.)	0.21	0.21	0.24	0.21
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	20.5	0.51
Effective	28.4	0.00

Remarks:

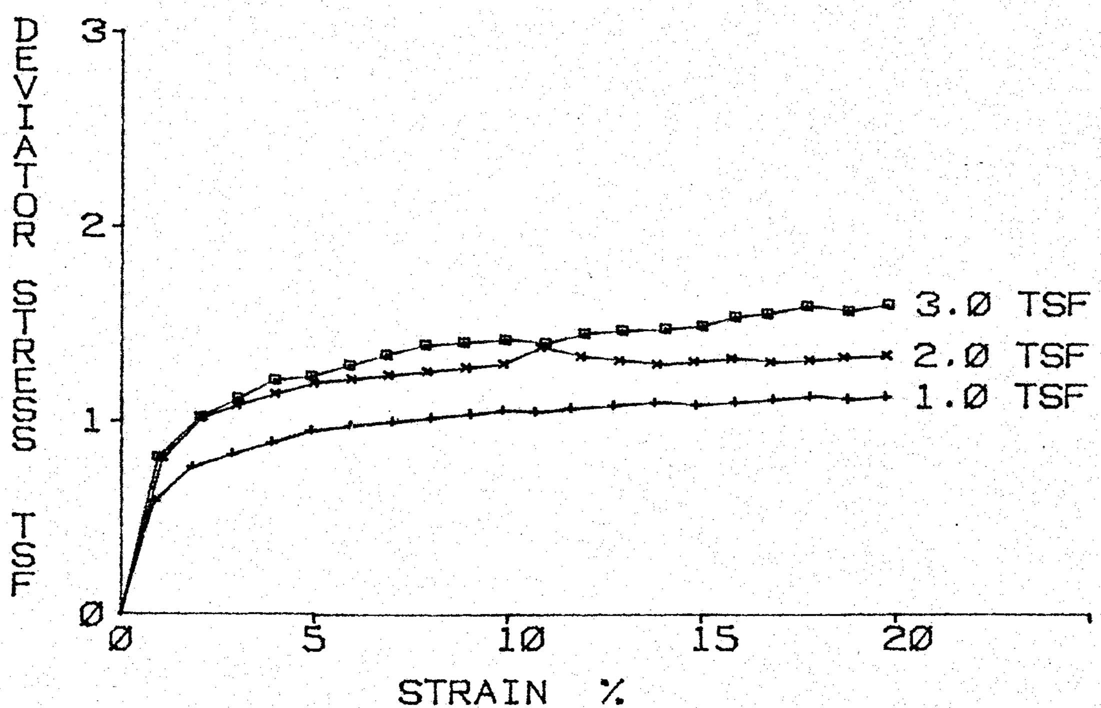
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P. EL. :1069.6-1069.1
FEATURE:ASH DIKE SAMPLE :1
STATION:85+39W PART :2
RANGE :4+68S SOIL SYM:CL
BORING :US-12 DATE :6-8-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P. EL. :1069.6-1069.1
FEATURE:ASH DIKE SAMPLE :1
STATION:85+39W PART :2
RANGE :4+68S SOIL SYM:CL
BORING :US-12 DATE :6-8-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DIKE
Station: 85+39W
Range : 4+68S
Boring : US-12

El. : 1069.6-1069.1
Sample: 1
Part : 2

Tested By : RA
Computed By: MHD
Checked By :
Report Date: 6-8-81

Soil Sybmbol= CL
Sp. Gr. = 2.69

L.L.(%)= 40
D10(mm)= 0

P.I.(%)= 20

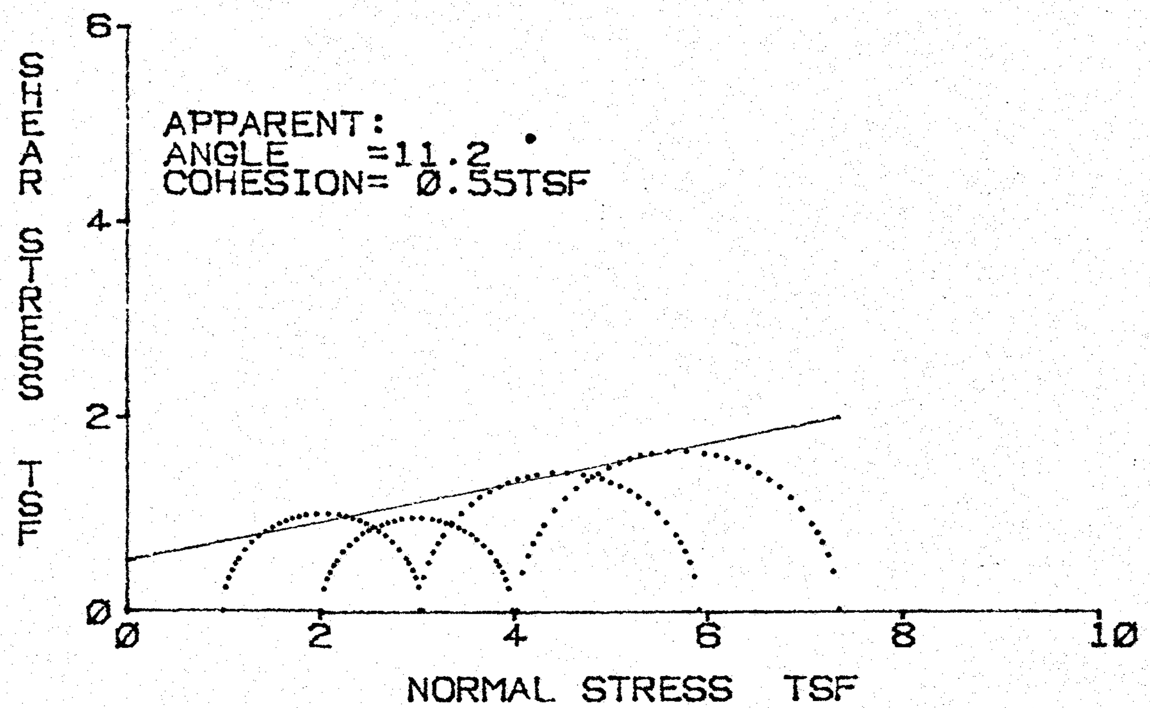
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	27.0	28.5	27.4	0.0
Dry Density(pcf)	82.1	77.9	77.9	0.0
Void Ratio	1.046	1.157	1.157	0.000
Saturation(%)	69.5	66.3	63.7	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	26.9	28.4	27.2	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.18	3.42	4.68	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	11	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.39	1.39	1.39	1.39

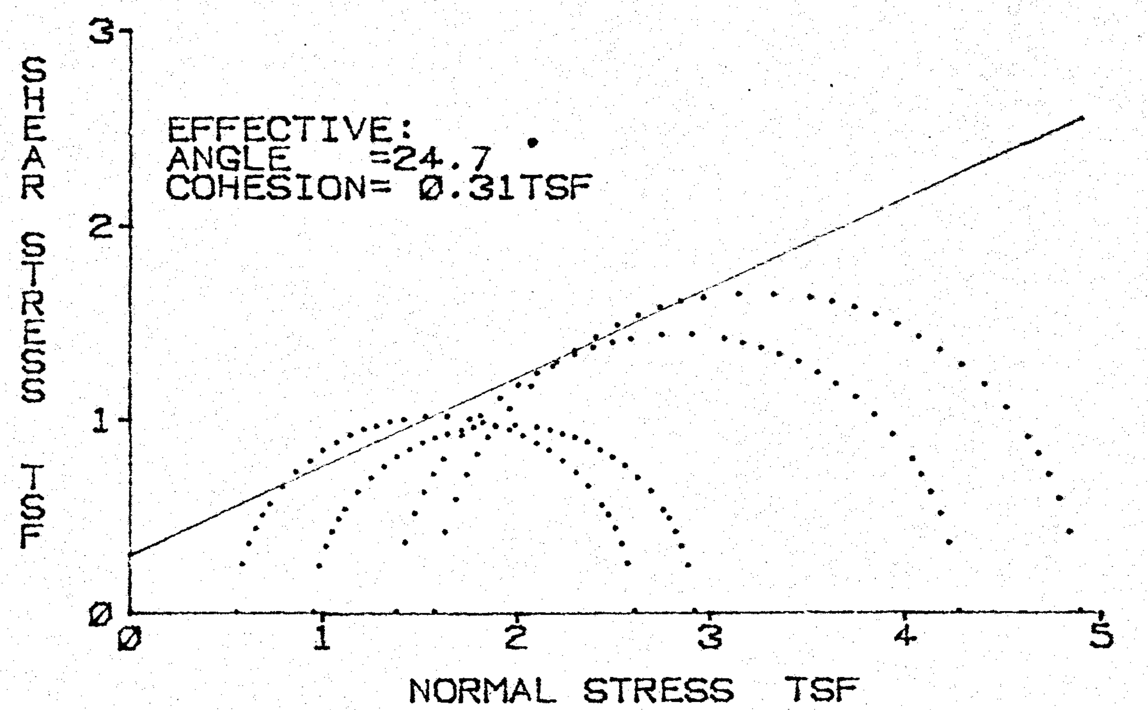
Shear Strength	Deg.	c(tsf)
Apparent	6.2	0.42
Effective	--	--

Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

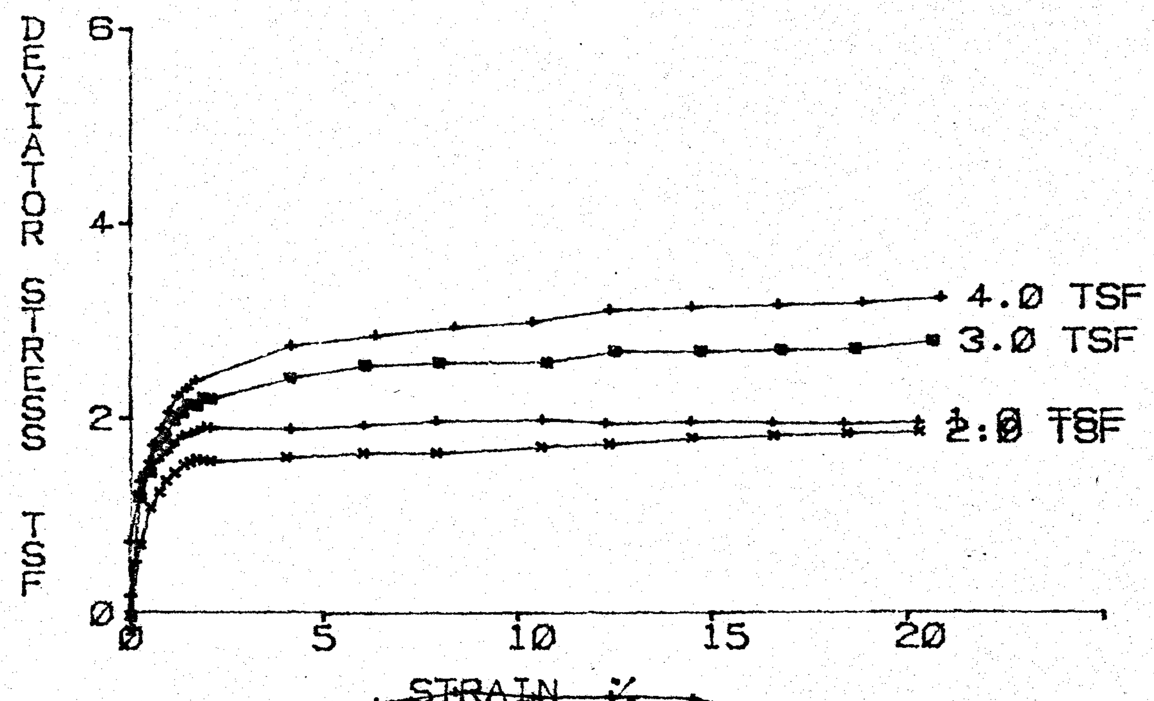
PROJECT:JOHN SEVIER S.P.EL. :1069.1-1068.6
FEATURE:ASH DIKE SAMPLE :1
STATION:W85+39.0 PART :3
RANGE :S4+68.2 SOIL SYM:CL
BORING :US-12 DATE :

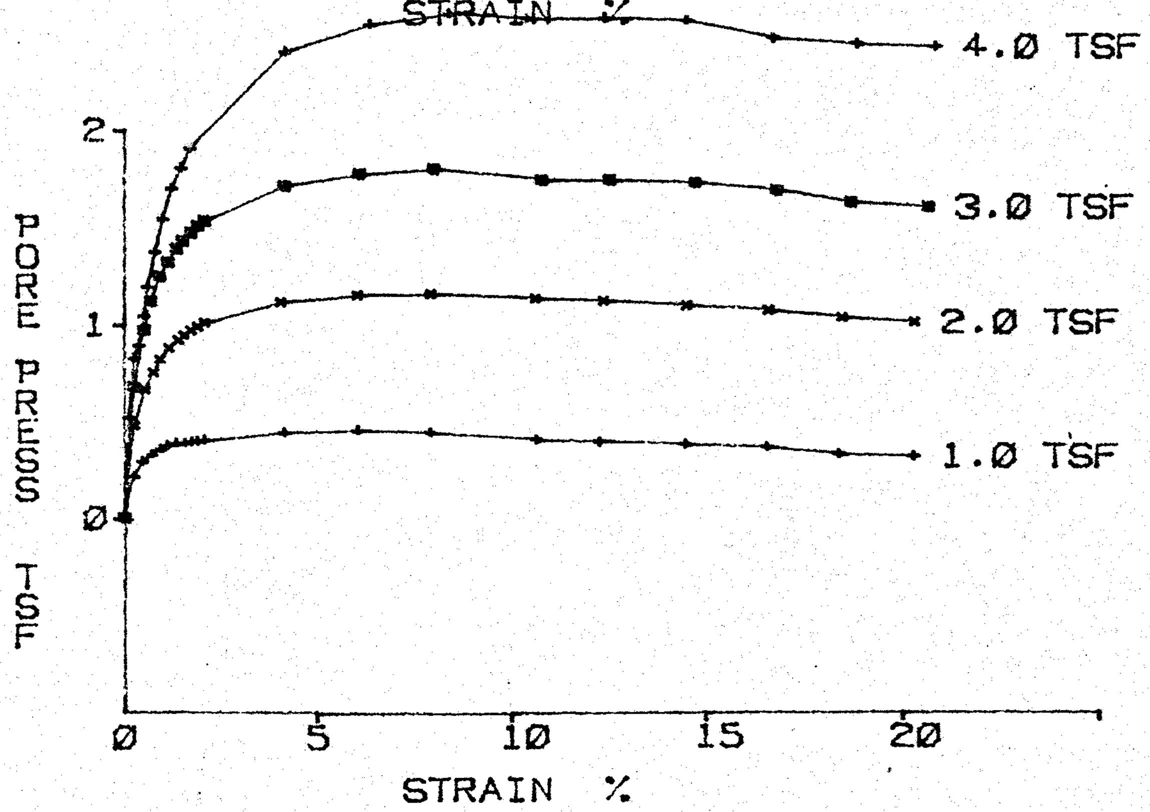




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT	:JOHN SEVIER S.P.	EL.	:1069.1-1068.6
FEATURE	:ASH DIKE	SAMPLE	:1
STATION	:W85+39.0	PART	:3
RANGE	:S4+68.2	SOIL SYM	:CL
BORING	:US-12	DATE	:





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DIKE		Tested By : JHD
Station: W85+39.0	El. : 1069.1-1068.6	Computed By:
Range : S4+68.2	Sample: 1	Checked By : TAL
Boring : US-12	Part : 3	Report Date:

Soil Sybmbol= CL	L.L.(%)= 40	P.I.(%)= 20
Sp. Gr. = 2.69	D10(mm)= 0	

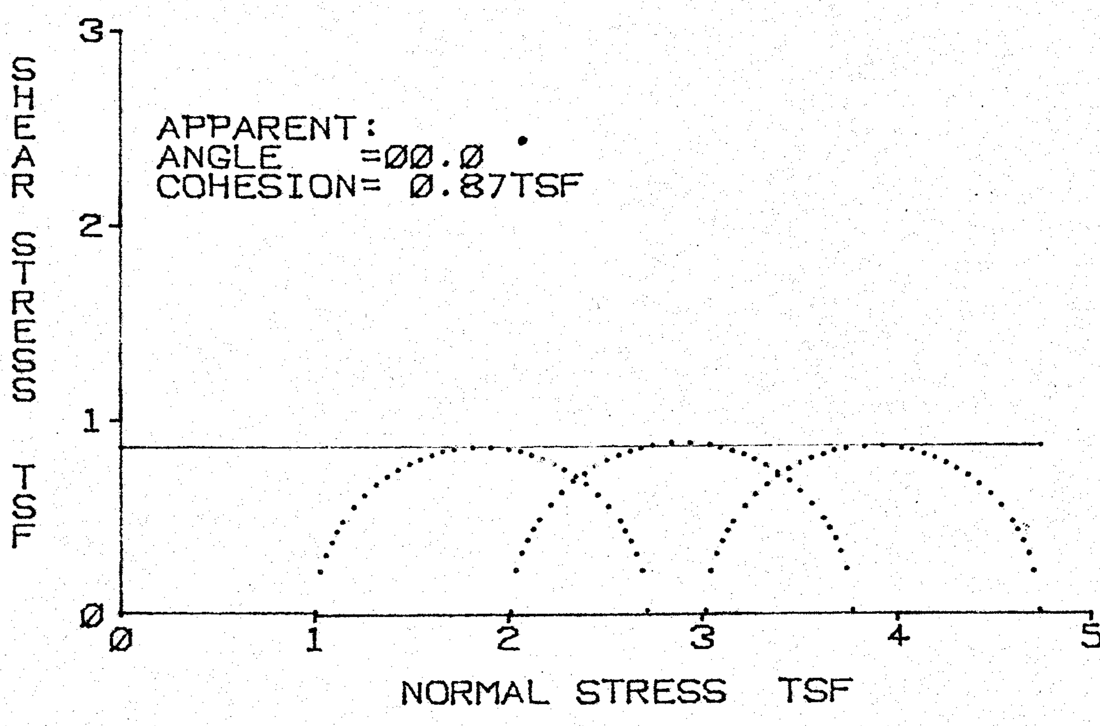
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	26.9	25.9	25.1	23.4
Dry Density(pcf)	88.4	91.3	92.8	91.9
Void Ratio	0.900	0.840	0.809	0.827
Saturation(%)	80.4	82.8	83.4	76.1
Before Shearing:				
Moisture(%) (after satur.)	33.5	31.2	30.1	30.7
Saturation(%)	100.0	100.0	100.0	100.0
Moisture(%) (after cons.)	32.9	29.8	26.7	26.7
Void Ratio (after cons.)	0.886	0.802	0.718	0.661
Final Moisture Content(%)	30.1	27.4	25.8	25.4
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	3.06	3.99	5.92	7.36
Eff. Minor Prin. Stress(tsf)	0.56	0.96	1.38	1.58
Eff. Major Prin. Stress(tsf)	2.62	2.93	4.28	4.90
Time to Failure(min.)	50	100	100	100
Rate of Strain(%/min.)	0.22	0.21	0.21	0.21
Specimen Height(in.)	3.08	3.08	3.08	3.08
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	11.2	0.55
Effective	24.7	0.31

Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

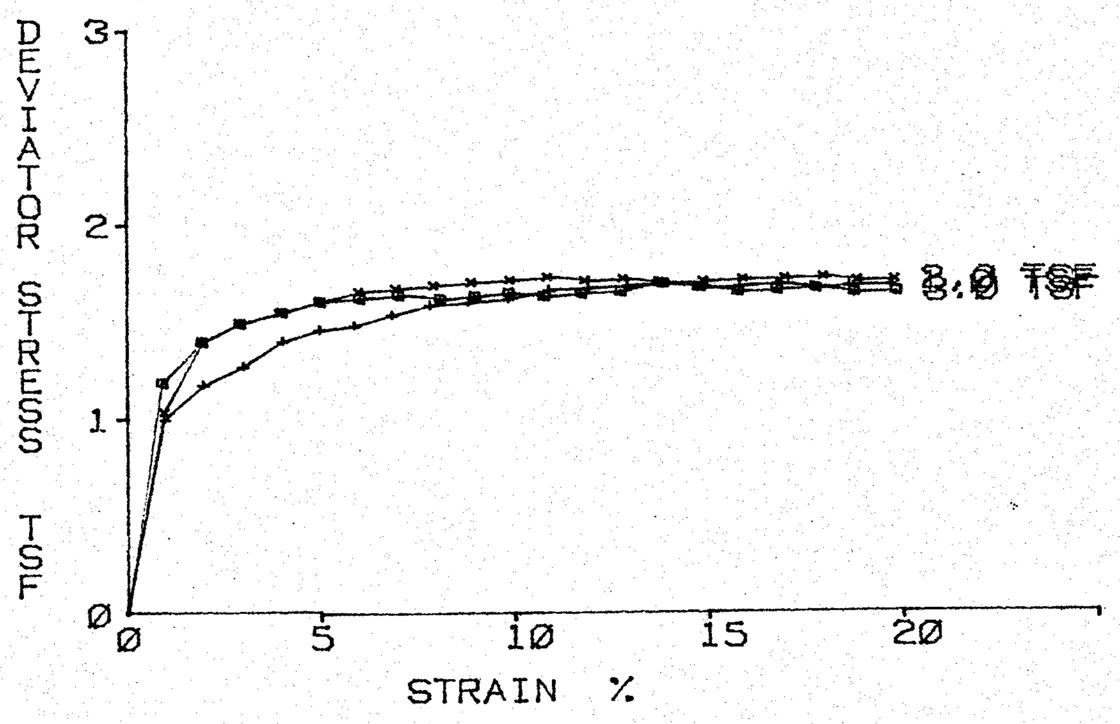
PROJECT	:JOHN SEVIER S.P.EL.		:1066.1-1066.6
FEATURE	:ASH DIKE	SAMPLE	:4
STATION	:82+71W	PART	:2
RANGE	:0+17S	SOIL SYM	:CL
BORING	:US-15	DATE	:6-9-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT	:JOHN SEVIER S.P.	EL.	:1Ø66.1-1Ø66.6
FEATURE	:ASH DIKE	SAMPLE	:4
STATION	:82+71W	PART	:2
RANGE	:Ø+17S	SOIL SYM	:CL
BORING	:US-15	DATE	:6-9-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DIKE		Tested By : RA
Station: 82+71W	El. : 1066.1-1066.6	Computed By: MHD
Range : 0+17S	Sample: 4	Checked By :
Boring : US-15	Part : 2	Report Date: 6-9-81

Soil Sybmbol= CL	L.L.(%)= 31	P.I.(%)= 13
Sp. Gr. = 2.71	D10(mm)= 0	

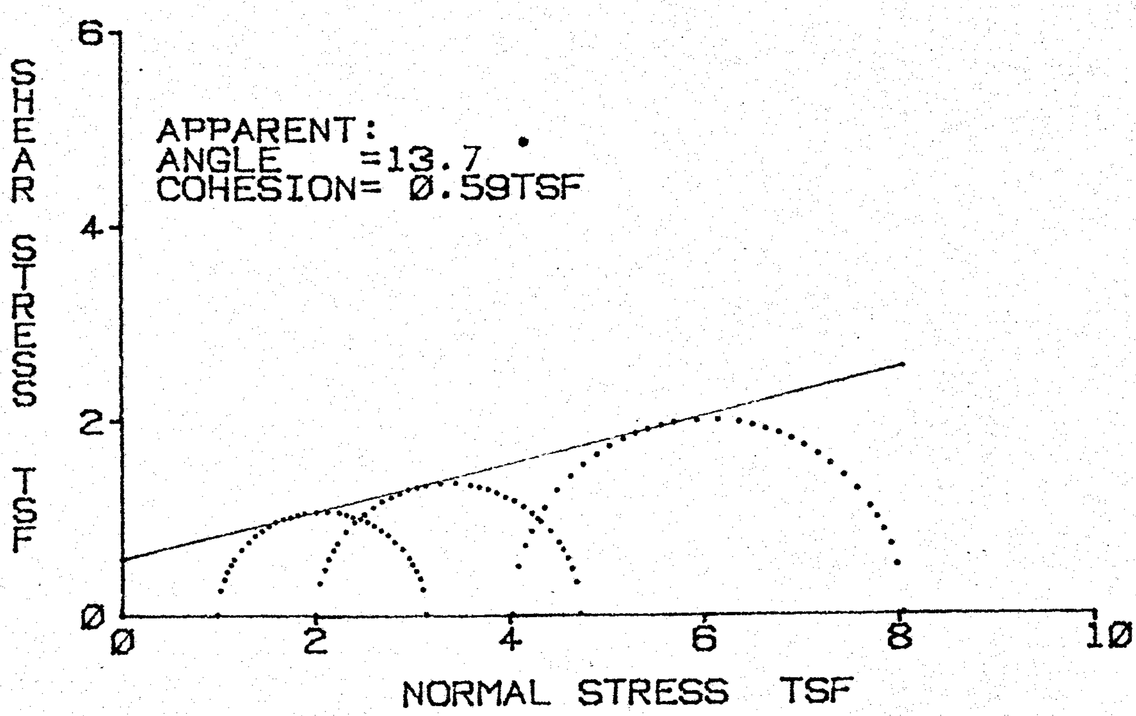
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	20.9	22.0	22.0	0.0
Dry Density(pcf)	98.2	99.9	99.7	0.0
Void Ratio	0.724	0.694	0.696	0.000
Saturation(%)	78.3	86.1	85.6	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	20.8	22.0	21.9	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.73	3.77	4.74	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	17	18	14	0
Rate of Strain(%/min.)	1.00	1.01	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.39	1.39	1.39	1.39

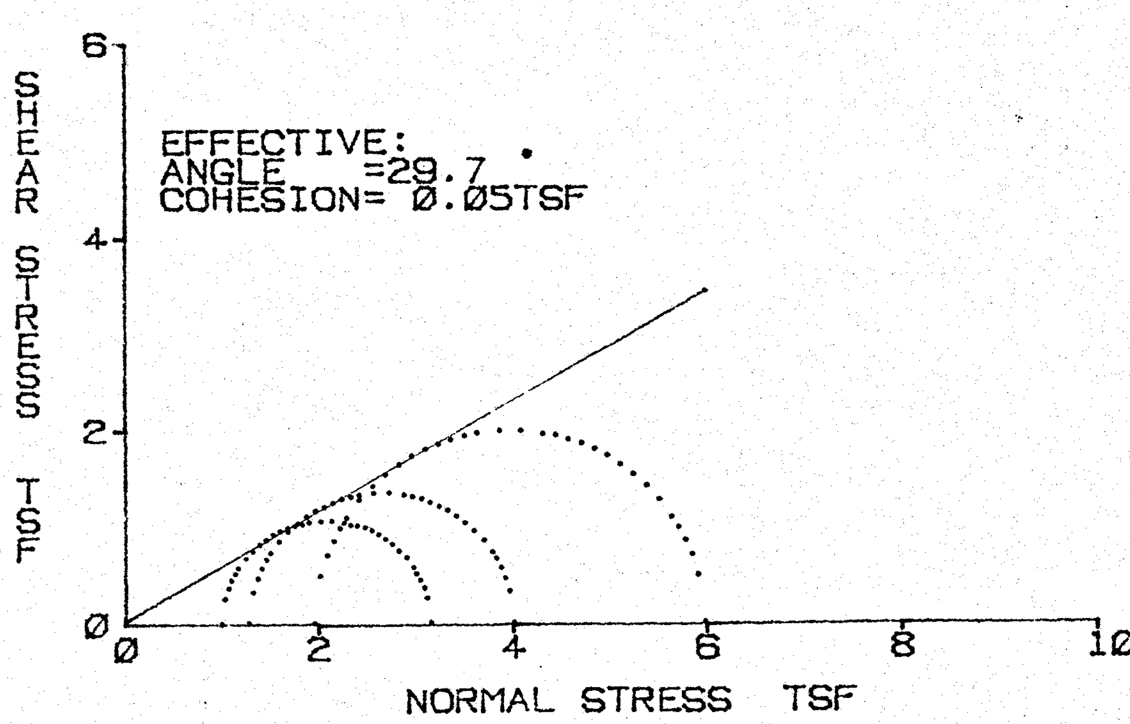
Shear Strength	Deg.	c(tsf)
Apparent	0.0	0.87
Effective	--	--

Remarks:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

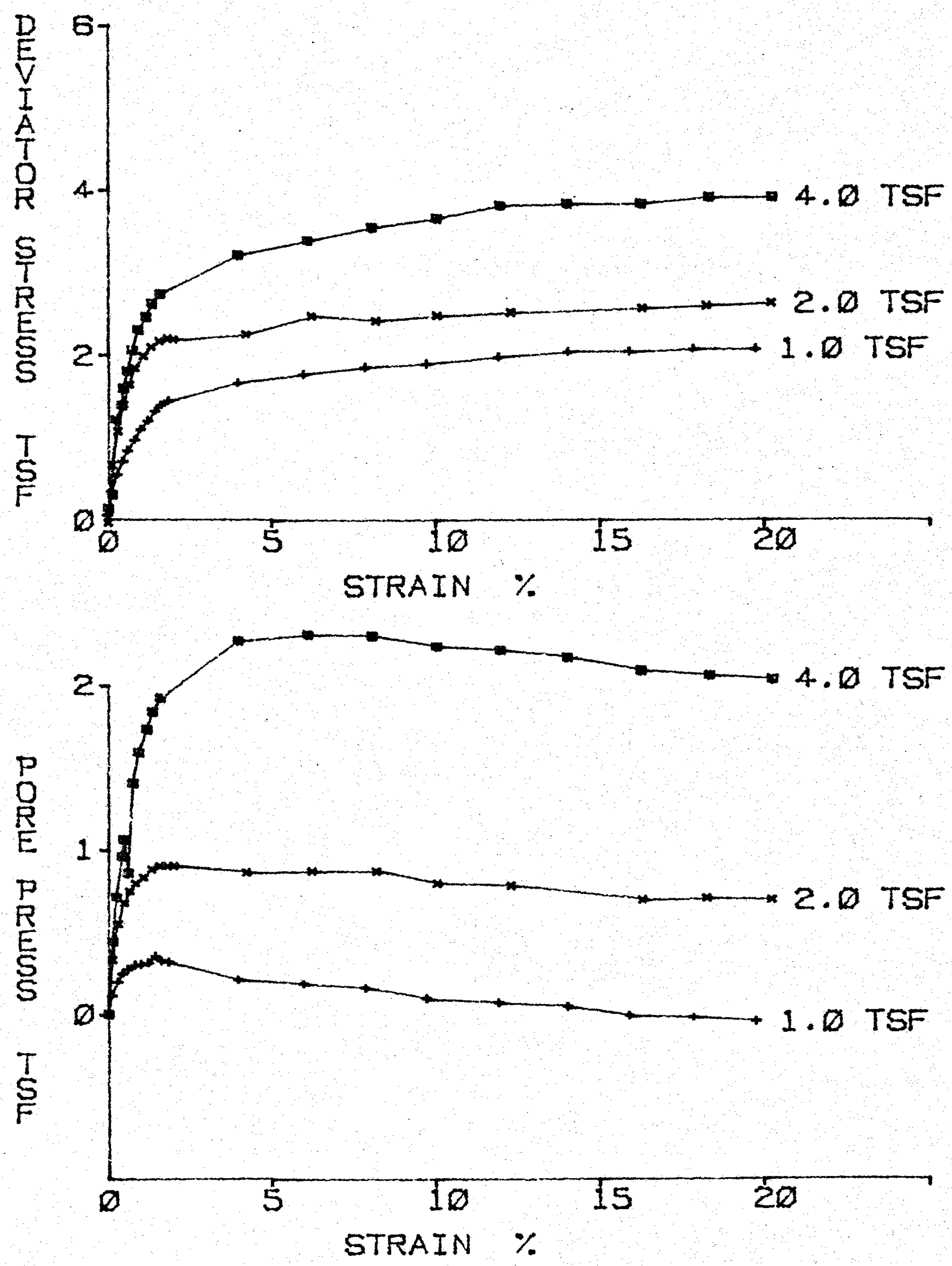
PROJECT:JOHN SEVIER SP   EL.   :1066.2-1065.7
FEATURE:ASH DIKE   SAMPLE   :4
STATION:W82+71.2   PART   :3
RANGE   :S0+72   SOIL SYM:CL
BORING :US-15   DATE   :7/17/81





TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER SP EL. :1066.2-1065.7
FEATURE:ASH DIKE SAMPLE :4
STATION:W82+71.2 PART :3
RANGE :S0+72 SOIL SYM:CL
BORING :US-15 DATE :7/17/81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP
Feature: ASH DIKE
Station: W82+71.2
Range : S0+72
Boring : US-15

El. : 1066.2-1065.7
Sample: 4
Part : 3

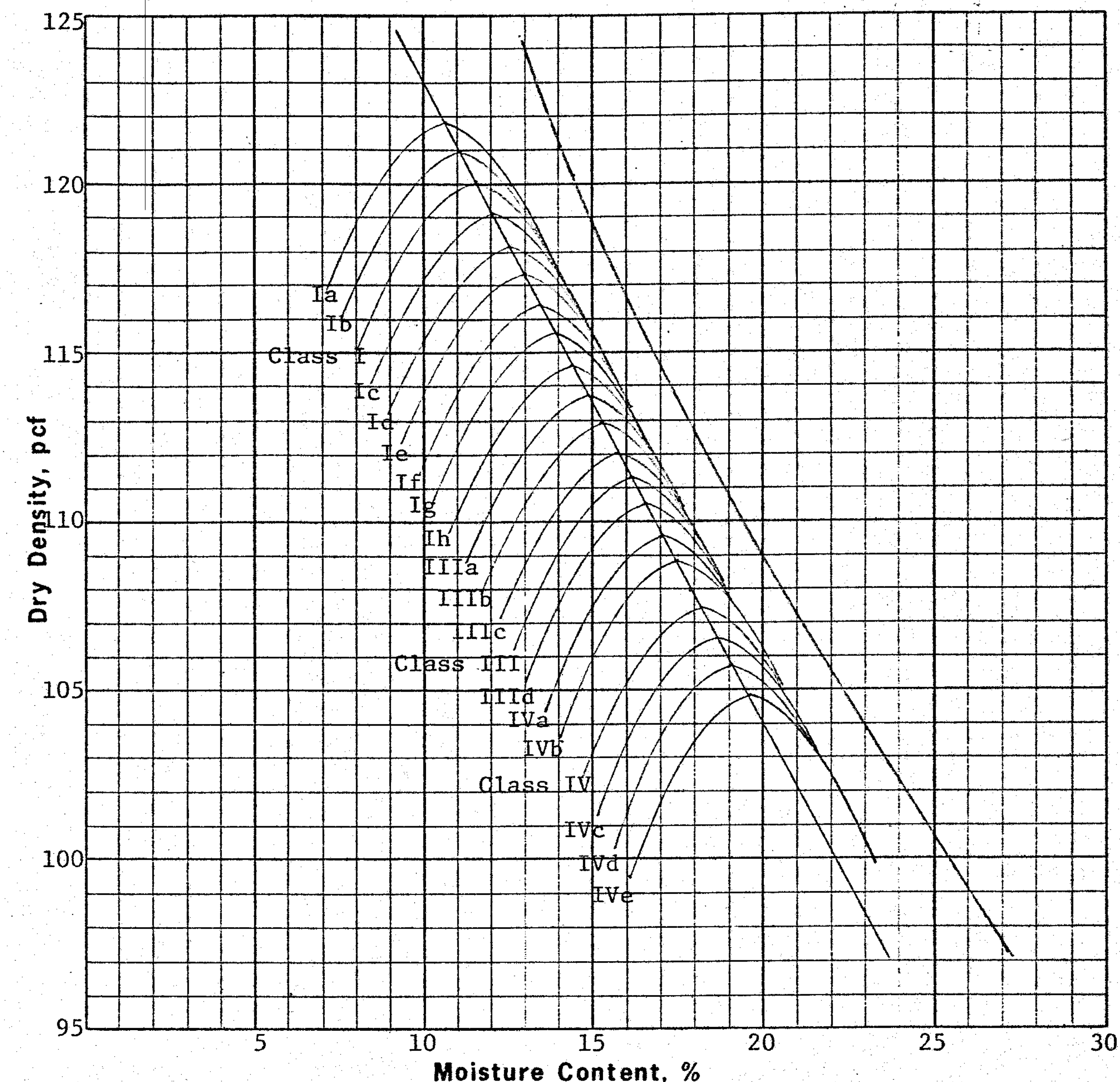
Tested By : JHD
Computed By: CRF
Checked By : [signature]
Report Date: 7/17/81

Soil Sybmbol= CL
Sp. Gr. = 2.71
L.L.(%)= 31
D10(mm)= 0
P.I.(%)= 13

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	22.1	22.2	22.1	0.0
Dry Density(pcf)	102.7	102.6	102.8	0.0
Void Ratio	0.648	0.649	0.645	0.000
Saturation(%)	92.6	92.8	92.8	0.0
Before Shearing:				
Moisture(%) (after satur.)	23.9	23.9	23.8	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	23.3	23.4	22.4	22.4
Void Ratio (after cons.)	0.632	0.635	0.607	0.000
Final Moisture Content(%)	23.0	22.2	21.8	0.0
Minor Principal Stress(tsf)	1.01	2.02	4.03	0.00
Major Principal Stress(tsf)	3.16	4.74	8.06	0.00
Eff. Minor Prin. Stress(tsf)	1.02	1.30	1.97	0.00
Eff. Major Prin. Stress(tsf)	3.17	4.02	5.99	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.20	0.20	0.20	0.00
Specimen Height(in.)	3.08	3.08	3.08	3.08
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	13.7	0.59
Effective	29.7	0.05

Remarks:



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
I-SC	0	53	23	24	2.67	26	12	11.5	120.0
III-CL	0	26	40	34	2.68	36	19	16.2	111.3
IV-CL	0	19	42	39	2.69	42	23	18.2	107.3

Plus No. 4 Specific Gravity, S S D	--
Plus No. 4 Absorption, %	--

Remarks:

Project John Sevier Steam Plant

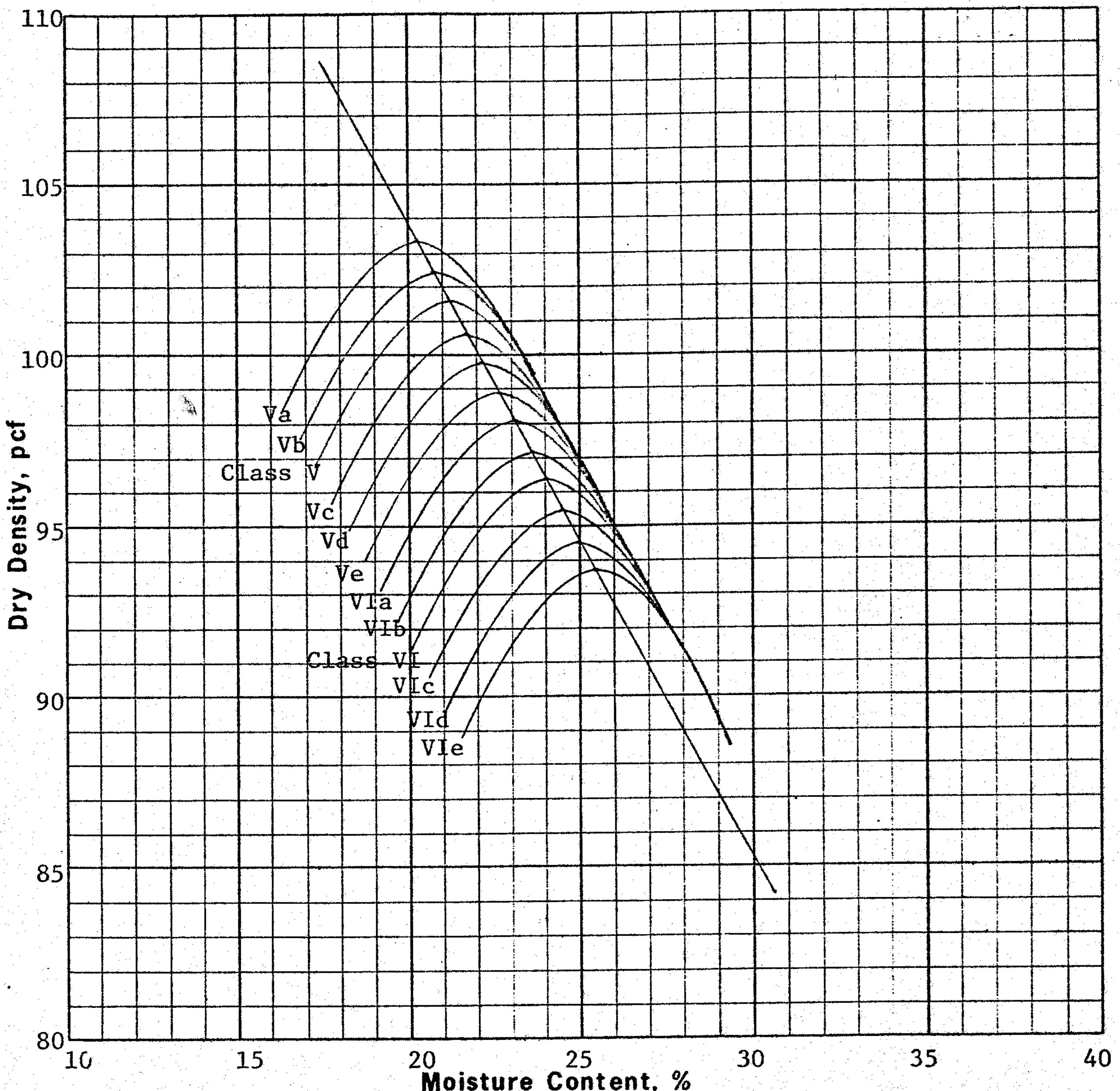
Feature Borrow Area

ASTM Designation D 698 A

Date Tested 6-2-81

COMPACTION TEST (FAMILY OF CURVES)

TVA 10201 (CONST-12-76) Tested by: JSC Reviewed by: RBG



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
V-GL	0	20	36	44	2.74	48	23	21.2	101.7
VI-CH-MH	0	12	39	49	2.77	56	27	24.1	96.3

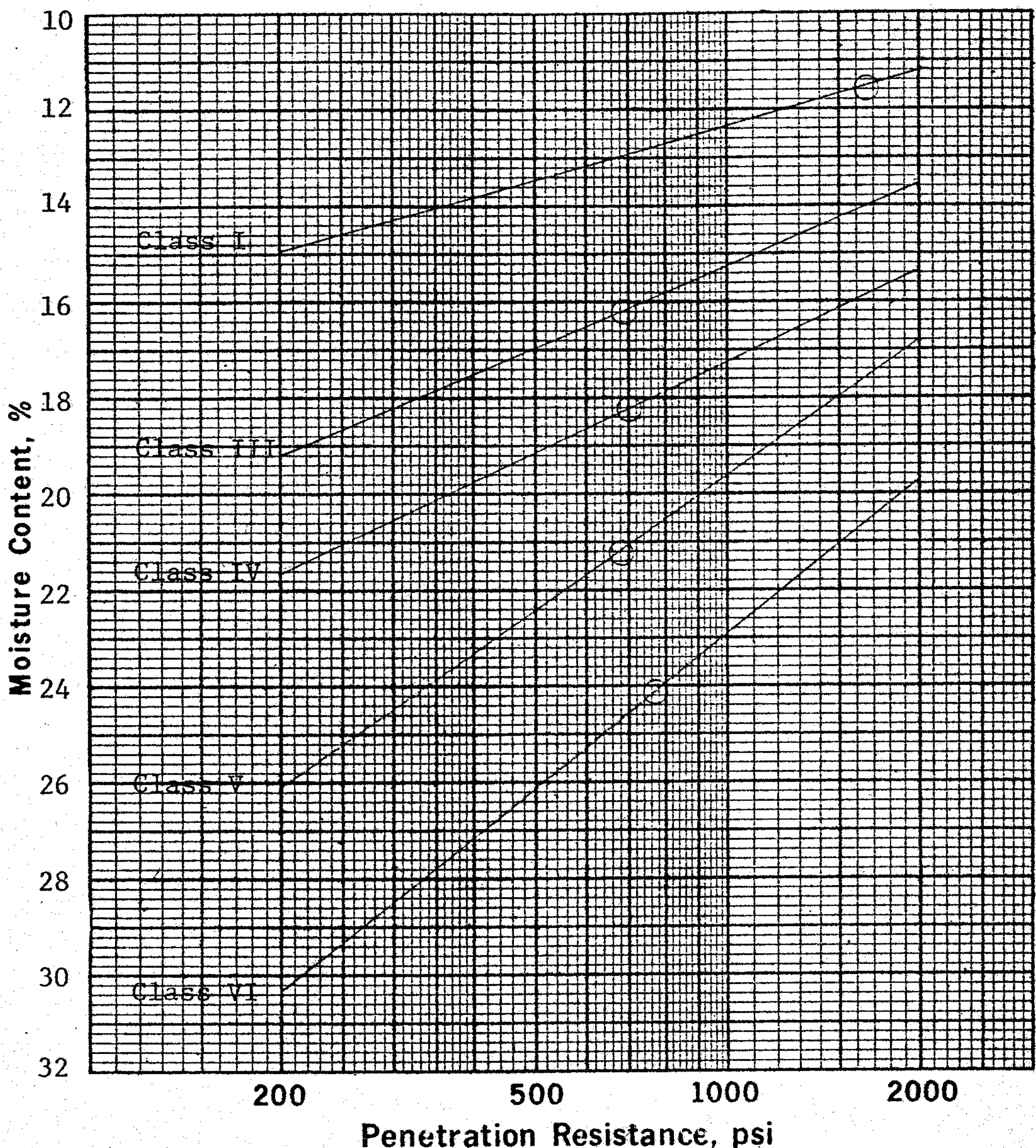
Plus No. 4 Specific Gravity, S S D	--
Plus No. 4 Absorption, %	--

Remarks:

Project	John Sevier Steam Plant Ash Dike
Feature	Borrow Areas A & B
ASTM Designation	D 698 A
Date Tested	6-2-81

COMPACTION TEST (FAMILY OF CURVES)

TVA 10201 (CONST-12-76) Tested by: JDC Reviewed by: [signature]



Soil Class	Optimum Moisture, %	Maximum Density, pcf	Penetration Resistance, psi
I-SC	11.5	120.0	1650
III-CL	16.2	111.3	685
IV-CL	18.2	107.3	705
V-CL	21.2	101.7	675
VI-CH-MH	24.1	96.3	790

Remarks:

○ **Denotes Optimum Moisture**

Project John Sevier Steam Plant
Ash Dike

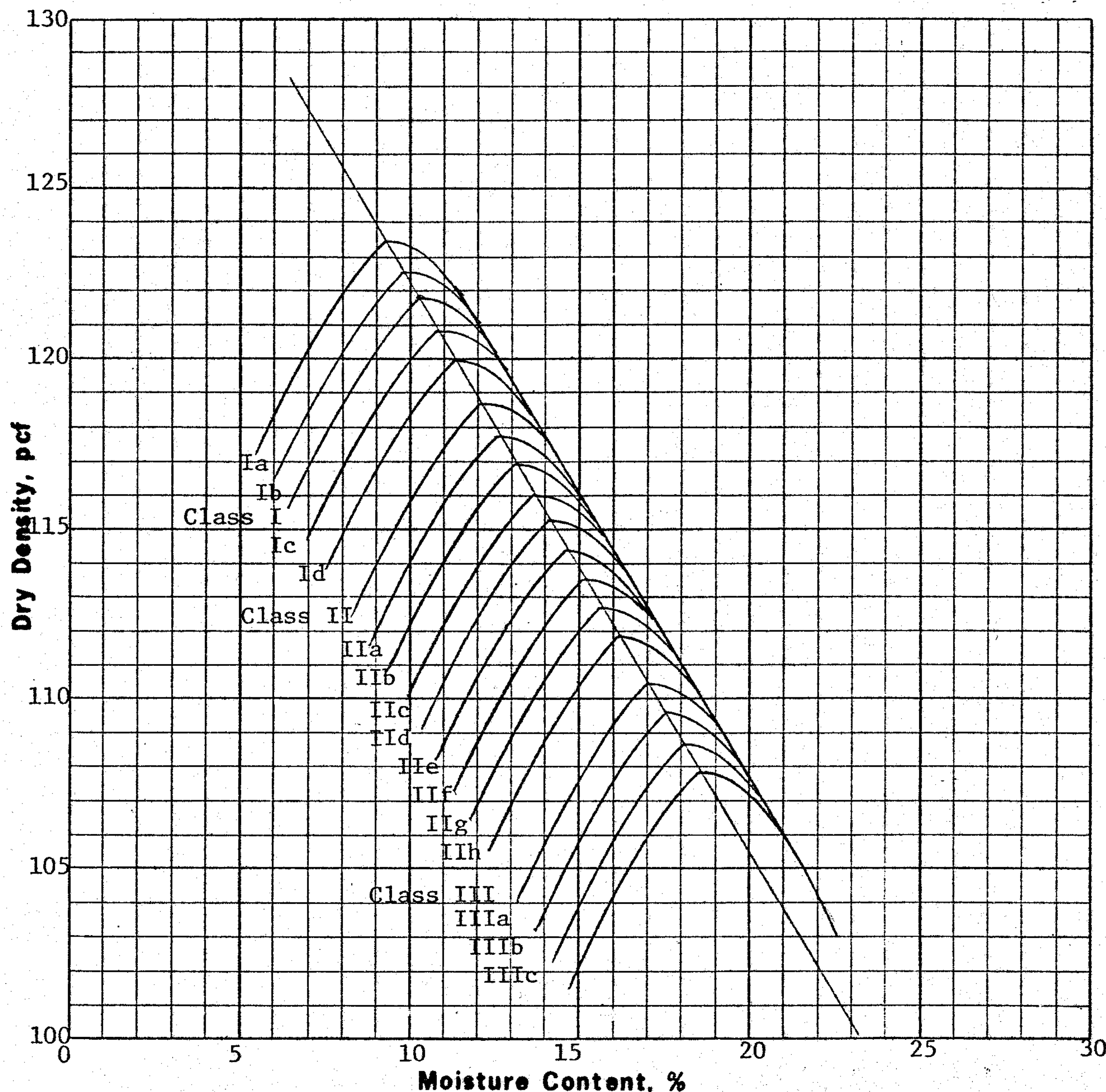
Feature Borrow Areas A & B

ASTM Designation D 698 A

Date Tested 6-2-81

MOISTURE - PENETRATION TEST

Tested by: JDC Reviewed by: CB



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
I-CL	20	22	26	32	2.74	49	23	10.2	121.9
II-SC	20	34	22	24	2.73	37	20	12.1	118.8
III-CL	20	29	23	28	2.71	33	17	16.0	110.4

Plus No. 4 Specific Gravity, S S D	2.55
Plus No. 4 Absorption, %	2.26

Remarks:

Project John Sevier Steam Plant
Ash Dike

Feature Borrow Areas A & B
ASTM Designation D 698 C

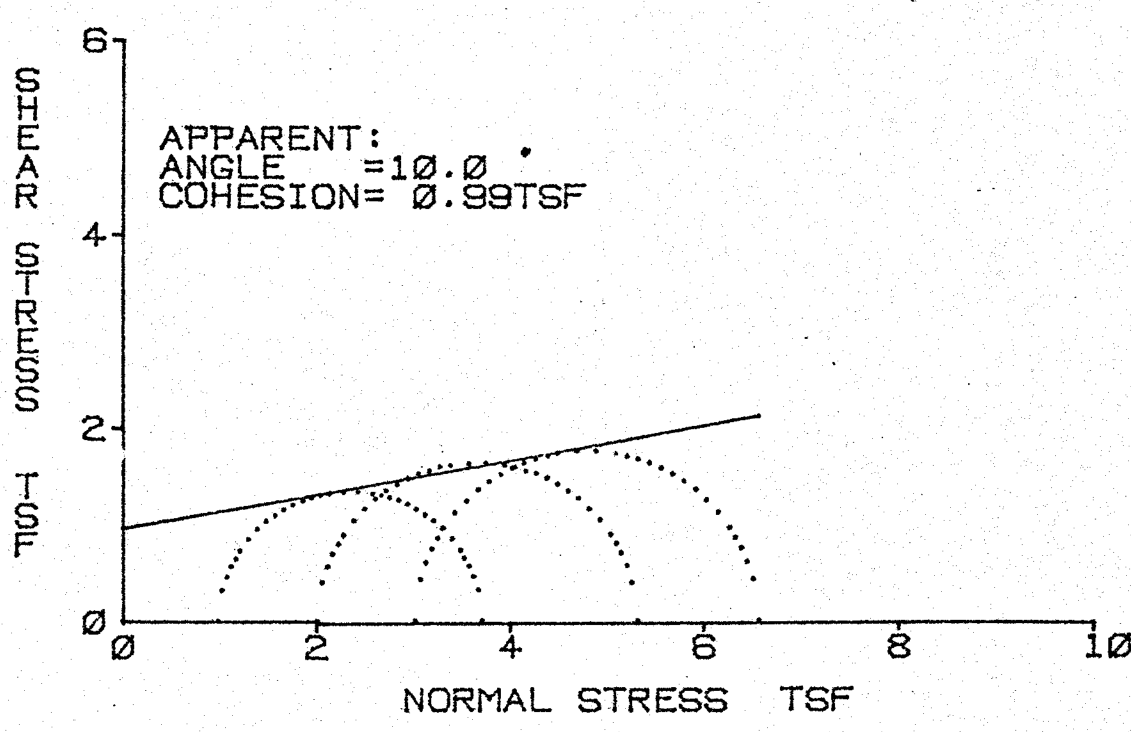
Date Tested 6-2-81

COMPACTION TEST (FAMILY OF CURVES)

TVA 10201 (CONST-6-77) Tested by: JDC Reviewed by: CBG

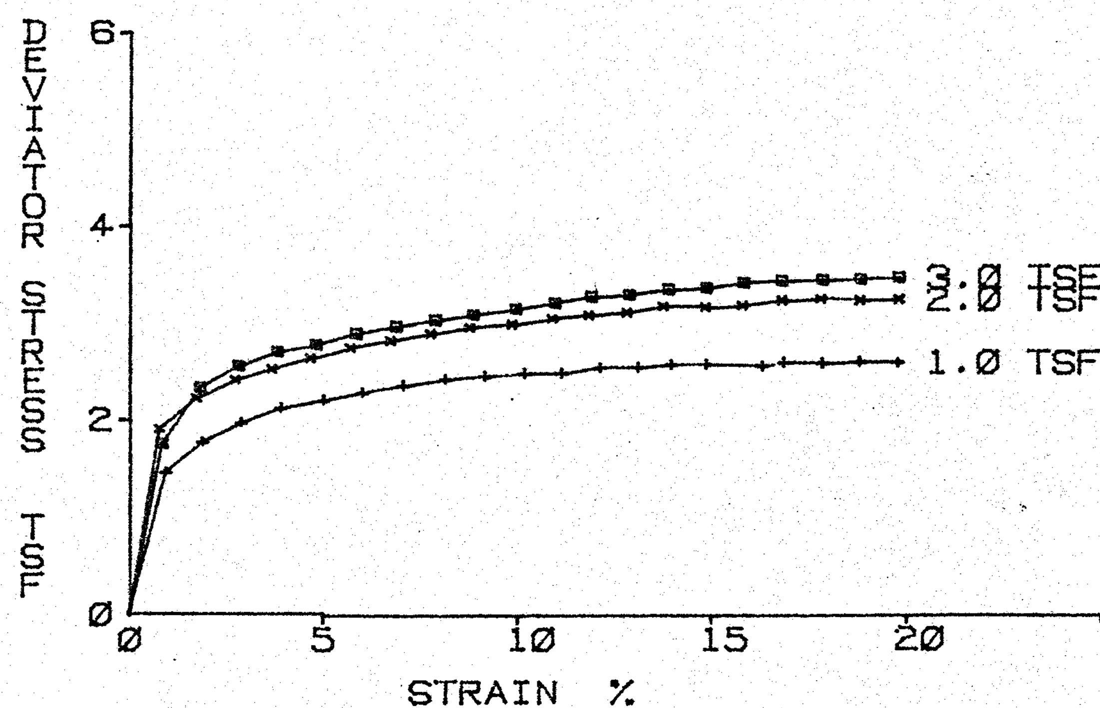
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B SAMPLE :CLASS I
STATION: PART :
RANGE : SOIL SYM:SC
BORING : DATE :5-5-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: BORROW AREAS A AND B SAMPLE : CLASS I
STATION: PART :
RANGE : SOIL SYM: SC
BORING : DATE : 5-5-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS I
Part :

Tested By : EL
Computed By: MHD
Checked By : OBG
Report Date: 5-5-81

Soil Sybmbol= SC
Sp. Gr. = 2.67
L.L.(%)= 26
D10(mm)= 0
P.I.(%)= 12

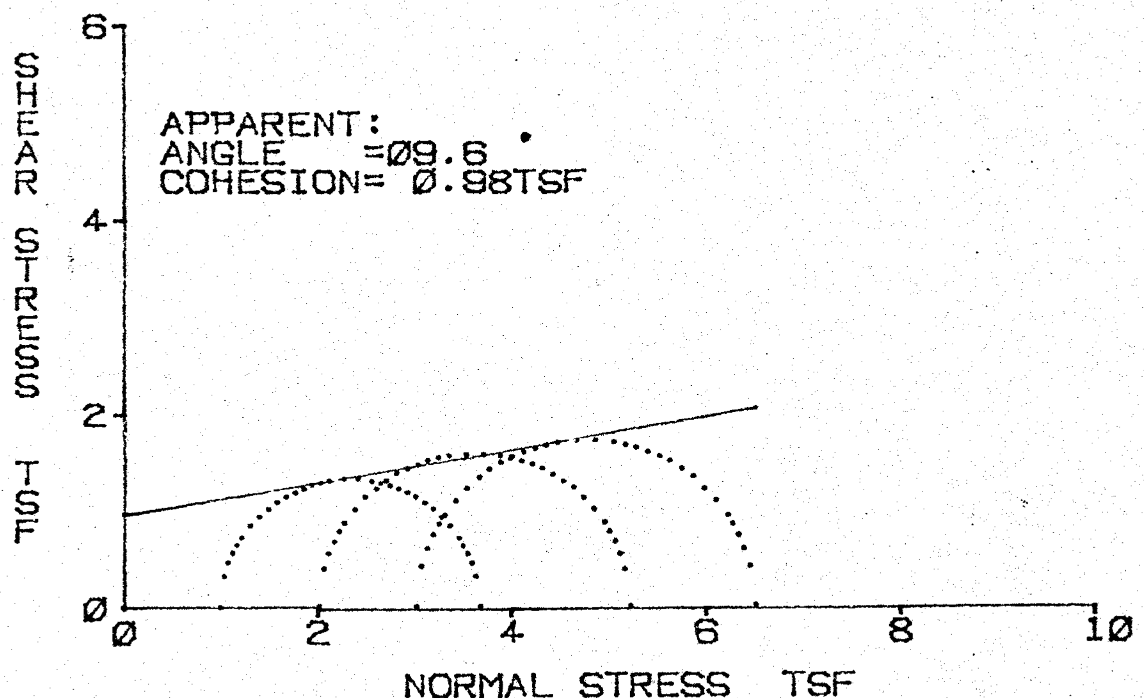
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	14.5	14.4	14.4	0.0
Dry Density(pcf)	114.0	114.2	114.2	0.0
Void Ratio	0.462	0.460	0.460	0.000
Saturation(%)	83.9	83.3	83.3	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	14.4	14.4	14.3	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.73	5.33	6.58	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	19	20	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	10.0	0.99
Effective	--	--

Remarks: Remolded at 3 (%) wet of optimum moisture
and at 95 (%) of maximum unit weight.

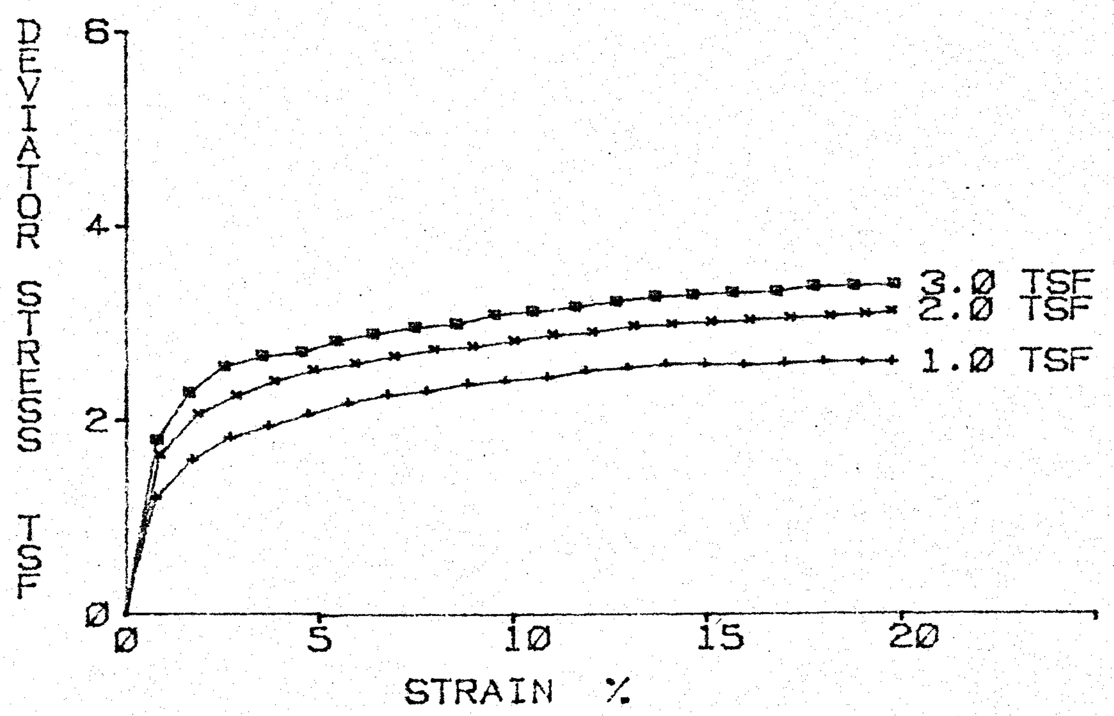
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER N.P.EL. :
FEATURE: Borrow Areas A & B SAMPLE :CLASS I
STATION: PART :
RANGE : SOIL SYM:SC
BORING : DATE :4-30-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT: JOHN SEVIER N.P.EL. :
FEATURE: BORROW AREAS A & B   SAMPLE :CLASS I
STATION: PART :
RANGE :   SOIL SYM: SC
BORING :   DATE :4-30-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER N.P.
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS I
Part :

Tested By : JHD
Computed By: MHD
Checked By : TAL
Report Date: 4-30-81

Soil Sybmbol= SC
Sp. Gr. = 2.67
L.L.(%)= 26
D10(mm)= 0
P.I.(%)= 12

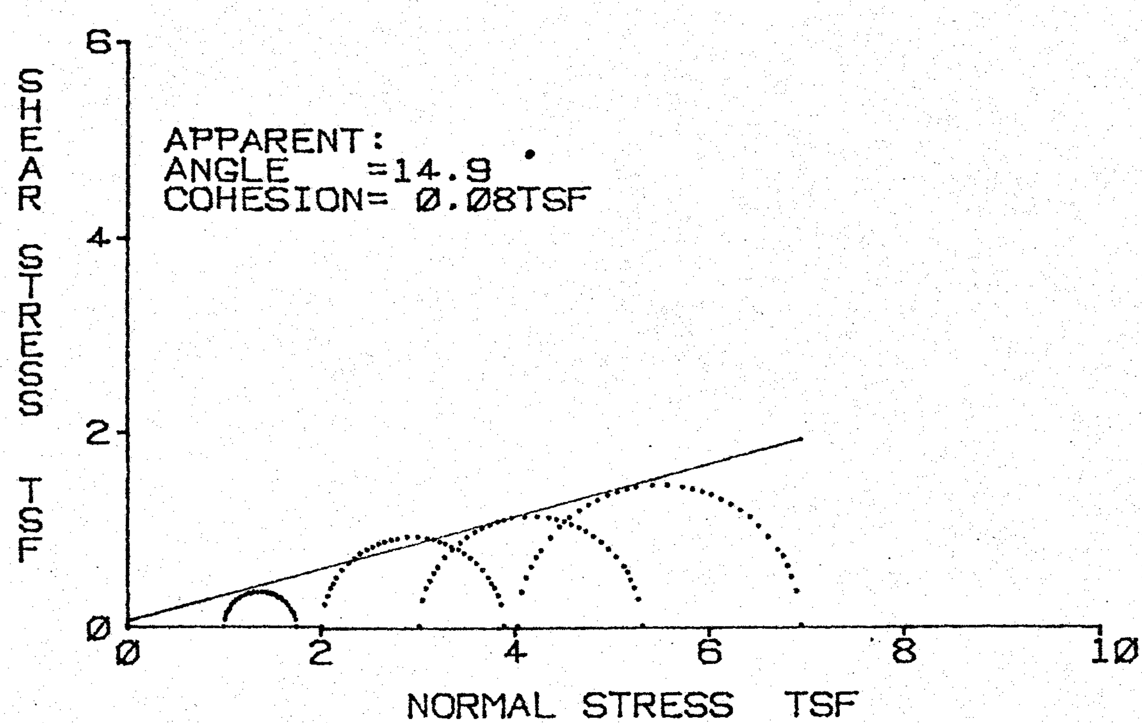
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	14.5	14.5	14.5	0.0
Dry Density(pcf)	114.0	114.0	114.0	0.0
Void Ratio	0.462	0.462	0.462	0.000
Saturation(%)	83.9	83.9	83.9	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	14.3	14.4	14.4	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.69	5.24	6.52	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	20	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

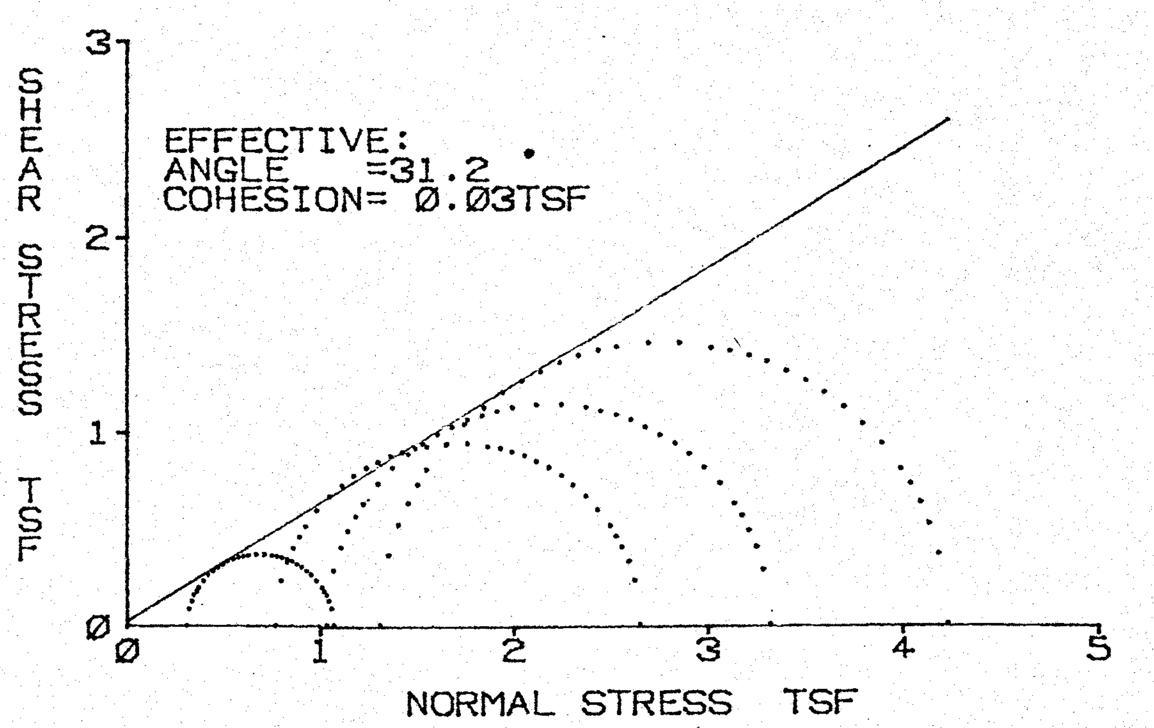
Shear Strength	Deg.	c(tsf)
Apparent	9.6	0.98
Effective	--	--

Remarks: Remolded at 3 (%) wet of optimum moisture
and at 95 (%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

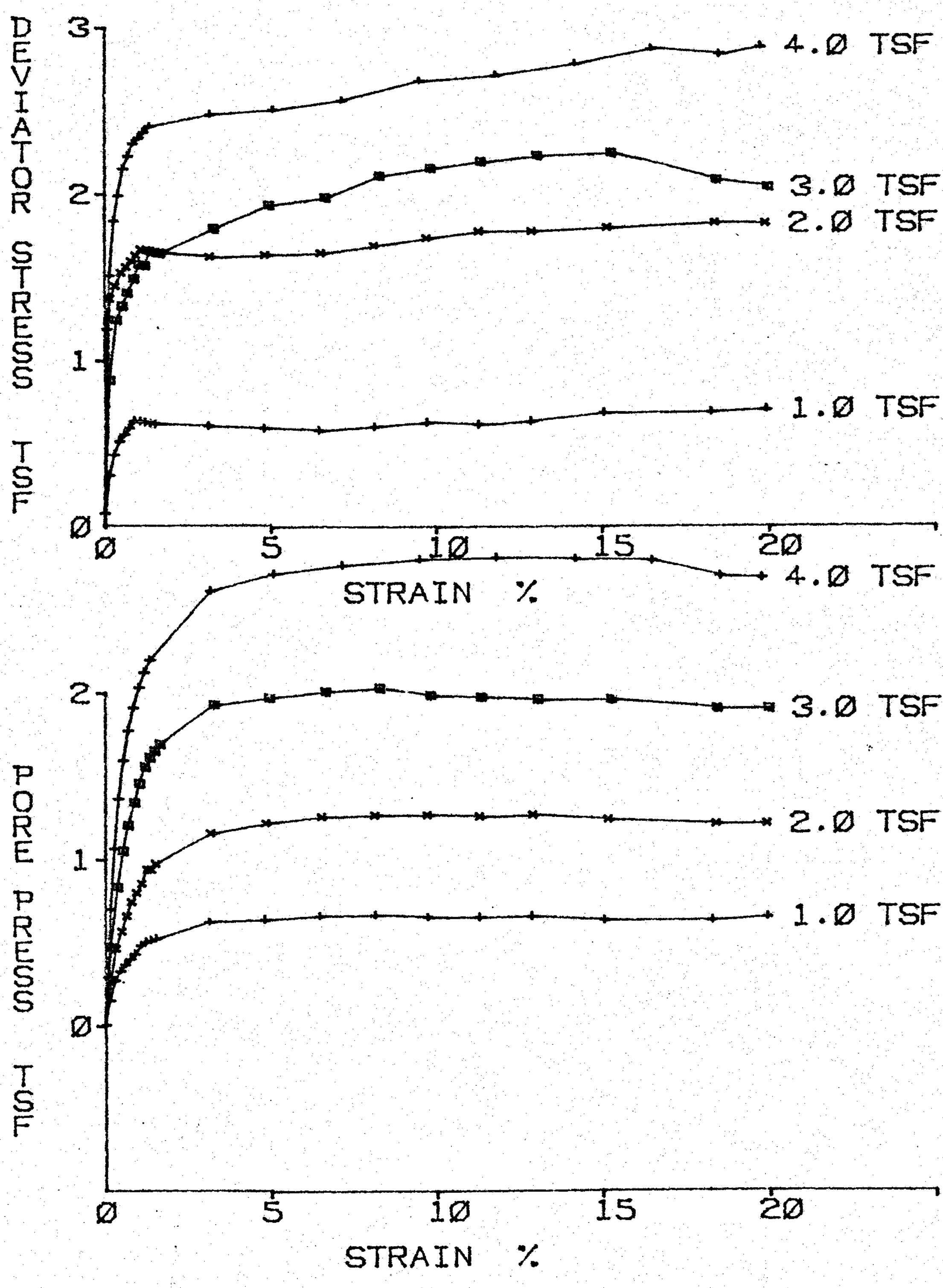
PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: BORROW AREAS A & B
SAMPLE : CLASS I
STATION:
PART :
RANGE :
SOIL SYM: SC
BORING :
DATE : 5-7-81





TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:	JOHN SEVIER S.P.EL.		:
FEATURE:	BORROW AREAS A & B	SAMPLE	:CLASS I
STATION:		PART	:
RANGE :		SOIL SYM:	SC
BORING :		DATE	:5-7-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: BORROW AREAS A & B
Station:
Range :
Boring :

El. :
Sample: CLASS I
Part :

Tested By : TAL
Computed By: MHD
Checked By : GMD
Report Date: 5-7-81

Soil Sybmbol= SC
Sp. Gr. = 2.67

L.L.(%)= 26
D10(mm)= 6.00000000E-04

P.I.(%)= 12

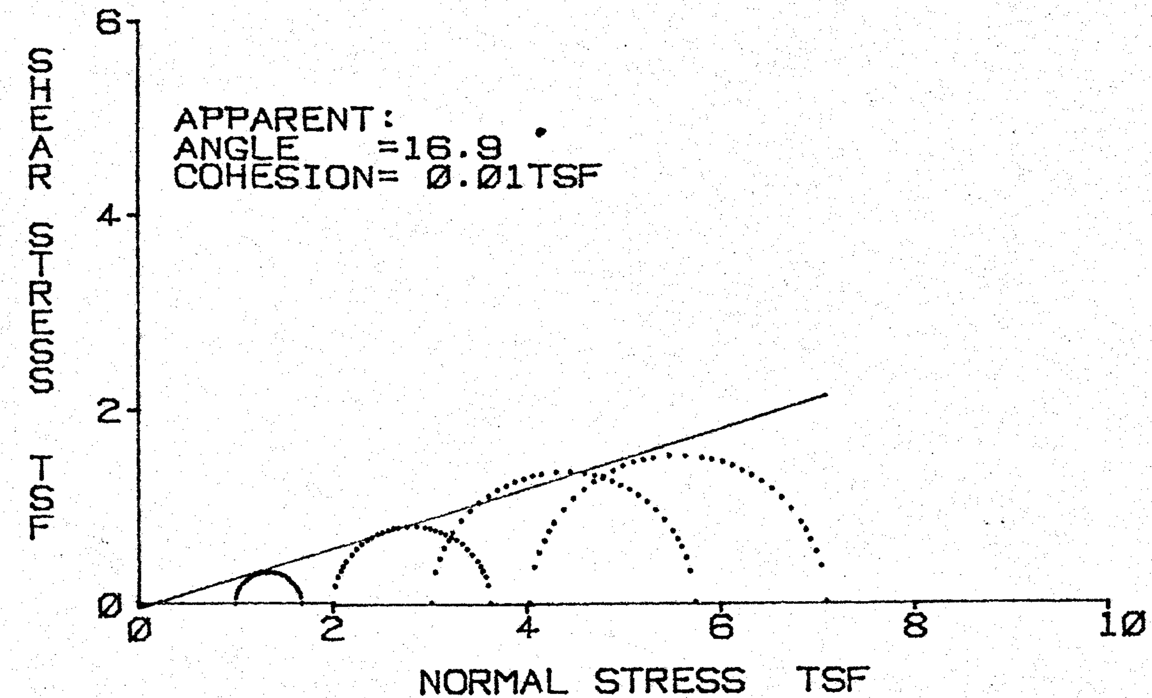
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	8.6	8.6	8.6	8.6
Dry Density(pcf)	114.0	114.0	114.0	114.0
Void Ratio	0.462	0.462	0.462	0.462
Saturation(%)	49.5	49.5	49.5	49.5
Before Shearing:				
Moisture(%) (after satur.)	17.3	17.3	17.3	17.3
Saturation(%)	100.0	100.0	100.0	100.0
Moisture(%) (after cons.)	17.1	17.0	16.3	16.3
Void Ratio (after cons.)	0.457	0.455	0.436	0.451
Final Moisture Content(%)	18.8	17.2	16.3	16.4
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	1.77	3.90	5.32	6.96
Eff. Minor Prin. Stress(tsf)	0.32	0.77	1.04	1.31
Eff. Major Prin. Stress(tsf)	1.07	2.65	3.33	4.24
Time to Failure(min.)	105	100	90	97
Rate of Strain(%/min.)	0.19	0.19	0.17	0.21
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

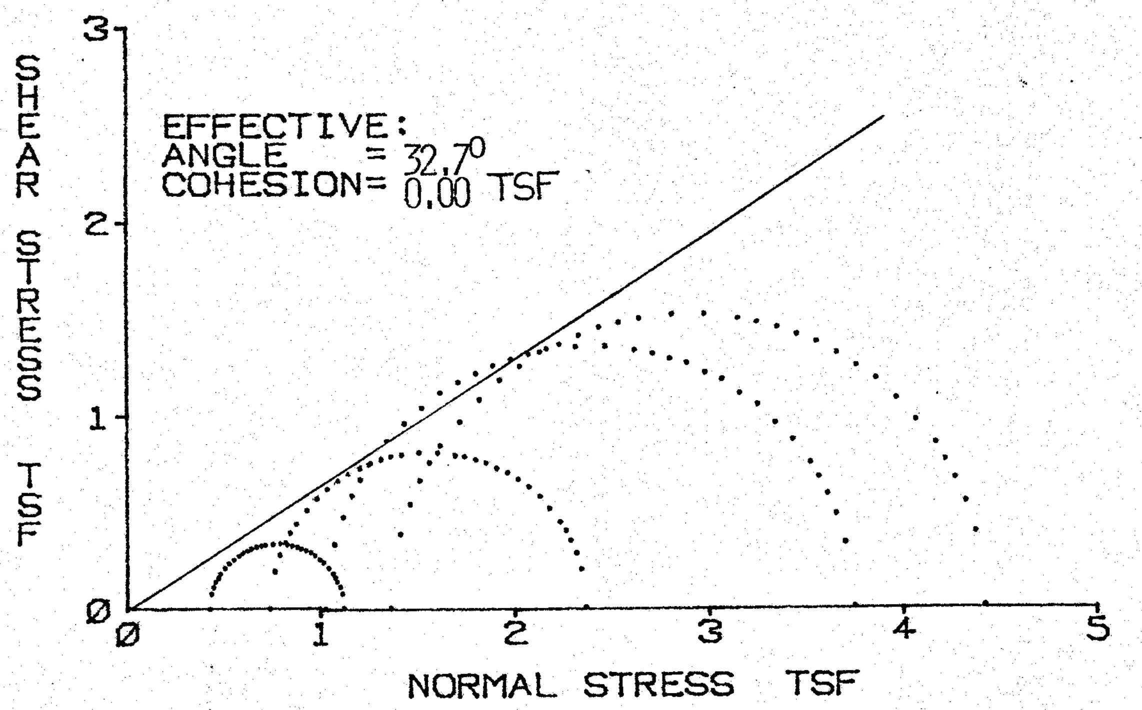
Shear Strength	Deg.	c(tsf)
Apparent	14.9	0.08
Effective	31.2	0.03

Remarks: Remolded at 3 (%) dry of optimum moisture
and at 95 (%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

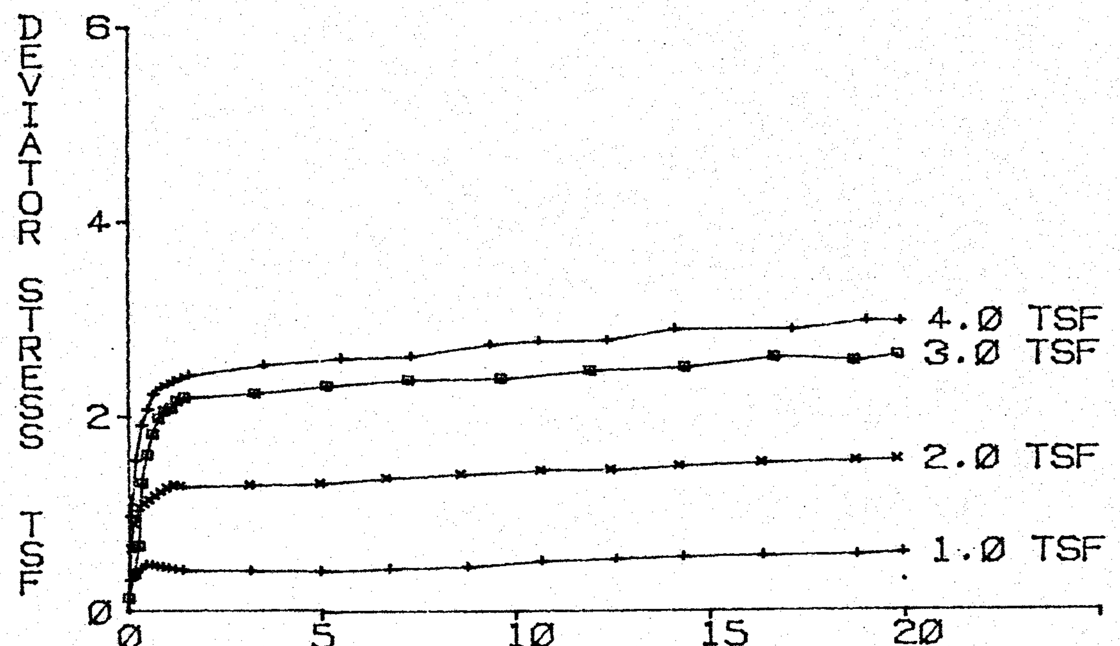
PROJECT: JOHN SEVIER S.P. EL. :
FEATURE: BURROW AREAS A & B SAMPLE : CLASS I
STATION: PART :
RANGE : SOIL SYM: SC
BORING : DATE : 5-7-81

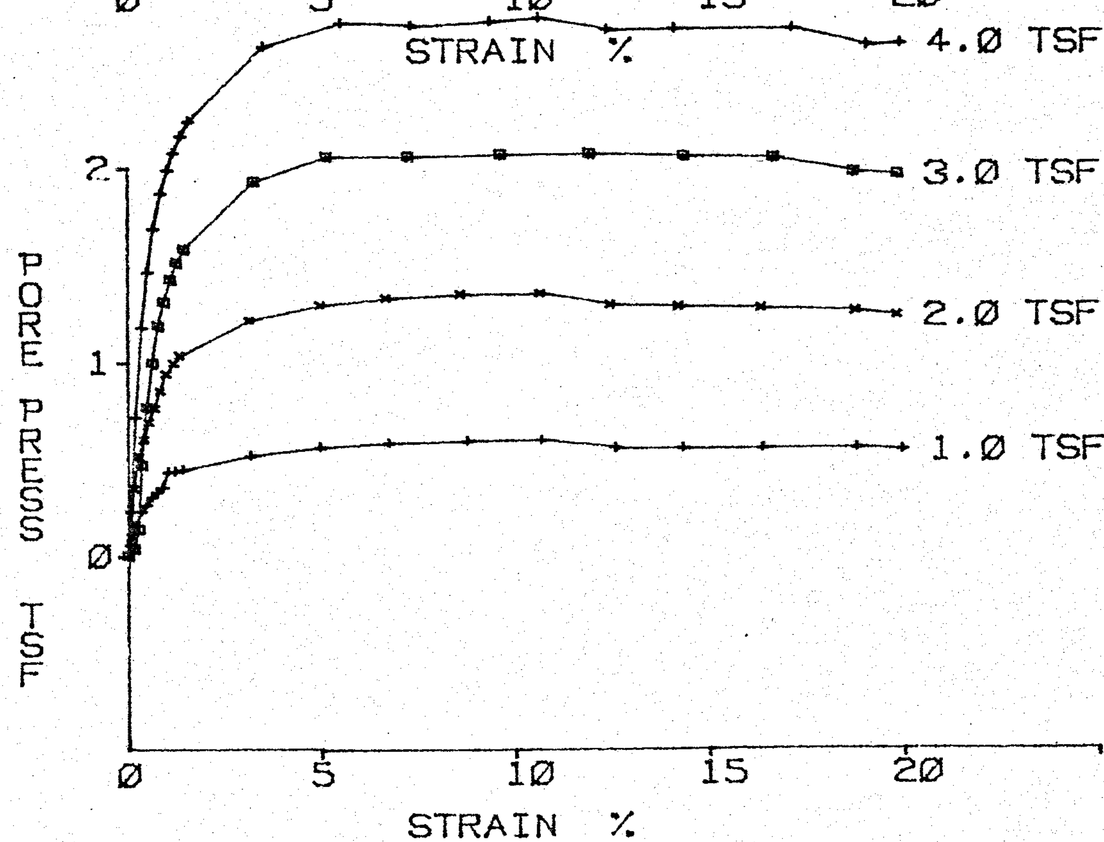




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: BORROW AREAS A & B   SAMPLE :CLASS I
STATION: PART :
RANGE :   SOIL SYM: SC
BORING :   DATE :5-7-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: BORROW AREA A & B		Tested By : TAL
Station:	El. :	Computed By: MHD
Range :	Sample: CLASS I	Checked By : OBG
Boring :	Part :	Report Date: 5-7-81

Soil Sybmbol= SC	L.L.(%)= 26	P.I.(%)= 12
Sp. Gr. = 2.67	D10(mm)= 6.00000000E-04	

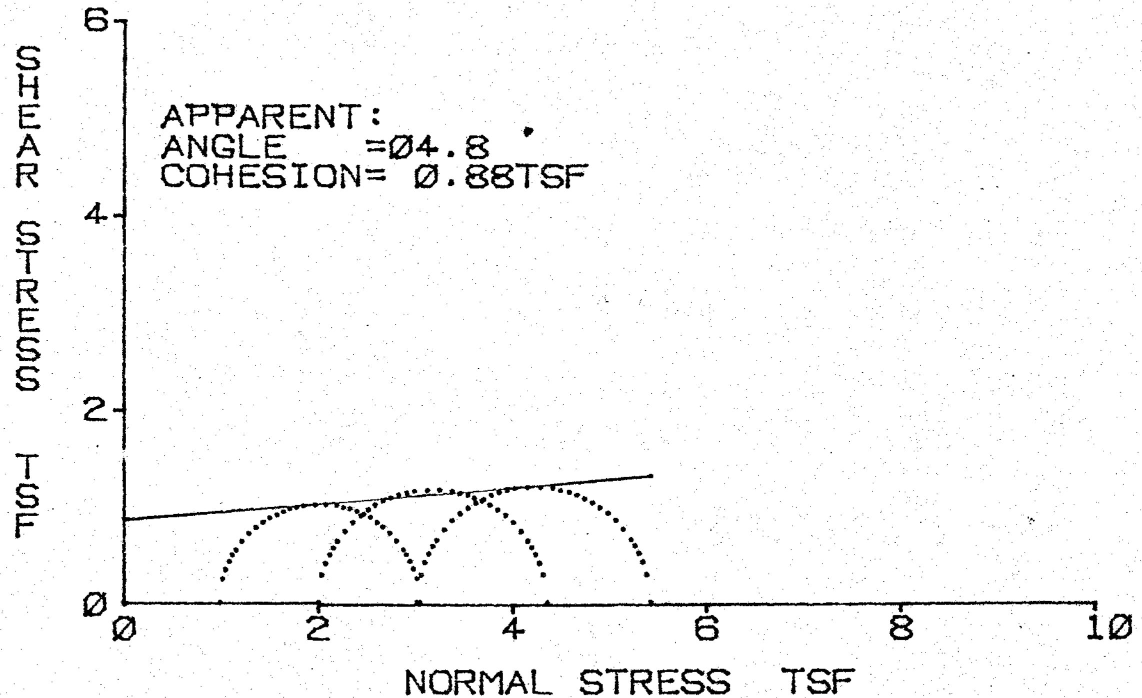
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	8.5	8.5	8.6	8.4
Dry Density(pcf)	114.0	114.0	114.0	114.0
Void Ratio	0.462	0.462	0.462	0.462
Saturation(%)	49.1	49.1	49.5	48.3
Before Shearing:				
Moisture(%) (after satur.)	17.3	17.3	17.3	17.3
Saturation(%)	100.0	100.0	100.0	100.0
Moisture(%) (after cons.)	16.7	16.5	16.8	16.8
Void Ratio (after cons.)	0.445	0.441	0.448	0.445
Final Moisture Content(%)	18.1	17.9	17.0	16.2
Minor Principal Stress(tsf)	1.01	2.02	3.02	4.03
Major Principal Stress(tsf)	1.70	3.65	5.75	7.09
Eff. Minor Prin. Stress(tsf)	0.43	0.74	1.03	1.36
Eff. Major Prin. Stress(tsf)	1.13	2.37	3.75	4.42
Time to Failure(min.)	105	105	97	100
Rate of Strain(%/min.)	0.19	0.19	0.21	0.19
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	16.9	0.01
Effective	32.7	0.00

Remarks: Remolded at 3 (%) dry of optimum moisture
and at 95 (%) of maximum unit weight.

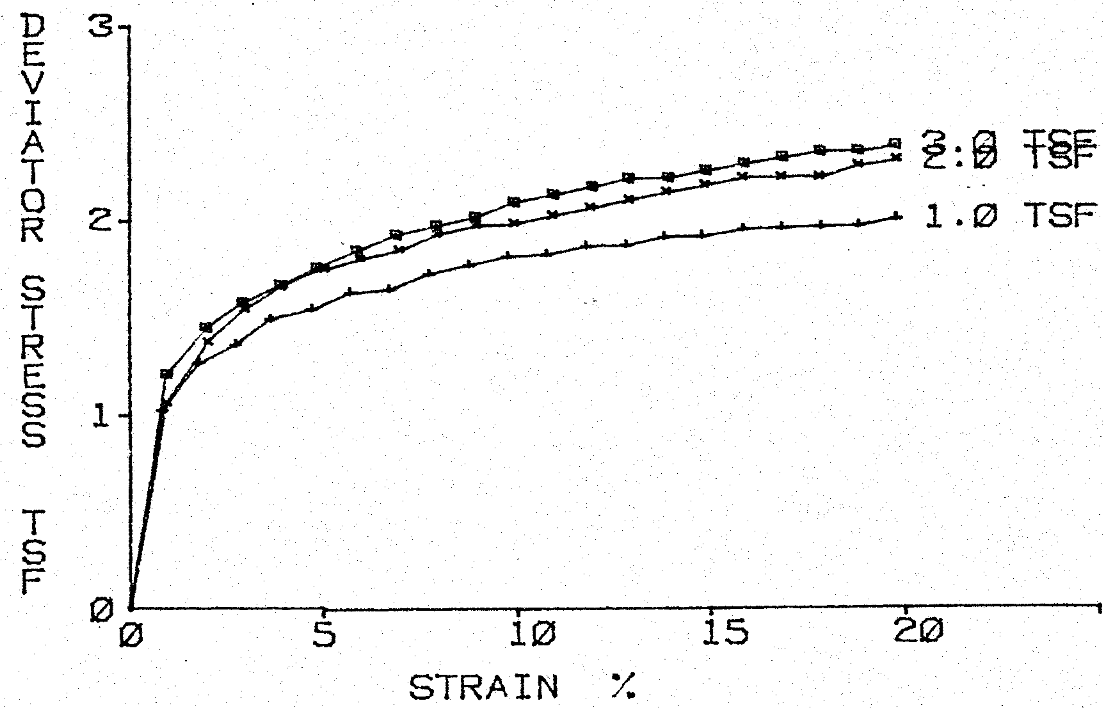
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B SAMPLE : CLASS III
STATION: PART :
RANGE : SOIL SYM: CL
BORING : DATE : 5-6-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT	:JOHN SEVIER S.P.EL.		:
FEATURE	:Borrow Areas A & B	SAMPLE	:CLASS III
STATION	:	PART	:
RANGE	:	SOIL SYM	:CL
BORING	:	DATE	:5-6-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS III
Part :

Tested By : EL
Computed By: MHD
Checked By : CLG
Report Date: 5-6-81

Soil Sybmbol= CL
Sp. Gr. = 2.68

L.L.(%)= 36
D10(mm)= 0

P.I.(%)= 19

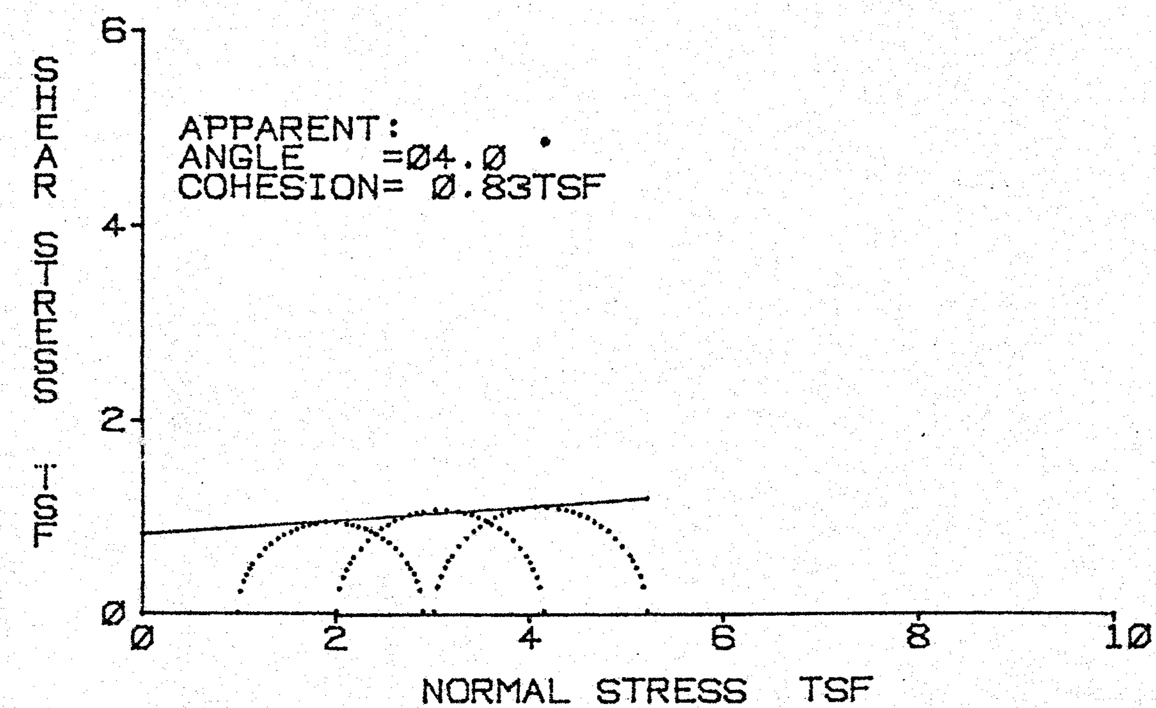
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	19.2	19.2	19.0	0.0
Dry Density(pcf)	105.7	105.7	105.8	0.0
Void Ratio	0.583	0.583	0.581	0.000
Saturation(%)	88.3	88.3	87.8	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	19.0	19.1	18.9	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.06	4.37	5.44	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	20	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	4.8	0.88
Effective	--	--

Remarks: Remolded at 3% wet of optimum moisture and at 95% of maximum unit weight.

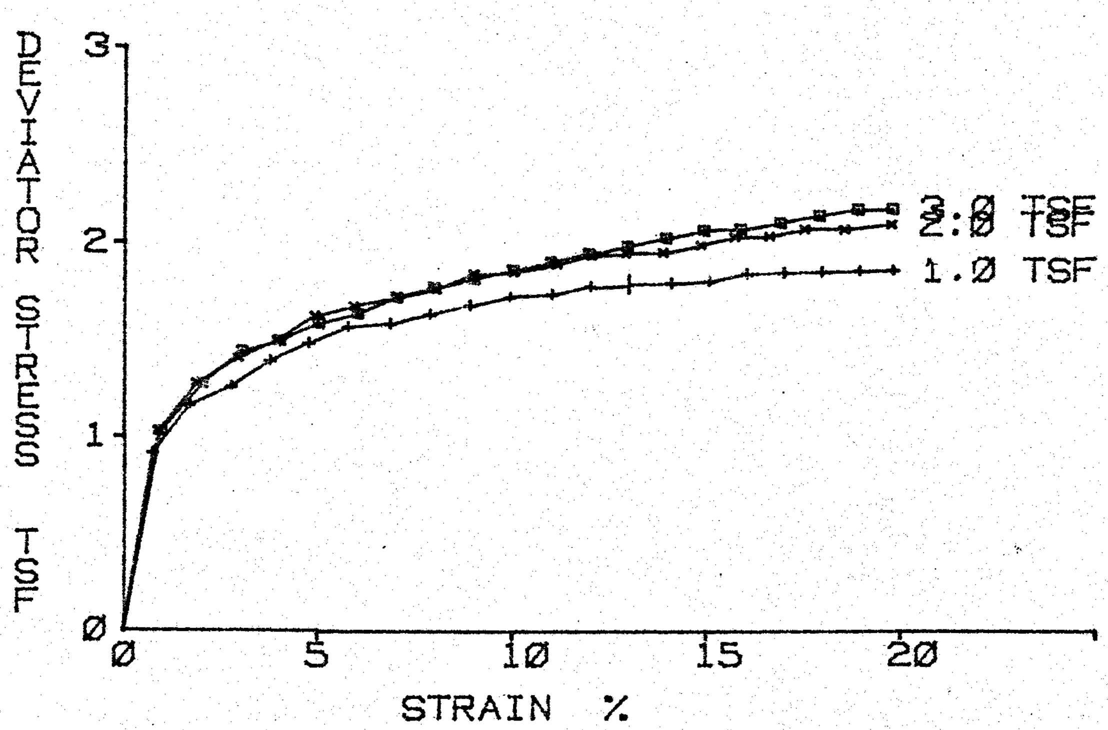
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B SAMPLE :CLASS III
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :5-5-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE:Borrow Areas A & B SAMPLE :CLASS III
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :5-5-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS III
Part :

Tested By : EL
Computed By: MHD
Checked By : CBG
Report Date: 5-5-81

Soil Sybmbol= CL
Sp. Gr. = 2.68
L.L.(%)= 36
D10(mm)= 0
P.I.(%)= 19

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	19.4	19.2	19.3	0.0
Dry Density(pcf)	105.6	105.7	105.6	0.0
Void Ratio	0.585	0.583	0.584	0.000
Saturation(%)	88.8	88.3	88.6	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	19.2	19.1	19.1	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.91	4.16	5.23	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	20	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

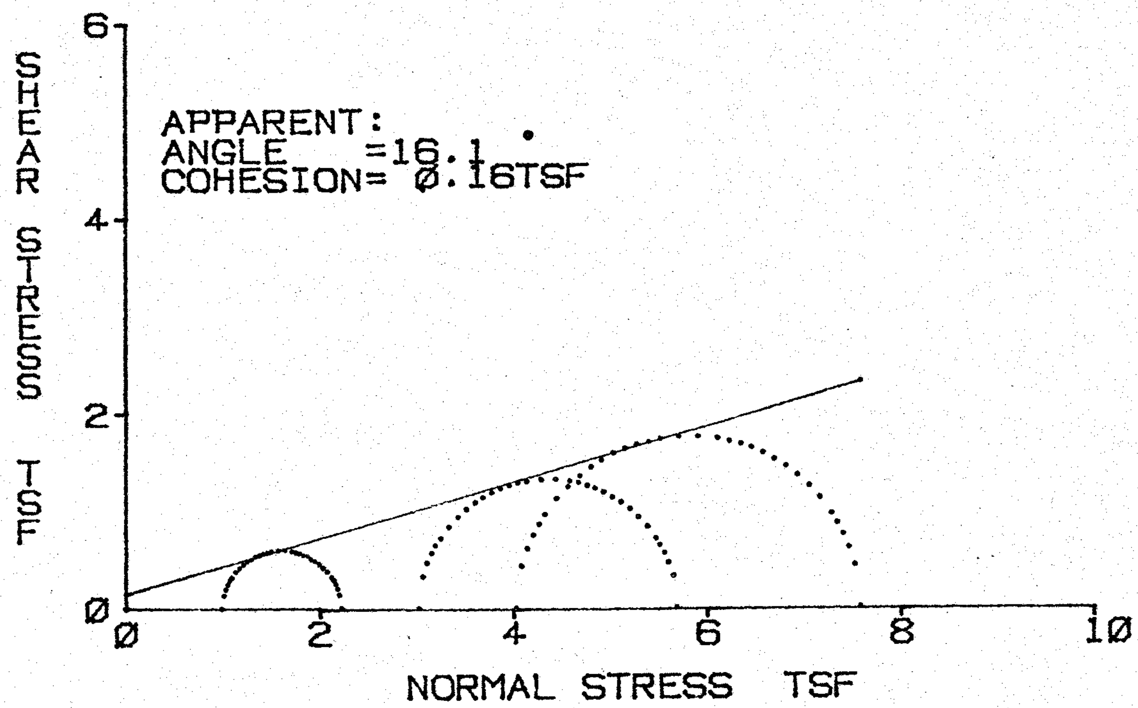
Shear Strength	Deg.	c(tsf)
Apparent	4.0	0.83
Effective	--	--

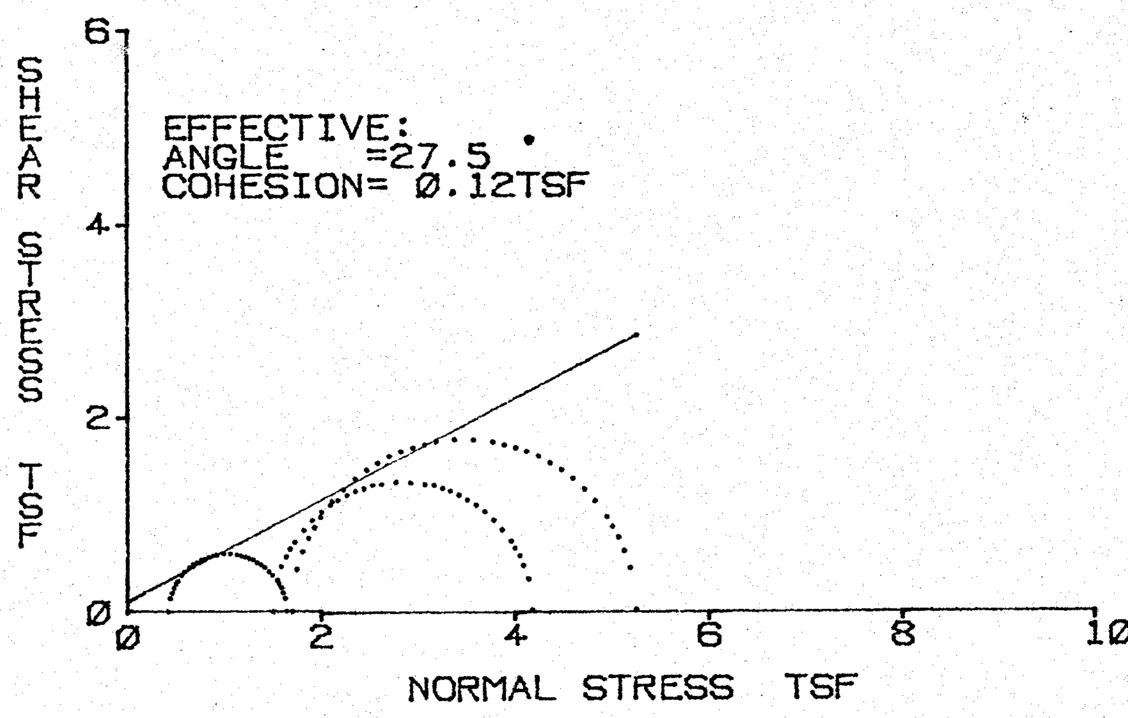
Remarks: Remolded at 3% wet of optimum moisture and at 95% of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER SP
FEATURE: BORROW AREAS A & B
STATION:
RANGE :
BORING :

EL. :
SAMPLE :CLASS III
PART :
SOIL SYM:CL
DATE :7/Ø7/81

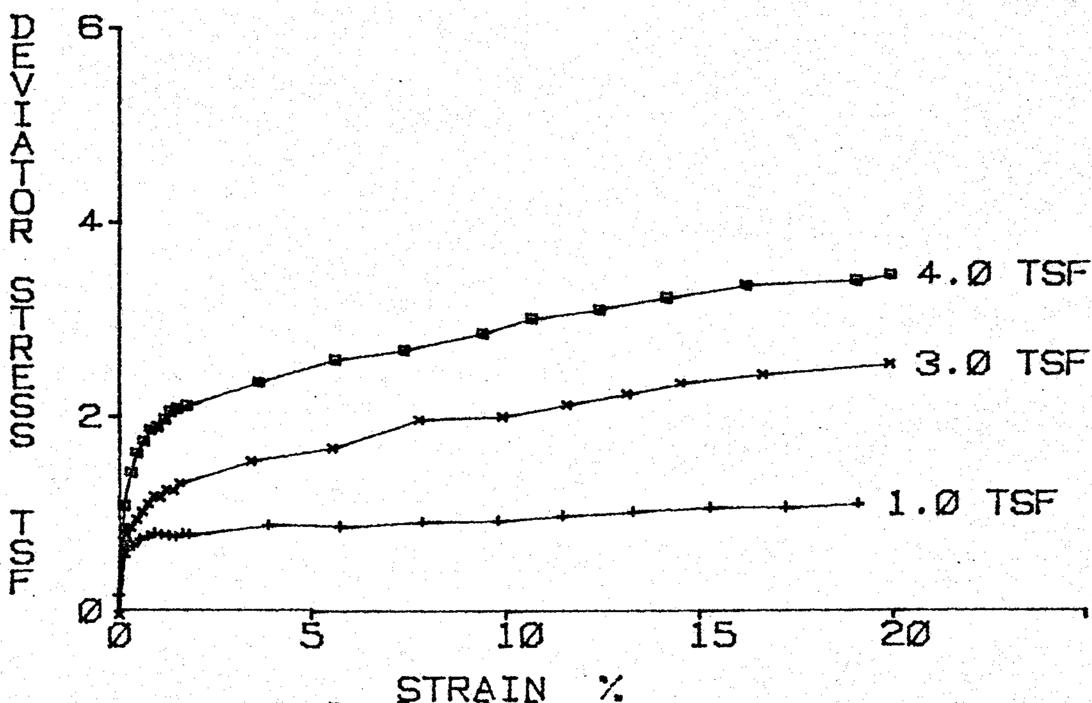


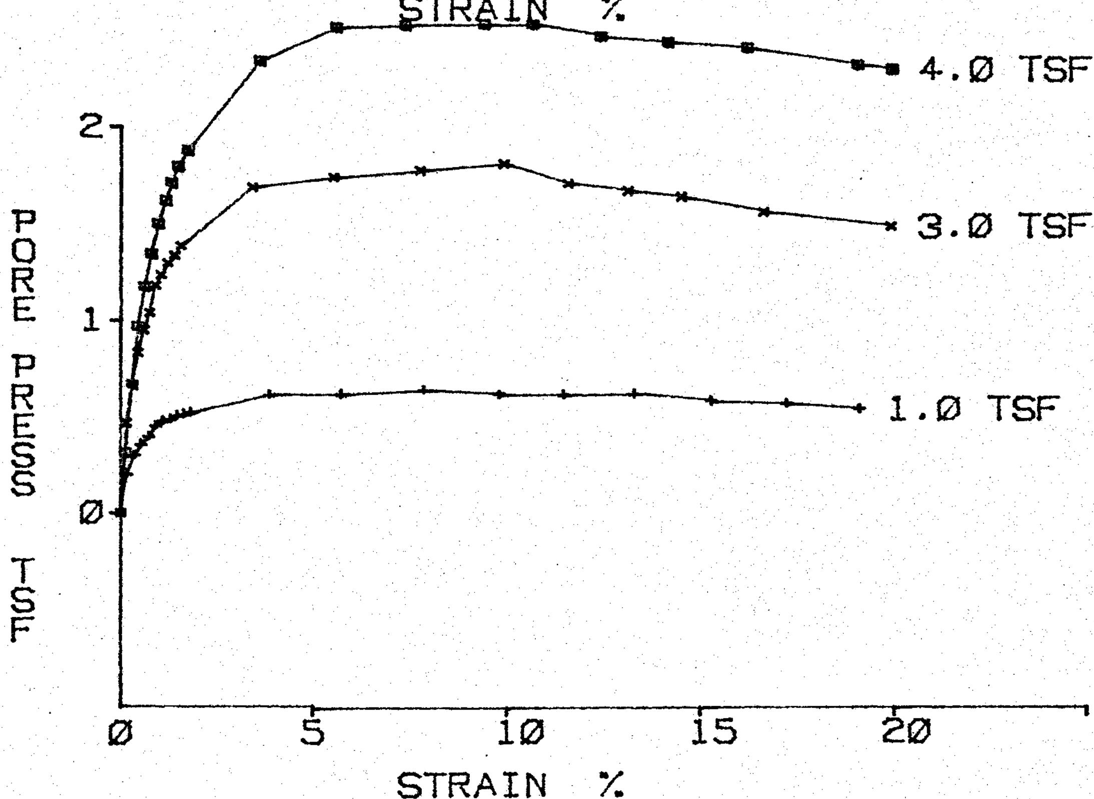


TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER SP
FEATURE: BORROW AREAS A & B
STATION:
RANGE :
BORING :

EL. :
SAMPLE : CLASS III
PART :
SOIL SYM: CL
DATE : 7/07/81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP
Feature: BORROW AREAS A & B
Station:
Range :
Boring :

El. :
Sample: CLASS III
Part :

Tested By : JHD
Computed By: CRF
Checked By : CRF
Report Date: 7/07/81

Soil Sybmbol= CL
Sp. Gr. = 2.68
L.L.(%)= 36
D10(mm)= 0
P.I.(%)= 19

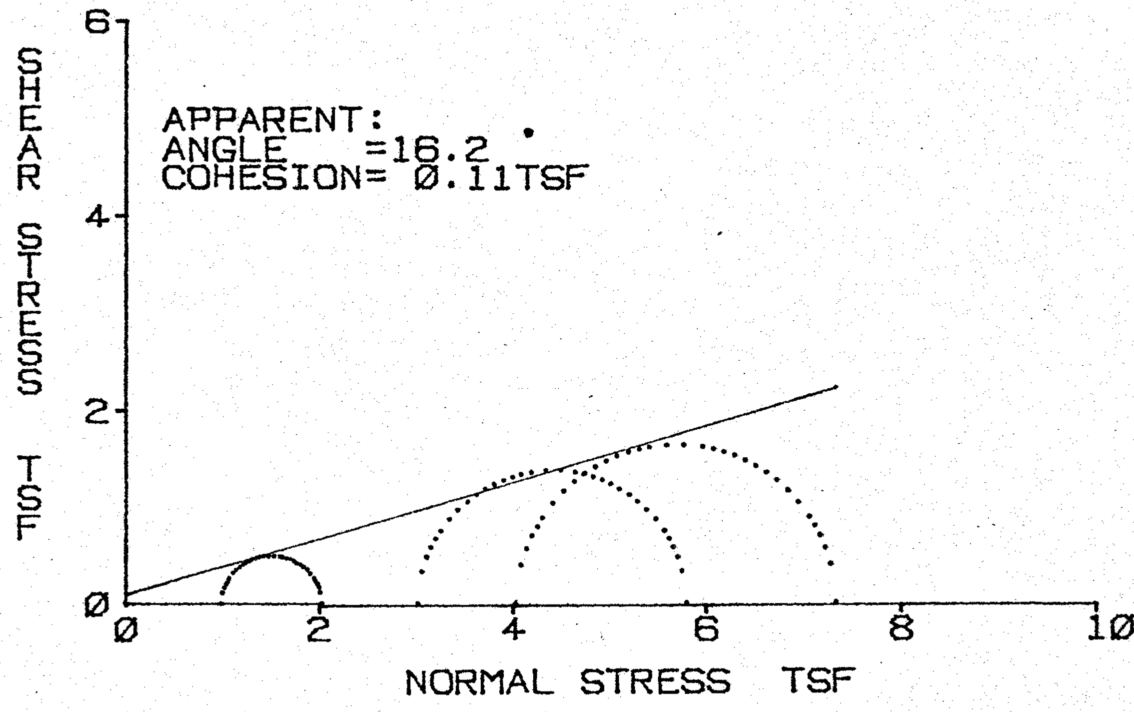
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	12.9	13.1	13.1	0.0
Dry Density(pcf)	106.0	105.8	105.8	0.0
Void Ratio	0.579	0.581	0.581	0.000
Saturation(%)	59.7	60.2	60.2	0.0
Before Shearing:				
Moisture(%) (after satur.)	21.6	21.7	21.7	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	19.9	20.7	20.9	20.9
Void Ratio (after cons.)	0.533	0.556	0.560	0.000
Final Moisture Content(%)	21.4	18.5	18.7	0.0
Minor Principal Stress(tsf)	1.01	3.02	4.03	0.00
Major Principal Stress(tsf)	2.23	5.70	7.59	0.00
Eff. Minor Prin. Stress(tsf)	0.43	1.51	1.71	0.00
Eff. Major Prin. Stress(tsf)	1.65	4.19	5.26	0.00
Time to Failure(min.)	100	100	103	0
Rate of Strain(%/min.)	0.19	0.20	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

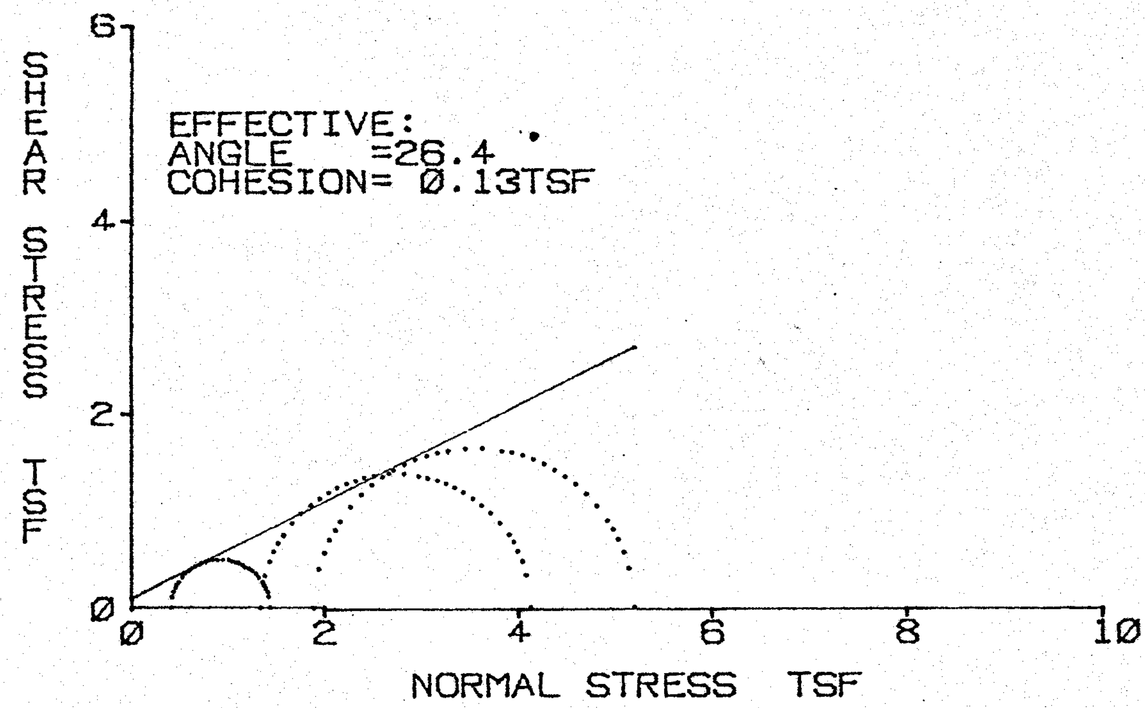
Shear Strength	Deg.	c(tsf)
Apparent	16.1	0.16
Effective	27.5	0.12

Remarks: Remolded at 3 (%) dry of optimum moisture
and at 95 (%) of maximum unitweight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

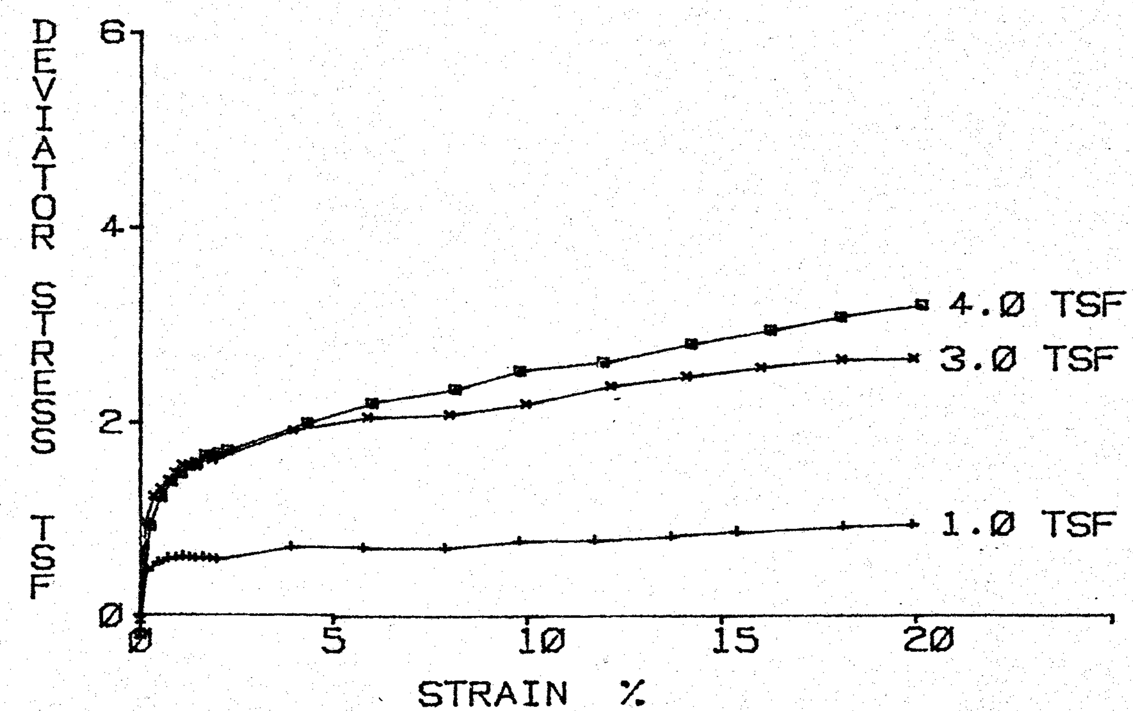
PROJECT:JOHN SEVIER SP	EL. :
FEATURE: BURROW AREAS A & B	SAMPLE :CLASS III
STATION:	PART :
RANGE :	SOIL SYM:CL
BORING :	DATE :7/Ø6/81

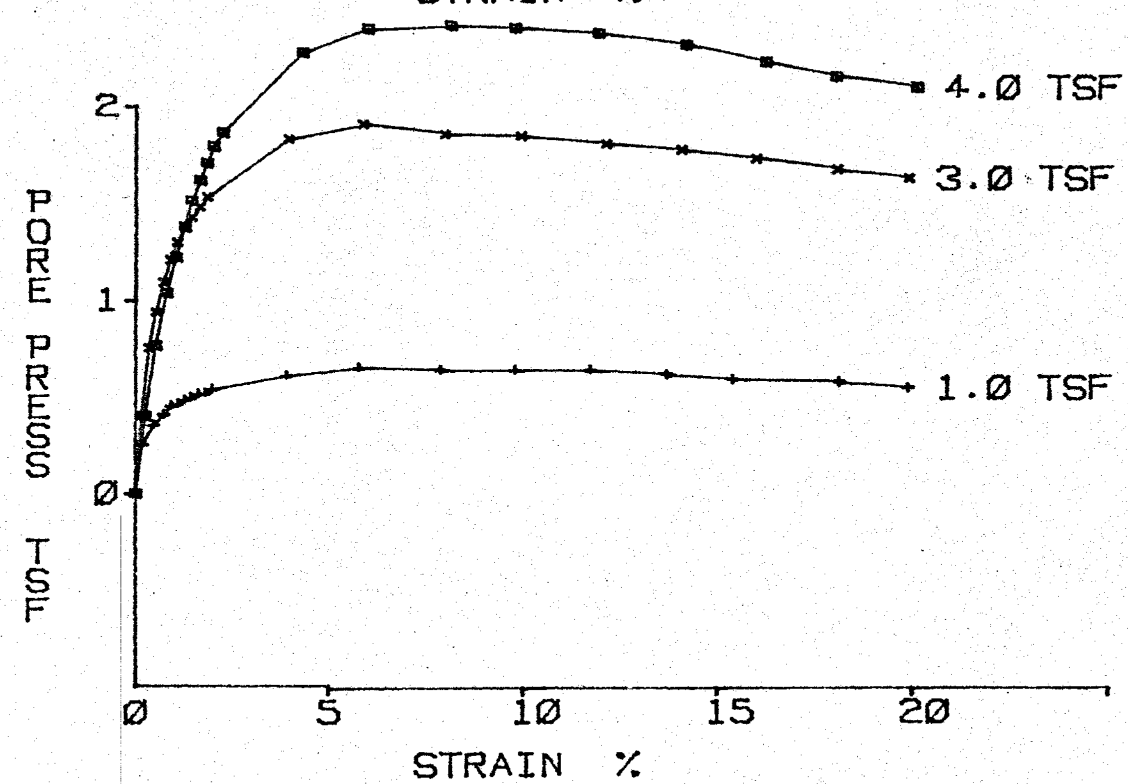




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:	JOHN SEVIER SP	EL.	:
FEATURE:	BORROW AREAS A & B	SAMPLE	:CLASS III
STATION:		PART	:
RANGE :		SOIL SYM:	CL
BORING :		DATE	:7/06/81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP
Feature: BORROW AREAS A & B
Station:
Range :
Boring :

El. :
Sample: CLASS III
Part :

Tested By : JHD
Computed By: CRF
Checked By : CBG
Report Date: 7/06/81

Soil Sybmbol= CL
Sp. Gr. = 2.68

L.L.(%)= 36
D10(mm)= 0

P.I.(%)= 19

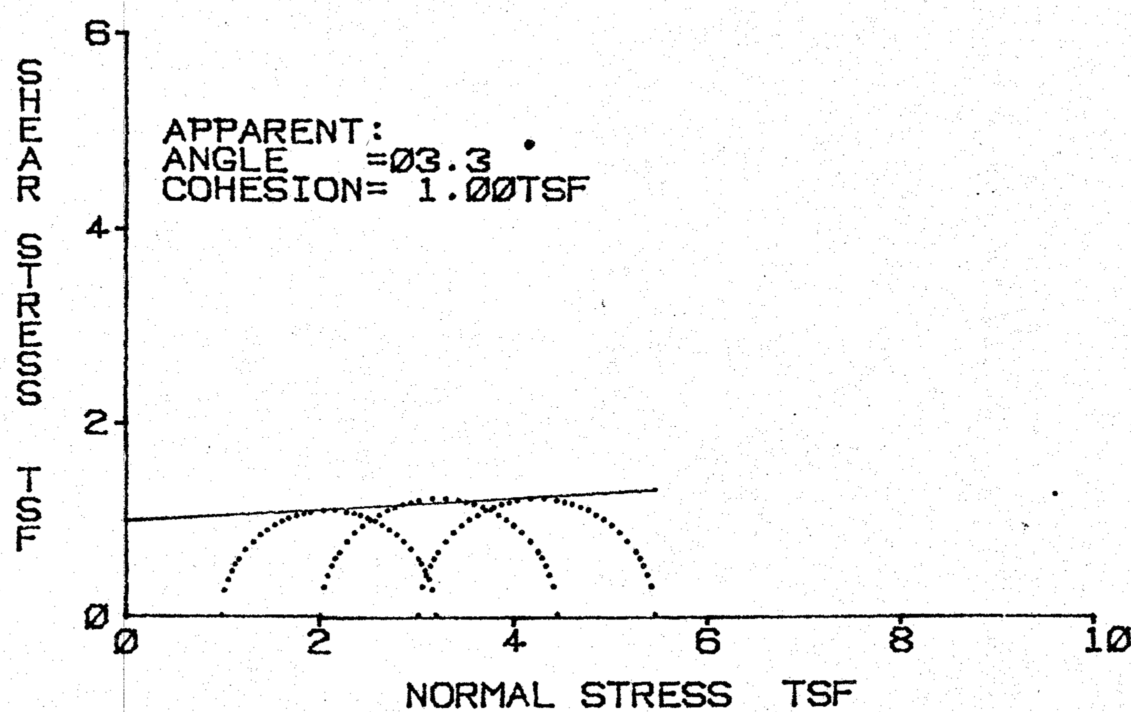
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	12.9	13.1	13.4	0.0
Dry Density(pcf)	106.0	105.8	105.5	0.0
Void Ratio	0.579	0.581	0.586	0.000
Saturation(%)	59.7	60.2	61.3	0.0
Before Shearing:				
Moisture(%) (after satur.)	21.6	21.7	21.9	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	20.5	19.5	18.8	18.8
Void Ratio (after cons.)	0.549	0.522	0.504	0.000
Final Moisture Content(%)	21.7	18.4	19.2	0.0
Minor Principal Stress(tsf)	1.01	3.02	4.03	0.00
Major Principal Stress(tsf)	2.05	5.81	7.35	0.00
Eff. Minor Prin. Stress(tsf)	0.42	1.35	1.89	0.00
Eff. Major Prin. Stress(tsf)	1.46	4.14	5.21	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.20	0.20	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	16.2	0.11
Effective	26.4	0.13

Remarks: Remolded at 3 (%) dry of optimum moisture
and at 95 (%) of maximum unitweight.

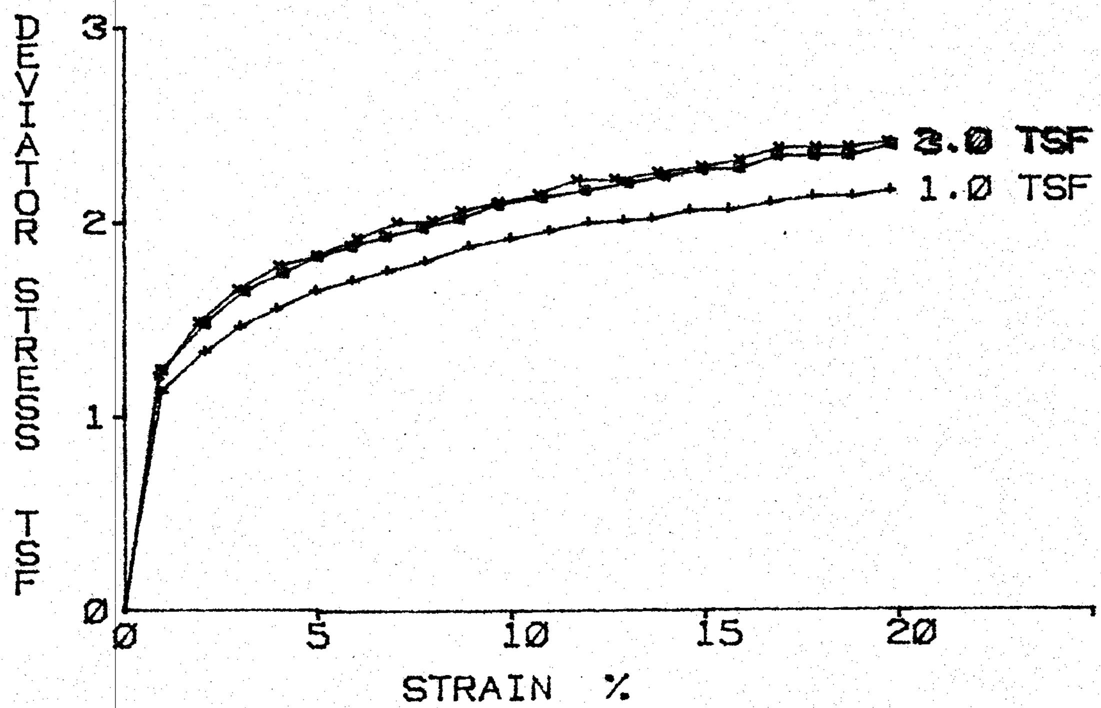
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B SAMPLE :CLASS IV
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :6-15-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE:Borrow Areas A & B SAMPLE :CLASS IV
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :6-15-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS IV
Part :

Tested By : RA
Computed By: MHD
Checked By : GMD
Report Date: 6-15-81

Soil Sybmbol= CL
Sp. Gr. = 2.69

L.L.(%)= 42
D10(mm)= 0

P.I.(%)= 23

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	20.9	20.9	21.1	0.0
Dry Density(pcf)	102.1	102.1	102.0	0.0
Void Ratio	0.644	0.644	0.647	0.000
Saturation(%)	87.5	87.5	87.9	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	20.9	20.9	21.1	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.21	4.46	5.47	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	20	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

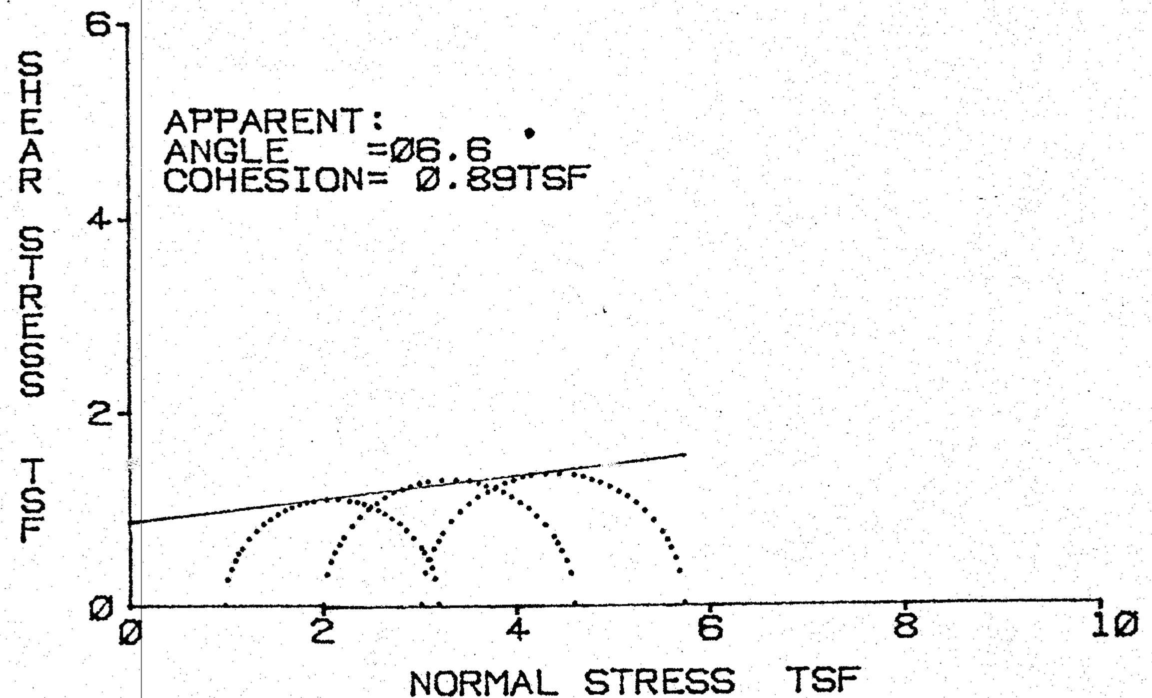
Shear Strength	Deg.	c(tsf)
Apparent	3.3	1.00
Effective	--	--

Remarks: Remolded at 3% wet of optimum moisture and at 95% of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY

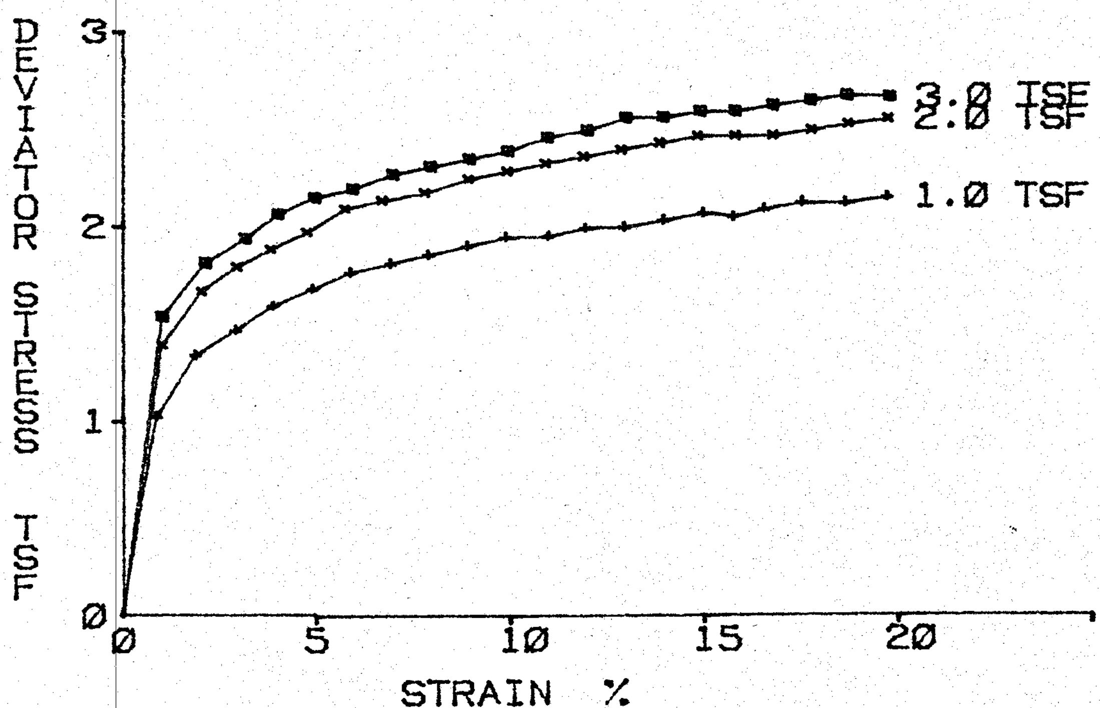
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B   SAMPLE :CLASS IV
STATION: PART :
RANGE :   SOIL SYM:CL
BORING :   DATE :6-15-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B   SAMPLE :CLASS IV
STATION: PART :
RANGE :   SOIL SYM: CL
BORING :   DATE :6-15-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS IV
Part :

Tested By : RA
Computed By: MHD
Checked By : GMD
Report Date: 6-15-81

Soil Sybmbol= CL
Sp. Gr. = 2.69
L.L.(%)= 42
D10(mm)= 0
P.I.(%)= 23

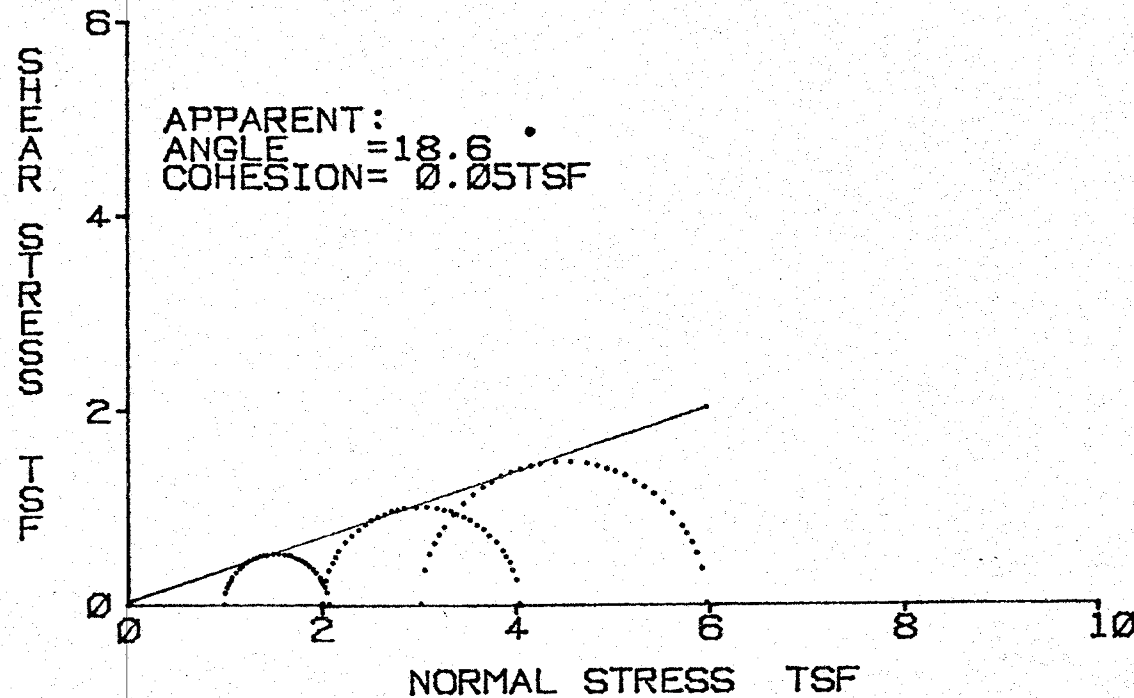
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	21.0	20.9	20.9	0.0
Dry Density(pcf)	102.1	102.2	102.2	0.0
Void Ratio	0.646	0.643	0.643	0.000
Saturation(%)	87.7	87.2	87.2	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	21.0	20.8	20.8	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.21	4.61	5.75	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	20	19	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

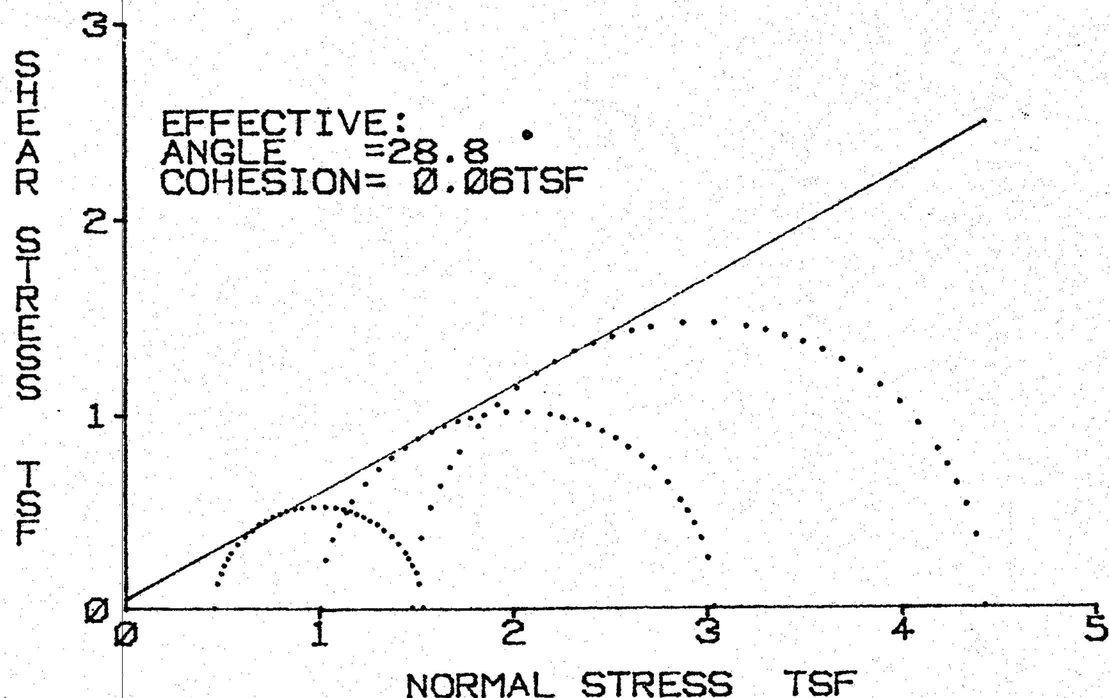
Shear Strength	Deg.	c(tsf)
Apparent	6.6	0.89
Effective	--	--

Remarks: Remolded at 3% wet of optimum moisture and at 95% of maximum unit weig

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

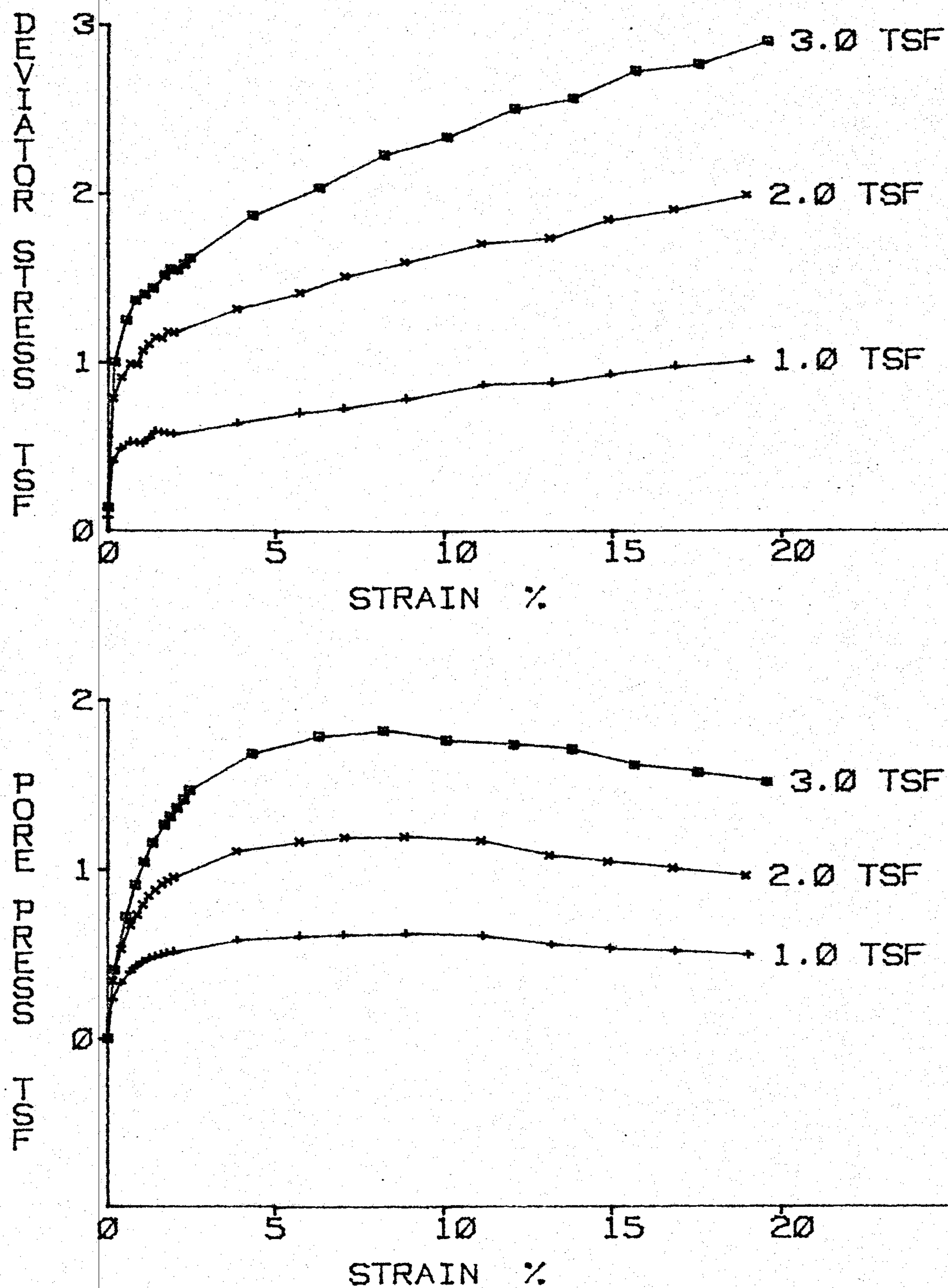
PROJECT:	JOHN SEVIER SP	EL.	:
FEATURE:	BORROW AREAS A & B	SAMPLE	:CLASS IV
STATION:		PART	:
RANGE :		SOIL SYM:	CL
BORING :		DATE	:7/10/81





TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER SP
FEATURE: BORROW AREAS A & B
STATION:
RANGE :
BORING :
EL. :
SAMPLE : CLASS IV
PART :
SOIL SYM: CL
DATE : 7/10/81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP
Feature: BORROW AREAS A & B
Station:
Range :
Boring :

El. :
Sample: CLASS IV
Part :

Tested By : TAL
Computed By: CRF
Checked By : ℓBG
Report Date: 7/10/81

Soil Sybmbol= CL
Sp. Gr. = 2.69

L.L.(%)= 42
D10(mm)= 0

P.I.(%)= 23

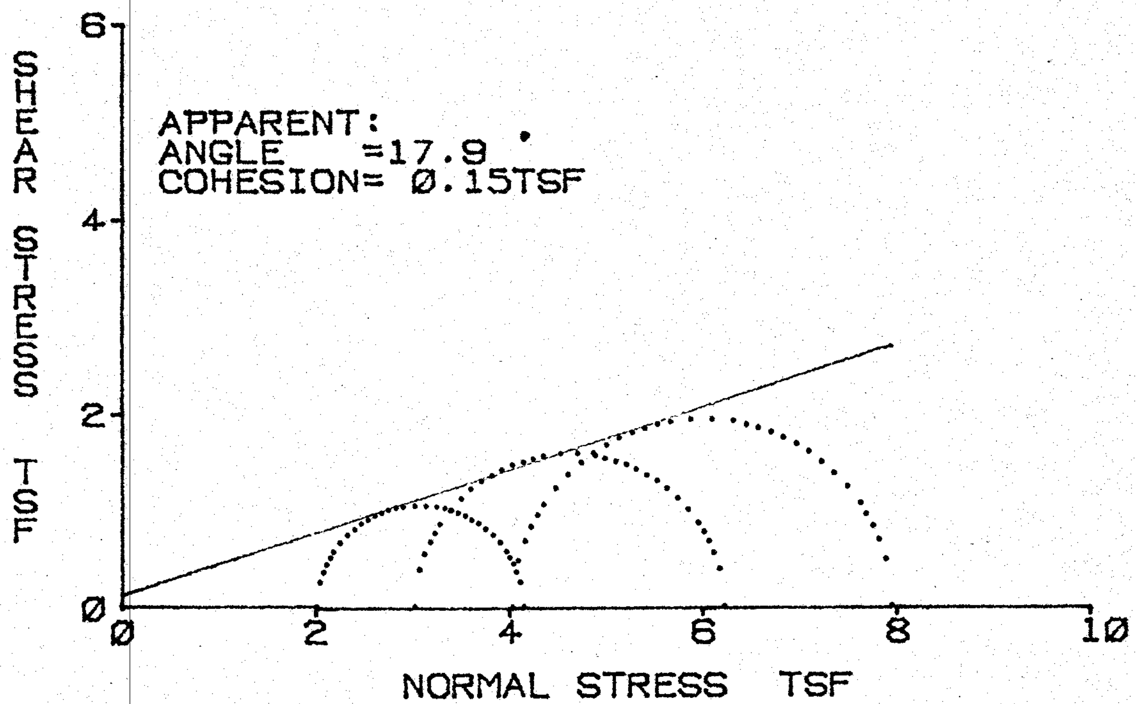
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	15.5	15.5	15.5	0.0
Dry Density(pcf)	101.7	101.7	101.7	0.0
Void Ratio	0.652	0.652	0.652	0.000
Saturation(%)	64.0	64.0	64.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	24.2	24.2	24.2	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	23.2	23.2	23.2	23.2
Void Ratio (after cons.)	0.624	0.624	0.625	0.000
Final Moisture Content(%)	23.5	21.7	20.6	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.08	4.05	5.98	0.00
Eff. Minor Prin. Stress(tsf)	0.47	1.01	1.48	0.00
Eff. Major Prin. Stress(tsf)	1.54	3.04	4.44	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.19	0.19	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

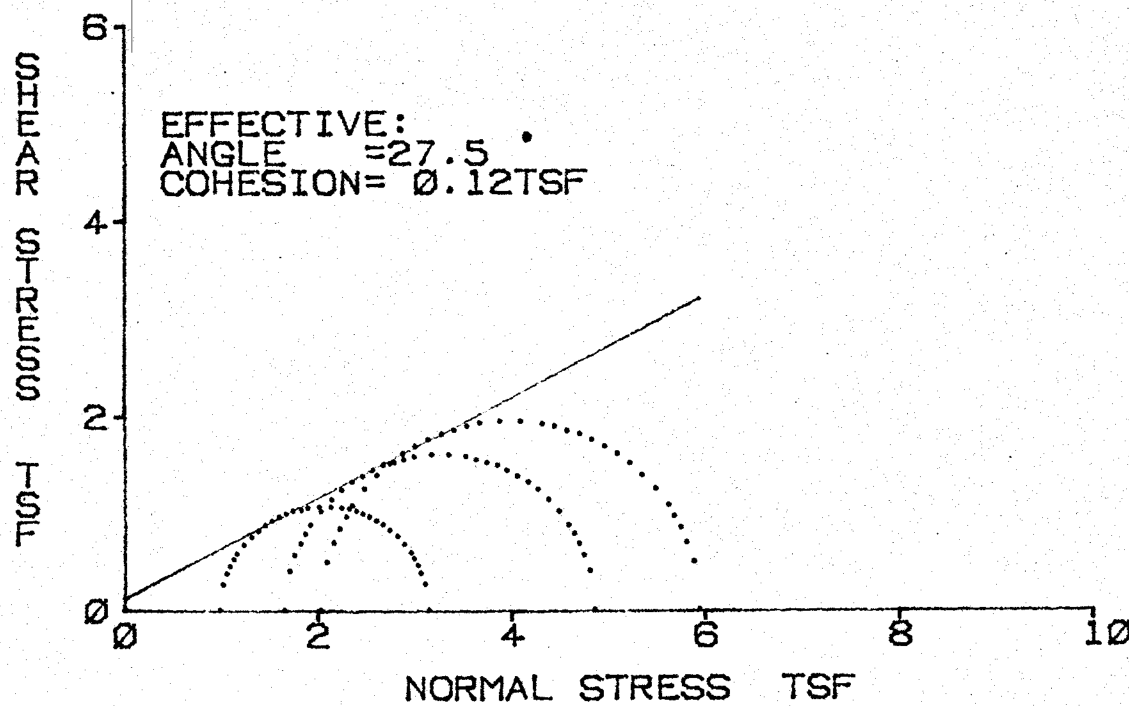
Shear Strength	Deg.	c(tsf)
Apparent	18.6	0.05
Effective	28.8	0.06

Remarks: Remolded at 3 (%) dry of optimum moisture
and at 95 (%) of maximum unitweight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT	:JOHN SEVIER SP	EL.	:
FEATURE	: BORROW AREAS A & B	SAMPLE	:CLASS IV
STATION	:	PART	:
RANGE	:	SOIL SYM	:CL
BORING	:	DATE	:6/24/81

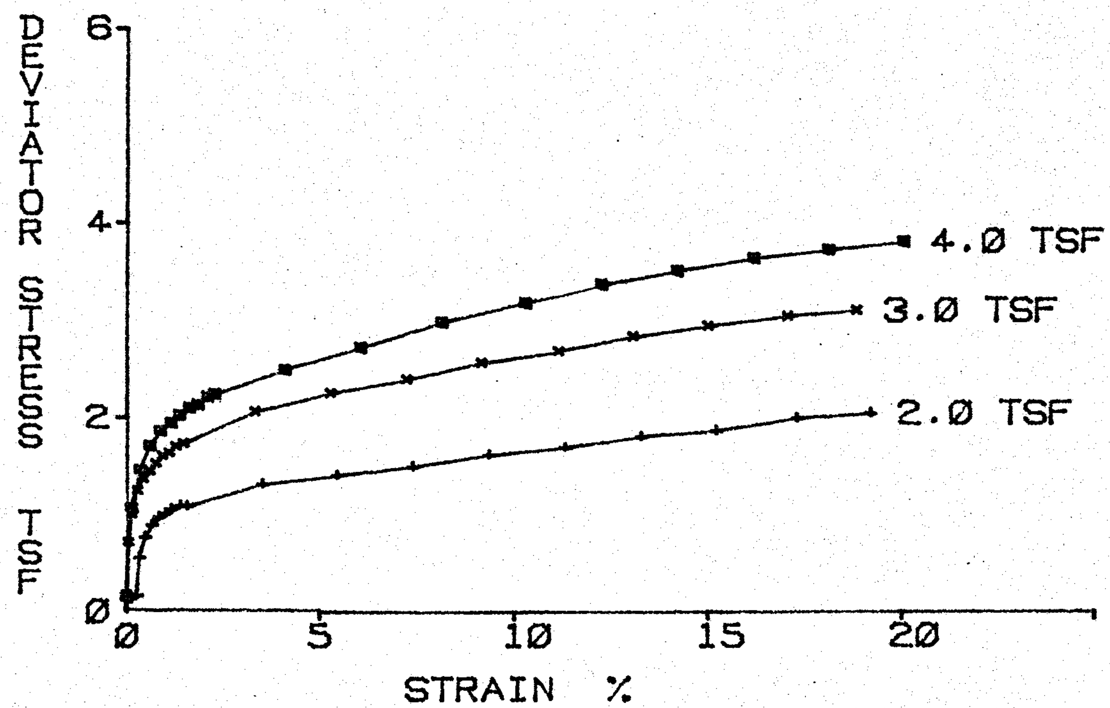


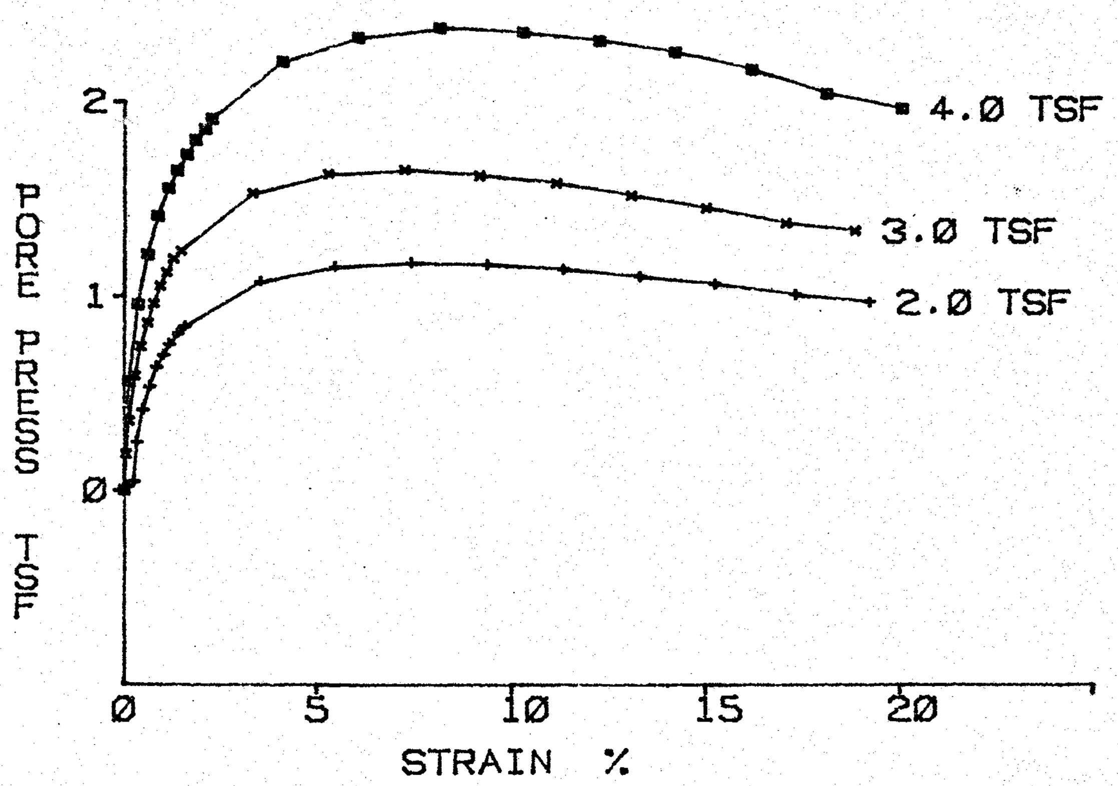


TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER SP
FEATURE: BORROW AREAS A & B
STATION:
RANGE :
BORING :

EL. :
SAMPLE : CLASS IV
PART :
SOIL SYM: CL
DATE : 6/24/81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP		
Feature: BORROW AREAS A & B		Tested By : JHD
Station:	El. :	Computed By: CRF
Range :	Sample: CLASS IV	Checked By : CBG
Boring :	Part :	Report Date: 6/24/81

Soil Sybmbol= CL	L.L.(%)= 42	P.I.(%)= 23
Sp. Gr. = 2.69	D10(mm)= 2.69	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	15.4	15.3	15.0	0.0
Dry Density(pcf)	101.7	101.8	102.1	0.0
Void Ratio	0.652	0.649	0.644	0.000
Saturation(%)	63.7	63.2	62.6	0.0
Before Shearing:				
Moisture(%) (after satur.)	24.2	24.1	24.0	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	21.4	21.9	21.0	21.0
Void Ratio (after cons.)	0.574	0.589	0.566	0.000
Final Moisture Content(%)	22.4	20.6	19.7	0.0
Minor Principal Stress(tsf)	2.02	3.02	4.03	0.00
Major Principal Stress(tsf)	4.16	6.23	7.95	0.00
Eff. Minor Prin. Stress(tsf)	1.00	1.66	2.03	0.00
Eff. Major Prin. Stress(tsf)	3.14	4.87	5.95	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.19	0.19	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

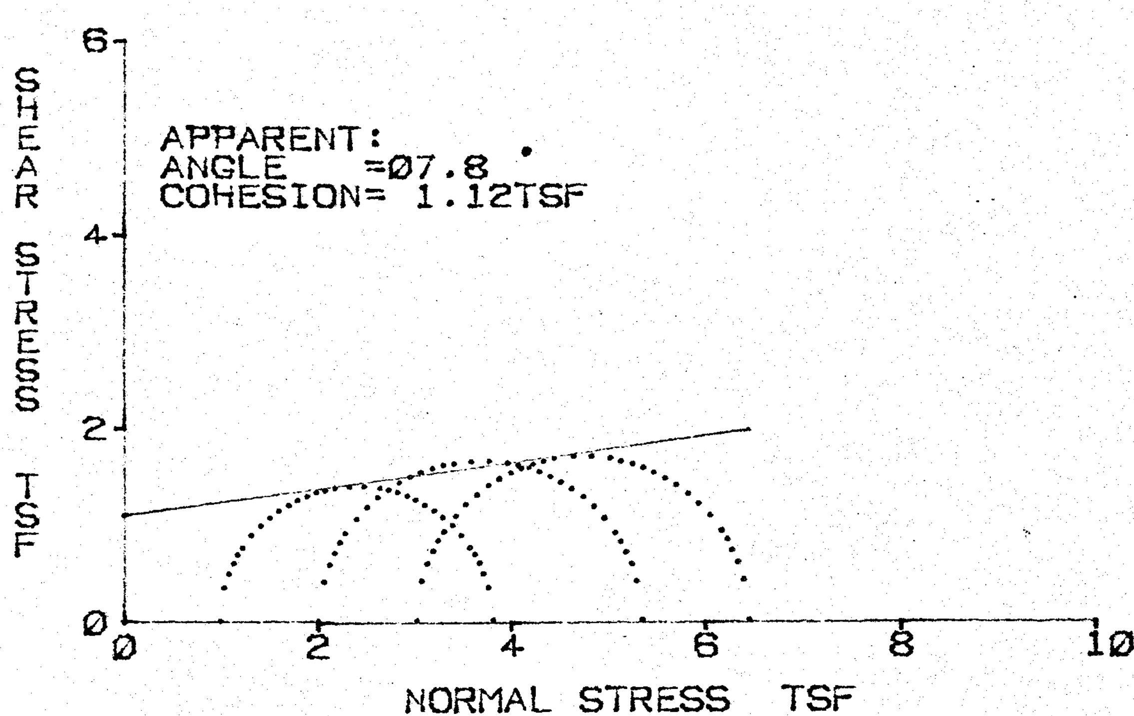
Shear Strength	Deg.	c(tsf)
Apparent	17.9	0.15
Effective	27.5	0.12

Remarks: Remolded at 3 (%) dry of optimum moisture and at 95 (%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

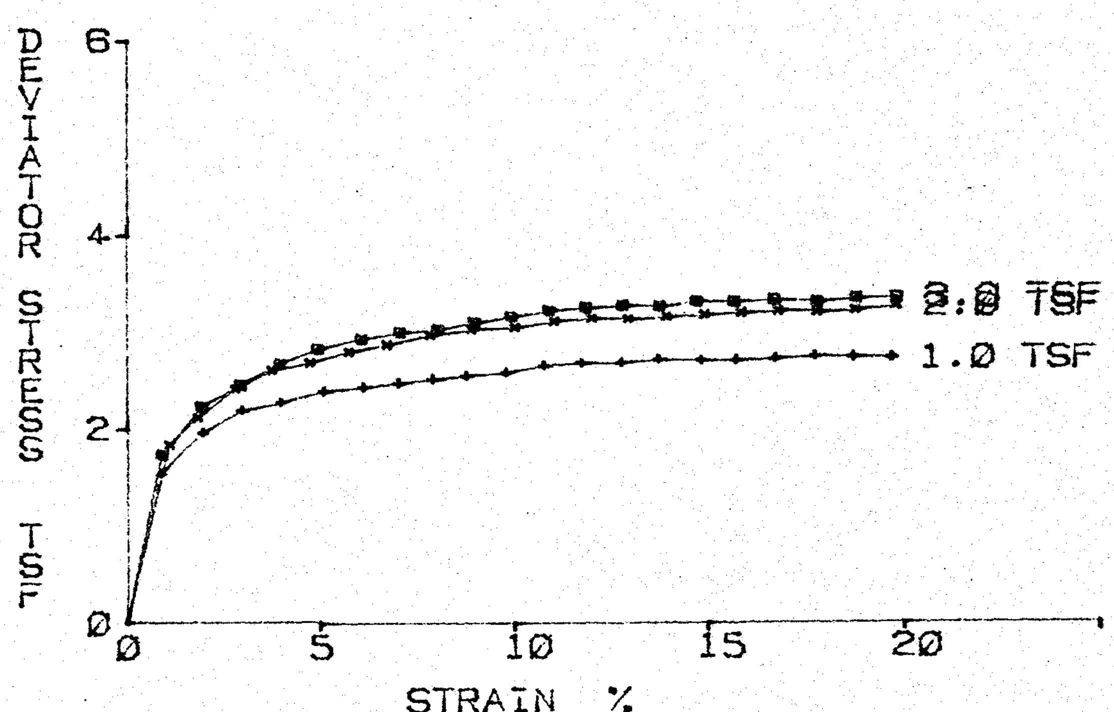
PROJECT:JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B SAMPLE :CLASS V
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :6-22-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT	:JOHN SEVIER S.P.EL.		:
FEATURE	:Borrow Areas A & B	SAMPLE	:CLASS V
STATION	:	PART	:
RANGE	:	SOIL SYM	:CL
BORING	:	DATE	:6-22-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: Borrow Areas A & B | Tested By : RA
Station: | El. : | Computed By: MHD
Range : | Sample: CLASS V | Checked By : [signature]
Boring : | Part : | Report Date: 6-22-81

Soil Sybmbol= CL | L.L.(%)= 48 | P.I.(%)= 23
Sp. Gr. = 2.74 | D10(mm)= 0

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	24.0	23.8	24.0	0.0
Dry Density(pcf)	96.8	96.9	96.8	0.0
Void Ratio	0.768	0.765	0.768	0.000
Saturation(%)	85.5	85.2	85.5	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	23.9	23.7	23.9	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.82	5.36	6.45	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	18	20	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

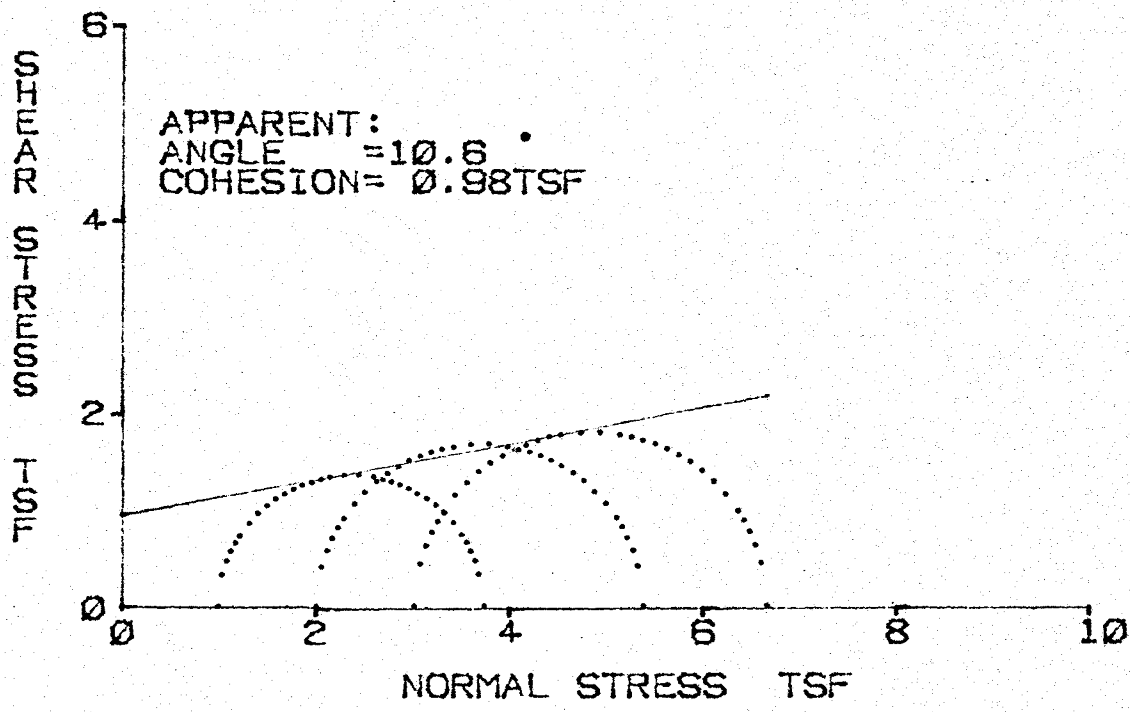
Shear Strength	Deg.	c(tsf)
Apparent	7.8	1.12
Effective	--	--

Remarks: Remolded at 3% wet of optimum moisture and at 95% of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

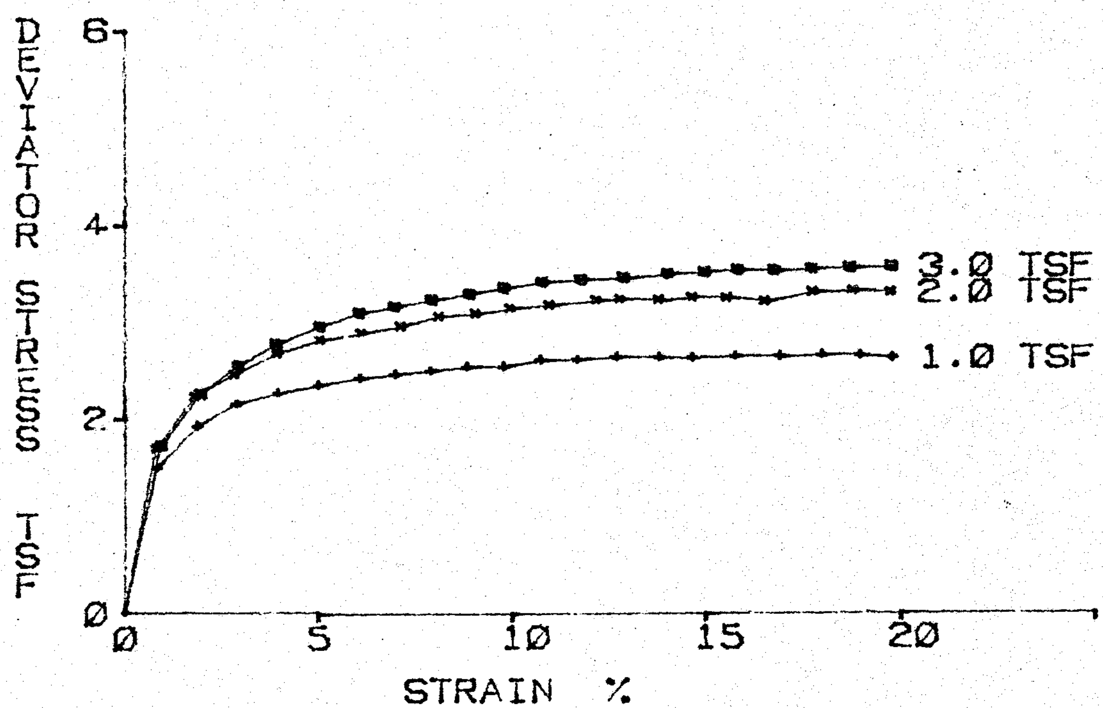
PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: Borrow Areas A & B
STATION:
RANGE :
BORING :

SAMPLE :CLASS V
PART :
SOIL SYM:CL
DATE :6-22-81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE:Borrow Areas A & B SAMPLE :CLASS V
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :6-22-81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.		
Feature: Borrow Areas A & B		Tested By : RA
Station:	El. :	Computed By: MHD
Range :	Sample: CLASS V	Checked By : CBG
Boring :	Part :	Report Date: 6-22-81

Soil Sybmbol= CL	L.L.(%)= 48	P.I.(%)= 23
Sp. Gr. = 2.74	D10(mm)= 0	

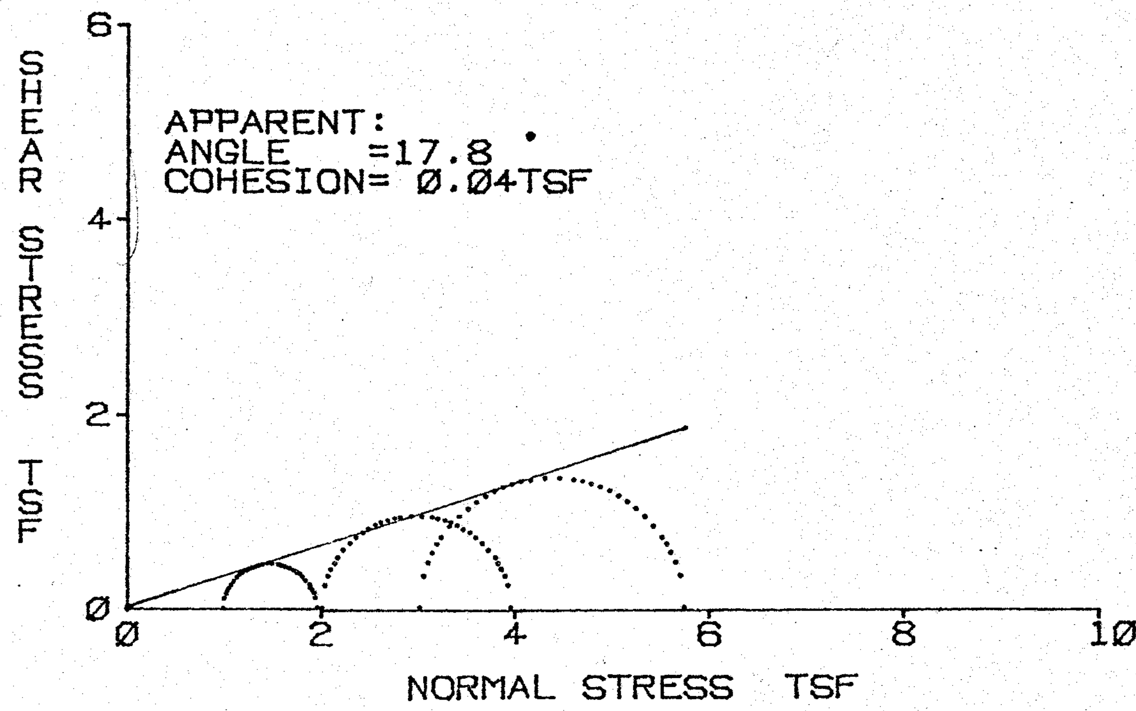
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	23.9	23.9	23.9	0.0
Dry Density(pcf)	96.8	96.8	96.8	0.0
Void Ratio	0.766	0.766	0.766	0.000
Saturation(%)	85.4	85.4	85.4	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	23.9	23.9	23.8	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.75	5.40	6.67	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	18	19	20	0
Rate of Strain(%/min.)	1.01	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

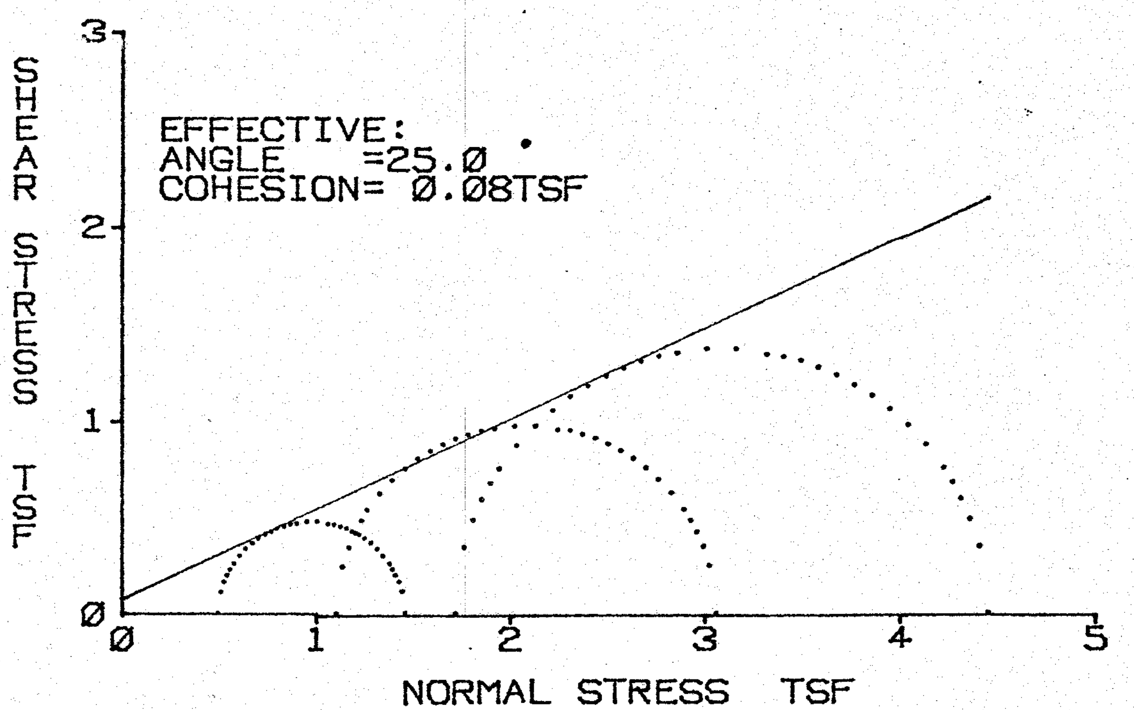
Shear Strength	Deg.	c(tsf)
Apparent	10.6	0.98
Effective	--	--

Remarks: Remolded at 3 (%) wet of optimum moisture
and at 95 (%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

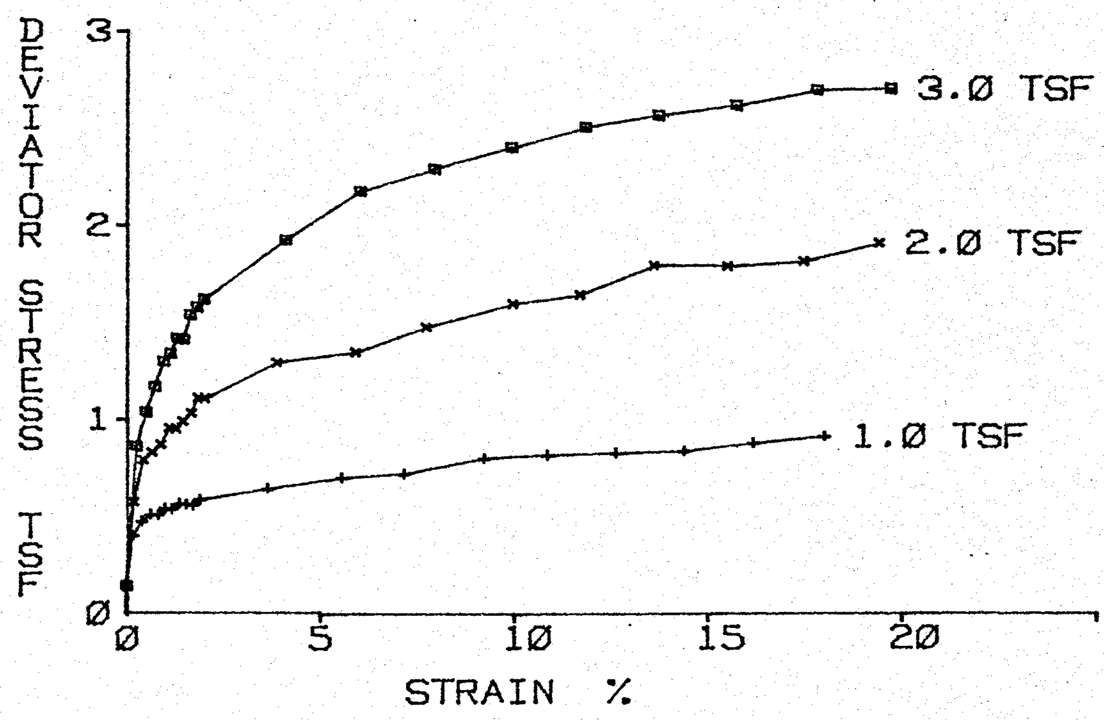
PROJECT: JOHN SEVIER SP	EL. :
FEATURE: BORROW AREAS A & B	SAMPLE : CLASS V
STATION:	PART :
RANGE :	SOIL SYM: CL
BORING :	DATE : 7/02/81

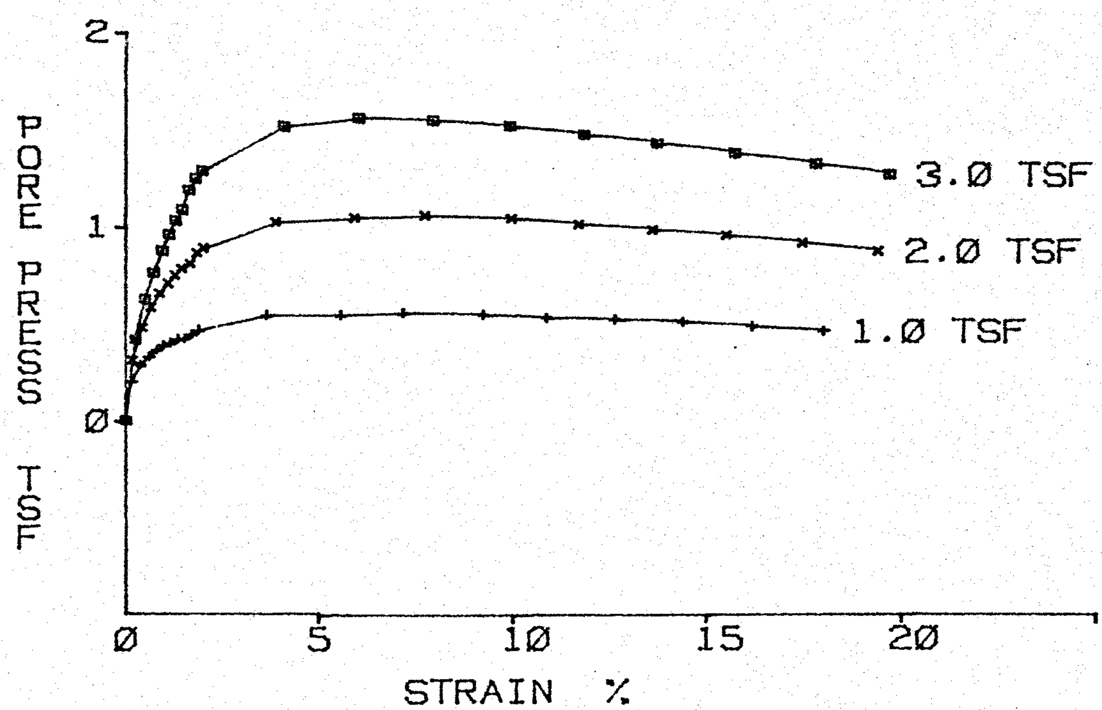




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:	JOHN SEVIER SP	EL.	:
FEATURE:	BORROW AREAS A & B	SAMPLE	:CLASS V
STATION:		PART	:
RANGE :		SOIL SYM:	CL
BORING :		DATE	:7/02/81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP		
Feature: BORROW AREAS A & B		Tested By : JHD
Station:	El. :	Computed By: CF
Range :	Sample: CLASS V	Checked By : BMD
Boring :	Part :	Report Date: 7/02/81

Soil Sybmbol= CL	L.L.(%)= 48	P.I.(%)= 23
Sp. Gr. = 2.74	D10(mm)= 0	

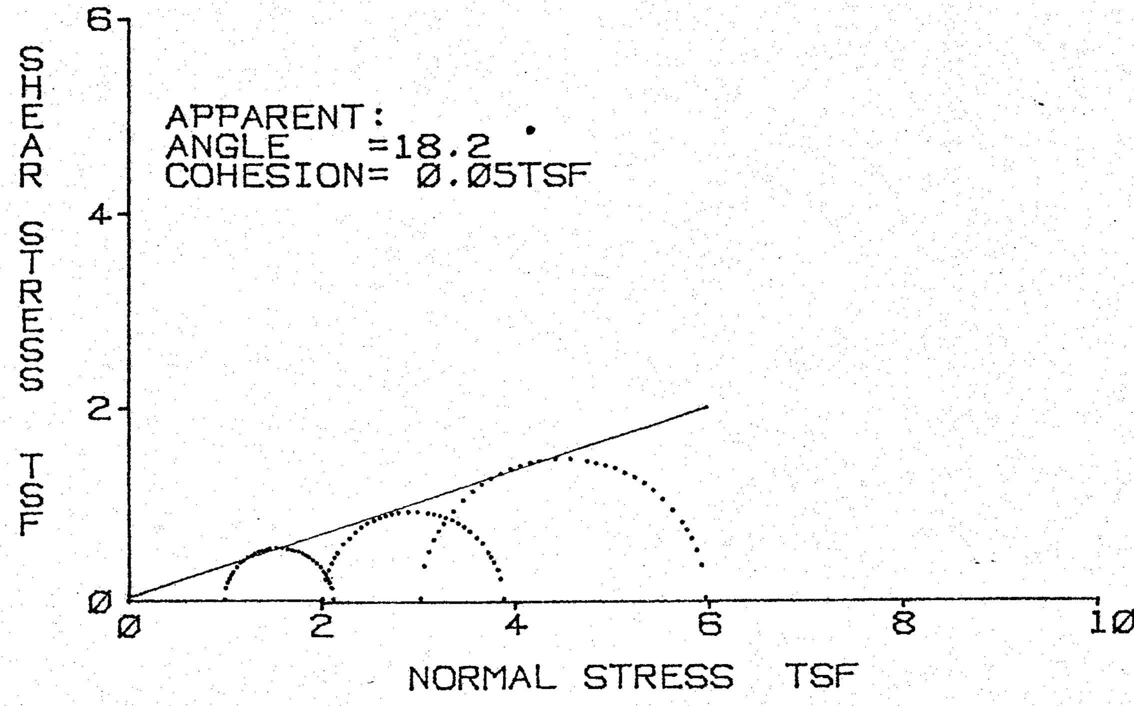
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	18.3	18.3	18.4	0.0
Dry Density(pcf)	96.5	96.5	96.4	0.0
Void Ratio	0.772	0.772	0.774	0.000
Saturation(%)	64.9	64.9	65.1	0.0
Before Shearing:				
Moisture(%) (after satur.)	28.2	28.2	28.2	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	40.6	25.3	23.7	23.7
Void Ratio (after cons.)	1.113	0.694	0.650	0.000
Final Moisture Content(%)	29.9	27.9	27.0	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	1.97	3.97	5.76	0.00
Eff. Minor Prin. Stress(tsf)	0.50	1.11	1.72	0.00
Eff. Major Prin. Stress(tsf)	1.47	3.07	4.46	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.18	0.20	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

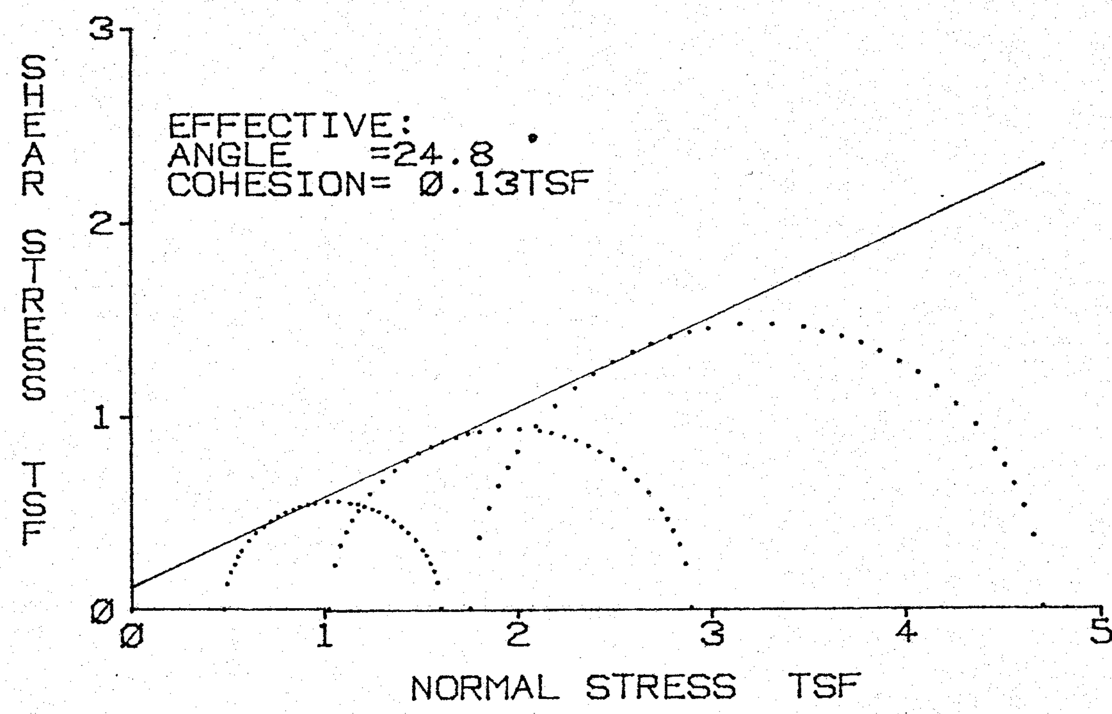
Shear Strength	Deg.	c(tsf)
Apparent	17.8	0.04
Effective	25.0	0.08

Remarks: Remolded at 3 (%) dry of optimum moisture and at 100 (%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

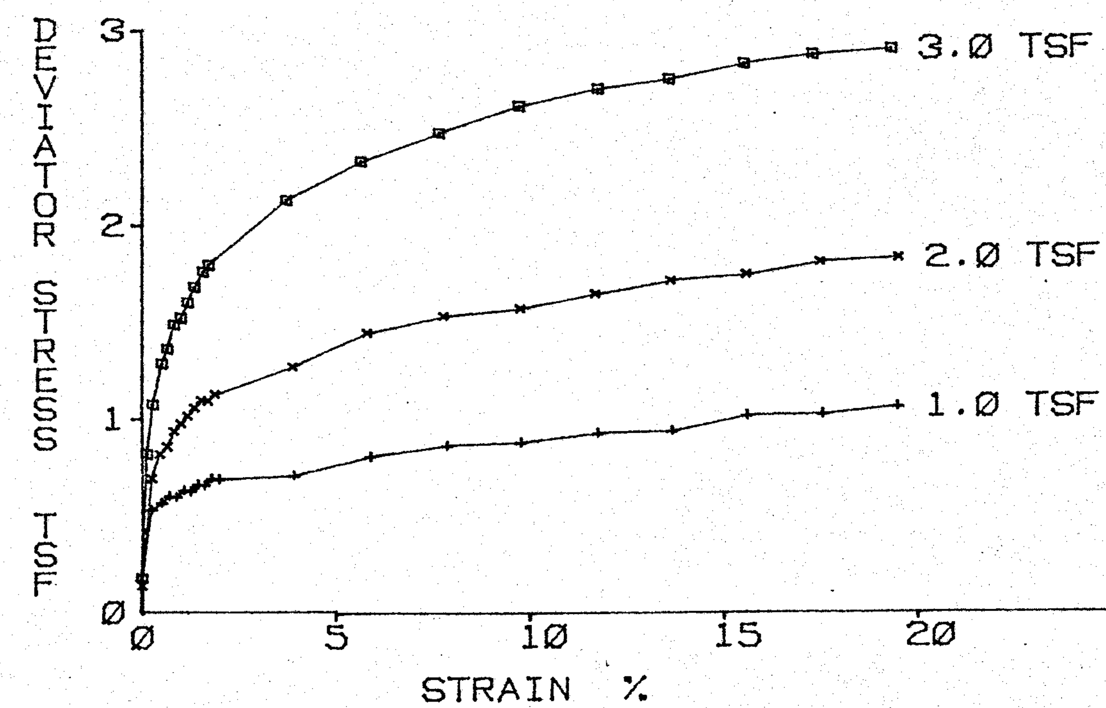
PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: BORROW AREAS A & B SAMPLE :CLASS V
STATION: PART :
RANGE : SOIL SYM:CL
BORING : DATE :7-1-81

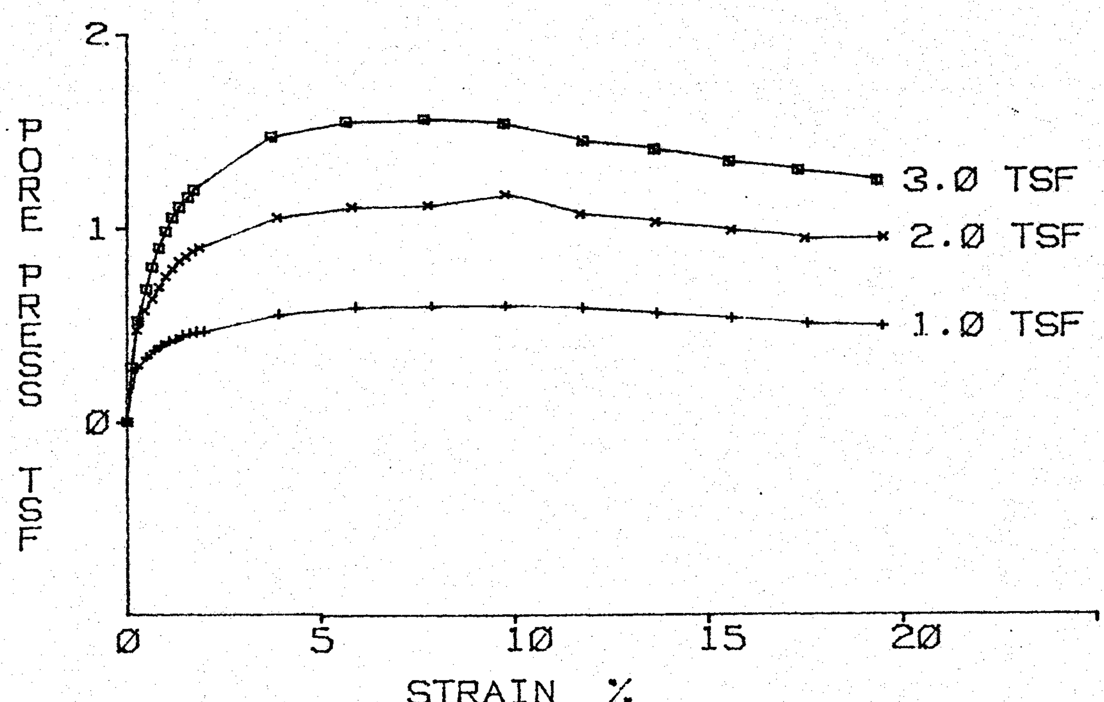




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: BORROW AREAS A & B   SAMPLE : CLASS V
STATION: PART :
RANGE :   SOIL SYM: CL
BORING :   DATE : 7-1-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: BORROW AREAS A & B
Station:
Range :
Boring :

El. :
Sample: CLASS V
Part :

Tested By :JHD
Computed By: CRF
Checked By : QMD
Report Date: 7-1-81

Soil Sybmbol= CL
Sp. Gr. = 2.74

L.L.(%)= 48
D10(mm)= 0

P.I.(%)= 23

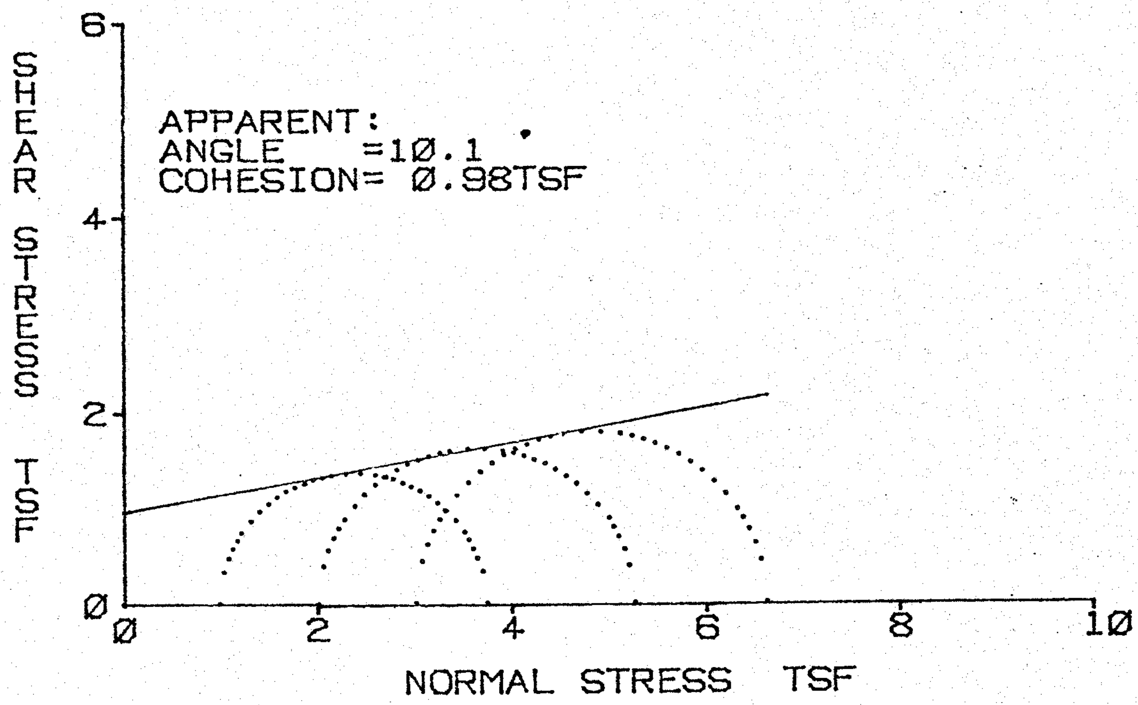
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	18.5	18.5	18.2	0.0
Dry Density(pcf)	96.4	96.4	96.5	0.0
Void Ratio	0.775	0.775	0.772	0.000
Saturation(%)	65.3	65.3	64.6	0.0
Before Shearing:				
Moisture(%) (after satur.)	28.3	28.3	28.2	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	28.7	27.6	23.7	23.7
Void Ratio (after cons.)	0.787	0.757	0.649	0.000
Final Moisture Content(%)	29.9	28.7	26.3	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.13	3.89	5.97	0.00
Eff. Minor Prin. Stress(tsf)	0.49	1.03	1.76	0.00
Eff. Major Prin. Stress(tsf)	1.61	2.90	4.71	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.20	0.20	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	18.2	0.05
Effective	24.8	0.13

Remarks: Remolded at 3 (%) dry of optimum moisture and 95 (%) of maximum unit weight.

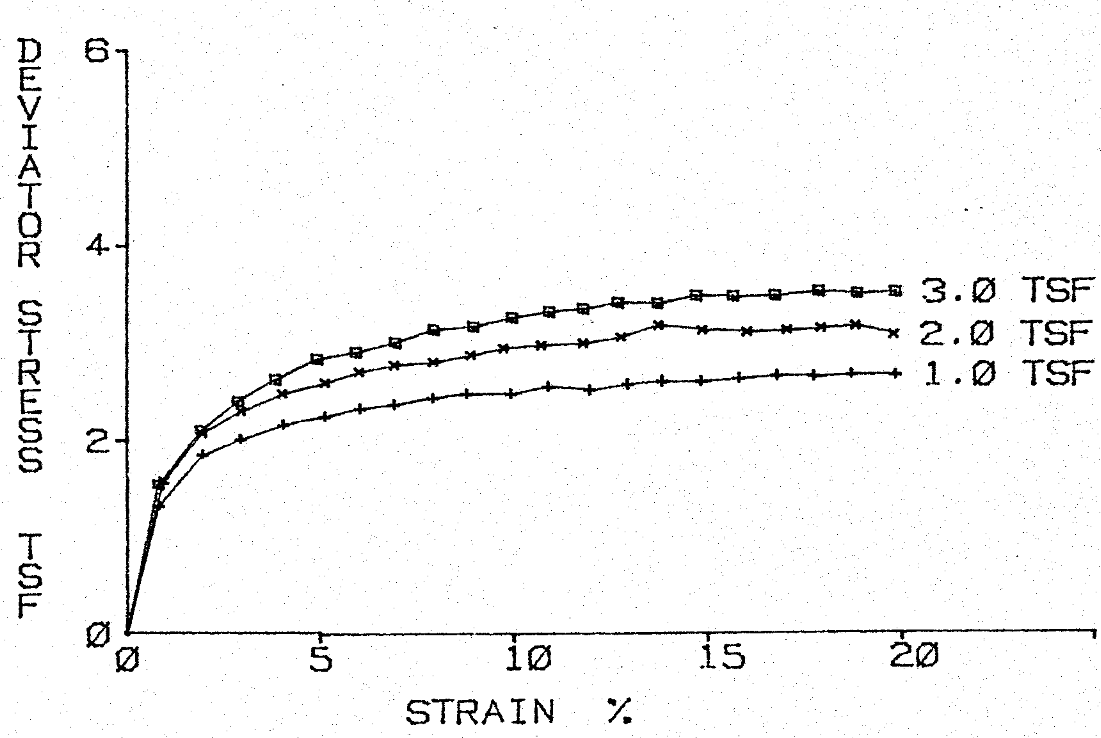
TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:	JOHN SEVIER SP	EL.	:
FEATURE:	Borrow Areas A & B	SAMPLE	:CLASS VI
STATION:		PART	:
RANGE :		SOIL SYM	:CH-MH
BORING :		DATE	:7/02/81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT	:JOHN SEVIER SP	EL.	:
FEATURE	:Borrow Areas A & B	SAMPLE	:CLASS VI
STATION	:	PART	:
RANGE	:	SOIL SYM	:CH-MH
BORING	:	DATE	:7/02/81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER SP
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS VI
Part :

Tested By : RA
Computed By: CRF
Checked By : OMD
Report Date: 7/02/81

Soil Sybmbol= CH-MH
Sp. Gr. = 2.77

L.L.(%)= 56
D10(mm)= 0

P.I.(%)= 27

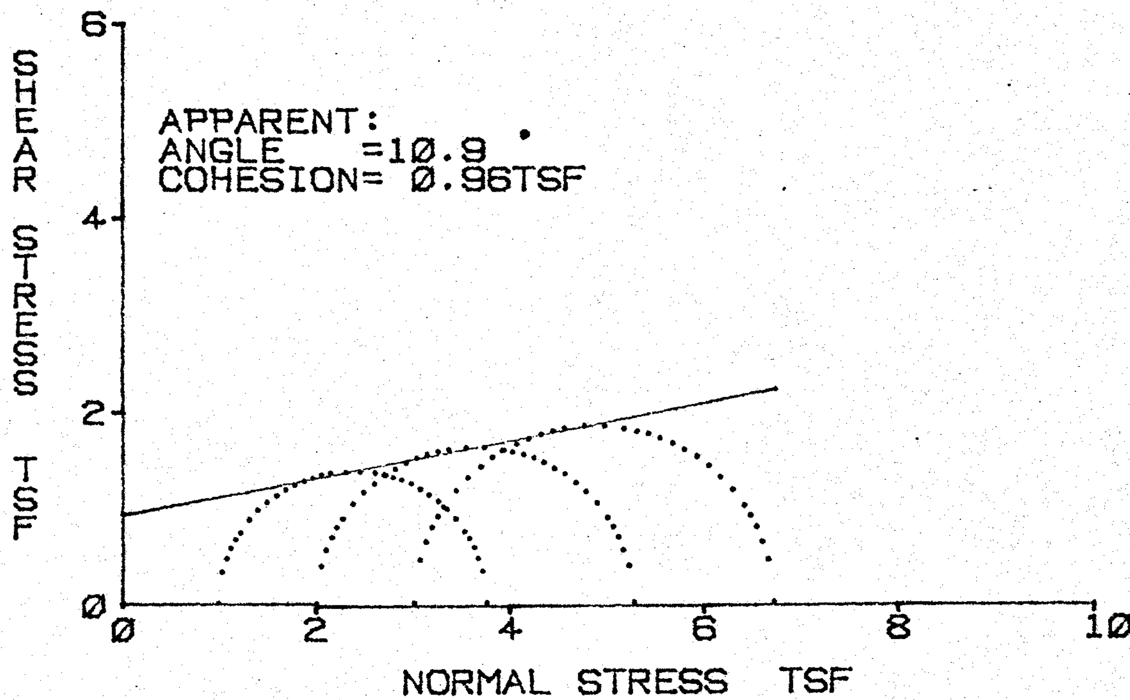
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	27.0	27.0	27.0	0.0
Dry Density(pcf)	91.5	91.5	91.5	0.0
Void Ratio	0.889	0.889	0.889	0.000
Saturation(%)	84.3	84.3	84.3	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	27.0	27.0	27.0	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.76	5.28	6.63	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	19	19	20	0
Rate of Strain(%/min.)	1.00	1.00	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	10.1	0.98
Effective	--	--

Remarks: Remolded at 3(%) wet of optimum moisture
and at 95(%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

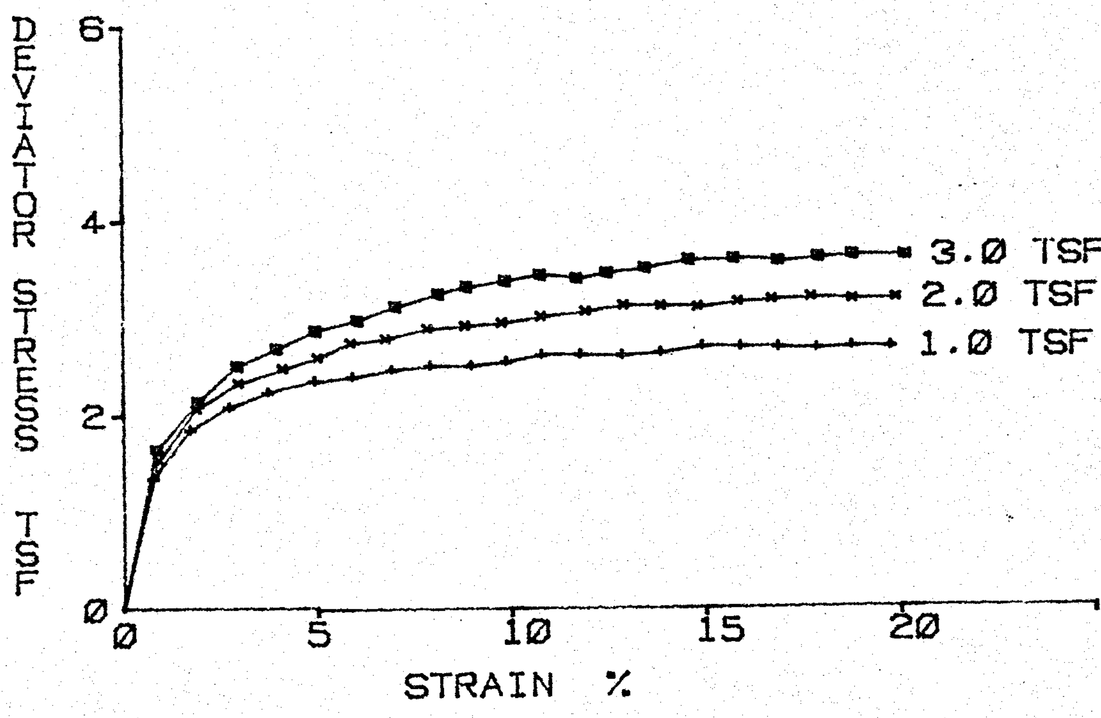
PROJECT: JOHN SEVIER SP
FEATURE: BORROW AREAS A & B
STATION:
RANGE :
BORING :
EL. :
SAMPLE :CLASS VI
PART :
SOIL SYM:CH-MH
DATE :6/29/81



TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT: JOHN SEVIER SP
FEATURE: Borrow Areas A & B
STATION:
RANGE :
BORING :

EL. :
SAMPLE :CLASS VI
PART :
SOIL SYM:CH-MH
DATE :6/29/81



Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER SP
Feature: Borrow Areas A & B
Station:
Range :
Boring :

El. :
Sample: CLASS VI
Part :

Tested By : RA
Computed By: CRF
Checked By : GMD
Report Date: 6/29/81

Soil Sybmbol= CH-MH
Sp. Gr. = 2.77

L.L.(%)= 56
D10(mm)= 0

P.I.(%)= 27

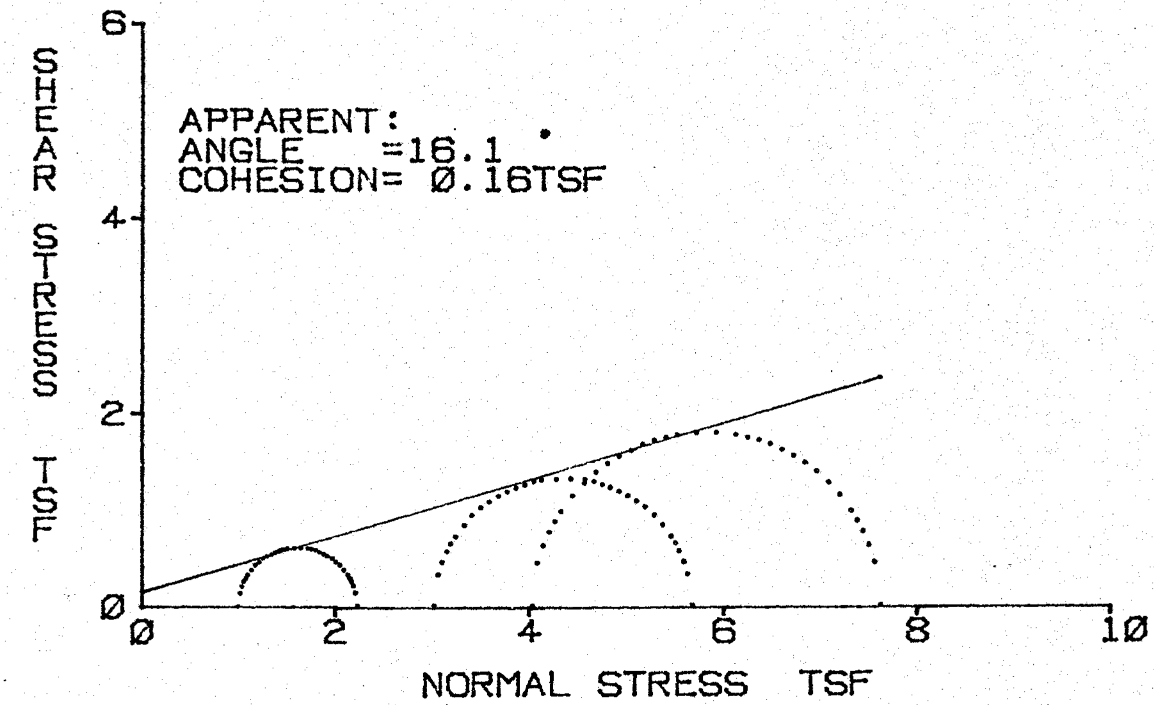
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	27.3	27.0	27.3	0.0
Dry Density(pcf)	91.4	91.5	91.4	0.0
Void Ratio	0.893	0.889	0.893	0.000
Saturation(%)	84.6	84.3	84.6	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	27.3	27.0	27.2	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.79	5.29	6.74	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	19	20	19	0
Rate of Strain(%/min.)	1.00	1.01	1.00	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

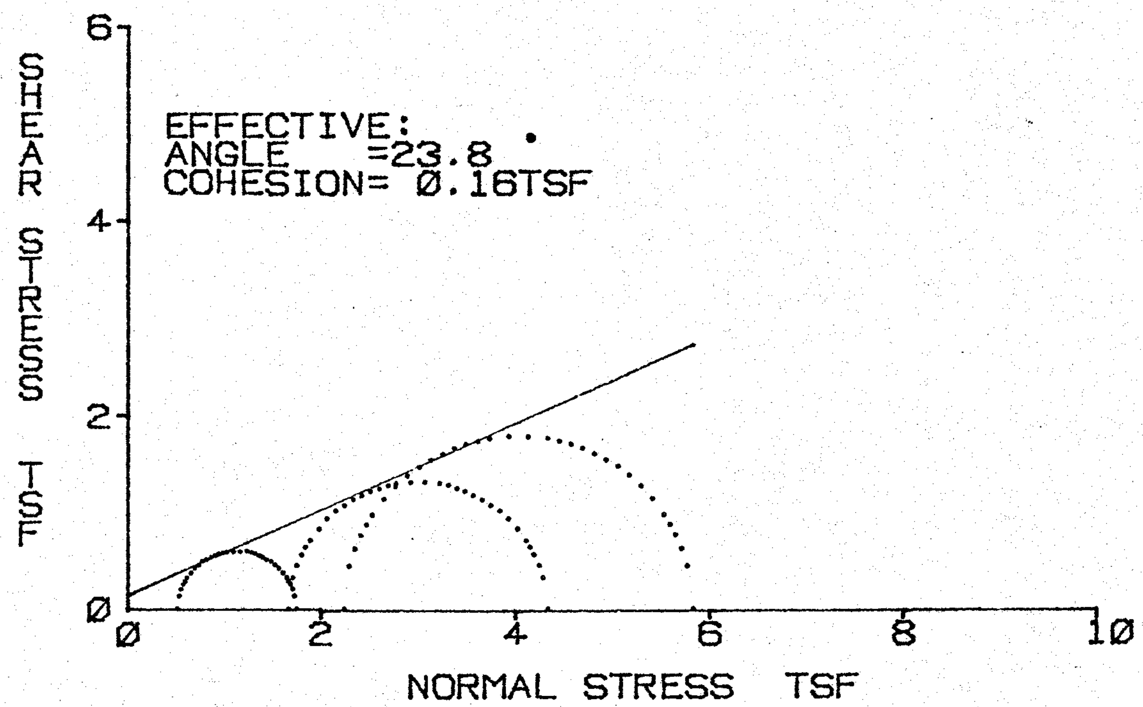
Shear Strength	Deg.	c(tsf)
Apparent	10.9	0.96
Effective	--	--

Remarks: Remolded at 3 (%) of wet of optimum moisture
and at 95 (%) of maximum unit weight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER SP	EL. :
FEATURE BORROW AREAS A & B	SAMPLE :CLASS VI
STATION:	PART :
RANGE :	SOIL SYM:CH-MH
BORING :	DATE :7/10/81

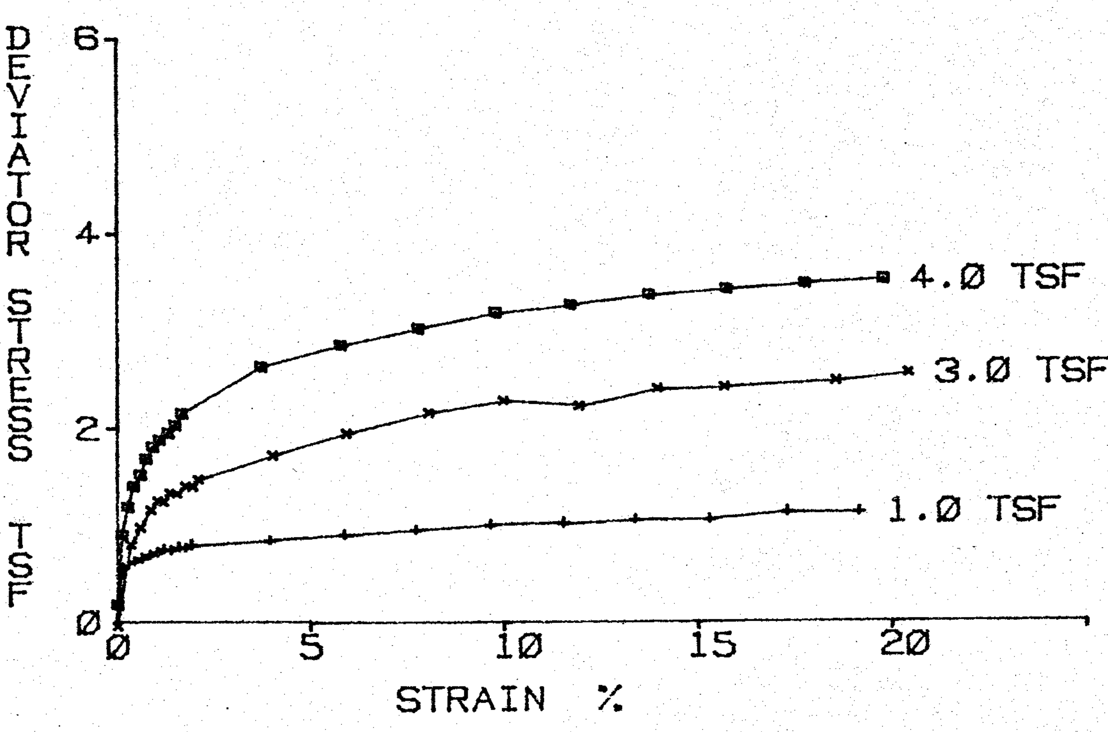


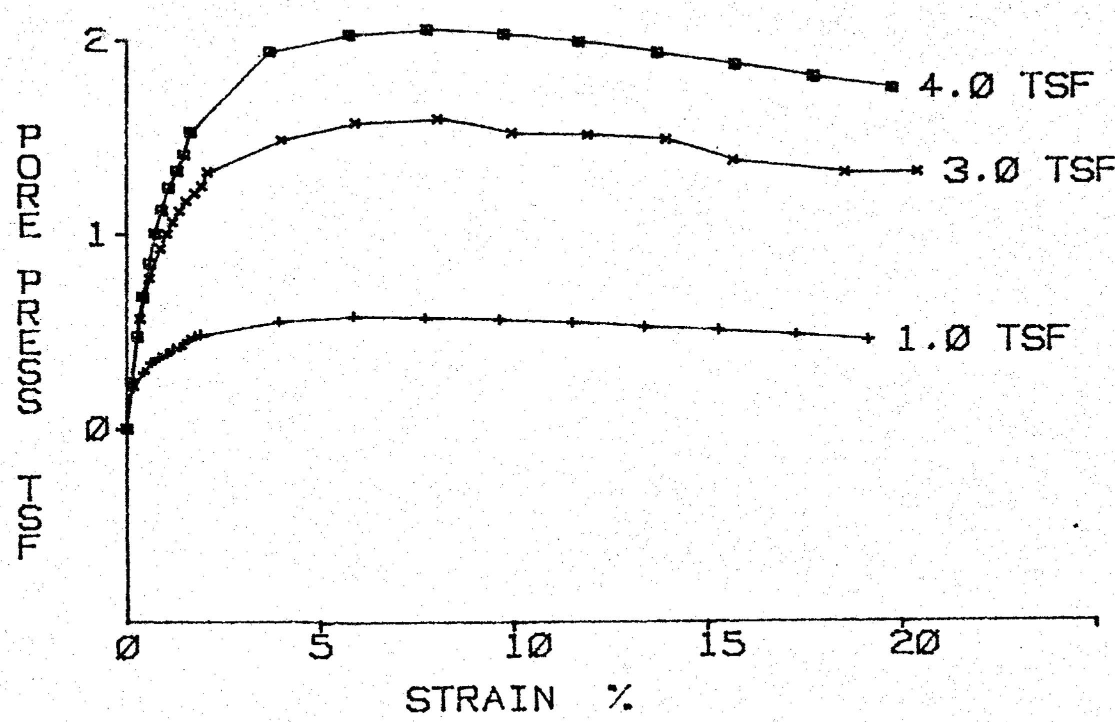


TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER SP
FEATURE: BORROW AREAS A & B
STATION:
RANGE :
BORING :

EL. :
SAMPLE : CLASS VI
PART :
SOIL SYM: CH-MH
DATE : 7/10/81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER SP
Feature: BORROW AREA A & B
Station:
Range :
Boring :

El. :
Sample: CLASS VI
Part :

Tested By : JHD
Computed By: CRF
Checked By : TAL
Report Date: 7/10/81

Soil Sybmbol= CH-MH
Sp. Gr. = 2.77

L.L.(%)= 56
D10(mm)= 2.77

P.I.(%)= 27

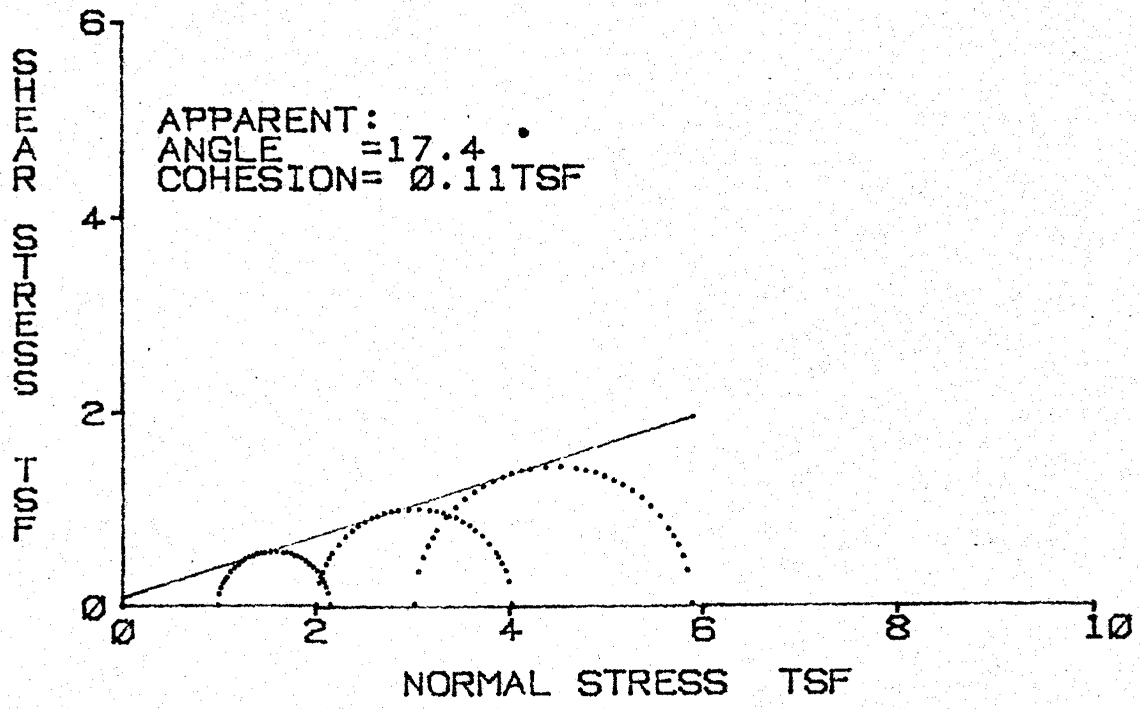
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	21.3	21.2	21.3	0.0
Dry Density(pcf)	91.4	91.4	91.4	0.0
Void Ratio	0.893	0.891	0.893	0.000
Saturation(%)	66.0	65.8	66.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	32.2	32.2	32.2	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	34.3	28.2	28.2	28.2
Void Ratio (after cons.)	0.951	0.780	0.782	0.000
Final Moisture Content(%)	34.0	31.0	33.1	0.0
Minor Principal Stress(tsf)	1.01	3.02	4.03	0.00
Major Principal Stress(tsf)	2.25	5.69	7.63	0.00
Eff. Minor Prin. Stress(tsf)	0.53	1.67	2.25	0.00
Eff. Major Prin. Stress(tsf)	1.76	4.33	5.84	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.19	0.21	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

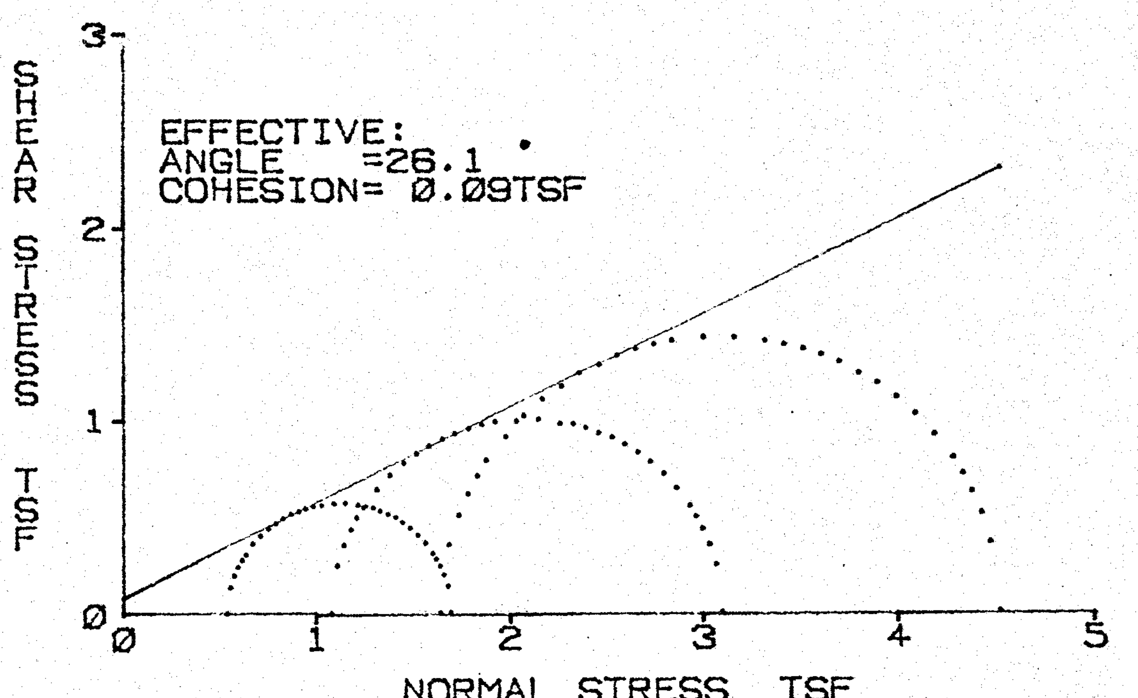
Shear Strength	Deg.	c(tsf)
Apparent	16.1	0.16
Effective	23.8	0.16

Remarks: Remolded at 3 (%) dry of of optimum moisture
and at 95 (%) of maximum unitweight.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

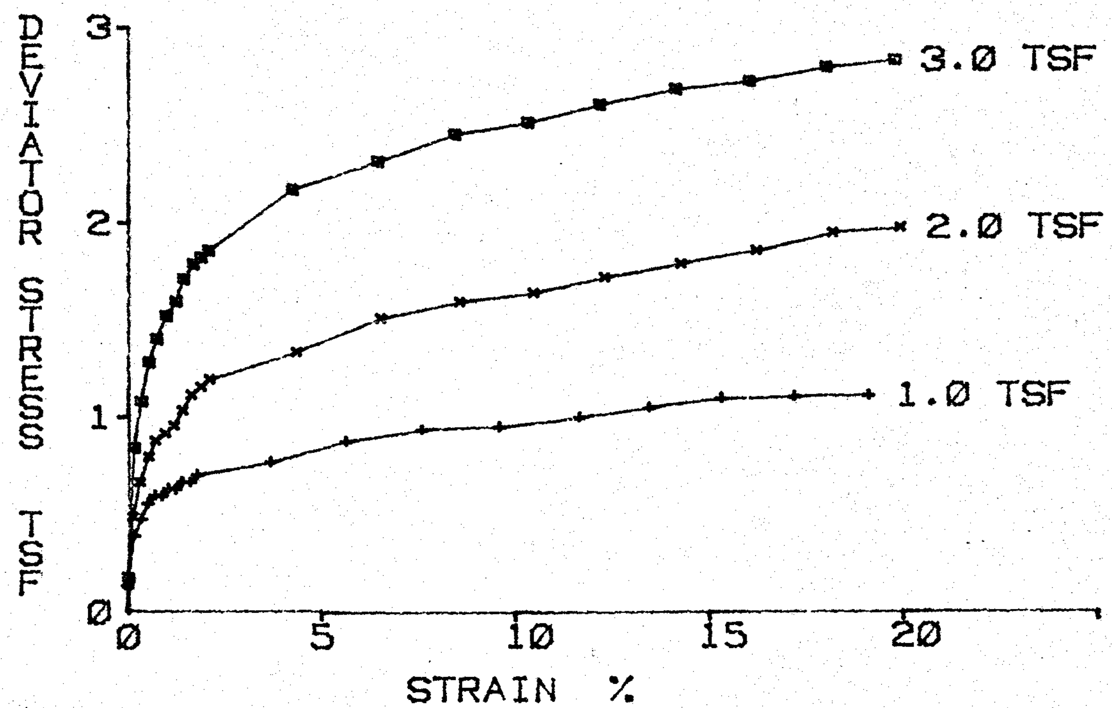
PROJECT: JOHN SEVIER S.P.EL. :
FEATURE: BORROW AREAS A & B SAMPLE :CLASS VI
STATION: PART :
RANGE : SOIL SYM:CH-MH
BORING : DATE :6-20-81

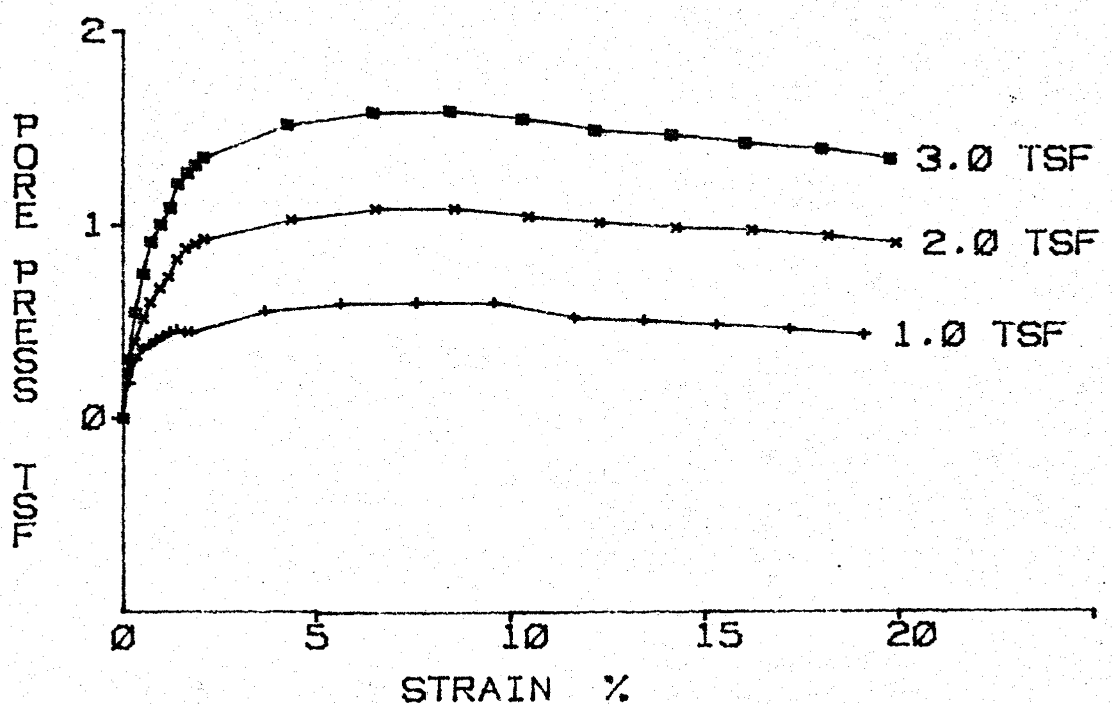




TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT	:JOHN SEVIER S.P.EL.		:
FEATURE	:BORROW AREAS A & B	SAMPLE	:CLASS VI
STATION	:	PART	:
RANGE	:	SOIL SYM	:CH-MH
BORING	:	DATE	:6-20-81





Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: BORROW AREAS A & B		Tested By : JHD
Station:	El. :	Computed By: MHD
Range :	Sample: CLASS VI	Checked By : [illegible]
Boring :	Part :	Report Date: 6-20-81

Soil Sybmbol= CH-MH	L.L.(%)= 56	P.I.(%)= 27
Sp. Gr. = 2.77	D10(mm)= 0	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	20.8	20.8	20.9	0.0
Dry Density(pcf)	91.7	91.7	91.7	0.0
Void Ratio	0.885	0.885	0.886	0.000
Saturation(%)	65.0	65.0	65.2	0.0
Before Shearing:				
Moisture(%) (after satur.)	31.9	31.9	32.0	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	31.2	28.7	30.3	30.3
Void Ratio (after cons.)	0.863	0.795	0.838	0.000
Final Moisture Content(%)	34.3	32.5	31.3	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.16	4.04	5.90	0.00
Eff. Minor Prin. Stress(tsf)	0.55	1.08	1.64	0.00
Eff. Major Prin. Stress(tsf)	1.70	3.10	4.52	0.00
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.19	0.20	0.20	0.00
Specimen Height(in.)	3.15	3.15	3.15	3.15
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Deg.	c(tsf)
Apparent	17.4	0.11
Effective	26.1	0.09

Remarks: Remolded at 3 (%) dry of optimum moisture and at 95 (%) of maximum unit weight.

KWB

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA

PROPOSED DRY STACKING

7. ✗

GEOTECH SHELVES

DIVISION OF ENGINEERING AND TECHNICAL SERVICES
SINGLETON MATERIALS ENGINEERING LABORATORY

Knoxville, Tennessee

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA

PROPOSED DRY STACKING

PUN NO. ______

Capital Form 1 Rev. No. _____

F&H PR CAPITAL PROJECT PLANNING REPORT

___ PROPOSED (for initial budget request) Date_______

X FINAL (to accompany Work Order) * Date _______

Project Originator J. D. Bukley Group # _____ Ext. 3560 Plant John Sevier

Project Manager G. L. Massey Ext. 3529

Project Title**John Sevier Fossil Plant - Reclaim Ash Pond No. 2

Budget Benefit Category Environmental Work Order No. ________

Outage Related: Yes ___ No X

FHUEM RELATED: Yes ______ No X Related Outage No. ________

General Description and Scope of Project: Reclamation of ash pond No. 2 to consist of excavating and hauling bottom and mechanical ash from pond No. 2 across a railroad to an onsite borrow area for final disposal. Also, ash may be hauled and disposed of on the original ash disposal area alongside the plant access road. All available cover (topsoil) shall be stockpiled for use as final cover. All design and construction to conform to environmentally acceptable standards.***

Justification: (Economic evaluation with rate of return and/or other justification)***
The existing ash pond No. 2 at John Sevier is near full capacity. Any additional ash sluiced to pond No. 2 could result in noncompliance with NPDES permit free water volume requirements. An interim emergency disposal area has been constructed within the abandoned original disposal area. This area will last approximately 3 years after which all available storage space for wet ponding bottom ash will be depleted. This supersedes and includes Phase I and requires excavation of the pond to its original contour and will provide an additional 20 years of storage life for bottom ash sluiced to pond No. 2.

Rate of Return: High _______ Medium _______ Low _______ load forecast N/A X
(Whole Numbers - No Decimals)

Environmental Reviews:

This project is routine maintenance of existing TVA facilities. It has been determined that this project falls within categorical exclusion 5.2.1 of TVA Instruction IX ENVIRONMENTAL REVIEW and requires neither an environmental assessment nor an environmental impact statement Yes X

If not qualified above, has the necessary environmental review been obtained from the Environmental Quality Staff, 229 SPB-K
A statement from the EQS must accompany all Final Form 1's, along with the Work Order, in this category. Yes ___ No ___

Explanation of Revision: (Reason for changes in monies and/or scheduling)***
This revision serves to combine two work orders (Phases I and II) which pertain to the same project. The costs and schedule will remain basically as originally planned.

*Attach copy of Proposed to Final (Capital Form 1)
**Exact title of work order.
***Attach additional sheets, as necessary

Revision 7/86

INFORMATION ON REVERSE SIDE MUST BE COMPLETED

F&H PR CAPITAL PROJECT PLANNING REPORT

Project Title John Sevier Fossil Plant - Reclaim Ash Pond No. 2

Resource Schedule:	Prior Years	FY88	FY89	FY90	Later Years	Total Project
	($000's only - No decimals)					
F&H PR						
Labor Cost	810	1,260	1,231			3,301
All Oth (Mat,Stores OH, misc)						
*Contract Services						
Central Off (F&H 2% OH)	17	25	25			67
Retirement						
Total F&H PR	827	1,285	1,256			3,368
Service Contracts (Agreements)						
Power Const - (PC - Org 37)						
Power Engg - (PE - Org.68)	30					30
Other Org. ( )						
Org 94 - Gen Engg & Const Exp (4%)	34	52	50			136
Org 96 - Central General Exp (2.5%)	21	32	31			84
Org 99 - Corporate Level Exp (2%)	17	26	26			69
TOTAL PROJECT	929	1,395	1,363			3,687

MILESTONES:

	Scheduled Month	(Calendar Year)	Signature Of (Scheduled By)
Design	Oct.	86	
Material Requisitioned	Oct.	86	
Material Receipt	Oct.	86	
Construction Start	Oct.	86	
Major Equipment in Service	Sept.	89	
Construction Complete	Sept.	89	
Completion Notice Issue	Sept.	89	
Project Completion (Final Close)	Sept.	89	

Approvals:

J. D. Bukley — Project Originator — Date: 2/3/87

Plant Project Coordinator — Date

G. L. Massey — Project Manager — Date: 2/19/87

C. N. Dammann — Manager of Fossil Operations — Date: 3/22/87

Jack T. Thompson — Branch Chief — Date: 3-10-87

R. L. Copeland — Asst. Mgr. Maint & Engg — Date: 3/13/87

B. B. Street — Plant Manager — Date: 3/16/87

Budget Approval — Date

INFORMATION ON REVERSE SIDE MUST BE COMPLETED

*Contract Services: Accounting Procedure 9 - Object 25

Date ______________

Power and Engineering Program
Capital Budget Project Investment Revision Schedule
Supplement to Schedule 1

Project with estimated costs exceeding $1 million
($000'S)

Organization: F&H PR

Subprogram: 544

Plant: John Sevier Fossil Plant

Project Title: RECLAIM ASH POND NO. 2

	Completion Schedule		(Expenditures in Thousands of Dollars)								
			Prior	FY 1987		FY 1988		To Complete		Project Total	
	Approved	Revised	Years	Approved	Revised	Approved	Revised	Approved	Revised	Approved	Revised
Revised Authorization:	9/87	9/89	929	929	0	0	1,395	0	1,363	929	3,687

Explanation of Change:

This revision is to combine two work orders (Phase I and II) which pertain to the same project. The costs and schedules will remain basically the same.

Impact:

It is necessary that this project be completed since there is no other feasible alternative to creating storage space onsite. After September 1989, all available storage space for bottom ash disposal will be depleted.

Justification:

This project is necessary for the continued plant operation of sluicing bottom ash.

Environmental Review:

Qualifies as a categorical exclusion pursuant to Section 5.2 of TVA Instruction IX ENVIRONMENTAL REVIEW.

TVA 4005 B (TD-3-75)

WORK ORDER

ADDITION ☒ - REGULAR ☐ - CONTINUING ☐ - BILLING P.R. LOC. SYMBOL SE-27 WO NO. 5812-544051-20866R1

RETIREMENT ☒ - REGULAR ☐ - CONTINUING ☐ - BILLING P.R. LOC. SYMBOL ______ WO NO. ______

TITLE John Sevier Fossil Plant - Reclaim Ash Pond No. 2

LOCATION OF WORK Tennessee, Hawkins (STATE, COUNTY, TOWN, ETC.) LOCAL EST. NO. ______ AUTHORIZATION NO. ______

F&H PR — ORGANIZATION PROVIDING BUDGET

F&H PR (John Sevier) — ORGANIZATION TO PERFORM WORK

PE-FEP — ORGANIZATION TO PERFORM ENGINEERING

DATES

ADD 10/1/86 (TO START) ______ (IN SERVICE) 9/30/89 (TO BE COMPLETED)

RET. ______ (TO START) ______ (OUT OF SERVICE) ______ (TO BE COMPLETED)

GIVE A COMPLETE DESCRIPTION OF THE PROPOSED WORK AND A STATEMENT OF PURPOSE AND BENEFITS. LIST GENERAL DRAWING REFERENCES AND NUMBERS OF RELATED CONTRACTS, AGREEMENTS, AND SUBORDERS.

The existing ash pond No. 2 at John Sevier is at full capacity. An interim pond within the original disposal pond has been constructed for emergency disposal so that John Sevier can continue operation. The emergency disposal pond will last approximately three years. After September 1989, all available storage space will be depleted. Further, there is neither adequate nor suitable space for construction of a new pond on the reservation. The work covered by this work order is to include hauling excavated ash from pond No. 2 to an onsite borrow pit for final disposal until the pond is excavated to its original contour. Also, ash may be hauled and disposed of on the original ash disposal area alongside the plant access road. It is essential that this work be completed so that suitable storage space is available beyond September 1989. Approximately 20 years of continued service can be created for pond No. 2 by completion of this work order. This work order is for the total project (includes Phase I) of reclaiming ash from pond No. 2 for final disposal in the borrow area. Initially, this project was proposed and approved for work orders in two phases. Phase I was approved for FY 1987 for $928,863. As such, charges have accumulated under Phase I. Phase II was to be the continuation of Phase I in order to finalize the total project as required by September 1989. Note: Any costs incurred as a result of this project under fixed price service contracts, etc., charged to plant account No. 5804-761051-120,U001 are to be transferred to this work order.

IF ADDITIONAL SPACE IS NEEDED FOR DESCRIPTION, USE PLAIN WHITE PAPER.

ESTIMATED COST OF PLANT ADDITIONS	AMOUNT (OMIT CENTS)
MATERIALS & EQUIPMENT PURCHASED	
MATERIALS & EQUIPMENT OBTAINED FROM STOCK	
MATERIALS & EQUIPMENT SALVAGED & REUSED	
TOTAL MATERIALS	
CONSTRUCTION LABOR	810,620
CONSTRUCTION EQUIPMENT	2,495,980
OTHER FIELD EXPENSE (TEMP. CONST. FACILITIES. TRANSP. OF TOOLS & EQUIP. FIELD OFFICE EXPENSE. ETC.)	
TOOLS AND OTHER PRORATIONS	
ENGINEERNG - DIRECT	30,000
INTEREST EXPENSE	
FINAL TEST AND INSPECTION	
LAND ACQUISITION EXPENSE	
TOTAL COST EXCLUDING OVERHEADS AND PURCHASE PRICE OF LAND AND RIGHTS	3,336,600
GENERAL ENG. & ADMIN. OVERHEADS 10.5 %	350,343
PURCHASE PRICE OF LAND AND LANDRIGHTS	
ESTIMATED TOTAL ADDITION	3,686,943

ESTIMATED COST OF RETIREMENT	AMOUNT (OMIT CENTS)
SALVAGE CREDIT:	
MAT. & EQUIP. REUSED	
MAT. & EQUIP. RETD. TO STOCK	
PROCEEDS FROM SALES	
TOTAL SALVAGE CREDIT	
DEDUCT:	
COST OF REMOVAL	
NET RETIREMENT DR ☐ CR ☐	
ORIGINAL INSTALLED	
COST OF PLANT RETIRED	
PROJECT COST	
ADDITION — ESTIMATED COST	
RETIREMENT — ESTIMATED COST	
NET COST OF PROJECT	

ORIGINATED	DATE	COORDINATED	DATE	PLANT ACCOUNTING	DATE
J. D. Bukley	2/ /87	Jack T. Thompson	3-10-87		
PREPARED: G. L. Massey	2/19/87			AUTHORIZED	DATE
SUBMITTED: B. B. Street	3/18/87	C. N. Dammann	3/22/87	Paul Wade	
RECOMMENDED				SIGNATURE	

VA 4009 (FD-3-82)

ESTIMATE OF COST

ORDER NO. 5812-544051-20866 R1

TITLE OF ORDER John Sevier Fossil Plant - Reclaim Ash Pond 2 PAGE 2

Acct. No.	Description	Material and Equipment			Labor	Other	Total
		Quantity	Unit Cost	Amount			
	Clearing and grubbing	11 ac.		11,200	2,800		14,000
	Seeding and mulching	38 ac.		16,500	38,500		55,000
	Relocate utility lines				20,000		20,000
	Construct temporary railroad crossing			1,000	2,000		3,000
	Flagman at railroad crossing				93,000		93,000
	Pumping/dewatering			2,000	10,000		12,000
	Site development			16,000	4,000		20,000
	Excavate haul ash	1,540,000	yd^3	2,324,000	581,000		2,905,000
	Groundwater monitoring wells			4,800	19,200		24,000
	Engineering				30,000		30,000
	Relocate air monitoring station				10,000		10,000
	Obtain clay borrow	145,000 yd^3		120,480	30,120		150,600
	Subtotal direct cost			2,495,980	840,620		3,336,600
	F&H PR Overheads (2.0%)						66,732
	Gen. Engg. & Const. Exp. (4.0%)						133,464
	Central Gen. Exp. (2.5%)						83,415
	Corporate Level Exp. (2.0%)						66,732
	Total estimated cost						3,686,943
	Prepared by: J. D. Bukley Ext. 3560-C						

COSTS ARE GROUPED BY ACCOUNTS AND UNITS OF PROPERTY BY USE OF SUBHEADINGS. OMIT CENTS.

B46 '86 0903 001

O. P. Thornton, Project Manager, Fossil Engineering Project, W3 D224 C-K

John A. Raulston, Chief Nuclear Engineer, W10 C126 C-K

SEP 4 1986

JOHN SEVIER STEAM PLANT - ASH DISPOSAL AREA - PROPOSED DRY STACKING

The soil investigation for the proposed dry stacking area at John Sevier Steam Plant outlined in the test request from R. E. Harris to W. H. Childres dated June 25, 1986 (B65 860625 004), has been completed. Its purpose was to provide data for the stability analysis of the ash disposal area and compaction control curves for construction. The field work was completed between July 1 and July 16, 1986. A total of 572 lin ft was drilled and sampled at 11 SPT and 3 undisturbed sample locations. Twenty undisturbed tube samples were taken. Boring SS-12 was deleted with the concurrence of FEP personnel because underground cables were located in the vicinity and their exact locations could not be determined. Borings were advanced by dry methods using a CME model 55 drill equipped with 3-3/8-in. and 6-in. id hollow stem augers and AW drill rods. Samples were the standard 2-in. split spoons and 5-in. thin wall tubes. Sampling was done in accordance with ASTM D 1586, D 1587, D 2488, and D 1452. Boring locations are shown in the attachments. Table 1 summarizes coordinates and elevations of all split-spoon borings.

Site Conditions

Surface elevations vary from 1099 to 1135. The soil profile for the ash dike area (SS-1 through SS-8) consists of a four-stratum system of surficial clays overlying fly ash fill and cohesive alluvium resting on a weathered shale. The ash disposal area (SS-9, SS-10, and SS-11) consists of only the bottom three strata of the ash dike. The interface of fill and alluvium is located approximately at elevation 1080. The fill is composed of light to dark gray fly ash while the alluvium consists of brown lean clay. Bedrock was encountered only at boring SS-3 at elevation 1058. For details, see the attached generalized cross section and graphic logs for each split-spoon boring.

Based on SPT N values, consistencies of surficial and alluvial cohesive soils are stiff to very stiff except at boring SS-7 where soft layers exist. Weak layers ($N < 8$) were found at several locations just above the interface at borings SS-1, 2, 3, 5, and 6. Relative densities of weathered shale range from dense to very dense. The following tabulation summarizes field data by general soil types.

SEP 4 1986

JOHN SEVIER STEAM PLANT - ASH DISPOSAL AREA - PROPOSED DRY STACKING

	Surficial Clay	Fly Ash Fill	Clay Alluvium	Weathered Shale
		Thickness, ft		
max.	22	33	15	14
min	3	0	0	4
avg	9	18	8	8
		N Values		
max.	26	43	42	100
min	4	0	2	4
avg	15	11	15	41

Except where holes collapsed, water table readings were observed at 1 and 24 hours after drilling. Water levels for borings are shown in the attached generalized cross section and graphic logs.

Laboratory Testing

Each split-spoon sample was visually classified and tested for moisture content (ASTM D 2216). Index testing including Atterberg limits determination (ASTM D 4318) and grain-size analyses (ASTM D 422) were performed on representative samples. Undisturbed samples underwent unit weight determination (SLP-2), grain-size analysis, Atterberg limits, and specific gravity tests (ASTM D 854). Triaxial Q (ASTM D 2850) and R (SLP-7) tests were conducted on representative undisturbed samples.

Test results are summarized in table 2 and are also shown in the graphic logs of SPT borings. Natural moisture contents of split-spoon samples range from 4.8 to 68.5 percent, while moisture contents of undisturbed samples vary from 11.2 to 56.6 percent. Dry densities range from 60.2 to 113.9 pcf with an average of 100.6 pcf. Under Q-test conditions, shear strength tests produced friction angles from zero to 23.7 degrees with cohesions from 0.30 to 0.53 tsf. Under R-test conditions, shear strength tests produced friction angles from 19.4 to 22.3 degrees with cohesions from 0.84 to 1.14 tsf for natural moisture samples and friction angles from 6.0 to 19.2 degrees with cohesions from 0.41 to 0.96 tsf for saturated samples.

O. P. Thornton
SEP 4 1985

JOHN SEVIER STEAM PLANT - ASH DISPOSAL AREA - PROPOSED DRY STACKING

Six bag samples of fly ash were taken at random locations in ~~borrow area J.~~ original disposal area ADA. Based on visual classification, all materials were very similar, thus one soil class was established. As shown in table 3, the material contains 79 ~~75~~ percent silt-size, 17 percent clay-size, and 4 percent sand-size particles and is nonplastic. Standard compaction tests (ASTM D 698) yielded an optimum moisture of 22.1 percent with a maximum density of 92.0 pcf. At the specified test conditions, shear strength tests produced friction angles of 15.0 and 23.8 degrees with corresponding cohesions of 0.15 and 0.33 tsf for triaxial R and Q conditions respectively.

In addition, a bearing ratio test (ASTM D 1883) was performed using undisturbed coarse fly ash (SM) samples from US-11 and US-11A, having a natural moisture content of 15.4 percent and a dry density of 90.4 pcf. The specimen was soaked for 5 days. A surcharge of 10 lb was used. Based on measurements of initial and final height of the specimen, no swelling was indicated. The bearing ratio at 0.100-in. penetration is 0.58. Table 4 shows bearing ratio test data and the load-penetration curve is attached.

Summary

The soil profile for the ash dike and disposal area investigated consists of fly ash fill (covered by a lean clay layer on ash dike only) underlain by a clay alluvium resting on a weathered shale. Based on SPT data, soft to very soft layers are indicated at several locations near interface lines. Shear strengths of the soils tested are low to medium. The bearing ratio at 0.100-in. penetration is 0.58. Borrow soil was determined to be a nonplastic fly ash and produced medium shear strength at the specified test conditions.

Original signed by John A. Raulston

John A. Raulston

YCC:BJ
Attachments
cc (Attachments):
RIMS, SL26 C-K
W. H. Childres, SME-K
S. D. Stone, 179 LB-K (2)
R. E. Harris, W2D220 C-K

This was prepared principally by Yung C. Chung, extension 2771.

A36245.1

B65 '86 0625 004

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

TEST REQUEST

Test Request Number N/A

TO: W. H. Childres, Supervisor, Singleton Materials Engineering Laboratory, SME-K

FROM: R. E. Harris, W2D220C-K

DATE: 6-25-86

Project JOHN SEVIER S.P. - ASH DISPOSAL AREA - PROPOSED DRY STACKING

Account See Attachment. Date Needed See Attachment.

1. Type and size of material: See Attachment.

2. Test evaluation requested: See Attachment.

3. Test material to following requirements: See Attachment.

4. Reports:

Test report to indicate acceptance or rejection ___ yes ✓ no

Submit report to: See Attachment.

For technical information contact: See Attachment.

JUN 26 '86

E15115.07

SOIL INVESTIGATION REQUEST

SUBJECT - John Sevier S.P. – Ash Disposal Area – Proposed Dry Stacking

OE SOIL SCHEDULE NO. 6.6

FIELD EXPLORATION

FOUNDATION OR IN-SITU

SPT (D1586*) (12) Continuous sampling ____, Sample interval 5' (max.) or each material change ✓, Other ____
To top of rock ** , or Elev. ____, or Depth ***

UNDISTURBED SAMPLING INSTRUCTIONS (D1587)
No. borings 3, No. UD samples required 12,
Sample each rep. soil type ✓, Sample each rep. soil condition ____,
Est. depth 60', Contact GGEG ✓, Other ____

PIEZOMETERS
No. required Ø, See sketch ____ for details,
Reading schedule ____
Special instructions ____

BORROW

Volume required (in-place) Ø C.Y., No. holes/acre ____

AUGER BORINGS (D1452) ____ TEST PITS ____
To top of rock ____, or Elev. ____, or Depth ____, Other ____

JAR/BAG SAMPLING INSTRUCTIONS

Sample frequency ____
Sample each rep. soil type ____
Other ____

GENERAL

Field classification (D2488): Each sample ✓, Other ____
Borings by: Dry procedures ✓, Drilling mud ____, Other ____
Borehole groundwater readings:
At completion of boring ____, 1 hr. ✓, 24 hr. ✓, Other ____
Special requirements for hole backfill Use fine-grained soil.
Boring locations shown on attached Drawing
Allowable boring offset from locations shown ****
Survey required ✓ Accuracy required 1.0' Horiz, 0.1' Vert.
Other instructions or requirements
**** Locate approximately from drawing then give location with above accuracy.
*** Borings 11 and 12 to be drilled to 30' depth.
** Borings 1 through 10 to be drilled to top of rock.

*Applicable ASTM test designation or SME special laboratory procedure.

LAB TESTING (Continued)

BORROW SOILS	ASTM or SME Proc.	All Samples	Other
A. JAR SAMPLES			
Classification	D2487		
Moisture Content	D2216		
Liquid Limit	D4318		
Plastic Limit	D4318		
Particle Size	D422		To D10 size ______
B. SOIL CLASSES		Each Soil Class	REPRESENTATIVE ASH SAMPLES
Classification	D2487	✓	
Liquid Limit	D4318	✓	
Plastic Limit	D4318	✓	
Particle Size	D422	✓	To D10 size ______
Specific Gravity	D854	✓	
Moisture-Density (Compaction)			
Standard	D698	✓	Family of compaction control curves ✓
Modified	D1557		Family of compaction control curves ______
Moisture-penetration	SLP5	✓	
Relative Density	D4253/4		Granular soils only
		Each Soil Class	MOLDING CONDITIONS AND SPECIAL INSTRUCTIONS
Consolidation	D2435		____% Compact, ____% Wet of OMC, ____% Dry of OMC, Max. load ____ TSF, Cr read ______ at load ______ TSF
Permeability			
Fine Grain	SLP 3		____% Compact, ____% Wet of OMC, ____% Dry of OMC
Granular	D2434		______ % Relative Density
Unconsolidated-Undrained (Q)	D2850	✓	* % Compact, * % Wet of OMC, * % Dry of OMC
Consolidated-Undrained (R)	SLP7	✓	* % Compact, * % Wet of OMC, * % Dry of OMC, Saturate before shear * , Pore pressure measurement ✓
Consolidated-Drained (S)			
Triaxial	SLP8		____% Compact, ____% Wet of OMC, ____% Dry of OMC, Saturate before shear ______
Direct Shear	D3080		____% Compact, ____% Wet of OMC, ____% Dry of OMC, Submerge before shear ______
Cyclic Triaxial Shear	SLP9		____% Compact, ____% Wet of OMC, ____% Dry of OMC, $\overline{\sigma_3}$ ____ TSF, Max. No. cycles ____, Initial cyclic stress ratio ____
Resonant Column	D4015		____% Compact, ____% Wet of OMC, ____% Dry of OMC, $\overline{\sigma_3}$ ____ TSF, Initial stress (H:V) ratio ____

Unused sample storage requirements -

Other instructions or requirements - These tests are to be performed on representative ash samples

* Contact GGES before testing.

LAB TESTING

FOUNDATION or IN-SITU	ASTM or SME Proc.	All Samples	Rep. Sample of Each Soil Type	Other
A. DISTURBED SAMPLES				
Classification	D2487		✓	
Moisture Content	D2216	✓		
Liquid Limit	D4318		✓	
Plastic Limit	D4318		✓	
Particle Size	D422		✓	To D10 size ____
Specific Gravity	D854		✓	
Other				
Unused Sample Storage Requirements				
B. UNDISTURBED SAMPLES				
Classification	D2487	✓		
Moisture Content	D2216	✓		
Liquid Limit	D4318	✓		
Plastic Limit	D4318	✓		
Particle Size	D422	✓		To D10 size ____
Specific Gravity	D854	✓		
Unit Weight	SLP1/2	✓		
Permeability				
Fine Grain	SLP3			
Granular	D2434			
Relative Density	D4253/4			
Consolidation	D2435			Natural moisture ____, Saturated ____, Max. load ____ TSF, Cr. reqd. ____ at load ____ TSF
Unconfined Compression	D2166			Degree of Sensitivity, St ____
Unconsolidated-Undrained (Q)	D2850			Natural moisture ____
Consolidated-Undrained (R)	SLP7		✓	Natural moisture ✓, (4) Saturated ✓, (4) Pore pressure measurement ✓
Consolidated-Drained (S)				
Triaxial	SLP8			Natural moisture ____, Saturated ____
Direct Shear	D3080			Natural moisture ____, Submerged ____
Cyclic Triaxial Shear	SLP9			$\overline{\sigma}_3$ ____ TSF, Max. No. of cycles ____, Initial cyclic stress ratio ____
Resonant Column	D4015			Natural moisture ____, Saturated ____, $\overline{\sigma}_3$ ____ TSF, Initial stress (H:V) ratio ____

Unused sample storage requirements - ____

Other instructions or requirements - ____

REPORT

Graphic Logs: SPT Borings ✓, Undisturbed Borings ✓, Auger Borings ____, Indicate Groundwater ✓

Boring Location Plan ✓

Soil Profiles (Geologic Sections) ✓

Tabulation of Undisturbed Sample Test Data ✓

Plots of Test Data ✓

Advanced Information Requirements Split spoon boring logs for GGEG selection of US boring locations. Compaction curves of ash for selection of molding conditions.

Final Report: Due Date Aug. 22, 1986

2 Copy(s) to S. D. Stone
1 Copy(s) to R. E. Harris
___ Copy(s) to

ADMINISTRATIVE

Contact Person KEN BURNETT Ext. 3426

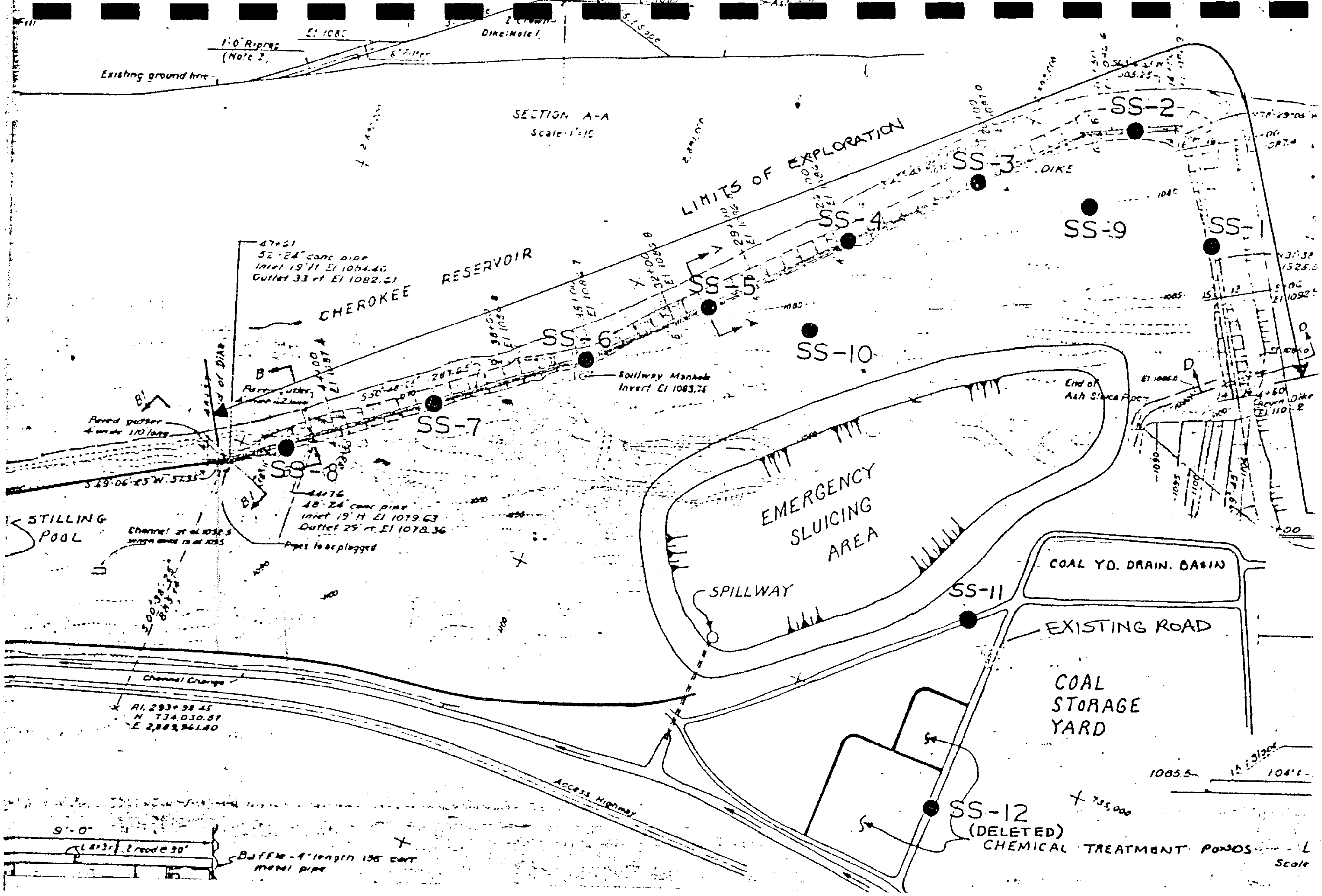
Estimated Cost #46,500

Account Number 544-68-20775, XXX-015

GGEG Reviewer Syed Ahmed, ext. 6905

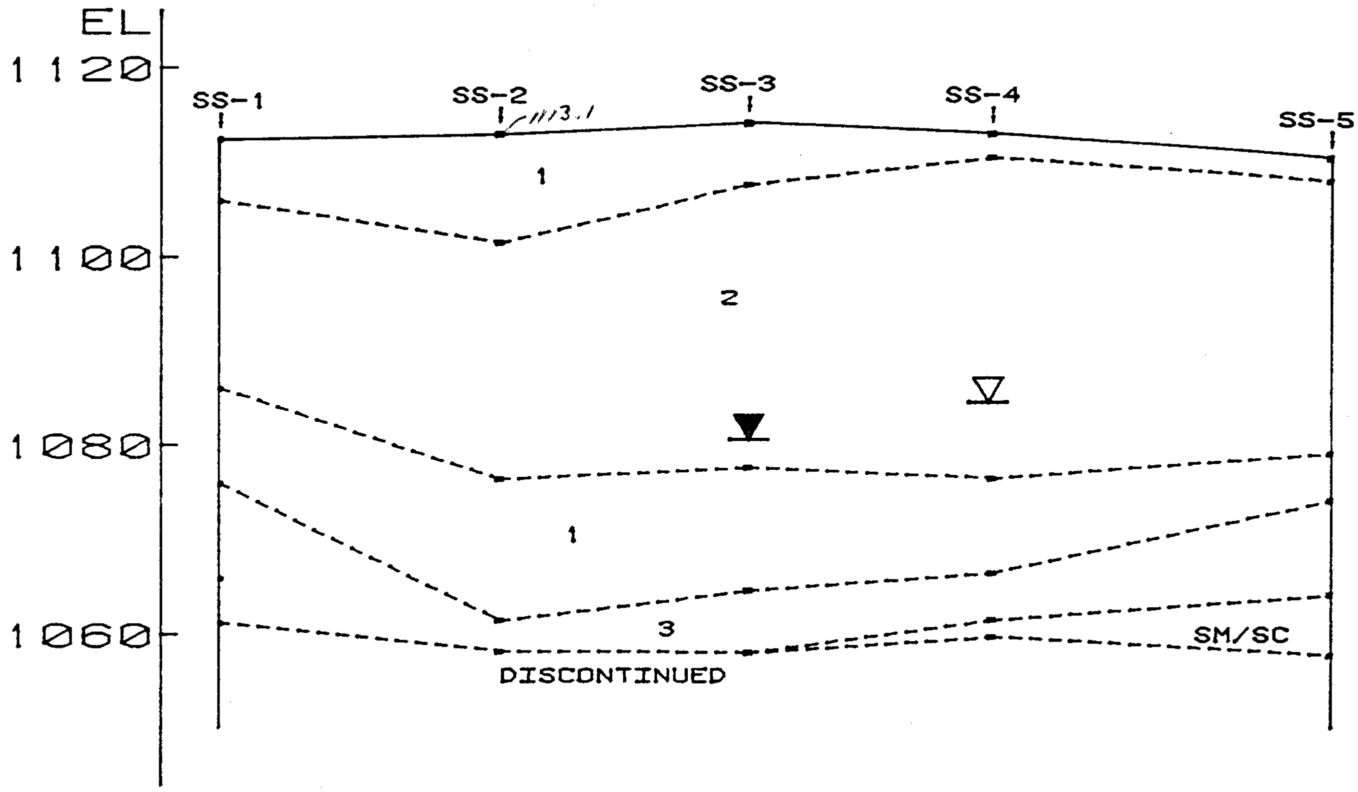
R. E. Harris

075SI.RE



JOHN SEVIER

BORING LOCATIONS



LEGEND

1	SILTY CLAY
2	SANDY SILT
3	SANDY SILTY GRAVEL
▽	1 h WATERTABLE
▼	24 h WATERTABLE

NOTE : STRATA CONTINUITY BETWEEN BORINGS ASSUMED

SCALE: VERT. 1'' = 20'
HORIZ. 1'' = 300'

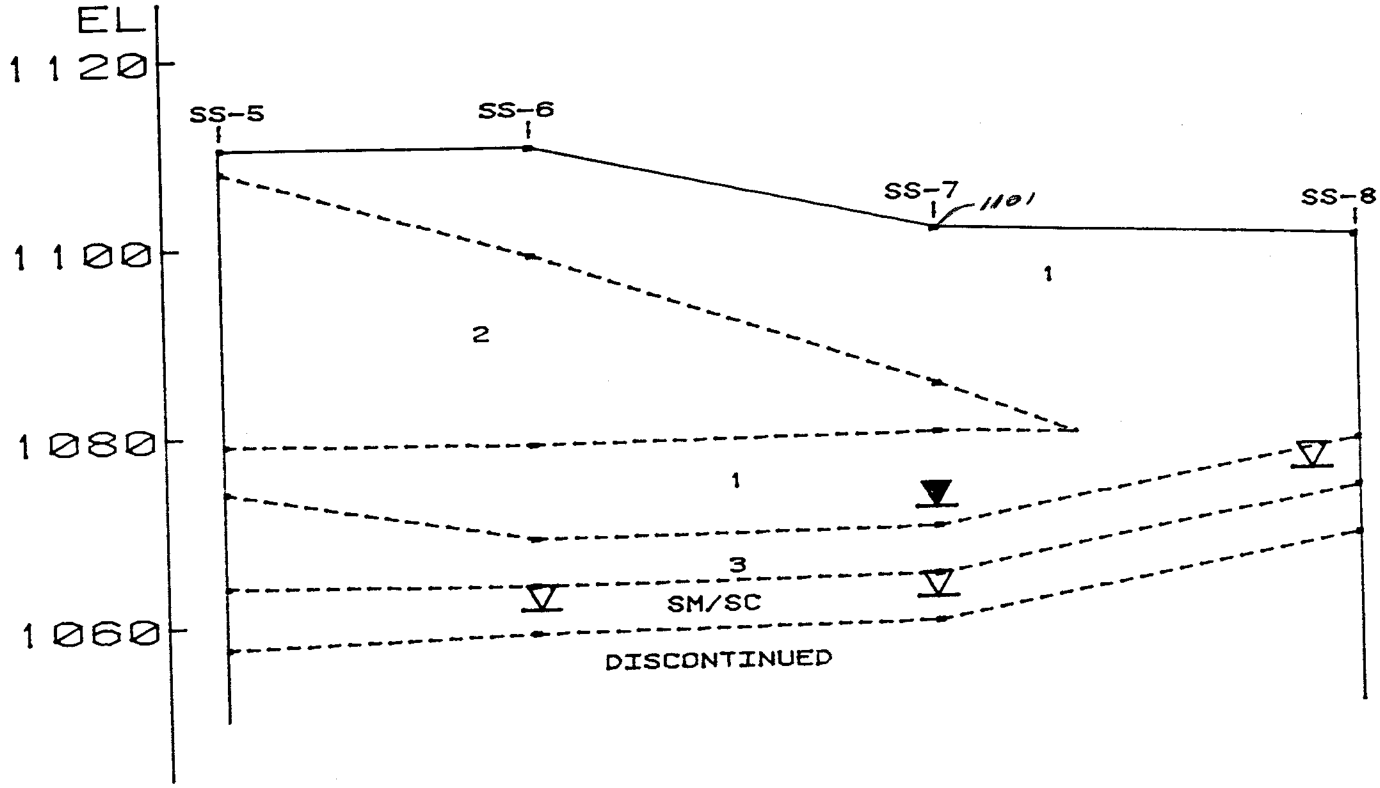
JOHN SEVIER S.P.

ASH DISPOSAL AREA
DRY STACKING
GENERALIZED CROSS SECTION

TENNESSEE VALLEY AUTHORITY
MATERIALS ENGINEERING LABORATORY

SUBMITTED	RECOMMENDED	APPROVED
Tmm	Y. C. Chang	J. J. Best

KNOXVILLE	082286	41	CS	3	604A2092R0



LEGEND

1	SILTY CLAY
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▽	1 h WATERTABLE
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NOTE : STRATA CONTINUITY BETWEEN BORINGS ASSUMED

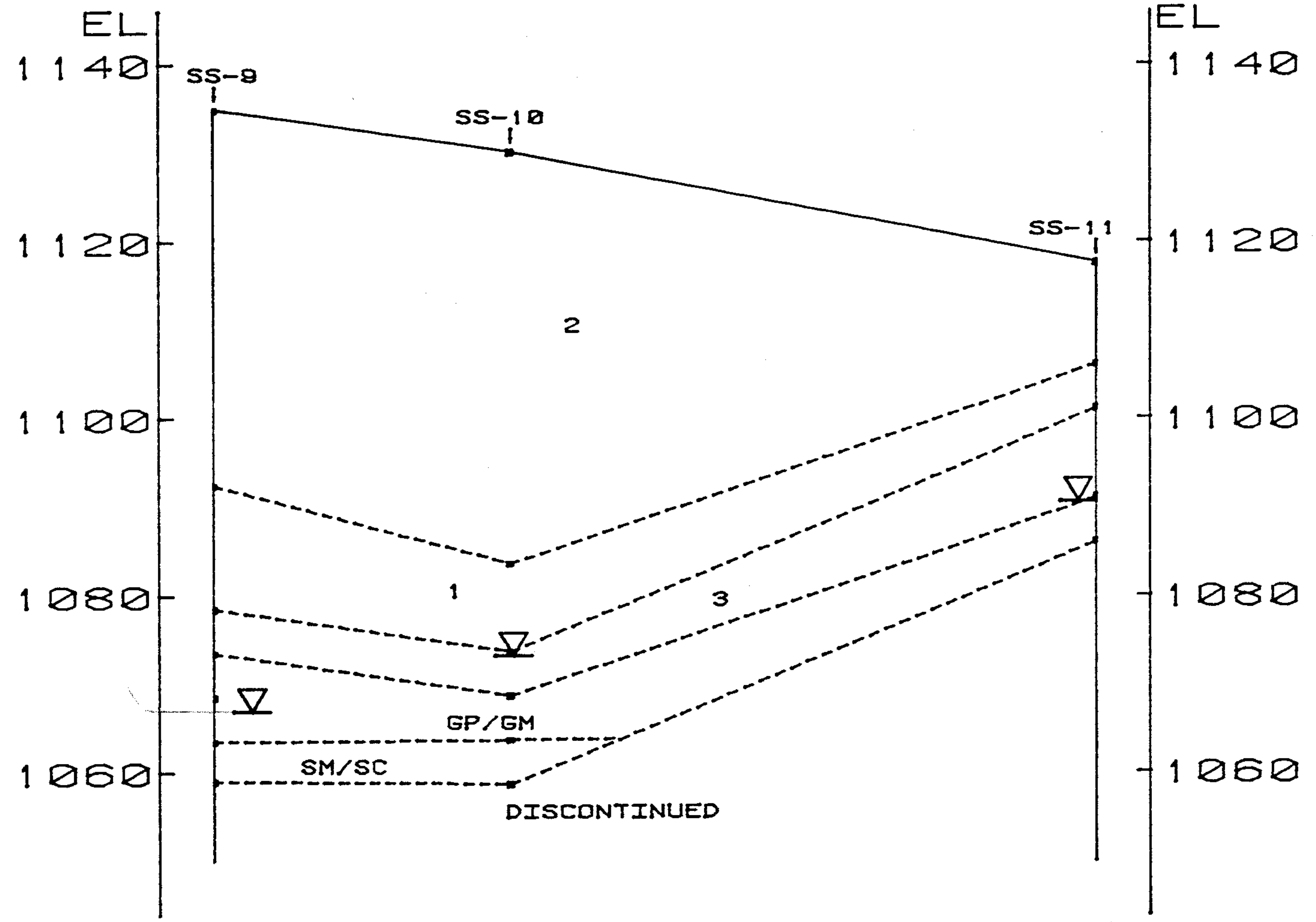
SCALE: VERT. 1'' = 20'
HORIZ. 1'' =300'

JOHN SEVIER S.P.

ASH DISPOSAL AREA
DRY STACKING
GENERALIZED CROSS SECTION

TENNESSEE VALLEY AUTHORITY
MATERIALS ENGINEERING LABORATORY

SUBMITTED	RECOMMENDED			APPROVED	
Jmm	G. C. Chung			J. T. Best	
KNOXVILLE	082286	41	CS	3	604A2093R0



LEGEND

1	SILTY CLAY
2	SANDY SILT
3	SANDY SILTY GRAVEL
▽	1 h WATERTABLE

NOTE : STRATA CONTINUITY BETWEEN BORINGS ASSUMED

SCALE: VERT. 1'' = 20'
HORIZ. 1'' =300'

JOHN SEVIER S.P.

ASH DISPOSAL AREA
DRY STACKING
GENERALIZED CROSS SECTION

TENNESSEE VALLEY AUTHORITY
MATERIALS ENGINEERING LABORATORY

SUBMITTED	RECOMMENDED	APPROVED
JMW	G. C. Chang	G. J. Best

KNOXVILLE	082286	41	C3	3	604A2094R0

Table 1

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA

COORDINATES OF SS BORINGS

Hole	Tennessee (East) North Coordinate	Tennessee (East) East Coordinate	Elevation
SS-1	736865.8	2892667.0	1112.5
SS-2	737030.8	2892252.1	1113.1
SS-3	736748.1	2891973.0	1114.3
SS-4	736465.9	2891710.5	1113.1
SS-5	736073.2	2891344.3	1110.6
SS-6	735728.3	2890998.3	1110.4
SS-7	735318.4	2890506.3	1101.0
SS-8	734904.4	2889985.4	1099.3
SS-9	736828.1	2892365.2	1135.0
SS-10	736480.1	2891999.5	1130.3
SS-11	735603.0	2892460.2	1117.6

A36238.1

Table 2

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA - SUMMARY OF LABORATORY TEST DATA

Elevation	Soil Symbol	Nat. Moist. %	Nat. Moist. % Sat.	Grain-Size Analysis Gravel %	Sand %	Silt %	Clay %	D_{10} mm	Atterb Limits Liq Limit %	Plastic. Index %	Dry Dens pcf	Void Ratio	Triaxial Q Undisturbed ϕ deg	c tsf	Nat. Moist. Triaxial R ϕ deg	c tsf	Saturated Triaxial R Apparent ϕ deg	c tsf	Effective ϕ deg	c tsf
Boring US-2, N 737030.8, E 2892667.0, Surface Elevation 113.1																				
1110.6-1109.1	CL	14.9	85.6	0	19	48	33	--	29	13	113.4	0.462								
1109.1-1108.1	CL	16.3	79.6	4	27	46	23	--	29	9	103.2	0.510								
1107.6-1105.1	CL	17.2	94.2	2	20	45	34	--	31	14	110.8	0.479								
1104.6-1102.1	CL	17.1	91.8	0	18	46	36	--	31	15	110.4	0.490								
1101.6-1099.1	CL	12.5	76.0	5	26	46	23	--	25	8	113.9	0.428								
1098.6-1096.1	ML	18.3	47.7	0	35	62	3	--	NP	NP	75.2	0.863	*probably isolated pocket*							
1086.6-1085.1	ML	25.7	90.0	1	26	61	12	--	NP	NP	89.6	0.695	*70° angle of specimen shear plane*							
1085.0-1084.1	CL	21.6	92.1	2	28	43	27	--	31	12	101.6	0.618								
1083.6-1081.1	ML	56.6	95.5	0	31	65	4	--	NP	NP	60.2	1.333	23.7	0.44	22.3	1.14				
1074.6-1073.1	ML	38.1	--	0	3	93	4	--	NP	NP	--	--	*2.26 S.G.*							
1073.4-1072.1	CL	21.6	91.0	1	20	44	35	--	33	13	102.7	0.641					*15.2*	*0.53*	*26.3*	*0.25*
1073.1-1072.1	CL	21.5	96.9	0	14	46	40	--	29	11	104.6	0.592								
Boring US-7, N 735318.4, E 2890506.3, Surface Elevation 1101.0																				
1094.5-1092.0	CL	18.5	91.1	0	21	47	32	--	26	9	107.4	0.538								
1091.5-1089.0	CL	20.6	95.1	2	19	48	31	--	29	11	104.7	0.571								
1088.5-1086.0	CL	21.4	94.2	0	24	45	31	--	29	11	103.5	0.603	11.7	0.30	19.4	0.84	19.2	0.41	27.9	0.21
1085.5-1083.0	CL	24.5	100.0	1	29	41	29	--	29	11	100.5	0.620								
1076.5-1074.0	CL	24.3	96.1	6	37	39	18	--	27	9	99.4	0.672	*bulge failure*							
1073.5-1071.0	ML-CL	19.7	94.2	1	38	37	24	--	24	7	106.3	0.552								
1070.5-1068.0	ML	26.6	92.8	0	42	45	13	--	21	1	94.4	0.767	0.0	0.53			6.0	0.96	21.9	0.49
													6 tests	*2.67 S.G.*						
Boring US-11, N 735603.0, E 2892460.2, Surface Elevation 1117.6																				
1115.1-1112.6	SM	11.2	38.5	12	64	23	1	.0341	NP	NP	90.5	0.726								
1109.1-1106.6	CL	19.3	89.4	1	26	41	32	--	32	13	106.0	0.579								
1106.1-1103.6	CL	19.2	100.0	2	24	39	35	--	35	17	110.7	0.482								
1103.1-1100.6	CL	16.9	91.0	11	27	37	25	--	30	12	111.6	0.499								
Boring US-11A, N 735603.0, E 2892460.2, Surface Elevation 1117.6																				
1112.1-1110.3	SM	19.6	68.5	12	44	42	2	.0144	NP	NP	89.6	0.696								
1110.3-1109.6	CL	20.6	94.1	0	39	37	24	--	26	7	103.6	0.573								

A36238.5

Table 3

JOHN SEVIER STEAM PLANT

ORIGINAL DISPOSAL AREA RDP
~~BORROW AREA J~~

SUMMARY OF LABORATORY TEST DATA

FLY ASH RDP
~~BORROW~~ SOIL CLASSES

Class	I
Symbol	ML
Mechanical and Hydrometer Analysis	
Gravel, percent	0
Sand, percent	4
Silt, percent	79
Clay, percent	17
Atterberg Limits	
Liquid limit, percent	NP
Plastic limit, percent	NP
Plasticity index, percent	NP
Standard Protector Compaction	
Optimum moisture, percent	22.1
Maximum density, pcf	92.0
Shear Strength at 3% Wet of Optimum Moisture and at 95% of Maximum Unit	
Triaxial Q: ϕ, degrees	23.8
c, tsf	0.33
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit	
Triaxial R: ϕ, degrees	15.0
c, tsf	0.15
$\bar{R}$: ϕ	20.5
c	0.23

A36238.3

Singleton Laboratories

TELECOPY TRANSMITTAL

DATE: 6/18/91

TO: Ron Powell
(NAME AND COMPANY)

TVA MR3D-C, Ext. 8912
(ADDRESS)

FROM: Yung Chung
(NAME)

1413 TOPSIDE ROAD, LOUISVILLE, TN 37777; (615) 970-2299

TOTAL NUMBER OF PAGES TRANSMITTED, INCLUDING COVER SHEET: 3

SENDING TO: ( ) 751-6403

VERIFY: ( )

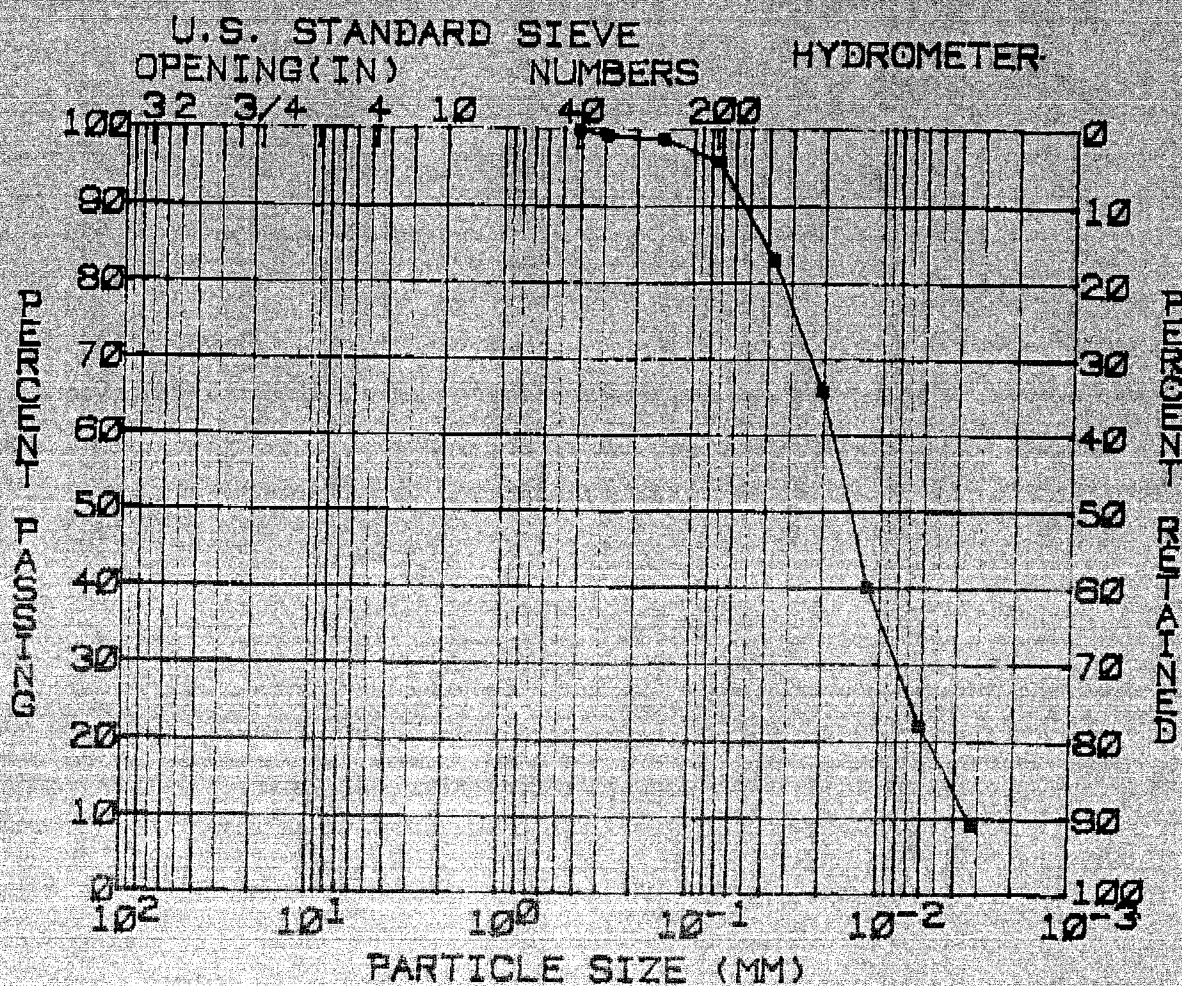
COMMENTS: Per your request, a copy of grain-size analysis for John Sevier S.P. is enclosed.

THIS TELECOPY WAS SENT FROM (615) 970-2312 XEROX 7011

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.
FEATURE:ASH POND J
STATION:
RANGE :

BORING:
EL. :
SAMPLE:
DATE :8-4-88



GRAVEL(%)= 0
SAND(%) = 4
SILT(%) = 79
CLAY(%) = 17

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

SOIL SYMBOL= ML
MOIST RH.(%)= --
SP. GR. = 2.43

L.L.(%) = NP
P.I.(%) = NP

REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
General Classification Tests

Project: JOHN SEVIER S.P.
Feature: ASH POND J
Station:
Range :
Boring :

El. :
Sample:
Part :

Tested By : MC
Computed By: MHD
Checked By : [signature]
Report Date: 8-4-86

Specific Gravity = 2.426
Flask No. = 23.00
Soil Wt.(gm) = 50.00

Temp.(deg.c.) = 22.60
Total Wt.(gm) =704.88

Moisture Determination
Dry Wt.+Tare(gm)= 318.30

Tare Wt.(gm) = 108.40

Hygroscopic Moisture
Wet Wt.+Tare(gm)= 65.90
Tare Wt.(gm) = 39.30

Dry Wt.+Tare(gm)= 65.80
Moisture(%) = 0.38

Non-Plastic Soil
Sieve and Hydrometer Analysis
Total Dry Weight(gm) = 209.9

Sieve	Wt.Ret.	% Pass.	Size(mm)
3 in.	0.0	100.0	76.2000
2 in.	0.0	100.0	50.8000
1.5 in.	0.0	100.0	38.1000
1 in.	0.0	100.0	25.4000
3/4 in.	0.0	100.0	19.0500
3/8 in.	0.0	100.0	9.5300
NO.4	0.0	100.0	4.7500
NO.10	0.0	100.0	2.0000
NO.20	0.0	100.0	0.8500
NO.40	0.0	100.0	0.4250
NO.50	0.1	99.8	0.3000
NO.100	0.4	99.2	0.1500
NO.200	1.9	96.2	0.0750

Air Dry Weight(gm)= 50.00
Corrected Weight(gm)= 49.81

Time	Temp.	Hyd.Rdg	Corr	% Pass	Size(mm)
1 min.	23.0	46.5	5.0	83.3	0.0383
4 min.	23.0	37.9	5.0	66.0	0.0207
15 min.	23.0	25.0	5.0	40.2	0.0117
1 hour	23.0	16.0	5.0	22.1	0.0062
4 hours	23.0	9.5	5.0	9.0	0.0032

Soil Symbol= ML (Inorganic silt of low plasticity)
Gravel(%)= 0 Sand(%)= 4 Silt(%)= 79 Clay(%)= 17

Table 4

JOHN SEVIER STEAM PLANT

ASH DISPOSAL AREA

BEARING RATIO ASTM D 1883

Boring US-11 and US-11A, Sample 1

Type of Material: SM (fly ash)

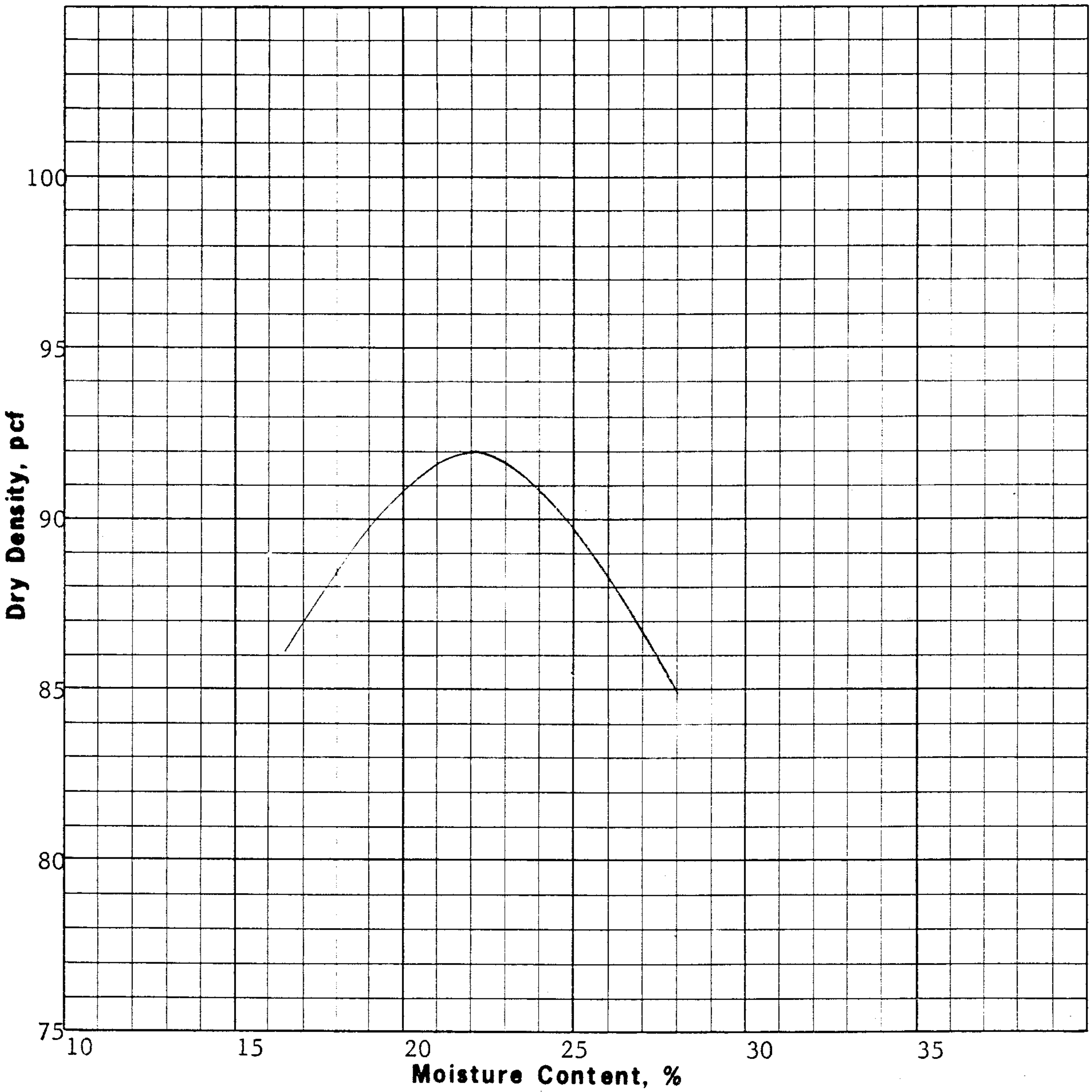
Moisture Content: 15.4 percent

Dry Density: 90.1 pcf

Surcharge Weight: 10.0 lb

Deformation in.	Load psi	Bearing Ratio
0.025	1.55	--
0.050	3.00	--
0.075	4.40	--
0.100	5.75	0.58
0.125	7.00	--
0.150	8.40	--
0.175	9.60	--
0.200	10.90	0.73
0.300	15.65	0.82
0.400	17.75	0.77
0.500	18.50	0.71

A36238.4



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
ML	0	4	79	17	2.43	NP	NP	22.1	92.0

Plus No. 4 Specific Gravity, S S D	--
Plus No. 4 Absorption, %	--

Remarks:

Project John Sevier Steam Plant

Feature ~~Ash Pond J~~ ORIGINAL DISP. AREA ROA

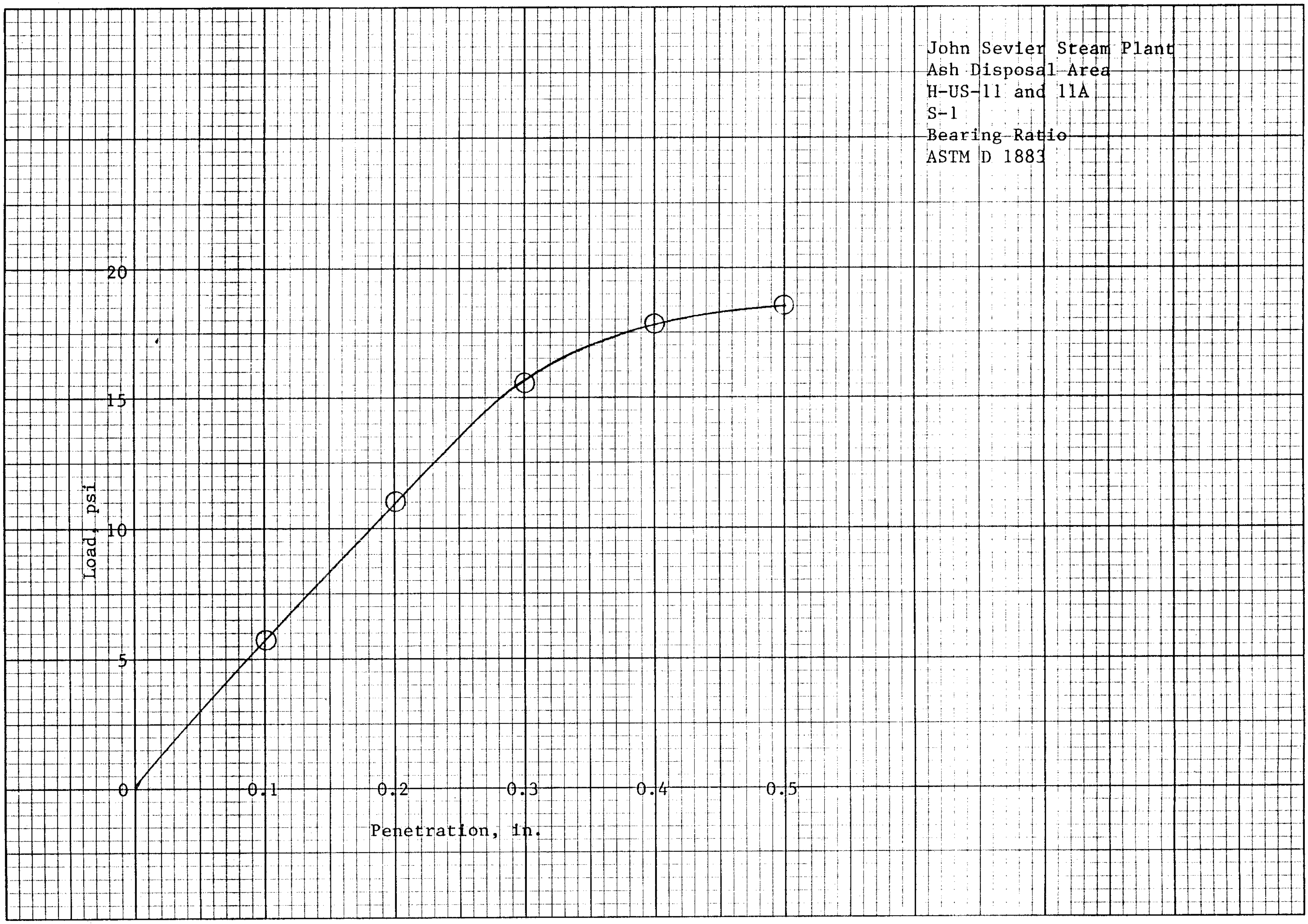
ASTM Designation D 698A

Date Tested July 17, 1986

COMPACTION TEST (FAMILY OF CURVES)

 Tested by: MC Reviewed by: CRE

4[redacted]82



TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE LEGEND AND SYMBOLS

Depth 1"=5'	El	SPT (N)	Log*	W	LL	PI	Gr	Description or Test Results
Boring Depth and Scale	Elevation	Blows Per Foot (SS Boring)	Lab Soil Type	Moisture Content	Liquid Limit	Plasticity Index	Soil Group Number	

Legend

Symbol	Meaning
Cl,etc	Soil Type (Unified Classification)
Mat'l	Notation of Soil Not Sampled (SS, PAH, HAH Logs)
(Core) Type	Bedrock (Note core if cored)
▽	Initial Water Table Reading
▼	24 h Water Table Reading
	Explanation of US Sampling Limits if Applicable

Boring Symbols

SS - 2-in. od Split Spoon Boring

SPT - Standard Penetration Test Blows Per Foot With 2-in. Split Spoon

CPT - Cone Penetration Test

US - Undisturbed Sample Boring

PAH - Power Auger Hole

HAH - Hand Auger Hole

TP - Test Pit or Trench

V - Vane Shear

P - Piezometer

Under Description or Test Results		
Test	**Engineering Test Results**	
Q, R, $\overline{R}$, S	Friction Angle (degrees)	Cohesion (tsf)
UC	Unconfined Compressive Strength (tsf)	Sensitivity Ratio
C	Compression Index	Preconsolidation Pressure (tsf)
k	Coefficient of Permeability (cm/sec)	

Example:

Q 12.0 0.62 R 19.6 0.21 S 34.0 0
UC 4.0 2.6 C 0.72 2.0 k 5.6

Soil Test Symbols

Q - Unconsolidated-Undrained Triaxial Compression

R - Consolidated-Undrained Triaxial Compression (Saturated)

$\overline{R}$ - Effective Consolidated-Undrained Triaxial Compression

R nat - Consolidated-Undrained Triaxial Compression (Natural Moisture)

S - Consolidated-Drained Direct Shear

UC - Unconfined Compression

C - Consolidation

k - Permeability

FLA

SINGLETON MATERIALS ENGINEERING LABORATORY

FIELD LOG ABBREVIATIONS

Typical Name	Abbreviation
Sandy gravel	sd Gv
Silty gravel	si Gv
Clayey gravel	cl Gv
Sand	Sd
Silty sand	si Sd
Clayey sand	cl Sd
Sandy silt	sd Si
Clayey silt	cl Si
Fat silt	ft Si
Sandy clay	sd Cl
Silty clay	si Cl
Riprap	RR
Medium clay	md Cl
Fat clay	ft Cl
Cobble	Cob
Boulder	Bld
Topsoil	TS

Name Modifiers

Clean	cln
Coarse	crs
Dirty	dty
Fine	fn
Organic	org
Poorly graded	pgd
Well graded	wgd
Degraded	degd

Gravel Shape

Angular	ang
Platy	plgy
Rounded	rd
Subangular	sb ang
Subrounded	sb rd

Lithology and Mineralogy	Abbreviation
Bedrock	br
Chert	cht
Dolomite	dol
Limestone	ls
Manganese	mn
Micaceous	mic
Pyrite	py
Quartz	qtz
Sandstone	ss
Shale	sh
Bentonite	bent
Hematite	hem

Color

Black	blk
Blue	blu
Brown	brn
Cream	crm
Dark	dk
Gray	gy
Green	grn
Light	lt
Maroon	mrn
Mottled	mott
Olive	olv
Pink	pk
Purple	pur
Red	r
Rust	rst
Tan	tn
White	wht
Yellow	yel

Moisture

Dry	d
Moist	mst
Very moist	v mst
Wet	w

Structure	Abbreviation
Blocky	blky
Fissured	fis
Homogeneous	homo
Laminated	lam
Saprolitic	sapr
Shaly	shly
Slickensided	slsid
Stratified	strat

Consistency	Abbreviation
Dense	dns
Firm	f
Hard	hd
Loose	lse
Soft	s
Stiff	stf
Very stiff	v stf

Origin	
Alluvial	all
Colluvial	coll
Loess	lss
Residual	resd

General Modifiers	
Alternating	altng
Angle	⊁
Augering	augg
Bottom Ash	ba
Coal	col
Contaminated	cont
Dip	dp
Disturbed	dstrb
Debris	dbr
Discontinued	Disc
Drilling mud	mud
Drive	dr
Dust	dst
Elevation	el
Feet	ft
Fill	fl
Fiber	fbr
Fly Ash	fa
High/highly	h
Horizontal	hor
Hydraulic	hyd
Inch	in
Inclusion	inc
Incomplete Recovery	IR
Interface	infa
Low	L
Material	matl
Medium	Med
Original	orig
Partings	prtgs
Plastic	plstc
River	rvr
Roots	rts
Rough	rou
Slow	sl
Small	sm
Spoil	sp
Terraced	ter
Thick	thk
Thin	thn
Trace	tr
Variable	var
Vegetation	veg
Vertical	vert
Weathered	wth
With	w/
Wood	wd

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-1 STATION: 736865.8NRANGE 2892667.0 ESURFACE EL: 1112.5
DATE DRILLED: 7/1/86 TO PREPARED BY: MHD CHECKED BY: CEE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
								LS GV, ROAD METAL, FL
	1110	21	CL	14.2	34	7	1	SI CL, LT BRN-LT GY, D, FL
5		10	CL	21.5	34	7	1	LAM FT CL, LT BRN-LT GY, MST, FL (TR LS GV)
	1105							
10		9	ML	18.5	NP	NP	7	STRAT: 50% SI CL, 50% SI FN SD, LT BRN-GY, MST, FL & FA
	1100							
15		7	ML	17.1	NP	NP	7	SI MED SD, DK GY, MST, FA FL
	1095							
20		7	ML	24.0	NP	NP	7	SI FN SD, DK GY, MST, FA FL
	1090							
25		2						NO RECOVERY
	1085							
30		18	CL	19.8	31	15	2	MOTT SI CL, BRN-GY, MST, ALL
	1080							
35		20	CL	16.6	31	15	2	FN SD CL, DK B RN, MST, ALL (TR SB RD QTZ GV)
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-1 STATION: 736865.8N RANGE: 2892667.0 E SURFACE EL: 1112.5
DATE DRILLED: 7/1/86 TO PREPARED BY: MHD CHECKED BY: [signature]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1075	18	GM	19.1	21	4	3	STRAT: 50% FN SD SI, 50% SI FN SD, BRN, MST, ALL(TR SB ANG CHT)
40								
	1070	34	GM	9.1	21	4	3	CRS SD GV, BRN-WHT, MST, ALL (GV SB RD DEGDD QTZ & CHT)
45								
	1065	50+	ML	13.8	NP	NP	8	SI CL (WTH SH SAPR), DK GY, MST, RESD
50								
	1060							DISCONTINUED. EL 1061.2
55								
	1055							
60								
	1050							
65								
	1045							
70								
1''=5'		* Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-2 STATION: 737030.8NRANGE:2892252.1ESURFACE EL: 1113.1
DATE DRILLED: 7/2/86 TO PREPARED BY: MHD CHECKED BY: [illegible]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
		15	CL	14.2	34	7	1	LAM SI CL, LT BRN-LT GY, D, FL
5	1110	7	CL	19.2	34	7	1	LAM SI CL, LT BRN-LT GY, MST, FL (TR COAL)
10	1105	11	CL	16.8	34	7	1	LAM SI CL, LT BRN-LT GY, MST, FL
15	1100	7	ML	22.2	NP	NP	8	SI FN SD, LT GY-DK GY, MST, FA FL (TR CL LAM)
20	1095	10	ML	23.7	NP	NP	8	SI FN SD, LT GY:DK GY, MST, FA FL (TR CL LAM)
25	1090	11	ML	24.4	NP	NP	8	SI FN SD, LT GY-DK GY, MST, FA FL (TR CL LAM)
30	1085	2	ML	58.1	NP	NP	8	LAM FN SD SI, BLK-GY, W, FA FL
35	1080	1	ML	47.7	NP	NP	8	FN SD SI, GY, W, FA FL
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-2 STATION: 737030.8NRANGE:2892252.1ESURFACE EL: 1113.1
DATE DRILLED: 7/2/86 TO PREPARED BY: MHD CHECKED BY: CBG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
40	1075	19	CL	20.2	31	11	4	SI CL, BRN, MST, ALL
45	1070	10	CL	22.6	31	11	4	SI CL, BRN, MST, ALL
50	1065	6	CL	23.4	26	10	5	FN SD CL, MOTT, LT BRN-DK BRN, V MST, ALL
55	1060	50	SM-SC	9.0	36	11	10	CRS SD GV (WTH SH, BR), DK GY, MST, RESD
								DISCONTINUED. EL 1058.3
60	1055							
65	1050							
70	1045							

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-3 STATION: 736748.1 RANGE: 2891973.0 SURFACE EL: 1114.3
DATE DRILLED: 7/3/86 TO PREPARED BY: MHD CHECKED BY: OBG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
		19	CL	16.1	31	15	2	FN SD FT CL, MOTT LT BRN-LT GY, MST, FL
5	1110	9	CL	18.4	31	15	2	LAM FT CL, LT BRN-LT GY, MST, FL
10	1105	3	ML	24.6	NP	NP	8	SI FN SD, DK GY, MST, FA FL
15	1100	8	ML/CL	22.8	NP	NP	9	LAM 50% SI CL, 50% FN SD SI (FA) BRN-DK GY, MST, FL
20	1095	8	ML	24.8	NP	NP	8	LAM 50% SI CL, 50% FN SD SI (FA) BRN-DK GY, MST, FL
25	1090	7	ML/CL	24.7	NP	NP	9	LAM 50% SI CL, 50% FN SD SI (FA) BRN-DK GY, MST, FL
30	1085	5	ML	47.1	NP	NP	8	FN SD SI, DK GY, MST, FA FL
35	1080		ML	44.6	NP	NP	8	▼IR; FN SD SI, DK GY, W, FA FL
1''=5'		* Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-3 STATION: 736748.1N RANGE: 2891973.0E SURFACE EL: 1114.3
DATE DRILLED: 7/3/86 TO PREPARED BY: MHD CHECKED BY: [illegible]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
40	1075	10	CL	18.9	36	14	6	STRAT: 30% CRS SD GV(WTH SH), 70% SI CL, DK BRN, MST, ALL
		11	CL	22.1	31	11	4	SI CL, MOTT BRN-LT GY, MST, ALL
45	1070							
		9	CL	19.4	26	10	5	FN SD CL, BRN, V MST, ALL (TR SB ANG SH GV)
50	1065							
		31	GM	15.9	21	4	3	DTY MED SD GV, BRN, W, ALL GV--SB ANG QTZ & CHT
55	1060							
								BEDROCK. EL 1058.2
60	1055							
65	1050							
70	1045							

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-4 STATION: 736465.9NRANGE:2891710.5ESURFACE EL: 1113.1
DATE DRILLED: 7/3/86 TO PREPARED BY: MHD CHECKED BY: CB

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
		22	CL	12.1	31	15	2	SI CL, BRN, D, FL(TR LS GV)
5	1110	8	ML	15.8	NP	NP	8	FN SD SI, DK GY, MST, FA FL F
10	1105	4	ML	23.2	NP	NP	8	FN SI SI, DK GY, MST, FA FL
15	1100	8	ML	26.1	NP	NP	8	LAM FN SD SI, DK GY, MST, FA FL (TR CL LAM)
20	1095	9	ML	29.7	NP	NP	8	LAM FN SD SI, DK GY, MST, FA FL (TR CL LAM)
25	1090	6	ML	37.9	NP	NP	8	LAM FN SD SI, DK GY, V MST, FA FL(TR CL LAM)
30	1085	5	ML	53.1	NP	NP	8	▽FN SD SI, MOTT GY-DK GY, W,FA FL
35	1080	24	ML	25.9	NP	NP	7	STRAT: 30% SI MED SD(FA), 40% SI CL, 30% CRS SD GV, BLK-DK BRN, W

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-4 STATION: 736465.9NRANGE:2891710.5ESURFACE EL: 1113.1
DATE DRILLED: 7/3/86 TO PREPARED BY: MHD CHECKED BY: [signature]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1075							
40		22	CL	19.7	31	11	4	SI CL, BRN, MST, ALL
	1070							
45		27	CL	12.6	26	10	5	STRAT FN SD CL, 20% FN SD GV, BRN, MST, ALL(SB ANG CHT DEGDD)
	1065							
50		35	SP-SM	14.7	NP	NP	11	DTY GV FN SD, BRN, V MST, ALL SB ANG CHT GV DEGDD
		50	SM-SC	4.8	36	11	10	GV CRS SD (WTH SH SAPR), GY, D, RESD
	1060							
55								DISCONTINUED. EL 1059.8
	1055							
60								
	1050							
65								
	1045							
70								

1''=5'

*Lab. Classif.

FN SD SI, LT GY, MST, FA FL (TR

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-5 STATION: 736073.2NRANGE:2891344.3ESURFACE EL: 1110.6
DATE DRILLED: 7/7/86 TO PREPARED BY: MHD CHECKED BY: CBG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1110	26	CL	10.0	30	13	14	SI CL, BRN, D, FL
5	1105	7	ML	21.8	NP	NP	12	FN SD SI, LT GY, MST, FA FL(TR COAL)
10	1100	3	ML	21.1	NP	NP	12	FN SD SI, LT GY, MST, FA FL(TR COAL)
15	1095	5	ML	30.1	NP	NP	12	FN SD SI, LT GY, MST, FA FL (TR COAL)
20	1090	4	ML	40.7	NP	NP	12	FN SD SI, LT GY, MST, FA FL (TR COAL)
25	1085	1						NO RECOVERY
30	1080	1	ML	57.2	NP	NP	12	FN SD SI, DK GY, W, FA FL
35		32	CL	22.1	27	10	15	SI CL, MOTT LT BRN-DK BRN, MST, ALL (TR RD QTZ GV)
1''=5'		* Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-5 STATION: 736073.2NRANGE:2891344.3ESURFACE EL: 1110.6
DATE DRILLED: 7/7/86 TO PREPARED BY: MHD CHECKED BY: DKG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1075							
40	1070	16	SC	17.1	25	8	13	FN SD CL, MOTT LT BRN-DK BRN, V MST, ALL
45	1065	8	SC	20.1	25	8	13	FN SD CL, BRN, V MST, ALL
50	1060	29	SC-SM	31.0	36	11	10	SI CL (WTH SH SAPR), DK BRN, MST, RESD
55	1055							DISCONTINUED. EL 1057.7
60	1050							
65	1045							
70								

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-6 STATION: 735728.3NRANGE:2890998.3ESURFACE EL: 1110.4
DATE DRILLED: 7/7/86 TO PREPARED BY: MHD CHECKED BY: [signature]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1110							
		20	CL	15.6	30	13	14	SI CL, MOTT LT BRN-R BRN, MST, FL (TR LS GV)
5	1105	9	CL	17.6	30	13	14	LAM SI CL, LT BRN-LT GY, MST, FL(TR LS GV)
10	1100	15	CL	19.8	30	13	14	LAM SI CL, LT BRN-LT GY, MST, FL (TR LS GV)
15	1095	8	ML	25.6	NP	NP	12	FN SD SI, DK GY, MST, FA FL
20	1090	4	ML	33.1	NP	NP	12	LAM FN SD SI, DK GY-GY, V MST, FA FL
25	1085	6	ML	43.7	NP	NP	12	LAM 70% FN SD SI, 30% SI FN SD, LT GY-BLK, V MST, FA FL
30	1080	9	ML	51.9	NP	NP	12	FA, P GD, GY, V MST, LSE
35		21	CL	22.0	30	13	14	MOTT, FN CL SI, MST, STF
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-6 STATION: 735728.3NRANGE:2890998.3ESURFACE EL: 1110.4
DATE DRILLED: 7/7/86 TO PREPARED BY: MHD CHECKED BY: [handwritten initials]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1075							
40	1070	14	CL	19.2	27	10	15	MOTT, FN CL SI, MST, STF, ±2% SB RD GV
45	1065	49	GP-GM	8.9	NP	NP	16	BRN, SI GV, MST, F, 30% RD TO SB RD GV
50	1060	50+	SM-SC	25.2	36	11	10	▽BRN-GY, WTH SH, MST, HD
								DISCONTINUED. EL 1058.9
55	1055							
60	1050							
65	1045							
70								
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-7 STATION: 735318.4NRANGE:2890506.3ESURFACE EL: 1101.0
DATE DRILLED: 7/8/86 TO PREPARED BY: MHD CHECKED BY: CCE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1100	23	CL	14.0	30	13	14	MOTT CL GV, MST, F, ±10% ANG-SB ANG GV
5	1095	20	CL	16.0	30	13	14	MOTT CL GV, MST, F, ±5% ANG-SB ANG GV
10	1090	4	CL	20.4	27	10	15	MOTT CL SI, MST, LST, ±2% ANG GV
15	1085	8	CL	21.8	27	10	15	MPTT SD CL, MST, LSE, P GD, ±2% ANG GV
20	1080	1	ML	57.4	NP	NP	12	FA, GY, V MST, P GD, S
25	1075	6	CL	25.9	27	10	15	MOTT CL SI MIX/W FA, GY, V MST, P GD, S, ±5% SB ANG GV
30	1070	2	CL	28.0	27	10	15	▼ FA GY, V MST, LSE P GD
35		4	SM	31.4	28	3	19	FA GY, V MST, LSE, P GD
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-7 STATION: 735318.4NRANGE:2890506.3ESURFACE EL: 1101.0
DATE DRILLED: 7/8/86 TO PREPARED BY: MHD CHECKED BY: CBE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1065							
		50+	SM-SC	14.8	36	11	10	WTH SH, BRN-GY, MST, HD
40								
	1060							
								DISCONTINUED. EL 1059.5
45								
	1055							
50								
	1050							
55								
	1045							
60								
	1040							
65								
	1035							
70								

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-8 STATION: 734904.4NRANGE:2889985.4ESURFACE EL: 1099.3
DATE DRILLED: 7/9/86 TO PREPARED BY: MHD CHECKED BY: CBG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
		24	CL	19.5	30	13	14	MOTT SI CL, MST, FN, STF, ±2% ANG GV
5	1095	16	CL	24.3	35	15	17	SI CL, TN, MST, STF, FN
10	1090	11	CL	18.9	35	10	17	MOTT SD SI, MST, STF, P GD ±15% RD-SB RD GV
15	1085	13	CL	16.3	35	15	17	MOTT CL SI, MST, STF P GD
20	1080	10	CL	21.5	35	15	17	SD CL, TN, MST, STF, P GD ±10% RD-SB RD GV
25	1075	47	GP-GM	16.6	NP	NP	16	▽ SD GV, TN-DK BRN, W GD ±20% RD SB RD GV, MST, HD
30	1070	70+	SM-SC	13.9	36	11	10	WTH SH, BRN-GY, HD, D
35	1065							DISCONTINUED. EL 1067.8

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-9 STATION: 736828.1NRANGE: 2892365.2ESURFACE EL: 1135.0
DATE DRILLED: 7/9/86 TO PREPARED BY: MHD CHECKED BY: CBE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1135	24	ML	13.5	NP	NP	18	FA, GY, P GD, D, DNS, FL
5	1130	28	ML	21.9	NP	NP	12	FA, GY, P GD, D, DNS, FL
10	1125	43	ML	22.2	NP	NP	12	FA, GY, P GD, D, DNS, FL
15	1120	23	ML	22.4	NP	NP	12	FA, GY, P GD, MST, V STF
20	1115	27	ML	16.1	NP	NP	18	FA, GY, DEGDD, MST, V STF, ±20% ANG COL
25	1110	37	ML	20.5	NP	NP	18	FA, GY, D EGDD, MST, V STF, ±20% ANG COL
30	1105	6	ML	30.9	NP	NP	18	BA, GY, MST, S, DEGDD, ±10% ANG COL
35	1100	7	ML	37.5	NP	NP	12	FA, GY, MST, S, DEGDD

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-9 STATION: 736828.1NRANGE:2892365.2ESURFACE EL: 1135.0
DATE DRILLED: 7/9/86 TO PREPARED BY: MHD CHECKED BY: [signature]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1100							
40	1095	9	ML	33.3	NP	NP	18	BA MIX/W FA, GY, MST, S, ±10% ANG COL DEGDD
45	1090	9	ML	41.2	NP	NP	12	FA, GY, P GD, FN, MST, S
50	1085	2	ML	48.1	NP	NP	12	FA, GY, P GD, FN, MST, S
55	1080	1	ML	68.5	NP	NP	12	FA, GY, P GD, FN, V MST, S
60	1075	3	SC	20.3	25	8	13	SD CL, TN, FN, MST, S
65	1070	26	GP-GM	12.4	NP	NP	16	SD GV, BRN, W GD, MST, V STF, ±40% RD-SB RD GV
70	1065	25	SP-SM	19.5	NP	NP	11	▽ SD GV, BRN, W GD, MST, V STF, ±40% RD-SB RD GV
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-9 STATION: 736828.1NRANGE:2892365.2ESURFACE EL: 1135.0
DATE DRILLED: 7/9/86 TO PREPARED BY: MHD CHECKED BY: [signature]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1065							
		100+	SM-SC	18.3	36	11	10	WTH SH, DK BRN, MST, HD
75	1060							
								DISCONTINUED. EL 1059.0
80	1055							
85	1050							
90	1045							
95	1040							
100	1035							
105	1030							

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-10 STATION: 736480.1NRANGE:2891999.5ESURFACE EL: 1130.3
DATE DRILLED: 7/10/86 TO PREPARED BY: MHD CHECKED BY: [illegible]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1130	19	ML	17.6	NP	NP	12	FA, GY, FN, MST, DNS
5	1125	20	ML	21.4	NP	NP	12	FA, GY, FN, MST, DNS
10	1120	28	ML	23.0	NP	NP	12	FA, GY, FN, MST, DNS
15	1115	26	ML	22.8	NP	NP	12	FA, GY, MST, FN, DNS, ±5% COL
20	1110	21	ML	25.4	NP	NP	12	FA, GY, MST, FN, DNS, ±5% COL
25	1105	31	ML	21.0	NP	NP	18	FA, GY, MST, FN, DNS, ±5% RTS
30	1100	18	ML	33.3	NP	NP	12	FA, GY, FN, MST, DNS, FL
35		7	ML	32.4	NP	NP	12	FA, GY, FN, MST, LSE, FL
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-10 STATION: 736480.1NRANGE:2891999.5ESURFACE EL: 1130.3
DATE DRILLED: 7/10/86 TO PREPARED BY: MHD CHECKED BY: CLG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1095							
40	1090	5	ML	41.6	NP	NP	12	FA, GY, FN, MST, DNS, FL
45	1085	3	ML	56.6	NP	NP	12	FA, GY, FN, P GD, V MST, S
50	1080	13	CL	20.1	26	7	20	MOTT, CL SD, MST, DEGD, STF
55	1075	17	CL	19.4	26	7	20	MOTT, CL SD, MST, DEGD, STF, ±10% SB RD GV
								▽
60	1070	10	GM	19.2	21	2	21	SD GV, TN, DEGD, MST, LSE, ±15% SB RD GV
65	1065	40	GP-GM	11.3	NP	NP	16	SD GV, TN, DEGD, MST, LSE, ±15% SB RD GV
70		100+	SM-SC	10.6	NP	NP	10	WTH, SHLY, D, HD, DEGD

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-10 STATION: 736480.1NRANGE:2891999.5ESURFACE EL: 1130.3
DATE DRILLED: 7/10/86 TO PREPARED BY: MHD CHECKED BY: [handwritten initials]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1060							
								DISCONTINUED.
75	1055							
80	1050							
85	1045							
90	1040							
95	1035							
100	1030							
105								
1''=5'		*Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (SPLIT SPOON)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: SS-11 STATION: 735603.0N RANGE: 2892460.2E SURFACE EL: 1117.6
DATE DRILLED: 7/11/86 TO PREPARED BY: TMM CHECKED BY: CBE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	FIELD DESCRIPTION
	1115	30	ML	11.8	NP	NP	18	FA, GY, D, DEGD, STF, ±15% COL
5		10	ML	14.6	NP	NP	18	FA, GY, DEGD, D, LSE ±15% COL
10	1110	6	ML	19.1	NP	NP	18	FA, GY, DEGD, D, LSE, ±15% COL
15	1105	8	CL	20	30	13	14	FT SI, TN, MST, LSE, ±10% ANG, SHLY
20	1100	42	GC	12.7			22	BLK, COL, MST, HD, M/W 20% TN SI CL, DEGD
25	1095	5	CL	21.1	30	13	14	BRN, CL SI, MST, LSE, +20% SHLY
30	1090	44	GP/GM	8.7	NP	NP	16	▽ SD GV, TN, P GD, V STF, +30% SB RD GV
35	1085							DISCONTINUED

1''=5'

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UNDISTURBED)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: US-2 STATION: 5' OFFSET RANGE: SS-2 SURFACE EL: 1113.1
DATE DRILLED: 7/14/86 TO PREPARED BY: MHD CHECKED BY: CBG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	DESCRIPTION (ENGINEERING TEST RESULTS)
	1110		CL	14.9	29	13		SI CL, TN, MST, HD, ±5% ANG GV
5			CL	16.3	29	9		
			CL	17.2	31	14		SI CL, TN, MST, HD, ±5% ANG GV
	1105							
10			CL	17.1	31	15		SI CL, TN, MST, HD, ±5% ANG GV
	1100		CL	12.5	25	8		MOTT SI CL, MST, HD, ±5% ANG GV
15			ML	18.3	NP	NP		FA, GY, MST, HD, P GD
	1095							
20								
	1090							
25								
			ML	25.7	NP	NP		FA, GY, MST, HD, P GD
	1085		CL	21.6	31	12		
30			ML	56.6	NP	NP		FA, GY, V MST, S, P GD Q 23.7 0.44 R 22.3 1.14
	1080							NO RECOVERY
35								

1''=5'

* Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UNDISTURBED)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: US-2 STATION:5 OFFSET RANGE:SS-2 SURFACE EL: 1113.1
DATE DRILLED: 7/14/86 TO PREPARED BY: MHD CHECKED BY: CBE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	DESCRIPTION (ENGINEERING TEST RESULTS)
								NO RECOVERY
	1075							
			ML	38.1	NP	NP		MOTT CL SI, MST, HD, MIX/W GY FA
40			CL	21.6	33	13		R 15.2 0.53 R 26.3 0.25
			CL	21.5	29	11		
								NO RECOVERY
	1070							
45								NO RECOVERY
	1065							NO RECOVERY
50								
								NO RECOVERY
	1060							
55								DISCONTINUED.
	1055							
60								
	1050							
65								
	1045							
70								
1''=5'		* Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (UNDISTURBED)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: US-7 STATION: 5' OFFSET RANGE: SS-7 SURFACE EL: 1101.0
DATE DRILLED: 7/14/86 TO PREPARED BY: MHD CHECKED BY: OEG

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	DESCRIPTION (ENGINEERING TEST RESULTS)
	1100							
5	1095							
			CL	18.5	26	9		MOTT CL GV, MST, F, ±5% ANG GV
10	1090		CL	20.6	29	11		MOTT, CL SI, MST, LSE, ±2% ANG GV
15			CL	21.4	29	11		MOTT CL SI,MST,LSE, ±5% ANG GV Q 11.7 0.30 R 19.4 0.84 R 19.2 0.41 R̄ 27.9 0.21
	1085		CL	24.5	29	11		MOTT CL SI, MST, LSE, ±5% ANG GV
20	1080							NO RECOVERY
25	1075		CL	24.3				MOTT CL SI MIX/W FA, GY, V MST, P GD, S, ±5% SB ANG GV
30			ML-CL	19.7				MOTT CL SI MIX/W FA, GY, V MST, P GD, S, ±5% SB ANG GV
	1070		ML	26.6				FA, GY, V MST, LSE, PGD Q 0.0 0.53 R 6.0 0.96 R̄ 21.9 0.49
35								DISCONTINUED.

1''=5'

*Lab. Classif.

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY

SOIL PROFILE (UNDISTURBED)

SHEET 1 OF 1

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: US-7A STATION: 5' OFFSET RANGE: SS-7 SURFACE EL: 1101.0
DATE DRILLED: 7/14/86 TO PREPARED BY: MHD CHECKED BY: [illegible]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	DESCRIPTION (ENGINEERING TEST RESULTS)
	1100							
5	1095							
10	1090							NO RECOVERY
15	1085							
20	1080							
25	1075							
30	1070							
35								
1''=5'		* Lab. Classif.						

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UNDISTURBED)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: US-11 STATION: 735603.0N RANGE: 2892460.2E SURFACE EL: 1117.6
DATE DRILLED: 7/16/86 TO PREPARED BY: TMM CHECKED BY: [illegible]

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	DESCRIPTION (ENGINEERING TEST RESULTS)
	1115							
5			SM	11.2	NP	NP		FA, GY, D H PGD, BA BA GY P GD, S, D
								NO RECOVERY
	1110							
10			CL	19.3	32	13		MOTT, CL SI, MST ±10% ANG GRVL
	1105		CL	19.2	35	17		SAME AS ABOVE
15			CL	16.9	30	12		MOTT, VL SI, MST M/W FA ±10% ANG GRAVEL
	1100							
20								DISCONTINUED
	1095							
25								
	1090							
30								
	1085							
35								
1''=5'		*Lab. Classif.						

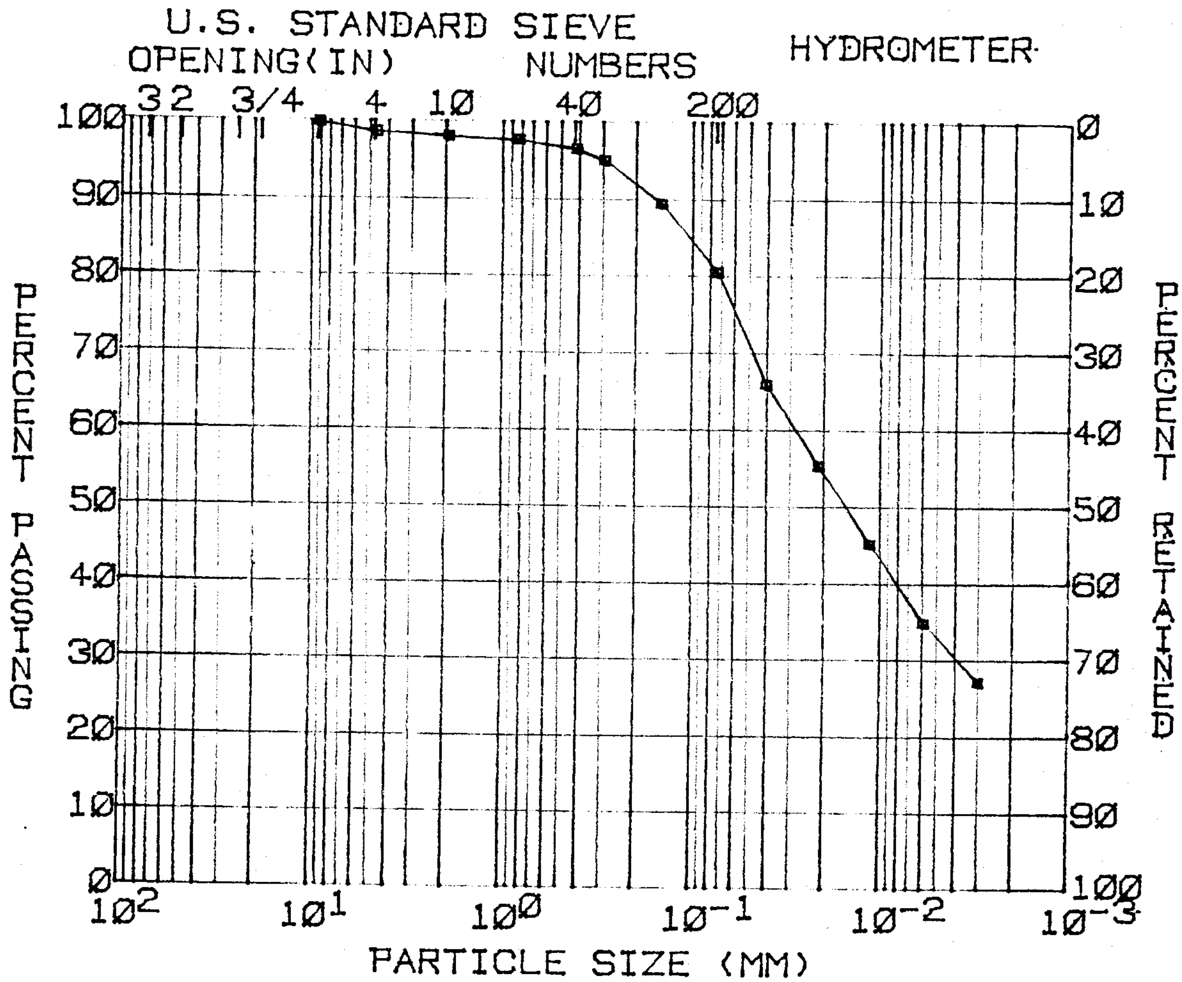
TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (UNDISTURBED)

PROJECT: JOHN SEVIER S.P. FEATURE: ASH DISPOSAL AREA
BORING: US-11A STATION: 5'OFFSET RANGE: SS-11 SURFACE EL: 1117.6
DATE DRILLED: 7/16/86 TO PREPARED BY: TMM CHECKED BY: CBE

DEPTH ft.	EL	SPT (N)	* LOG	W	LL	PI	GR	DESCRIPTION (ENGINEERING TEST RESULTS)
	1115							
5								
			SM	19.6	NP	NP		FA GY D, P GD
	1110		CL	20.6	26	7		
10								DISCONTINUED
	1105							
15								
	1100							
20								
	1095							
25								
	1090							
30								
	1085							
35								
1''=5'		*Lab. Classif.						

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-2
FEATURE: ASH DISPOSAL AREA EL.: 1110.6-1109.1
STATION: N737030.8 SAMPLE: 1
RANGE: E2892252.1 DATE: 8-4-86



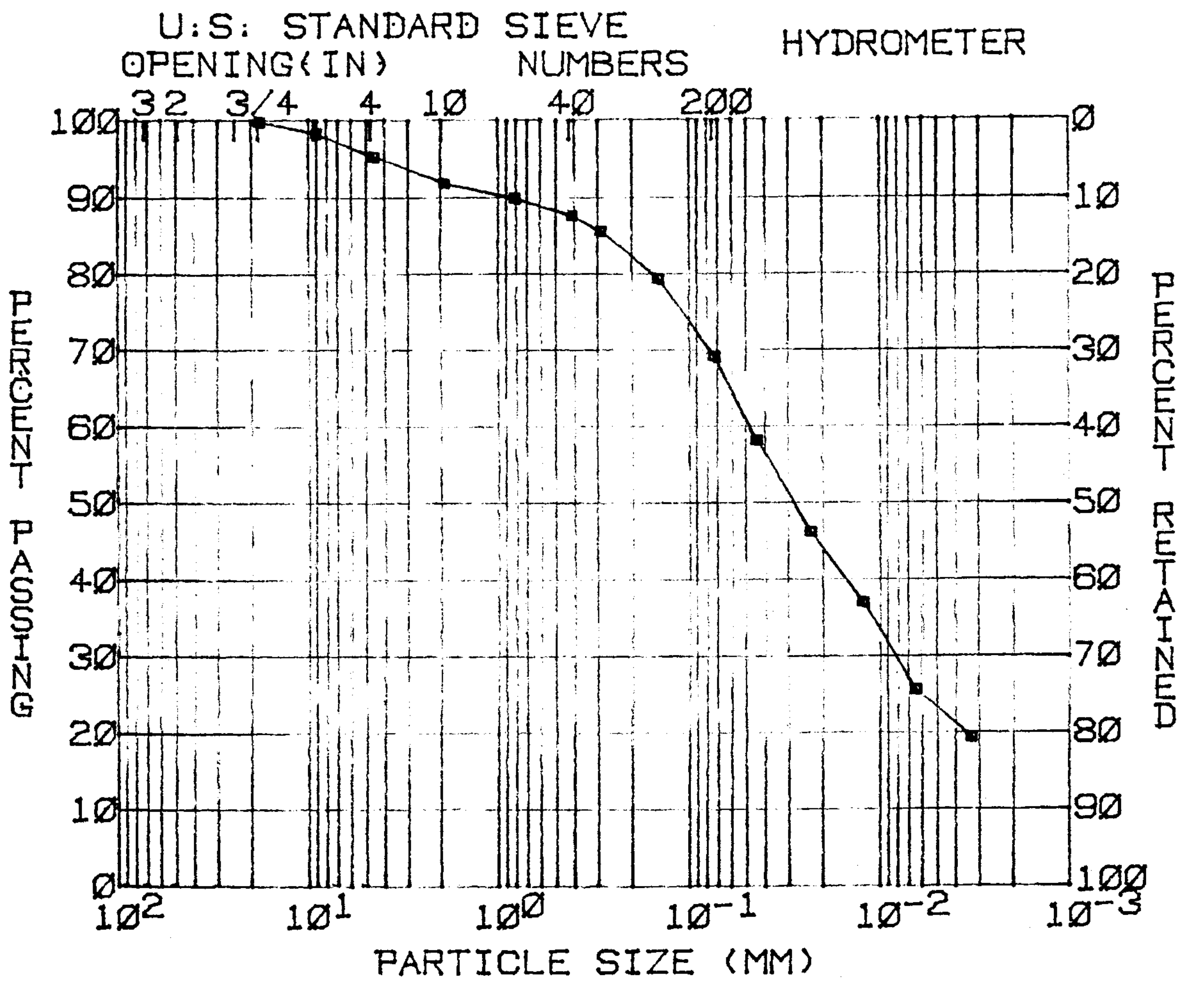
GRAVEL(%) =	0	D10(MM) =	--
SAND(%) =	19	D30(MM) =	--
SILT(%) =	48	D60(MM) =	--
CLAY(%) =	33	COEF UNIF =	--

SOIL SYMBOL = CL L.L.(%) = 29
MOISTURE(%) = 14.9 P.I.(%) = 13
SP. GR. = 2.68

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-2
FEATURE:ASH DISPOSAL AREA EL. :1109.1-1108.1
STATION:N737030.8 SAMPLE:1
RANGE :E2892252.1 DATE :8-4-86



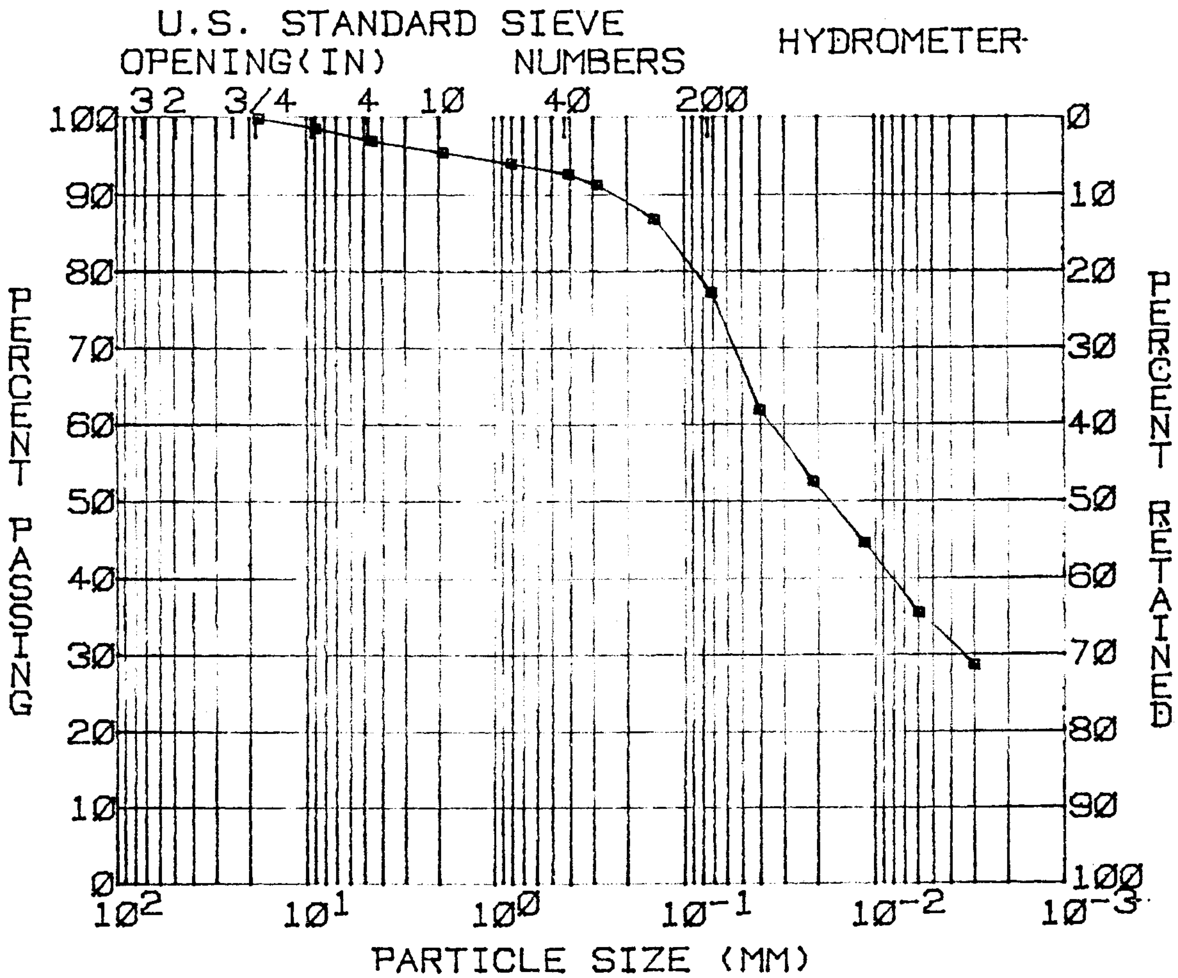
GRAVEL(%) =	4	D10(MM) =	--
SAND(%) =	27	D30(MM) =	--
SILT(%) =	46	D60(MM) =	--
CLAY(%) =	23	COEF UNIF=	--

SOIL SYMBOL= CL L.L.(%) = 29
MOISTURE(%)= 16.3 P.I.(%) = 9
SP. GR. = 2.49

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-2
FEATURE:ASH DISPOSAL AREA EL. :1107.6-1105.1
STATION:N737030.8 SAMPLE:2
RANGE :E2892252.1 DATE :8-4-86



GRAVEL(%)= 2
SAND(%) = 20
SILT(%) = 44
CLAY(%) = 34

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

SOIL SYMBOL= CL
MOISTURE(%)= 17.2
SP. GR. = 2.65

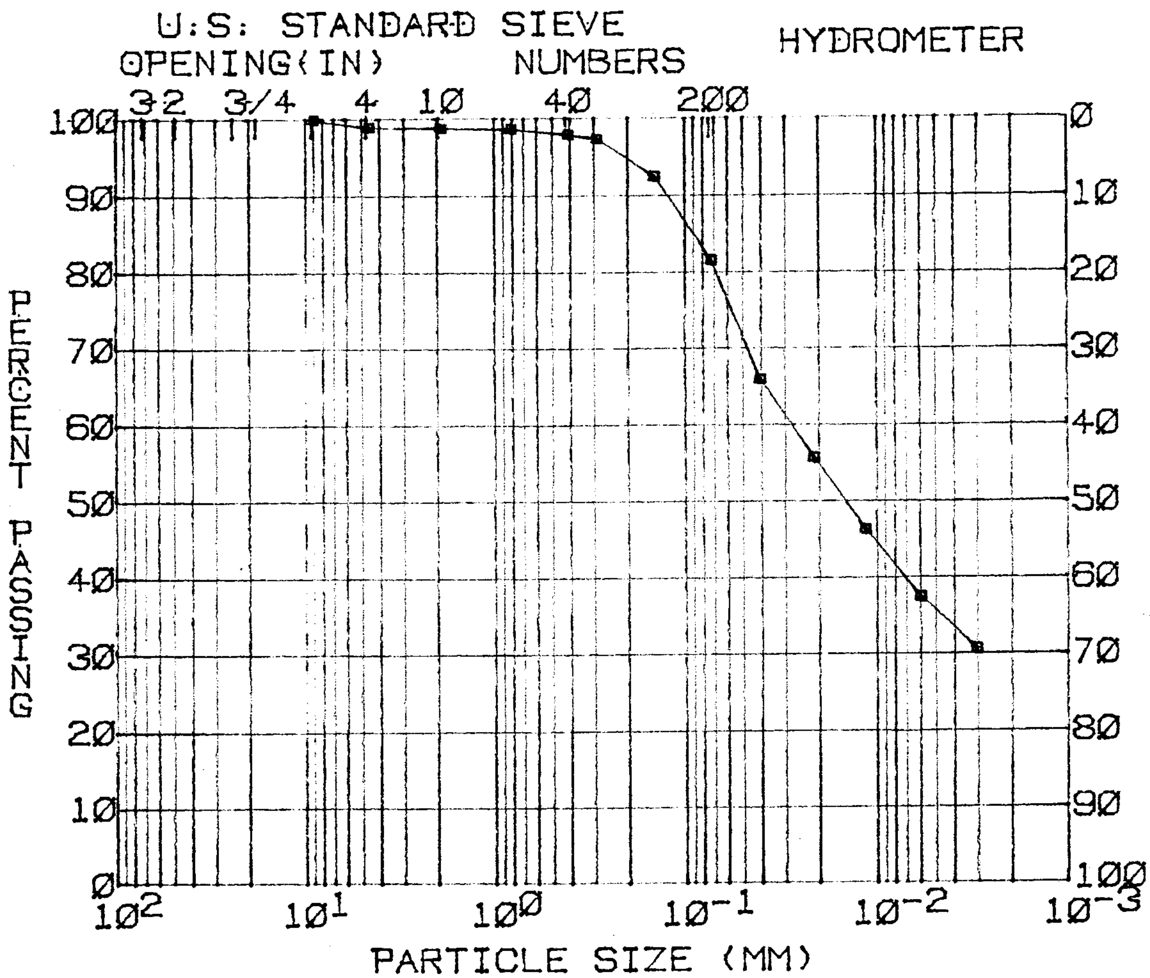
L.L.(%) = 31
P.I.(%) = 14

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N737030.8
RANGE : E2892252.1

BORING: US-2
EL. : 1104.6-1102.1
SAMPLE: 3
DATE : 8-4-86



GRAVEL(%) = 0
SAND(%) = 18
SILT(%) = 46
CLAY(%) = 36

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF = --

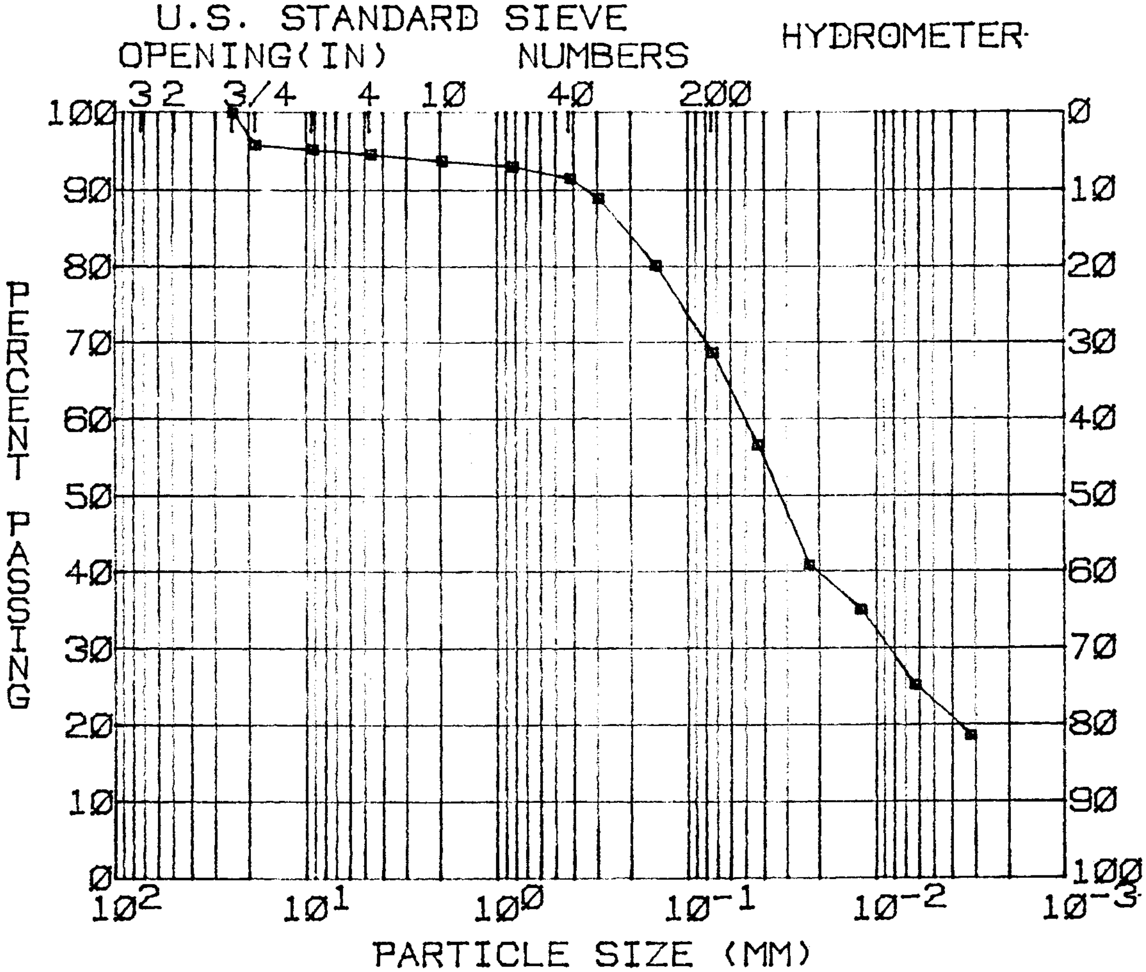
SOIL SYMBOL = CL
MOISTURE(%) = 17.1
SP. GR. = 2.66

L.L.(%) = 31
P.I.(%) = 15

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-2
FEATURE:ASH DISPOSAL AREA EL. :1101.6-1099.1
STATION:N737030.8 SAMPLE:4
RANGE :E2892252.1 DATE :8-4-86



GRAVEL(%) = 5 D10(MM) = --
SAND(%) = 26 D30(MM) = --
SILT(%) = 46 D60(MM) = --
CLAY(%) = 23 COEF UNIF= --

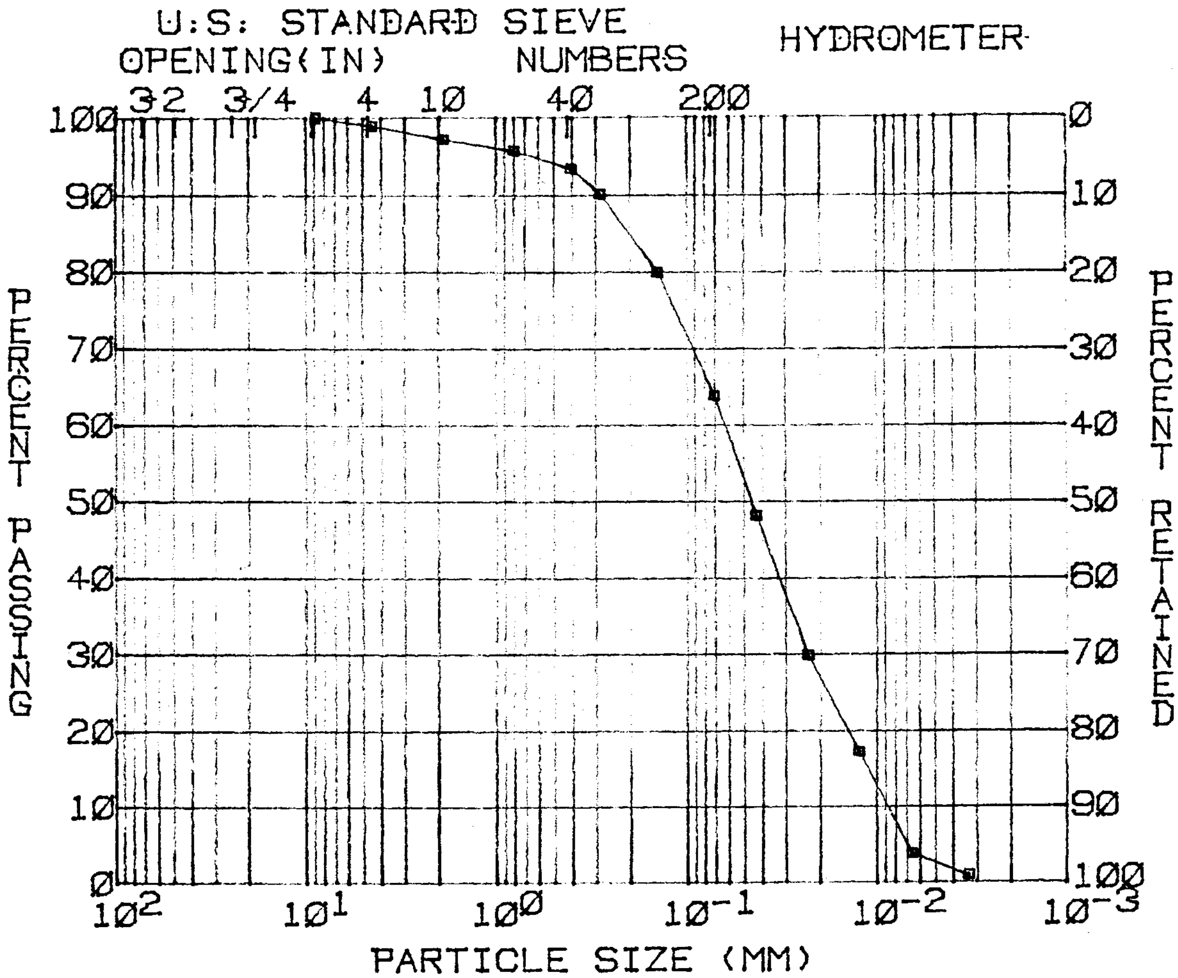
SOIL SYMBOL= CL L.L.(%) = 25
MOISTURE(%)= 12.5 P.I.(%) = 8
SP. GR. = 2.58

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N737030.8
RANGE: E2892252.1

BORING: US-2
EL.: 1098.6-1096.1
SAMPLE: 5
DATE: 8-4-86



GRAVEL(%) = 0
SAND(%) = 35
SILT(%) = 62
CLAY(%) = 3

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF = --

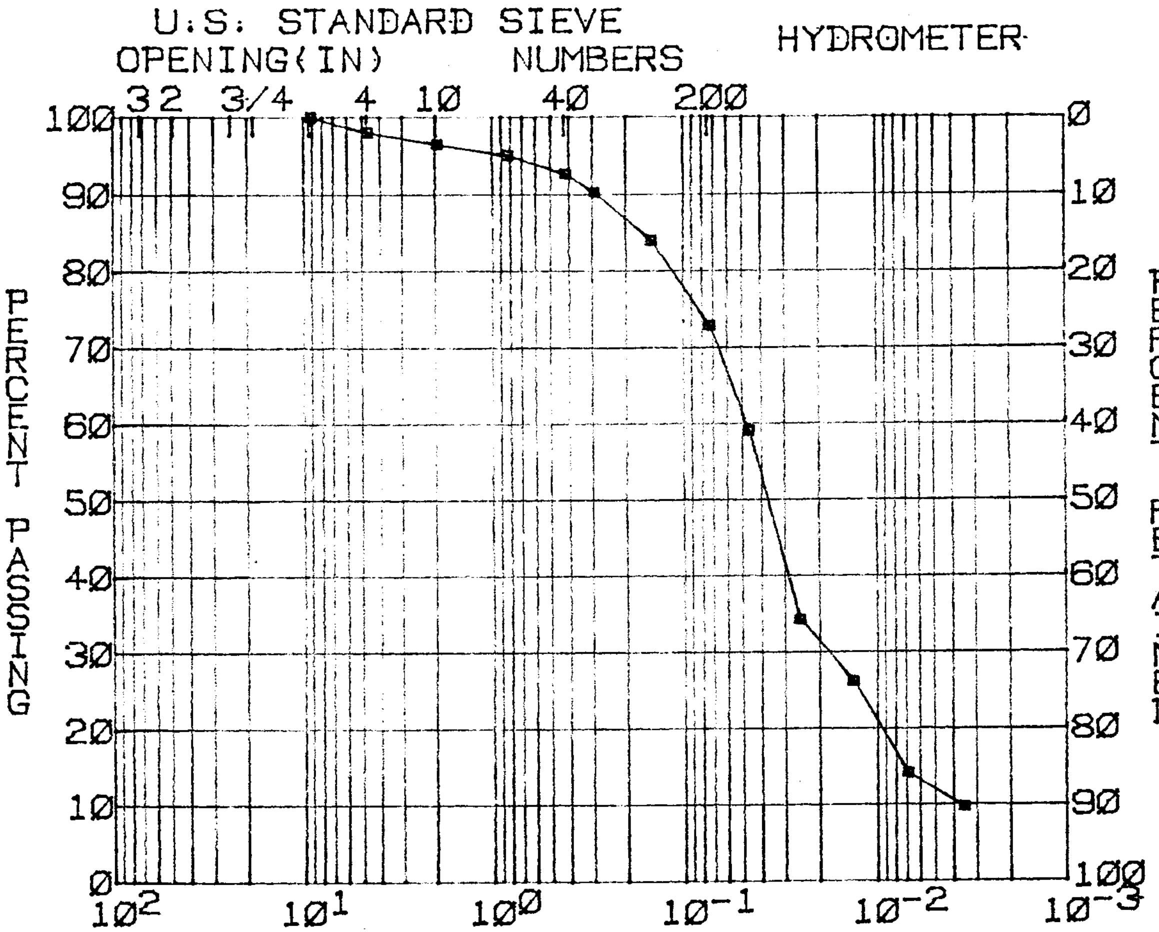
SOIL SYMBOL = ML
MOISTURE(%) = 18.3
SP. GR. = 2.65

L.L.(%) = NP
P.I.(%) = NP

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-2
FEATURE: ASH DISPOSAL AREA EL. : 1086.6-1085.0
STATION: N737030.8 SAMPLE: 6
RANGE : E2892252.1 DATE : 8-4-86



GRAVEL(%) = 1 D10(MM) = --
SAND(%) = 26 D30(MM) = --
SILT(%) = 61 D60(MM) = --
CLAY(%) = 12 COEF UNIF = --

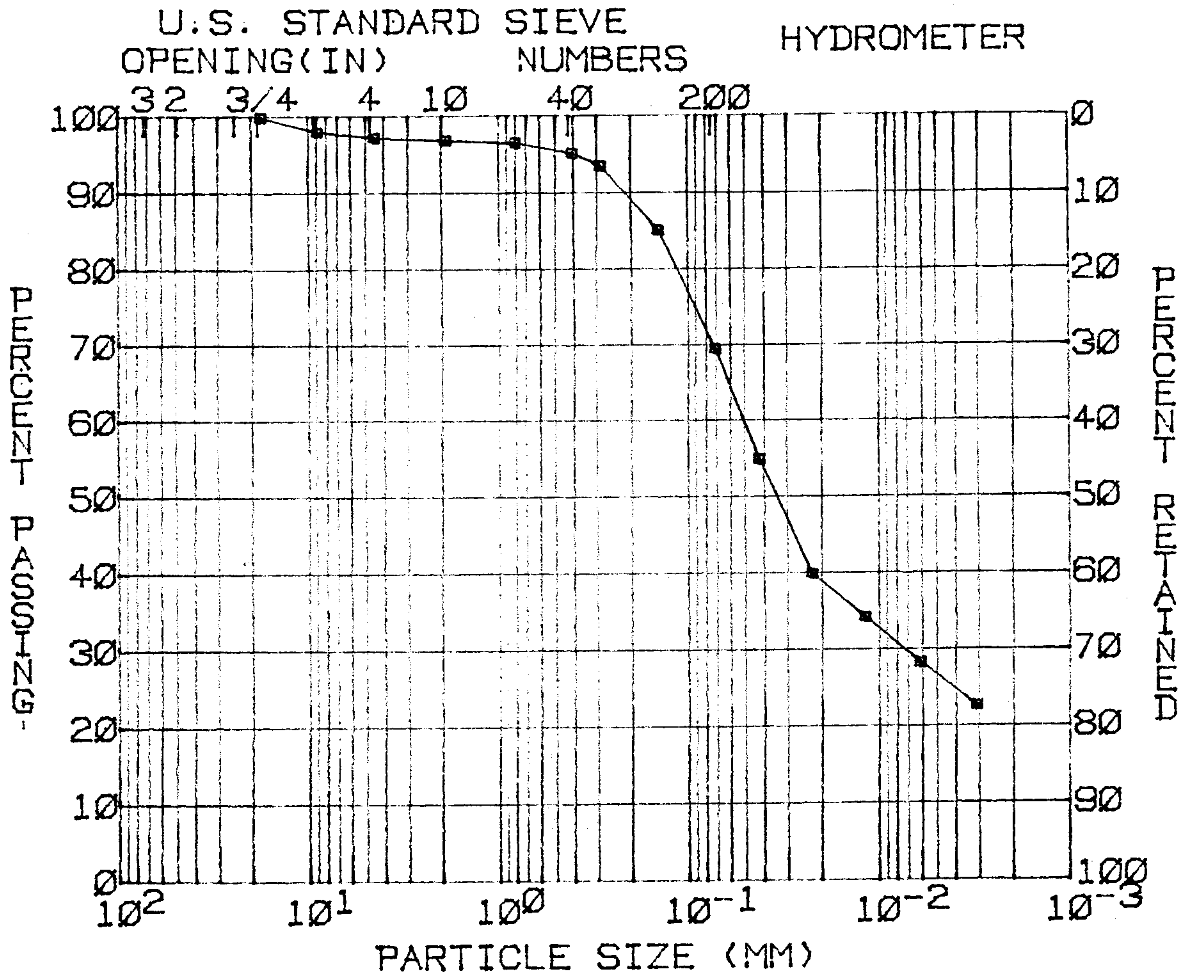
SOIL SYMBOL = ML L.L.(%) = NP
MOISTURE(%) = 25.7 P.I.(%) = NP
SP. GR. = 2.38

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N737030.8
RANGE : E2892252.1

BORING: US-2
EL. : 1085.0-1084.1
SAMPLE: 6
DATE : 8-4-86



GRAVEL(%) = 2
SAND(%) = 28
SILT(%) = 43
CLAY(%) = 27

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF = --

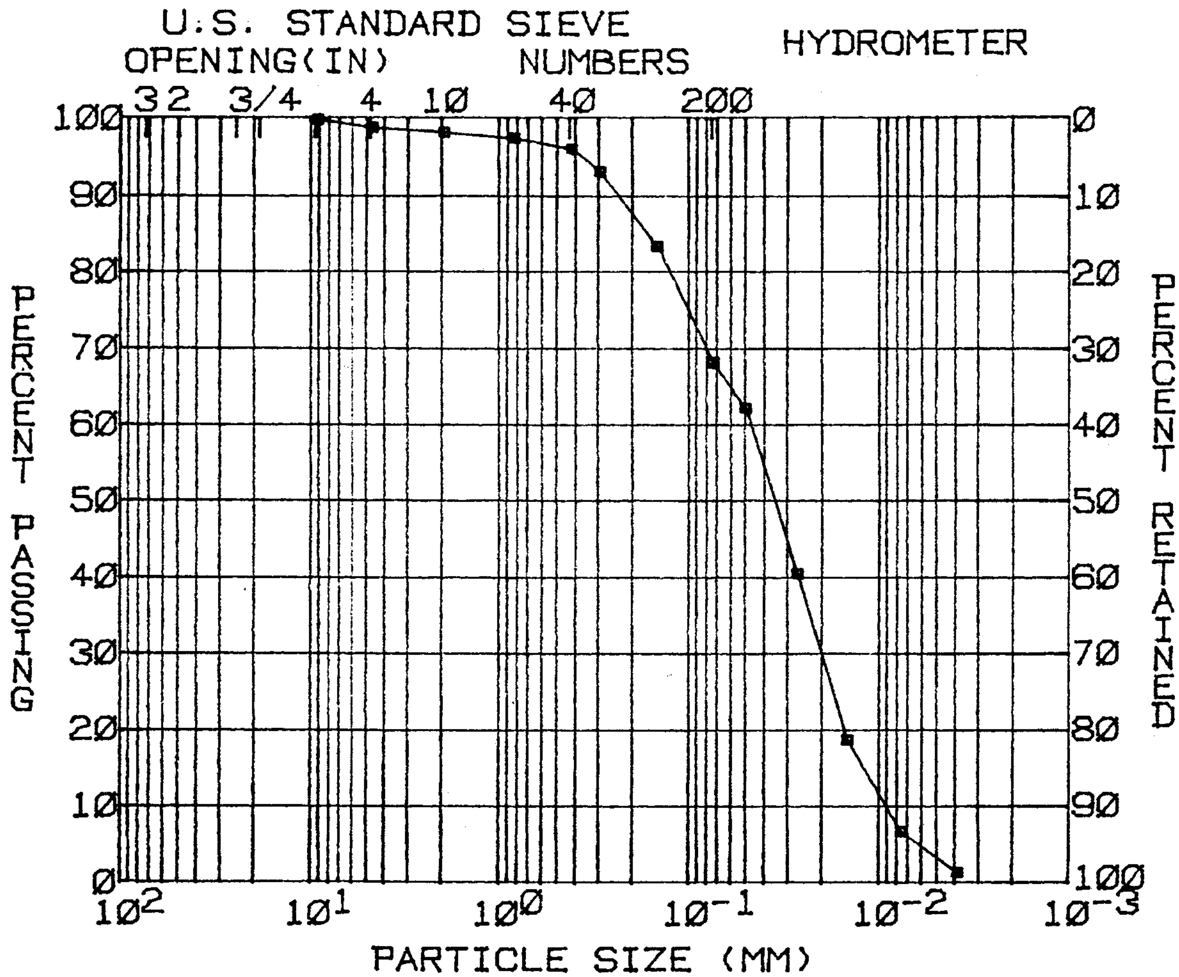
SOIL SYMBOL = CL
MOISTURE(%) = 21.6
SP. GR. = 2.65

L.L.(%) = 31
P.I.(%) = 12

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-2
FEATURE: ASH DISPOSAL AREA EL. : 1083.6-1081.1
STATION: N737030.8 SAMPLE: 7
RANGE : E2892252.1 DATE : 8-8-86



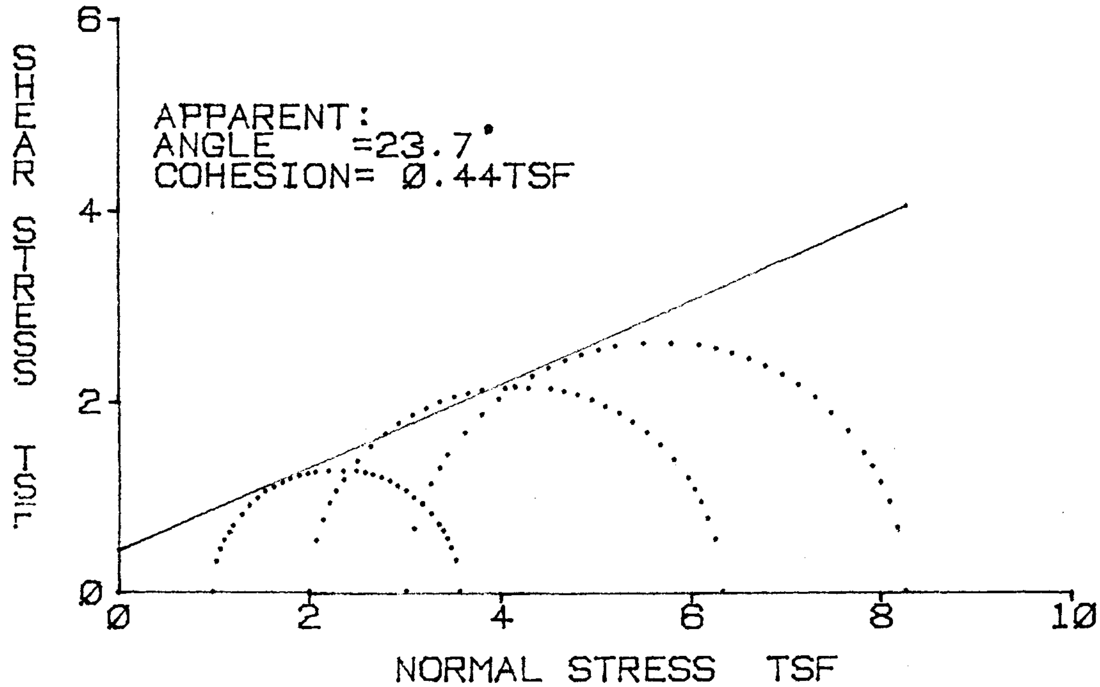
GRAVEL(%) = 0 D10(MM) = --
SAND(%) = 31 D30(MM) = --
SILT(%) = 65 D60(MM) = --
CLAY(%) = 4 COEF UNIF= --

SOIL SYMBOL= ML L.L.(%) = NP
MOISTURE(%)= 63.0 P.I.(%) = NP
SP. GR. = 2.26

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

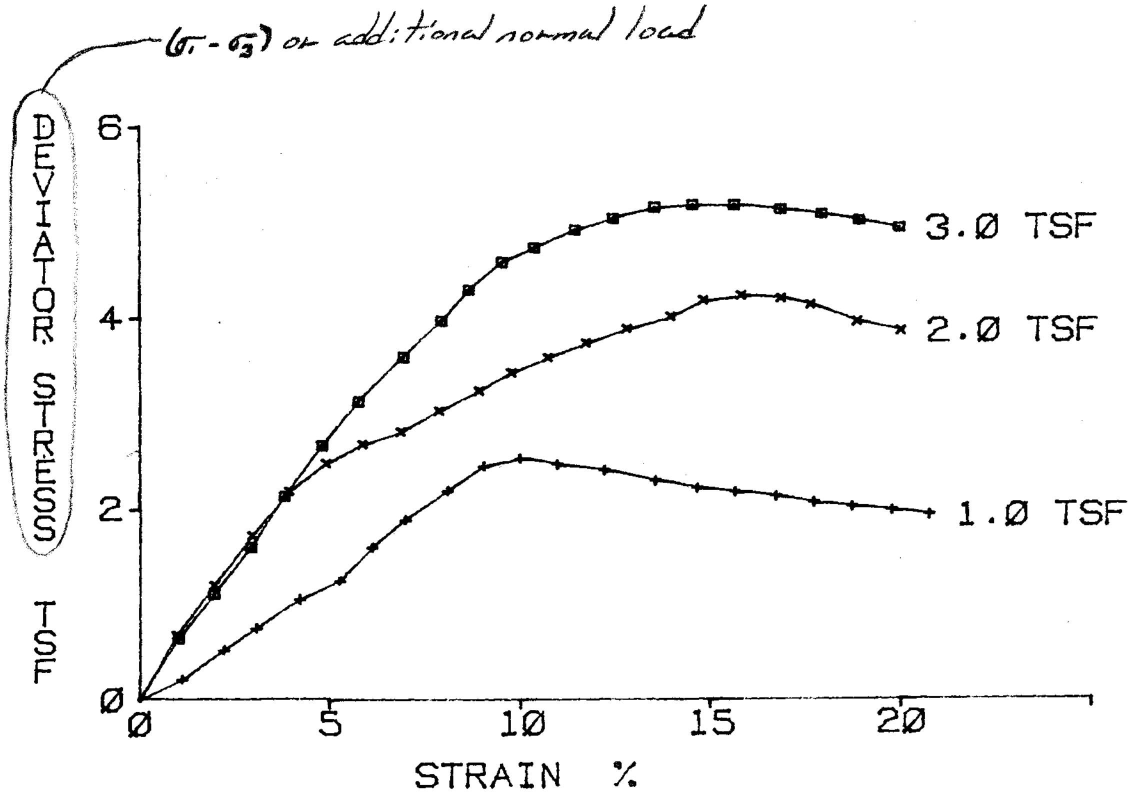
PROJECT:JOHN SEVIER S.P.EL.1083.0 :1082.6
FEATURE:ASH DISP AREA SAMPLE :7
STATION:N737030.8 PART :2
RANGE :E2892667.0 SOIL SYM:ML
BORING :US-2 DATE :8-11-86



REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL 1083.0 : 10826
FEATURE:ASH DISP AREA SAMPLE :7
STATION:N737030.8 PART :2
RANGE :E2892667.0 SOIL SYM:ML
BORING :US-2 DATE :8-11-86



REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISPOSAL AREA
Station: N737030.8
Range : E2892667.0
Boring : US-2

El. : 1083.0-1082.6
Sample: 7
Part : 2

Tested By : TAL
Computed By: MHD
Checked By : OBG
Report Date: 8-11-86

Soil Sybmbol= ML
Sp. Gr. = 2.26
L.L.(%)= NP
D10(mm)= —
P.I.(%)= NP

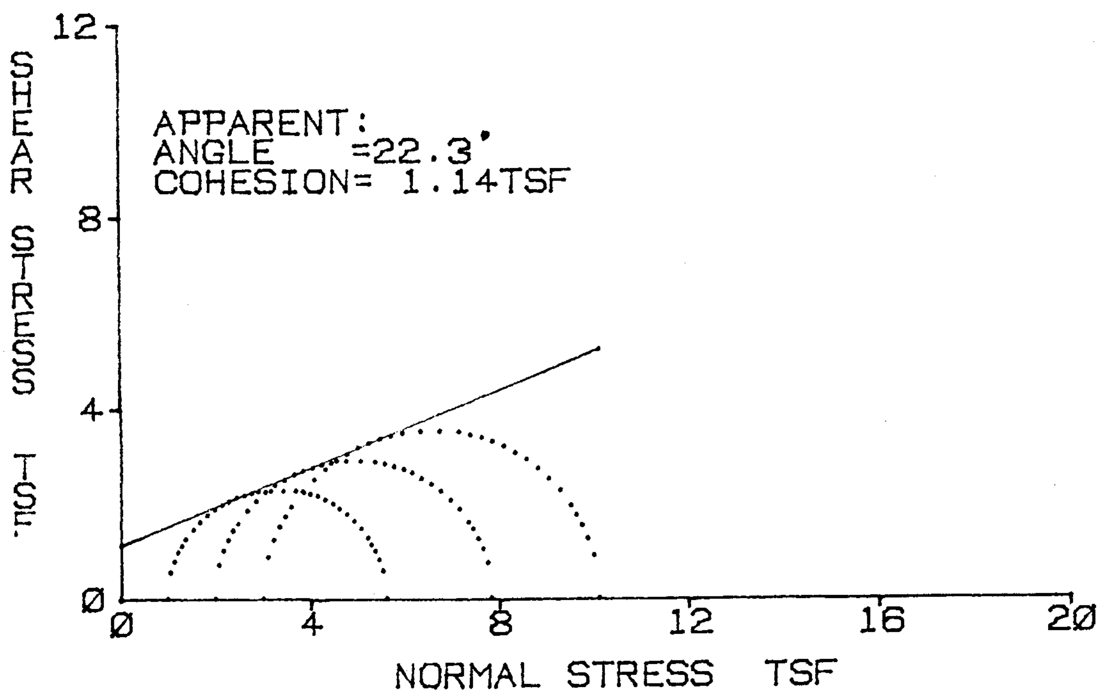
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	52.4	56.5	52.9	0.0
Dry Density(pcf)	63.0	61.3	62.5	0.0
Void Ratio	1.240	1.300	1.257	0.000
Saturation(%)	95.5	98.2	95.1	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	50.7	51.1	50.1	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.59	6.34	8.28	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	10	16	16	0
Rate of Strain(%/min.)	1.01	1.00	0.99	0.00
Specimen Height(in.)	3.13	3.13	3.13	3.13
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	23.7	0.44		
Effective	--	--		

TVA SINGLETON MATERIALS ENGINEERING LABORATORY

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(R) TEST

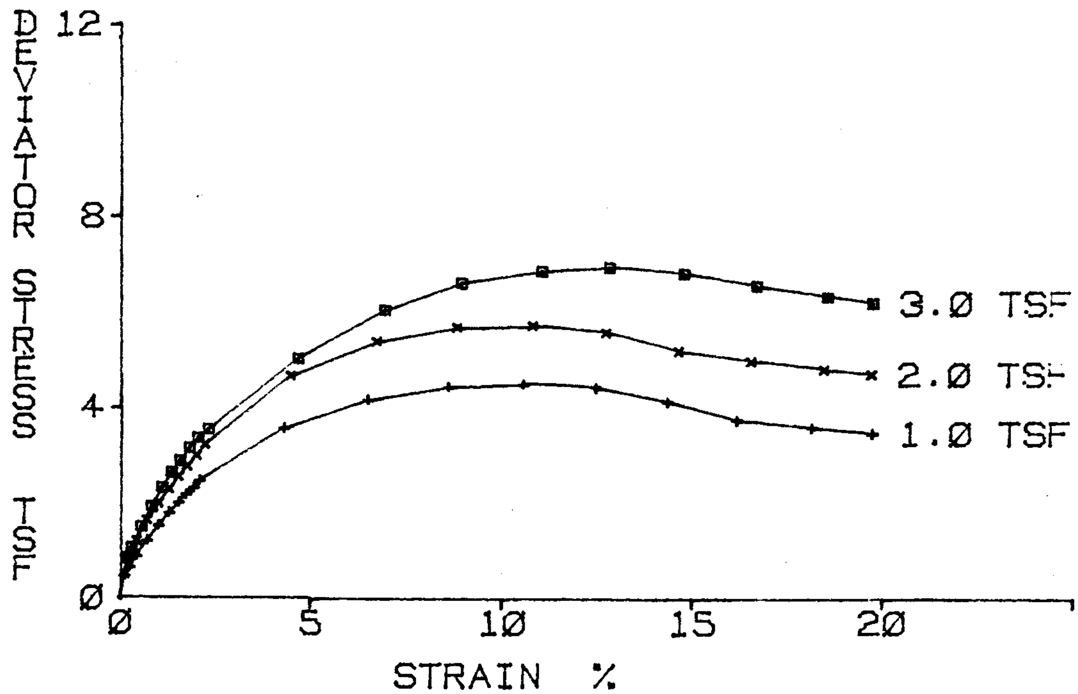
PROJECT:JOHN SEVIER S.P.EL. :1081.4-1081.1
FEATURE:ASH DISP AREA SAMPLE :7
STATION:N737030.8 PART :6
RANGE :E2892252.1 SOIL SYM:ML
BORING :US-2 DATE :8-12-86



REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(R) TEST

PROJECT:JOHN SEVIER S.P. EL. :1081.4-1081.1
FEATURE:ASH DISP AREA SAMPLE :7
STATION:N737030.8 PART :6
RANGE :E2892252.1 SOIL SYM:ML
BORING :US-2 DATE :8-12-86



REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISPOSAL AREA
Station: N737030.8
Range : E2892252.1
Boring : US-2

El. : 1081.4-1081.1
Sample: 7
Part : 6

Tested By : EJL
Computed By: MHD
Checked By : [signature]
Report Date: 8-12-86

Soil Sybmbol= ML
Sp. Gr. = 2.26

L.L.(%)=
D10(mm)=

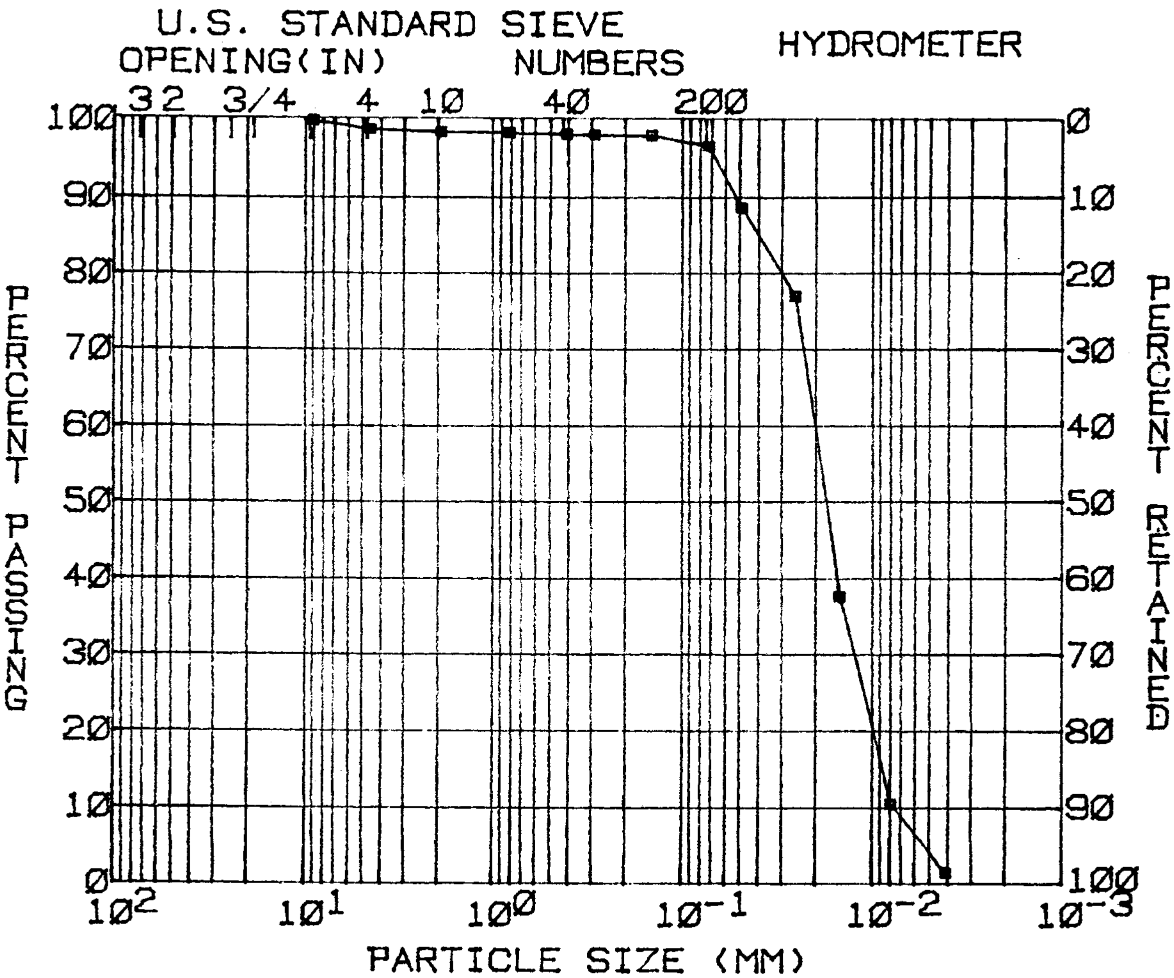
P.I.(%)=

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	57.2	57.0	57.5	0.0
Dry Density(pcf)	59.4	59.5	58.7	0.0
Void Ratio	1.376	1.373	1.405	0.000
Saturation(%)	94.0	93.9	92.5	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	54.4	53.3	53.6	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	5.65	7.88	10.13	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	50	50	60	0
Rate of Strain(%/min.)	0.21	0.22	0.22	0.00
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Max Deviator Stress Deg.	c(tsf)	Max Eff Stress Ratio Deg.	c(tsf)
Apparent	22.3	1.14		
Effective	--	--		

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-2
FEATURE:ASH DISPOSAL AREA EL. :1074.6-1073.4
STATION:N737030.8 SAMPLE:8
RANGE :E2892252.1 DATE :8-8-86



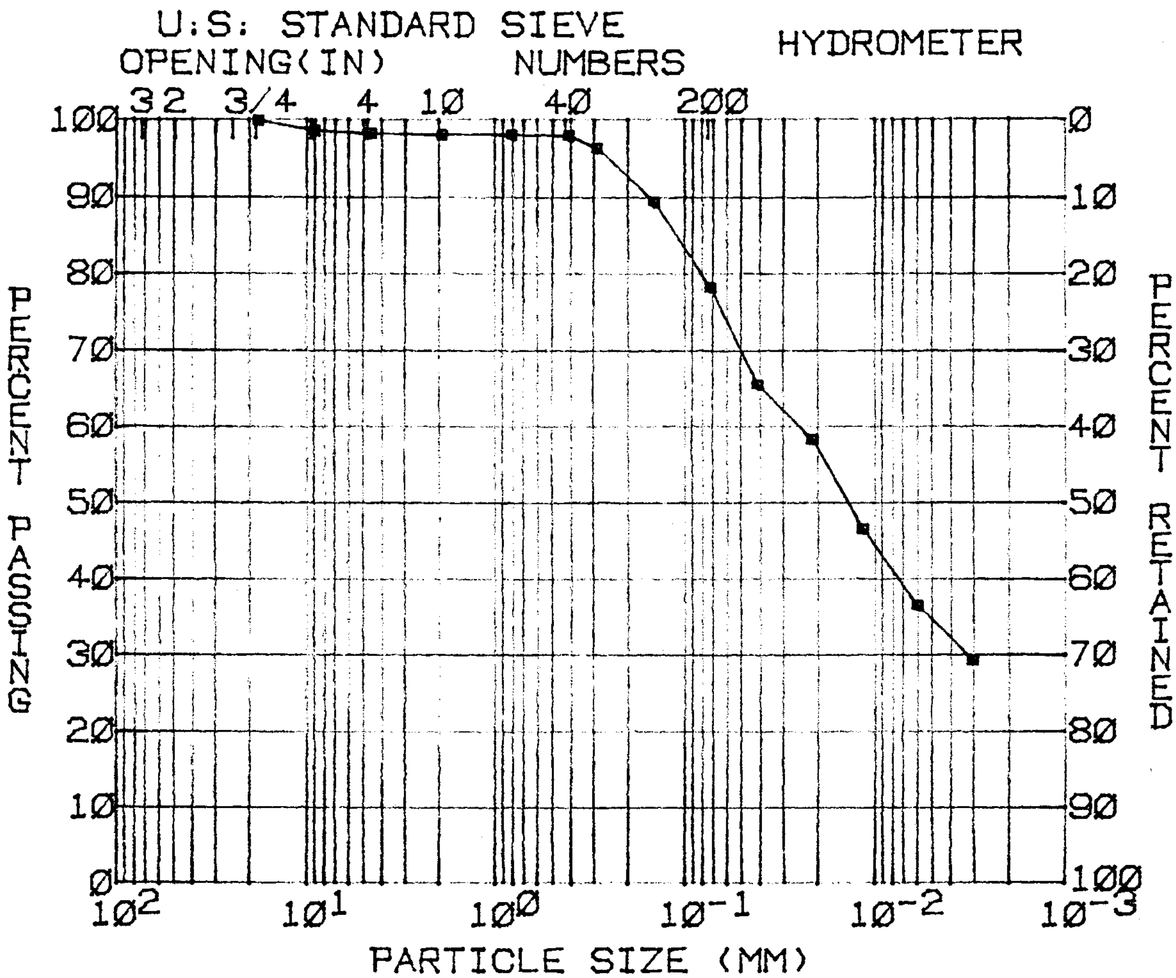
GRAVEL(%)= 0 D10(MM) = --
SAND(%) = 3 D30(MM) = --
SILT(%) = 93 D60(MM) = --
CLAY(%) = 4 COEF UNIF= --

SOIL SYMBOL= ML L.L.(%) = NP
MOISTURE(%)= 38.1 P.I.(%) = NP
SP. GR. = 2.10

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-2
FEATURE:ASH DISPOSAL AREA EL. :1073.4-1073.1
STATION:N737030.8 SAMPLE:8
RANGE :E2892252.1 DATE :8-20-86



GRAVEL(%)= 1
SAND(%) = 20
SILT(%) = 44
CLAY(%) = 35

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

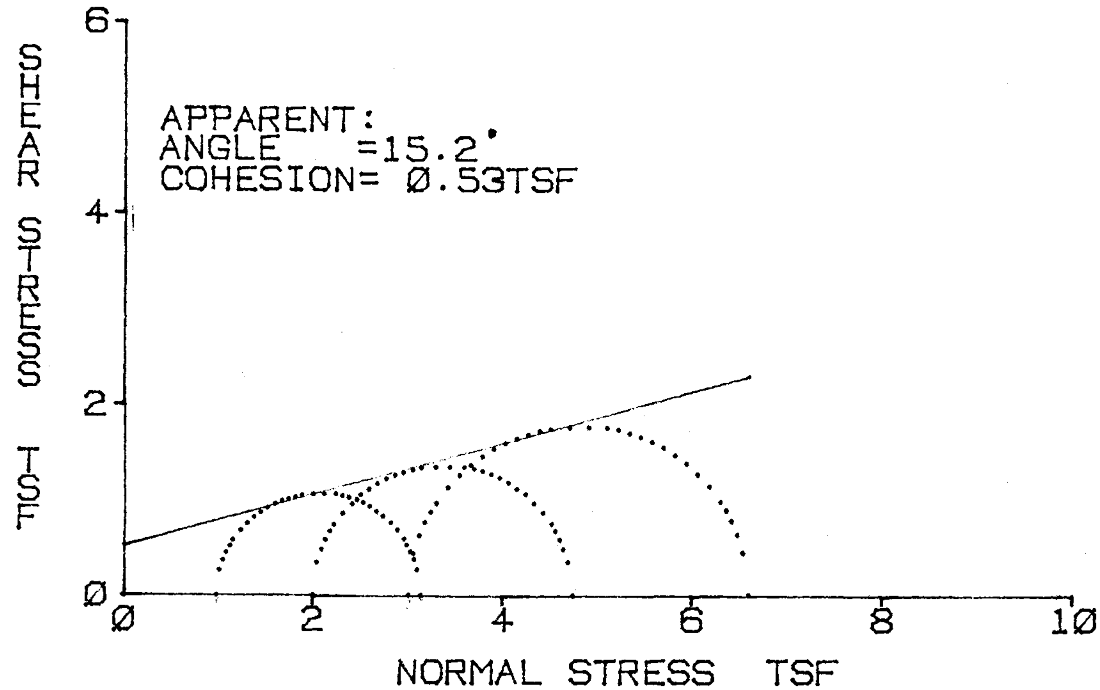
SOIL SYMBOL= CL
MOISTURE(%)= 21.5
SP. GR. = 2.70

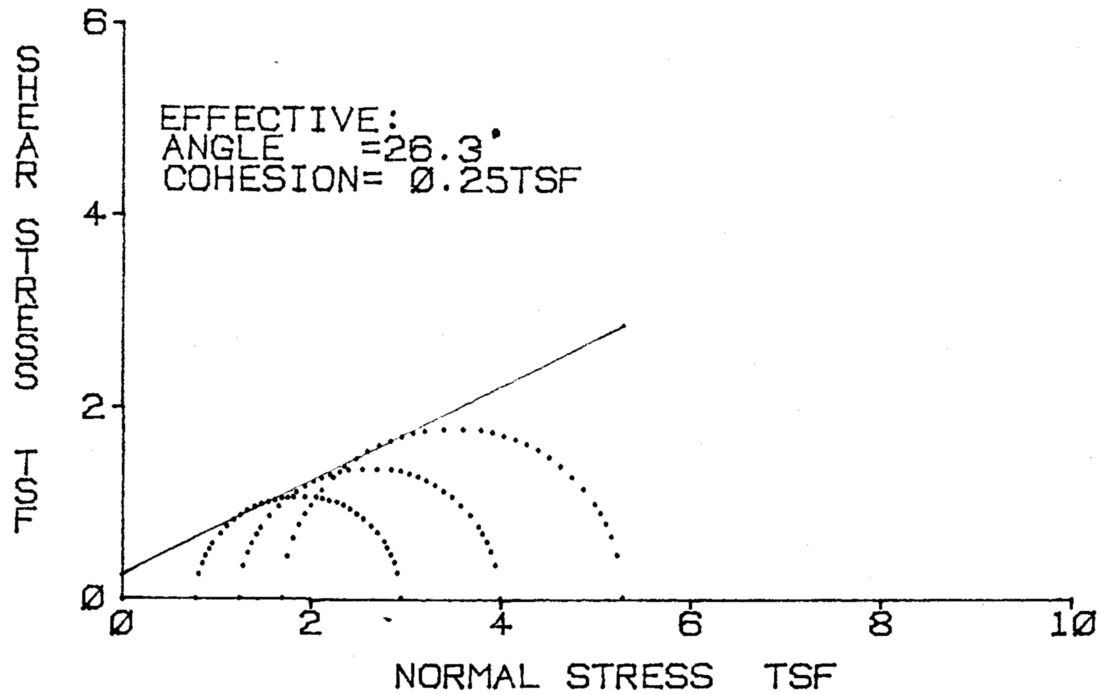
L.L.(%) = 33
P.I.(%) = 13

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT	:JOHN SEVIER S.P.	EL.	:1Ø73.4-1Ø73.1
FEATURE	:ASH DISP AREA	SAMPLE	:8
STATION	:N737Ø3Ø.8	PART	:4
RANGE	:E2892252.1	SOIL SYM	:CL
BORING	:US-2	DATE	:8-11-86

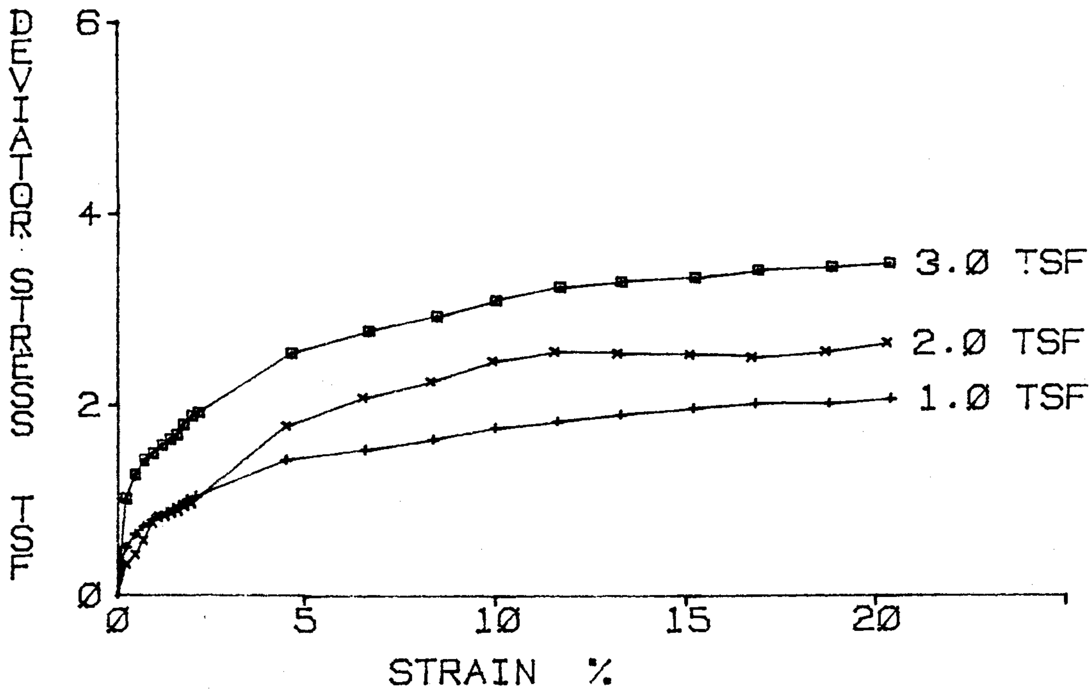


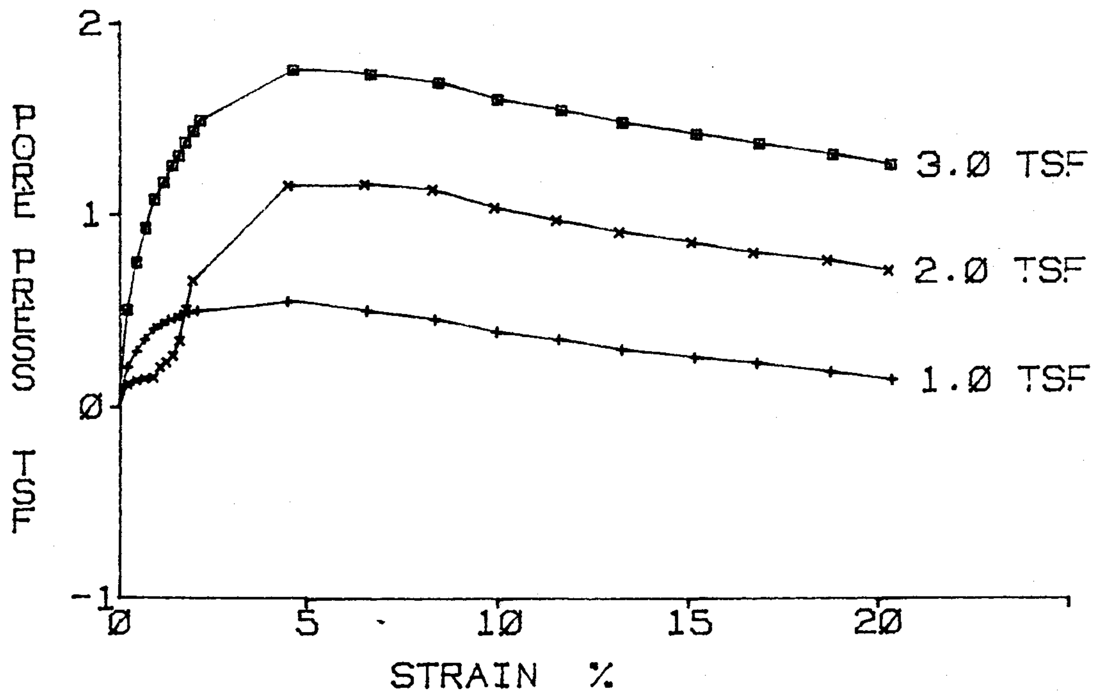


REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1Ø73.4-1Ø73.1
FEATURE:ASH DISP AREA SAMPLE :8
STATION:N737Ø3Ø.8 PART :4
RANGE :E2892252.1 SOIL SYM:CL
BORING :US-2 DATE :8-11-86





REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DISP AREA		Tested By : TAL
Station: N737030.8	El. : 1073.4-1073.1	Computed By: MHD
Range : E2892252.1	Sample: 8	Checked By : [illegible]
Boring : US-2	Part : 4	Report Date: 8-86

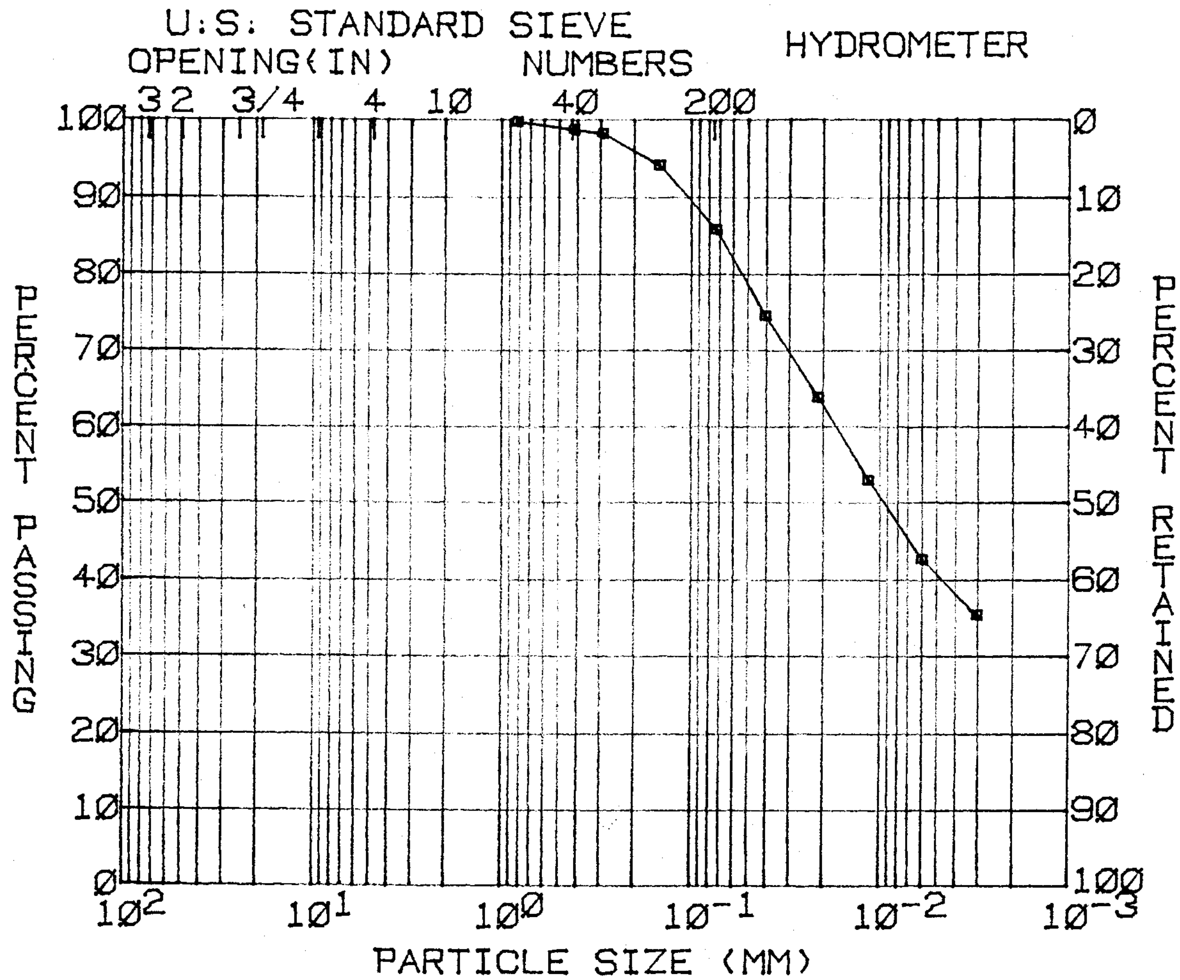
Soil Sybmool= CL	L.L.(%)= 33	P.I.(%)= 13
Sp. Gr. = 2.7	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	20.8	21.9	22.0	0.0
Dry Density(pcf)	104.2	102.3	101.7	0.0
Void Ratio	0.618	0.647	0.657	0.000
Saturation(%)	90.9	91.6	90.4	0.0
Before Shearing:				
Moisture(%) (after satur.)	22.9	24.0	24.3	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	19.2	20.3	20.3	20.3
Void Ratio (after cons.)	0.520	0.549	0.548	0.000
Final Moisture Content(%)	19.9	20.0	19.6	0.0
Minor Principal Stress(tsf)	1.01(1.01)	2.02(2.02)	3.02(3.02)	0.00(0.00)
Major Principal Stress(tsf)	3.16(2.48)	4.75(4.32)	6.61(6.34)	0.00(0.00)
Eff. Minor Prin. Stress(tsf)	0.81(0.42)	1.27(0.86)	1.71(1.44)	0.00(0.00)
Eff. Major Prin. Stress(tsf)	2.97(1.90)	4.01(3.16)	5.29(4.76)	0.00(0.00)
Time to Failure(min.)	110	110	110	0
Rate of Strain(%/min.)	0.19	0.19	0.19	0.00
Specimen Height(in.)	3.13	3.13	3.13	3.13
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	15.2	0.53	18.3	0.19
Effective	26.3	0.25	28.3	0.22

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-2
FEATURE:ASH DISPOSAL AREA   EL.   :1073.1 -1072.1
STATION:N737030.8   SAMPLE:8
RANGE   :E2892252.1   DATE   :8-11-86



GRAVEL(%)= 0   D10(MM) = --
SAND(%) = 14   D30(MM) = --
SILT(%) = 46   D60(MM) = --
CLAY(%) = 40   COEF UNIF= --

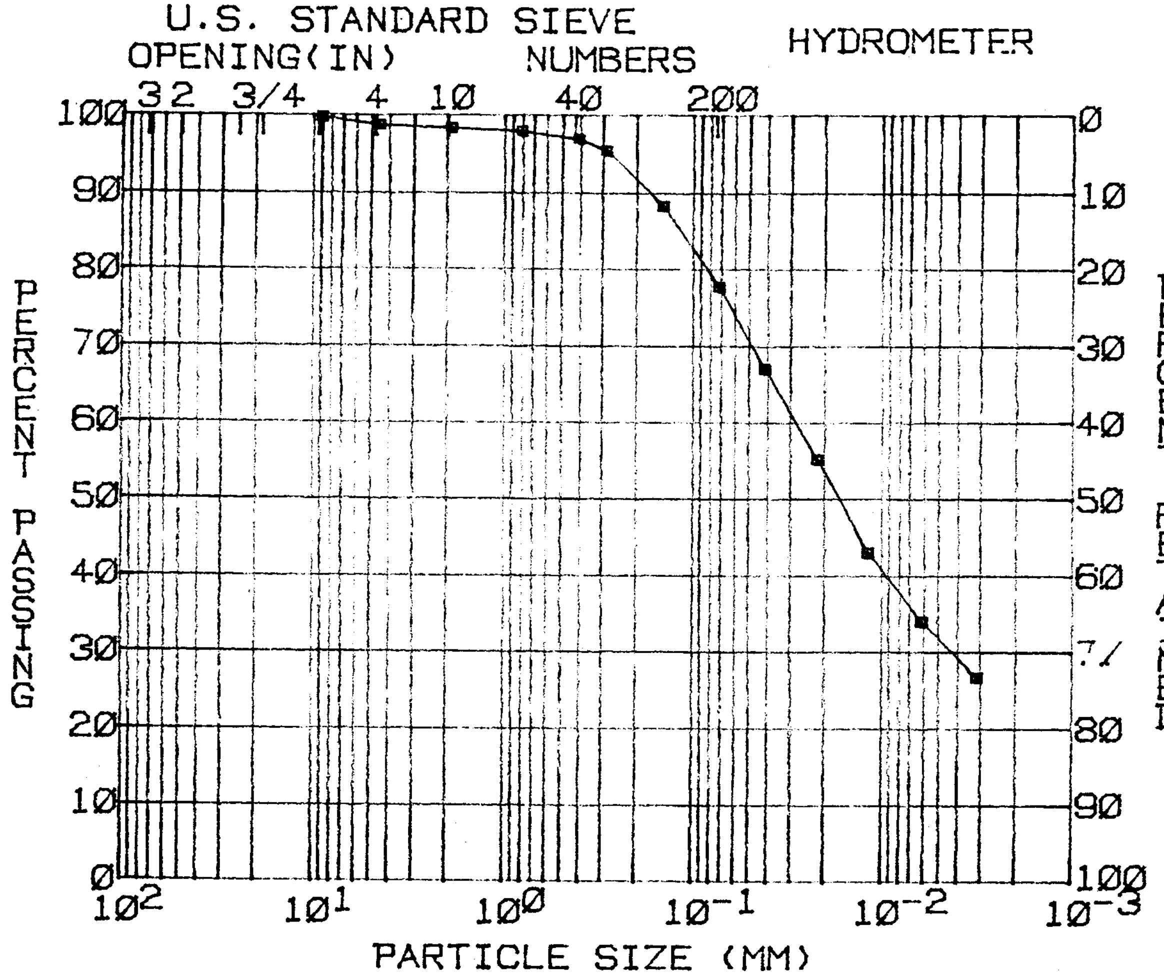
SOIL SYMBOL= CL   L.L.(%) = 40
MOISTURE(%)= 21.5   P.I.(%) = 18
SP. GR. = 2.67

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N735318.4
RANGE : E2890506.3

BORING: US-7
EL. : 1094.5-1092.0
SAMPLE: 1
DATE : 8-8-86



GRAVEL(%) = 0
SAND(%) = 21
SILT(%) = 47
CLAY(%) = 32

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

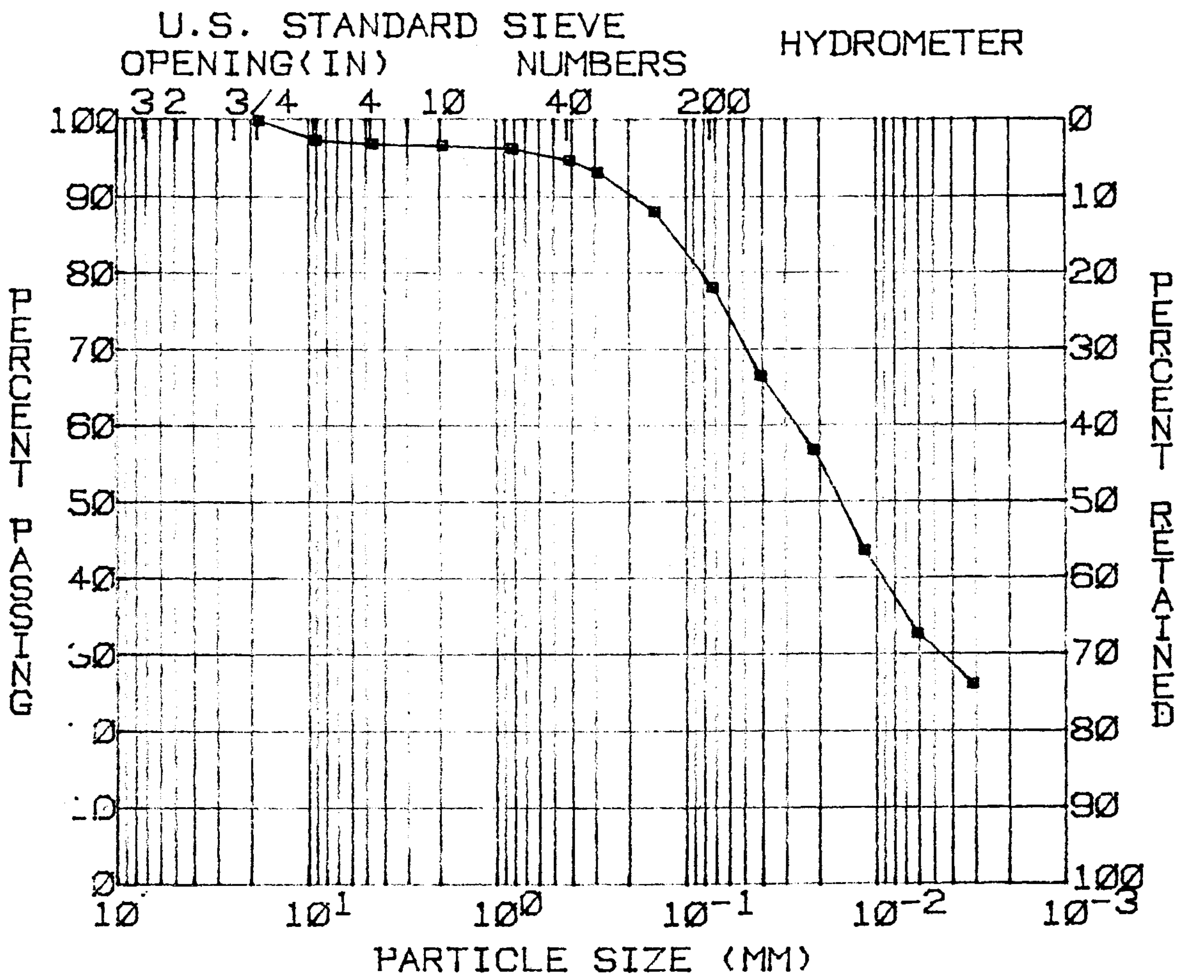
SOIL SYMBOL= CL
MOISTURE(%)= 18.5
SP. GR. = 2.64

L.L.(%) = 26
P.I.(%) = 9

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-7
FEATURE:ASH DISPOSAL AREA EL. :1091.5-1089.0
STATION:N735318.4 SAMPLE:2
RANGE :E2890506.3 DATE :8-8-86



GRAVEL(%)= 2
SAND(%) = 19
SILT(%) = 48
CLAY(%) = 31

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

SOIL SYMBOL= CL
MOISTURE(%)= 20.6
SP. GR. = 2.65

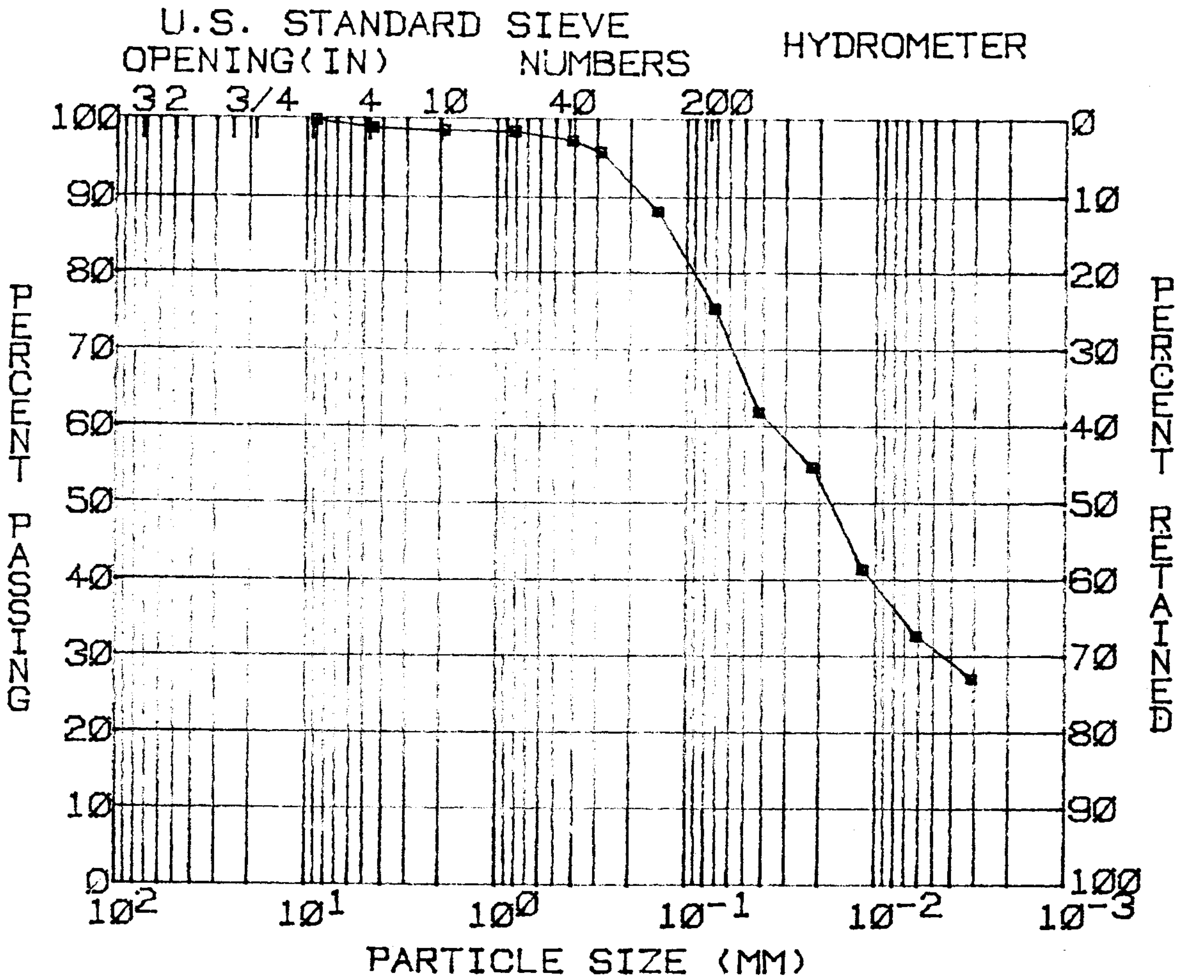
L.L.(%) = 29
P.I.(%) = 11

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N735318.4
RANGE : E2890506.3

BORING: US-7
EL. : 1088.5-1086.0
SAMPLE: 3
DATE : 8-8-86



GRAVEL(%) = 0
SAND(%) = 24
SILT(%) = 45
CLAY(%) = 31

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

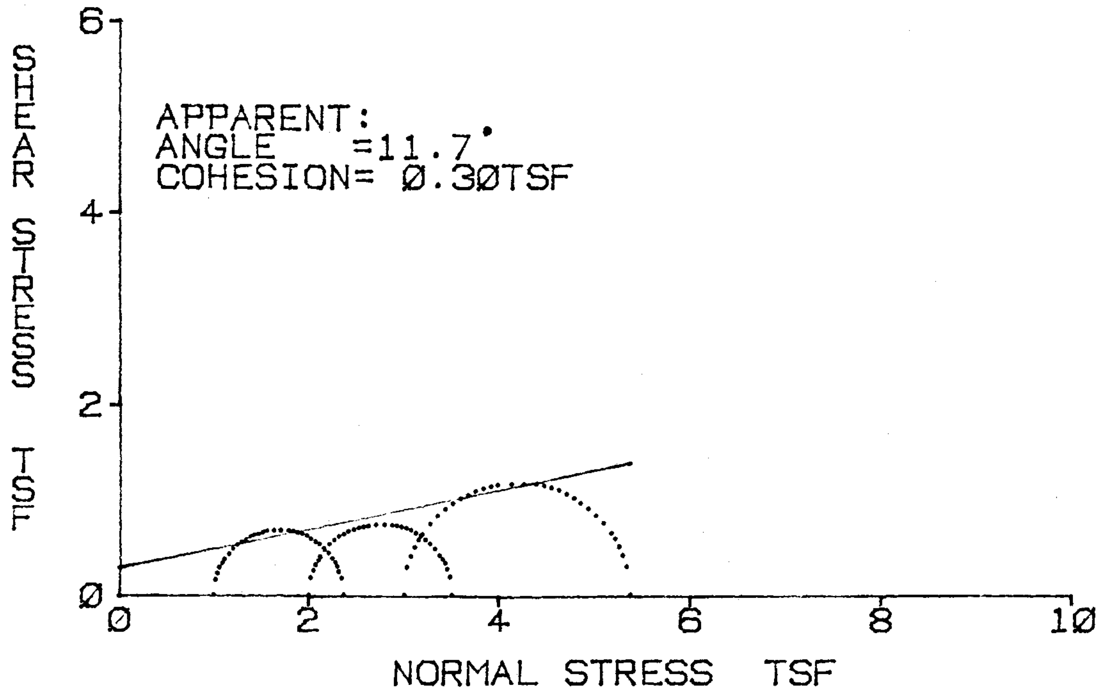
SOIL SYMBOL= CL
MOISTURE(%)= 20.9
SP. GR. = 2.66

L.L.(%) = 29
P.I.(%) = 11

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

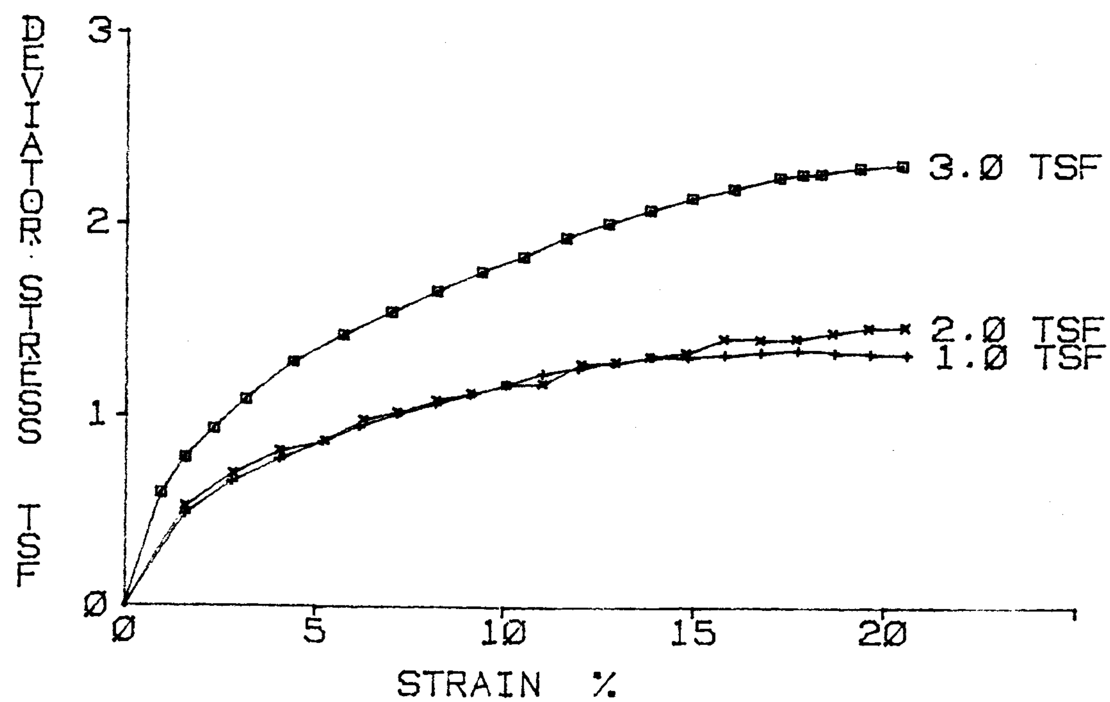
PROJECT:JOHN SEVIER S.P.EL. :1086.8-1086:3
FEATURE:ASH DISP AREA SAMPLE :3
STATION:N735318.4 PART :1
RANGE :E2890506.3 SOIL SYM:CL
BORING :US-7 DATE :8-12-86



REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT:JOHN SEVIER S.P.EL. :1086.8-1086.3
FEATURE:ASH DISP AREA SAMPLE :3
STATION:N735318.4 PART :1
RANGE :E2890506.3 SOIL SYM:CL
BORING :US-7 DATE :8-12-86



REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISP AREA
Station: N735318.4
Range : E2890506.3
Boring : US-7

El. : 1086.8-1086.3
Sample: 3
Part : 1

Tested By : EJL
Computed By: MHD
Checked By : [illegible]
Report Date: 8-12-86

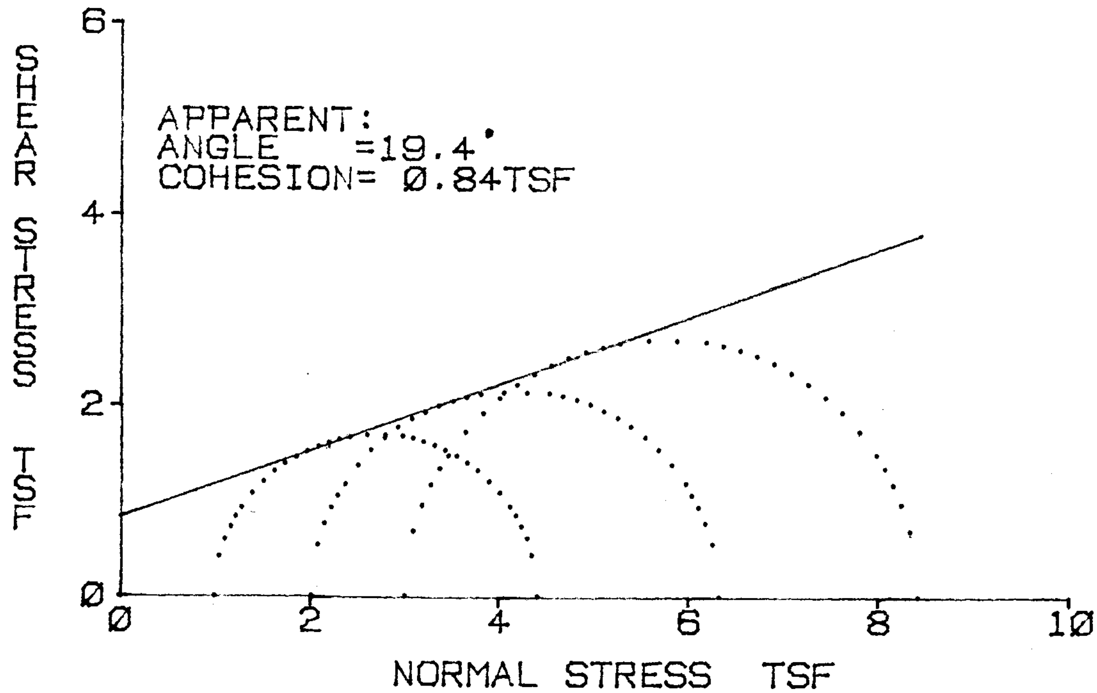
Soil Sytmbol= CL
L.L.(%)= 29
P.I.(%)= 11
Sp. Gr. = 2.66
D10(mm)=

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	21.5	20.6	20.0	0.0
Dry Density(pcf)	102.8	102.8	106.7	0.0
Void Ratio	0.616	0.615	0.556	0.000
Saturation(%)	92.8	89.2	95.8	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	21.3	20.3	19.8	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	2.39	3.53	5.40	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	17	20	20	0
Rate of Strain(%/min.)	1.05	1.04	1.03	0.00
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	11.7	0.30		
Effective	--	--		

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(R) TEST

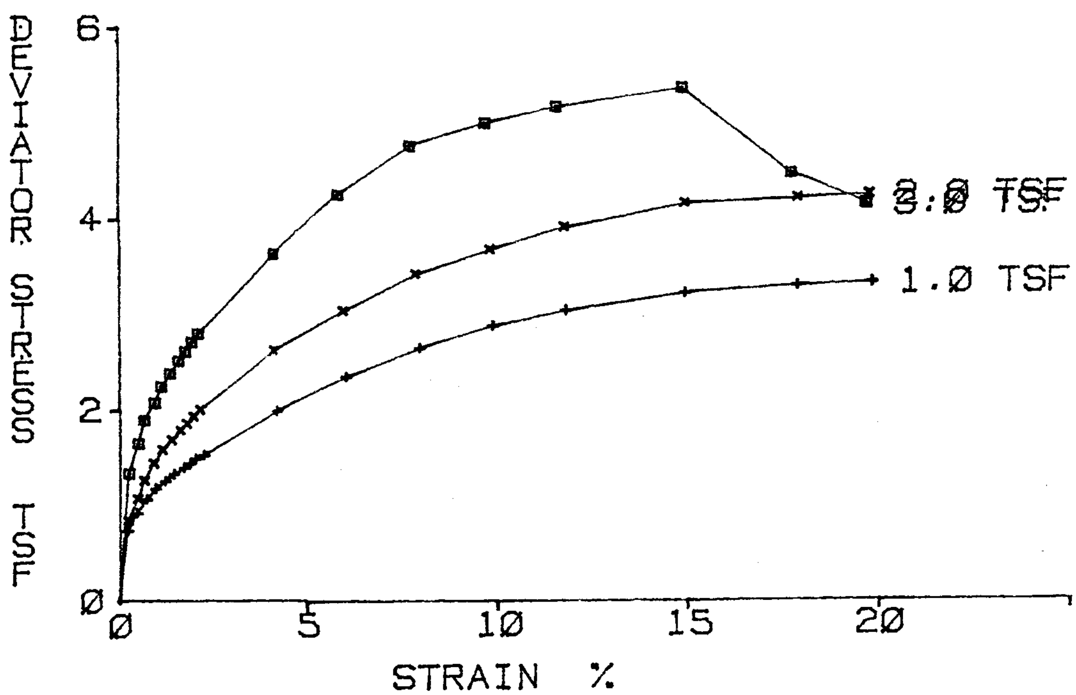
PROJECT:JOHN SEVIER S.P.EL. :1087.3-1086:8
FEATURE:ASH DISP AREA SAMPLE :3
STATION:N735318.4 PART :2
RANGE :E2890506.3. SOIL SYM:CL
BORING :US-7 DATE :8-12-86



REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(R) TEST

PROJECT	:JOHN SEVIER S.P.	EL.	:1087.3-1086.8
FEATURE	:ASH DISP AREA	SAMPLE	:3
STATION	:N735318.4	PART	:2
RANGE	:E2890506.3.	SOIL SYM	:CL
BORING	:US-7	DATE	:8-12-86



REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISPOSAL AREA
Station: N735318.4
Range : E2890506.3.
Boring : US-7

El. : 1087.3-1086.8
Sample: 3
Part : 2

Tested By : EJL
Computed By: MHD
Checked By : [signature]
Report Date: 8-12-86

Soil Sybmbol= CL
Sp. Gr. = 2.66

L.L.(%)= 29
D10(mm)=

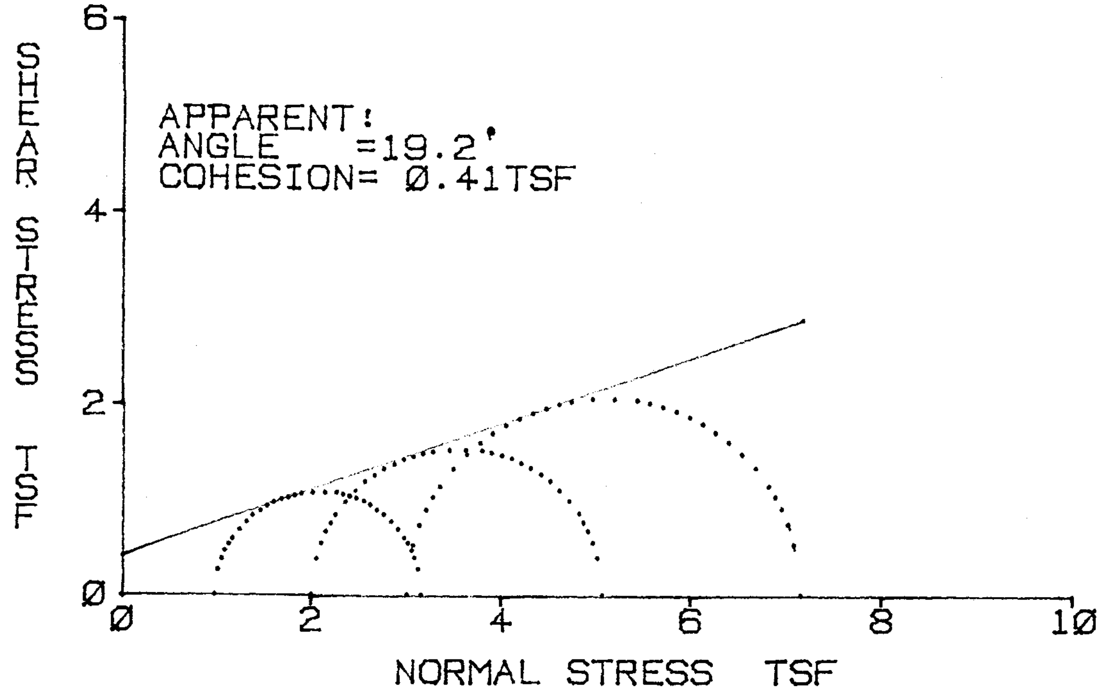
P.I.(%)= 11

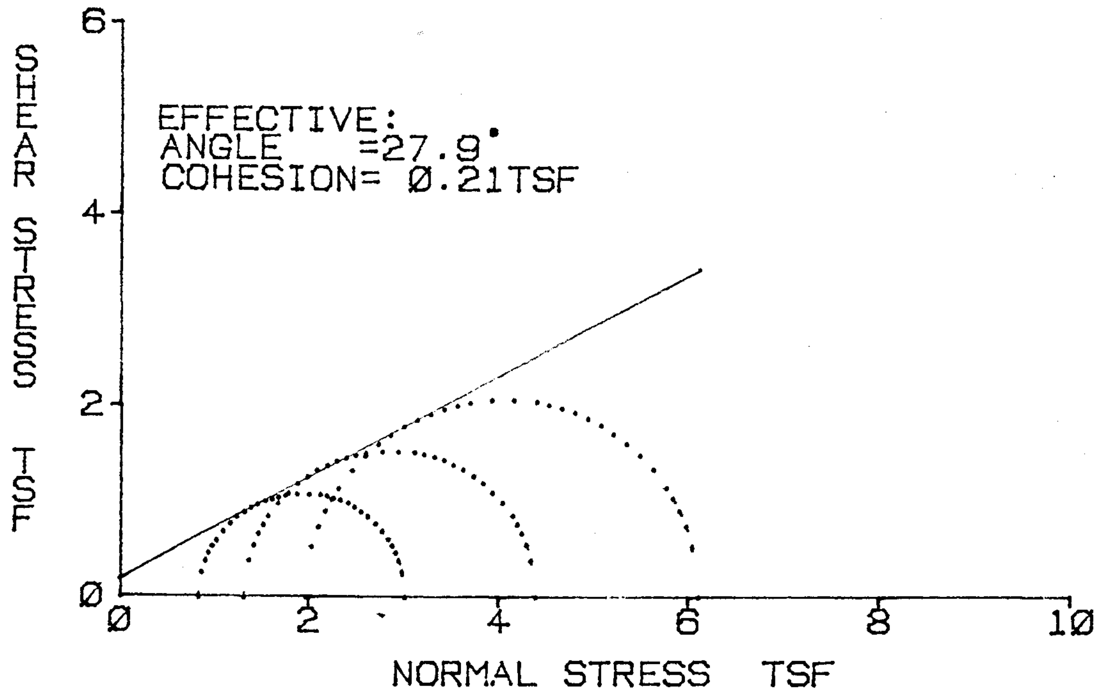
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	23.5	22.5	22.5	0.0
Dry Density(pcf)	100.1	100.9	101.7	0.0
Void Ratio	0.658	0.645	0.632	0.000
Saturation(%)	94.8	92.8	94.6	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	21.3	20.4	20.2	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	4.42	6.34	8.44	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	90	90	70	0
Rate of Strain(%/min.)	0.22	0.22	0.22	0.00
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	19.4	0.84		
Effective	--	--		

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT	:JOHN SEVIER S.P.	EL.	:1086.8-1086.3
FEATURE	:ASH DISP AREA	SAMPLE	:3
STATION	:N735318.4	PART	:3
RANGE	:E2890506.3	SOIL SYM	:CL
BORING	:US-7	DATE	:8-11-86

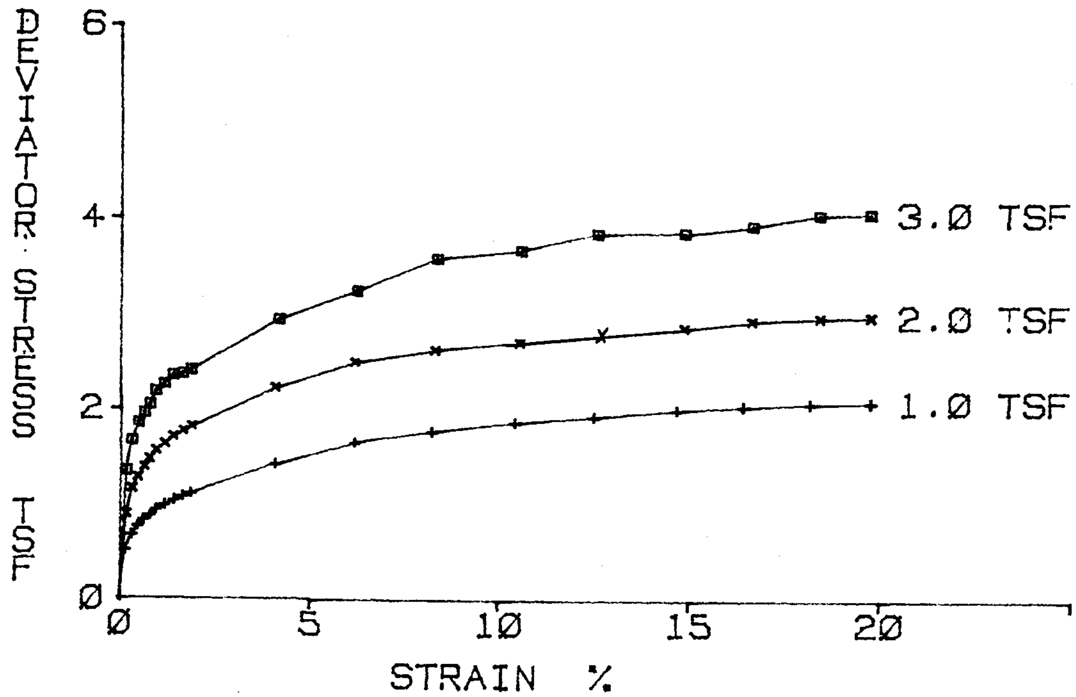


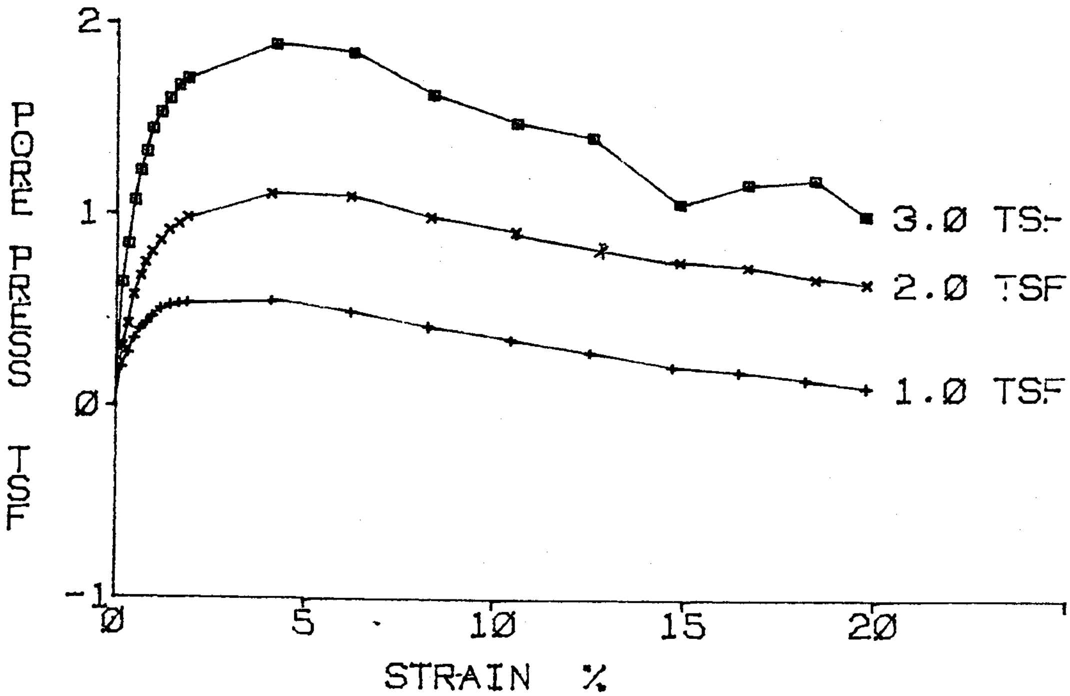


REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRES ION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :1086.8-1086.3
FEATURE:ASH DISP AREA SAMPLE :3
STATION:N735318.4 PART :3
RANGE :E2890506.3 SOIL SY:1:CL
BORING :US-7 DATE :8-[illegible]1-[illegible]6





REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.		
Feature: ASH DISP AREA		Tested By : EJL
Station: N735318.4	El. : 1086.8-1086.3	Computed By: MHD
Range : E2890506.3	Sample: 3	Checked By : CBG
Boring : US-7	Part : 3	Report Date: 8-11-86

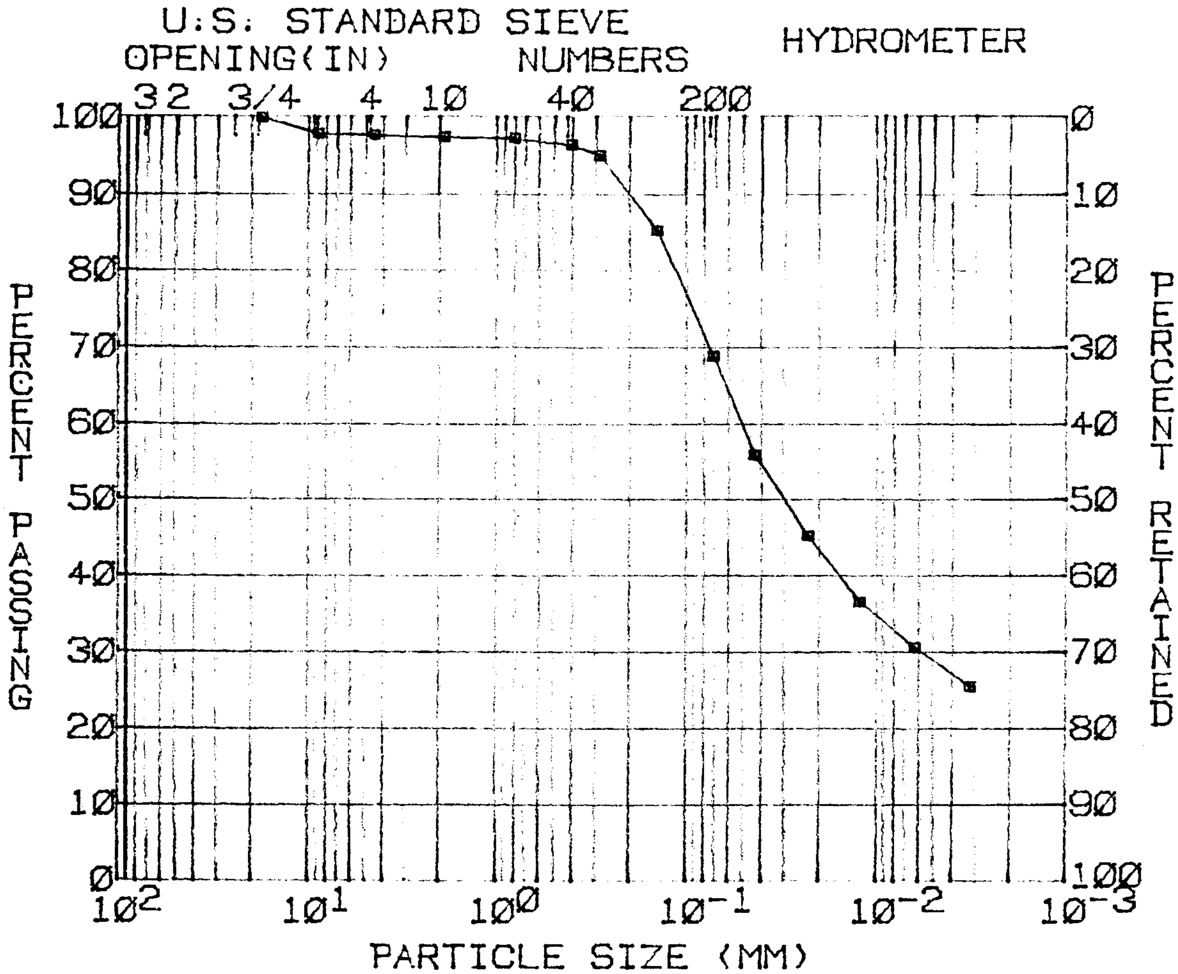
Soil Sybmbol= CL	L.L.(%)= 29	P.I.(%)= 11
Sp. Gr. = 2.66	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	20.6	20.8	20.6	0.0
Dry Density(pcf)	105.1	105.0	105.0	0.0
Void Ratio	0.580	0.581	0.581	0.000
Saturation(%)	94.3	95.2	94.5	0.0
Before Shearing:				
Moisture(%) (after satur.)	21.8	21.8	21.8	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	20.0	17.7	17.6	17.6
Void Ratio (after cons.)	0.532	0.472	0.468	0.000
Final Moisture Content(%)	20.4	20.1	18.4	0.0
Minor Principal Stress(tsf)	1.01(1.01)	2.02(2.02)	3.02(3.02)	0.00(0.00)
Major Principal Stress(tsf)	3.19(2.74)	5.09(4.58)	7.17(6.33)	0.00(0.00)
Eff. Minor Prin. Stress(tsf)	0.86(0.50)	1.33(0.89)	1.98(1.15)	0.00(0.00)
Eff. Major Prin. Stress(tsf)	3.04(2.22)	4.41(3.45)	6.13(4.46)	0.00(0.00)
Time to Failure(min.)	100	100	100	0
Rate of Strain(%/min.)	0.20	0.20	0.20	0.00
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	19.2	0.41	16.4	0.36
Effective	27.9	0.21	33.1	0.14

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-7
FEATURE:ASH DISPOSAL AREA EL. :1085.5-1083.0
STATION:N735318.4 SAMPLE:4
RANGE :E2890506.3 DATE :8-8-86



GRAVEL(%)= 1
SAND(%) = 29
SILT(%) = 41
CLAY(%) = 29

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

SOIL SYMBOL= CL
MOISTURE(%)= 24.5
SP. GR. = 2.62

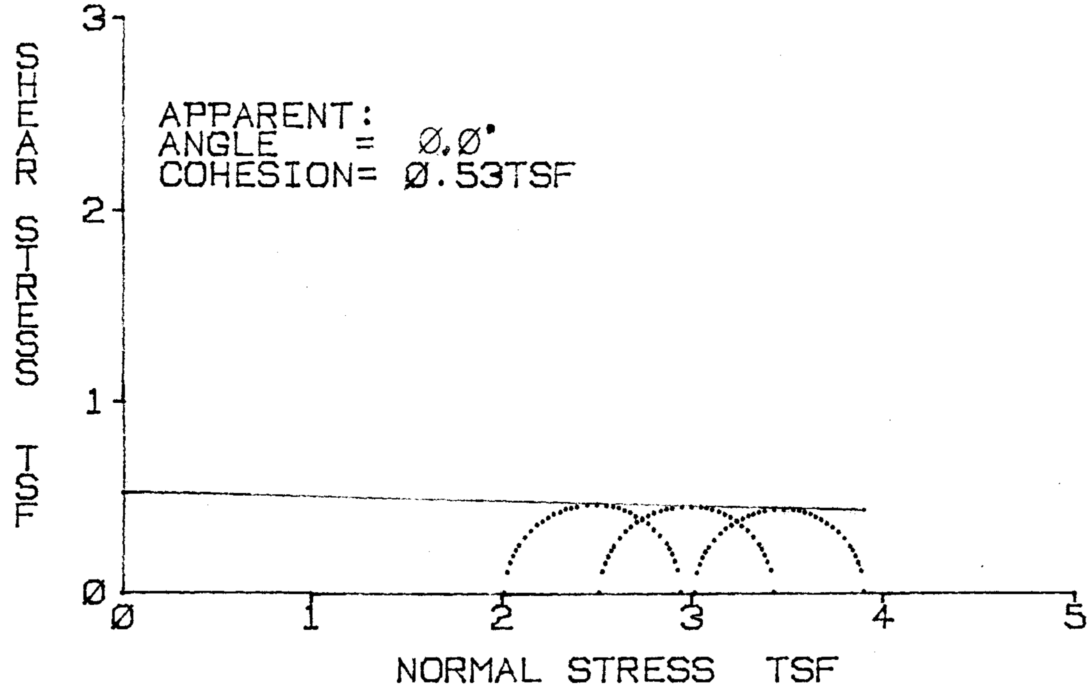
L.L.(%) = 29
P.I.(%) = 11

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

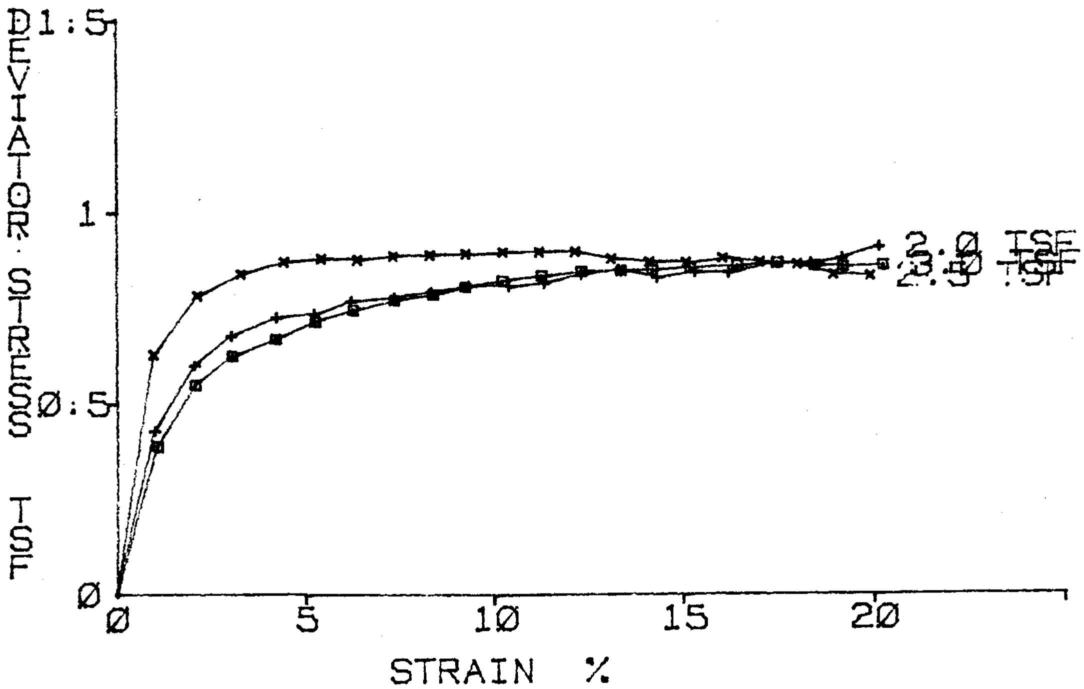
PROJECT:JOHN SEVIER S.P.EL. :1068.8-1068.4
FEATURE:ASH DISP AREA SAMPLE :7
STATION:N735318.4 PART :4
RANGE :E2890506.3 SOIL SYM:ML
BORING :US-7 DATE :8-12-86



REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT	:JOHN SEVIER S.P.	EL.	:1068.8-1068.4
FEATURE	:ASH DISP AREA	SAMPLE	:7
STATION	:N735318.4	PART	:4
RANGE	:E2890506.3	SOIL SYM	:ML
BORING	:US-7	DATE	:8-12-86



REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISP AREA
Station: N735318.4
Range : E2890506.3
Boring : US-7

El. : 1068.8-1068.4
Sample: 7
Part : 4

Tested By : TAL
Computed By: MHD
Checked By : CLG
Report Date: 8-12-86

Soil Sybmbol= ML
Sp. Gr. = 2.67

L.L.(%)= 21
D10(mm)=

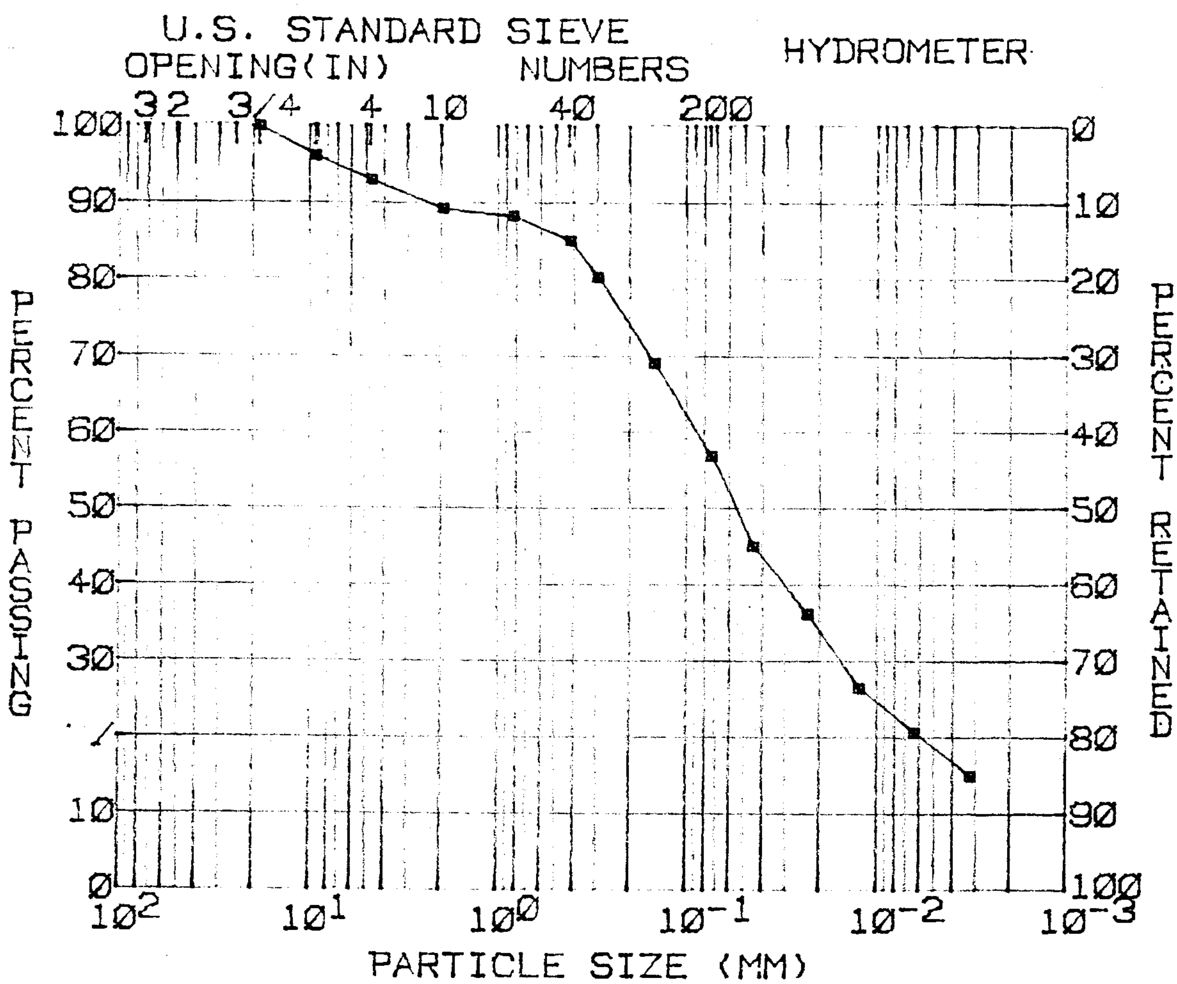
P.I.(%)= 1

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	28.6	28.2	27.7	0.0
Dry Density(pcf)	90.5	92.8	91.0	0.0
Void Ratio	0.842	0.797	0.831	0.000
Saturation(%)	90.8	94.5	89.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	28.2	27.7	28.5	0.0
Minor Principal Stress(tsf)	2.02	2.52	3.02	0.00
Major Principal Stress(tsf)	2.95	3.44	3.91	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	20	12	17	0
Rate of Strain(%/min.)	1.02	1.03	1.04	0.00
Specimen Height(in.)	3.13	3.13	3.13	3.13
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	0.0	0.53		
Effective	--	--		

T.E SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-7
FEATURE:ASH DISPOSAL AREA EL. :1076.5-1074.0
STATION:N735318.4 SAMPLE:5
RANGE :E2893506.3 DATE :8-8-86



GRAVEL(%)= 6
SAND(%) = 37
SILT(%) = 39
CLAY(%) = 18

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

SOIL SYMBOL= CL
MOISTURE(%)= 24.3
SP. GR. = 2.66

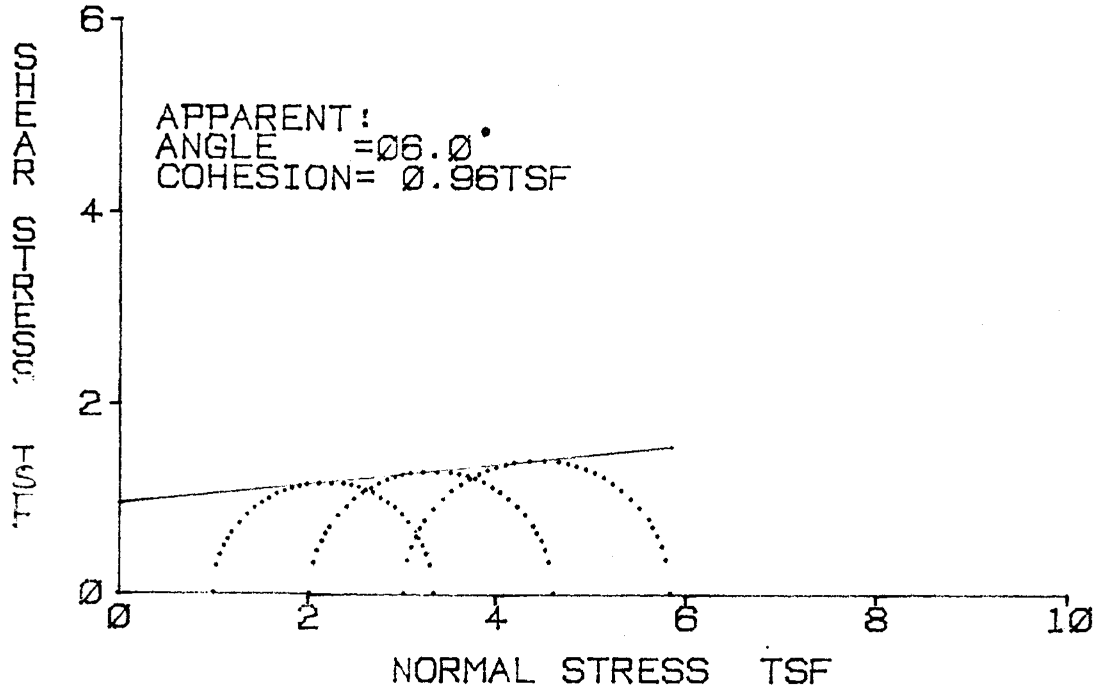
L.L.(%) = 27
P.I.(%) = 9

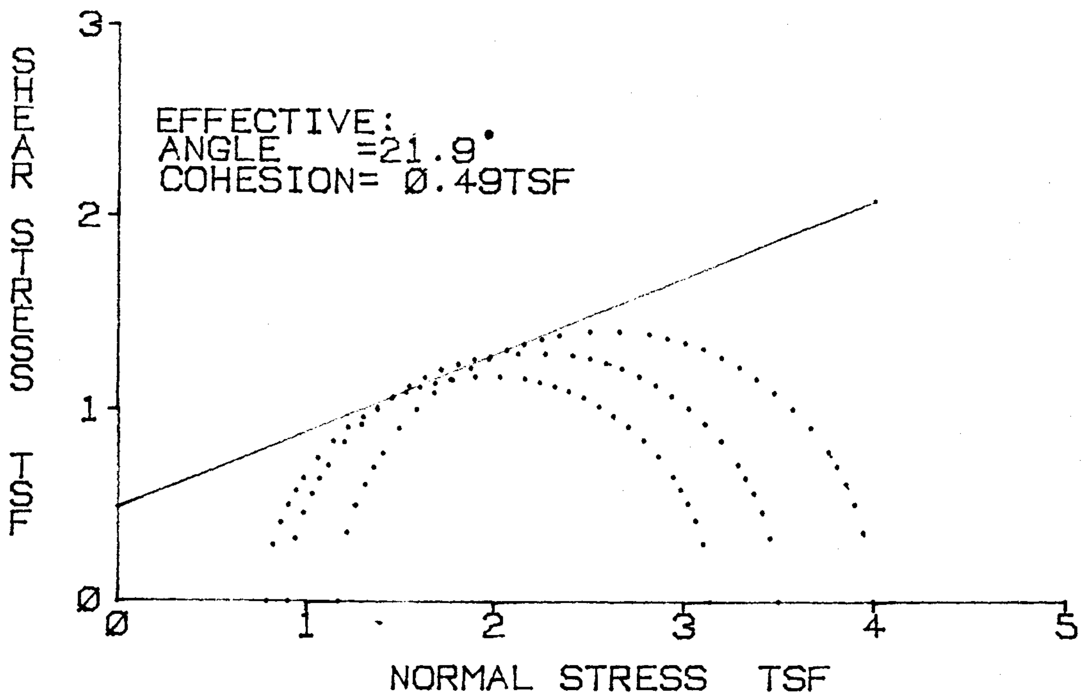
REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER S.P. EL. : 1068.4-1068.0
FEATURE: ASH DISP AREA SAMPLE : 7
STATION: N735318.4 PART : 5
RANGE : E2890506.3 SOIL SYM: ML
BORING : US-7 DATE : 8-11-86

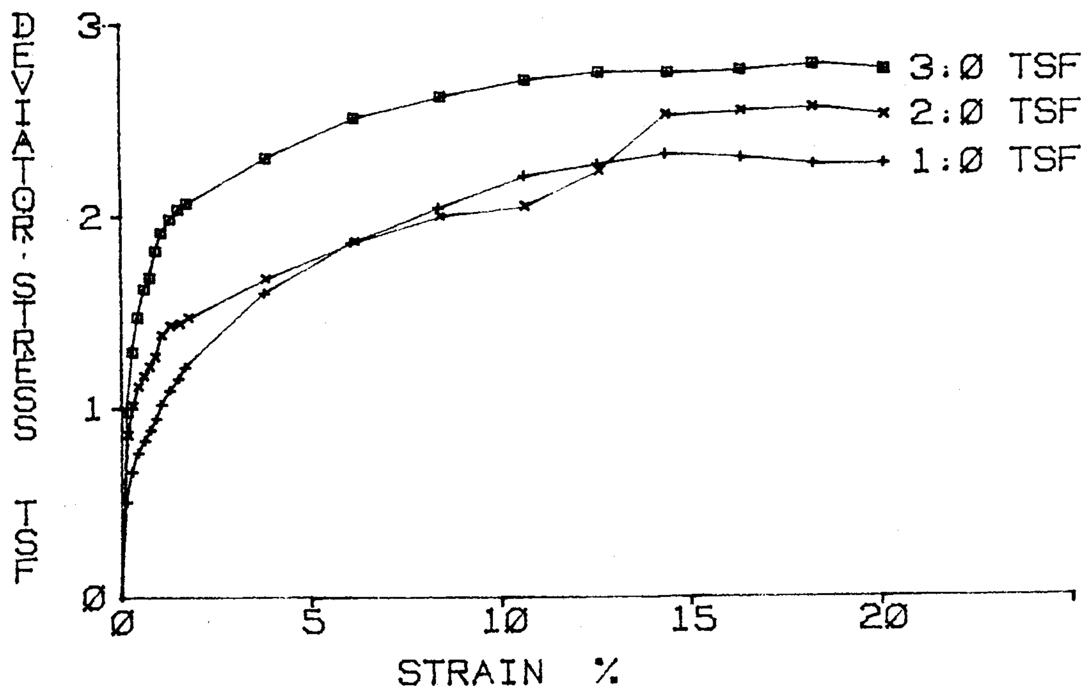


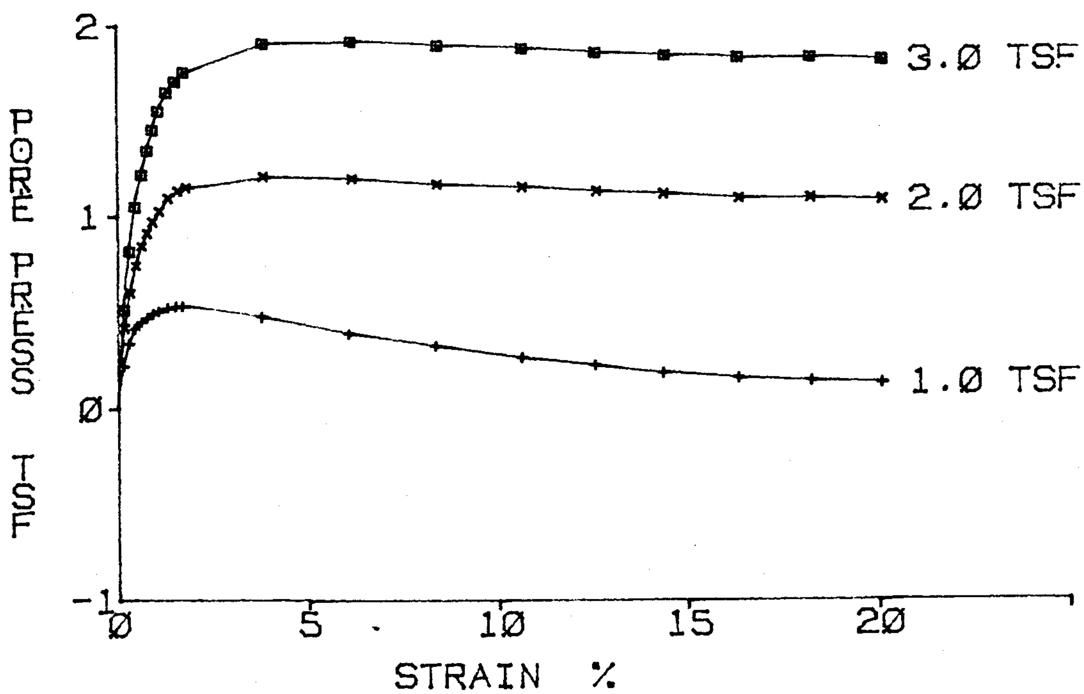


REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT: JOHN SEVIER S.P.EL. : 1068.4-1068.0
FEATURE: ASH DISP AREA SAMPLE : 7
STATION: N735318.4 PART : 5
RANGE : E2890506.3 SOIL SYM: ML
BORING : US-7 DATE : 8-11-86





REMARKS:

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISPOSAL AREA
Station: N735318.4
Range : E2890506.3
Boring : US-7

El. : 1068.4-1068.0
Sample: 7
Part : 5

Tested By : TAL
Computed By: MHD
Checked By : CBG
Report Date: 8-11-86

Soil Sybmbol= ML
Sp. Gr. = 2.67

L.L.(%)=21
D10(mm)= —

P.I.(%)=1

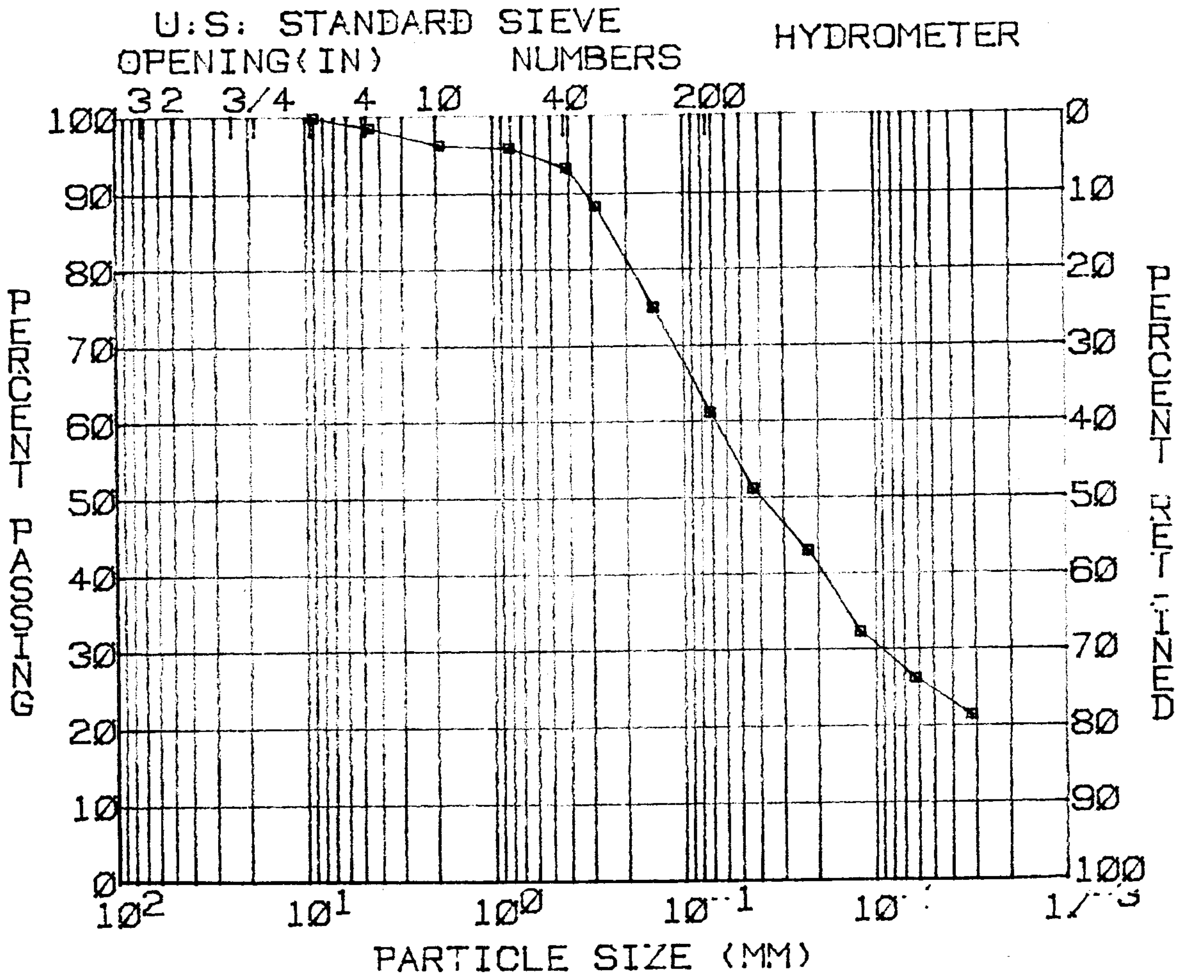
Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	24.4	25.4	25.7	0.0
Dry Density(pcf)	97.1	97.2	96.9	0.0
Void Ratio	0.717	0.714	0.721	0.000
Saturation(%)	91.0	94.8	95.2	0.0
Before Shearing:				
Moisture(%) (after satur.)	26.8	26.7	27.0	0.0
Saturation(%)	100.0	100.0	100.0	0.0
Moisture(%) (after cons.)	23.6	24.1	23.5	23.5
Void Ratio (after cons.)	0.629	0.644	0.629	0.000
Final Moisture Content(%)	23.1	23.3	22.8	0.0
Minor Principal Stress(tsf)	1.01(1.01)	2.02(2.02)	3.02(3.02)	0.00(0.00)
Major Principal Stress(tsf)	3.36(2.63)	4.62(4.58)	5.85(5.77)	0.00(0.00)
Eff. Minor Prin. Stress(tsf)	0.79(0.51)	0.90(0.88)	1.17(1.12)	0.00(0.00)
Eff. Major Prin. Stress(tsf)	3.15(2.14)	3.50(3.44)	4.00(3.87)	0.00(0.00)
Time to Failure(min.)	70	90	90	0
Rate of Strain(%/min.)	0.21	0.20	0.20	0.00
Specimen Height(in.)	3.13	3.13	3.13	3.13
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

Shear Strength	Max Deviator Stress Deg.	c(tsf)	Max Eff Stress Ratio Deg.	c(tsf)
Apparent	6.0	0.96	12.9	0.46
Effective	21.9	0.49	29.6	0.20

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N735318.4
RANGE : E2890506.3

BORING: US-7
EL. : 1073.5-1071.0
SAMPLE: 6
DATE : 8-8-86



GRAVEL(%) = 1
SAND(%) = 38
SILT(%) = 37
CLAY(%) = 24

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF = --

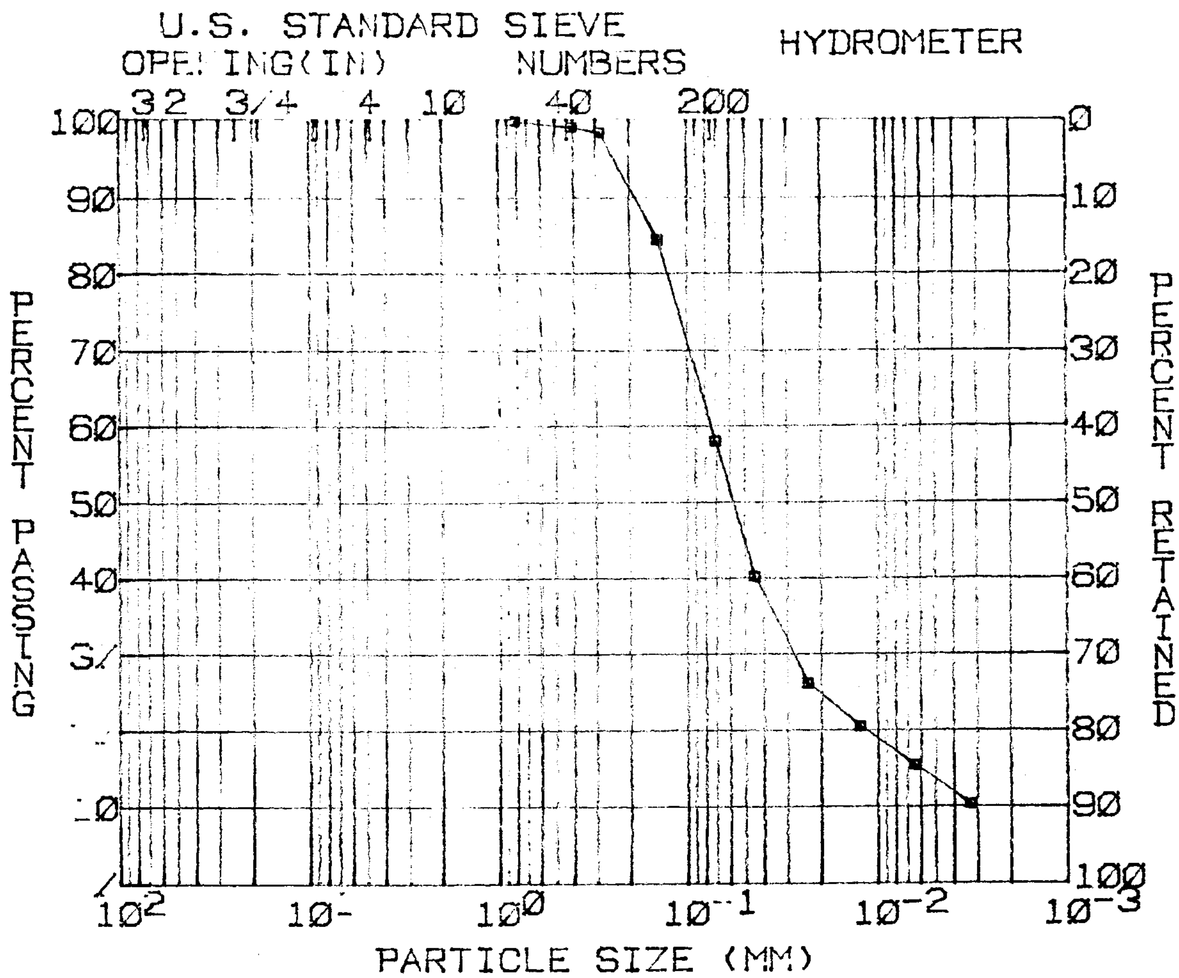
SOIL SYMBOL = CL-ML
MOISTURE(%) = 19.7
SP. GR. = 2.65

L.L.(%) = 24
P.I.(%) = 7

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-7
FEATURE:ASH DISPOSAL AREA EL. :1070.5-1068.0
STATION:N735318.4 SAMPLE:7
RANGE :E2890506.3 DATE :8-8-86



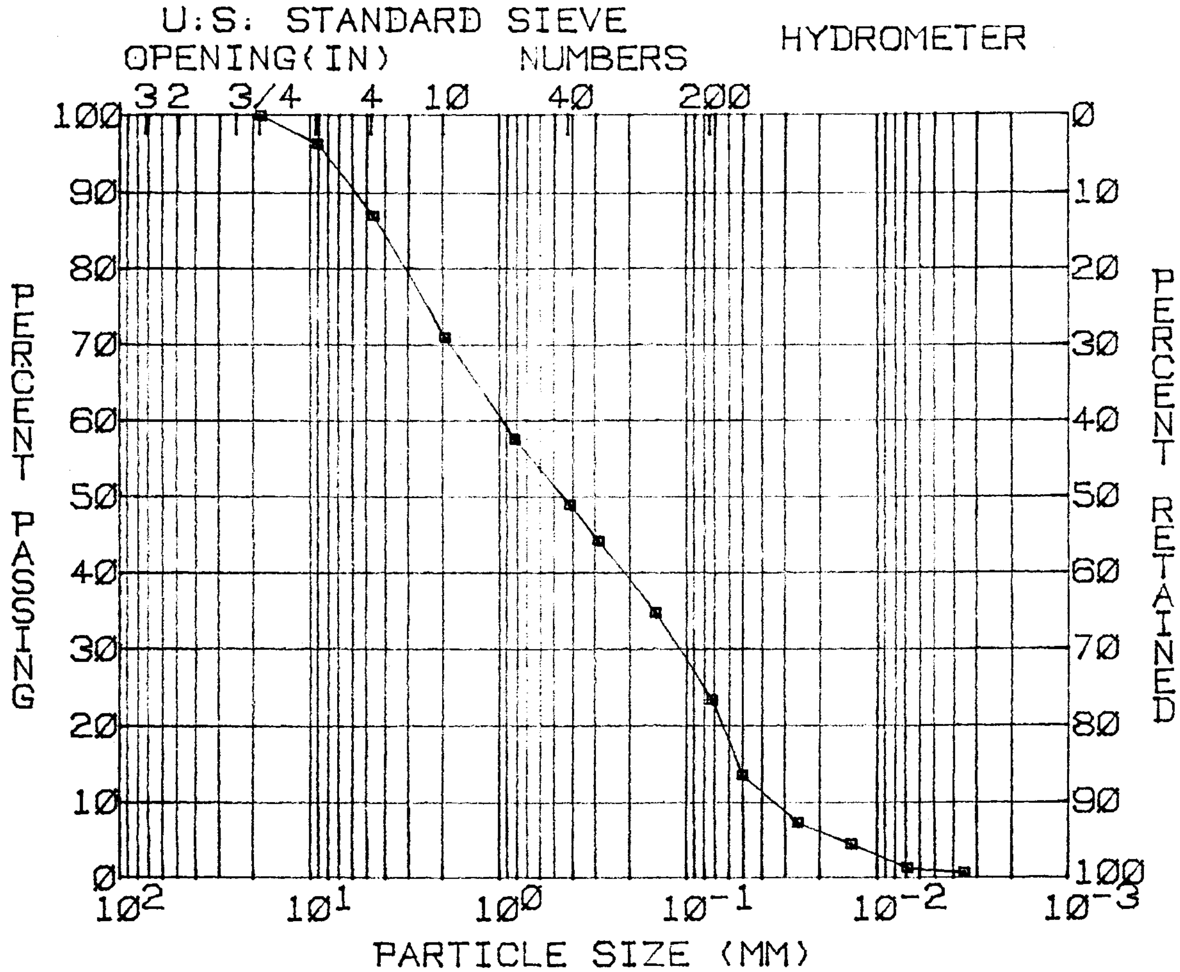
GRAVEL(%)= 0 D10(MM) = --
SAND(%) = 42 D30(MM) = --
SILT(%) = 45 D60(MM) = --
CLAY(%) = 13 COEF UNIF= --

SOIL SYMBOL= ML L.L.(%) = 21
MOISTURE(%)= 26.5 P.I.(%) = 1
SP. GR. = 2.67

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P. BORING:US-11
FEATURE:ASH DISPOSAL AREA EL. :1115.1-1112.6
STATION:N735603.0 SAMPLE:1
RANGE :E2892460.2 DATE :8-8-86



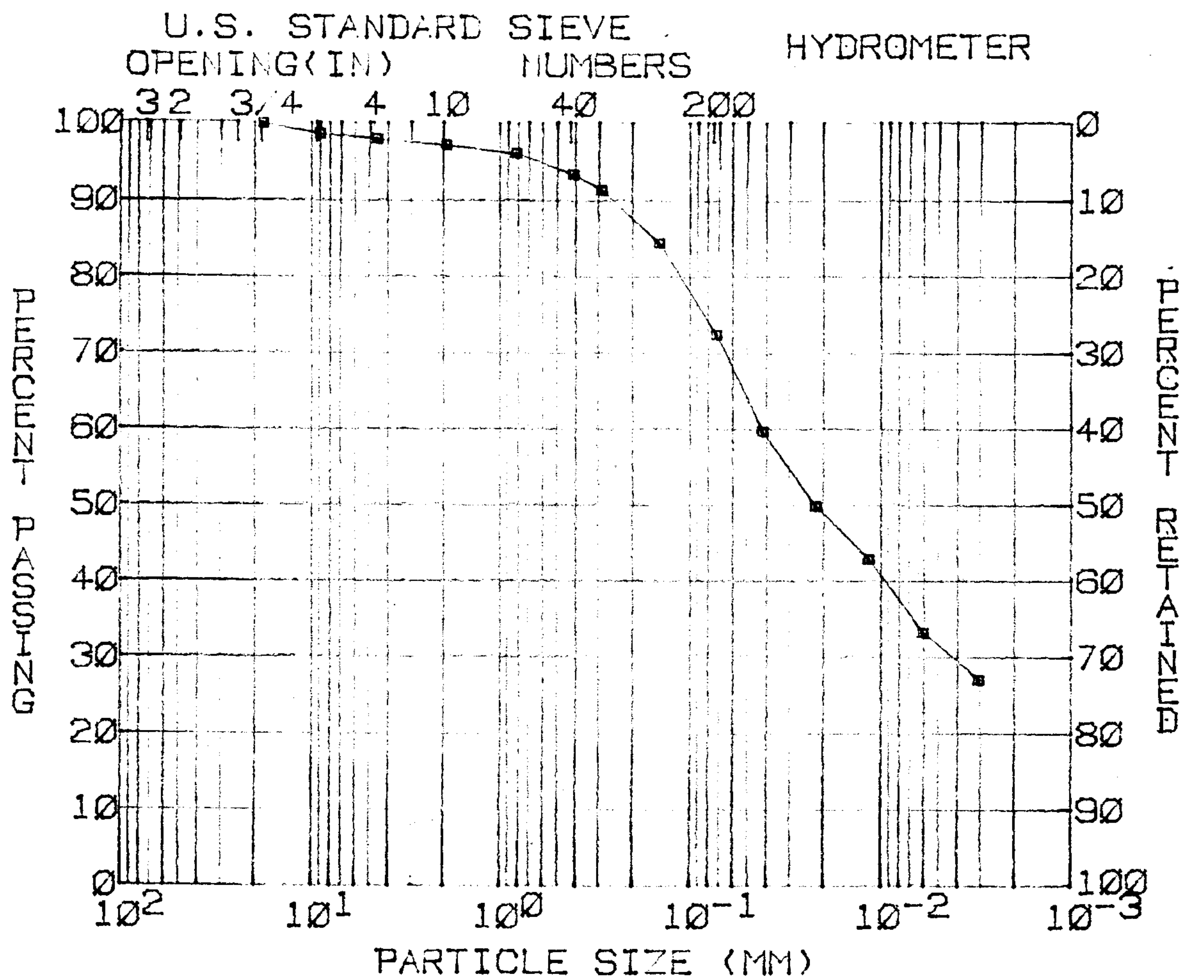
GRAVEL(%)= 12 D10(MM) = 0.0341
SAND(%) = 64 D30(MM) = 0.1090
SILT(%) = 23 D60(MM) = 0.9493
CLAY(%) = 1 COEF UNIF=27.8

SOIL SYMBOL= SM L.L.(%) = NP
MOISTURE(%)= 11.2 P.I.(%) = NP
SP. GR. = 2.55

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P. BORING: US-11
FEATURE: ASH DISPOSAL AREA EL. : 1109.1 1106.6
STATION: N735603.0 SAMPLE: 2
RANGE : E2892460.2 DATE : 8-8-86



GRAVEL(%) =	1	D10(MM) =	--
SAND(%) =	26	D30(MM) =	--
SILT(%) =	41	D60(MM) =	--
CLAY(%) =	32	COEF UNIF=	--

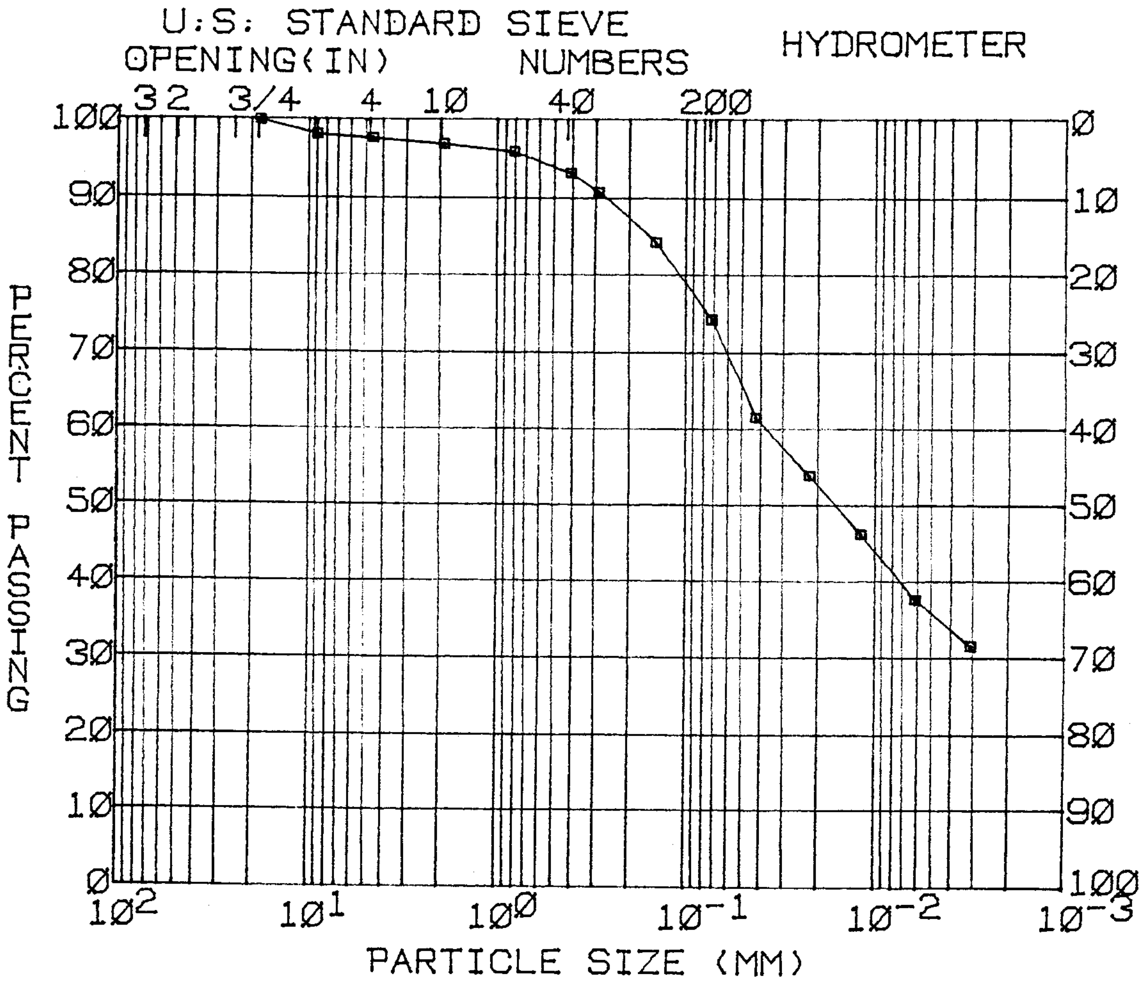
SOIL SYMBOL=	CL	L.L.(%) =	32
MOISTURE(%)=	19.3	P.I.(%) =	13
ST. GR. =	2.70		

REMARKS :

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT: JOHN SEVIER S.P.
FEATURE: ASH DISPOSAL AREA
STATION: N735128.7
RANGE : E2892435.4

BORING: US-11
EL. : 1106.1-1103.6
SAMPLE: 3
DATE : 8-6-86



GRAVEL(%) = 2
SAND(%) = 24
SILT(%) = 39
CLAY(%) = 35

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF = --

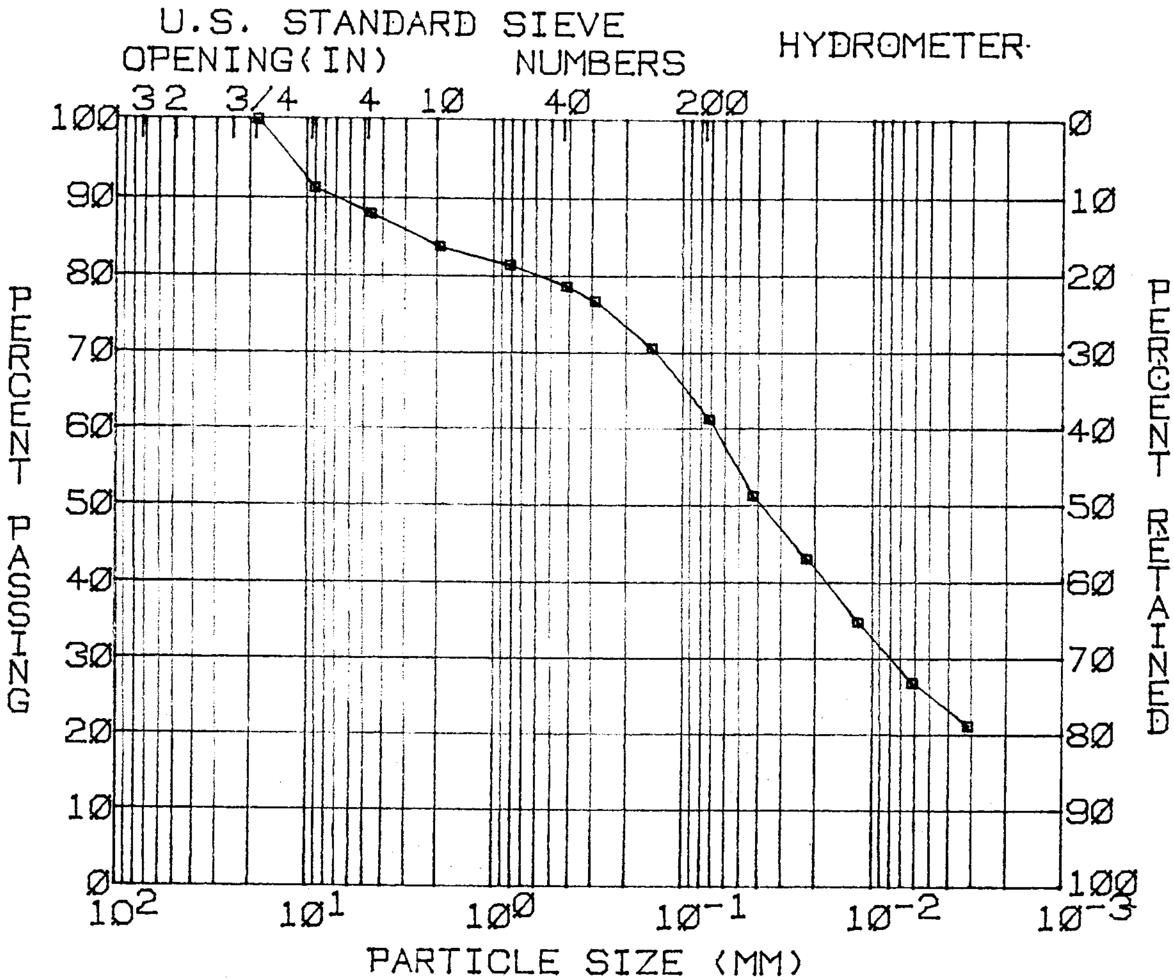
SOIL SYMBOL = CL
MOISTURE(%) = 19.2
SP. GR. = 2.64

L.L.(%) = 35
P.I.(%) = 17

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-11
FEATURE:ASH DISPOSAL AREA   EL.   :1103.1 -1100.6
STATION:N735128.7   SAMPLE:4
RANGE   :E2892435.4   DATE   :8-8-86



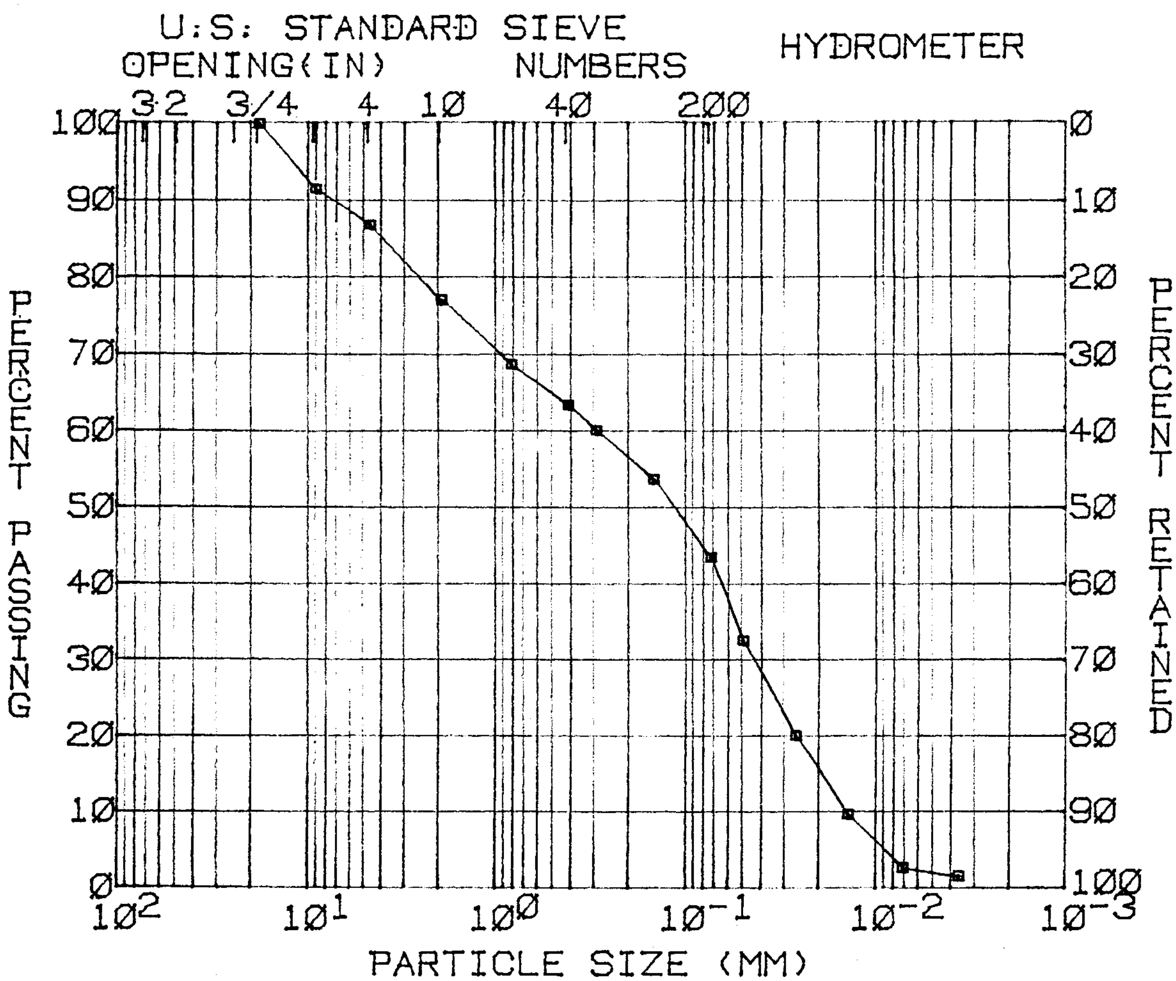
GRAVEL(%)= 11   D10(MM)   = --
SAND(%)   = 27   D30(MM)   = --
SILT(%)   = 37   D60(MM)   = --
CLAY(%)   = 25   COEF UNIF= --

SOIL SYMBOL= CL   L.L.(%)   = 30
MOISTURE(%)= 16.9   P.I.(%)   = 12
SP. GR.   = 2.68

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING L-BORATORY
PARTICLE SIZE ANALYSIS

PROJECT:JOHN SEVIER S.P.   BORING:US-11A
FEATURE:ASH DISPOSAL AREA   EL.   :1112.1 -1110.3
STATION:N735128.7   SAMPLE:1
RANGE   :E2892435.4   DATE   :8-8-86



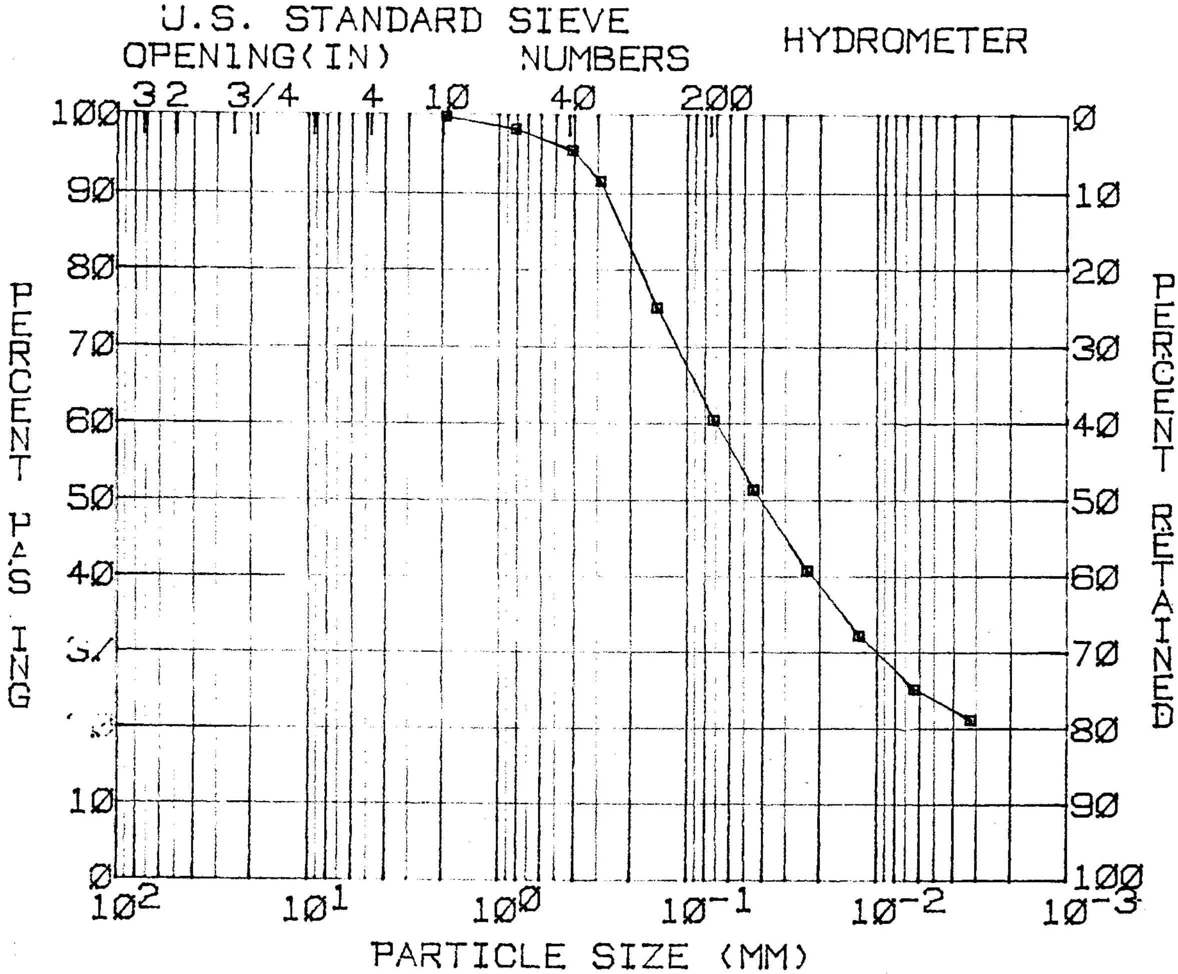
GRAVEL(%)= 12   D10(MM) = 0.0144
SAND(%) = 44   D30(MM) = 0.0434
SILT(%) = 42   D60(MM) = 0.2801
CLAY(%) = 2   COEF UNIF=19.5

SOIL SYMBOL= SM   L.L.(%) = NP
MOISTURE(%)= 19.6   P.I.(%) = NP
SP. GR. = 2.44

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
PARTICLE SIZE ANALYSIS

PROJECT :JOHN SEVIER S.P. BORING:US-11A
FEATURE:ASH DISPOSAL AREA EL. :1110.3 -1109.6
STATION :N735128.7 SAMPLE:1
RANGE :E2892435.4 DATE :8-8-86



GRAVEL(%) = 0
SAND(%) = 39
SILT(%) = 37
CLAY(%) = 24

D10(MM) = --
D30(MM) = --
D60(MM) = --
COEF UNIF= --

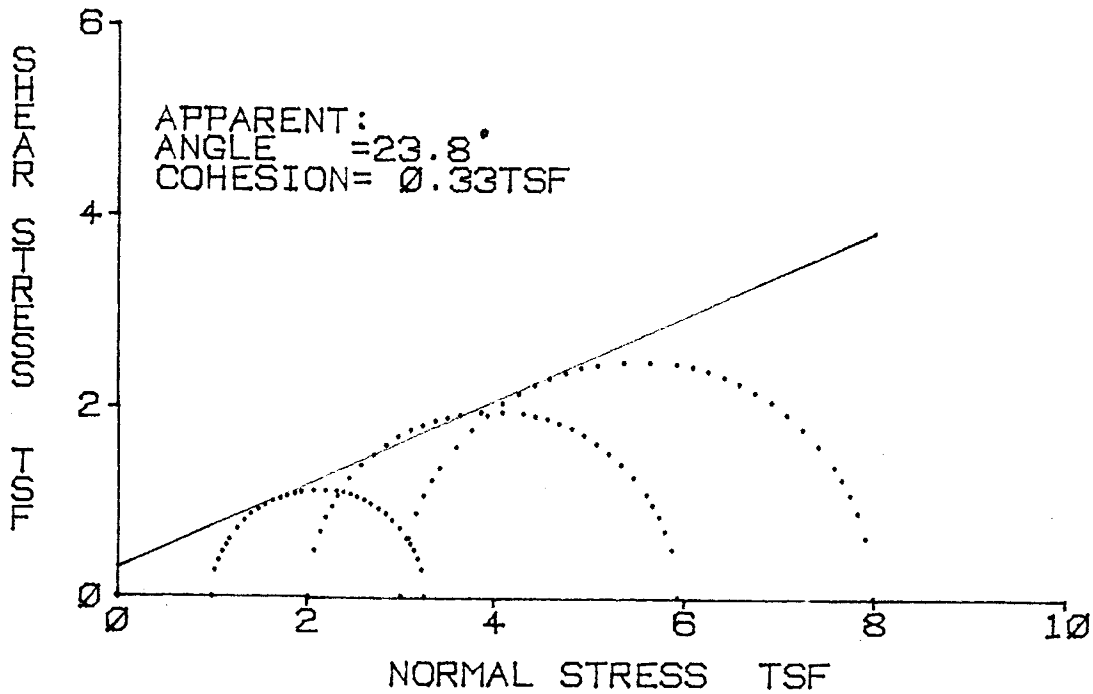
SOIL SYMBOL= CL
MOISTURE(%)= 20.6
SP. GR. = 2.61

L.L.(%) = 26
P.I.(%) = 7

REMARKS:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

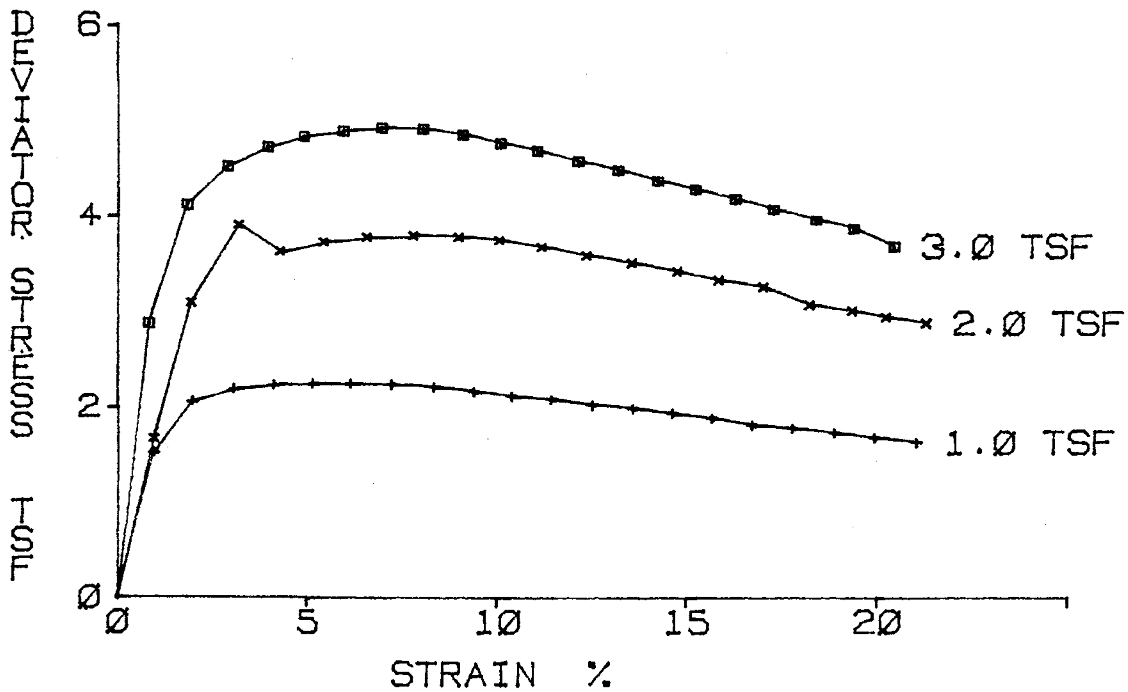
PROJECT:JOHN SEVIER S.P.EL. :
FEATURE:ASH POND J   SAMPLE :CLASS I
STATION: PART :
RANGE :   SOIL SYM:ML
BORING :   DATE :8-11-86



REMARKS:REMOLDED AT 3% WET OF OPTIMUM MOISTURE
AND AT 95% OF MAXIMUM UNIT WEIGHT:

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION(Q) TEST

PROJECT	:JOHN SEVIER S.P.EL.		:
FEATURE	:ASH POND J	SAMPLE	:CLASS I
STATION	:	PART	:
RANGE	:	SOIL SYM	:ML
BORING	:	DATE	:8-11-86



REMARKS:REMOLDED AT 3% WET OF OPTIMUM MOISTURE
AND AT 95% OF MAXIMUM UNIT WEIGHT.

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Unconsolidated Undrained Triaxial Compression (Q) Test

Project: JOHN SEVIER S.P.		
Feature: ASH POND J		Tested By : GMD
Station:	El. :	Computed By: MHD
Range :	Sample: CLASS I	Checked By : CEG
Boring :	Part :	Report Date: 8-11-86

Soil Symbol= ML	L.L.(%)=	P.I.(%)=
Sp. Gr. = 2.43	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	25.5	25.6	25.5	0.0
Dry Density(pcf)	87.2	87.2	87.4	0.0
Void Ratio	0.739	0.739	0.736	0.000
Saturation(%)	83.8	84.1	84.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	25.5	25.5	25.4	0.0
Minor Principal Stress(tsf)	1.01	2.02	3.02	0.00
Major Principal Stress(tsf)	3.29	5.94	8.00	0.00
Eff. Minor Prin. Stress(tsf)	--	--	--	--
Eff. Major Prin. Stress(tsf)	--	--	--	--
Time to Failure(min.)	6	3	7	0
Rate of Strain(%/min.)	1.03	1.06	1.00	0.00
Specimen Height(in.)	3.14	3.14	3.14	3.14
Specimen Diameter(in.)	1.40	1.40	1.40	1.40

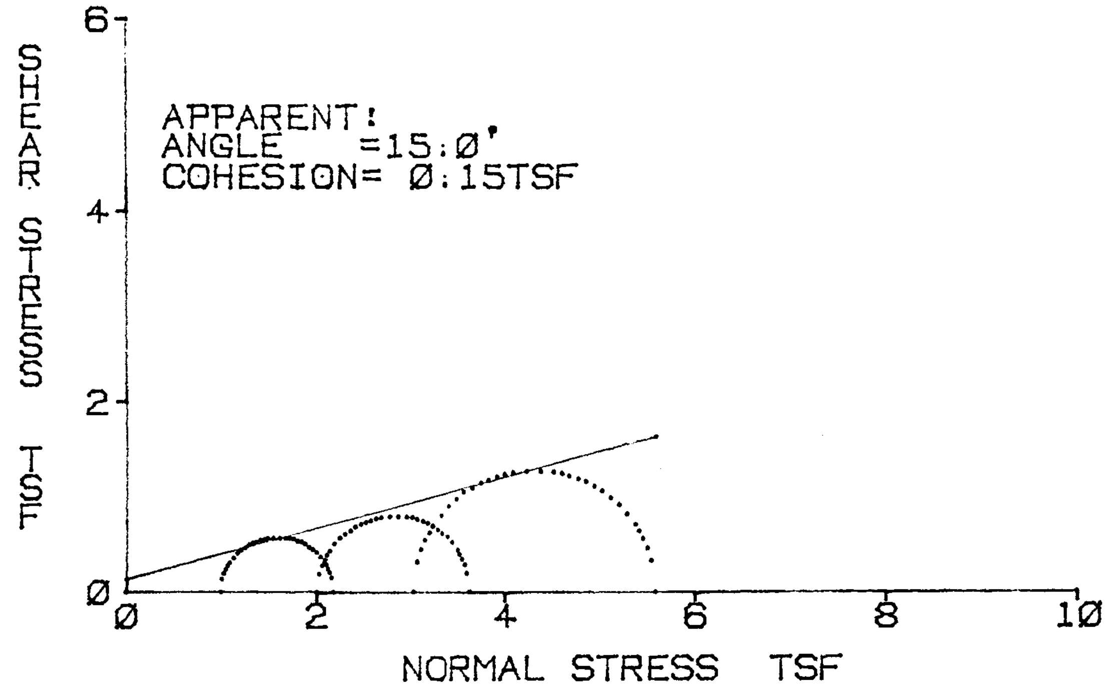
	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	23.8	0.33		
Effective	--	--		

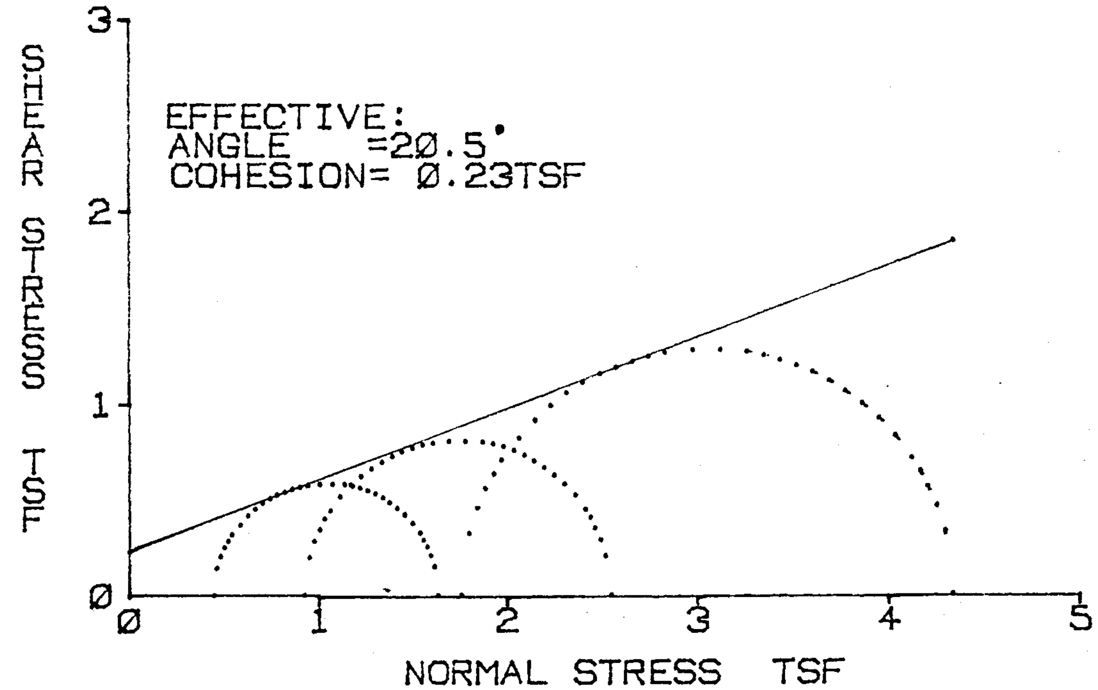
Remark: REMOLDED AT 3% WET OF OPTIMUM MOISTURE
AND AT 95% OF MAXIMUM UNIT WEIGHT.

TVA - SINGLETON MATERIALS ENGINEERING LABORATORY

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT	:JOHN SEVIER S.P.EL.		:
FEATURE	:ASH DISP AREA	SAMPLE	:CLASS I
STATION	:	PART	:
RANGE	:	SOIL SYM	:ML
BORING	:BORROW J	DATE	:8-18-86

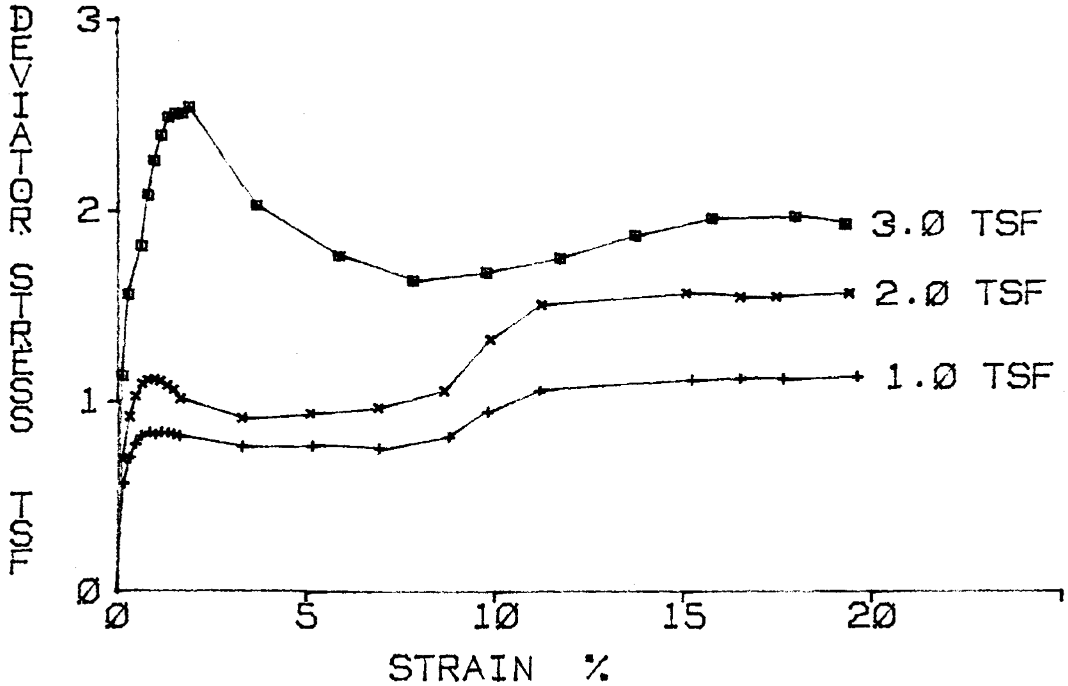


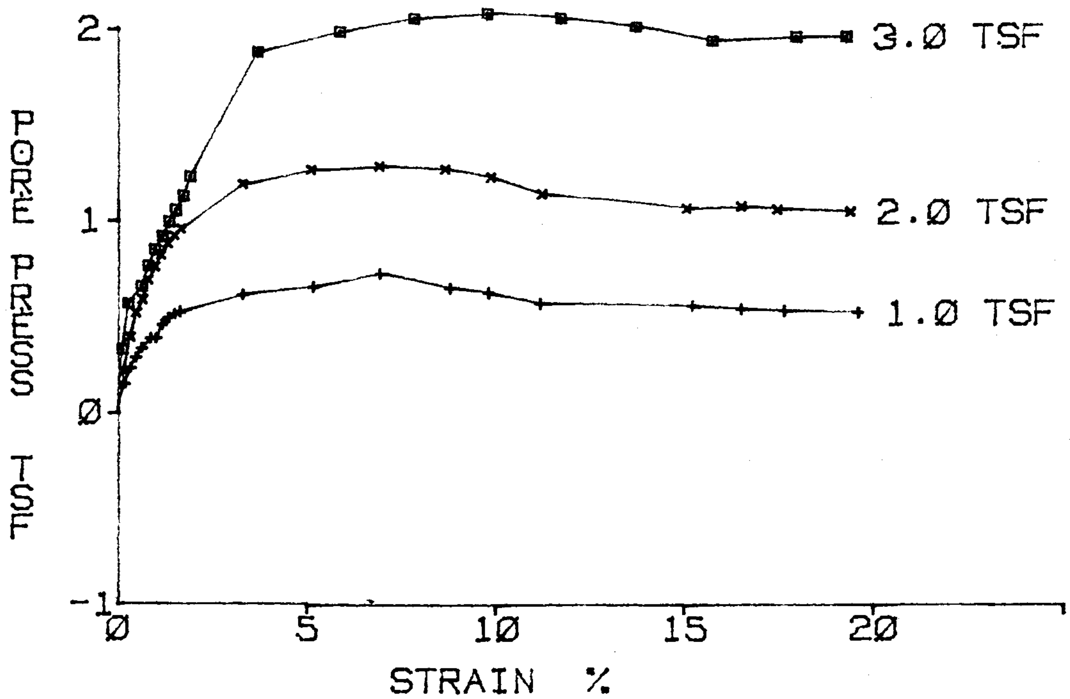


REMARKS:REMOLDED AT 3% DRY OF OPTIMUM MOISTURE
AND AT 95% OF MAXIMUM UNIT WEIGHT.

TVA SINGLETON MATERIALS ENGINEERING LABORATORY
CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (R) TEST

PROJECT:JOHN SEVIER S.P.EL. :
FEATURE:ASH DISP AREA SAMPLE :CLASS I
STATION: PART :
RANGE : SOIL SYM:ML
BORING :BORROW J DATE :8-18-86





REMARKS:REMOLDED AT 3% DRY OF OPTIMUM MOISTURE
AND AT 95% OF MAXIMUM UNIT WEIGHT.

Tennessee Valley Authority
Singleton Materials Engineering Laboratory
Consolidated Undrained Triaxial Compression (R) Test

Project: JOHN SEVIER S.P.
Feature: ASH DISP AREA
Station:
Range :
Boring : BORROW J

El. :
Sample: CLASS I
Part :

Tested By : GMD
Computed By: MHD
Checked By :
Report Date: 8-18-86

Soil Sybmbol= ML
Sp. Gr. = 2.43

L.L.(%)=
D10(mm)=

P.I.(%)=

Specimen Number	1		2		3		4	
Initial:								
Moisture Content(%)	19.4		19.4		19.4		0.0	
Dry Density(pcf)	87.3		87.3		87.3		0.0	
Void Ratio	0.738		0.738		0.738		0.000	
Saturation(%)	64.0		64.0		64.0		0.0	
Before Shearing:								
Moisture(%) (after satur.)	30.4		30.4		30.4		0.0	
Saturation(%)	100.0		100.0		100.0		0.0	
Moisture(%) (after cons.)	26.2		27.7		28.7		28.7	
Void Ratio (after cons.)	0.637		0.674		0.696		0.000	
Final Moisture Content(%)	31.4		31.0		29.1		0.0	
Minor Principal Stress(tsf)	1.01(	1.01)	2.02(	2.02)	3.02(	3.02)	0.00(	0.00)
Major Principal Stress(tsf)	2.19(	1.79)	3.64(	3.57)	5.60(	5.05)	0.00(	0.00)
Eff. Minor Prin. Stress(tsf)	0.45(	0.26)	0.93(	0.84)	1.76(	1.02)	0.00(	0.00)
Eff. Major Prin. Stress(tsf)	1.63(	1.04)	2.55(	2.40)	4.34(	3.04)	0.00(	0.00)
Time to Failure(min.)	110		110		10		0	
Rate of Strain(%/min.)	0.18		0.18		0.21		0.00	
Specimen Height(in.)	3.14		3.14		3.14		3.14	
Specimen Diameter(in.)	1.40		1.40		1.40		1.40	

	Max Deviator Stress		Max Eff Stress Ratio	
Shear Strength	Deg.	c(tsf)	Deg.	c(tsf)
Apparent	15.0	0.15	13.7	0.08
Effective	20.5	0.23	26.2	0.11

Remark:REMOLDED AT 3% DRY OF OPTIMUM MOISTURE
AND AT 95% OF MAXIMUM UNIT WEIGHT.

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

REPORT OF HYDROGEOLOGIC AND ENGINEERING EVALUATION (REVISED) PROPOSED DRY FLY ASH DISPOSAL FACILITY SITE

JOHN SEVIER FOSSIL PLANT
ROGERSVILLE, TENNESSEE

Prepared for:

TENNESSEE VALLEY AUTHORITY

OCTOBER 1994

LAW ENGINEERING PROJECT 57401440.01

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

September 30, 1994

Mr. Jerry Glover
LP2G
1101 Market Street
Chattanooga, Tennessee 37402-2801

Subject: **Report of Hydrogeologic and Engineering Evaluation (Revised)**
Proposed Dry Fly Ash Disposal Facility Site
John Sevier Fossil Plant
Rogersville, Tennessee
Law Engineering Project 57401440.01

Dear Mr. Glover:

Law Engineering, Inc. is pleased to submit this Revised Report of Hydrogeologic and Engineering Evaluation for the proposed Dry Fly Ash Disposal Facility at the John Sevier Fossil Plant. The evaluation was performed in general accordance with the applicable requirements of the Tennessee Department of Environment and Conservation, Rule Chapter 1200-1-7, Solid Waste Processing and Disposal. Our services were provided as set forth in Task Order No. 395305 under the terms of Contract Number 91PS-89294B, and TVA Personal Services Contract No. TV-92663V.

We have appreciated the opportunity to conduct this study for you. If you have any questions regarding this report or if we can be of further assistance, please fell free to contact us at your convenience.

Sincerely,

LAW ENGINEERING, INC.

James W. Niehoff, P.E.
Principal Engineer
Registered, Tennessee - 22,132

David A. Miller, P.E.
Principal Engineer
Registered, Tennessee - 15,485

Attachments

JWN/DAM:jdc 574-J\0144001.RNO

LAW ENGINEERING, INC.
396 PLASTERS AVENUE, N.E. • ATLANTA, GA 30324
(404) 873-4761 • FAX (404) 881-0508

TABLE OF CONTENTS

1.0 INTRODUCTION

The John Sevier Fossil Plant (JSF) is a coal burning power plant operated by the Tennessee Valley Authority on the south bank of the Holston River south of Rogersville, Tennessee (see Figure 1). One of the by-products of coal combustion is fly ash, a fine grained solid material trapped in electrostatic precipitators. In the past, the fly ash generated at this plant was sluiced to one of several ponds located within the TVA reservation. The ponds were permitted under NPDES regulations. Within the past few years, however, the plant has converted to a dry fly ash system to enhance the marketability of the fly ash as a construction material. At the present time, up to 1/2 of all of the ash generated is sold and transported off-site. The remaining material must be disposed of on-site utilizing a stacking procedure.

The purpose of the current work is to characterize the hydrogeologic conditions in the area of the fly ash disposal site. The proposed site is located immediately to the west of the generating facility, above and within an existing ash disposal pond (see Figure 2). This site was selected for a number of reasons:

- The site is close to the plant and will not require significant haul distance.
- The site has been used for ash disposal in the past. Thus, new land will not have to be disturbed.
- The development of the disposal facility can be coordinated with the closure of the existing ash pond.

This current study was intended to meet the requirements of the Tennessee Department of Environment and Conservation for permitting waste disposal facilities of this type. It should be noted that we have relied upon several sources of published data for assistance in developing our understanding of the local geology and hydrogeology. These sources, while not specifically referenced at the point of use in the text, are listed and acknowledged in the References Section of this report.

2.0 SCOPE OF THE EVALUATION

The scope of this evaluation included a review of existing data relating to the geology and soil conditions in the plant area, the performance of field and laboratory tests and an evaluation of the existing data and test results relative to the proposed waste disposal facility.

2.1 GENERAL

The purpose of this evaluation was to describe and define the hydrogeologic characteristics of the subject site in accordance with the requirements of Rule Chapter 1200-1-7, Solid Waste Processing and Disposal, as adopted by the Tennessee Department of Environment and Conservation, effective March 18, 1990. Rule 1200-1-7-.04(9)(a) lists the specific characteristics to be assessed by the hydrogeologic investigation. Specifically, the scope of the evaluation has included the following activities:

2.1.1. Map and Literature Research

Geologic and topographic maps of the area were examined for evidence of fracture zones, sinkholes, other karst features and areal drainage patterns. Available literature concerning the area, including State reports, soil surveys, groundwater level data, etc., was also collected and reviewed.

2.1.2 Site Reconnaissance

The site was visited by a LAW geotechnical engineer and geologist for the purpose of visual inspection of surface conditions. The field inspection included a search for obvious sinks, springs, rock outcrops, and other characteristics of geologic or hydrogeologic significance.

2.1.3 Geotechnical Exploration

A number of studies have been conducted in the proposed disposal site area by representatives of the Tennessee Valley Authority over the past few years. These studies have included the drilling of soil test borings, the installation of piezometers and wells, and the performance of field and laboratory tests for the characterization of subsurface soil and rock strata. To supplement this data, and to satisfy State of Tennessee requests and comments, four additional soil test borings were drilled as part of this study to better define the condition of overburden materials and to obtain samples for laboratory strength and moisture content tests.

3.0 GENERAL SITE INFORMATION

The following sections of this report describe the location of the site, as well as its topographic setting and current development.

3.1 SITE LOCATION

The John Sevier Fossil Plant is located on the southern (left) bank of the Holston River in Hawkins County, Tennessee, approximately three miles to the southeast of Rogersville. Access to the plant is by state Highway 70 and by a paved TVA roadway system.

The proposed site consists of an approximately 90-acre parcel located immediately west of the generating facility. When developed, the disposal facility will consist of a disposal area, access roads and surface drainage facilities.

3.2 GENERAL SITE DESCRIPTION

The TVA reservation is located within a broad, relatively flat plain located on the southern bank of the Holston River. To the south of the plant is a wide, southwest to northeast trending ridgeline which rises up to 180 feet above the plain. The ridgeline is dissected by north-west trending swales which direct overland runoff to Polly Branch and Dodson Creek. Dodson Creek empties directly into the Holston River. Polly Branch is currently impounded within the TVA reservation. No obvious sinkholes or solution features were noted on the south bank of the Holston River. To the north of the Holston River is a broad undulating flood plain with numerous apparent solution features.

The proposed disposal site is occupied by a filled ash pond. The ash pond was constructed by building dikes 30 to 40 feet above the flood plain of the Holston River. After reaching capacity a few years ago, the eastern portion of the pond was dredged to provide a disposal area (known as the "bathtub") for sluiced bottom ash. Recently, this sluicing operation was stopped and the materials directed to a pond located near the southern boundary of the TVA reservation. Since conversion to dry fly ash handling, as part of the Operating Plan, the plant has disposed of ash in a stacking procedure over the western portion of the pond surface. Consequently, the western portion of the site has risen to approximately 20 feet above the level of the impoundment dikes. Surface water within the ash pond area is controlled by a series of ditches which direct runoff to a pond at the western extreme of the disposal area. The discharge from this pond is permitted under NPDES regulations.

4.0 GEOLOGY

The John Sevier Fossil Plant is located in the eastern portion of the State of Tennessee which is underlain by ancient sedimentary rocks folded and fractured as a result of tectonic events several million years ago. A detailed description of the geologic setting of the plant site and its environs is presented in the following sections of this report.

4.1 GEOLOGIC STRUCTURE

The John Sevier Fossil Plant is located on the northwest limb of a broad syncline that is associated with the Bays Mountain Synclinorium. Rock units in the area have been subjected to several orogenic events. These events have caused folding and fracturing of the bedrock which has in turn produced extensive jointing and fracturing, particularly in the more competent limestone strata. Measurements taken on massive limestone outcrops along the north side of the Holston River directly across from the site and on massive shale outcrops located in a quarry southeast of the site indicate that the folded Sevier strata beneath the site dips at an angle between 45 and 80 degrees to the southeast (See Figure 3A). Joints were observed in both of these outcroppings running subparallel to the strike of the formations and dipping near vertical. The Sevier Shale in the Bay Mountain Synclinorium is at least 2500 feet thick and may be as thick as 5000 feet.

Based upon our review of geologic reports and our observation of topographic features, it is likely that the Holston River lies at or near a facies contact of the Sevier Shale Formation and the Newala Formation of the Knox Dolomite Group (see Figure 3 & 3A). The Newala Formation of the Knox Dolomite Group is exposed along the northern side of the river and is evidenced by the significant level of solution activity noted in this area. An ancient, inactive fault is located just north of the river and trends to the northeast near the contact of the Sevier Shale and the Knox Dolomite Group (see Figure 3A).

4.2 STRATIGRAPHY

As noted previously, the proposed disposal site had previously been developed as an ash pond. Consequently, the near surface materials include perimeter dikes composed of compacted silty clay and sandy silt fill materials surrounding settled fly and bottom ash materials. These materials are underlain in some areas by recent alluvial deposits and older terrace alluvial deposits associated with the Holston River. Beneath these water-deposited soils near the river, and beneath fill in other areas, are residual soils derived from the decomposition of the underlying bedrock. The bedrock consists of the Sevier Shale Formation of Ordovician age. This formation was explored extensively during the initial development of the site by TVA. The 60+ borings extending into the bedrock within the plant site encountered a dark gray to black, slightly calcareous shale, with thin (0.1 to 3 inch) seams of limestone. In general, the shale was found to incorporate a weathered zone of only 1 to 2 feet in thickness. Below this level, the shale was found to be relatively massive and intact. Faults and shears were present in the rock, but are apparently ancient and have recemented with calcite.

4.3 SOILS

The alluvial deposits within the plant area are typically composed of yellow-brown and red-brown silty clays and sands. Discontinuous layers of alluvial gravels can be found just above the harder residual soils and bedrock in the unconsolidated zone. Weathered residual soils derived from the Sevier Shale Formation are characteristically yellowish-brown silty clay soil with a remnant shale texture. Soil overburden at the site, which includes fill, alluvial soils and residuum, ranges from between 20 to 60 feet with an average thickness of 40 feet. The soil-bedrock interface ranges in elevation from about 1120 feet in the southern portion of the TVA reservation to less than 1060 feet along the south bank of the Holston River.

4.3.1 Soil Classification

The soil within this site is classified as part of the Holston-Urban land complex. It is composed of large areas which have been modified by cutting and filling. The SCS has classified the natural, undisturbed soils as Holston. The Holston consists of deep, loamy, well-drained soils formed by mixed sedimentary deposits in thick layers over shale bedrock. Permeability of Holston soils is moderate and available water capacity is high. The soils tend to be strongly to very strongly acidic.

4.3.2 Soil Sampling and Testing

Our interpretation of subsurface conditions in the proposed disposal area is based upon a total of eleven soil test borings drilled in 1986 around the periphery of the site (SS-1 through SS-11), ten borings/piezometers drilled in 1986 (PZ-1A/1B through PZ-5A/5B), two borings/piezometers drilled in 1991 (Wells 15 and 21), and four soil test borings/piezometers drilled in August of 1994 specifically for this study (94-1 through 94-4). Additional monitoring wells located throughout the plant site were also used in the interpretation of groundwater flow directions. The locations of the borings used in this study are shown on Figure 4 in Appendix A. Test Boring Records illustrating the classification of materials sampled and details of well construction are presented in Appendix B of this report along with a table of boring locations and elevations.

Wells 1, 2 and 3 from early TVA studies (1986) were subsequently renamed Wells 3, 4 and 5, respectively, in later TVA studies. We have utilized the most recent monitoring well designations in this report. We note that boring logs for these wells were not available, although groundwater data was provided.

Following completion of drilling, a number of the boreholes were fitted with slotted or screened PVC pipe to permit long-term measurement of water-table elevations. Water-table elevations made during the period of March through June of 1991 are presented on Table 1 in Appendix B. More recent groundwater measurements obtained from the new soil test borings are indicated on individual boring logs, but are not presented on Table 1 as they represent water levels from a significantly later time period.

Slug and pumping tests were conducted by TVA personnel in 14 borings in the site area to gauge the hydraulic conductivity of the various subsurface strata. The results of these tests indicated conductivities ranging from 5 x 10^{-2} to 5 x 10^{-4} cm/sec in the various subsurface strata. No consistent trend was noted relative to hydraulic conductivity and material type. That is, wide variations were noted in fill, alluvium and residuum. We believe this is indicative of the non-homogeneous nature of the subsurface strata. A summary of field hydraulic conductivity test results is presented on Table 2 in Appendix A.

Soil strength tests were conducted on samples of ash and alluvial soils retrieved during the more recent soil test boring program. Methods of strength determination included both triaxial shear and direct shear tests. Additionally, moisture contents were determined for samples obtained in the borings to provide a subsurface profile of the degree of saturation of the materials. Laboratory test data is presented in Appendix C. Strength and moisture content values were used to evaluate the stability of the proposed disposal area (see Section 6).

5.0 HYDROGEOLOGY

The term hydrogeology, as used in this report, refers to the recharge, discharge, and flow characteristics of subsurface water within this site.

5.1 REGIONAL SETTING

Groundwater in the site vicinity generally exists in an unconfined condition, although confined conditions may exist locally. The groundwater is stored and flows through the interstices of soil and in open partings (fractures, joints, bedding planes, etc.) in bedrock before discharging to wells, springs, and seeps of other water bodies. Most groundwater in this area originates directly from precipitation, which infiltrates soil and fractured bedrock, percolating downward until it reaches the zone of saturation (i.e., the water table). Some groundwater recharge may result from seepage through stream beds. The depth of the water table surface varies according to the relationship between local topography, base-level flow and seasonal precipitation.

Groundwater is not used to a great extent in the plant area. Most residents in the general area obtain potable water from the Persia Utility District. However, during a previous study, 50 domestic wells were identified within one-mile south of the proposed disposal site, primarily in or surrounding the McCloud Community. An additional 9 wells were identified within one mile of the site on the north side of the

Holston River during a site reconnaissance in 1994. A map indicating the locations of all of these wells is presented on Figure 5 in Appendix A. We understand that these wells generally extend only a short distance into the bedrock. All wells located on the south side of the site are considered to be upgradient of the disposal area. Although water levels were not obtained from the wells on the north side of the river, they extend into a different geologic formation and are separated from the proposed disposal site by the river, which is considered to form a hydrogeologic divide. Consequently, we consider it to be unlikely that groundwater from the site would flow toward or reach any of these wells.

The surface hydrology of the site is controlled by regional topography and by man-made drainage structures located within the plant area. Surface runoff originates as "sheet flow" which is directed to Polly Branch at the eastern side of the site, Dodson Creek at the western end of the site, and toward ditches in the central portion of the site. All surface flows ultimately discharge to the Holston River.

5.2 SITE HYDROGEOLOGY

The aquifer beneath the site area includes the soil overburden and the upper weathered portion of the Sevier Shale bedrock. Water flows through voids in the soil overburden and through fractures in the upper portion of the underlying shale. Due to the intact nature of the lower, relatively unweathered portion of the bedrock zone, it is not thought that significant flow occurs through this portion of the subsurface profile. The near-surface aquifer exists under unconfined conditions within the plant area. No confined systems are known to exist in the site vicinity, although confined conditions may exist locally.

5.2.1 Groundwater Recharge

Groundwater is recharged over the entire site mainly by the infiltration and percolation of precipitation and surface waters throughout the soil mantle. The former presence of a bottom ash pond at the eastern end of the disposal site and the stilling basin at the western end of the site, has facilitated recharge, and mounding of the groundwater table has resulted. However, most of the groundwater flowing beneath the proposed disposal site area originates from recharge areas located on the northern flank of the ridgeline located to the south of the site.

5.2.2 Groundwater Discharge

Discharge of groundwater occurs along the extreme northern border of the proposed disposal site, where the ground surface drops abruptly to form the southern bank of the Holston River. For the most part, discharge occurs at or slightly above the water elevation in the Holston River and is not generally visible. However, in a few locations (reportedly four), drainage pipes (of unknown origin or design) beneath the dike system appear to concentrate seepage and measurable flows can reportedly be observed when the river level is down. These pipes were not visible during the course of this study and therefore, their exact location could not be determined. However, the flow and chemical characteristics of the discharge from these pipes were studied in detail by the TVA and the results presented in their report entitled *Seepage Flux from John Sevier Fossil Plant Ash Disposal Area into Holston River*, dated May, 1987. It was the conclusion of this report that the majority of the flow from these pipes resulted from the sluicing of bottom ash into the "bathtub" area of the site. Since the pipes were below river level during the course of this study, it was not possible to quantify the likely reduction in flow rates resulting from the transfer of sluicing to another pond. We understand that the future use of these pipes will be controlled by NPDES regulations. The locations of these pipes will be accurately determined during the next low-water period.

When Holston River flow decreases and exposes the discharge pipes, the pipe locations will be determined by survey. The pipes will subsequently be capped and the pipe outlet plugged with non-shrink grout.

5.2.3 Groundwater Flow

The groundwater surface is relatively shallow, typically ranging from about 6 to 20 feet below the ground surface in most lower areas of the proposed disposal site. Groundwater lies at greater depth (up to 40 feet) beneath the higher (western) portions of the disposal areas. Figure 6 is a water table map of the site showing apparent contours of the water table at 10 foot intervals. Although water level readings have been recorded over extended periods of time in all locations, the map is based upon readings taken June 13, 1991 to establish a uniform datum. More recent data obtained from the soil test borings conducted in August of 1994 indicated that the mounding had been lowered as much as ten feet since sluicing operations to the "bathtub" had ceased. Further, moisture content distributions through the overlying fill did not suggest the presence of any perched zones of water above the general phreatic surface.

The groundwater surface within the plant site is generally a subdued replica of the ground surface topography. That is, groundwater generally flows from higher elevations along the southern boundary of the plant toward the lower elevations adjacent to the Holston River. Impounded water bodies present in ponds create mounds in the "normal" phreatic surface.

6.0 HYDROGEOLOGIC ASSESSMENT AND RECOMMENDATIONS

This evaluation has examined the geology and hydrogeology of the proposed Ash Disposal Facility at the John Sevier Fossil Plant with regard to applicable standards of Rule 1200-1-7-.04, Specific Requirements for Class 1, II, III, and IV Disposal Facilities. The general site characteristics and their applicability to the Rule are summarized in the following sections.

6.1 GENERAL

The proposed disposal facility is located atop an abandoned dry ash pond, which is scheduled to be closed within the next few months. At the present time, the entire site is underlain by a thick zone of fly ash and bottom ash, which is in turn underlain by alluvial and residual soils. Until recently, the ash disposal site has operated under NPDES regulations. Under current regulations, the ponds would require a closure plan under solid waste rules. The objectives of such a closure plan include: 1) a reduction of leachate generation through proper grading and construction of a low permeability cap, and 2) long term monitoring of groundwater quality through the use of a monitoring well network. It is believed that the construction of a new dry fly ash disposal facility atop the existing ash pond will enhance the objectives of a closure plan and will allow for several years of additional ash storage. The basis for this belief rests upon the following factors:

1. Construction of a stack atop the relatively flat surface of the ash pond will enhance surface runoff and reduce infiltration of precipitation.

2. Dry ash has a significant capacity both to store and evaporate water due to its porosity and high capillarity. Recent studies by the TVA at its Bull Run Fossil Plant suggest that dry fly ash stacks may not produce leachate for a period of up to 7 years or more as a result of this characteristic. After reaching a steady state condition of moisture, leachate production has still been demonstrated to be minimal at other TVA facilities.

6.2 GEOLOGIC BUFFER

Waste disposal facilities involving combustion by-products are currently required to incorporate a geologic buffer having a thickness of at least 3 feet and a permeability of 1 x 10 -6 cm/sec. With regard to this site, we believe that this should require the construction of a buffer atop the existing ash pond surface, and beneath the new dry fly ash stack. Our understanding of the hydrologic characteristics of dry fly ash suggest that such a buffer should not serve to significantly reduce the quantity of the leachate which would be generated by this facility. With this in mind, the Norris Laboratory at TVA conducted a computer modeling study of the John Sevier Fossil Plant in an effort to predict generation rates of leachate assuming: 1) installation of a 3-foot geologic buffer, 2) construction of the ash stack without the benefit of a geologic buffer, and 3) simple closure of the pond with a clay cap. The results of these studies were presented in a report entitled *Evaluation of Water Resource Impacts from Proposed Fly Ash Dry Stack at John Sevier Fossil Plant* dated April, 1992. This study indicated little or no environmental benefit relating to the installation of the buffer.

As a result of this study and similar studies at TVA's Cumberland Fossil Plant in Cumberland City Tennessee, consideration has been given to waiving the requirement for a geologic buffer, provided that an interim cover is provided during construction of the stack, and that a relatively impervious final cover is constructed upon completion.

6.3 GENERAL CONSTRUCTION SEQUENCE

The low "bathtub" area has been drained of standing water. We recommend the following sequence of construction relating to this facility:

1. Dry fly ash should be placed and compacted in the "bathtub" area to bring the entire site to level grade.

2. After leveling the low area of the site ("bathtub" area), ash should be placed and compacted in lifts employing maximum 3:1 (horizontal to vertical) side slopes. Slopes should be covered with an interim cover consisting of 12 inches of compacted soil, then vegetated with an approved grass to promote runoff and to minimize erosion.

3. Upon reaching final grade, it should be completely covered with an FML or GCL liner, an appropriate drainage medium, and 12 inches of soil suitable to support vegetation to inhibit further infiltration of rainwater into the disposal cell.

6.4 STABILITY ANALYSIS

To evaluate the stability of the proposed stack configuration, the disposal stack and underlying foundation were evaluated utilizing the PCSTABL5M computer program developed at Purdue University. Descriptions of the cases studied and the results obtained are presented in the following sub-sections of this report.

6.4.1 Slope Configuration and Materials Properties

Slope stability analyses were performed on two idealized cross-sections of the disposal site assuming completion of the stack as designed. The data used to generate the cross-sections was obtained from the available subsurface boring information and sheets 2 and 4 of the design plans for the John Sevier Fossil Plant Dry Fly Ash Stack, dated 9-15-94. The two selected sections represented typical "worst case" profiles within the eastern and western sides of the disposal area. Both were aligned approximately perpendicular to the river and the perimeter dike.

The various types of material present in the design cross-sections included: 1) ash, 2) compacted fill, 3) alluvial soils, 4) residual soils, and 5) bedrock. Strength parameters for these materials were obtained from laboratory tests conducted on undisturbed and remolded samples obtained in the field and by correlations between standard penetration resistances and strengths of similar materials at other geologically similar sites.

6.4.2 Analyses

Two cases were analyzed for the stability of each embankment configuration including the following:

1. A steady-state case analyzed with a circular failure surface using drained soil strength parameters
2. A steady-state case analyzed with a circular failure surface under pseudo-static (earthquake) loadings with a horizontal and vertical acceleration equal to 0.1g in accordance with seismic maps of the area.

In addition to the above, the stability of the final cover was evaluated using a hand-calculated block sliding method of analysis for both the static and dynamic loading conditions.

The calculated factors of safety for each case were as follows:

SECTION/LOADING	STATIC	PSEUDO-STATIC
Western Section	2.58	1.35
Eastern Section	2.36	1.24
Final Cap	1.8	1.3

Printouts of each stability calculation as well as a pictorial representation of the slope cross-section, soil parameters, and critical failure plane are presented in Appendix C.

6.4.3 Evaluation/Conclusion

Accepted minimum safety factors for static and pseudo-static (earthquake) stability of slopes are 1.5 and 1.1, respectively. Consequently, the minimum calculated stability safety factors for the design slope configuration specified for the various cases analyzed above are considered to be adequate for the facility.

6.5 BORROW SOURCES

It is our understanding that adequate borrow material for the cap is probably not available within the TVA reservation. Assuming that off-site sources of borrow soil are to be used for the interim cover and as part of the final cap, proper testing and inspection should be conducted on a regular basis to confirm that materials being used are adequate for their intended use.

6.6 GROUNDWATER MONITORING

Groundwater beneath the site does not flow toward any known well or springs. Wells in the site area are hydraulically upgradient of the facility. All flows are expected to enter the Holston River. To assess groundwater quality on a long-term basis, a series of at least three downgradient monitoring wells should be constructed along the northern side of the disposal area. As other TVA ponds and facilities are located immediately up-gradient of the site, we recommend that well W-3 (previously designated W-1), located at the southern extreme of the TVA reservation, be used for background water quality evaluation.

6.7 CONCLUSION

In conclusion, it is our opinion that the selected site should be suitable for the disposal of dry fly ash materials. The construction of the facility in this location maximizes the use of previously developed land, and will enhance the closure objectives of the existing ash pond.

7.0 REFERENCES

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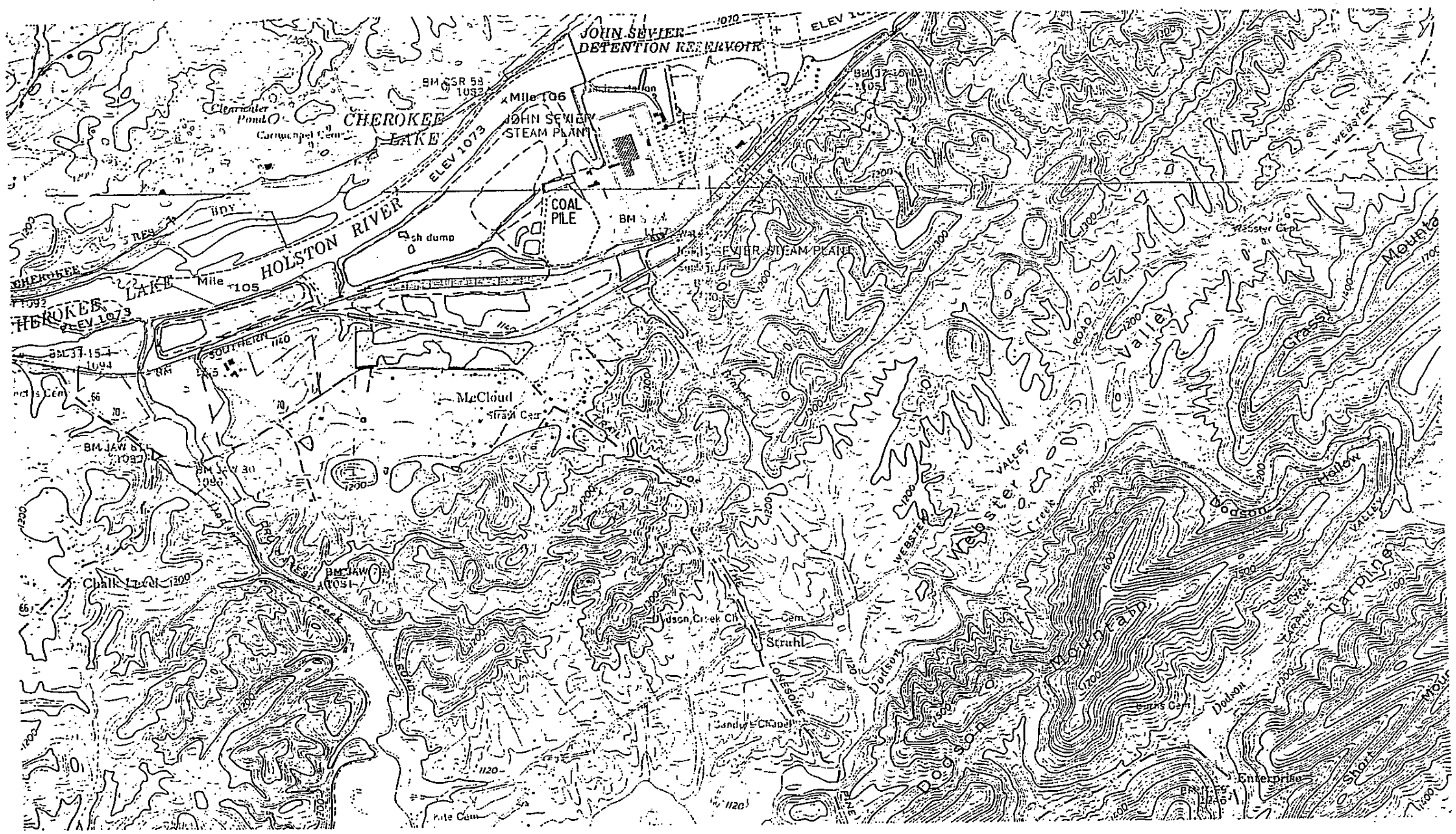
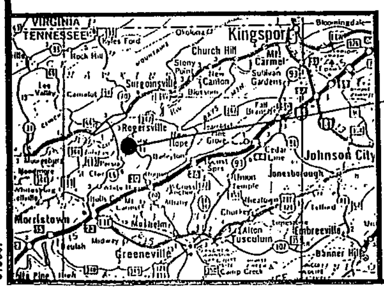
APPENDIX A



NORTH

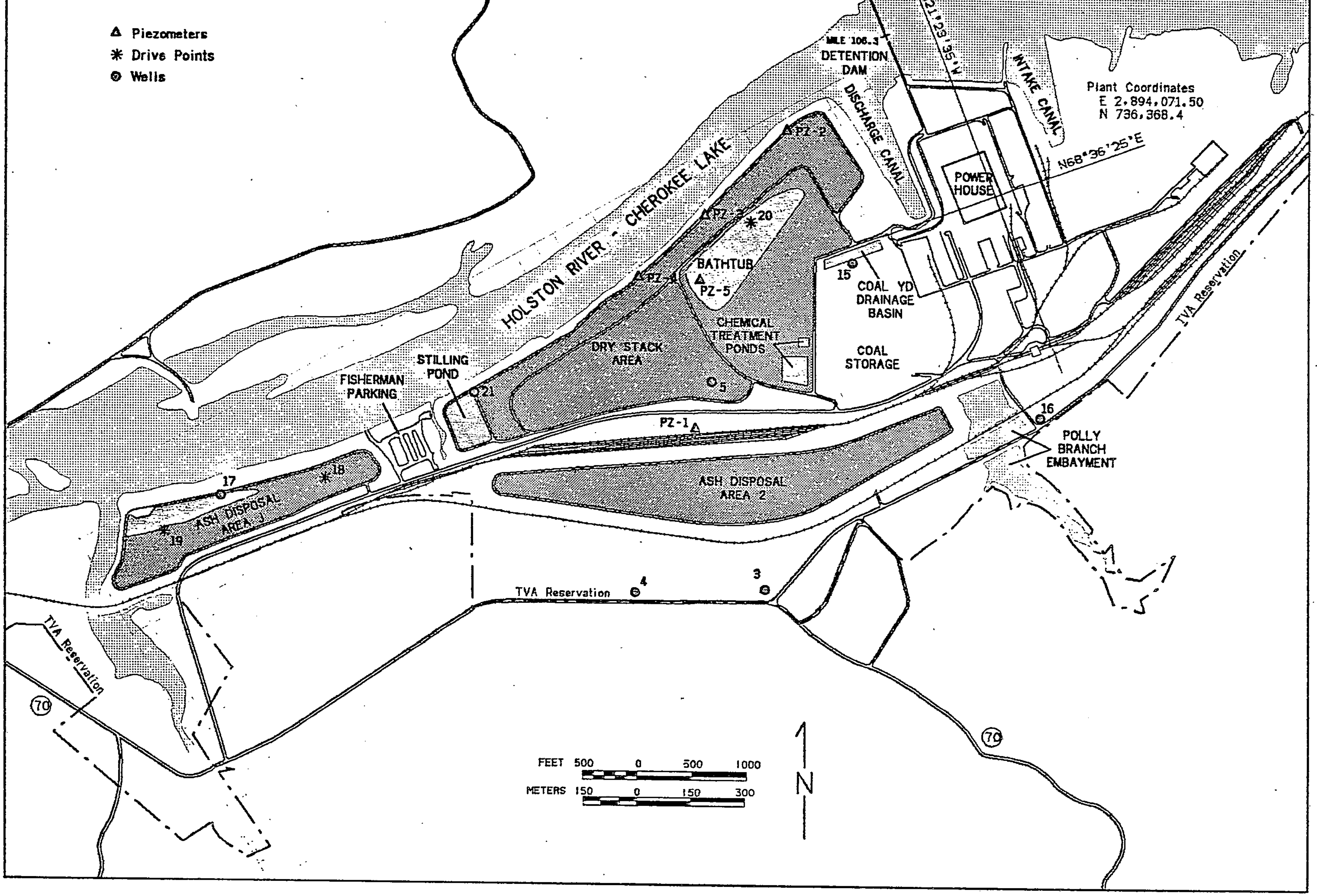


SITE

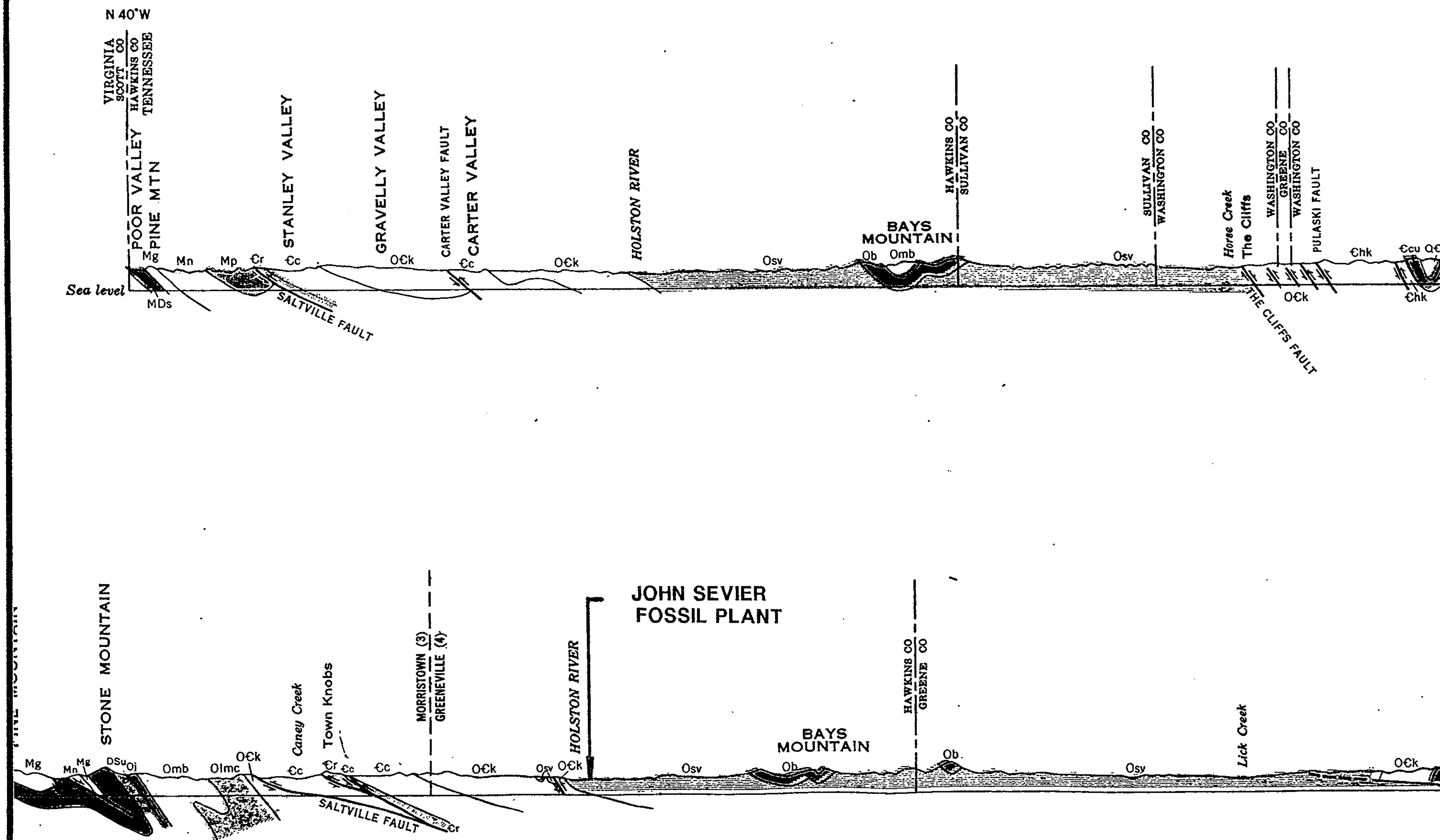
LAW ENGINEERING Atlanta, Georgia **Geotechnical, Materials & Environmental Consultants**	TVA JOHN SEVIER FOSSIL PLANT ASH DISPOSAL FACILITY			FIGURE 1 SITE LOCATION/ TOPOGRAPHIC MAP
	SCALE	PROJECT NO. 57401440.01	DATE	

318647

JOHN SEVIER FOSSIL PLANT



PREPARED IN COOPERATION WITH
UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY



Law Engineering
Atlanta, Georgia
Geotechnical, Materials & Environmental Consultants

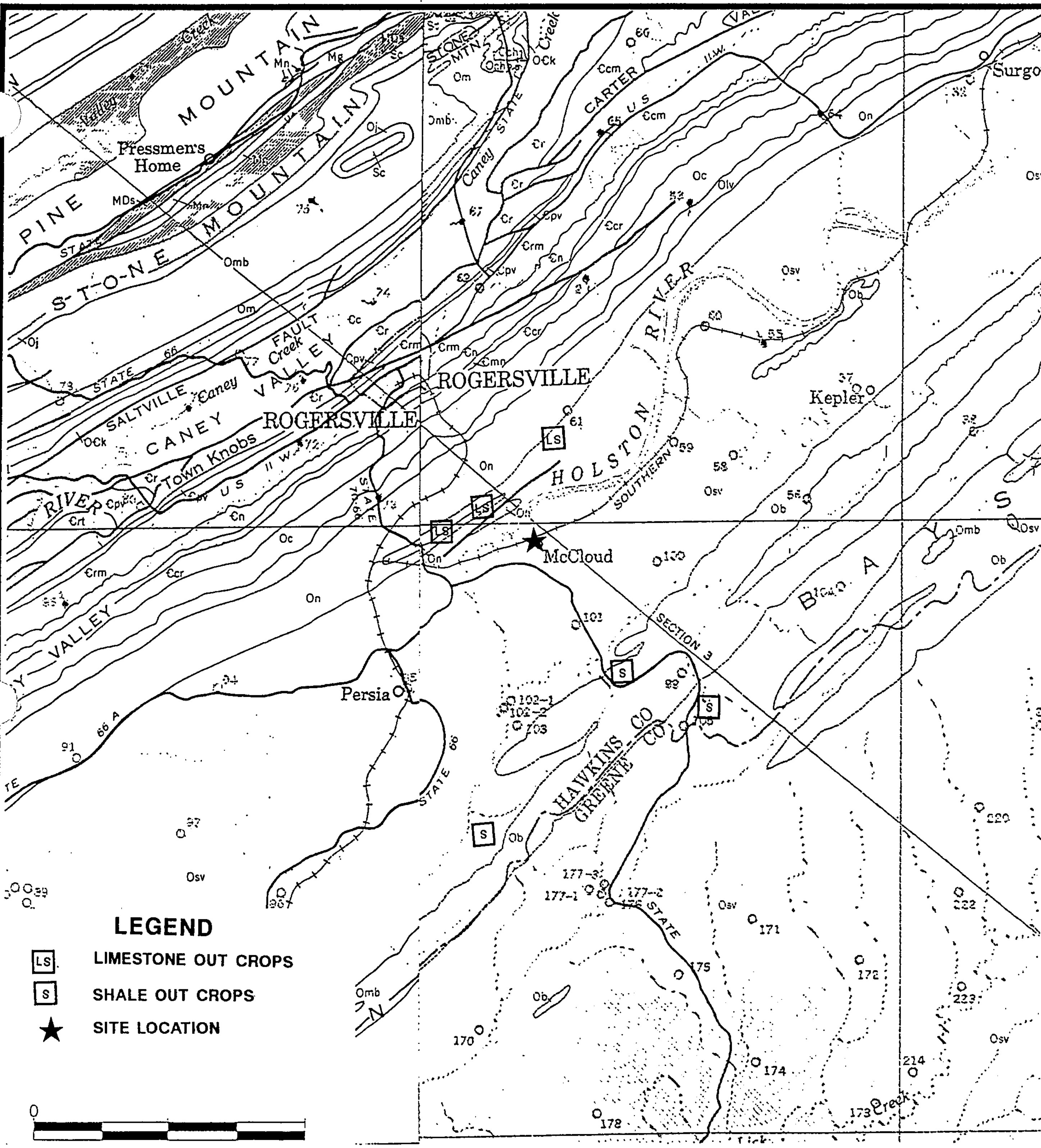
TVA JOHN SEVIER FOSSIL PLANT
ASH DISPOSAL FACILITY

Project No.	Scale	Date
57401440.01	N.T.S.	

FIGURE 3

GEOLOGIC CROSS SECTION

572864



SOURCE: STATE OF TENNESSEE DEPARTMENT OF CONSERVATION DIVISION OF GEOLOGY

Law Engineering
Atlanta, Georgia

Geotechnical, Materials & Environmental Consultants

FIGURE 3A
GEOLOGIC FEATURES

TVA JOHN SEVIER FOSSIL PLANT
ASH DISPOSAL FACILITY

Project No.	Scale	Date
574-01440.01	AS SHOWN	SEPT. 1994

Note: Boring log for well 5 not available.

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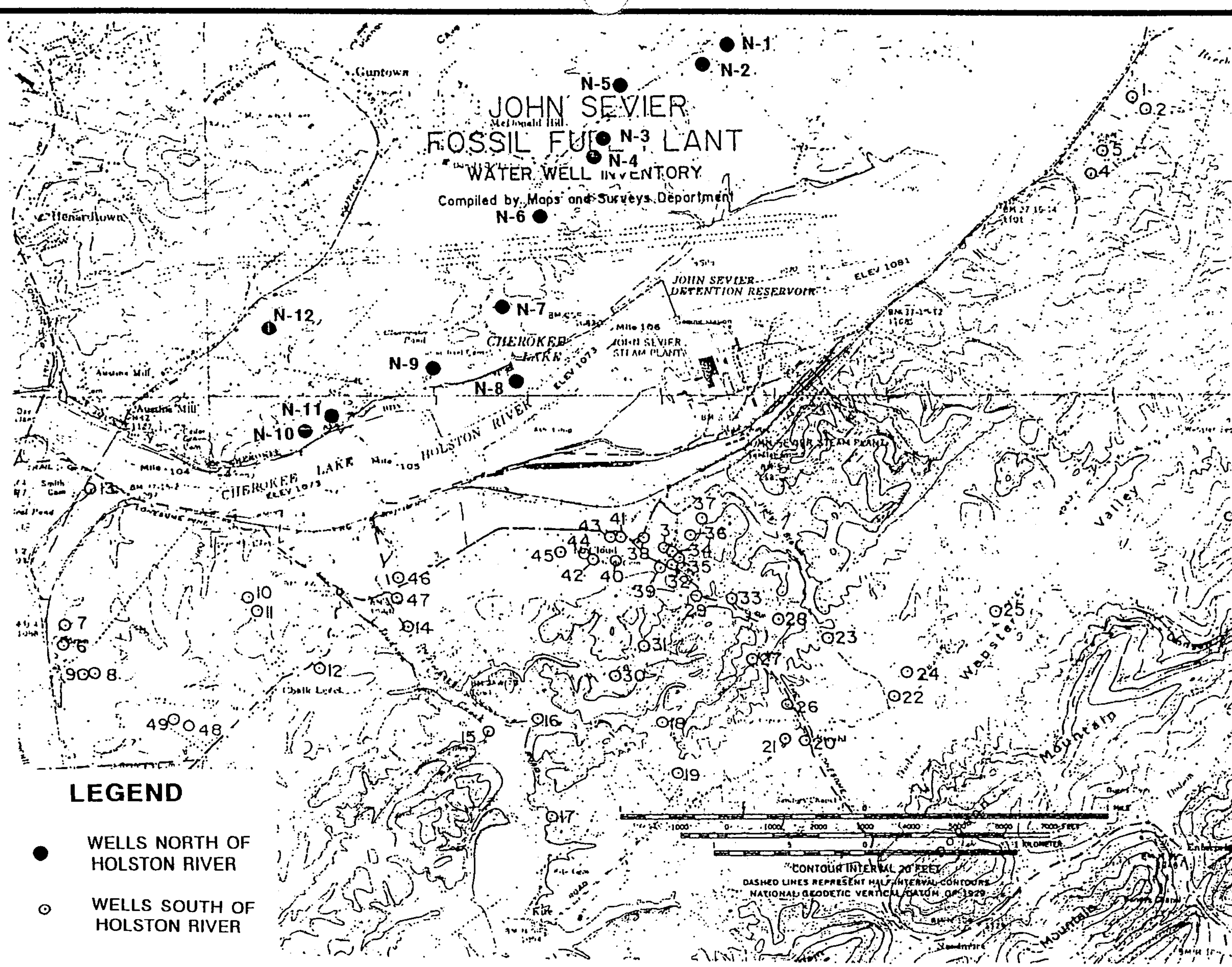
ATLANTA, GEORGIA

FIGURE 4 - BORING LOCATION PLAN

SCALE: 1"=200'	APPROVED BY: J. NIEHOFF	DRAWN BY: R.A.B.
DATE: 3-24-92		REVISED
JOHN SEVIER FOSSIL PLANT ASH DISPOSAL FACILITY		PROJECT NO. 57401440.01



Law Engineering
Atlanta, Georgia

Geotechnical, Materials & Environmental Consultants

TVA JOHN SEVIER FOSSIL PLANT
ASH DISPOSAL FACILITY

Project No.	Scale	Date
57401440.01	AS SHOWN	SEPT. 1994

FIGURE 5
WATER WELL LOCATIONS REVISED TO SHOW WELLS NORTH OF HOLSTON RIVER
SEPTEMBER 1994

LAW ENGINEERING INC.
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FIGURE 6 - PHREATIC SURFACE CONTOURS

SCALE: 1"=100'	APPROVED BY:		DRAWN BY:- R.A.B.
DATE: 3-24-92	J. NIEHOFF		REVISED

JOHN SEVIER FOSSIL PLANT
ASH DISPOSAL FACILITY

PROJECT NO.

APPENDIX B

SUMMARY OF BORING LOCATIONS AND ELEVATIONS

Boring No.	Ground Surface Elevation
SS-1	1112.5
SS-2	1113.1
SS-3	1114.3
SS-4	1113.1
SS-5	1110.6
SS-6	1110.4
SS-7	1101.0
SS-8	1099.3
SS-9	1135.0
SS-10	1130.3
SS-11	1117.6
PZ-1	1121.7
PZ-1B	1121.7
PZ-2A	1113.8
PZ-2B	1114.3
PZ-3A	1112.1
PZ-3B	1112.4
PZ-4A	1110.4
PZ-4B	1111.1
PZ-5A	1098.3
PZ-5B	1099.0
15	1102.8
21	1099.4
94-1	*
94-2	*
94-3	*
94-4	*

* Boring locations were not surveyed by September 30, 1994

TABLE 1. 1991 GROUNDWATER ELEVATIONS AT JOHN SEVIER FOSSIL PLANT

WELL No.	GROUNDWATER ELEV. (ft-msl) 3/26/91	GROUNDWATER ELEV. (ft-msl) 4/29/91	GROUNDWATER ELEV. (ft-msl) 5/23-24/91	GROUNDWATER ELEV. (ft-msl) 6/13/91	GROUNDWATER ELEV. (ft-msl) 6/26/91
3	1133	1133.03	1132.45	1132.37	1132.10
4	1127.62	1126.36	1125.12	1125.76	1125.20
5	1103.58	1102.87	1102.97	1102.80	1102.57
PZ1	1110.50	ND	1109.38	1109.95	1109.28
PZ2A	1086.62	ND	1086.70	1087.22	1087.32
PZ2B	1096.49	ND	1096.08	1096.19	1096.47
PZ3A	1100.00	ND	1099.97	1100.19	1100.27
PZ3B	1100.46	ND	1100.35	1100.34	1100.45
PZ4A	1087.20	ND	1087.20	1087.54	1087.43
PZ4B	1087.65	ND	1087.43	1087.56	1087.43
PZ5A	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER
PZ5B	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER
15	1092.50	1092.74	1092.66	1092.58	1092.80
16	1116.63	1116.06	1115.43	1115.06	1114.60
17	1068.96	ND	ND	1070.36	1070.26
18	1096.52	1093.40	1093.22	1094.19	1093.37
19	1097.63	1098.69	1097.93	1097.43	1097.49
20	1118.97	1118.79	1118.97	1118.66	1119.25
21	ND	ND	ND	1077.95	1077.73
22	ND	ND	1077.60	1077.60	1078.30
23	ND	ND	1120.30	1120.60	1119.65
RP#1	ND	ND	1094.14	1093.30	1093.85
RP#2	ND	ND	1111.77	1111.53	1111.09
RP#3	ND	ND	1068.62	1071.30	1071.34

RP#1 - COAL YARD DRAINAGE BASIN
RP#2 - POLLY BRANCH
RP#3 - DOOSON CREEK

WELL 5 IS IN THE DRY STACK AREA SO GROUND ELEVATION VARIES WITH TIME.

ND - NO DATA

TABLE 2

FIELD TEST RESULTS AT JOHN SEVIER FOSSIL PLANT

WELL No.	TEST TYPE	No. OF REPLICATE TESTS	K CM/SEC	SATURATED THICKNESS FT.	T FT^2/DAY	MATERIAL TYPE
PZ1	SLUG TEST	2	$5x10^{-3}$	8.0	10	RESIDUUM
PZ2A	SLUG TEST	2	$1x10^{-2}$	29.0	87	ALLUVIUM
PZ2B	SLUG TEST	1	$1x10^{-2}$	29.0	90	ASH AND FILL
PZ2B	PUMPTEST	1	$2x10^{-3}$	29.0	15	
PZ3A	SLUG TEST	4	$1x10^{-2}$	42.0	126	ALLUVIUM
PZ3B	SLUG TEST	2	$2x10^{-2}$	42.0	210	ASH AND FILL
PZ3B	PUMPTEST	1	$3x10^{-3}$	42.0	29	
PZ4A	SLUG TEST	4	$2x10^{-3}$	26.5	12	ALLUVIUM
W3	SLUG TEST	1	$2x10^{-2}$	19.5	117	RESIDUUM
W3	PUMPTEST	1	$4x10^{-3}$	19.5	20	
W4	SLUG TEST	3	$2x10^{-2}$	19.5	86	RESIDUUM
W4	PUMPTEST	2	$3x10^{-3}$	19.5	15	
W15	SLUG TEST	2	$5x10^{-4}$	16.0	2	RESIDUUM
W15	PUMPTEST	1	$8x10^{-4}$	16.0	3	
W16	SLUG TEST	2	$1x10^{-3}$	13.5	4	RESIDUUM
W17	SLUG TEST	1	$5x10^{-2}$	6.0	73	RESIDUUM
W18	SLUG TEST	2	$5x10^{-3}$	29.0	38	ASH
W20	PUMPTEST	1	$9x10^{-3}$	49.0	121	ASH
W21	SLUG TEST	2	$1x10^{-2}$	8.0	21	RESIDUUM

TEST BORING LEGEND
KEY TO CLASSIFICATIONS AND SYMBOLS

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	NO. OF BLOWS, N	RELATIVE DENSITY
SANDS	0 - 4	Very Loose
	4 - 10	Loose
	10 - 30	Firm
	30 - 50	Dense
	Over 50	Very Dense
		CONSISTENCY
SILTS AND CLAYS	0 - 2	Very Soft
	2 - 4	Soft
	4 - 8	Firm
	8 - 15	Stiff
	15 - 30	Very Stiff
	30 - 50	Hard
	Over 50	Very Hard

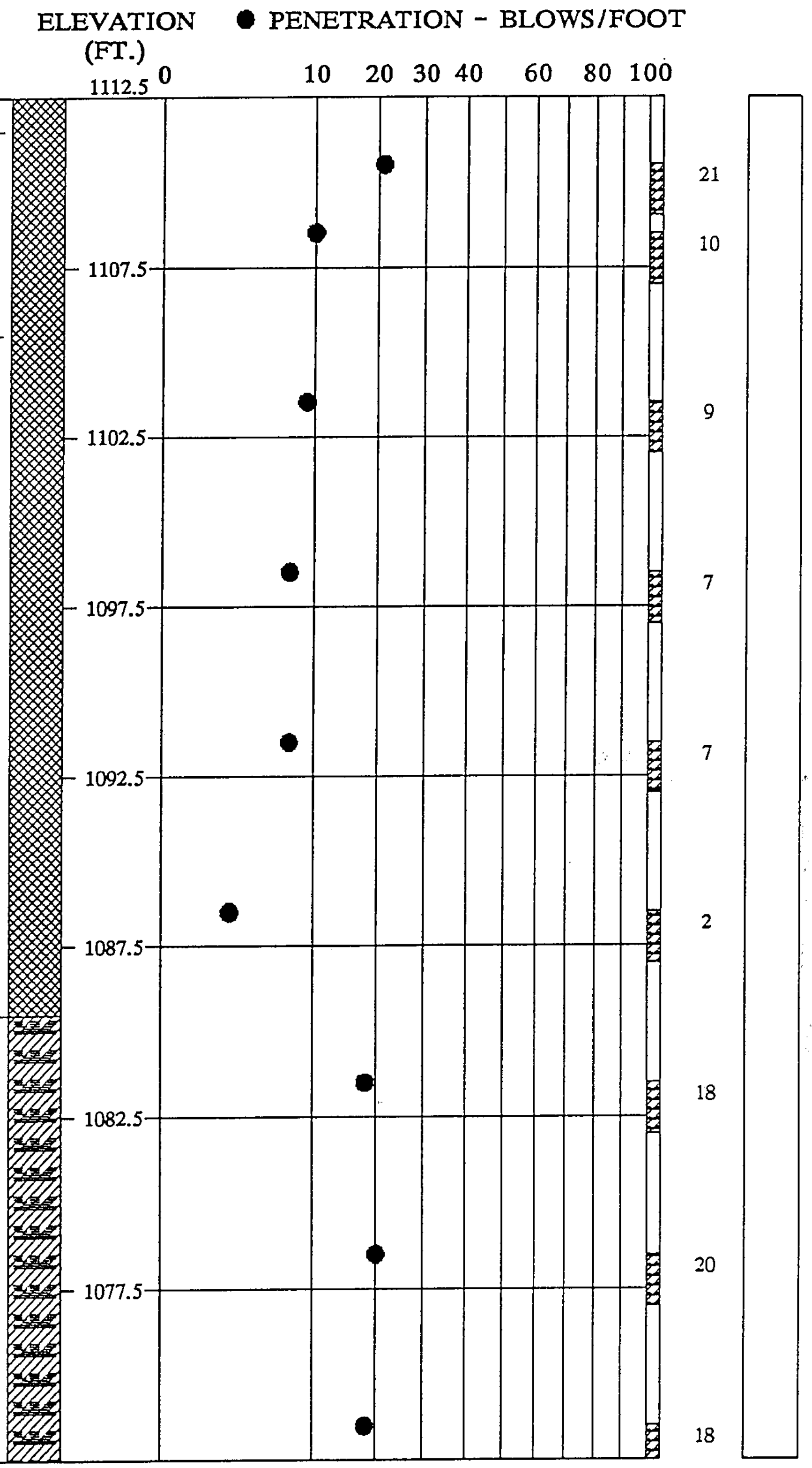
SYMBOLS

■	- Undisturbed sample (UD) recovered
◫	- Undisturbed sample (UD) not recovered
100/2"	- Number of blows (100) to drive the spoon a number of inches (2)
NQ, HQ	- Core barrel sizes which obtain cores 1-7/8 and 2-1/2 inches in diameter respectively
65%	- Percentage (65) of rock core recovered
RQD	- Rock quality designation - % of core segments 4 or more inches long
▼	- Water table at least 24 hours after drilling
▽	- Water table one hour or less after drilling
◀	- Loss of drilling water
A	- Atterberg limits test performed
C	- Consolidation test performed
GS	- Grain size test performed
T	- Triaxial shear test performed
P	- Proctor compaction test performed
V	- Field vane shear test performed
18	- Percent of natural moisture content (18)
—●—	- Borehole caved

DRILLING PROCEDURES

Soil sampling and penetration testing performed in accordance with ASTM D 1586-67. The standard penetration resistance is the number of blows of a 140 pound hammer falling 30 inches to drive a 2 inch O.D., 1.4 inch I.D. split spoon sampler one foot. Core drilling in accordance with ASTM designation D 2113-62T. The undisturbed sampling procedure is described by ASTM specification D 1587-67.

DEPTH (FT.)	DESCRIPTION
0.0	FILL - LIMESTONE GRAVEL, ROAD METAL
1.0	FILL - MEDIUM DENSE TO LOOSE LIGHT BROWN TO LIGHT GRAY LAMINATED SILTY CLAY WITH TRACE LOOSE GRAVEL
7.0	FLY ASH FILL - LOOSE TO VERY LOOSE LIGHT BROWN TO DARK GRAY CLAYEY SILTY MEDIUM TO FINE SAND
27.0	ALLUVIUM - VERY STIFF DARK BROWN TO GRAY MOTTLED FINE SANDY SILTY CLAY



REMARKS:

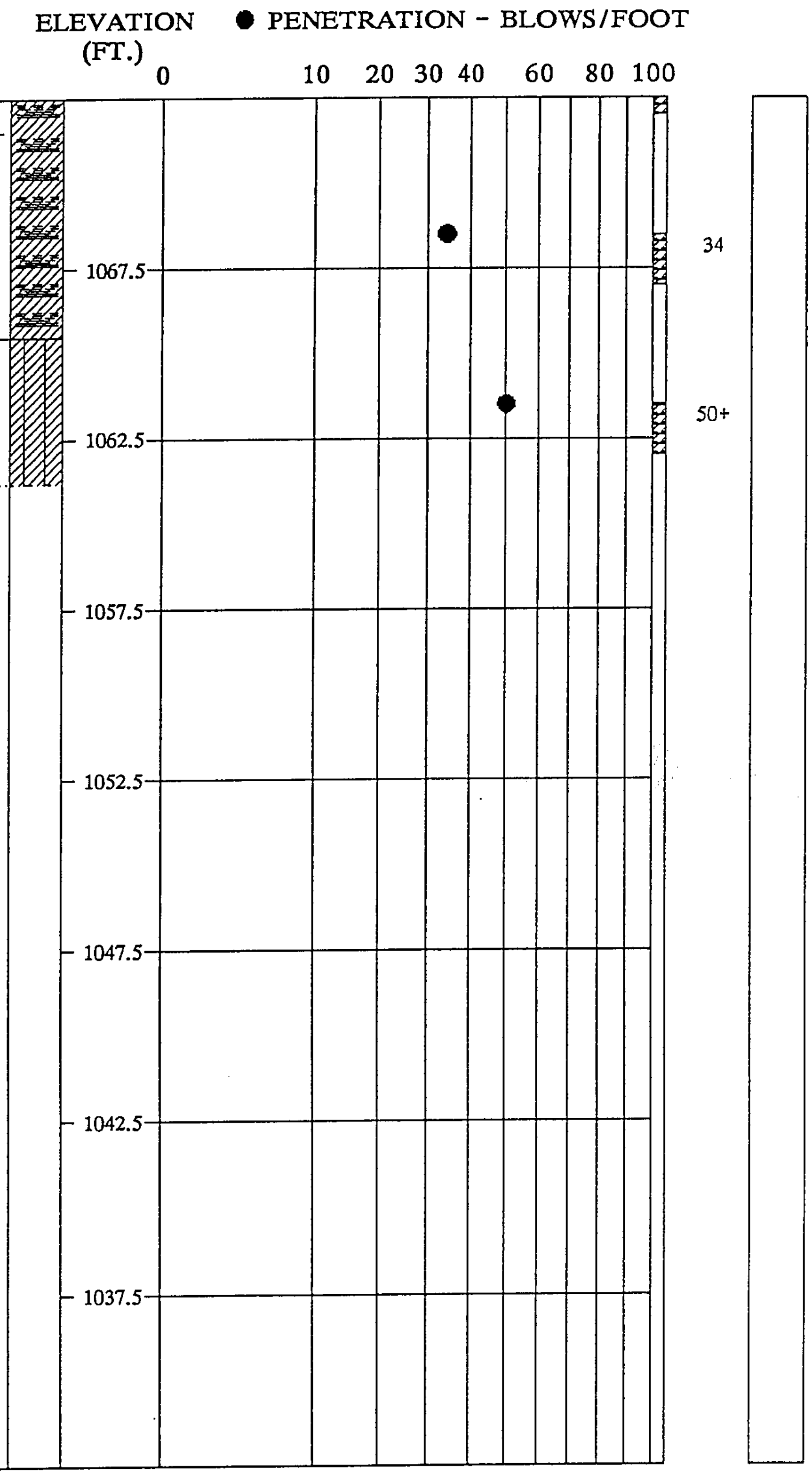
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-1
DATE DRILLED	July 1, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
41.0	ALLUVIUM - HARD BROWN TO WHITE COARSE SANDY GRAVEL
47.0	RESIDUAL - VERY DENSE DARK GRAY SILTY CLAY WITH WEATHERED SHALE
51.3	BORING TERMINATED



REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

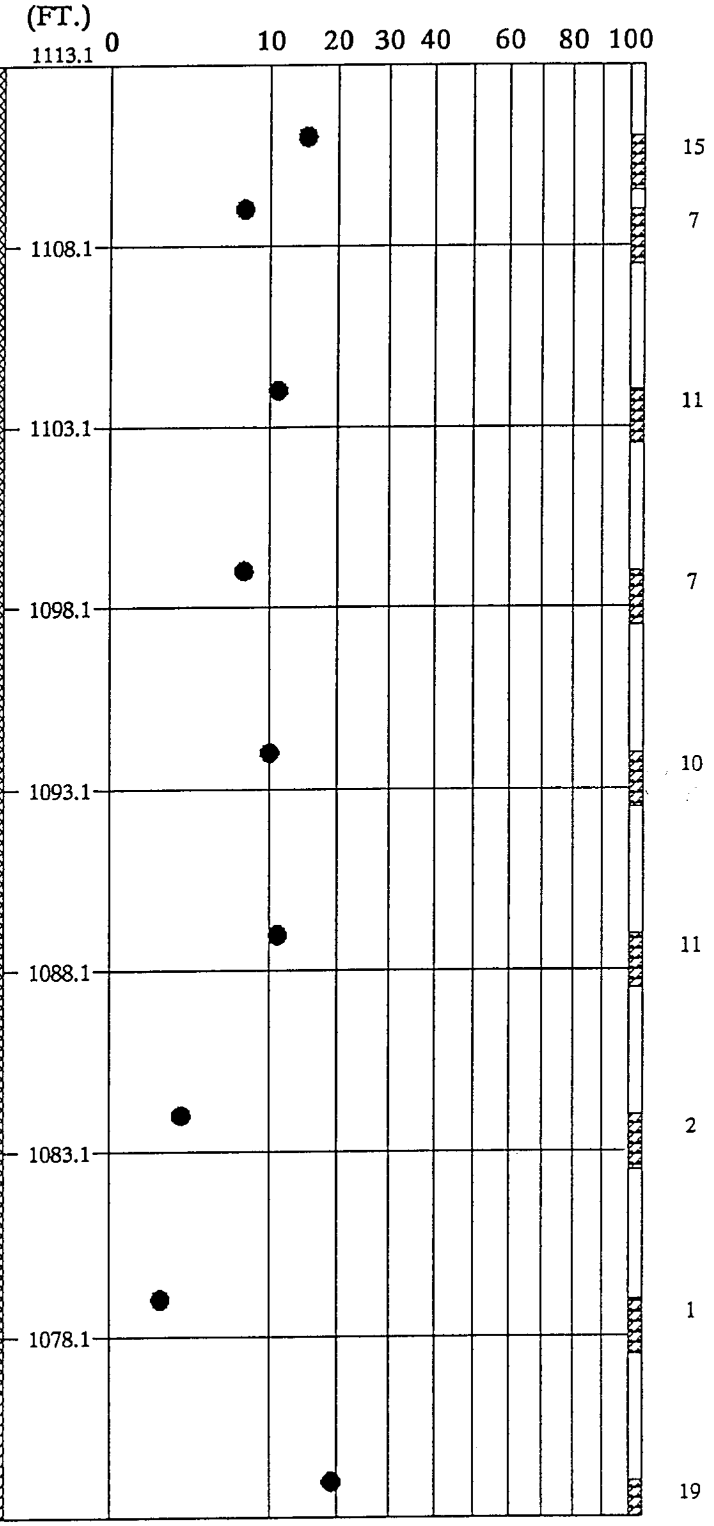
TEST BORING RECORD

BORING NUMBER	SS-1
DATE DRILLED	July 1, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	FILL - FIRM TO STIFF LIGHT BROWN TO LIGHT GRAY LAMINATED SILTY CLAY WITH TRACE COAL	1113.1
11.5	FLY ASH FILL - LOOSE TO MEDIUM DENSE LIGHT GRAY TO DARK GRAY SILTY FINE SAND WITH TRACE LAMINATED CLAY	
26.5	FLY ASH FILL - VERY SOFT BLACK TO GRAY FINE SANDY SILT	
36.5	ALLUVIUM - FIRM TO VERY STIFF LIGHT BROWN TO DARK BROWN FINE SANDY SILTY CLAY	

● PENETRATION - BLOWS/FOOT



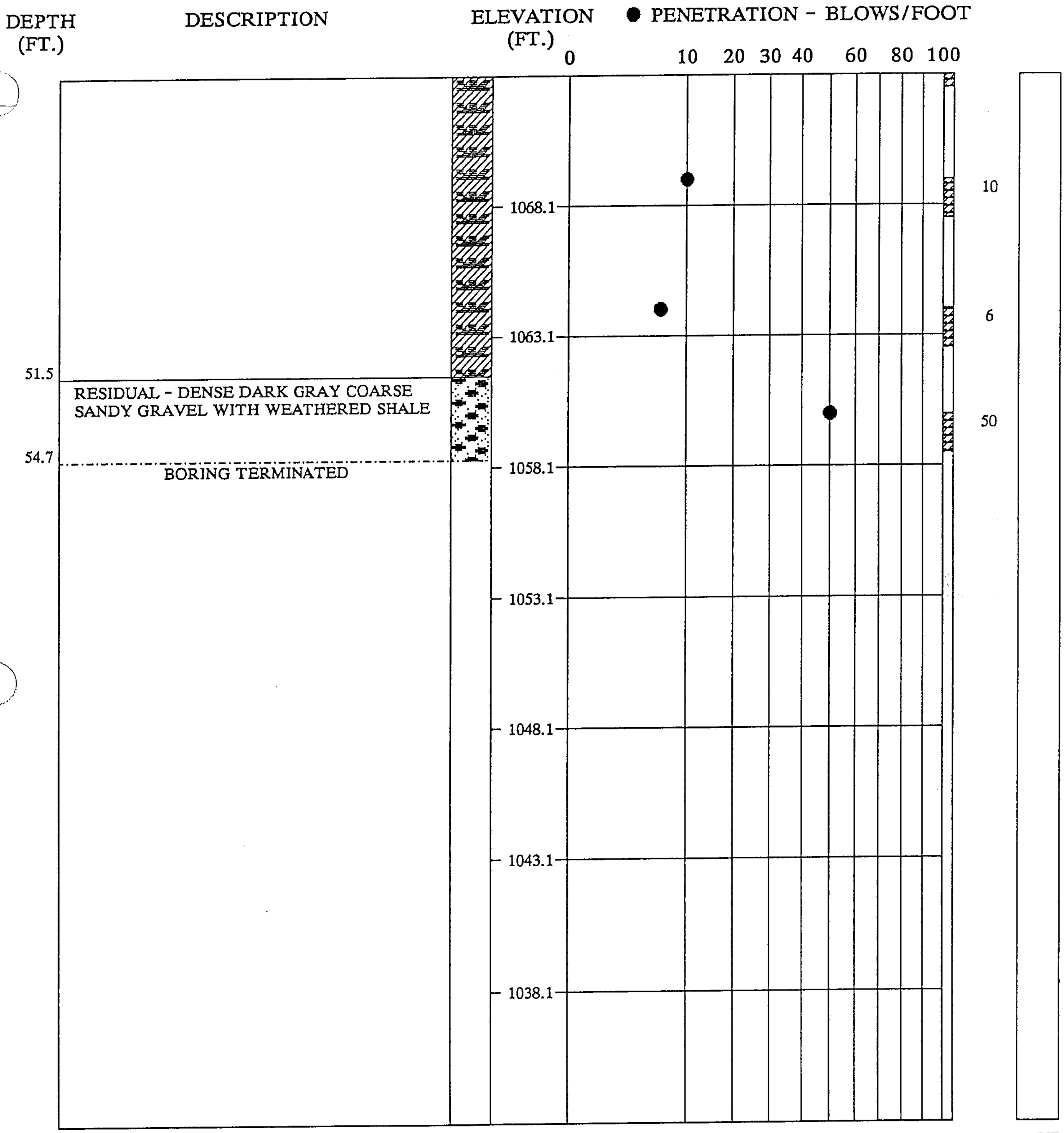
REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-2
DATE DRILLED	July 2, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 2	

LAW ENGINEERING



REMARKS:

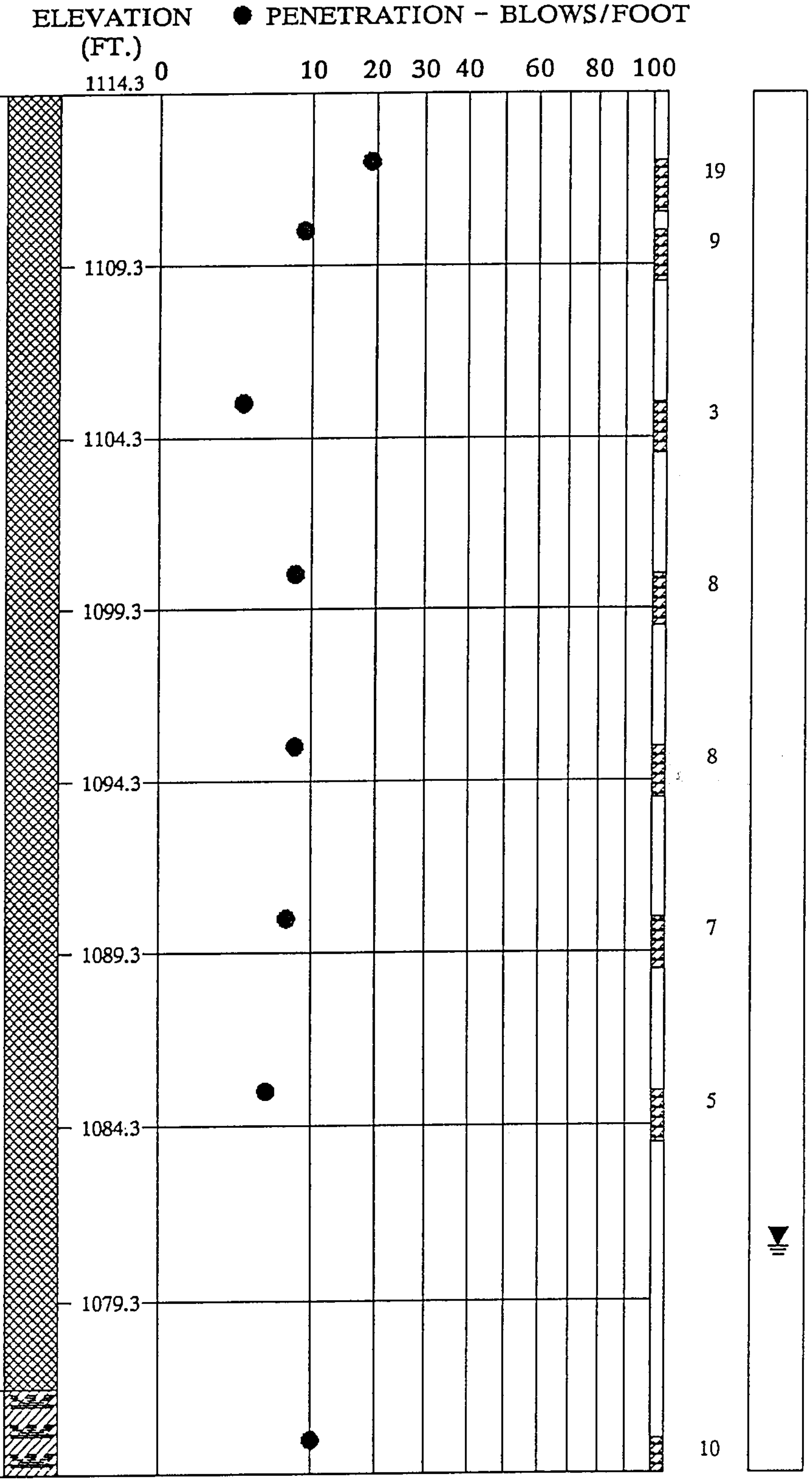
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER SS-2
DATE DRILLED July 2, 1986
PROJECT NUMBER 57401440.04
PROJECT TVA - JOHN SEVIER S.P.
PAGE 2 OF 2

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FILL - STIFF TO VERY STIFF MOTTLED LIGHT BROWN TO LIGHT GRAY FINE SANDY FAT CLAY
6.5	FLY ASH FILL - SOFT TO FIRM BROWN TO DARK GRAY FINE SANDY CLAYEY SILT
37.5	ALLUVIUM - STIFF BROWN TO LIGHT GRAY FINE SANDY SILTY CLAY



REMARKS:

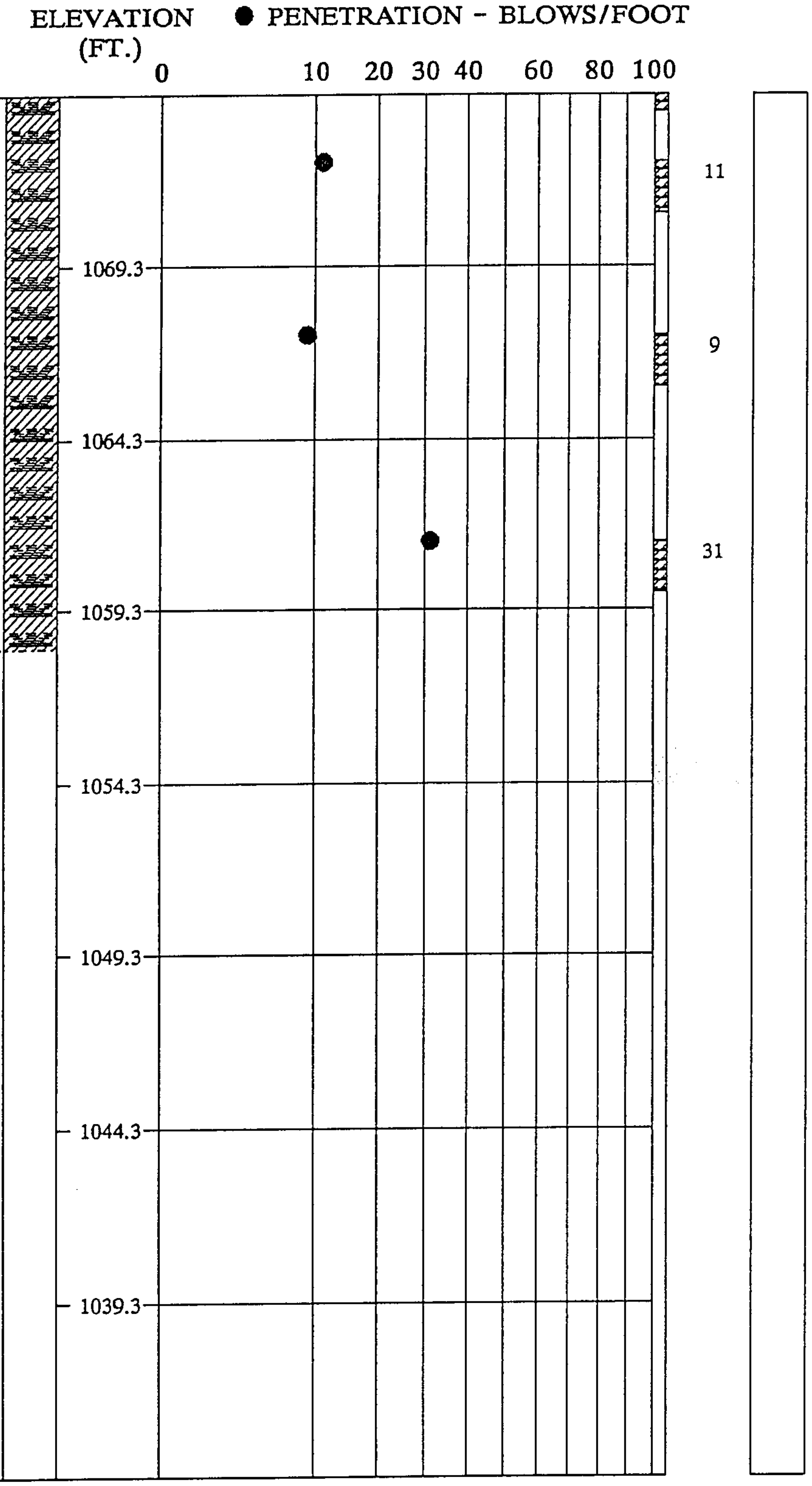
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-3
DATE DRILLED	July 3, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
49.5	ALLUVIUM - DENSE BROWN MEDIUM SANDY GRAVEL, SUBANGULAR QUARTZ AND CHERT
56.1	BORING TERMINATED ON BEDROCK



REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

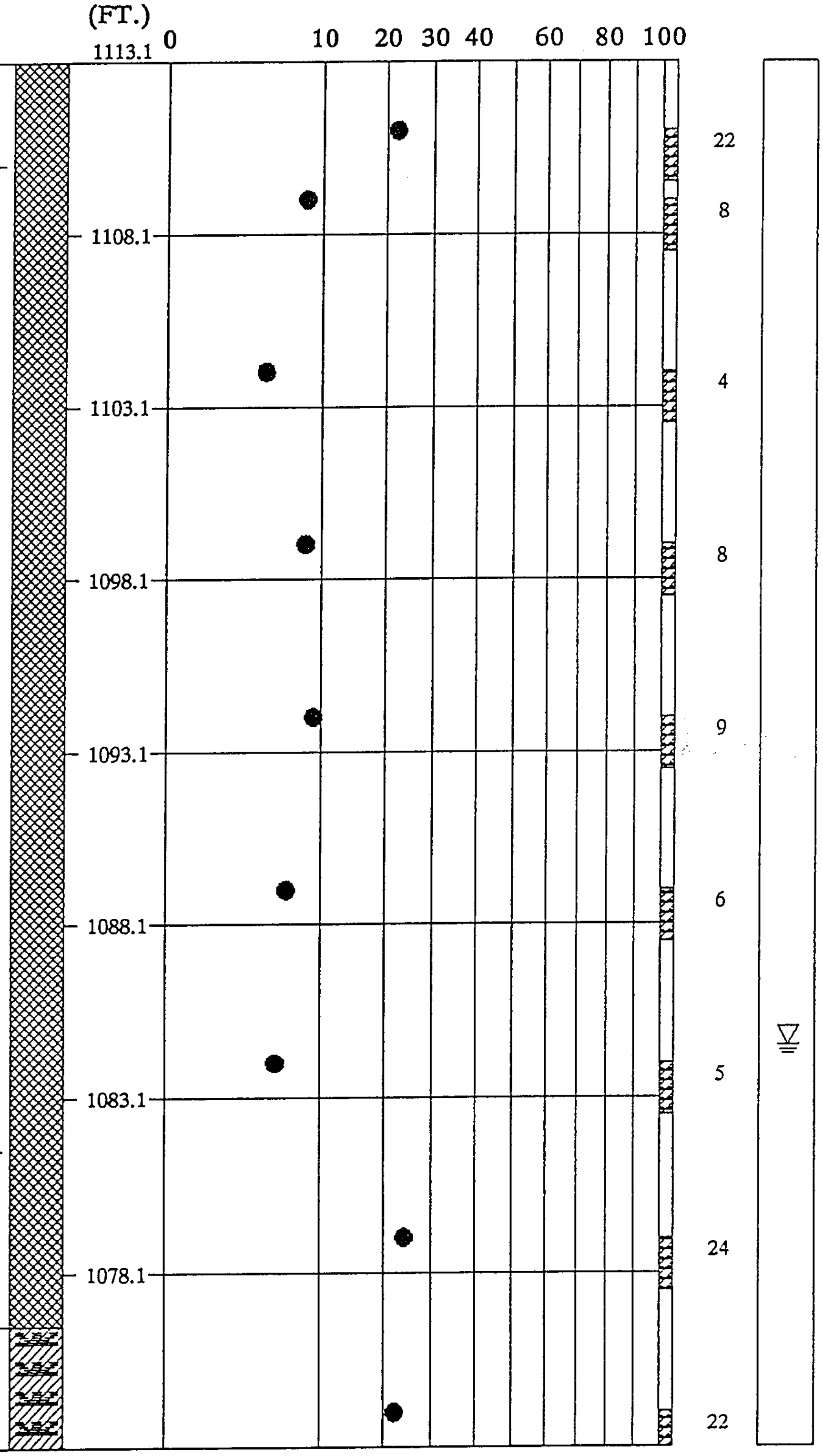
TEST BORING RECORD

BORING NUMBER	SS-3
DATE DRILLED	July 3, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 2 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FILL - VERY STIFF BROWN SILTY CLAY WITH TRACE GRAVEL
3.0	FLY ASH FILL - SOFT TO STIFF DARK GRAY LAMINATED FINE SANDY SILT
31.5	FLY ASH FILL - VERY STIFF BLACK TO DARK BROWN MEDIUM SANDY SILTY CLAY WITH COARSE GRAVEL
36.5	ALLUVIUM - VERY STIFF BROWN FINE SANDY SILTY CLAY

ELEVATION (FT.) ● PENETRATION - BLOWS/FOOT



REMARKS:

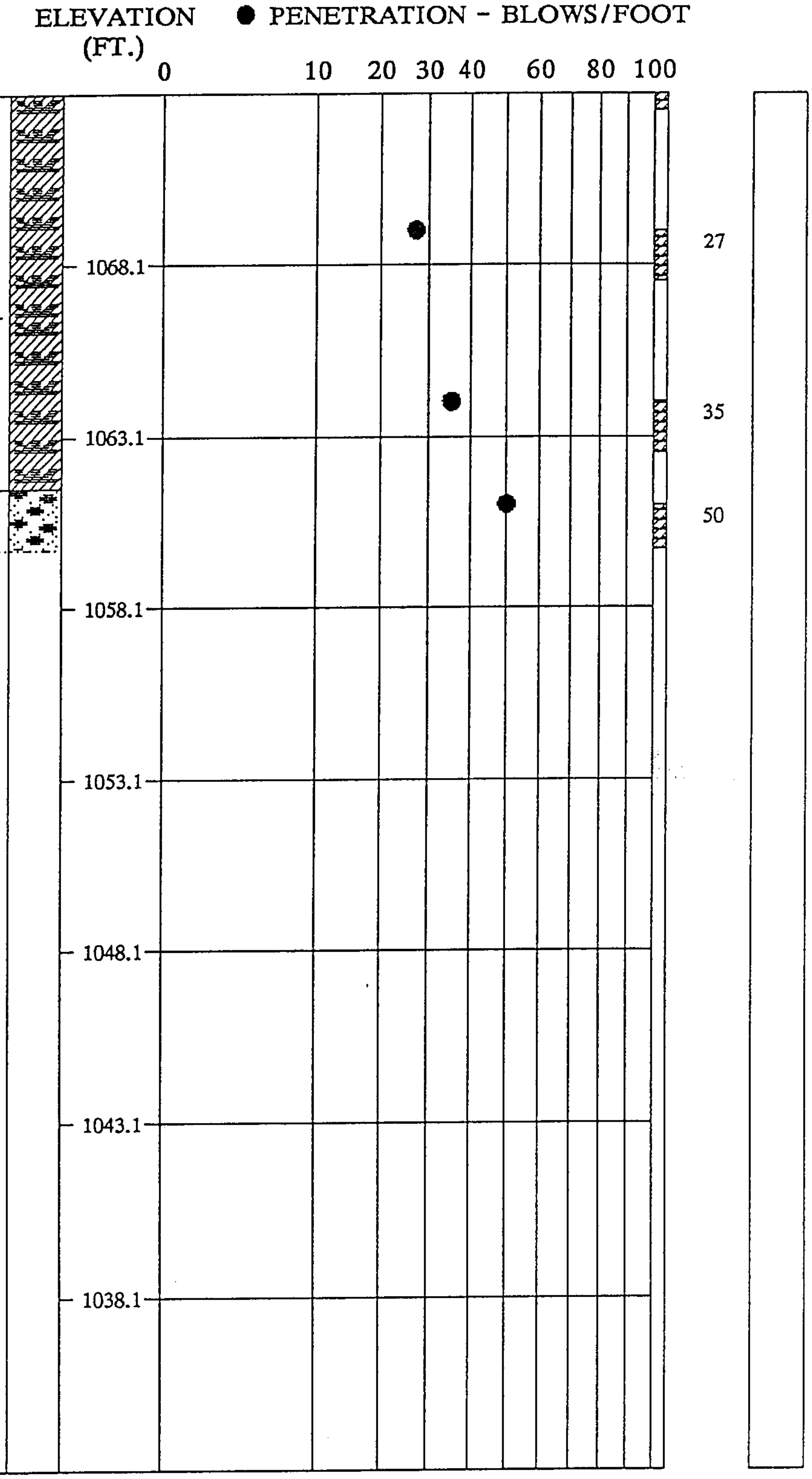
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-4
DATE DRILLED	July 3, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
46.5	ALLUVIUM - DENSE BROWN FINE SAND WITH GRAVEL
51.5	RESIDUAL - DENSE GRAY COARSE SAND WITH GRAVEL
53.3	BORING TERMINATED



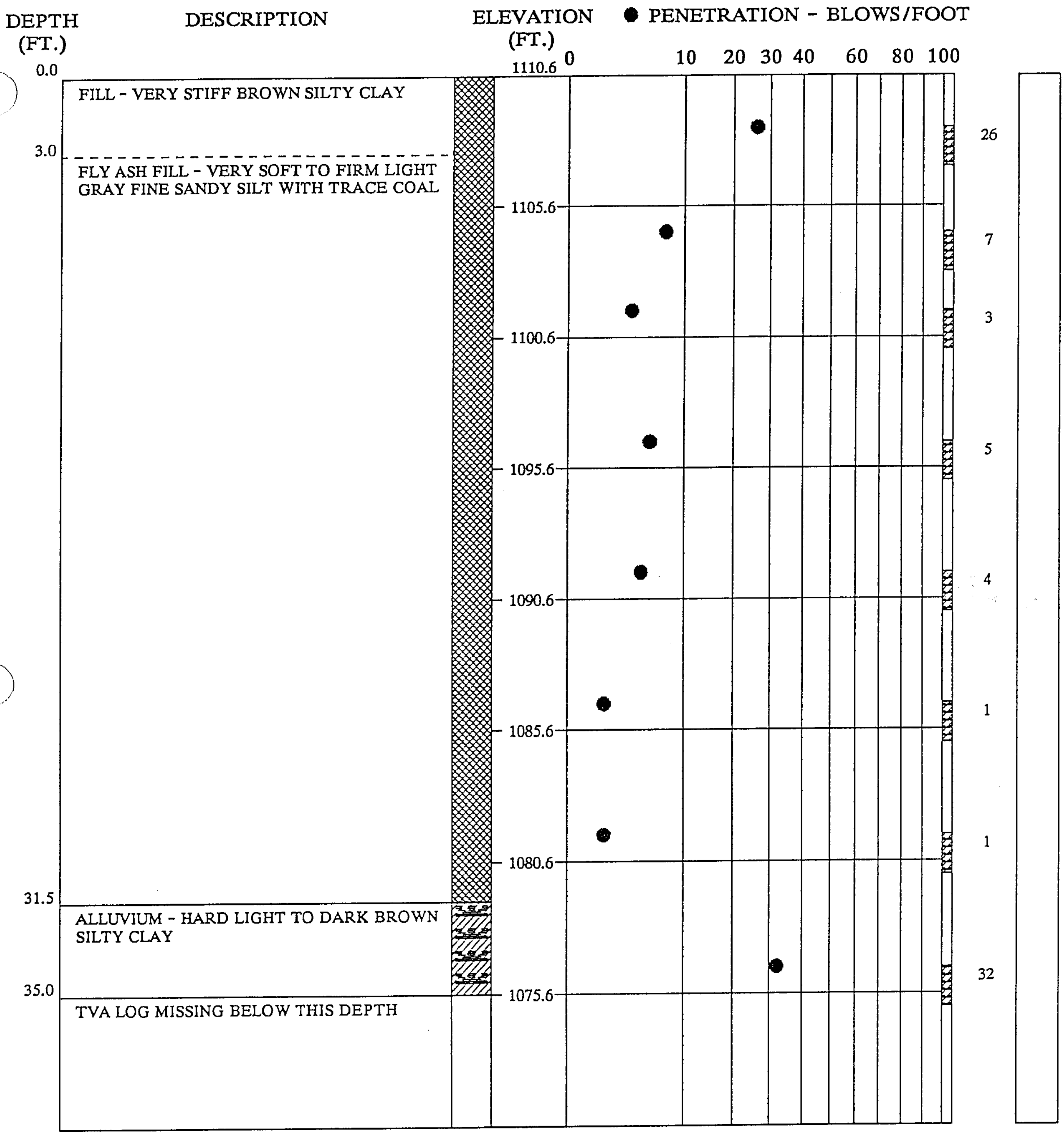
REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-4
DATE DRILLED	July 3, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 2 OF 2	

LAW ENGINEERING



REMARKS:
SECOND PAGE MISSING FROM TVA LOG

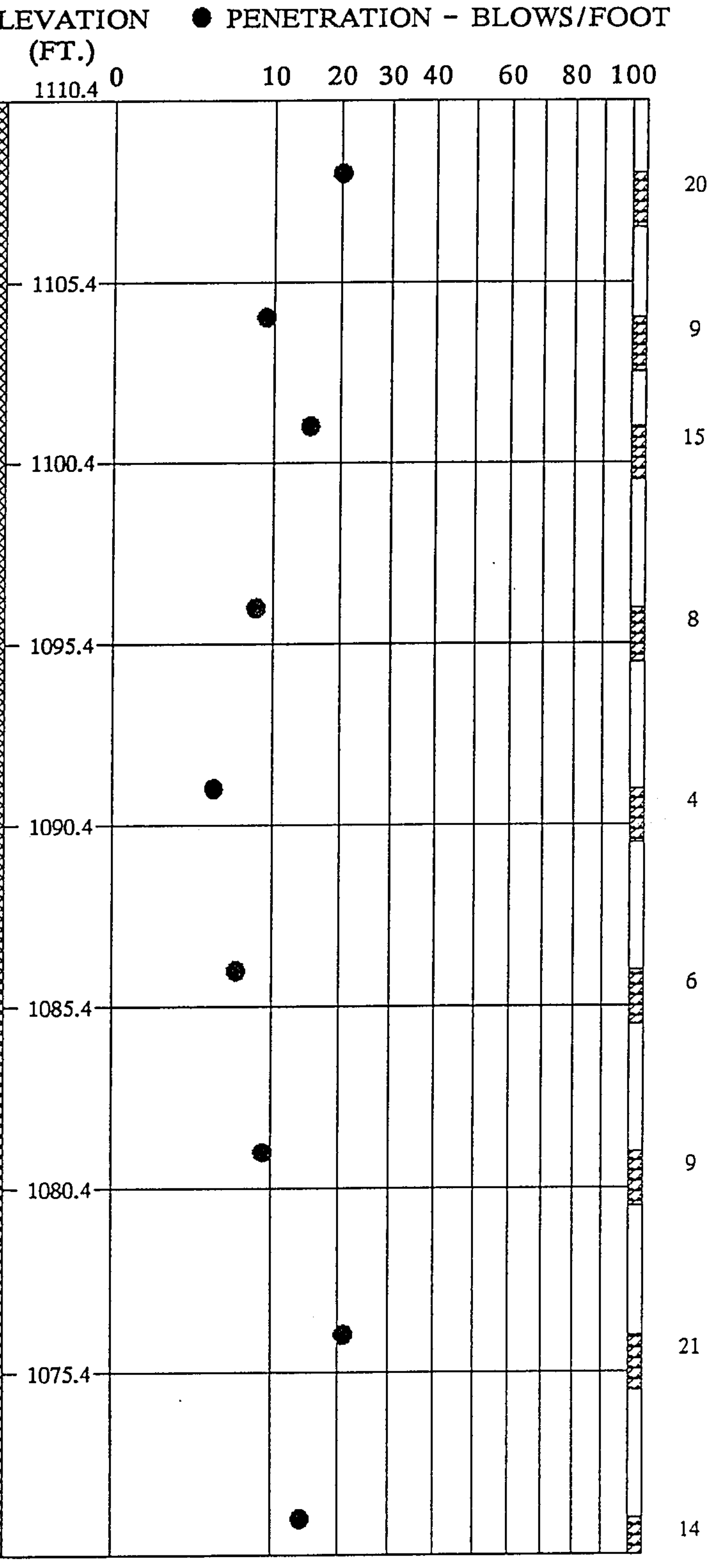
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-5
DATE DRILLED	July 7, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FILL - STIFF TO VERY STIFF LIGHT BROWN TO LIGHT GRAY SILTY CLAY WITH TRACE GRAVEL
11.5	FLY ASH FILL - SOFT TO STIFF DARK GRAY TO GRAY FINE SANDY SILT
31.5	RESIDUAL - STIFF TO VERY STIFF RED TO BROWN CLAYEY SILT



REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

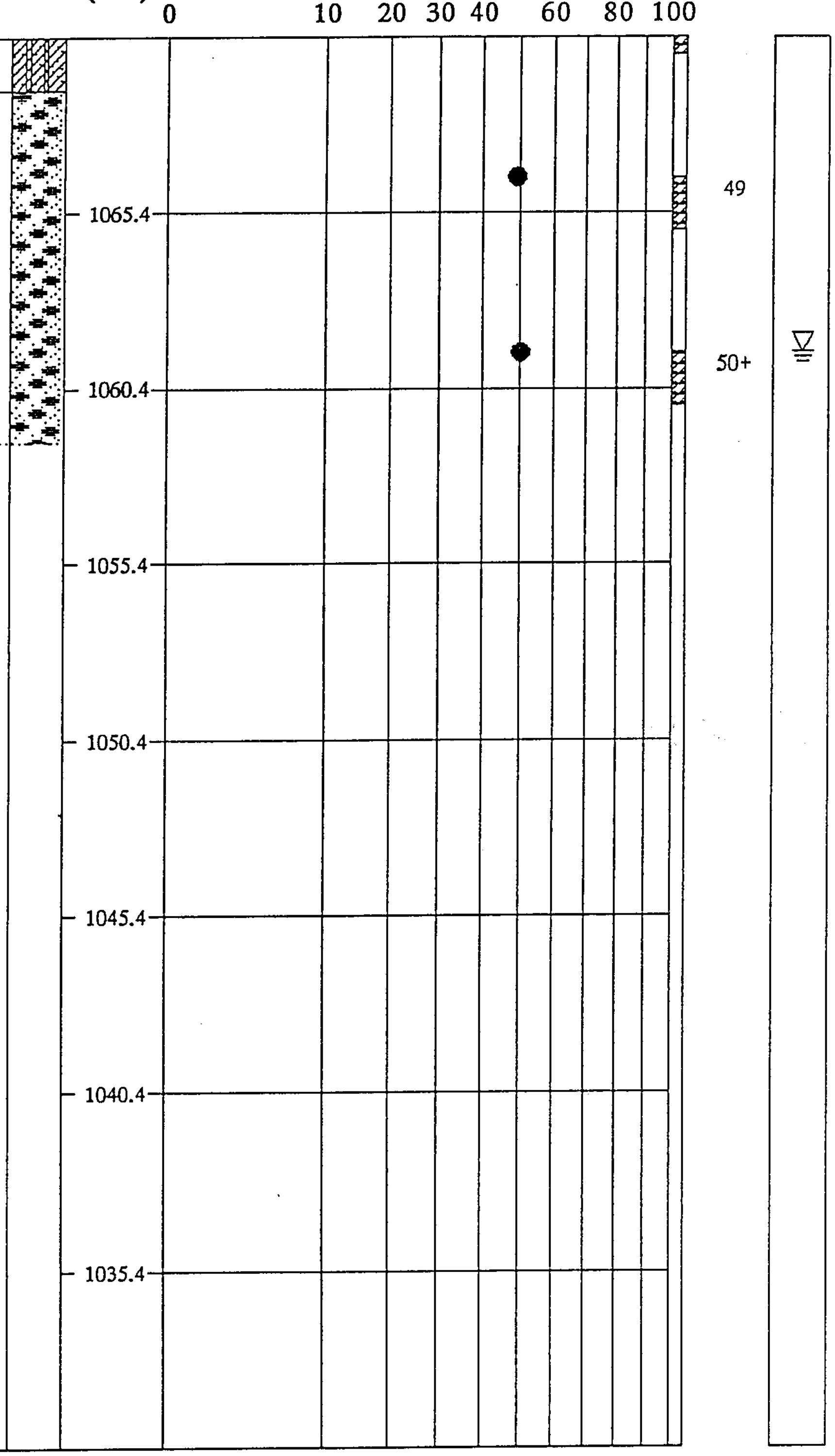
TEST BORING RECORD

BORING NUMBER SS-6
DATE DRILLED July 7, 1986
PROJECT NUMBER 57401440.04
PROJECT TVA - JOHN SEVIER S.P.
PAGE 1 OF 2

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
41.5	RESIDUAL - DENSE TO VERY DENSE BROWN TO GRAY SILTY GRAVEL WITH WEATHERED SHALE
51.5	BORING TERMINATED

ELEVATION (FT.) ● PENETRATION - BLOWS/FOOT



REMARKS:

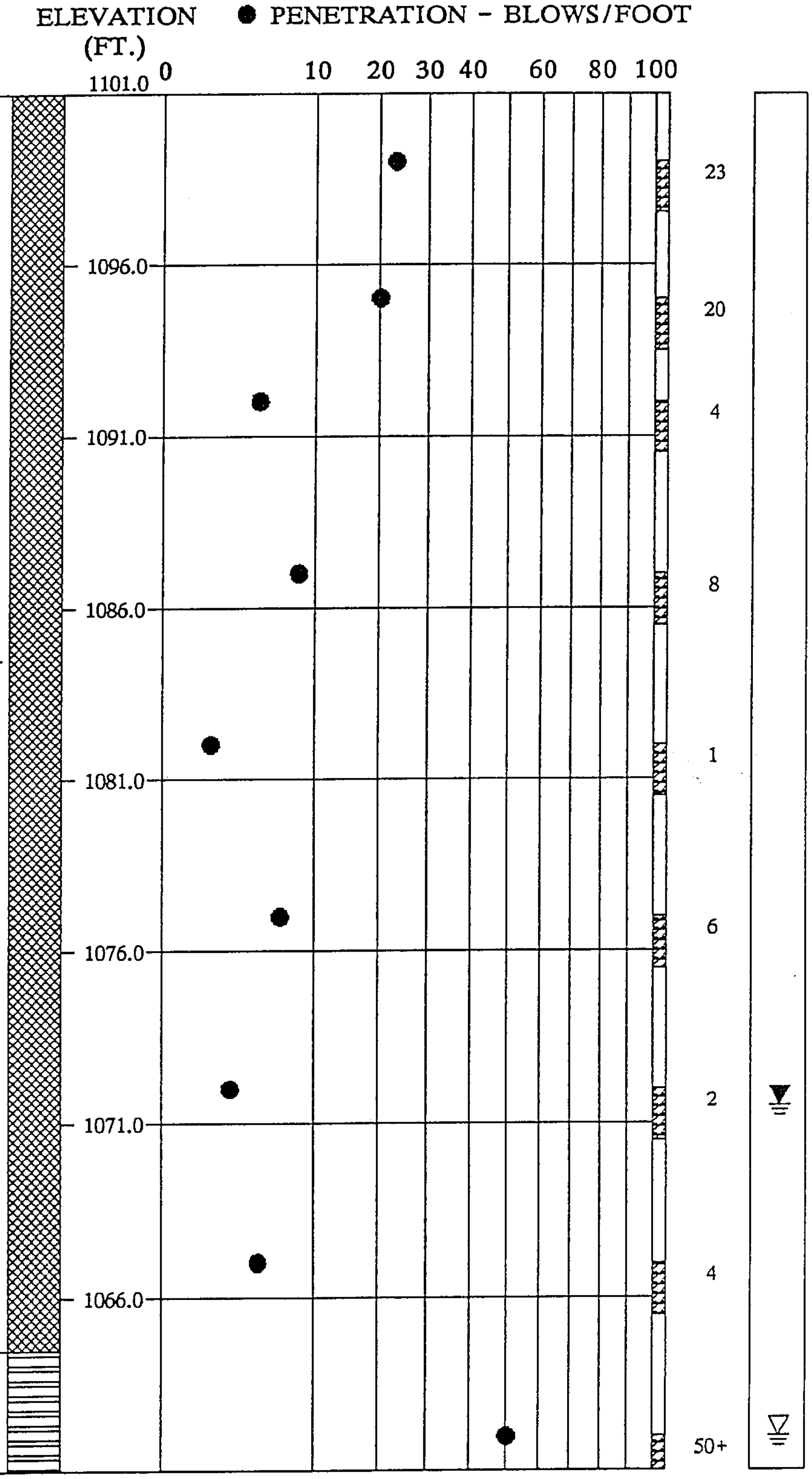
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-6
DATE DRILLED	July 7, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 2 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FILL - COARSE TO MEDIUM DENSE MOTTLED SILTY CLAYEY GRAVEL
16.5	FLY ASH FILL - VERY LOOSE TO LOOSE GRAY POORLY GRADED FLY ASH
36.5	RESIDUAL - VERY HARD BROWN TO GRAY WEATHERED SHALE



REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-7
DATE DRILLED	July 8, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	● PENETRATION - BLOWS/FOOT 0 10 20 30 40 60 80 100
41.5	BORING TERMINATED		
		1056.0	
		1051.0	
		1046.0	
		1041.0	
		1036.0	
		1031.0	
		1026.0	

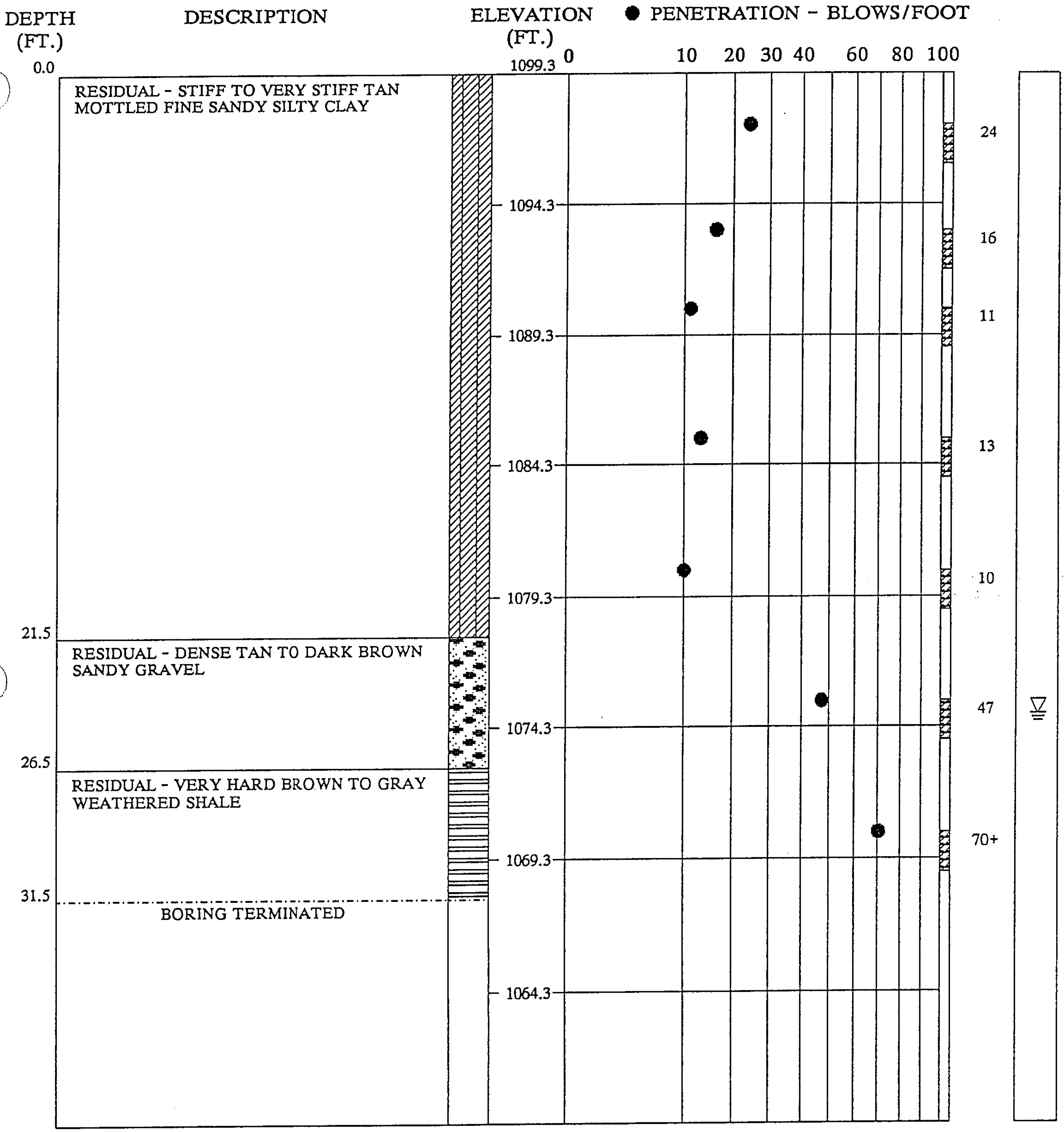
REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-7
DATE DRILLED	July 8, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.

LAW ENGINEERING



REMARKS:

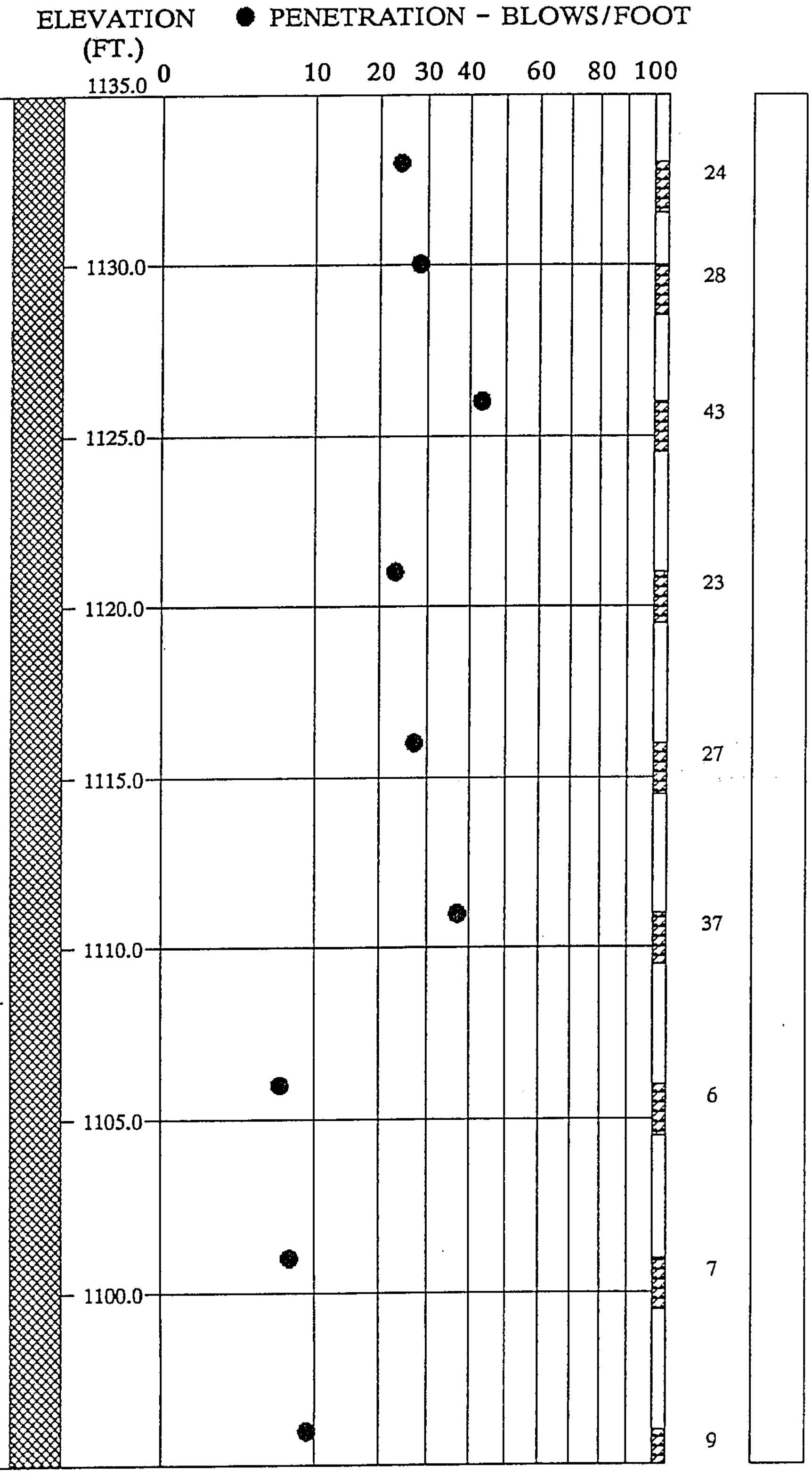
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-8
DATE DRILLED	July 9, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FLY ASH FILL - MEDIUM DENSE TO DENSE GRAY FLY ASH
26.5	FLY ASH & BOTTOM ASH FILL - LOOSE TO VERY LOOSE GRAY FLY ASH & BOTTOM ASH



REMARKS:

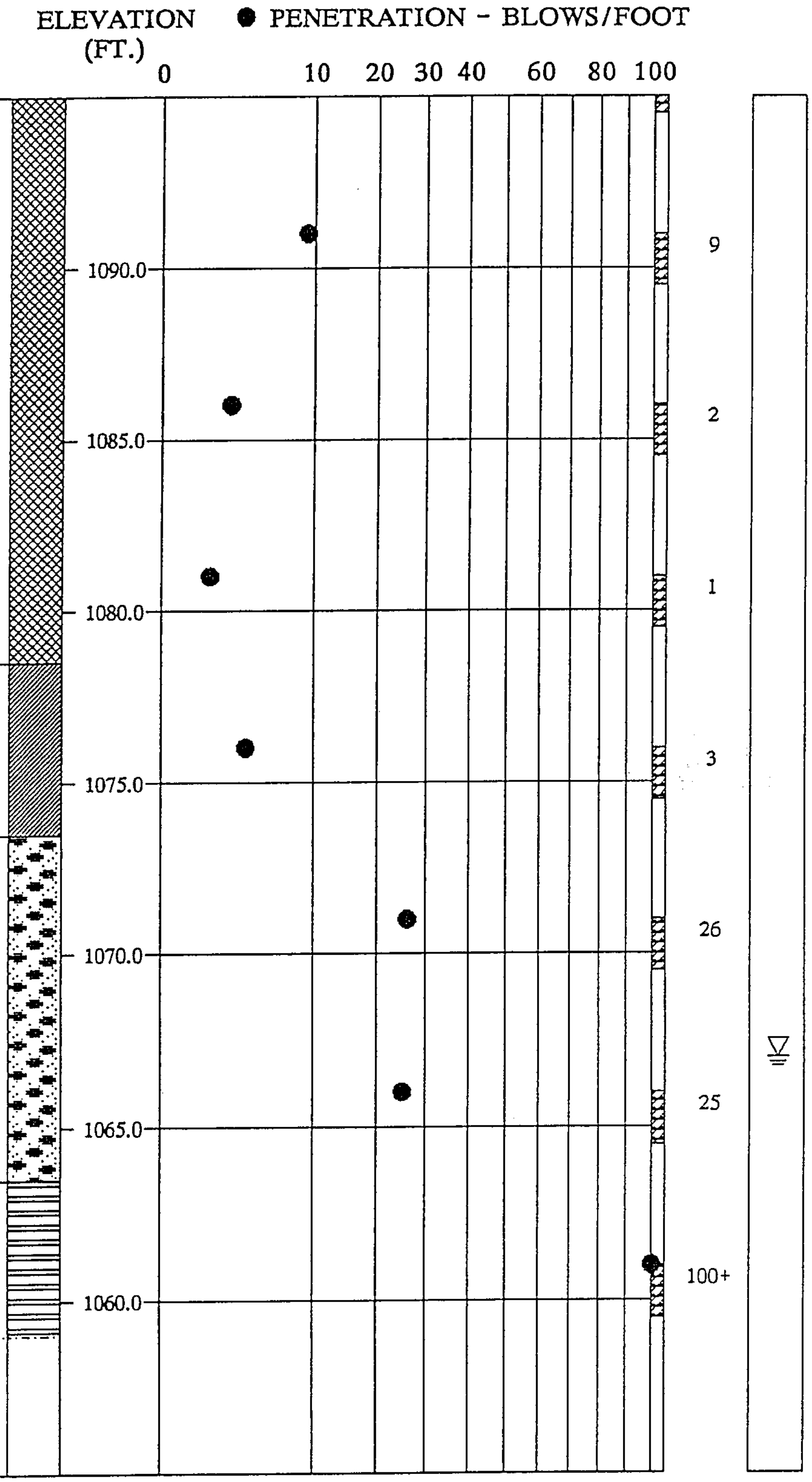
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-9
DATE DRILLED	July 9, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
56.5	RESIDUAL - SOFT TAN SANDY CLAY
61.5	RESIDUAL - MEDIUM DENSE BROWN SANDY GRAVEL
71.5	RESIDUAL - VERY HARD DARK BROWN WEATHERED SHALE
76.0	BORING TERMINATED



REMARKS:

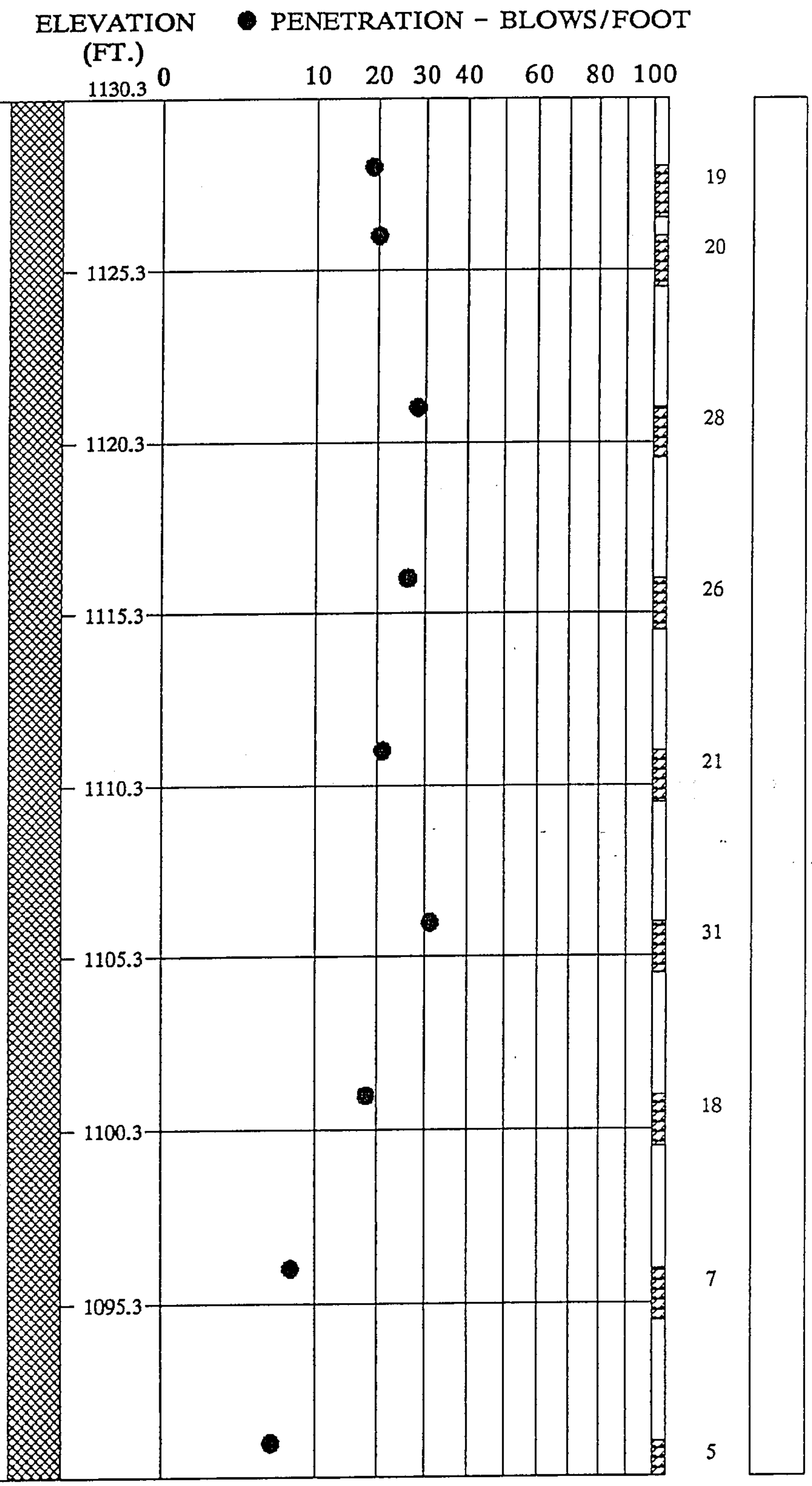
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER SS-9
DATE DRILLED July 9, 1986
PROJECT NUMBER 57401440.04
PROJECT TVA - JOHN SEVIER S.P.
PAGE 2 OF 2

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FLY ASH FILL - MEDIUM DENSE TO DENSE GRAY FINE FLY ASH
31.5	FLY ASH FILL - LOOSE TO VERY LOOSE GRAY FINE FLY ASH



REMARKS:

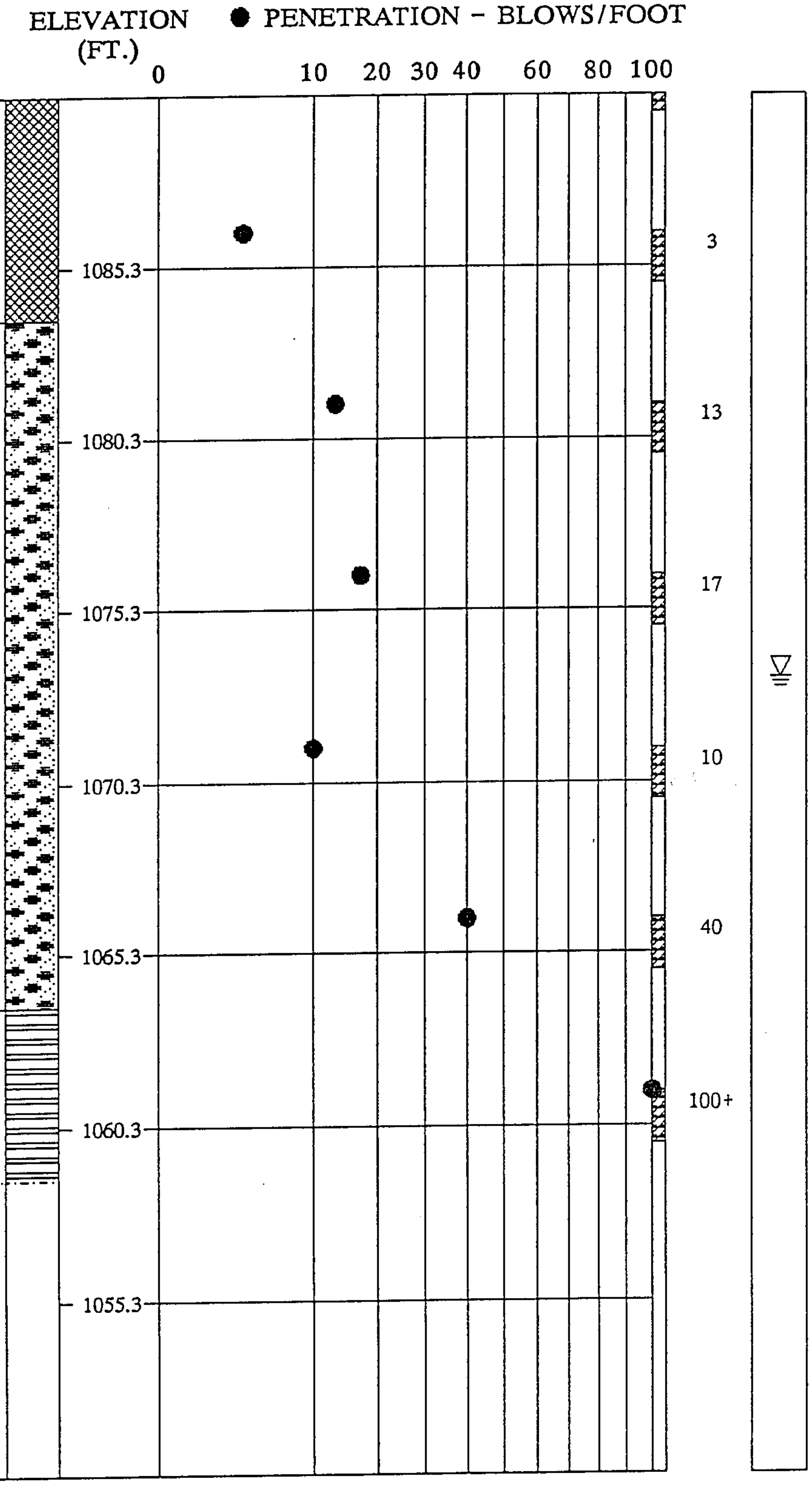
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-10
DATE DRILLED	July 10, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
46.5	RESIDUAL - FIRM TO DENSE TAN CLAYEY SANDY GRAVEL
66.5	RESIDUAL - VERY DENSE DARK BROWN WEATHERED SHALE
71.5	BORING TERMINATED



REMARKS:

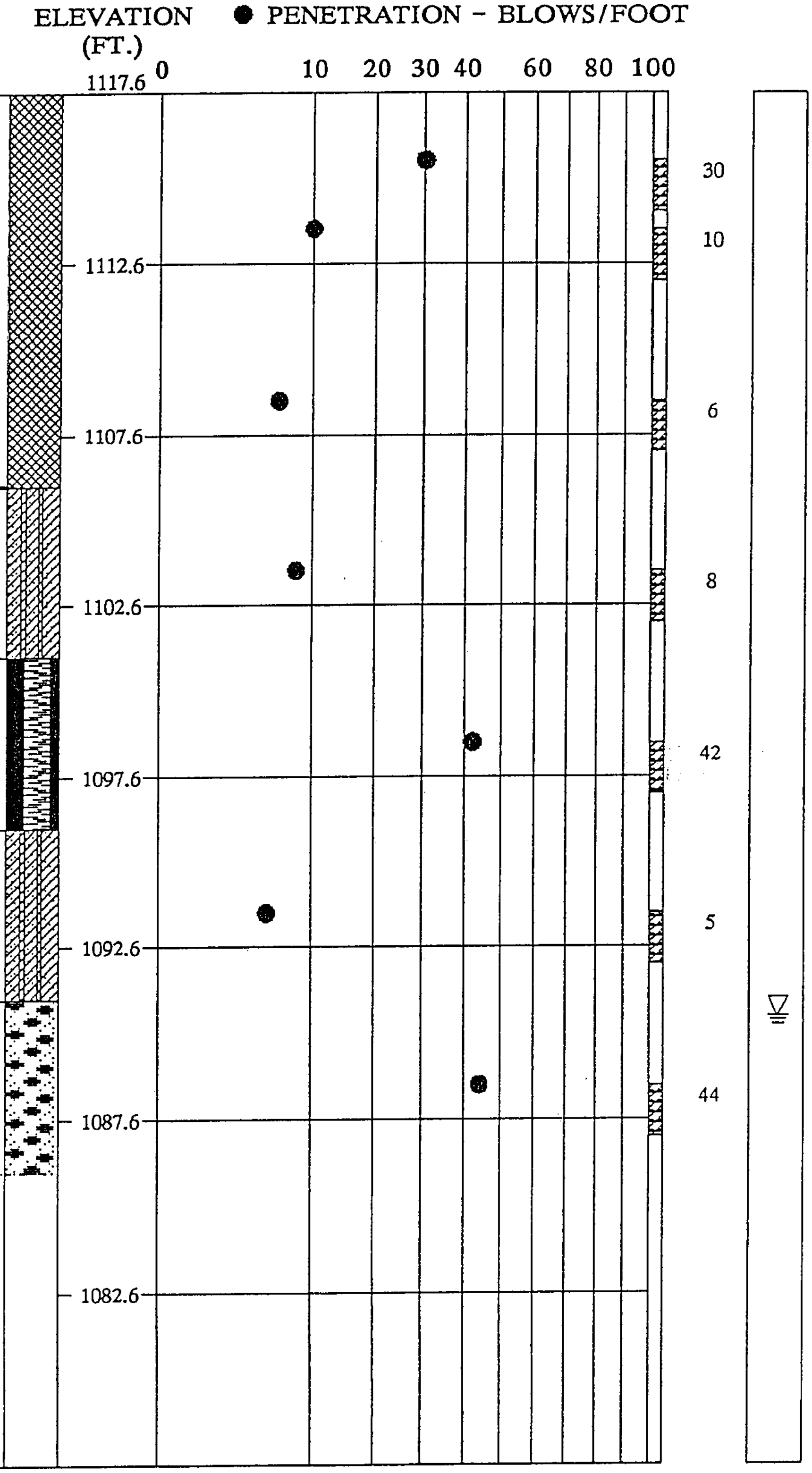
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-10
DATE DRILLED	July 10, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 2 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FLY ASH FILL - FIRM TO LOOSE GRAY FLY ASH
11.5	FIRM TAN CLAYEY SILT
16.5	DENSE BLACK COAL
21.5	FIRM BROWN CLAYEY SILT
26.5	DENSE TAN SANDY GRAVEL
31.5	BORING TERMINATED



REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	SS-11
DATE DRILLED	July 11, 1986
PROJECT NUMBER	57401440.04
PROJECT	TVA - JOHN SEVIER S.P.
PAGE 1 OF 1	

LAW ENGINEERING

BORING LOGS PZ-1 THROUGH PZ-5

Drilled in October/November 1986

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	FILL - GRAVEL AND CLAY	1121.7
5.0	CLAY	1116.7
8.0	CLAY AND SILT	
10.0	CLAY	1111.7
13.0	GRAVEL AND CLAY	1106.7
20.0	REFUSAL AT 20.0 FEET	1101.7
		1096.7
		1091.7
		1086.7
		1081.7
		1076.7
		1071.7
		1066.7

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

REMARKS:

GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER PZ-1
DATE DRILLED November 5, 1986
PROJECT NUMBER 57401440.01
PROJECT JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	FILL - GRAVEL AND CLAY	1121.7
		1116.7
6.0	SILT AND CLAY	
8.0	GRAVEL AND CLAY	
		1111.7
		1106.7
20.0	REFUSAL AT 20.0 FEET	1101.7
		1096.7
		1091.7
		1086.7
		1081.7
		1076.7
		1071.7
		1066.7

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-1B
DATE DRILLED	November 5, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	ASH
38.0	GRAVEL, SILT AND CLAY
39.0	CLAY
42.0	FINE SANDY SILT
48.0	NO RECOVERY
55.5	REFUSAL AT 55.5 FEET

ELEVATION (FT.): 1113.8, 1108.8, 1103.8, 1098.8, 1093.8, 1088.8, 1083.8, 1078.8, 1073.8, 1068.8, 1063.8, 1058.8

● PENETRATION - BLOWS/FOOT: 0, 10, 20, 30, 40, 60, 80, 100

REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

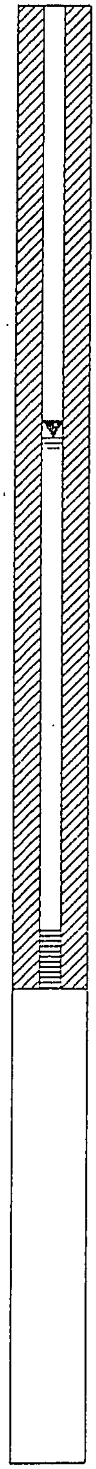
BORING NUMBER	PZ-2A
DATE DRILLED	November 3, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	ASH	1114.3
		1109.3
		1104.3
		1099.3
		1094.3
		1089.3
		1084.3
		1079.3
38.0	CLAY	
40.5	REFUSAL AT 40.5 FEET	1074.3
		1069.3
		1064.3
		1059.3

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100



REMARKS:

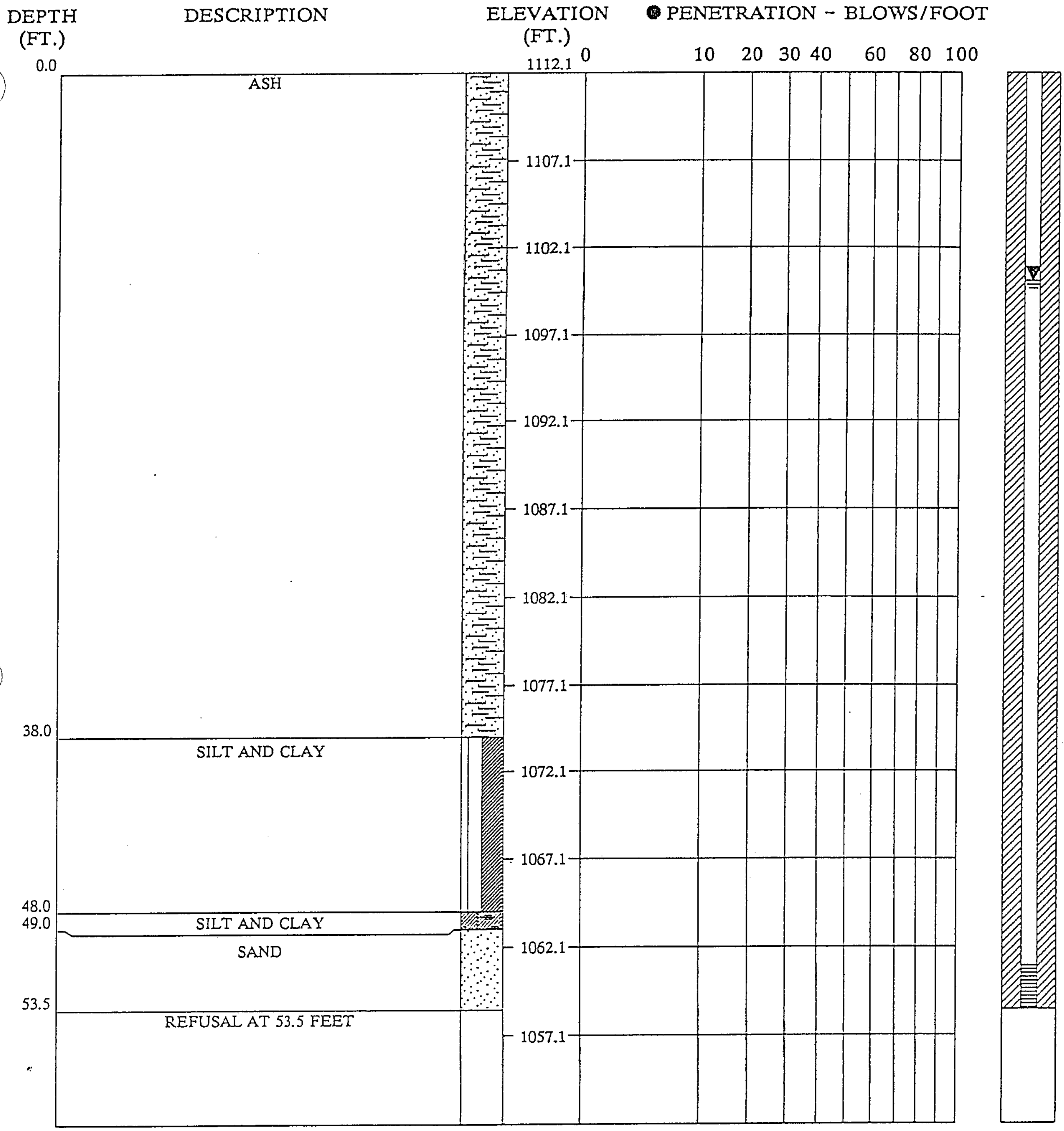
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER PZ-2B
DATE DRILLED November 3, 1986
PROJECT NUMBER 57401440.01
PROJECT JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1

LAW ENGINEERING



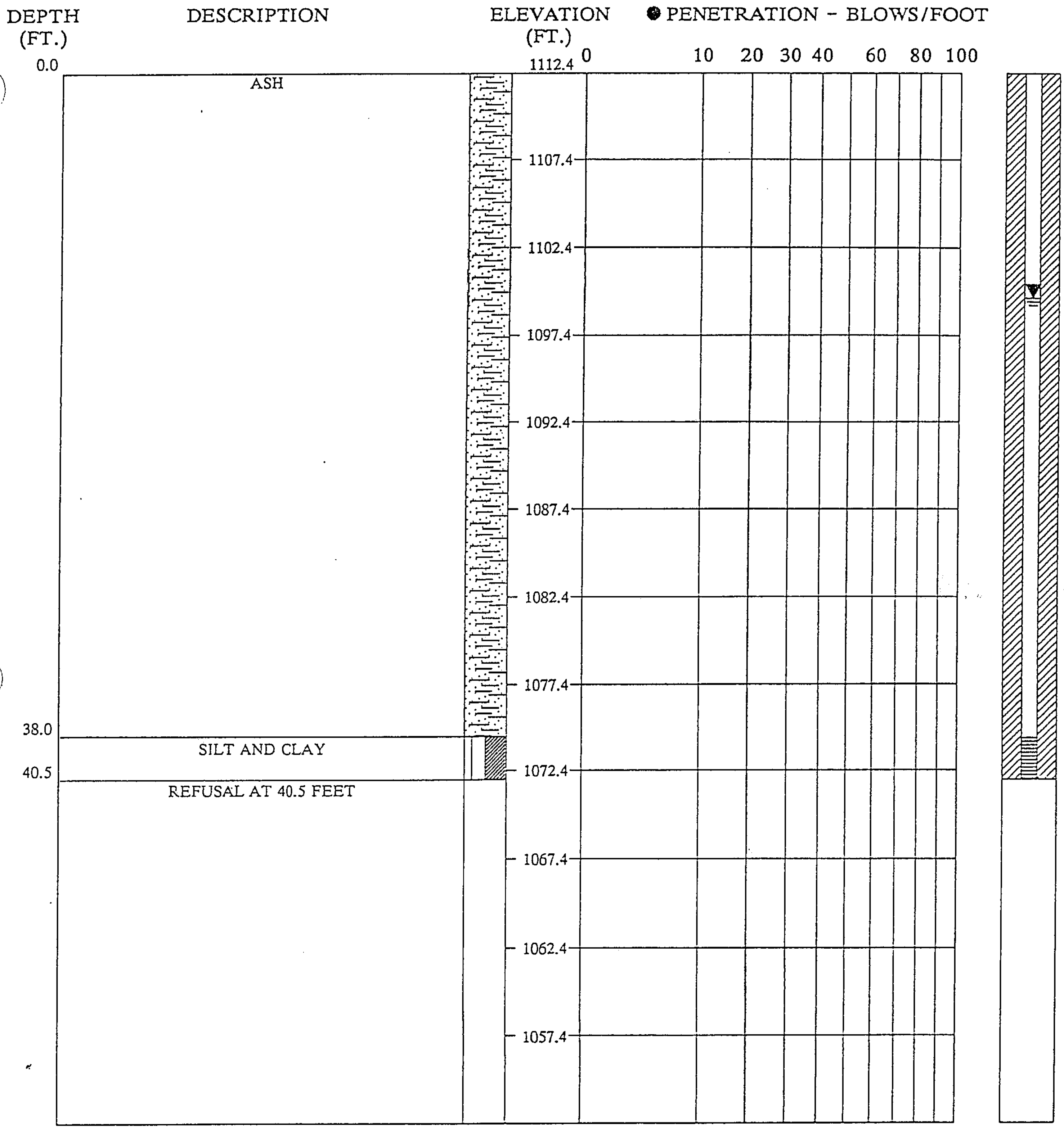
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-3A
DATE DRILLED	October 31, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING



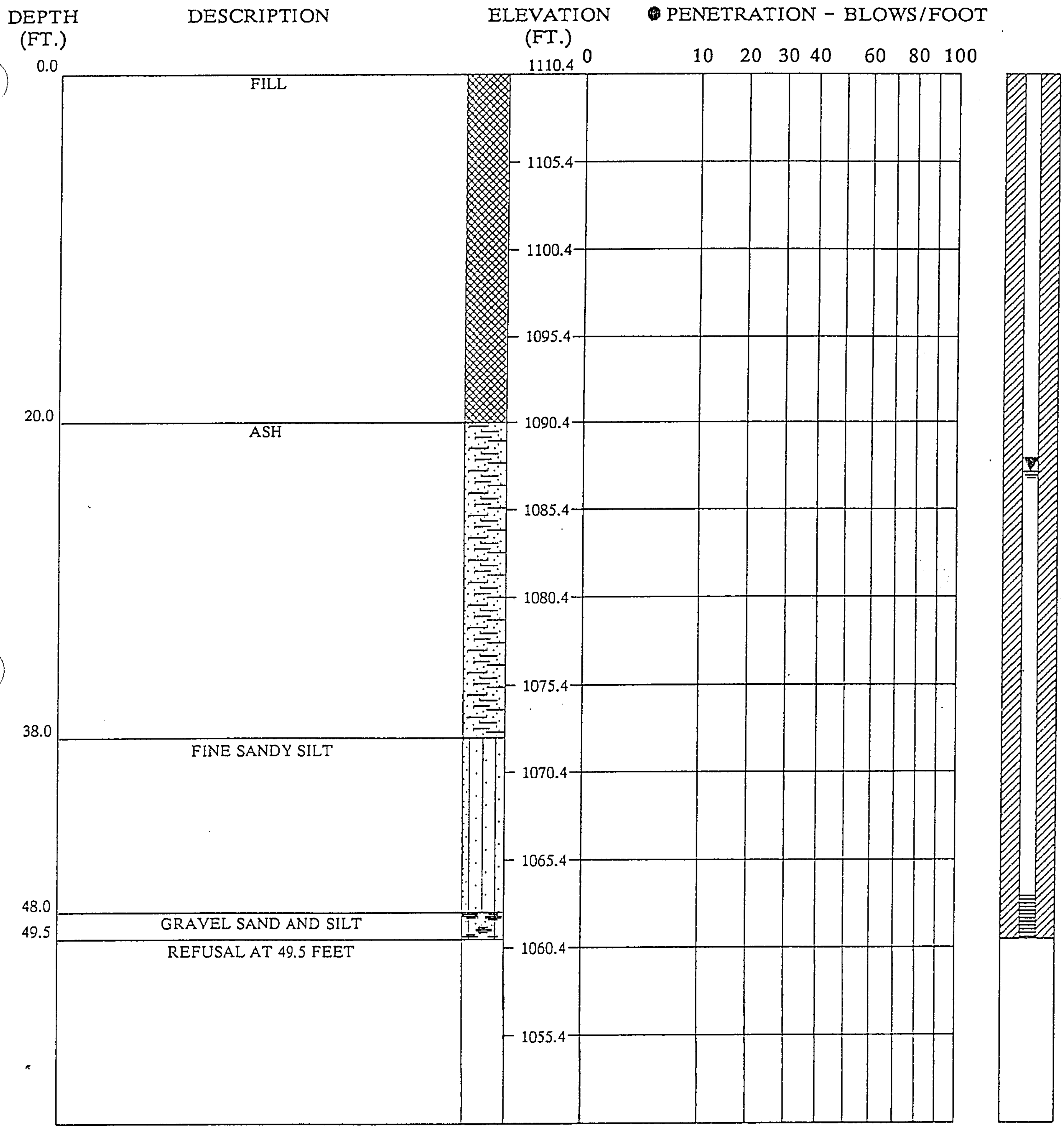
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

AUGER BORING RECORD

BORING NUMBER PZ-3B
DATE DRILLED October 31, 1986
PROJECT NUMBER 57401440.01
PROJECT JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

LAW ENGINEERING



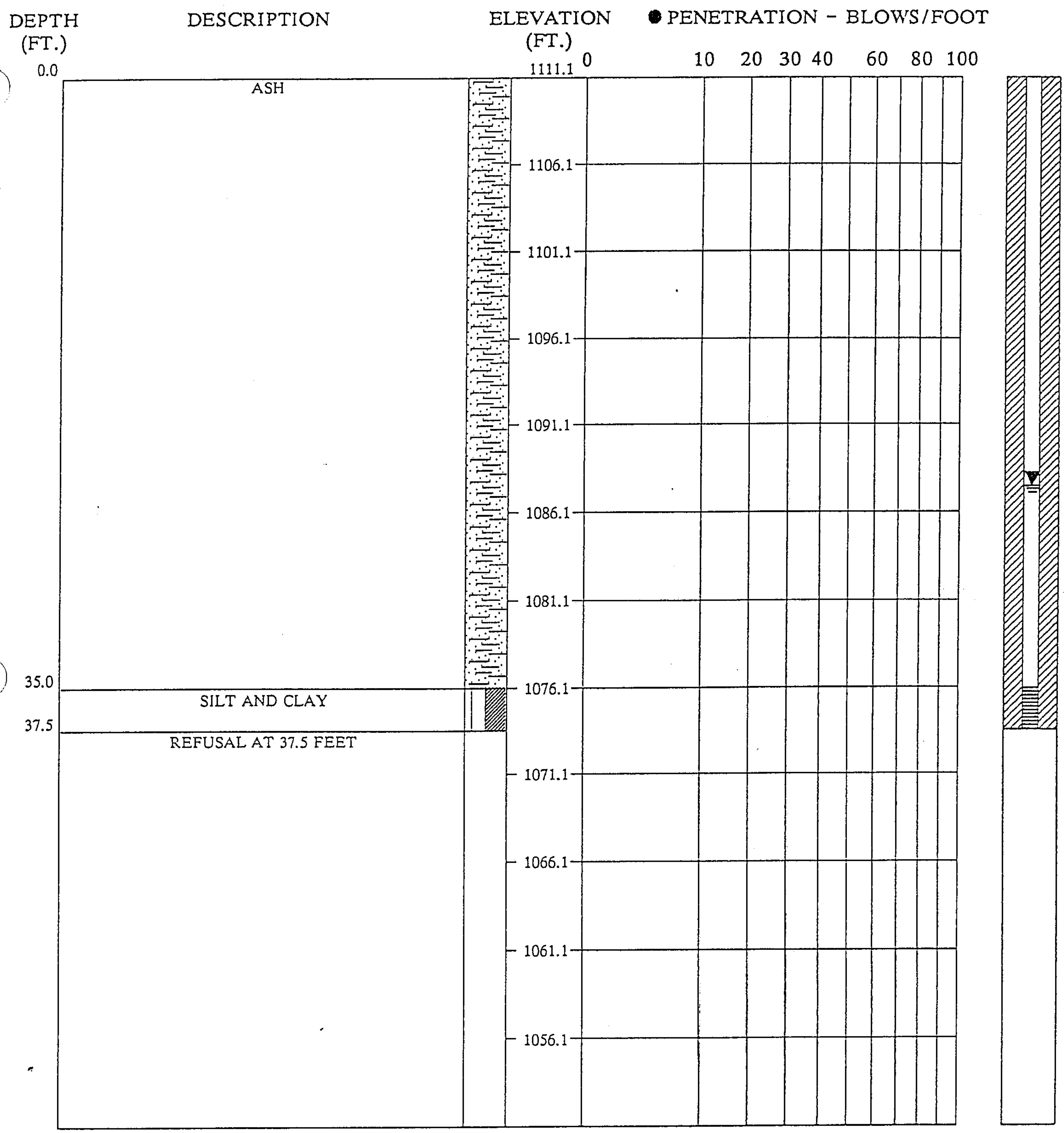
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

AUGER BORING RECORD

BORING NUMBER	PZ-4A
DATE DRILLED	November 3, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE



REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-4B
DATE DRILLED	November 5, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	ASH
19.0	SILT AND CLAY
23.5	REFUSAL AT 23.5 FEET

ELEVATION (FT.): 1098.3, 1093.3, 1088.3, 1083.3, 1078.3, 1073.3, 1068.3, 1063.3, 1058.3, 1053.3, 1048.3, 1043.3

● PENETRATION - BLOWS/FOOT: 0, 10, 20, 30, 40, 60, 80, 100

REMARKS:
UNDERWATER

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

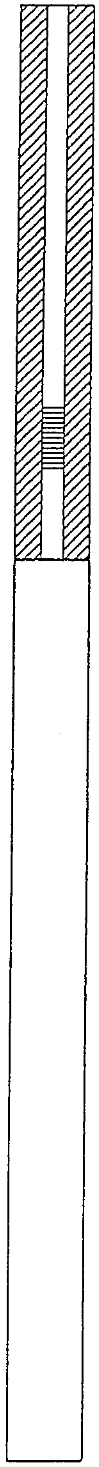
BORING NUMBER	PZ-5A
DATE DRILLED	October 28, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	ASH	1099.0
15.0	NO RECOVERY	
19.0	SILT AND CLAY	
21.0	NO RECOVERY	
23.0	BORING TERMINATED AT 23.0 FEET	

ELEVATION (FT.): 1099.0, 1094.0, 1089.0, 1084.0, 1079.0, 1074.0, 1069.0, 1064.0, 1059.0, 1054.0, 1049.0, 1044.0

● PENETRATION - BLOWS/FOOT: 0, 10, 20, 30, 40, 60, 80, 100



REMARKS:
UNDERWATER

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-5B
DATE DRILLED	October 28, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

BORING LOGS 15 AND 21

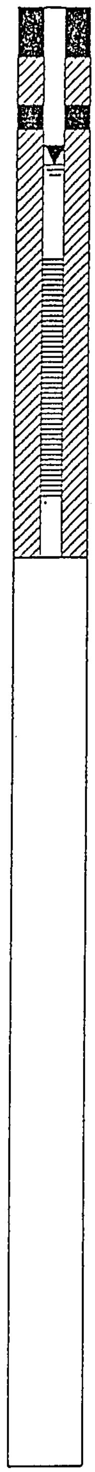
Drilled By Law Engineering - December 1991

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	SILT AND CLAY	1102.8
21.0	SHALE	
22.7	REFUSAL AT 22.7 FEET	

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

ELEVATION (FT.): 1102.8, 1097.8, 1092.8, 1087.8, 1082.8, 1077.8, 1072.8, 1067.8, 1062.8, 1057.8, 1052.8, 1047.8



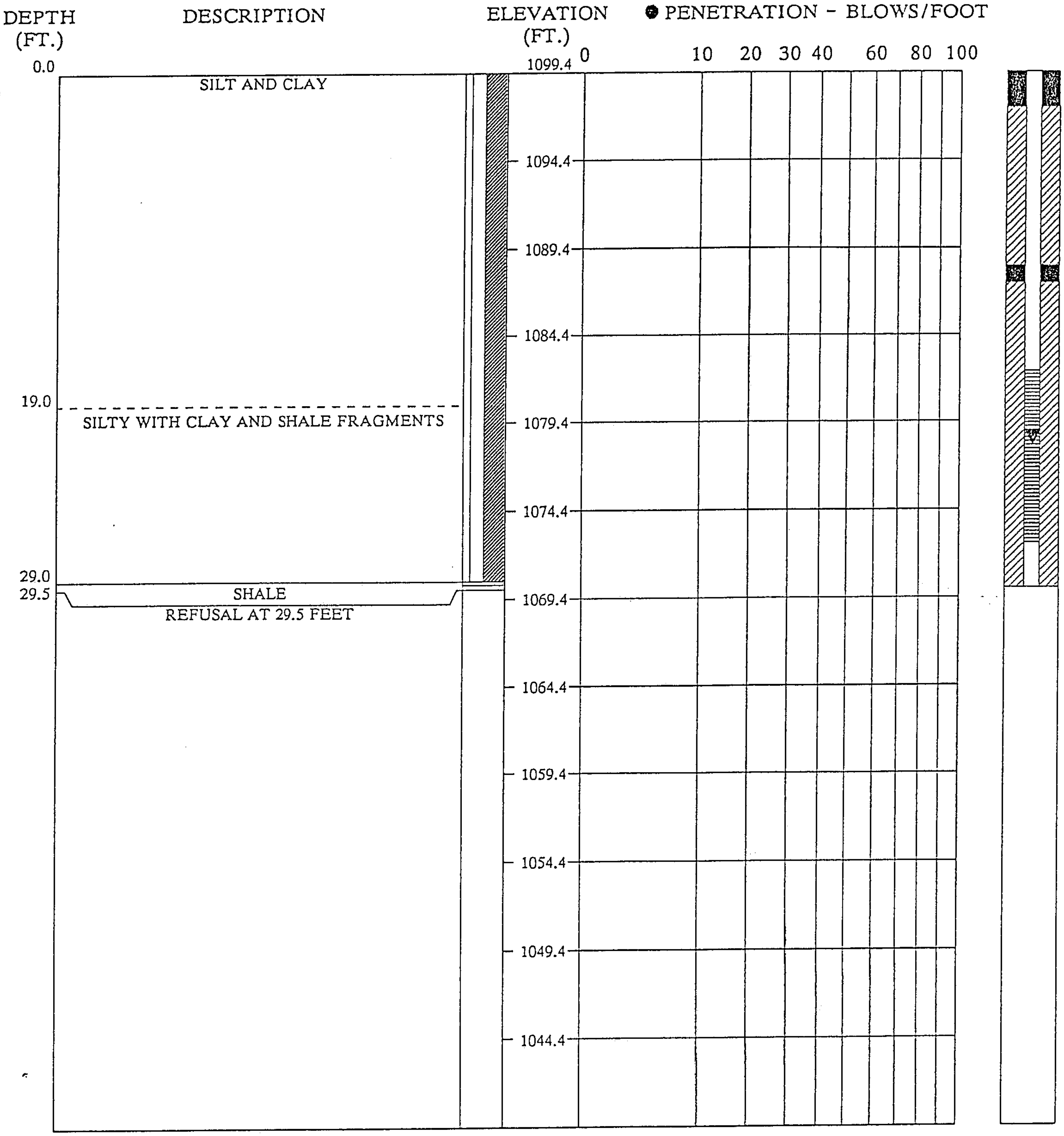
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER 15
DATE DRILLED December 14, 1991
PROJECT NUMBER 57401440.01
PROJECT JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1

LAW ENGINEERING



REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

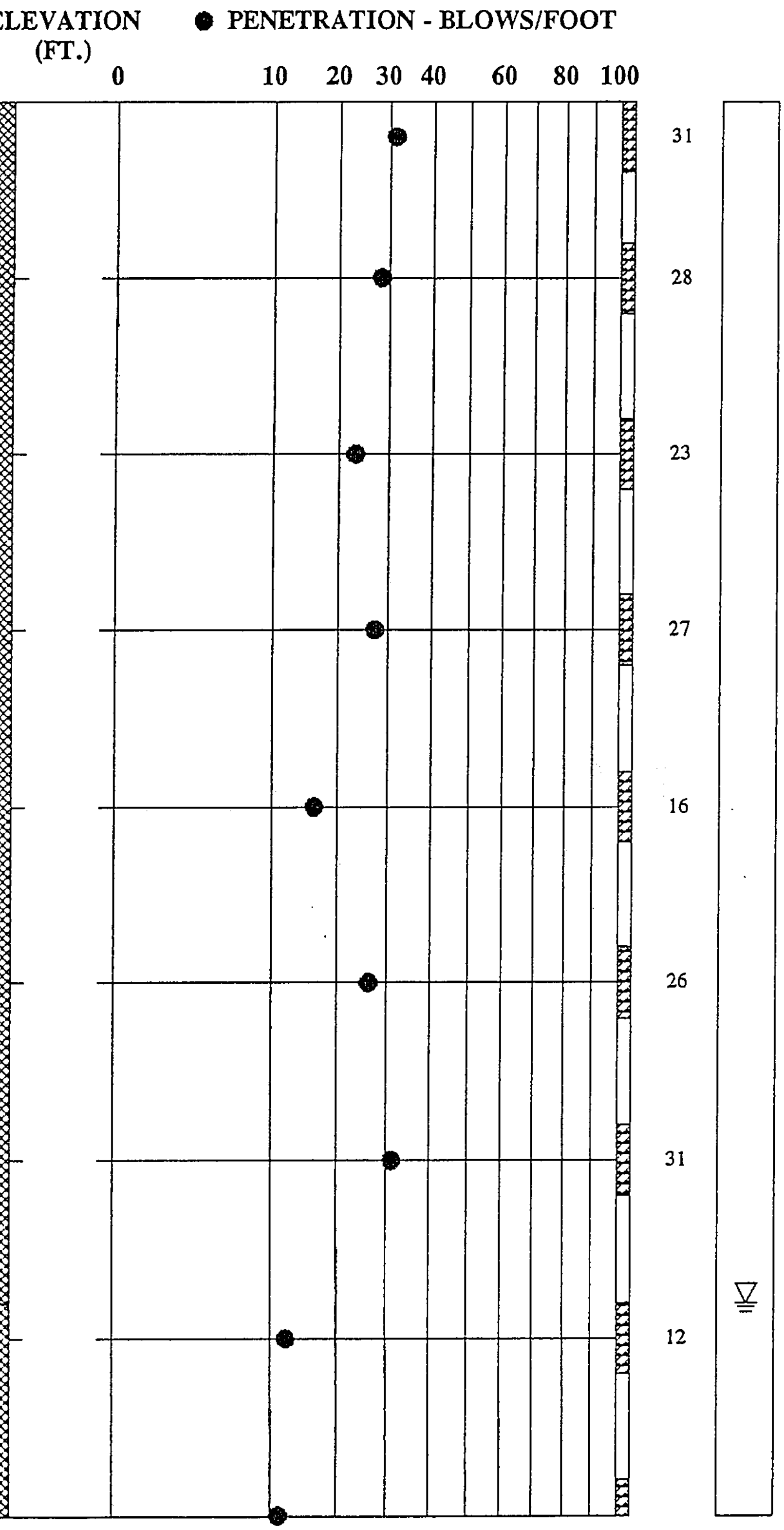
BORING NUMBER	21
DATE DRILLED	December 15, 1991
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

BORING LOGS 94-1 THROUGH 94-4

Drilled By Law Engineering - August 1994

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	DARK GRAY ASH; SANDY SILTY TEXTURE - FILL	
34.0	DARK GRAY ASH; SANDY SILTY TEXTURE; WET - FILL	
40.0		



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-1
DATE DRILLED	August 22, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
	DARK GRAY ASH; SANDY SILT TEXTURE; WET - FILL
49.0	BROWN AND GRAY SILTY CLAY - ALLUVIUM
54.0	VERY STIFF TO VERY HARD BROWN AND TAN SILTY CLAY; VERY MOIST - RESIDUUM
66.0	VERY HARD BROWN AND GRAY WEATHERED SHALE - RESIDUUM (The sample possessed the relict structure of the underlying parent bedrock.)
70.7	AUGER REFUSAL

ELEVATION (FT.)

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

Blows/foot
11
15
14
16
12
176/0.8
100/0.3

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

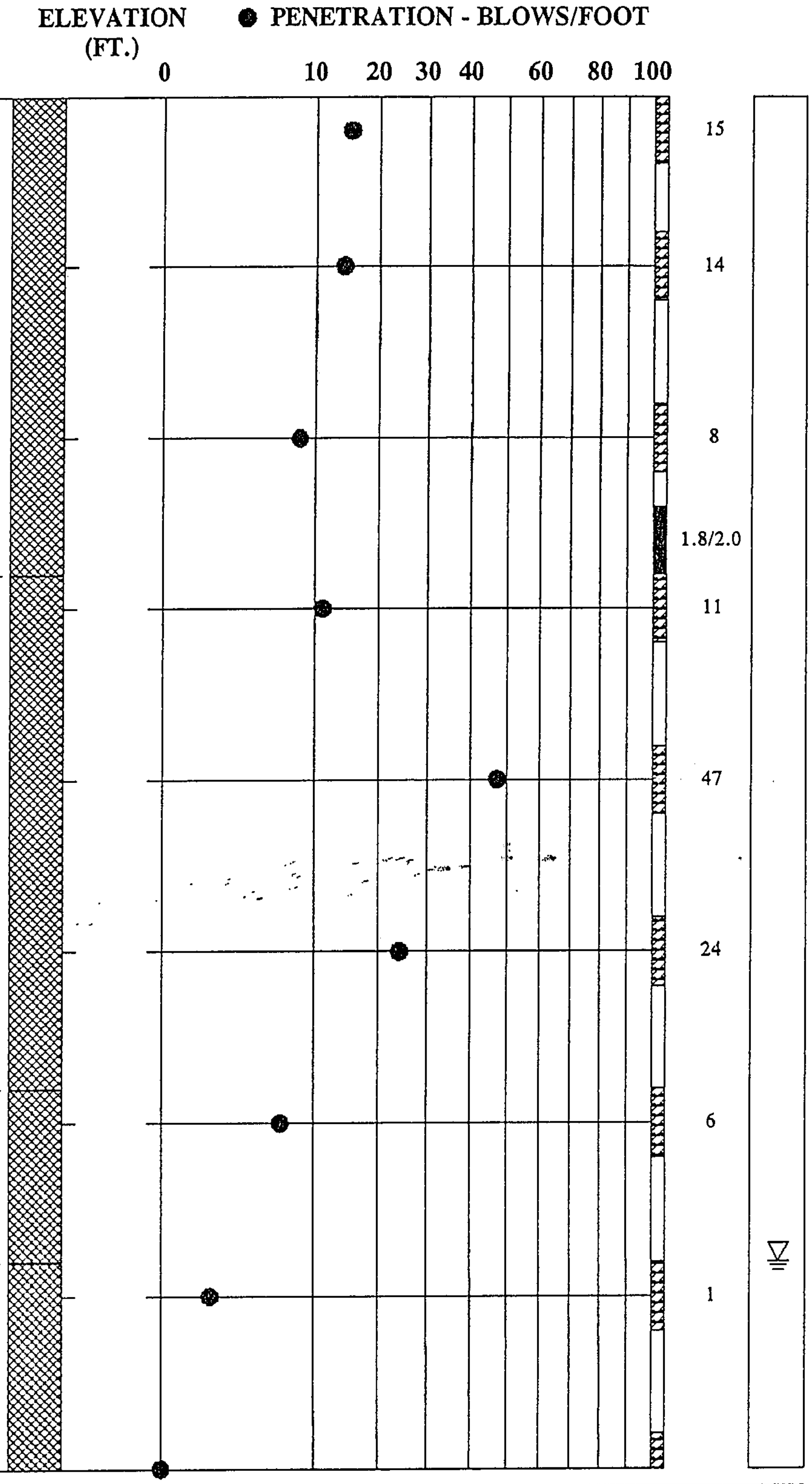
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-1
DATE DRILLED	August 22, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 2 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	DARK GRAY ASH; SANDY SILT TEXTURE - FILL
14.0	LIGHT GRAY ASH; SILT SIZE - FILL
29.0	DARK GRAY ASH; SANDY SILT TEXTURE - FILL
34.0	GRAY ASH; SANDY SILT; VERY WET - FILL
40.0	



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

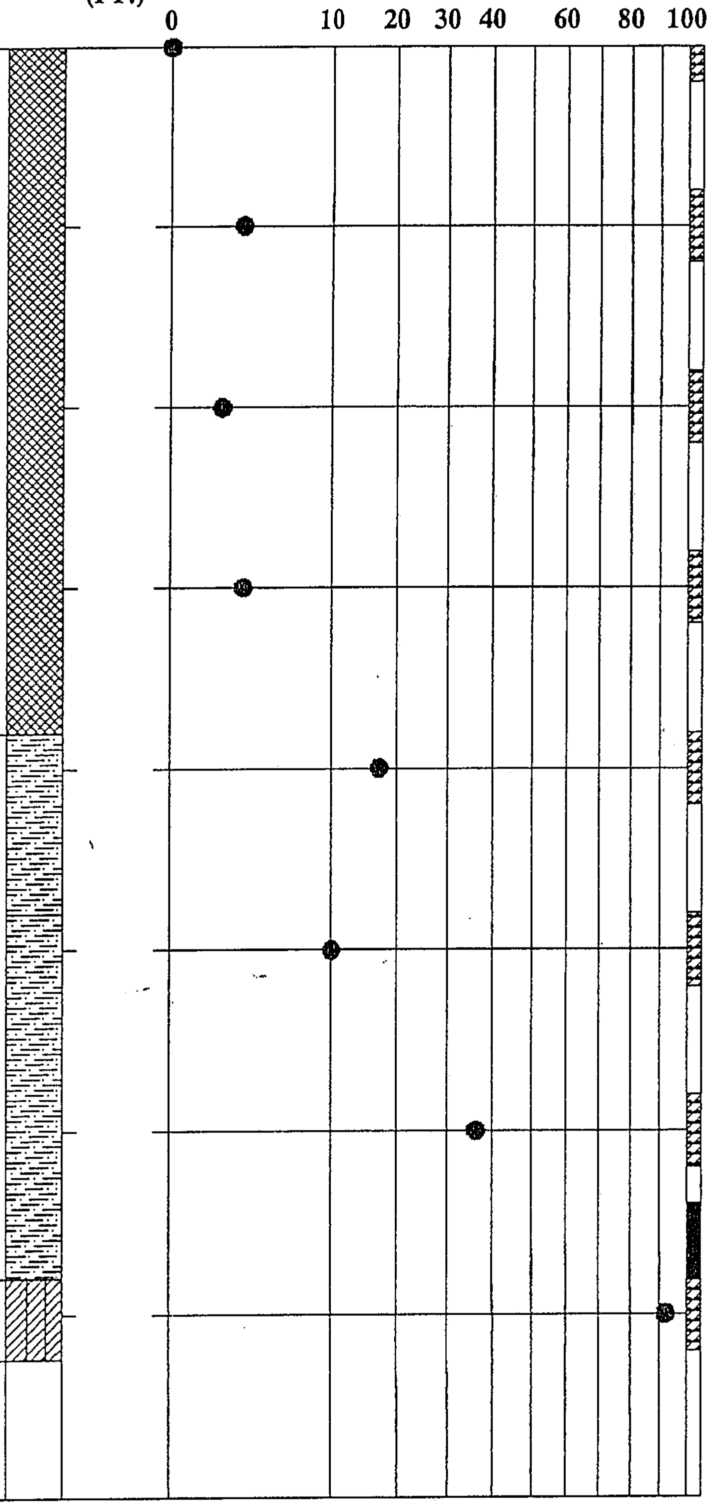
BORING NUMBER	94-2
DATE DRILLED	August 23, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
	GRAY ASH; SANDY SILT; VERY WET - FILL
59.0	VERY STIFF LIGHT BROWN SILTY CLAY - ALLUVIUM (OR FILL)
64.0	STIFF TO HARD BROWN SANDY SILTY CLAY - ALLUVIUM
74.0	VERY HARD GRAY WEATHERED SHALE - RESIDUUM
76.2	AUGER REFUSAL

ELEVATION (FT.)

● PENETRATION - BLOWS/FOOT



Blows/foot
0
2
1
2
17
10
36
92

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

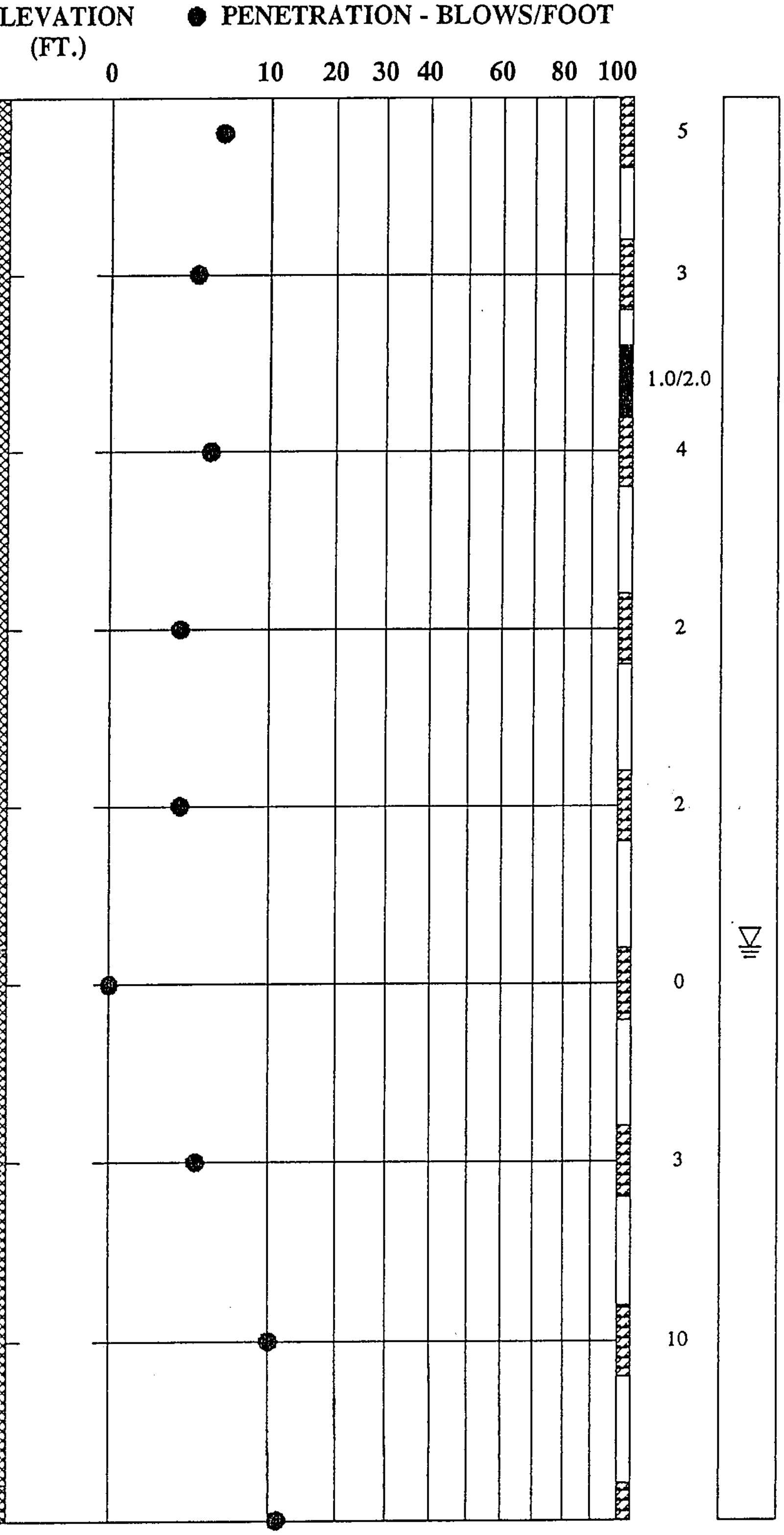
TEST BORING RECORD

BORING NUMBER	94-2
DATE DRILLED	August 23, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 2 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	DARK BROWN SANDY SILTY CLAY - FILL
1.5	DARK GRAY ASH; SANDY SILT TEXTURE - FILL
24.0	GRAY ASH; SANDY SILT TEXTURE; VERY WET - FILL
39.0	

ELEVATION (FT.)



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-3
DATE DRILLED	August 18, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	● PENETRATION - BLOWS/FOOT
	BROWN AND GRAY SANDY SILTY CLAY - FILL (OR ALLUVIUM)		11
45.5			37
	BROWN AND GRAY SILTY CLAYEY SAND - ALLUVIUM		
49.0			
	GRAY AND BROWN WEATHERED SHALE - RESIDUUM		18
			100/0.3
56.4			
	AUGER REFUSAL		

Penetration scale: 0, 10, 20, 30, 40, 60, 80, 100

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

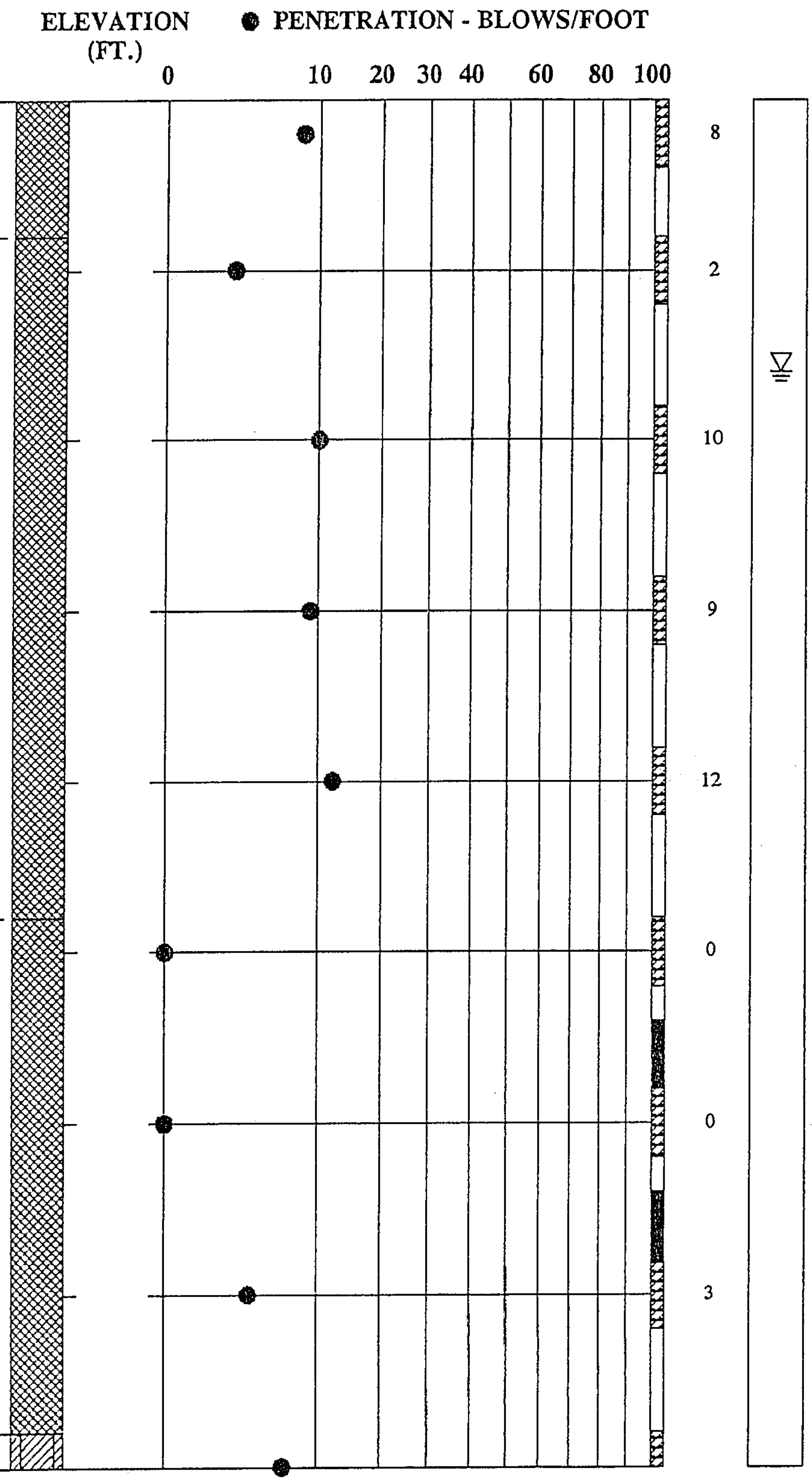
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-3
DATE DRILLED	August 18, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	RED-BROWN SILTY CLAY WITH GRAVEL - FILL
4.0	RED-BROWN SANDY SILTY CLAY - FILL
24.0	GRAY ASH; SANDY SILT TEXTURE - FILL
39.0	



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-4
DATE DRILLED	August 19, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	● PENETRATION - BLOWS/FOOT
	FIRM TO VERY HARD BROWN AND GRAY WEATHERED SHALE - RESIDUUM		6
43.6			100/0.4
	AUGER REFUSAL		

Penetration scale: 0, 10, 20, 30, 40, 60, 80, 100

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-4
DATE DRILLED	August 19, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 2 OF 2	

LAW ENGINEERING

APPENDIX C

MOISTURE CONTENT
LABORATORY TEST RESULTS

TVA John Sevier Plant
Law Engineering Job Number 385 94467 01

Boring Number	Sample Depth (ft)	Moisture Content
94-1	0-2	12.4
	0-2	20.0
	4-6	19.1
	4-6	23.8
	9-11	15.8
	14-16	18.0
	14-16	17.7
	14-16	20.4
	19-21	18.7
	19-21	19.8
	24-26	18.3
	24-26	15.2
	29-31	21.1
	29-31	19.6
	34-36	19.0
	34-36	20.4
	39-41	20.7
	39-41	30.1
	44-45.5	22.8
	44-45.5	23.9
	49-51	15.9
	49-51	19.5
	54-56	16.9
	54-56	15.2
	59-61	23.6
	59-61	22.5
	64-66	40.0
	64-66	15.9
	69-71	7.3

Boring Number	Sample Depth (ft)	Moisture Content
94-2	0-2	20.1
	0-2	25.3
	4-6	18.2
	4-6	17.8
	9-11	23.8
	9-11	25.4
	14-16	26.7
	14-16	27.2
	19-21	16.9
	19-21	18.9
	24-26	19.7
	24-26	29.0
	29-31	32.5
	29-31	29.0
	34-36	45.5
	34-36	47.9
	39-41	55.8
	39-41	38.6
	44-46	45.4
	44-46	54.2
	49-51	56.2
	54-56	58.4
	49-51	42.6
	54-56	43.8
	59-61	21.3
	59-61	21.8
	64-66	22.7
	64-66	23.1
	69-71	17.5
	69-71	12.3
	74-76	15.8
	74-76	9.3

Boring Number	Sample Depth (ft)	Moisture Content
94-3	0-1.5	15.4
	1.5-3	25.5
	4-5.5	18.5
	4-5.5	19.0
	9-10.5	26.8
	9-10.5	25.8
	14-15.5	29.8
	14-15.5	27.4
	19-20.5	31.2
	19-20.5	35.1
	24-25.5	56.7
	24-25.5	55.0
	29-30.5	39.9
	29-30.5	45.8
	34-35.5	48.3
	34-35.5	21.4
	39-40.5	23.1
	39-40.5	21.0
	44-45.5	24.4
	44-45.5	16.0
	49-50.5	9.4
	49-50.5	34.2
	54-55.5	10.8

Boring Number	Sample Depth (ft)	Moisture Content
94-4	0-1.5	17.7
	0-1.5	25.1
	4-5.5	17.1
	4-5.5	25.6
	9-10.5	24.2
	14-15.5	16.1
	14-15.5	17.9
	19-20.5	16.0
	19-20.5	15.6
	24-25.5	62.0
	24-25.5	55.5
	29-30.5	50.3
	29-30.5	38.6
	34-35.5	38.3
	34-35.5	40.8
	39-40.5	29.5
	39-40.5	24.4
	42-43.5	14.2

Tested by: CLG | Reviewed by: [signature] | Law Job No. 5740144004

Date: 09/18/94 | Date: 9/29/94 | Job Name John Sevier Fossil Fuel

TP-4A: UNIT WEIGHT OF SAMPLE

"TYPICAL"

Sample: Boring No.: 94-2
Depth: 59-61 Ft.
Sample ID: Jar sample

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	1.674		
2	1.668	top	1.500
3	1.670	bottom	1.495
Avg.	1.671 (H)	Avg.	1.498 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	V-79
Tare Weight	16.47 gm
Wet Wt. + Tare	118.00 gm
Dry Wt. + Tare	99.90 gm
Wt. of Water	18.10 gm
Dry Weight	83.43 gm
Moisture Content, *w*	21.7 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	101.62 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	0 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	0.224 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.002 ft^3
WET DENSITY, $[W_s/V]$	D_w =	131.4 pcf
DRY DENSITY, $[D_w/(1+w/100)]$	D_d =	108.0 pcf

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Tested by:	CLG	Reviewed by:	HD	Law Job No.	5740144004
Date:	09/18/94	Date:	9/29/94	Job Name	John Sevier Fossil Fuel

TP-4A: UNIT WEIGHT OF SAMPLE
"TYPICAL"

Sample: Boring No.: 94-3
Depth: 39-40 Ft.
Sample ID: Jar sample

MEASUREMENTS (Nominal 6-inch cut sample height):

TOTAL SAMPLE HEIGHT (inches)		INSIDE DIAMETER OF CUT TUBE (inches)	
1	2.154		
2	2.160	top	1.452
3	2.155	bottom	1.461
Avg.	2.156 (H)	Avg.	1.457 (D)

MOISTURE CONTENT DETERMINATION

MOISTURE CONTENT	
Tare No.	K-62
Tare Weight	16.16 gm
Wet Wt. + Tare	141.91 gm
Dry Wt. + Tare	118.79 gm
Wt. of Water	23.12 gm
Dry Weight	102.63 gm
Moisture Content, *w*	22.5 %

TOTAL WEIGHT OF SOIL + TUBE SECTION	W_{s+t} =	125.75 gm
WEIGHT OF CLEAN, DRY TUBE SECTION	W_t =	0 gm
WET WEIGHT OF SOIL, $[(W_{s+t} - W_t)/454]$	W_s =	0.277 lbs
VOLUME OF SAMPLE, $[(pi*D^2/4)*H/1728]$	V =	0.002 ft^3
WET DENSITY, $[W_s/V]$	D_w =	133.2 pcf
DRY DENSITY, $[D_w/(1+w/100)]$	D_D =	108.7 pcf

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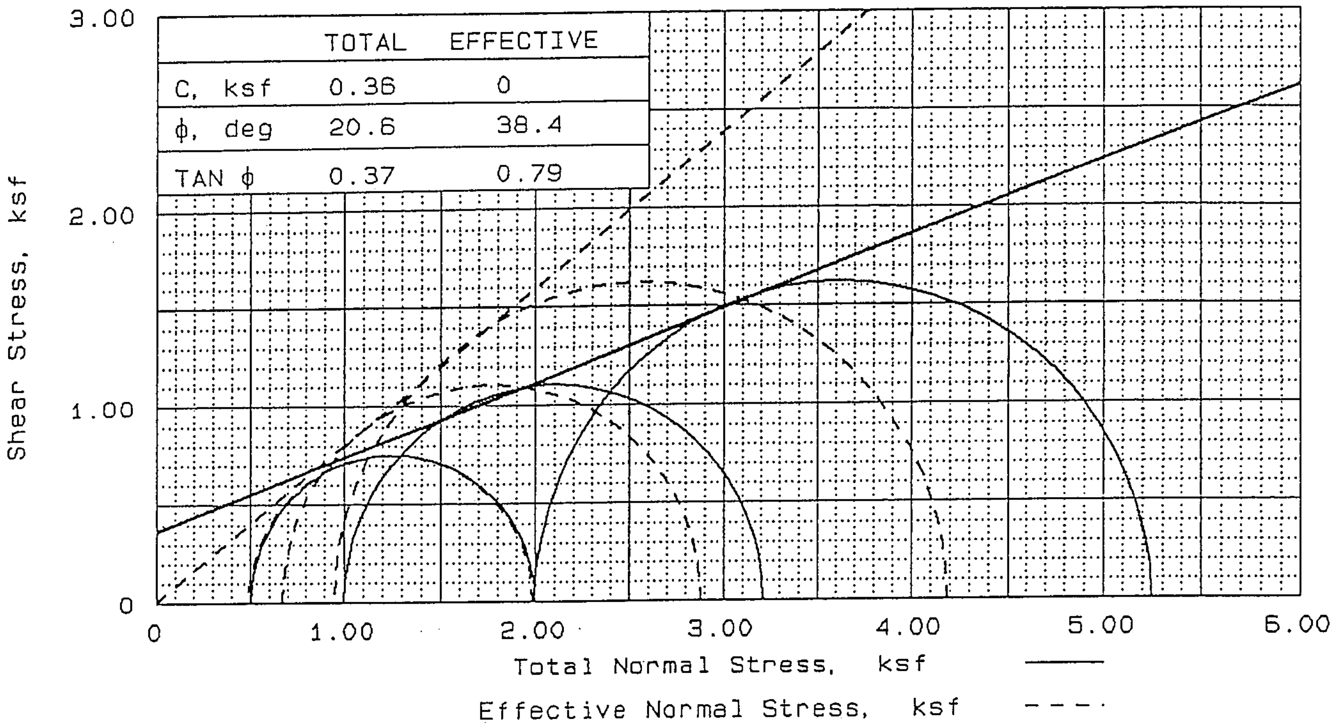
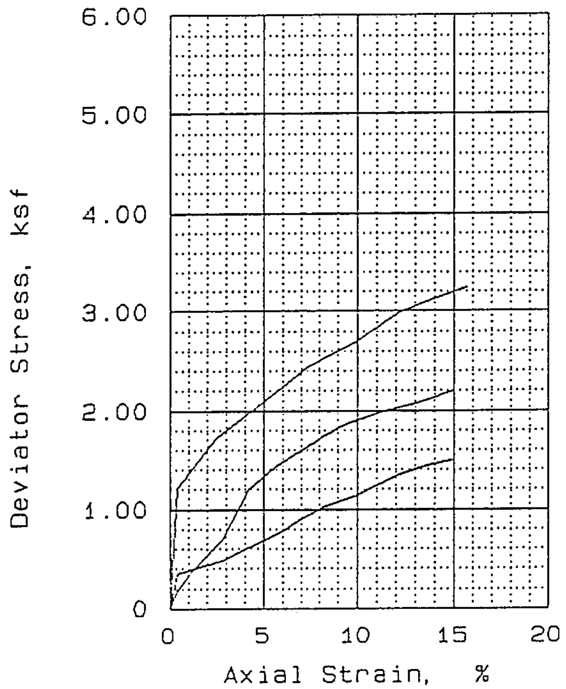




SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	20.6	20.8	20.5
	DRY DENSITY, pcf	107.0	107.1	106.1
	SATURATION, %	97.1	98.8	99.4
	VOID RATIO	0.570	0.568	0.554
	DIAMETER, in	1.43	1.43	1.43
	HEIGHT, in	2.87	2.87	2.87
AT TEST	WATER CONTENT, %	21.1	20.8	19.5
	DRY DENSITY, pcf	107.1	107.7	110.2
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.568	0.560	0.524
	DIAMETER, in	1.43	1.43	1.42
	HEIGHT, in	2.87	2.87	2.87
BACK PRESSURE, ksf		4.18	4.18	6.05
CELL PRESSURE, ksf		4.68	5.18	8.05
FAILURE STRESS, ksf		1.50	2.21	3.24
PORE PRESSURE, ksf		4.19	4.51	7.10
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		1.99	2.88	4.19
$\bar{\sigma}_3$ FAILURE, ksf		0.49	0.67	0.95

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Remolded

DESCRIPTION: Tan Clayey Silt

LL= PL= PI=

SPECIFIC GRAVITY= 2.69

REMARKS: Tested by: CLG

Reviewed by: HD

FIG. NO.

CLIENT:

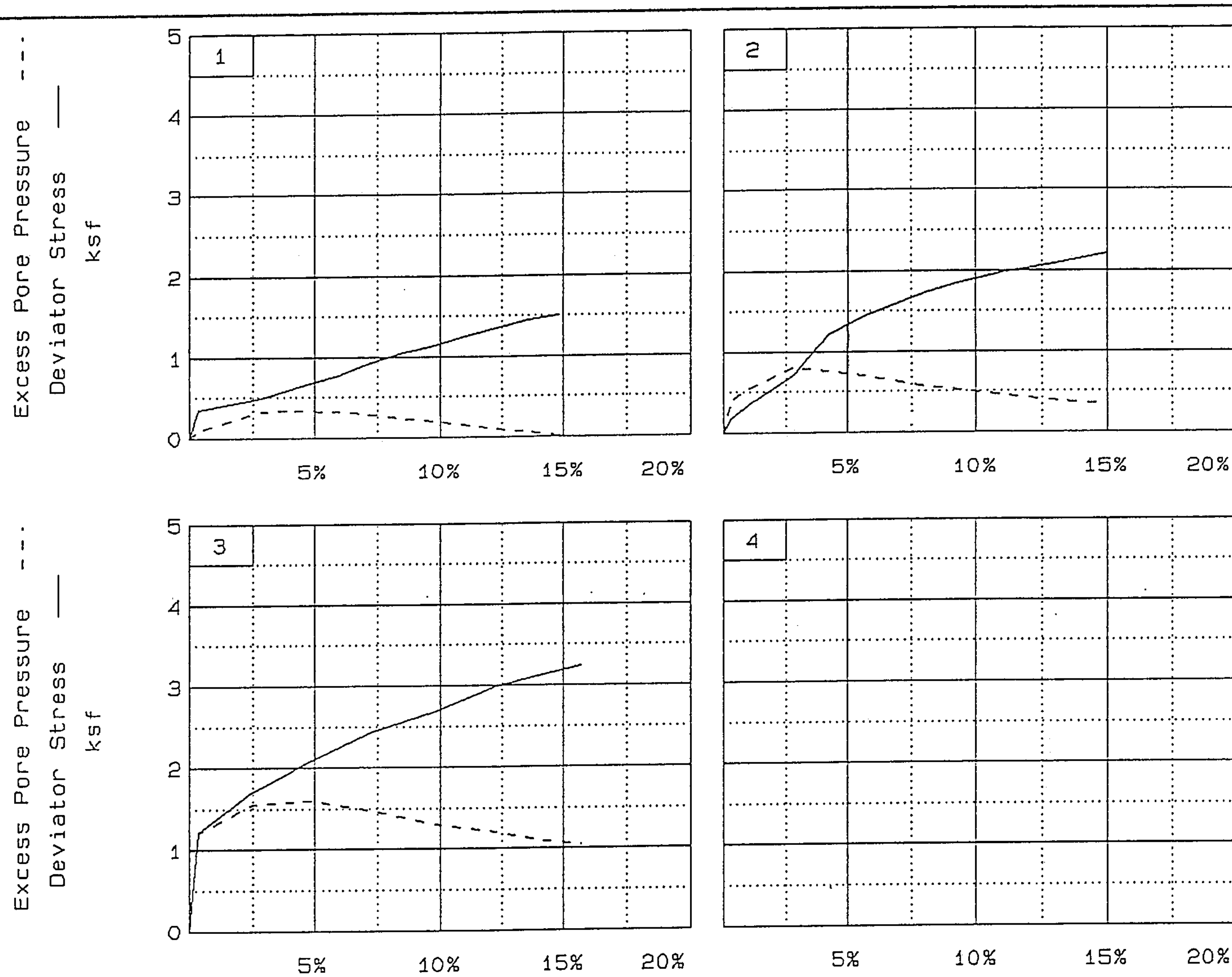
PROJECT: John Sevier Fossil Fuel

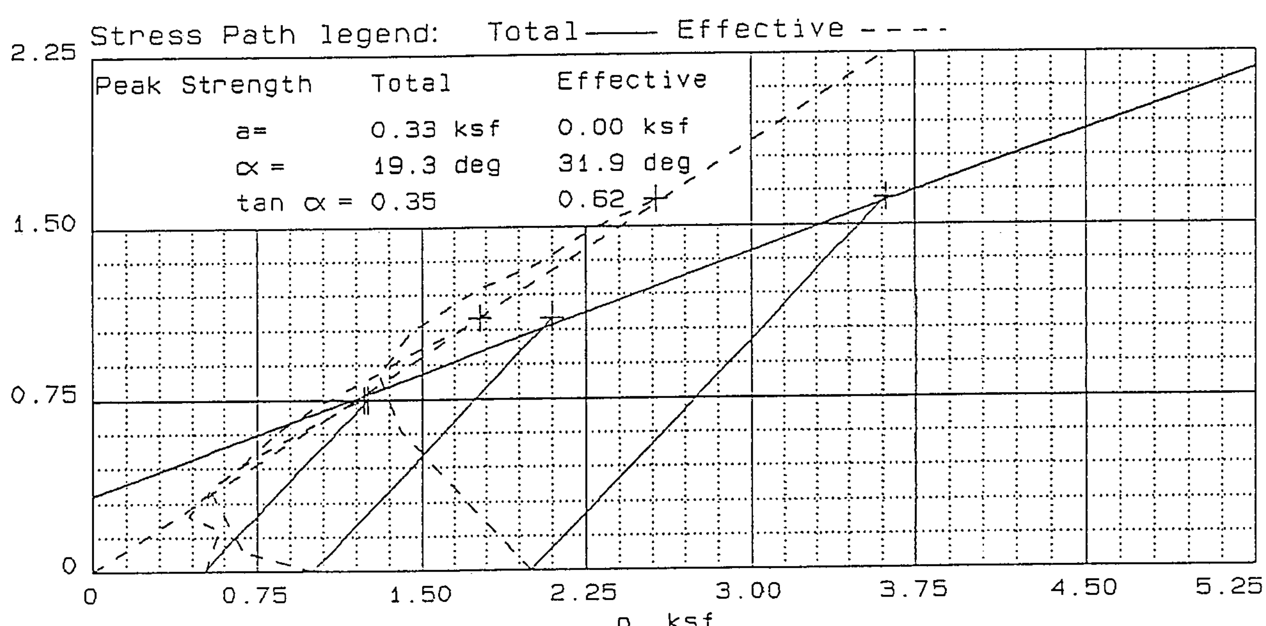
SAMPLE LOCATION: Composite (Jar samples)

PROJ. NO.: 5740144004 DATE: 09/29/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





Client:

Project: John Sevier Fossil Fuel

Location: Composite (Jar samples)

File: 4004A Project No.: 5740144004 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST — 9-29-1994
CU with pore pressures — 2:01 pm

Project Data

Project No.: 5740144004 Date: 09/29/94 Data file: 4004A
Client:
Project: John Sevier Fossil Fuel
Sample location: Composite (Jar samples)
Sample description: Tan Clayey Silt
Remarks: Tested by:
Reviewed by: HD Fig No.

Sample No. 1 Data

Type of sample: Remolded
Specific Gravity= 2.69 LL= PL= PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	1.43	1.43	
Height change, in		0.00	
Height, in	2.87	2.87	
Weight, grams	156.1		
Water volume change, cc		-0.70	
Moisture, %	20.6	21.1	21.1
Dry density, pcf	107.0	107.1	
Saturation, %	97.1	100.0	
Void ratio	0.570	0.568	

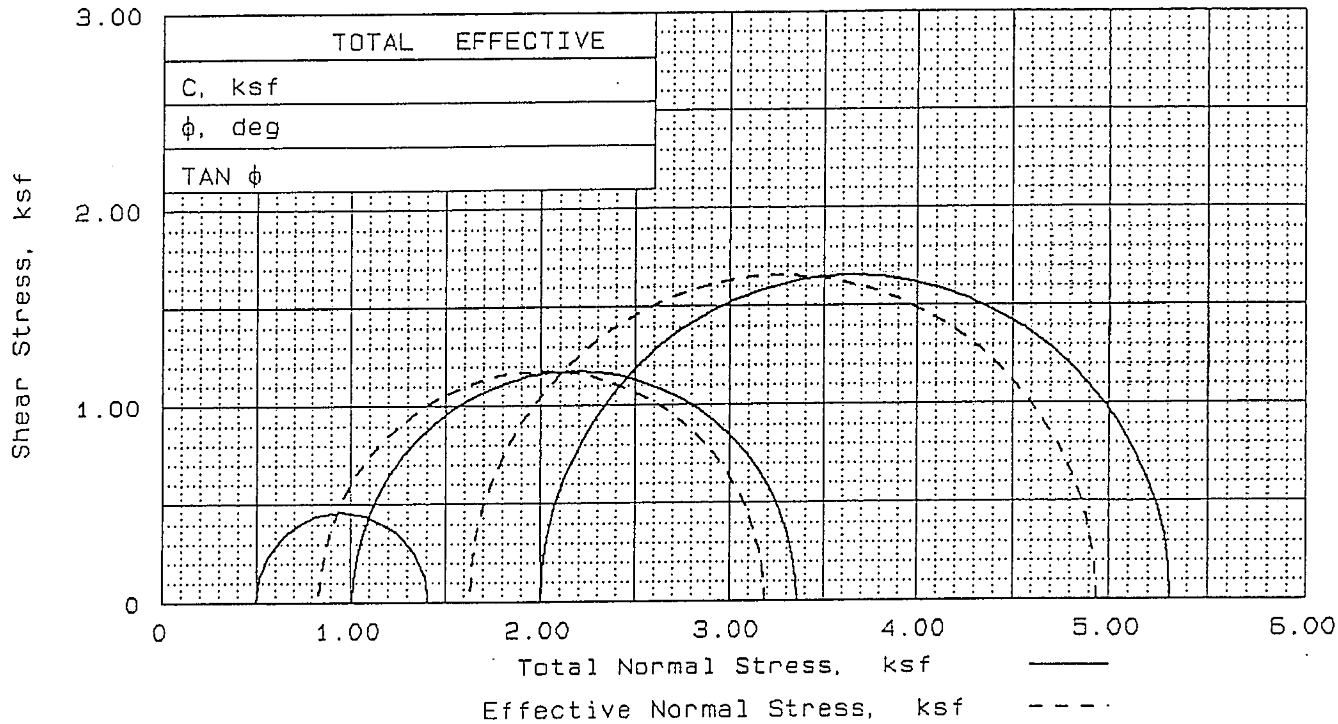
Test Data

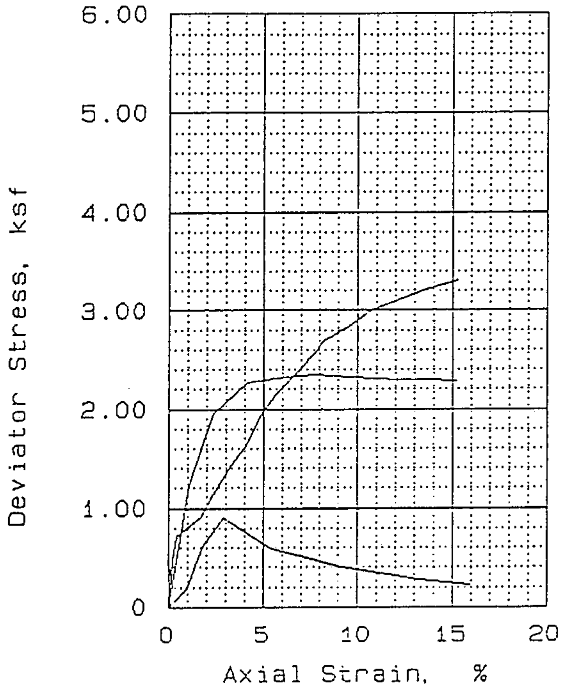
Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 0.100 % per minute
Consolidation cell pressure = 32.5 psi
Consolidation back pressure = 29 psi
Consolidation effective confining stress = 0.504 ksf
Peak deviator stress = 1.50 ksf at reading no. 11
Ult. deviator stress =

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	0.50	0.50	1.00	29.0	0.50	0.00
1	0.0100	0.010	4.00	4.0	0.3	0.36	0.40	0.76	1.89	29.7	0.58	0.18
2	0.0800	0.080	5.60	5.6	2.8	0.49	0.19	0.68	3.61	31.2	0.43	0.24
3	0.1200	0.120	7.20	7.2	4.2	0.62	0.17	0.79	4.58	31.3	0.48	0.31
[illegible]	0.1700	0.170	9.20	9.2	5.9	0.78	0.19	0.96	5.14	31.2	0.58	0.39
[illegible]	0.2000	0.200	10.80	10.8	7.0	0.90	0.22	1.12	5.17	31.0	0.67	0.45

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Effective Stresses Major ksf	Effective Stresses 1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
	0.2400	0.240	12.60	12.6	8.4	1.03	0.26	1.29	4.99	30.7	0.78	0.52
7	0.2800	0.280	14.00	14.0	9.8	1.13	0.30	1.43	4.74	30.4	0.87	0.57
8	0.3200	0.320	15.80	15.8	11.2	1.26	0.36	1.62	4.50	30.0	0.99	0.63
9	0.3500	0.350	17.20	17.2	12.2	1.35	0.40	1.76	4.36	29.7	1.08	0.68
10	0.3900	0.390	18.60	18.6	13.6	1.44	0.45	1.89	4.23	29.4	1.17	0.72
11	0.4250	0.425	19.60	19.6	14.8	1.50	0.49	1.99	4.06	29.1	1.24	0.75





SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	20.4	19.7	19.6
	DRY DENSITY, pcf	66.7	65.1	64.7
	SATURATION, %	42.6	39.4	38.8
	VOID RATIO	1.041	1.090	1.104
	DIAMETER, in	2.87	2.87	2.87
	HEIGHT, in	5.60	5.60	5.60
AT TEST	WATER CONTENT, %	46.7	49.6	50.4
	DRY DENSITY, pcf	67.4	65.4	64.9
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.019	1.081	1.098
	DIAMETER, in	2.86	2.87	2.87
	HEIGHT, in	5.58	5.59	5.59
BACK PRESSURE, ksf		4.75	5.33	4.90
CELL PRESSURE, ksf		6.75	6.34	5.40
FAILURE STRESS, ksf		3.31	2.35	0.91
PORE PRESSURE, ksf		5.13	5.50	4.90
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		4.94	3.16	1.41
$\bar{\sigma}_3$ FAILURE, ksf		1.63	0.84	0.5

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: UD

DESCRIPTION: Ash

LL= PL= PI=

SPECIFIC GRAVITY= 2.18

REMARKS: Tested by: [signature]

Reviewed by: CCG

FIG. NO.

CLIENT:

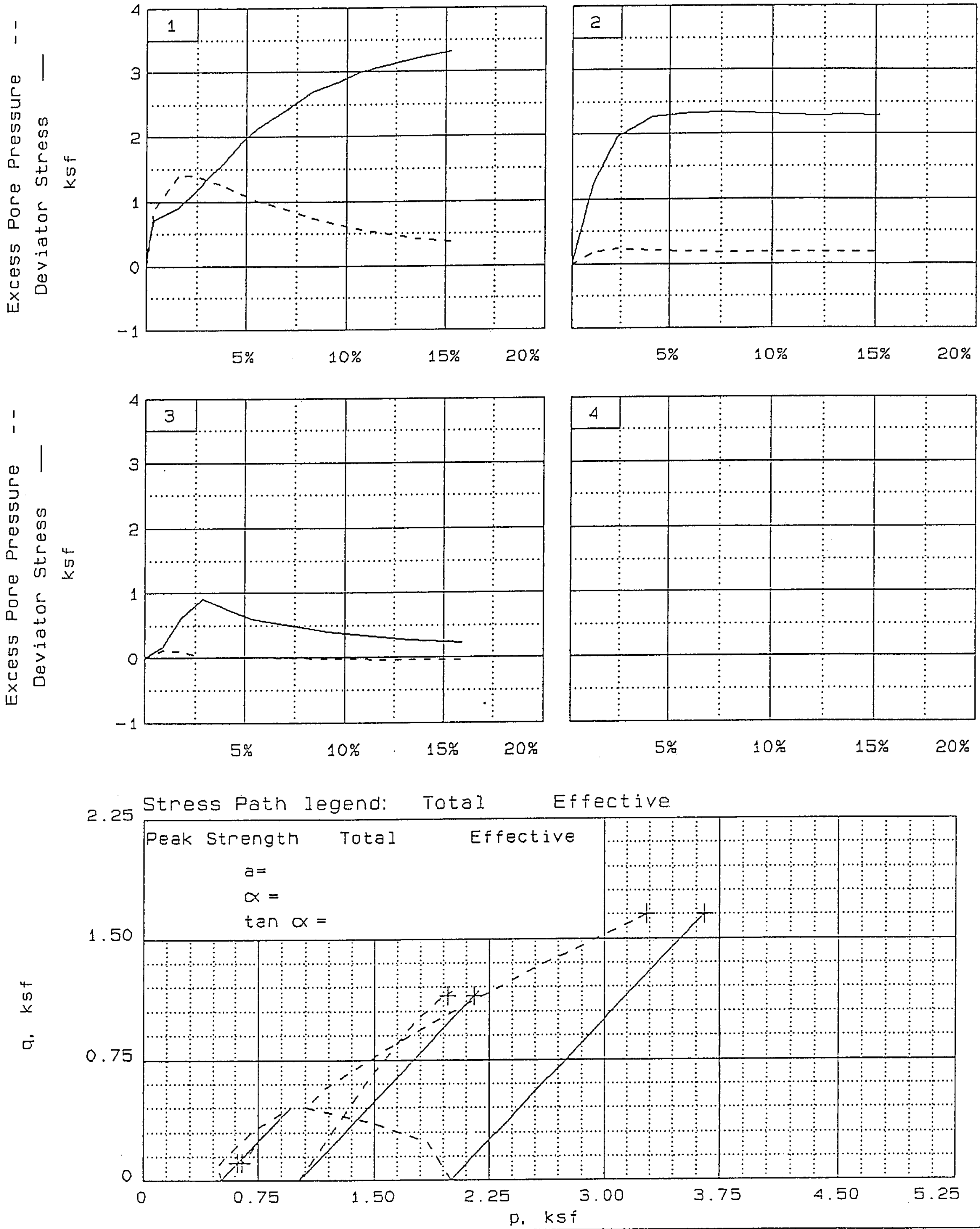
PROJECT: John Sevier Fossil Fuel

SAMPLE LOCATION: S4-2

PROJ. NO.: 5740144004 DATE: 09/26/94

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



Client:

Project: John Sevier Fossil Fuel

Location: 94-2

File: 5744004 Project No.: 5740144004 Page 2/2 Fig. No. ____

TRIAXIAL COMPRESSION TEST — 9-29-1994

CU with pore pressures — 2:18 pm

Project Data

Project No.: 5740144004   Date: 09/26/94   Data file: 5744004

Client:

Project: John Sevier Fossil Fuel

Sample location: 94-2

Sample description: Ash

Remarks: Tested by: CLC

Reviewed by: HD   Fig No.

Sample No. 2 Data

Type of sample: UD

Specific Gravity= 2.18   LL=   PL=   PI=

Sample Parameters	Before Test	At Testing	After Test
Diameter, in	2.87	2.87	
Height change, in		0.01	
Height, in	5.60	5.59	
Weight, grams	741.4		
Water volume change, cc		%-185.07	
Moisture, %	19.7	49.6	49.6
Dry density, pcf	65.1	65.4	
Saturation, %	39.4	100.0	
Void ratio	1.090	1.081	

Test Data

Deformation dial constant= 1 in per input unit

Primary load ring constant= 1 lbs. per input unit

Secondary load ring constant= 0 lbs. per input unit

Crossover reading for secondary load ring= 0 input units

Rate of strain= 0.100 % per minute

Consolidation cell pressure = 44 psi

Consolidation back pressure = 37 psi

Consolidation effective confining stress = 1.008 ksf

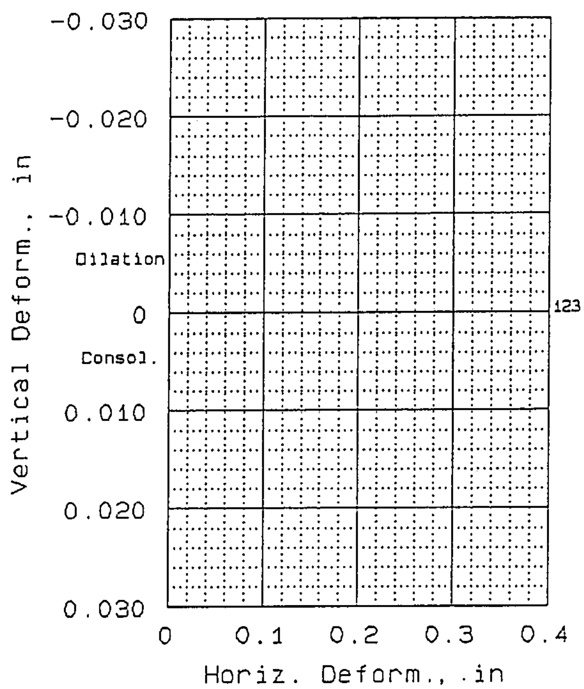
Peak deviator stress = 2.35 ksf at reading no. 5

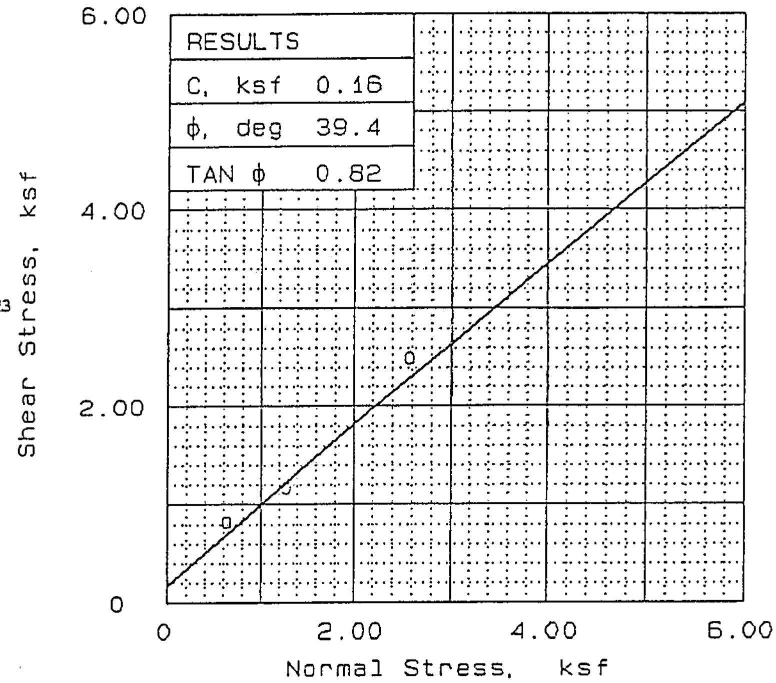
Ult. deviator stress =

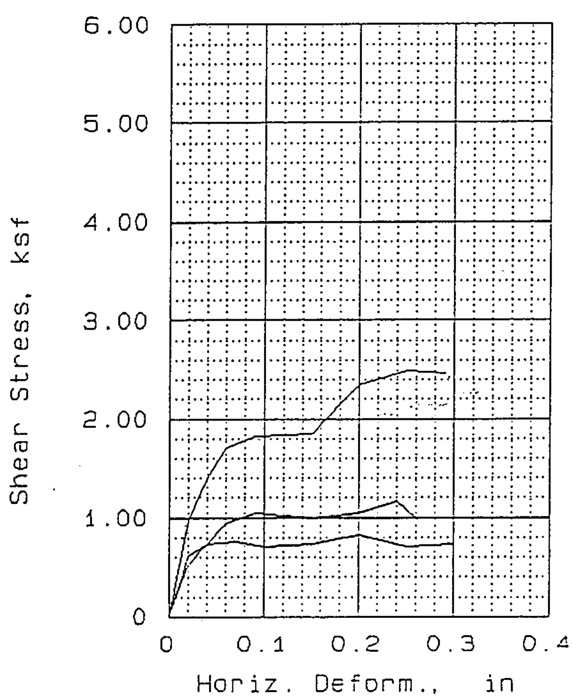
No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
0	0.0000	0.000	0.00	0.0	0.0	0.00	1.01	1.01	1.00	37.0	1.01	0.00
1	0.0600	0.060	56.00	56.0	1.1	1.24	0.84	2.07	2.48	38.2	1.45	0.62
2	0.1300	0.130	90.00	90.0	2.3	1.96	0.78	2.74	3.52	38.6	1.76	0.98
3	0.2300	0.230	106.00	106.0	4.1	2.27	0.81	3.07	3.81	38.4	1.94	1.13
	0.3400	0.340	111.00	111.0	6.1	2.33	0.82	3.15	3.83	38.3	1.98	1.16
	0.4300	0.430	114.00	114.0	7.7	2.35	0.84	3.18	3.81	38.2	2.01	1.17

LAW ENGINEERING, INC.

No.	Def. Dial Units	Def. in	Load Dial Units	Load lbs.	Strain %	Deviator Stress ksf	Effective Stresses Minor ksf	Major ksf	1:3 Ratio	Pore Pres. psi	P ksf	Q ksf
[illegible]	0.5400	0.540	115.00	115.0	9.7	2.32	0.84	3.15	3.78	38.2	1.99	1.16
7	0.6800	0.680	117.00	117.0	12.2	2.29	0.84	3.13	3.75	38.2	1.98	1.15
8	0.7600	0.760	119.00	119.0	13.6	2.29	0.84	3.13	3.75	38.2	1.98	1.15
9	0.8500	0.850	121.00	121.0	15.2	2.29	0.84	3.12	3.74	38.2	1.98	1.14







	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	31.3	31.4	32.4
	DRY DENSITY, pcf	86.2	84.1	84.3
	SATURATION, %	117.9	110.7	115.0
	VOID RATIO	0.578	0.618	0.614
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.81	0.81	0.81
AT TEST	WATER CONTENT, %	31.9	31.4	32.4
	DRY DENSITY, pcf	86.2	84.1	84.3
	SATURATION, %	120.1	110.7	115.0
	VOID RATIO	0.578	0.618	0.614
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.81	0.81	0.81
	NORMAL STRESS, ksf	2.60	1.30	0.65
	MAX. SHEAR, ksf	2.49	1.17	0.82
	STRAIN RATE, %/min.	2.400	2.400	2.400
	ULT. SHEAR, ksf			

SAMPLE DATA

SAMPLE TYPE: Remolded

DESCRIPTION: Ash

LL= PL= PI=

SPECIFIC GRAVITY= 2.18

REMARKS: Tested by: [signature]

Reviewed by: [signature]

FIG. NO.

CLIENT:

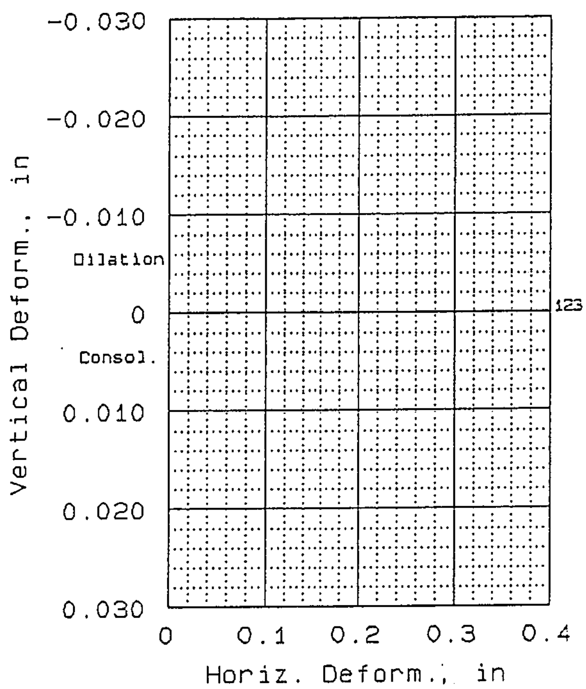
PROJECT: John Sevier Fossil Fuel

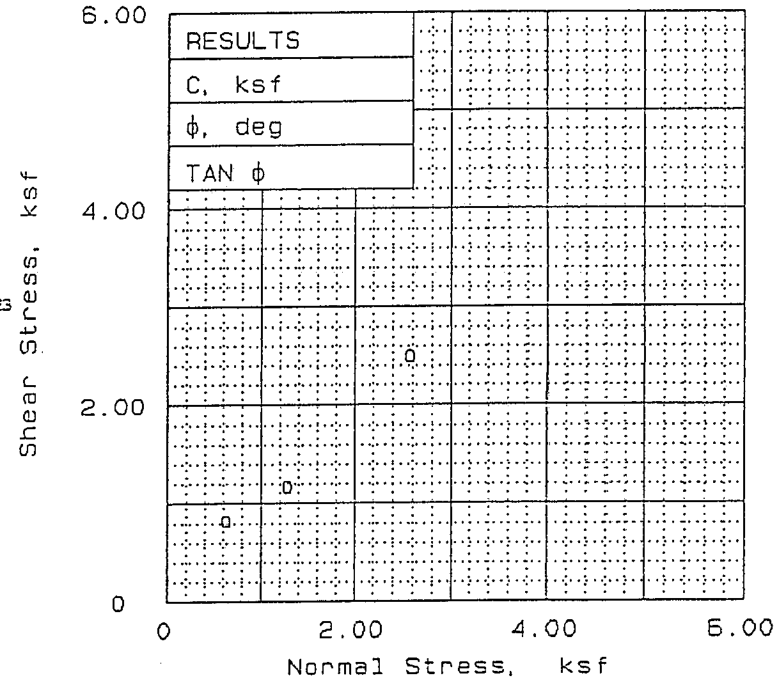
SAMPLE LOCATION: Ash

PROJ. NO.: 5740144004 DATE: 09/26/94

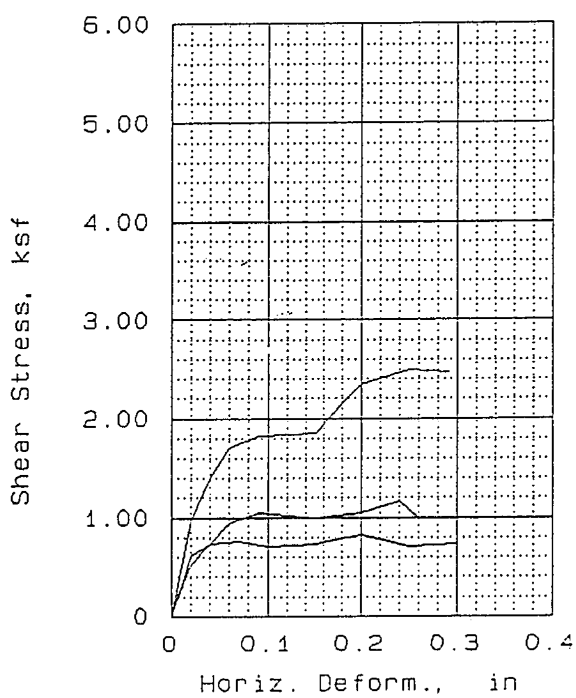
DIRECT SHEAR TEST

LAW ENGINEERING, INC.





RESULTS	
C, ksf	
ϕ, deg	
TAN ϕ	



	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	31.3	31.4	32.4
	DRY DENSITY, pcf	86.2	84.1	84.3
	SATURATION, %	117.9	110.7	115.0
	VOID RATIO	0.578	0.618	0.614
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.81	0.81	0.81
AT TEST	WATER CONTENT, %	31.9	31.4	32.4
	DRY DENSITY, pcf	86.2	84.1	84.3
	SATURATION, %	120.1	110.7	115.0
	VOID RATIO	0.578	0.618	0.614
	DIAMETER, in	2.50	2.50	2.50
	HEIGHT, in	0.81	0.81	0.81
	NORMAL STRESS, ksf	2.60	1.30	0.65
	MAX. SHEAR, ksf	2.49	1.17	0.82
	STRAIN RATE, %/min.	2.400	2.400	2.400
	ULT. SHEAR, ksf			

SAMPLE DATA

SAMPLE TYPE: Remolded

DESCRIPTION: Ash

LL= PL= PI=

SPECIFIC GRAVITY= 2.18

REMARKS: Tested by:

Reviewed by:

FIG. NO.

CLIENT:

PROJECT: John Savier Fossil Fuel

SAMPLE LOCATION: Ash

PROJ. NO.: 5740144004 DATE: 09/26/94

DIRECT SHEAR TEST

LAW ENGINEERING, INC.

DIRECT SHEAR TEST 9-27-1994

Project Data

Project No.: 5740144004 Date: 09/26/94 Data file: 4004
Client:
Project: John Sevier Fossil Fuel
Sample location: Ash
Sample description: Ash
Remarks: Tested by:
Reviewed by: [signature] Fig No.

Sample No. 1 Data

Type of sample: Remolded
Specific Gravity= 2.18 LL= PL= PI=

Sample Parameters	Before Test	At Testing
Diameter, in	2.50	
Height, in	0.81	0.81
Weight, grams	118.1	
Moisture, %	31.3	31.9
Dry density, pcf	86.2	
Saturation, %	117.9	
Void ratio	0.578	

Test Data

Deformation dial constant= 1 in per input unit
Primary load ring constant= 1 lbs. per input unit
Secondary load ring constant= 0 lbs. per input unit
Crossover reading for secondary load ring= 0 input units
Rate of strain= 2.400 % per minute
Normal Stress= 2.6 ksf

No.	HORIZONTAL Dial Reading	HORIZONTAL Def. in	Load Dial Units	Load lbs.	Shear Stress ksf	VERTICAL Dial Reading	VERTICAL Def. in
0	0.0000	0.000	0.00	0.0	0.00	0.0000	0.0000
1	0.0200	0.020	33.00	33.0	0.97	0.0000	0.0000
2	0.0400	0.040	48.00	48.0	1.41	0.0000	0.0000
3	0.0600	0.060	58.00	58.0	1.70	0.0000	0.0000
4	0.0900	0.090	62.00	62.0	1.82	0.0000	0.0000
5	0.1500	0.150	63.00	63.0	1.85	0.0000	0.0000
6	0.2000	0.200	80.00	80.0	2.35	0.0000	0.0000
7	0.2500	0.250	85.00	85.0	2.49	0.0000	0.0000
8	0.2900	0.290	84.00	84.0	2.46	0.0000	0.0000

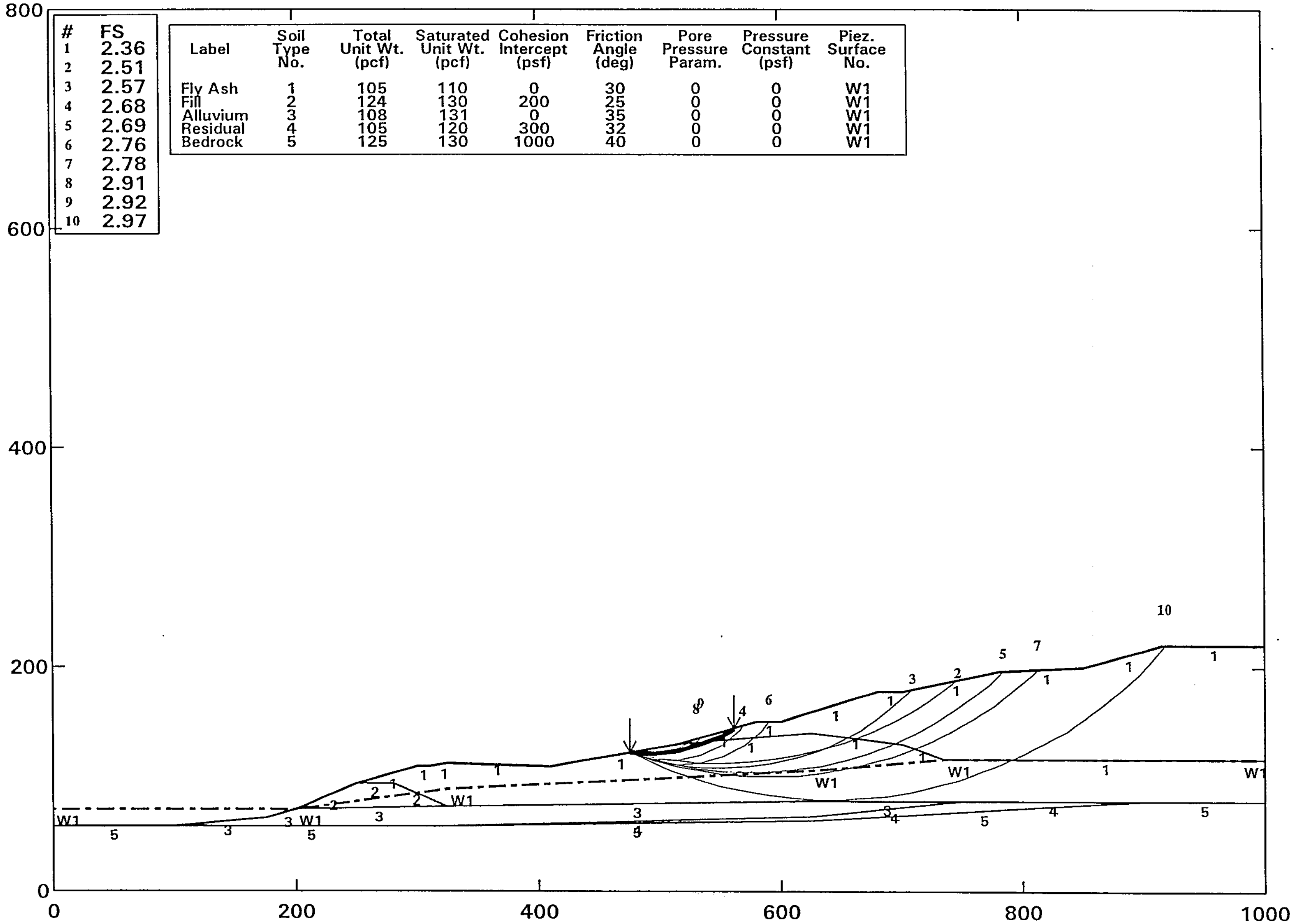
APPENDIX D

TVA - JOHN SEVIER (Proposed East) (File Sevier.PE)

Ten Most Critical. C:SEVIER.PLT By: DAN GROGAN 09-29-94 5:12pm

#	FS
1	2.36
2	2.51
3	2.57
4	2.68
5	2.69
6	2.76
7	2.78
8	2.91
9	2.92
10	2.97

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Fly Ash	1	105	110	0	30	0	0	W1
Fill	2	124	130	200	25	0	0	W1
Alluvium	3	108	131	0	35	0	0	W1
Residual	4	105	120	300	32	0	0	W1
Bedrock	5	125	130	1000	40	0	0	W1



PCSTABL5M FSmin = 2.36 X-Axis (ft)

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date:	09-29-94
Time of Run:	5:12pm
Run By:	DAN GROGAN
Input Data Filename:	C:SEVIER.PE
Output Filename:	C:SEVIER.OUT
Plotted Output Filename:	C:SEVIER.PLT

PROBLEM DESCRIPTION TVA - JOHN SEVIER (Proposed East)
(File Sevier.PE)

BOUNDARY COORDINATES

17 Top Boundaries
33 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	58.00	100.00	58.00	5
2	100.00	58.00	175.00	65.00	3
3	175.00	65.00	200.00	73.00	3
4	200.00	73.00	250.00	95.00	2
5	250.00	95.00	300.00	110.00	1
6	300.00	110.00	310.00	110.00	1
7	310.00	110.00	325.00	112.00	1
8	325.00	112.00	410.00	110.00	1
9	410.00	110.00	515.00	130.00	1
10	515.00	130.00	580.00	150.00	1
11	580.00	150.00	600.00	150.00	1
12	600.00	150.00	680.00	178.00	1
13	680.00	178.00	700.00	178.00	1
14	700.00	178.00	780.00	196.00	1
15	780.00	196.00	850.00	200.00	1
16	850.00	200.00	915.00	220.00	1
17	915.00	220.00	1000.00	220.00	1
18	515.00	130.00	625.00	140.00	1
19	625.00	140.00	700.00	130.00	1
20	700.00	130.00	735.00	116.00	1
21	735.00	116.00	1000.00	116.00	1
22	250.00	95.00	280.00	95.00	2

23	280.00	95.00	325.00	75.00	2
24	200.00	73.00	325.00	75.00	3
25	325.00	75.00	625.00	80.00	3
26	625.00	80.00	750.00	80.00	3
27	750.00	80.00	900.00	80.00	4
28	900.00	80.00	1000.00	80.00	5
29	100.00	58.00	325.00	58.00	5
30	325.00	58.00	625.00	66.00	4
31	625.00	66.00	750.00	80.00	4
32	325.00	58.00	625.00	63.00	5
33	625.00	63.00	900.00	80.00	5

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	.0	30.0	.00	.0	1
2	124.0	130.0	200.0	25.0	.00	.0	1
3	108.0	131.0	.0	35.0	.00	.0	1
4	105.0	120.0	300.0	32.0	.00	.0	1
5	125.0	130.0	1000.0	40.0	.00	.0	1

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 6 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	73.00
2	200.00	73.00
3	325.00	90.00
4	625.00	106.00
5	735.00	116.00
6	1000.00	116.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

50 Surfaces Initiate From Each Of 2 Points Equally Spaced
Along The Ground Surface Between X = 100.00 ft.
and X = 475.00 ft.

Each Surface Terminates Between X = 475.00 ft.
and X = 950.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	494.99	121.70
3	514.84	124.15
4	534.07	129.66
5	552.20	138.10
6	561.37	144.27

Circle Center At X = 489.4 ; Y = 246.8 and Radius, 125.3

*** 2.358 ***

Individual data on the 7 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)

1	20.0	4705.1	.0	.0	.0	.0	.0	.0	.0
2	19.8	10735.6	.0	.0	.0	.0	.0	.0	.0
3	.2	98.3	.0	.0	.0	.0	.0	.0	.0
4	19.1	12019.1	.0	.0	.0	.0	.0	.0	.0
5	5.5	3352.9	.0	.0	.0	.0	.0	.0	.0
6	12.6	5740.7	.0	.0	.0	.0	.0	.0	.0
7	9.2	1612.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	494.49	117.88
3	514.24	114.73
4	534.16	112.94
5	554.15	112.51
6	574.13	113.45
7	594.00	115.76
8	613.66	119.42
9	633.02	124.42
10	652.00	130.73
11	670.50	138.33
12	688.44	147.17
13	705.73	157.22
14	722.30	168.43
15	738.05	180.75
16	746.68	188.50

Circle Center At X = 550.4 ; Y = 403.9 and Radius, 291.4

*** 2.513 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.98	116.08
3	513.48	111.61
4	533.31	109.02
5	553.30	108.32
6	573.26	109.52
7	593.02	112.61
8	612.40	117.56
9	631.22	124.33
10	649.31	132.85
11	666.51	143.06
12	682.66	154.85

Circle Center At X = 574.3 ; Y = 389.4 and Radius, 284.9

*** 2.688 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.41	114.58
3	513.13	111.19
4	533.09	112.42
5	552.24	118.18
6	569.57	128.17
7	584.14	141.87
8	589.53	150.00

Circle Center At X = 517.7 ; Y = 196.8 and Radius, 85.8

*** 2.756 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.81	115.60
3	513.03	110.05
4	532.57	105.77
5	552.34	102.76
6	572.26	101.04
7	592.26	100.63
8	612.24	101.51
9	632.12	103.69
10	651.82	107.16
11	671.25	111.91
12	690.33	117.90
13	708.98	125.12
14	727.12	133.54
15	744.67	143.13
16	761.57	153.83
17	777.73	165.61
18	793.10	178.41
19	807.60	192.19

20	812.86	197.88

Circle Center At X = 588.6 ; Y = 407.7 and Radius, 307.1

*** 2.782 ***

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	495.00	122.15
3	514.48	126.68
4	530.44	134.75

Circle Center At X = 485.9 ; Y = 203.8 and Radius, 82.2

*** 2.906 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	494.89	120.25
3	514.49	124.19
4	532.00	133.86
5	533.86	135.80

Circle Center At X = 491.9 ; Y = 185.9 and Radius, 65.7

*** 2.923 ***

Failure Surface Specified By 26 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	492.87	113.40

3	511.23	105.47
4	530.02	98.61
5	549.17	92.84
6	568.62	88.19
7	588.31	84.67
8	608.16	82.28
9	628.13	81.05
10	648.13	80.96
11	668.10	82.03
12	687.97	84.25
13	707.69	87.61
14	727.18	92.10
15	746.38	97.71
16	765.22	104.42
17	783.64	112.20
18	801.59	121.02
19	819.00	130.87
20	835.81	141.71
21	851.97	153.49
22	867.42	166.19
23	882.11	179.76
24	896.00	194.15
25	909.04	209.32
26	917.20	220.00

Circle Center At X = 639.5 ; Y = 427.5 and Radius, 346.6

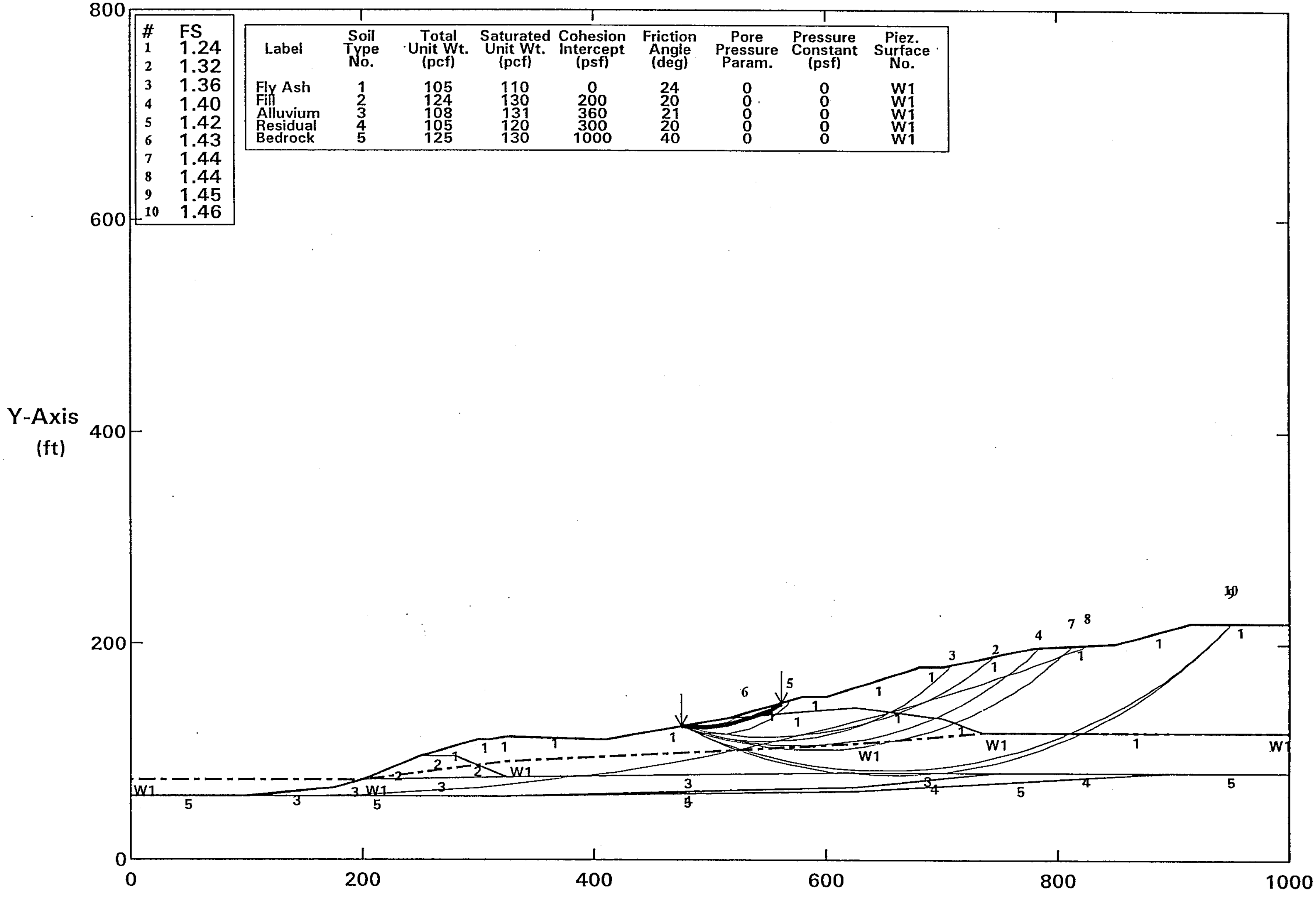
*** 2.974 ***

TVA - JOHN SEVIER (Proposed East) (File Sevier.PEE-EQ)

Ten Most Critical. C:SEVIER.PLT By: DAN GROGAN 09-29-94 5:18pm

#	FS
1	1.24
2	1.32
3	1.36
4	1.40
5	1.42
6	1.43
7	1.44
8	1.44
9	1.45
10	1.46

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Fly Ash	1	105	110	0	24	0	0	W1
Fill	2	124	130	200	20	0	0	W1
Alluvium	3	108	131	360	21	0	0	W1
Residual	4	105	120	300	20	0	0	W1
Bedrock	5	125	130	1000	40	0	0	W1



PCSTABL5M FSmin = 1.24 X-Axis (ft)

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 09-29-94
Time of Run: 5:18pm
Run By: DAN GROGAN
Input Data Filename: C:SEVIER.PEE
Output Filename: C:SEVIER.OUT
Plotted Output Filename: C:SEVIER.PLT

PROBLEM DESCRIPTION TVA - JOHN SEVIER (Proposed East)
(File Sevier.PEE-EQ)

BOUNDARY COORDINATES

17 Top Boundaries
33 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	58.00	100.00	58.00	5
2	100.00	58.00	175.00	65.00	3
3	175.00	65.00	200.00	73.00	3
4	200.00	73.00	250.00	95.00	2
5	250.00	95.00	300.00	110.00	1
6	300.00	110.00	310.00	110.00	1
7	310.00	110.00	325.00	112.00	1
8	325.00	112.00	410.00	110.00	1
9	410.00	110.00	515.00	130.00	1
10	515.00	130.00	580.00	150.00	1
11	580.00	150.00	600.00	150.00	1
12	600.00	150.00	680.00	178.00	1
13	680.00	178.00	700.00	178.00	1
14	700.00	178.00	780.00	196.00	1
15	780.00	196.00	850.00	200.00	1
16	850.00	200.00	915.00	220.00	1
17	915.00	220.00	1000.00	220.00	1
18	515.00	130.00	625.00	140.00	1
19	625.00	140.00	700.00	130.00	1
20	700.00	130.00	735.00	116.00	1
21	735.00	116.00	1000.00	116.00	1
22	250.00	95.00	280.00	95.00	2

23	280.00	95.00	325.00	75.00	2
24	200.00	73.00	325.00	75.00	3
25	325.00	75.00	625.00	80.00	3
26	625.00	80.00	750.00	80.00	3
27	750.00	80.00	900.00	80.00	4
28	900.00	80.00	1000.00	80.00	5
29	100.00	58.00	325.00	58.00	5
30	325.00	58.00	625.00	66.00	4
31	625.00	66.00	750.00	80.00	4
32	325.00	58.00	625.00	63.00	5
33	625.00	63.00	900.00	80.00	5

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	.0	24.0	.00	.0	1
2	124.0	130.0	200.0	20.0	.00	.0	1
3	108.0	131.0	360.0	21.0	.00	.0	1
4	105.0	120.0	300.0	20.0	.00	.0	1
5	125.0	130.0	1000.0	40.0	.00	.0	1

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 6 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	73.00
2	200.00	73.00
3	325.00	90.00
4	625.00	106.00
5	735.00	116.00
6	1000.00	116.00

A Horizontal Earthquake Loading Coefficient
Of .100 Has Been Assigned

A Vertical Earthquake Loading Coefficient

Of .100 Has Been Assigned

Cavitation Pressure = .0 psf

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

50 Surfaces Initiate From Each Of 2 Points Equally Spaced Along The Ground Surface Between X = 100.00 ft. and X = 475.00 ft.

Each Surface Terminates Between X = 475.00 ft. and X = 950.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	494.99	121.70
3	514.84	124.15
4	534.07	129.66
5	552.20	138.10
6	561.37	144.27

Circle Center At X = 489.4 ; Y = 246.8 and Radius, 125.3

*** 1.237 ***

Individual data on the 7 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	20.0	4705.1	.0	.0	.0	.0	470.5	470.5	.0
2	19.8	10735.6	.0	.0	.0	.0	1073.6	1073.6	.0
3	.2	98.3	.0	.0	.0	.0	9.8	9.8	.0
4	19.1	12019.1	.0	.0	.0	.0	1201.9	1201.9	.0
5	5.5	3352.9	.0	.0	.0	.0	335.3	335.3	.0
6	12.6	5740.7	.0	.0	.0	.0	574.1	574.1	.0
7	9.2	1612.3	.0	.0	.0	.0	161.2	161.2	.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	494.49	117.88
3	514.24	114.73
4	534.16	112.94
5	554.15	112.51
6	574.13	113.45
7	594.00	115.76
8	613.66	119.42
9	633.02	124.42
10	652.00	130.73
11	670.50	138.33
12	688.44	147.17
13	705.73	157.22
14	722.30	168.43
15	738.05	180.75
16	746.68	188.50

Circle Center At X = 550.4 ; Y = 403.9 and Radius, 291.4

*** 1.319 ***

Failure Surface Specified By 14 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.98	116.08

3	513.48	111.61
4	533.31	109.02
5	553.30	108.32
6	573.26	109.52
7	593.02	112.61
8	612.40	117.56
9	631.22	124.33
10	649.31	132.85
11	666.51	143.06
12	682.66	154.85
13	697.62	168.13
14	708.62	179.94

Circle Center At X = 550.6 ; Y = 318.3 and Radius, 210.0

*** 1.362 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.98	116.08
3	513.36	111.12
4	533.03	107.53
5	552.91	105.33
6	572.89	104.53
7	592.88	105.13
8	612.78	107.13
9	632.50	110.52
10	651.92	115.28
11	670.96	121.39
12	689.53	128.83
13	707.53	137.54
14	724.88	147.50
15	741.48	158.65
16	757.26	170.93
17	772.15	184.29
18	783.69	196.21

Circle Center At X = 574.3 ; Y = 389.4 and Radius, 284.9

*** 1.404 ***

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	494.04	116.27
3	514.02	115.29
4	533.57	119.51
5	551.36	128.65
6	566.18	142.08
7	569.13	146.65

Circle Center At X = 507.7 ; Y = 191.7 and Radius, 76.6

*** 1.420 ***

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	495.00	122.15
3	514.48	126.68
4	530.44	134.75

Circle Center At X = 485.9 ; Y = 203.8 and Radius, 82.2

*** 1.430 ***

Failure Surface Specified By 20 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.81	115.60
3	513.03	110.05
4	532.57	105.77
5	552.34	102.76
6	572.26	101.04
7	592.26	100.63
8	612.24	101.51
9	632.12	103.69
10	651.82	107.16
11	671.25	111.91
12	690.33	117.90
13	708.98	125.12

14	727.12	133.54
15	744.67	143.13
16	761.57	153.83
17	777.73	165.61
18	793.10	178.41
19	807.60	192.19
20	812.86	197.88

Circle Center At X = 588.6 ; Y = 407.7 and Radius, 307.1

*** 1.436 ***

Failure Surface Specified By 39 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.00	58.00
2	120.00	57.71
3	140.00	57.66
4	160.00	57.82
5	179.99	58.22
6	199.98	58.84
7	219.97	59.69
8	239.94	60.76
9	259.89	62.06
10	279.84	63.59
11	299.76	65.34
12	319.66	67.32
13	339.54	69.53
14	359.39	71.96
15	379.21	74.61
16	399.01	77.49
17	418.76	80.59
18	438.49	83.92
19	458.17	87.47
20	477.81	91.24
21	497.41	95.23
22	516.96	99.45
23	536.46	103.89
24	555.91	108.55
25	575.30	113.43
26	594.64	118.52
27	613.92	123.84
28	633.14	129.38
29	652.30	135.13
30	671.38	141.10
31	690.40	147.28
32	709.35	153.69
33	728.23	160.30
34	747.02	167.13
35	765.74	174.17
36	784.38	181.42

37	802.94	188.89
38	821.41	196.56
39	826.26	198.64

Circle Center At X = 135.2 ; Y = 1822.2 and Radius, 1764.5

*** 1.441 ***

Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	492.87	113.40
3	511.19	105.37
4	529.91	98.33
5	548.97	92.28
6	568.33	87.25
7	587.92	83.25
8	607.70	80.29
9	627.61	78.38
10	647.59	77.52
11	667.59	77.72
12	687.55	78.98
13	707.42	81.29
14	727.14	84.65
15	746.65	89.04
16	765.90	94.46
17	784.84	100.89
18	803.41	108.31
19	821.56	116.70
20	839.25	126.04
21	856.42	136.30
22	873.02	147.46
23	889.01	159.47
24	904.34	172.32
25	918.97	185.95
26	932.86	200.34
27	945.97	215.44
28	949.52	220.00

Circle Center At X = 653.8 ; Y = 455.6 and Radius, 378.1

*** 1.450 ***

Failure Surface Specified By 28 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	475.00	122.38
2	493.18	114.05
3	511.77	106.65
4	530.69	100.20
5	549.93	94.71
6	569.41	90.19
7	589.10	86.66
8	608.93	84.13
9	628.88	82.60
10	648.87	82.07
11	668.86	82.56
12	688.81	84.05
13	708.65	86.55
14	728.34	90.04
15	747.84	94.52
16	767.08	99.97
17	786.02	106.39
18	804.61	113.75
19	822.81	122.05
20	840.57	131.25
21	857.85	141.33
22	874.59	152.27
23	890.76	164.04
24	906.32	176.60
25	921.22	189.94
26	935.43	204.01
27	948.92	218.78
28	949.93	220.00

Circle Center At X = 649.2 ; Y = 478.8 and Radius, 396.7

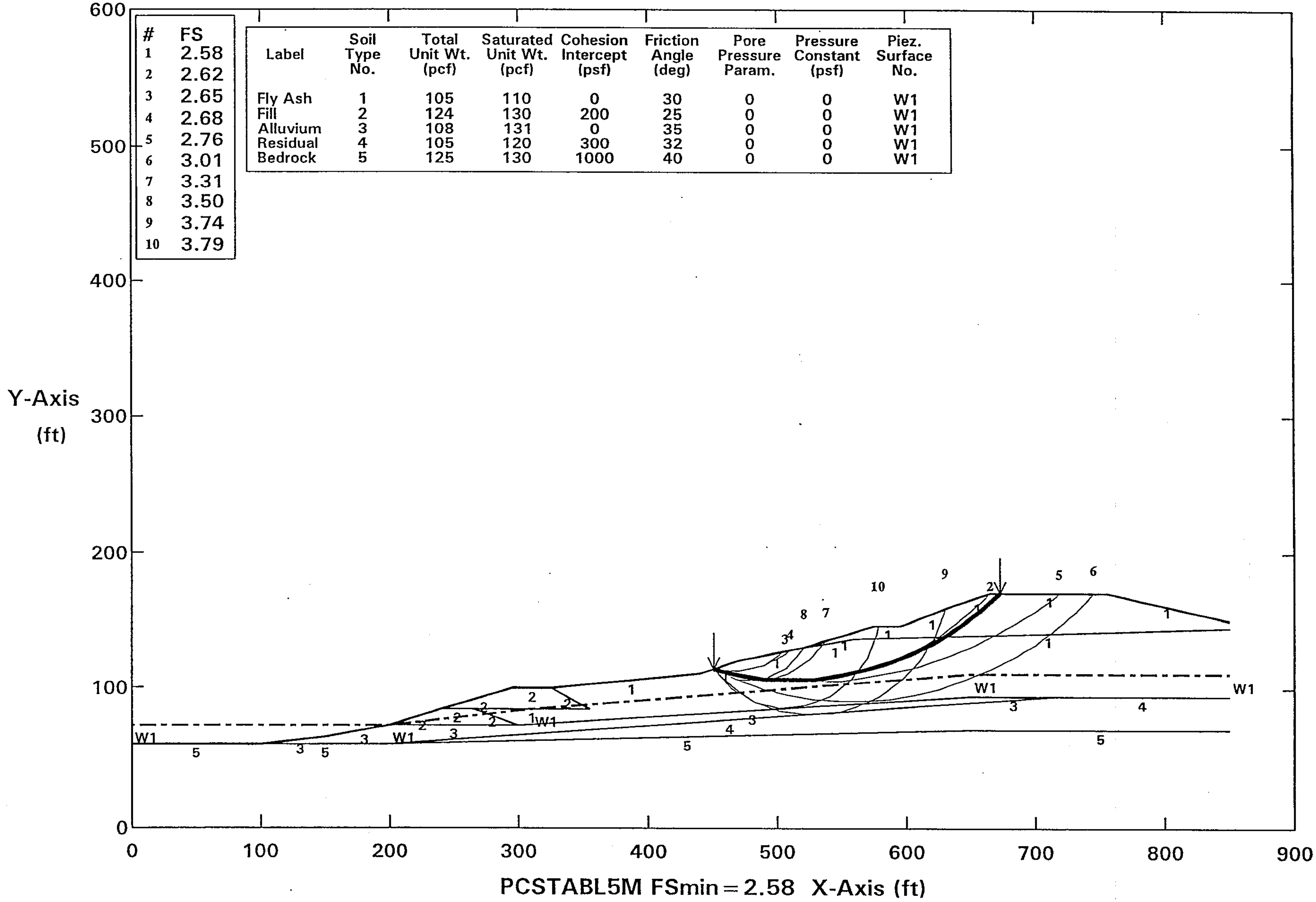
*** 1.455 ***

TVA - JOHN SEVIER (Proposed West) (File Sevier.PW)

Ten Most Critical. C:SEVIER.PLT By: DAN GROGAN 09-29-94 5:01pm

#	FS
1	2.58
2	2.62
3	2.65
4	2.68
5	2.76
6	3.01
7	3.31
8	3.50
9	3.74
10	3.79

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Fly Ash	1	105	110	0	30	0	0	W1
Fill	2	124	130	200	25	0	0	W1
Alluvium	3	108	131	0	35	0	0	W1
Residual	4	105	120	300	32	0	0	W1
Bedrock	5	125	130	1000	40	0	0	W1



** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 09-29-94
Time of Run: 5:01pm
Run By: DAN GROGAN
Input Data Filename: C:SEVIER.PW
Output Filename: C:SEVIER.OUT
Plotted Output Filename: C:SEVIER.PLT

PROBLEM DESCRIPTION TVA - JOHN SEVIER (Proposed West)
(File Sevier.PW)

BOUNDARY COORDINATES

15 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	60.00	100.00	60.00	5
2	100.00	60.00	150.00	65.00	3
3	150.00	65.00	200.00	73.00	3
4	200.00	73.00	240.00	85.00	2
5	240.00	85.00	295.00	100.00	2
6	295.00	100.00	325.00	100.00	2
7	325.00	100.00	440.00	110.00	1
8	440.00	110.00	470.00	120.00	1
9	470.00	120.00	520.00	130.00	1
10	520.00	130.00	575.00	146.00	1
11	575.00	146.00	595.00	146.00	1
12	595.00	146.00	635.00	160.00	1
13	635.00	160.00	665.00	170.00	1
14	665.00	170.00	755.00	170.00	1
15	755.00	170.00	850.00	150.00	1
16	520.00	130.00	560.00	136.00	1
17	560.00	136.00	850.00	145.00	1
18	325.00	100.00	355.00	85.00	2
19	240.00	85.00	265.00	85.00	2
20	265.00	85.00	355.00	85.00	1
21	265.00	85.00	300.00	73.00	2
22	200.00	73.00	300.00	73.00	3

23	300.00	73.00	650.00	95.00	3
24	650.00	95.00	715.00	95.00	3
25	715.00	95.00	850.00	95.00	4
26	100.00	60.00	200.00	60.00	5
27	200.00	60.00	715.00	95.00	4
28	200.00	60.00	650.00	70.00	5
29	650.00	70.00	850.00	70.00	5

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	.0	30.0	.00	.0	1
2	124.0	130.0	200.0	25.0	.00	.0	1
3	108.0	131.0	.0	35.0	.00	.0	1
4	105.0	120.0	300.0	32.0	.00	.0	1
5	125.0	130.0	1000.0	40.0	.00	.0	1

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1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	73.00
2	200.00	73.00
3	310.00	85.00
4	650.00	110.00
5	850.00	110.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

40 Trial Surfaces Have Been Generated.

20 Surfaces Initiate From Each Of 2 Points Equally Spaced Along The Ground Surface Between X = 100.00 ft.

and X = 450.00 ft.

Each Surface Terminates Between X = 450.00 ft.
and X = 750.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.56	109.15
3	489.40	106.62
4	509.38	105.76
5	529.36	106.58
6	549.21	109.06
7	568.77	113.20
8	587.93	118.96
9	606.53	126.31
10	624.45	135.18
11	641.57	145.53
12	657.76	157.27
13	672.52	170.00

Circle Center At X = 509.6 ; Y = 344.4 and Radius, 238.7

*** 2.581 ***

Individual data on the 20 slices

Water Force	Water Force	Tie Force	Tie Force	Earthquake Force	Surcharge

Slice No.	Width Ft(m)	Weight Lbs(kg)	Top Lbs(kg)	Bot Lbs(kg)	Norm Lbs(kg)	Tan Lbs(kg)	Hor Lbs(kg)	Ver Lbs(kg)	Load Lbs(kg)
1	19.6	10988.5	.0	.0	.0	.0	.0	.0	.0
2	.4	501.1	.0	.0	.0	.0	.0	.0	.0
3	19.4	28681.9	.0	.0	.0	.0	.0	.0	.0
4	20.0	41305.6	.0	.0	.0	.0	.0	.0	.0
5	10.6	25606.8	.0	.0	.0	.0	.0	.0	.0
6	9.4	24554.3	.0	.0	.0	.0	.0	.0	.0
7	19.8	57911.3	.0	.0	.0	.0	.0	.0	.0
8	10.8	33843.4	.0	.0	.0	.0	.0	.0	.0
9	8.8	28230.8	.0	.0	.0	.0	.0	.0	.0
10	6.2	20237.1	.0	.0	.0	.0	.0	.0	.0
11	12.9	39338.8	.0	.0	.0	.0	.0	.0	.0
12	7.1	19045.0	.0	.0	.0	.0	.0	.0	.0
13	11.5	29037.4	.0	.0	.0	.0	.0	.0	.0
14	17.9	42202.8	.0	.0	.0	.0	.0	.0	.0
15	4.9	10573.2	.0	.0	.0	.0	.0	.0	.0
16	5.6	11338.7	.0	.0	.0	.0	.0	.0	.0
17	6.6	12100.8	.0	.0	.0	.0	.0	.0	.0
18	16.2	22925.2	.0	.0	.0	.0	.0	.0	.0
19	7.2	6387.8	.0	.0	.0	.0	.0	.0	.0
20	7.5	2561.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.52	108.95
3	489.34	106.35
4	509.33	105.53
5	529.30	106.51
6	549.11	109.28
7	568.59	113.81
8	587.58	120.08
9	605.94	128.03
10	623.50	137.59
11	640.14	148.69
12	655.71	161.24
13	664.65	169.88

Circle Center At X = 508.4 ; Y = 328.0 and Radius, 222.5

*** 2.624 ***

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	450.00	113.33
2	469.98	112.53
3	489.38	117.40
4	506.08	127.22

Circle Center At X = 462.8 ; Y = 182.0 and Radius, 69.9

*** 2.649 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.98	112.42
3	489.52	116.70
4	507.28	125.89
5	509.48	127.90

Circle Center At X = 463.5 ; Y = 188.8 and Radius, 76.6

*** 2.676 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.60	109.34
3	489.41	106.57
4	509.35	105.04
5	529.34	104.74
6	549.32	105.68
7	569.20	107.86
8	588.91	111.27
9	608.37	115.89
10	627.50	121.71
11	646.24	128.70
12	664.51	136.84
13	682.24	146.10
14	699.36	156.44
15	715.80	167.82
16	718.57	170.00

Circle Center At X = 524.1 ; Y = 426.8 and Radius, 322.1

*** 2.757 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	468.57	105.92
3	487.66	99.93
4	507.14	95.41
5	526.91	92.38
6	546.85	90.86
7	566.85	90.86
8	586.79	92.38
9	606.56	95.40
10	626.05	99.92
11	645.13	105.90
12	663.71	113.32
13	681.67	122.12
14	698.91	132.26
15	715.33	143.67
16	730.83	156.31
17	745.25	170.00

Circle Center At X = 556.9 ; Y = 354.0 and Radius, 263.4

*** 3.010 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	468.69	106.20
3	488.65	105.06
4	508.03	110.02
5	524.99	120.61
6	537.25	135.02

Circle Center At X = 482.3 ; Y = 169.8 and Radius, 65.0

*** 3.313 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	468.56	105.89
3	488.56	106.31
4	506.79	114.54
5	520.34	129.25
6	520.67	130.20

Circle Center At X = 477.5 ; Y = 154.8 and Radius, 49.7

*** 3.500 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	465.32	100.48
3	482.75	90.66
4	501.68	84.22
5	521.48	81.37
6	541.46	82.22
7	560.95	86.72
8	579.27	94.73
9	595.81	105.98
10	609.99	120.08
11	621.34	136.55
12	629.47	154.82
13	630.31	158.36

Circle Center At X = 526.9 ; Y = 189.5 and Radius, 108.2

*** 3.744 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

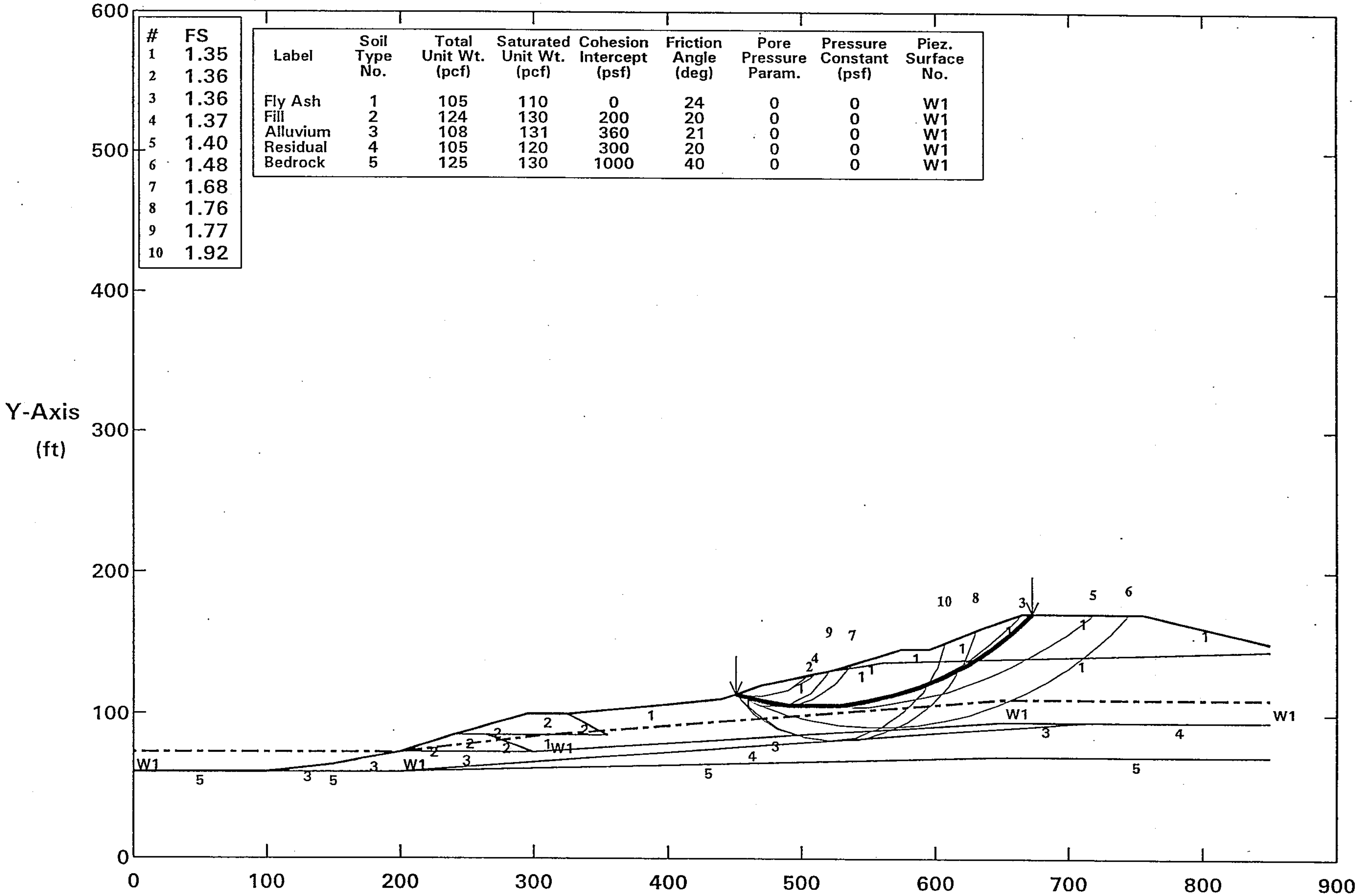
1	450.00	113.33
2	464.54	99.60
3	482.27	90.35
4	501.86	86.30
5	521.81	87.75
6	540.60	94.59
7	556.81	106.30
8	569.21	122.00
9	576.86	140.48
10	577.50	146.00

Circle Center At X = 506.4 ; Y = 158.2 and Radius, 72.1

*** 3.787 ***

TVA - JOHN SEVIER (Proposed West) (File Sevier.PWE-EQ)

Ten Most Critical. C:SEVIER.PLT By: DAN GROGAN 09-29-94 5:06pm



#	FS
1	1.35
2	1.36
3	1.36
4	1.37
5	1.40
6	1.48
7	1.68
8	1.76
9	1.77
10	1.92

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
Fly Ash	1	105	110	0	24	0	0	W1
Fill	2	124	130	200	20	0	0	W1
Alluvium	3	108	131	360	21	0	0	W1
Residual	4	105	120	300	20	0	0	W1
Bedrock	5	125	130	1000	40	0	0	W1

PCSTABL5M FSmin = 1.35 X-Axis (ft)

** PCSTABL5M **

by
Purdue University

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 09-29-94
Time of Run: 5:06pm
Run By: DAN GROGAN
Input Data Filename: C:SEVIER.PWE
Output Filename: C:SEVIER.OUT
Plotted Output Filename: C:SEVIER.PLT

PROBLEM DESCRIPTION TVA - JOHN SEVIER (Proposed West)
(File Sevier.PWE-EQ)

BOUNDARY COORDINATES

15 Top Boundaries
29 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	60.00	100.00	60.00	5
2	100.00	60.00	150.00	65.00	3
3	150.00	65.00	200.00	73.00	3
4	200.00	73.00	240.00	85.00	2
5	240.00	85.00	295.00	100.00	2
6	295.00	100.00	325.00	100.00	2
7	325.00	100.00	440.00	110.00	1
8	440.00	110.00	470.00	120.00	1
9	470.00	120.00	520.00	130.00	1
10	520.00	130.00	575.00	146.00	1
11	575.00	146.00	595.00	146.00	1
12	595.00	146.00	635.00	160.00	1
13	635.00	160.00	665.00	170.00	1
14	665.00	170.00	755.00	170.00	1
15	755.00	170.00	850.00	150.00	1
16	520.00	130.00	560.00	136.00	1
17	560.00	136.00	850.00	145.00	1
18	325.00	100.00	355.00	85.00	2
19	240.00	85.00	265.00	85.00	2
20	265.00	85.00	355.00	85.00	1
21	265.00	85.00	300.00	73.00	2
22	200.00	73.00	300.00	73.00	3

23	300.00	73.00	650.00	95.00	3
24	650.00	95.00	715.00	95.00	3
25	715.00	95.00	850.00	95.00	4
26	100.00	60.00	200.00	60.00	5
27	200.00	60.00	715.00	95.00	4
28	200.00	60.00	650.00	70.00	5
29	650.00	70.00	850.00	70.00	5

ISOTROPIC SOIL PARAMETERS

5 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	105.0	110.0	.0	24.0	.00	.0	1
2	124.0	130.0	200.0	20.0	.00	.0	1
3	108.0	131.0	360.0	21.0	.00	.0	1
4	105.0	120.0	300.0	20.0	.00	.0	1
5	125.0	130.0	1000.0	40.0	.00	.0	1

---

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	73.00
2	200.00	73.00
3	310.00	85.00
4	650.00	110.00
5	850.00	110.00

A Horizontal Earthquake Loading Coefficient
Of .100 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of .100 Has Been Assigned

Cavitation Pressure = .0 psf

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

40 Trial Surfaces Have Been Generated.

20 Surfaces Initiate From Each Of 2 Points Equally Spaced Along The Ground Surface Between X = 100.00 ft. and X = 450.00 ft.

Each Surface Terminates Between X = 450.00 ft. and X = 750.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.56	109.15
3	489.40	106.62
4	509.38	105.76
5	529.36	106.58
6	549.21	109.06
7	568.77	113.20
8	587.93	118.96
9	606.53	126.31
10	624.45	135.18
11	641.57	145.53
12	657.76	157.27
13	672.52	170.00

Circle Center At X = 509.6 ; Y = 344.4 and Radius, 238.7

*** 1.345 ***

Individual data on the 20 slices

Slice No.	Width Ft(m)	Weight Lbs(kg)	Water Force Top Lbs(kg)	Water Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Tie Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	19.6	10988.5	.0	.0	.0	.0	1098.9	1098.9	.0
2	.4	501.1	.0	.0	.0	.0	50.1	50.1	.0
3	19.4	28681.9	.0	.0	.0	.0	2868.2	2868.2	.0
4	20.0	41305.6	.0	.0	.0	.0	4130.6	4130.6	.0
5	10.6	25606.8	.0	.0	.0	.0	2560.7	2560.7	.0
6	9.4	24554.3	.0	.0	.0	.0	2455.4	2455.4	.0
7	19.8	57911.3	.0	.0	.0	.0	5791.1	5791.1	.0
8	10.8	33843.4	.0	.0	.0	.0	3384.3	3384.3	.0
9	8.8	28230.8	.0	.0	.0	.0	2823.1	2823.1	.0
10	6.2	20237.1	.0	.0	.0	.0	2023.7	2023.7	.0
11	12.9	39338.8	.0	.0	.0	.0	3933.9	3933.9	.0
12	7.1	19045.0	.0	.0	.0	.0	1904.5	1904.5	.0
13	11.5	29037.4	.0	.0	.0	.0	2903.7	2903.7	.0
14	17.9	42202.8	.0	.0	.0	.0	4220.3	4220.3	.0
15	4.9	10573.2	.0	.0	.0	.0	1057.3	1057.3	.0
16	5.6	11338.7	.0	.0	.0	.0	1133.9	1133.9	.0
17	6.6	12100.8	.0	.0	.0	.0	1210.1	1210.1	.0
18	16.2	22925.2	.0	.0	.0	.0	2292.5	2292.5	.0
19	7.2	6387.8	.0	.0	.0	.0	638.8	638.8	.0
20	7.5	2561.2	.0	.0	.0	.0	256.1	256.1	.0

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.98	112.53
3	489.38	117.40
4	506.08	127.22

Circle Center At X = 462.8 ; Y = 182.0 and Radius, 69.9

*** 1.358 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	450.00	113.33
2	469.52	108.95
3	489.34	106.35
4	509.33	105.53
5	529.30	106.51
6	549.11	109.28
7	568.59	113.81
8	587.58	120.08
9	605.94	128.03
10	623.50	137.59
11	640.14	148.69
12	655.71	161.24
13	664.65	169.88

Circle Center At X = 508.4 ; Y = 328.0 and Radius, 222.5

*** 1.363 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.98	112.42
3	489.52	116.70
4	507.28	125.89
5	509.48	127.90

Circle Center At X = 463.5 ; Y = 188.8 and Radius, 76.6

*** 1.366 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	469.60	109.34
3	489.41	106.57
4	509.35	105.04
5	529.34	104.74
6	549.32	105.68
7	569.20	107.86
8	588.91	111.27

9	608.37	115.89
10	627.50	121.71
11	646.24	128.70
12	664.51	136.84
13	682.24	146.10
14	699.36	156.44
15	715.80	167.82
16	718.57	170.00

Circle Center At X = 524.1 ; Y = 426.8 and Radius, 322.1

*** 1.402 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	468.57	105.92
3	487.66	99.93
4	507.14	95.41
5	526.91	92.38
6	546.85	90.86
7	566.85	90.86
8	586.79	92.38
9	606.56	95.40
10	626.05	99.92
11	645.13	105.90
12	663.71	113.32
13	681.67	122.12
14	698.91	132.26
15	715.33	143.67
16	730.83	156.31
17	745.25	170.00

Circle Center At X = 556.9 ; Y = 354.0 and Radius, 263.4

*** 1.478 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	468.69	106.20

3	488.65	105.06
4	508.03	110.02
5	524.99	120.61
6	537.25	135.02

Circle Center At X = 482.3 ; Y = 169.8 and Radius, 65.0

*** 1.678 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	465.32	100.48
3	482.75	90.66
4	501.68	84.22
5	521.48	81.37
6	541.46	82.22
7	560.95	86.72
8	579.27	94.73
9	595.81	105.98
10	609.99	120.08
11	621.34	136.55
12	629.47	154.82
13	630.31	158.36

Circle Center At X = 526.9 ; Y = 189.5 and Radius, 108.2

*** 1.756 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	468.56	105.89
3	488.56	106.31
4	506.79	114.54
5	520.34	129.25
6	520.67	130.20

Circle Center At X = 477.5 ; Y = 154.8 and Radius, 49.7

*** 1.768 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	450.00	113.33
2	464.65	99.72
3	481.92	89.63
4	500.98	83.55
5	520.90	81.78
6	540.73	84.39
7	559.51	91.26
8	576.34	102.07
9	590.41	116.28
10	601.03	133.22
11	607.05	150.22

Circle Center At X = 519.0 ; Y = 172.9 and Radius, 91.1

*** 1.917 ***

LAW

LAWGIBB Group Member

REPORT OF GEOTECHNICAL EXPLORATION

DIKE EXPLORATION AND TESTING PROGRAM
JOHN SEVIER FOSSIL PLANT
ROGERSVILLE, TENNESSEE

Prepared for:

TENNESSEE VALLEY AUTHORITY

Chattanooga, Tennessee

October 1, 1999

LAW
LAWGIBB Group Member

October 1, 1999

Mr. Ron Purkey
Tennessee Valley Authority
1101 Market Street, LP-2G
Chattanooga, Tennessee 37402

Subject: **Report of Geotechnical Exploration**
Dike Exploration and Testing Program
John Sevier Fossil Plant
Rogersville, Tennessee
LAW Project 50300-8-2075/0024/0800

Dear Mr. Purkey:

We at Law Engineering and Environmental Services, Inc., (LAW) are pleased to submit this Report of Geotechnical Exploration for dike exploration and testing program at TVA's John Sevier Fossil Plant. Our services, as authorized by Mr. Lynn Petty, were provided in general accordance with our proposal 50300-7-9000/9330/0001 dated July 26, 1999 and executed under Task Assignment Order LAW-024-1347559.

This report reviews the information provided to us, discusses the site and subsurface conditions, and presents our conclusions and recommendations. The Appendices contain the Field Exploratory Procedures, the Test Boring Records, and the Laboratory Test Results.

We will be pleased to discuss our recommendations with you and look forward to working with you and TVA on future projects.

Sincerely,

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

Mark S. Connell

Mark S. Connell, E.I.
Staff Professional

Carl D. Tockstein, P.E.
Principal Engineer

CARL D. TOCKSTEIN
REGISTERED ENGINEER
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REPORT OF GEOTECHNICAL EXPLORATION

DIKE EXPLORATION AND TESTING PROGRAM
JOHN SEVIER FOSSIL PLANT
ROGERSVILLE, TENNESSEE

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Knoxville, Tennessee

October 1, 1999

Project 50300-8-2075/0024/0800

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LIST OF FIGURES

EXECUTIVE SUMMARY

We were selected by the Tennessee Valley Authority to perform a subsurface exploration at the John Sevier fossil plant for a 4,500-foot section of the dike adjacent to the Holston River. The subject section of the dike is located between the Stilling Pond and the Discharge Canal just to the Northwest of the plant. The objectives of our exploration were to determine general subsurface conditions and obtain data for a comprehensive slope stability analysis.

The exploration consisted of drilling six test borings along the top of the dike and six test borings along the road at the base of the dike to rock/auger refusal. An additional test boring was performed along the top of the dike adjacent to the discharge canal to rock/auger refusal. Laboratory testing was conducted on selected samples to obtain data to determine the soil classification and soil strength parameters of the in-place soils.

1.0 INTRODUCTION

This report presents the findings of our subsurface exploration and laboratory testing recently performed for an approximately 4,500-foot section of dike at TVA's John Sevier fossil plant. The subject section of the dike is located adjacent to the Holston River between the Stilling Pond and the Discharge Canal just to the northwest of the plant. Our services were authorized by Mr. Lynn Petty of the Tennessee Valley Authority through Task Authorization Order LAW-024-1347559.

2.0 OBJECTIVES OF EXPLORATION

The objectives of our exploration were to determine general subsurface conditions and to obtain data for a comprehensive slope stability analysis to be performed by others. An assessment of site environmental conditions, or for the presence of pollutants in the soil, bedrock, surface water, or ground water of the site was not an objective of our exploration.

3.0 SCOPE OF EXPLORATION

The scope of services for this exploration has included a site reconnaissance, drilling six test borings along the top of the dike and six test borings along the road at the base of the dike. One additional boring was drilled adjacent to the discharge canal on the top of the dike. Standard penetration resistance testing was performed in conjunction with the drilling at the ground surface, on 2-½ centers to a depth of about 10 feet and on 5-foot centers thereafter. The samples obtained from the standard penetration resistance testing were visually classified in the field by one of our engineers and reviewed in our laboratory by one of our principal engineers.

We attempted twelve undisturbed samples in conjunction with the drilling for laboratory testing, however, one of the tubes was damaged during sampling, and two of the tubes had no recovery. The undisturbed samples were returned to our laboratory and the requested laboratory testing was performed. Also, natural moisture, Atterberg Limits, and grain size distribution laboratory tests were conducted on selected samples obtained during the standard penetration testing. The results of laboratory testing are attached in Appendix C.

4.0 PROJECT INFORMATION AND SITE CONDITIONS

TVA is planning to perform a stability analysis along an approximately 4,500-foot section of dike adjacent to the Holston River between the stilling pond and the discharge canal and southeasterly for 500 feet along the discharge canal. TVA has requested LAW to perform an exploration and testing program to provide data for the analysis. The subject site is located just to the northwest of the existing John Sevier fossil plant in Rogersville, Tennessee (see Figure 1 Site Location Map).

We understand the dike was constructed of by-products from the operation of the fossil plant and was capped off with soil fill. Portions of the dike have sloughed off in the past and there is concern as to the stability of the slope. Several areas of the slope have been repaired in the past as evidenced by the shot rock fill placed along the riverbank and on portions of the slope. Also, ash was encountered in one of our borings at the base of the dike which most likely is the result of past or current slope failures exposing ash which has been transported to the base of the slope.

Several seeps were observed along the base of the slope. The seeps appeared to be concentrated at the areas where drain lines have been installed and capped off in the past. The fill gravel and fill soils around the closed off pipes are acting as conduits to drain water from the fill.

5.0 AREA AND SITE GEOLOGY

The John Sevier fossil plant located in Rogersville, Tennessee is located in the Appalachian Valley and Ridge Physiographic Province. This province extends as a continuous belt from Central Alabama, through Georgia and Tennessee, northward into Pennsylvania. The formations that underlie this province consist primarily of limestone, dolostone, shale, and sandstone, which have been folded and faulted in the geologic past. These formations range in age from Cambrian to Pennsylvanian and have been subject to at least one extensive period of erosion since their structural deformation. The erosion has produced a series of subparallel, alternating ridges and valleys. The valleys are formed over more soluble bedrock (interbedded shale with limestone and limestone), whereas bedrock more resistant to solution weathering forms ridges (sandstone, shale, and cherty dolostone).

In particular, the subject site is geologically mapped to be underlain by Sevier Shale which primarily consists of bluish-gray, silty to sandy calcareous shale and may contain layers or lenses of limestone and siltstone. Some thin sandstone layers also occur throughout the formation. The Sevier Shale typically weathers to a yellowish-brown, silty clay with a "chippy" texture. Solution weathering may occur in the more calcareous zones of the Sevier Shale. In these zones there is an inherent risk of sinkhole development.

6.0 SUBSURFACE CONDITIONS

Subsurface conditions were explored with 14 widely spaced borings drilled in general accordance with the procedures presented in Appendix A. The boring locations were selected and established in the field by others. The borings were drilled to rock/auger refusal. No topographic data was available at the time of report preparation. Therefore, the boring locations shown on Figure 2: the Boring Location Plan should be considered approximate.

Subsurface conditions encountered at the boring locations are shown on the Test Boring Records in Appendix B. These Test Boring Records represent our interpretation of the subsurface conditions, based on the field logs and visual examination of the field samples by one of our engineers. The lines designating the interfaces between various strata on the Test Boring Records represent the approximate interface locations.

The test borings performed at this site typically encountered fill soils and alluvial soils and residual soils. Fill soils are soils that have been transported to their present location by man. Alluvial soils are soils that have been transported to their present location by running water. Residual soils are soils that have developed from the in-place weathering of the underlying bedrock.

Test Borings at Top of Dike

The test borings performed at the top of the dike, B-1 through B-6 and B-13, typically encountered a layer of fill soils used to cap the ash disposal site. These fill soils are typically composed of tan and gray silty clays and clayey silts with rock fragments. The fill depths ranged from 1 to 15 feet. Standard penetration test (SPT) resistance values for the fill ranged from 7 to 32 blows per foot (bpf) indicating firm to hard soil consistencies. Below the cap fill soils in borings B-1, B-2, B-5, ash was encountered to depths ranging from 32 to 40 feet and is typically composed of gray silt sized particles. SPT resistance values for the ash ranged from 1 to 11 indicating very soft to stiff consistencies. Below the cap fill soils in the remaining borings and to depths of between 17 and 37 feet, a combination of fill soils and ash was encountered. These soils were a mixture of tan silts and clays with gray silt sized ash. SPT resistance values for these soils ranged from 1 to 26 bpf indicating very soft to very stiff soil consistencies.

Below the fill soils, ash, and fill/ash combination soils, all of the test borings except B-5 encountered alluvial soils that are primarily composed of brown and gray silty clay with sand and rounded river gravel. SPT resistance values for the alluvial soils ranged from 6 bpf to greater than 50 blows per ½-foot. Test borings B-2, B-4, B-6, and B-13 experienced auger refusal before penetrating the alluvial soils at depths ranging from 26.5 to 51.3 feet.

Below the alluvial soils in test borings B-1, B-3, and B-5, residual soils were encountered to auger refusal at depths ranging from 43.1 to 57.3 feet. The residual soils were composed primarily of hard gray decomposed shale. SPT resistance values for the residual material ranged from 37 bpf to greater than 50 blows per 0.4 feet.

Test Borings at Base of Dike

Test borings B-7 through B-12 were performed at the base of the dike along the narrow access road. Test boring B-8 encountered gray silt sized particles (ash) from the ground surface to a depth of about 5 feet. Below the ash, a fill/ash combination was encountered to a depth of about 9 feet. Test borings B-10, B-11, and B-11A encountered a surface layer of gravel to depths of bout 1-½ to 2 feet. Boring B-11 encountered auger refusal on shot rock fill at a depth of about 2.2 feet, consequently test boring B-11A was performed about 60 feet to the east. Test borings B-7 and B-12 encountered fill soils from the ground surface to depths of 10 and 6 feet, respectively. The fill soils encountered were similar to those encountered at the top of the dike. SPT resistance values for the fill in these borings ranged from 3 to 33 bpf, indicating soft to hard soil consistencies.

Below the fill soils in the above borings and from the ground surface in test boring B-9, alluvial soils were encountered to auger refusal at depths ranging from 2.2 to 22.2 feet. The alluvial soils were typically composed of brown and gray silty clay with sand and rounded river gravel. SPT resistance values for the alluvial soils ranged from 3 to 50 bpf, indicating soft to very hard soil consistencies, but were typically in the firm to stiff range.

7.0 GROUND-WATER CONDITIONS

Ground water was observed in the test borings at the top of the dike at the time of drilling at depths ranging from 24 to 39 feet. Ground water was observed in test borings B-7 and B-12 at the base of the dike at depths of about 19 and 9 feet, respectively. For safety reasons, the borings were backfilled promptly after drilling; consequently, long-term measurements for the presence or absence of ground water were not obtained. However, we understand that TVA has installed several monitoring wells in the vicinity of our borings and that those records are available from personnel at the John Sevier plant.

8.0 SOIL STRENGTH PARAMETERS

Based on the subsurface conditions observed, the laboratory testing performed, and our experience in this area, we recommend the following design parameters for use in the slope stability analysis:

Design Soil Strength Parameters				
Soil Type	**Description of Soil**	**Unit Weight (pcf)**	**Cohesion (psf)**	**Friction Angle (Degrees)**
I	Soil Fill	125	0	28
IV	Alluvium	125	0	30

Note See Figures 3 and 4, and test boring records for soil stratification
Values derived from correlation of material encountered in field to published values of similar soils.

Design Soil Strength Parameters						
Soil Type	**Description of Soil**	**Unit Weight (pcf)**	**R***			
			Total		**Effective**	
			C (psf)	ϕ(degrees)	C (psf)	ϕ(degrees)
II	Fly Ash Fill	83	900	10	250	17
III	Fly Ash/Soil Fill	120	1000	11	0	29

* Denotes values obtained from Triaxial Laboratory Test, Consolidated Undrained (CU) with pore pressure measurements.

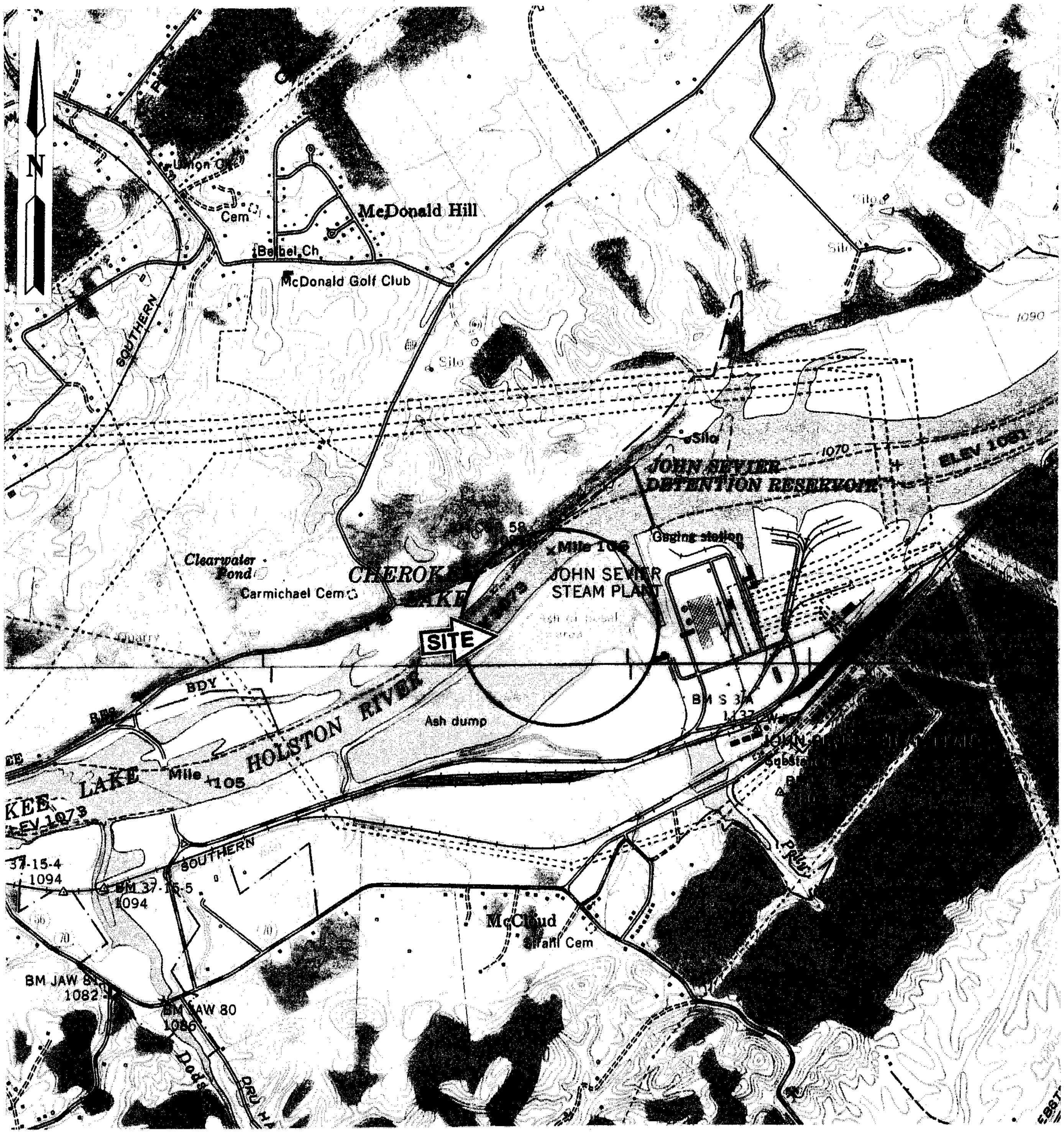
9.0 BASIS OF RECOMMENDATIONS

The recommendations provided herein are based on the subsurface conditions and on project information provided to us; they apply only to the specific project and site discussed in this report. If the project information section in this report contains incorrect information or if additional information becomes available, you should convey the corrected or additional information to us and retain us to review our recommendations. We will then modify them if the new information has rendered them inappropriate for the proposed project.

Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions between test borings will differ from those at specific test boring locations, and that conditions will not be as anticipated by the designers or contractors.

Our exploration services include storing the collected samples and making them available for inspection for a period of 30 days. The samples are then discarded unless you request otherwise.

FIGURES



SOURCE: USGS TOPOGRAPHIC MAPS OF THE BUREM AND MC CLOUD QUADRANGLES

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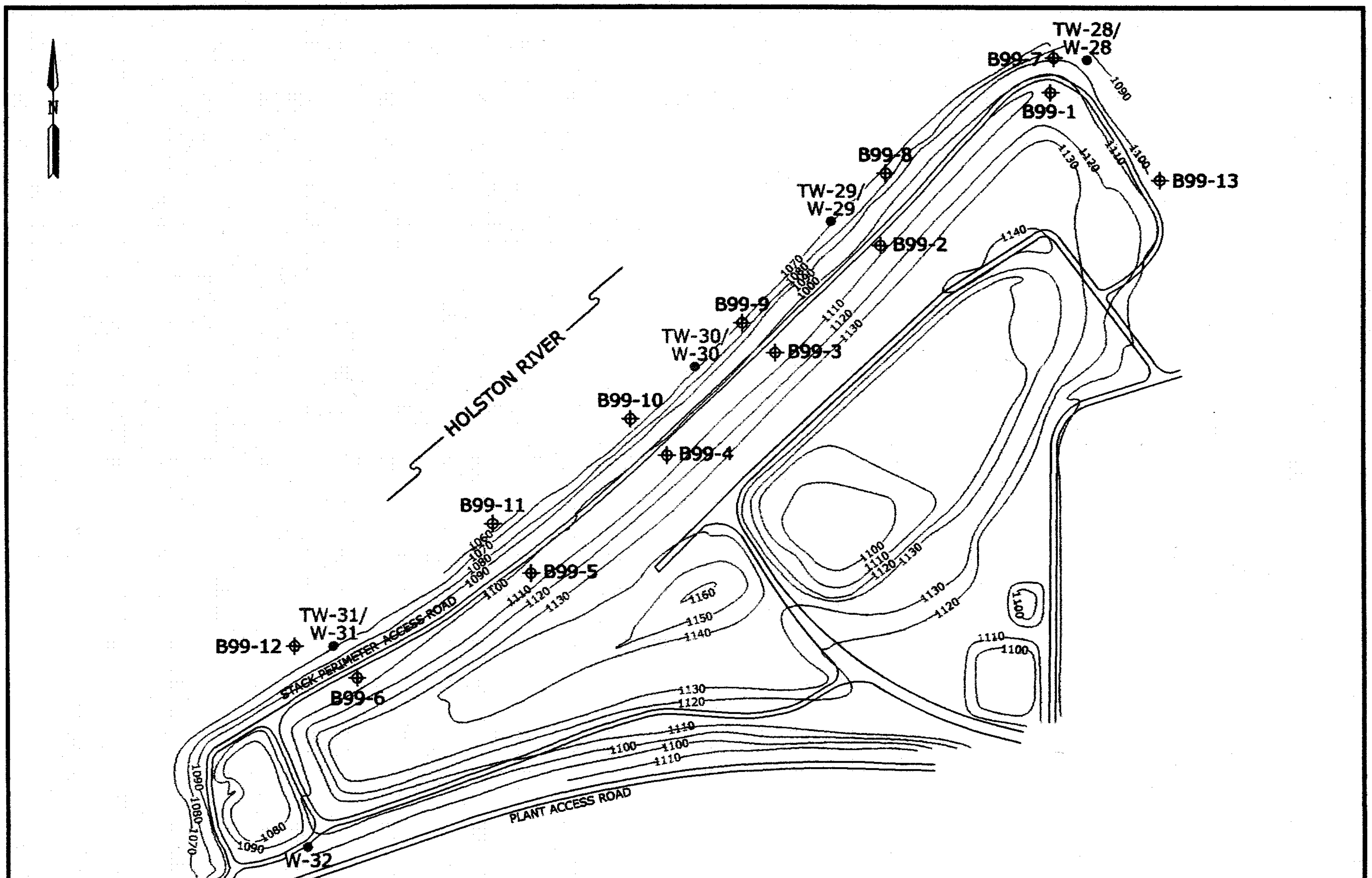
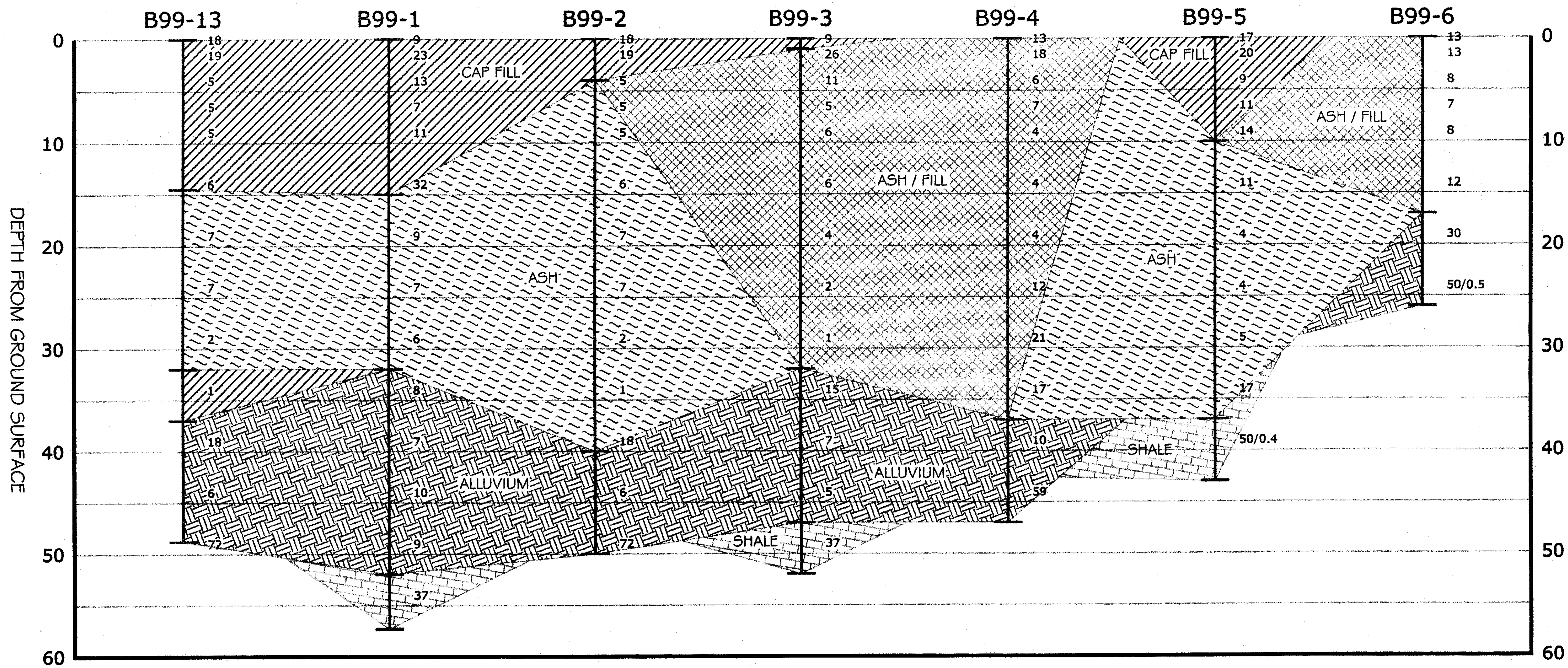
FIGURE 1: SITE LOCATION MAP
TVA JOHN SEVIER FOSSIL PLANT
ROGERSVILLE, TENNESSEE

JOB NUMBER:	DATE:	SCALE:
50300-8-2075/024/800	SEPTEMBER 22, 1999	0 2000'

COORDINATES: N 36°22'42" W 82°58'06"



LEGEND		FIGURE 2: BORING LOCATION PLAN TVA JOHN SEVIER FOSSIL PLANT ROGERSVILLE, TENNESSEE		
⊕ BORING LOCATION ● MONITORING WELL LOCATION	LAW LAWGIBB Group Member LAW Engineering and Environmental Services, Inc. 1725 Louisville Drive Knoxville, TN 37921-5904 423-588-8544 • Fax 423-588-8026	JOB NUMBER: 50300-8-2075/024/800	DATE: SEPTEMBER 22, 1999	DRAWN / DATE: TAD / 9-22-99 CHECKED / DATE: MSC / 9-22-99 APPROXIMATE SCALE: 0 60'



NOTE: NO HORIZONTAL SCALE

NOTE:
DRAWING PREPARED BY INTERPRETATION OF FIELD OBSERVATIONS AND SUBSURFACE CONDITIONS ENCOUNTERED AT THE SPECIFIC BORING LOCATIONS.

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LAW Engineering and Environmental Services, Inc.
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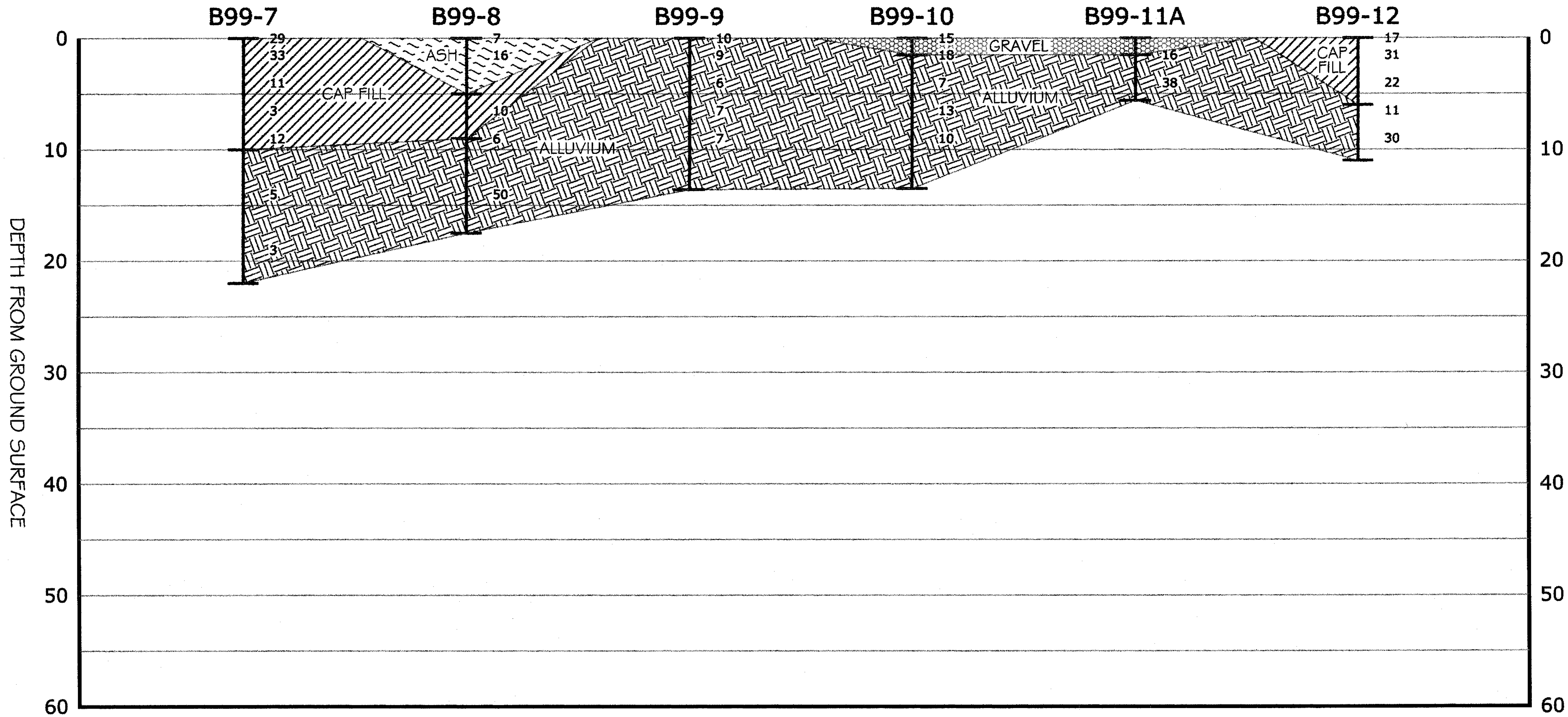
Knoxville, TN 37921-5904
423-588-8544 • Fax 423-588-8026

FIGURE 3: SUBSURFACE PROFILE SECTION
TOP OF DIKE
JOHN SEVIER FOSSIL PLANT
ROGERSVILLE, TENNESSEE

JOB NUMBER:	DATE:	SCALE:
50300-8-2075/024/800	SEPTEMBER 30, 1999	AS SHOWN



NOTE: NO HORIZONTAL SCALE

NOTE:
DRAWING PREPARED BY INTERPRETATION OF FIELD OBSERVATIONS AND SUBSURFACE CONDITIONS ENCOUNTERED AT THE SPECIFIC BORING LOCATIONS.

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FIGURE 4: SUBSURFACE PROFILE SECTION
BASE OF DIKE
JOHN SEVIER FOSSIL PLANT
ROGERSVILLE, TENNESSEE

JOB NUMBER:	DATE:	SCALE:
50300-8-2075/024/800	SEPTEMBER 30, 1999	AS SHOWN

APPENDIX A

FIELD EXPLORATORY PROCEDURES

FIELD EXPLORATORY PROCEDURES

Soil Test Boring (Hollow Stem)

All boring and sampling operations were conducted in general accordance with ASTM D 1586. The borings were advanced by mechanically twisting continuous steel hollow-stem auger flights into the ground. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot of penetration was recorded and is designated the "standard penetration resistance (SPT)." Proper evaluation of the penetration resistance provides an index to the soil's strength, density, and ability to support foundations.

Representative portions of the soil samples obtained from the split-tube sampler were sealed in plastic bags and transported to our laboratory, where they were examined by our engineer to verify the driller's field classifications. Test Boring Records are attached, graphically showing the soil descriptions and penetration resistances.

Undisturbed Sampling

The relatively undisturbed samples were obtained by pushing a section of 3-inch O.D., 16-gauge steel tubing into the soil at the desired sampling level. The sampling procedure is described by ASTM D 1587. The tube, together with the encased soils, was carefully removed from the ground, made airtight and transported to our laboratory.

Boring Backfill

After drilling, the borings were backfilled with a Portland cement/grout mixture. The borings were backfilled utilizing a "tremie" tube and grout was pumped to the bottom of the hole and filled from the bottom of the boring up to the ground surface.

You are advised that, even with this backfill technique, there is the possibility of future borehole subsidence depending on actual subsurface conditions, surface drainage, etc. The property owner should monitor the boring locations over time to discover subsidence and make the necessary repairs.

APPENDIX B

KEY SHEET AND

TEST BORING RECORDS

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	NO. OF BLOWS, N	RELATIVE DENSITY
SANDS:	0-4	Very Loose
	5-10	Loose
	11-30	Firm
	31-50	Dense
	OVER 50	Very Dense

	NO. OF BLOWS, N	CONSISTENCY
SILTS & CLAYS:	0-2	Very Soft
	3-4	Soft
	5-8	Firm
	9-15	Stiff
	16-30	Very stiff
	31-50	Hard
	OVER 50	Very Hard

PARTICLE SIZE IDENTIFICATION

BOULDERS:		Greater than 300 mm
COBBLES:		75 mm to 300 mm
GRAVEL:	Coarse -	19.0 mm to 75 mm
	Fine -	4.75 mm to 19.0 mm
SANDS:	Coarse -	2.00 mm to 4.75 mm
	Medium -	0.425 mm to 2.00 mm
	Fine -	0.075 mm to 0.425 mm
SILTS & CLAYS:		Less than 0.075 mm

KEY TO DRILLING SYMBOLS

Undisturbed Sample

Split Spoon Sample

Water Table 24 HR.

Water Table at Time of Drilling

60-100 = RQD/Recovery

Rock Coring

KEY TO SOIL AND ROCK CLASSIFICATIONS

TOPSOIL

ASPHALT AND GRAVEL

CONCRETE AND GRAVEL

FILL

ALLUVIUM

RESIDUUM - Soft to firm

RESIDUUM - Stiff to very hard

AUGER BORING

UNDISTURBED SAMPLE ATTEMPT

DOLOMITE

LIMESTONE

SHALE

LIMESTONE/SHALE - Limestone with shale interbeds

SANDSTONE

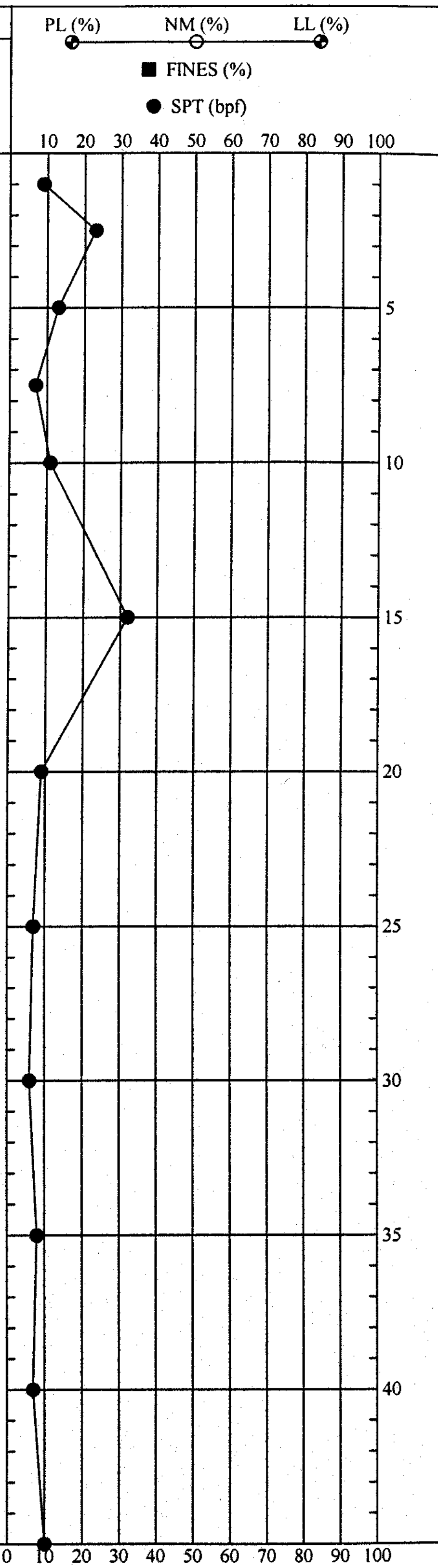
GRANITE

SILTSTONE

SLATE

Revised 6/25/97

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	STIFF TO VERY STIFF BROWN, TAN, AND GRAY CLAYEY SILT WITH ROCK FRAGMENTS - FILL			SPT		6-5-4
				SPT		9-10-13
	STIFF, FIRM, AND HARD BROWN, TAN, AND GRAY SILTY CLAY WITH ROCK FRAGMENTS AND SOME SAND - FILL					
5				SPT		3-5-8
				SPT		2-3-4
10				SPT		1-4-7
15	STIFF TO FIRM GRAY SILT (ASH) - FILL			SPT		3-14-18
				UD		2.0-2.0
20				SPT		3-5-4
25				SPT		3-3-4
30				SPT		2-3-3
	FIRM WET GRAY SILT (ASH) AND BROWN SILT WITH SMALL ROOTS - FILL ∇					
35				SPT		3-3-5
40				SPT		1-1-6
	STIFF MOIST TO WET BROWN SILTY CLAY WITH SAND - ALLUVIUM					
45						



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 9, 1999 **BORING NO.:** B99- 1

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
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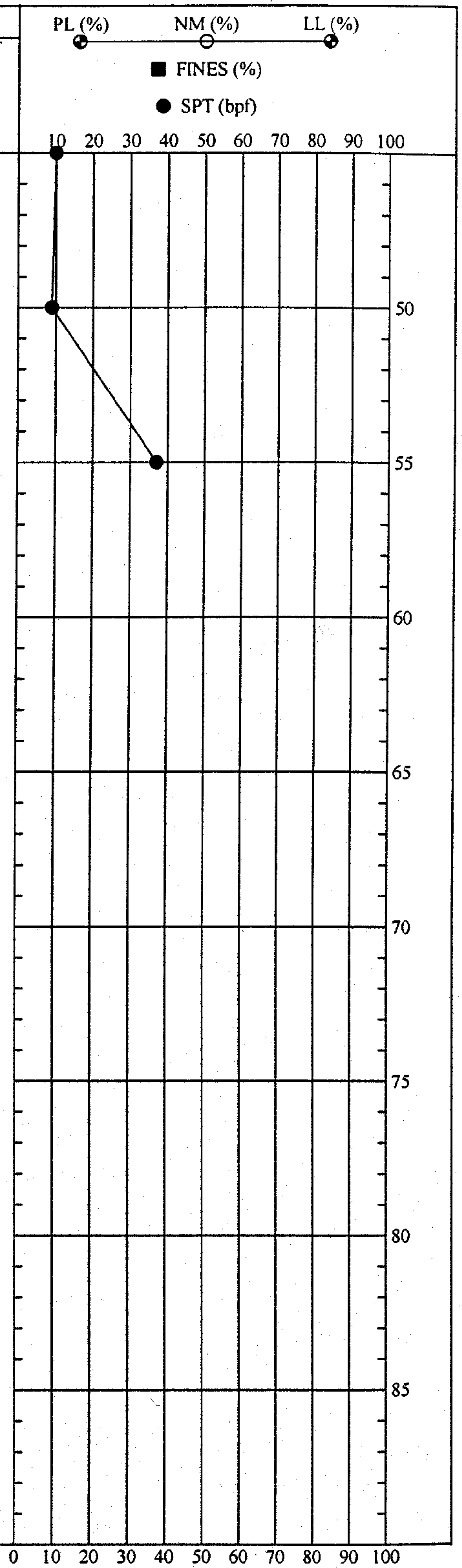
DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
45	STIFF MOIST TO WET BROWN SILTY CLAY WITH SAND - ALLUVIUM			SPT		3-4-6
50				SPT		1-3-6
	HARD DARK GRAY DECOMPOSED SHALE - RESIDUUM					
55				SPT		4-19-18
	AUGER REFUSAL AT 57.3'					
60						
65						
70						
75						
80						
85						
90						



SOIL 9207524.GPJ LAW GIBB.GDT 9/29/99

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SOIL TEST BORING RECORD

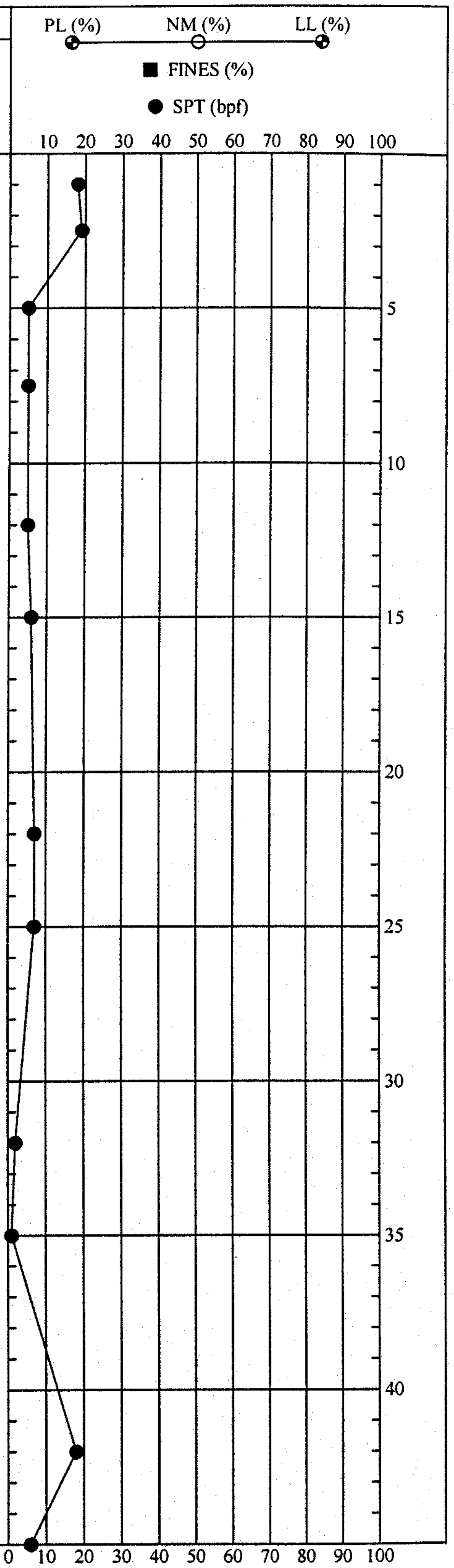
PROJECT: JOHN SEVIER

DRILLED: August 9, 1999 **BORING NO.:** B99- 1

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 2 **OF** 2

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
0	VERY STIFF BROWN AND TAN CLAYEY SILT WITH SMALL ROOTS, ROCK FRAGMENTS, AND GRAY SILT (ASH) - FILL		SPT		5-7-11
			SPT		8-9-10
	FIRM GRAY SILT (ASH) AND BROWN CLAYEY SILT - FILL				
5			SPT		3-3-2
			SPT		1-2-3
10			UD		1.55-2.0
			SPT		2-2-3
15			SPT		2-2-4
20			UD		2.0-2.0
			SPT		3-3-4
25			SPT		2-3-4
	VERY SOFT WET GRAY SILT (ASH) - FILL				
30			UD		2.0-2.0
	∇		SPT		1-1-1
35			SPT		0-0-1
40	VERY STIFF BROWN AND GRAY SILTY CLAY WITH SAND - ALLUVIUM		UD		2.0-2.0
			SPT		5-7-11
	FIRM MOIST TO WET BROWN AND GRAY SANDY SILTY CLAY - ALLUVIUM				
45					



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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

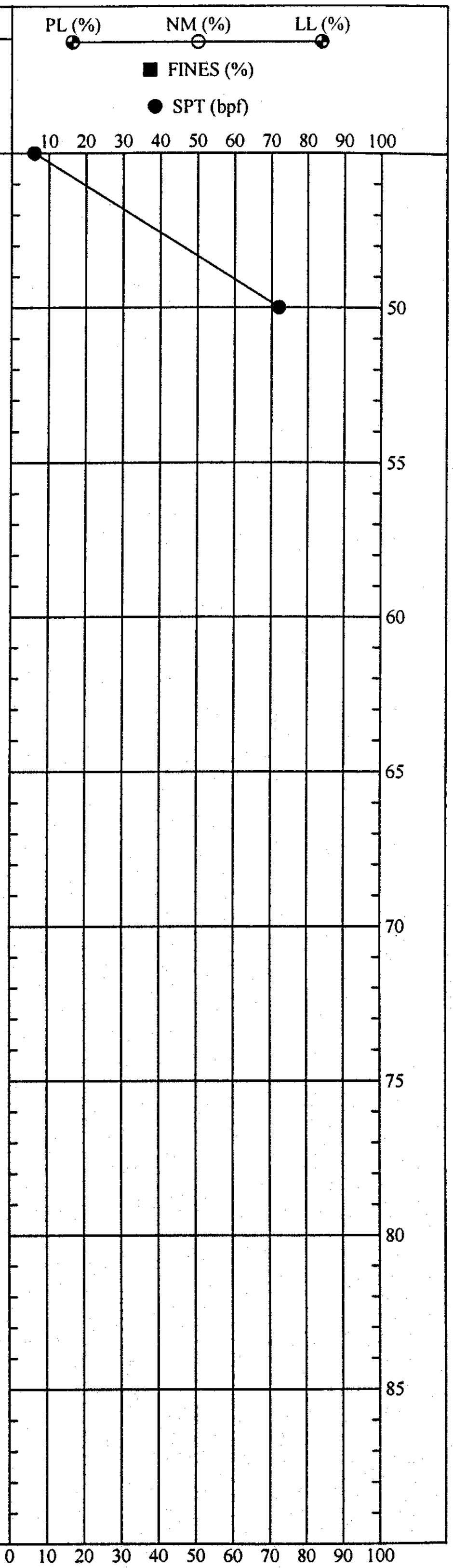
DRILLED: August 10, 1999 **BORING NO.:** B99- 2

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
45	FIRM MOIST TO WET BROWN AND GRAY SANDY SILTY CLAY - ALLUVIUM			SPT		2-3-3
	VERY HARD MOIST TO WET GRAY CLAYEY SAND WITH ROUNDED RIVER ROCKS - ALLUVIUM (NOTE: SPT value was probably amplified by rock fragments in the sample interval.)					
50				SPT		4-41-31
51.3	AUGER REFUSAL AT 51.3'					
55						
60						
65						
70						
75						
80						
85						
90						



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 2

PROJ. NO.: 50300-8-2075/024/800 **PAGE 2 OF 2**

LAW
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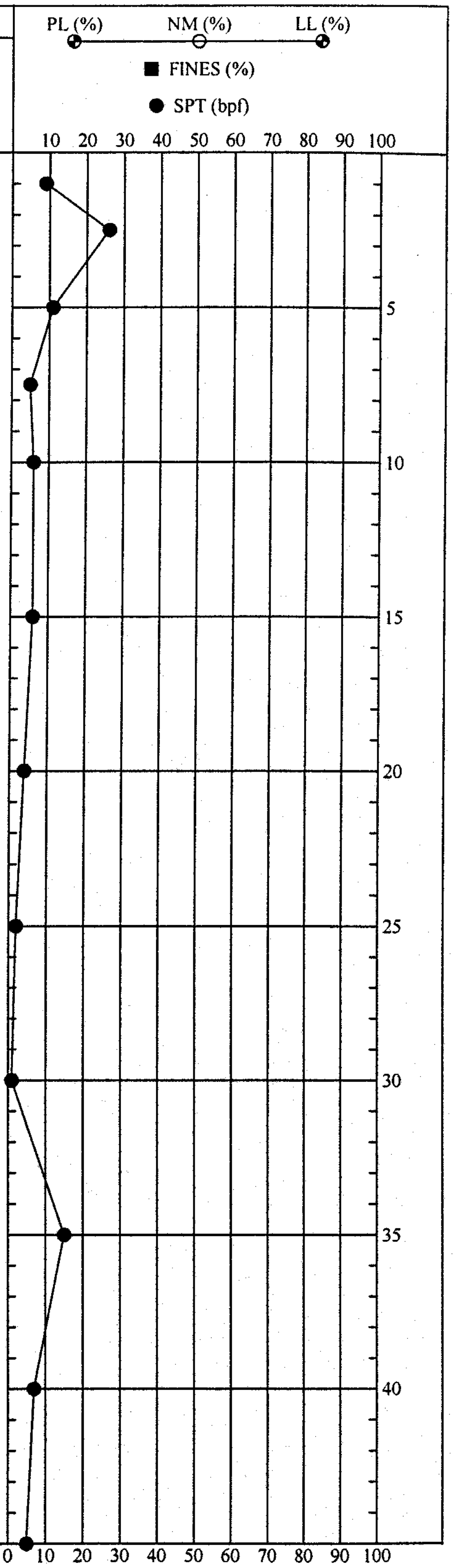
DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)
0	STIFF TAN CLAYEY SILT - FILL		
	STIFF GRAY SILT (ASH) - FILL		
	VERY STIFF GRAY SILT (ASH) WITH TAN CLAYEY SILT - FILL		
	STIFF BROWN CLAYEY SILT WITH ROCK FRAGMENTS - FILL		
5			
	FIRM TO SOFT GRAY SILT (ASH) WITH TAN CLAYEY SILT - FILL		
10			
15			
20			
	VERY SOFT WET GRAY SILT (ASH) WITH TAN CLAYEY SILT - FILL		
	∇		
25			
30			
	STIFF TO FIRM MOIST TO WET BROWN AND GRAY SILTY CLAY WITH SAND - ALLUVIUM		
35			
40			
	FIRM TAN SANDY SILTY CLAY - ALLUVIUM		
45			

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
SPT		4-3-6
SPT		7-12-14
SPT		4-6-5
SPT		2-3-2
SPT		3-3-3
SPT		3-3-3
SPT		1-2-2
SPT		1-1-1
SPT		0-0-1
SPT		3-7-8
SPT		4-3-4



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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 3

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

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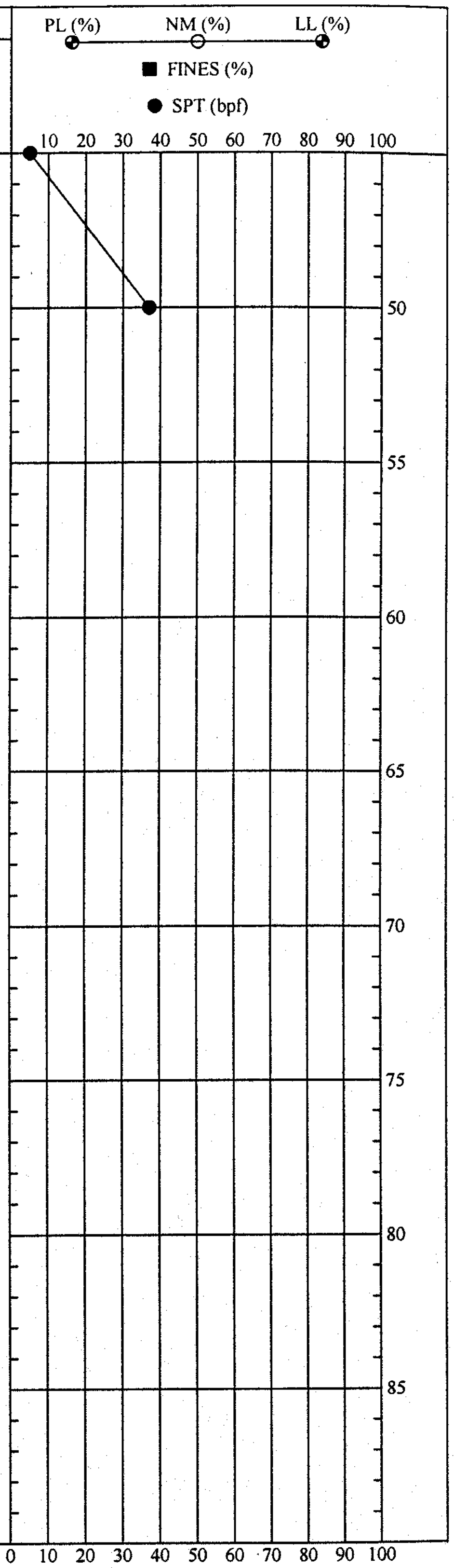
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
45	FIRM TAN SANDY SILTY CLAY - ALLUVIUM			SPT		1-2-3
	HARD GRAY DECOMPOSED SHALE - RESIDUUM					
50				SPT		6-14-23
	AUGER REFUSAL AT 52.1'					
55						
60						
65						
70						
75						
80						
85						
90						



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 3

PROJ. NO.: 50300-8-2075/024/800 **PAGE 2 OF 2**

LAW
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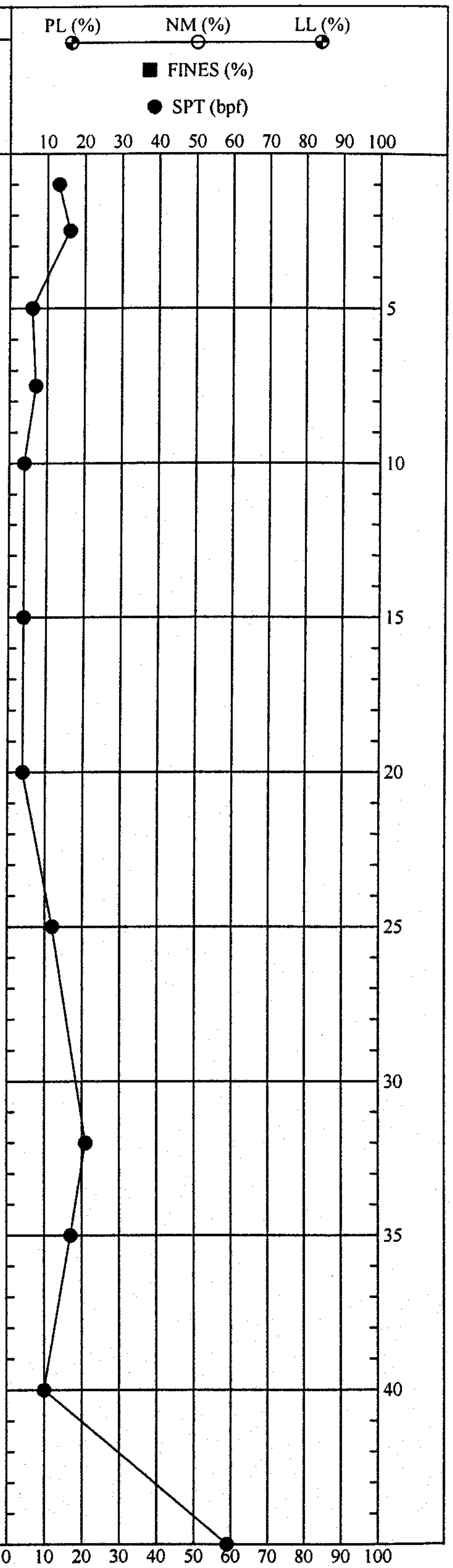
DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)
0	STIFF, VERY STIFF, AND FIRM RED-BROWN AND TAN CLAYEY SILT WITH ROCK FRAGMENTS - FILL
8.5	SOFT BROWN AND RED-BROWN CLAYEY SILT WITH GRAY SILT (ASH) - FILL
12	SOFT BROWN AND GRAY SILTY CLAY WITH ROCK FRAGMENTS - FILL
17	SOFT BROWN AND GRAY SILTY CLAY WITH SAND - FILL
22	STIFF MOTTLED BROWN, GRAY, AND TAN SILTY CLAY WITH ASH AT BOTTOM OF SAMPLE - FILL
27	VERY STIFF MOTTLED BROWN AND TAN SILTY CLAY WITH SAND AND BLACK MOTTLING - ALLUVIUM
39	STIFF TO HARD WET BROWN SANDY SILTY CLAY - ALLUVIUM
42	VERY DENSE WET BROWN SAND WITH ROUNDED RIVER ROCK - ALLUVIUM

DEPTH (ft)	SAMPLES IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6")
1	SPT	5-6-7
2.5	SPT	5-7-9
5	SPT	2-3-3
7.5	SPT	1-3-4
10	SPT	1-2-2
15	SPT	2-2-2
20	SPT	4-2-2
25	SPT	2-4-8
30	UD	0.0-2.0
32	SPT	6-10-11
35	SPT	5-8-9
40	SPT	2-3-7



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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1988 **BORING NO.:** B99- 4

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	VERY DENSE WET BROWN SAND WITH ROUNDED RIVER ROCK - ALLUVIUM			SPT		7-14-45
	AUGER REFUSAL AT 47.6'					

PL (%) NM (%) LL (%)
■ FINES (%)
● SPT (bpf)
10 20 30 40 50 60 70 80 90 100

Depth scale: 45 50 55 60 65 70 75 80 85 90

0 10 20 30 40 50 60 70 80 90 100

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1988 **BORING NO.:** B99- 4

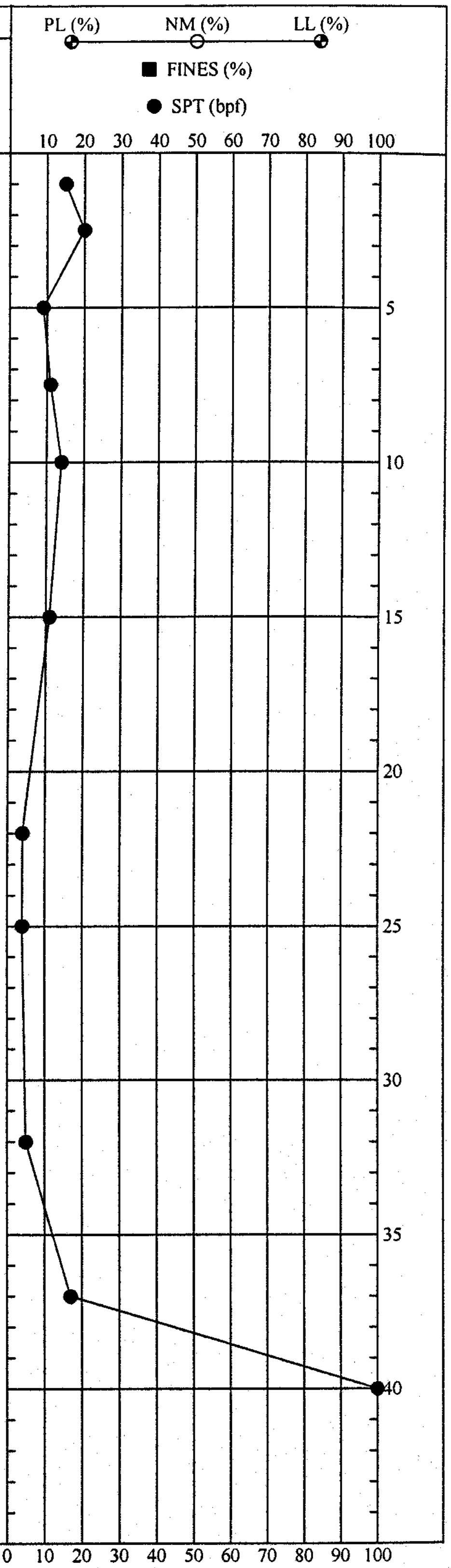
PROJ. NO.: 50300-8-2075/024/800 **PAGE** 2 **OF** 2

LAW
LAWGIBB Group Member

SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	SAMPLE IDENT	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
0	VERY STIFF AND STIFF BROWN AND RED-BROWN CLAYEY SILT WITH ROCK FRAGMENTS AND GRAY SILT (ASH) - FILL	SPT	5-6-9
		SPT	7-8-12
5		SPT	2-5-4
	STIFF BROWN AND RED-BROWN CLAYEY SILT WITH SAND, ROUNDED RIVER ROCKS, AND TRACE GRAY SILT (ASH) - FILL	SPT	2-6-5
10		SPT	2-6-8
	STIFF BROWN CLAYEY SILT AND GRAY SILT (ASH) - FILL		
15		SPT	2-6-5
	SOFT WET BLACK COAL ASH WITH WOOD FRAGMENTS - FILL		
20		UD	2.0-2.0
	∇	SPT	1-2-2
25		SPT	1-1-3
	FIRM WET GRAY AND BLACK SILTY CLAY/CLAYEY SILT (ASH) WITH ROUNDED RIVER ROCKS - FILL		
30		UD	0.0-2.0
		SPT	0-0-5
	VERY STIFF WET MOTTLED BROWN AND GRAY SILTY CLAY (ASH) - FILL		
35		UD	2.0-2.0
	HARD MOTTLED BROWN AND GRAY SILTY CLAY WITH DECOMPOSED GRAY SHALE - RESIDUUM	SPT	3-7-10
40		SPT	12-50/0.4
	AUGER REFUSAL AT 43.1'		
45			



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

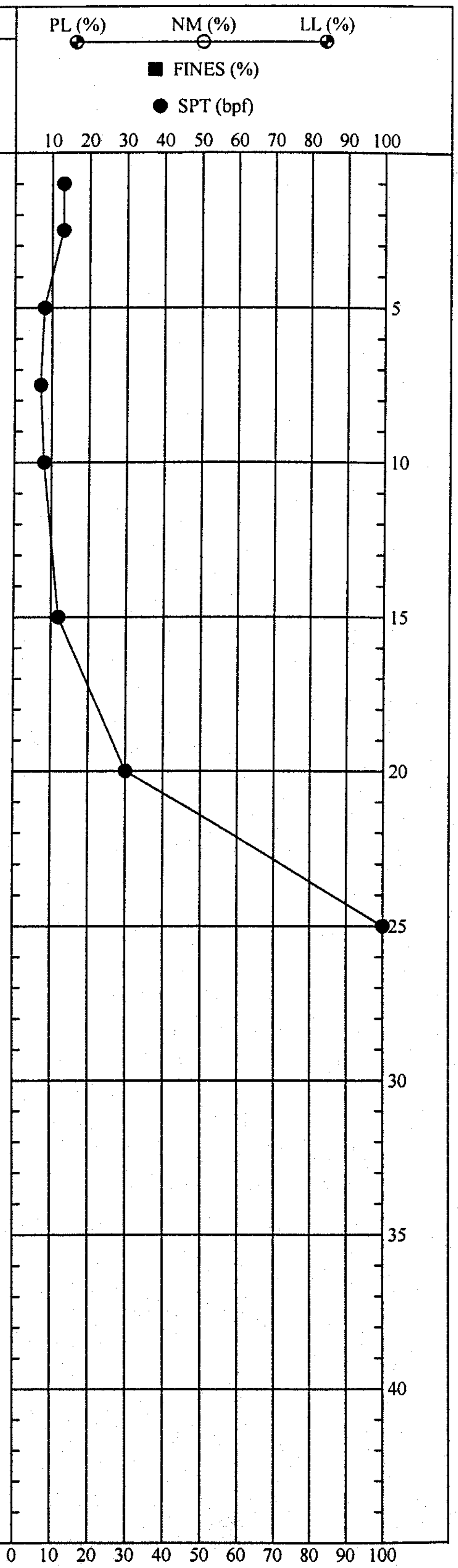
DRILLED: August 10, 1999 **BORING NO.:** B99- 5

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
0	STIFF TO FIRM TAN CLAYEY SILT WITH ROCK FRAGMENTS AND TRACE AMOUNTS OF GRAY SILT (ASH) - FILL					
				SPT		6-7-6
				SPT		5-7-6
5				SPT		3-3-5
				SPT		1-3-4
10				SPT		2-3-5
	STIFF TO VERY STIFF BROWN SANDY CLAYEY SILT WITH TRACE GRAY SILT (ASH) AND ROUNDED RIVER ROCKS - FILL					
15				SPT		1-5-7
20				SPT		8-14-16
	HARD WET BROWN SANDY SILT AND ROUNDED RIVER ROCKS - ALLUVIUM (NOTE: Shale fragments encountered at bottom of sample.) ∇					
25				SPT		17-27-50/0.5
	AUGER REFUSAL AT 26.5'					
30						
35						
40						
45						

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 6

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
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SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

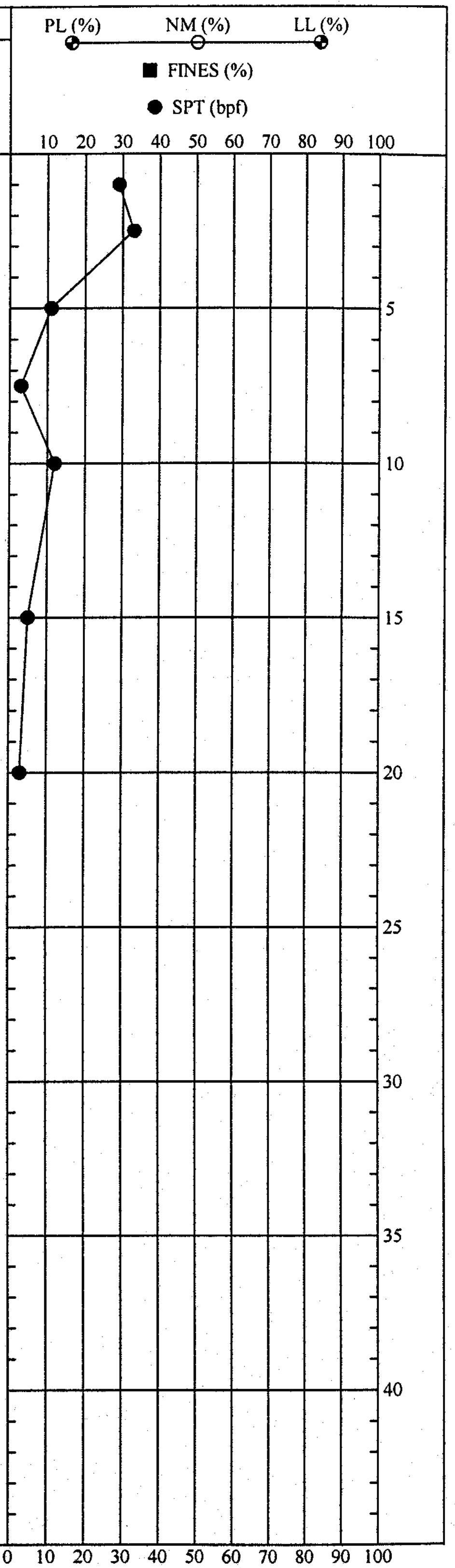
DRILLED: August 12, 1999 **BORING NO.:** B99- 7

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	VERY STIFF TO HARD BROWN CLAYEY SILT, GRAY SILT (ASH), AND ROCK FRAGMENTS - FILL		SPT		6-14-15
			SPT		10-18-15
	FIRM AND VERY SOFT BROWN CLAYEY SILT AND GRAY SILT (ASH) - FILL				
5			SPT		4-7-4
			SPT		1-1-2
10	STIFF TO FIRM BROWN AND GRAY SILTY CLAY WITH SAND - ALLUVIUM		SPT		1-4-8
15	FIRM GRAY SILTY CLAY WITH SAND AND DECOMPOSED SHALE - ALLUVIUM		SPT		1-2-3
	SOFT WET BROWN AND GRAY SILTY CLAY/CLAYEY SILT WITH SAND - ALLUVIUM				
20			SPT		0-0-3
22.2	AUGER REFUSAL AT 22.2'				



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

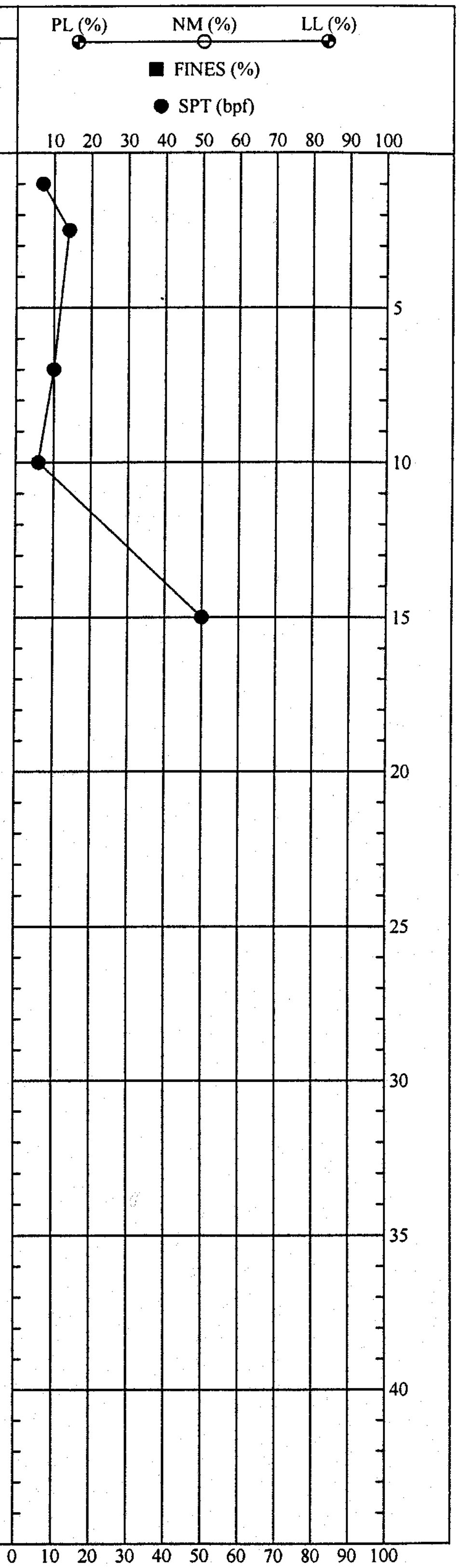
LAW

LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

SOIL TEST BORING RECORD

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	FIRM GRAY SILT (ASH) - FILL			SPT		1-3-4
	STIFF MOTTLED BROWN CLAYEY SILT AND GRAY SILT (ASH) - FILL			SPT		5-5-9
5	STIFF BROWN SILTY CLAY AND GRAY SILT (ASH) WITH ORGANICS - FILL			UD		1.4-2.0
				SPT		3-4-6
10	FIRM MOTTLED BROWN AND GRAY SILTY CLAY - ALLUVIUM			SPT		1-2-4
15	HARD BROWN AND GRAY SANDY SILTY CLAY WITH QUARTZITE AND ROCK FRAGMENTS - ALLUVIUM (NOTE: SPT value was probably amplified by rock fragments in the sample interval.)			SPT		2-21-29
17.5	AUGER REFUSAL AT 17.5'					



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99- 8

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

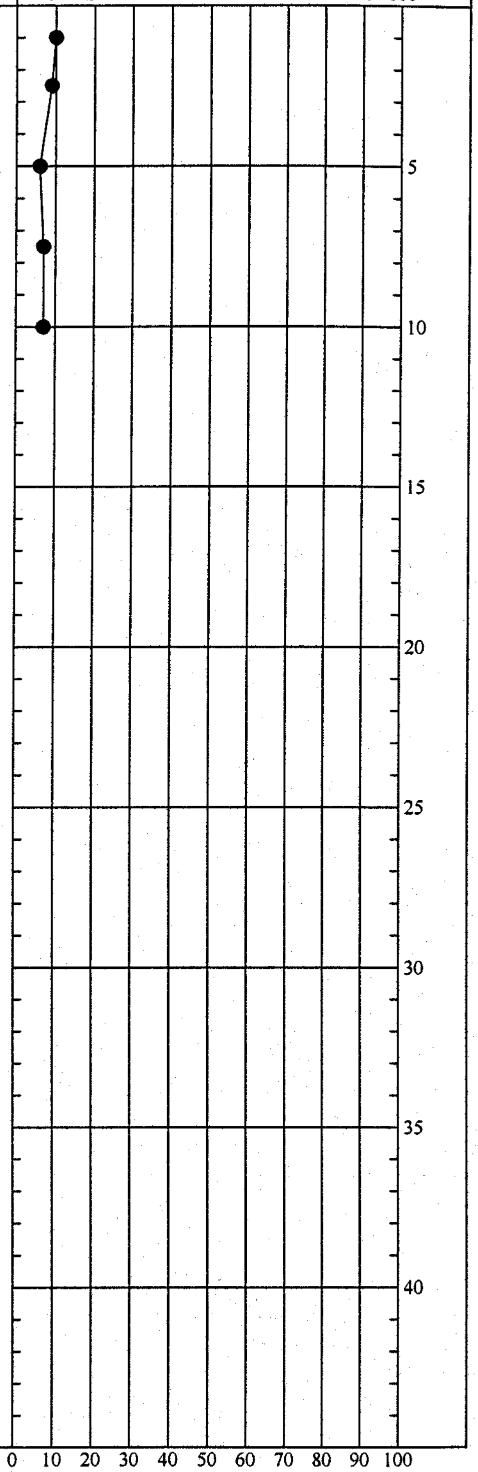
SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	STIFF TO FIRM BROWN AND GRAY SILTY CLAY/CLAYEY SILT - ALLUVIUM					
				SPT		4-5-5
				SPT		4-4-5
5				SPT		1-2-4
				SPT		1-3-4
10				SPT		2-3-4
13.6	AUGER REFUSAL AT 13.6'					
15						
20						
25						
30						
35						
40						
45						

PL (%) NM (%) LL (%)

■ FINES (%)

● SPT (bpf)



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99- 9

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
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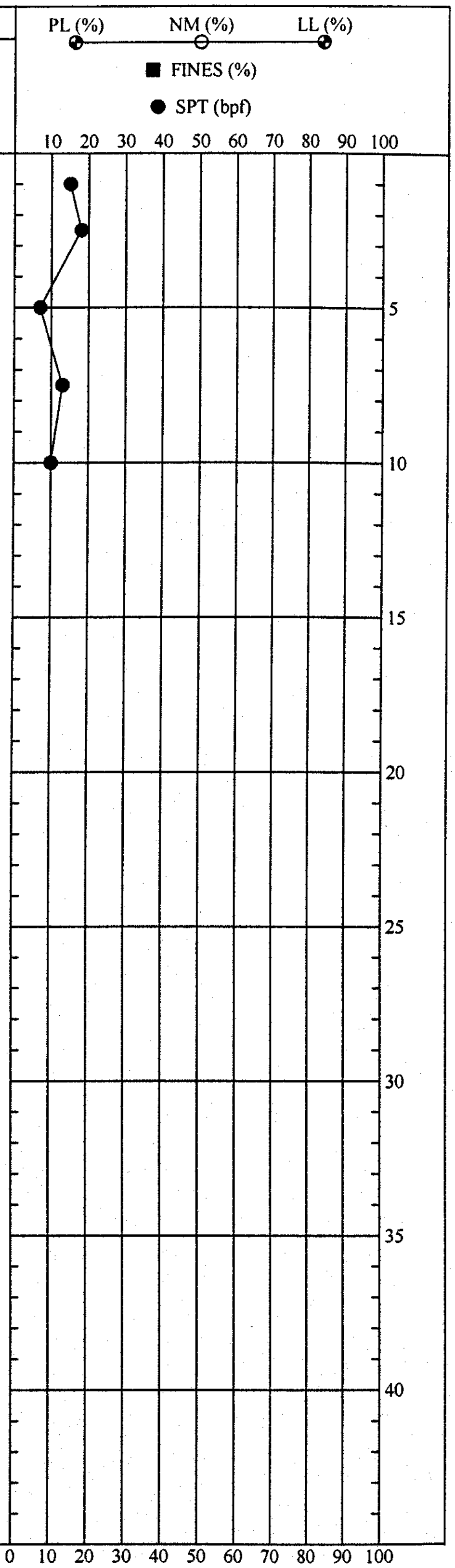
DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)
0	STIFF BROWN CLAYEY SILT WITH GRAVEL - FILL		
	VERY STIFF TO FIRM BROWN CLAYEY SILT WITH ROUNDED RIVER GRAVEL AND TRACE ORGANICS - ALLUVIUM		
	STIFF MOIST BROWN, GRAY, AND RED-BROWN SANDY SILTY CLAY - ALLUVIUM		
13.5	AUGER REFUSAL AT 13.5'		

SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SPT		5-8-7
SPT		5-6-12
SPT		2-2-5
SPT		3-4-9
SPT		3-4-6



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-10

PROJ. NO.: 50300-8-2075/024/800 **PAGE 1 OF 1**

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LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ■ FINES (%) ● SPT (bpf)
0	CRUSHED LIMESTONE			SPT		10-42-62	>●
2.2	AUGER REFUSAL AT 2.2'						

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45

Chart scale: 0 10 20 30 40 50 60 70 80 90 100

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-11

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

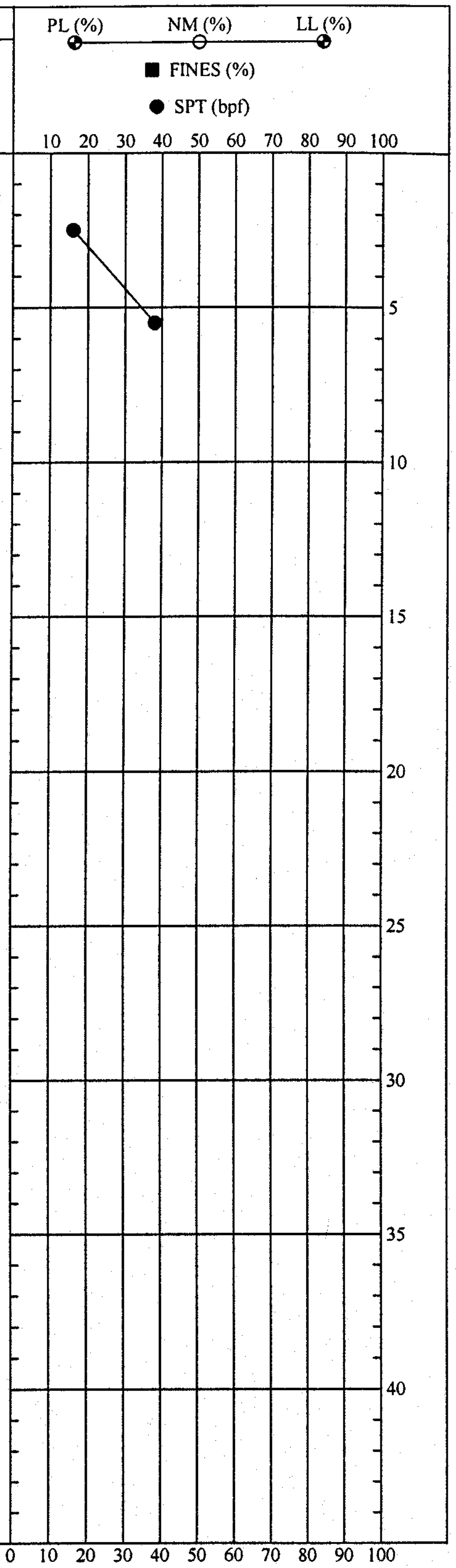
LAW
LAWGIBB Group Member

SOIL TEST BORING RECORD

SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
0	CRUSHED LIMESTONE					
	VERY STIFF TO HARD MOTTLED BROWN, RED-BROWN, AND GRAY SILTY CLAY WITH SAND AND ROUNDED RIVER GRAVEL - FILL			SPT		5-7-9
5				SPT		5-21-17
	AUGER REFUSAL AT 5.6'					



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION. OFFSET 60.0' TOWARDS B-10.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

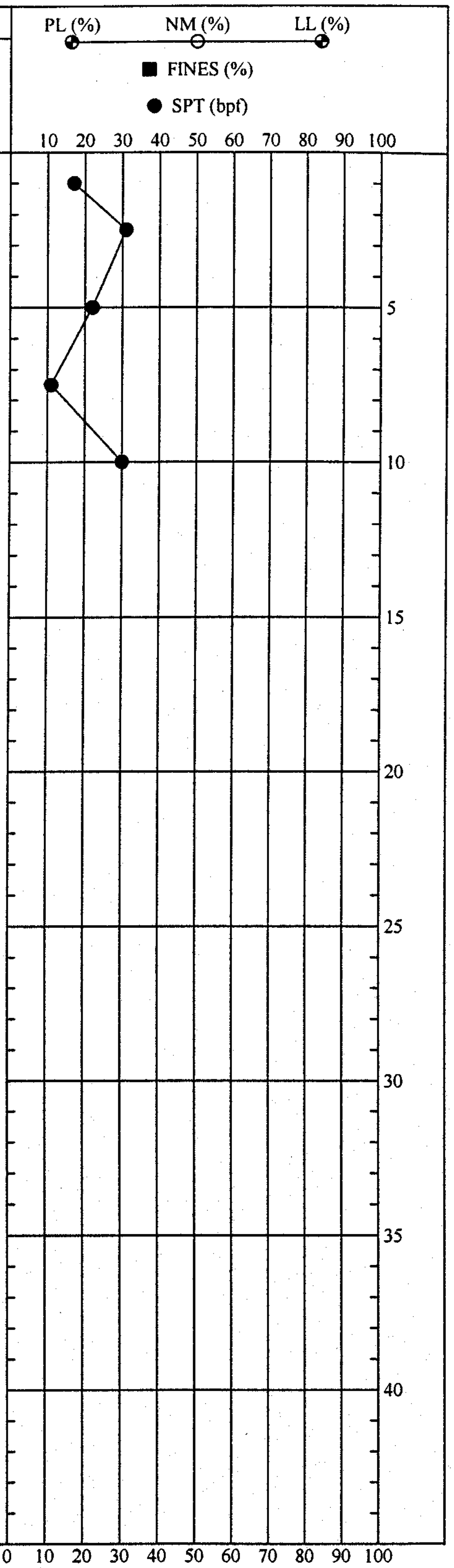
DRILLED: August 12, 1999 **BORING NO.:** B99-11A

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)
0	VERY STIFF AND HARD BROWN SILTY CLAY/CLAYEY SILT WITH ROCK FRAGMENTS, BLACK MOTTLING, AND TRACE ORGANICS - FILL		
	FIRM MOIST BROWN TO RED-BROWN SILTY SAND WITH TRACE GRAY SILT - ALLUVIUM		
	DENSE WET BROWN SAND WITH ROUNDED RIVER GRAVEL - ALLUVIUM ▽		
	AUGER REFUSAL AT 11.1'		

SAMPLES IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
SPT		5-9-8
SPT		6-14-17
SPT		5-10-12
SPT		4-6-5
SPT		6-10-20



Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40, 45

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-12

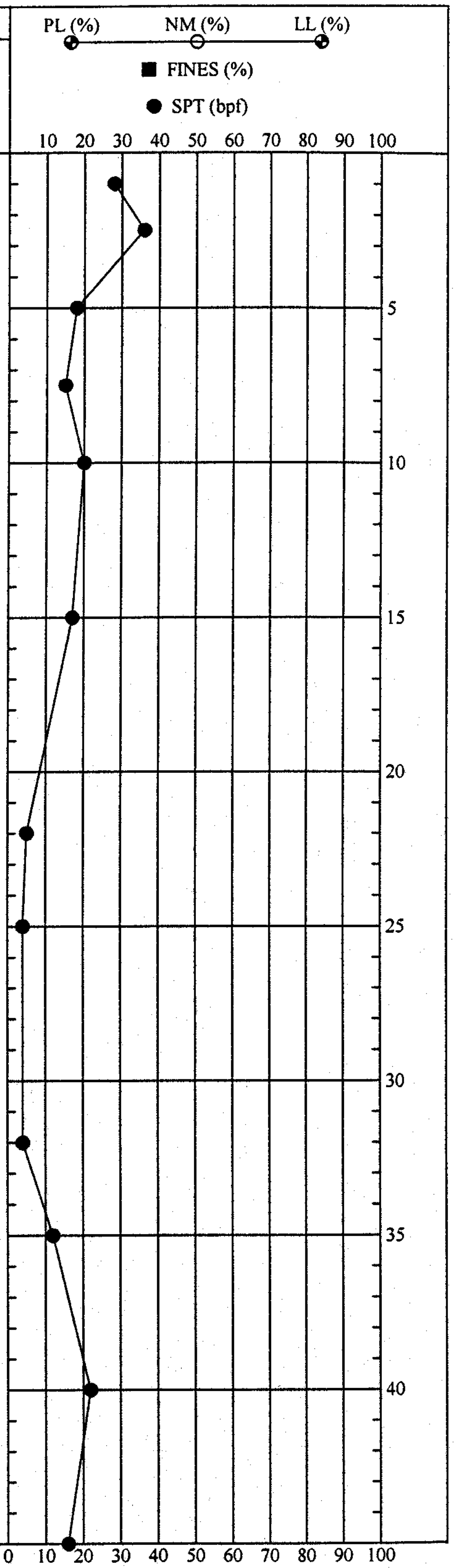
PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

SOIL_9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)
0	VERY STIFF TO HARD BROWN CLAYEY SILT WITH CRUSHED LIMESTONE AND ROUNDED RIVER ROCKS - FILL		
	VERY STIFF TO STIFF BROWN AND GRAY CLAYEY SILT WITH ROCK FRAGMENTS - FILL		
5			
	VERY STIFF BROWN AND GRAY CLAYEY SILT WITH ASH AND COAL FRAGMENTS AND ROUNDED RIVER GRAVEL - FILL		
10			
15	VERY STIFF GRAY SILT (ASH) WITH COAL FRAGMENTS - FILL		
	FIRM TO SOFT BROWN SILTY CLAY AND GRAY SILT (ASH) - FILL		
20			
25			
	SOFT WET GRAY SILT (ASH) - FILL		
30	∇		
	STIFF GRAY SILTY CLAY/CLAYEY SILT WITH SMALL ROOTS AND ORGANICS - FILL		
35			
	VERY STIFF MOTTLED BROWN AND GRAY SILTY CLAY/CLAYEY SILT WITH BLACK STAINING - ALLUVIUM		
40			
45			

SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SPT		10-14-14
SPT		20-17-19
SPT		5-6-12
SPT		6-8-7
SPT		3-9-11
SPT		1-8-9
UD		2.0-2.0
SPT		3-2-3
SPT		1-2-2
UD		2.0-2.0
SPT		1-2-2
SPT		3-4-8
SPT		3-8-14



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-13

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ■ FINES (%) ● SPT (bpf)
45	VERY STIFF MOTTLED BROWN AND GRAY SILTY CLAY/CLAYEY SILT WITH BLACK STAINING - ALLUVIUM			SPT		2-7-9	
	AUGER REFUSAL AT 48.8'						
50							
55							
60							
65							
70							
75							
80							
85							
90							

Scale: 0 10 20 30 40 50 60 70 80 90 100

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-13

PROJ. NO.: 50300-8-2075/024/800

LAW
LAWGIBB Group Member

APPENDIX C

LABORATORY TEST PROCEDURES

AND

TEST RESULTS

LABORATORY TEST PROCEDURES

Atterberg Limits (PI)

Originally, the Atterberg Limits consisted of seven "limits of consistency" of fine-grained soils. In current engineering usage, the term usually refers only to the liquid limit (LL) and plastic limit (PL). The LL (between the liquid and plastic states) is the water content at which a trapezoidal groove of specified shape, cut in moist soil held in a special cup, is closed after 25 taps on a hard rubber plate. The PL (between plastic and semi-solid states) is the water content at which the soil crumbles when rolled into threads of 1/8 inch in diameter.

The LL has been found to be proportional to the compressibility of the normally consolidated soil. The PI is the calculated difference in water contents between the LL and the PL. Together the LL and PI are used to classify silts and clays according to the Unified Soil Classification System (ASTM D 2487). The PI is used to predict the potential for volume changes in confined soils beneath foundations or grade slabs. The LL, PL, and PI are determined in accordance with ASTM D 4318.

Moisture Content

The moisture content in a given mass of soil is the ratio, expressed as a percentage, of the weight of the water to the weight of the solid particles. This test was conducted in accordance with ASTM D 2216.

Grain Size Distribution

Grain Size Tests are performed to aid in determining the soil classification and the grain size distribution. The soil samples are prepared for testing according to ASTM D 421 (dry preparation) or ASTM D 2217 (wet preparation). If only the grain size distribution of soils coarser than a number 200 sieve (0.074-mm opening) is desired, the grain size distribution is determined by washing the sample over a number 200 sieve and, after drying, passing the samples through a standard set of nested sieves. If the grain size distribution of the soils finer than the number 200 sieve is also desired, the grain size distribution of the soils coarser than the number 10 sieve is determined by passing the sample through a set of nested sieves. Materials passing the number 10 sieve are dispersed with a dispersing agent and suspended in water, and the grain size distribution calculated from the measured settlement rate of the particles. These tests are conducted in accordance with ASTM D 422.

Unit Weights

The moist or dry unit weight of a given soil mass is obtained by dividing the weight of the soil mass by the volume. Selected portions of the shelby tube samples obtained during the exploration were measured and weighed in our laboratory to determine sample unit weights.

Triaxial Shear Tests

Triaxial shear tests are used to determine the strength characteristics and friction angle of a given soil sample. Triaxial tests are also used to determine the elastic properties of the soil specimen.

Triaxial shear tests are performed on several sections of a relatively undisturbed sample extruded from the sampling tube. The samples are trimmed into cylinders 1.4 to 2.8 inches in diameter and encased in rubber membranes. Each is then placed in a compression chamber and confined by all-around air pressure. The test results are presented in the form of stress-strain curves and Mohr envelopes, or p-q plots on the accompanying Triaxial Shear Test Sheets.

One of three types of triaxial tests is normally performed, the most suitable type being determined by the loading conditions imposed on the soil in the field and the soil characteristics.

1. Consolidated-Undrained (Designated as a CU or R Test)
2. Consolidated-Drained (designated as a CD or S Test)
3. Unconsolidated-Undrained (designated as a UU or Q Test)

Specific Gravity

The specific gravity laboratory tests were performed in accordance with the test procedure ASTM D 854.

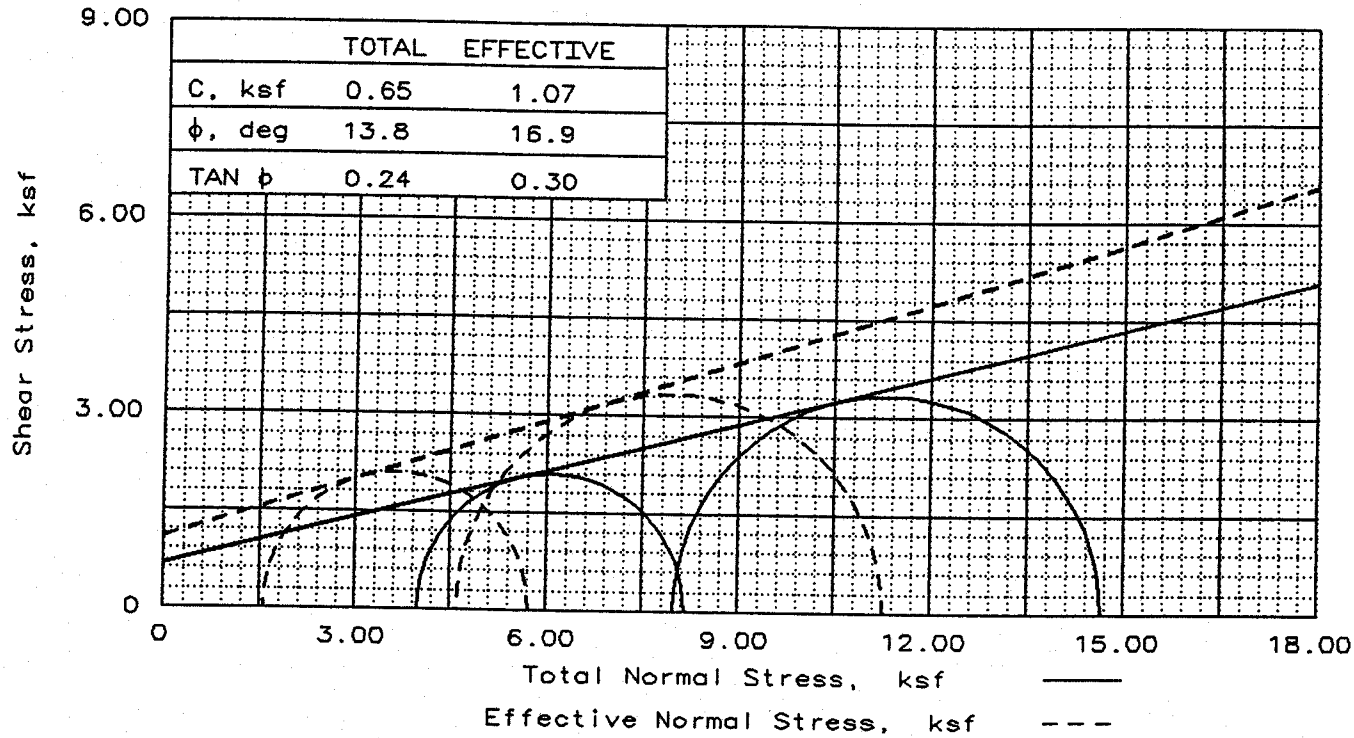
Plasticity Index Laboratory Test Results LAW Project 50300-8-2075/0024/0800						
Boring Number	**Sample Type**	**Sample Depth (ft)**	**Moisture Content (%)**	**Atterberg Limits**		
				Liquid Limit (LL)	**Plastic Limit (PL)**	**Plasticity Index (PI=LL-PL)**
B99-2	UD	9-11	---	NL	NP	NP
B99-4	SPT	4-5.5 & 6.5-8	---	38	19	19
B99-4	UD	29-31	---	29	19	10
B99-4	UD	34-36	---	49	24	25
B99-5	UD	19-21	---	NL	NP	NP
B99-5	UD	34-36	---	49	24	25
B99-8	UD	4-6	---	45	22	23
B99-10	SPT	4-5.5 & 6.5-8	---	30	19	11
B99-13	UD	19-21	---	NL	NP	NP

SPT - Standard Penetration Test Sample
UD – Undisturbed Sample
NP – Non-plastic
NL – Non-Liquid

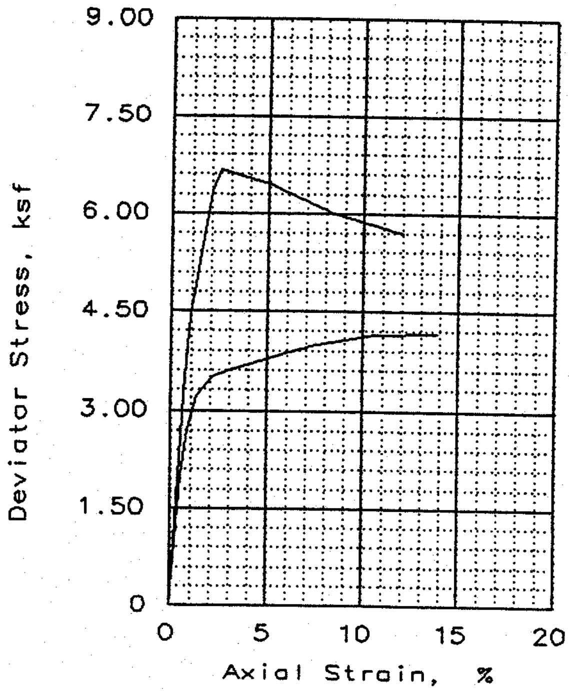
Moisture Content Laboratory Test Results LAW Project 50300-8-2075/0024/0800			
Boring Number	**Sample Type**	**Sample Depth (ft)**	**Moisture Content (%)**
B99-1	SPT	9-10.5	15.5
B99-1	SPT	24-25.5	27
B99-2	SPT	0-1.5	15
B99-2	SPT	1.5-3	9
B99-2	SPT	4-5.5	18
B99-2	SPT	6.5-8	18.5
B99-2	SPT	9-10.5	22
B99-2	SPT	14-15.5	22
B99-2	SPT	19-20.5	26.5
B99-2	SPT	24-25.5	27
B99-2	SPT	29-30.5	42
B99-2	SPT	34-35.5	41
B99-2	SPT	39-40.5	24
B99-2	SPT	44-45.5	24.5
B99-4	SPT	0-1.5	14
B99-4	SPT	1.5-3	19
B99-4	SPT	4-5.5	20
B99-4	SPT	6.5-8	16
B99-4	SPT	9-10.5	21
B99-4	SPT	14-15.5	20.5
B99-4	SPT	19-20.5	17
B99-4	SPT	24-25.5	21
B99-4	SPT	29-30.5	17
B99-4	SPT	34-35.5	18
B99-4	SPT	39-40.5	20
B99-5	SPT	4-5.5	16
B99-5	SPT	6.5-8	20
B99-5	SPT	9-10.5	16
B99-5	SPT	14-15.5	16
B99-5	SPT	19-20.5	52.5
B99-5	SPT	24-25.5	37
B99-5	SPT	29-30.5	23
B99-5	SPT	34-35.5	38
B99-6	SPT	9-10.5	18
B99-7	SPT	0-1.5	4
B99-7	SPT	1.5-3	9
B99-7	SPT	4-5.5	5
B99-7	SPT	6.5-8	28
B99-7	SPT	9-10.5	21

Moisture Content Laboratory Test Results Cont. LAW Project 50300-8-2075/0024/0800			
Boring Number	**Sample Type**	**Sample Depth (ft)**	**Moisture Content (%)**
B99-7	SPT	14-15.5	22
B99-7	SPT	19-20.5	28.5
B99-8	SPT	1.5-3	18
B99-8	SPT	4-5.5	25
B99-8	SPT	6.5-8	21
B99-8	SPT	9-10.5	13
B99-10	SPT	0-1.5	13
B99-10	SPT	1.5-3	15
B99-10	SPT	4-5.5	21
B99-10	SPT	6.5-8	22
B99-10	SPT	9-10.5	19
B99-12	SPT	0-1.5	17
B99-12	SPT	1.5-3	16
B99-12	SPT	4-5.5	11
B99-12	SPT	6.5-8	18
B99-12	SPT	9-10.5	13

SPT – Standard Penetration Test Sample



	TOTAL	EFFECTIVE
C, ksf	0.65	1.07
ϕ, deg	13.8	16.9
TAN ϕ	0.24	0.30



SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	18.4	18.5
	DRY DENSITY, pcf	61.9	70.5
	SATURATION, %	31.9	40.8
	VOID RATIO	1.330	1.047
	DIAMETER, in	2.87	2.88
	HEIGHT, in	6.00	6.00
AT TEST	WATER CONTENT, %	55.8	40.1
	DRY DENSITY, pcf	63.0	74.9
	SATURATION, %	100.0	100.0
	VOID RATIO	1.290	0.926
	DIAMETER, in	2.86	2.81
	HEIGHT, in	5.95	5.90
BACK PRESSURE, ksf		2.97	2.98
CELL PRESSURE, ksf		6.97	10.98
FAILURE STRESS, ksf		4.16	6.66
PORE PRESSURE, ksf		5.40	6.36
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		5.73	11.27
$\bar{\sigma}_3$ FAILURE, ksf		1.57	4.62

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Gray Sandy Silt

LL= PL= PI=

SPECIFIC GRAVITY= 2.31

REMARKS: Tested by: LW

Reviewed by: HD

FIG. NO.

CLIENT:

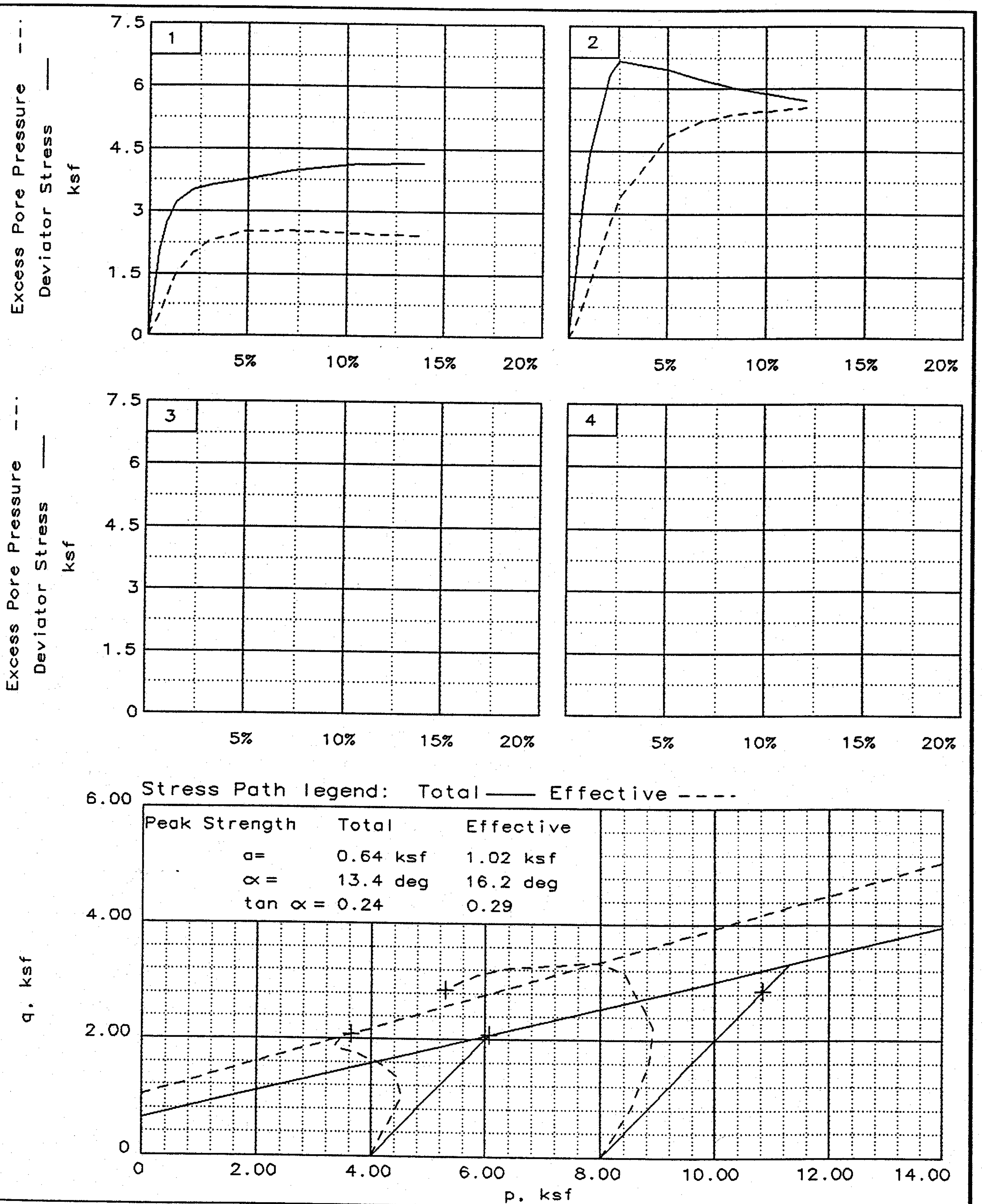
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-1
Ud @ 17.5-19.5 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

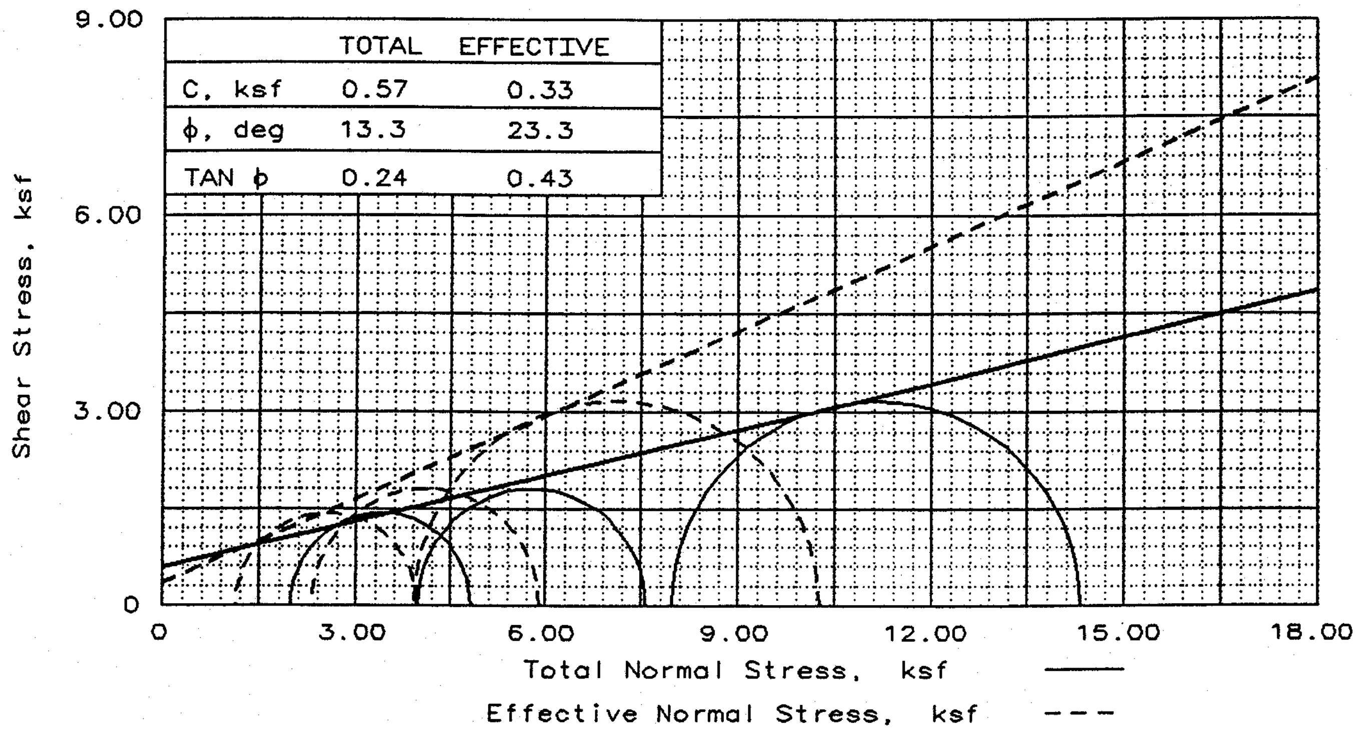


Client:

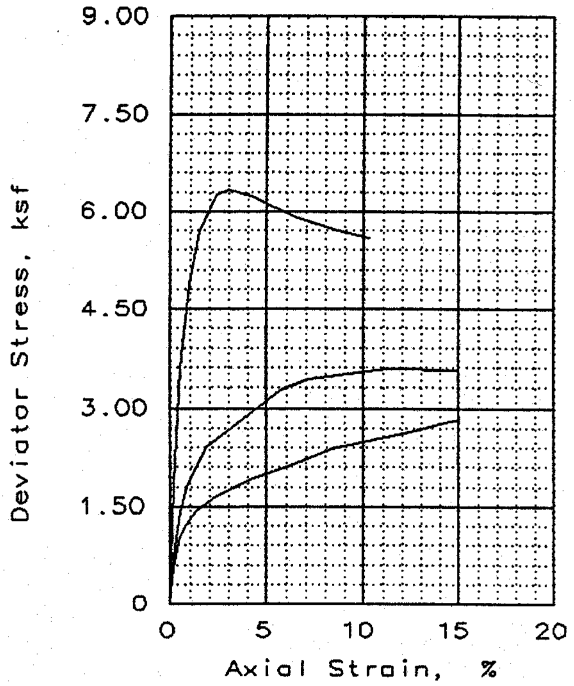
Project: TVA John Sevier

Location: B99-1 Ud @ 17.5-19.5 Ft.

File: 2075B Project No.: 5030082075 Page 2/2 Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	0.57	0.33
ϕ, deg	13.3	23.3
TAN ϕ	0.24	0.43



SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	37.2	44.3	35.4
	DRY DENSITY, pcf	64.0	59.9	62.1
	SATURATION, %	69.3	73.4	62.4
	VOID RATIO	1.223	1.375	1.293
	DIAMETER, in	2.87	2.87	2.87
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	50.5	57.4	52.4
	DRY DENSITY, pcf	66.2	61.7	64.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.151	1.309	1.195
	DIAMETER, in	2.83	2.84	2.83
	HEIGHT, in	5.97	5.95	5.92
BACK PRESSURE, ksf		2.94	2.98	3.01
CELL PRESSURE, ksf		4.94	6.98	11.01
FAILURE STRESS, ksf		2.83	3.59	6.33
PORE PRESSURE, ksf		3.79	4.65	7.07
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		3.98	5.91	10.27
$\bar{\sigma}_3$ FAILURE, ksf		1.15	2.33	3.94

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Gray Silt with Sand

LL= PL= PI=

SPECIFIC GRAVITY= 2.28

REMARKS: Tested by: LW

Reviewed by: Hb

FIG. NO.

CLIENT:

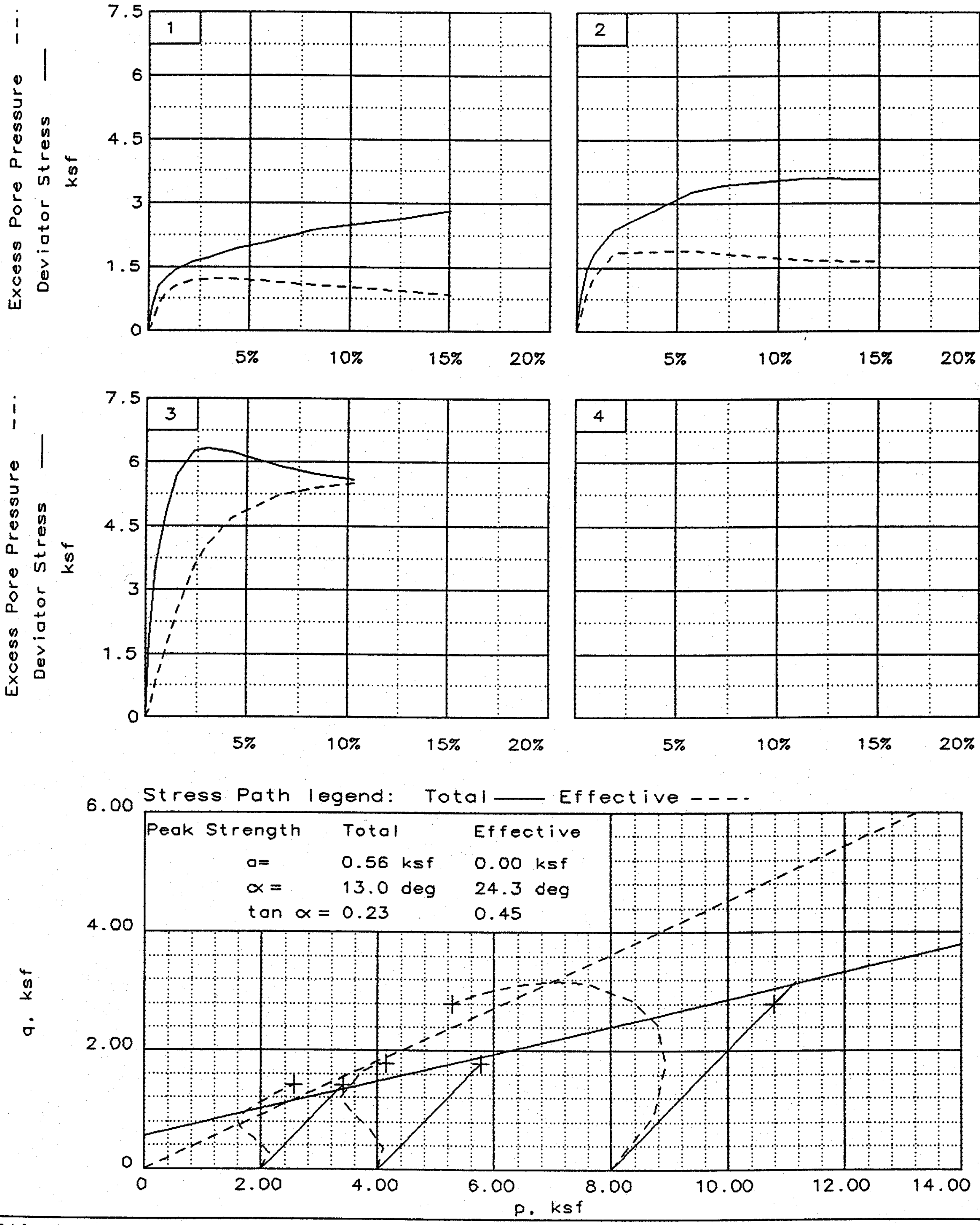
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-2
Ud @ 19-21 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

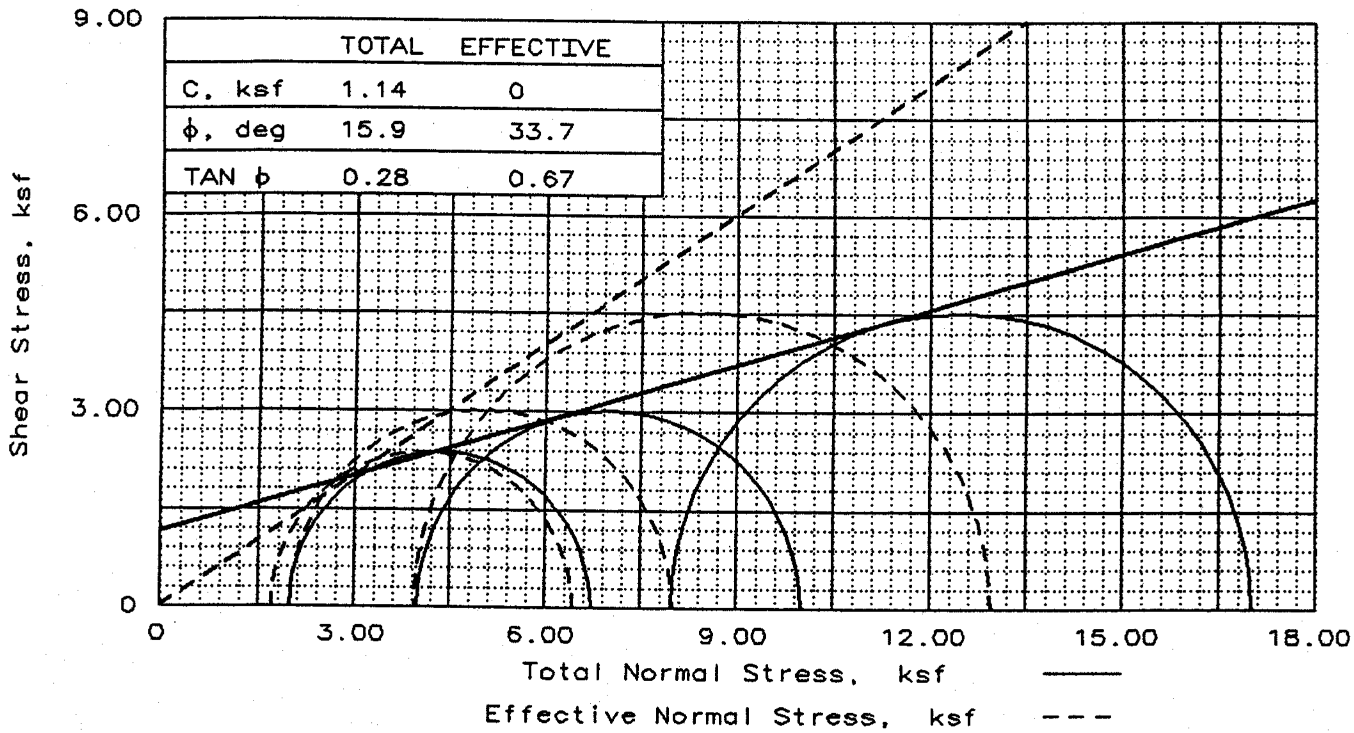


Client:

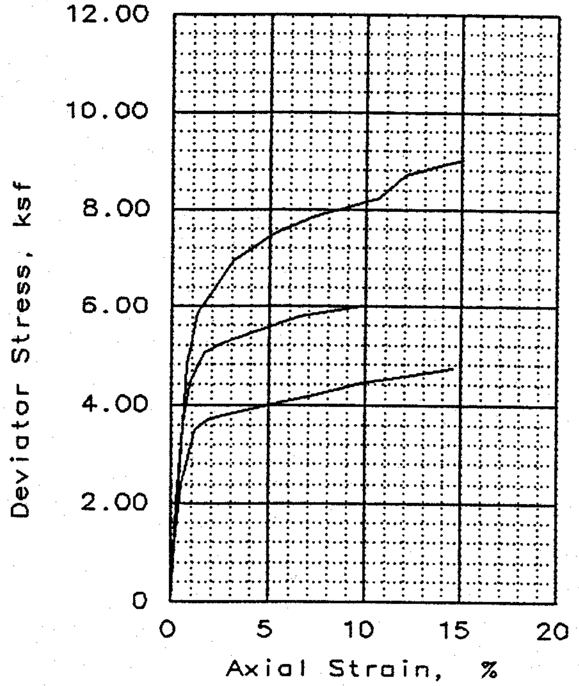
Project: TVA John Sevier

Location: B99-2 Ud @ 19-21 Ft.

File: 2075D | Project No.: 5030082075 | Page 2/2 | Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	1.14	0
ϕ, deg	15.9	33.7
TAN ϕ	0.28	0.67



	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	24.3	25.2	23.4
	DRY DENSITY, pcf	102.0	100.5	102.2
	SATURATION, %	98.4	98.1	95.1
	VOID RATIO	0.678	0.702	0.674
	DIAMETER, in	2.86	2.88	2.88
	HEIGHT, in	6.01	6.00	6.00
AT TEST	WATER CONTENT, %	23.6	24.0	24.4
	DRY DENSITY, pcf	103.9	103.2	102.5
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.646	0.657	0.669
	DIAMETER, in	2.84	2.85	2.88
	HEIGHT, in	5.98	5.94	5.97
	BACK PRESSURE, ksf	2.94	3.04	3.66
	CELL PRESSURE, ksf	6.94	11.04	5.66
	FAILURE STRESS, ksf	6.01	9.02	4.73
	PORE PRESSURE, ksf	4.94	7.08	3.95
	STRAIN RATE, %/min.	0.100	0.100	0.100
	ULTIMATE STRESS, ksf			
	PORE PRESSURE, ksf			
	$\bar{\sigma}_1$ FAILURE, ksf	8.01	12.97	6.44
	$\bar{\sigma}_3$ FAILURE, ksf	2	3.95	1.71

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Ud
DESCRIPTION: Gray Brown Clayey Silty with Sand
LL= PL= PI=
SPECIFIC GRAVITY= 2.74
REMARKS: Tested by: LW

Reviewed by: ltd

FIG. NO.

CLIENT:

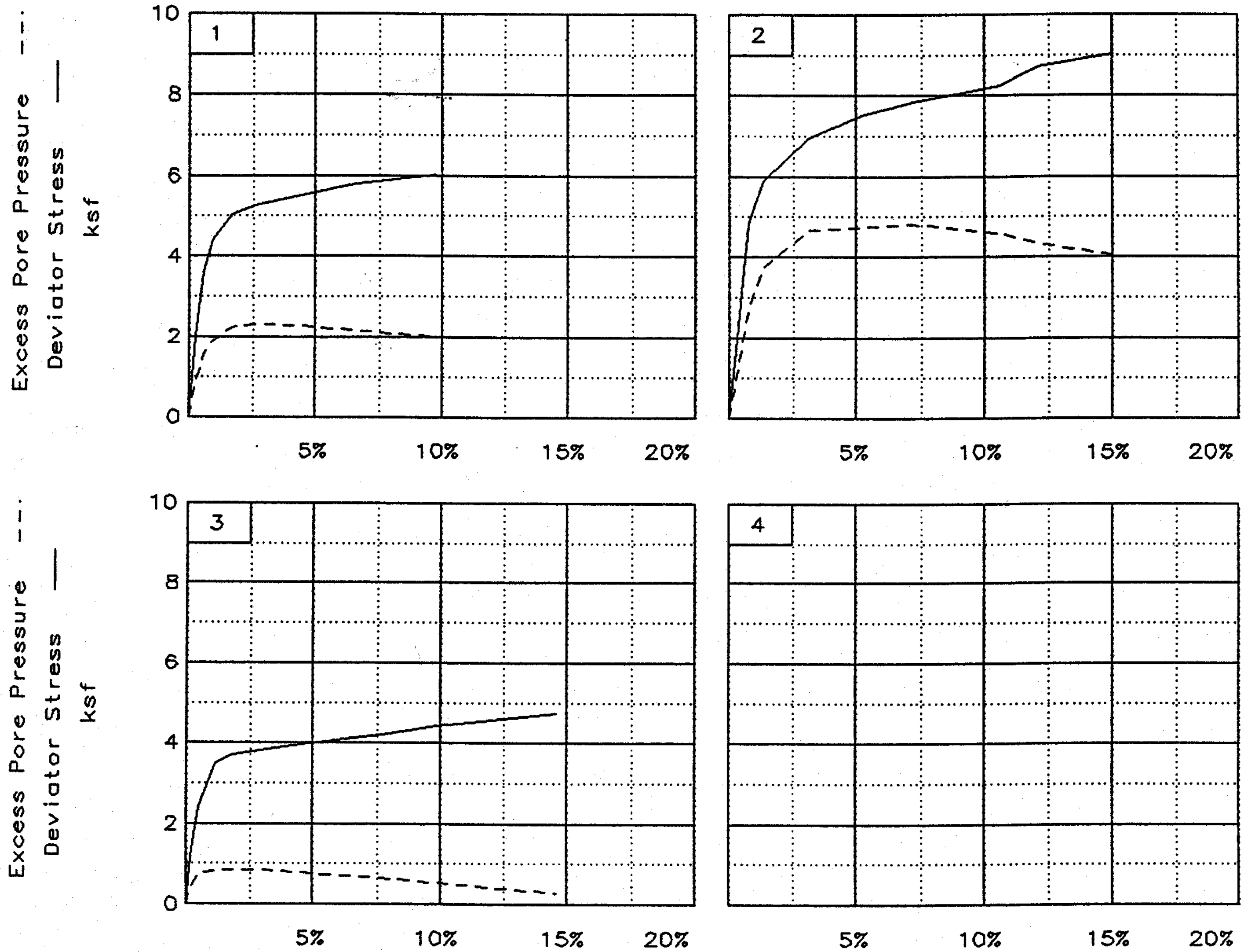
PROJECT: TVA John Sevier

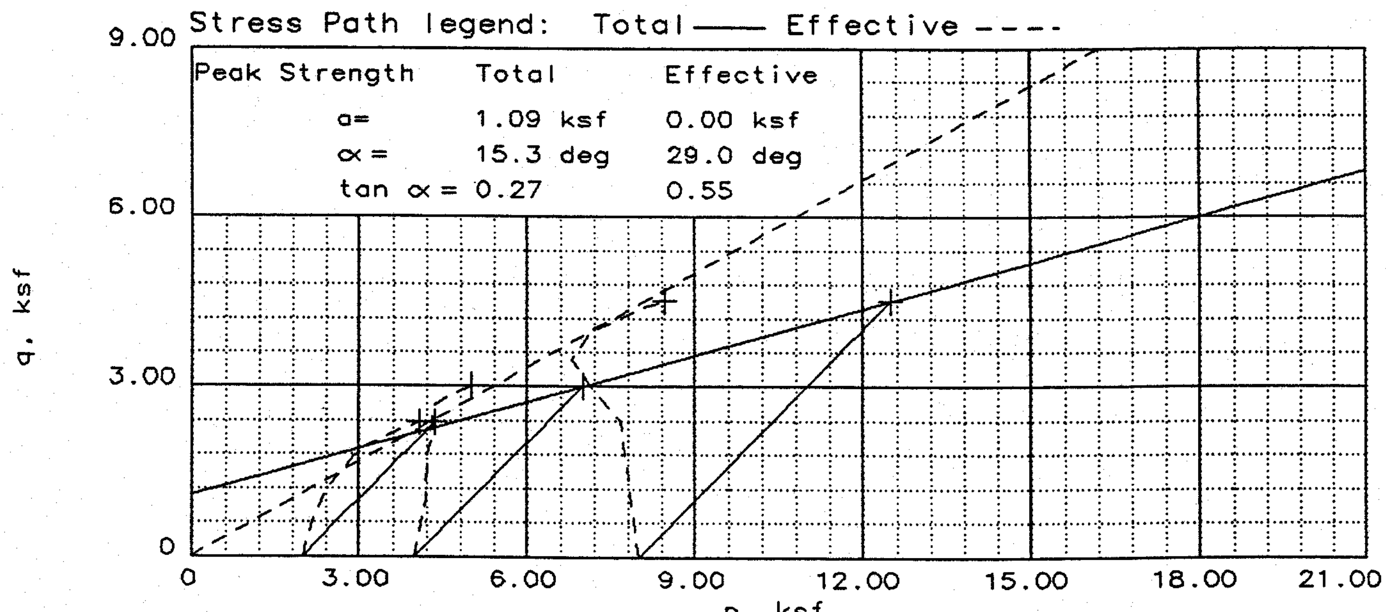
SAMPLE LOCATION: B99-2
Ud @ 39-41 Ft

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

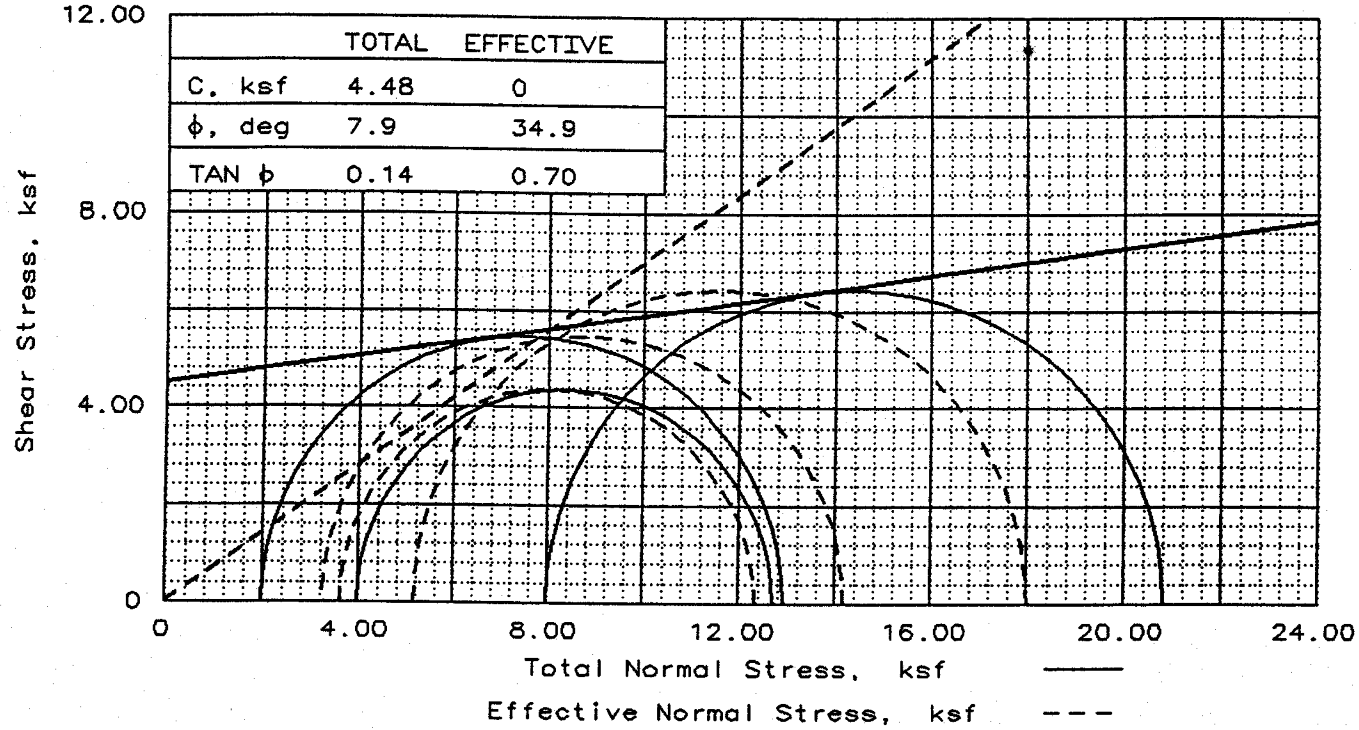


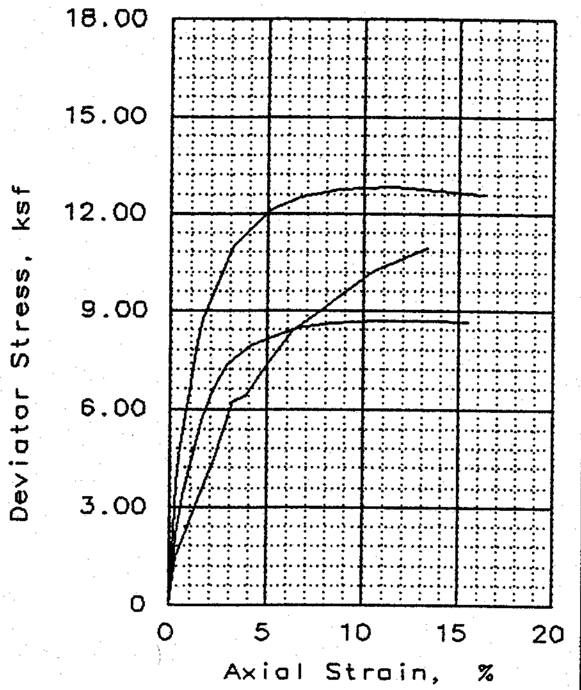


Peak Strength	Total	Effective
a=	1.09 ksf	0.00 ksf
α =	15.3 deg	29.0 deg
tan α =	0.27	0.55

Client:
Project: TVA John Sevier
Location: B99-2 Ud @ 39-41 Ft
File: 2075 Project No.: 5030082075 Page 2/2 Fig. No. ____

	TOTAL	EFFECTIVE
C, ksf	4.48	0
ϕ, deg	7.9	34.9
TAN ϕ	0.14	0.70





	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	17.2	18.0	19.0
	DRY DENSITY, pcf	113.1	111.6	108.7
	SATURATION, %	90.9	91.2	89.4
	VOID RATIO	0.523	0.544	0.585
	DIAMETER, in	2.88	2.86	2.87
	HEIGHT, in	6.03	6.01	6.01
AT TEST	WATER CONTENT, %	18.2	18.2	22.8
	DRY DENSITY, pcf	114.6	114.6	105.7
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.503	0.503	0.631
	DIAMETER, in	2.86	2.84	2.91
	HEIGHT, in	6.00	5.94	5.98
	BACK PRESSURE, ksf	3.72	3.66	2.94
	CELL PRESSURE, ksf	5.71	11.66	6.94
	FAILURE STRESS, ksf	10.92	12.83	8.71
	PORE PRESSURE, ksf	2.45	6.48	3.30
	STRAIN RATE, %/min.	0.100	0.100	0.100
	ULTIMATE STRESS, ksf			
	PORE PRESSURE, ksf			
	$\bar{\sigma}_1$ FAILURE, ksf	14.19	18.01	12.35
	$\bar{\sigma}_3$ FAILURE, ksf	3.27	5.18	3.64

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud.

DESCRIPTION: Gray Brown Sandy Lean Clay

LL= 29 PL= 19 PI= 10.0

SPECIFIC GRAVITY= 2.76

REMARKS: Tested by: LW

Reviewed by: Hb

FIG. NO.

CLIENT:

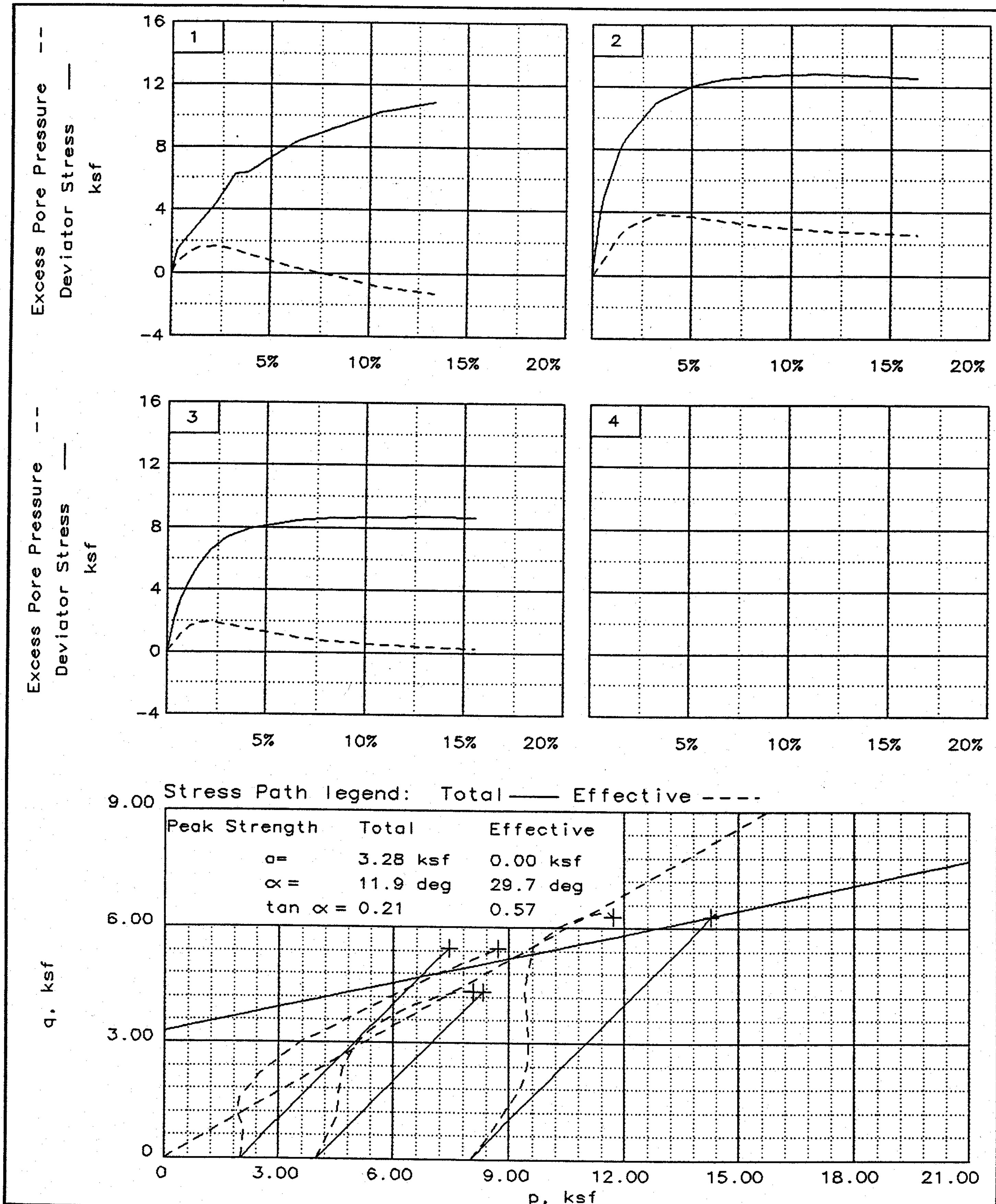
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-4
Ud @ 29-31 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



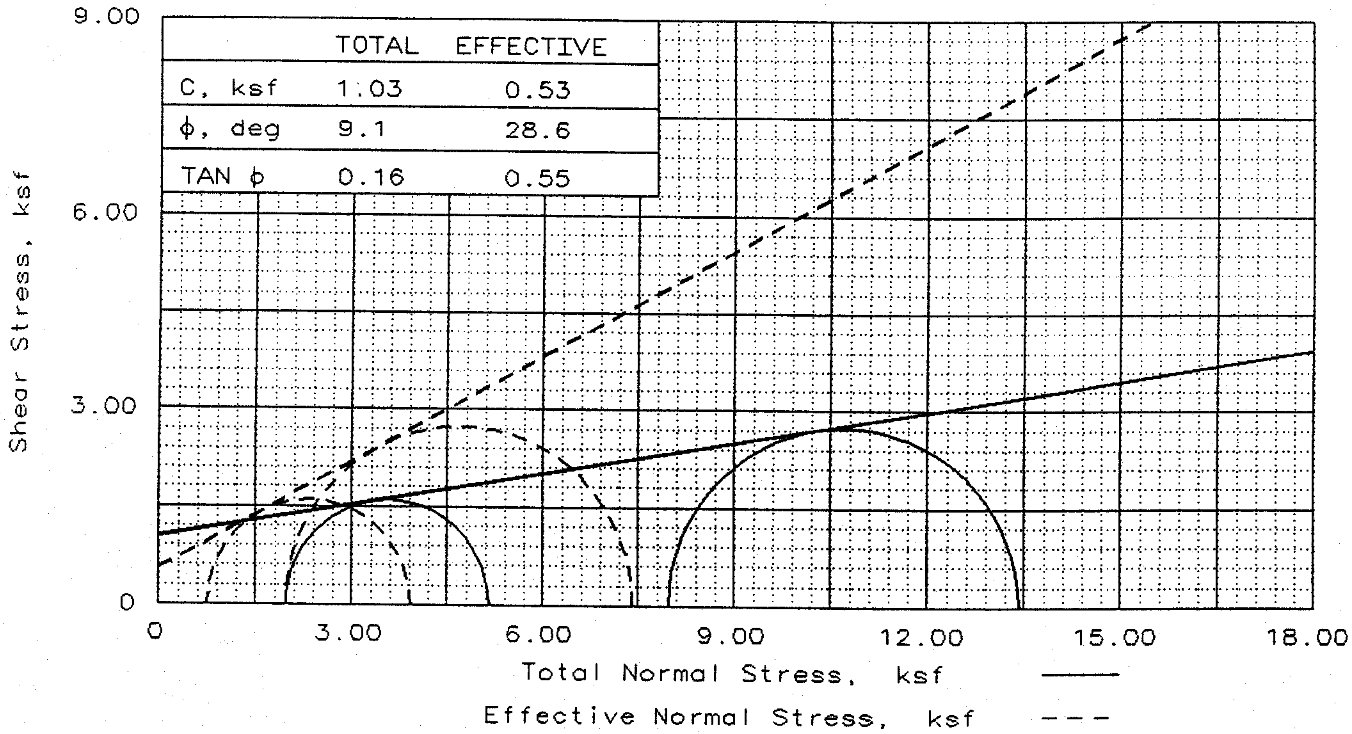
Client:

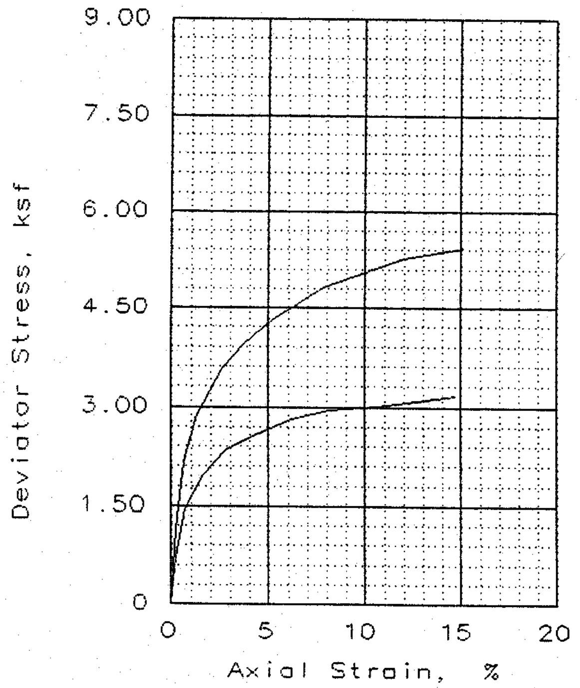
Project: TVA John Sevier

Location: B99-4 Ud @ 29-31 Ft.

File: 2075A   Project No.: 5030082075   Page 2/2   Fig. No. ____

	TOTAL	EFFECTIVE
C, ksf	1.03	0.53
ϕ, deg	9.1	28.6
TAN ϕ	0.16	0.55





SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	27.6	25.9
	DRY DENSITY, pcf	95.7	98.7
	SATURATION, %	95.7	96.4
	VOID RATIO	0.794	0.739
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.01	6.01
AT TEST	WATER CONTENT, %	28.1	25.2
	DRY DENSITY, pcf	96.9	101.5
	SATURATION, %	100.0	100.0
	VOID RATIO	0.772	0.692
	DIAMETER, in	2.85	2.85
	HEIGHT, in	5.99	5.96
BACK PRESSURE, ksf		3.64	2.76
CELL PRESSURE, ksf		5.64	10.76
FAILURE STRESS, ksf		3.17	5.43
PORE PRESSURE, ksf		4.88	8.77
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		3.93	7.43
$\bar{\sigma}_3$ FAILURE, ksf		0.76	1.99

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Ud
DESCRIPTION: Gray Brown Sandy Lean Clay
LL= 49 PL= 24 PI= 25.0
SPECIFIC GRAVITY= 2.75
REMARKS: Tested by: LW

Reviewed by: HD

FIG. NO.

CLIENT:

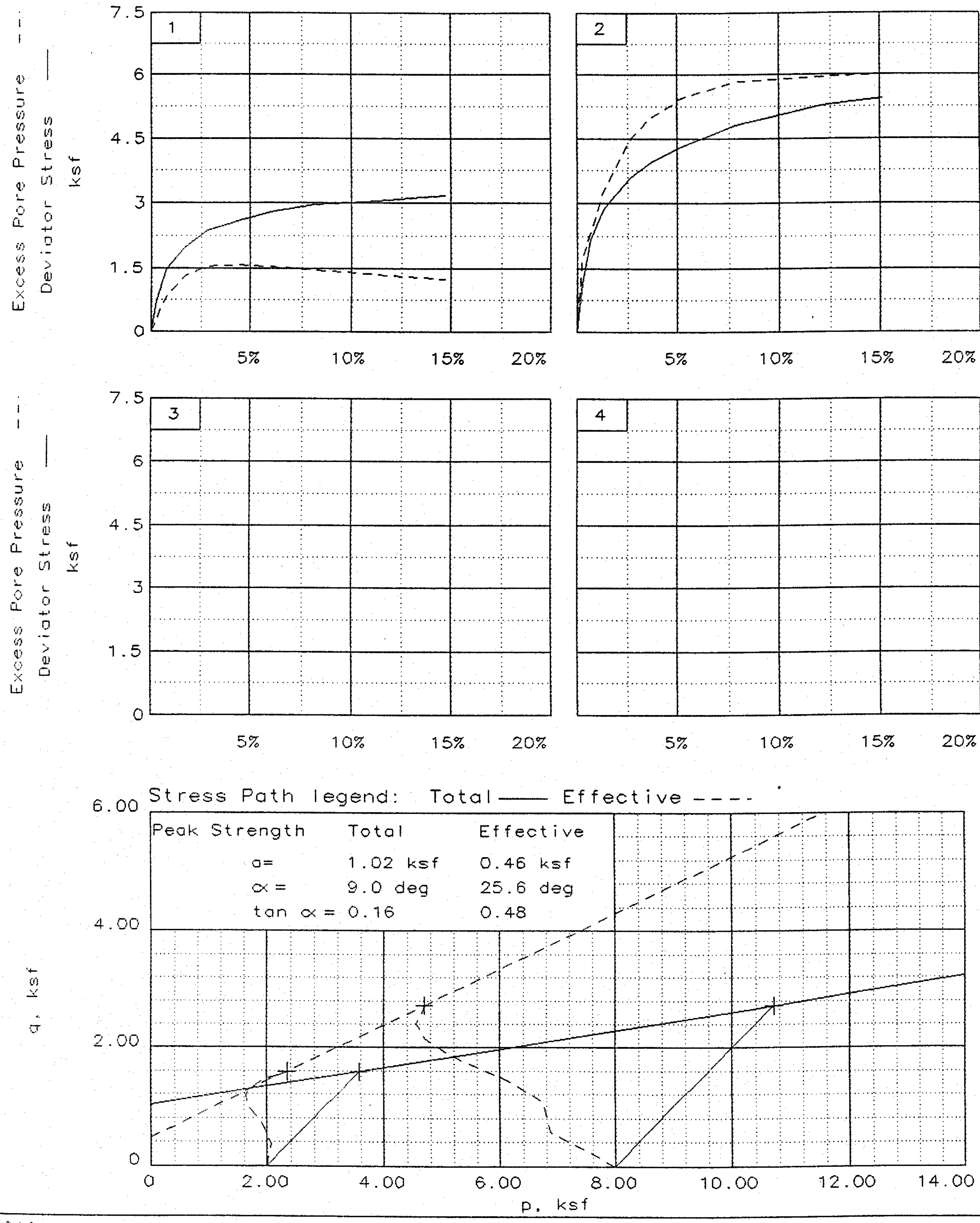
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-15
Ud @ 34-36 Ft.

PROJ. NO.: 5030082075 DATE: Sept 22, 1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

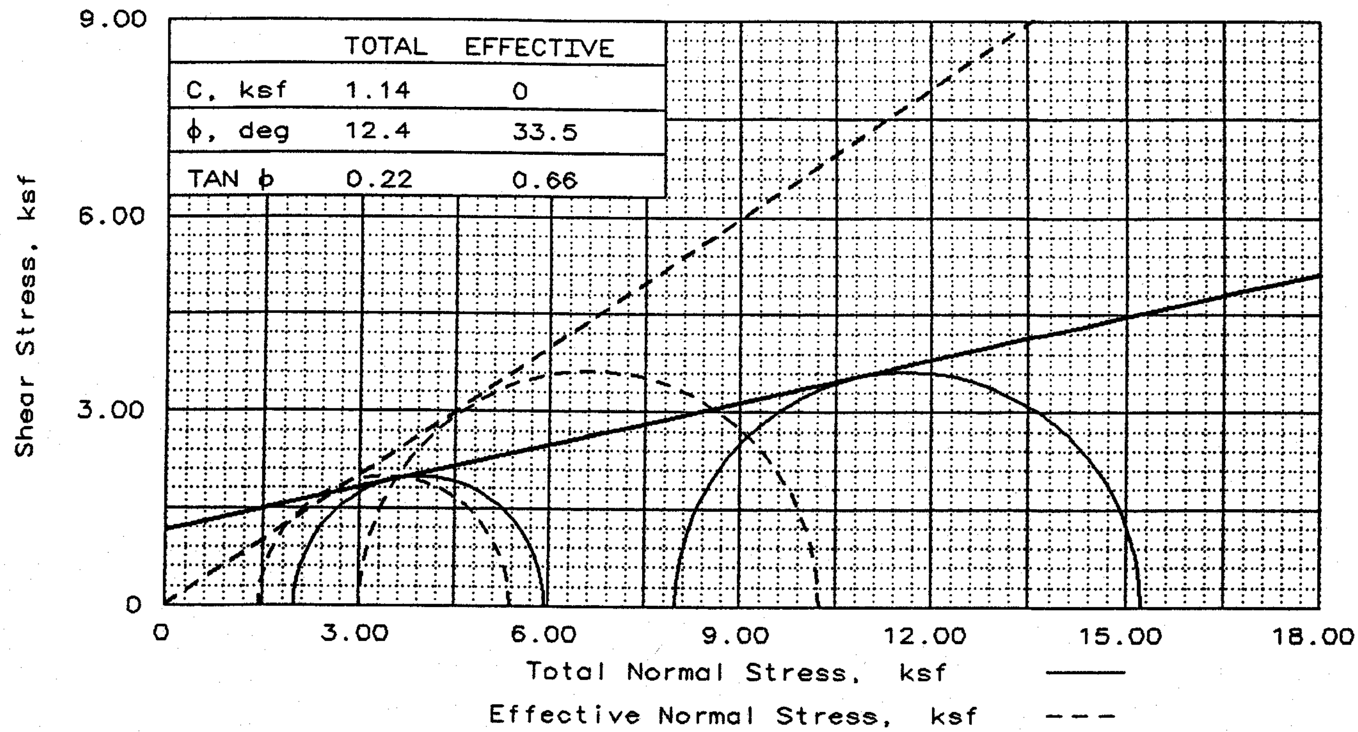


Client:

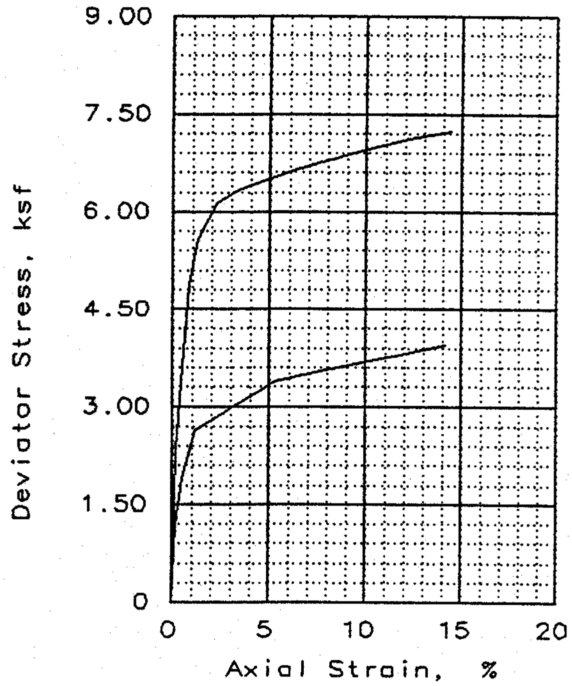
Project: TVA John Sevier

Location: B99-~~4~~5 Ud @ 34-36 Ft.

File: 2075E Project No.: 5030082075 Page 2/2 Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	1.14	0
ϕ, deg	12.4	33.5
TAN ϕ	0.22	0.66



SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	20.3	21.8
	DRY DENSITY, pcf	103.4	100.3
	SATURATION, %	88.4	87.8
	VOID RATIO	0.613	0.662
	DIAMETER, in	2.85	2.87
	HEIGHT, in	6.01	6.01
AT TEST	WATER CONTENT, %	22.2	22.3
	DRY DENSITY, pcf	104.7	104.4
	SATURATION, %	100.0	100.0
	VOID RATIO	0.592	0.596
	DIAMETER, in	2.84	2.82
	HEIGHT, in	5.98	5.96
BACK PRESSURE, ksf		3.77	3.69
CELL PRESSURE, ksf		5.77	11.69
FAILURE STRESS, ksf		3.94	7.24
PORE PRESSURE, ksf		4.32	8.67
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		5.40	10.25
$\bar{\sigma}_3$ FAILURE, ksf		1.45	3.02

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Brown Sandy Lean Clay

LL= 45 PL= 22 PI= 23.0

SPECIFIC GRAVITY= 2.67

REMARKS: Tested by: LW

Reviewed by: lb

FIG. NO.

CLIENT:

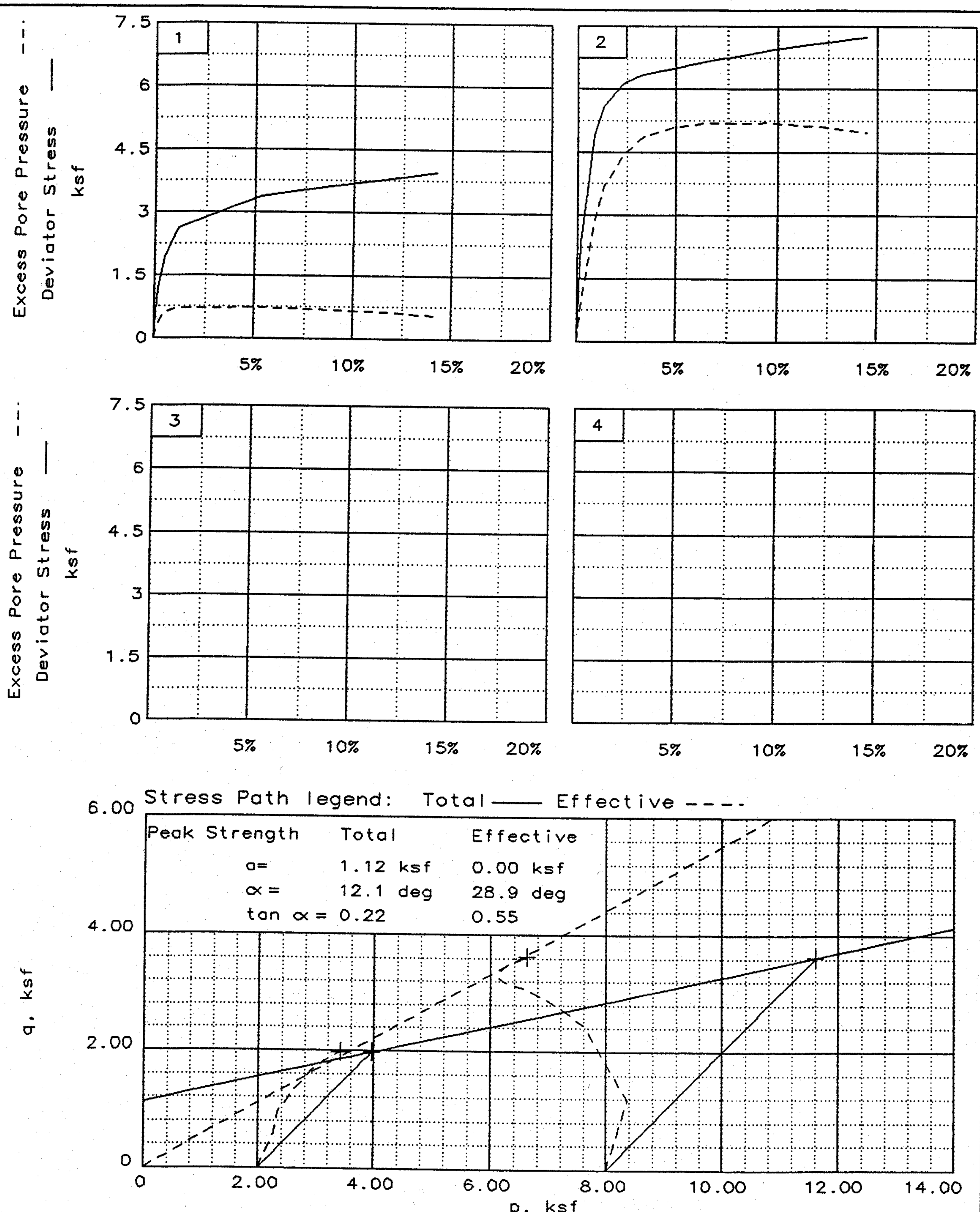
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-8
Ud @ 4-6 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



Client:

Project: TVA John Sevier

Location: B99-8 Ud @ 4-6 Ft.

File: 2075C Project No.: 5030082075 Page 2/2 Fig. No. ____

LAWGIBB GROUP

TP-4A: UNIT WEIGHT OF SAMPLE

Project No.:	50300-8-2075	Boring No.:	B-99-5
Phase:	24 Task: 830	Depth:	19.0-21.0 Ft.
Project Name:	TVA John Sevier	Sample ID:	Ud
Tested By:	JTM	Reviewed By:	HEJ
Date:	08/17/99	Date:	09/01/99

Total Sample Height, *inches*		Inside Diameter of Cut Tube, *inches*		Moisture Content		
1	4.711			Tare No.	SS-56	
2	4.71	Top	2.870	Tare Weight	142.64	*grams*
3	4.71	Bottom	2.865	Wet Weight + Tare	251.82	*grams*
Average	4.71	Average	2.868	Dry Weight + Tare	207.27	*grams*
				Moisture Content	68.9	%

Total Weight of Soil + Tube Section	733.30	*grams*
Weight of Clean, Dry Tube Section	0.00	*grams*
Wet Weight of Soil	1.62	*lbs*
Volume of Sample	0.018	ft^3

RESULT SUMMARY

Moisture Content	**68.9**	**%**
Wet Density	**91.8**	***pcf***
Dry Density	**54.4**	***pcf***

LAWGIBB GROUP

TP-4A: UNIT WEIGHT OF SAMPLE

Project No.:	50300-8-2075	Boring No.:	B-99-13
Phase:	24 Task: 830	Depth:	19.0-21.0 Ft.
Project Name:	TVA John Sevier	Sample ID:	Ud
Tested By:	JTM	Reviewed By:	HEJ
Date:	08/17/99	Date:	09/01/99

Total Sample Height, *inches*		**Inside Diameter of Cut Tube, *inches***		**Moisture Content**		
1	4.712			Tare No.	SS-52	
2	4.71	Top	2.868	Tare Weight	144.53	*grams*
3	4.714	Bottom	2.868	Wet Weight + Tare	240.49	*grams*
Average	4.71	Average	2.868	Dry Weight + Tare	223.65	*grams*
				Moisture Content	21.3	%

Total Weight of Soil + Tube Section	711.12	*grams*
Weight of Clean, Dry Tube Section	0.00	*grams*
Wet Weight of Soil	1.57	*lbs*
Volume of Sample	0.018	ft^3

RESULT SUMMARY

Moisture Content	**21.3**	**%**
Wet Density	**89.0**	***pcf***
Dry Density	**73.4**	***pcf***

LAWGIBB GROUP

TP-4A: UNIT WEIGHT OF SAMPLE

Project No.: 50300-8-2075
Phase: 24 Task: 830
Project Name: TVA John Sevier
Tested By: JTM
Date: 08/17/99

Boring No.: B-99-2
Depth: 9.0-11.0 Ft.
Sample ID: Ud
Reviewed By: HEJ
Date: 09/01/99

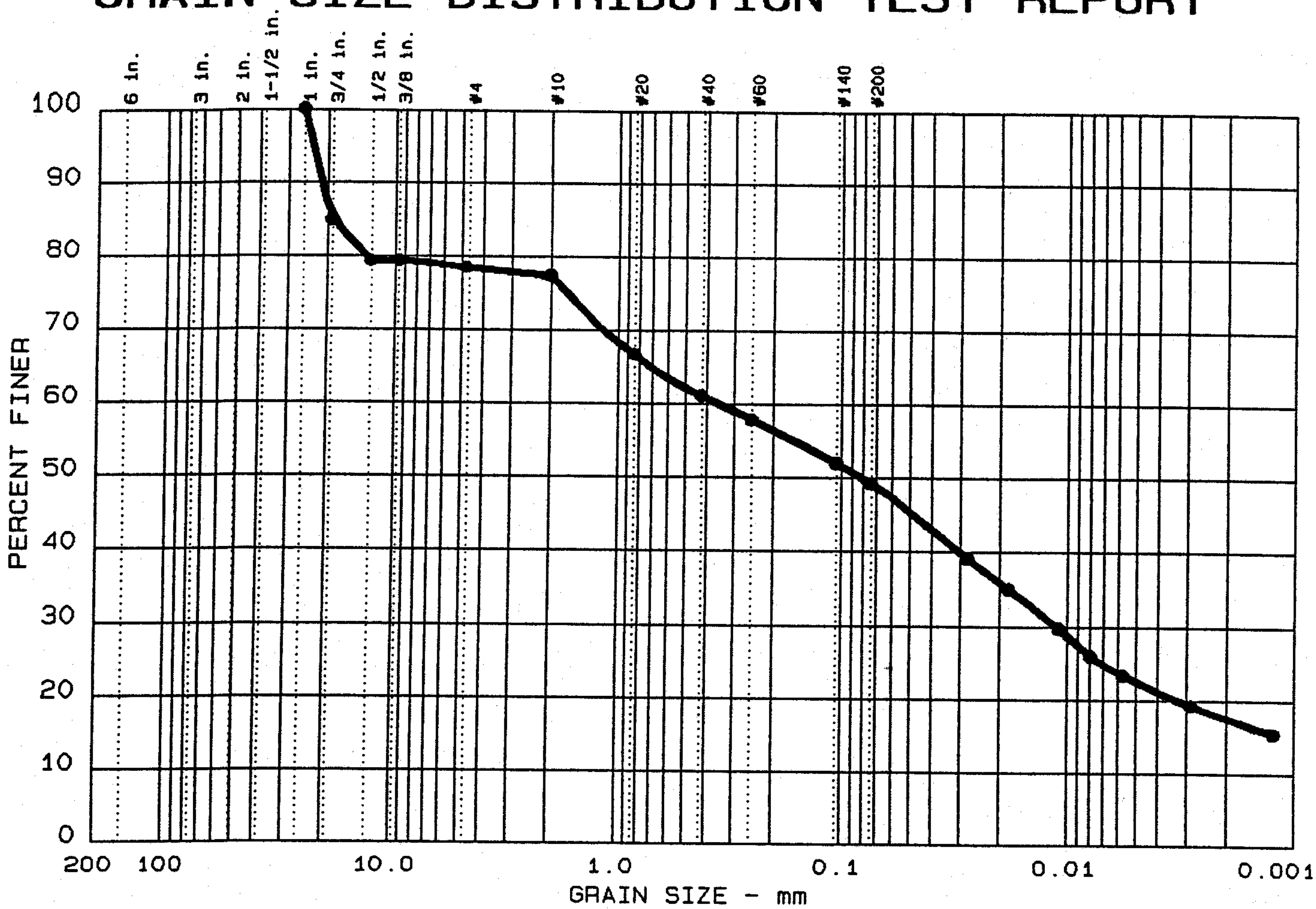
Total Sample Height, *inches*		Inside Diameter of Cut Tube, *inches*		Moisture Content		
1	4.705			Tare No.	SS-49	
2	4.704	Top	2.850	Tare Weight	143.56	*grams*
3	4.705	Bottom	2.850	Wet Weight + Tare	198.59	*grams*
Average	4.70	Average	2.850	Dry Weight + Tare	188.39	*grams*
				Moisture Content	22.8	%

Total Weight of Soil + Tube Section	542.30	*grams*
Weight of Clean, Dry Tube Section	0.00	*grams*
Wet Weight of Soil	1.20	*lbs*
Volume of Sample	0.017	ft^3

RESULT SUMMARY

Moisture Content	**22.8**	*%*
Wet Density	**68.8**	*pcf*
Dry Density	**56.1**	*pcf*

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	21.6	29.2	26.6	22.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			19.05	0.35	0.08	0.011				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Silty Sand	SM	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-1 S-5

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:

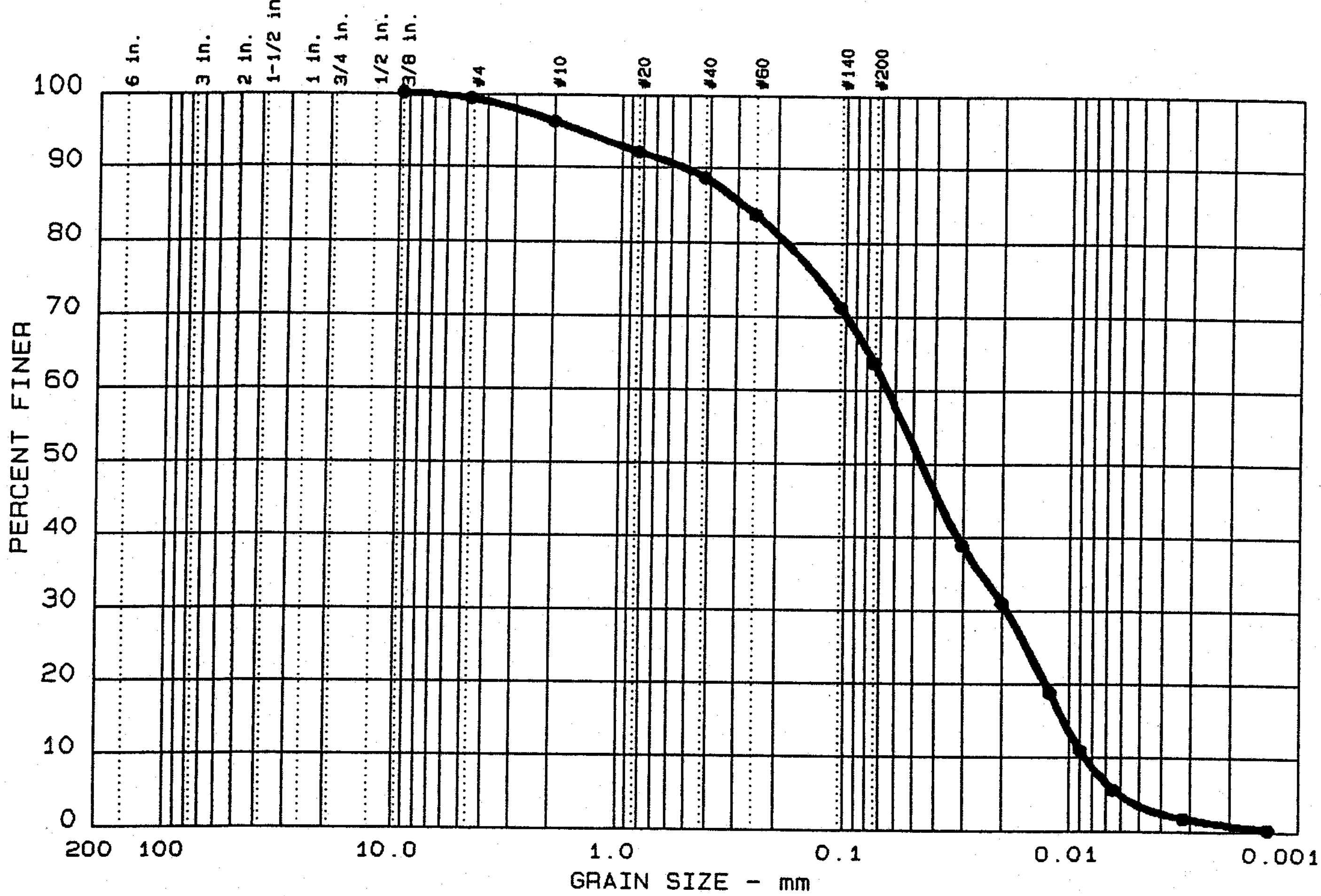
Tested by: Sc

Reviewed by: Hb

Moisture Content = 15.5%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.6	35.7	60.3	3.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.28		0.05	0.019	0.0105	0.0085	0.66	7.6

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-1 Ud @ 17.5-19.5 Ft.

Date: August 31, 1999

Remarks:

Tested by: Sc/JTM

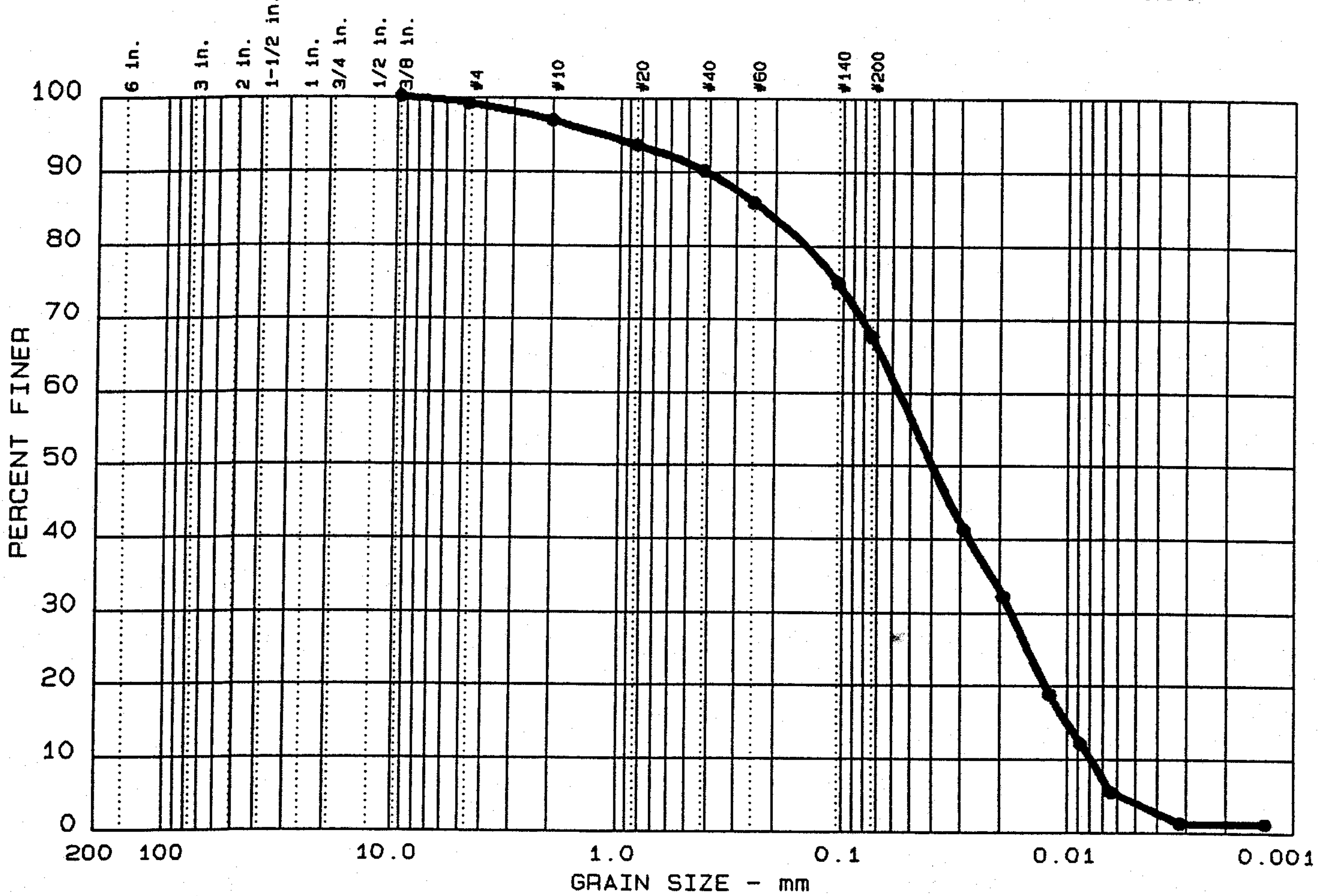
Reviewed by: Kb

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.9	31.4	63.6	4.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.23		0.04	0.018	0.0100	0.0078	0.72	7.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-1 S-8

Date: August 29, 1999

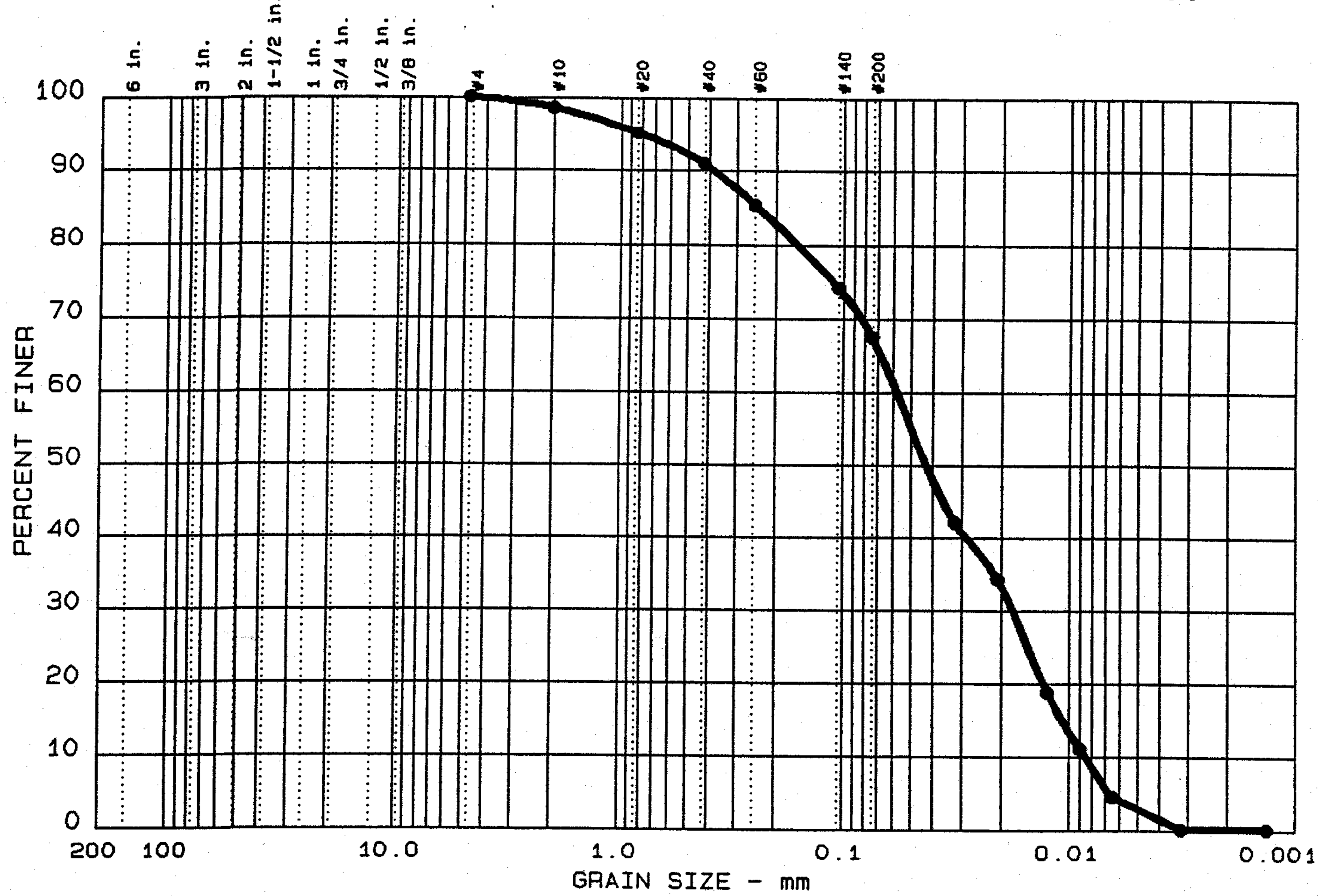
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: Hb

Moisture Conttent = 27.0

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	13	0.0	0.0	32.5	64.6	2.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.24		0.04	0.018	0.0107	0.0085	0.64	6.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-2 Ud @ 9.0-11.0 Ft.

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

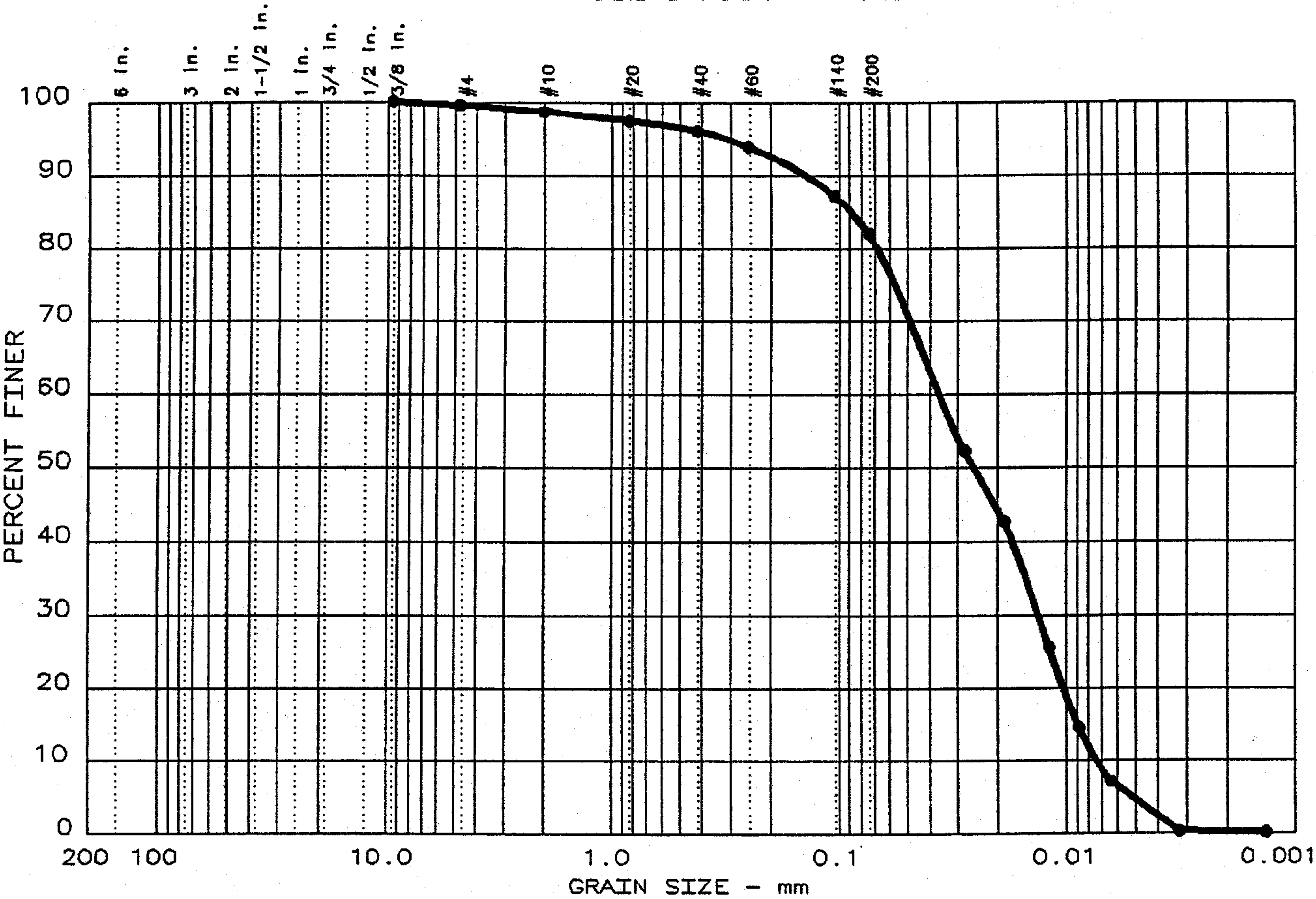
Tested by: SC

Reviewed by: [signature]

Moisture Content = 22.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.5	17.5	77.4	4.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.09		0.03	0.013	0.0089	0.0074	0.65	4.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Silt with Sand	ML	A-4(0.0)

Project No.: 50300-8-2075.24.830
Project: TVA John Sevier
● Location: B99-2 Ud @ 19-21 Ft.

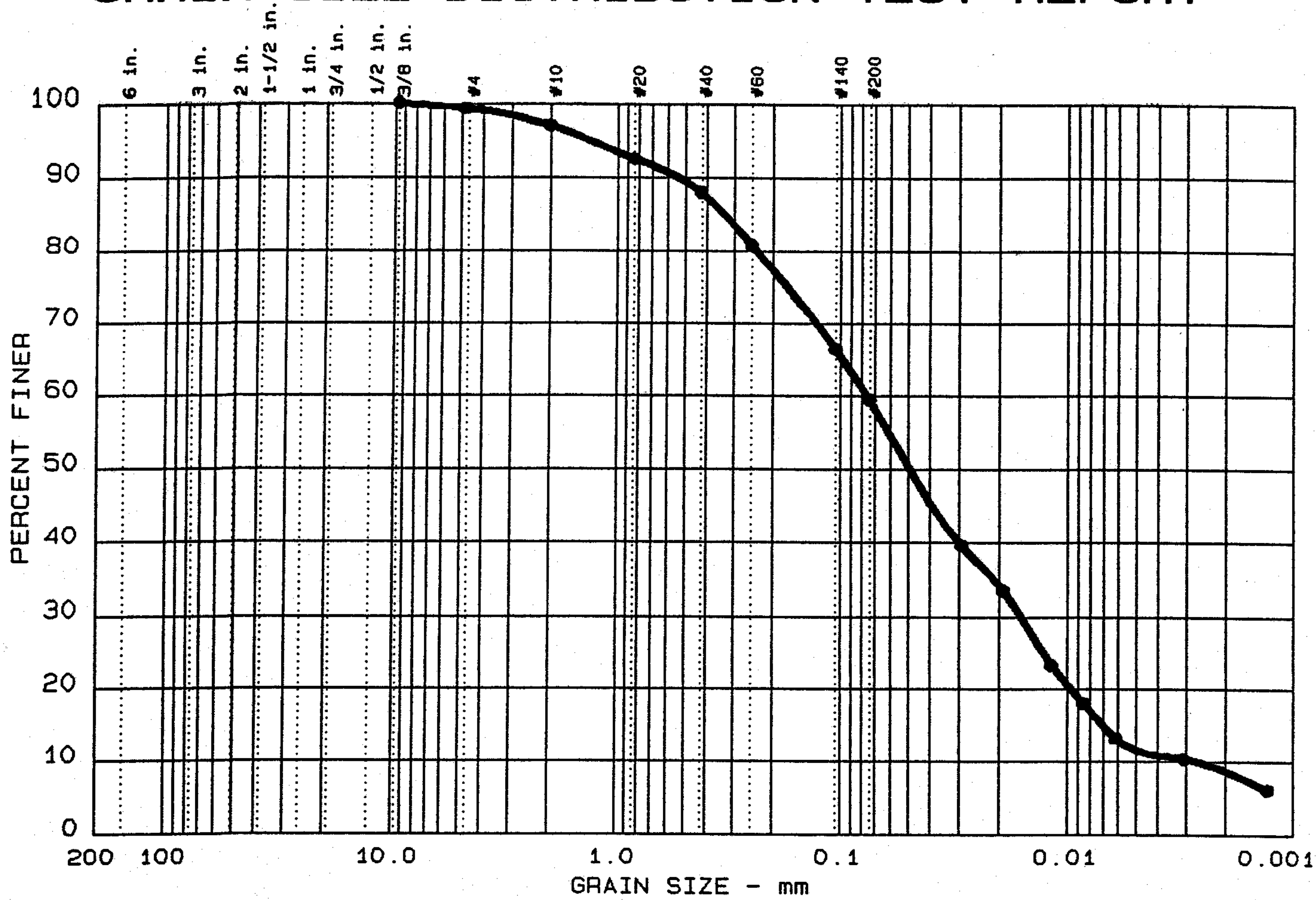
Date: August 31,1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested By: SC
Reviewed by: Hb

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	0.7	39.9	47.9	11.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.33	0.08	0.05	0.016	0.0070	0.0027	1.23	28.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-2 S-8

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:

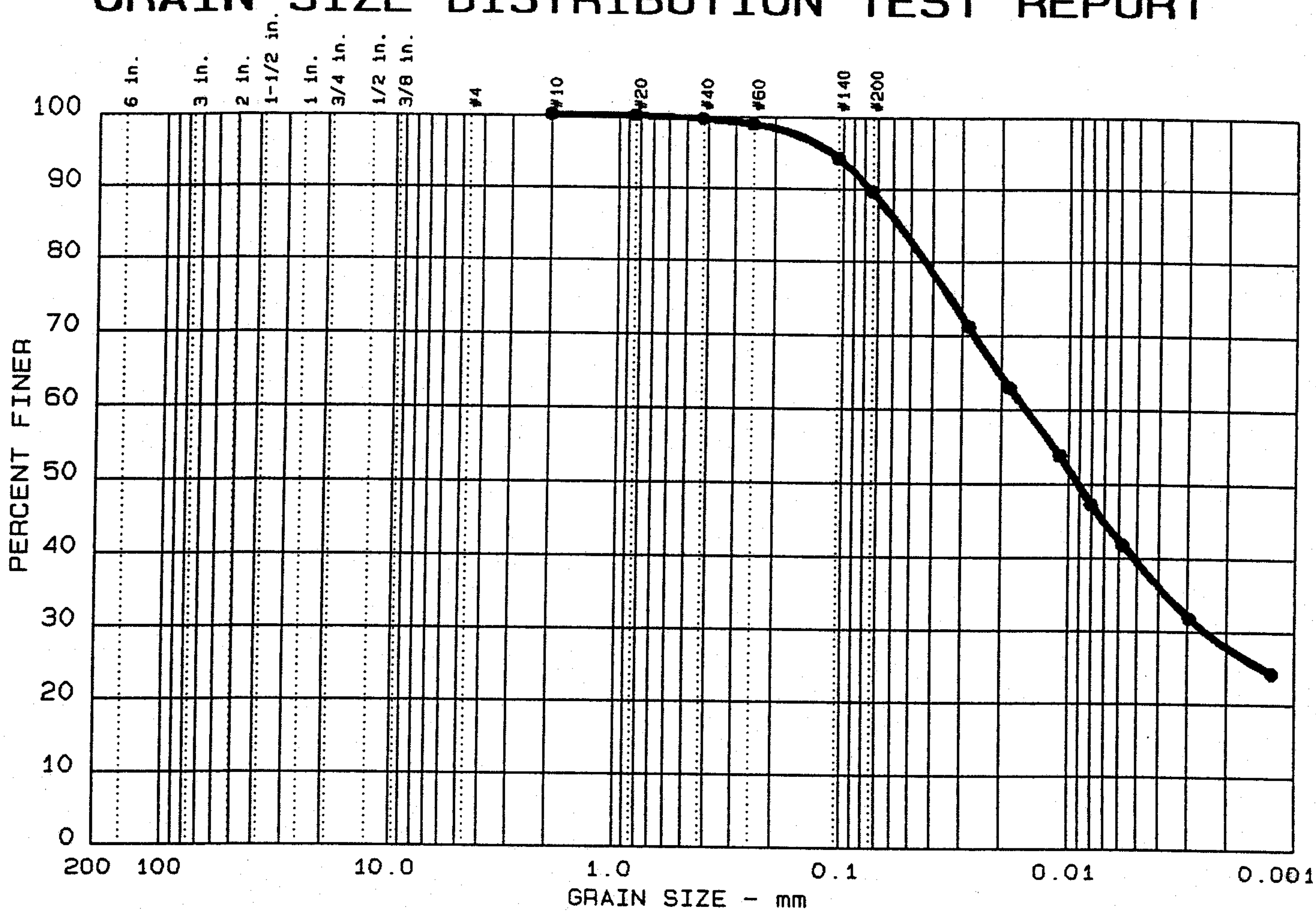
Tested by: SC

Reviewed by: [initials]

Moisture Content = 26.9%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	10.3	50.2	39.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●					0.01	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Clayey Silt with Sand	ML	A-4 (0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-2 Ud @ 39.0-41.0 Ft.

Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

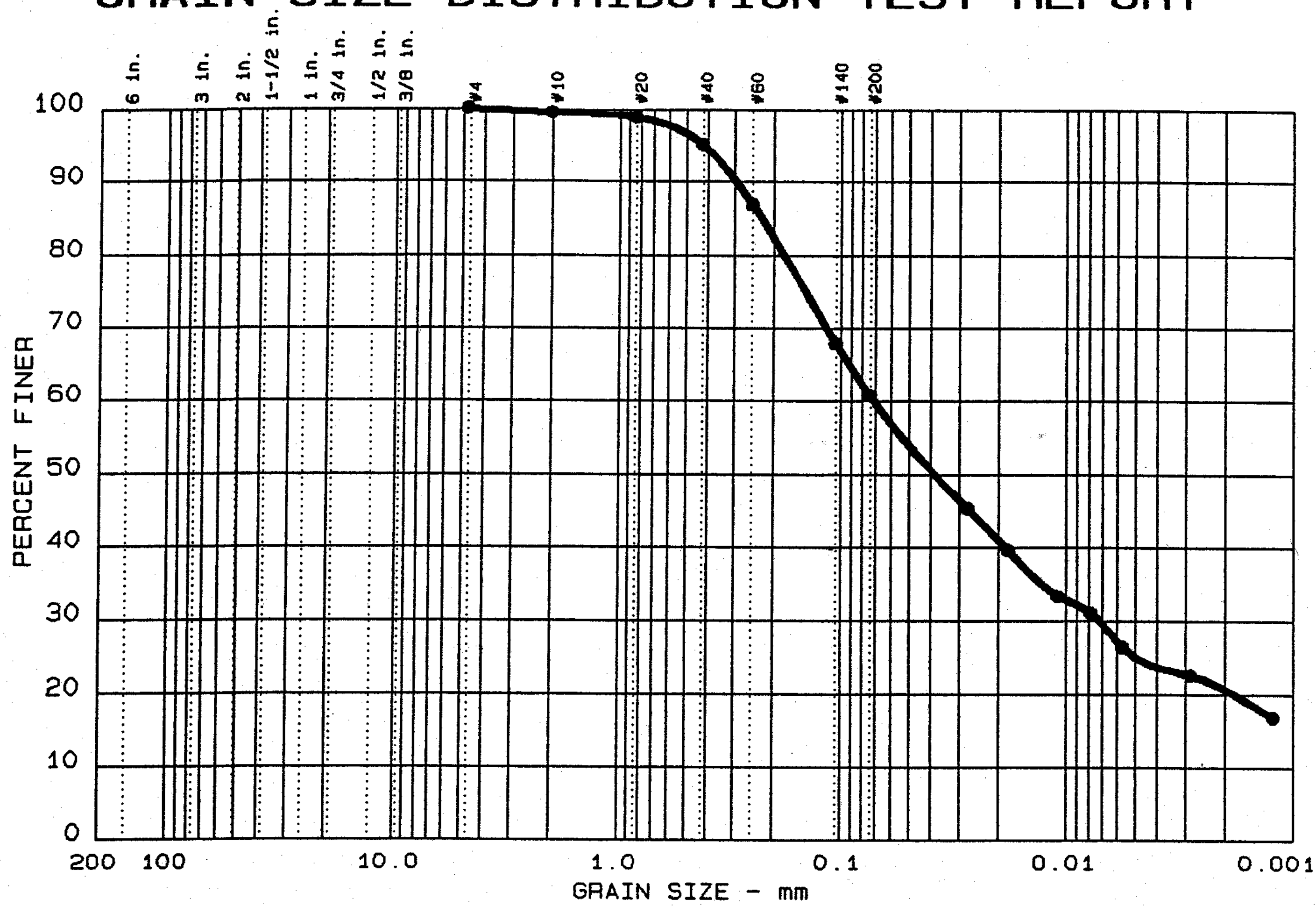
Remarks:

Tested by: SC/JTM

Reviewed by: tb

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	39.2	35.7	25.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.23		0.04	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-4 S-5

Date: August 29, 1999

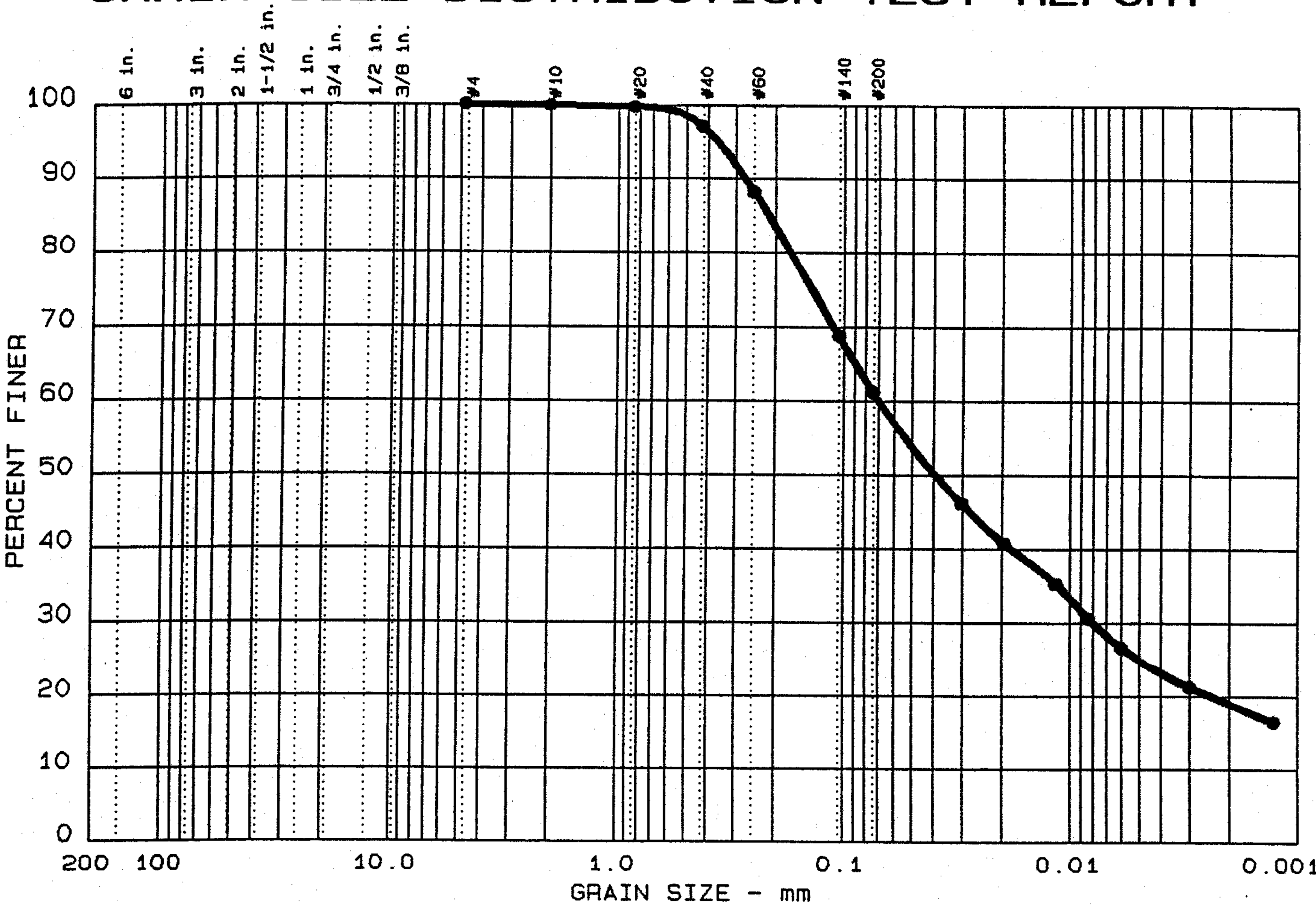
Remarks:
Tested by: SC
Reviewed by: Hb

Moisture Content = 21.1%

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	38.9	36.2	24.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	29	10	0.21		0.04	0.008				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Lean Clay	CL	A-4 (3.8)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-4 Ud @ 29-31 Ft.

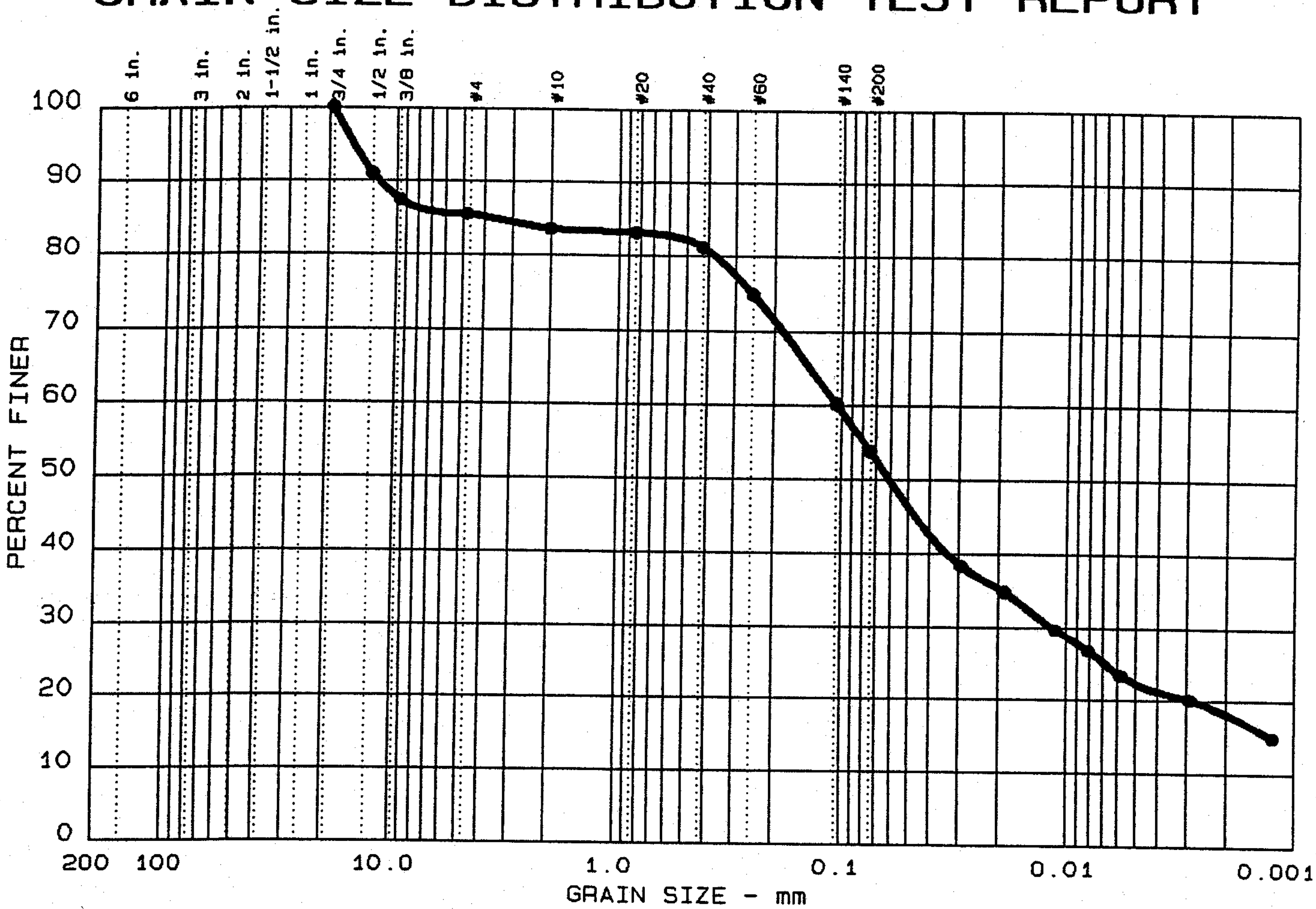
Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: HB

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	14.5	31.7	31.5	22.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			3.76	0.10	0.06	0.012				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-4 S-9

Date: August 29, 1999

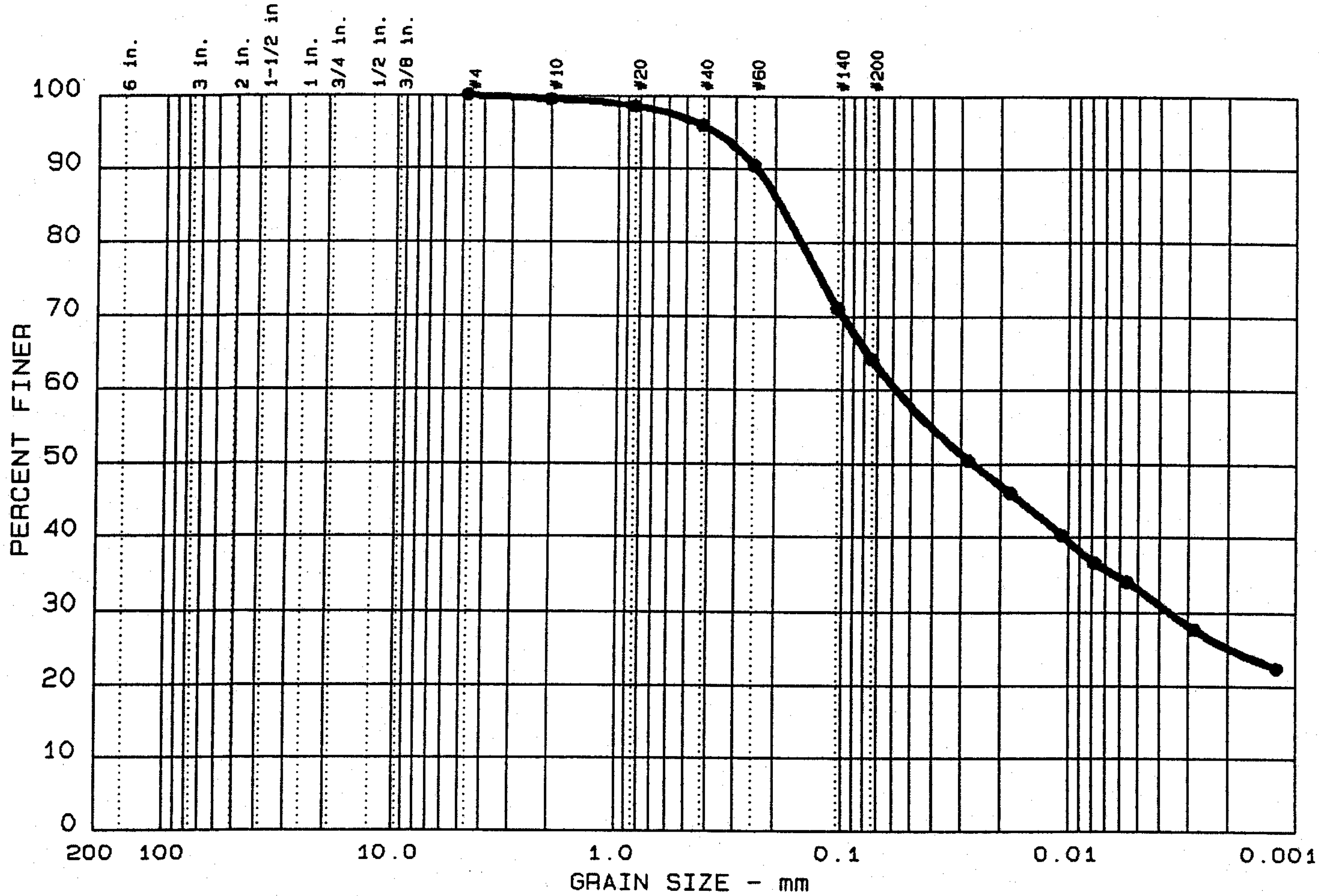
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: tb

Moisture Content = 16.9%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	0.0	35.9	31.1	33.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.19		0.03	0.004				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-5 S-4

Date: August 29, 1999

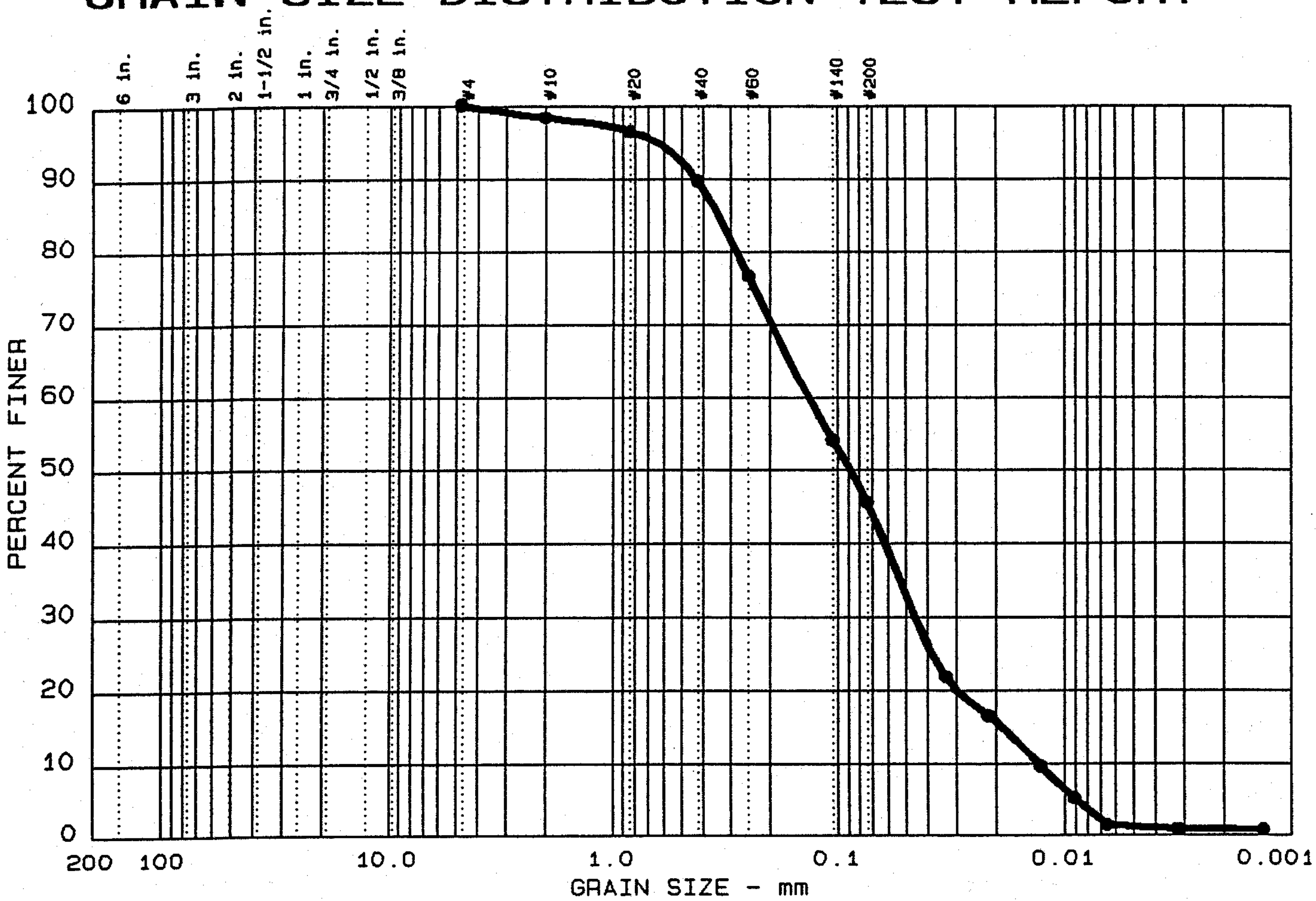
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: [signature]

Moisture Content = 19.6%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	54.5	44.3	1.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.34	0.13	0.09	0.045	0.0186	0.0129	1.19	10.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Silty Sand	SM	A-4 (0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-5 Ud @ 19.0-21.0 Ft.

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

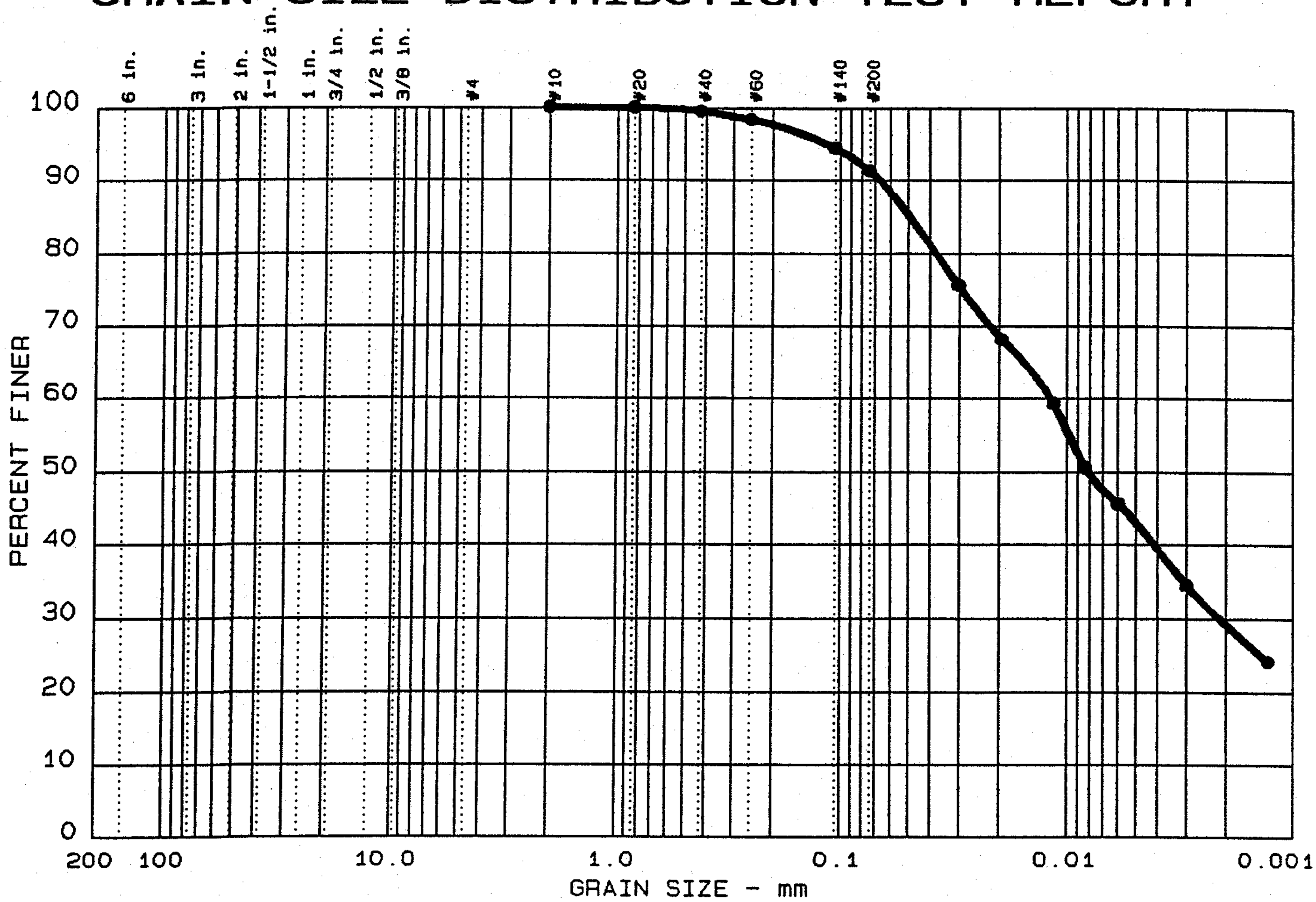
Tested by:

Reviewed by:

Moisture Content = 68.9%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	8.6	48.4	43.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	49	25			0.01	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Lean Clay	CL	A-7-6(25.1)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-5 Ud @ 34.0-36.0 Ft.

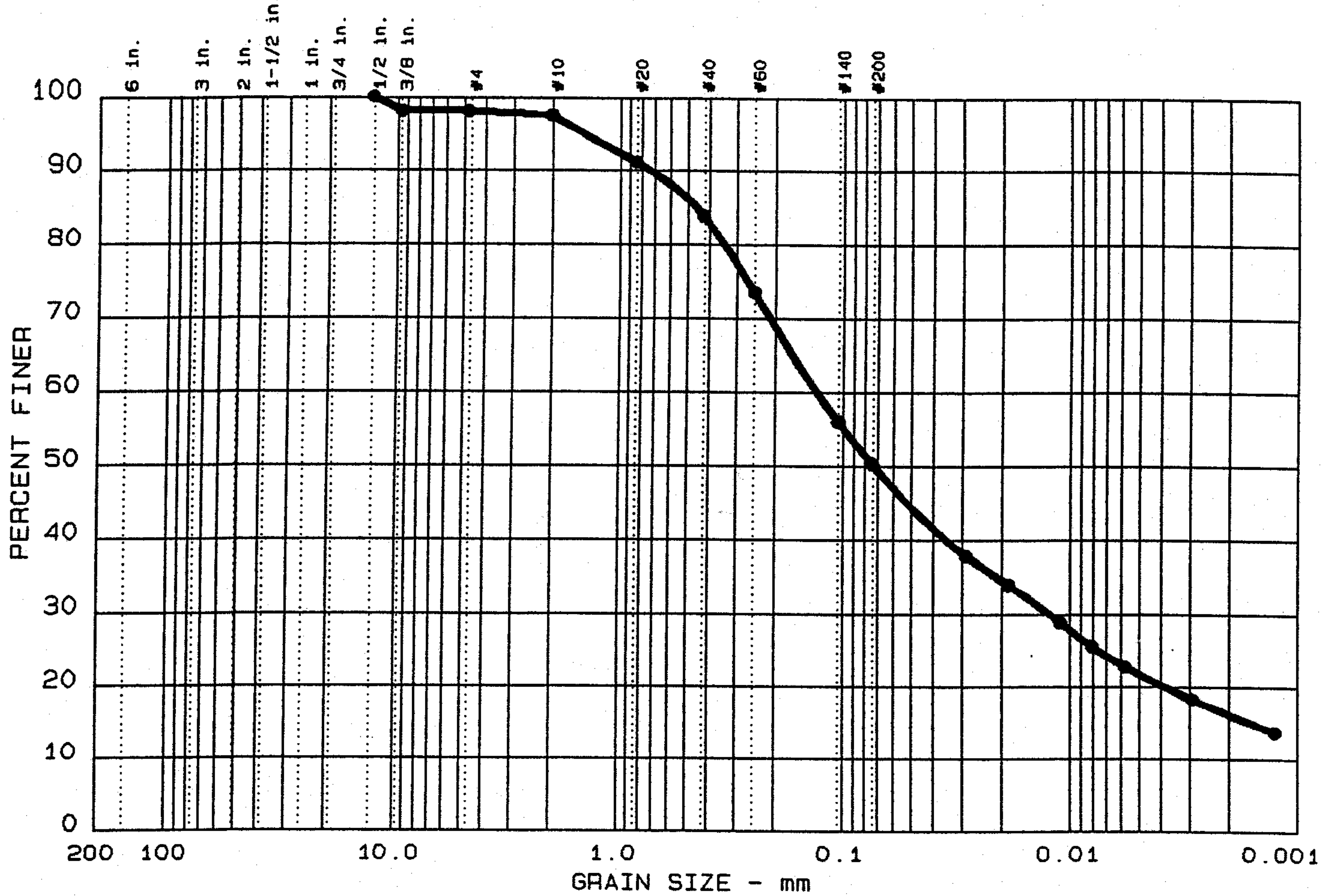
Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: Hb

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	1.9	47.9	28.4	21.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.45	0.13	0.07	0.012	0.0016			

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-6 S-5

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

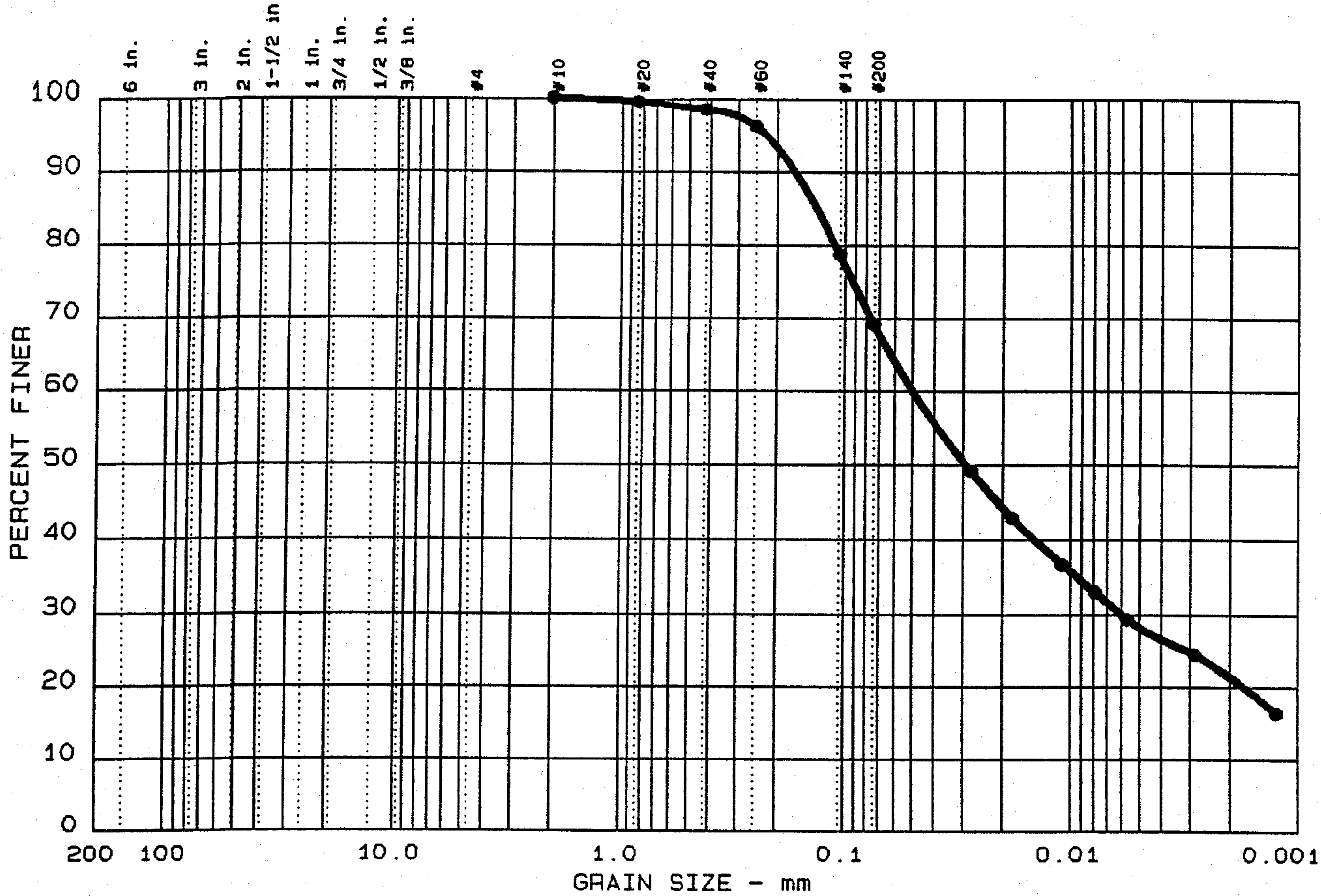
Tested by: SC

Reviewed by: tb

Moisture Content = 18.0%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	30.8	41.0	28.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.13		0.03	0.006				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-7 S-6

Date: August 29, 1999

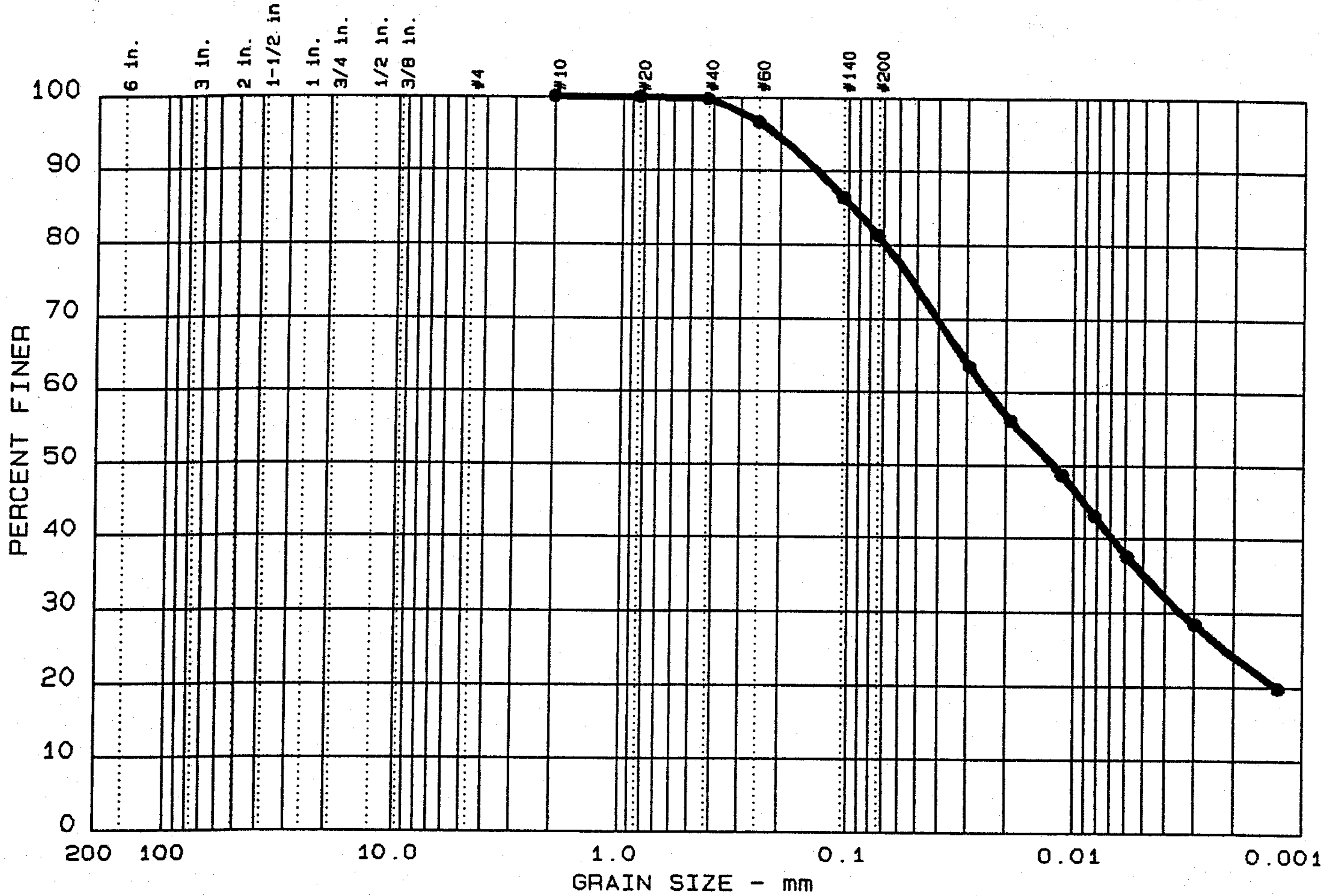
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: [signature]

Moisture Content = 21.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	18.7	46.3	35.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	45	23	0.09		0.01	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Sandy Lean Clay	CL	A-7-6(18.9)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-8 Ud @ 4.0-6.0 ft.

Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

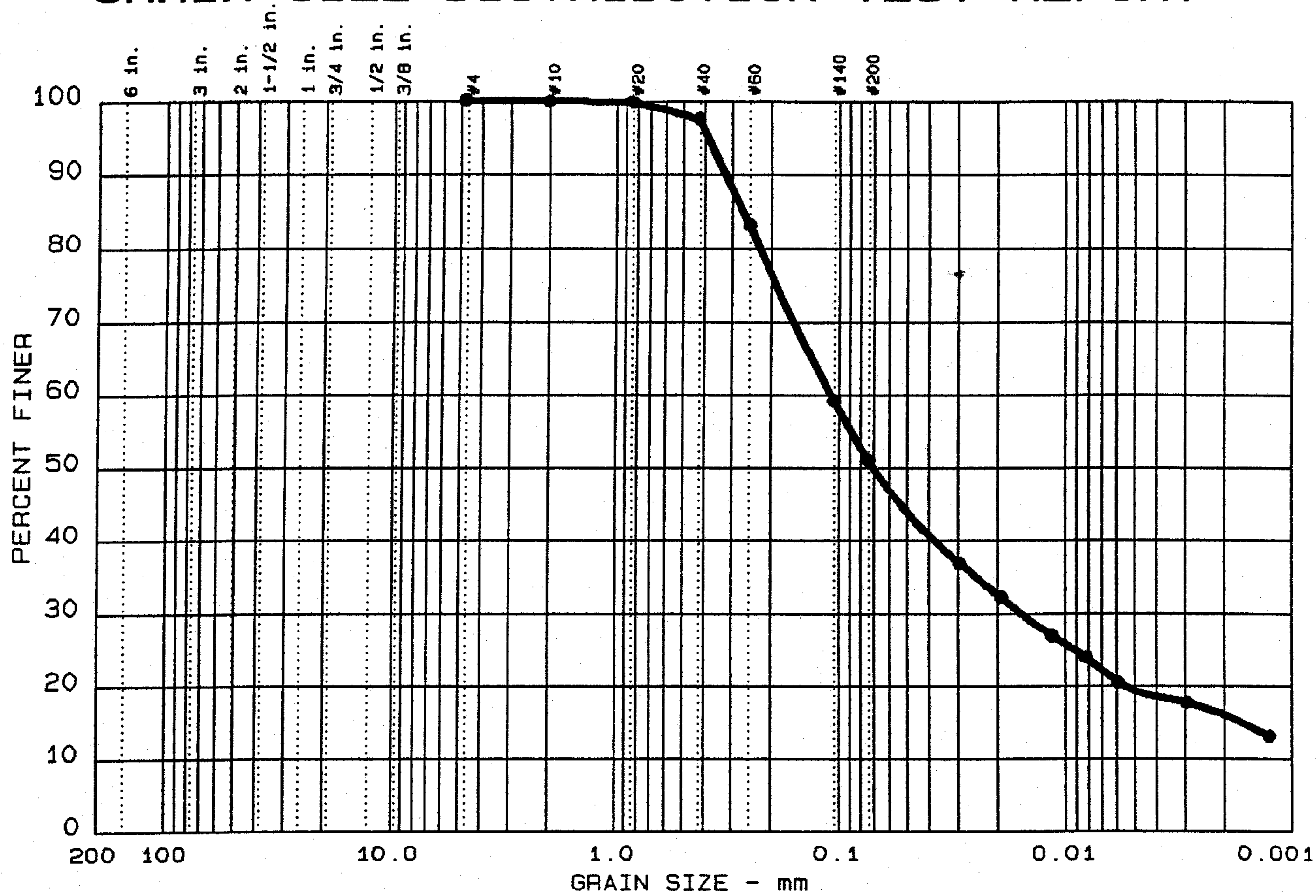
Remarks:

Tested by: SC

Reviewed by: HD

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	49.0	31.6	19.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.27	0.11	0.07	0.016	0.0016			

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-10 S-5

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:

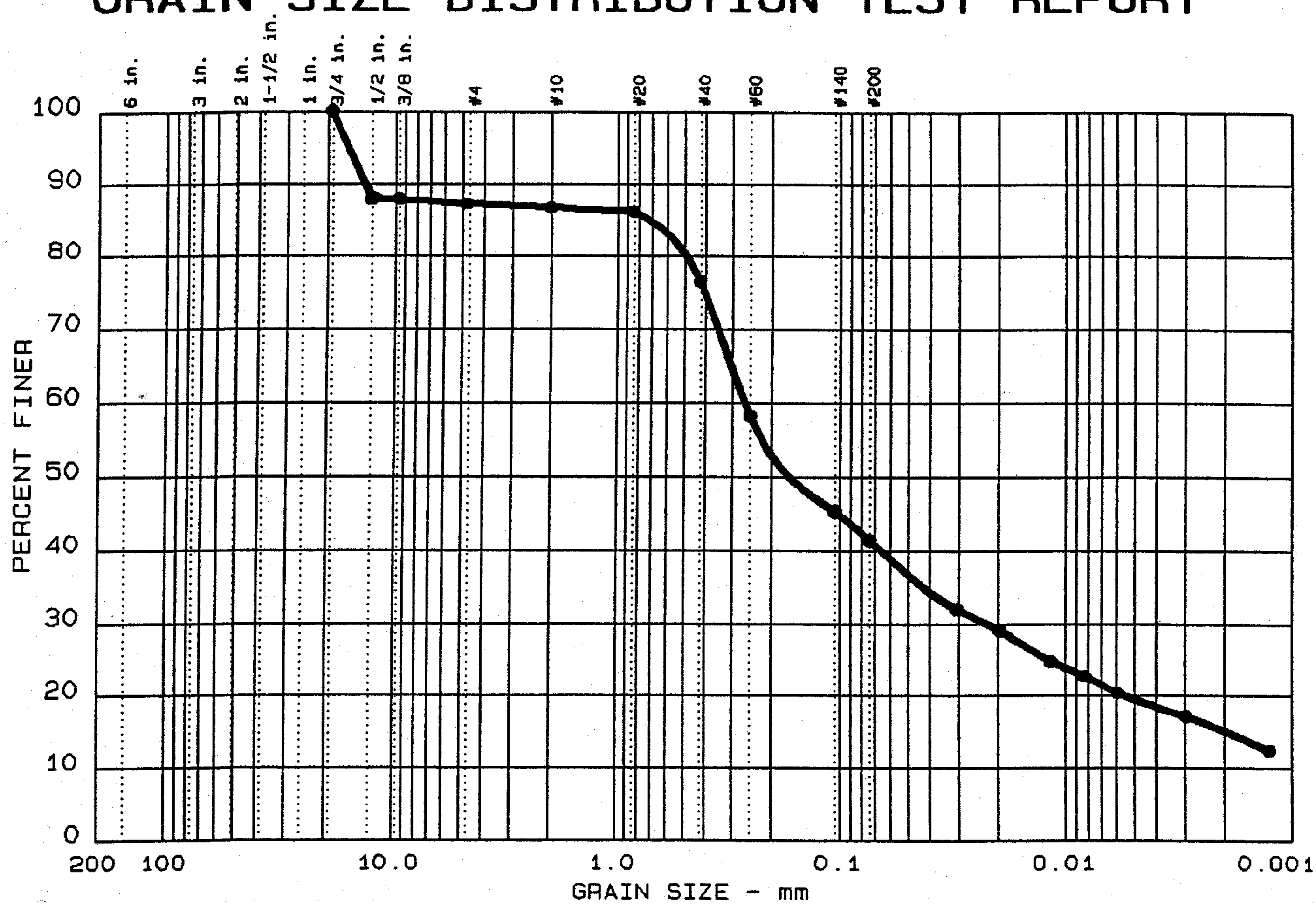
Tested by: SC

Reviewed by: Hb

Moisture Content = 19.3%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	12.7	45.9	22.0	19.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.72	0.26	0.17	0.022	0.0020			

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Silty Sand	SM	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-12 S-4

Date: August 29, 1999

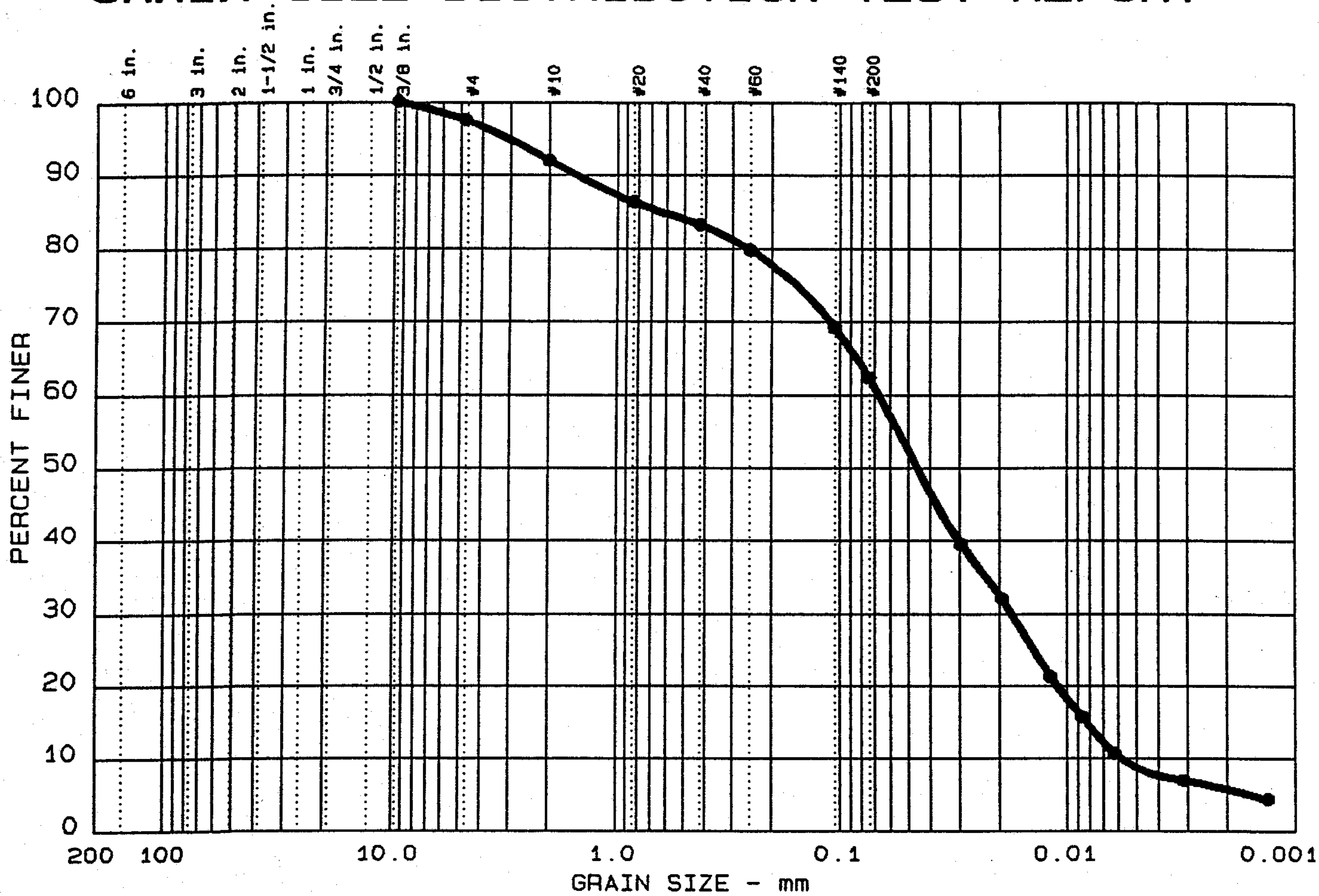
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: JTM
Reviewed by: HD

Moisture Content =

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	2.5	35.2	53.7	8.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.62		0.05	0.017	0.0082	0.0059	0.78	11.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-13 Ud @ 19.0-21.0 Ft.

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: JTm
Reviewed by: Hb

Moisture Content =

Figure No.

TENNESSEE VALLEY AUTHORITY
JOHN SEVIER PLANT, ROGERSVILLE, TN
FLY ASH POND DIKE SLOPE STABILITY EVALUATION

PHASE ONE REPORT

REVISION 0

DECEMBER 9, 1999

Prepared By:

Kanthan Siva, P.E.
Geotechnical Engineer

Approved By:

F. Gregory Nadeau, P.E.
Chief Civil/Geotechnical Engineer

Reviewed By:

David R. Erali, P.E
Senior Geotechnical Engineering Consultant

Parsons Power Project No. 541055-67100

December 9, 1999

PARSONS ENERGY & CHEMICALS GROUP INC.
2675 Morgantown Road
Reading, PA 19607
Tel.: (610) 855-2000
Fax: (610) 855-2001

TABLE OF CONTENTS

1.0 Project Background

The John Sevier power plant is located in Hawkins County, near the city of Rogersville Tennessee. It utilizes coal as its fuel source, which results in the production of fly ash and bottom ash as waste products. An earlier practice during the processing of the fly ash was to sluice it into stilling ponds, also called the "bath tubs". To create one such tub, an approximately 4850 ft long dike was built just south of the Holston River, and is the focus of this report. The dike begins from the discharge canal in the east and extends towards the river, where it makes a bend in a westerly direction, until the existing stilling ponds. The site plans (drawing numbers 10W287-1 and 10W287-2) included at the end of this report show the dike.

It is our understanding that the dikes are built in two stages. Initially, the dike is built to 10 to 15 feet (typical) high using mostly materials excavated from the reservoir. This is followed by use of the dike reservoir until it reaches its near full capacity, when the dike is then raised (or over-built) by 10 to 15 feet. The raising of the dike typically uses fly ash materials from the plant. A soil fill cap is typically used in the top few feet of the dike, and the dike's downstream slope is typically capped with 18 to 24 inches of soil fill to promote and maintain vegetation.

Starting in the early 1990s, the sluicing practice was stopped and all fly ash was processed in a dry form. Fly ash produced subsequently was dry stacked. One of such areas is behind the subject dike. The dike is separated from the dry stack slope by a gravel access road (approximately 10 to 15 feet wide) and a grassed drainage ditch (with a minimum width of approximately 25 feet).

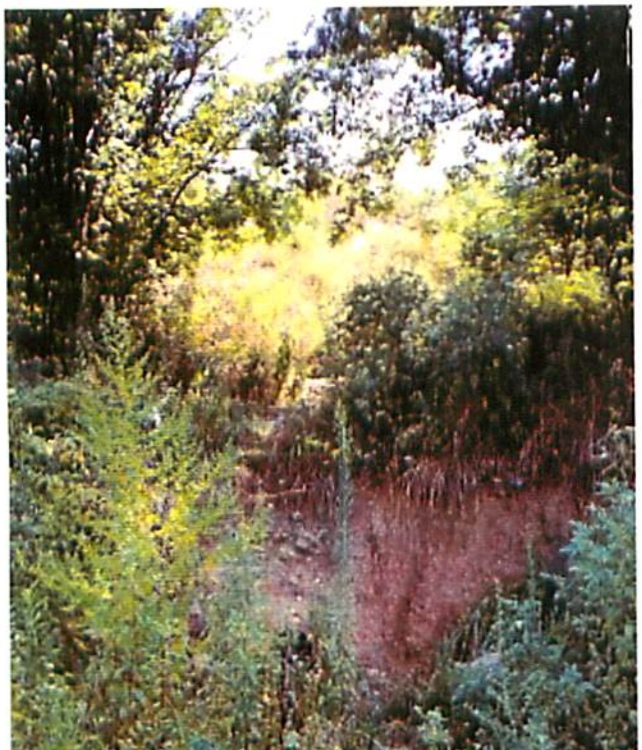
The subject dike has had a history of experiencing instability via small to medium sized sloughing, surface sliding and cracking. At least two failures occurred prior to 1993 along the main or long section of the dike along the river. It was also learned that there were failures in the canal area around 1991 – 1992. We understand that after the sluicing practice was discontinued in 1992 – 1993, no major failures have occurred but sloughing of the dike's slope has continued. During a recent (November 1999) walk-through, a slippage that is about 5 feet high and about 50 feet wide was observed on the dike. The scarp was devoid of vegetation and appeared to be relatively recent (say within the last year).

Some photographs of the dike taken during the summer of 1999 are attached below. As seen on some of the photos and on the site plans, the dike has some segments with steep slopes, such as 1.6H:1V. A section of the dike that previously experienced a slippage and was repaired and protected with riprap is shown in one of the photos.

View of dike's downstream slope

View of dike's downstream slope

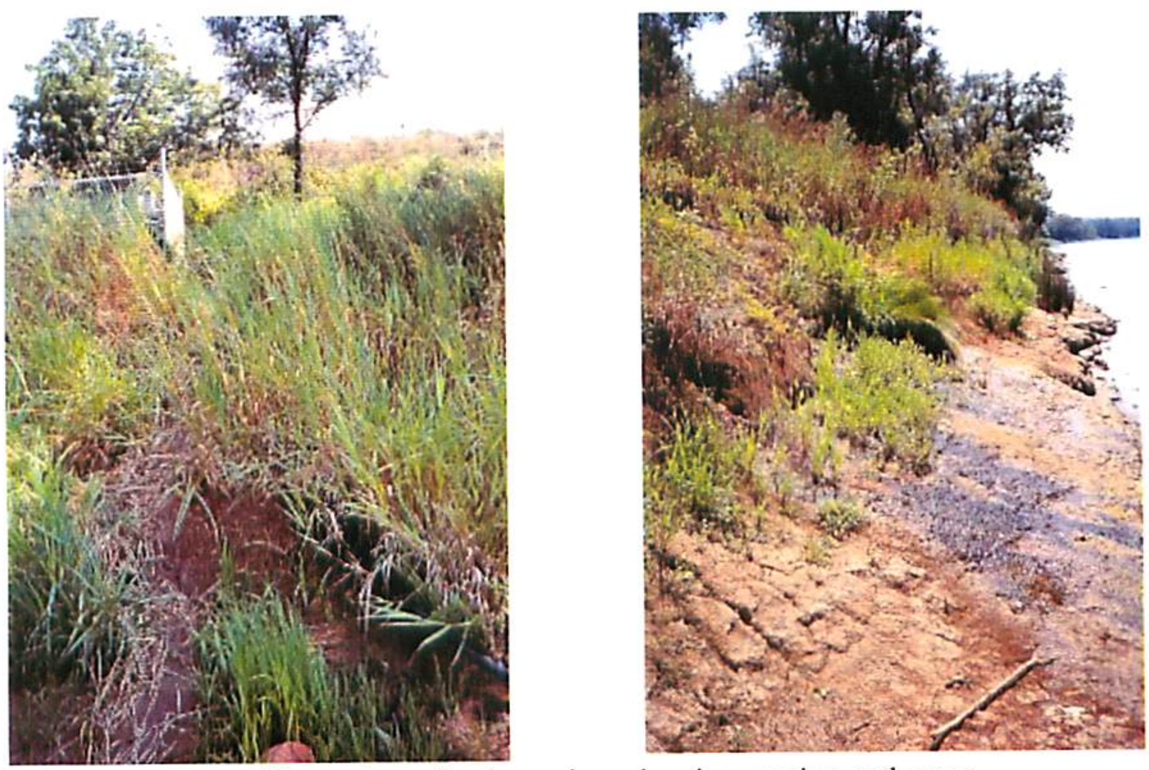
View of dike slope showing previous repair protected with using riprap.



View showing sloughing on dike.

At the dike's bottom and along the riverbank, groundwater seeps were observed on the ground surface at certain locations. As seen on some of the photos below, the seeps were reddish in color at most locations. The source of the coloration is not known.

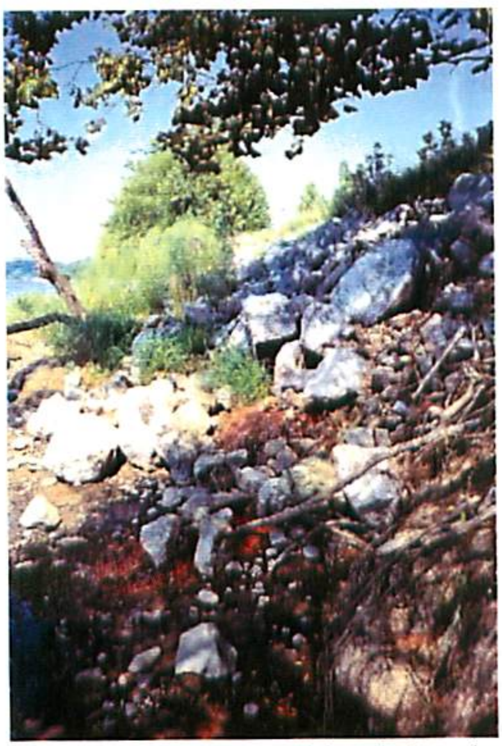
Views along the river edges showing red seeps



Views along the river edges showing erosion and seeps

Sections of the riverbank immediately along the Holston River are experiencing erosion and/or sloughing. As shown on the photos below, some of the top vegetation has eroded and the underlying soils have sloughed, resulting in tilting of some of the trees. Only some sections of the riverbank were previously protected with riprap.


Views of river edge experiencing erosion



View along river edge with existing rip-rap

The erosion and sloughing along the riverbank are not believed to be directly related to the dike instability. It may, however, be aggravated by the bank slopes being continuously wet by the groundwater seeps originating from the ash in and behind the dike, as well as from overland run-off from the dike towards the river. Fluctuation in the river water levels also may contribute to the wetness of the riverbanks and contribute to its erosion and sloughing.

2.0 Objectives of Study

In the summer of 1999, this study and report was authorized to evaluate the stability of the dike and to propose alternatives for improving its stability. Specifically, the objectives were to perform slope stability analysis of the dike at select locations, provide conceptual alternatives for areas requiring stability improvement, and to provide detailed analysis with conceptual design details for the most cost effective alternative after presenting the preliminary results to TVA. These are presented in this report, called a Phase One study. Additionally, the report is to propose measures to address the erosion along the riverbanks

3.0 Input Data for Analysis and Evaluation

As with all slope stability analysis, representative data on the subsurface materials and their strength characteristics as well as the surface topography are needed. The subsurface data was gathered from several sources:

1. Results of a subsurface exploration and laboratory testing program conducted in the summer of 1999. This consisted of 14 soil borings conducted on top and near the bottom of the dike. This and the laboratory testing of select samples retrieved during the drilling operations were performed by Law Engineering. The laboratory testing included triaxial testing of select Shelby tube samples under undrained conditions after consolidation, with pore pressure measurements. The results of the subsurface exploration and lab testing is presented in the "Report of Geotechnical Exploration, Dike Exploration and Testing Program, John Sevier Fossil Plant" by Law Engineering (Project 50300-8-2075/0024/0800) dated 10/01/99.

2. Results of a 1994 subsurface exploration and lab testing as presented in the "Report of Hydrogeologic and Engineering Evaluation (Revised) for Proposed Dry Ash Disposal Facility Site, John Sevier Fossil Plant" by Law Engineering (Project 5740144.01) dated 09/30/94, and

3. Groundwater level measurements of 08/04/99 in existing piezometers and wells.

The approximate location of the 1999 and 1994 borings and selected monitoring wells are shown on the site plans at the end of this report. Copies of the referenced boring logs and relevant laboratory test results are included in Appendix B and C, respectively.

Topographic data used for the slope analysis was obtained from a recent (summer 1999) survey performed by TVA. This survey was performed north of the access road existing on top of the dike towards the river. Data from this survey was superimposed with that from a previous survey of the area south of the access road. The combined data is shown on the first site plan (drawing number 10W287-1) at the end of this report. In the area along the discharge canal (in the east), data from another previous survey was superimposed with the recent survey, and the combined topographic data is shown on drawing number 10W287-2. It should be noted that the recent survey did not extend to the actual riverbank edges.

The slope stability was evaluated at seven locations, C1-C1, C2-C2, C3-C3, C4-C4, C5-C5, C6-6 and C7-C7. The location of these sections is shown on the site plans. From the points labeled Edge of River Bank on the site plans, the existing topography towards the river at these sections was extrapolated and/or assumed. Based on the boring data and laboratory test results, generalized subsurface stratigraphies (or profiles) were developed at the seven selected cross sections. The cross-section profile and stratigraphy at the seven sections are shown on drawing numbers 10W287-3 through 10W287-3 included at the end of this report. These drawings include the surface profiles at three additional sections (C3A-C3A, C4A-C4A and C6A-C6A) that were created later to aid in better estimation of cut/fill quantities.

The strength properties used in the analysis were based on a review of the available boring and laboratory testing results, and our engineering interpretation of them. The strength parameters are believed to be slightly conservative for two main reasons. The first is to account for the somewhat random profile and nature of the old, wet ash. For example, the thickness of the weak strata (i.e., the soft and wet fly ash) was much smaller, not encountered, and/or not soft in the borings at sections C1-C1 and C7-C7, while it was very thick at the other sections.

The second main reason is to account for the current state of strain of the dike materials. Most of the stress-strain plots from the laboratory triaxial tests on the fly ash show the materials to have a lower residual strength than peak strengths. Residual strength is that mobilized at large strain while peak strength is typically at small strain. Based on the plots, peak strengths occurred at 2 to 3% strain and full residual strength was at 10% strain. The soft and wet fly ash of the dike is more likely to be being in a residual rather than a peak condition due to the on going strains. Hence, the in-situ strength of the fly ash is assumed to be lower than the triaxial test results, which were based on peak strengths.

In geotechnical engineering practice, a Factor of safety (FS) of 1.3 is typically acceptable if the chances of failure will not be catastrophic from life/safety, environmental and economic stand points especially when there is subsurface exploration and laboratory testing data and/or extensive prior knowledge and experience of the subsurface conditions. That is, as long as there will not be loss of life and/or large property damage, or lead to environmental damage as a result of a failure, a FS of 1.3 is typically acceptable. Else, a FS of 1.5 is typically required. The publication "Current Trends in Design and Construction of Embankment Dams" by American Society of Civil Engineers (1979) quotes the FS suggested by the Corps of Engineers as 1.3 for upstream and downstream slope stability of earth and rockfill dams less than 50 feet high at end of construction.

In this study, subsurface and laboratory test data are available, and the chosen soil strength parameters are believed to be slightly conservative. Thus, it is assumed that a minimum FS of 1.3 is sufficient for non-seismic evaluations.

The FS from seismic analysis may be 1.0 or greater as set by the geotechnical engineer, according to the above referenced publication. With the soil parameters chosen in this study, it is assumed that a minimum FS of 1.0 will be acceptable for seismic evaluations.

4.0 Results

The calculation attached in Appendix A presents the results of the analysis and summary of conclusions. Based on the stability evaluation of the dike at the seven selected sections, the dike was categorized into three sections with respect to stability (i.e., the FS obtained). This categorization approximately correlates to the existing slope of the dike as follows:

Critical ($FS < 1.0$), for existing slope of 2.25H:1V and steeper

Marginal ($1.0 \leq FS \leq 1.1$), for existing slope between 2.25H and 2.75H:1V

Acceptable ($FS \geq 1.3$), for existing slope of 2.9H:1V and flatter

5.0 Considered Alternatives

The site plans at the end of this report show the FS along the different lengths of the dike. Of significance are segments of the dike from about the midpoint between sections C2-C2 and C3-C3 to near the corner at section C7-C7 (categorized as critical), and from section C7-C7 towards section C6-C6 (categorized as marginal). In these segments, where the FS using recent groundwater level readings in piezometers and borings was less than 1.3, the stability of the dike should be improved. The following are some alternatives considered for improving slope stability.

Regrading of dike by excavation: The dike can be flattened by partially excavating into the embankment at the recommended slope. The excavation will be initiated from the bottom of the dike, typically near the bottom of the soft and wet fly ash. This option will result in the access road existing on top of the dike to be shifted in a southeasterly direction. The spoils from the dike maybe re-used for creating new fill sections if placed in a controlled manner. Controlled manner refers to proper placement (moisture and lift thickness controls), proper compaction (typically at 95% compaction of ASTM D-698 MDD) and testing, and proper benching into the embankment (typically at least every 2 ft) where appropriate. Given the wet nature of the underlying fly ash, moisture reduction most likely will be needed before being able to be reused to achieve proper compaction. Possible means of drying are by liming (probably more time efficient but more expensive) and discing (which will require space and time, and could be hampered by wet weather conditions). Given the soft/wet conditions expected within the existing swale next to the access road, it maybe necessary to install a stabilizing geotextile (such as Amoco 2016 or approved equivalent) and use of drier and granular materials while initiating placement of fill.

It should be noted that this regrading alternative could necessitate the relocation of some underground utility lines, such as the pipes leading to and from the pump stations. The potential cost associated with this should be considered.

Regrading of dike by filling: The dike also can be flattened by creating a fill wedge at the bottom of and above the dike. The wedge will be extended out at the base of the dike, and meet the top of the existing dike. This option will require space at the base of the dike. Regrading with this option may not necessitate the relocation of the pipes leading to and from the pump stations. But tops of monitoring wells may need to be extended. The potential cost associated with this should be considered.

Piers: Another alternative will be to install drilled piers into the existing dike. No major regrading will be involved with this alternative. Typically, the piers will be installed in a position that intercepts the critical failure circles. Based on a review of the slope stability evaluation, the piers most likely will need to be installed in the middle of the slope face. Piers are assumed to be of 18 to 24-inch diameter and spaced at 5 feet on centers. Length will be about 35 feet and a rebar cage (say seven No.8) will be needed for the full length of the piers. If this alternative is further considered, the final pier diameter, spacing and depths will need to be confirmed, along with the required reinforcing.

Access by small caisson rig and related equipment to install the piers at the mid height of the dike may not be easy given the existing slope. Depending on the drill rig, a bench may need to be created to facilitate the installation. The bench may be left in place as long as the slope of the final cut above the bench is at the recommended slope.

This alternative will most likely not require the relocation of the underground pipes leading to and from the pump stations. Any proposed piers conflicting with existing pipes will need to be relocated and/or complemented with additional piers, depending on the resulting spacing of the piers.

Retaining Wall: Another alternative is to install a retaining wall system near the base of the dike and backfilling over the dike, to meet the dike's existing top. The wall should have a retained height that will make the resulting back slope safe. The wall system can be of the geosynthetic reinforced backfill type, soldier piles with lagging system (similar to a sheeting and shoring retention) or a rigid cantilever type. With this approach, the footing subgrade of the retaining wall will most likely need to be embedded into the firm Alluvium materials for global stability. The backfill materials may be fly ash, soil or mix, depending on the system chosen.

This alternative may not necessitate relocation of the pipes leading to and from the pump stations, depending on the backfill slope chosen. Some of the discharge pipes may, however, need to be extended.

Others: Another alternative is by excavating part of the dike slope and replacing it in a controlled manner while incorporating geogrids. The geogrids serve as horizontal reinforcement to the dike, enabling the slope to be steeper than without the geogrids. Based on the critical failure surfaces determined in the analyses, it appears that the dike will need to be excavated into by approximately 30 feet to be able to install a geogrid reinforced block long enough to intercept the critical failure surfaces. This option may not prove to be cost effective.

Another alternative may be by chemical treatment to the underlying soft fly ash layer. One form of this is by pressure injected grouting. However this will not be cost effective, and may not be effective due to the high moisture content and low permeability nature of the underlying soft, fly ash.

The following table provides approximate cost estimates for the proposed alternatives. These cost estimates are general in nature and are provided to illustrate the relative expected cost difference between the various alternatives.

ALTERNATIVE	BASIS FOR COST	APPROXIMATE COST ESTIMATE
Regrading by excavation	Uniform excavation at 3H:1V	1 million
Drilled piers	24-inch diameter piers at 5 feet o/c, 35 feet length, with 7#8 grade 60 rebar cage for full length. Assume required number of piers = 710	2 million
Retaining wall at base of dike	Segmental wall with a 11 feet average height with a total face area of 50,000 sq. feet	1.5 million
Excavate and replace with geogrid reinforcement.	Assume excavation to extend 25 feet into dike, from its base to the top, and requiring 53,000 sq. yd. of Tensar UX-1500SB geogrids every 2 vertical feet Assume average dike height and length as 32 and 3550 feet	1.75 million

6.0 Recommended Alternative

Based on the approximate cost difference between the different alternatives, the regrading option appears to be the best alternative. Both forms of regrading (i.e., by cutting back and filling in front of the dike) can be utilized depending on the space available at the bottom of the dike as well as for better balance of cut and fill.

The calculation in Appendix A also presents the stability evaluations with the regrading options. In summary, the length of the dike categorized as critical should be uniformly laid back by excavation at 3H:1V. The dike in the canal area (categorized as marginal) will re-graded by creating a fill wedge in front of it. The slope of the fill wedge will vary from 3H:1V at C6-C6 to 3.5H:1V at C6A-C6A and at C7-C7. The fill wedge at section C7-C7 is proposed only to get a better balance of cut and fill volumes, as the stability at C7-C7 was determined to be acceptable (FS≥1.3). The fill wedge at C7-C7 can be created even flatter, say at 4H:1V, to be able to reuse more of the cut materials.

To further help balance cut-fill volumes and to improve the pitch of the existing drainage ditch, the existing access road will be raised in elevation and widened. The cross-sectional profiles at the end of this report show the conceptual proposed regrading configuration at the ten cross-sections. With the proposed grading, the resulting non-seismic FS will at least 1.3 and the minimum seismic FS (with 0.1g horizontal acceleration) will be 1.0. The estimated quantities associated with the proposed grading is given in the table below:

Section along dike length	Length between section (feet)	Approximate areas of cut (sq. feet)	fill (sq. feet)	Approximate volumes of cut (cu. yd.)	fill (cu. yd.)
C1-C1		0	54		
C2-C2		0	140		
Acceptable/critical boundary	1,200			0	4,311
C3-C3		623	301		
C3A-C3A		471	422		
C4-C4		347	326		
C4A-C4A		406	367		
C5-C5		405	261		
Critical/acceptable boundary	2,500			41,704	31,056
C7-C7 (3.5H:1V fill)		0	282		
C6A-C6A (3.5H:1V fill)		0	696		
C6-C6 C6A (3H:1V fill)		0	478		
End of dike (before road turn)	1,050			0	18,874
TOTAL	4,750			41,704	54,241

In the above table, the fill volume assumes that the relocated road will utilize all of the excavated materials up to its subgrade level. In reality, this will not be the case. A typical section design for the relocated road will consist of 6 inches of graded aggregate underlain by at least 2 feet of compacted soil fill. The soil fill is intended to minimize water infiltration into the underlying fly ash of the dike, and should have a relatively low permeability; the soil fill and the aggregate will be separated by an Amoco 2016 geotextile. With such a proposed design, the road section will have an estimated volume of 6,597 cubic yards, resulting in the volume of fill to be 47,643 cubic yards (= 54,241 – 6,597) and a net cut/fill of 5,939 cubic yards still needed for fill.

The cut volume in the above table also assumes that all of the materials will be reused. Depending on the moisture conditions and other characteristics, most of the underlying materials can be reused. The less suitable materials can be used in the new fill section above the dike but away from the relocated access road. Most of the existing topsoil can be reused as part of the final 18-inch soil cap required on the regraded dike slope (to support vegetation). Depending on the actual balance of cut and fill, the topsoil may be placed above the new slopes or be below (i.e., be part of it).

6.0 Additional Considerations

The first part of this section discusses some measures for improving the dike stability by improving the groundwater and moisture conditions in the dike. This will be done concurrently with the regrading operations on the dike. The second part presents measures to minimize the erosion along the riverbanks.

6.1 Improving Groundwater Conditions

As noted in the calculation, the slope stability was sensitive to the groundwater level at sections C1-C1, C2-C2, C5-C5 and C6-C6. Since fly ash is generally lightweight, relatively porous and of moderate permeabilities, it can act as a large sponge when there is a recharge source of groundwater. The wet and soft ash strata identified as strata # 2 in the outputs is thick, and exists below the soil cap on top of the dike at nearly all of the sections. The exceptions were at C1-C1 and C7-C7. Proper diversion of surface run off and any other recharge sources that will result to reduce the groundwater conditions in the wet and soft fly ash strata of the dike will improve the dike stability.

Runoff from the dry stack slope currently drains into the ditch between the access road and the stack. The bottom of this very long ditch slopes at a mild pitch, and appear to result in occasional ponding. The new ditch should have sufficient slope to prevent ponding. Ensuring that the swale and the upper slope are grassed will help to minimize infiltration rates.

After the repairs, establishing vegetation on the dike slope will be important. Due to the highly erodible nature of the fly ash materials and some of the native soils, erosion control blankets (or other geosynthetics, including Jute matting) may be necessary until vegetation is established.

We understand that the existing piping system to and from the pump station consists of plastic pipes joined mostly by welds, with concrete manholes as collection sumps. During a recent exchange of ideas and notes, it was suggested that its integrity be verified; i.e., to test for leaks. But it was felt was the system is probably pretty tight.

6.2 Protect River Bank Erosion

As mentioned in the beginning of this report, the topographic survey did not extend to the actual river edge. The horizontal distance between the actual river edge to the toe of the dike varies. Based on a walk-through on the existing fisherman's trail along the dike's bottom, the distance appears to vary from 15 to 50 feet. As can be seen on some of the photographs presented earlier, the riverbank is experiencing erosion and sloughing. The stability of the dike does not appear to be immediately affected by this erosion. But if the erosion is uncontrolled, the riverbank will start eroding into the toe of the dike and compromise its stability.

The erosion can be controlled by placing rip-rap along those sections of the riverbank that are currently experiencing erosion. Access to the riverbank generally is difficult. Hence, even though the dike's stability does not appear to be immediately affected by the riverbank erosion, it may be cost effective to install the rip-rap materials during repair to the dike. During the repair, a temporary access road between the top and bottom of the dike may be created, and can be utilized to haul the rip-rap.

Given the tough access conditions, it is recommend that the riprap is placed even in other areas that currently do not show erosion. Based on field observations, the riprap should be placed along the common edge between the dike and Holston River, but not in the discharge canal area. The site plan shows the approximate limits of existing rip-rap. The new rip-rap should consisting of large rock boulders with typical dimensions of 12 to 24 inches that have previously been crushed and/or blasted. These will be either dumped and/or manually stacked against the riverbank edges, which should be lined with a filter fabric (such as Mirafi 140N). For quantity estimates, it maybe assumed that the rip-rap will be placed as a triangular wedge with typical dimensions of 6 feet along the river bottom and 5 feet high (against the river edge). This results in an approximate volume of 1500 cubic yards, or approximately 3,050 tons.

7.0 Additional Recommendations, Concerns and Report Limitations

The analyses and conclusions reached in this report were based on available topographic and subsurface data. As stated in the calculation, some assumptions were made during the slope stability analysis. One of these is related to the topographic data. As a check of the data, as well as for better volume and cost estimation, it would be beneficial to conduct a topographic survey extending from the rive edge to about the midpoint on the dry stack slope at select locations along the dike. The survey could be done at the ten cross-sections.

The slope stability evaluation was specifically done at seven sections along the dike's length. The location of these sections was selected partly based on the existing topography (after the overlay of data from different surveys). It is our opinion that the results and conclusions reached reasonably identify sections of the dike with respect to overall slope stability. But due to the variability of the dike materials, there may be areas along the dike that was categorized as being acceptable that could experience sloughing. But in our opinion, such locations are likely to be isolated and not result in a massive slough.

DRAWINGS

Site Plan (Drawing number 10W287-1)

Site Plan – East Side (Drawing number 10W287-2)

Cross-sections C1-C1 and C2-C2 (Drawing number 10W287-3)

Cross-sections C3-C3 and C3A-C3A (Drawing number 10W287-4)

Cross-sections C4-C4 and C4A-C4A (Drawing number 10W287-5)

Cross-sections C5-C5 and C7-C7 (Drawing number 10W287-6)

Cross-sections C6-C6 and C6A-C6A (Drawing number 10W287-7)

C 10W287-1

PLOT FACTOR:1:100
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

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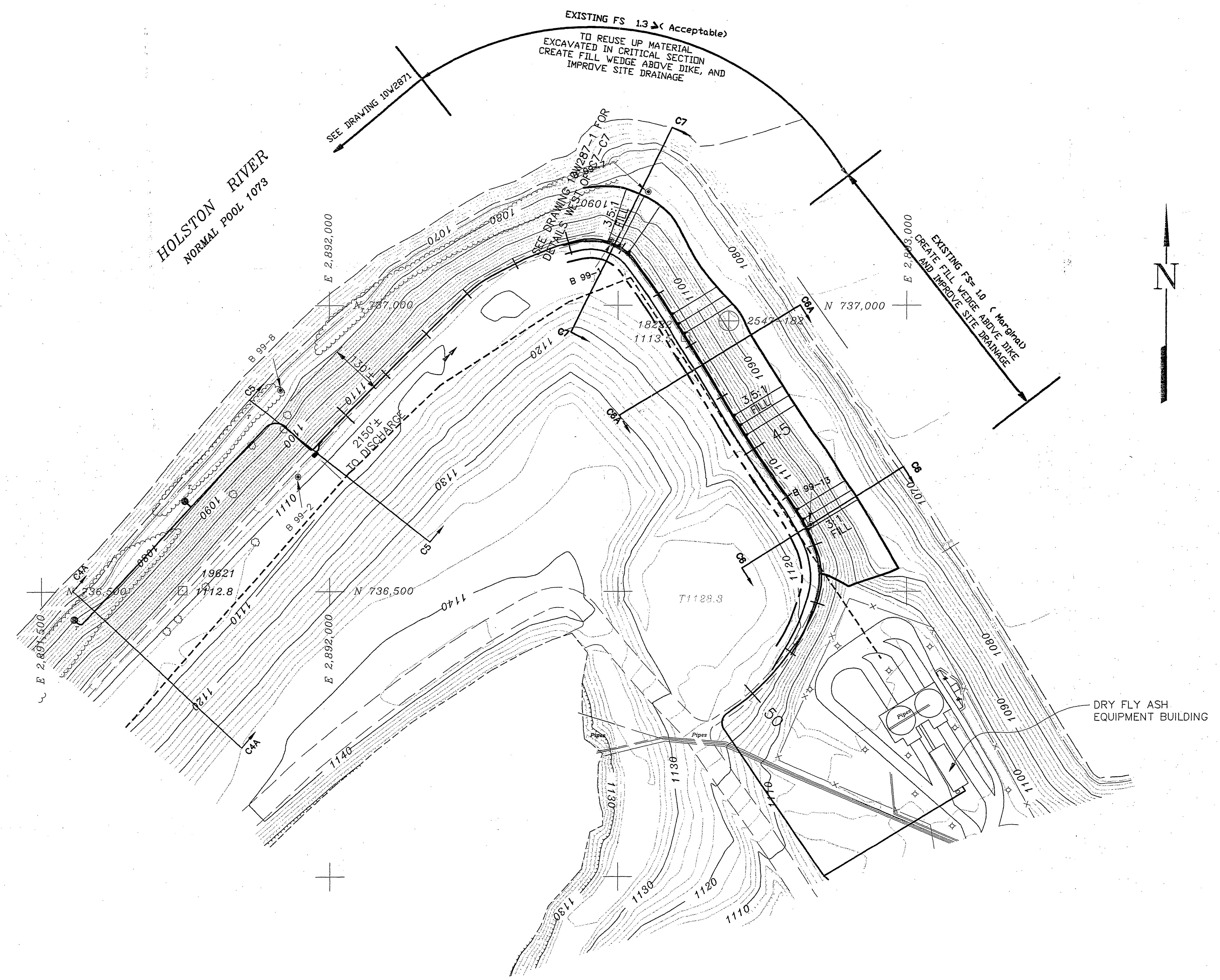

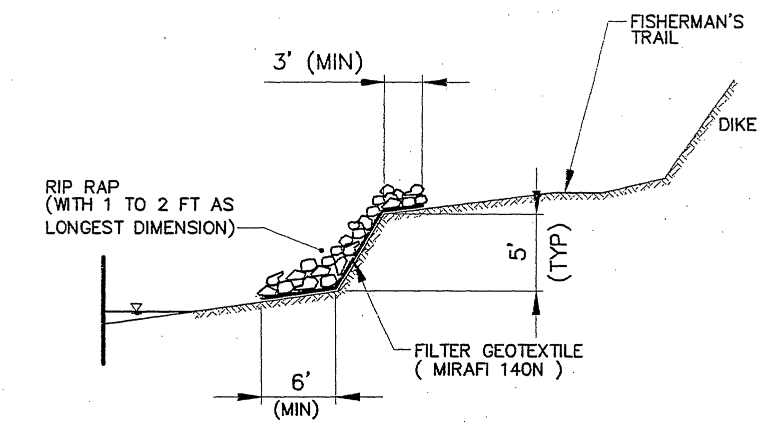

RIP RAP DETAIL
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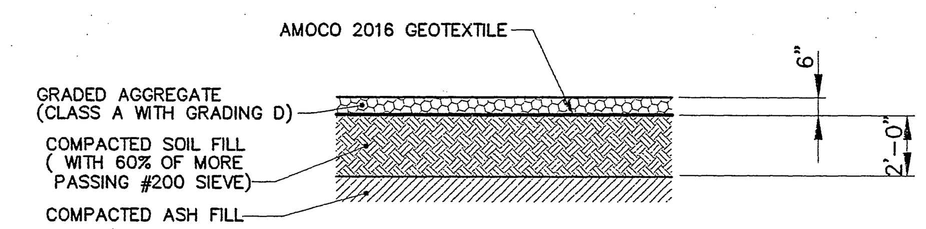

RE-LOCATED ROAD DETAIL
Not to scale

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GRAPHIC SCALE

NOTES:

1. CONTOUR INFORMATION WAS PROVIDED FROM A TOPOGRAPHIC SURVEY COMPLETED IN OCT.99 AND EXISTING DRAWING NO. 10W204-9.
2. DRAWING NO. 10W287-2 WAS CREATED FROM DRAWING NO. 17W445-1. DRAWING NO. 17W445-1 PROVIDED ADDITIONAL INFORMATION ON EXISTING CONTOURS FOR SECTION C-6 AND C-7. THE LOCATION AND ALIGNMENT OF THE PUMP STATIONS AND LEACHATE LINE WAS ALSO OBTAINED FROM THIS DRAWING.
3. SECTION C-1 TO C-5 WERE CREATED FROM DRAWING NO. 10W287-1, WHILE SECTIONS C-6,C-6A AND C-7 WERE CREATED FROM DRAWING NO. 10W287-2.

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	12-10-99	UKS	HMN	UKS	FGN	CEB	LAN				

PHASE I STUDY

SCALE: 1" = 100' EXCEPT AS NOTED

DIKE EMBANKMENT STABILITY EVALUATION

ASH DISPOSAL-STACK AREA EXISTING CONTOURS (EAST SIDE) WITH PROPOSED REGRADING

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
UKS	HMN	UKS	F.G.Nadeau	C.E.Bohac	L.A.Nash	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE 12-10-99 | 41 | C | 10W287-2 | R 0

PLOT FACTOR:1:100
W_TVA

C.A.D. DRAWING
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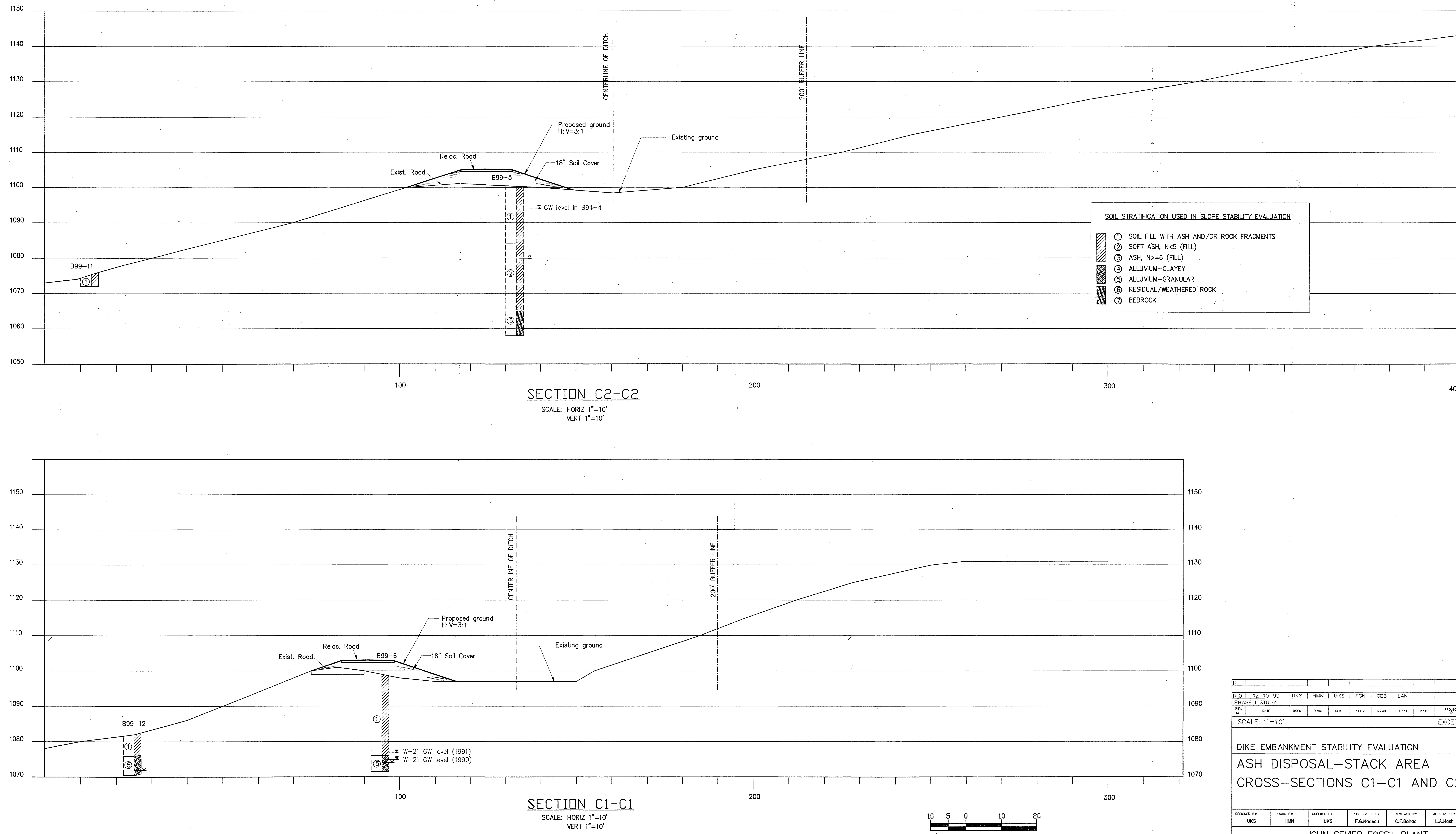
41 | 10W287-2



R	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD
0	12-10-99	UKS	HMN	UKS	FGN	CEB	LAN	

PHASE I STUDY

SCALE: 1"=10' EXCEPT AS NOTED

DIKE EMBANKMENT STABILITY EVALUATION

ASH DISPOSAL-STACK AREA

CROSS-SECTIONS C1-C1 AND C2-C2

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
UKS	HMN	UKS	F.G.Nadeau	C.E.Bohac	L.A.Nash	

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AUTOCAD R14 | DATE 12-10-99 | 41 | C | 10W287-3 | R 0

PARSONS | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR: W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

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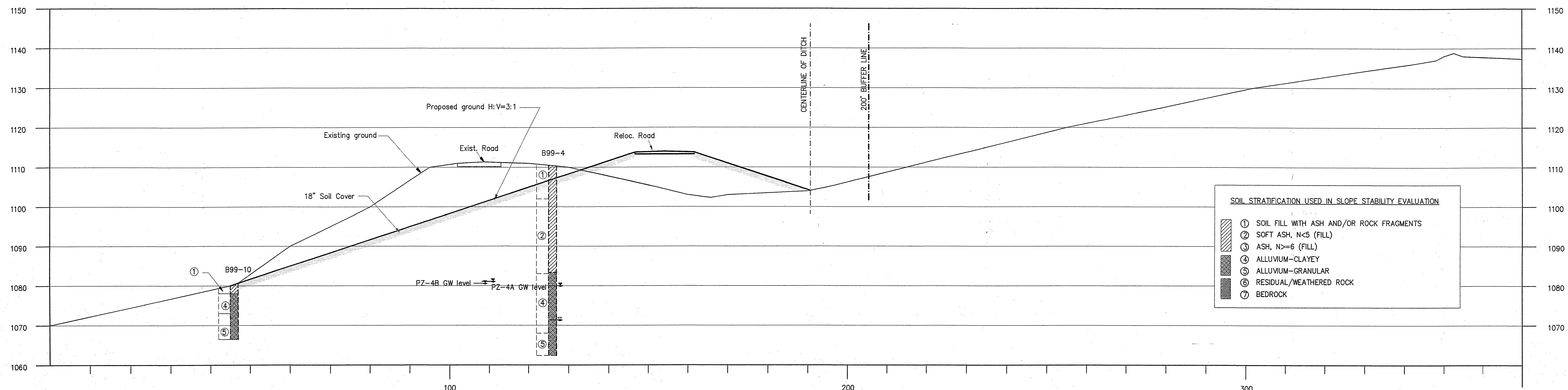

SECTION C3-C3

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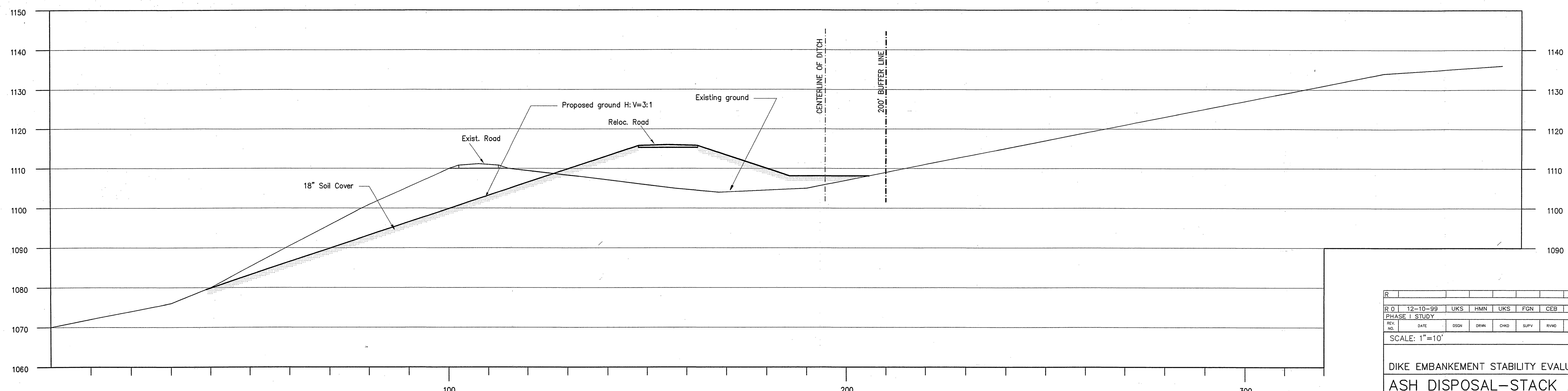

SECTION C3A-C3A

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VERT 1"=10'

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GRAPHIC SCALE

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PHASE I STUDY											
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SCALE: 1"=10' EXCEPT AS NOTED

DIKE EMBANKEMENT STABILITY EVALUATION

ASH DISPOSAL-STACK AREA
CROSS-SECTIONS C3-C3 & C3A-C3A

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
USK	HMN	USK	F.G.Nadeau	C.E.Bohac	L.A.Nash	

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AUTOCAD R14 | DATE 12-10-99 | 41 | C | 10W287-4 | R 0

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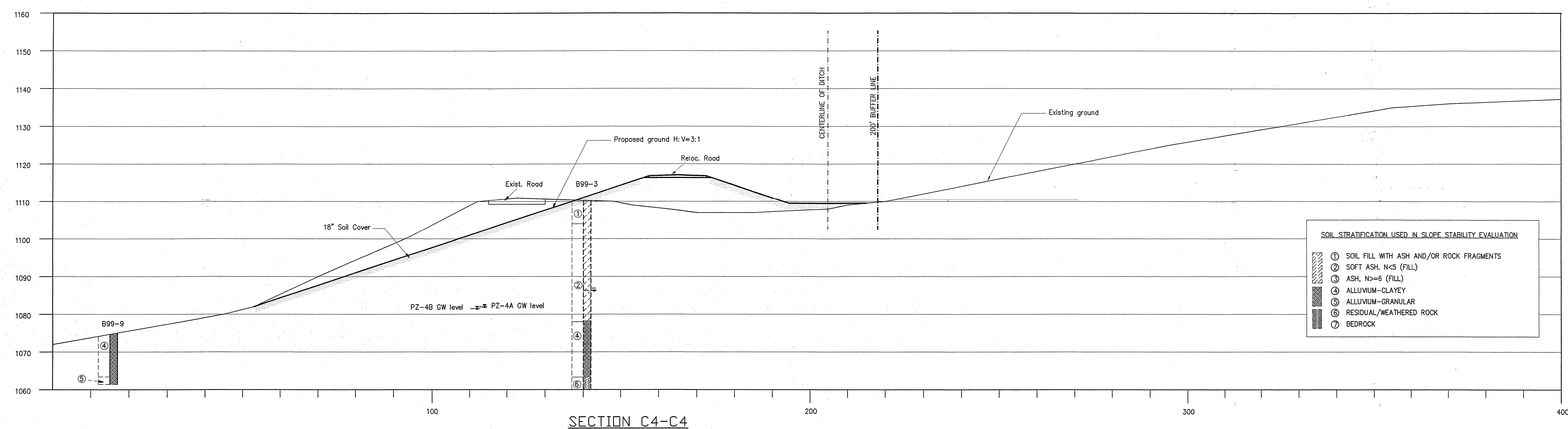

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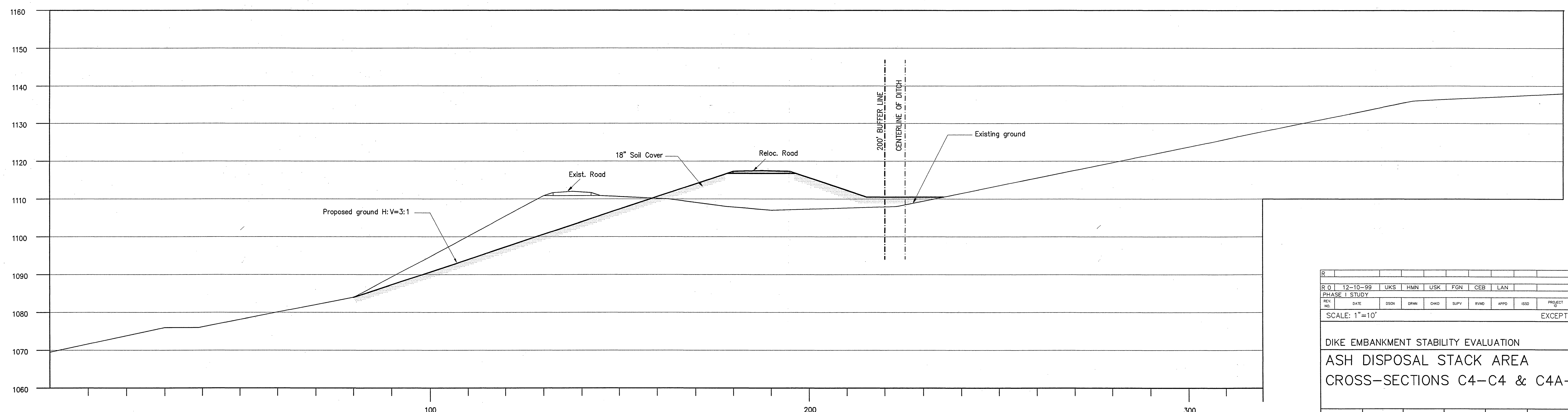

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VERT 1"=10'

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GRAPHIC SCALE

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R 0	12-10-99	UKS	HMN	USK	FGN	CEB	LAN			
PHASE I STUDY										

SCALE: 1"=10' EXCEPT AS NOTED

DIKE EMBANKMENT STABILITY EVALUATION

ASH DISPOSAL STACK AREA
CROSS-SECTIONS C4-C4 & C4A-C4A

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
UKS	HMN	UKS	F.G.Nadeau	C.E.Bohac	L.A.Nash	

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FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE 12-10-99 | 41 | C | 10W287-5 | R 0

PLOT FACTOR: 1:1
W_TVA

C.A.D. DRAWING
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41 C 10W287-5

SECTION C5-C5

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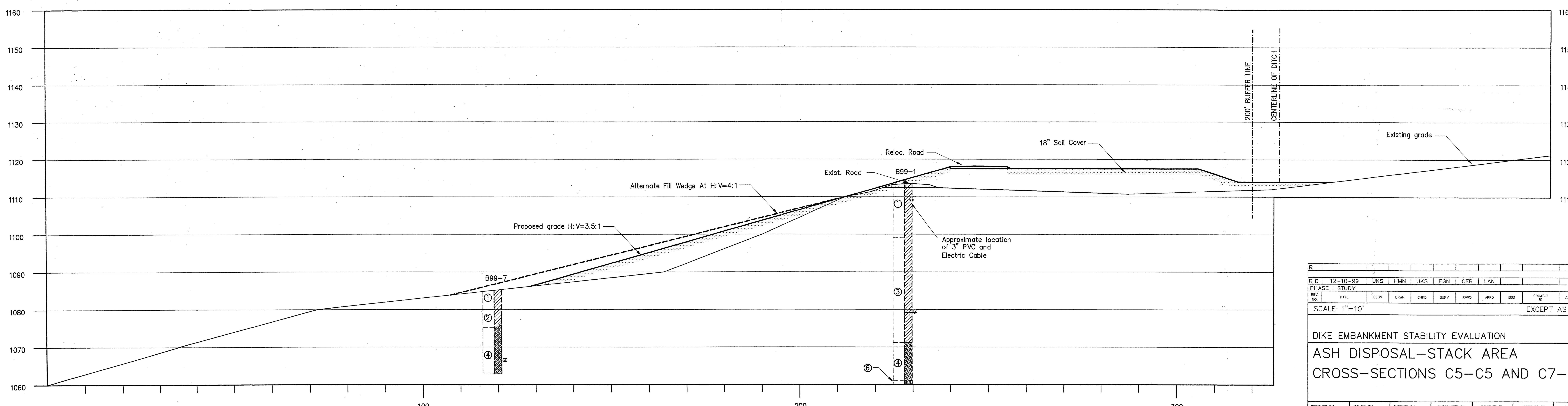

SECTION C7-C7

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VERT 1"=10'

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GRAPHIC SCALE

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R 0	12-10-99	UKS	HMN	UKS	FGN	CEB	LAN				0

PHASE I STUDY

SCALE: 1"=10' EXCEPT AS NOTED

DIKE EMBANKMENT STABILITY EVALUATION

ASH DISPOSAL-STACK AREA
CROSS-SECTIONS C5-C5 AND C7-C7

DESIGNED BY	DRAWN BY	CHECKED BY	SUPERVISED BY	REVIEWED BY	APPROVED BY	ISSUED BY
UKS	HMN	UKS	F.G.Nadeau	C.E.Bohac	L.A.Nash	

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AUTOCAD R14 | DATE 11-12-99 | 41 | C | 10W287-6 | R 0

PLOT FACTOR: 1:1
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C.A.D. DRAWING
DO NOT ALTER MANUALLY

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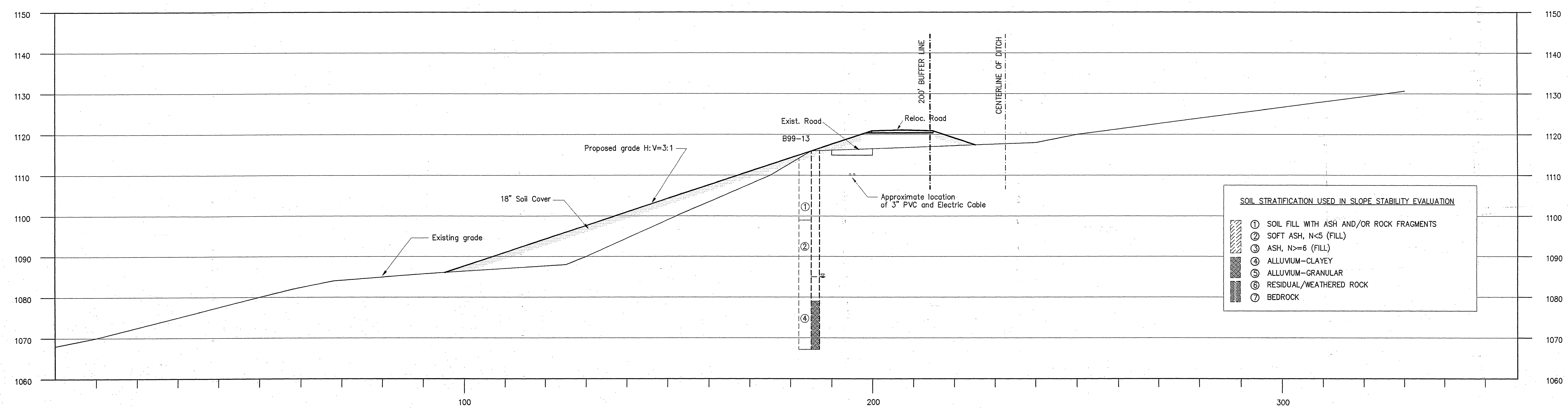

SECTION C6-C6

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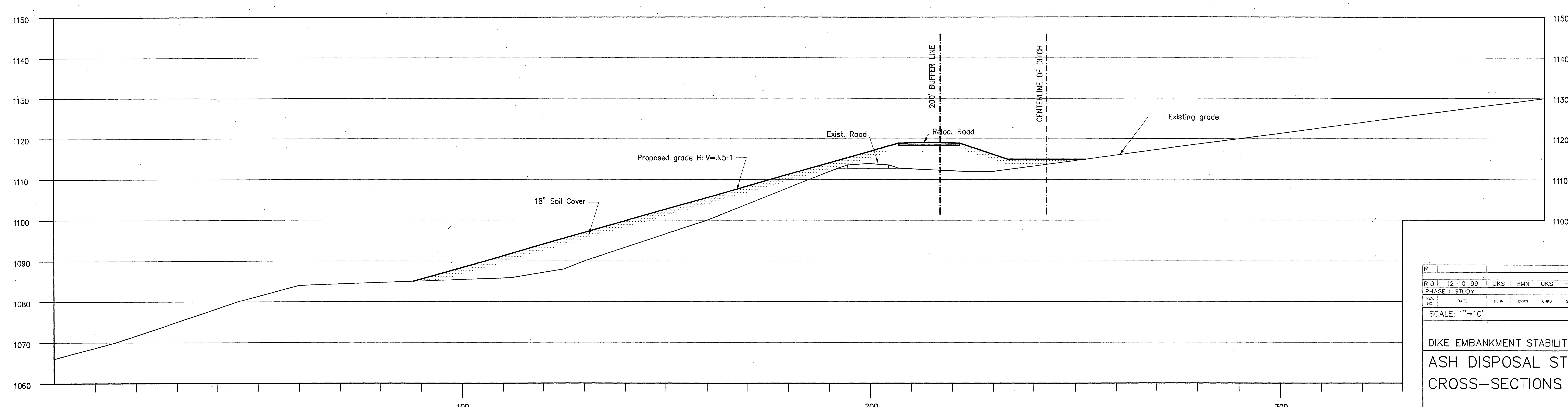

SECTION C6A-C6A

SCALE: HORIZ 1"=10'
VERT 1"=10'

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GRAPHIC SCALE

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD
R 0	12-10-99	UKS	HMN	UKS	FGN	CEB	LAN	

PHASE I STUDY

SCALE: 1"=10' EXCEPT AS NOTED

DIKE EMBANKMENT STABILITY EVALUATION

ASH DISPOSAL STACK AREA
CROSS-SECTIONS C6-C6 & C6A-C6A

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
UKS	HMN	UKS	F.G.Nadeau	C.E.Bohac	L.A.Nash	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE 12-10-99 | 41 | C | 10W287-7 | R 0

PLOT FACTOR: 1:1
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C.A.D. DRAWING
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PARSONS | 0
TASK COMPLETED BY: | REV NO.

PPG-DATE: 12/10/99 - 10:16 AM
PPG-FILE: 10W2877.dwg

APPENDIX A

Calculation – Evaluation of Ash Pond Dike Stability

CALCULATION COVER SHEET

PARSONS

CLIENT	Tennessee Valley Authority		
PROJECT	John Sevier Fossil Plant		
SUBJECT	Evaluation of Ash Pond Dike Stability		
JOB NUMBER	541055	WBS NUMBER	67100
CALCULATION NO.:	DC-541055-67100-C001	PAGE 1 OF	6

DESCRIPTION/PURPOSE

To evaluate the stability of the existing fly ash pond dike at the John Sevier Fossil Plant, and to recommend alternatives for maintaining, improving and/or repairing the dike when the Factor of Safety (FS) against instability is not adequate.

METHOD OF ANALYSIS AND COMPUTER PROGRAMS

The stability of the dike was evaluated at seven locations selected along the dike. The location of these sections, labeled C1-C1 through C7-C7, is shown on the site plans included with the main (Phase One) report. To simulate perched groundwater conditions within the soft and wet fly ash, a second set of runs was done with the groundwater level slightly higher (typically 10 ft.) than that recorded in the nearby borings and piezometers.

One method to improve dike stability is by uniformly laying back (i.e. excavating into) the dike slope. This was evaluated first by assuming that the excavation will be at a slope of 3H:1V. If the resulting FS was much greater than 1.3, the stability was re-evaluated by excavating with a slope of 2.5H:1V. As requested, a benched cut alternative with steeper slopes was evaluated at three of the sections located in the critical area (C3-C3 through C5-C5). At C6-C6, in the discharge canal area, a second alternative of creating a fill wedge over the dike was also evaluated due to the space available at the bottom of the dike. The seismic stability of all of the re-graded slopes was also analyzed.

The slope stability evaluations made use of the computer program PC STABL, which was developed for Federal Highway Administration at Purdue University as the general solution for two-dimensional slope stability problems using the limit equilibrium method. The calculation of the factor of safety against instability of a slope was performed by the method of slices. In this study a graphical interface program called STED (short for STabl EDitor) was used. STED itself performs no stability analysis but creates data files in the format expected by STABL and prepares high-quality graphics from the output. It supports PCSTABL versions 4, 4M, 5, 5M and 6H, and PennDOT's PASTABLM.EXE and PASTABLE.EXE programs. The specific versions used in this study was STABL5M, using the Bishop method (for circular failure surfaces), and STEDwin 2.0 (which is a recent release that supports the latest version of STABL6).

CODES AND STANDARDS

1. As mentioned within the calculations

REV	DATE	DESCRIPTION	PAGES REVISED	PAGES ADDED	PAGES DELETED	BY/DATE	REV/DATE	LDE/DATE
3								
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PARSONS

CALCULATION COVER SHEET

CLIENT	Tennessee Valley Authority
PROJECT	John Sevier Fossil Plant
SUBJECT	Evaluation of Ash Pond Dike Stability
JOB NUMBER	541055 — WBS NUMBER 67100
CALCULATION NO.:	DC-541055-67100-C001 — PAGE 2 OF 6

INFORMATION SOURCES

1. "Report of Geotechnical Exploration, Dike Exploration and Testing Program, John Sevier Fossil Plant", by Law Engineering (Project 50300-8-2075/0024/0800), 10/01/99
2. "Groundwater Monitoring Well Installation Report, John Sevier Fossil Plant", by Law Engineering (Project 50385-5-0400/0045/0001), 07/08/98
3. "Report of Hydrogeologic and Engineering Evaluation (Revised) for Proposed Dry Ash Disposal Facility Site, John Sevier Fossil Plant", by Law Engineering (Project 5740144.01), 09/30/94
4. Ash Disposal Stack Area Existing Contour (John Sevier Fossil Plant) drawing 10W204-9 revised
5. "Current Trends in Design and Construction of Embankment Dams" by American Society of Civil Engineers, 1979
6. Survey drawing JSEROSON.DWG
7. Drawings 10W2871, 10W2872, 10W2873, and 10W2874

ASSUMPTIONS

1. Recent topographic data was not available up to the actual riverbank. For this study, it was assumed that the ground surface drops a further 10 to 15 below that at the "Edge of River Bank" shown on reference 4 and on the site plans. This assumption appears to be generally consistent with an old survey that shows the river bank to be near elevation 1060 ft.
2. Based on a review of the available topographic and subsurface data, and our engineering interpretation of them, generalized subsurface profiles (or stratigraphy) were developed at the seven cross sections selected along the dike for the slope stability evaluations. The soils were grouped into seven common soil types (#1 to #7) as shown on the table at the top left corner of the profile outputs from the slope stability program included in Attachment A.
3. Excess pore water pressure does not exist within the fly ash dike materials. That is, the materials have had sufficient time since their placement to dissipate all excess pore water pressure.
4. The strength properties of the different strata are as noted on the profile printouts in Appendix B. These parameters were based on available boring data and laboratory testing results, and our engineering interpretation of them. To account for the somewhat random profile and nature of the old wet ash, as well as the residual strength condition of the materials, slightly conservative parameters were assumed.
5. For the purpose of this evaluation and study, it is assumed that a minimum FS of 1.3 is generally adequate. This should be acceptable especially since there are test boring and laboratory test data.
6. Materials used to create new fill sections on top of the dike will have properties equivalent to that of soil type # 1 (i.e. the soil cover) after placement and compaction, which be monitored and tested. The materials may consist of a mix of the soil cover existing on top of the dike and the underlying soft and wet fly ash (when manipulated to reduce moisture and screened for unsuitable materials such as plastic clays and organics), or any other materials approved by the geotechnical engineer.

DISCUSSION, RECOMMENDATIONS AND CONCLUSIONS

The slope stability of the dike was evaluated at the seven cross-sections (C1-C1 through C7-C7). The first set of runs was with "normal" groundwater levels as obtained from the nearby borings and piezometers. Since groundwater seeps were observed near the toe of the dike at elevations higher than that of groundwater levels recorded in nearby borings and/or piezometers, it is believed that perched groundwater exist within the soft and wet fly ash. To simulate such conditions, a second set of runs was done with the groundwater level slightly higher (typically 10 ft.). The output from these analyses is included in Attachment B. The minimum Factors of Safety (FS) obtained from the evaluation of the dike slope at the seven cross-sections is summarized below:

SECTION	APPROX. SLOPE OF DIKE	FS OF EXISTING DIKE SLOPE (NON-SEISMIC)		CATEGORY BASED ON FS OF EXIST. DIKE with normal gw level
		Normal g/water level	Higher g/water level	
C1-C1	2.9H:1V	1.3	1.1	Acceptable
C2-C2	3H:1V	1.61	1.36	Acceptable
C3-C3	1.63H:1V	0.87	0.85	Critical
C4-C4	2H:1V	0.9	0.9	Critical
C5-C5	2.11H:1V	1.1	0.89	Critical
C7-C7	3H:1V	1.36	1.36	Acceptable
C6-C6	2.32H:1V	1.04	1.03	Marginal

While these are generally consistent with field observations with respect to signs of instability (like slippages and sloughing), it would appear that exceptions may be taken at C3-C3, C4-C4 and C6-C6. At C3-C3 and C4-C4, the results suggest that the dike would have experienced very large slippages. Based on conversation with plant officials, only small to medium slippages have occurred in this length of the dike. Two surficial type slippages (like an "Oreo cookie") occurred in the early 1990s. And current field observations revealed a relatively recent (probably less than a year old) scarp about 5 ft. high and about 50 ft. wide observed on the dike east of section C4-C4. At C6-C6, the slope had tall and thick vegetative growth during our visits and was hard to look for signs of instability. But it was mentioned in a recent meeting that there were failures in the canal area about 7 to 8 years ago. Hence based on the field observations and the results of the evaluation, there is some conservatism in the analysis (as mentioned in assumption #3), but it is our opinion that the parameters are not overly conservative. With the presence of perched groundwater and/or clay lenses, apparent cohesion higher than that assumed in the analysis probably exist within the fly ash. But this is likely to be variable, or non-uniform, and harder to account for.

Based on the results obtained above, the following conclusions are drawn:

1. Depending on the stratigraphy, the groundwater level can affect the dike stability. For example at sections C1-C1, C2-C2 and C5-C5, the groundwater level was more sensitive to the FS obtained.
2. Along its length, the dike may be categorized into three sections based on the FS obtained:
   a. Acceptable sections are where a FS of at least 1.3 was obtained. This will be sections of the dike from just west of section C1-C1 to about the midpoint between C2-C2 and C3-C3, near where the slope steepens, and around C7-C7,
   b. Critical sections are where a FS less than 1.0 was obtained. This will be the section of the dike from about the midpoint between C2-C2 and C3-C3 to near the corner at Section C7-C7.
   c. Marginal sections are where FS of 1.0 to about 1.1 was obtained. This will be the section of the dike from near C7-C7 towards C6-C6.
3. The above categorization approximately correlates with the existing slope of the dike as acceptable

when steepness is 3H:1V and flatter, critical when steepness is 2.25H:1V and steeper, and marginal for slopes between 2.25H and 2.75H:1V.

In the sections categorized as critical and marginal, where the factor of safety (FS) with the normal groundwater level was less than 1.3, the stability of the dike should be improved by any one of the alternatives discussed in the main (Phase One) report. As discussed in that report, the cost-effective solution is by re-grading the dike, and is further evaluated below. In addition, it helps to improve the groundwater conditions in the wet and soft fly ash strata of the dike as well as that of materials behind the dike. This can be achieved by minimizing the infiltration of surface run-off. Run-off from the dry stack slope (south of the dike) currently drains into a ditch that appears to have poor to mild pitch or slope. Ponding appear to occur at some locations. Ensuring that the new swale will have better pitch and that the dry stack slope is grassed will help to minimize infiltration.

One method to improve dike stability is by uniformly laying back the dike slope (i.e. by excavation), and is further evaluated by first assuming that the excavation will be at a slope of 3H:1V. If the resulting FS was much greater than 1.3, the stability was re-evaluated by excavating with a slope of 2.5H:1V. The resulting outputs are included in Attachment C. At C6-C6, in the discharge canal area, a second alternative of creating a fill wedge over the dike was also evaluated. This appears feasible due to the space available at the bottom of the dike. The outputs with the fill option at C6-C6 are included in Attachment D. As requested at sections C3-C3 thru C5-C5, another alternative of creating a bench while laying back the dike with 2.5H:1V and 3H:1V slopes was also evaluated. The results are included in Attachment E.

Since the overall groundwater conditions will be improved following the recommendations outlined in the main report, only the normal groundwater level (i.e. at elevations encountered in the recent borings and per recent readings in the wells and piezometers) are considered in analyzing all of the re-graded sections above. The minimum Factors of Safety (FS) obtained from the various analysis and outputs mentioned above are summarized below. As requested by the client, the seismic stability of all the re-graded slopes was also analyzed.

SECTION	FS OF DIKE LAID BACK AT 3H:1V (normal gw level)		FS OF DIKE EXCAVATED AT OTHER SLOPES (normal gw level)	
	Non seismic	With 0.1g horz.	Non seismic	With 0.1g horz.
C1-C1	1.34	1.0	n/a	n/a
C2-C2	n/a	n/a	n/a	n/a
C3-C3	1.86	1.3	1.58 at 2.5H:1V	1.2 at 2.5H:1V
C4-C4	1.55	1.1	1.11 at 2.5H:1V	0.9 at 2.5H:1V
C5-C5	1.48	1.1	1.22 at 2.5H:1V	1.0 at 2.5H:1V
C7-C7	1.4	1.0	1.57 at 3.5H:1V	1.1 at 3.5H:1V
C6-C6 (by cut)	1.25	0.9	1.35 at 3.5H:1V	1.0 at 3.5H:1V
C6-C6 (by fill)	1.32	1.0	1.56 at 3.5H:1V	1.1 at 3.5H:1V

SECTION	FS OF DIKE EXCAVATED WITH A BENCH AT 3H:1V (normal gw level)		FS OF DIKE LAID BACK WITH A BENCH AT 2.5H:1V (normal gw level)	
	Non seismic	With 0.1g horz.	Non seismic	With 0.1g horz.
C3-C3	1.48	1.0	1.28	0.9
C4-C4	1.47	1.0	1.27	1.0
C5-C5	1.42	1.1	1.18	0.9

NOTE: All benches were assumed to be 15 ft. wide and at an elevation of approximatel

Based on these results, the following recommendations and conclusions are drawn:

1. Within the length of the dike categorized as critical, any re-grading done should be at 3H:1V or flatter. The resulting FS will be closer to 1.5 with normal groundwater conditions (and closer to 1.3 with the higher groundwater conditions previously modeled). Creating a bench with 2.5H:1V slopes is not preferable as the resulting static FS was 1.2 at C5-C5 and the seismic FS was 0.9 at both C3-C3 and C5-C. A 3H:1V bench option may be used but will result in more cut volumes than with a uniform re-grading at 3H:1V.

2. Within the length of the dike categorized as marginal, laying back the dike at 3.5H:1V will be marginally acceptable as the resulting non-seismic FS was slightly less than 1.3 and that the seismic FS was slightly less than 1.0 at C6-C6. If 1.5 is desired, then the excavation has to be at 3.5H:1V. Alternatively with a 3H:1V fill wedge option, the resulting non-seismic and seismic FS was 1.3 and 1.0, respectively, at C6-C6. With a 3.5H:1V fill wedge, the resulting non-seismic and seismic FS was 1.5 and 1.1, respectively. Hence in this area, the fill wedge is recommended, with the wedge having a slope of 3H:1V or flatter (to use up cut materials from the critical lengths of the dike, for example).

3. In the acceptable sections, there does not appear to be the need to re-grade other than general improvement of groundwater conditions. If a minimum FS of 1.5 desired, or required, even with the assumed soil strength parameters, then any re-grading has to be at a steepness flatter than the current (3H:1V), such as at 4H:1V.

SUMMARY

Based on the slope stability evaluations, the dike may be divided into four different sections. The site plans show the sections that are categorized as acceptable, marginal and marginal. The table below summarizes the recommended alternatives for the dike.

PARSONS

CALCULATION COVER SHEET

CLIENT	Tennessee Valley Authority
PROJECT	John Sevier Fossil Plant
SUBJECT	Evaluation of Ash Pond Dike Stability
JOB NUMBER	541055 WBS NUMBER 67100
CALCULATION NO.:	DC-541055-67100-C001 PAGE 6 OF 6

SECTION	PROPOSED ALTERNATIVE	RESULTING FS WITH PROPOSED ALTERNATIVE	
		Non seismic	With 0.1g horz.
C1-C1	None; just improve site drainage	Existing FS = 1.30	Existing FS = 1.0
C2-C2	None; just improve site drainage	Existing FS = 1.61	Existing FS = 1.2
C3-C3	Re-grade by excavating at 3H:1V	1.86	1.3
C4-C4	Re-grade by excavating at 3H:1V	1.55	1.1
C5-C5	Re-grade by excavating at 3H:1V	1.48	1.1
C7-C7	None; just improve site drainage	Existing FS = 1.36	Existing FS = 1.0
C6-C6	Create a 3H:1V (or flatter) fill wedge	1.32	1.0

The main (Phase One) report has additional discussion as well as recommendations for protecting the riverbank that is also experiencing erosion and sloughing.

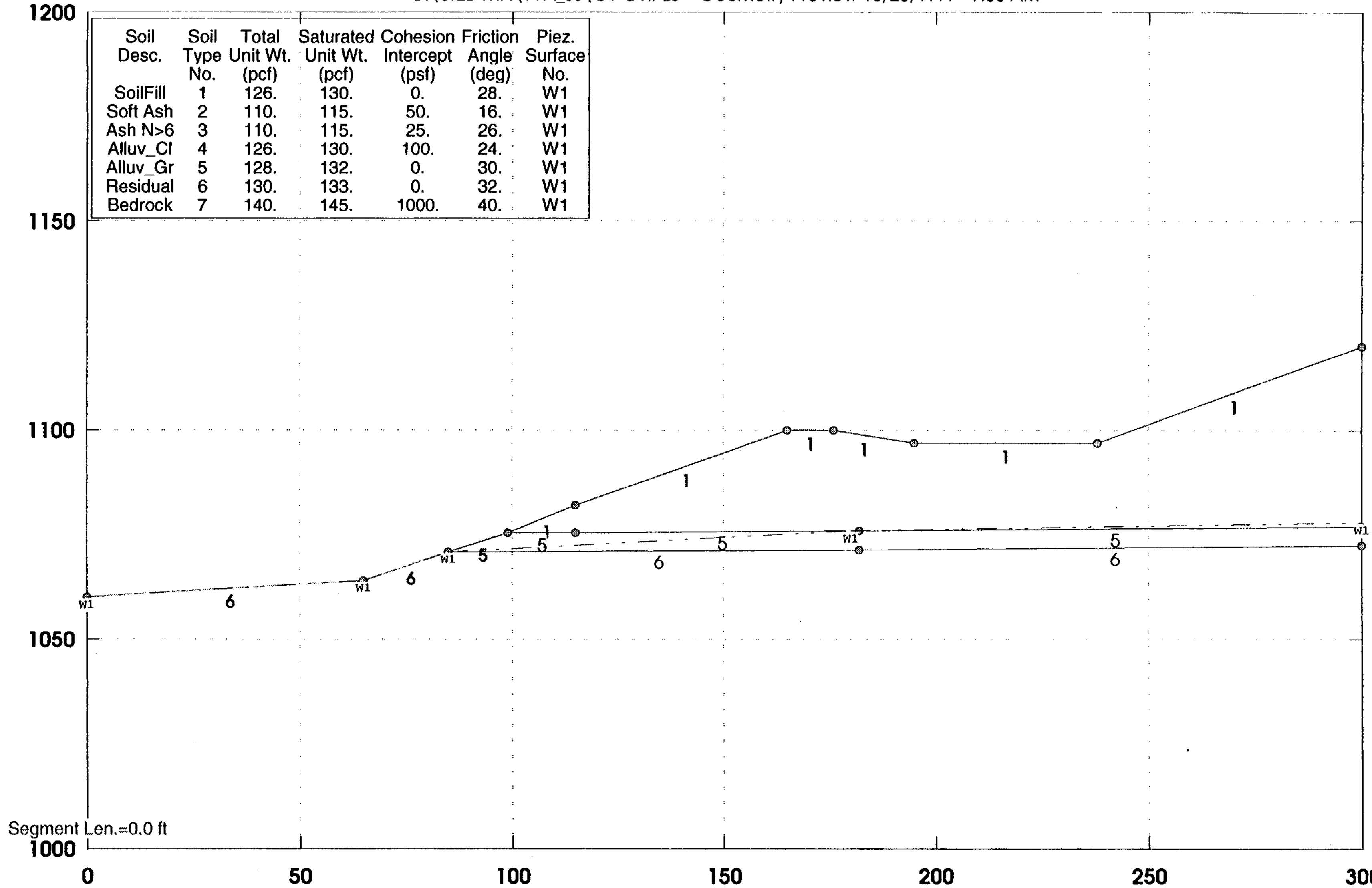
ATTACHMENT A (OF CALCULATION SHEET)

Output of profile used at sections C1-C1 through C7-C7

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C1-C1

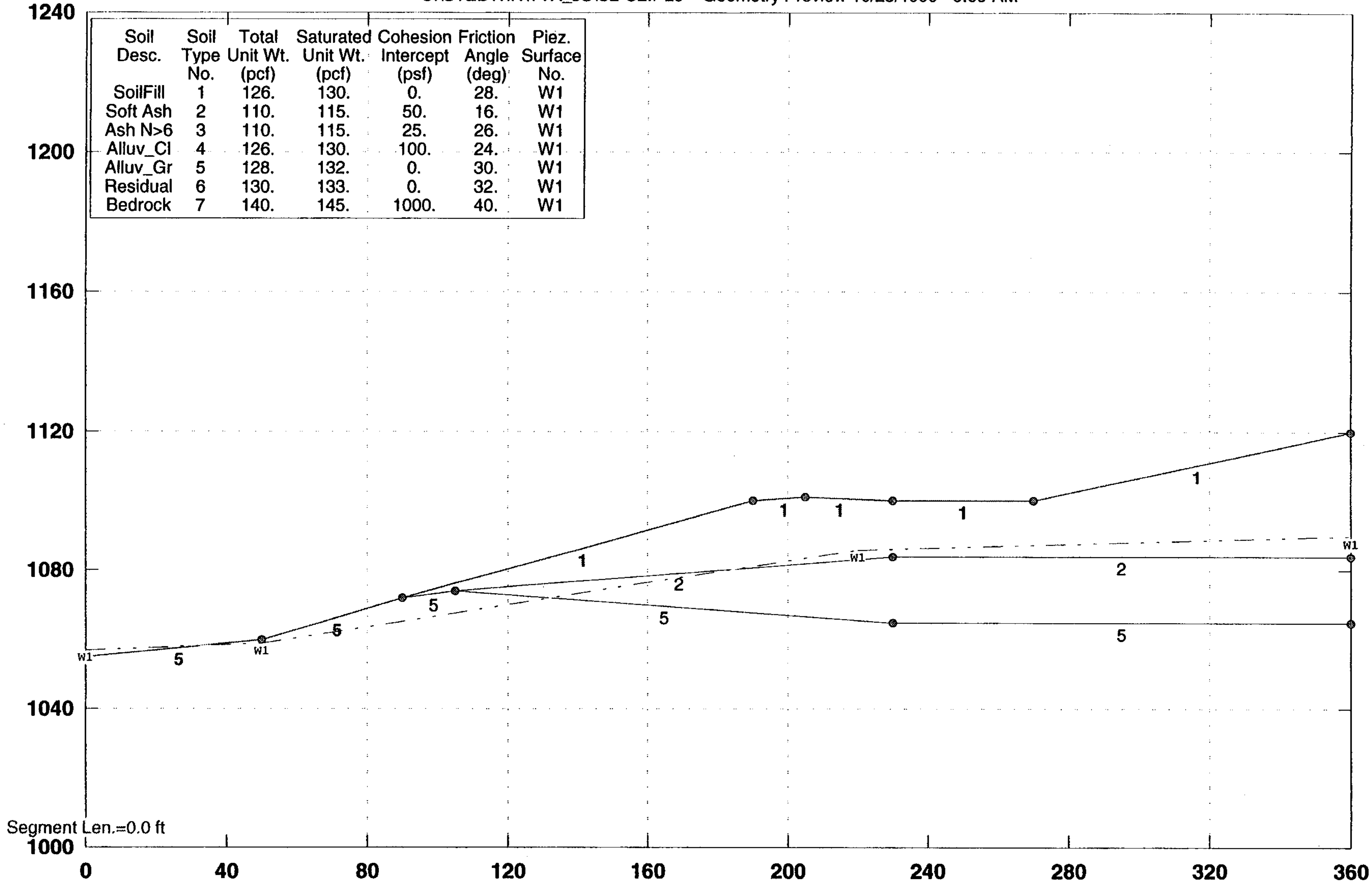
C:\STEDWIN\TVA_JS\C1-C1.PL0 Geometry Preview 10/25/1999 9:08 AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1



TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C2-C2

C:\STEDWIN\TVA_JS\C2-C2.PL0   Geometry Preview 10/25/1999   9:09 AM



Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C3-C3

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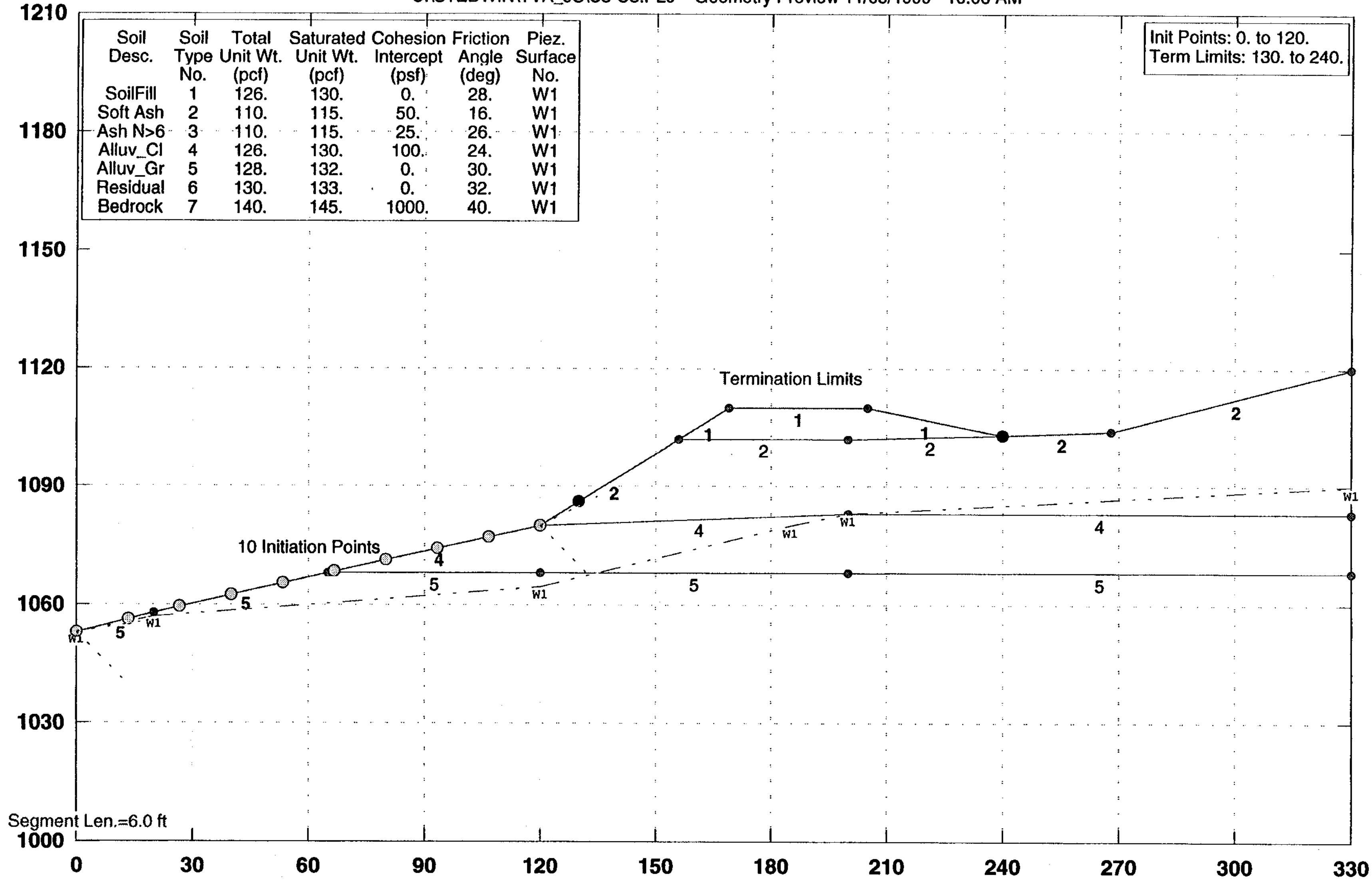

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C4-C4

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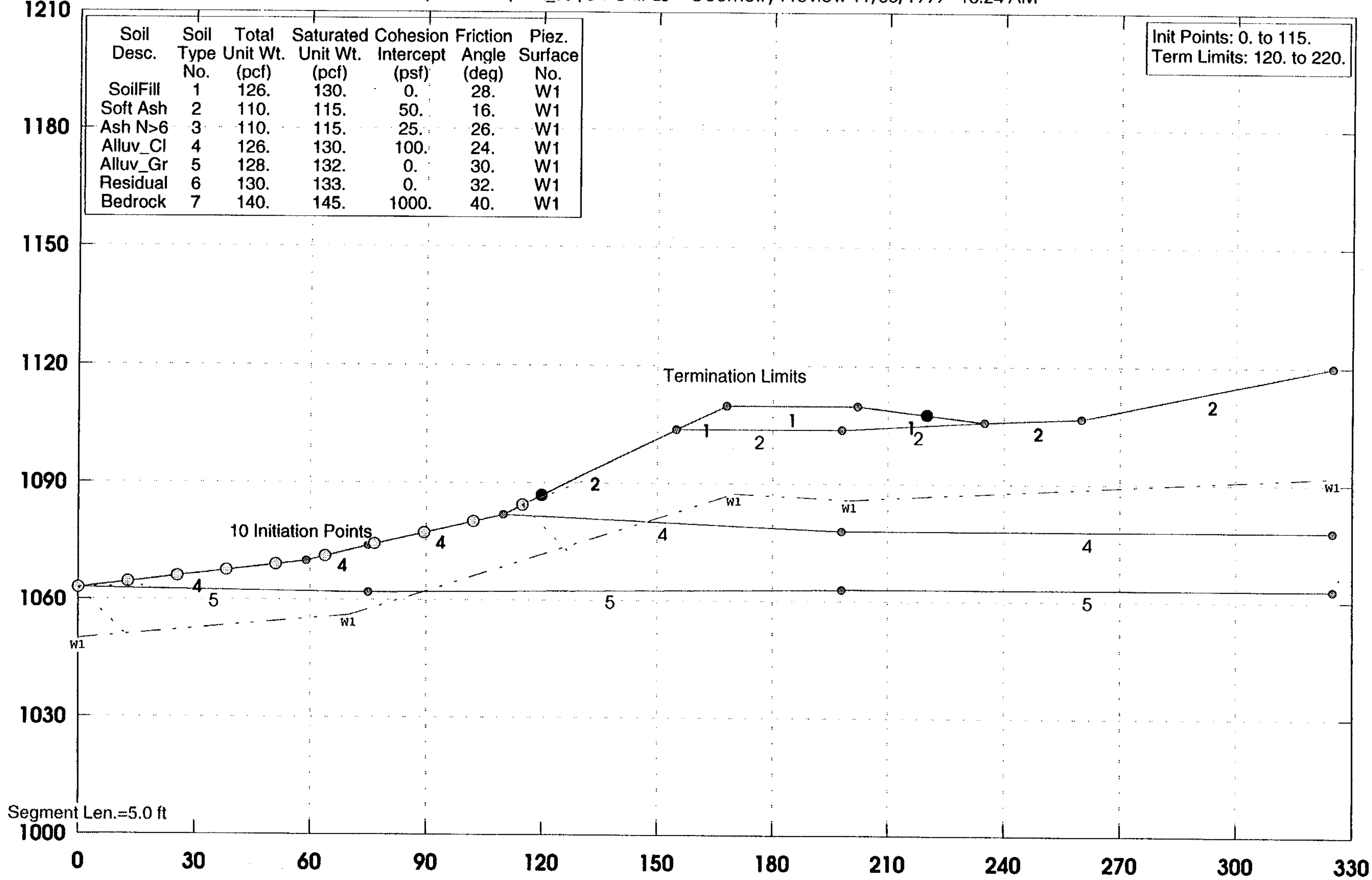

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C5-C5

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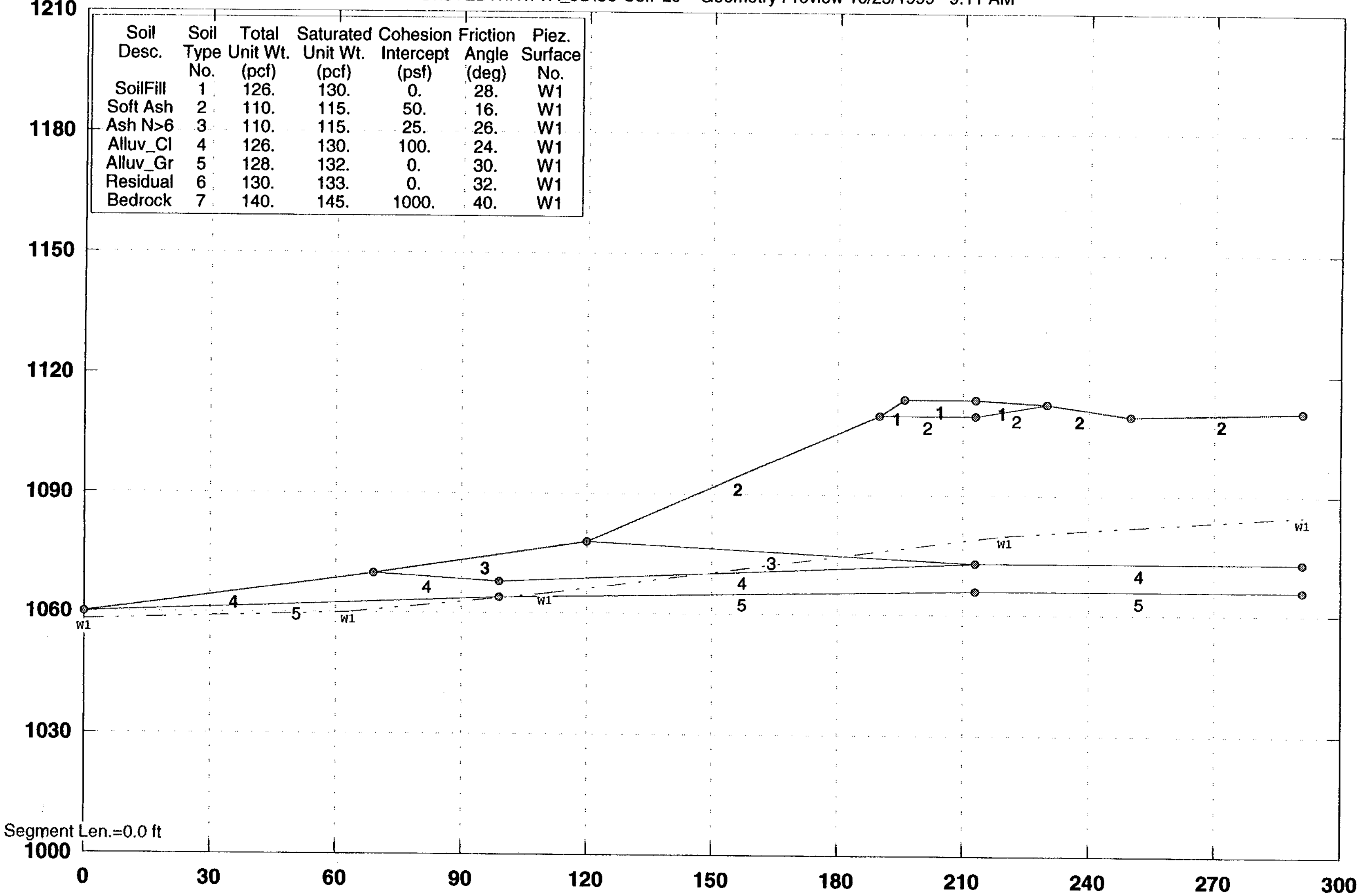

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C6-C6

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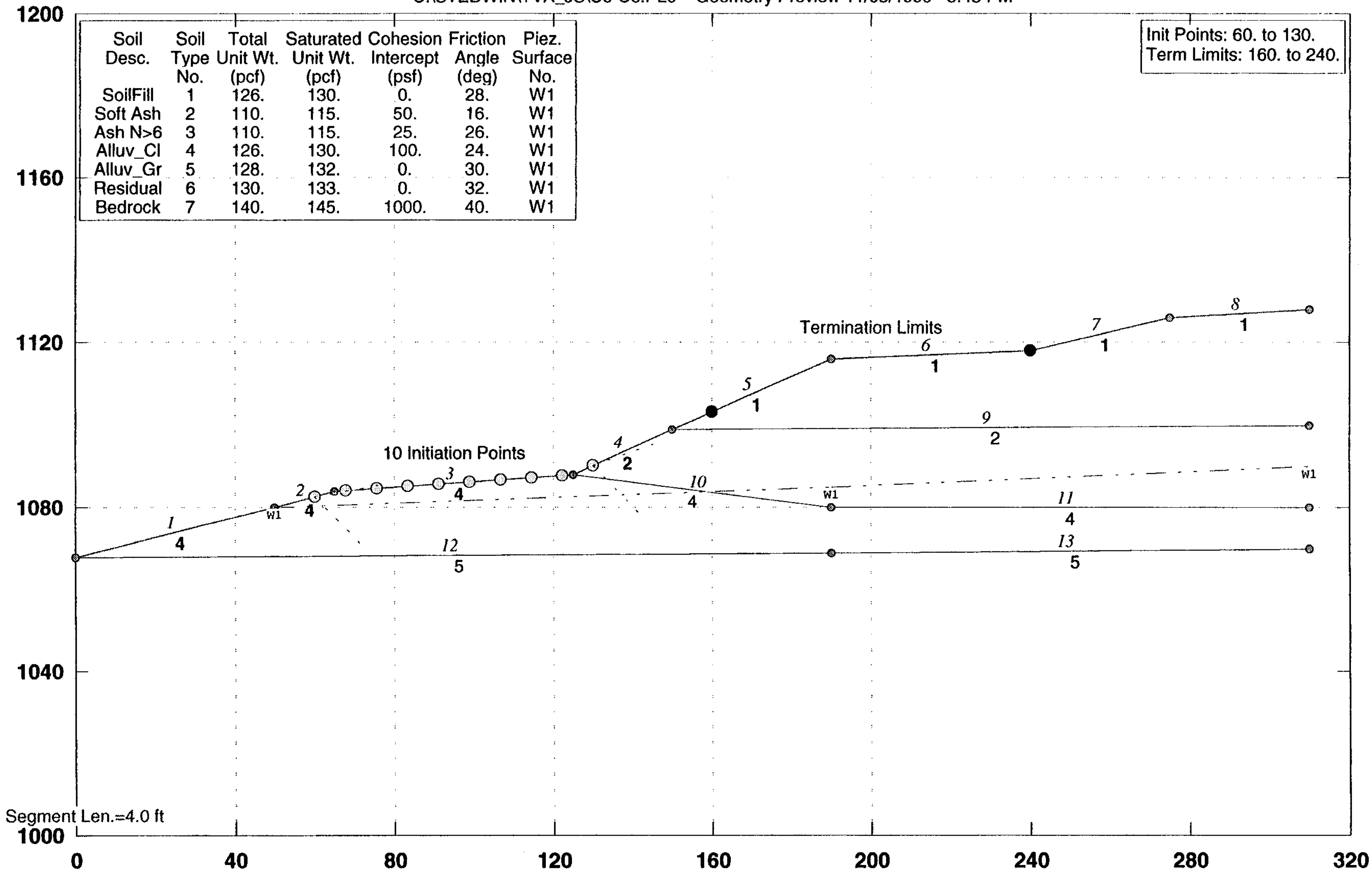
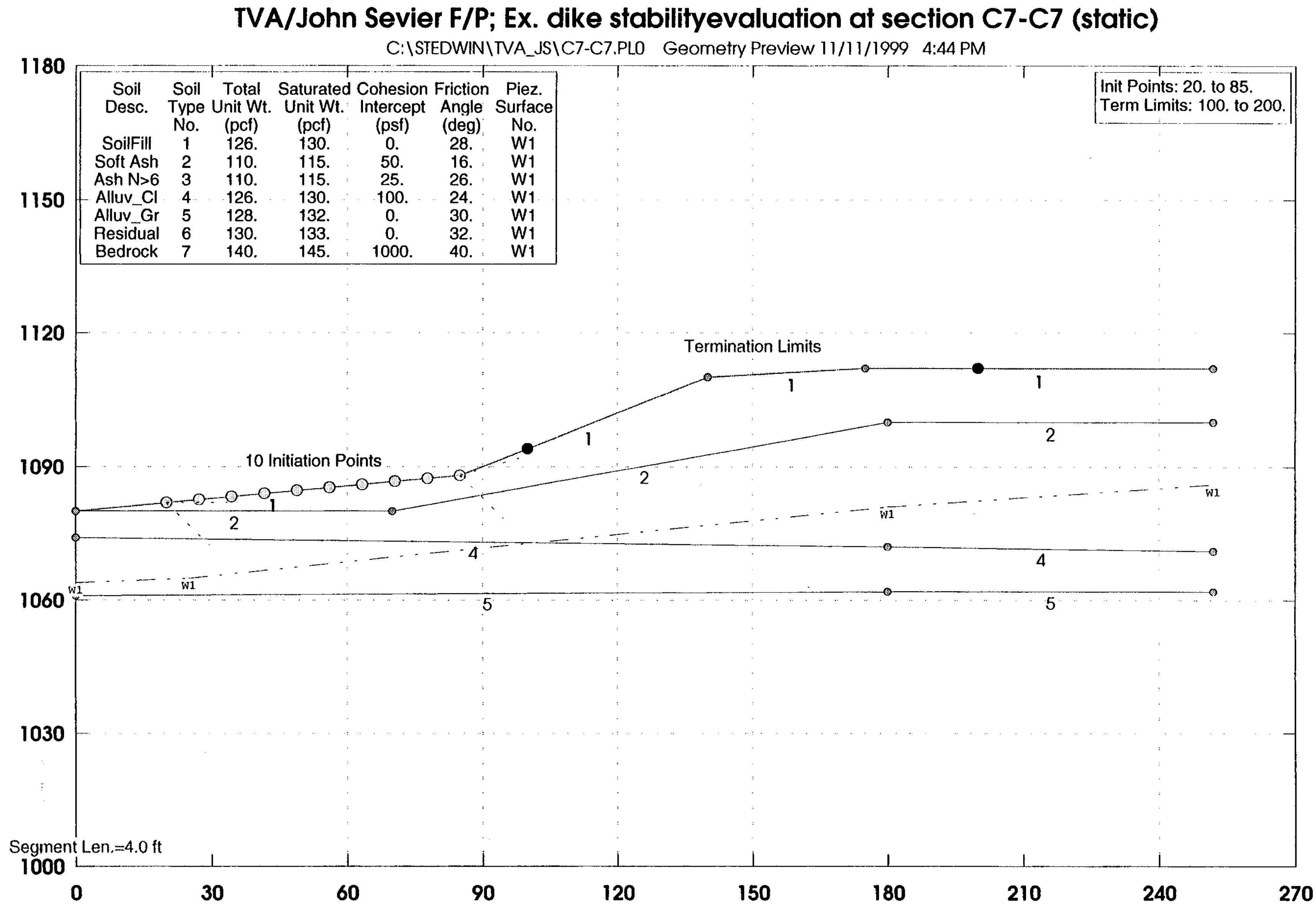


Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1


TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C7-C7 (static)
C:\STEDWIN\TVA_JS\C7-C7.PL0 Geometry Preview 11/11/1999 4:44 PM
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No.
SoilFill 1 126. 130. 0. 28. W1
Soft Ash 2 110. 115. 50. 16. W1
Ash N>6 3 110. 115. 25. 26. W1
Alluv_Cl 4 126. 130. 100. 24. W1
Alluv_Gr 5 128. 132. 0. 30. W1
Residual 6 130. 133. 0. 32. W1
Bedrock 7 140. 145. 1000. 40. W1
Init Points: 20. to 85.
Term Limits: 100. to 200.
Termination Limits
10 Initiation Points
Segment Len.=4.0 ft
1180
1150
1120
1090
1060
1030
1000
0
30
60
90
120
150
180
210
240
270

ATTACHMENT B (OF CALCULATION SHEET)

Stability outputs of existing sections at C1-C1 through C7-C7

TVA/John Sevier F/P; Ex. dike stability evaluation at section C1-C1

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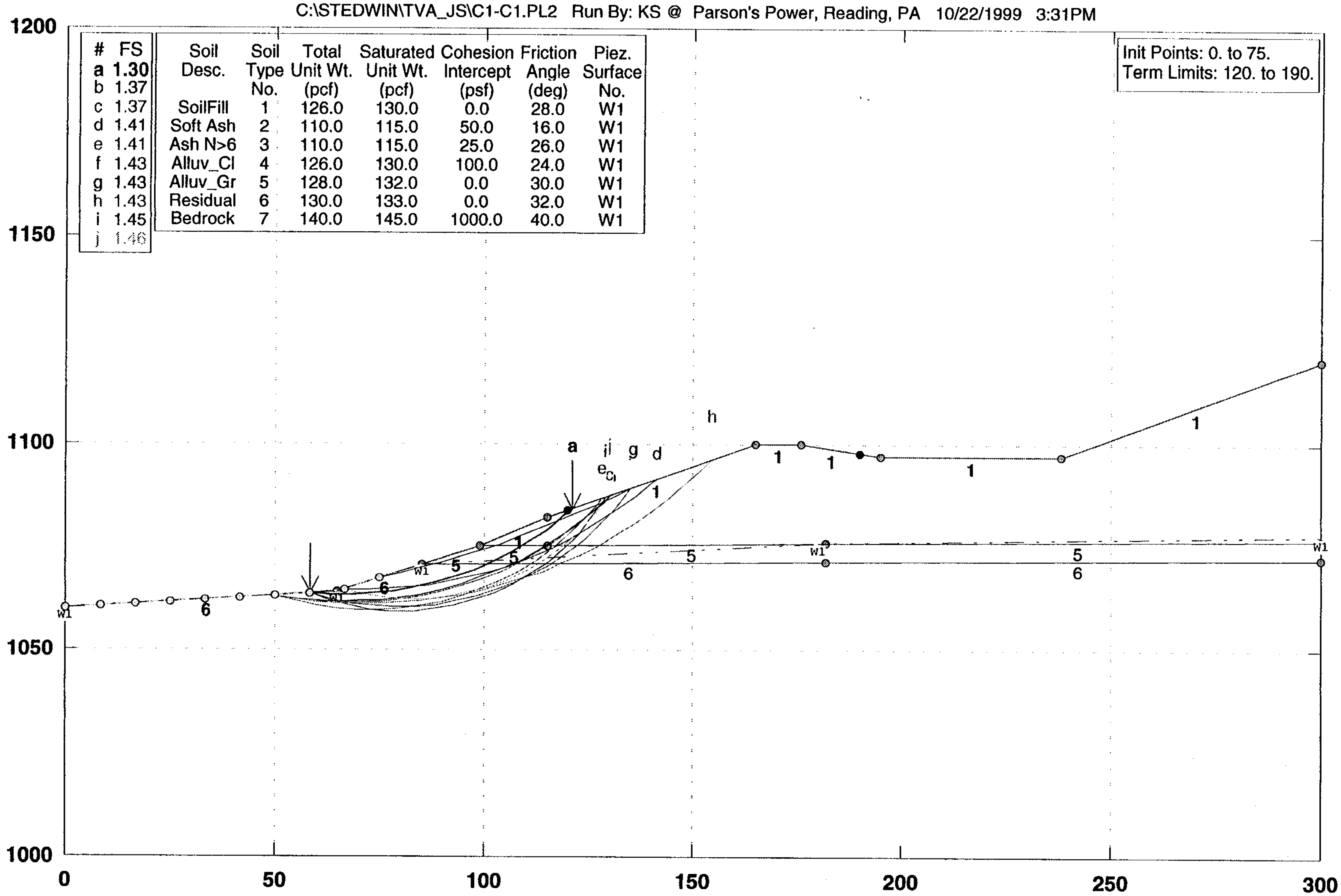

#	FS
a	1.30
b	1.37
c	1.37
d	1.41
e	1.41
f	1.43
g	1.43
h	1.43
i	1.45
j	1.46

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.30

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C1-C1 with higher water level

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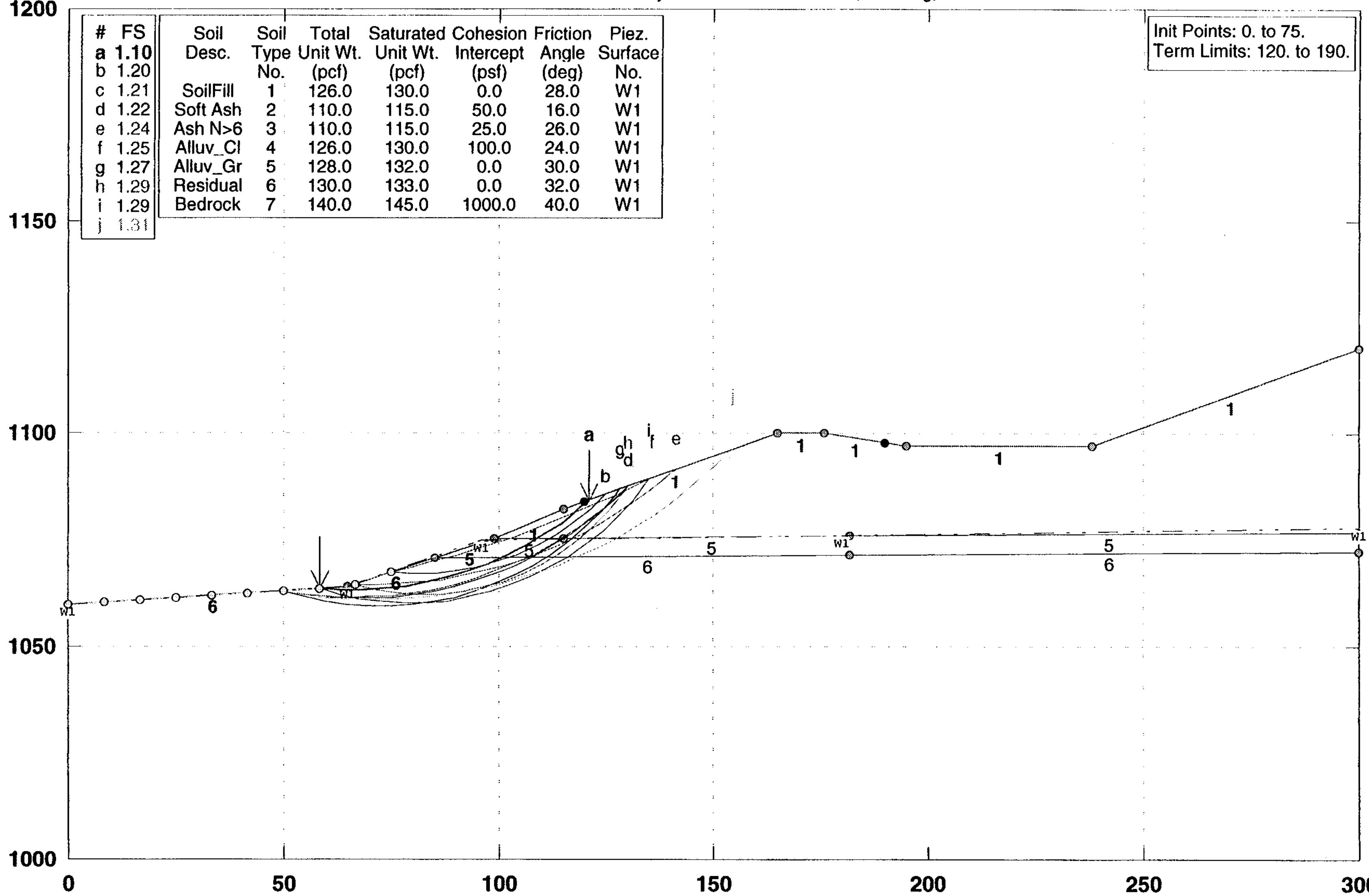
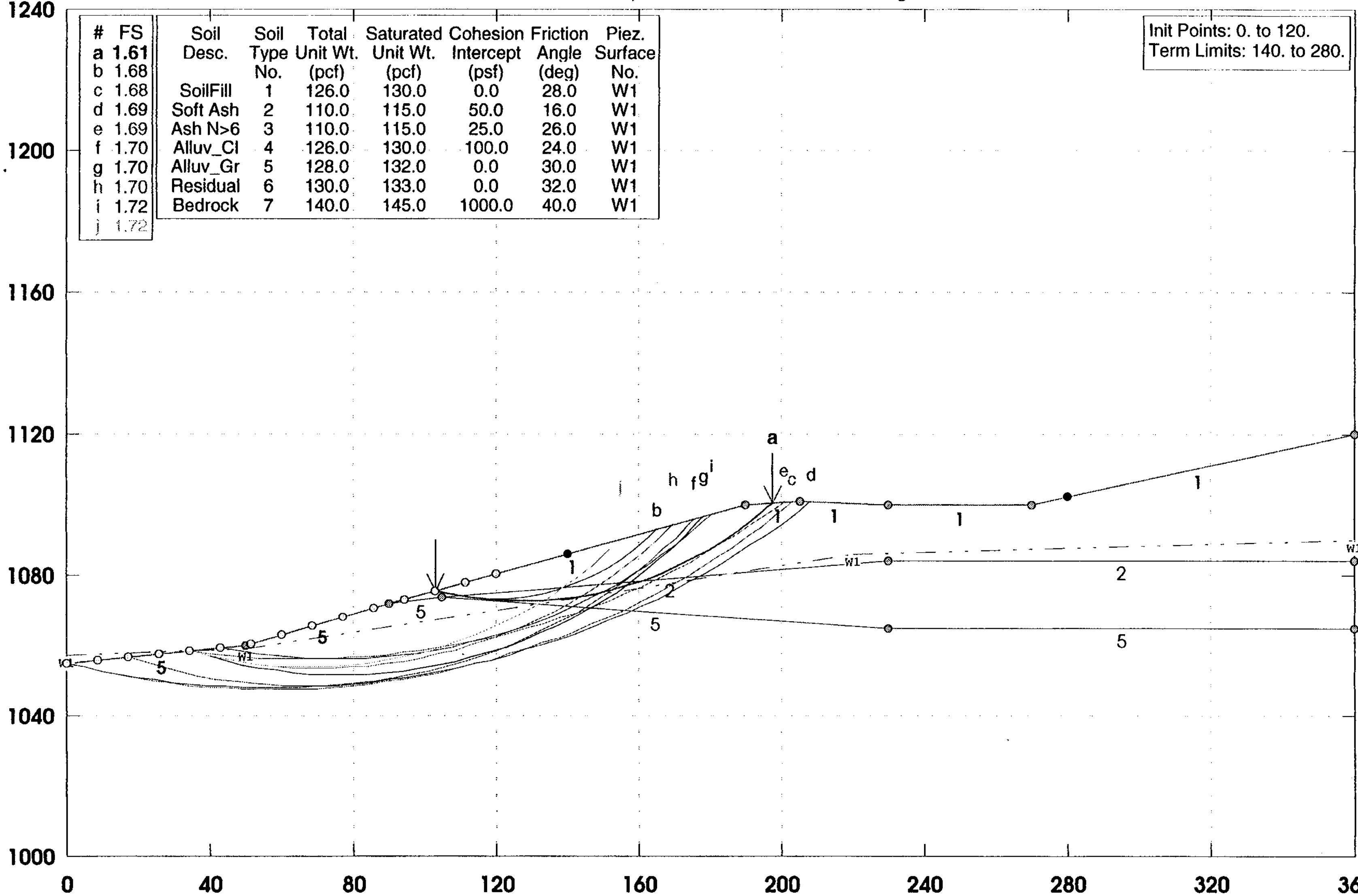


PCSTABL5M/si FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C2-C2

C:\STEDWIN\TVA_JS\C2-C2.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 3:17PM

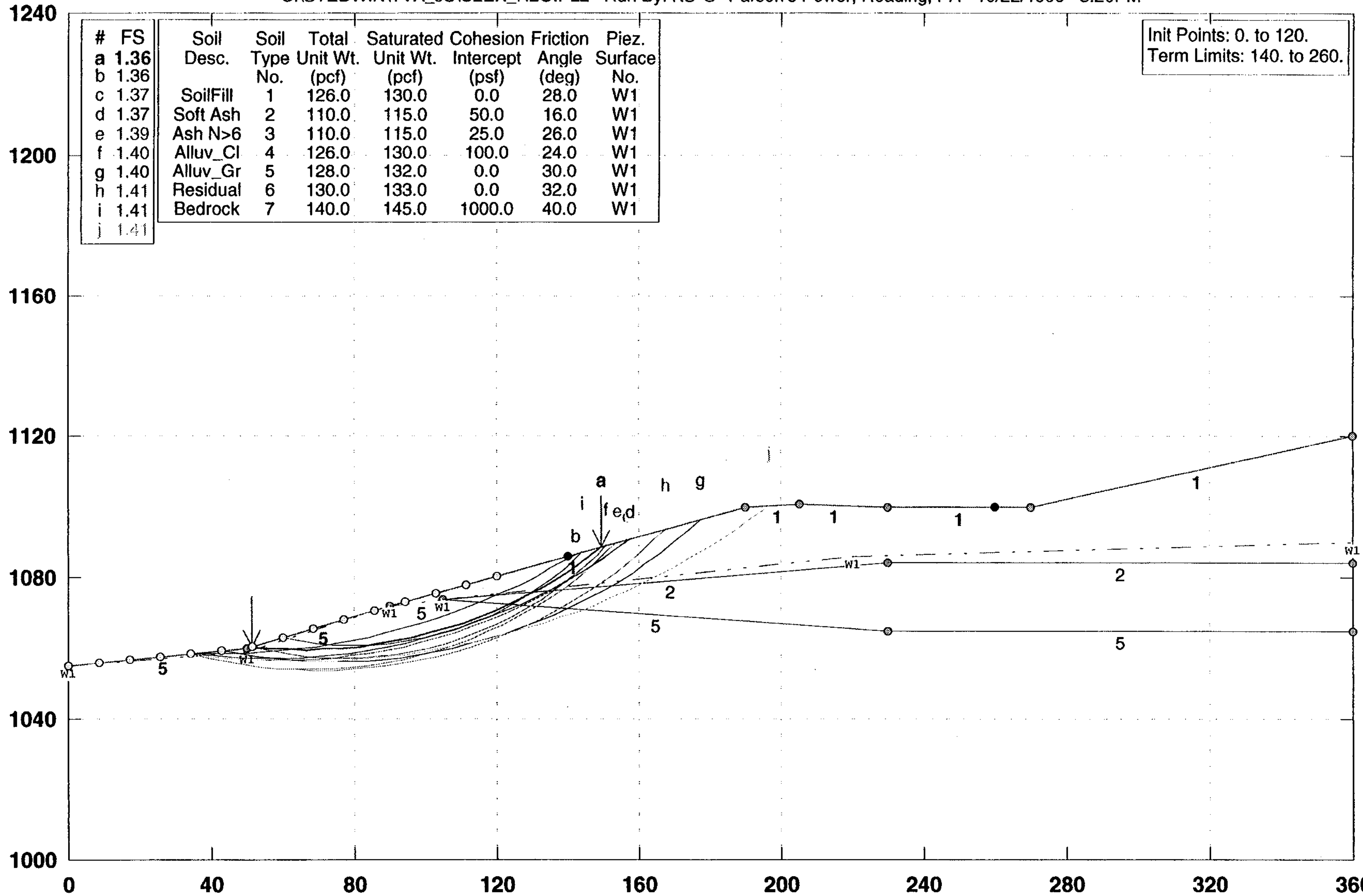


PCSTABL5M/si FSmin=1.61

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C2-C2 with higher water level

C:\STEDWIN\TVA_JS\C2EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 3:20PM



#	FS
a	**1.36**
b	1.36
c	1.37
d	1.37
e	1.39
f	1.40
g	1.40
h	1.41
i	1.41
j	1.41

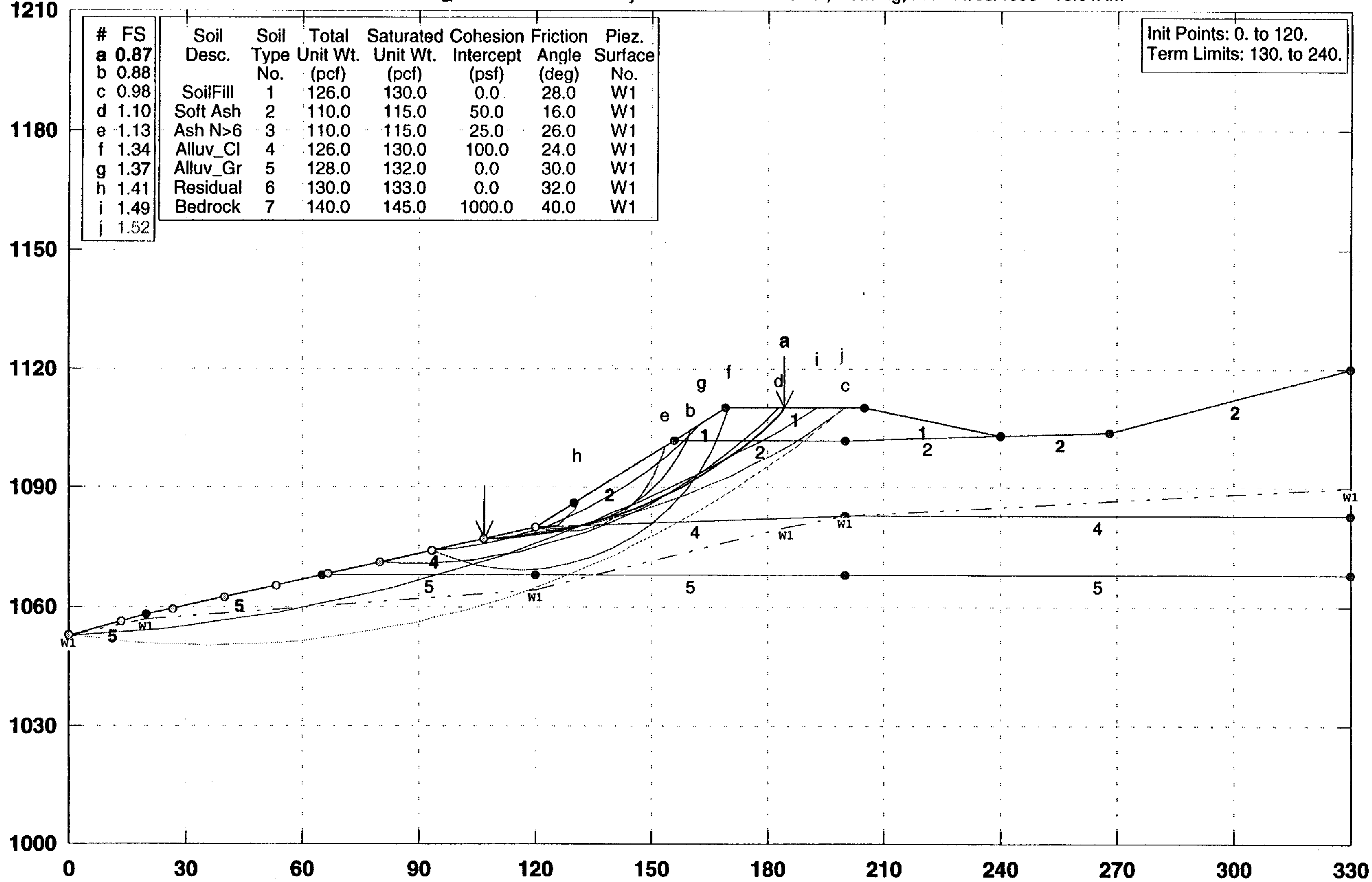
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.36

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C3-C3

C:\STEDWIN\TVA_JS\C3-C3.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:01AM



#	FS
a	0.87
b	0.88
c	0.98
d	1.10
e	1.13
f	1.34
g	1.37
h	1.41
i	1.49
j	1.52

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=0.87

Safety Factors Are Calculated By The Modified Bishop Method

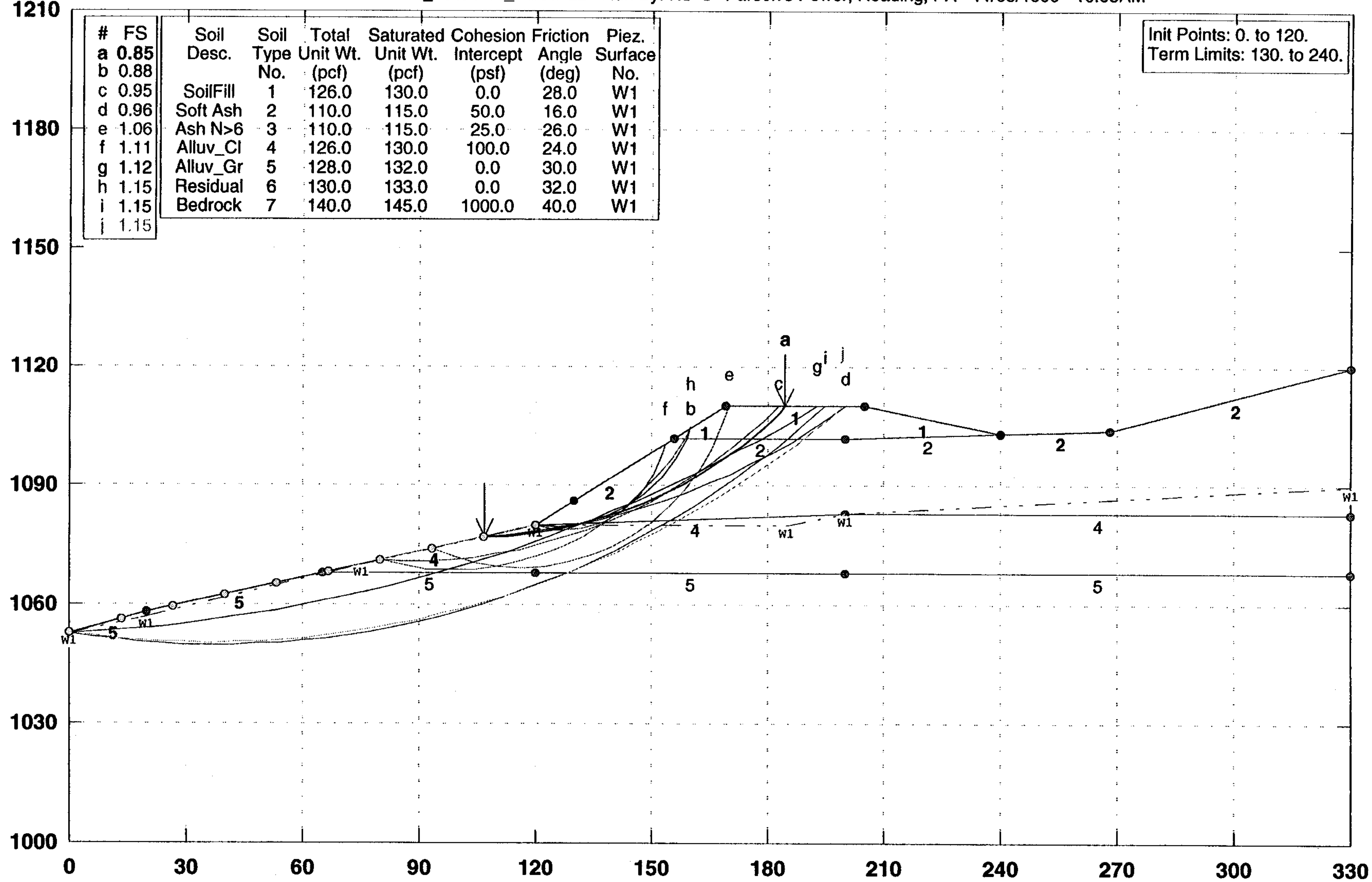
TVA/John Sevier F/P; Ex. dike stability at C3-C3 with higher temporary g/w level

C:\STEDWIN\TVA_JS\C3EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:05AM

#	FS
a	0.85
b	0.88
c	0.95
d	0.96
e	1.06
f	1.11
g	1.12
h	1.15
i	1.15
j	1.15

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Init Points: 0. to 120.
Term Limits: 130. to 240.

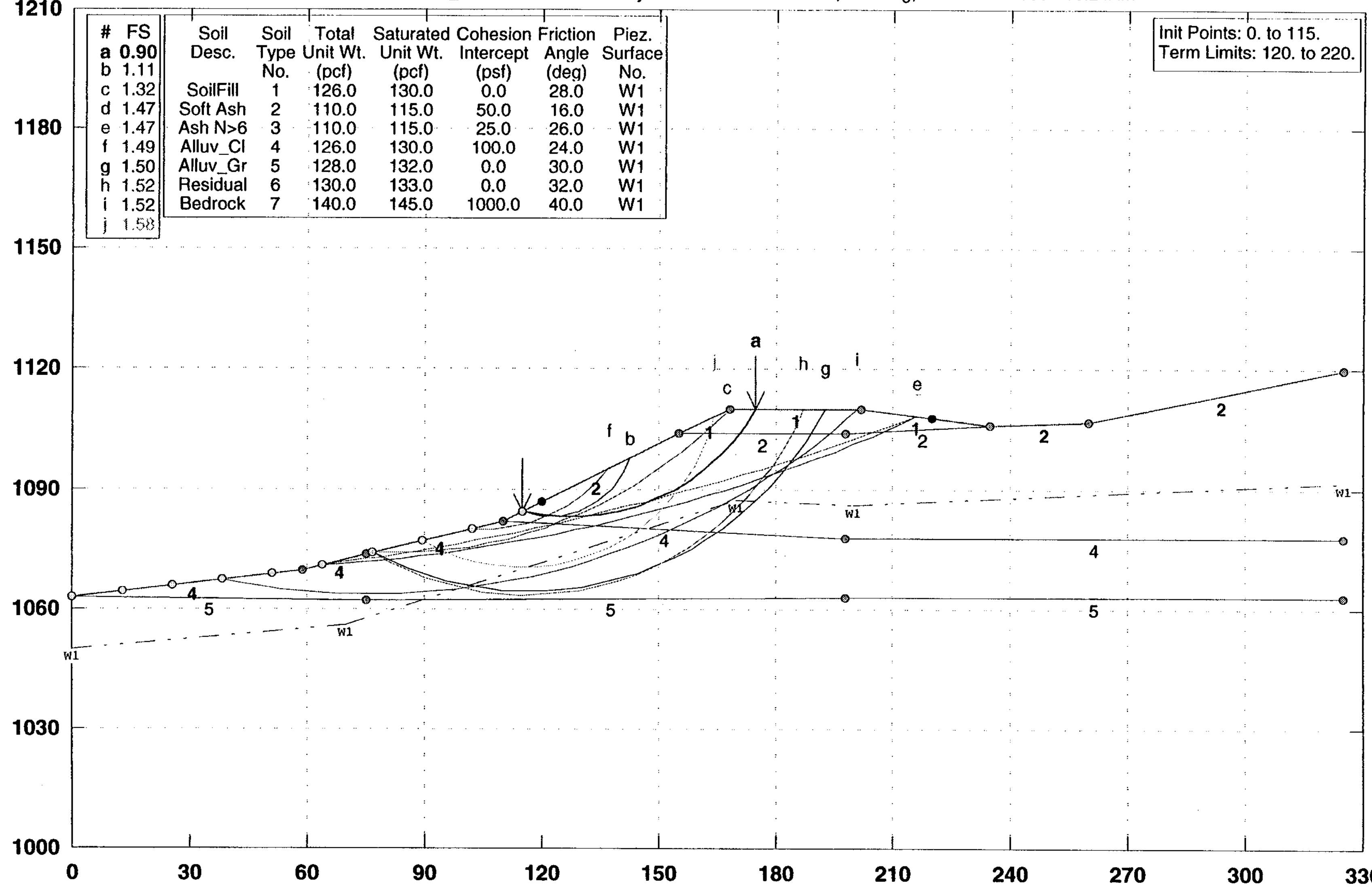


PCSTABL5M/si FSmin=0.85

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C4-C4

C:\STEDWIN\TVA_JS\C4-C4.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:24AM



#	FS
a	0.90
b	1.11
c	1.32
d	1.47
e	1.47
f	1.49
g	1.50
h	1.52
i	1.52
j	1.58

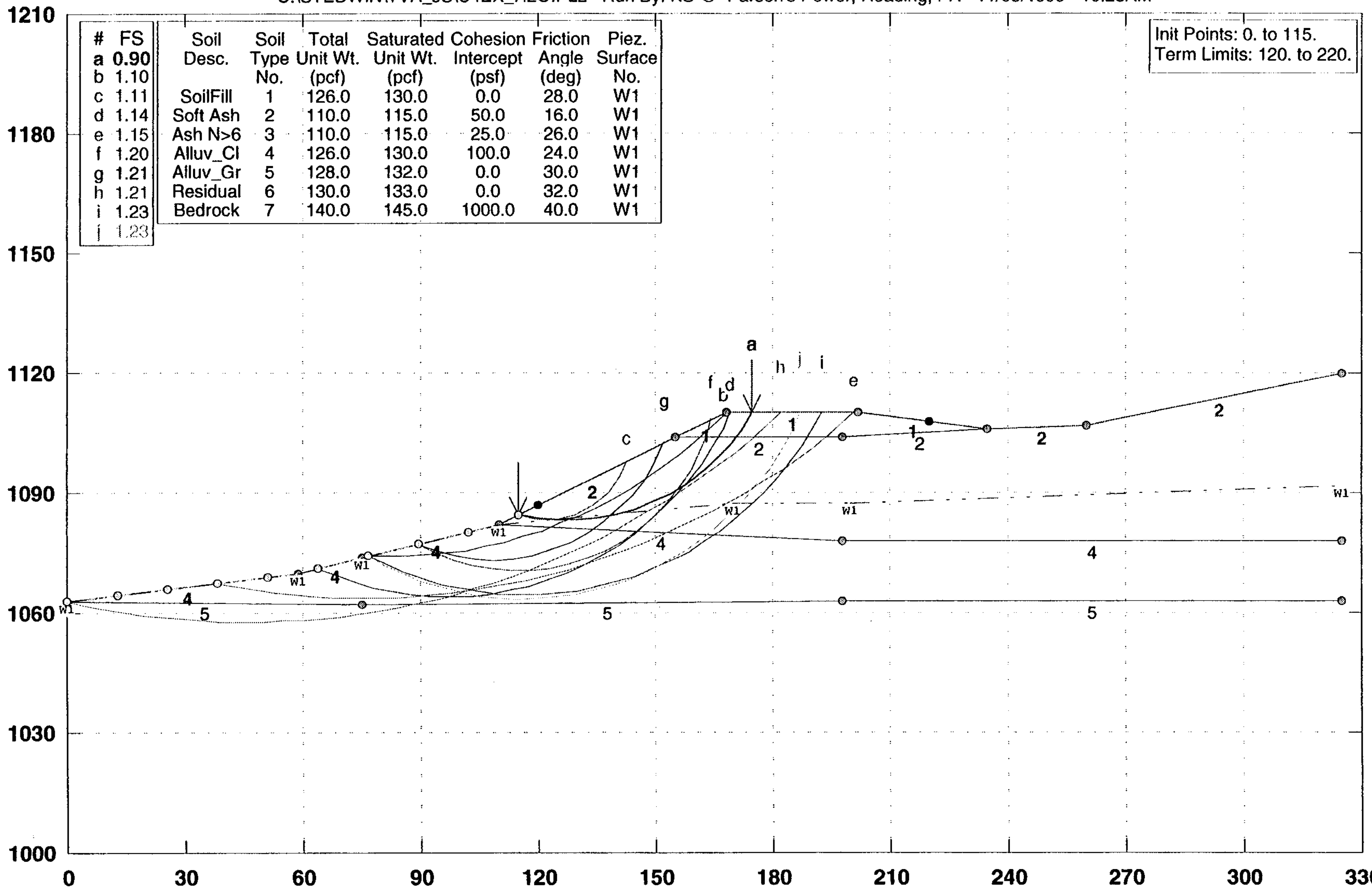
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=0.90

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C4-C4 with temporary higher H2O level

C:\STEDWIN\TVA_JS\C4EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:28AM



#	FS
a	**0.90**
b	1.10
c	1.11
d	1.14
e	1.15
f	1.20
g	1.21
h	1.21
i	1.23
j	1.23

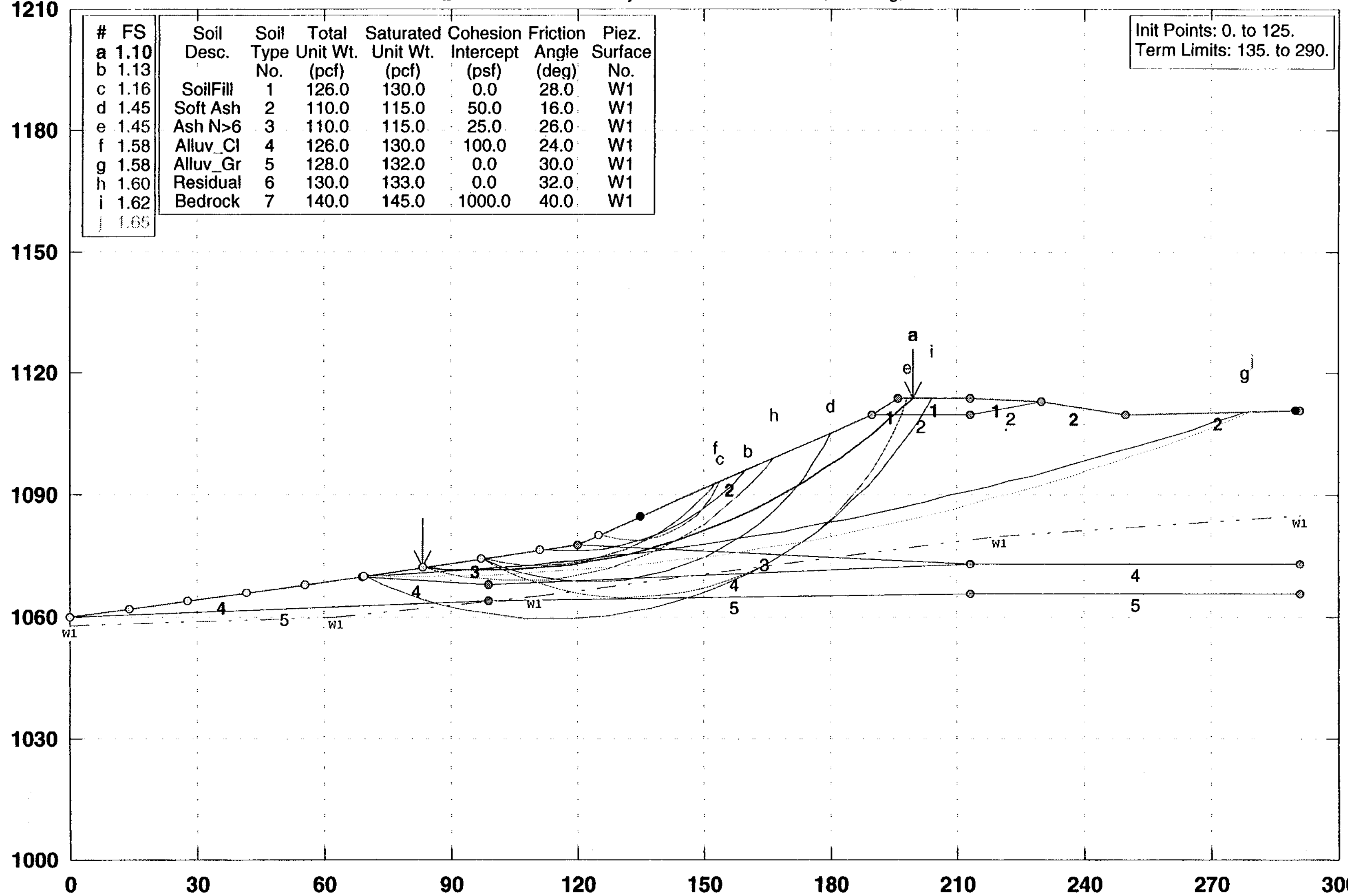
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=0.90

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C5-C5

C:\STEDWIN\TVA_JS\C5-C5.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:46PM



#	FS
a	1.10
b	1.13
c	1.16
d	1.45
e	1.45
f	1.58
g	1.58
h	1.60
i	1.62
j	1.65

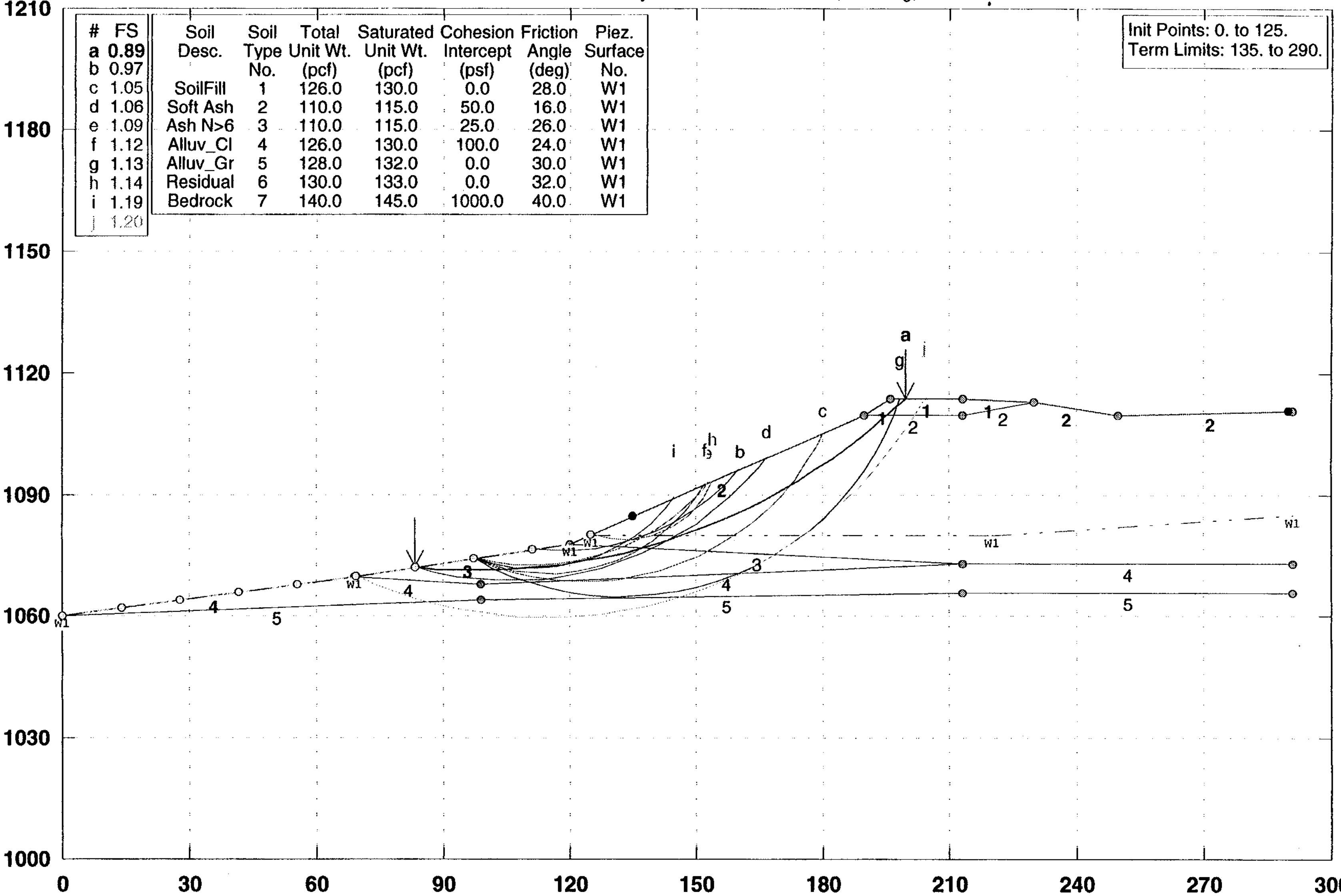
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C5-C5 with high temporary water level

C:\STEDWIN\TVA_JS\C5EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:57PM

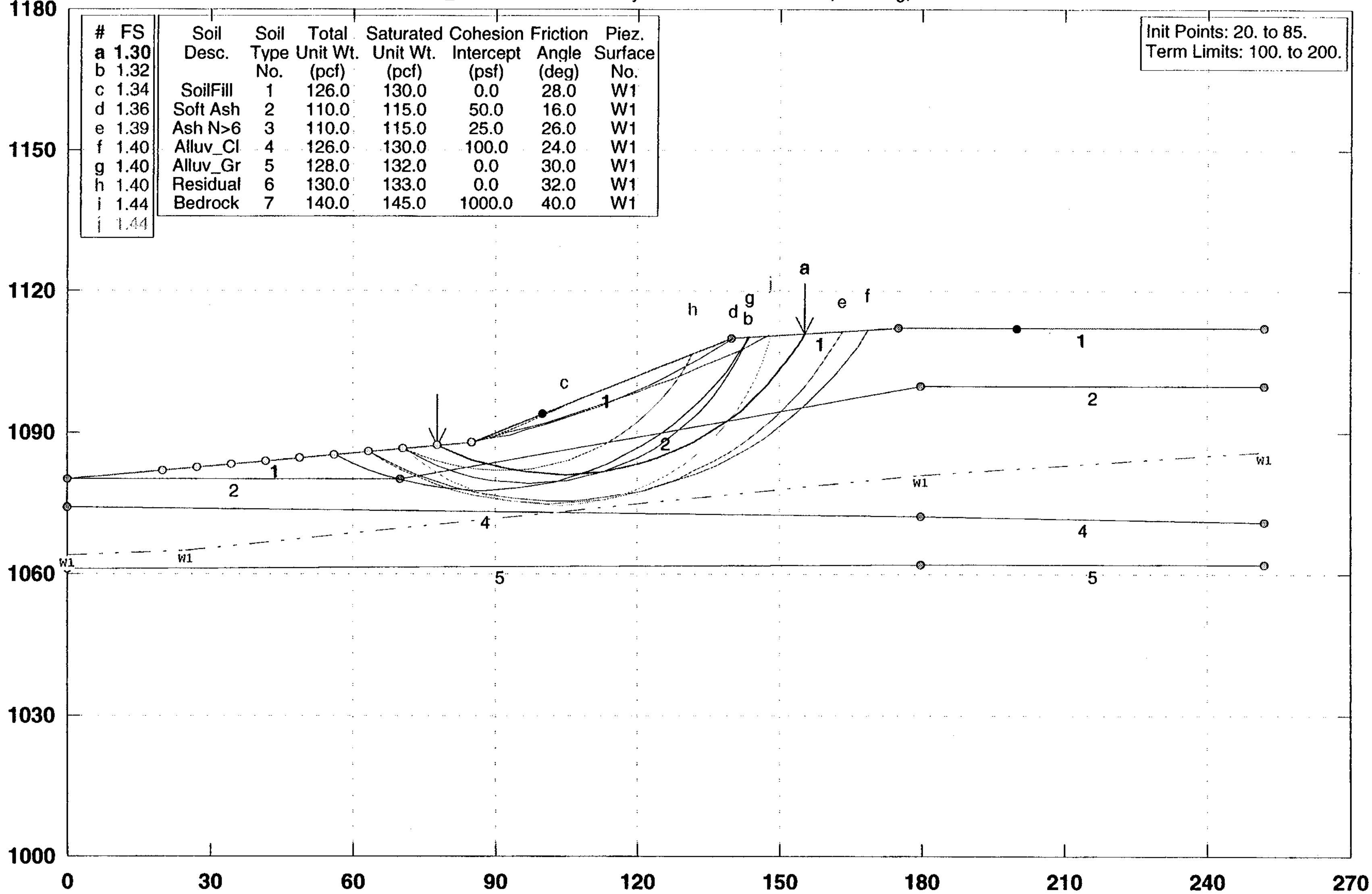


PCSTABL5M/si FSmin=0.89

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C7-C7 (static)

C:\STEDWIN\TVA_JS\C7-C7.PL2 Run By: KS @ Parson's Power, Reading, PA 11/11/1999 4:40PM

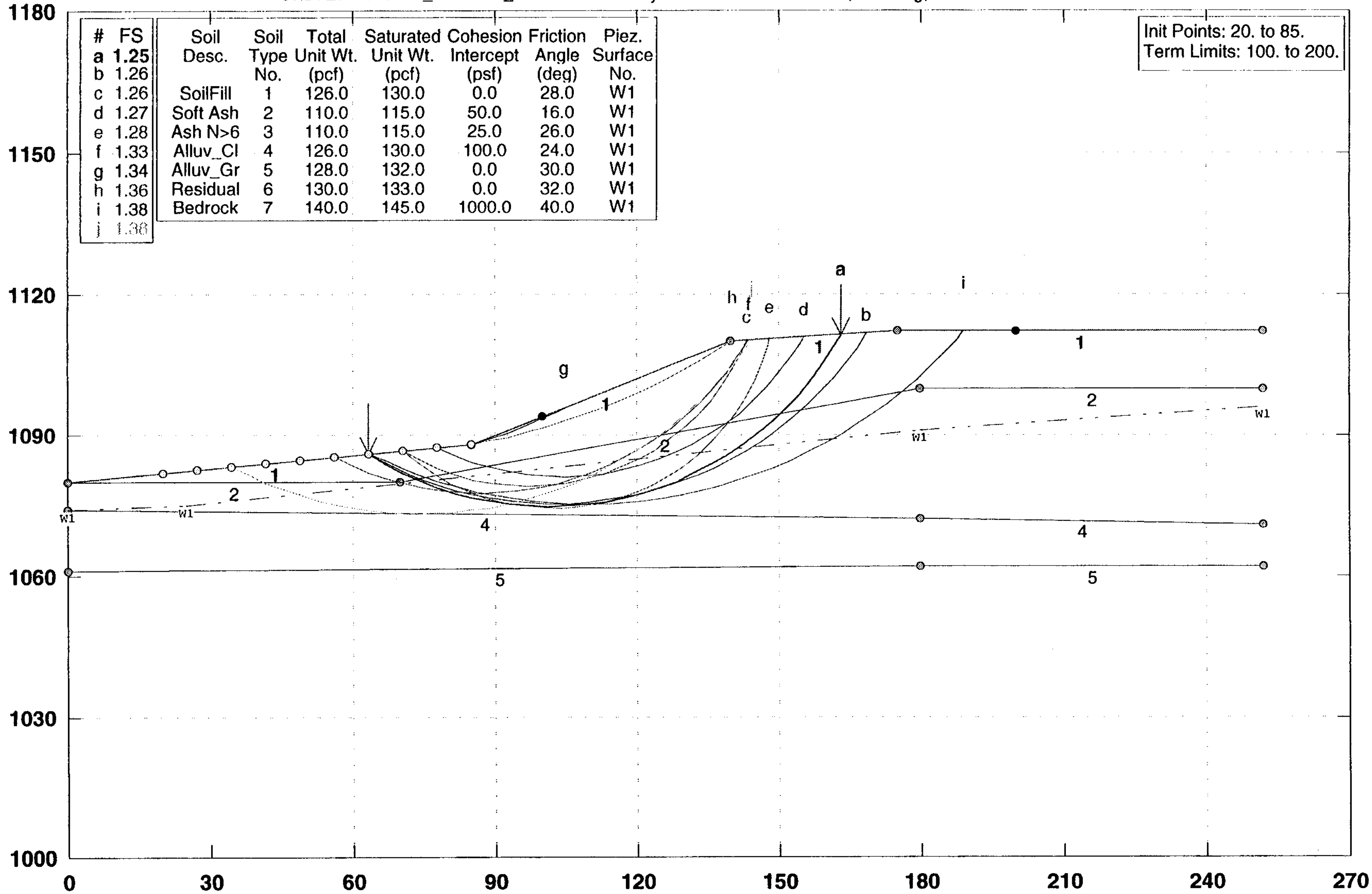


PCSTABL5M/si FSmin=1.30

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaln. at C7-C7 w/ higher g/w level

C:\STEDWIN\TVA_JS\C7C7_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 11/11/1999 4:52PM

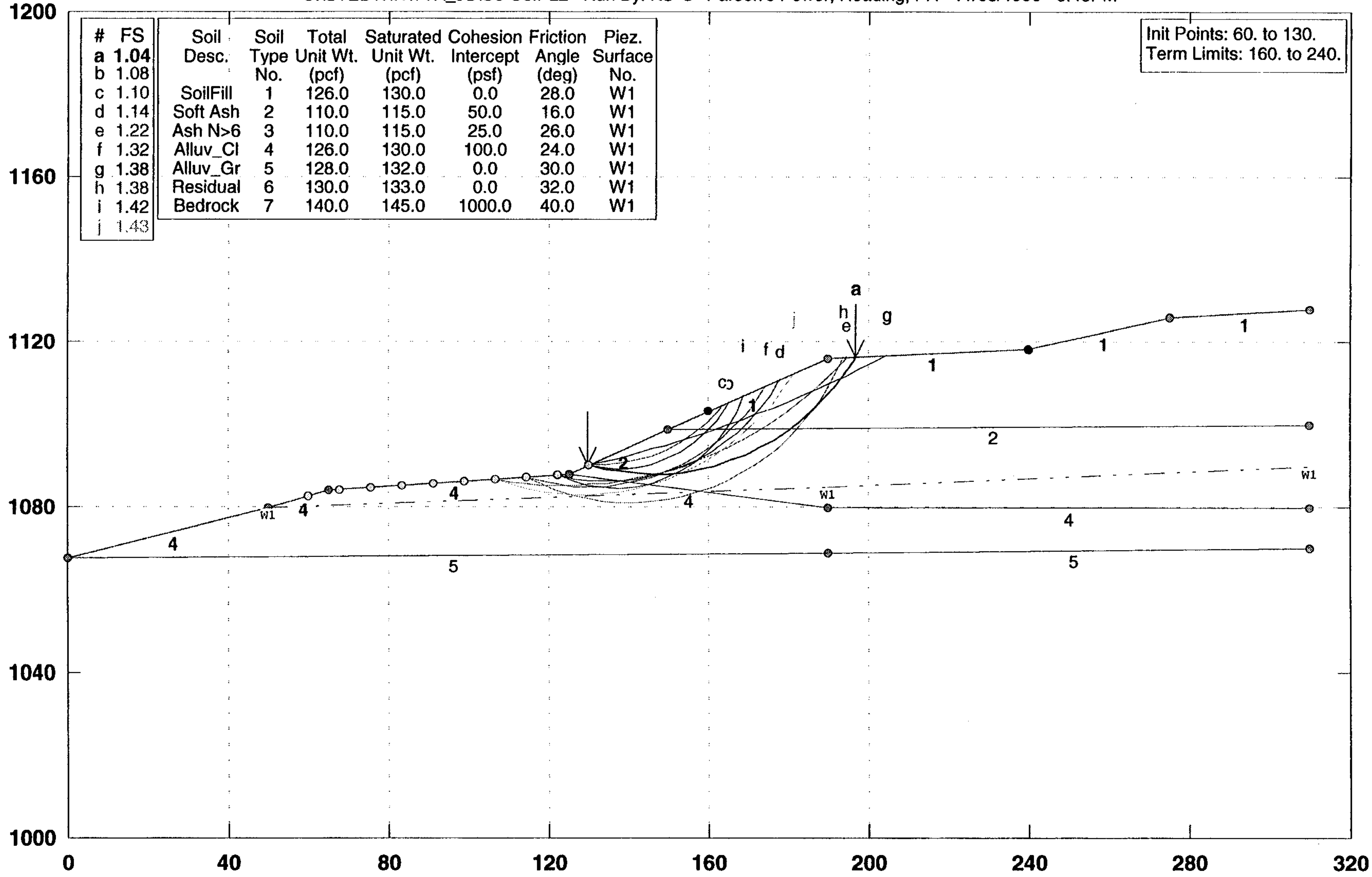


PCSTABL5M/si FSmin=1.25

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C6-C6

C:\STEDWIN\TVA_JS\C6-C6.PL2 Run By: KS @ Parson's Power, Reading, PA 11/03/1999 5:43PM

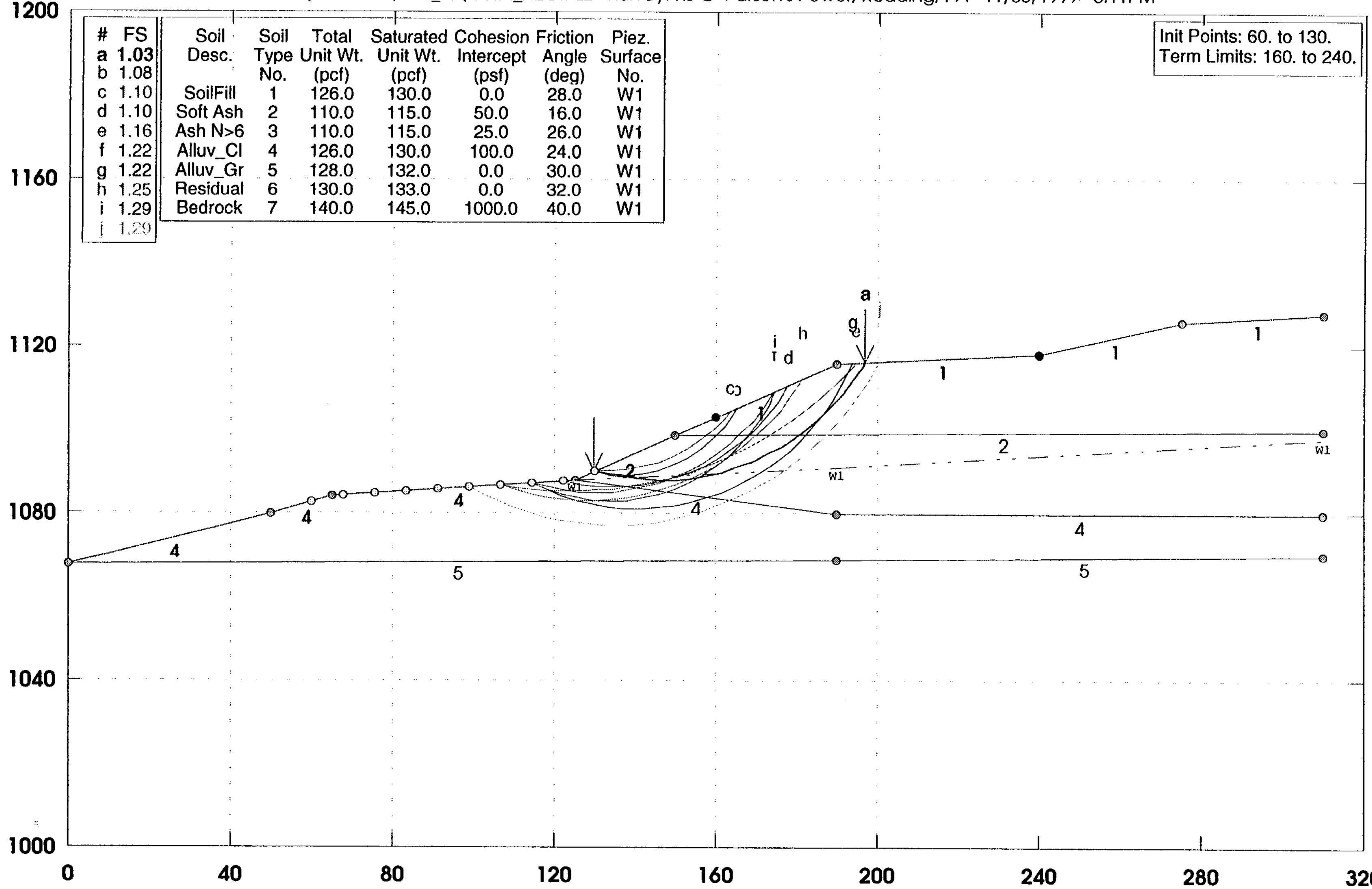


PCSTABL5M/si FSmin=1.04

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C6-C6 with temporary high water level

C:\STEDWIN\TVA_JS\C6EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 11/03/1999 6:11PM



#	FS
a	1.03
b	1.08
c	1.10
d	1.10
e	1.16
f	1.22
g	1.22
h	1.25
i	1.29
j	1.29

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.03

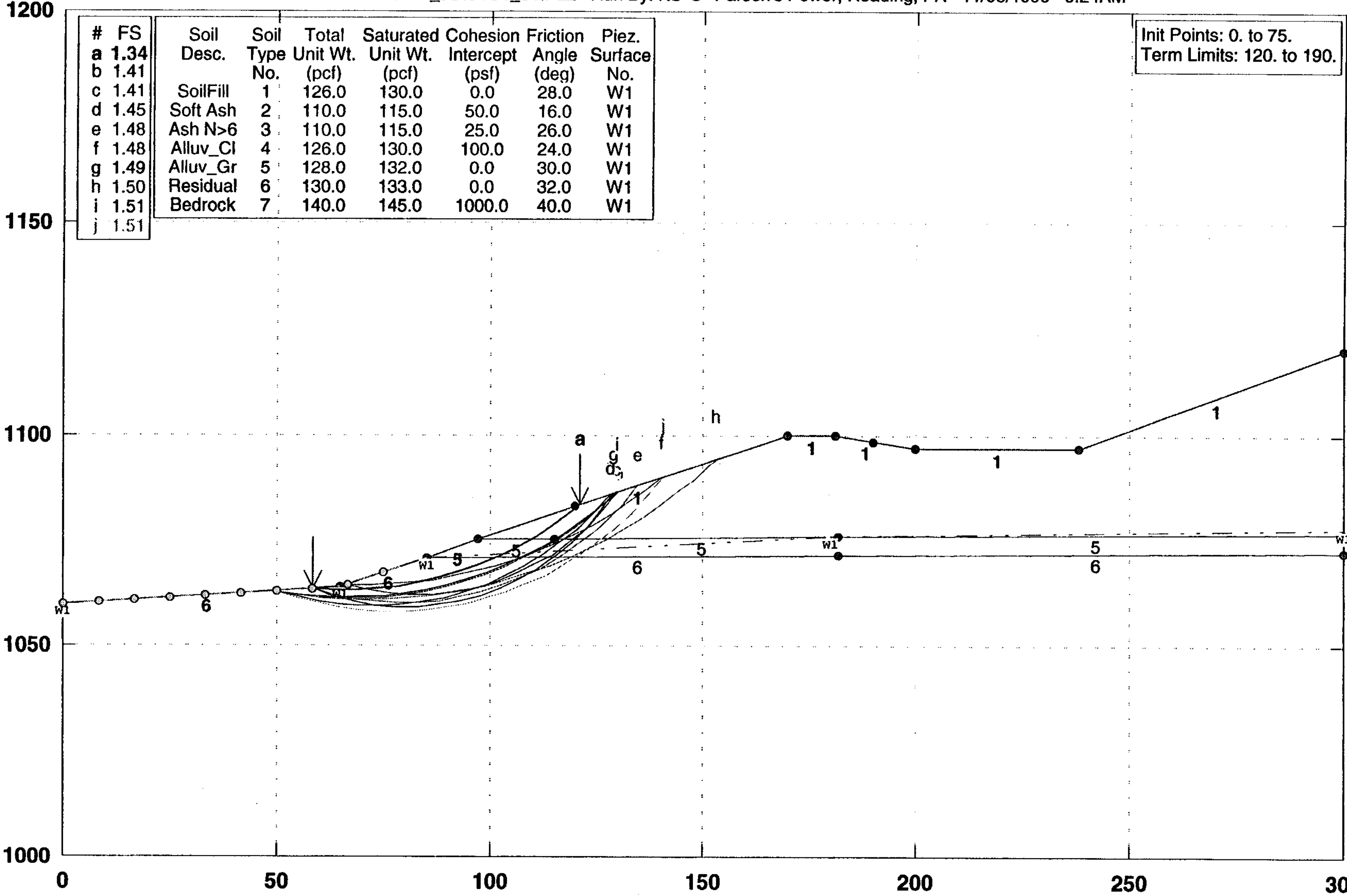
Safety Factors Are Calculated By The Modified Bishop Method

ATTACHMENT C (OF CALCULATION SHEET)

Stability outputs of laid back sections at C1-C1 through C7-C7

TVA/John Sevier F/P; dike re-graded to 3H:1V at C1-C1 (static analysis)

C:\STEDWIN\TVA_JS\C1C1_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/08/1999 9:24AM



#	FS
a	1.34
b	1.41
c	1.41
d	1.45
e	1.48
f	1.48
g	1.49
h	1.50
i	1.51
j	1.51

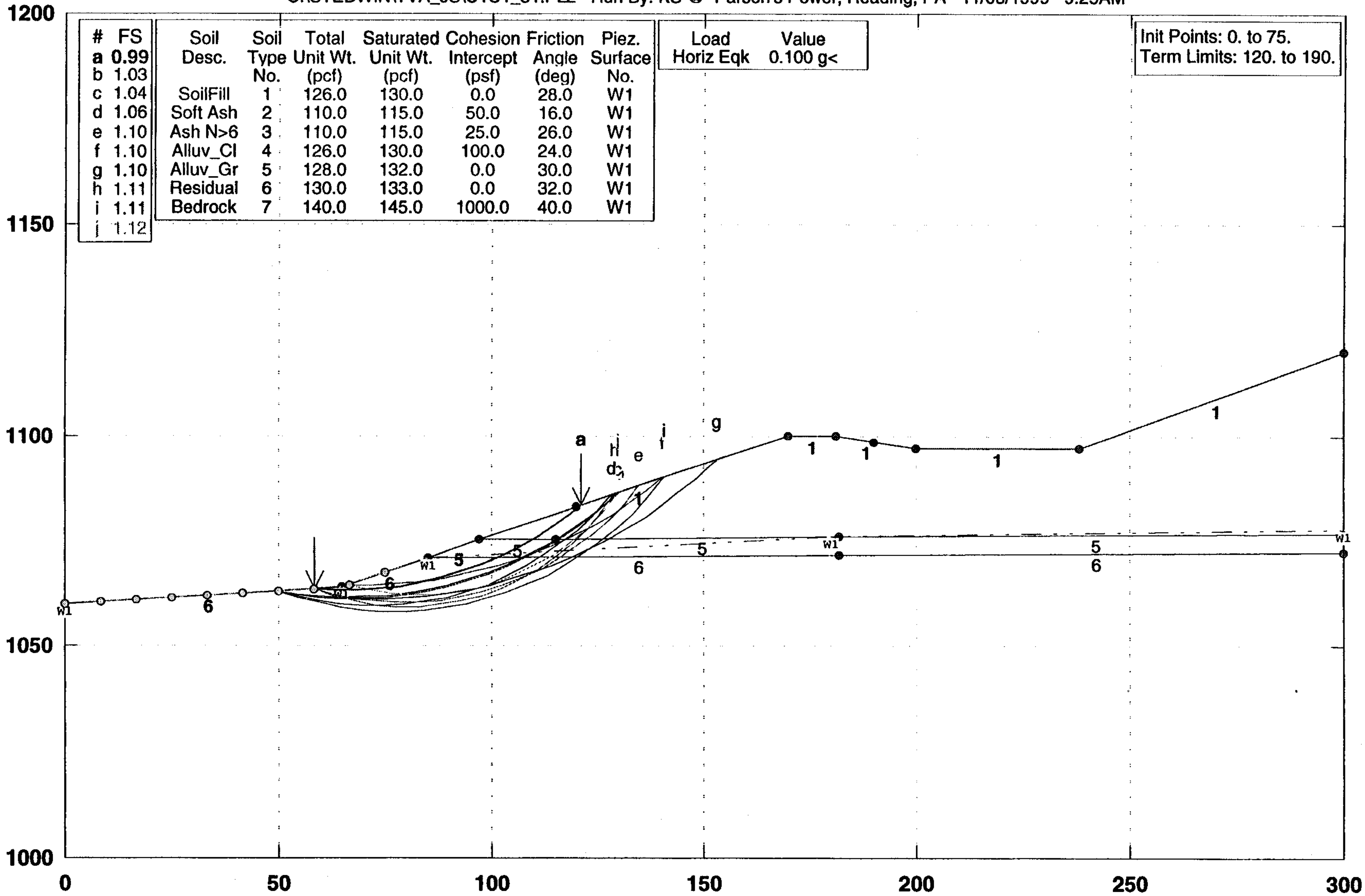
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.34

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; dike re-graded to 3H:1V at C1-C1with 0.1g horz. acceln.

C:\STEDWIN\TVA_JS\C1C1_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/08/1999 9:25AM



#	FS
a	0.99
b	1.03
c	1.04
d	1.06
e	1.10
f	1.10
g	1.10
h	1.11
i	1.11
j	1.12

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

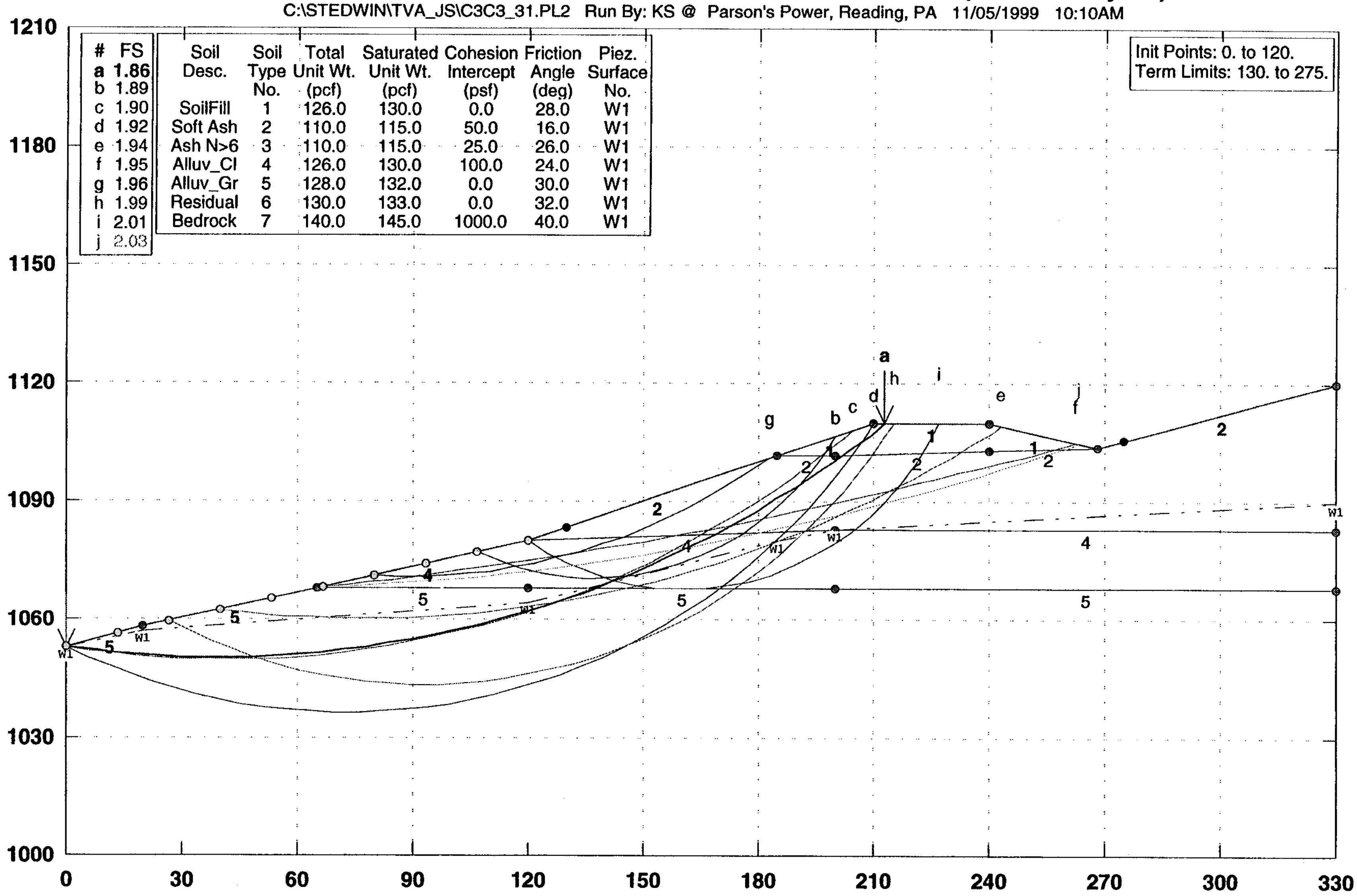
Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=0.99

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 3H:1V at C3-C3 (static analysis)

C:\STEDWIN\TVA_JS\C3C3_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:10AM

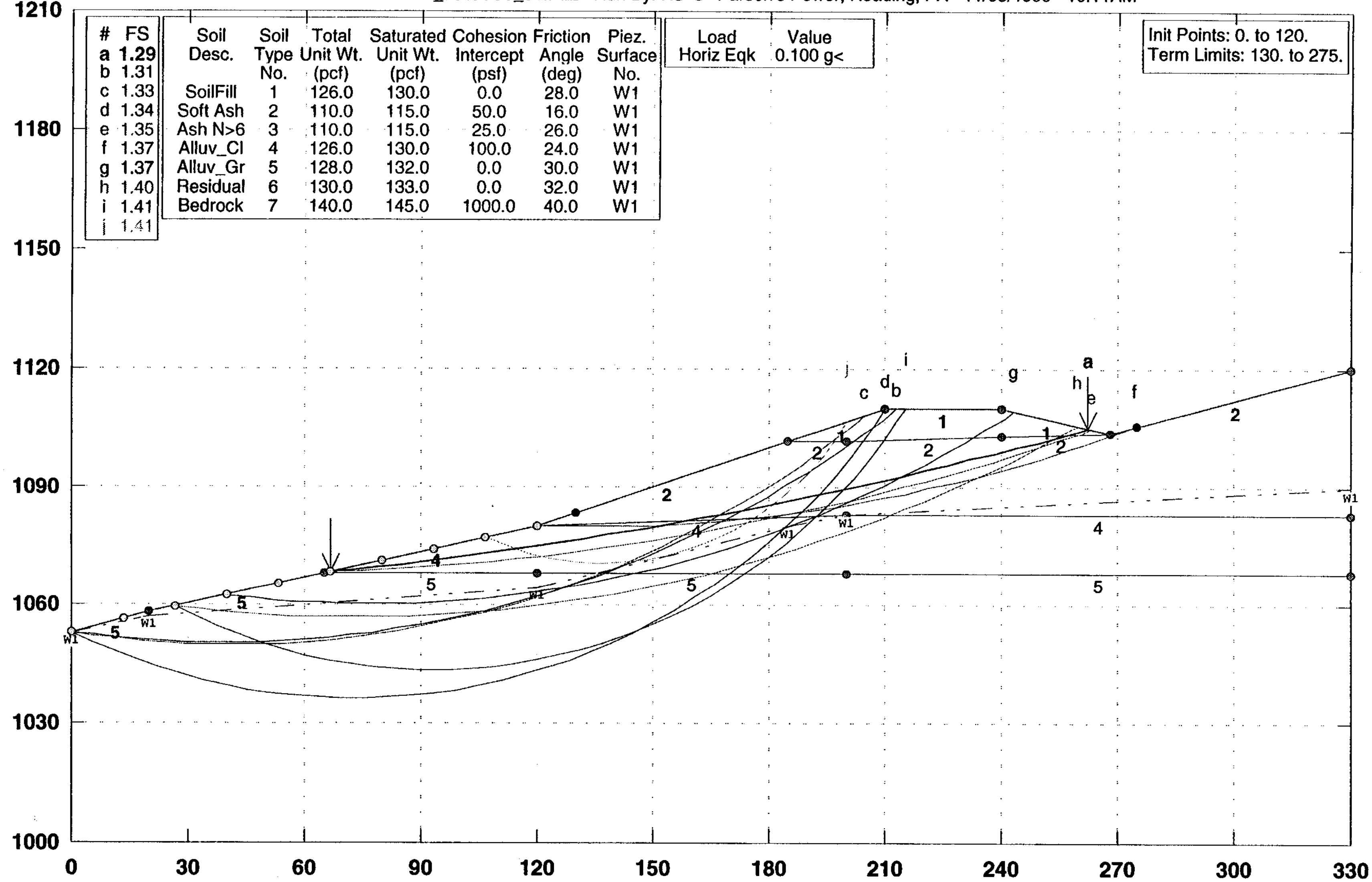


PCSTABL5M/si FSmin=1.86

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 3H:1V at C3-C3 with 0.1g horiz. acceln.

C:\STEDWIN\TVA_JS\C3C3_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:11AM

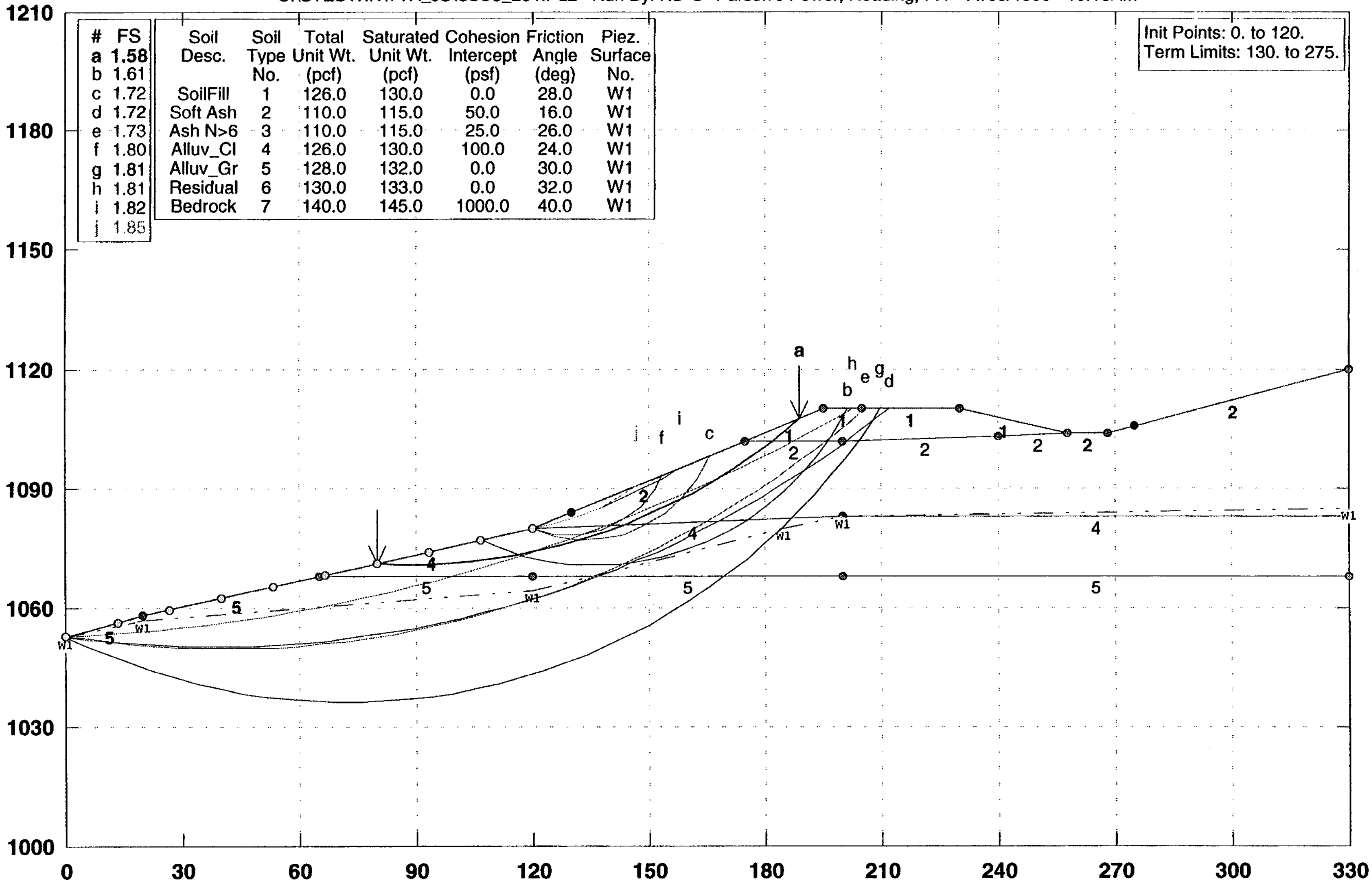


PCSTABL5M/si FSmin=1.29

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 2.5H:1V at C3C3 (static analysis)

C:\STEDWIN\TVA_JS\C3C3_251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:13AM

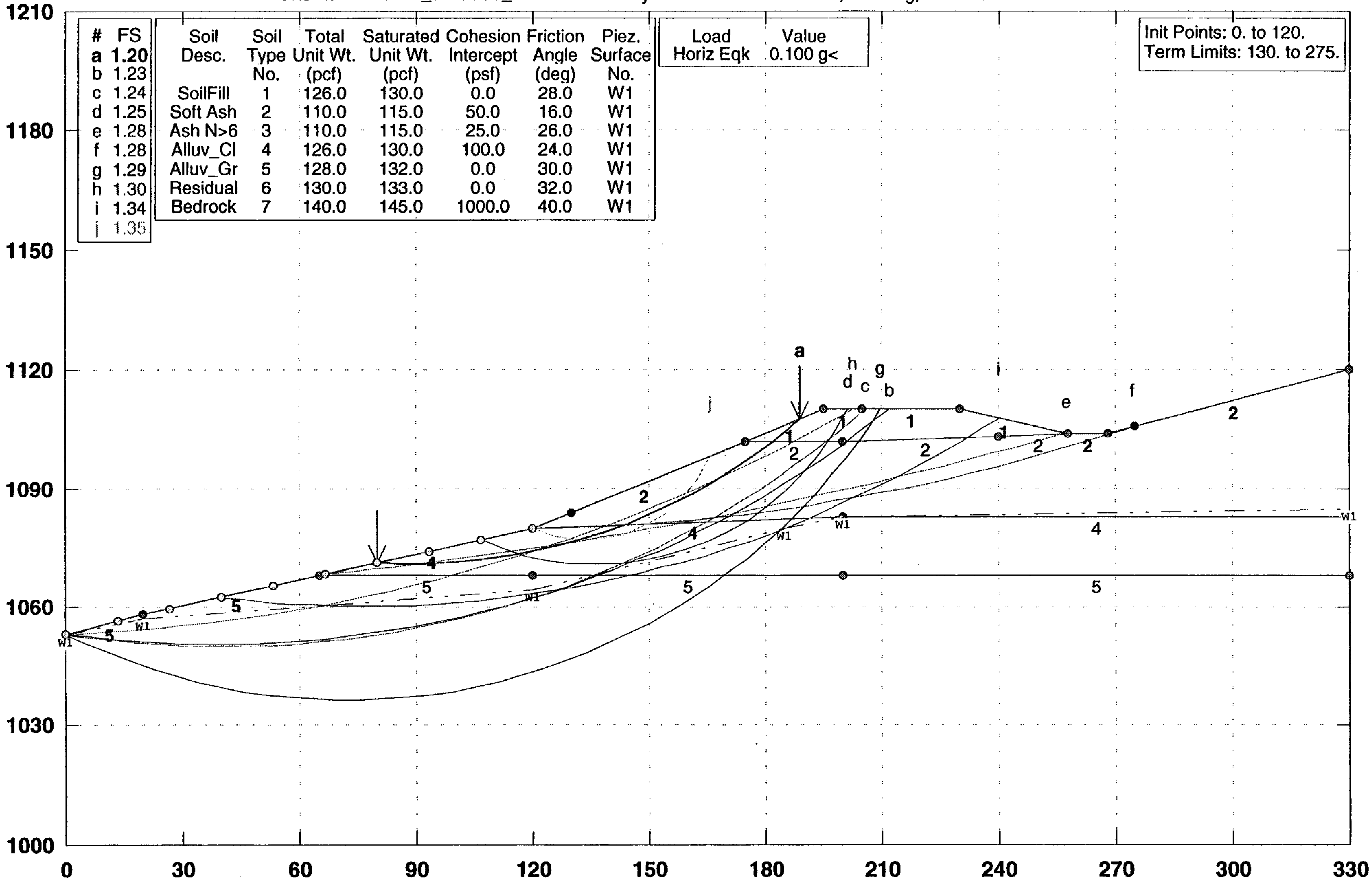


PCSTABL5M/si FSmin=1.58

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 2.5H:1V at C3C3 with 0.1g horiz. acceln.

C:\STEDWIN\TVA_JS\C3C3_251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:12AM



#	FS
a	**1.20**
b	1.23
c	1.24
d	1.25
e	1.28
f	1.28
g	1.29
h	1.30
i	1.34
j	1.35

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

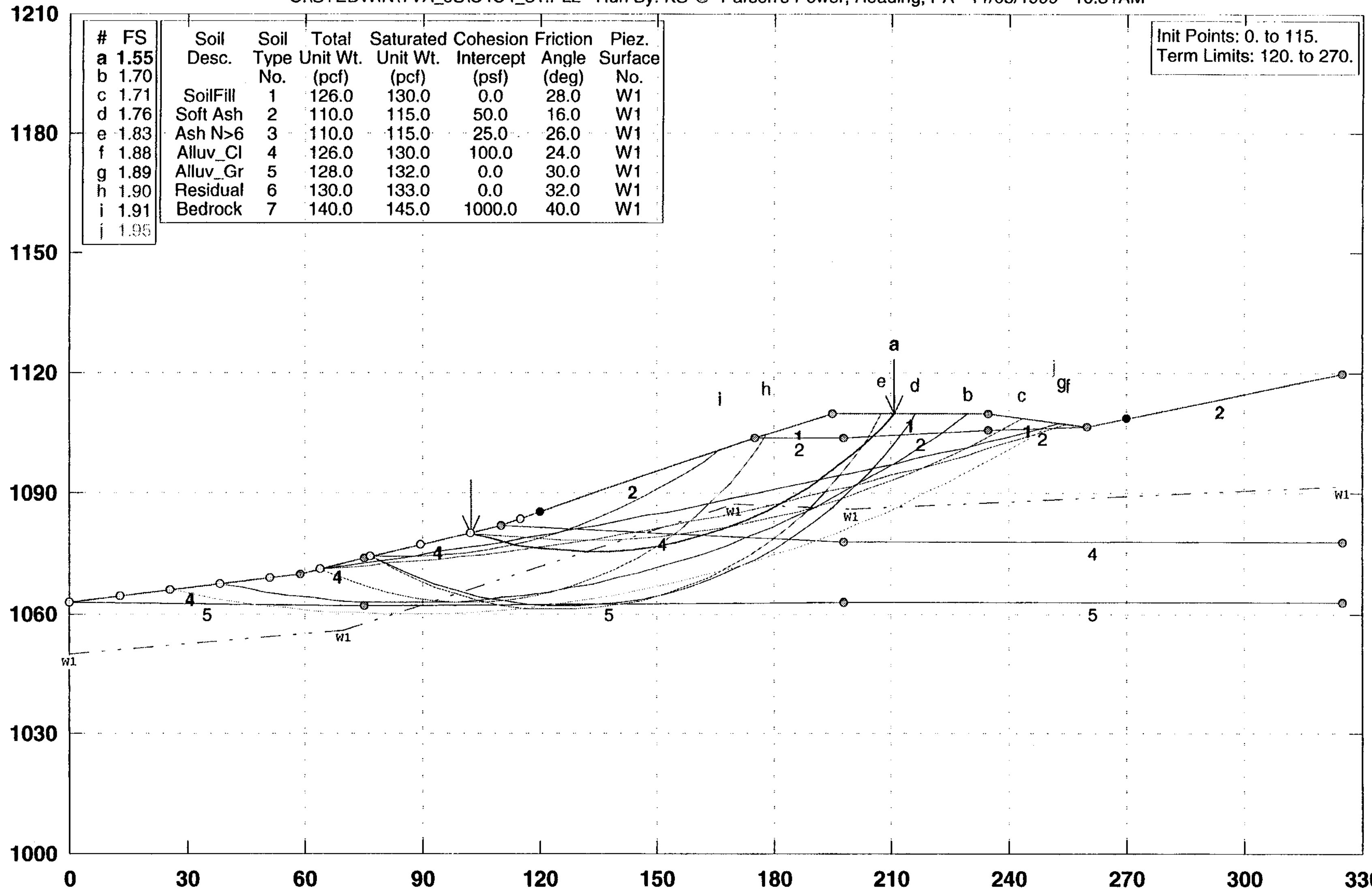
Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=1.20

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; dike re-graded to 3H:1V at C4-C4 (static analysis)

C:\STEDWIN\TVA_JS\C4C4_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:31AM

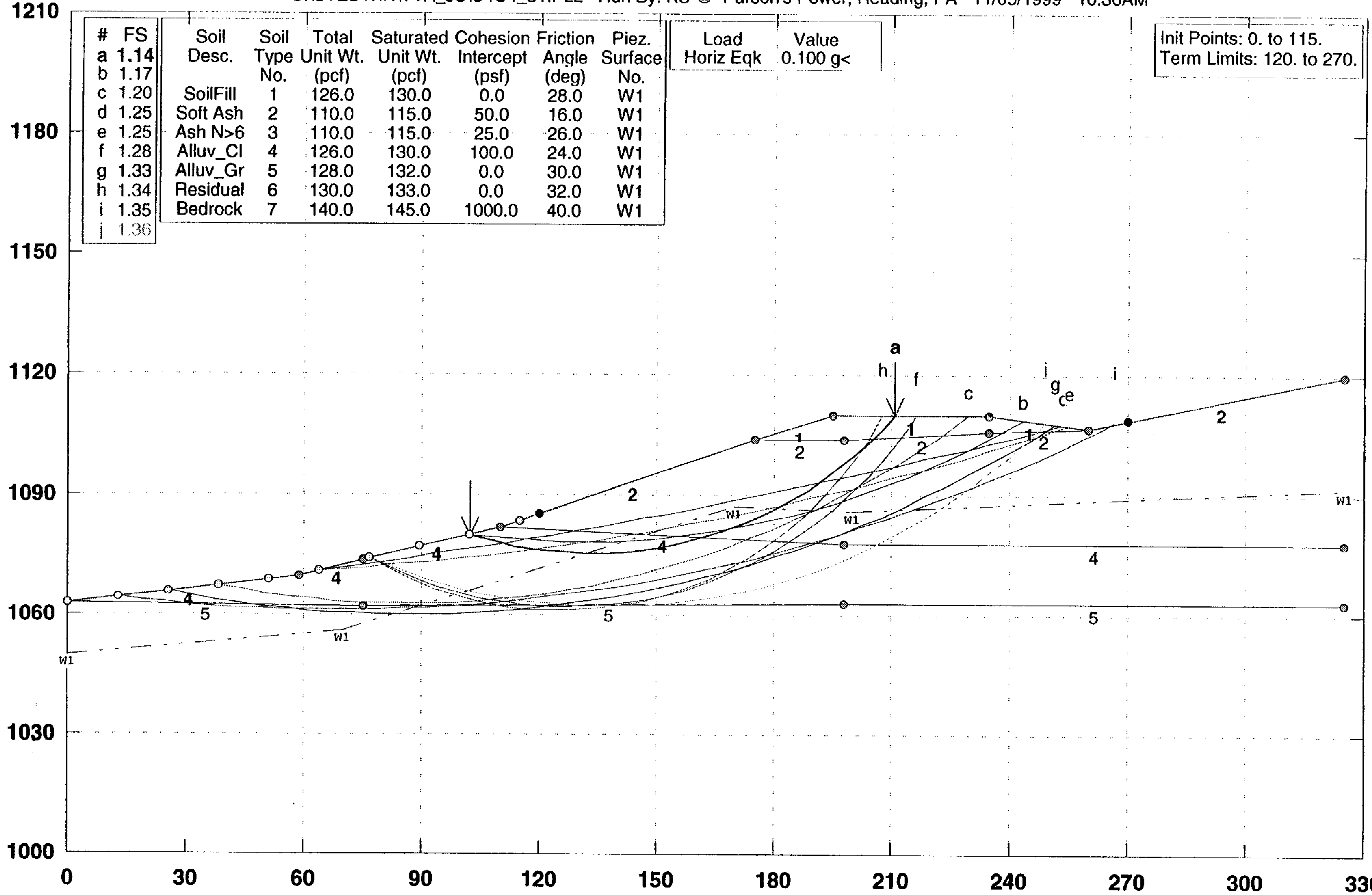


PCSTABL5M/si FSmin=1.55

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; dike re-graded to 3H:1V at C4-C4 with 0.1g horiz. acceln.

C:\STEDWIN\TVA_JS\C4C4_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:30AM



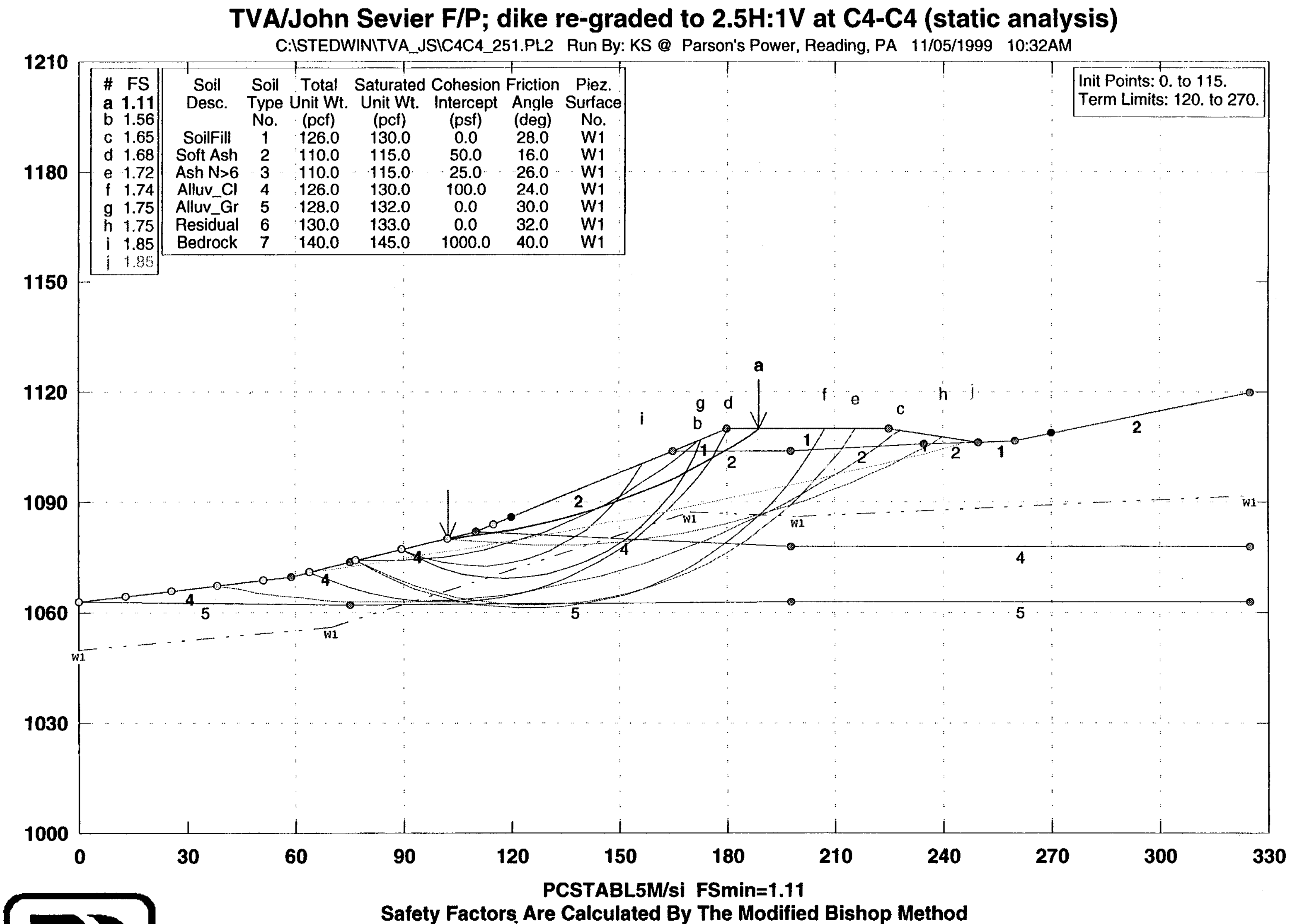
#	FS
a	1.14
b	1.17
c	1.20
d	1.25
e	1.25
f	1.28
g	1.33
h	1.34
i	1.35
j	1.36

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=1.14

Safety Factors Are Calculated By The Modified Bishop Method

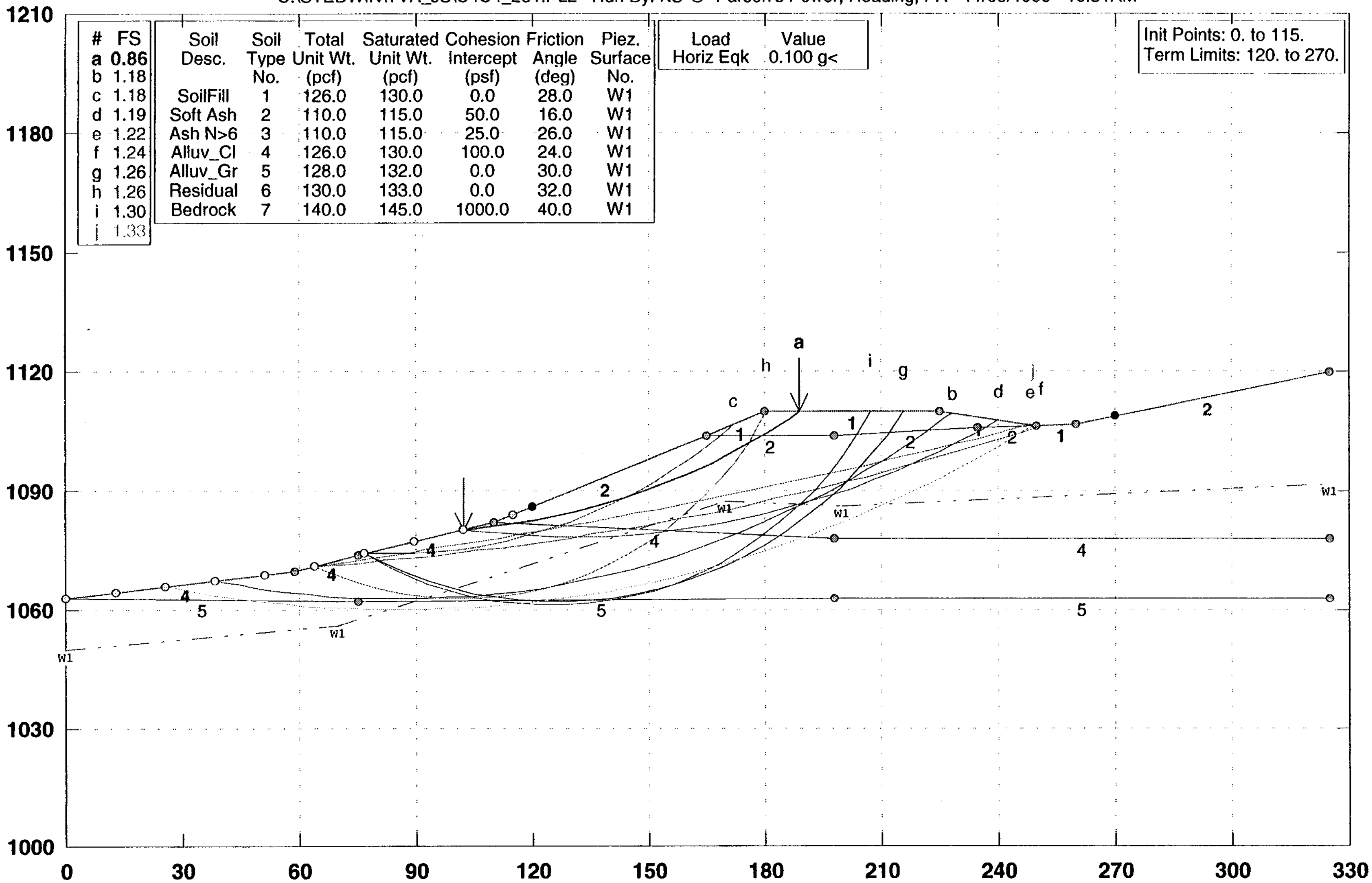


#	FS
a	1.11
b	1.56
c	1.65
d	1.68
e	1.72
f	1.74
g	1.75
h	1.75
i	1.85
j	1.85

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

TVA/John Sevier F/P; dike re-graded to 2.5H:1V at C4-C4 with 0.1g horiz. acceln

C:\STEDWIN\TVA_JS\C4C4_251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/05/1999 10:31AM



#	FS
a	0.86
b	1.18
c	1.18
d	1.19
e	1.22
f	1.24
g	1.26
h	1.26
i	1.30
j	1.33

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

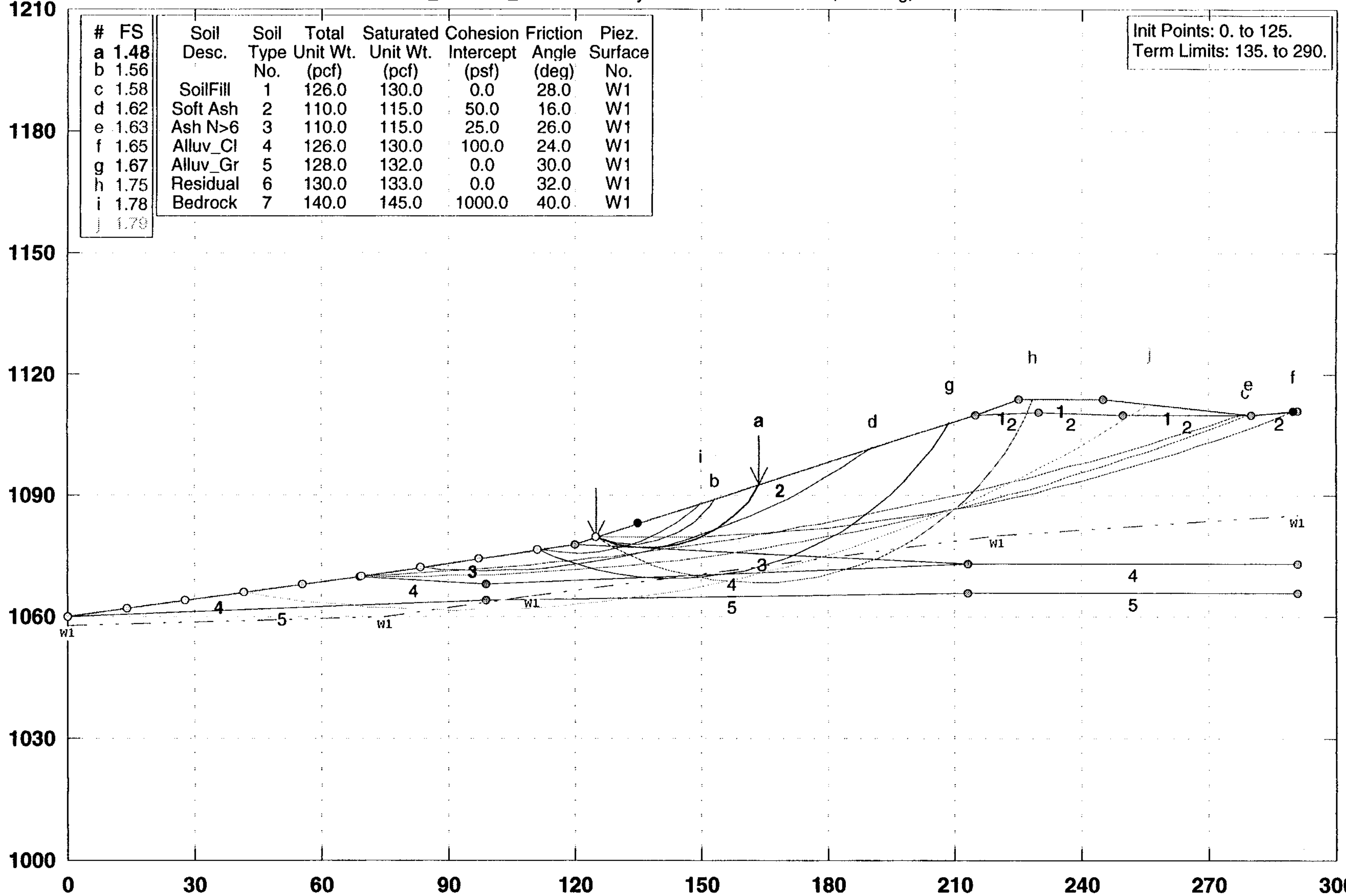
Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=0.86

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 3H:1V at section C5-C5

C:\STEDWIN\TVA_JS\C5C5_31.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 9:37AM



#	FS
a	**1.48**
b	1.56
c	1.58
d	1.62
e	1.63
f	1.65
g	1.67
h	1.75
i	1.78
j	1.79

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Init Points: 0. to 125.
Term Limits: 135. to 290.

PCSTABL5M/si FSmin=1.48

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 3H:1V at C5-C5 w/ 0.1g horiz. acceln.

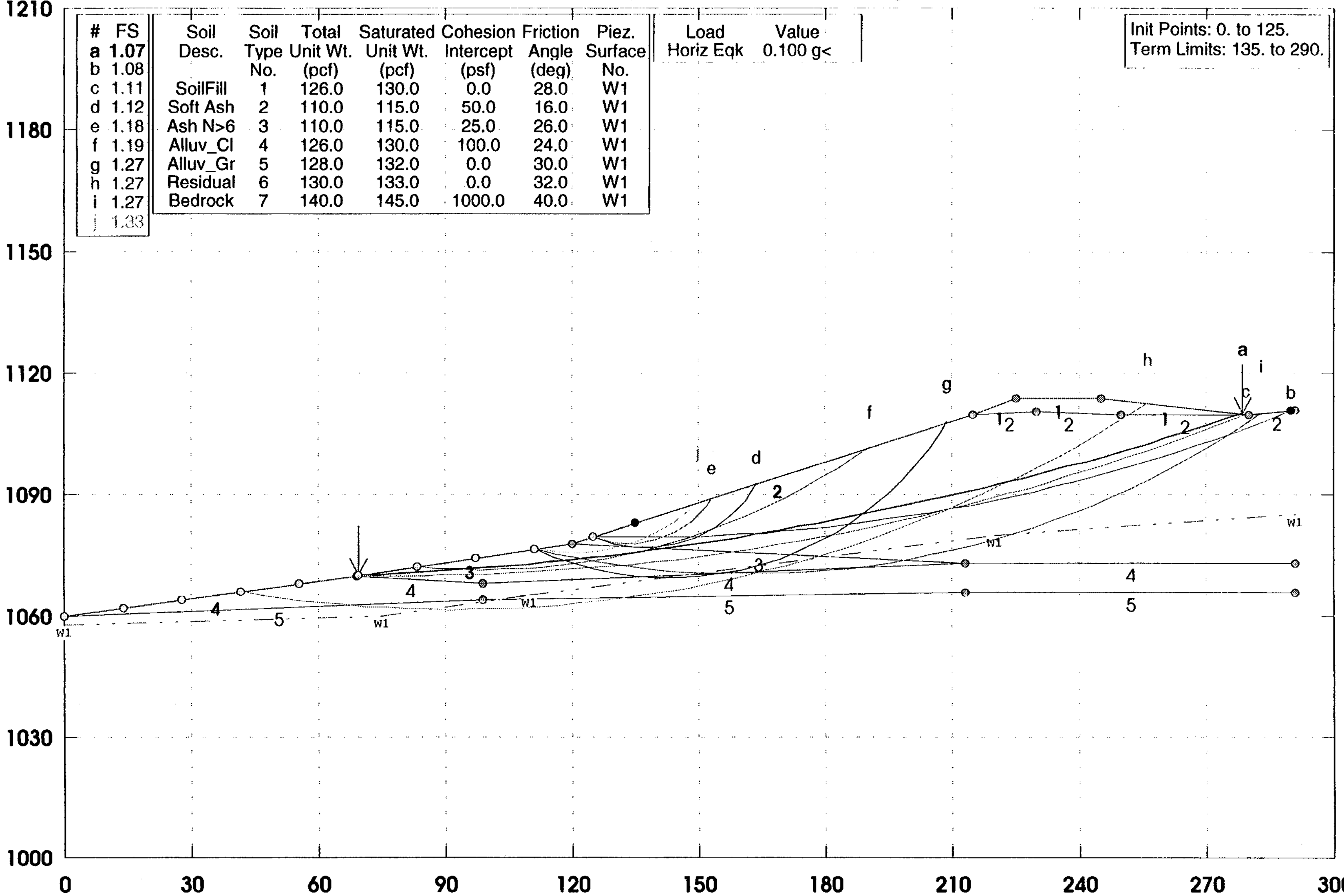
C:\STEDWIN\TVA_JS\C5C5_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/03/1999 8:19AM

#	FS
a	**1.07**
b	1.08
c	1.11
d	1.12
e	1.18
f	1.19
g	1.27
h	1.27
i	1.27
j	1.33

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Load	Value
Horiz Eqk	0.100 g<

Init Points: 0. to 125.
Term Limits: 135. to 290.

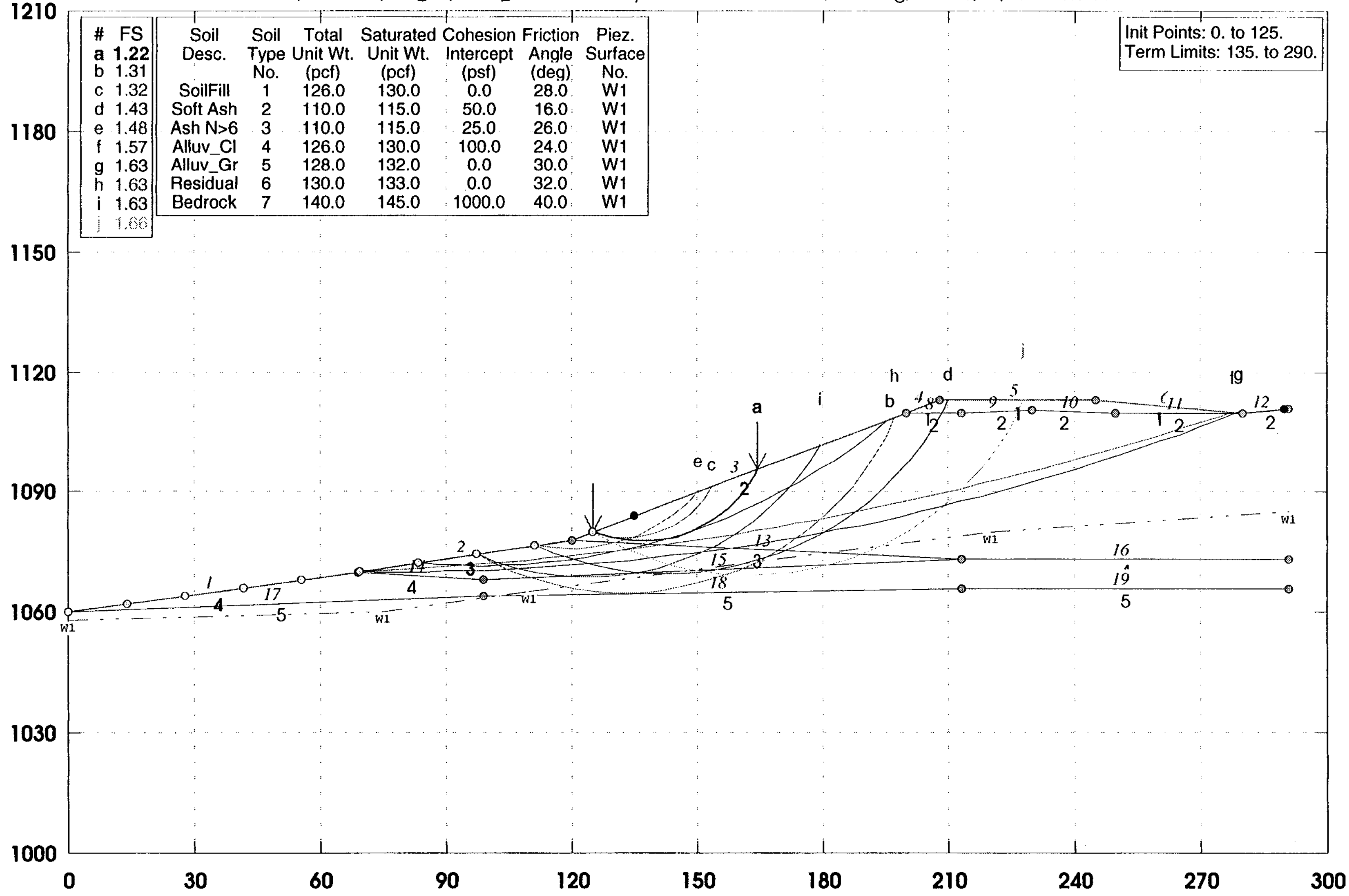


PCSTABL5M/si FSmin=1.07

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 2.5H:1V at section C5-C5

C:\STEDWIN\TVA_JS\C5C5_251.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 9:34AM



#	FS
a	**1.22**
b	1.31
c	1.32
d	1.43
e	1.48
f	1.57
g	1.63
h	1.63
i	1.63
j	1.66

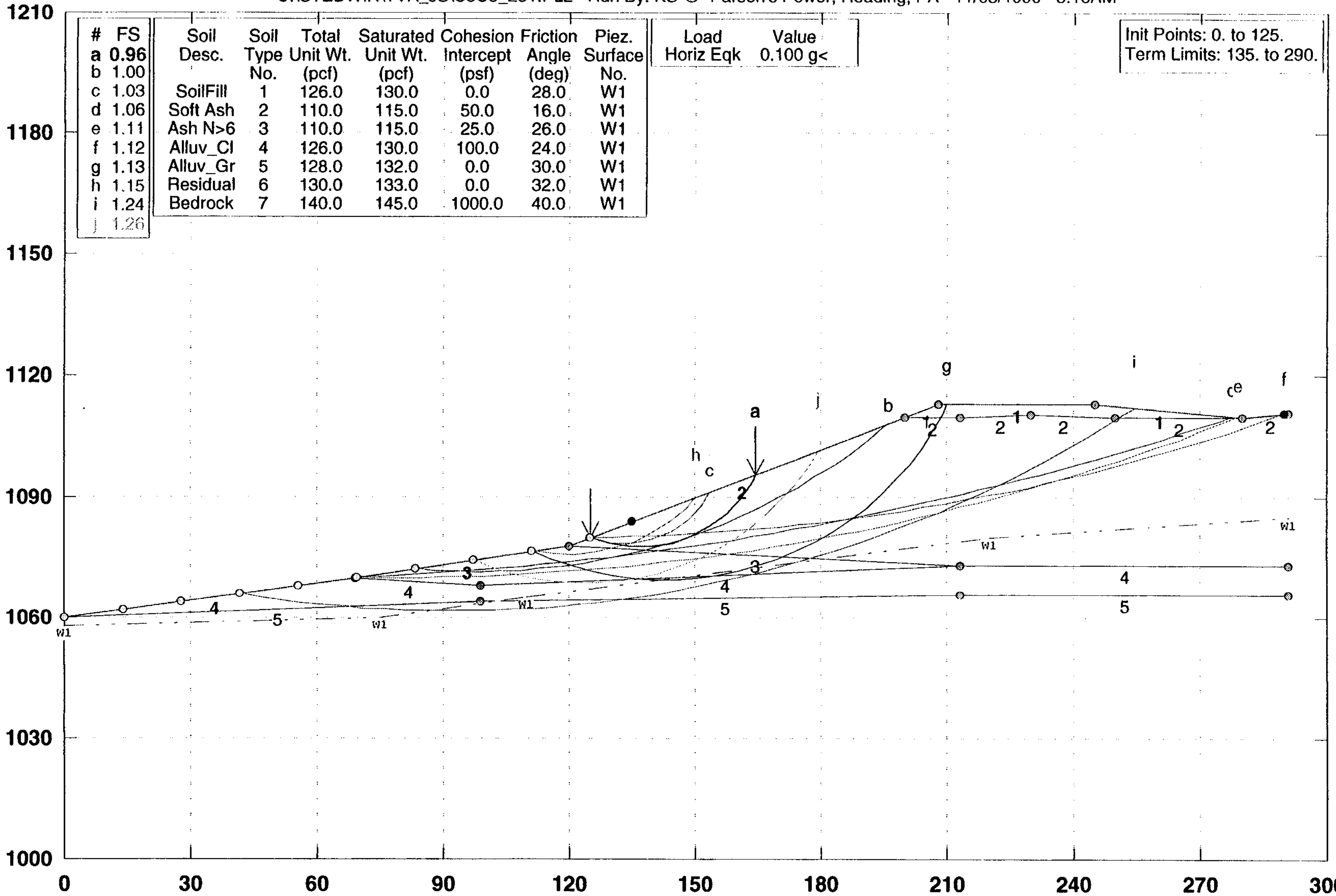
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.22

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 2.5H:1V at C5-C5 with 0.1g horiz. acceln

C:\STEDWIN\TVA_JS\C5C5_251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/03/1999 8:16AM

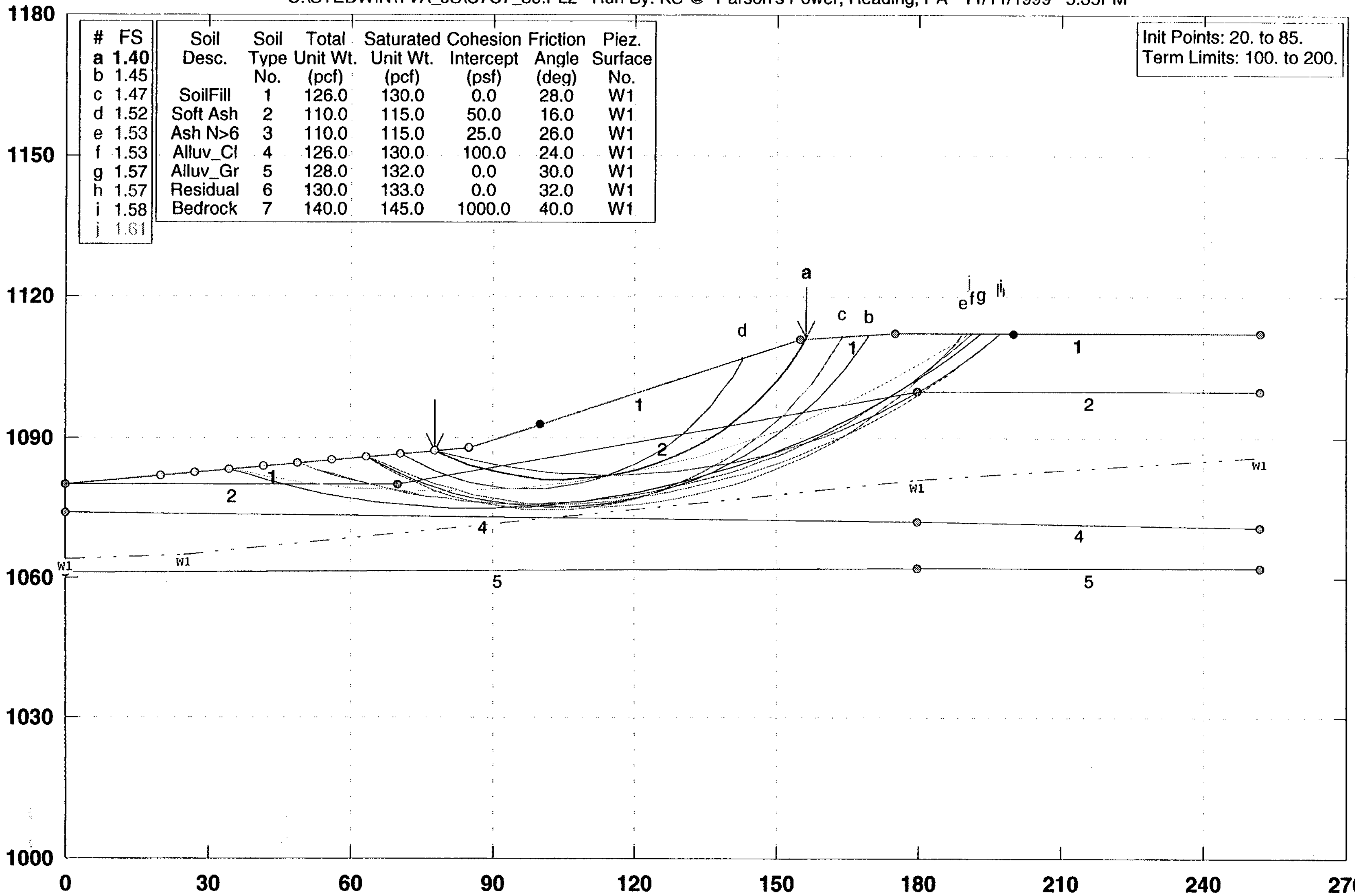


PCSTABL5M/si FSmin=0.96

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike stability at C7 re-graded at 3H:1V (static anal.)

C:\STEDWIN\TVA_JS\C7C7_35.PL2 Run By: KS @ Parson's Power, Reading, PA 11/11/1999 5:35PM



#	FS
a	**1.40**
b	1.45
c	1.47
d	1.52
e	1.53
f	1.53
g	1.57
h	1.57
i	1.58
j	1.61

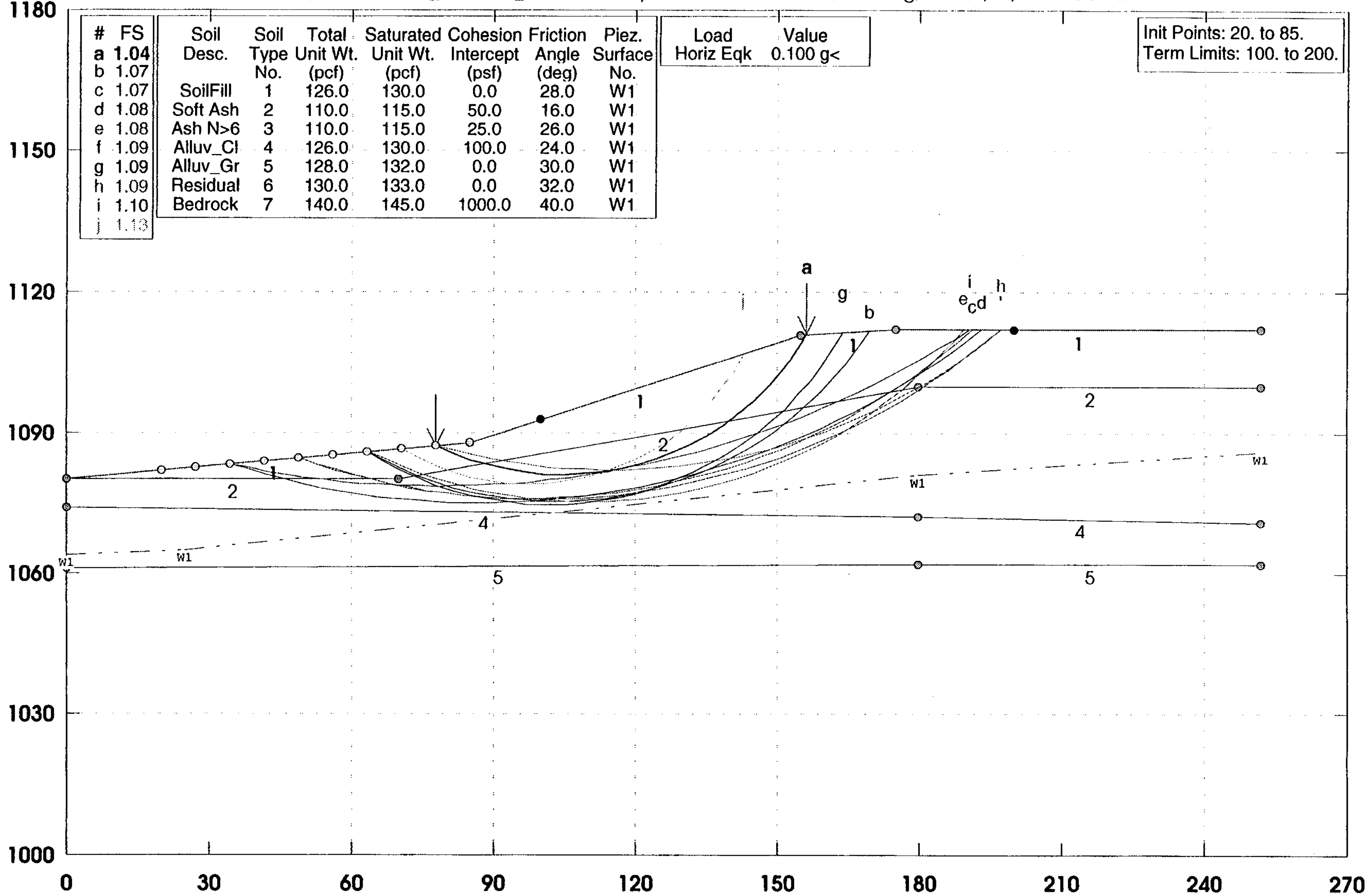
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.40

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike stability at C7 re-graded at 3H:1V (w/ 0.1g h/a)

C:\STEDWIN\TVA_JS\C7C7_35.PL2 Run By: KS @ Parson's Power, Reading, PA 11/11/1999 5:34PM

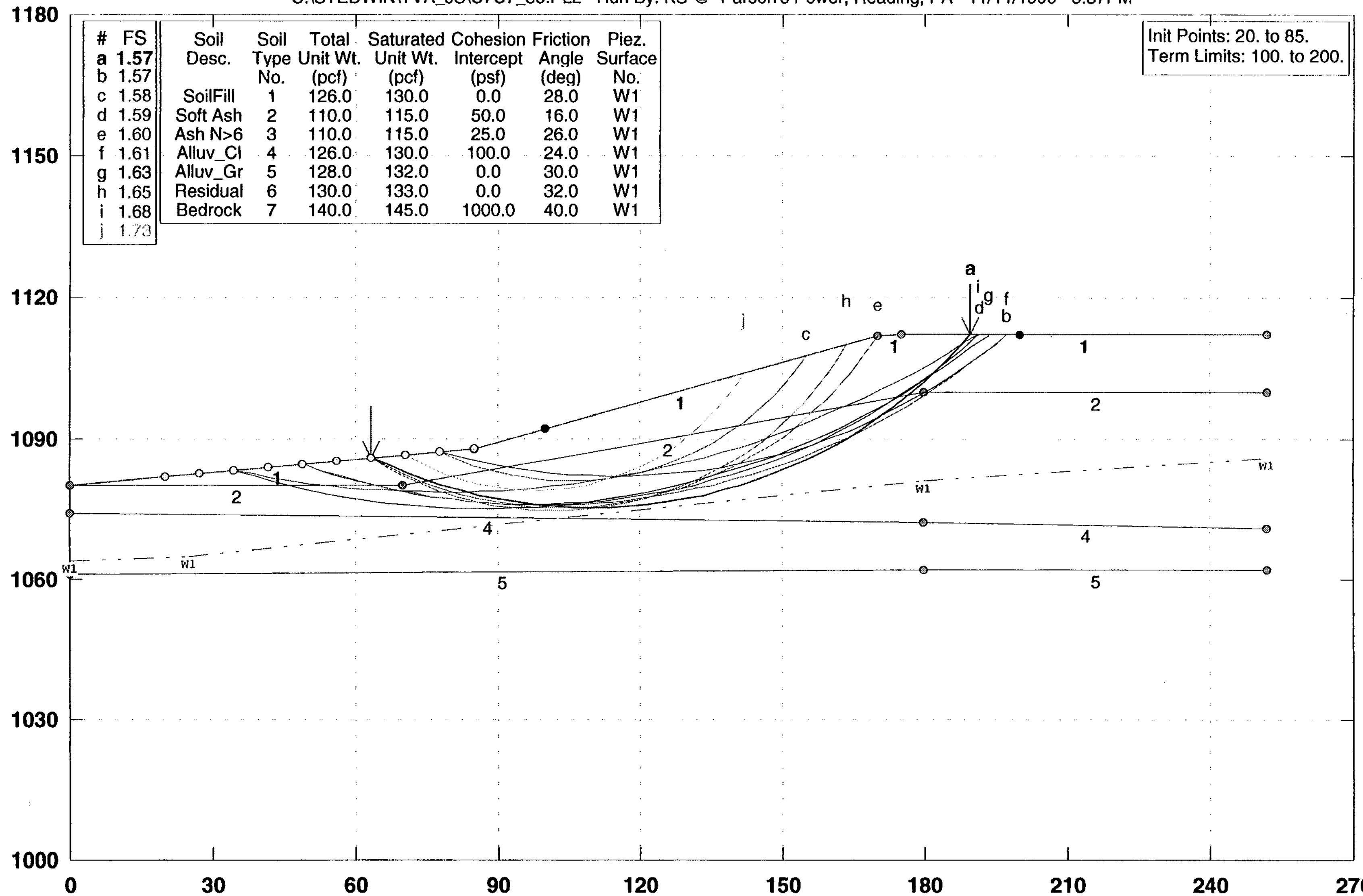


PCSTABL5M/si FSmin=1.04

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike stability at C7 re-graded at 3.5H:1V (static)

C:\STEDWIN\TVA_JS\C7C7_35.PL2 Run By: KS @ Parson's Power, Reading, PA 11/11/1999 5:37PM

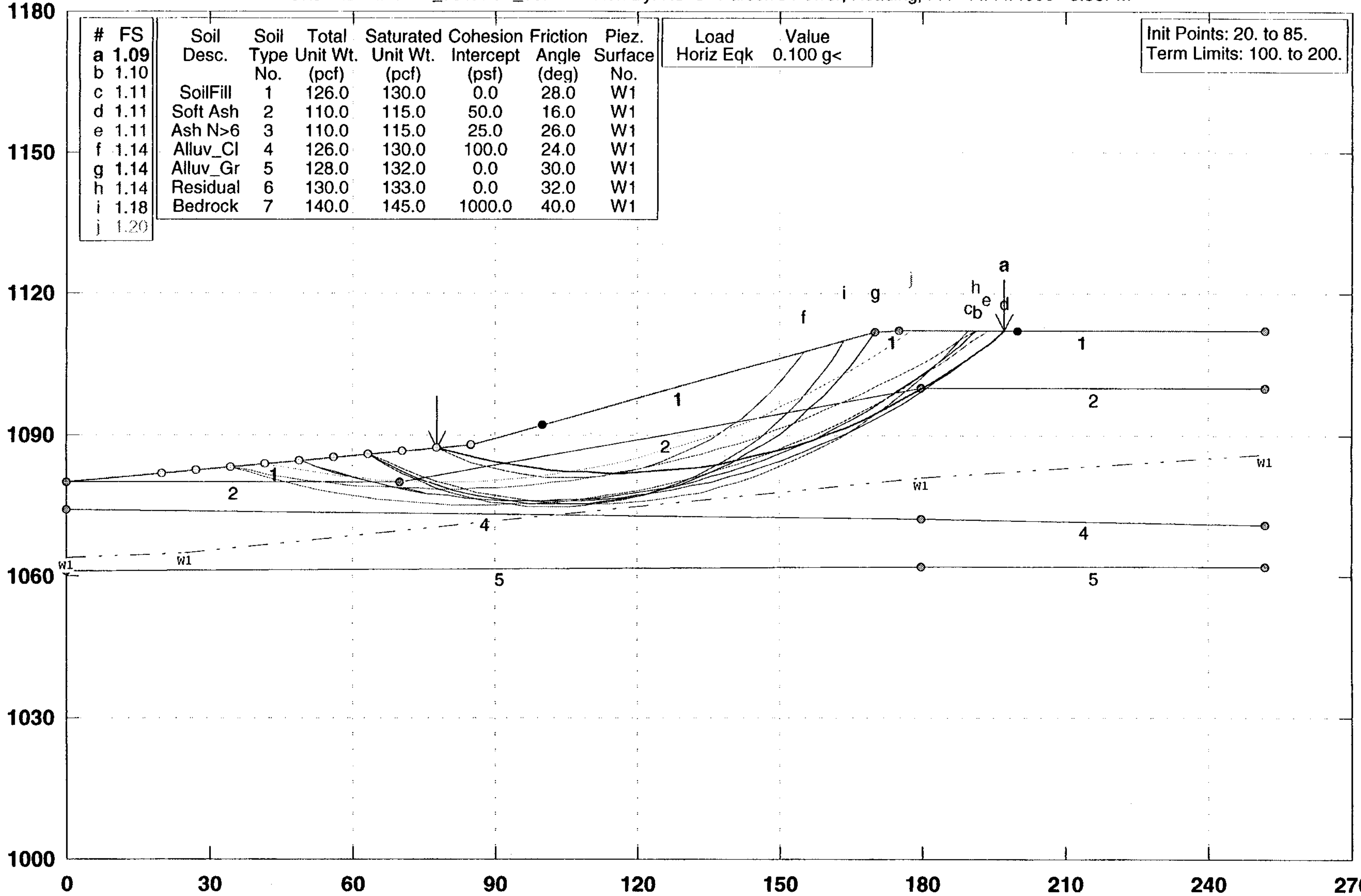


PCSTABL5M/si FSmin=1.57

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike stability at C7 re-graded at 3.5H:1V (w/ 0.1g h/a)

C:\STEDWIN\TVA_JS\C7C7_35.PL2 Run By: KS @ Parson's Power, Reading, PA 11/11/1999 5:38PM



#	FS
a	1.09
b	1.10
c	1.11
d	1.11
e	1.11
f	1.14
g	1.14
h	1.14
i	1.18
j	1.20

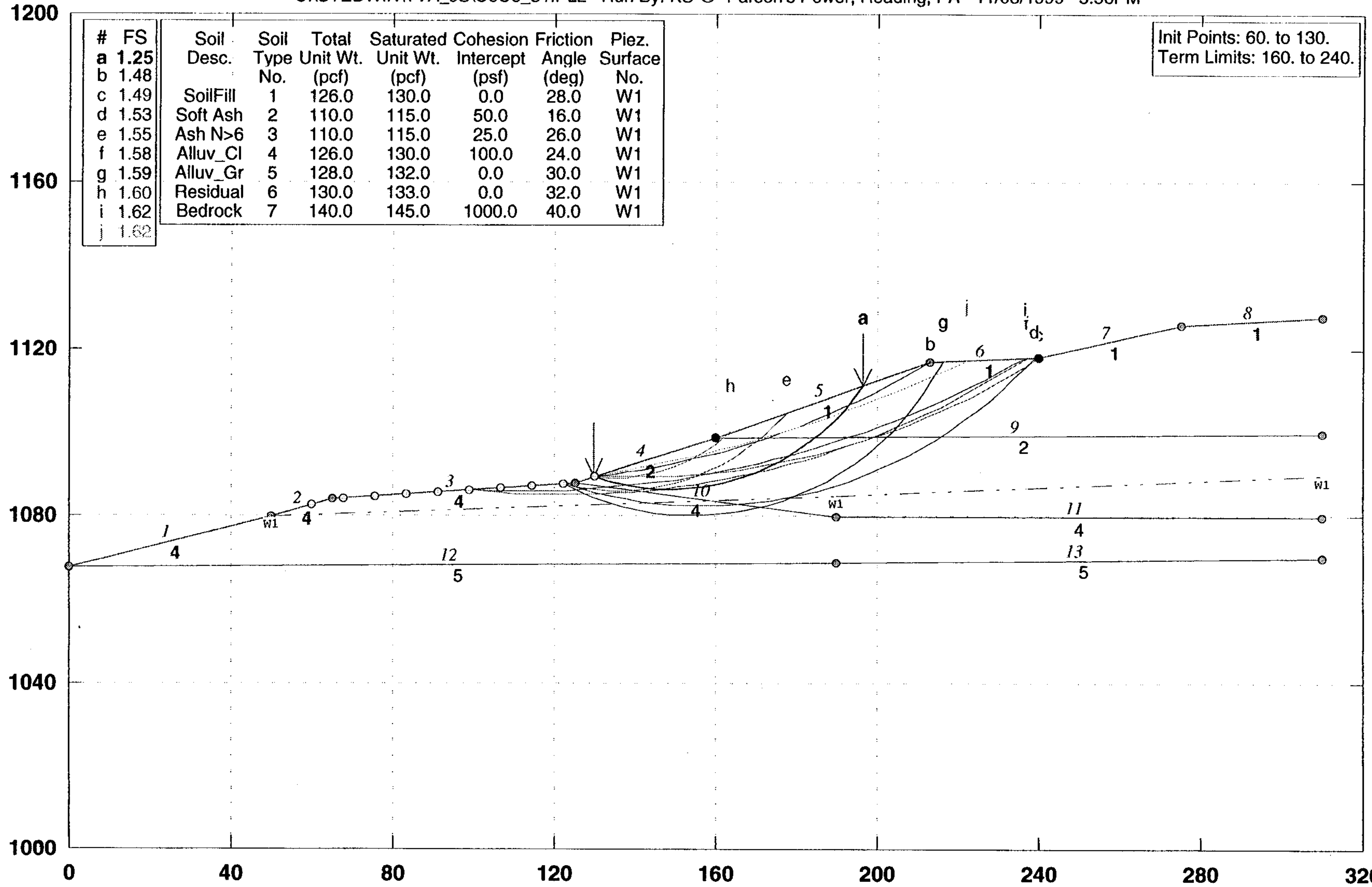
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=1.09
Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C6-C6 re-graded at 3H:1V by cut (static analysis)

C:\STEDWIN\TVA_JS\C6C6_31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/03/1999 5:56PM



#	FS
a	**1.25**
b	1.48
c	1.49
d	1.53
e	1.55
f	1.58
g	1.59
h	1.60
i	1.62
j	1.62

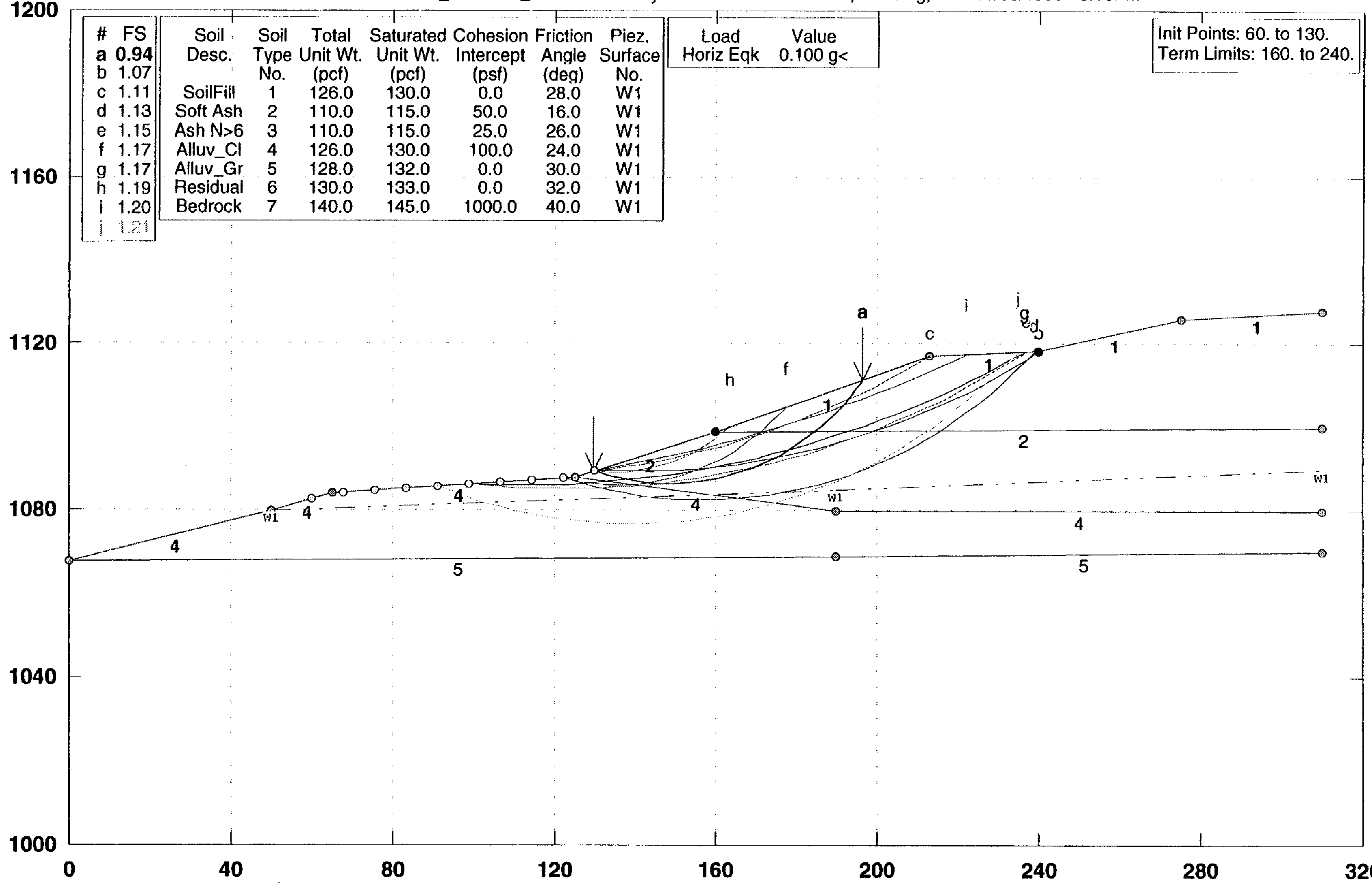
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.25

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike at C6-C6 re-graded to 3H:1V by cut with 0.1g horiz. acce

C:\STEDWIN\TVA_JS\C6C6_31.PL2 Run By: KS @. Parson's Power, Reading, PA 11/03/1999 6:16PM



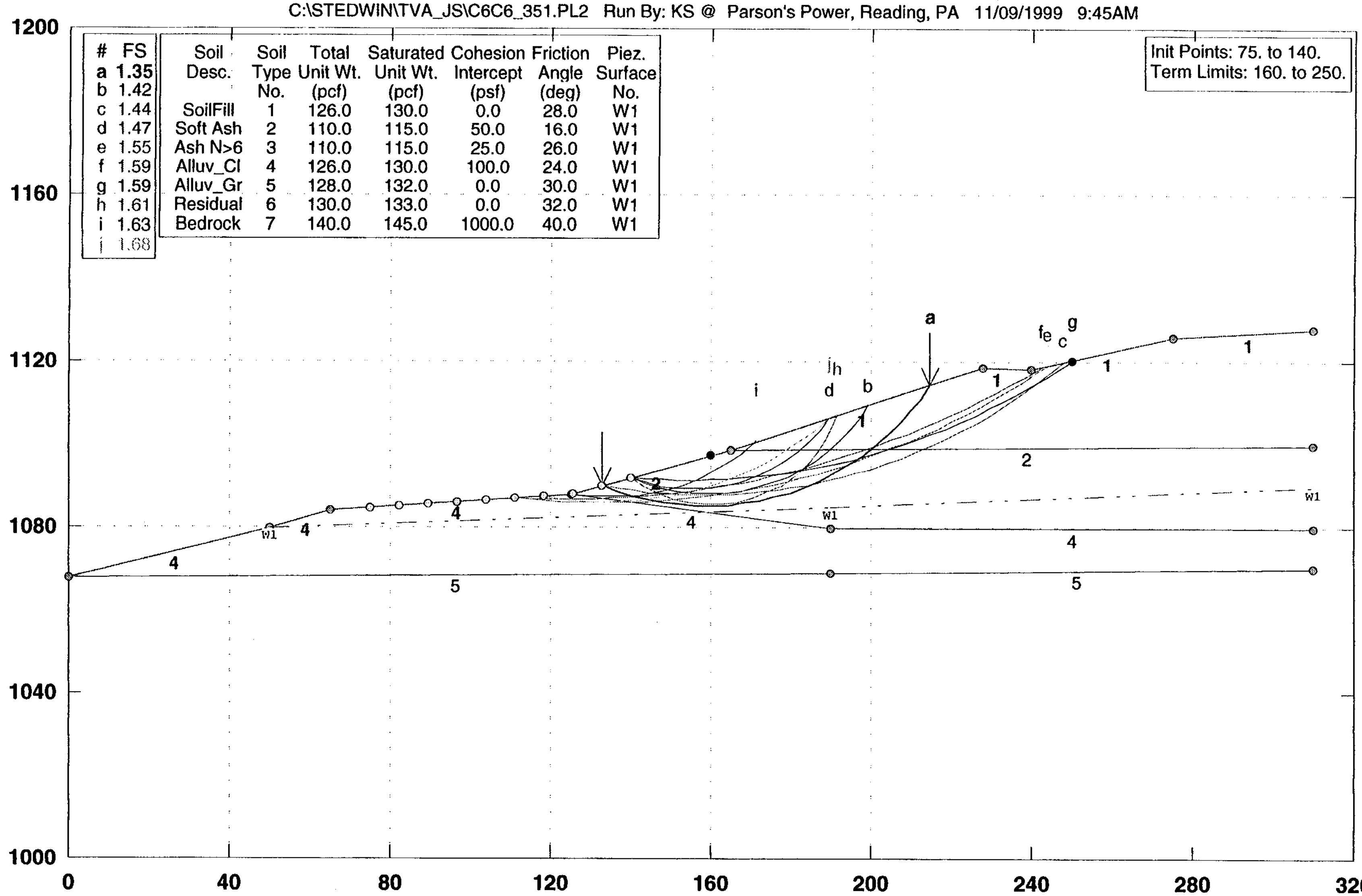
PCSTABL5M/si FSmin=0.94

Safety Factors Are Calculated By The Modified Bishop Method

by cut

TVA/John Sevier F/P; Ex. dike at C6-C6 re-graded to 3.5H:1V (static analysis)

C:\STEDWIN\TVA_JS\C6C6_351.PL2 Run By: KS @ Parson's Power, Reading, PA 11/09/1999 9:45AM



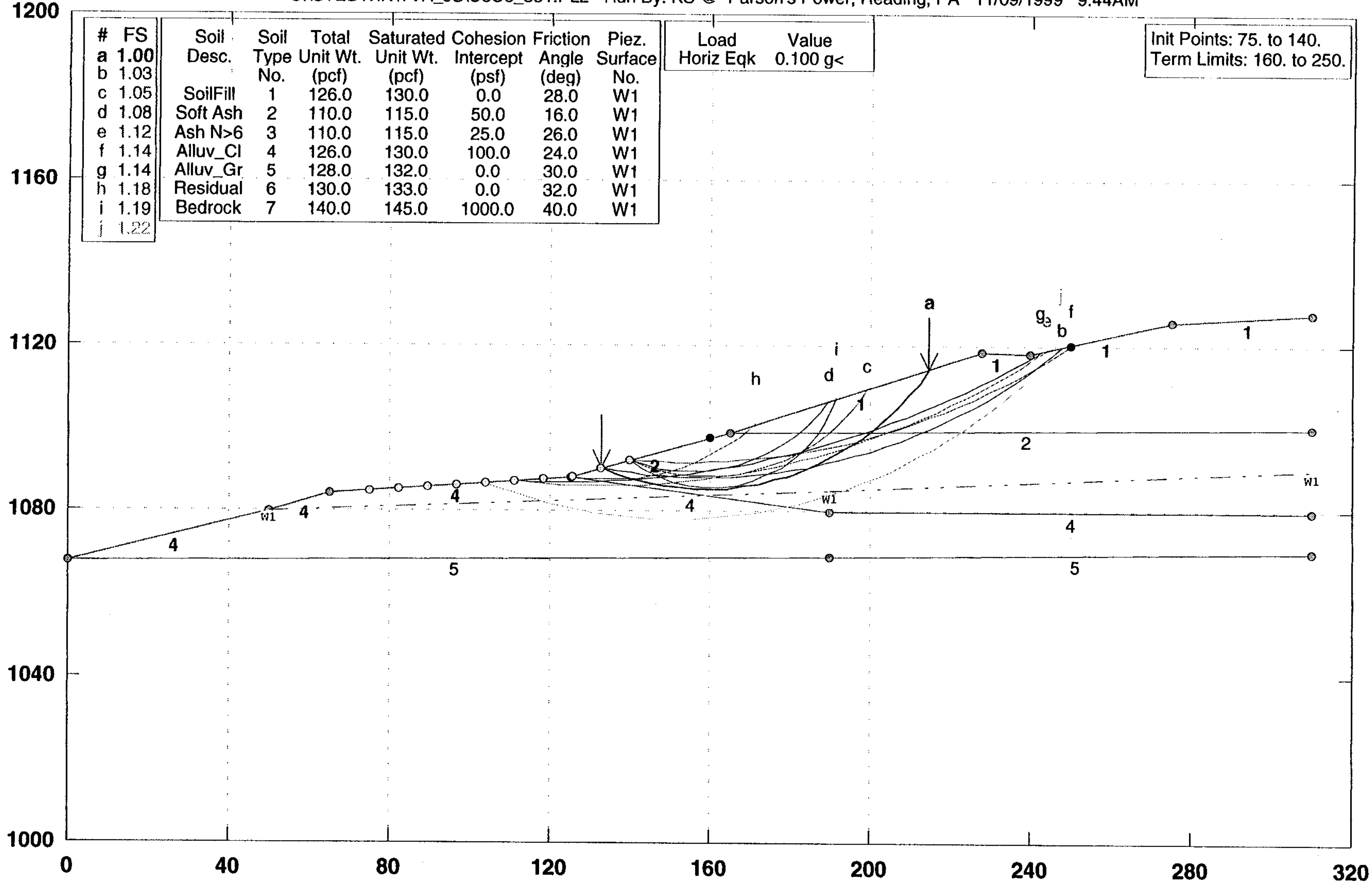
PCSTABL5M/si FSmin=1.35

Safety Factors Are Calculated By The Modified Bishop Method

by cut

TVA/John Sevier F/P; Ex. dike at C6-C6 re-graded to 3.5H:1V w/ 0.1g hor. accln.

C:\STEDWIN\TVA_JS\C6C6_351.PL2 Run By: KS @ Parson's Power, Reading, PA 11/09/1999 9:44AM



PCSTABL5M/si FSmin=1.00

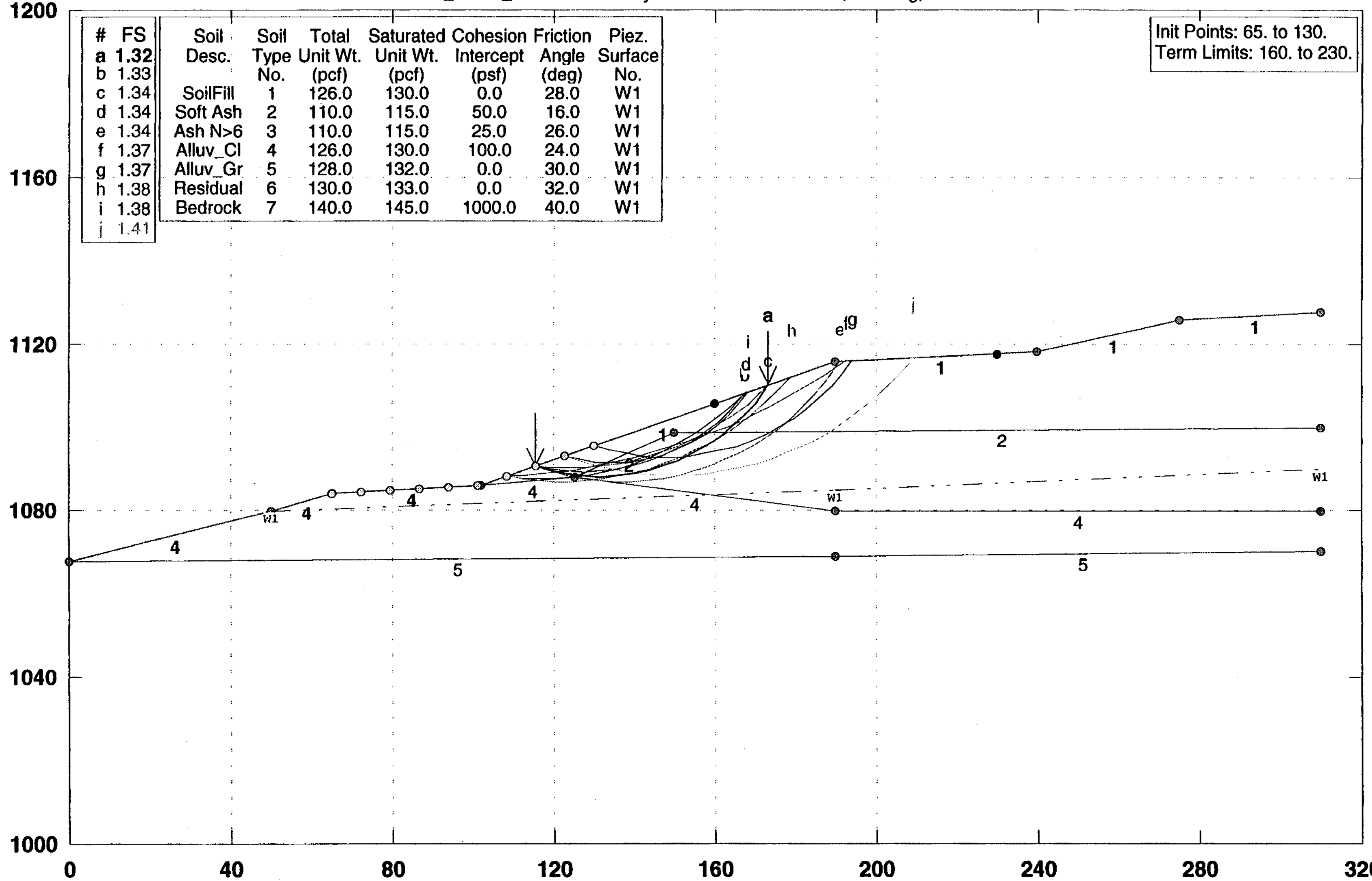
Safety Factors Are Calculated By The Modified Bishop Method

ATTACHMENT D (OF CALCULATION SHEET)

Stability outputs of filled sections at C6-C6

TVA/John Sevier F/P; stability of dike @ C6 w/ 3H:1V fill wedge (static anal.)

C:\STEDWIN\TVA_JS\C6_F31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/24/1999 4:17PM

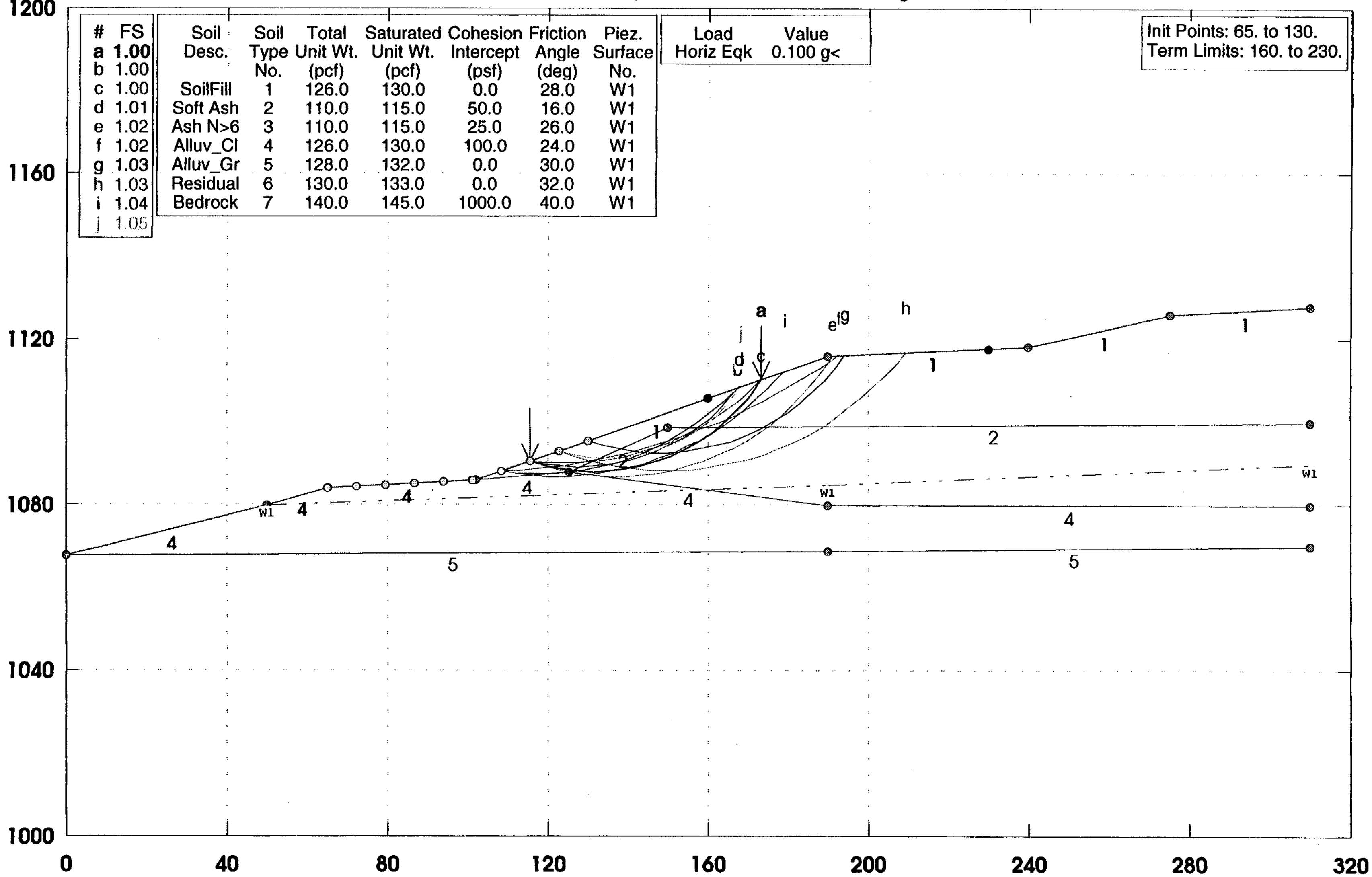


PCSTABL5M/si FSmin=1.32

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability of dike @ C6 w/ 3H:1V fill wedge & 0.1 horz. acc

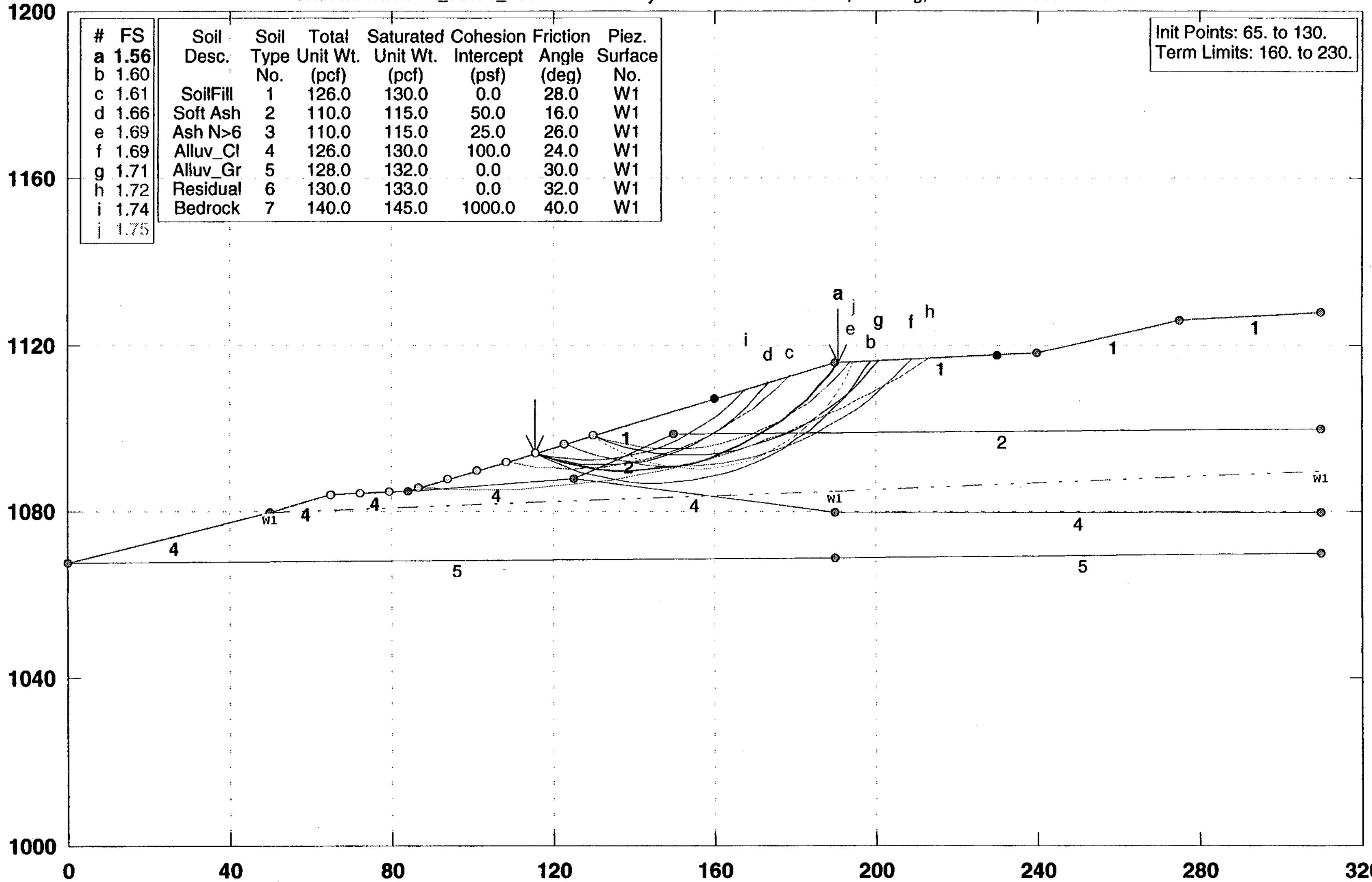
C:\STEDWIN\TVA_JS\C6_F31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/24/1999 4:16PM



PCSTABL5M/si FSmin=1.00
Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability of dike @ C6 w/ 3.5H:1V fill wedge (static ana.)

C:\STEDWIN\TVA_JS\C6_F351.PL2 Run By: KS @ Parson's Power, Reading, PA 11/24/1999 4:19PM

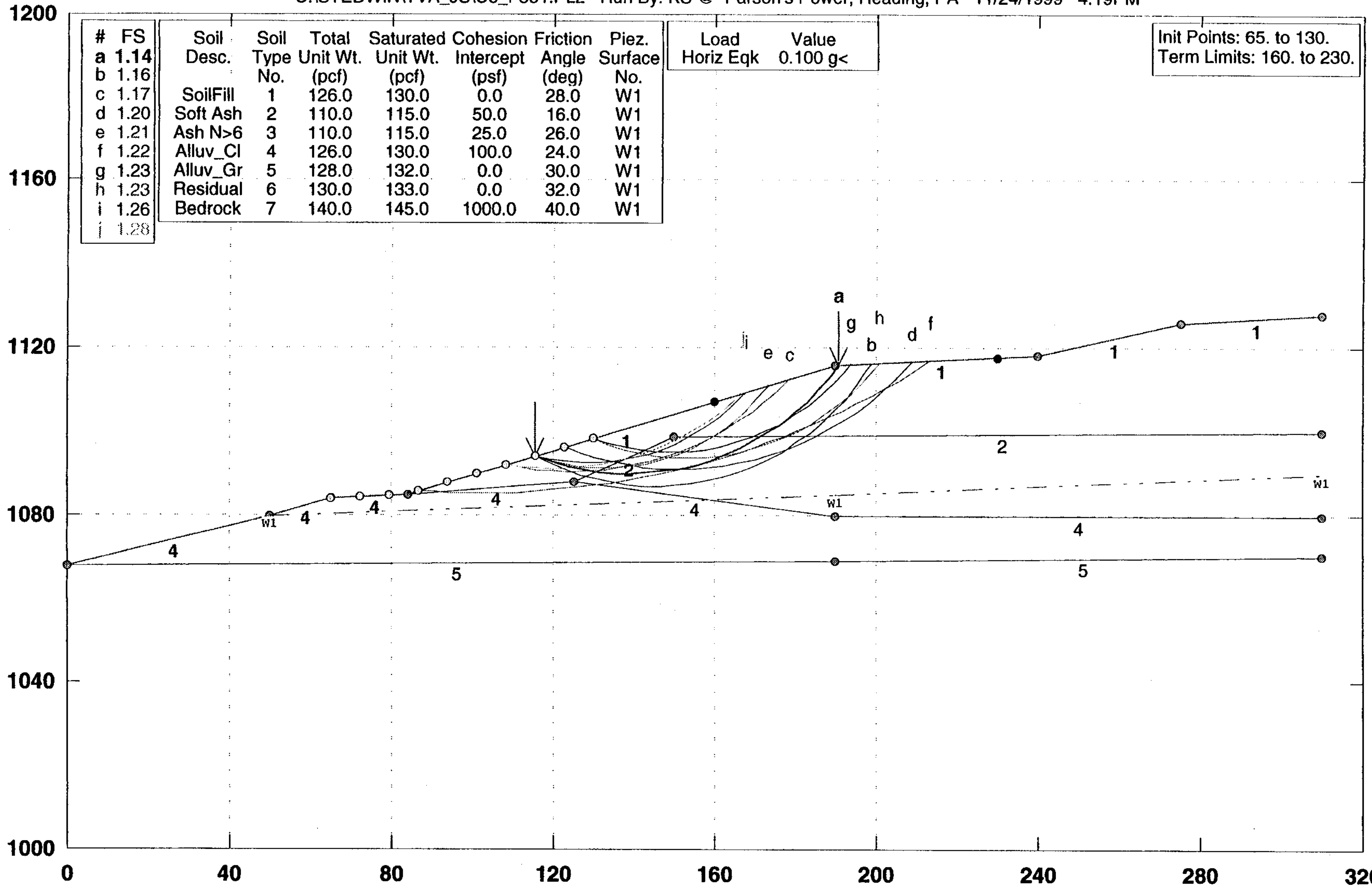


PCSTABL5M/si FSmin=1.56

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability of dike @ C6 w/ 3.5H:1V fill wedge & 0.1g horz.

C:\STEDWIN\TVA_JS\C6_F351.PL2 Run By: KS @ Parson's Power, Reading, PA 11/24/1999 4:19PM



#	FS
a	1.14
b	1.16
c	1.17
d	1.20
e	1.21
f	1.22
g	1.23
h	1.23
i	1.26
j	1.28

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.14

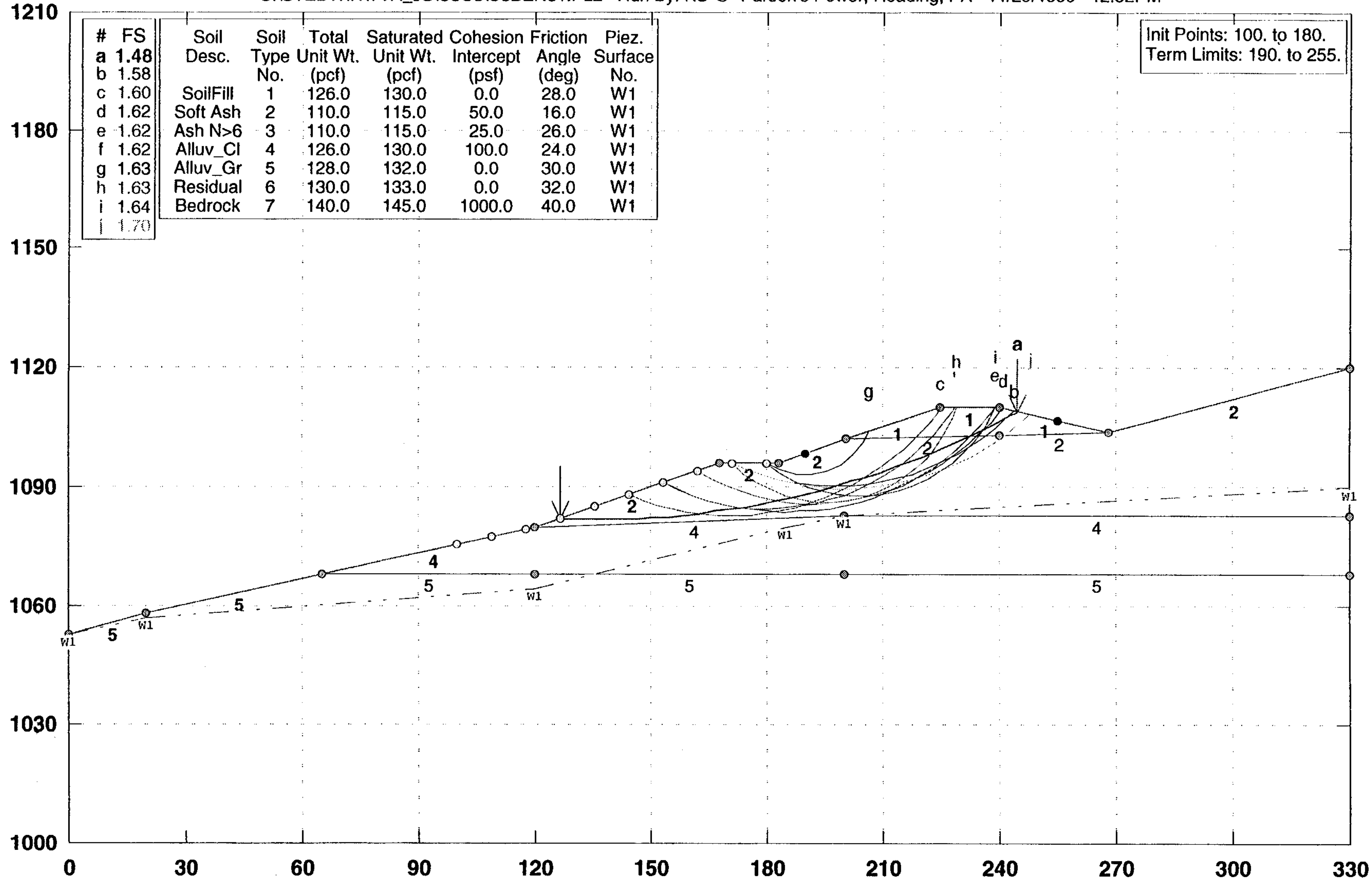
Safety Factors Are Calculated By The Modified Bishop Method

ATTACHMENT E (OF CALCULATION SHEET)

Stability outputs of benched laid back sections at C3 through C5

TVA/John Sevier F/P; Stability at C3-C3with 3H:1V bench (static analysis)

C:\STEDWIN\TVA_JS\C3C3\C3BEN31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 12:52PM



#	FS
a	**1.48**
b	1.58
c	1.60
d	1.62
e	1.62
f	1.62
g	1.63
h	1.63
i	1.64
j	1.70

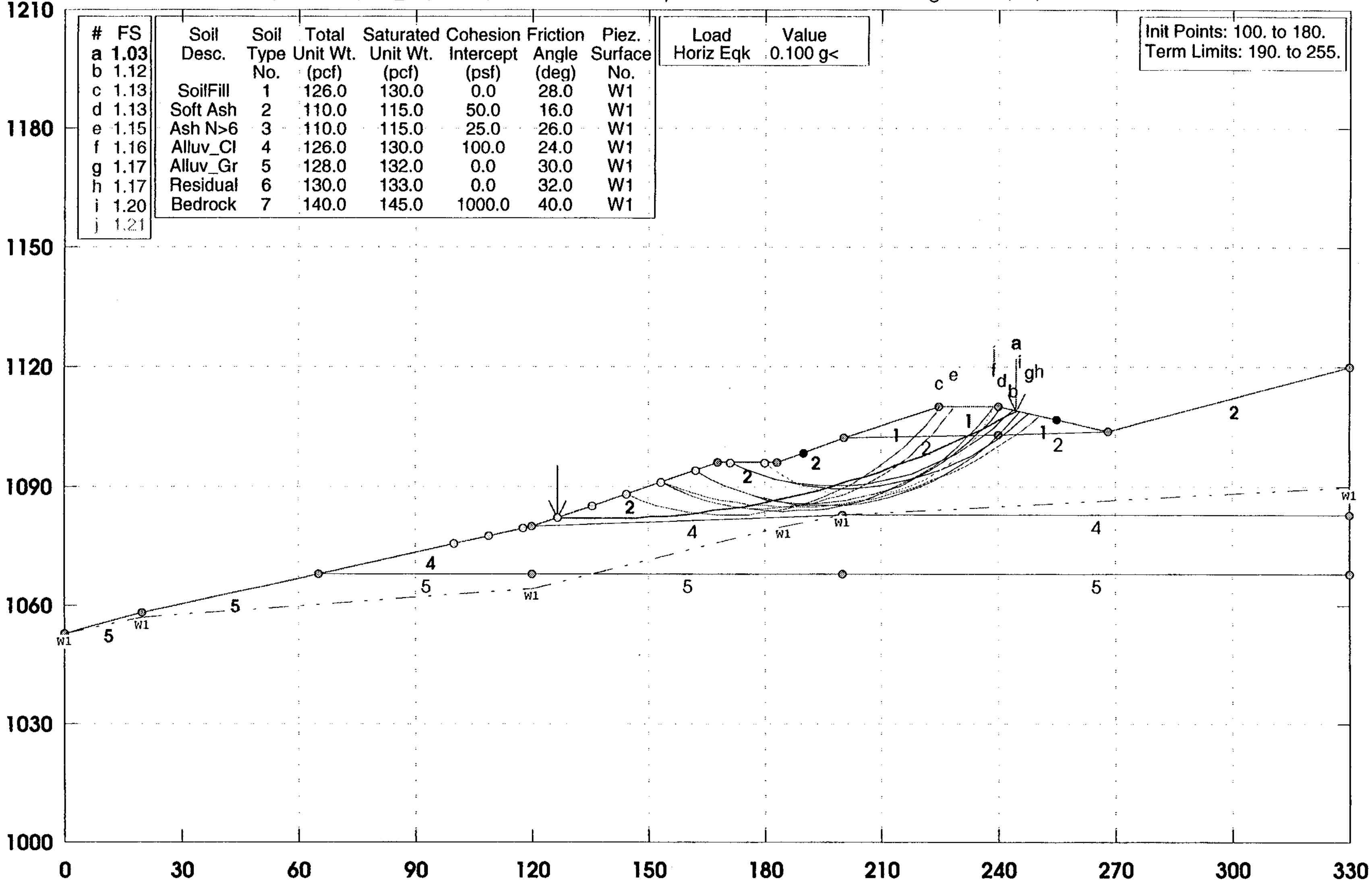
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.48

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Stability at C3-C3with 3H:1V bench (with 0.1g hor. accl)

C:\STEDWIN\TVA_JS\C3C3\C3BEN31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 12:51PM



#	FS
a	**1.03**
b	1.12
c	1.13
d	1.13
e	1.15
f	1.16
g	1.17
h	1.17
i	1.20
j	1.21

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

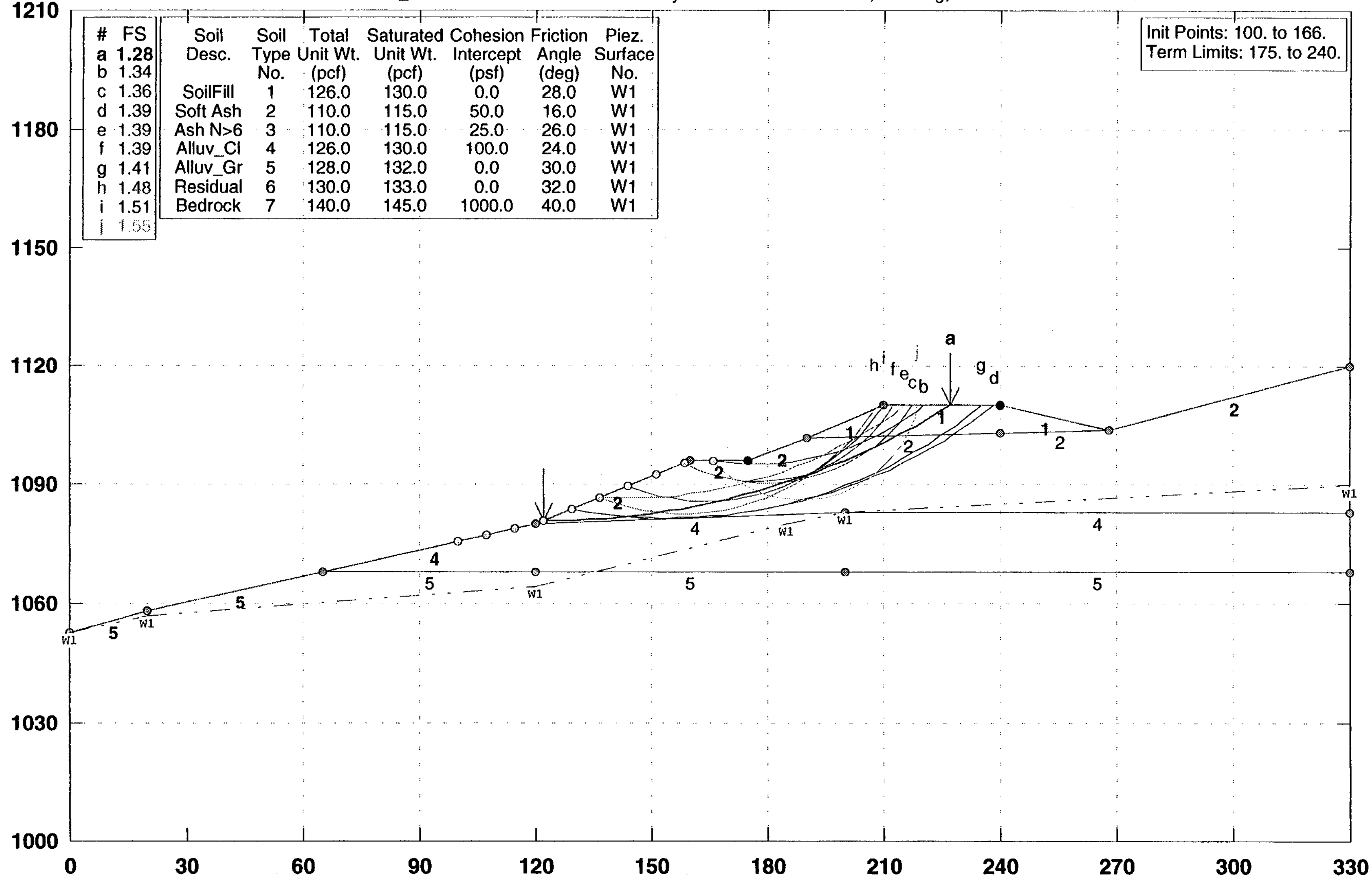
Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=1.03

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Stability at C3-C3with 2.5H:1V bench (static analysis)

C:\STEDWIN\TVA_JS\C3C3\C3BEN251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 12:35PM



#	FS
a	**1.28**
b	1.34
c	1.36
d	1.39
e	1.39
f	1.39
g	1.41
h	1.48
i	1.51
j	1.55

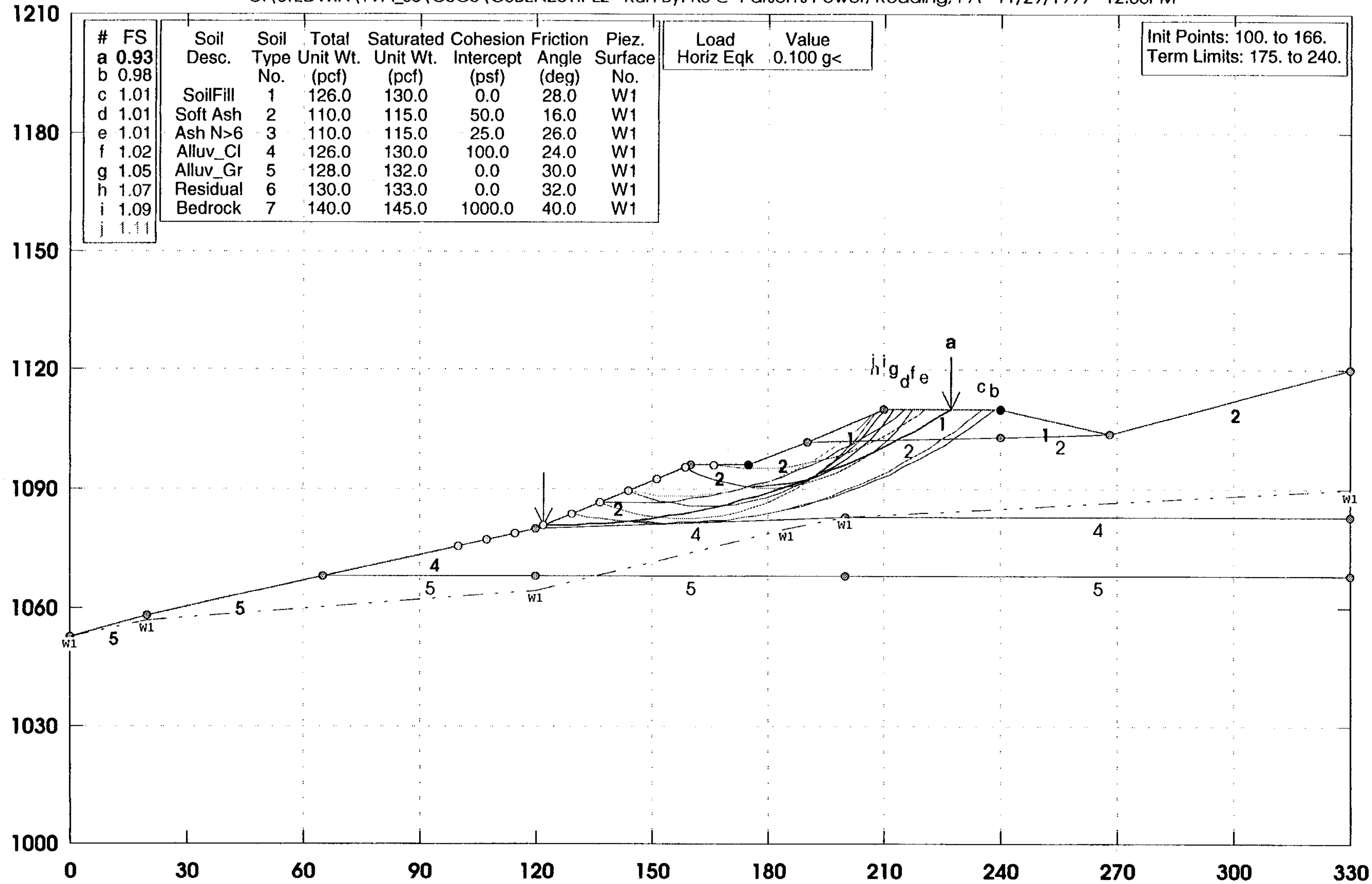
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.28

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Stability at C3-C3with 2.5H:1V bench (with 0.1g hor. accl)

C:\STEDWIN\TVA_JS\C3C3\C3BEN251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 12:35PM

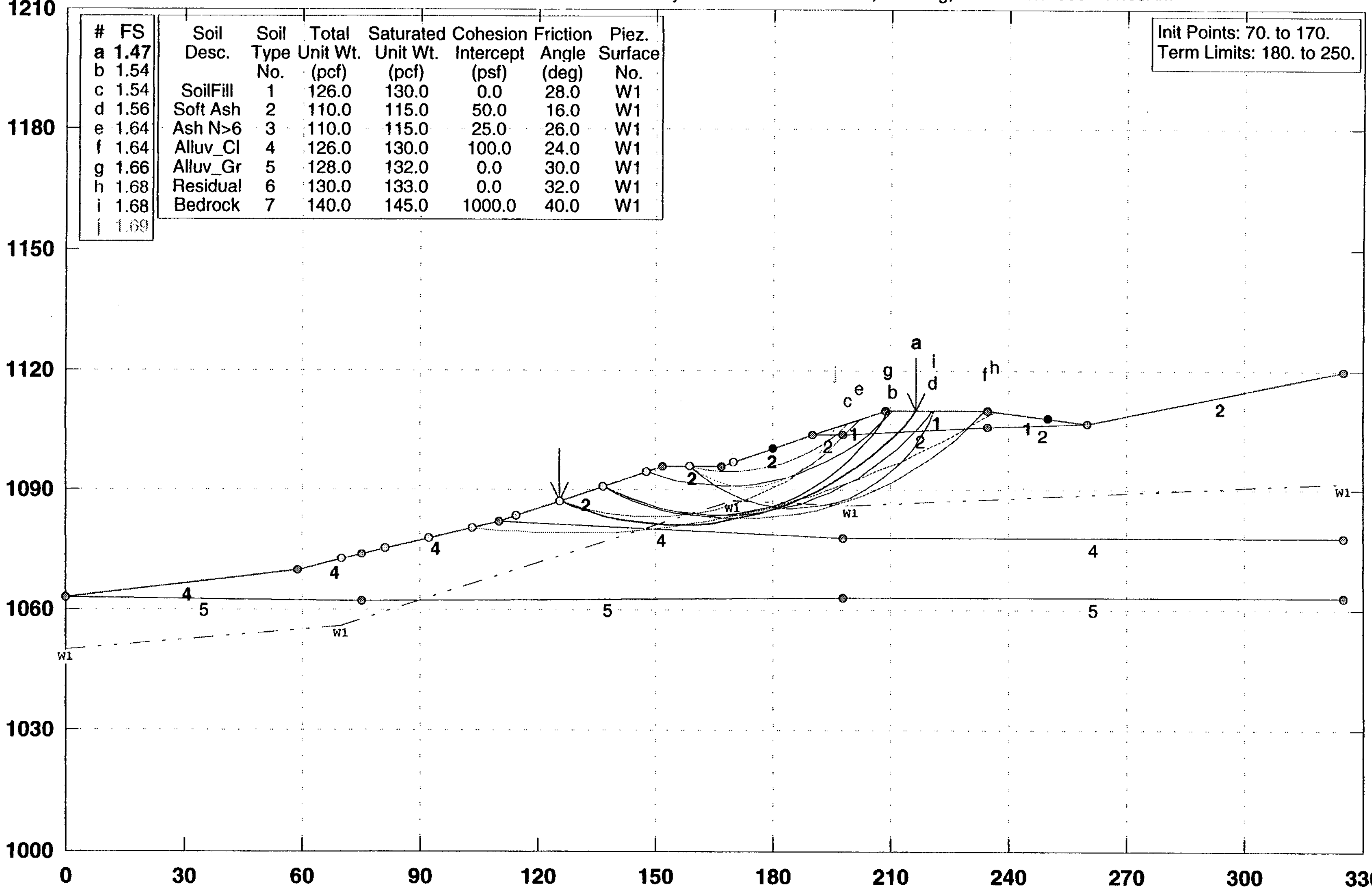


PCSTABL5M/si FSmin=0.93

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C4-C4 with 3H:1V bench (static analysis)

C:\STEDWIN\TVA_JS\C4C4\C4BEN31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 11:08AM



#	FS
a	1.47
b	1.54
c	1.54
d	1.56
e	1.64
f	1.64
g	1.66
h	1.68
i	1.68
j	1.69

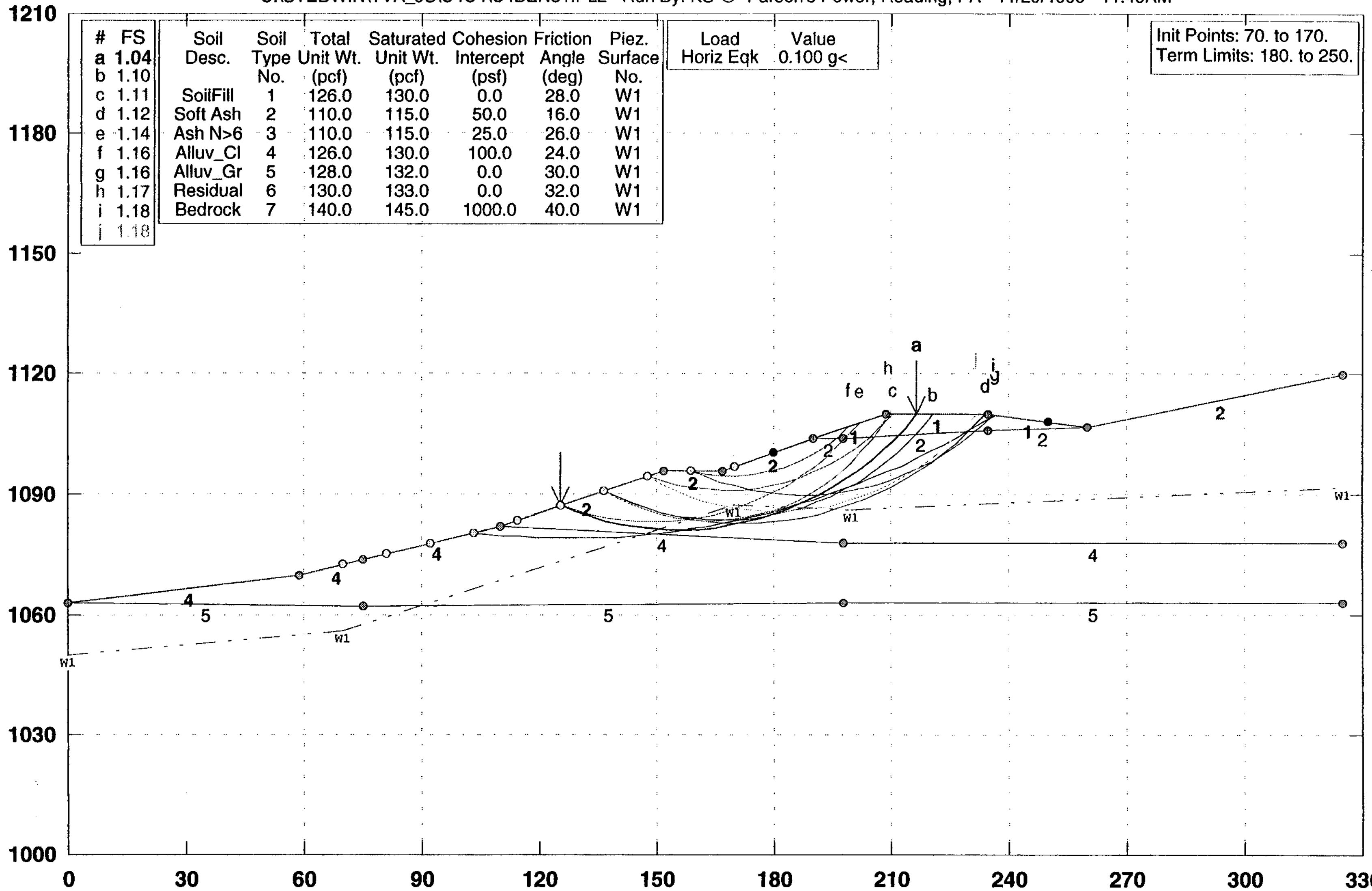
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.47

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C4-C4 with 3H:1V bench (with 0.1g hor. accl)

C:\STEDWIN\TVA_JS\C4C4\C4BEN31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 11:49AM



#	FS
a	1.04
b	1.10
c	1.11
d	1.12
e	1.14
f	1.16
g	1.16
h	1.17
i	1.18
j	1.18

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

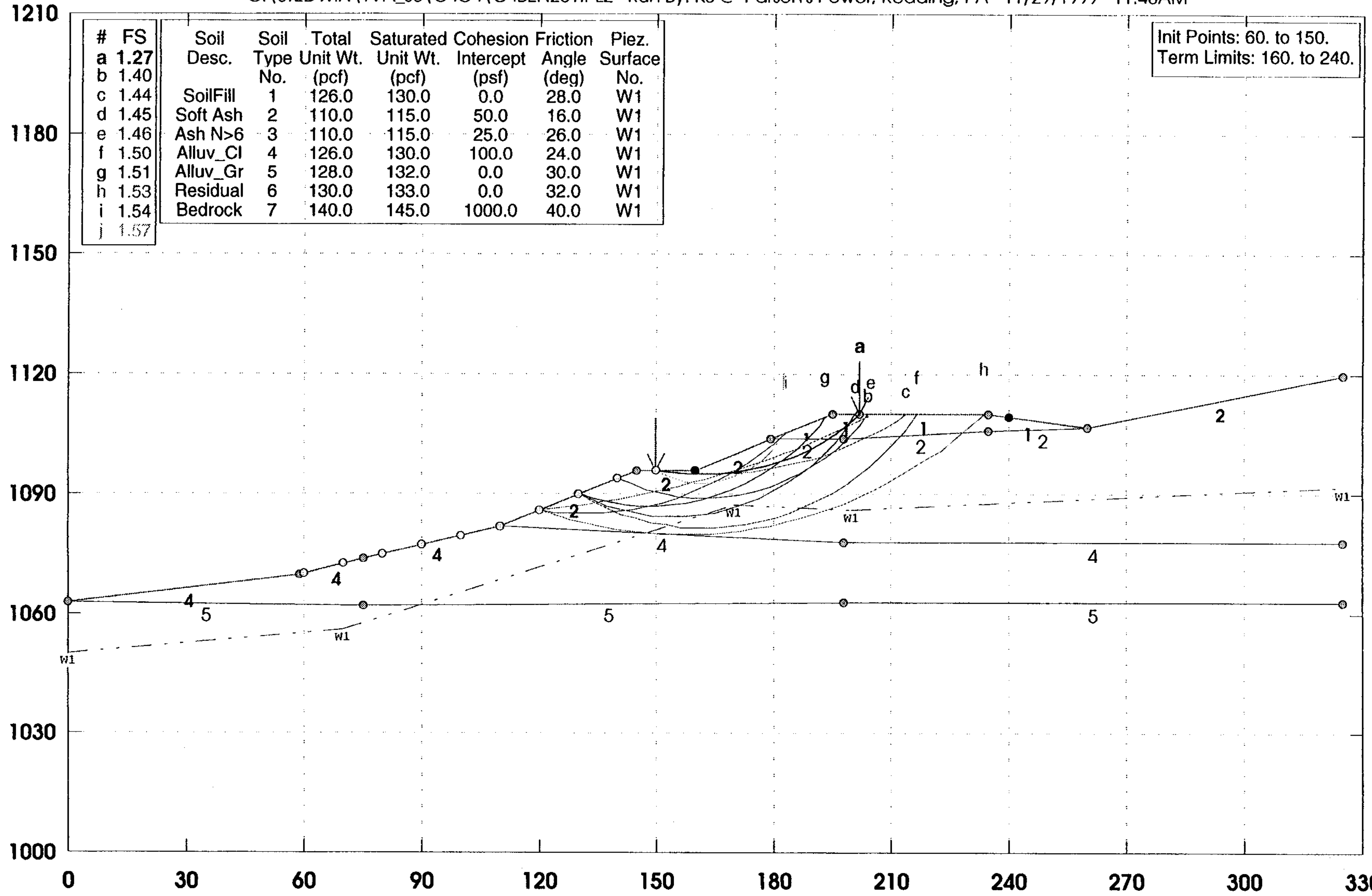
Load	Value
Horiz Eqk	0.100 g<

PCSTABL5M/si FSmin=1.04

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C4-C4 with 2.5H:1V bench (static analysis)

C:\STEDWIN\TVA_JS\C4C4\C4BEN251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 11:48AM



PCSTABL5M/si FSmin=1.27

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C4-C4 with 2.5H:1V bench (with 0.1g hor. accl)

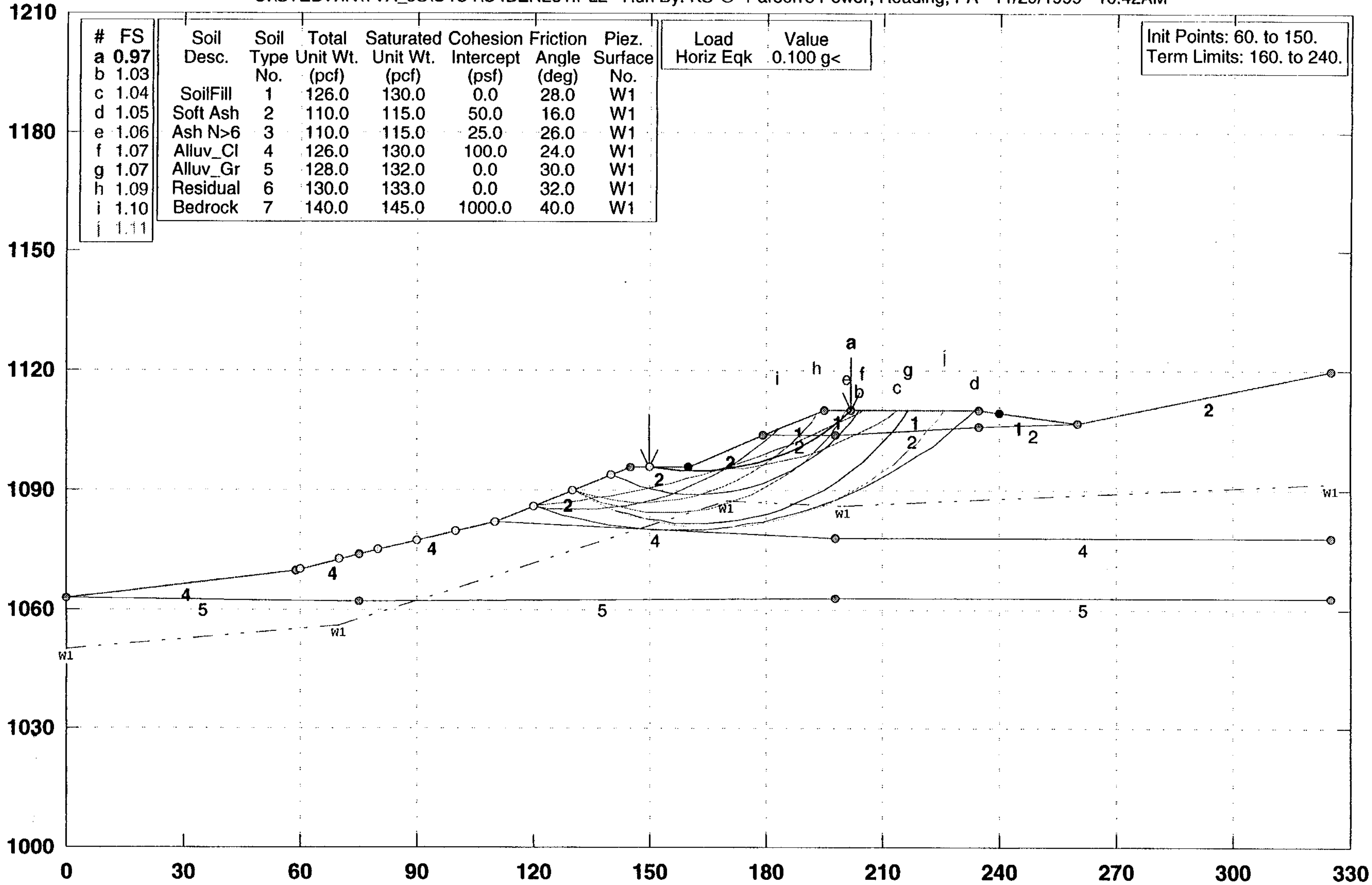
C:\STEDWIN\TVA_JS\C4C4\C4BEN251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 10:42AM

#	FS
a	**0.97**
b	1.03
c	1.04
d	1.05
e	1.06
f	1.07
g	1.07
h	1.09
i	1.10
j	1.11

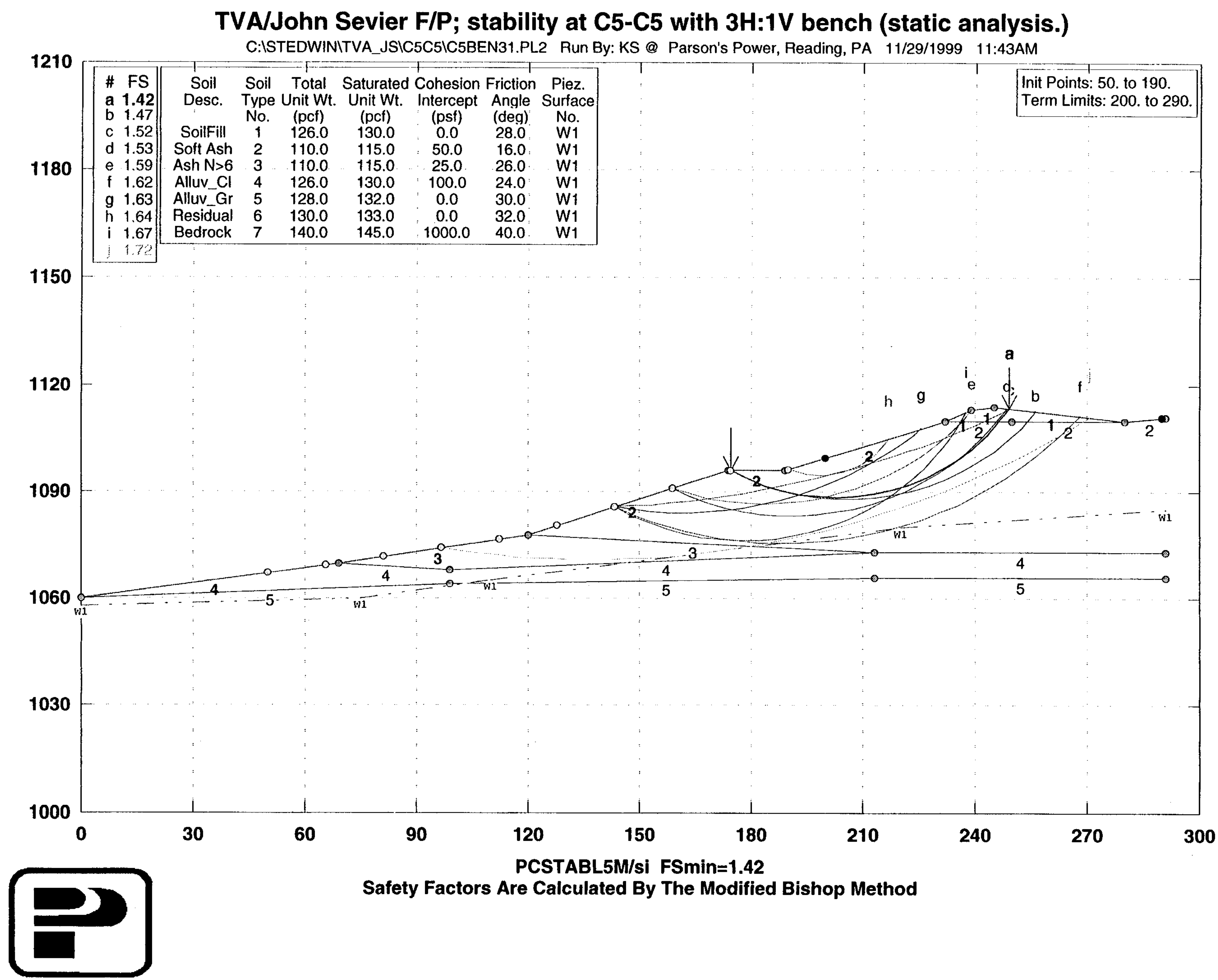
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Load	Value
Horiz Eqk	0.100 g<

Init Points: 60. to 150.
Term Limits: 160. to 240.

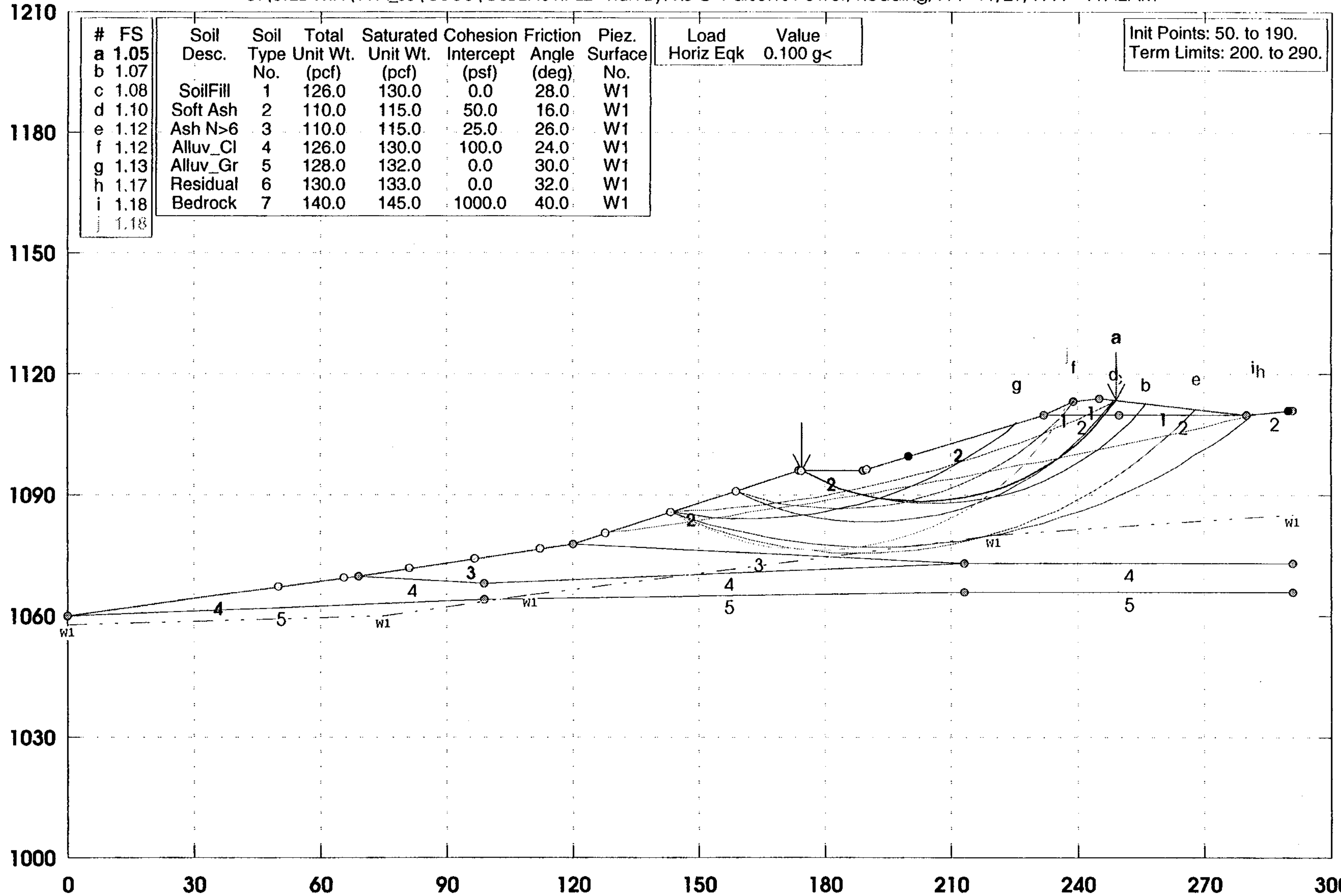


PCSTABL5M/si FSmin=0.97
Safety Factors Are Calculated By The Modified Bishop Method


TVA/John Sevier F/P; stability at C5-C5 with 3H:1V bench (static analysis.)
C:\STEDWIN\TVA_JS\C5C5\C5BEN31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 11:43AM
FS
a 1.42
b 1.47
c 1.52
d 1.53
e 1.59
f 1.62
g 1.63
h 1.64
i 1.67
j 1.72
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No.
SoilFill 1 126.0 130.0 0.0 28.0 W1
Soft Ash 2 110.0 115.0 50.0 16.0 W1
Ash N>6 3 110.0 115.0 25.0 26.0 W1
Alluv_Cl 4 126.0 130.0 100.0 24.0 W1
Alluv_Gr 5 128.0 132.0 0.0 30.0 W1
Residual 6 130.0 133.0 0.0 32.0 W1
Bedrock 7 140.0 145.0 1000.0 40.0 W1
Init Points: 50. to 190.
Term Limits: 200. to 290.
1210
1180
1150
1120
1090
1060
1030
1000
0
30
60
90
120
150
180
210
240
270
300
PCSTABL5M/si FSmin=1.42
Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C5-C5 with 3H:1V bench (with 0.1g hor. accl.)

C:\STEDWIN\TVA_JS\C5C5\C5BEN31.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 11:42AM



PCSTABL5M/si FSmin=1.05

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C5-C5 with 2.5H:1V bench (static analysis)

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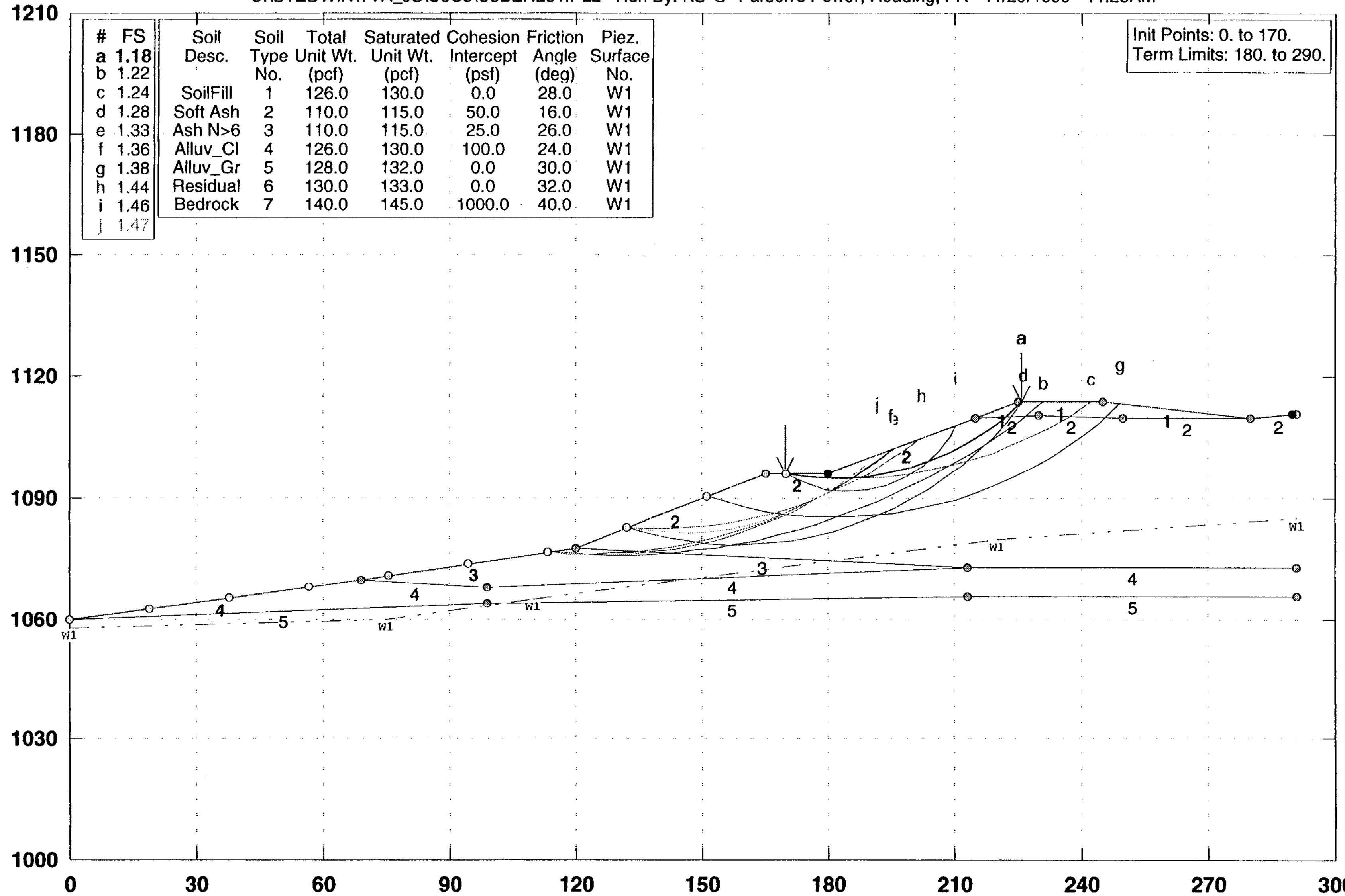


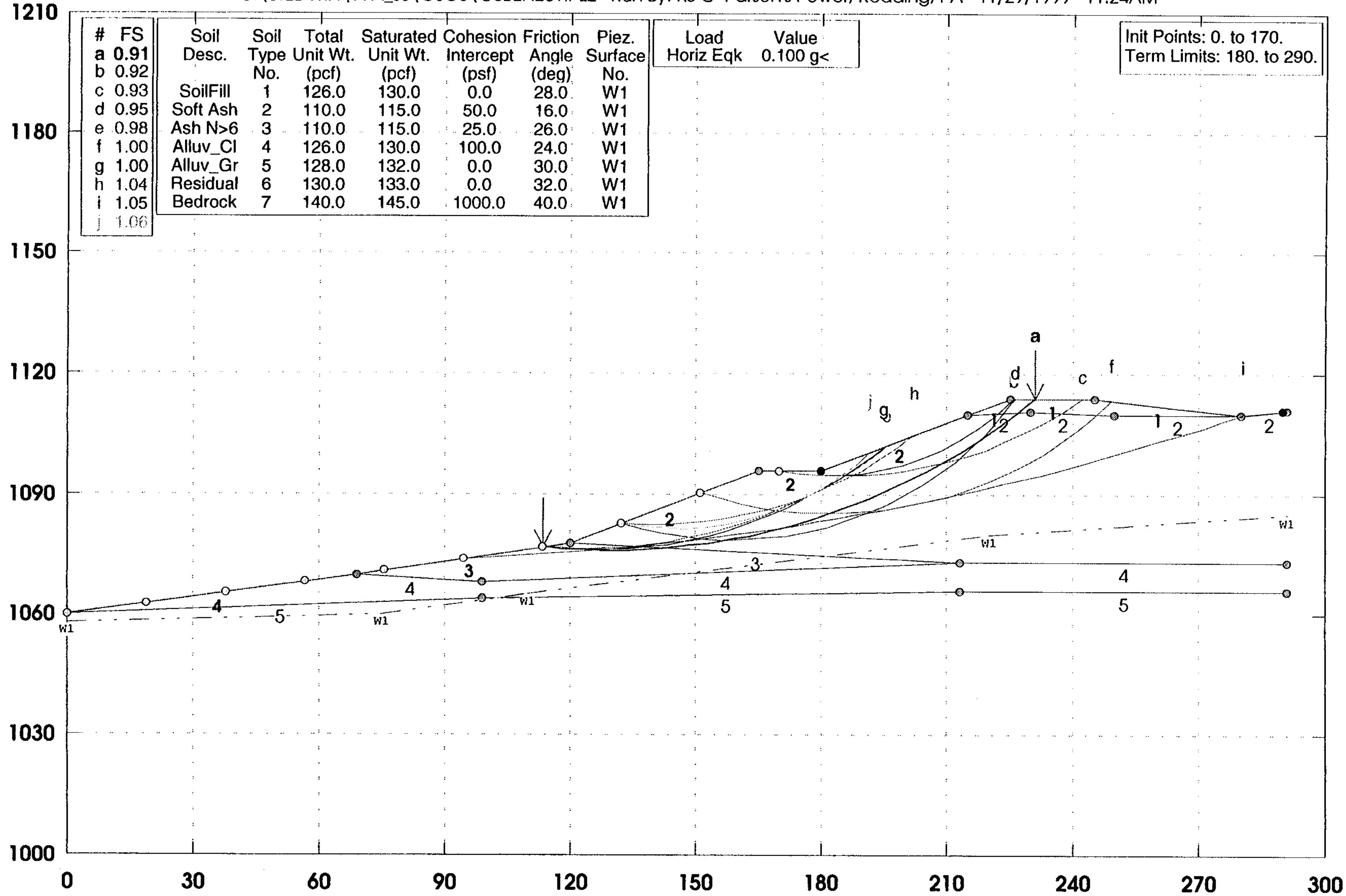
#	FS
a	1.18
b	1.22
c	1.24
d	1.28
e	1.33
f	1.36
g	1.38
h	1.44
i	1.46
j	1.47

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.18
Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; stability at C5-C5 with 2.5H:1V bench (with 0.1g hor. accl)

C:\STEDWIN\TVA_JS\C5C5\C5BEN251.PL2 Run By: KS @ Parson's Power, Reading, PA 11/29/1999 11:24AM



#	FS
a	0.91
b	0.92
c	0.93
d	0.95
e	0.98
f	1.00
g	1.00
h	1.04
i	1.05
j	1.06

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=0.91

Safety Factors Are Calculated By The Modified Bishop Method

APPENDIX B

Reference notes and key to borings logs (LAW Eng.)

Boring logs B99-1 through B99-13 (from 10/01/99 LAW Eng. Report)

Boring logs B94-1 through B94-3 (from 09/30/94 LAW Eng. report)

Logs of wells 15 and 21 (from 09/30/94 LAW Eng. report)

Piezometers PZ-1A/B through PZ-5A/B (from 09/30/94 LAW Eng. report)

Groundwater level measurements if 8/4/99 in existing wells and piezometers

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	NO. OF BLOWS, N	RELATIVE DENSITY
SANDS:	0-4	Very Loose
	5-10	Loose
	11-30	Firm
	31-50	Dense
	OVER 50	Very Dense

		CONSISTENCY
SILTS & CLAYS:	0-2	Very Soft
	3-4	Soft
	5-8	Firm
	9-15	Stiff
	16-30	Very stiff
	31-50	Hard
	OVER 50	Very Hard

PARTICLE SIZE IDENTIFICATION

BOULDERS:		Greater than 300 mm
COBBLES:		75 mm to 300 mm
GRAVEL:	Coarse -	19.0 mm to 75 mm
	Fine -	4.75 mm to 19.0 mm
SANDS:	Coarse -	2.00 mm to 4.75 mm
	Medium -	0.425 mm to 2.00 mm
	Fine -	0.075 mm to 0.425 mm
SILTS & CLAYS:		Less than 0.075 mm

KEY TO DRILLING SYMBOLS

- Undisturbed Sample
- Split Spoon Sample
- Water Table 24 HR.
- Water Table at Time of Drilling
- 60-100 = RQD/Recovery
- Rock Coring

KEY TO SOIL AND ROCK CLASSIFICATIONS

- **TOPSOIL**
- **ASPHALT AND GRAVEL**
- **CONCRETE AND GRAVEL**
- **FILL**
- **ALLUVIUM**
- **RESIDUUM** - Soft to firm
- **RESIDUUM** - Stiff to very hard
- **AUGER BORING**
- **UNDISTURBED SAMPLE ATTEMPT**
- **DOLOMITE**
- **LIMESTONE**
- **SHALE**
- **LIMESTONE/SHALE** - Limestone with shale interbeds
- **SANDSTONE**
- **GRANITE**
- **SILTSTONE**
- **SLATE**

Revised 6/25/97

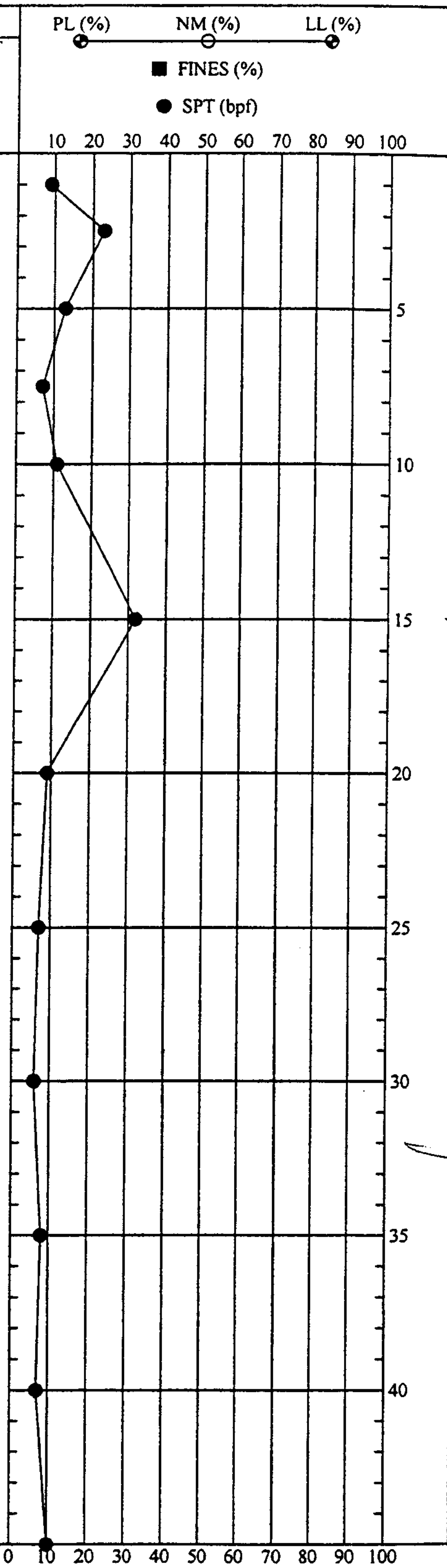
SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
0	STIFF TO VERY STIFF BROWN, TAN, AND GRAY CLAYEY SILT WITH ROCK FRAGMENTS - FILL	1115
3.5	STIFF, FIRM, AND HARD BROWN, TAN, AND GRAY SILTY CLAY WITH ROCK FRAGMENTS AND SOME SAND - FILL	
15	STIFF TO FIRM GRAY SILT (ASH) - FILL	1100
32	FIRM WET GRAY SILT (ASH) AND BROWN SILT WITH SMALL ROOTS - FILL	
33.5	∇ (water level)	1081
42	STIFF MOIST TO WET BROWN SILTY CLAY WITH SAND - ALLUVIUM	1073

SAMPLES

DEPTH (ft)	IDENT	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
1	SPT	6-5-4
2.5	SPT	9-10-13
5	SPT	3-5-8
7.5	SPT	2-3-4
10	SPT	1-4-7
15	SPT	3-14-18
18.5	UD	2.0-2.0
20	SPT	3-5-4
25	SPT	3-3-4
30	SPT	2-3-3
35	SPT	3-3-5
40	SPT	1-1-6



Cap x'' → Act ←

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

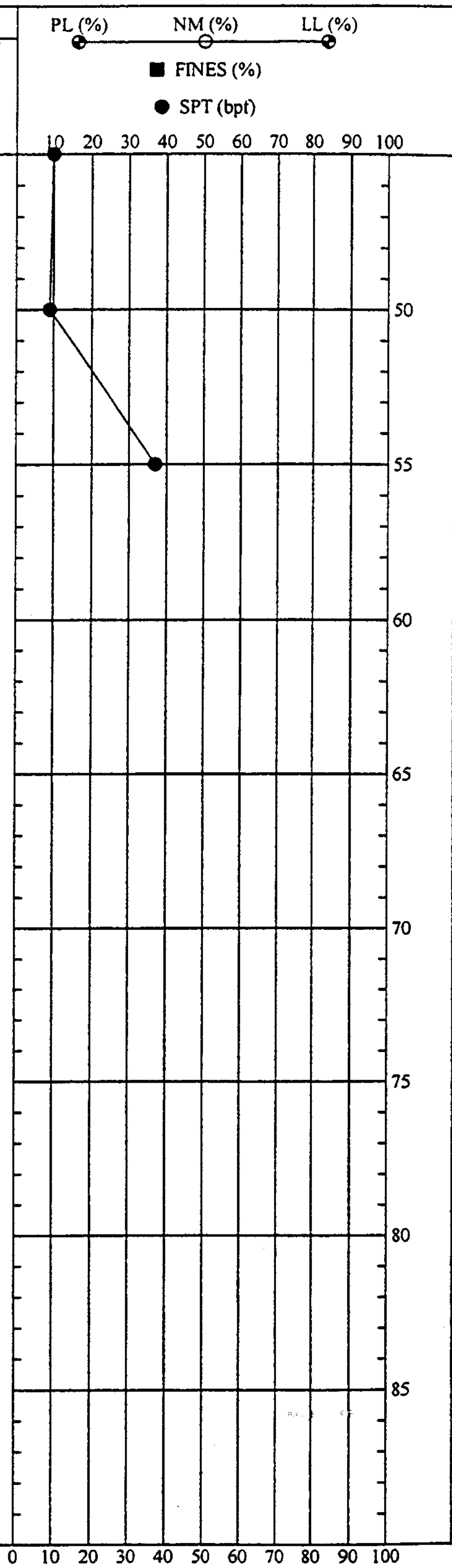
PROJECT: JOHN SEVIER

DRILLED: August 9, 1999 **BORING NO.:** B99- 1

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
45	STIFF MOIST TO WET BROWN SILTY CLAY WITH SAND - ALLUVIUM			SPT		3-4-6
50				SPT		1-3-6
	HARD DARK GRAY DECOMPOSED SHALE - RESIDUUM		1063 / 1062			
55				SPT		4-19-18
	AUGER REFUSAL AT 57.3'		1057.7			
60						
65						
70						
75						
80						
85						
90						



SOIL 9207524.GPJ LAW GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

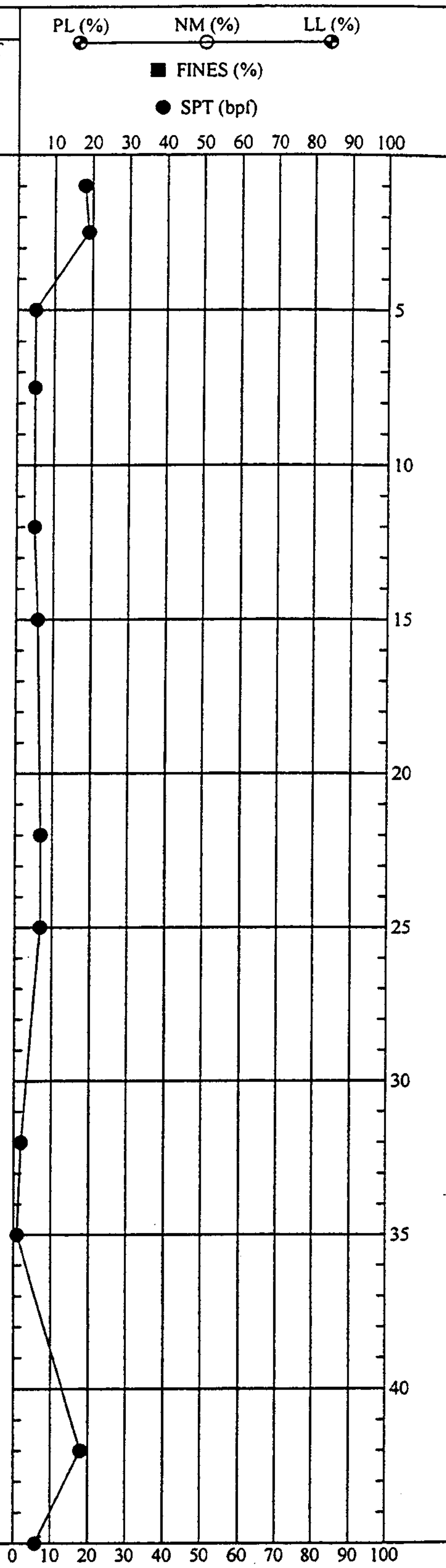
DRILLED: August 9, 1999 **BORING NO.:** B99- 1

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 2 **OF** 2

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)
0	VERY STIFF BROWN AND TAN CLAYEY SILT WITH SMALL ROOTS, ROCK FRAGMENTS, AND GRAY SILT (ASH) - FILL	1113.2 ✓
	FIRM GRAY SILT (ASH) AND BROWN CLAYEY SILT - FILL	1109.7
	VERY SOFT WET GRAY SILT (ASH) - FILL	
∇		1082
40	VERY STIFF BROWN AND GRAY SILTY CLAY WITH SAND - ALLUVIUM	1073
	FIRM MOIST TO WET BROWN AND GRAY SANDY SILTY CLAY - ALLUVIUM	

DEPTH (ft)	SAMPLES IDENT	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
1.5	SPT	5-7-11
3	SPT	8-9-10
5	SPT	3-3-2
7.5	SPT	1-2-3
10	UD	1.55-2.0
12	SPT	2-2-3
15	SPT	2-2-4
20	UD	2.0-2.0
22	SPT	3-3-4
25	SPT	2-3-4
30	UD	2.0-2.0
32	SPT	1-1-1
35	SPT	0-0-1
40	UD	2.0-2.0
42	SPT	5-7-11



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

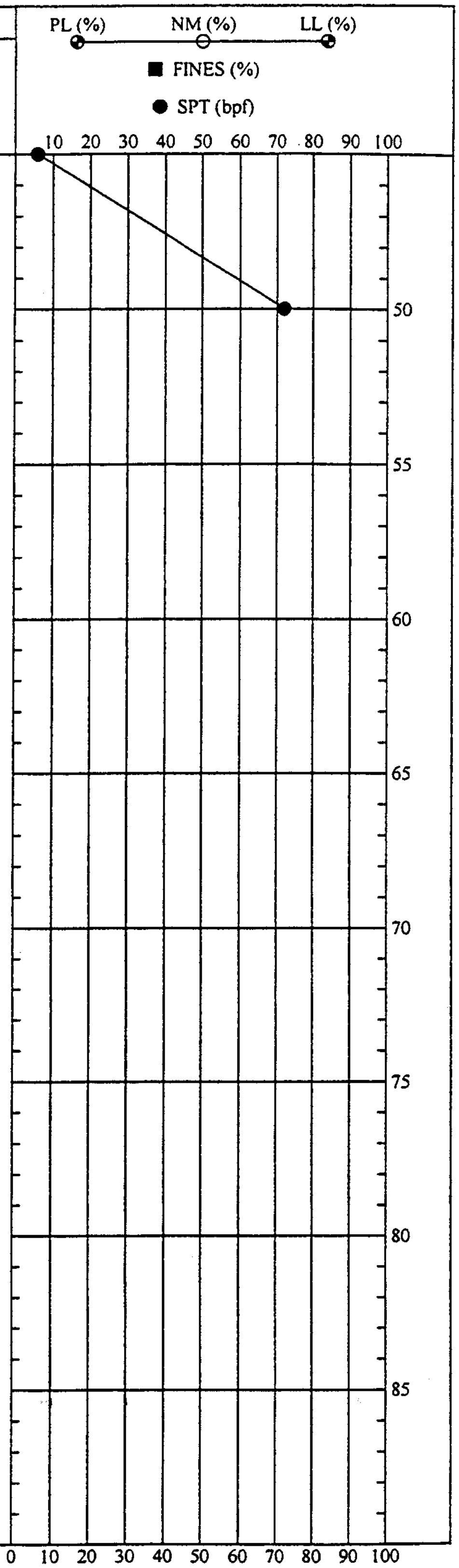
PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 2

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
45	FIRM MOIST TO WET BROWN AND GRAY SANDY SILTY CLAY - ALLUVIUM			SPT		2-3-3
	VERY HARD MOIST TO WET GRAY CLAYEY SAND WITH ROUNDED RIVER ROCKS - ALLUVIUM (NOTE: SPT value was probably amplified by rock fragments in the sample interval.)		1066			
50				SPT		4-41-31
	AUGER REFUSAL AT 51.3'		1061.9			
55						
60						
65						
70						
75						
80						
85						
90						



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 2

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 2 **OF** 2

LAW
LAWGIBB Group Member

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

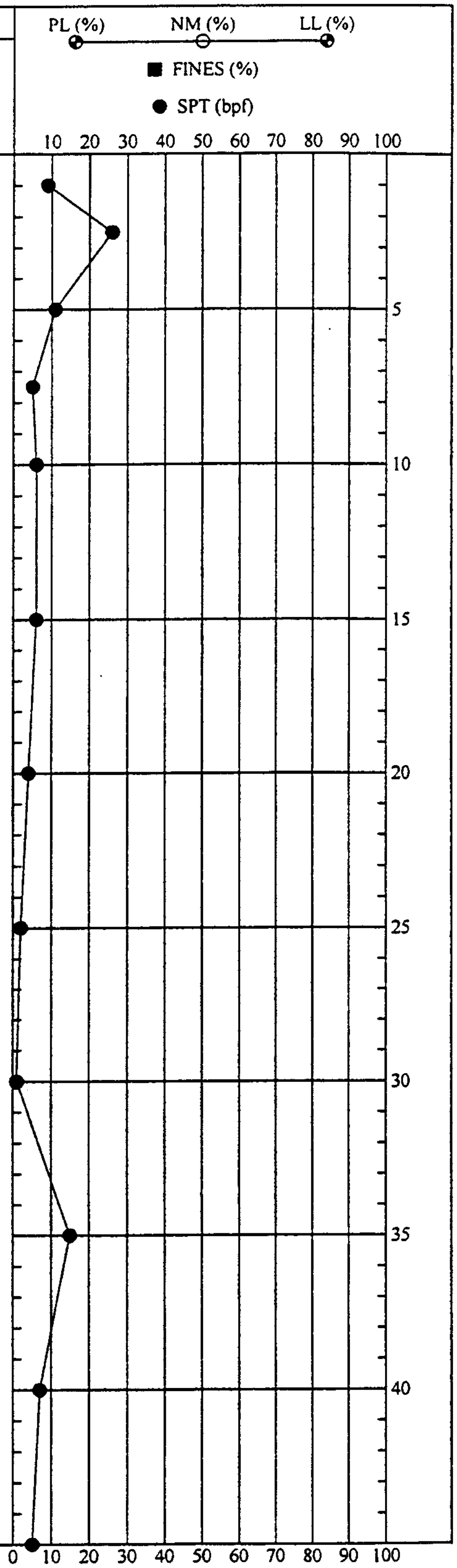
DRILLED: August 10, 1999 **BORING NO.:** B99- 3

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
0	STIFF TAN CLAYEY SILT - FILL	1110
	STIFF GRAY SILT (ASH) - FILL	
	VERY STIFF GRAY SILT (ASH) WITH TAN CLAYEY SILT - FILL	
	STIFF BROWN CLAYEY SILT WITH ROCK FRAGMENTS - FILL	
5	FIRM TO SOFT GRAY SILT (ASH) WITH TAN CLAYEY SILT - FILL	1104
20	VERY SOFT WET GRAY SILT (ASH) WITH TAN CLAYEY SILT - FILL	
	∇ (water level)	1086
30	STIFF TO FIRM MOIST TO WET BROWN AND GRAY SILTY CLAY WITH SAND - ALLUVIUM	1078
40	FIRM TAN SANDY SILTY CLAY - ALLUVIUM	1068
45		

SAMPLES IDENT	TYPE	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
SPT		4-3-6
SPT		7-12-14
SPT		4-6-5
SPT		2-3-2
SPT		3-3-3
SPT		3-3-3
SPT		1-2-2
SPT		1-1-1
SPT		0-0-1
SPT		3-7-8
SPT		4-3-4



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

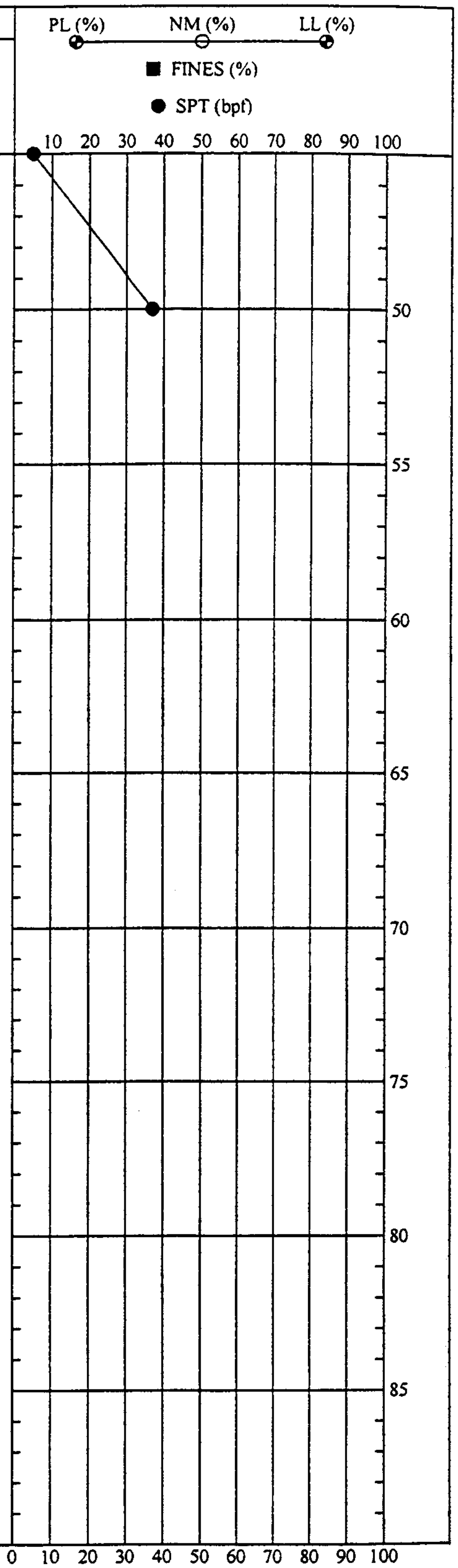
SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 3

PROJ. NO.: 50300-8-2075/024/800

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
45	FIRM TAN SANDY SILTY CLAY - ALLUVIUM		SPT		1-2-3
	HARD GRAY DECOMPOSED SHALE - RESIDUUM	1063			
50			SPT		6-14-23
	AUGER REFUSAL AT 52.1'	1057.7			
55					
60					
65					
70					
75					
80					
85					
90					



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

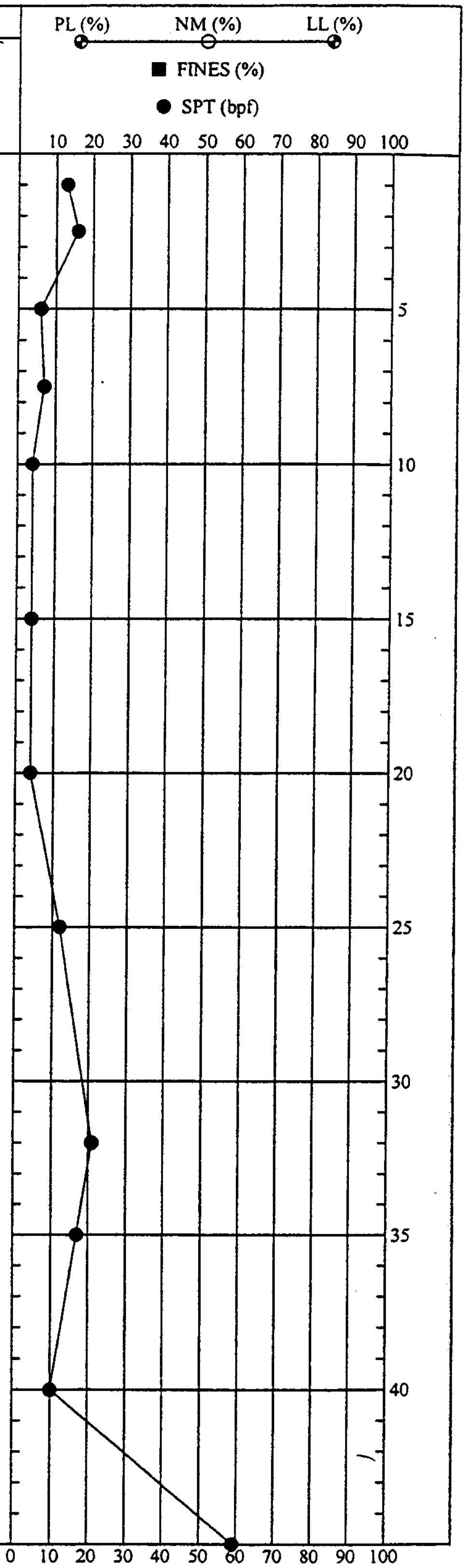
SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
0	STIFF, VERY STIFF, AND FIRM RED-BROWN AND TAN CLAYEY SILT WITH ROCK FRAGMENTS - FILL	1110.2
	SOFT BROWN AND RED-BROWN CLAYEY SILT WITH GRAY SILT (ASH) - FILL	1102
	SOFT BROWN AND GRAY SILTY CLAY WITH ROCK FRAGMENTS - FILL	
	SOFT BROWN AND GRAY SILTY CLAY WITH SAND - FILL	
	STIFF MOTTLED BROWN, GRAY, AND TAN SILTY CLAY WITH ASH AT BOTTOM OF SAMPLE - FILL	
	VERY STIFF MOTTLED BROWN AND TAN SILTY CLAY WITH SAND AND BLACK MOTTLING - ALLUVIUM	1083'
30	1080 ▼ Mudd	
	STIFF TO HARD WET BROWN SANDY SILTY CLAY - ALLUVIUM	
	VERY DENSE WET BROWN SAND WITH ROUNDED RIVER ROCK - ALLUVIUM	1068.
45		

SAMPLES

DEPTH (ft)	IDENT	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
	SPT	5-6-7
	SPT	5-7-9
5	SPT	2-3-3
	SPT	1-3-4
10	SPT	1-2-2
15	SPT	2-2-2
20	SPT	4-2-2
25	SPT	2-4-8
30	UD	0.0-2.0
	SPT	6-10-11
35	SPT	5-8-9
40	SPT	2-3-7



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1988 **BORING NO.:** B99- 4

PROJ. NO.: 50300-8-2075/024/800 **PAGE 1 OF 2**

LAW

LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ■ FINES (%) ● SPT (bpf)
45	VERY DENSE WET BROWN SAND WITH ROUNDED RIVER ROCK - ALLUVIUM			SPT		7-14-45	
	AUGER REFUSAL AT 47.6'		1662.6				

Depth scale: 45, 50, 55, 60, 65, 70, 75, 80, 85, 90

Plot scale: 0 10 20 30 40 50 60 70 80 90 100

SOIL. 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1988 **BORING NO.:** B99- 4

PROJ. NO.: 50300-8-2075/024/800

LAW
LAWGIBB Group Member

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 10, 1999 **BORING NO.:** B99- 5

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

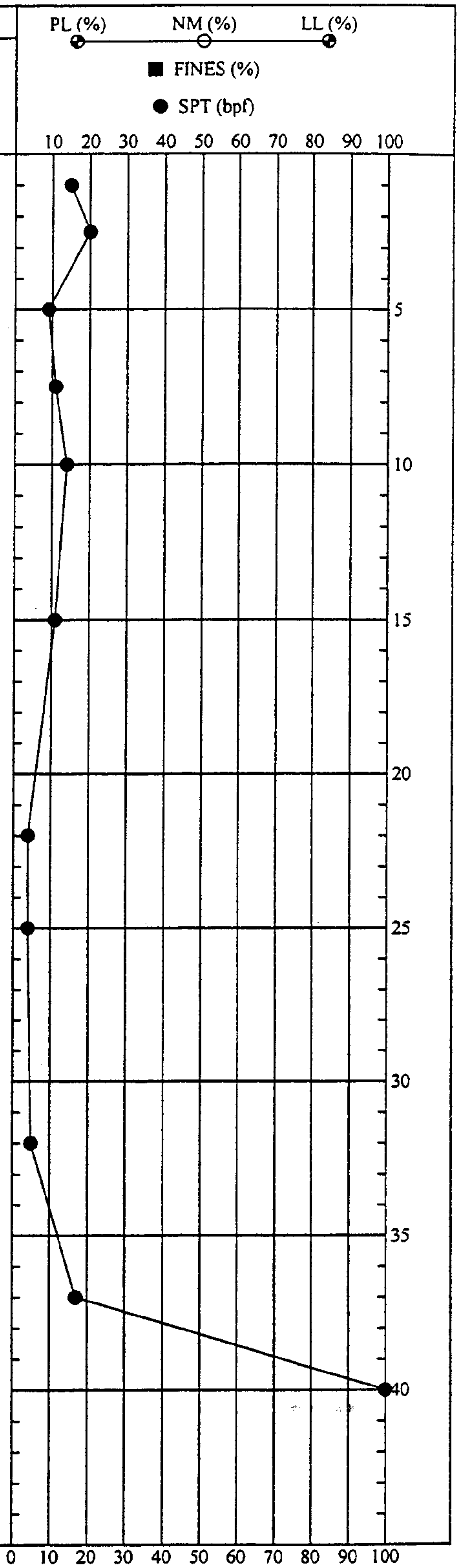
SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

Depth (ft)	Soil Classification and Remarks	Elev (ft)
0	VERY STIFF AND STIFF BROWN AND RED-BROWN CLAYEY SILT WITH ROCK FRAGMENTS AND GRAY SILT (ASH) - FILL	2110 (from b?to)
	STIFF BROWN AND RED-BROWN CLAYEY SILT WITH SAND, ROUNDED RIVER ROCKS, AND TRACE GRAY SILT (ASH) - FILL	1095
	STIFF BROWN CLAYEY SILT AND GRAY SILT (ASH) - FILL	
	SOFT WET BLACK COAL ASH WITH WOOD FRAGMENTS - FILL (water level ∇ 1060)	1084
	FIRM WET GRAY AND BLACK SILTY CLAY/CLAYEY SILT (ASH) WITH ROUNDED RIVER ROCKS - FILL	
	VERY STIFF WET MOTTLED BROWN AND GRAY SILTY CLAY (ASH) - FILL	
	HARD MOTTLED BROWN AND GRAY SILTY CLAY WITH DECOMPOSED GRAY SHALE - RESIDUUM	1065
	AUGER REFUSAL AT 43.1'	1057.9

SAMPLES

Ident	N-Count (1st 6" - 2nd 6" - 3rd 6")
SPT	5-6-9
SPT	7-8-12
SPT	2-5-4
SPT	2-6-5
SPT	2-6-8
SPT	2-6-5
UD	2.0-2.0
SPT	1-2-2
SPT	1-1-3
UD	0.0-2.0
SPT	0-0-5
UD	2.0-2.0
SPT	3-7-10
SPT	12-50/0.4



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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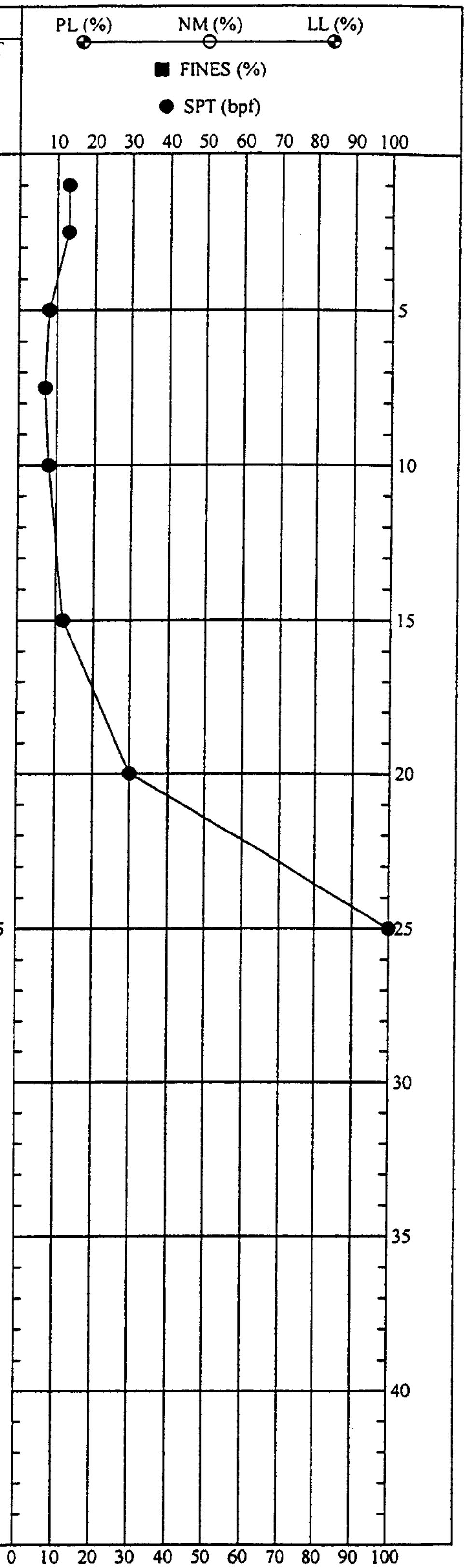
LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)
0	STIFF TO FIRM TAN CLAYEY SILT WITH ROCK FRAGMENTS AND TRACE AMOUNTS OF GRAY SILT (ASH) - FILL	1098
12	STIFF TO VERY STIFF BROWN SANDY CLAYEY SILT WITH TRACE GRAY SILT (ASH) AND ROUNDED RIVER ROCKS - FILL	1086
22	HARD WET BROWN SANDY SILT AND ROUNDED RIVER ROCKS - ALLUVIUM (NOTE: Shale fragments encountered at bottom of sample.) ∇ 1074	1076
26.5	AUGER REFUSAL AT 26.5'	1071.5

DEPTH (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
1	SPT		6-7-6
2.5	SPT		5-7-6
5	SPT		3-3-5
7.5	SPT		1-3-4
10	SPT		2-3-5
15	SPT		1-5-7
20	SPT		8-14-16
25	SPT		17-27-50/0.5



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

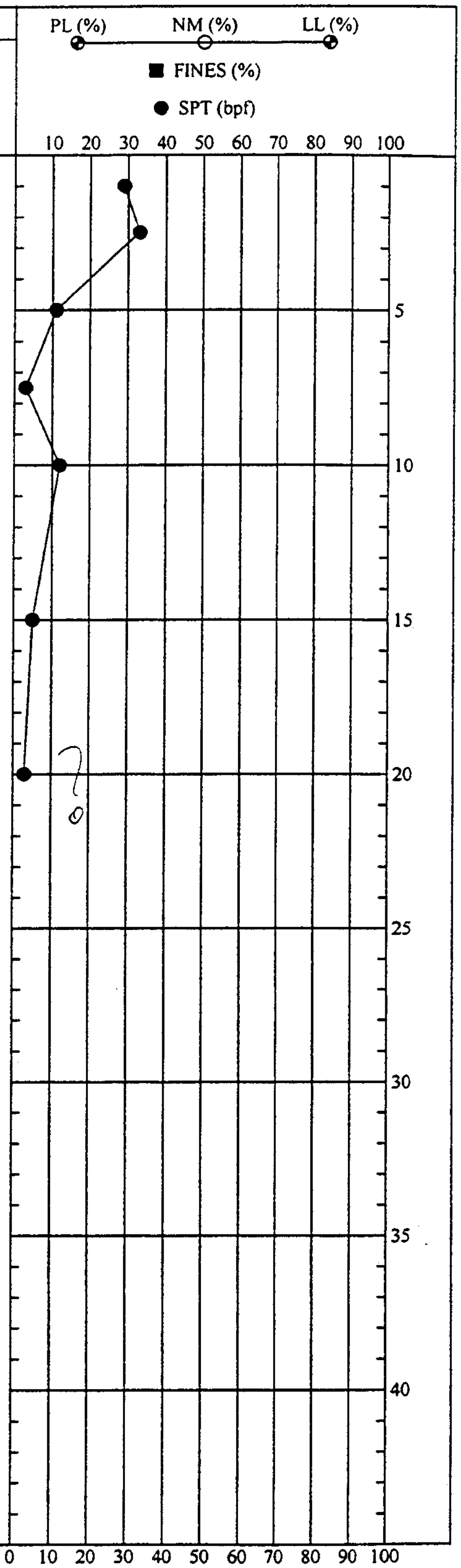
DRILLED: August 10, 1999 **BORING NO.:** B99- 6

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

SOIL TEST BORING RECORD

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	VERY STIFF TO HARD BROWN CLAYEY SILT, GRAY SILT (ASH), AND ROCK FRAGMENTS - FILL	1083.5	SPT		6-14-15
			SPT		10-18-15
	FIRM AND VERY SOFT BROWN CLAYEY SILT AND GRAY SILT (ASH) - FILL	1080			
5			SPT		4-7-4
			SPT		1-1-2
10	STIFF TO FIRM BROWN AND GRAY SILTY CLAY WITH SAND - ALLUVIUM	1073.5	SPT		1-4-8
15	FIRM GRAY SILTY CLAY WITH SAND AND DECOMPOSED SHALE - ALLUVIUM		SPT		1-2-3
	SOFT WET BROWN AND GRAY SILTY CLAY/CLAYEY SILT WITH SAND - ALLUVIUM				
20			SPT		0-0-3
22.2	AUGER REFUSAL AT 22.2'	1061.3			



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99- 7

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

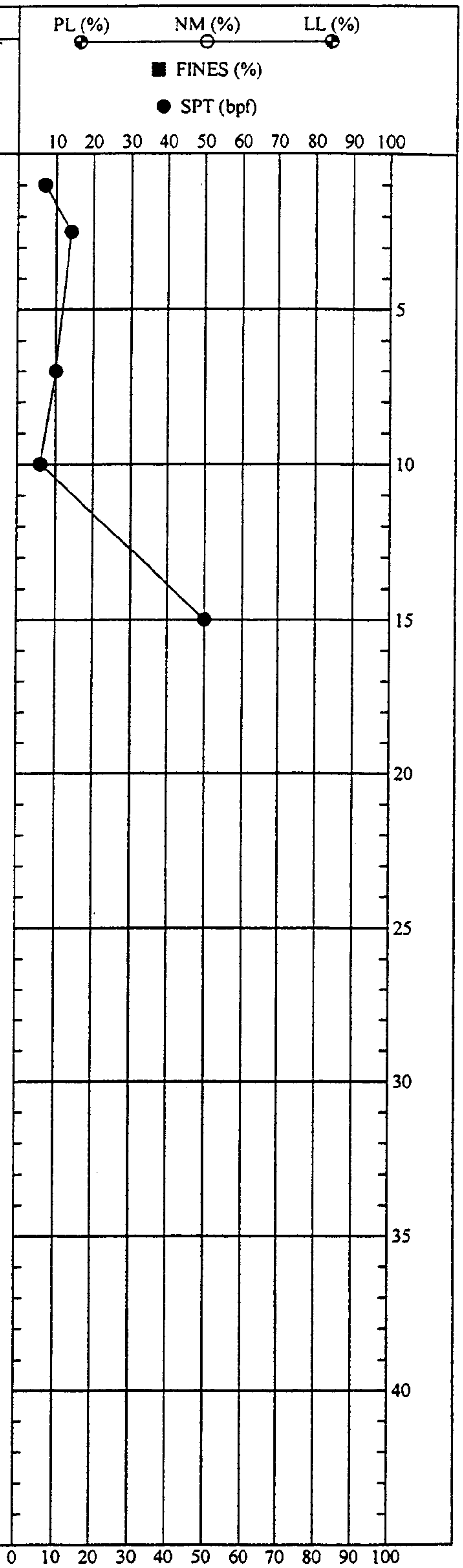
SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
0	FIRM GRAY SILT (ASH) - FILL	1076.2
	STIFF MOTTLED BROWN CLAYEY SILT AND GRAY SILT (ASH) - FILL	
5	STIFF BROWN SILTY CLAY AND GRAY SILT (ASH) WITH ORGANICS - FILL	
	FIRM MOTTLED BROWN AND GRAY SILTY CLAY - ALLUVIUM	1067.5
10		
	HARD BROWN AND GRAY SANDY SILTY CLAY WITH QUARTZITE AND ROCK FRAGMENTS - ALLUVIUM (NOTE: SPT value was probably amplified by rock fragments in the sample interval.)	1064.2
15		
	AUGER REFUSAL AT 17.5'	1058.7
20		
25		
30		
35		
40		
45		

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
SPT		1-3-4
SPT		5-5-9
UD		1.4-2.0
SPT		3-4-6
SPT		1-2-4
SPT		2-21-29



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99- 8

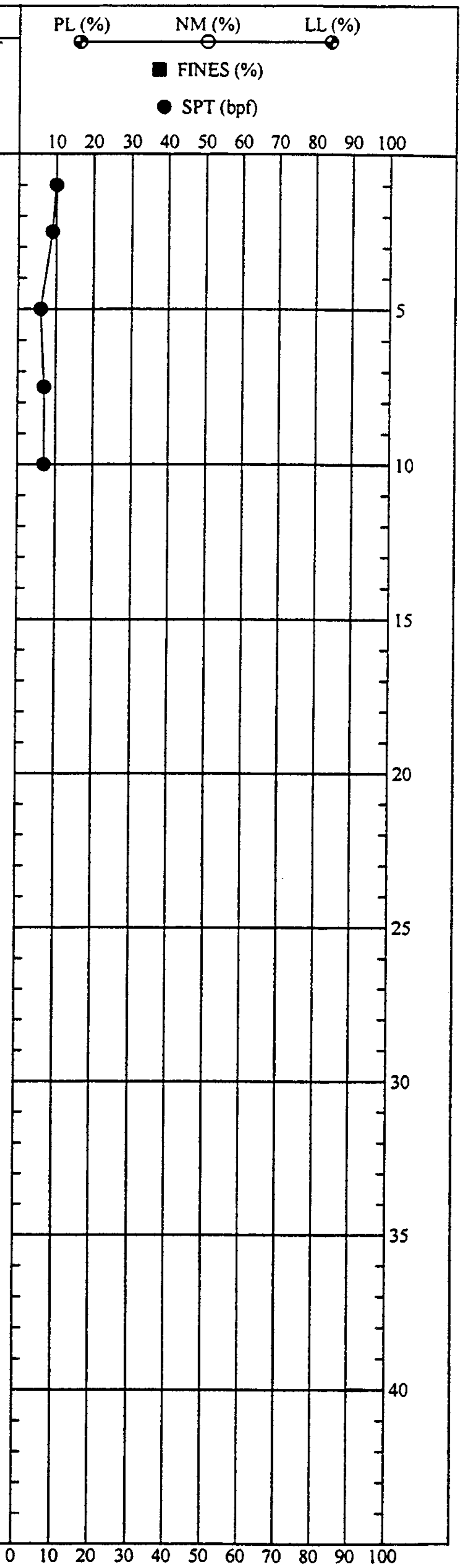
PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

SOIL CLASSIFICATION AND REMARKS

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6")
0	STIFF TO FIRM BROWN AND GRAY SILTY CLAY/CLAYEY SILT - ALLUVIUM		1073.8	SPT		4-5-5
				SPT		4-4-5
5				SPT		1-2-4
				SPT		1-3-4
10				SPT		2-3-4
	on cobble ?					
13.6	AUGER REFUSAL AT 13.6'		1060.2			



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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

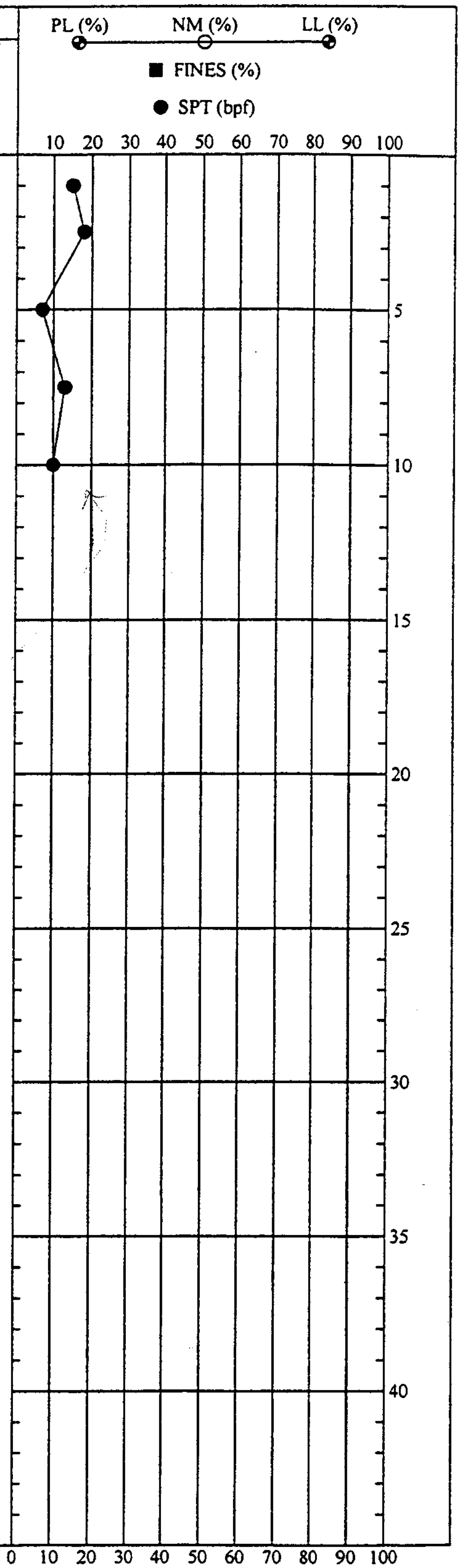
DRILLED: August 12, 1999 **BORING NO.:** B99- 9

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	STIFF BROWN CLAYEY SILT WITH GRAVEL - FILL	1679.3			
	VERY STIFF TO FIRM BROWN CLAYEY SILT WITH ROUNDED RIVER GRAVEL AND TRACE ORGANICS - ALLUVIUM	1677	SPT		5-8-7
			SPT		5-6-12
5			SPT		2-2-5
	STIFF MOIST BROWN, GRAY, AND RED-BROWN SANDY SILTY CLAY - ALLUVIUM ML	1673.3	SPT		3-4-9
10			SPT		3-4-6
13.5	AUGER REFUSAL AT 13.5'	1665.8			



REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION.

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-10

PROJ. NO.: 50300-8-2075/024/800 **PAGE 1 OF 1**

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")	PL (%) / NM (%) / LL (%) ■ FINES (%) ● SPT (bpf)
0	CRUSHED LIMESTONE						
				SPT		10-42-62	>● 100
2.2	AUGER REFUSAL AT 2.2'						

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45

Chart scale: 0 10 20 30 40 50 60 70 80 90 100

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION.

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SOIL TEST BORING RECORD

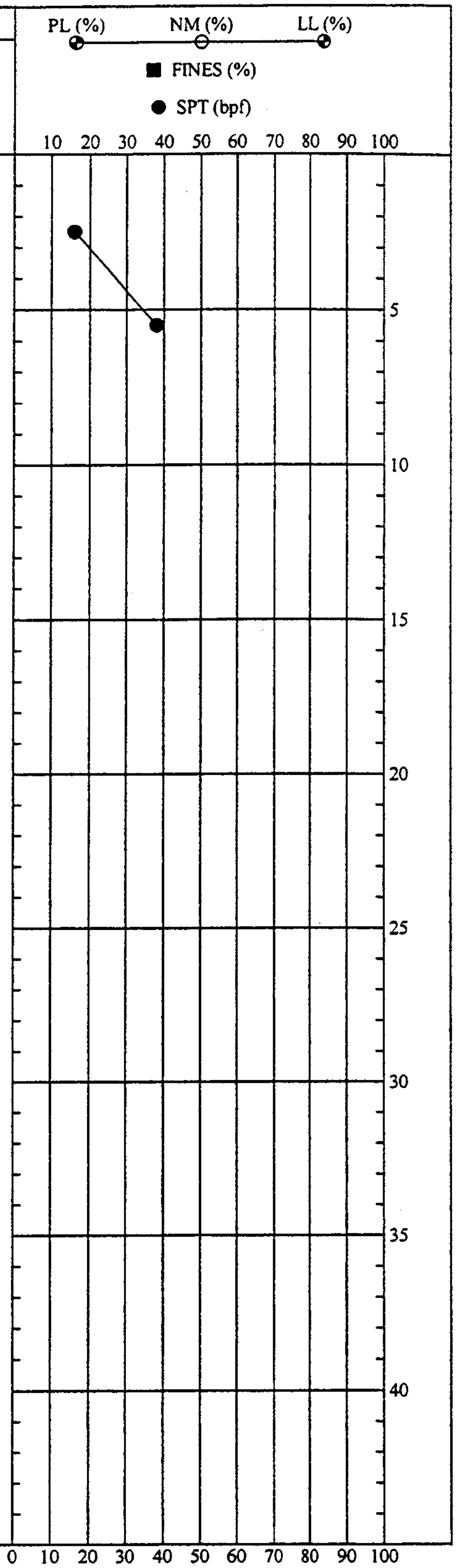
PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-11

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	CRUSHED LIMESTONE					
	VERY STIFF TO HARD MOTTLED BROWN, RED-BROWN, AND GRAY SILTY CLAY WITH SAND AND ROUNDED RIVER GRAVEL - FILL			SPT		5-7-9
5	AUGER REFUSAL AT 5.6'			SPT		5-21-17
10						
15						
20						
25						
30						
35						
40						
45						



SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER. NO GROUND WATER ENCOUNTERED AT TIME OF EXPLORATION. OFFSET 60.0' TOWARDS B-10. B99-10?

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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-11A

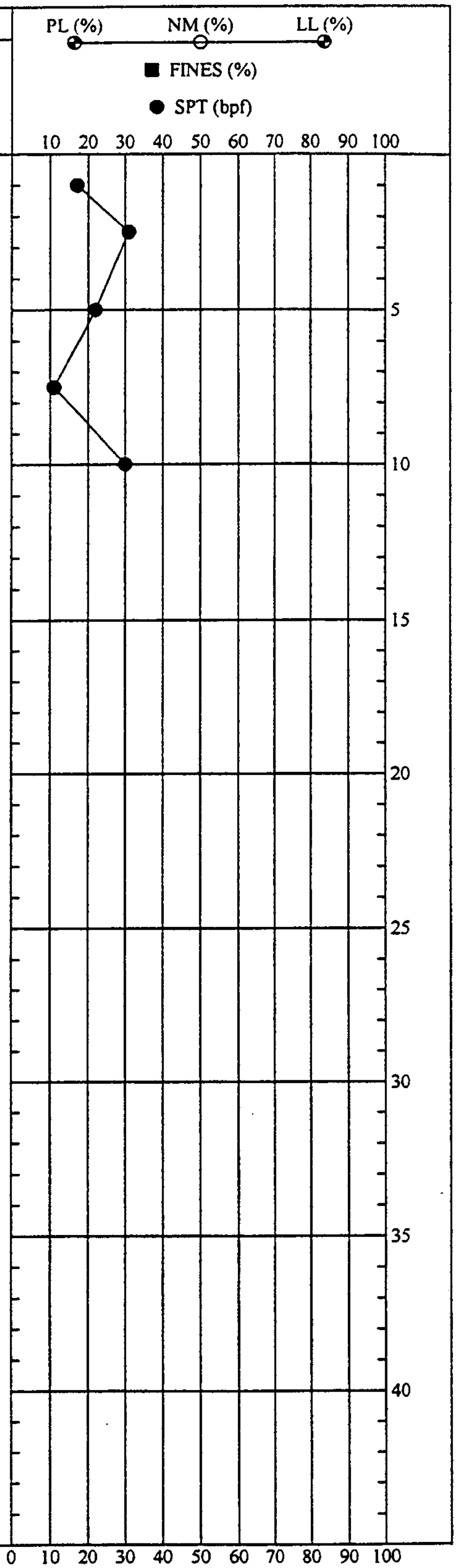
PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

SOIL TEST BORING RECORD

SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	IDENT	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
0	VERY STIFF AND HARD BROWN SILTY CLAY/CLAYEY SILT WITH ROCK FRAGMENTS, BLACK MOTTLING, AND TRACE ORGANICS - FILL	1081.6	SPT	5-9-8
			SPT	6-14-17
5			SPT	5-10-12
6	FIRM MOIST BROWN TO RED-BROWN SILTY SAND WITH TRACE GRAY SILT - ALLUVIUM	1075.6	SPT	4-6-5
8.5	DENSE WET BROWN SAND WITH ROUNDED RIVER GRAVEL - ALLUVIUM ▽			
10			SPT	6-10-20
11.1	AUGER REFUSAL AT 11.1'	1070.5		



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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

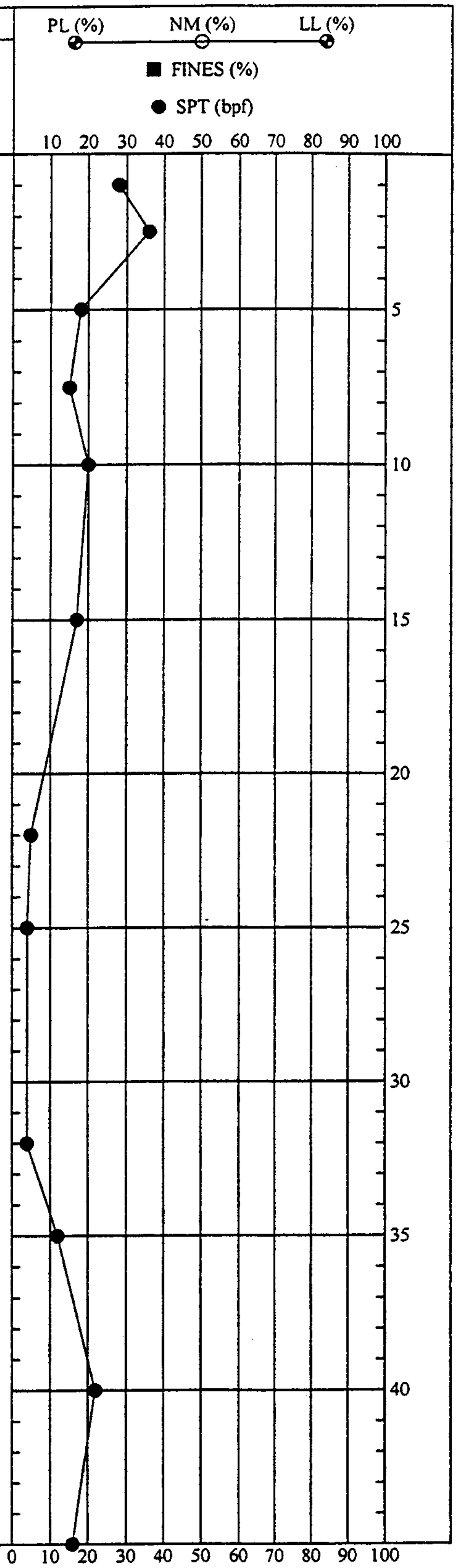
DRILLED: August 12, 1999 **BORING NO.:** B99-12

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 1

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS (SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.)	ELEV (ft)	SAMPLES IDENT	N-COUNT (1st 6" - 2nd 6" - 3rd 6")
0	VERY STIFF TO HARD BROWN CLAYEY SILT WITH CRUSHED LIMESTONE AND ROUNDED RIVER ROCKS - FILL	1116.5	SPT	10-14-14
			SPT	20-17-19
	VERY STIFF TO STIFF BROWN AND GRAY CLAYEY SILT WITH ROCK FRAGMENTS - FILL			
5			SPT	5-6-12
			SPT	6-8-7
	VERY STIFF BROWN AND GRAY CLAYEY SILT WITH ASH AND COAL FRAGMENTS AND ROUNDED RIVER GRAVEL - FILL			
10			SPT	3-9-11
15	VERY STIFF GRAY SILT (ASH) WITH COAL FRAGMENTS - FILL		SPT	1-8-9
	FIRM TO SOFT BROWN SILTY CLAY AND GRAY SILT (ASH) - FILL	1099.5		
20			UD	2.0-2.0
			SPT	3-2-3
25			SPT	1-2-2
	SOFT WET GRAY SILT (ASH) - FILL			
30			UD	2.0-2.0
			SPT	1-2-2
	STIFF GRAY SILTY CLAY/CLAYEY SILT WITH SMALL ROOTS AND ORGANICS - FILL			
35			SPT	3-4-8
	VERY STIFF MOTTLED BROWN AND GRAY SILTY CLAY/CLAYEY SILT WITH BLACK STAINING - ALLUVIUM	1079.5		
40			SPT	3-8-14
45				



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SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-13

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 1 **OF** 2

LAW
LAWGIBB Group Member

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SYMBOL SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
45	VERY STIFF MOTTLED BROWN AND GRAY SILTY CLAY/CLAYEY SILT WITH BLACK STAINING - ALLUVIUM			SPT		2-7-9
	AUGER REFUSAL AT 48.8' on cobble ?		1067.7			
50						
55						
60						
65						
70						
75						
80						
85						
90						

PL (%) — NM (%) — LL (%)

■ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100

SOIL 9207524.GPJ LAW_GIBB.GDT 9/29/99

REMARKS: STANDARD PENETRATION RESISTANCE TESTING PERFORMED USING AN AUTOMATIC HAMMER.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

PROJECT: JOHN SEVIER

DRILLED: August 12, 1999 **BORING NO.:** B99-13

PROJ. NO.: 50300-8-2075/024/800 **PAGE** 2 **OF** 2

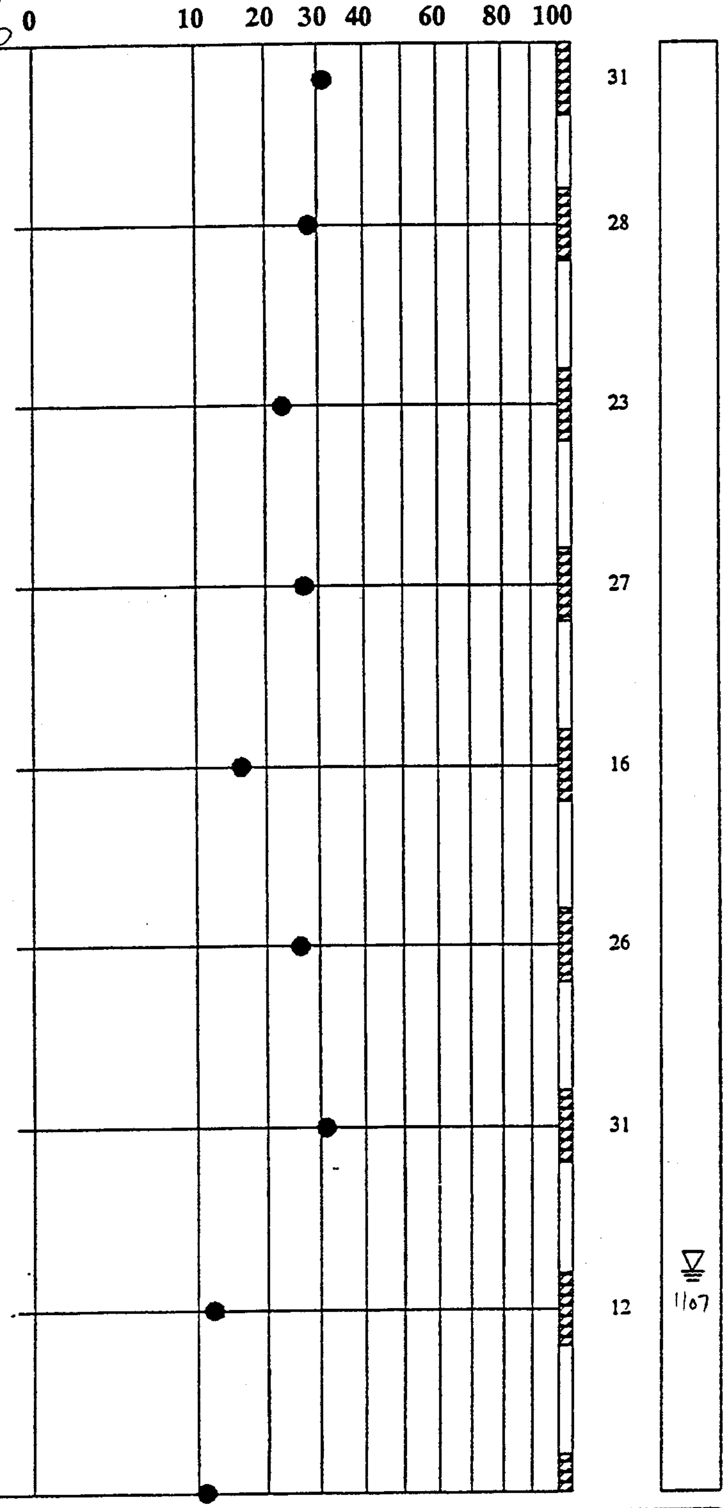
LAW
LAWGIBB Group Member

BORING LOGS 94-1 THROUGH 94-4

Drilled By Law Engineering - August 1994

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	DARK GRAY ASH; SANDY SILTY TEXTURE - FILL	1141.0
34.0	DARK GRAY ASH; SANDY SILTY TEXTURE; WET - FILL	1167
40.0		

● PENETRATION - BLOWS/FOOT



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-1
DATE DRILLED	August 22, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
	DARK GRAY ASH; SANDY SILT TEXTURE; WET - FILL	
49.0	BROWN AND GRAY SILTY CLAY - ALLUVIUM	1092
54.0	VERY STIFF TO VERY HARD BROWN AND TAN SILTY CLAY; VERY MOIST - RESIDUUM	1087
66.0	VERY HARD BROWN AND GRAY WEATHERED SHALE - RESIDUUM (The sample possessed the relict structure of the underlying parent bedrock.)	1075
70.7	AUGER REFUSAL	1070.3

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

	11
	15
	14
	16
	12
	176/0.8
	100/0.3

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

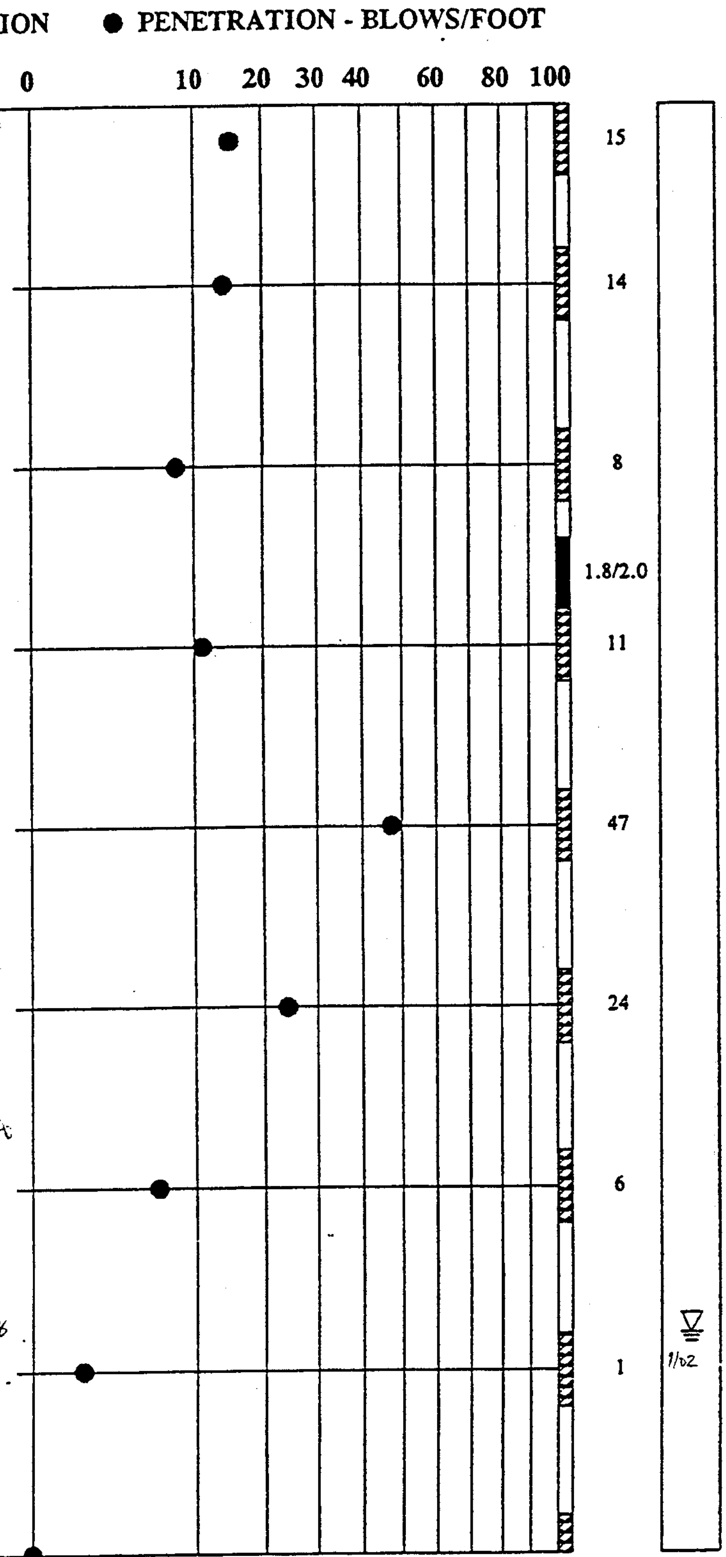
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-1
DATE DRILLED	August 22, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	DARK GRAY ASH; SANDY SILT TEXTURE - FILL	1136.8
14.0	LIGHT GRAY ASH; SILT SIZE - FILL	1122.8
29.0	DARK GRAY ASH; SANDY SILT TEXTURE - FILL	1107.8
34.0	GRAY ASH; SANDY SILT; VERY WET - FILL	1102.8
40.0		



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-2
DATE DRILLED	August 23, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
	GRAY ASH; SANDY SILT; VERY WET - FILL	
59.0	VERY STIFF LIGHT BROWN SILTY CLAY - ALLUVIUM (OR FILL)	1077.78
64.0	STIFF TO HARD BROWN SANDY SILTY CLAY - ALLUVIUM	1072.78
74.0	VERY HARD GRAY WEATHERED SHALE - RESIDUUM	1062.78
76.2	AUGER REFUSAL	1060.6

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

Blows/Foot
0
2
1
2
17
10
36
92

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

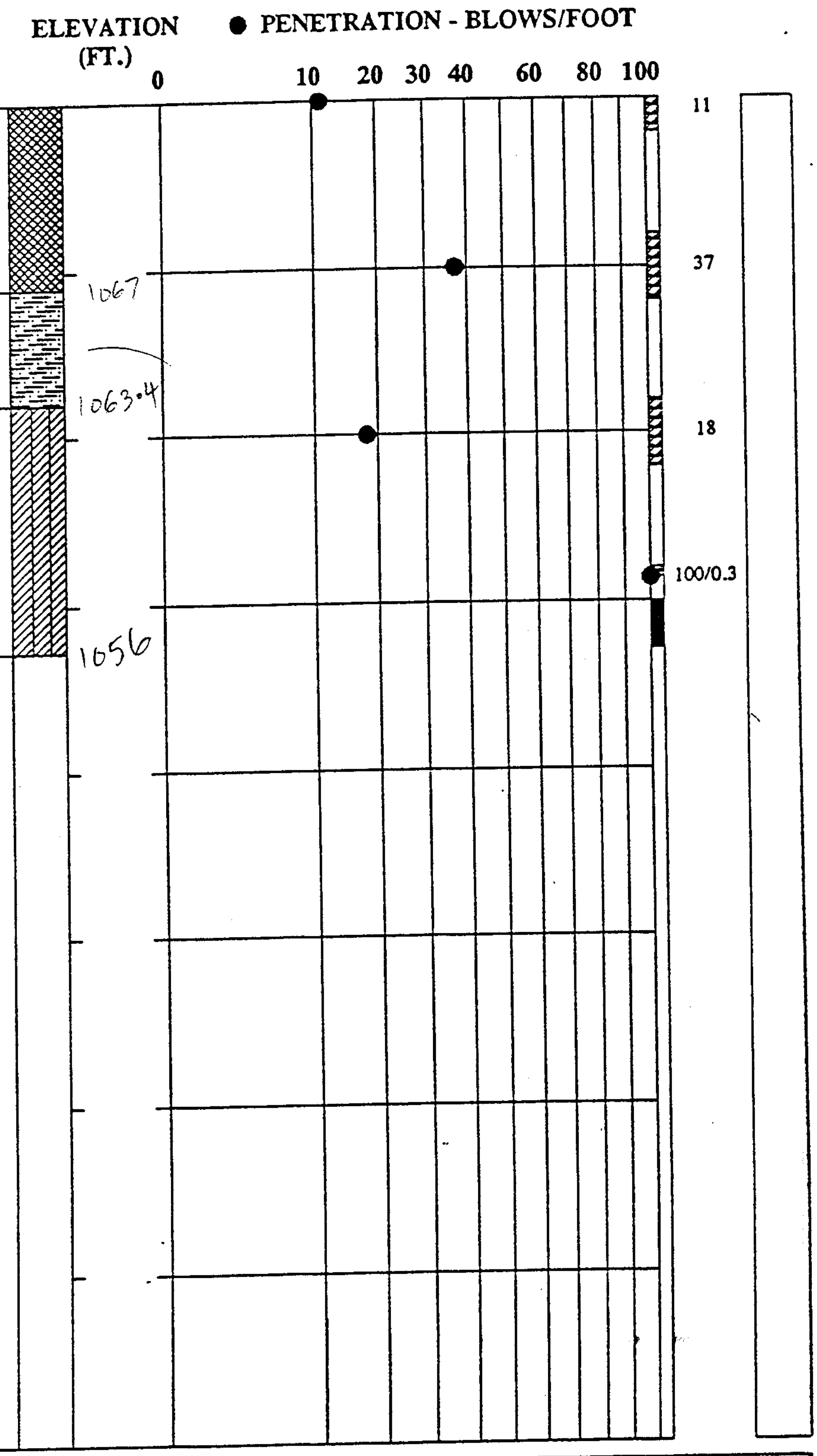
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-2
DATE DRILLED	August 23, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 2 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
	BROWN AND GRAY SANDY SILTY CLAY - FILL (OR ALLUVIUM)
45.5	BROWN AND GRAY SILTY CLAYEY SAND - ALLUVIUM
49.0	GRAY AND BROWN WEATHERED SHALE - RESIDUUM
56.4	AUGER REFUSAL



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

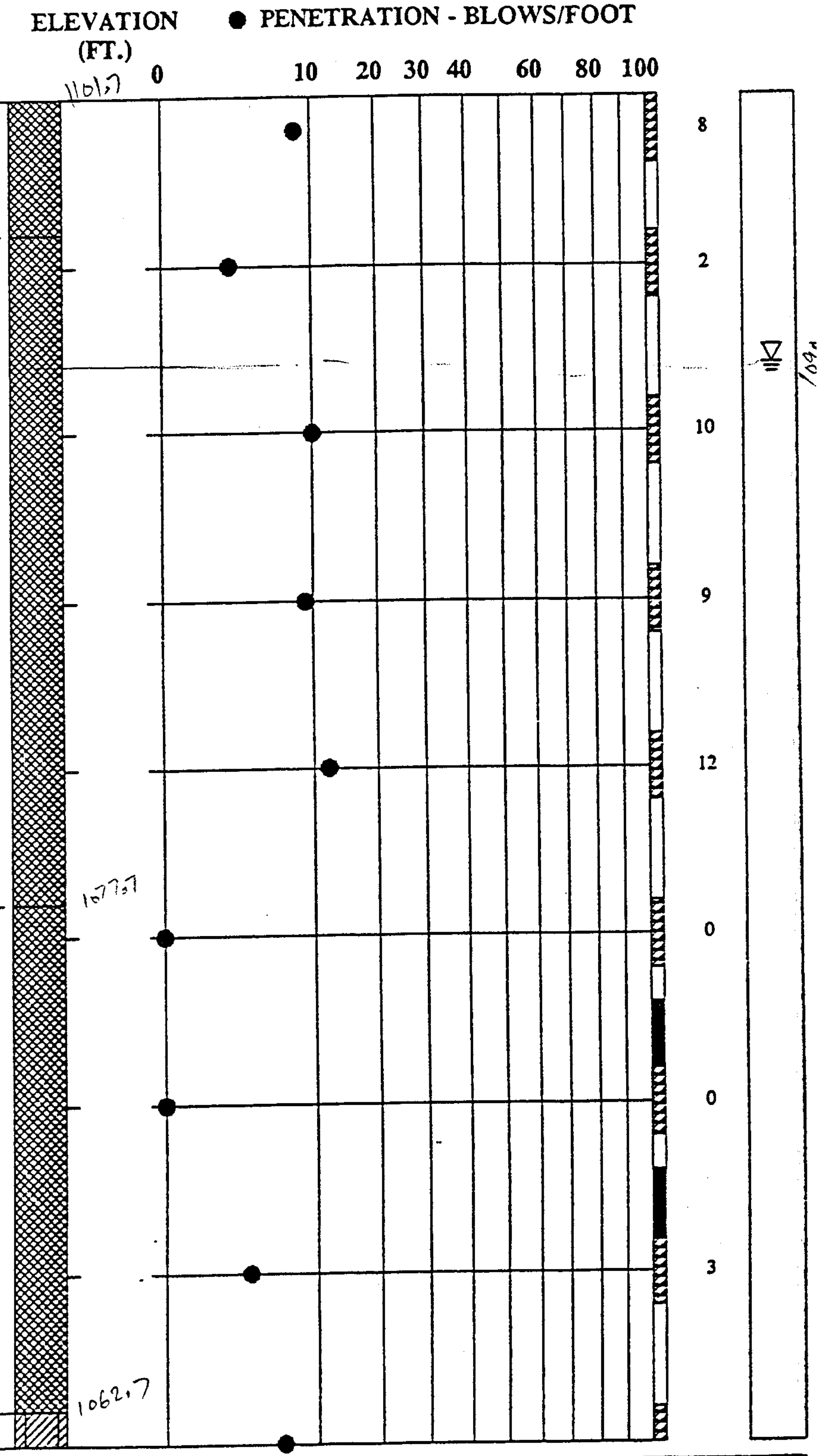
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER 94-3
DATE DRILLED August 18, 1994
PROJECT NUMBER 385 94467 01
PROJECT John Sevier Fossil Fuel Ash Pile
PAGE 2 OF 2

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	RED-BROWN SILTY CLAY WITH GRAVEL - FILL
4.0	RED-BROWN SANDY SILTY CLAY - FILL
24.0	GRAY ASH; SANDY SILT TEXTURE - FILL
39.0	



REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-4
DATE DRILLED	August 19, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile
PAGE 1 OF 2	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	● PENETRATION - BLOWS/FOOT
	FIRM TO VERY HARD BROWN AND GRAY WEATHERED SHALE - RESIDUUM		6
43.6		1058.1	100/0.4
	AUGER REFUSAL		

Penetration scale: 0, 10, 20, 30, 40, 60, 80, 100

REMARKS:

TOPOGRAPHIC DATA WAS NOT AVAILABLE AT THE TIME OF THE EXPLORATION.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE

TEST BORING RECORD

BORING NUMBER	94-4
DATE DRILLED	August 19, 1994
PROJECT NUMBER	385 94467 01
PROJECT	John Sevier Fossil Fuel Ash Pile

LAW ENGINEERING

BORING LOGS 15 AND 21

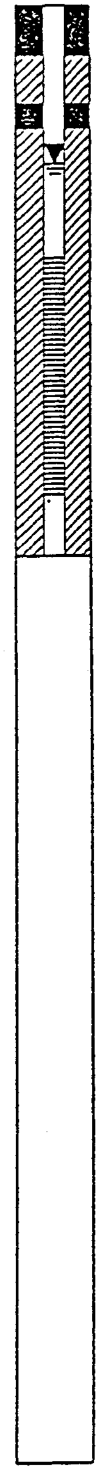
Drilled By Law Engineering - December 1991

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	SILT AND CLAY	1102.8
21.0	SHALE	
22.7	REFUSAL AT 22.7 FEET	

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

Elevation scale: 1102.8, 1097.8, 1092.8, 1087.8, 1082.8, 1077.8, 1072.8, 1067.8, 1062.8, 1057.8, 1052.8, 1047.8



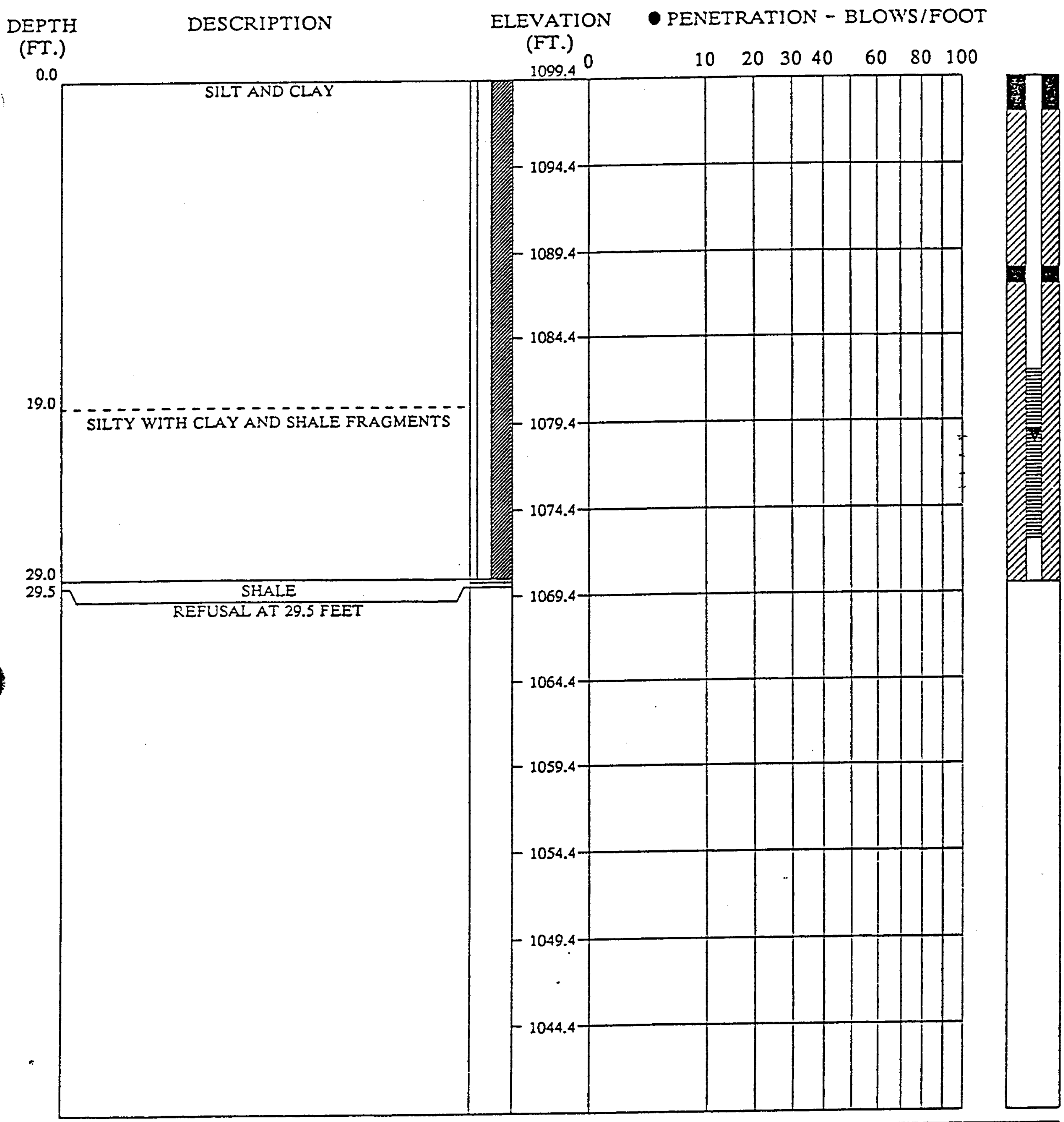
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	15
DATE DRILLED	December 14, 1991
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING



REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	21
DATE DRILLED	December 15, 1991
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT

PAGE 1 OF 1

LAW ENGINEERING

BORING LOGS PZ-1 THROUGH PZ-5

Drilled in October/November 1986

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	FILL - GRAVEL AND CLAY	1121.7
5.0	CLAY	1116.7
8.0	CLAY AND SILT	
10.0	CLAY	1111.7
13.0	GRAVEL AND CLAY	1106.7
20.0	REFUSAL AT 20.0 FEET	1101.7
		1096.7
		1091.7
		1086.7
		1081.7
		1076.7
		1071.7
		1066.7

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF
SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

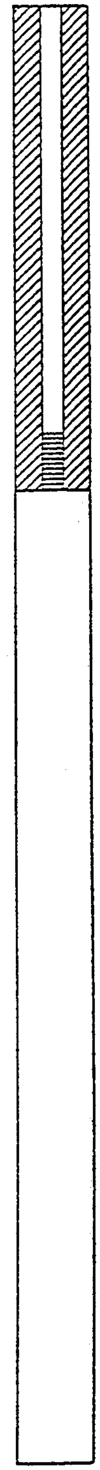
BORING NUMBER PZ-1
DATE DRILLED November 5, 1986
PROJECT NUMBER 57401440.01
PROJECT JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	FILL - GRAVEL AND CLAY
6.0	SILT AND CLAY
8.0	GRAVEL AND CLAY
20.0	REFUSAL AT 20.0 FEET

ELEVATION (FT.): 1121.7, 1116.7, 1111.7, 1106.7, 1101.7, 1096.7, 1091.7, 1086.7, 1081.7, 1076.7, 1071.7, 1066.7

● PENETRATION - BLOWS/FOOT: 0, 10, 20, 30, 40, 60, 80, 100



REMARKS:

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

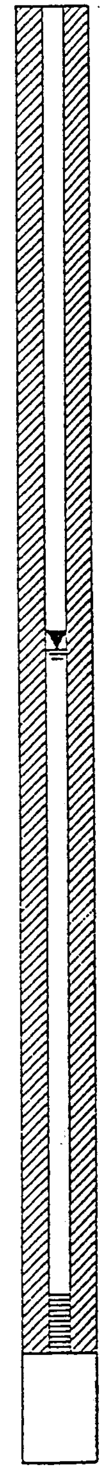
BORING NUMBER	PZ-1B
DATE DRILLED	November 5, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION
0.0	ASH
38.0	GRAVEL, SILT AND CLAY
39.0	CLAY
42.0	FINE SANDY SILT
48.0	NO RECOVERY
55.5	REFUSAL AT 55.5 FEET

ELEVATION (FT.): 1113.8, 1108.8, 1103.8, 1098.8, 1093.8, 1088.8, 1083.8, 1078.8, 1073.8, 1068.8, 1063.8, 1058.8

● PENETRATION - BLOWS/FOOT: 0, 10, 20, 30, 40, 60, 80, 100



REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-2A
DATE DRILLED	November 3, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	ASH	1114.3
		1109.3
		1104.3
		1099.3
		1094.3
		1089.3
		1084.3
		1079.3
38.0	CLAY	
40.5	REFUSAL AT 40.5 FEET	1074.3
		1069.3
		1064.3
		1059.3

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

REMARKS:

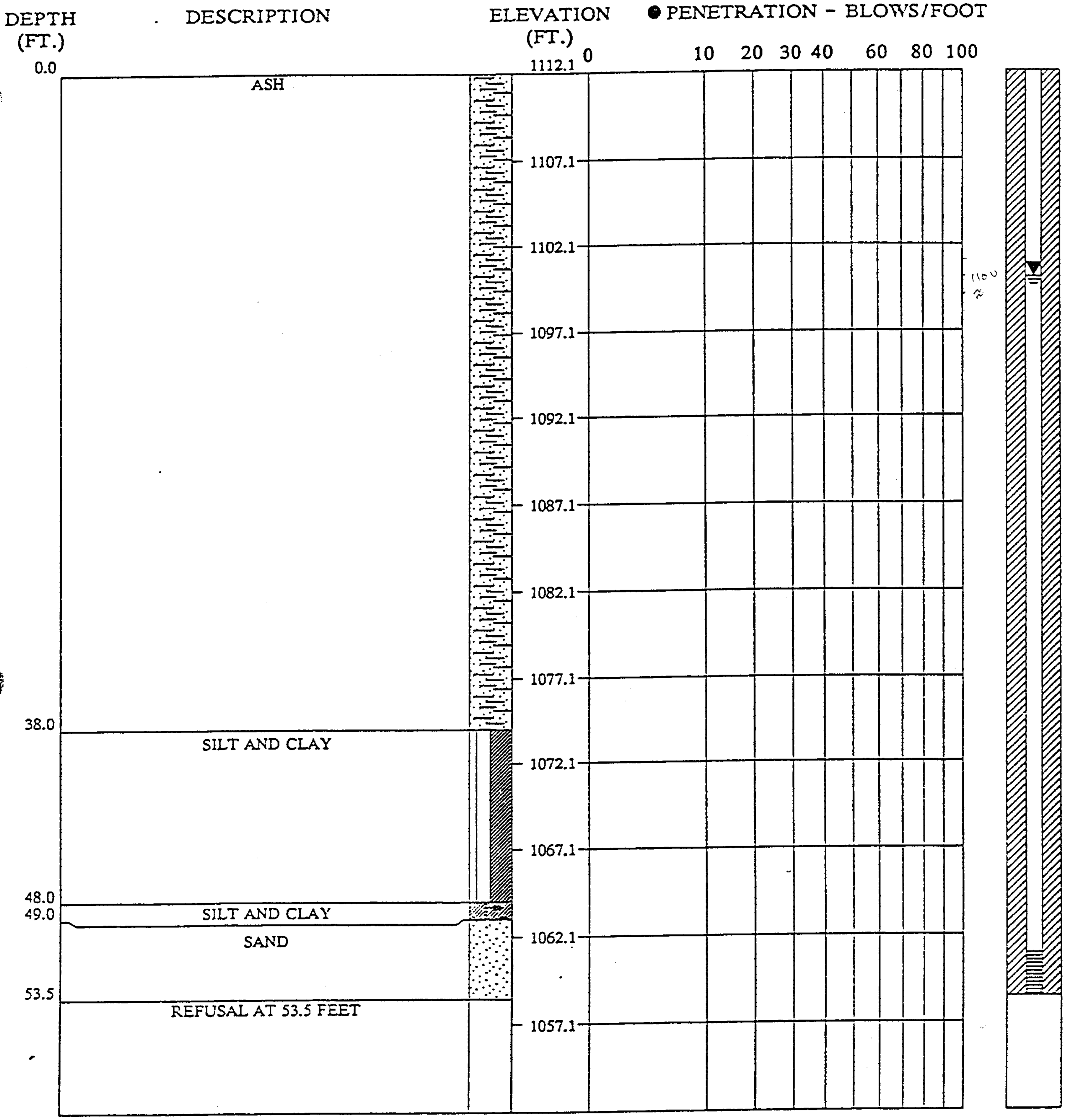
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-2B
DATE DRILLED	November 3, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING



REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF
SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-3A
DATE DRILLED	October 31, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	ASH	1112.4
38.0	SILT AND CLAY	
40.5	REFUSAL AT 40.5 FEET	

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

ELEVATION (FT.): 1112.4, 1107.4, 1102.4, 1097.4, 1092.4, 1087.4, 1082.4, 1077.4, 1072.4, 1067.4, 1062.4, 1057.4

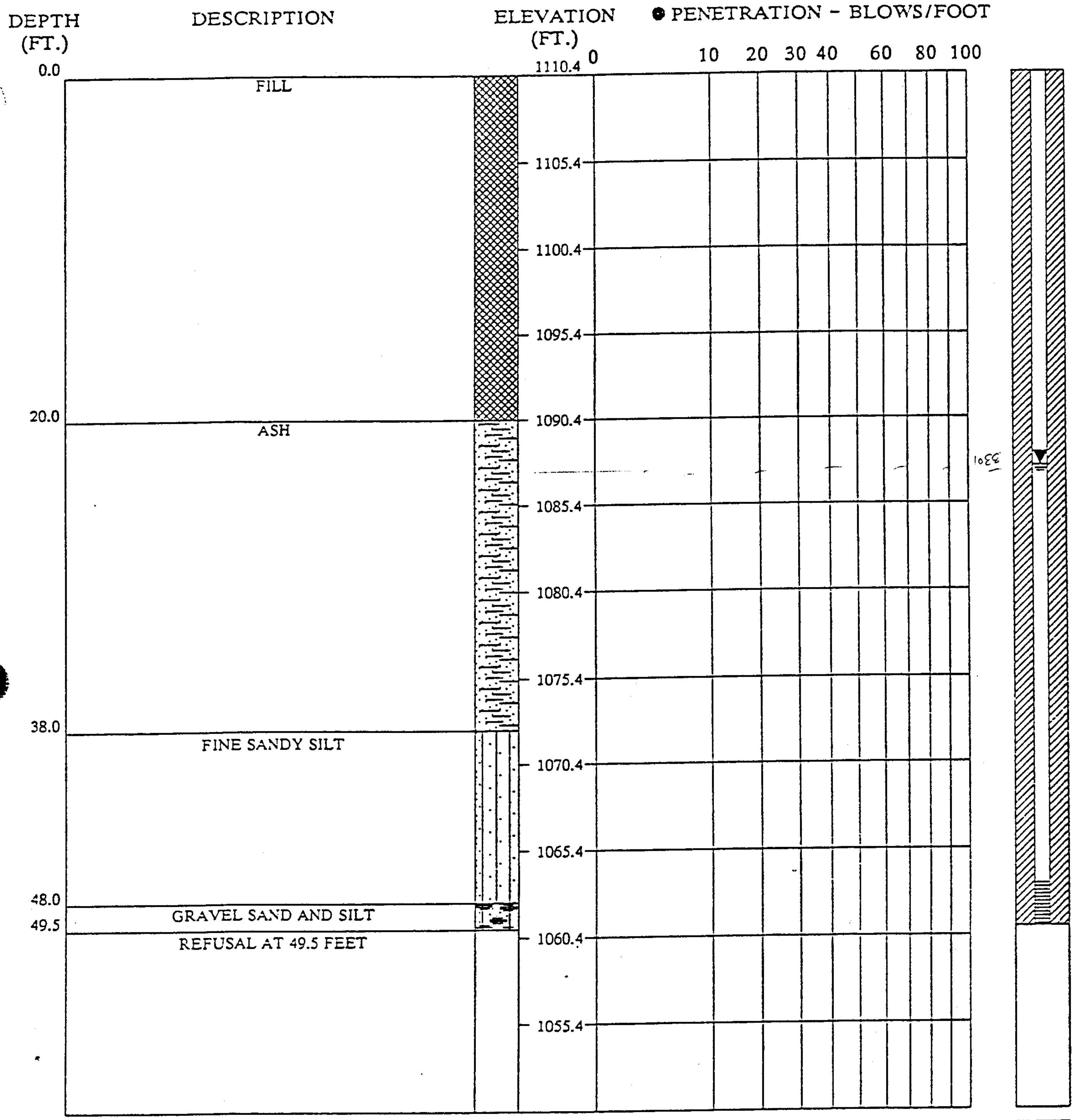
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-3B
DATE DRILLED	October 31, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING



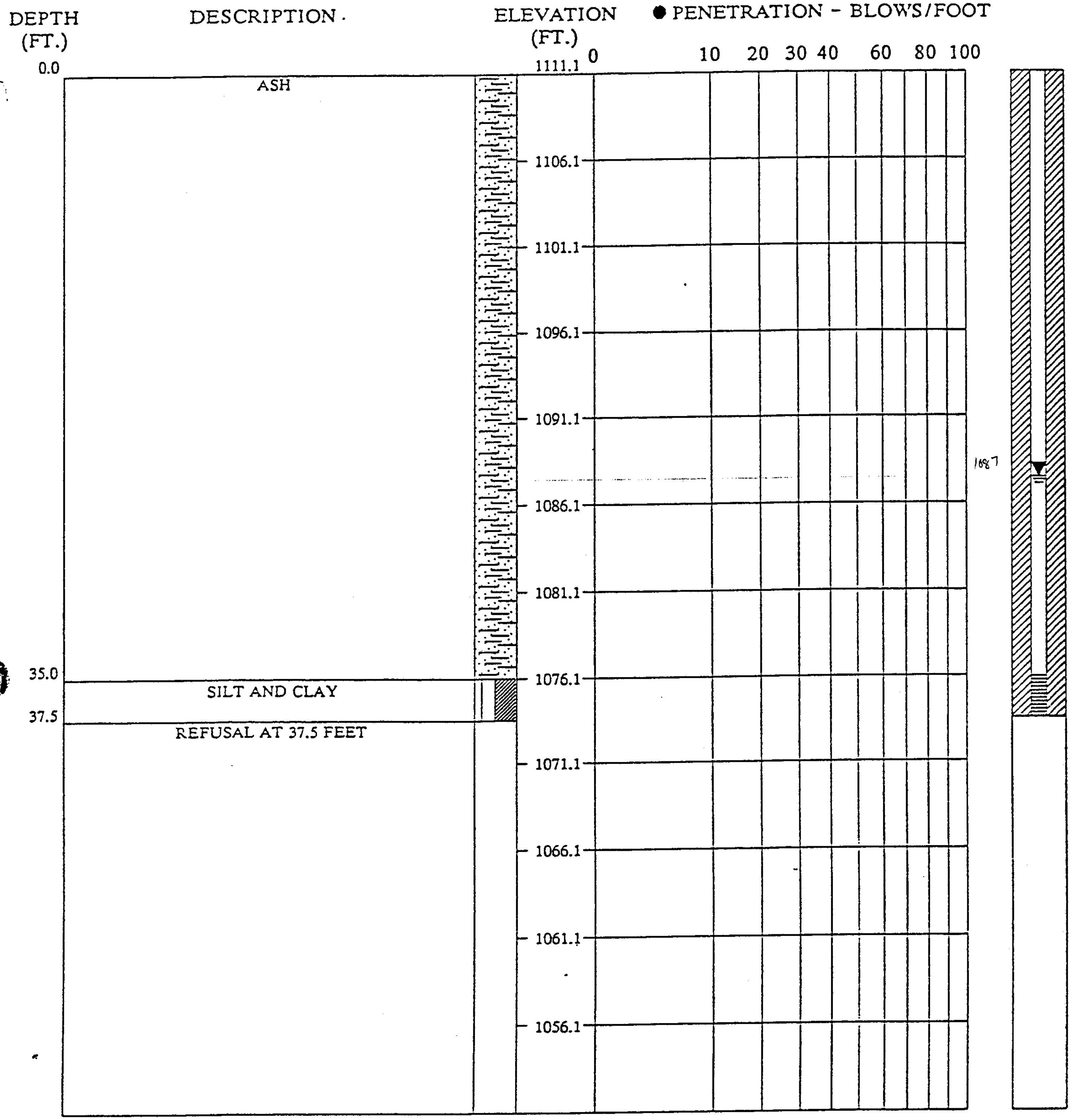
REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF
SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-4A
DATE DRILLED	November 3, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING



REMARKS:
GROUNDWATER MEASURED ON 6-13-91.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-4B
DATE DRILLED	November 5, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	ASH	1098.3
19.0	SILT AND CLAY	
23.5	REFUSAL AT 23.5 FEET	

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

ELEVATION (FT.): 1098.3, 1093.3, 1088.3, 1083.3, 1078.3, 1073.3, 1068.3, 1063.3, 1058.3, 1053.3, 1048.3, 1043.3

REMARKS:
UNDERWATER

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-5A
DATE DRILLED	October 28, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)
0.0	ASH	1099.0
		1094.0
		1089.0
15.0	NO RECOVERY	1084.0
19.0	SILT AND CLAY	
21.0	NO RECOVERY	1079.0
23.0	BORING TERMINATED AT 23.0 FEET	
		1074.0
		1069.0
		1064.0
		1059.0
		1054.0
		1049.0
		1044.0

● PENETRATION - BLOWS/FOOT

0 10 20 30 40 60 80 100

REMARKS:
UNDERWATER

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVATIONS USED ABOVE

AUGER BORING RECORD

BORING NUMBER	PZ-5B
DATE DRILLED	October 28, 1986
PROJECT NUMBER	57401440.01
PROJECT	JOHN SEVIER FOSSIL PLANT
PAGE 1 OF 1	

LAW ENGINEERING

GROUNDWATER LEVEL MEASUREMENTS - JOHN SEVIER FOSSIL PLANT

Date: 8/4/99	Measured By: R.W. Sims	Instrument:: Test Well Instrument Co. SST Series			Start Time: (CST) 630		End Time: (CST) 0805	
Location Identifier (P84068)	Reference Point Description	Ref Point Elev (m)	Dist to Wtr Surface (m) (4195)	Calc Water Surf El (m) (4189)	Bottom Depth (m) (4194)	Bottom Depth (ft)	Remarks	Calc. water Surf El. (ft).
Well 1	Top of 102mm casing	349.04	4.56	344.48	#VALUE!			
Well 3	Top of 102mm casing	348.01	11.64	336.37	#VALUE!			
PZ2A	Top of 51mm casing	340.25	12.46	327.79	#VALUE!			1075.2
PZ2B	Top of 51mm casing	340.41	11.74	328.67	#VALUE!			1078.0
PZ3A	Top of 51mm casing	339.73	9.28	330.45				
PZ3B	Top of 51mm casing	339.82	9.14	330.68				
PZ4A	Top of 51mm casing	339.22	9.70	329.52				1080.8
PZ4B	Top of 51mm casing	339.41	9.58	329.83	#VALUE!			1081.8
PZ 6	Top of casing	328.96	2.40	326.56	#VALUE!			1071.1
PZ 7	Top of casing	328.54	2.69	325.85	#VALUE!			
PZ 8	Top of casing	346.9	10.82	336.08	#VALUE!			1102.3
PZ 9	Top of casing	350.07	14.88	335.19	#VALUE!			1099.4
Well 21	Top of 51mm casing	335.87	8.28	327.59	#VALUE!			1074.5 ft
Well 24	Top of 51mm casing	346.3	7.72	338.58	#VALUE!			
Well 25	Top of 102 mm casing	346.54	11.89	334.65	#VALUE!			
Well 28	Top of casing	331.54	5.76	325.78	#VALUE!			1068.8
Well 29	Top of casing	328.71	3.96	324.75				1065.18
Well 30	Top of casing	328.99	1.72	327.27				
TW 30	Top of casing	339.92	9.26	330.66	#VALUE!			
Well 31	Top of casing	330.59	3.13	327.46				1074.1 ft
Well 32	Top of casing	336.48	5.79	330.69				1084.7 ft

Distribution: Field book; Office book; Data Management HB 2A-C; Denver Bennett JSF 1A-RGT; Mark Boggs LAB 1A-N; Andy Danzig PSC 1E- C

File: S: DLB: JSFMASTERGROUNDWATERFIELDSHT

TABLE 1. 1991 GROUNDWATER ELEVATIONS AT JOHN SEVIER FOSSIL PLANT

WELL No.	GROUNDWATER ELEV. (ft-msl) 3/26/91	GROUNDWATER ELEV. (ft-msl) 4/29/91	GROUNDWATER ELEV. (ft-msl) 5/23-24/91	GROUNDWATER ELEV. (ft-msl) 6/13/91	GROUNDWATER ELEV. (ft-msl) 6/26/91
3	1133	1133.03	1132.45	1132.37	1132.10
4	1127.62	1126.36	1125.12	1125.76	1125.20
5	1103.58	1102.87	1102.97	1102.80	1102.57
PZ1	1110.50	ND	1109.38	1109.95	1109.28
PZ2A	1086.62	ND	1086.70	1087.22	1087.32
PZ2B	1096.49	ND	1096.08	1096.19	1096.47
PZ3A	1100.00	ND	1099.97	1100.19	1100.27
PZ3B	1100.46	ND	1100.35	1100.34	1100.45
PZ4A	1087.20	ND	1087.20	1087.54	1087.43
PZ4B	1087.65	ND	1087.43	1087.56	1087.43
PZ5A	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER
PZ5B	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER	UNDERWATER
15	1092.50	1092.74	1092.66	1092.58	1092.80
16	1116.63	1116.06	1115.43	1115.06	1114.60
17	1068.96	ND	ND	1070.36	1070.26
18	1096.52	1093.40	1093.22	1094.19	1093.37
19	1097.63	1098.69	1097.93	1097.43	1097.49
20	1118.97	1118.79	1118.97	1118.66	1119.25
21	ND	ND	ND	1077.95	1077.73
22	ND	ND	1077.60	1077.60	1078.30
23	ND	ND	1120.30	1120.60	1119.65
RP#1	ND	ND	1094.14	1093.30	1093.85
RP#2	ND	ND	1111.77	1111.53	1111.09
RP#3	ND	ND	1068.62	1071.30	1071.34

RP#1 - COAL YARD DRAINAGE BASIN
RP#2 - POLLY BRANCH
RP#3 - DODSON CREEK

WELL 5 IS IN THE DRY STACK AREA SO GROUND ELEVATION VARIES WITH TIME.

ND - NO DATA

APPENDIX C

Laboratory Test Procedures (LAW Eng.)

Laboratory test results (from 10/01/99 Law Eng. report)

LABORATORY TEST PROCEDURES

Atterberg Limits (PI)

Originally, the Atterberg Limits consisted of seven "limits of consistency" of fine-grained soils. In current engineering usage, the term usually refers only to the liquid limit (LL) and plastic limit (PL). The LL (between the liquid and plastic states) is the water content at which a trapezoidal groove of specified shape, cut in moist soil held in a special cup, is closed after 25 taps on a hard rubber plate. The PL (between plastic and semi-solid states) is the water content at which the soil crumbles when rolled into threads of 1/8 inch in diameter.

The LL has been found to be proportional to the compressibility of the normally consolidated soil. The PI is the calculated difference in water contents between the LL and the PL. Together the LL and PI are used to classify silts and clays according to the Unified Soil Classification System (ASTM D 2487). The PI is used to predict the potential for volume changes in confined soils beneath foundations or grade slabs. The LL, PL, and PI are determined in accordance with ASTM D 4318.

Moisture Content

The moisture content in a given mass of soil is the ratio, expressed as a percentage, of the weight of the water to the weight of the solid particles. This test was conducted in accordance with ASTM D 2216.

Grain Size Distribution

Grain Size Tests are performed to aid in determining the soil classification and the grain size distribution. The soil samples are prepared for testing according to ASTM D 421 (dry preparation) or ASTM D 2217 (wet preparation). If only the grain size distribution of soils coarser than a number 200 sieve (0.074-mm opening) is desired, the grain size distribution is determined by washing the sample over a number 200 sieve and, after drying, passing the samples through a standard set of nested sieves. If the grain size distribution of the soils finer than the number 200 sieve is also desired, the grain size distribution of the soils coarser than the number 10 sieve is determined by passing the sample through a set of nested sieves. Materials passing the number 10 sieve are dispersed with a dispersing agent and suspended in water, and the grain size distribution calculated from the measured settlement rate of the particles. These tests are conducted in accordance with ASTM D 422.

Unit Weights

The moist or dry unit weight of a given soil mass is obtained by dividing the weight of the soil mass by the volume. Selected portions of the shelby tube samples obtained during the exploration were measured and weighed in our laboratory to determine sample unit weights.

Triaxial Shear Tests

Triaxial shear tests are used to determine the strength characteristics and friction angle of a given soil sample. Triaxial tests are also used to determine the elastic properties of the soil specimen.

Triaxial shear tests are performed on several sections of a relatively undisturbed sample extruded from the sampling tube. The samples are trimmed into cylinders 1.4 to 2.8 inches in diameter and encased in rubber membranes. Each is then placed in a compression chamber and confined by all-around air pressure. The test results are presented in the form of stress-strain curves and Mohr envelopes, or p-q plots on the accompanying Triaxial Shear Test Sheets.

One of three types of triaxial tests is normally performed, the most suitable type being determined by the loading conditions imposed on the soil in the field and the soil characteristics.

1. Consolidated-Undrained (Designated as a CU or R Test)
2. Consolidated-Drained (designated as a CD or S Test)
3. Unconsolidated-Undrained (designated as a UU or Q Test)

Specific Gravity

The specific gravity laboratory tests were performed in accordance with the test procedure ASTM D 854.

Plasticity Index Laboratory Test Results LAW Project 50300-8-2075/0024/0800						
				Atterberg Limits		
Boring Number	**Sample Type**	**Sample Depth (ft)**	**Moisture Content (%)**	**Liquid Limit (LL)**	**Plastic Limit (PL)**	**Plasticity Index (PI=LL-PL)**
B99-2	UD	9-11	--- 22*	NL	NP	NP
B99-4	SPT	4-5.5 & 6.5-8	--- ≈18	38	19	19
B99-4	UD	29-31	--- 17*	29	19	10
B99-4	UD	34-36	--- 18*	49	24	25
B99-5	UD	19-21	--- 52.5*	NL	NP	NP
B99-5	UD	34-36	--- 38*	49	24	25
B99-8	UD	4-6	--- 25*	45	22	23
B99-10	SPT	4-5.5 & 6.5-8	--- ≈21.5	30	19	11
B99-13	UD	19-21	---	NL	NP	NP

SPT - Standard Penetration Test Sample
UD – Undisturbed Sample
NP – Non-plastic
NL – Non-Liquid

* From SPT sample.

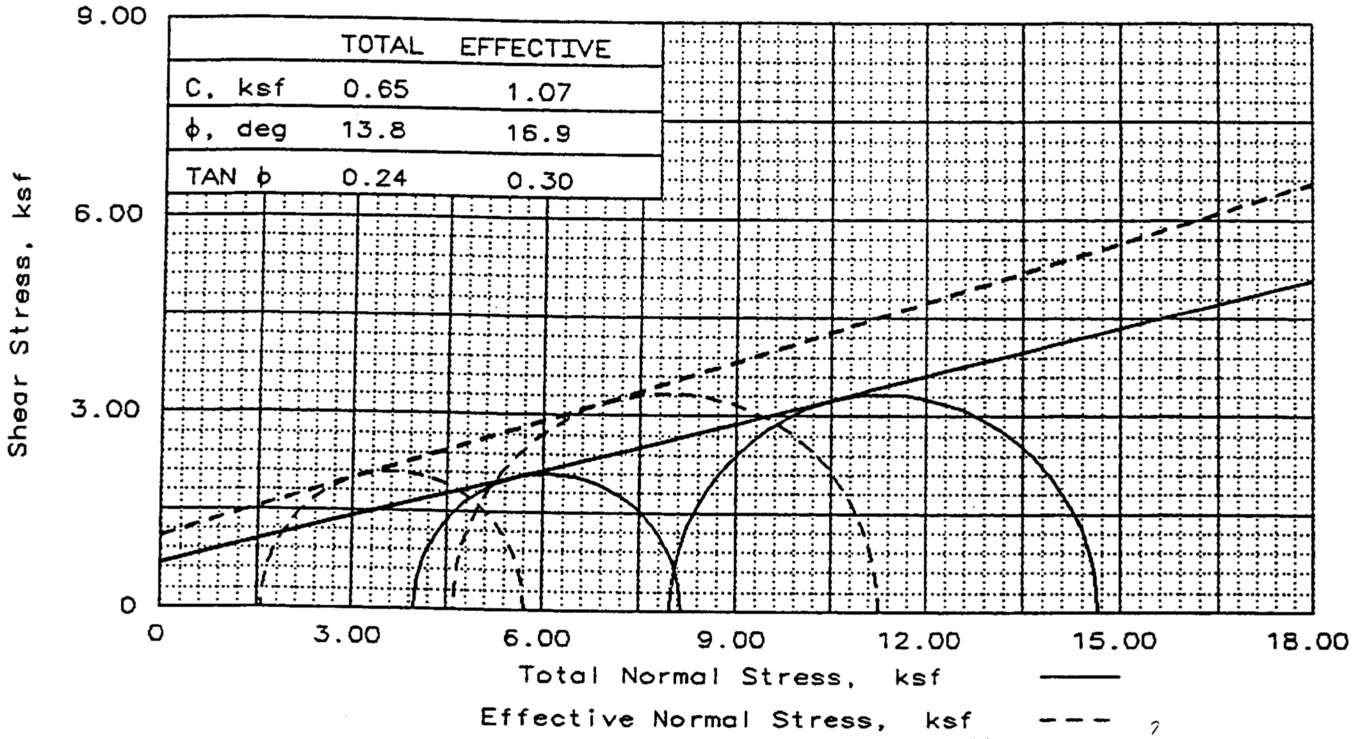
Moisture Content
Laboratory Test Results
LAW Project 50300-8-2075/0024/0800

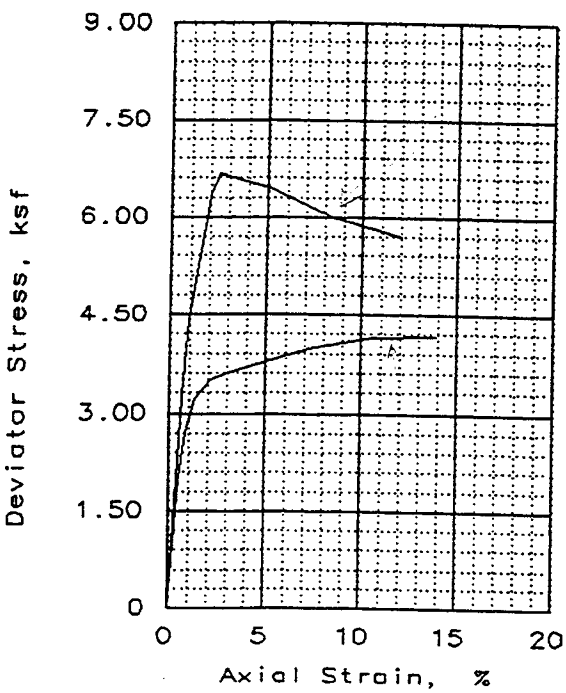
Boring Number	Sample Type	Sample Depth (ft)	Moisture Content (%)
B99-1	SPT	9-10.5	15.5
B99-1	SPT	24-25.5	27
B99-2	SPT	0-1.5	15
B99-2	SPT	1.5-3	9
B99-2	SPT	4-5.5	18
B99-2	SPT	6.5-8	18.5
B99-2	SPT	9-10.5	22
B99-2	SPT	14-15.5	22
B99-2	SPT	19-20.5	26.5
B99-2	SPT	24-25.5	27
B99-2	SPT	29-30.5	42
B99-2	SPT	34-35.5	41
B99-2	SPT	39-40.5	24
B99-2	SPT	44-45.5	24.5
B99-4	SPT	0-1.5	14
B99-4	SPT	1.5-3	19
B99-4	SPT	4-5.5	20
B99-4	SPT	6.5-8	16
B99-4	SPT	9-10.5	21
B99-4	SPT	14-15.5	20.5
B99-4	SPT	19-20.5	17
B99-4	SPT	24-25.5	21
B99-4	SPT	29-30.5	17
B99-4	SPT	34-35.5	18
B99-4	SPT	39-40.5	20
B99-5	SPT	4-5.5	16
B99-5	SPT	6.5-8	20
B99-5	SPT	9-10.5	16
B99-5	SPT	14-15.5	16
B99-5	SPT	19-20.5	52.5
B99-5	SPT	24-25.5	37
B99-5	SPT	29-30.5	23
B99-5	SPT	34-35.5	38
B99-6	SPT	9-10.5	18
B99-7	SPT	0-1.5	4
B99-7	SPT	1.5-3	9
B99-7	SPT	4-5.5	5
B99-7	SPT	6.5-8	28
B99-7	SPT	9-10.5	21

Moisture Content Laboratory Test Results Cont. LAW Project 50300-8-2075/0024/0800			
Boring Number	**Sample Type**	**Sample Depth (ft)**	**Moisture Content (%)**
B99-7	SPT	14-15.5	22
B99-7	SPT	19-20.5	28.5
B99-8	SPT	1.5-3	18
B99-8	SPT	4-5.5	25
B99-8	SPT	6.5-8	21
B99-8	SPT	9-10.5	13
B99-10	SPT	0-1.5	13
B99-10	SPT	1.5-3	15
B99-10	SPT	4-5.5	21
B99-10	SPT	6.5-8	22
B99-10	SPT	9-10.5	19
B99-12	SPT	0-1.5	17
B99-12	SPT	1.5-3	16
B99-12	SPT	4-5.5	11
B99-12	SPT	6.5-8	18
B99-12	SPT	9-10.5	13

SPT – Standard Penetration Test Sample

	TOTAL	EFFECTIVE
C, ksf	0.65	1.07
ϕ, deg	13.8	16.9
TAN ϕ	0.24	0.30





SAMPLE NO.		1	2	wet densities	
INITIAL	WATER CONTENT, %	18.4	18.5		
	DRY DENSITY, pcf	61.9	70.5	73.3	83.5
	SATURATION, %	31.9	40.8		
	VOID RATIO	1.330	1.047		
	DIAMETER, in	2.87	2.88		
	HEIGHT, in	6.00	6.00		
AT TEST	WATER CONTENT, %	55.8	40.1		
	DRY DENSITY, pcf	63.0	74.9	98.2	104.9
	SATURATION, %	100.0	100.0		
	VOID RATIO	1.290	0.926		
	DIAMETER, in	2.86	2.81		
	HEIGHT, in	5.95	5.90		
BACK PRESSURE, ksf		2.97	2.98		
CELL PRESSURE, ksf		6.97	10.98		
FAILURE STRESS, ksf		4.16	6.66	← peak	
PORE PRESSURE, ksf		5.40	6.36		
STRAIN RATE, %/min.		0.100	0.100		
ULTIMATE STRESS, ksf					
PORE PRESSURE, ksf					
$\bar{\sigma}_1$ FAILURE, ksf		5.73	11.27		
$\bar{\sigma}_3$ FAILURE, ksf		1.57	4.62		

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Gray Sandy Silt

LL= PL= PI=

SPECIFIC GRAVITY= 2.31

REMARKS: Tested by: LW

Reviewed by: HS

FIG. NO.

CLIENT:

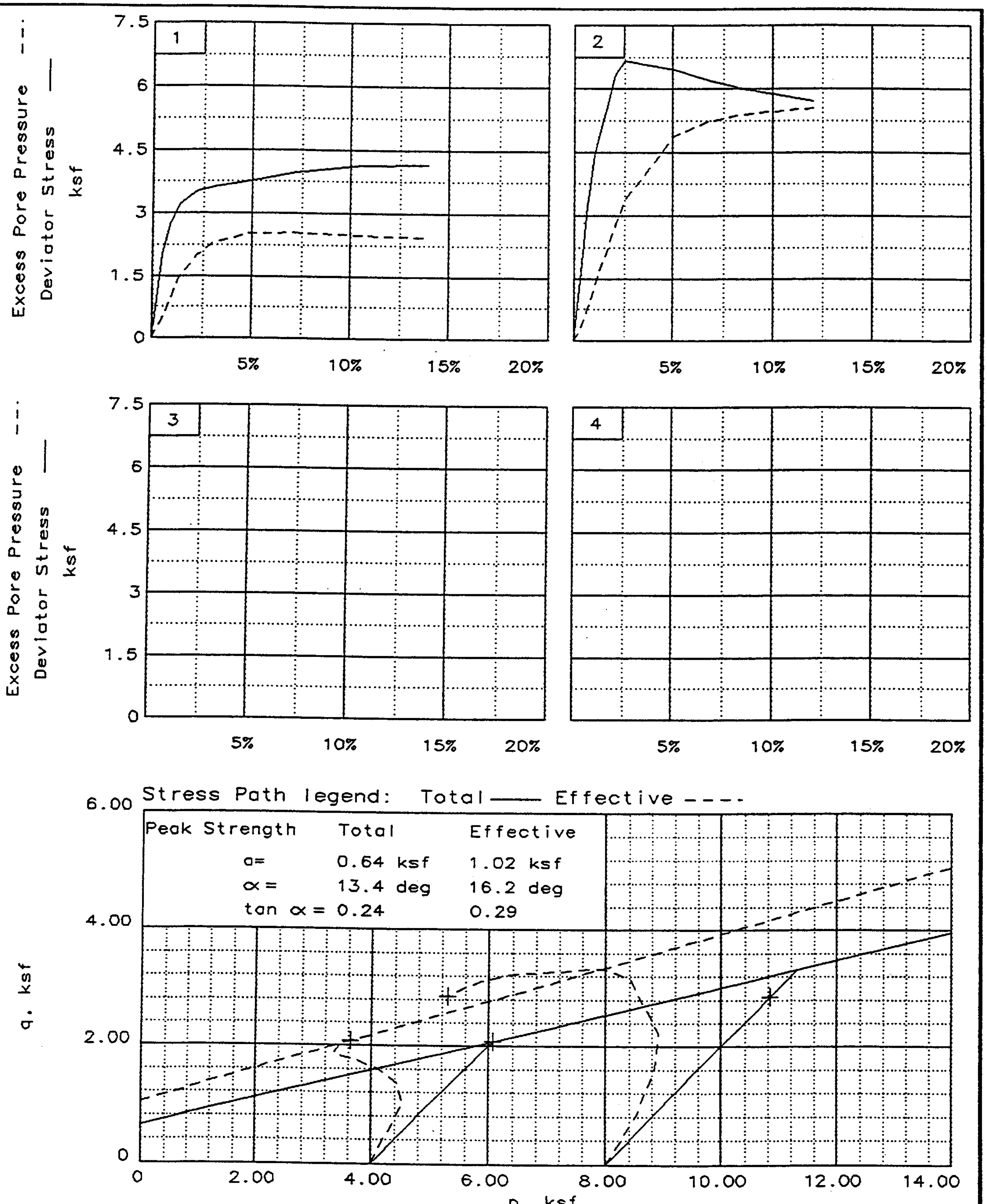
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-1
Ud @ 17.5-19.5 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

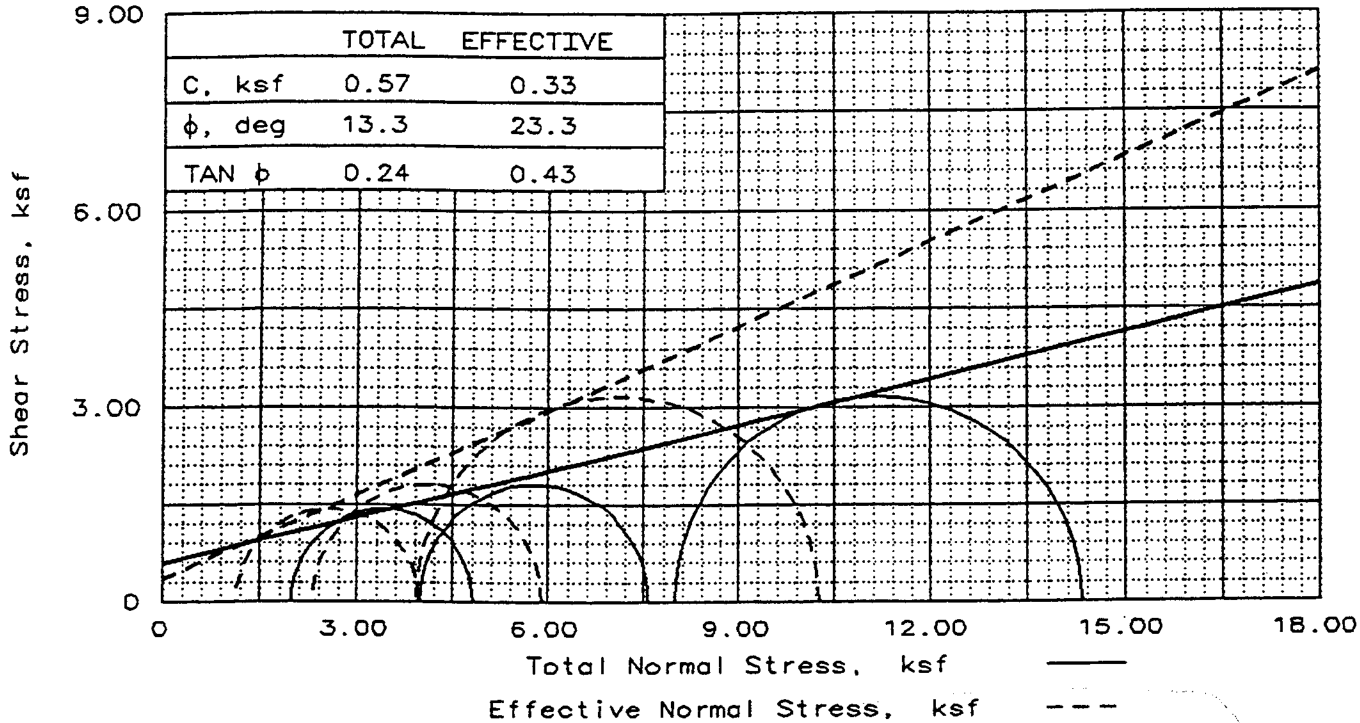


Client:

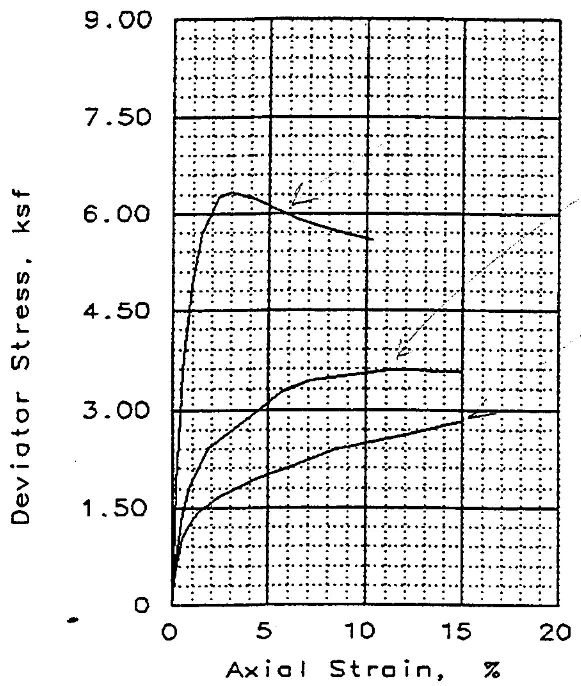
Project: TVA John Sevier

Location: B99-1 Ud @ 17.5-19.5 Ft.

File: 2075B Project No.: 5030082075 Page 2/2 Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	0.57	0.33
ϕ, deg	13.3	23.3
TAN ϕ	0.24	0.43



SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	37.2	44.3	35.4
	DRY DENSITY, pcf	64.0	59.9	62.1
	SATURATION, %	69.3	73.4	62.4
	VOID RATIO	1.223	1.375	1.293
	DIAMETER, in	2.87	2.87	2.87
	HEIGHT, in	6.00	6.00	6.00
AT TEST	WATER CONTENT, %	50.5	57.4	52.4
	DRY DENSITY, pcf	66.2	61.7	64.8
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	1.151	1.309	1.195
	DIAMETER, in	2.83	2.84	2.83
	HEIGHT, in	5.97	5.95	5.92
BACK PRESSURE, ksf		2.94	2.98	3.01
CELL PRESSURE, ksf		4.94	6.98	11.01
FAILURE STRESS, ksf		2.83	3.59	6.33 ← Peak.
PORE PRESSURE, ksf		3.79	4.65	7.07
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		3.98	5.91	10.27
$\bar{\sigma}_3$ FAILURE, ksf		1.15	2.33	~~3.94~~

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Gray Silt with Sand

LL= PL= PI=

SPECIFIC GRAVITY= 2.28

REMARKS: Tested by: LW

Reviewed by: Hb

FIG. NO.

CLIENT:

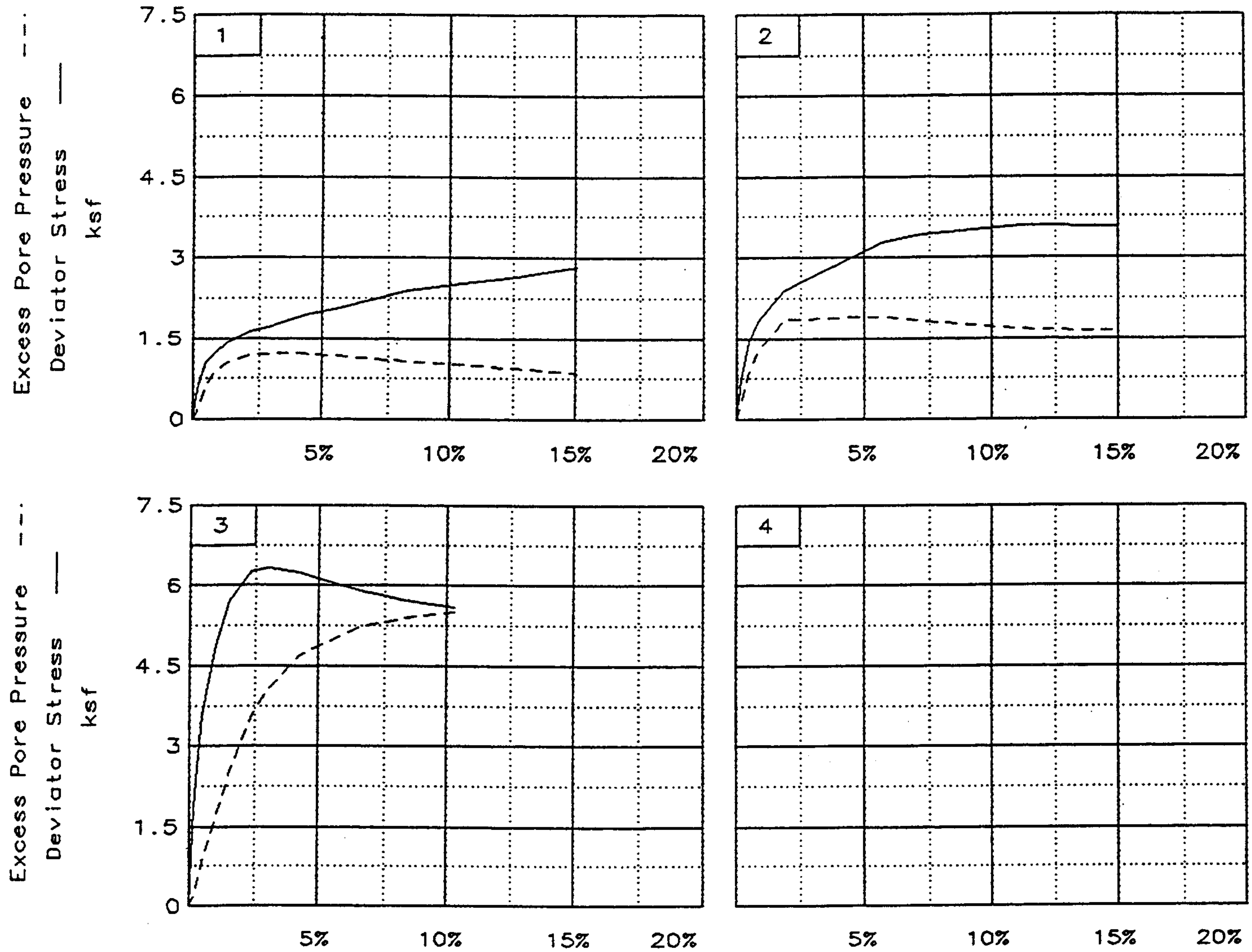
PROJECT: TVA John Sevier

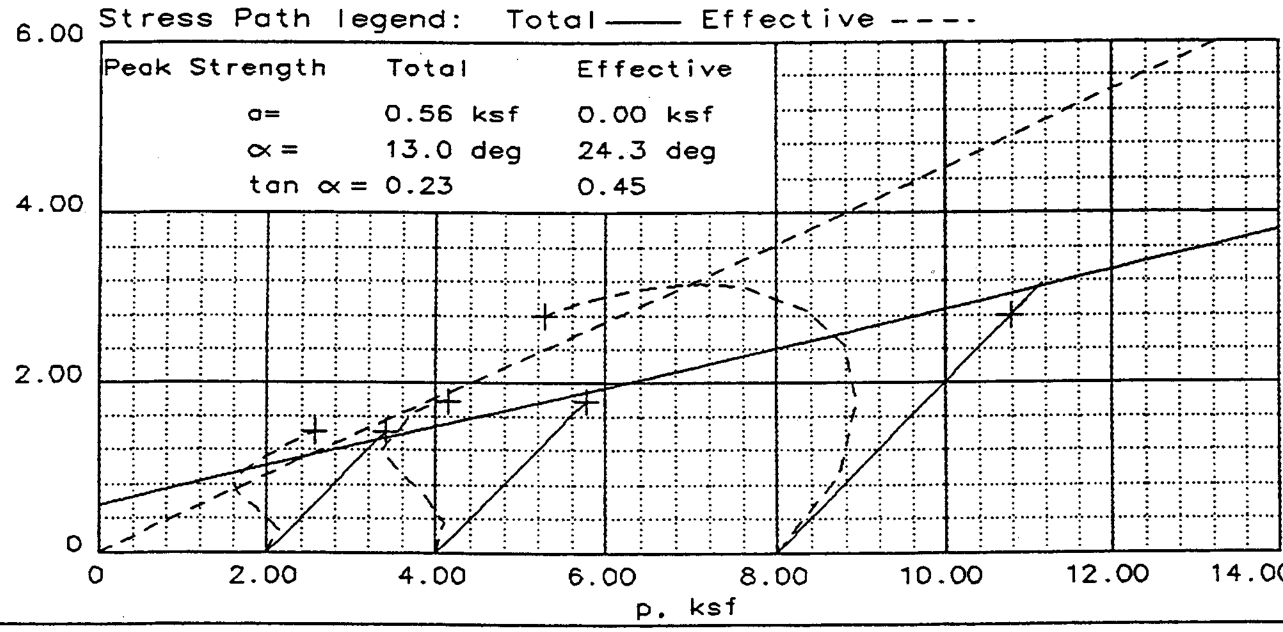
SAMPLE LOCATION: B99-2
Ud @ 19-21 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





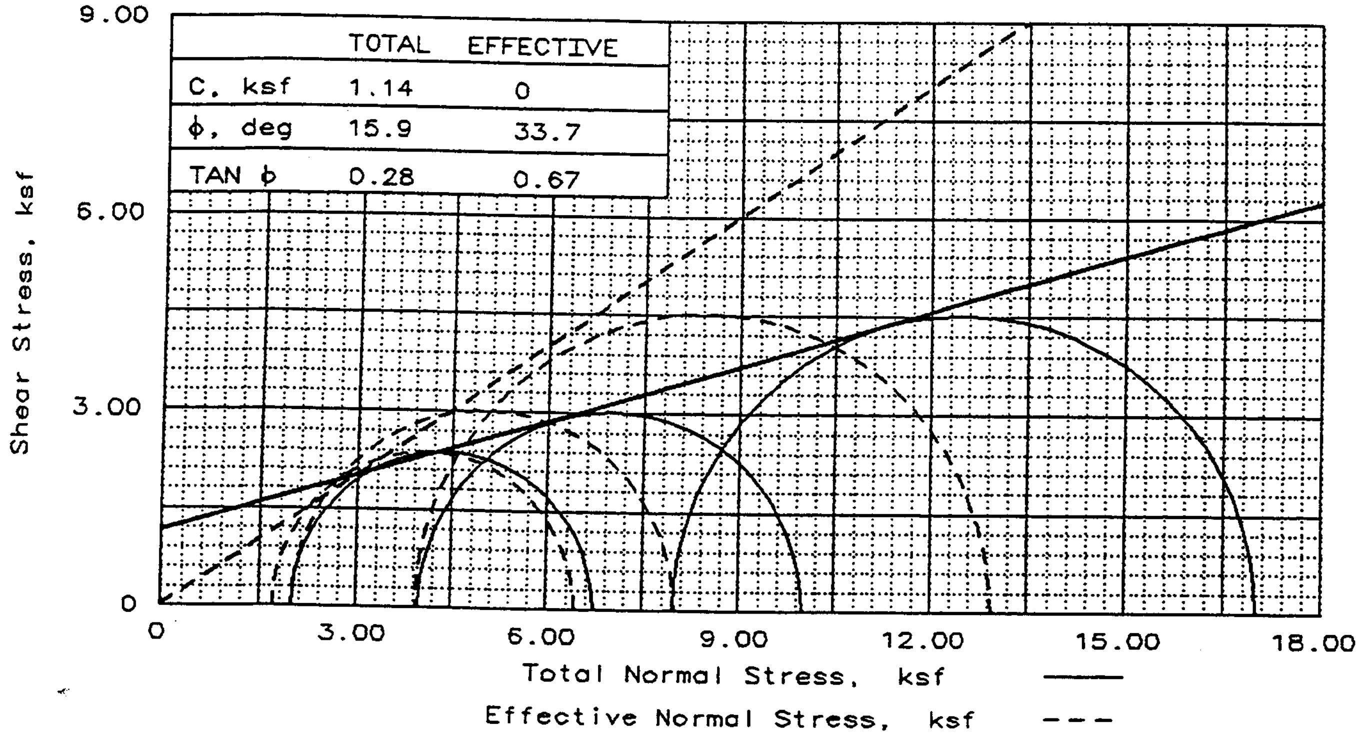
Peak Strength	Total	Effective
a=	0.56 ksf	0.00 ksf
α =	13.0 deg	24.3 deg
tan α =	0.23	0.45

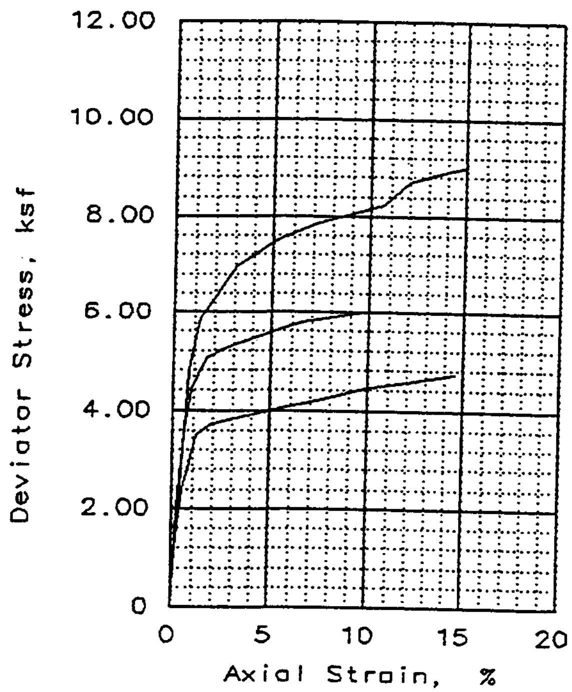
Client:

Project: TVA John Sevier

Location: B99-2 Ud @ 19-21 Ft.

File: 2075D Project No.: 5030082075 Page 2/2 Fig. No. ____





	SAMPLE NO.	1	2	3
INITIAL	WATER CONTENT, %	24.3	25.2	23.4
	DRY DENSITY, pcf	102.0	100.5	102.2
	SATURATION, %	98.4	98.1	95.1
	VOID RATIO	0.678	0.702	0.674
	DIAMETER, in	2.86	2.88	2.88
	HEIGHT, in	6.01	6.00	6.00
AT TEST	WATER CONTENT, %	23.6	24.0	24.4
	DRY DENSITY, pcf	103.9	103.2	102.5
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.646	0.657	0.669
	DIAMETER, in	2.84	2.85	2.88
	HEIGHT, in	5.98	5.94	5.97
	BACK PRESSURE, ksf	2.94	3.04	3.66
	CELL PRESSURE, ksf	6.94	11.04	5.66
	FAILURE STRESS, ksf	6.01	9.02	4.73
	PORE PRESSURE, ksf	4.94	7.08	3.95
	STRAIN RATE, %/min.	0.100	0.100	0.100
	ULTIMATE STRESS, ksf			
	PORE PRESSURE, ksf			
	$\bar{\sigma}_1$ FAILURE, ksf	8.01	12.97	6.44
	$\bar{\sigma}_3$ FAILURE, ksf	2	3.95	1.71

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Ud
DESCRIPTION: Gray Brown Clayey Silty with Sand
LL= PL= PI=
SPECIFIC GRAVITY= 2.74
REMARKS: Tested by: LW

Reviewed by: [illegible] (Based on this assumption it appears that the Alluvium part of the sample was tested.)

FIG. NO.

CLIENT:

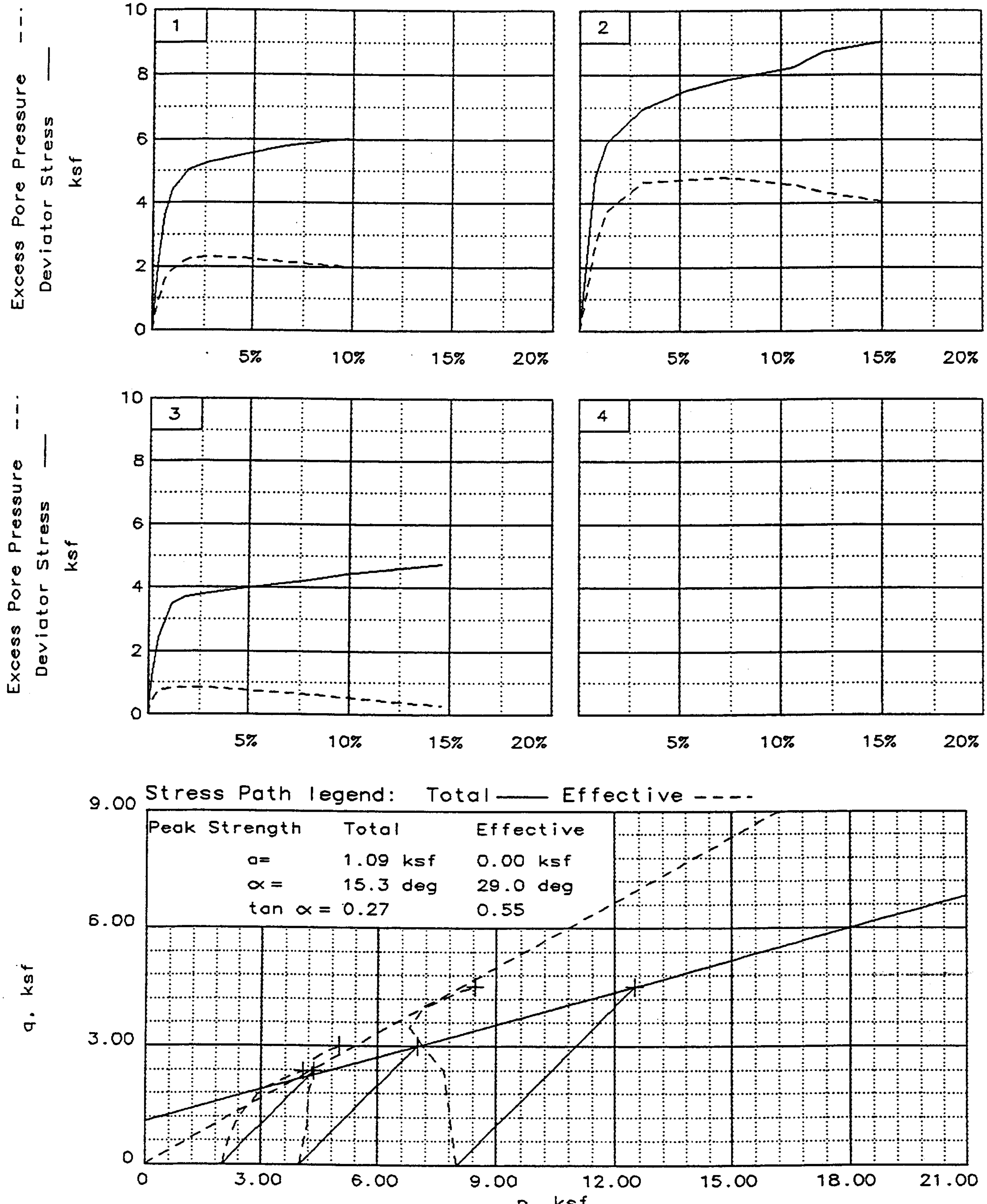
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-2
Ud @ 39-41 Ft @ interface b/w fill and Alluvium

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

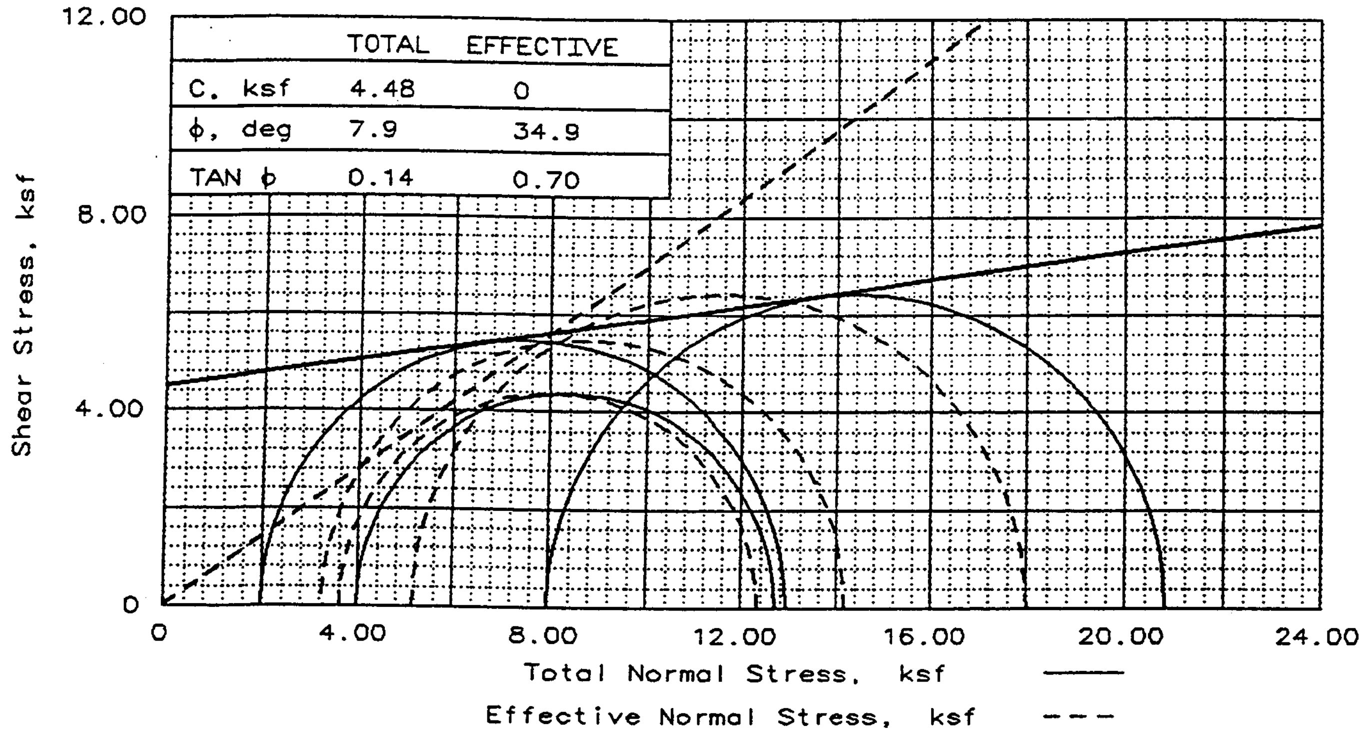


Client:

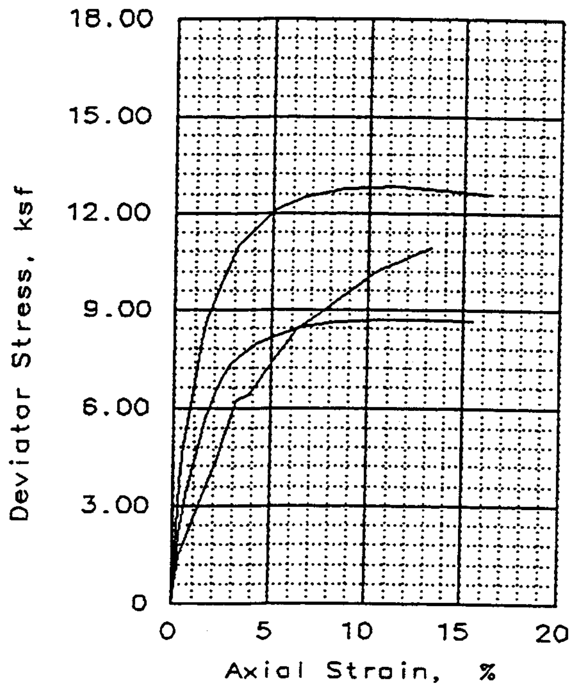
Project: TVA John Sevier

Location: B99-2 Ud @ 39-41 Ft

File: 2075 Project No.: 5030082075 Page 2/2 Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	4.48	0
ϕ, deg	7.9	34.9
TAN ϕ	0.14	0.70



SAMPLE NO.		1	2	3
INITIAL	WATER CONTENT, %	17.2	18.0	19.0
	DRY DENSITY, pcf	113.1	111.6	108.7
	SATURATION, %	90.9	91.2	89.4
	VOID RATIO	0.523	0.544	0.585
	DIAMETER, in	2.88	2.86	2.87
	HEIGHT, in	6.03	6.01	6.01
AT TEST	WATER CONTENT, %	18.2	18.2	22.8
	DRY DENSITY, pcf	114.6	114.6	105.7
	SATURATION, %	100.0	100.0	100.0
	VOID RATIO	0.503	0.503	0.631
	DIAMETER, in	2.86	2.84	2.91
	HEIGHT, in	6.00	5.94	5.98
BACK PRESSURE, ksf		3.72	3.66	2.94
CELL PRESSURE, ksf		5.71	11.66	6.94
FAILURE STRESS, ksf		10.92	12.83	8.71
PORE PRESSURE, ksf		2.45	6.48	3.30
STRAIN RATE, %/min.		0.100	0.100	0.100
ULTIMATE STRESS, ksf				
PORE PRESSURE, ksf				
$\bar{\sigma}_1$ FAILURE, ksf		14.19	18.01	12.35
$\bar{\sigma}_3$ FAILURE, ksf		3.27	5.18	3.64

TYPE OF TEST:
CU with pore pressures
SAMPLE TYPE: Ud.
DESCRIPTION: Gray Brown Sandy Lean Clay
LL= 29 PL= 19 PI= 10.0
SPECIFIC GRAVITY= 2.76
REMARKS: Tested by: LW

Reviewed by: Hb

FIG. NO.

CLIENT:

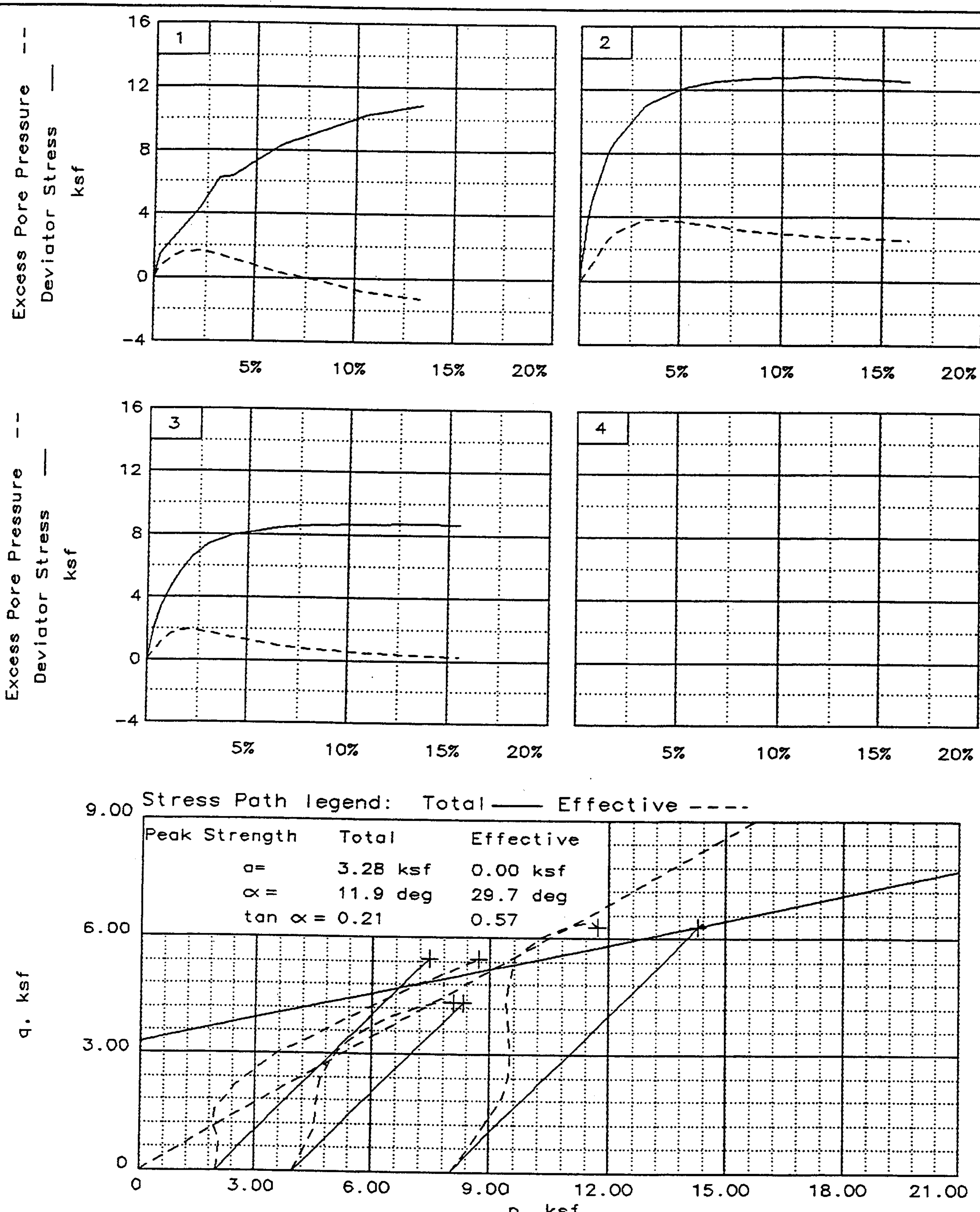
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-4
Ud @ 29-31 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.

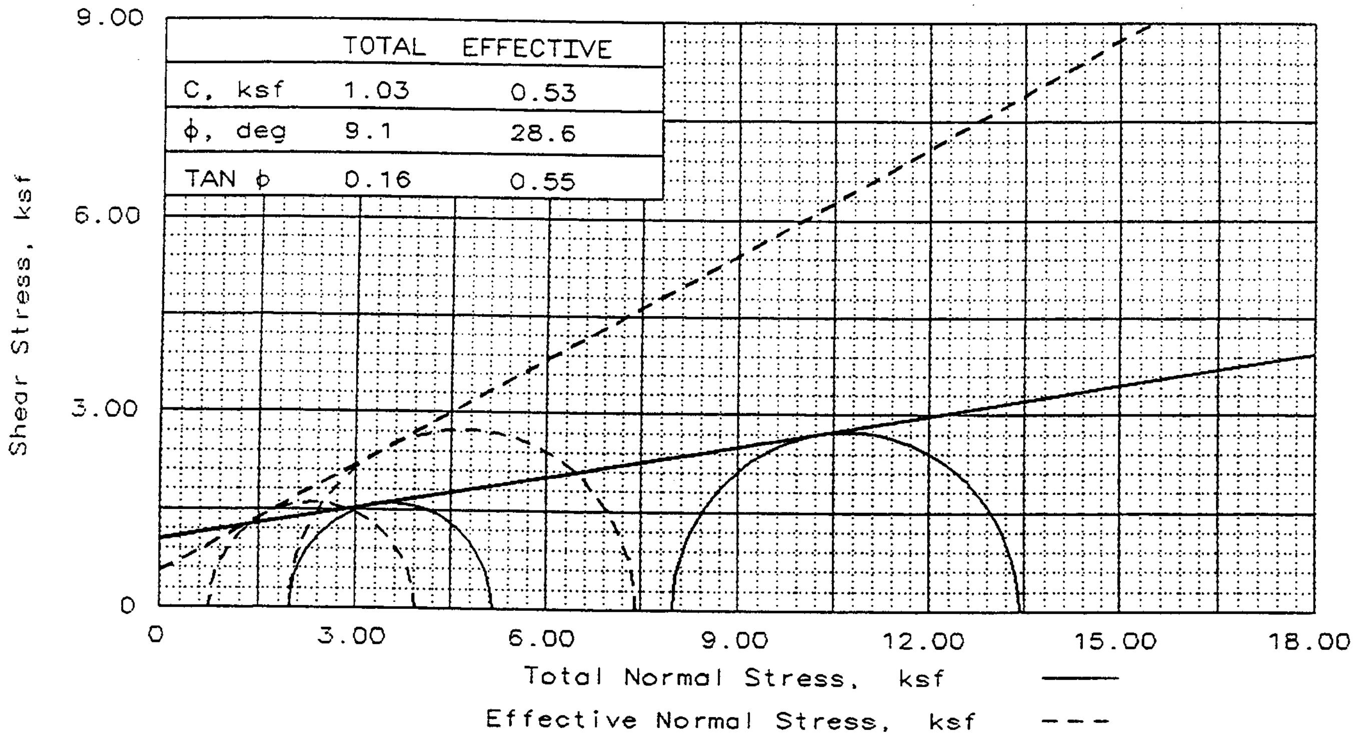


Client:

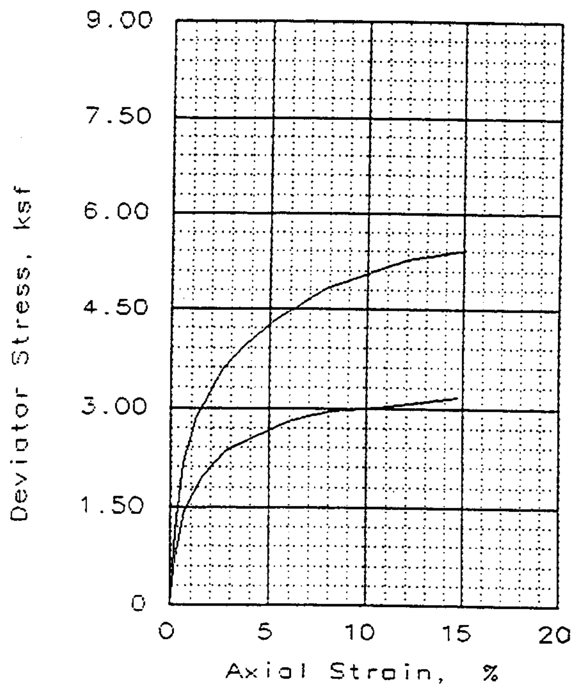
Project: TVA John Sevier

Location: B99-4 Ud @ 29-31 Ft.

File: 2075A Project No.: 5030082075 Page 2/2 Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	1.03	0.53
ϕ, deg	9.1	28.6
TAN ϕ	0.16	0.55



SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	27.6	25.9
	DRY DENSITY, pcf	95.7	98.7
	SATURATION, %	95.7	96.4
	VOID RATIO	0.794	0.739
	DIAMETER, in	2.87	2.87
	HEIGHT, in	6.01	6.01
AT TEST	WATER CONTENT, %	28.1	25.2
	DRY DENSITY, pcf	96.9	101.5
	SATURATION, %	100.0	100.0
	VOID RATIO	0.772	0.692
	DIAMETER, in	2.85	2.85
	HEIGHT, in	5.99	5.96
BACK PRESSURE, ksf		3.64	2.76
CELL PRESSURE, ksf		5.64	10.76
FAILURE STRESS, ksf		3.17	5.43
PORE PRESSURE, ksf		4.88	8.77
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		3.93	7.43
$\bar{\sigma}_3$ FAILURE, ksf		0.76	1.99

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Gray Brown Sandy Lean Clay

LL= 49 PL= 24 PI= 25.0

SPECIFIC GRAVITY= 2.75

REMARKS: Tested by: LW

Reviewed by: HD

FIG. NO.

CLIENT:

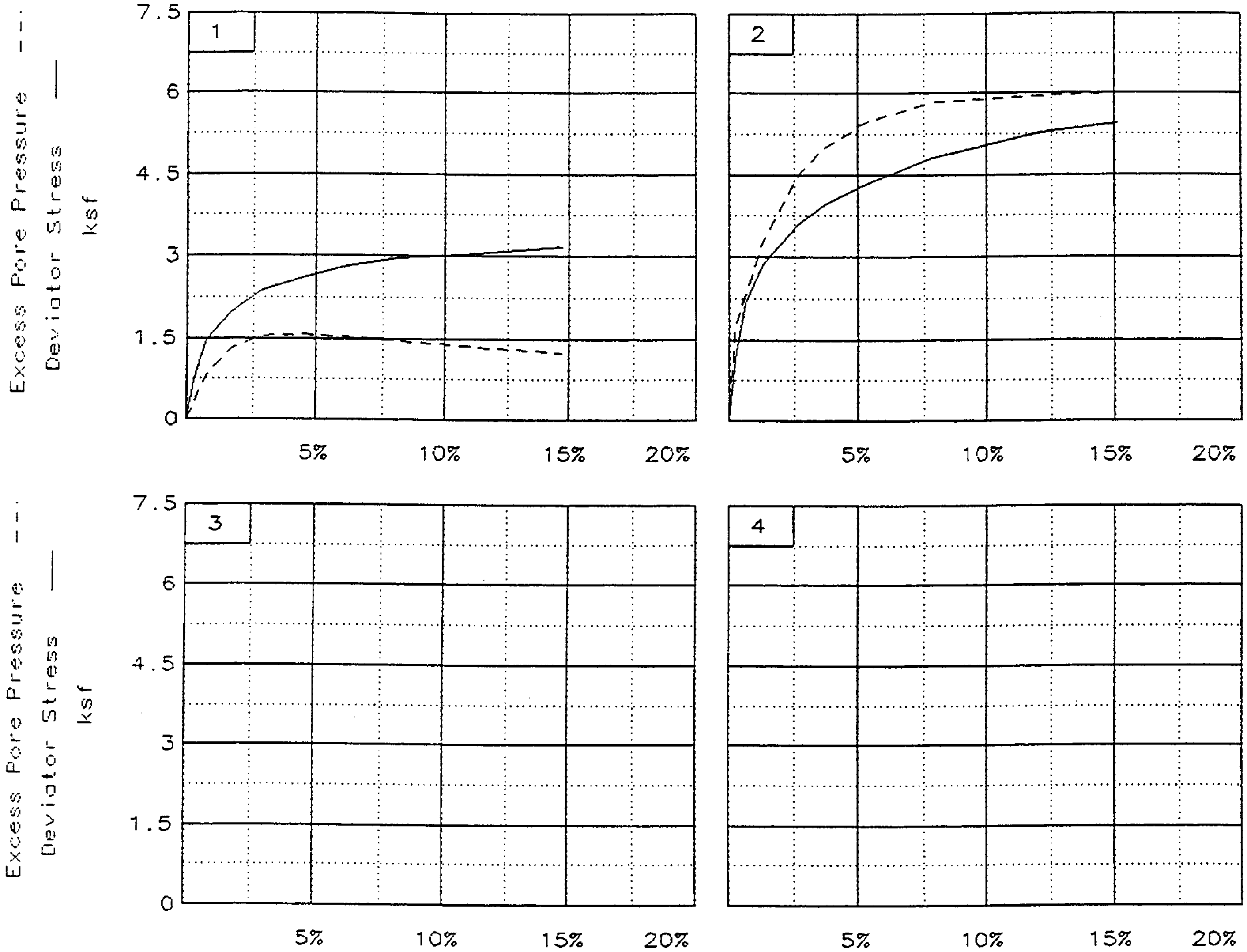
PROJECT: TVA John Sevier

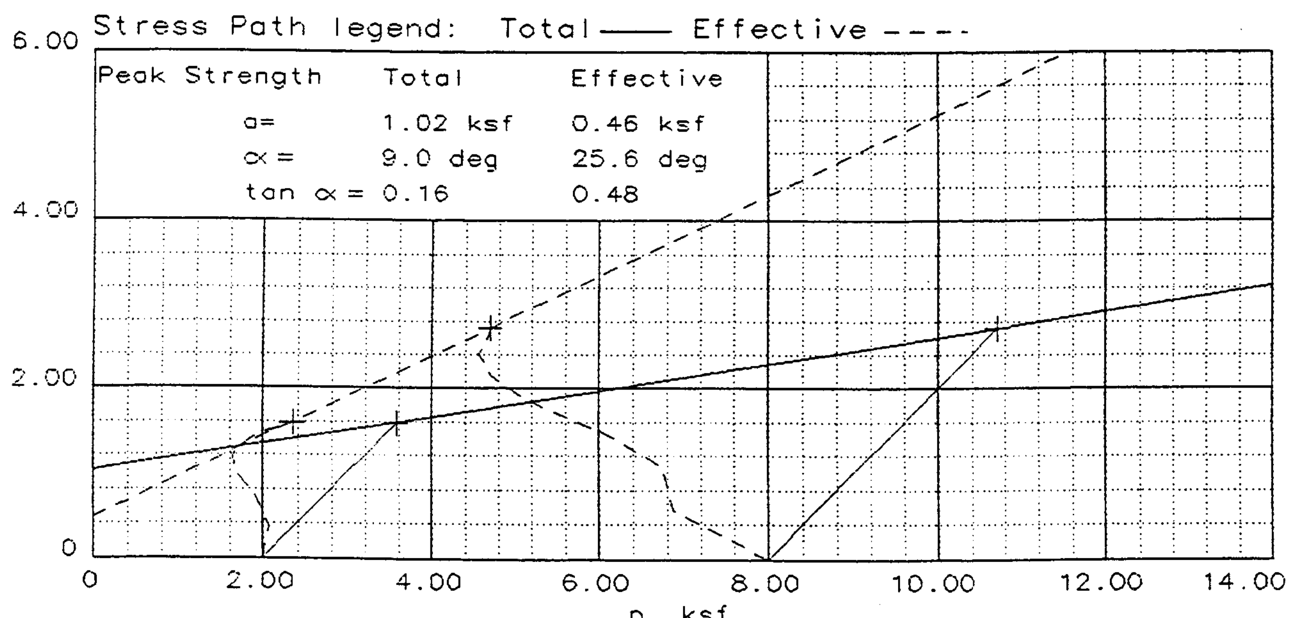
SAMPLE LOCATION: B99-A5
Ud @ 34-36 Ft.

PROJ. NO.: 5030082075 DATE: Sept 22, 1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.





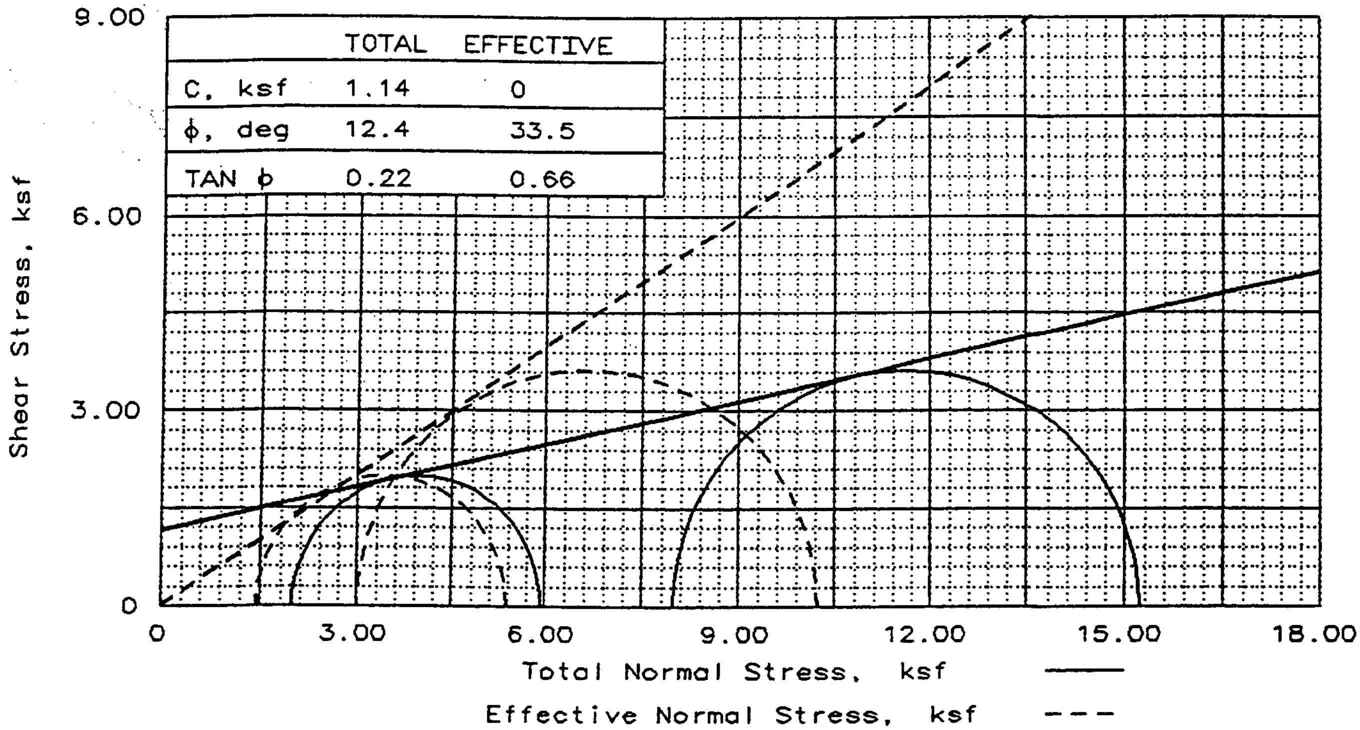
Peak Strength	Total	Effective
a=	1.02 ksf	0.46 ksf
∝ =	9.0 deg	25.6 deg
tan ∝ =	0.16	0.48

Client:

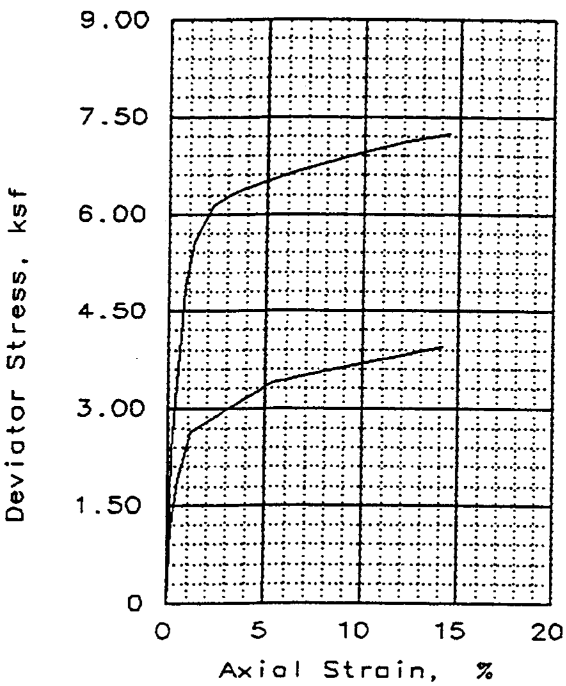
Project: TVA John Sevier

Location: B99-~~4~~5 Ud @ 34-36 Ft.

File: 2075E Project No.: 5030082075 Page 2/2 Fig. No. ____



	TOTAL	EFFECTIVE
C, ksf	1.14	0
ϕ, deg	12.4	33.5
TAN ϕ	0.22	0.66



SAMPLE NO.		1	2
INITIAL	WATER CONTENT, %	20.3	21.8
	DRY DENSITY, pcf	103.4	100.3
	SATURATION, %	88.4	87.8
	VOID RATIO	0.613	0.662
	DIAMETER, in	2.85	2.87
	HEIGHT, in	6.01	6.01
AT TEST	WATER CONTENT, %	22.2	22.3
	DRY DENSITY, pcf	104.7	104.4
	SATURATION, %	100.0	100.0
	VOID RATIO	0.592	0.596
	DIAMETER, in	2.84	2.82
	HEIGHT, in	5.98	5.96
BACK PRESSURE, ksf		3.77	3.69
CELL PRESSURE, ksf		5.77	11.69
FAILURE STRESS, ksf		3.94	7.24
PORE PRESSURE, ksf		4.32	8.67
STRAIN RATE, %/min.		0.100	0.100
ULTIMATE STRESS, ksf			
PORE PRESSURE, ksf			
$\bar{\sigma}_1$ FAILURE, ksf		5.40	10.25
$\bar{\sigma}_3$ FAILURE, ksf		1.45	3.02

TYPE OF TEST:
CU with pore pressures

SAMPLE TYPE: Ud

DESCRIPTION: Brown Sandy Lean Clay

LL= 45 PL= 22 PI= 23.0

SPECIFIC GRAVITY= 2.67

REMARKS: Tested by: LW

Reviewed by: [signature]

FIG. NO.

CLIENT:

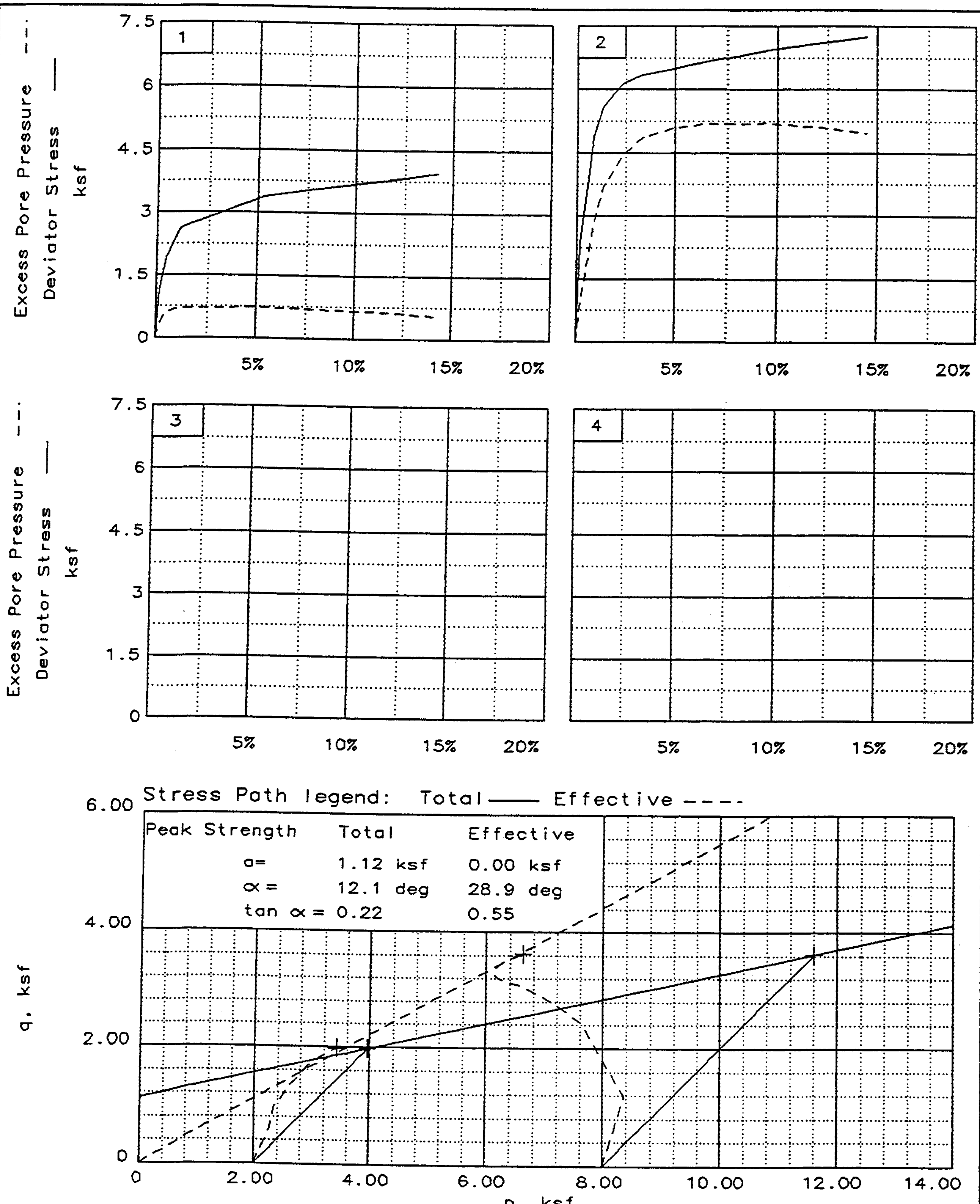
PROJECT: TVA John Sevier

SAMPLE LOCATION: B99-8
Ud @ 4-6 Ft.

PROJ. NO.: 5030082075 DATE: Sept.20,1999

TRIAXIAL COMPRESSION TEST

LAW ENGINEERING, INC.



Client:

Project: TVA John Sevier

Location: B99-8 Ud @ 4-6 Ft.

File: 2075C Project No.: 5030082075 Page 2/2 Fig. No. ____

LAWGIBB GROUP

TP-4A: UNIT WEIGHT OF SAMPLE

Project No.: 50300-8-2075
Phase: 24 Task: 830
Project Name: TVA John Sevier
Tested By: JTM
Date: 08/17/99

Boring No.: B-99-5
Depth: 19.0-21.0 Ft.
Sample ID: Ud
Reviewed By: HEJ
Date: 09/01/99

Total Sample Height, *inches*		Inside Diameter of Cut Tube, *inches*		Moisture Content		
1	4.711			Tare No.	SS-56	
2	4.71	Top	2.870	Tare Weight	142.64	*grams*
3	4.71	Bottom	2.865	Wet Weight + Tare	251.82	*grams*
Average	4.71	Average	2.868	Dry Weight + Tare	207.27	*grams*
				Moisture Content	68.9	%

Total Weight of Soil + Tube Section	733.30	*grams*
Weight of Clean, Dry Tube Section	0.00	*grams*
Wet Weight of Soil	1.62	*lbs*
Volume of Sample	0.018	ft^3

RESULT SUMMARY

Moisture Content	**68.9**	*%*
Wet Density	**91.8**	*pcf*
Dry Density	**54.4**	*pcf*

LAWGIBB GROUP

TP-4A: UNIT WEIGHT OF SAMPLE

Project No.:	50300-8-2075	Boring No.:	B-99-13
Phase:	24 Task: 830	Depth:	19.0-21.0 Ft.
Project Name:	TVA John Sevier	Sample ID:	Ud
Tested By:	JTM	Reviewed By:	HEJ
Date:	08/17/99	Date:	09/01/99

Total Sample Height, *inches*		Inside Diameter of Cut Tube, *inches*		Moisture Content		
1	4.712			Tare No.	SS-52	
2	4.71	Top	2.868	Tare Weight	144.53	*grams*
3	4.714	Bottom	2.868	Wet Weight + Tare	240.49	*grams*
Average	4.71	Average	2.868	Dry Weight + Tare	223.65	*grams*
				Moisture Content	21.3	%

Total Weight of Soil + Tube Section	711.12	*grams*
Weight of Clean, Dry Tube Section	0.00	*grams*
Wet Weight of Soil	1.57	*lbs*
Volume of Sample	0.018	ft^3

RESULT SUMMARY

Moisture Content	**21.3**	*%*
Wet Density	**89.0**	*pcf*
Dry Density	**73.4**	*pcf*

LAWGIBB GROUP

TP-4A: UNIT WEIGHT OF SAMPLE

Project No.: 50300-8-2075	Boring No.: B-99-2
Phase: 24 Task: 830	Depth: 9.0-11.0 Ft.
Project Name: TVA John Sevier	Sample ID: Ud
Tested By: JTM	Reviewed By: HEJ
Date: 08/17/99	Date: 09/01/99

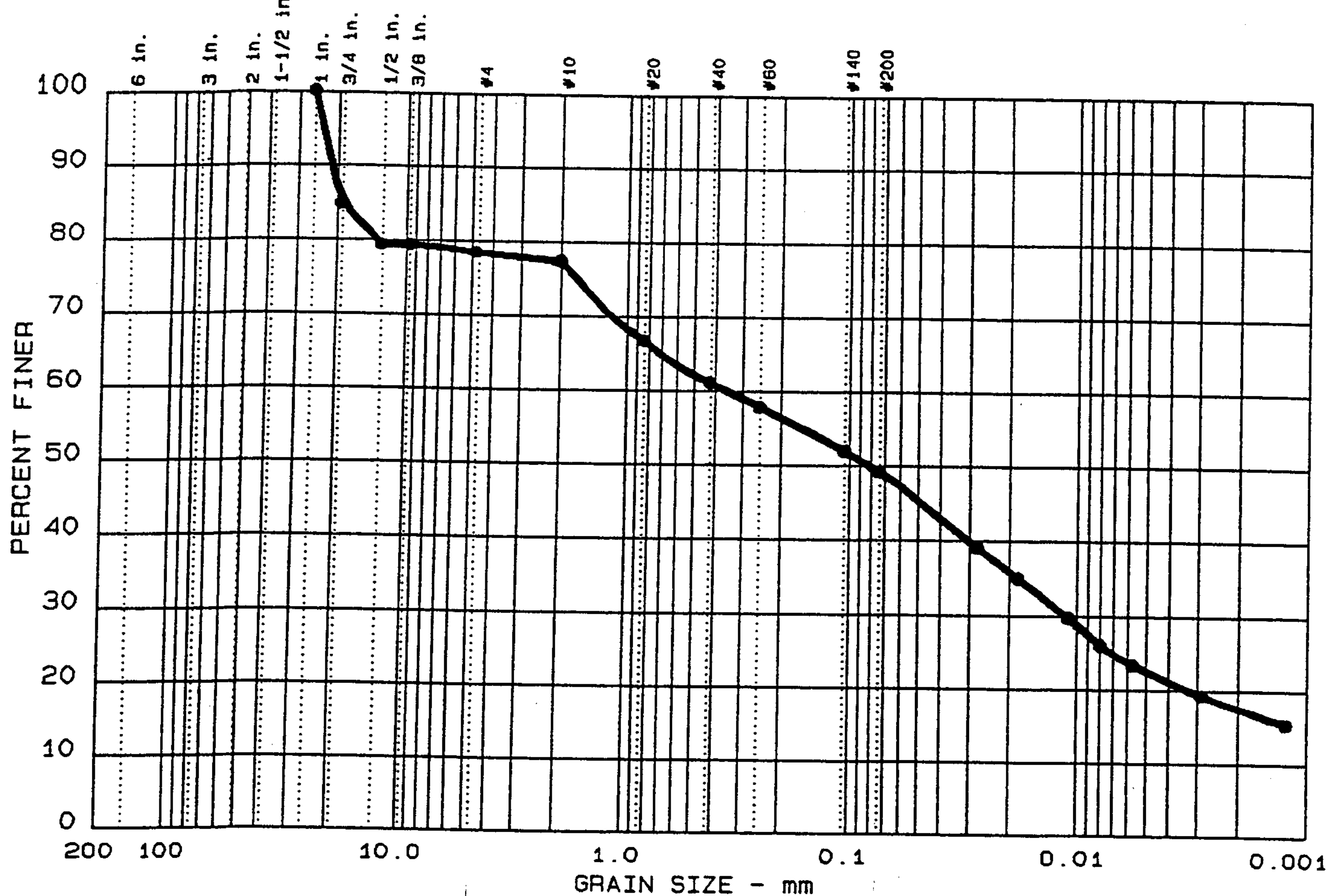
Total Sample Height, *inches*		Inside Diameter of Cut Tube, *inches*		Moisture Content		
1	4.705			Tare No.	SS-49	
2	4.704	Top	2.850	Tare Weight	143.56	*grams*
3	4.705	Bottom	2.850	Wet Weight + Tare	198.59	*grams*
Average	4.70	Average	2.850	Dry Weight + Tare	188.39	*grams*
				Moisture Content	22.8	%

Total Weight of Soil + Tube Section	542.30	*grams*
Weight of Clean, Dry Tube Section	0.00	*grams*
Wet Weight of Soil	1.20	*lbs*
Volume of Sample	0.017	*ft*^{3}

RESULT SUMMARY

Moisture Content	**22.8**	**%**
Wet Density	**68.8**	***pcf***
Dry Density	**56.1**	***pcf***

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	12	0.0	21.6	29.2	26.6	22.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			19.05	0.35	0.08	0.011				

MATERIAL DESCRIPTION	USCS	AASHTO
● Tan Brown Silty Sand	SM	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-1 S-5

Date: August 29, 1999

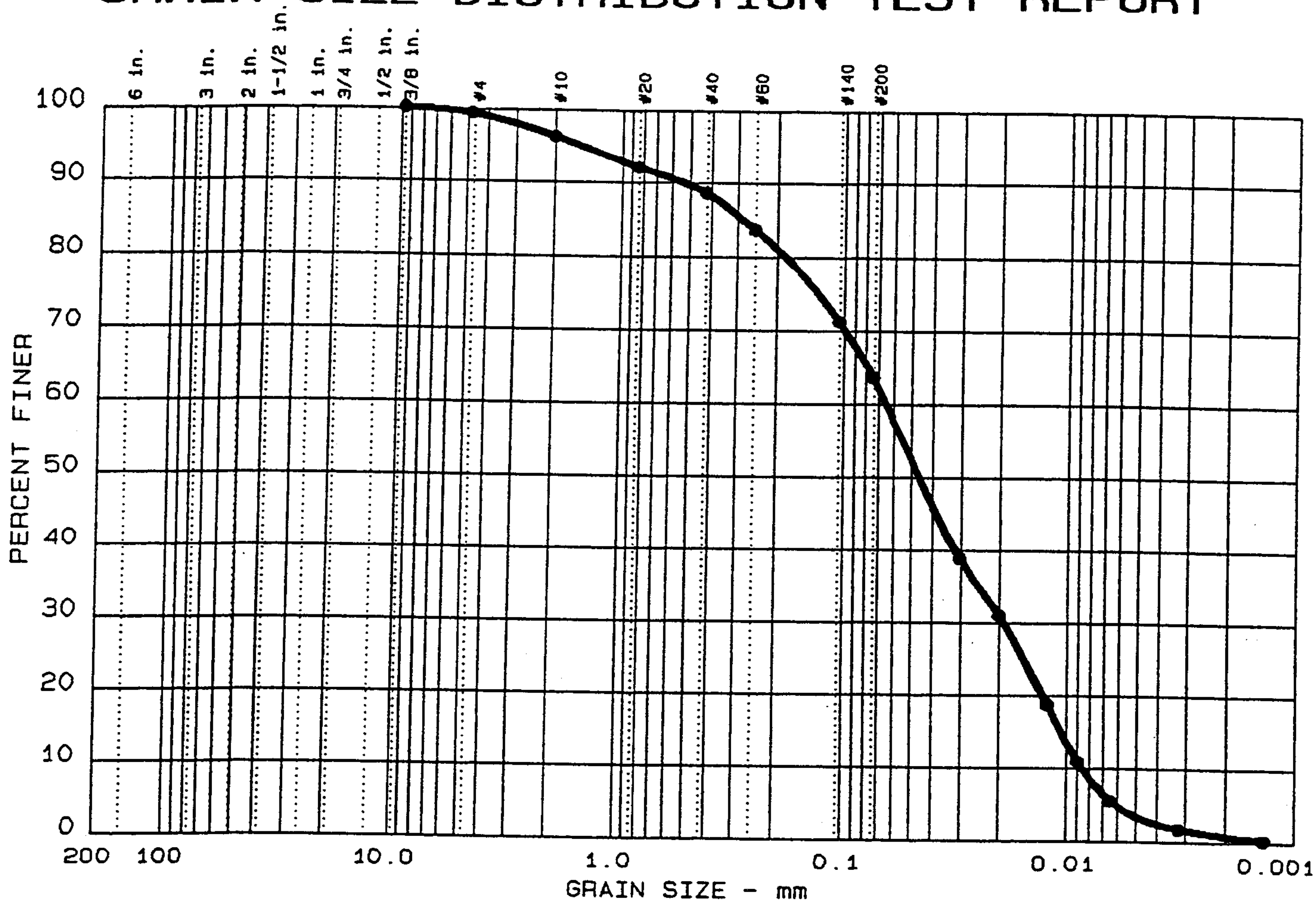
Remarks:
Tested by: SC
Reviewed by: lb

Moisture Content = 15.5%

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.6	35.7	60.3	3.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.28		0.05	0.019	0.0105	0.0085	0.66	7.6

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-1 Ud @ 17.5-19.5 Ft.

Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

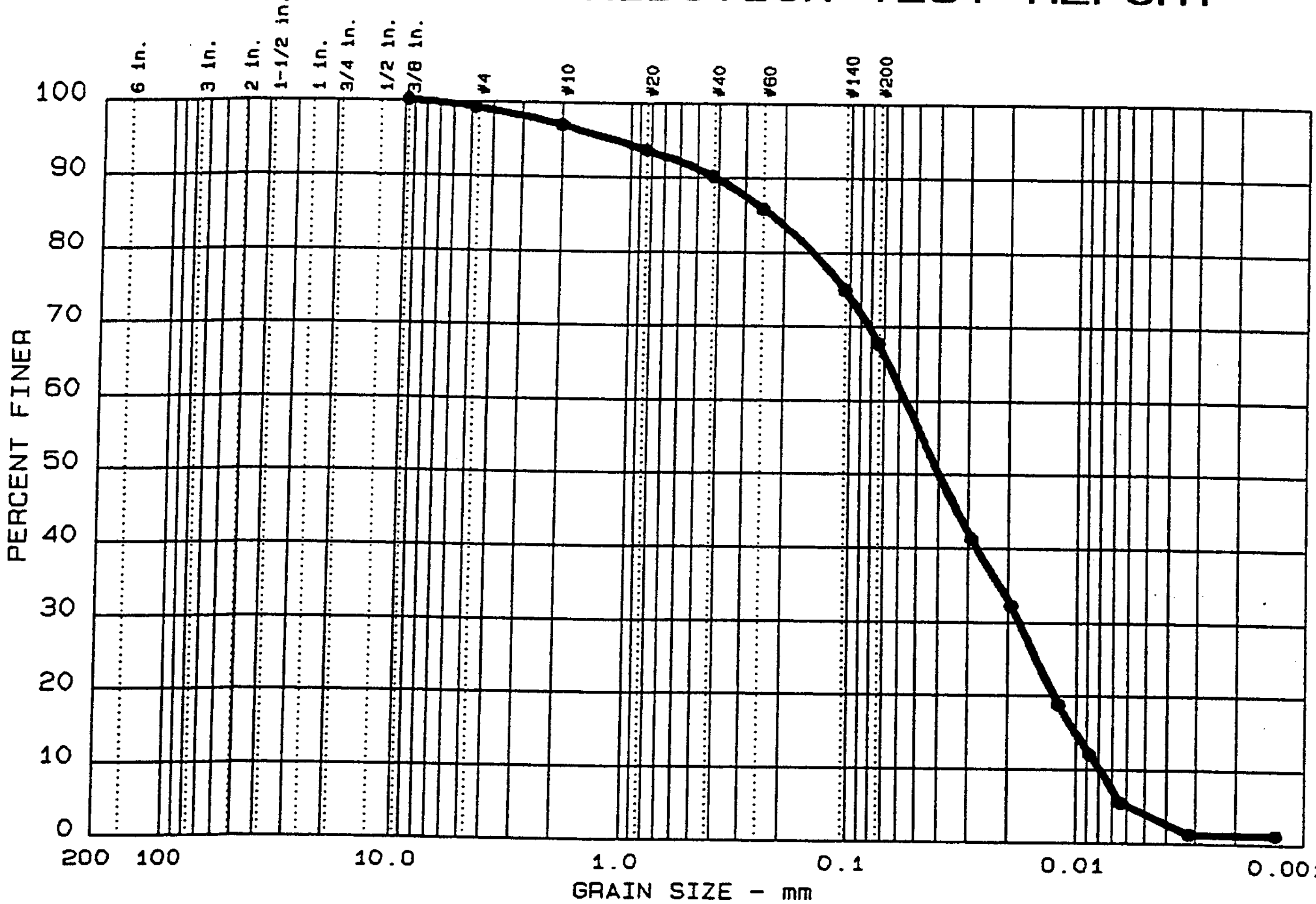
Remarks:

Tested by: SC/JTM

Reviewed by: HB

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	10	0.0	0.9	31.4	63.6	4.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.23		0.04	0.018	0.0100	0.0078	0.72	7.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-1 S-8

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

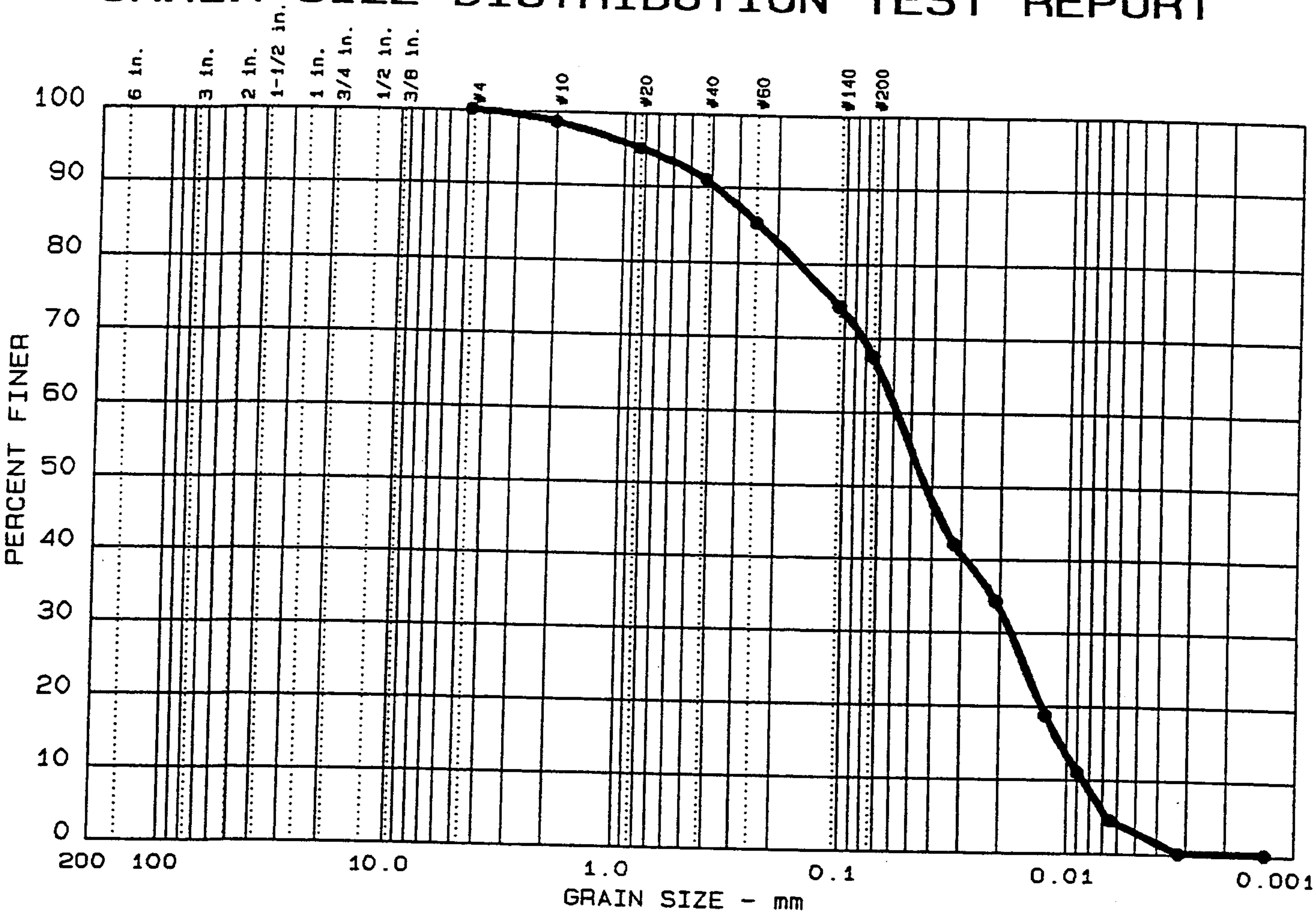
Tested by: SC

Reviewed by: HD

Moisture Conttent = 27.0

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	13	0.0	0.0	32.5	64.6	2.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.24		0.04	0.018	0.0107	0.0085	0.64	6.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-2 Ud @ 9.0-11.0 Ft.

Date: August 29, 1999

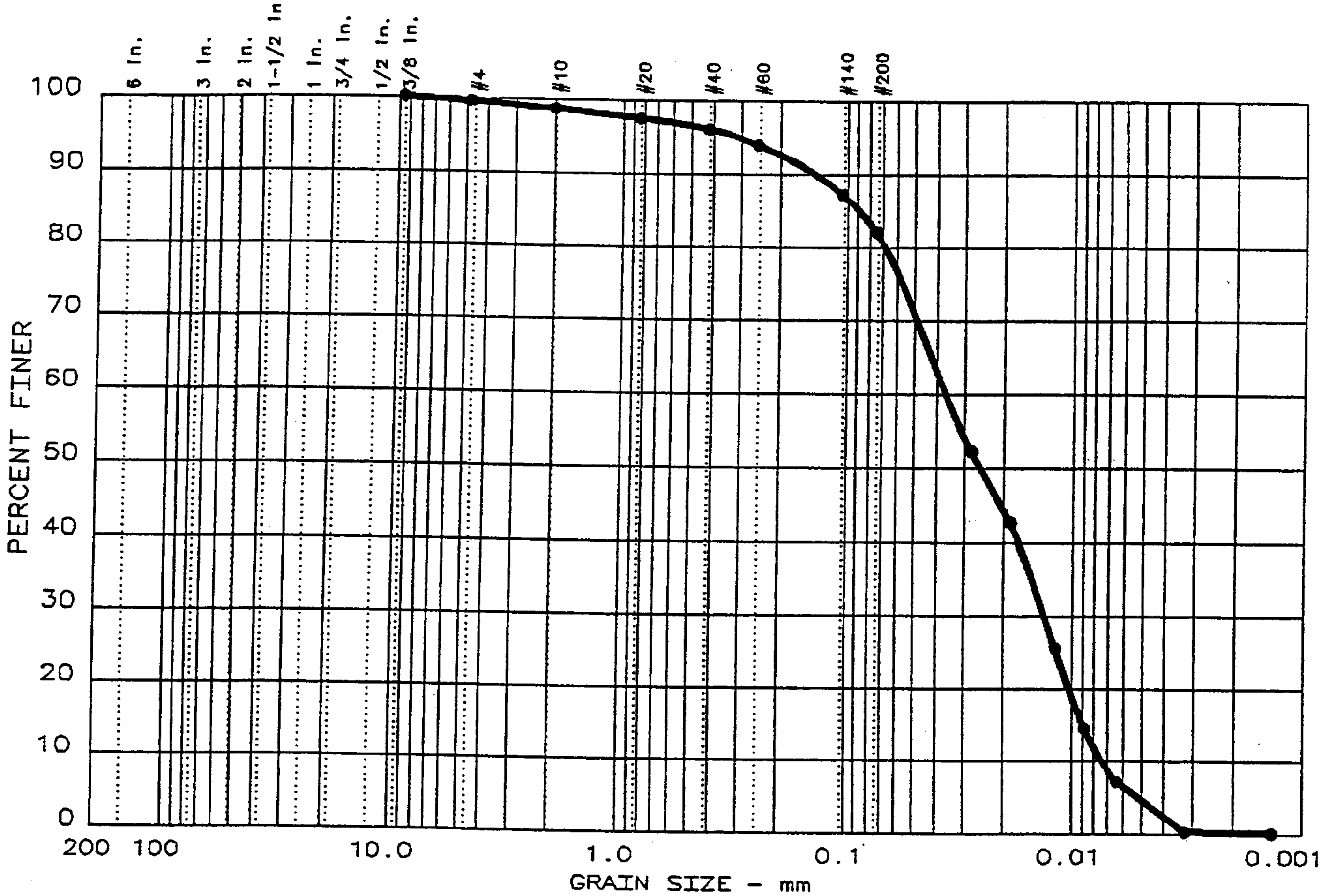
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: [signature]

Moisture Content = 22.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	14	0.0	0.5	17.5	77.4	4.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.09		0.03	0.013	0.0089	0.0074	0.65	4.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Silt with Sand	ML	A-4(0.0)

Project No.: 50300-8-2075.24.830
Project: TVA John Sevier
● Location: B99-2 Ud @ 19-21 Ft.

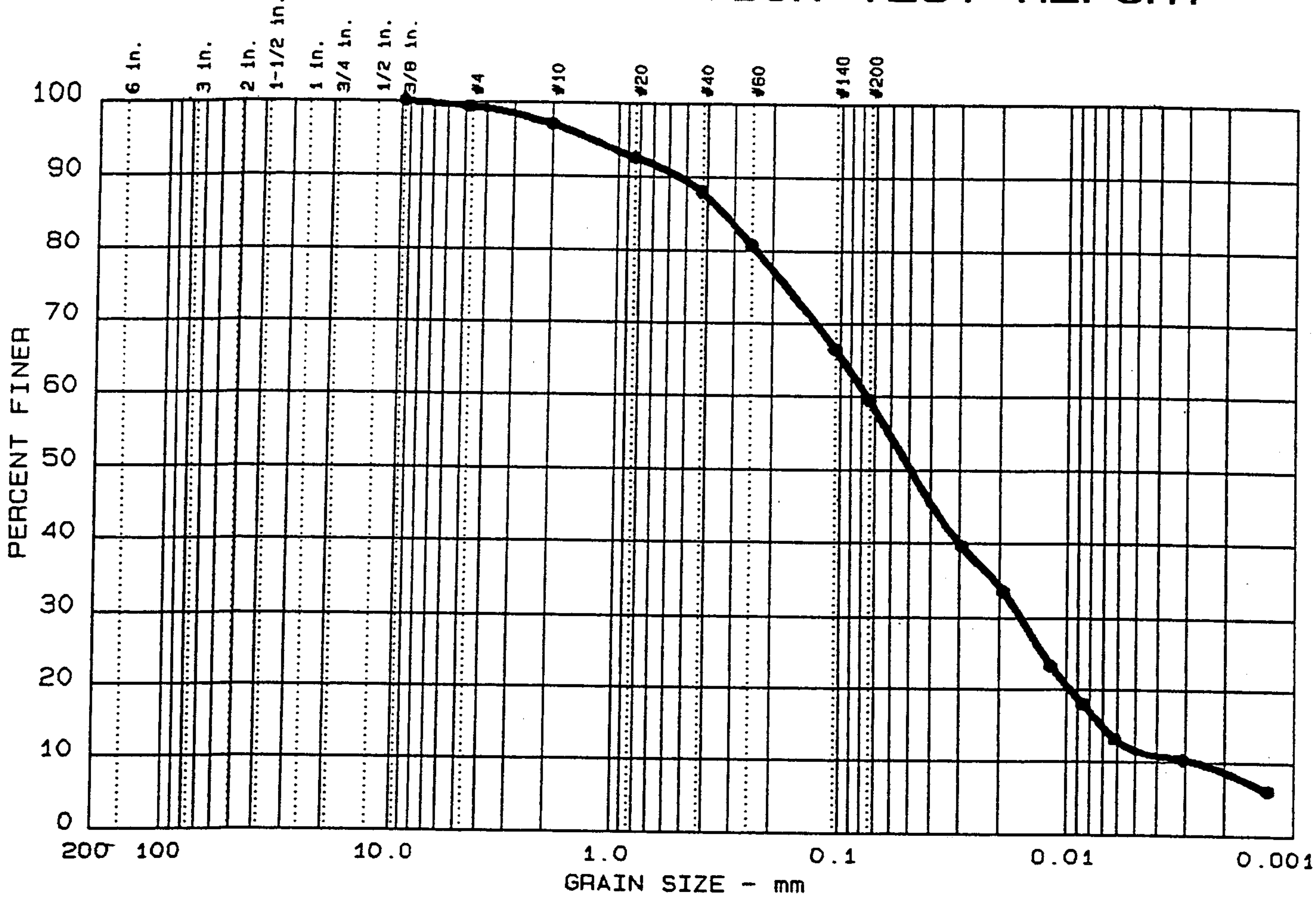
Date: August 31,1999

Remarks:
Tested By: SC
Reviewed by: lb

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	0.7	39.9	47.9	11.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.33	0.08	0.05	0.016	0.0070	0.0027	1.23	28.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-2 S-8

Date: August 29, 1999

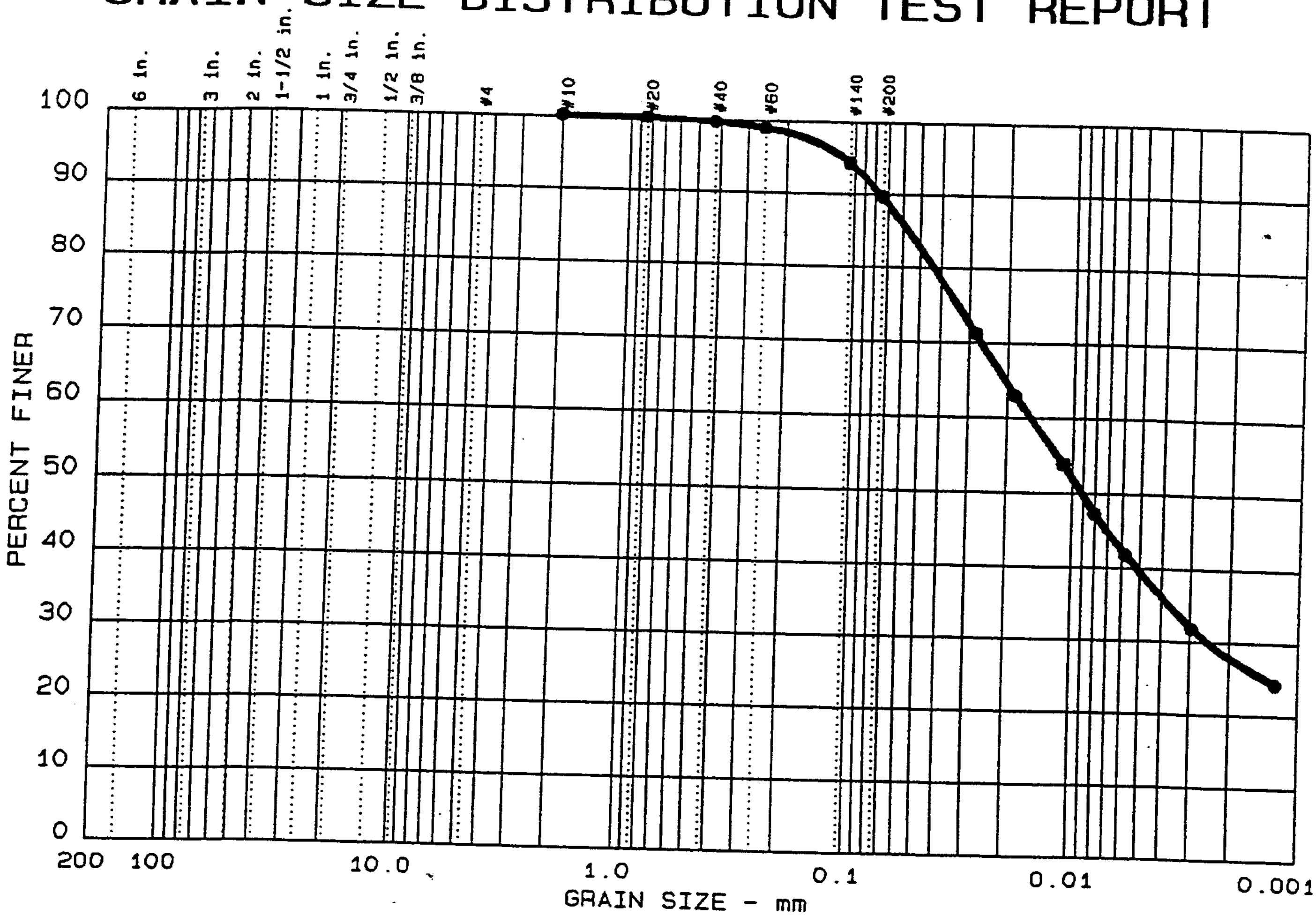
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: [signature]

Moisture Content = 26.9%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	10.3	50.2	39.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●					0.01	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Clayey Silt with Sand	ML	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-2 Ud @ 39.0-41.0 Ft.

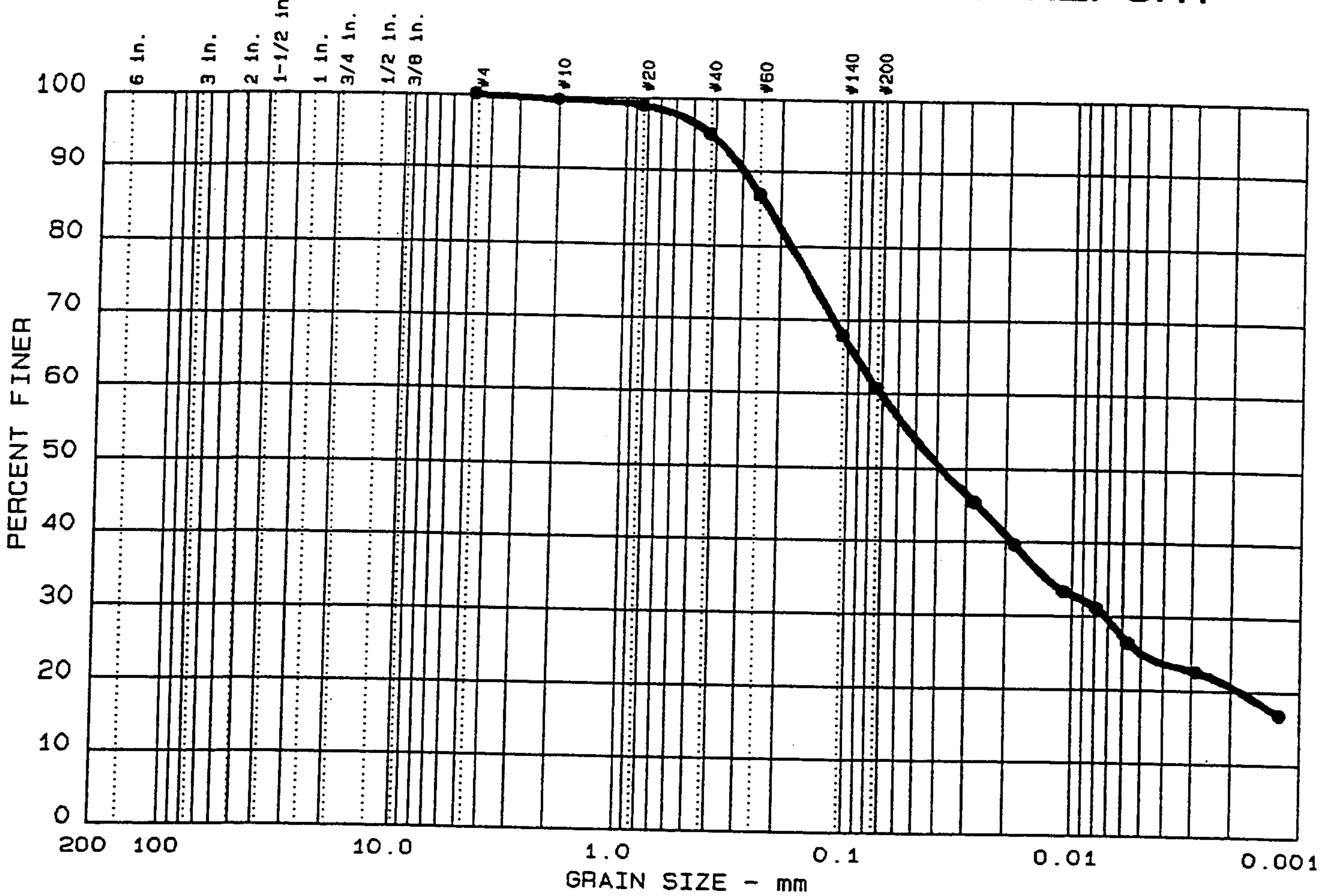
Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC/JTm
Reviewed by: lb

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	0.0	39.2	35.7	25.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.23		0.04	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4(0.0)

Project No.: 50300-8-2075

Project: TVA John Sevier

● Location: B-99-4 S-5

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Remarks:

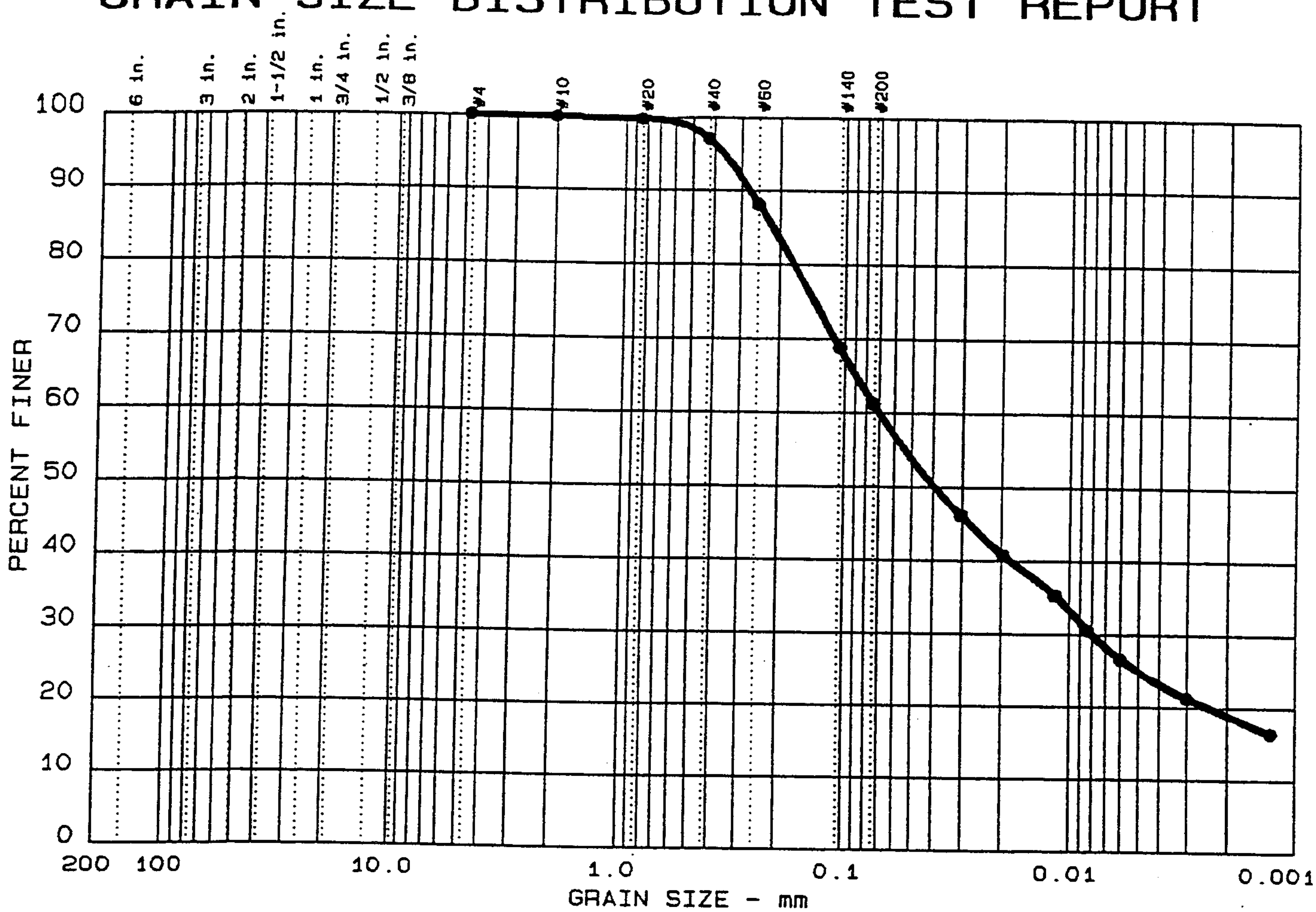
Tested by: SC

Reviewed by: Hb

Moisture Content = 21.1%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	0.0	38.9	36.2	24.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	29	10	0.21		0.04	0.008				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Lean Clay	CL Barely!	A-4 (3.8)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-4 Ud @ 29-31 Ft.

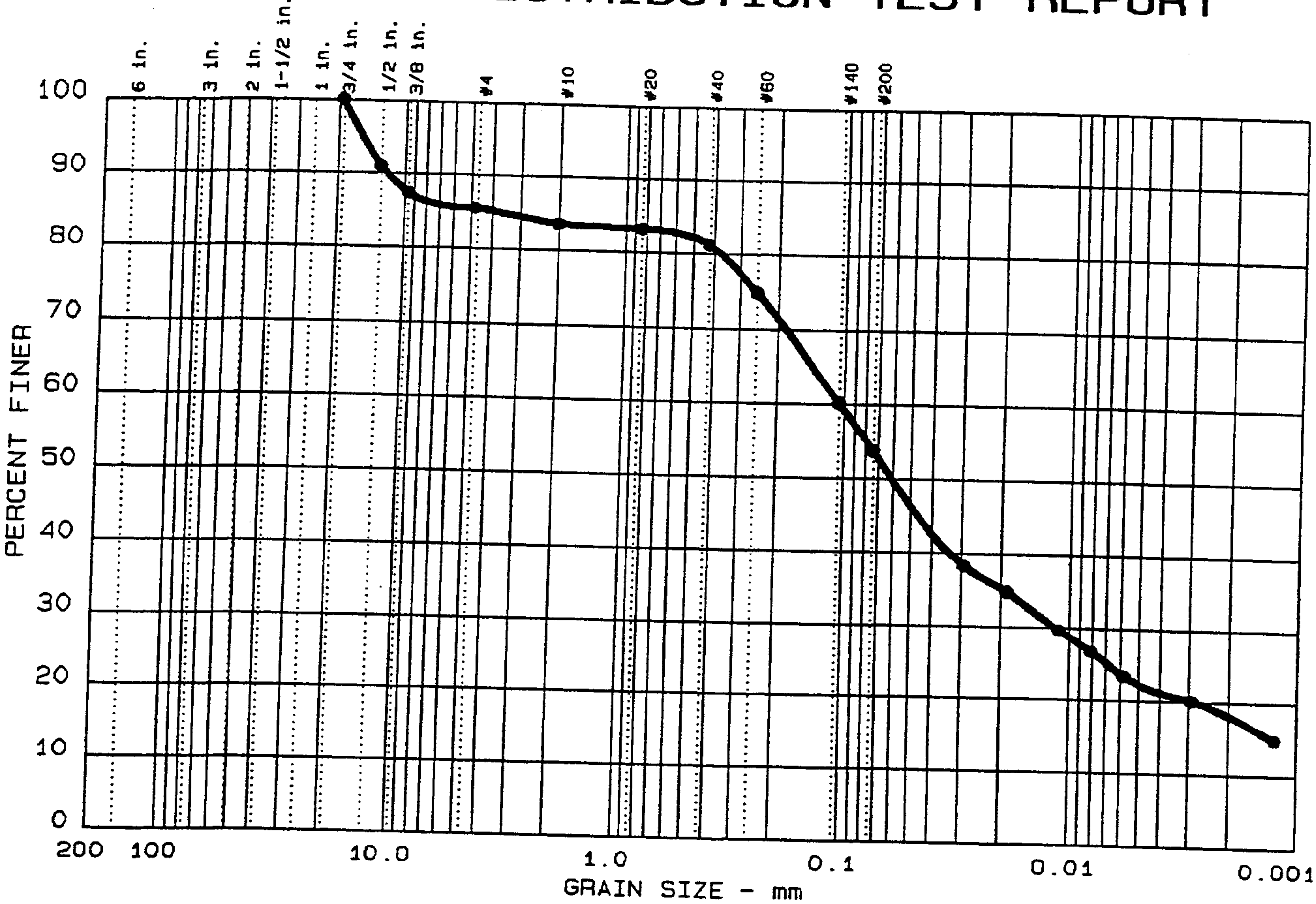
Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: HB

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	14.5	31.7	31.5	22.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			3.76	0.10	0.06	0.012				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-4 S-9

Date: August 29, 1999

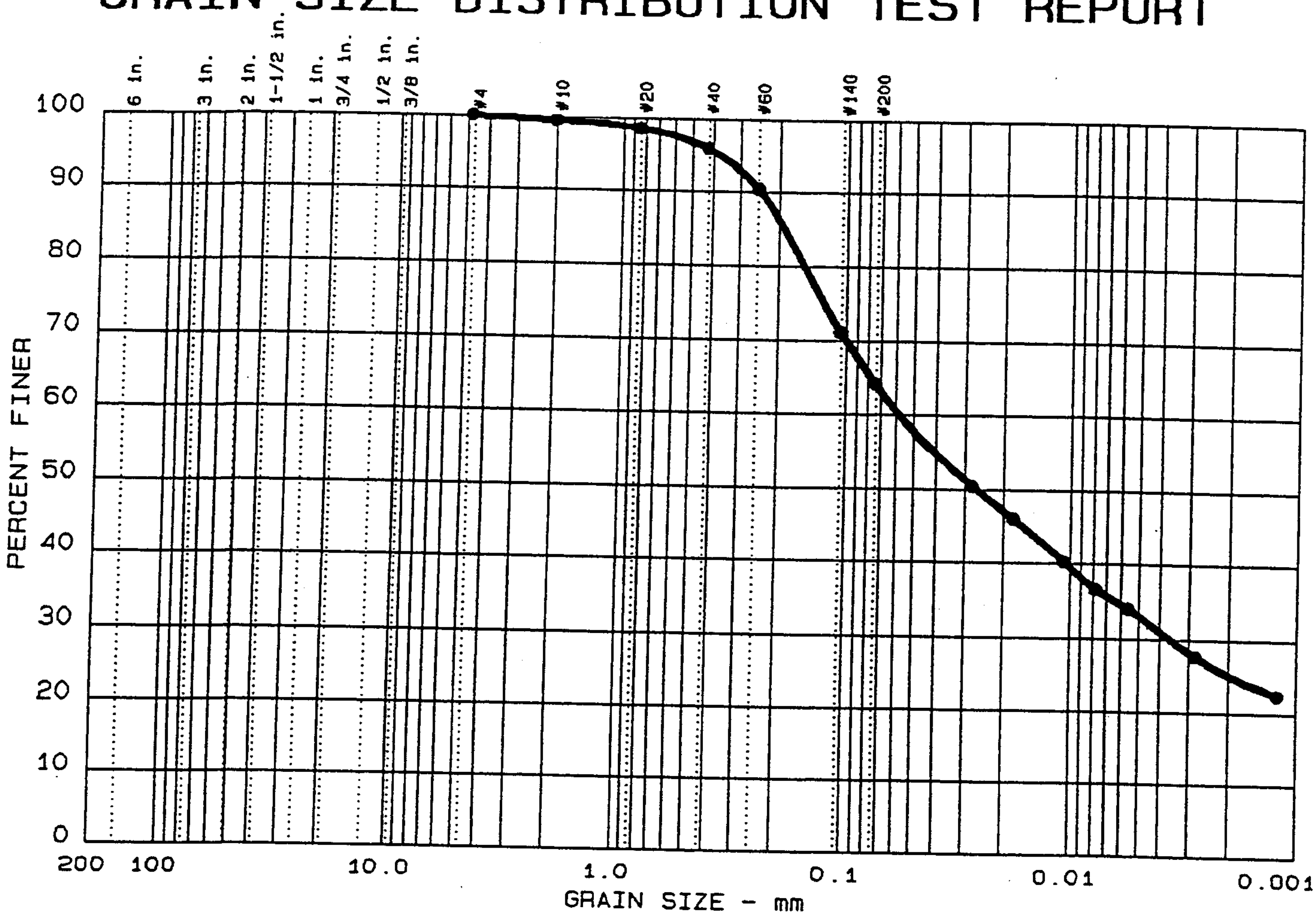
Remarks:
Tested by: SC
Reviewed by: tb

Moisture Content = 16.9%

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	9	0.0	0.0	35.9	31.1	33.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.19		0.03	0.004				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-5 S-4

Date: August 29, 1999

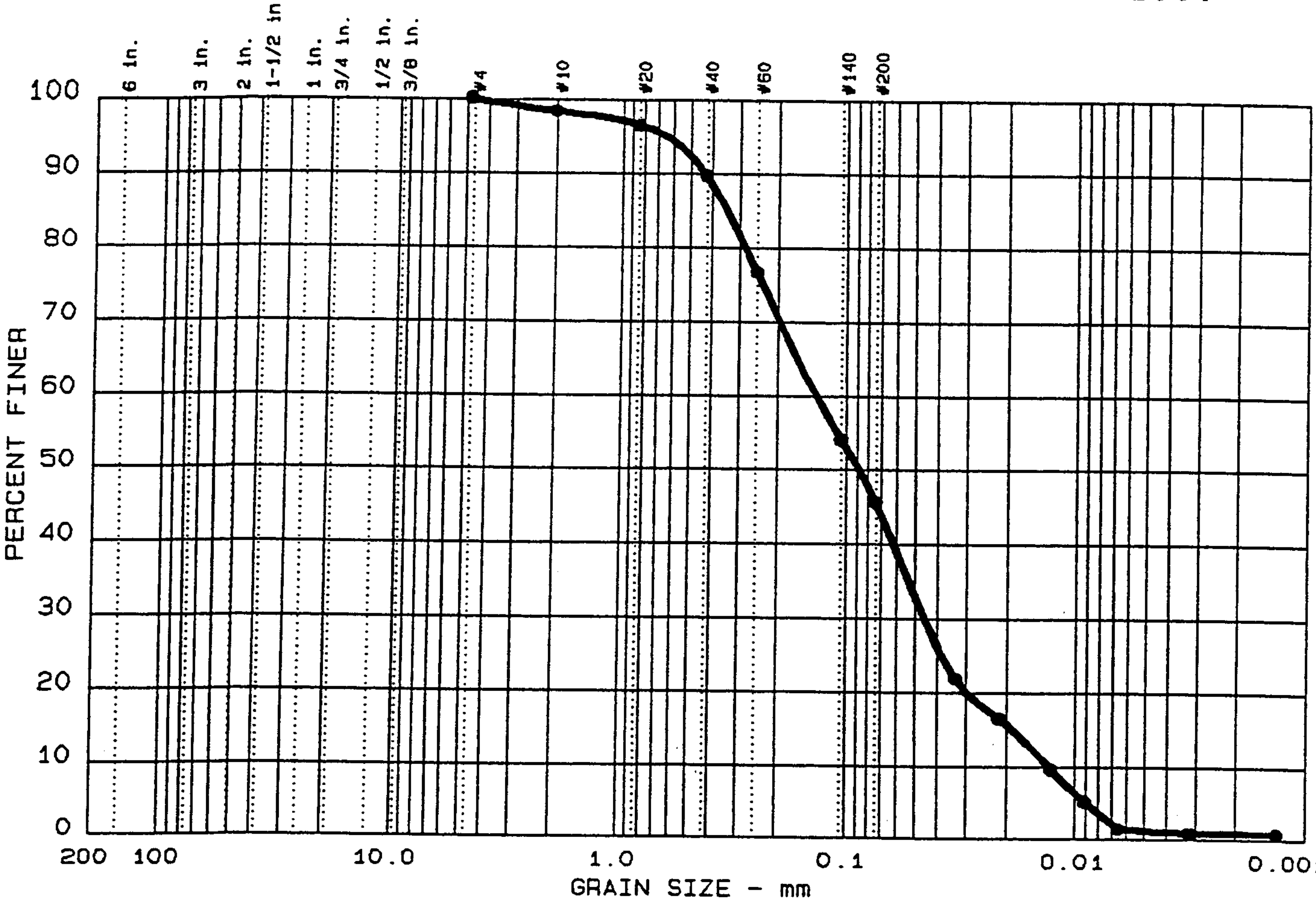
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: [signature]

Moisture Content = 19.6%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	54.5	44.3	1.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.34	0.13	0.09	0.045	0.0186	0.0129	1.19	10.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Silty Sand	SM	A-4(0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-5 Ud @ 19.0-21.0 Ft.

Date: August 29, 1999

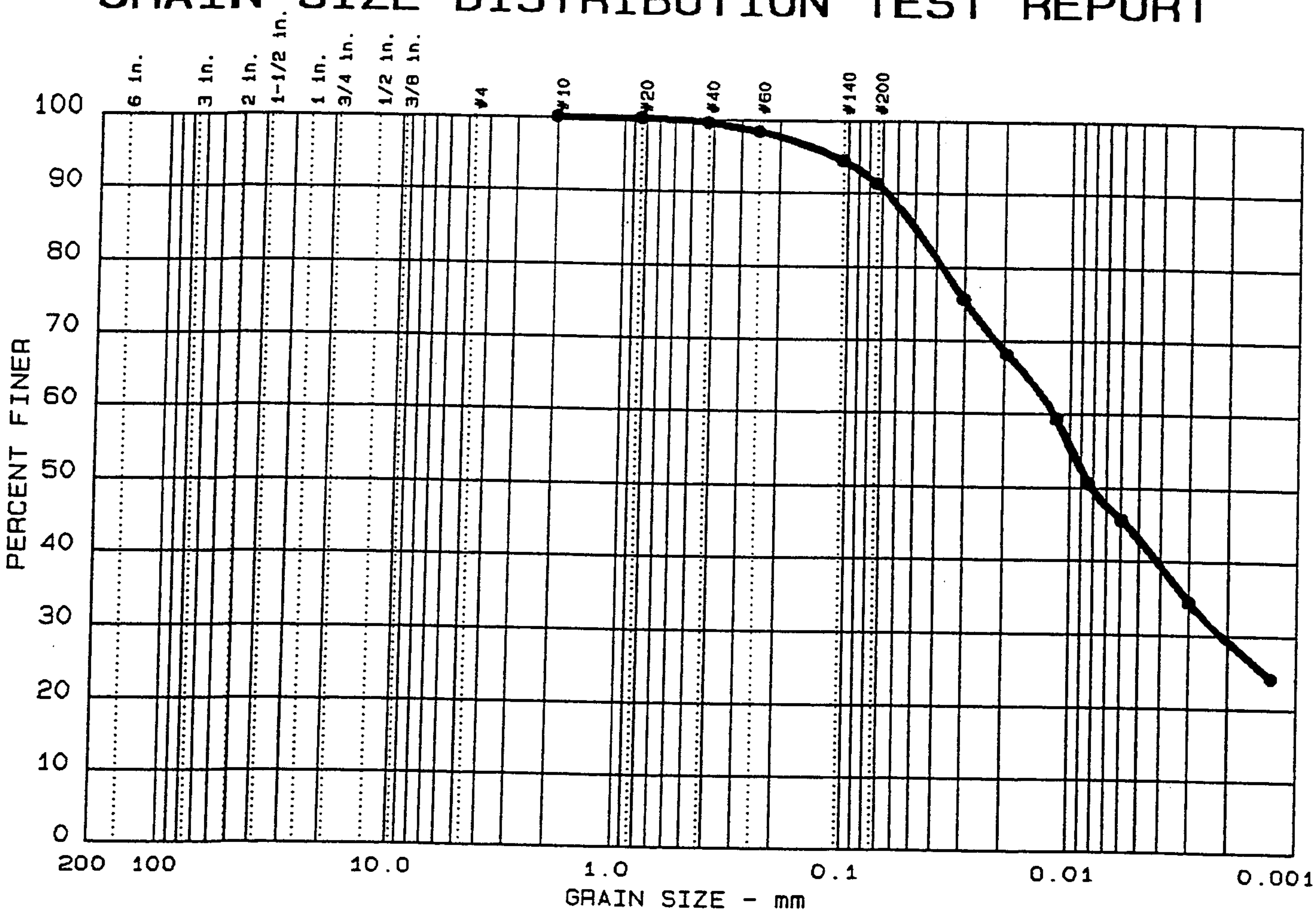
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by:
Reviewed by:

Moisture Content = 68.9%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	0.0	8.6	48.4	43.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	49	25			0.01	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Lean Clay	CL	A-7-6 (25.1)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-5 Ud @ 34.0-36.0 Ft.

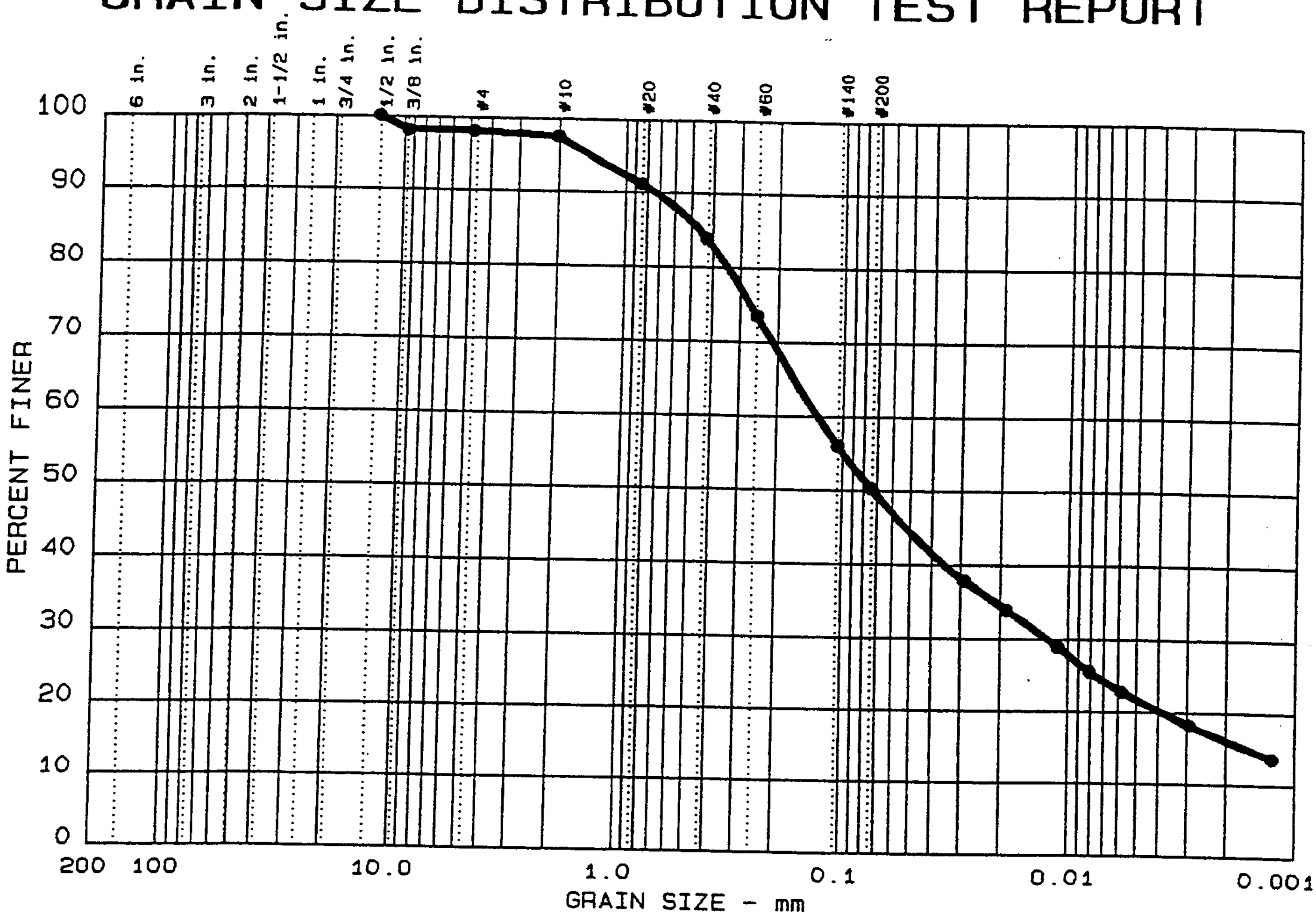
Date: August 31, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: Hb

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	11	0.0	1.9	47.9	28.4	21.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.45	0.13	0.07	0.012	0.0016			

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-6 S-5

Date: August 29, 1999

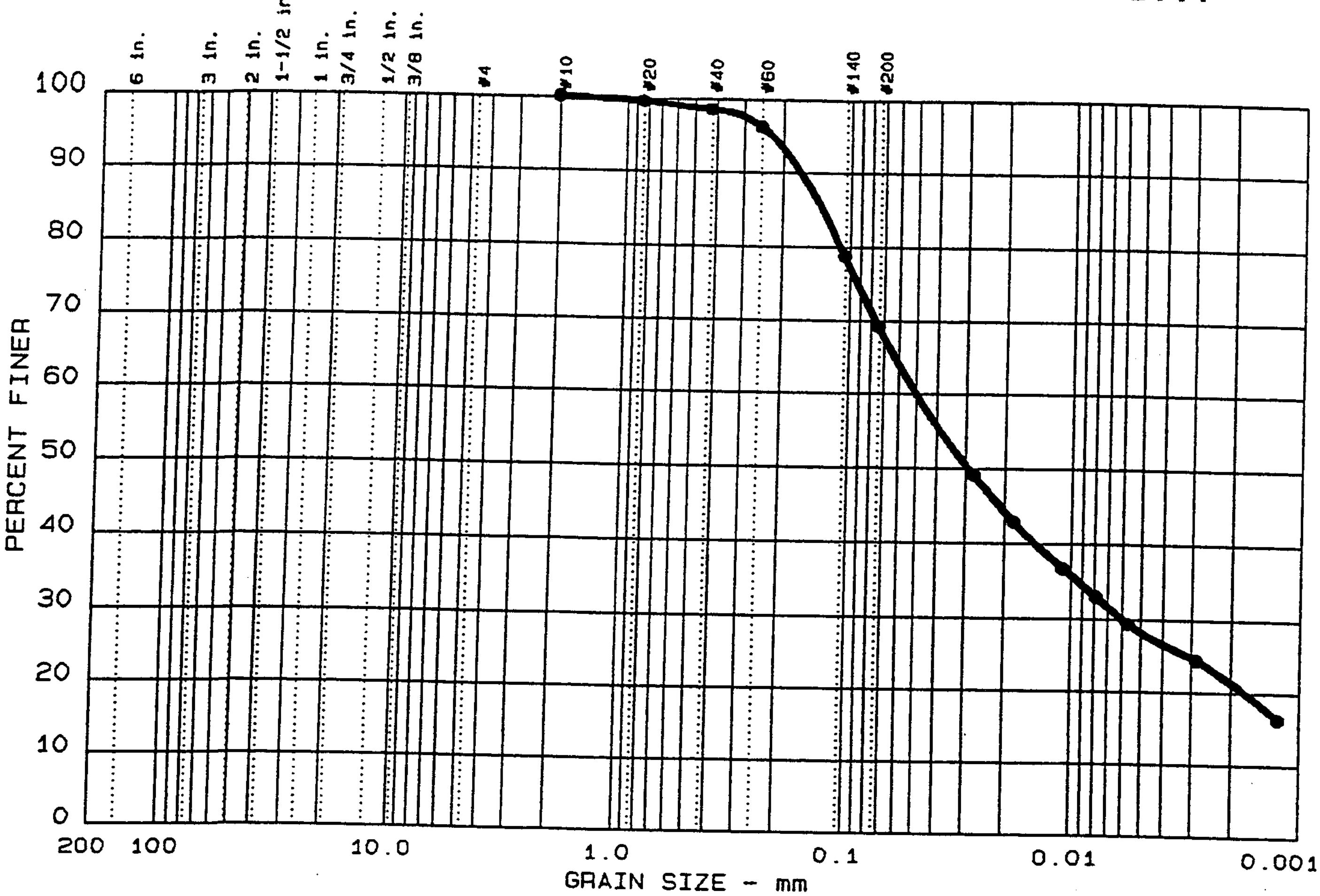
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: tb

Moisture Content = 18.0%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	30.8	41.0	28.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.13		0.03	0.006				

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-7 S-6

Date: August 29, 1999

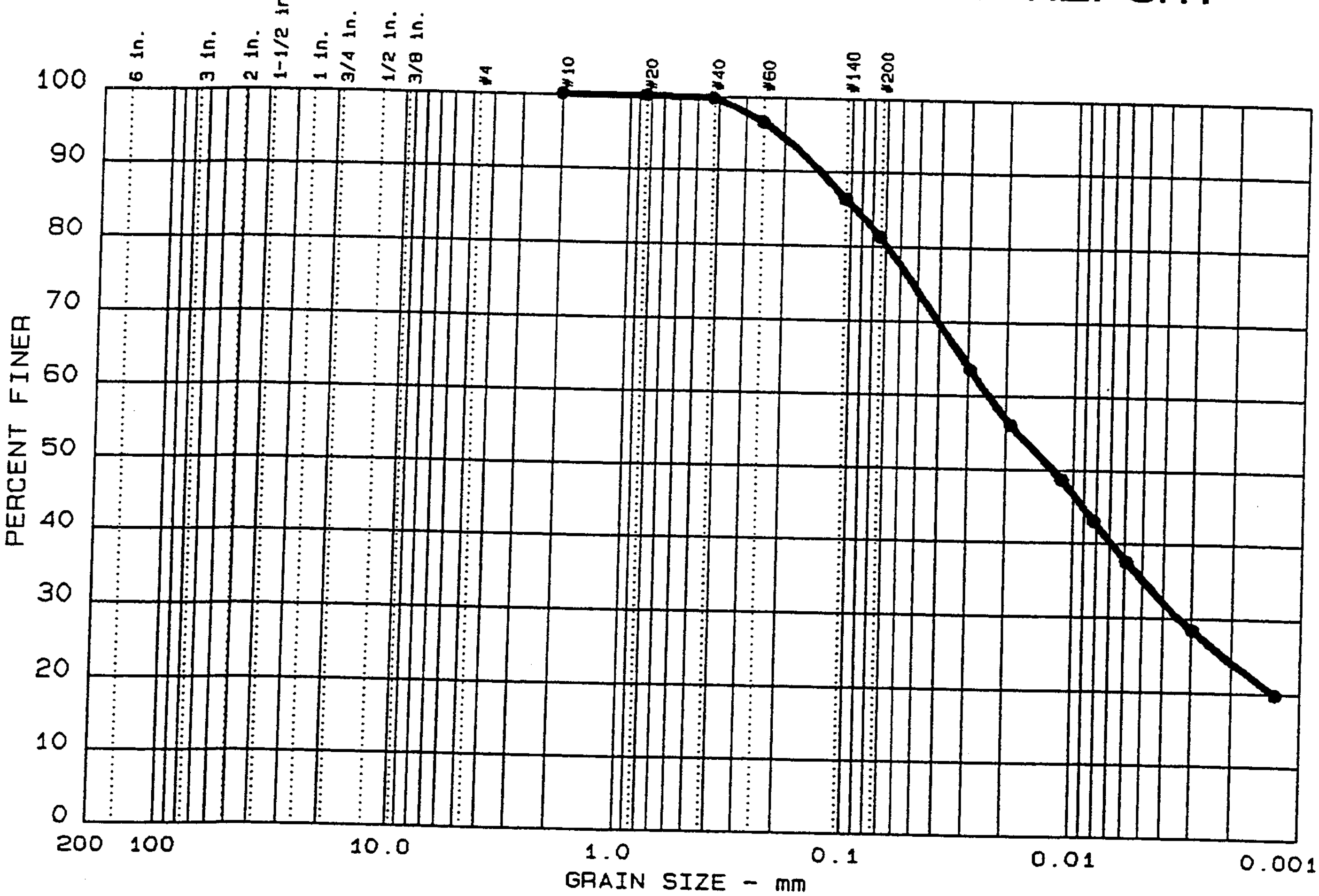
Remarks:
Tested by: SC
Reviewed by: [signature]

Moisture Content = 21.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	0.0	18.7	46.3	35.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	45	23	0.09		0.01	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Sandy Lean Clay	CL	A-7-6 (18.9)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-8 Ud @ 4.0-6.0 ft.

Date: August 31, 1999

Remarks:

Tested by: SC

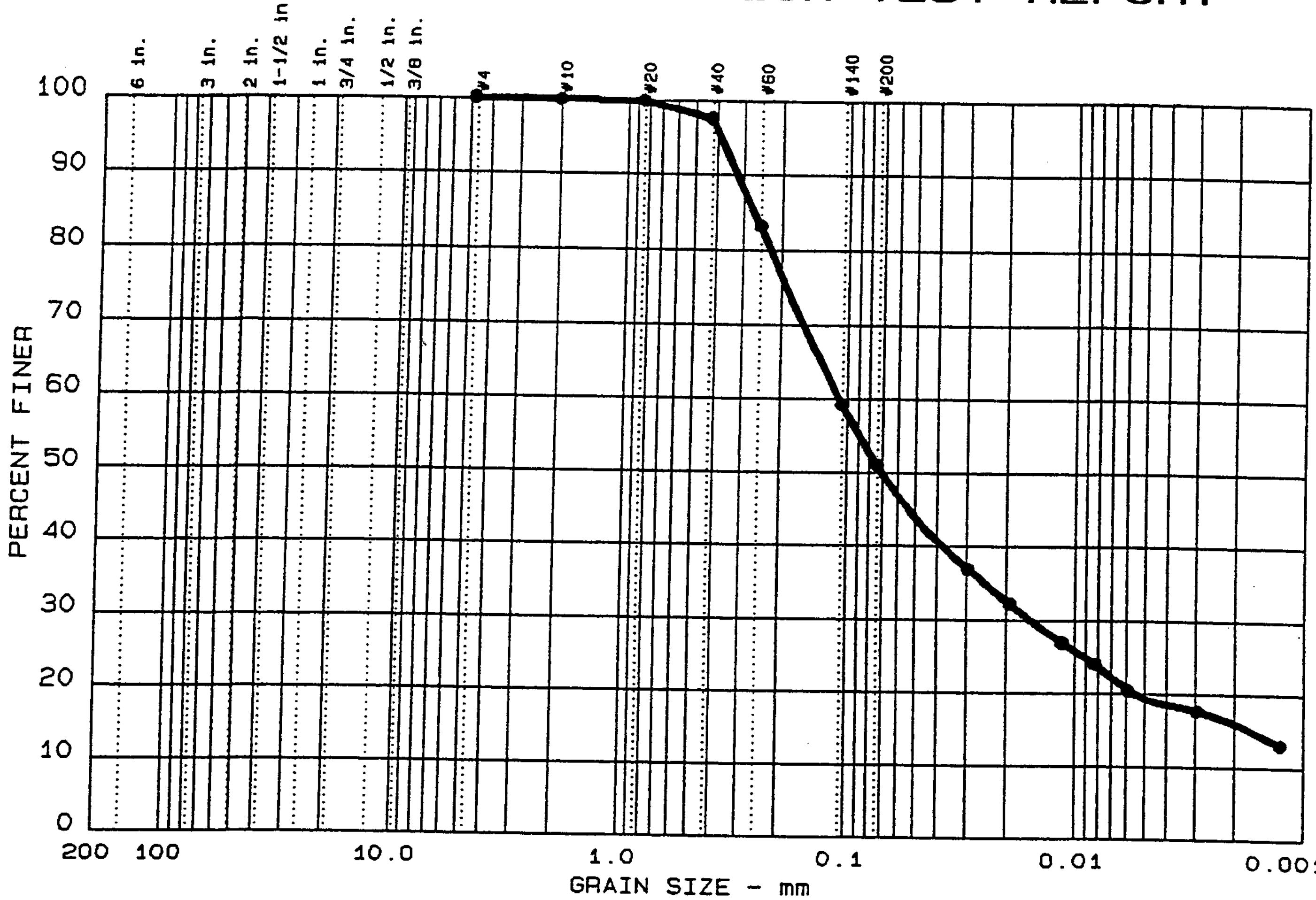
Reviewed by: [illegible]

GRAIN SIZE DISTRIBUTION TEST REPORT

LAW ENGINEERING, INC.

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	0.0	49.0	31.6	19.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.27	0.11	0.07	0.016	0.0016			

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Brown Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-10 S-5

Date: August 29, 1999

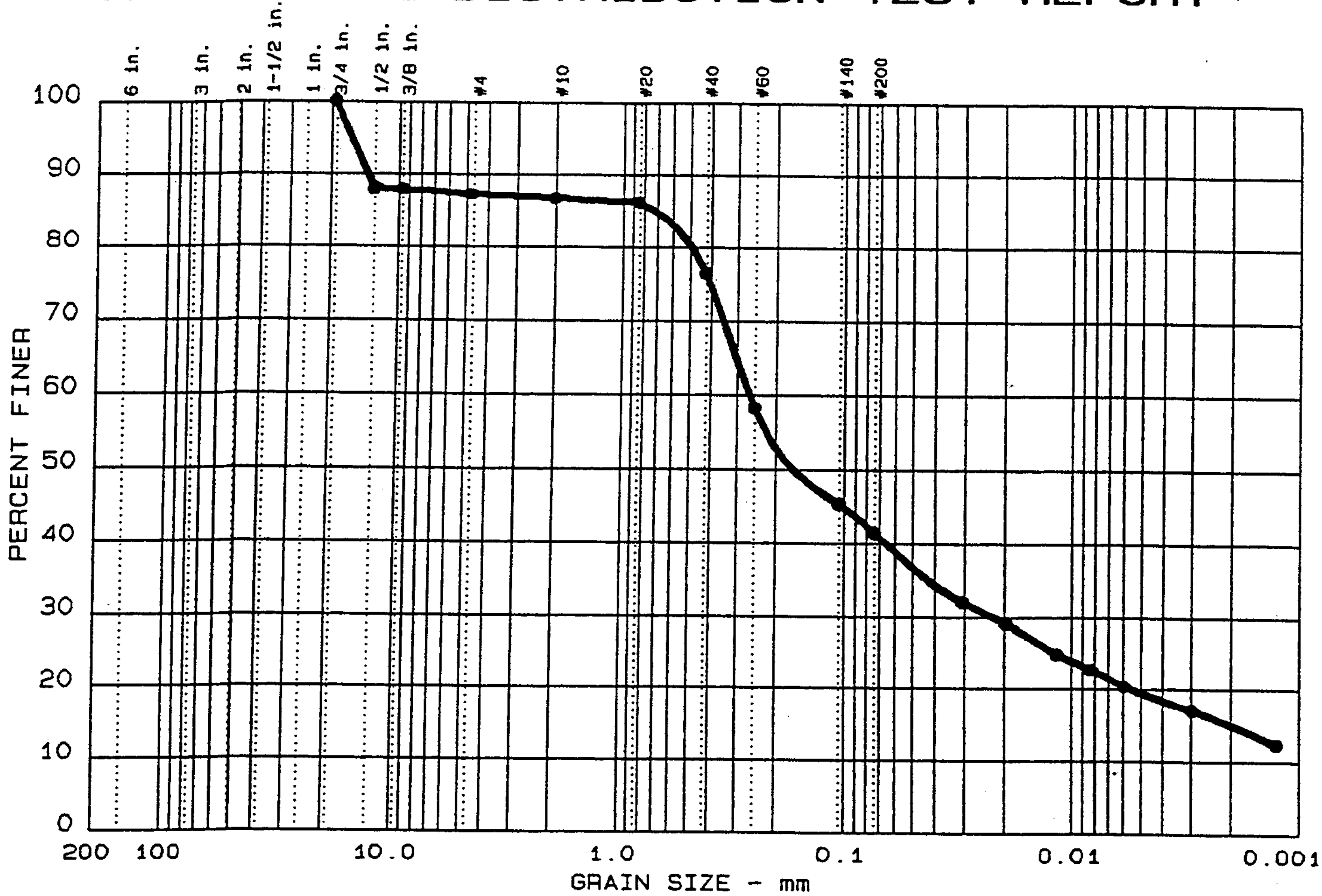
GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: SC
Reviewed by: Hb

Moisture Content = 19.3%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	12.7	45.9	22.0	19.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.72	0.26	0.17	0.022	0.0020			

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown Silty Sand	SM	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-12 S-4

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT

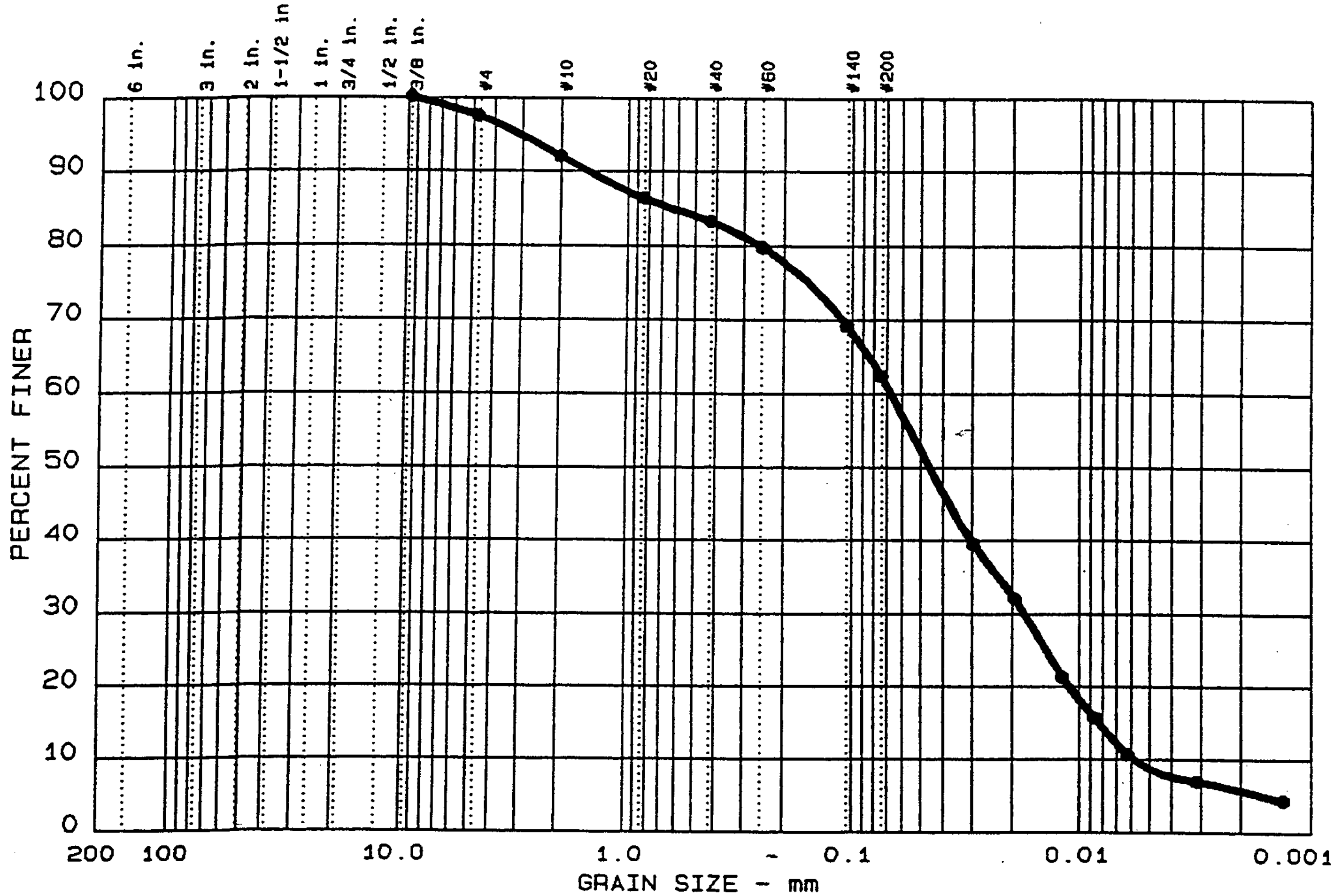
LAW ENGINEERING, INC.

Remarks:
Tested by: JTM
Reviewed by: [signature]

Moisture Content = 18.0%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	2.5	35.2	53.7	8.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NL	NP	0.62		0.05	0.017	0.0082	0.0059	0.78	11.4

MATERIAL DESCRIPTION	USCS	AASHTO
● Gray Sandy Silt	ML	A-4 (0.0)

Project No.: 50300-8-2075
Project: TVA John Sevier
● Location: B-99-13 Ud @ 19.0-21.0 Ft.

Date: August 29, 1999

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING, INC.

Remarks:
Tested by: J Tm
Reviewed by: Hb

Moisture Content = 21.3%

Figure No.

Lynn —
Please discuss w/
me & Steve your Church
Review

R

PARSONS

CALCULATION COVER SHEET

B65 991026 252

CLIENT	Tennessee Valley Authority
PROJECT	John Sevier Fossil Plant
SUBJECT	Geotechnical Evaluation of Ash Pond Dike Stability
JOB NUMBER	541055 — WBS NUMBER 67100
CALCULATION NO.:	? ????? — PAGE 1 OF 3

DESCRIPTION/PURPOSE

To evaluate the geotechnical stability of the existing fly ash pond dike at the John Sevier Fossil Plant, and to recommend/propose alternatives for maintaining, improving and/or repairing the dike, either in part or whole, when the Factor of Safety (FS) against instability was not sufficient. In this evaluation and study, a minimum FS of 1.3 (*is this acceptable for TVA ?*) is assumed to be acceptable when laboratory test results are available from the subsurface strata, as is the case in this study.

METHOD OF ANALYSIS AND COMPUTER PROGRAMS

The stability of the dike was evaluated using the computer program PC STABL, which was developed for Federal Highway Administration at Purdue University as the general solution for two-dimensional slope stability problems using the limit equilibrium method. The calculation of the factor of safety against instability of a slope is performed by the method of slices. The particular methods employed in STABL are the simplified Bishop method, applicable to circular shaped failure surfaces, the simplified Janbu method, applicable to failure surfaces of general shape, and the Spencer method, applicable to any type of surface. STABL features unique random techniques for generation of potential failure surfaces for subsequent determination of the more critical surfaces and their corresponding factors of safety. One technique generates circular. Another generates surfaces of sliding blocks. And a third method generates irregular surfaces of random shape. For more details, see the STABL web page at http://www.ecn.purdue.edu/STABL/

DRAFT

In this study a graphical interface program called STED (short for STabl EDitor), which is a smart editor for all the STABL programs, was used. STED itself performs no stability analysis but creates data files in the format expected by STABL and prepares high-quality graphics from the output. It supports PCSTABL versions 4, 4M, 5, 5M and 6H, and PennDOT's PASTABLM.EXE and PASTABLE.EXE programs. The specific versions used in this study was STABL5M, using the Bishop method (for circular failure surfaces), and STEDwin 2.0 (which is a recent release that supports the latest version of STABL6).

CODES AND STANDARDS

1. Per industry standards
2.
3.

REV	DATE	DESCRIPTION	PAGES REVISED	PAGES ADDED	PAGES DELETED	BY/DATE	REV/DATE	LDE/DATE
3								
2								
1								
0		ORIGINAL ISSUE	NA	NA	NA			

TVA_JS_Dike Evaluation.DOC — THIS IS A DESIGN RECORD — Form EP3-1 3/97

PARSONS

CALCULATION COVER SHEET

CLIENT	Tennessee Valley Authority
PROJECT	John Sevier Fossil Plant
SUBJECT	Geotechnical Evaluation of Ash Pond Dike Stability
JOB NUMBER	541055 WBS NUMBER 67100
CALCULATION NO.:	? ????? PAGE 2 OF 3

INFORMATION SOURCES

1. "Report of Geotechnical Exploration, Dike Exploration and Testing Program, John Sevier Fossil Plant", by Law Engineering (Project 50300-8-2075/0024/0800), 10/01/99
2. "Groundwater Monitoring Well Installation Report, John Sevier Fossil Plant", by Law Engineering (Project 50385-5-0400/0045/0001), 07/08/98
3. "Report of Hyrdogeologic and Engineering Evaluation (Revised) for Proposed Dry Ash Disposal Facility Site, John Sevier Fossil Plant", by Law Engineering (Project 5740144.01), 09/30/94
4. Ash Disposal Stack Area Existing Contour (John Sevier Fossil Plant) drawing 10W204-9 revised
5. "Current Trends in Design and Construction of Embankment Dams" by American Society of Civil Engineers, 1979
6. Survey drawing JSEROSON.DWG
7. Drawings 10W2871, 10W2872, 10W2873, and 10W2874

ASSUMPTIONS

Topographic data was not available up to the actual riverbank. It was assumed for this study that the ground surface drops a further 10 to 15 below that at the "Edge of River Bank" shown on reference 4.

Based on available test boring data and laboratory test results, and our engineering interpretation of them, generalized subsurface startigraphy (or profiles) were developed at seven selected cross sections (C1-C1 through C7-C7) for the slope stability evaluations. The profiles, along with the stratification are shown on the run outputs in Appendix B.

Material strength properties of the different starta are as noted on the profiles in Appendix B. These parameters were based on available boring data and laboratory testing results, and our engineering interpretation and judgement. To account for the somewhat random profile and nature of the old wet ash, slightly conservative parameters were assumed.

Where determined to be necessary, the materials used to create new fill sections on top of the dike to flatten the dike may consist of a mix of the existing soil cover on top of the dike and the underlying soft (and wet) fly ash, or any other approved materials that will have properties equivalent to that of Strata 1 after placement and compaction, which should be monitored.

For the purpose of this evaluation and study, it is assumed that a minimum FS of 1.3 (*- discus with TVA ! ?*) is sufficient when laboratory test results are available from the subsurface strata, as is the case in this study.

CONCLUSIONS OR RESULTS

The minimum Factors of Safety (FS) obtained from the evaluation at the seven sections is summarized below. As mentioned earlier, the stability of the existing slope was first analyzed, including some with slightly higher groundwater levels.

PARSONS

CALCULATION COVER SHEET

CLIENT: Tennessee Valley Authority

PROJECT: John Sevier Fossil Plant

SUBJECT: Geotechnical Evaluation of Ash Pond Dike Stability

JOB NUMBER: 541055 WBS NUMBER: 67100

CALCULATION NO.: ? ?????

Section	Existing	Existing w/ higher water level	Re-graded to 3H:1V	Re-graded to 2.5H:1V
C1-C1	1.30	1.10	n/a	n/a
C2-C2	1.61	1.36	n/a	n/a
C3-C3	0.87	0.87	1.86	1.58
C4-C4	0.90	0.90	1.64	1.11
C5-C5	1.10	0.89	1.22	1.48
C7-C7	1.36	1.36	n/a	n/a
C6-C6	0.94	0.85	1.31	n/a

Based on these data and the assumptions stated earlier, it appears that the existing dike is stable from just west of section C1-C1 to about midpoint between C2C2 and C3C3 (near where the slope steepens). From about midpoint between C2C2 and C3C3 to near the split corner (at Section C7-C7), it is at best only marginally safe. The stability of the dike around C7-C7 maybe acceptable (if 1.3 is) while that around C6-C6 is not. It should be noted that with the exception at C6-C6, all of these are generally consistent with field observations with respect to signs of instability (like slipages, sloughing, etc.) At C6-C6, the slope had tall and thick vegetative growth during our previous visit to prevent observing for signs of instability.

The marginally safe sections of the dike discussed above should be re-graded to attain a better FS. If an FS of at least 1.3 is considered acceptable, such as at C4C4 and C6,C6, certain portions of the dike can be re-graded to a 2.5H:1V slope (such as at C3C3 and C5C5) while the remaining to 3H:1V (such as at C4C4 and C6C6). Please see the site plan in Appendix D for locations (*will it be available/ ready for this draft ?).*

APPROACH, RESULTS AND DISCUSSION

Seven cross sections were selected along the dike for the slope stability evaluation, as shown on the site plan attached in Appendix A. At each location, C1-C1 through C7-C7, two runs were done, one with a groundwater level based on available boring well reading data and the other based on a higher groundwater level since water seeps were observed near the ground surface on some sections of the slope in the site. The second set was also analyzed to evaluate the effects of the underlying fly ash potentially acting as a large sponge.

As shown on the summary table of FS presented earlier, it appears that the existing dike is stable from just west of section C1C1 to about midpoint between C2C2 and C3C3 (near where the slope steepens). From about midpoint between C2C2 and C3C3 to near the corner (at Section C7C7), it is at best only marginally safe. The stability of the dike around C7C7 maybe acceptable while that around C6C6 is not / marginal ?. The groundwater level was sensitive to the stability depending on the stratigraphy at the location. For example, at sections C1C1, C2C2, C5C5 and C6C6, it was.

At those sections where the FS of the existing section with higher groundwater level was less than 1.3, the stability of the dike re-graded at a steepness of 3H:1V was evaluated. If the FS of the re-graded section was much greater than 1.3 (*an acceptable criteria* ?), the stability of the dike re-graded at a steepness of 2.5H:1V was then evaluated; else it was not. As shown on summary table of FS on the previous page, it appears that the existing dike can be re-graded to 2.5H:1V at C3 and C5 and to 3H:1V at C4 and C6. Please see the site plan in Appendix D for locations (*this is not ready at the time of issue of this draft*).

RECOMMENDATIONS

(1) DIKE STABILIZATION

The following are some three alternatives for improving the dike stability. Depending on cost, time and other factors, one of these should be chosen by the owner.

1.1 RE-GRADING OF DIKE: Re-grading of the dike embankment will be needed at sections of the dike as shown on the site plan in Appendix D (*this is not ready at the time of issue of this draft*). This will involve partially cutting into the embankment at the recommended slope and creating a new fill section on top of the existing dike, resulting in the existing access road being shifted in a southeast direction. The cuttings from the existing embankment maybe re-used for the new fill if placed in a control manner, i.e. with proper benching (into the embankment every 2 ft ?), placement (moisture and lift thickness controls), compaction (typically at 95% compaction of ASTM D698 MDD) and testing. Given the soft/wet conditions expected in the vicinity of the existing swale next to the access road, it maybe necessary to install a stabilizing geogrid (such Fortrac 4net20, which comes in 17 ft. wide rolls, or any other approved equivalent).

1.2. PIERS: Another alternative will be install piers into the dike and leave the existing dike as-is, i.e. no re-grading will be involved. Typically the piers will be positioned such as to intercept the critical failure circle. Based on a visual review of the outputs of the existing slope sections, the piers will most likely need to be installed in the middle of the slope face, and typically extended to 40 ft. deep, with 18" diameter and on 4 ft. on centers. If this alternative is further considered, the final diameter, spacing, and depths will need to be analyzed.

1.3 RETAINING WALL: Another alternative is to install a retaining wall system near the base (and in front) of the dike, with a height that will make the resulting back slope safe. The wall system can be of the geosynthetic reinforced backfill type (which may required some excavation into the dike), soldier piles with lagging (similar to a sheet and shoring retention) system, a rigid cantilever type. With this approach, the base or footing subgrade of the retaining walls will most likely have to be embedded into the firm Alluvium materials for global stability. The backfill materials may be fly ash, soil or mix, depending on the system chosen.

1.4 CHEMICAL: Another alternative may be by chemical treatment to the underlying soft fly ash layer. However this is not easily done in-situ, other than by excavation and replacement, and is only mentioned for completeness.

(2) DRAINAGE IMPROVEMENT

There is thick soft and wet fly ash (identified as Strata 2 in outputs) below the soil cap on top of the dike at nearly all of the sections (exceptions are at C1-C1 and C7-C7). Since fly ash is generally lightweight, relatively porous and of moderate permeabilities, it can act as a large sponge when there is a recharge source of groundwater. This may partially explain groundwater seeps observed on certain sections of the dike slope even when though groundwater was not observed at nearby the piezometers or borings at the similar elevations. And as noted earlier, the groundwater level was sensitive to the slope stability at sections C1-C1, C2-C2, C5-C5 and C6-C6. Hence control of both surface run off and subsurface drainage are important to minimize recharge volumes.

Runoffs from the slope above the existing dike should be diverted into swales, or an underground drain tile system, to prevent ponding and convey it away from the dike. Ensuring that the upper slope and the swale are grassed to minimize infiltration rates will help.

Similarly reducing the infiltration property of the dry ash area above the dike will also help, such as by daily sealing of ash surfaces with smooth drum roller with slopes. The latter may not be practically feasible depending on volume of dry ash processed. Though the exact source or sources of the groundwater seeps on the dike are not currently known, one alternative will to install a geocomposite trench type drain on the upgradient side of the dike to lower the groundwater inflow.

Erosion control - probably not an issue other than establishing vegetation after repairs.

PARSONS	CLIENT NAME: PROJECT NAME:				JOB NO.:
STANDARD CALCULATION SHEET	SUBJECT:				CALC NO.:
	REVISION	0	1	2	3	Page 1 of 1
	ORIGINATOR:					
	REVIEWER:					
	DATE:					

ATTACHMENTS

ATTACHMENT A Site Plan showing boring locations and cross sections

ATTACHMENT B Profiles at sections C1-C1 through C7-C7

ATTACHMENT C Stability outputs at sections C1-C1 through C7-C7

ATTACHMENT D Site Plan showing recommended areas for improvement (not available at time of issue of this draft !)

APPENDIX B

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C1-C1

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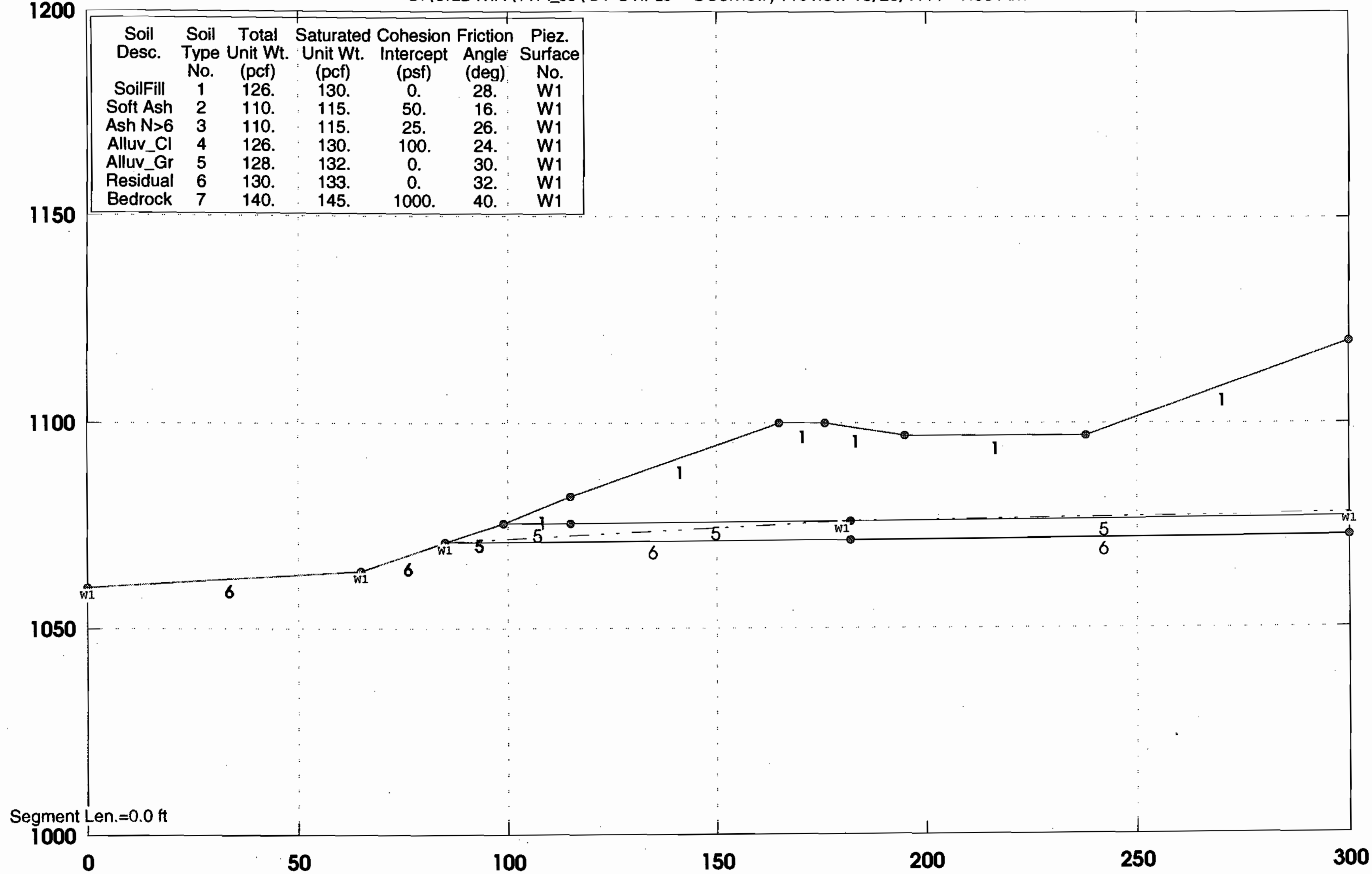

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C2-C2

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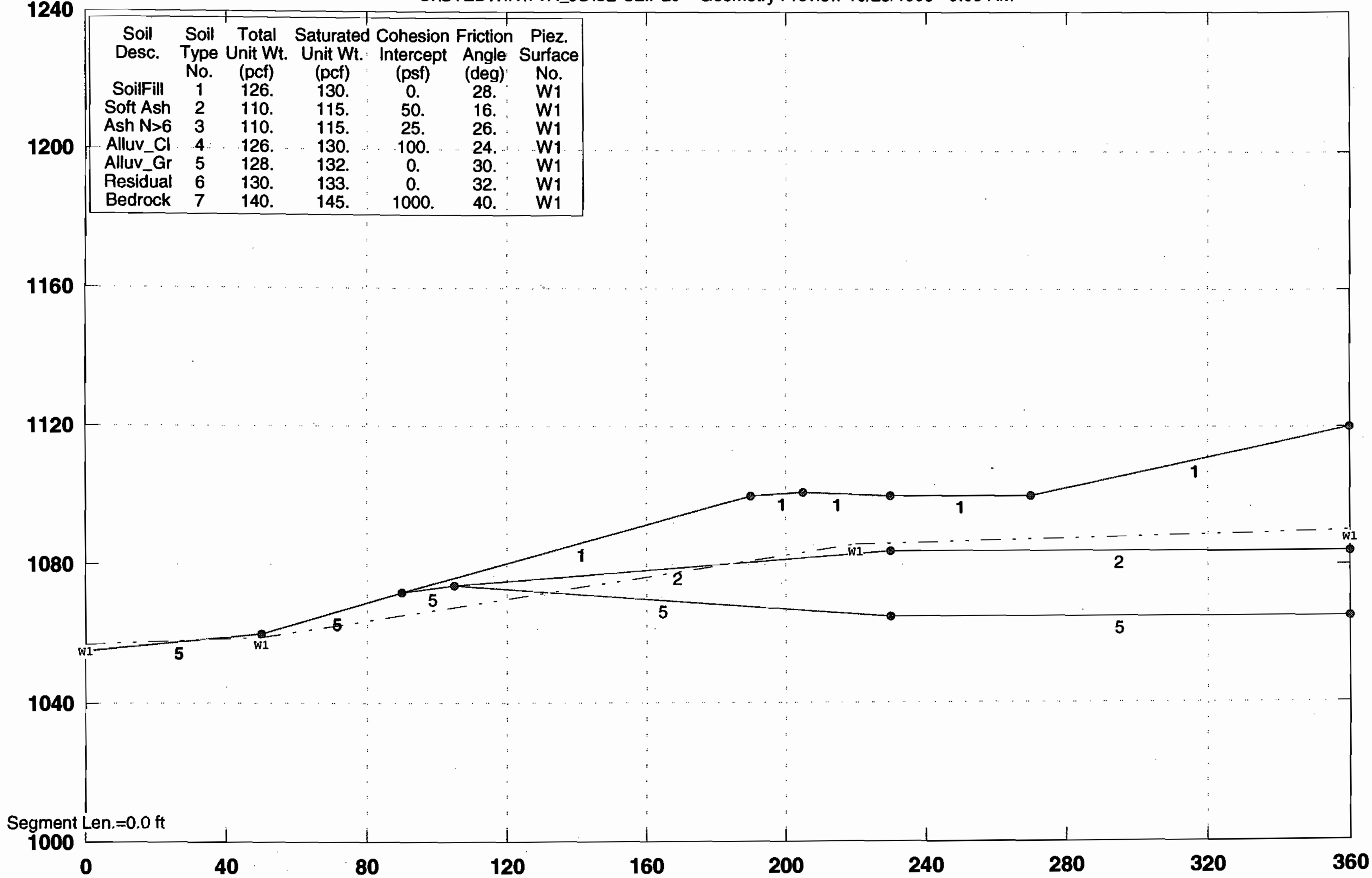
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1



TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C3-C3

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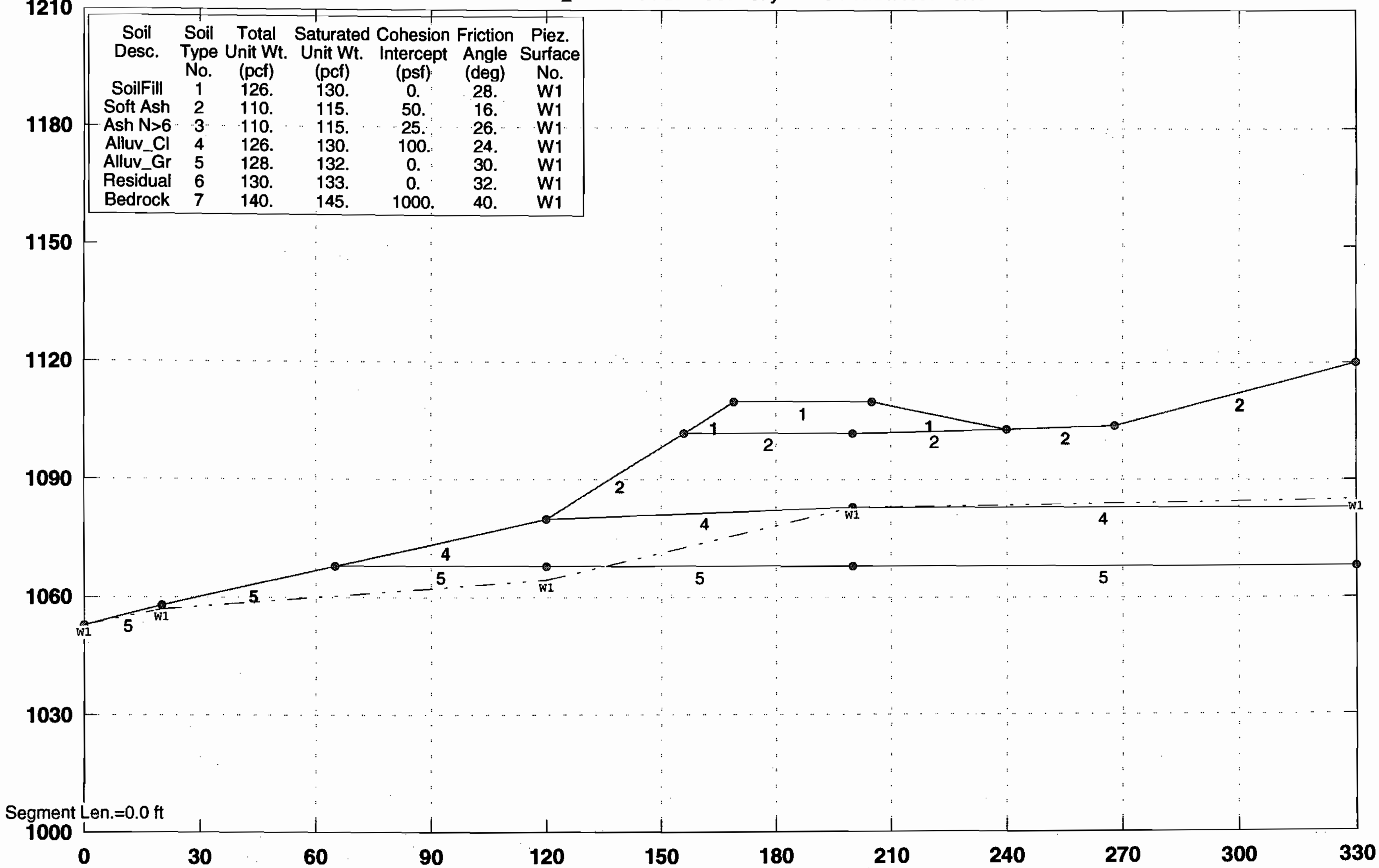
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1



TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C4-C4

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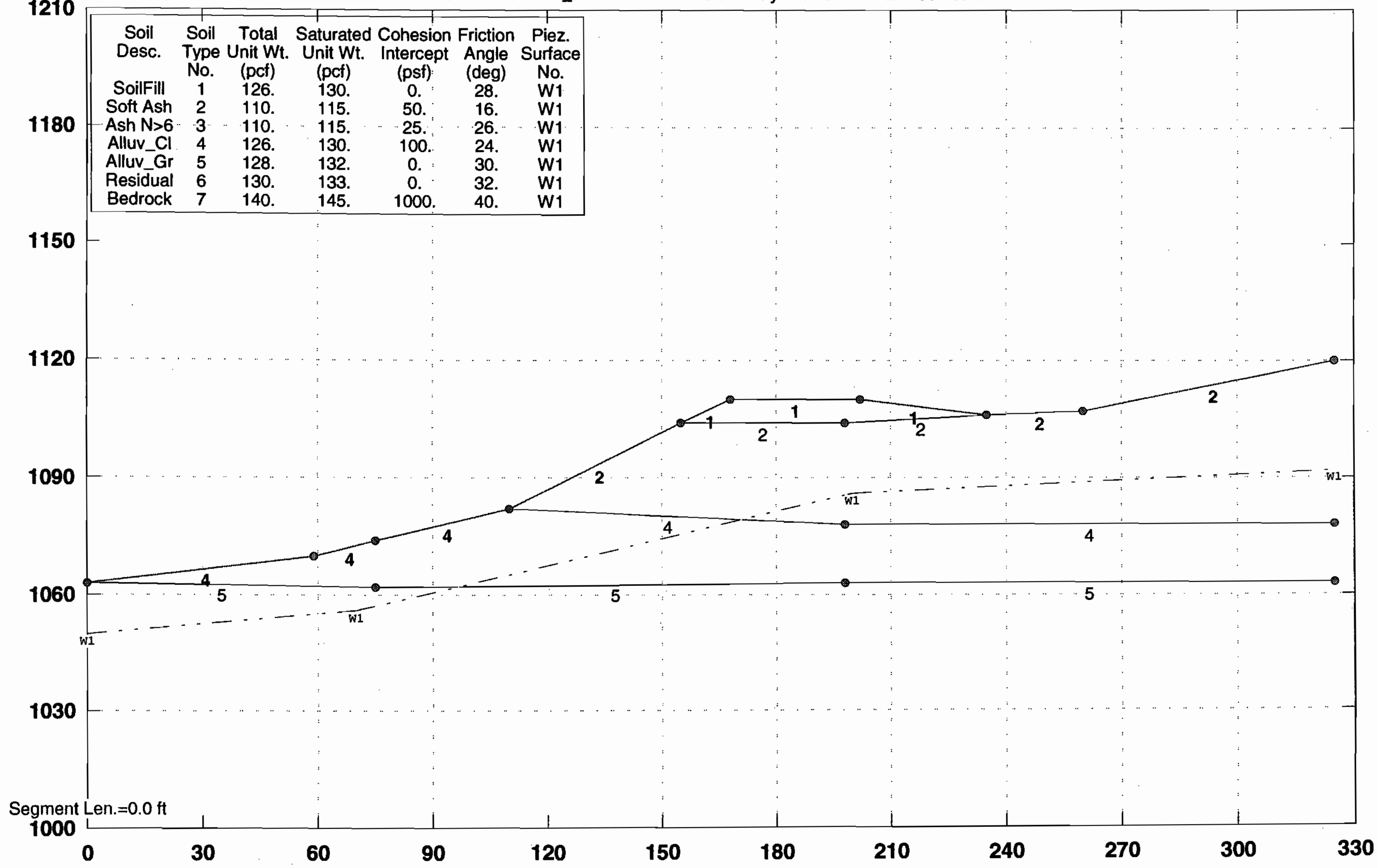

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C5-C5

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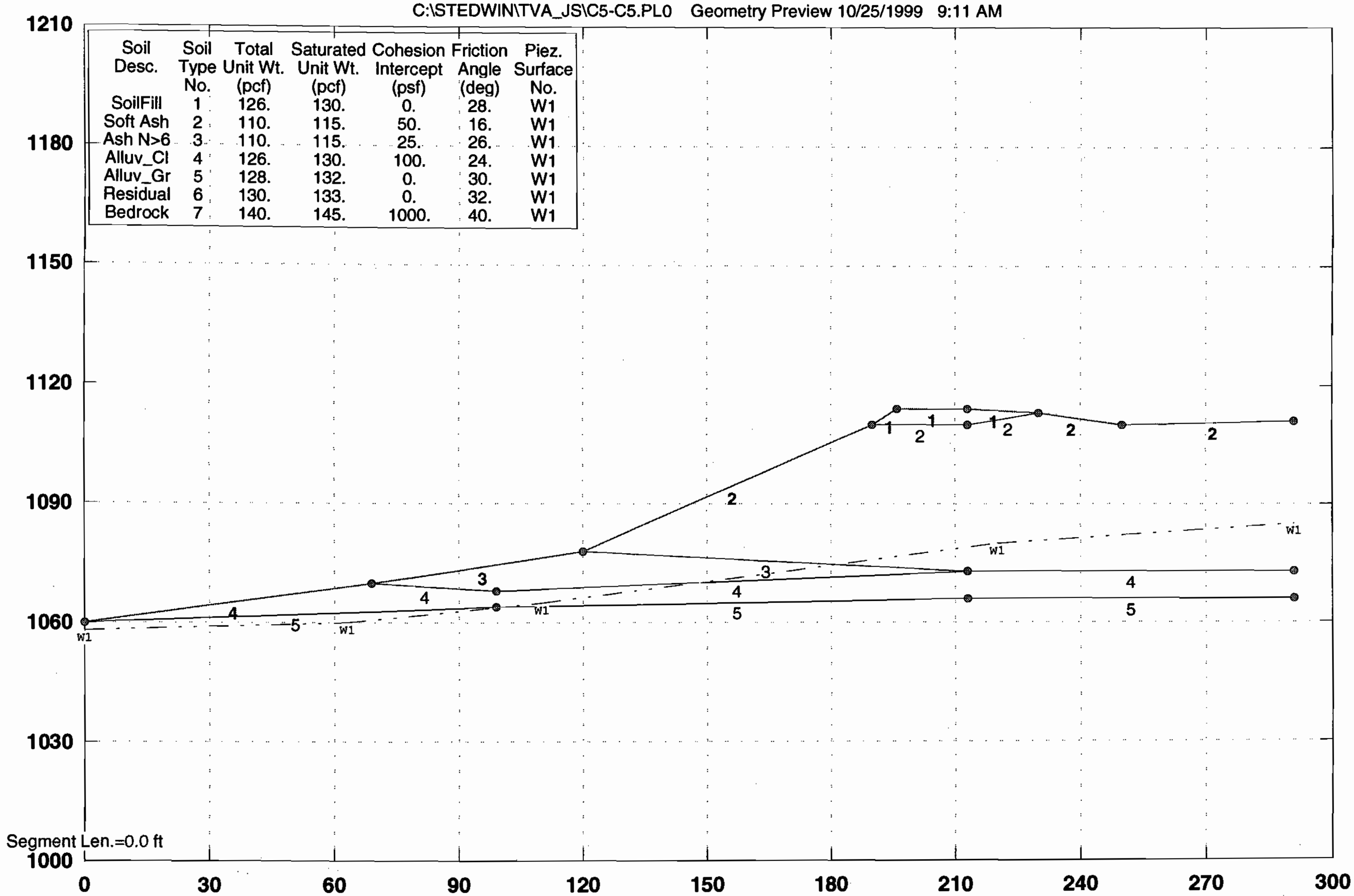
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1



TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C6-C6

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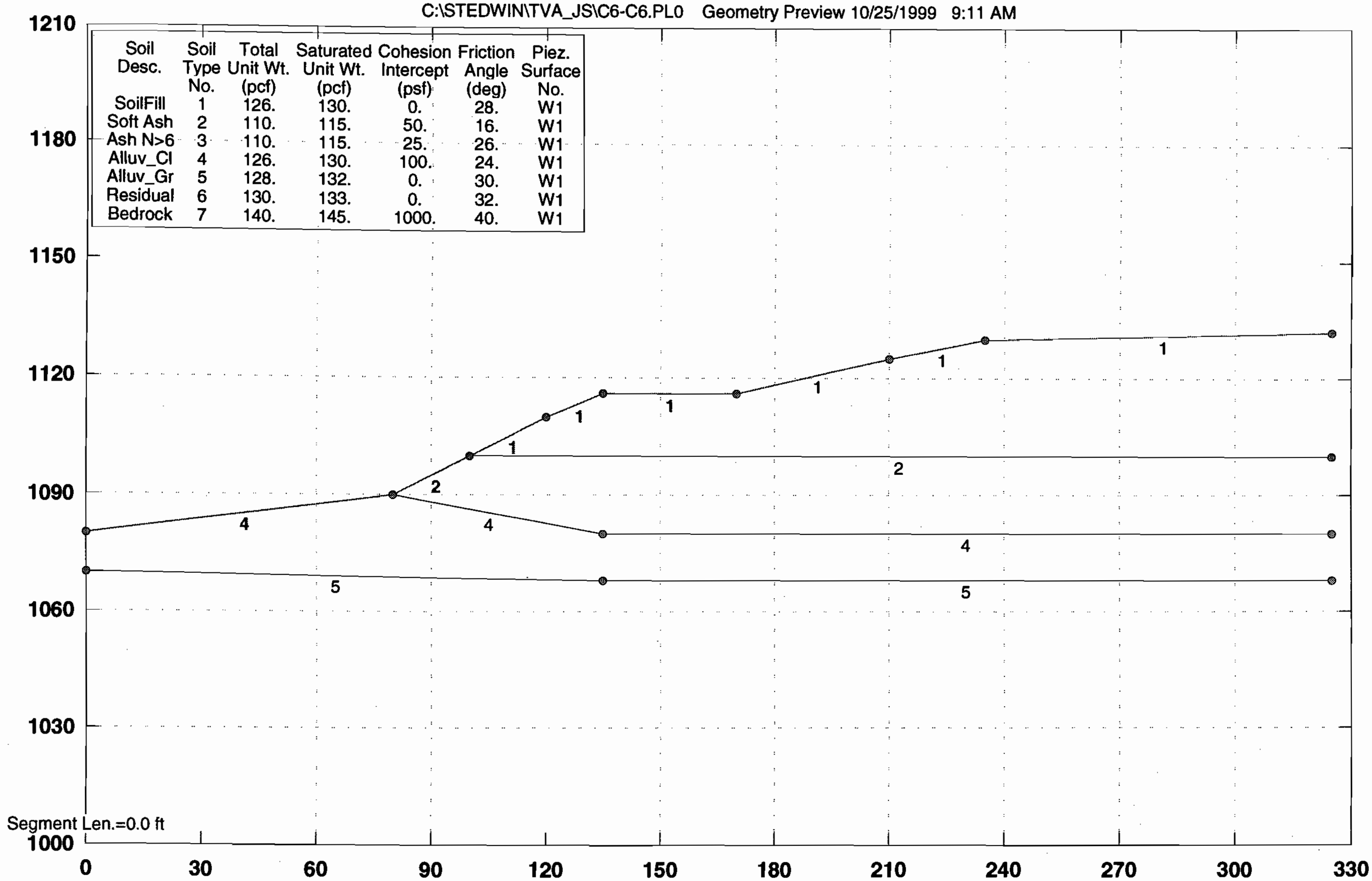

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SoilFill	1	126.	130.	0.	28.	W1
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1

TVA/John Sevier F/P; Ex. dike stabilityevaluation at section C7-C7

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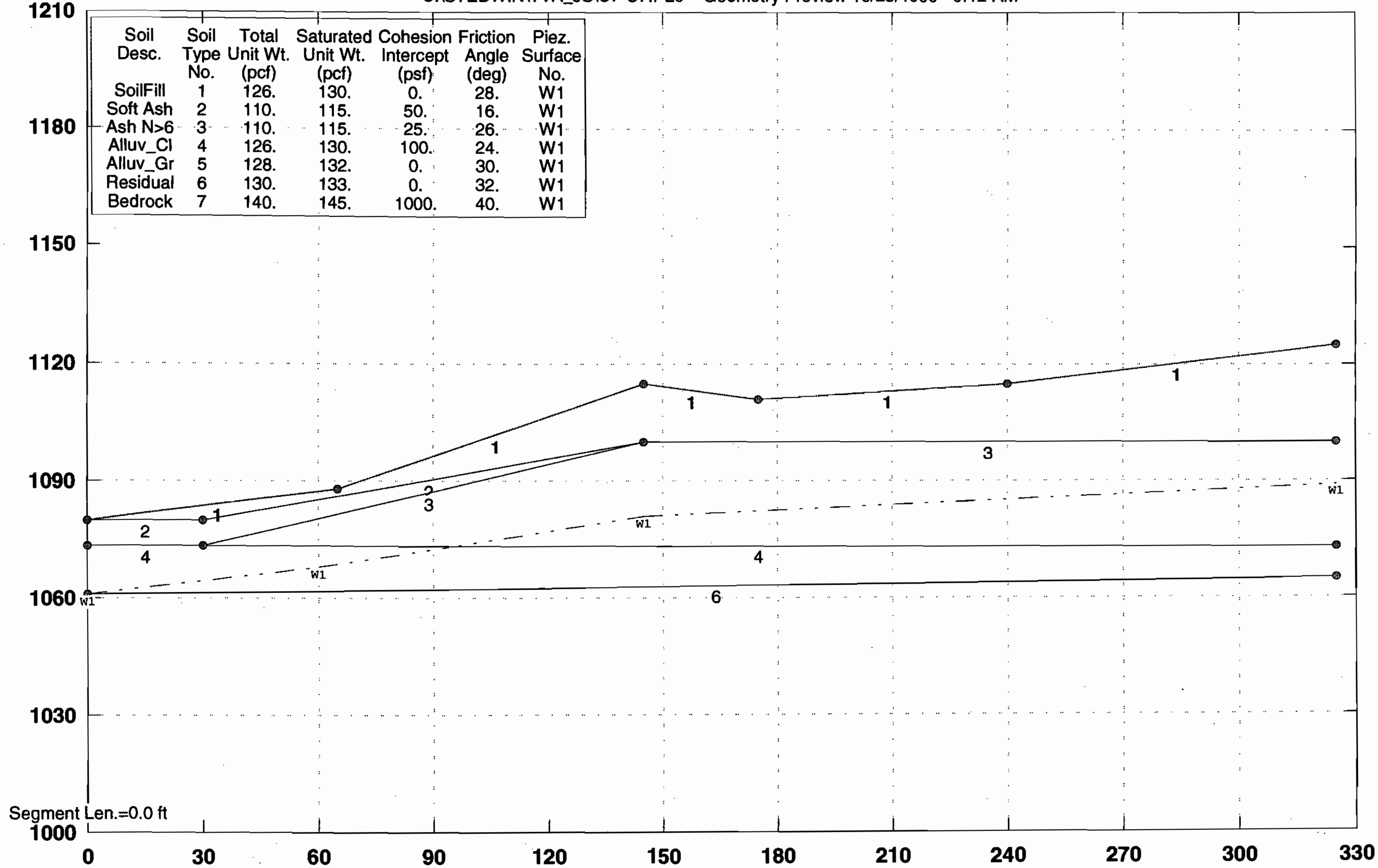
Soft Ash	2	110.	115.	50.	16.	W1
Ash N>6	3	110.	115.	25.	26.	W1
Alluv_Cl	4	126.	130.	100.	24.	W1
Alluv_Gr	5	128.	132.	0.	30.	W1
Residual	6	130.	133.	0.	32.	W1
Bedrock	7	140.	145.	1000.	40.	W1



APPENDIX C

TVA/John Sevier F/P; Ex. dike stability evaluation at section C1-C1

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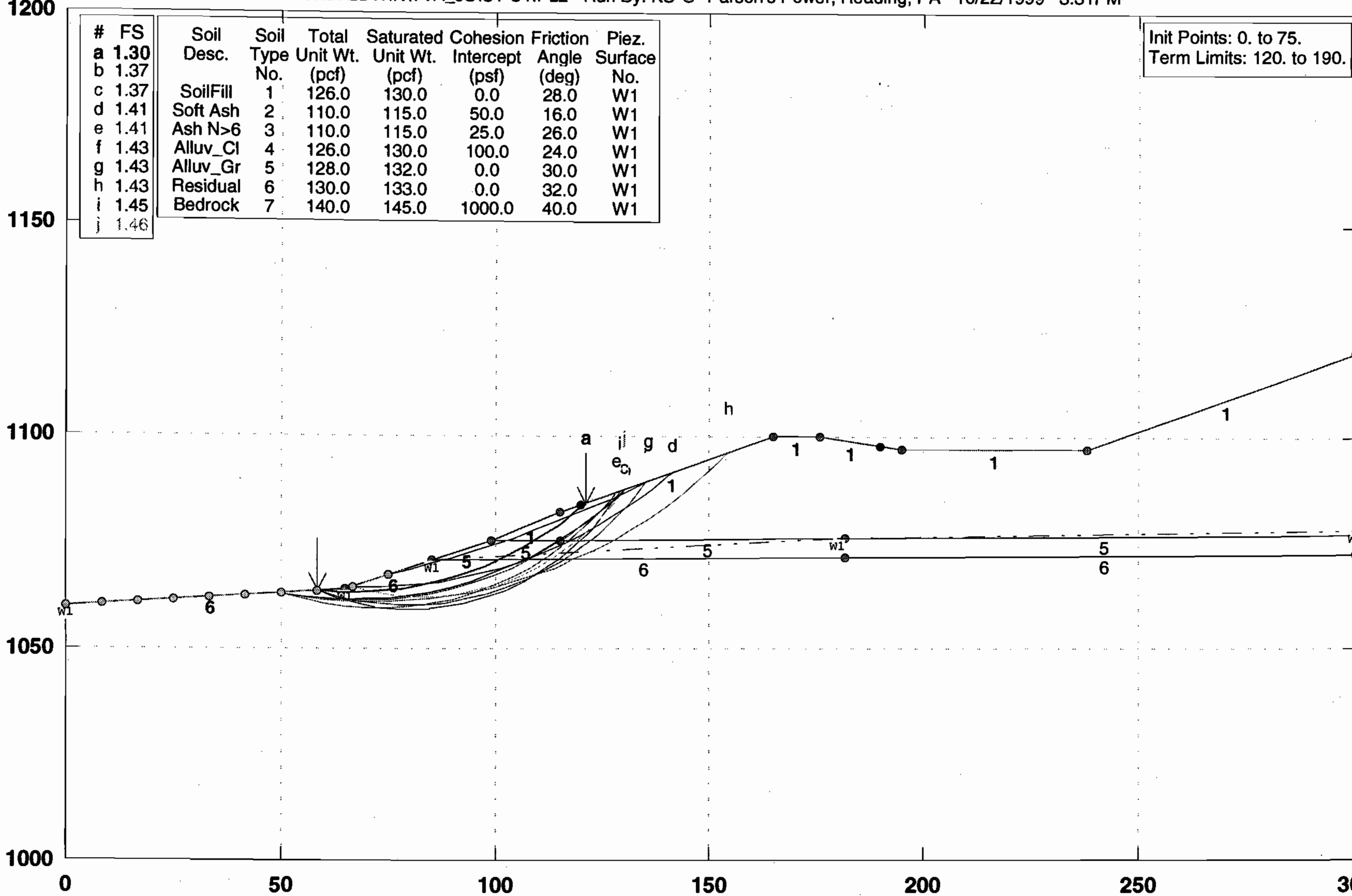

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Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C1-C1 with higher water level

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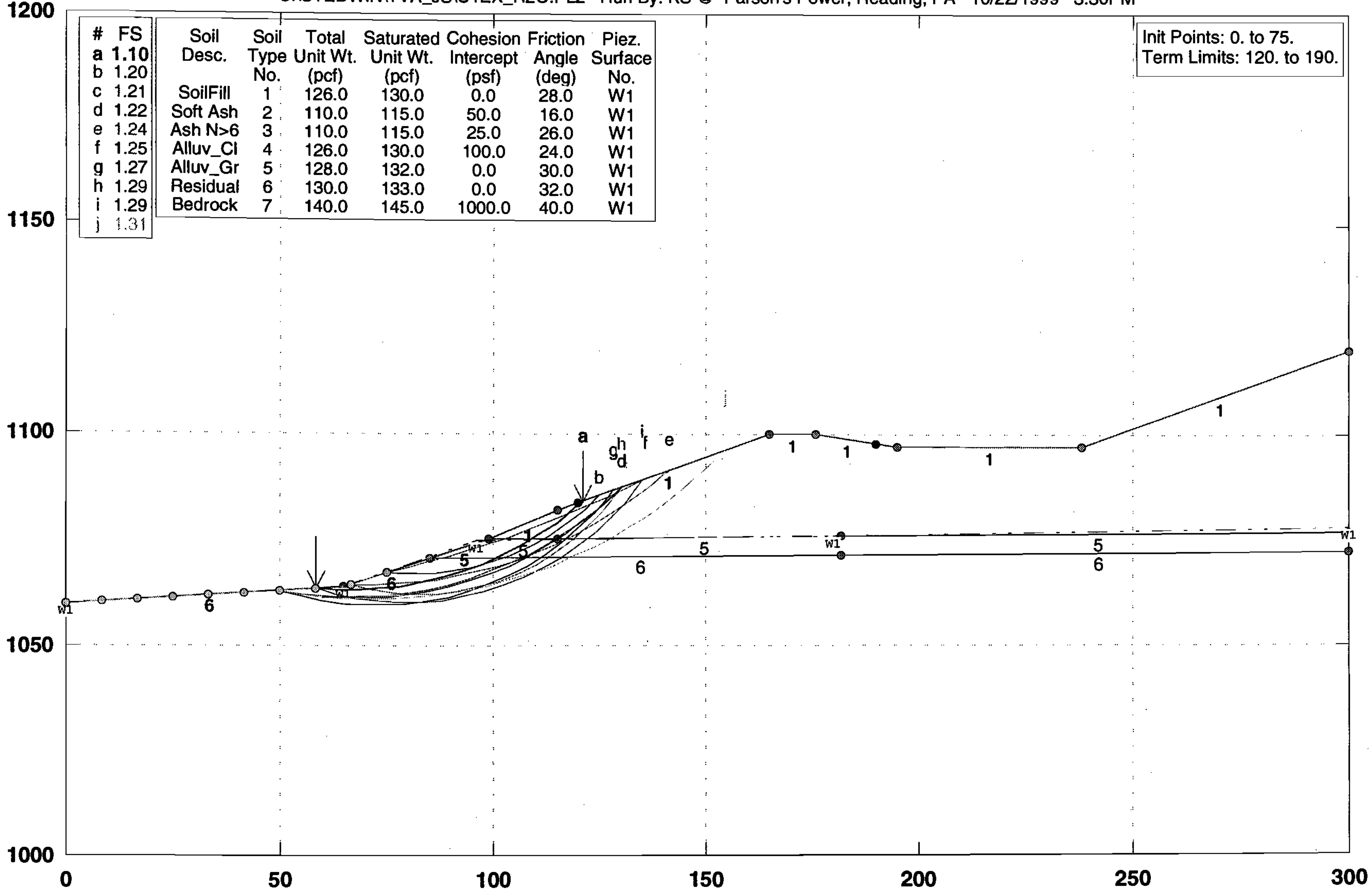

#	FS
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b	1.20
c	1.21
d	1.22
e	1.24
f	1.25
g	1.27
h	1.29
i	1.29
j	1.31

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C2-C2

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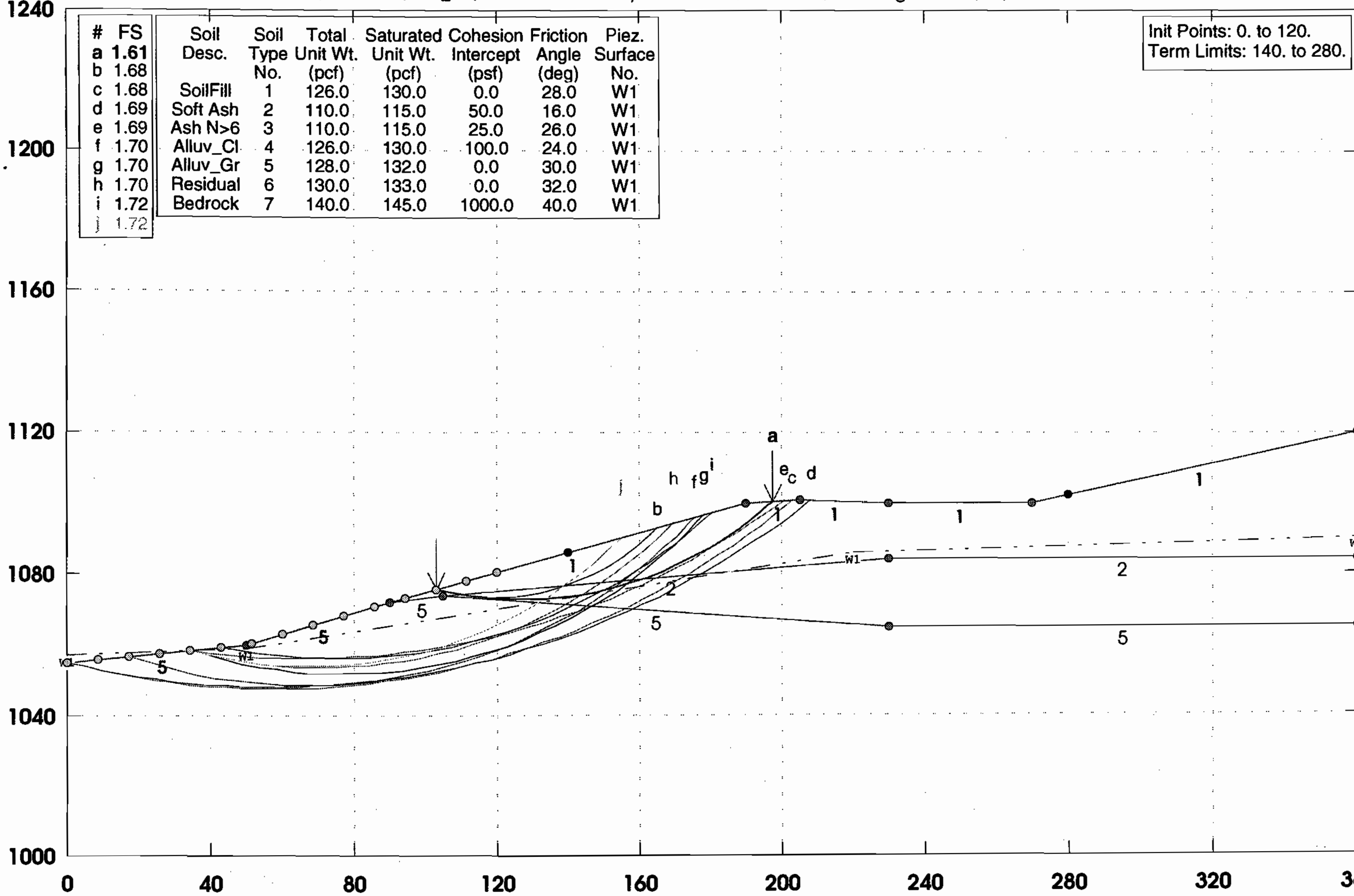

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Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C2-C2 with higher water level

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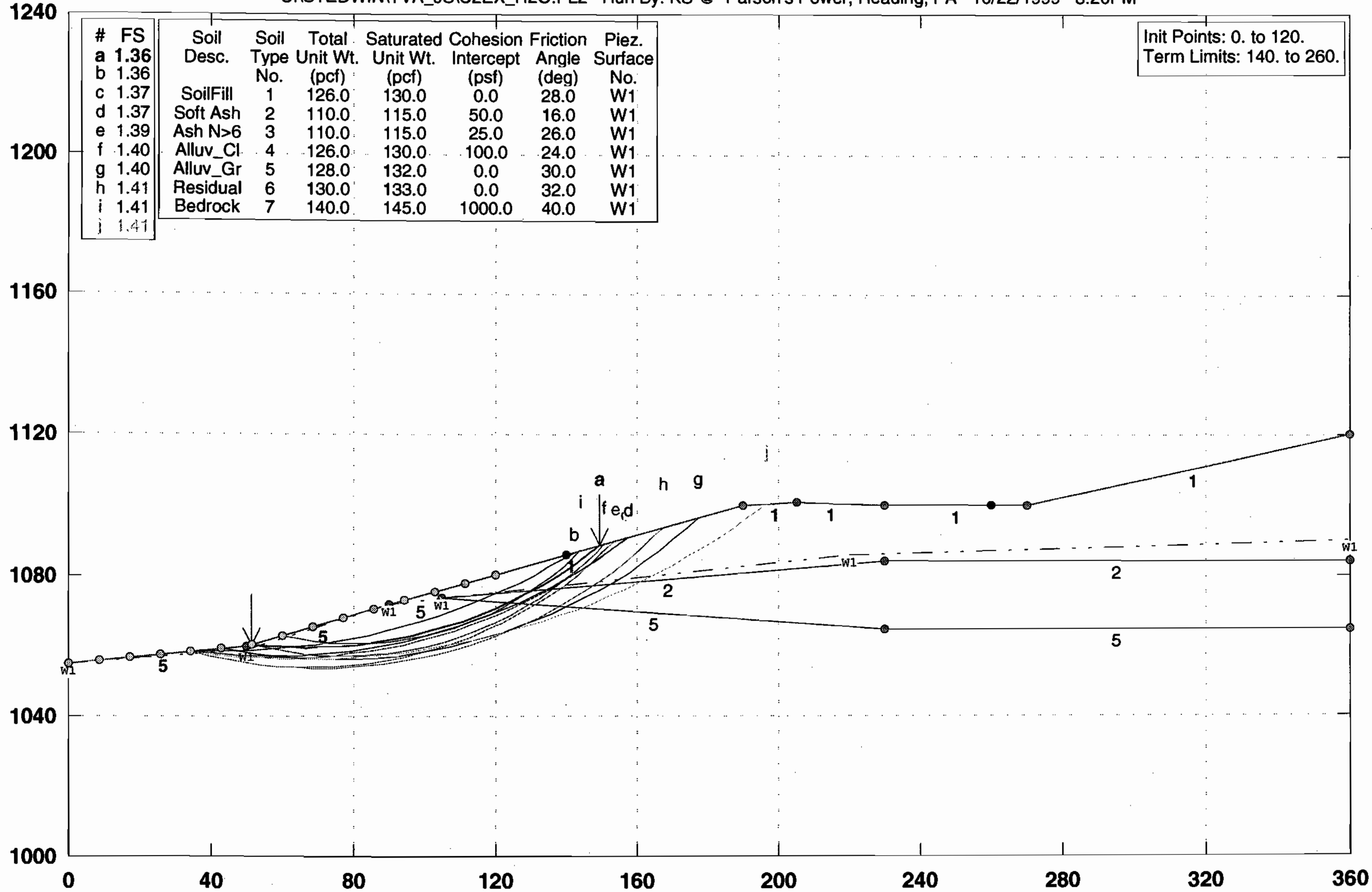


#	FS
a	**1.36**
b	1.36
c	1.37
d	1.37
e	1.39
f	1.40
g	1.40
h	1.41
i	1.41
j	1.41

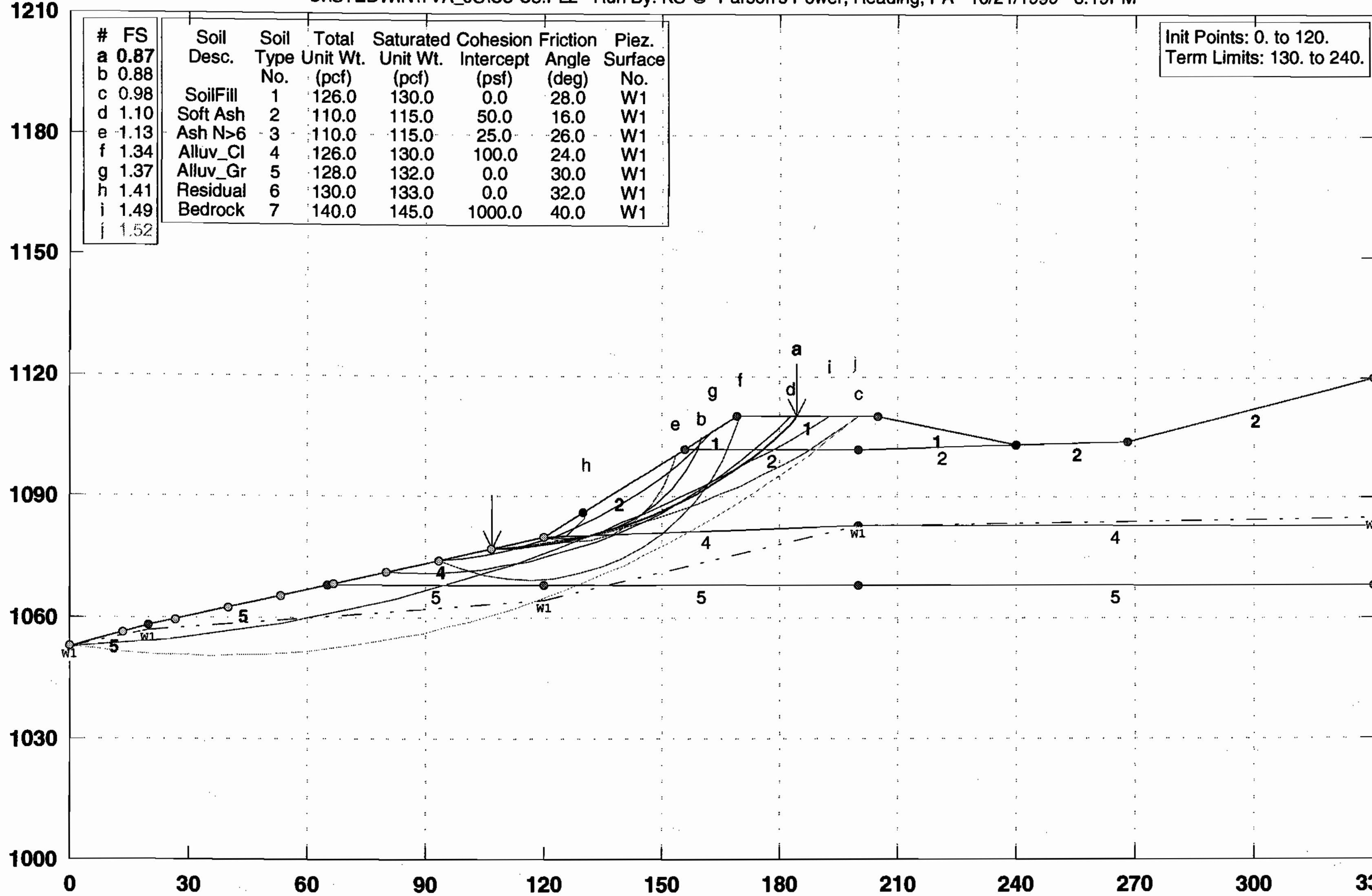
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.36

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C3-C3

C:\STEDWIN\TVA_JS\C3-C3.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:19PM



#	FS
a	**0.87**
b	0.88
c	0.98
d	1.10
e	1.13
f	1.34
g	1.37
h	1.41
i	1.49
j	1.52

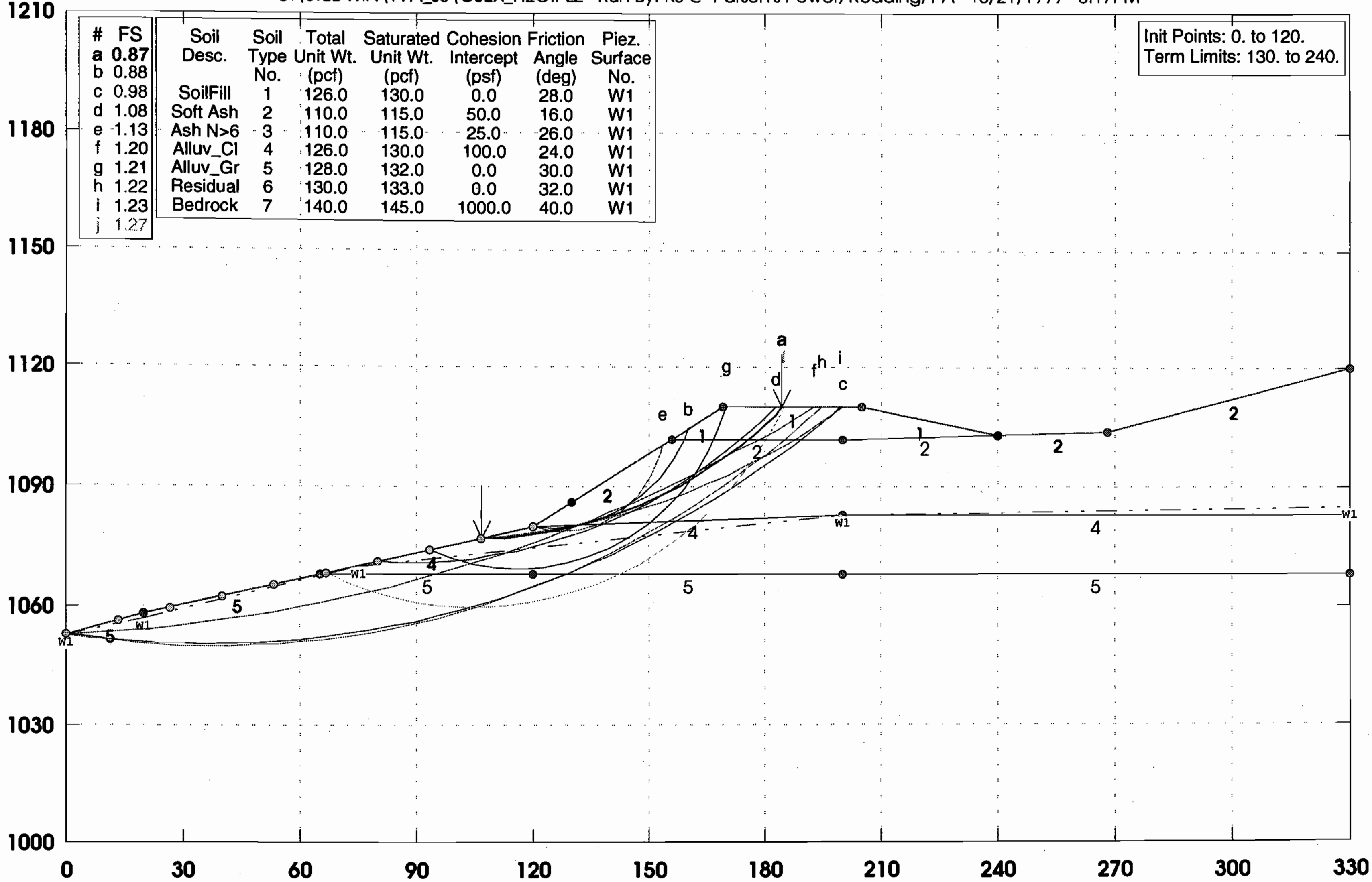
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=0.87

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C3-C3 with higher temporary g/w level

C:\STEDWIN\TVA_JS\C3EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:17PM



PCSTABL5M/si FSmin=0.87

Safety Factors Are Calculated By The Modified Bishop Method

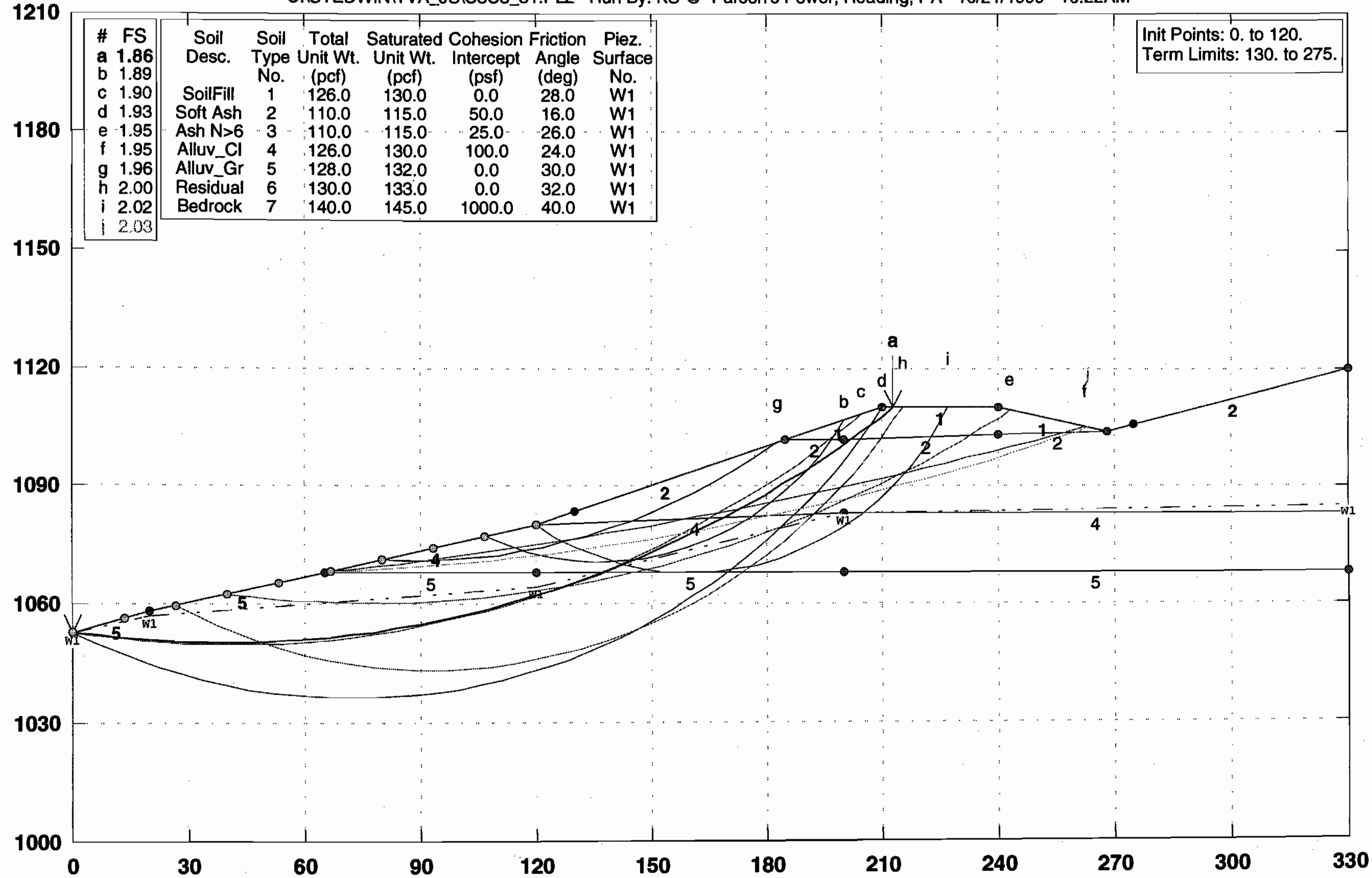
TVA/John Sevier F/P; Dike re-graded to 3H:1V at section C3-C3

C:\STEDWIN\TVA_JS\C3C3_31.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 10:22AM

#	FS
a	1.86
b	1.89
c	1.90
d	1.93
e	1.95
f	1.95
g	1.96
h	2.00
i	2.02
j	2.03

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Init Points: 0. to 120.
Term Limits: 130. to 275.



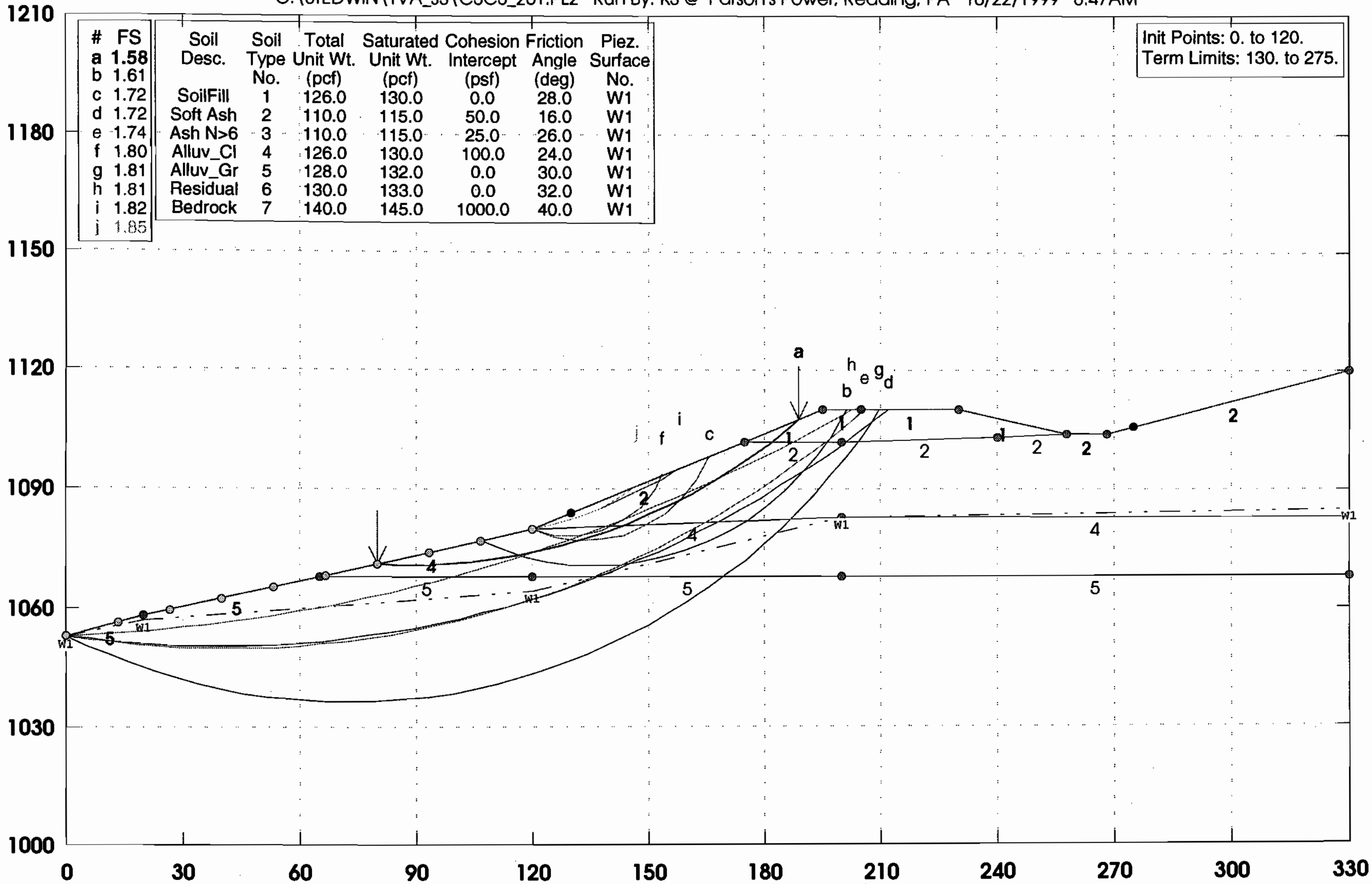
PCSTABL5M/si FSmin=1.86

Safety Factors Are Calculated By The Modified Bishop Method

STED

TVA/John Sevier F/P; Dike re-graded to 2.5H:1V at section C3-C3

C:\STEDWIN\TVA_JS\C3C3_251.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 8:47AM

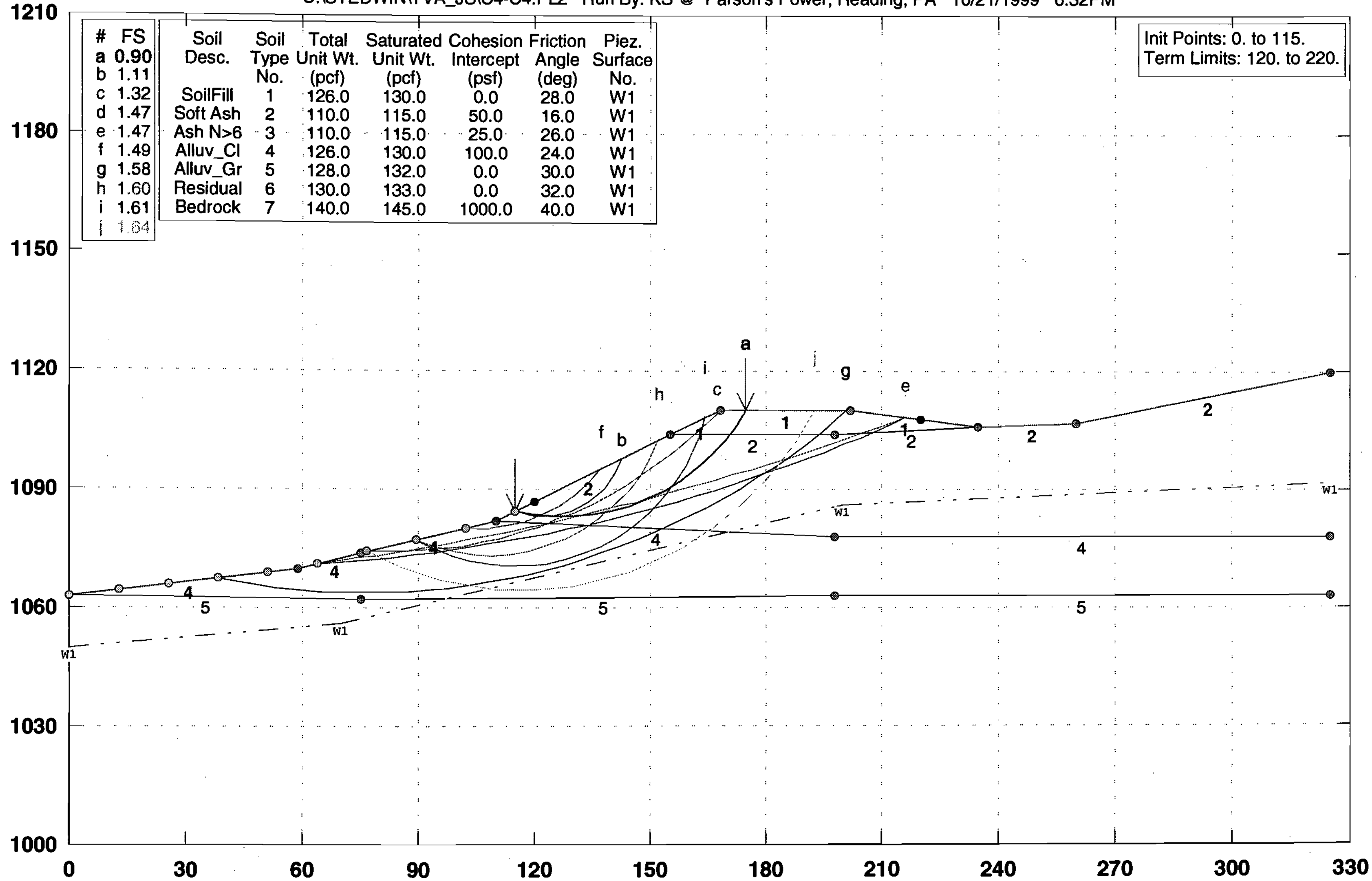


PCSTABL5M/si FSmin=1.58

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C4-C4

C:\STEDWIN\TVA_JS\C4-C4.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:32PM



PCSTABL5M/si FSmin=0.90

Safety Factors Are Calculated By The Modified Bishop Method

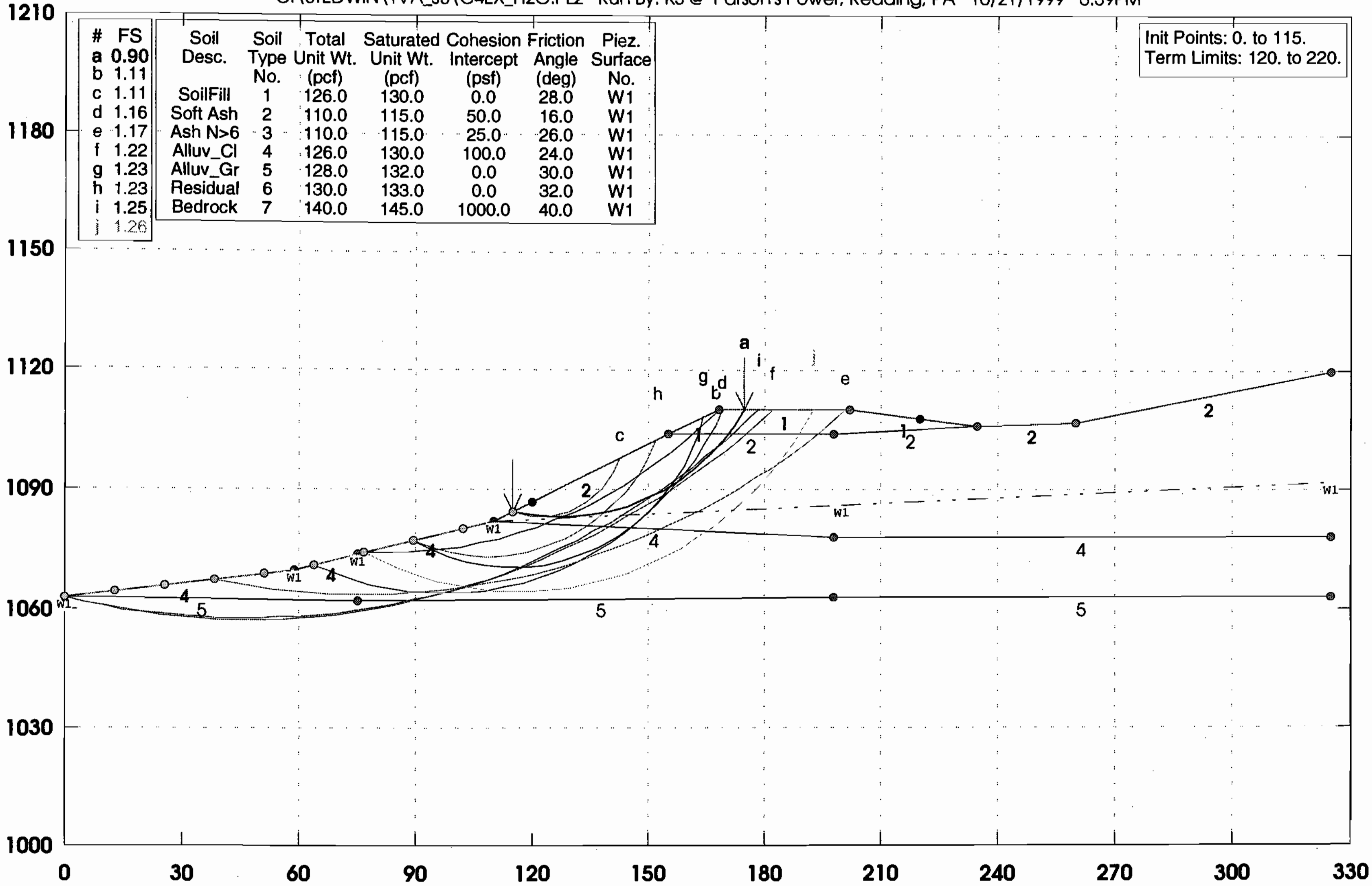
TVA/John Sevier F/P; Ex. dike stability at C4-C4 with temporary higher H2O level

C:\STEDWIN\TVA_JS\C4EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:39PM

#	FS
a	0.90
b	1.11
c	1.11
d	1.16
e	1.17
f	1.22
g	1.23
h	1.23
i	1.25
j	1.26

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

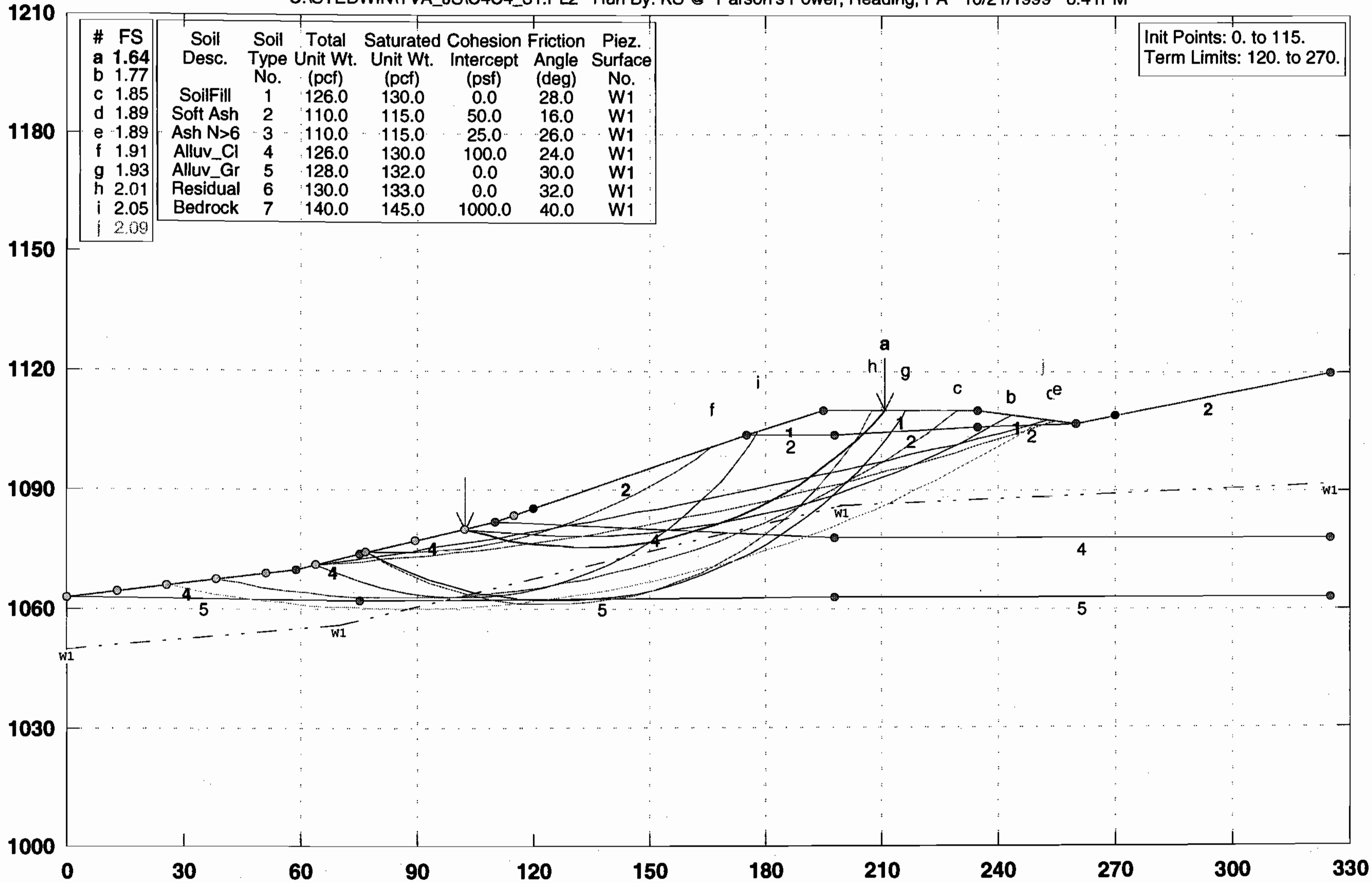
Init Points: 0. to 115.
Term Limits: 120. to 220.



PCSTABL5M/si FSmin=0.90
Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; dike re-graded to 3H:1V at section C4-C4

C:\STEDWIN\TVA_JS\C4C4_31.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:41PM



#	FS
a	**1.64**
b	1.77
c	1.85
d	1.89
e	1.89
f	1.91
g	1.93
h	2.01
i	2.05
j	2.09

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.64

Safety Factors Are Calculated By The Modified Bishop Method

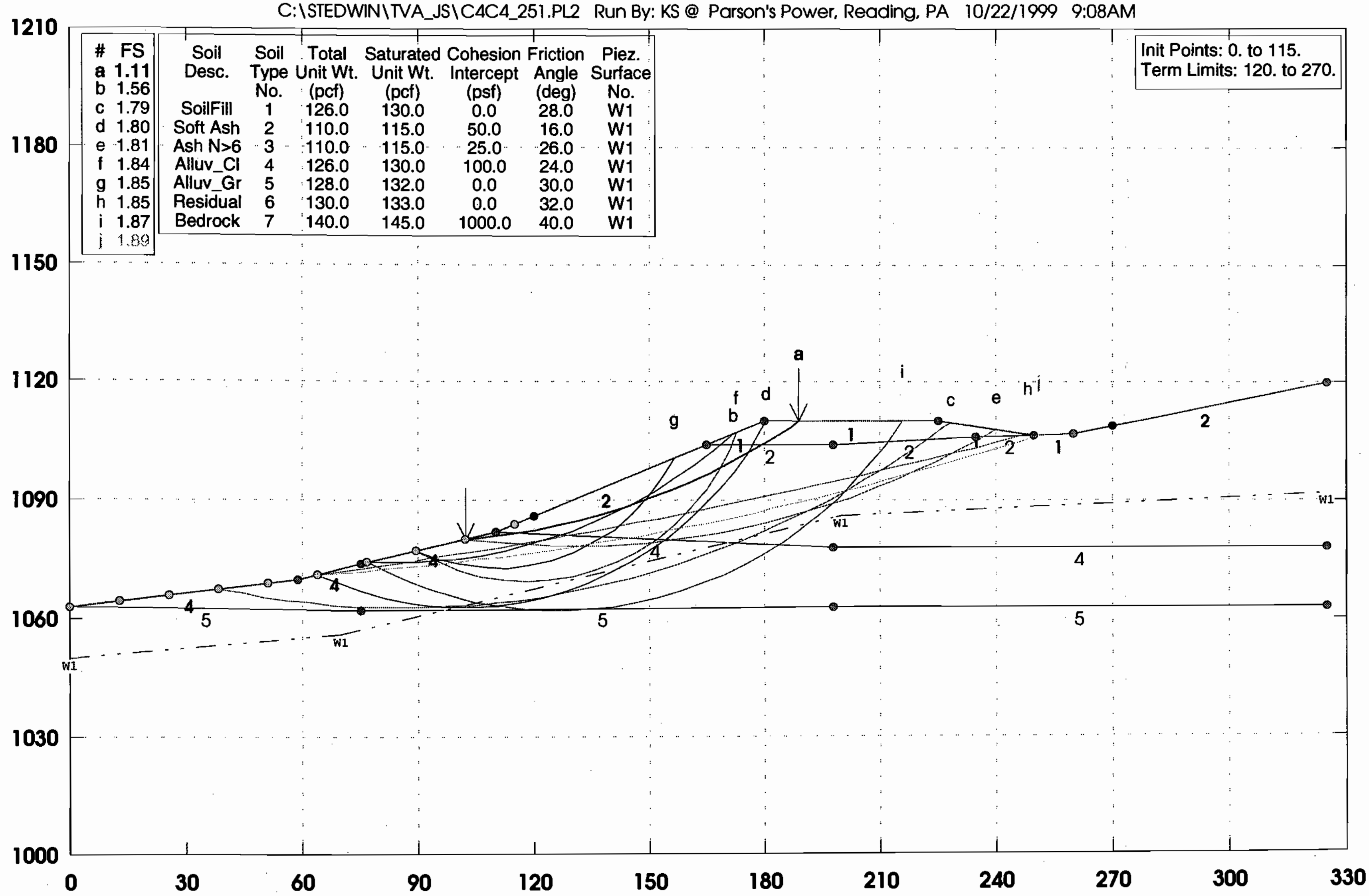
TVA/John Sevier F/P; dike re-graded to 2.5H:1V at section C4-C4

C:\STEDWIN\TVA_JS\C4C4_251.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 9:08AM

#	FS
a	1.11
b	1.56
c	1.79
d	1.80
e	1.81
f	1.84
g	1.85
h	1.85
i	1.87
j	1.89

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

Init Points: 0. to 115.
Term Limits: 120. to 270.

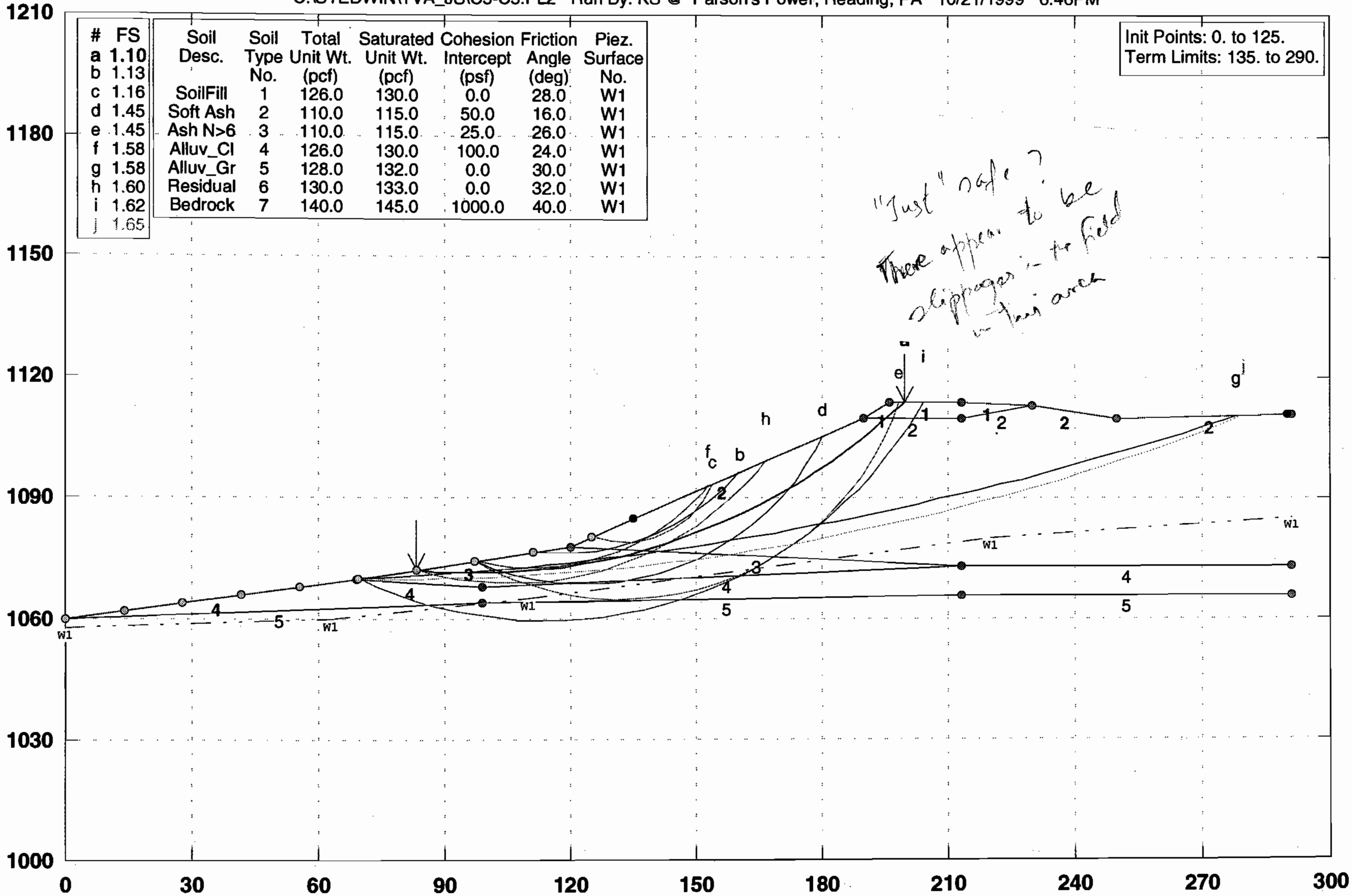


PCSTABL5M/si FSmin=1.11

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C5-C5

C:\STEDWIN\TVA_JS\C5-C5.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:46PM



#	FS
a	1.10
b	1.13
c	1.16
d	1.45
e	1.45
f	1.58
g	1.58
h	1.60
i	1.62
j	1.65

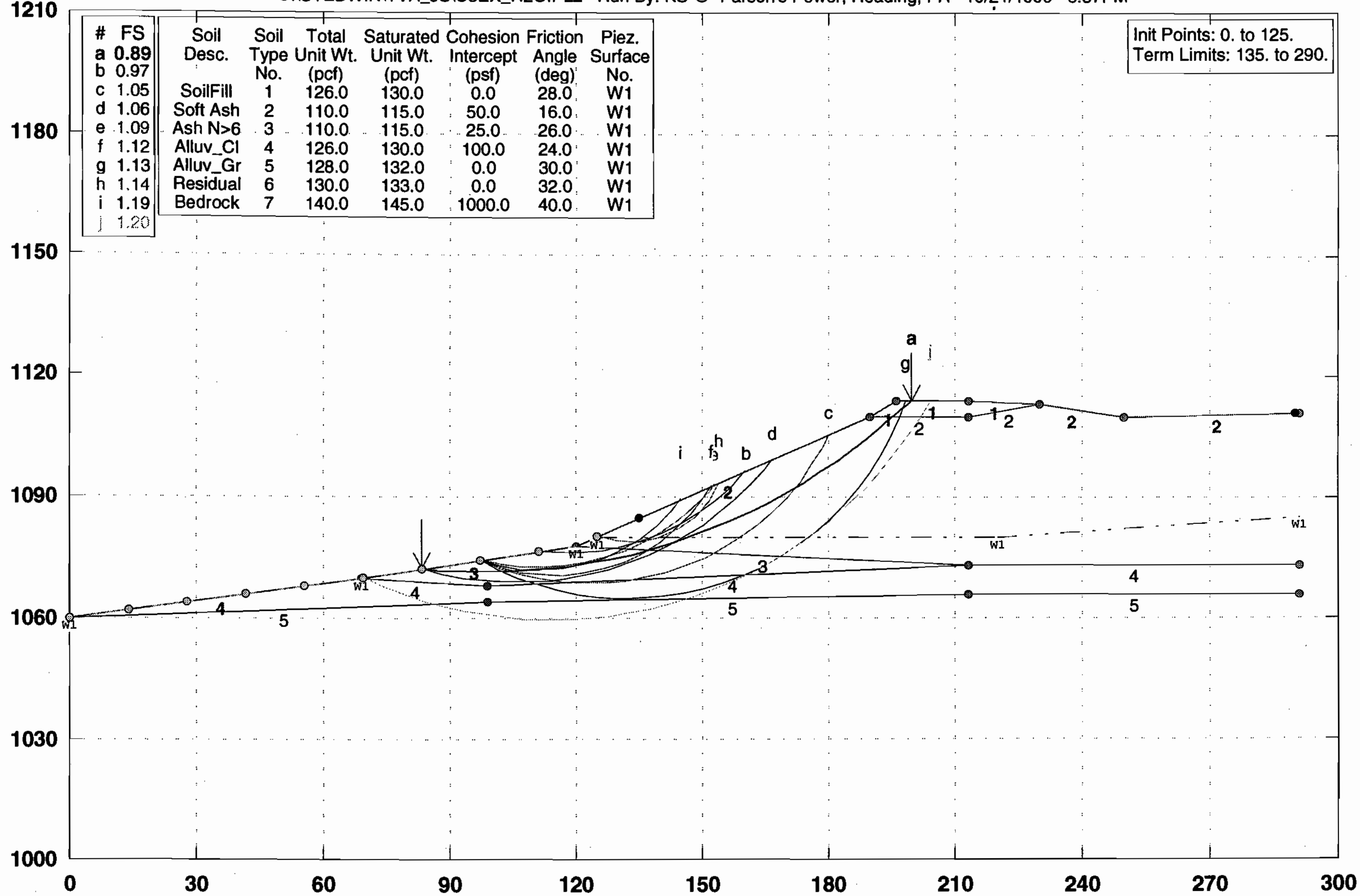
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.10

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C5-C5 with high temporary water level

C:\STEDWIN\TVA_JS\C5EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 6:57PM

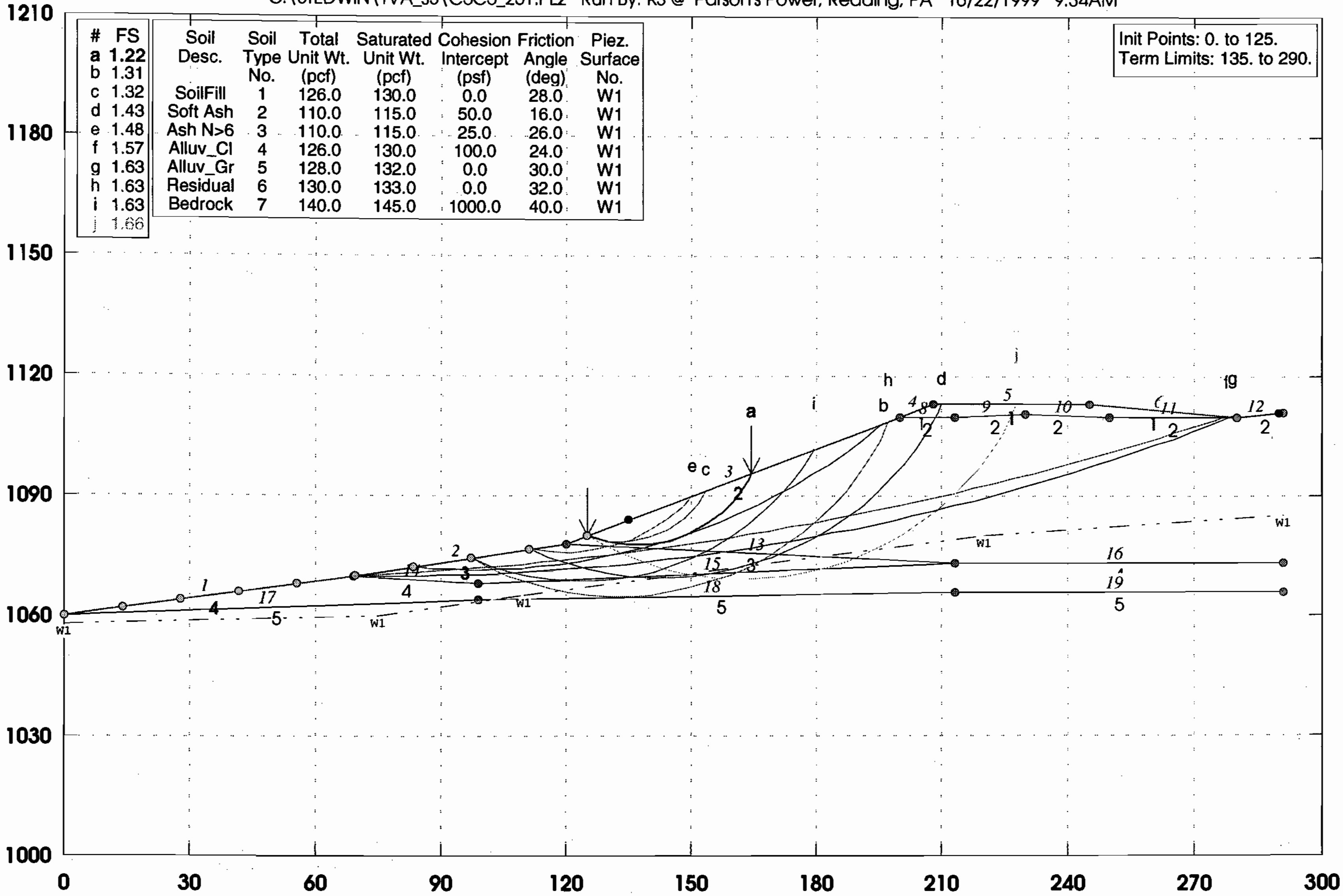


PCSTABL5M/si FSmin=0.89

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 2.5H:1V at section C5-C5

C:\STEDWIN\TVA_JS\C5C5_251.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 9:34AM

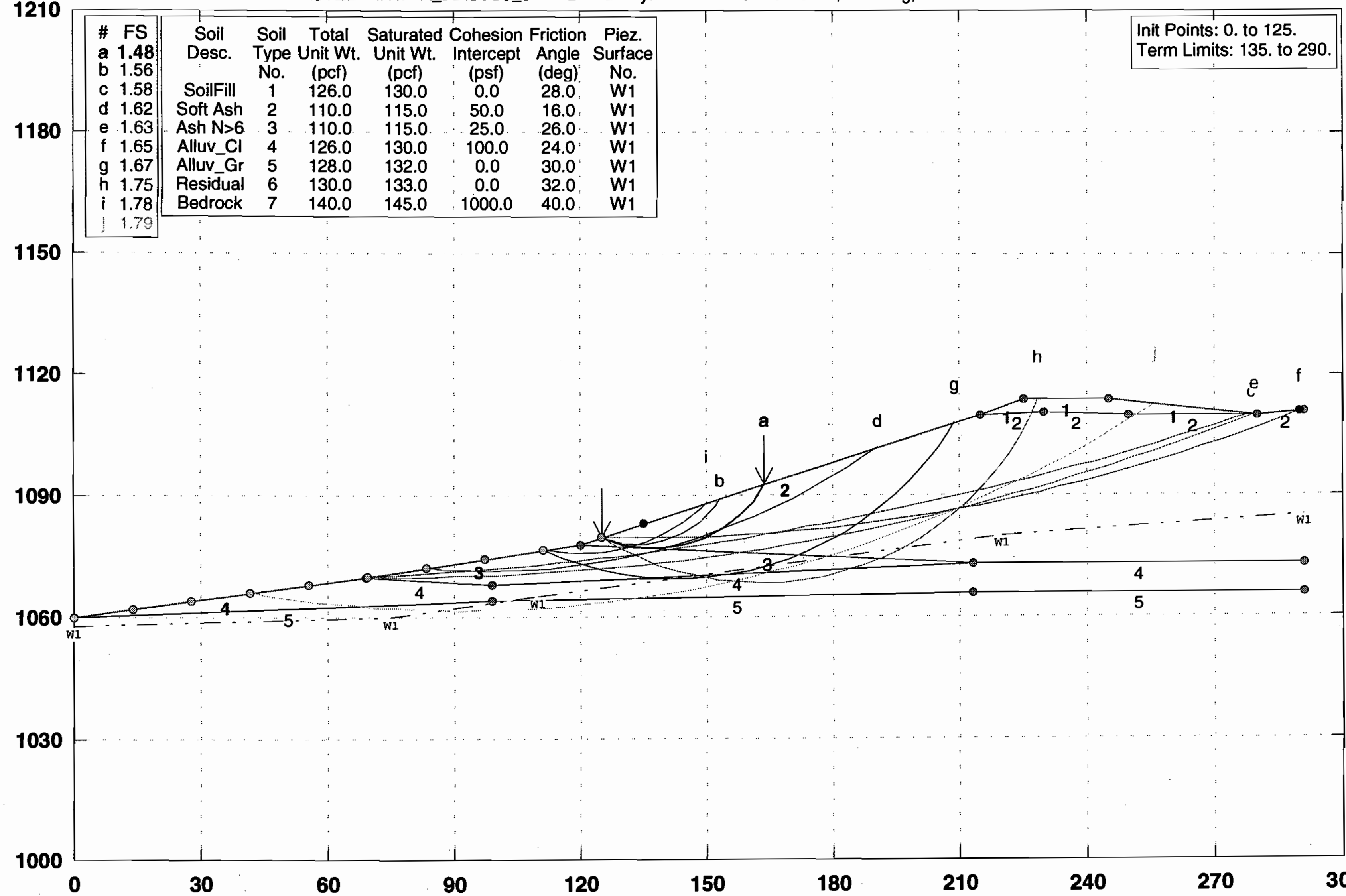


PCSTABL5M/si FSmin=1.22

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to 3H:1V at section C5-C5

C:\STEDWIN\TVA_JS\C5C5_31.PL2 Run By: KS @ Parson's Power, Reading, PA 10/22/1999 9:37AM

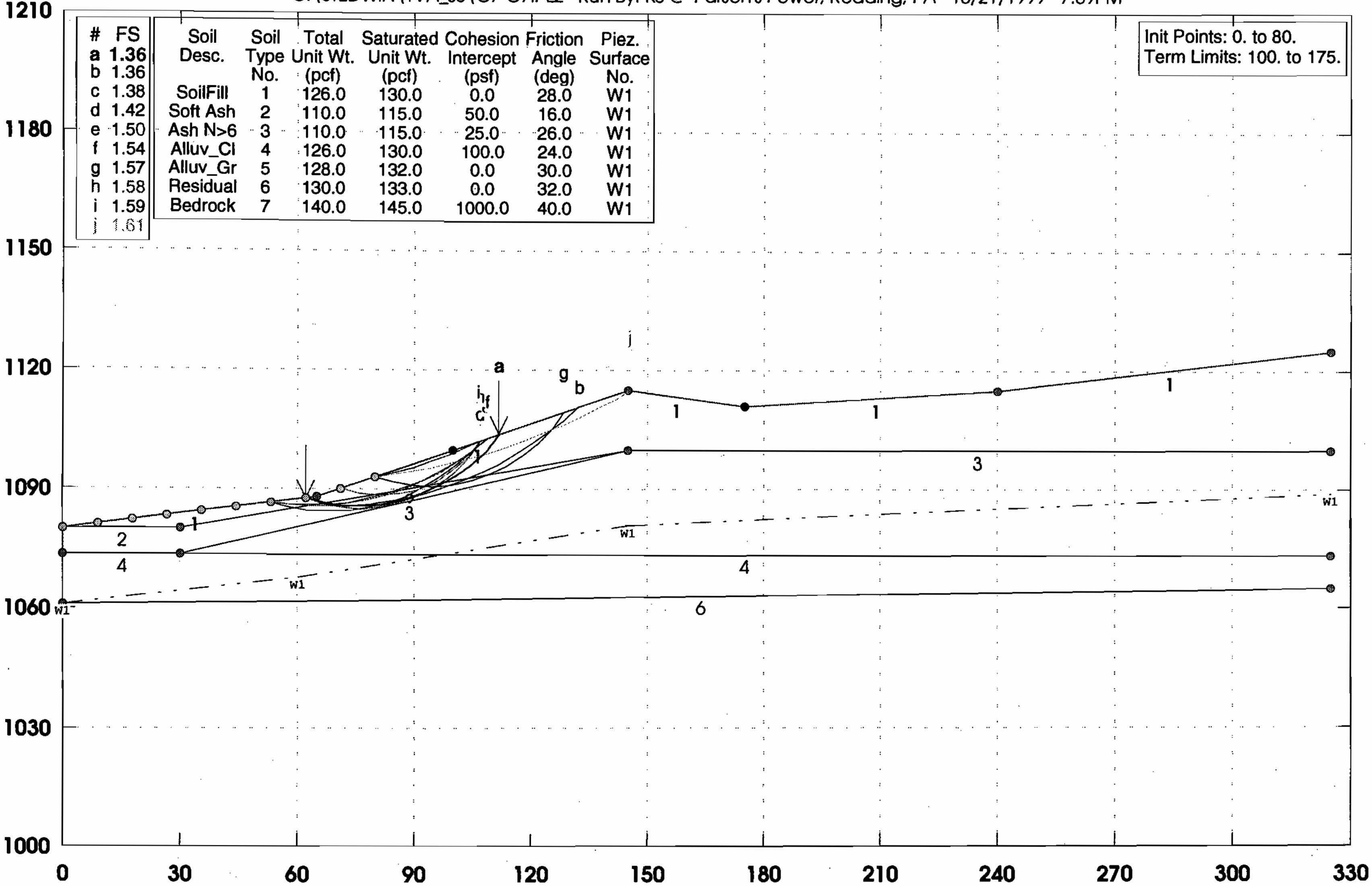


PCSTABL5M/si FSmin=1.48

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability evaluation at section C7-C7

C:\STEDWIN\TVA_JS\C7-C7.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 7:09PM



#	FS
a	1.36
b	1.36
c	1.38
d	1.42
e	1.50
f	1.54
g	1.57
h	1.58
i	1.59
j	1.61

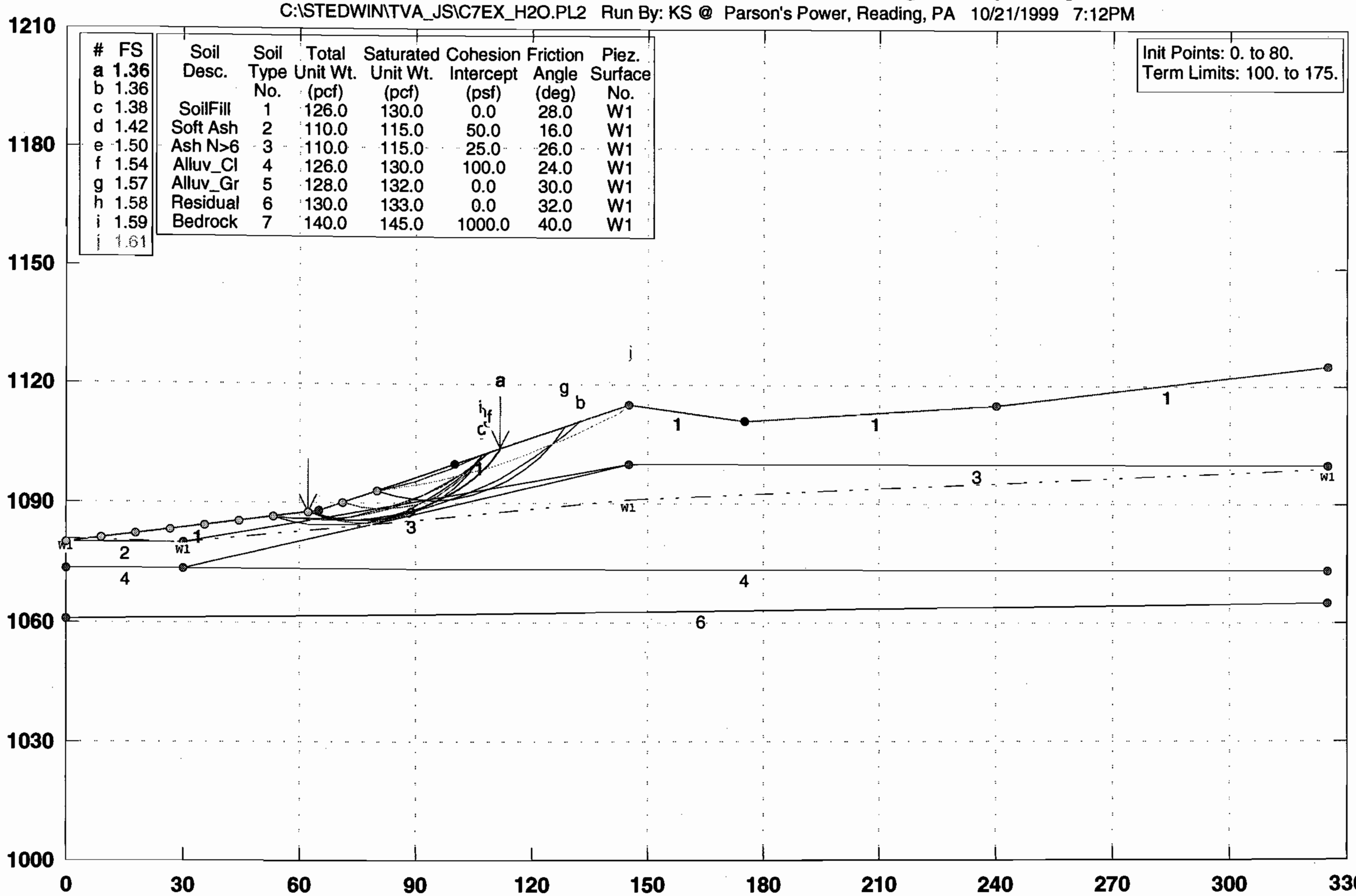
Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.36

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C7-C7 with high temporary water level

C:\STEDWIN\TVA_JS\C7EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 7:12PM

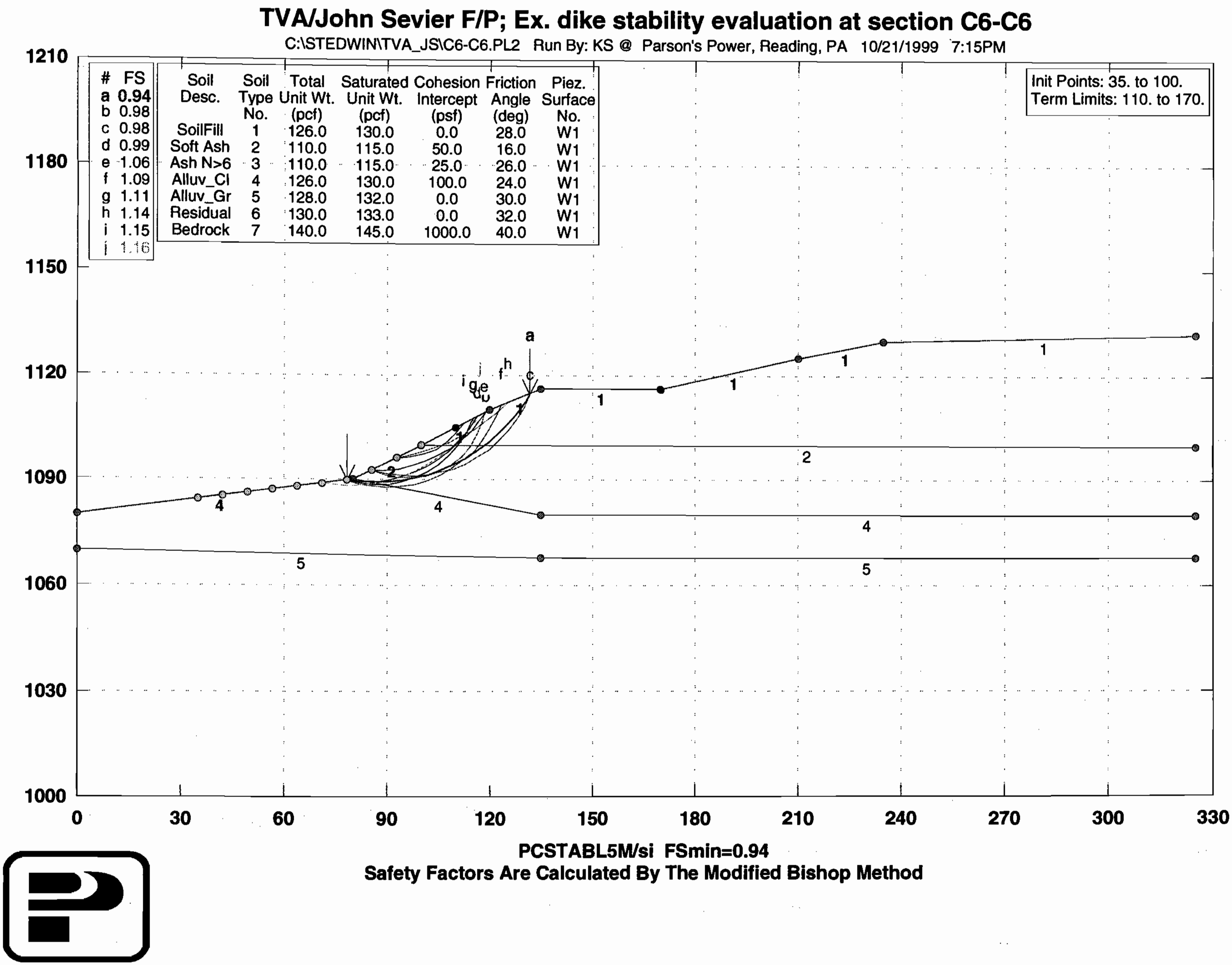


#	FS
a	1.36
b	1.36
c	1.38
d	1.42
e	1.50
f	1.54
g	1.57
h	1.58
i	1.59
j	1.61

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
SoilFill	1	126.0	130.0	0.0	28.0	W1
Soft Ash	2	110.0	115.0	50.0	16.0	W1
Ash N>6	3	110.0	115.0	25.0	26.0	W1
Alluv_Cl	4	126.0	130.0	100.0	24.0	W1
Alluv_Gr	5	128.0	132.0	0.0	30.0	W1
Residual	6	130.0	133.0	0.0	32.0	W1
Bedrock	7	140.0	145.0	1000.0	40.0	W1

PCSTABL5M/si FSmin=1.36

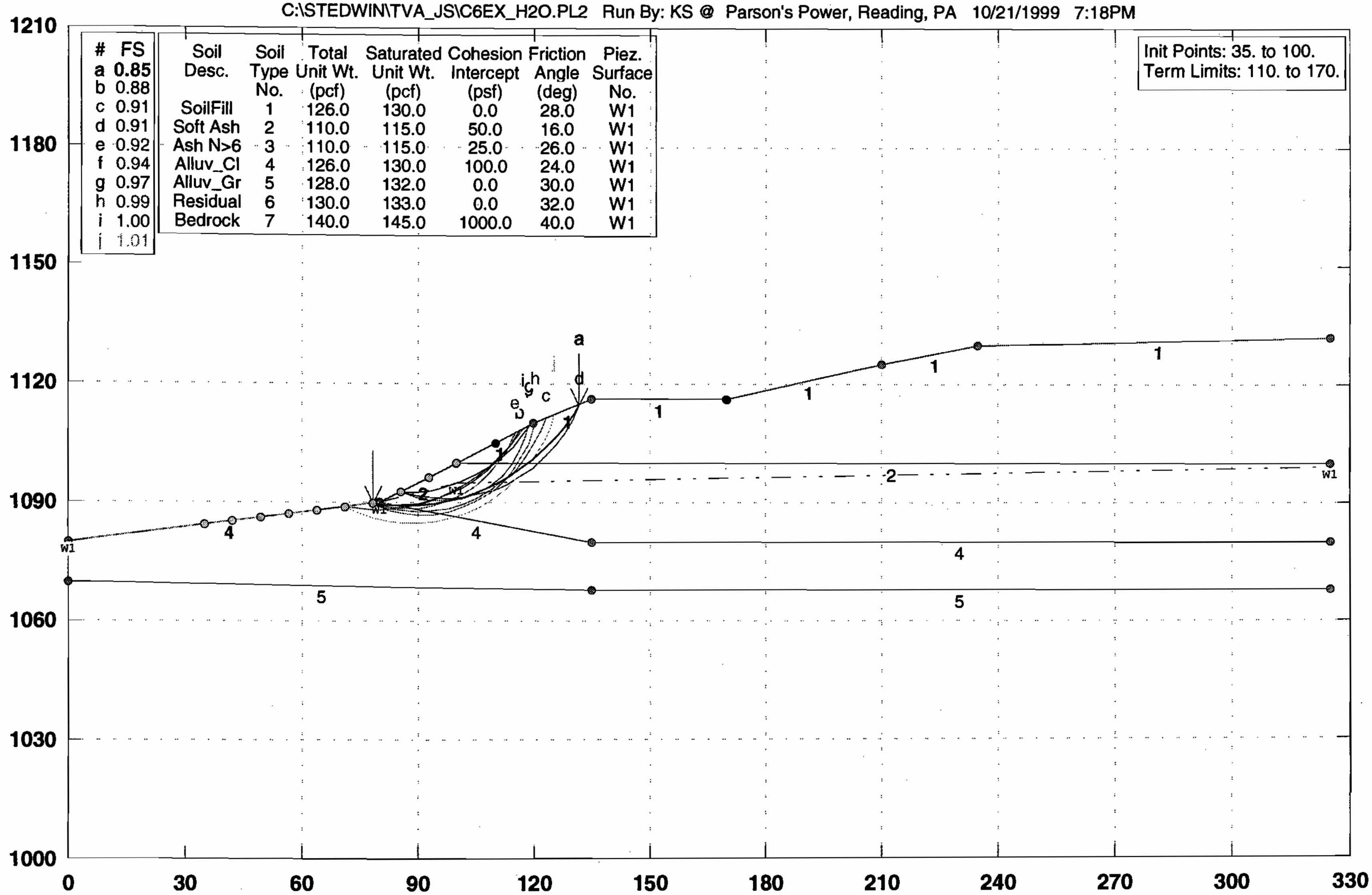
Safety Factors Are Calculated By The Modified Bishop Method



TVA/John Sevier F/P; Ex. dike stability evaluation at section C6-C6
C:\STEDWIN\TVA_JS\C6-C6.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 7:15PM
FS
a 0.94
b 0.98
c 0.98
d 0.99
e 1.06
f 1.09
g 1.11
h 1.14
i 1.15
j 1.16
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Piez. Surface No.
SoilFill 1 126.0 130.0 0.0 28.0 W1
Soft Ash 2 110.0 115.0 50.0 16.0 W1
Ash N>6 3 110.0 115.0 25.0 26.0 W1
Alluv_Cl 4 126.0 130.0 100.0 24.0 W1
Alluv_Gr 5 128.0 132.0 0.0 30.0 W1
Residual 6 130.0 133.0 0.0 32.0 W1
Bedrock 7 140.0 145.0 1000.0 40.0 W1
Init Points: 35. to 100.
Term Limits: 110. to 170.
1210
1180
1150
1120
1090
1060
1030
1000
0
30
60
90
120
150
180
210
240
270
300
330
PCSTABL5M/si FSmin=0.94
Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Ex. dike stability at C6-C6 with temporary high water level

C:\STEDWIN\TVA_JS\C6EX_H2O.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 7:18PM

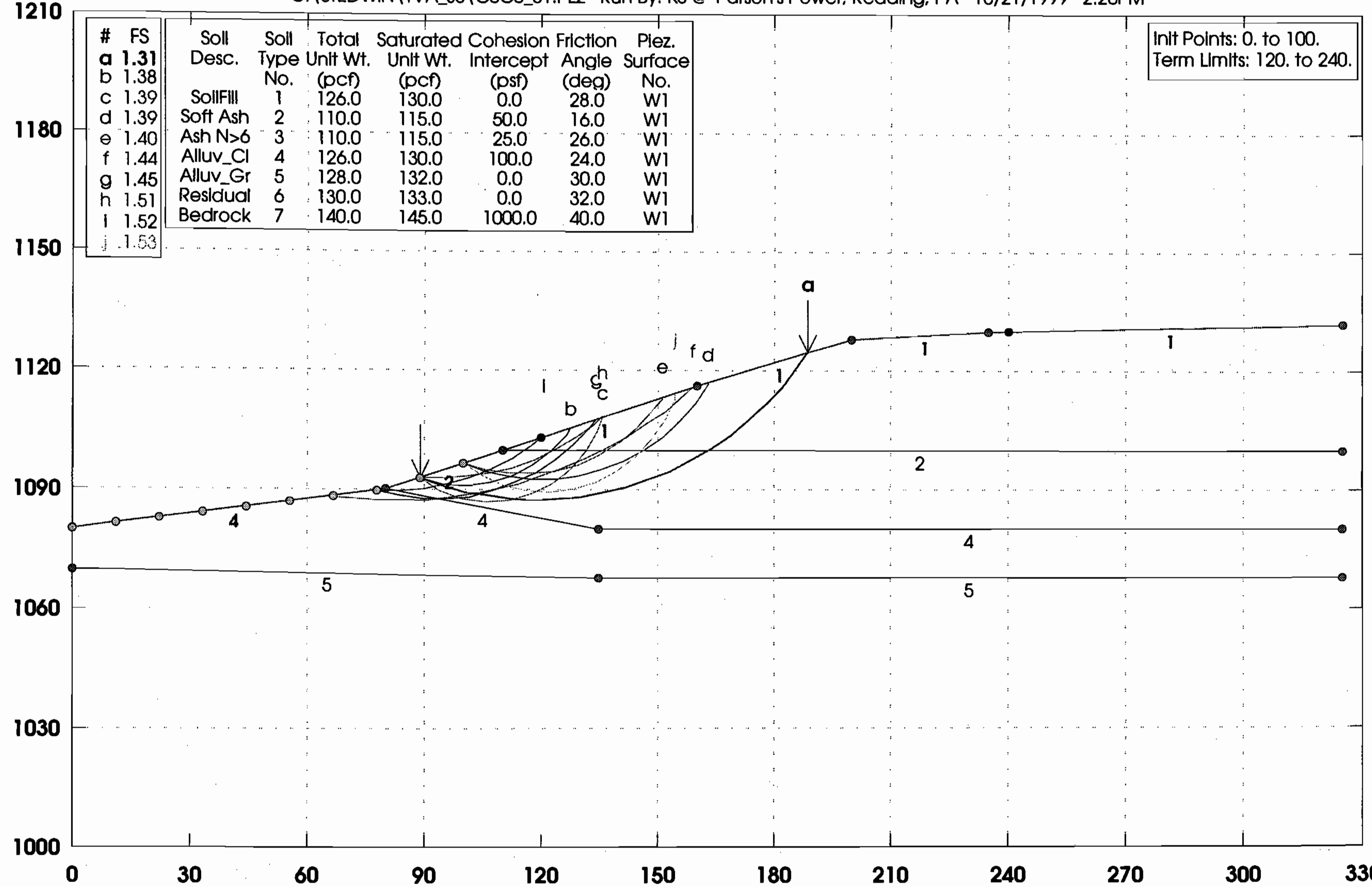


PCSTABL5M/si FSmin=0.85

Safety Factors Are Calculated By The Modified Bishop Method

TVA/John Sevier F/P; Dike re-graded to to 3H:1V at section C6-C6

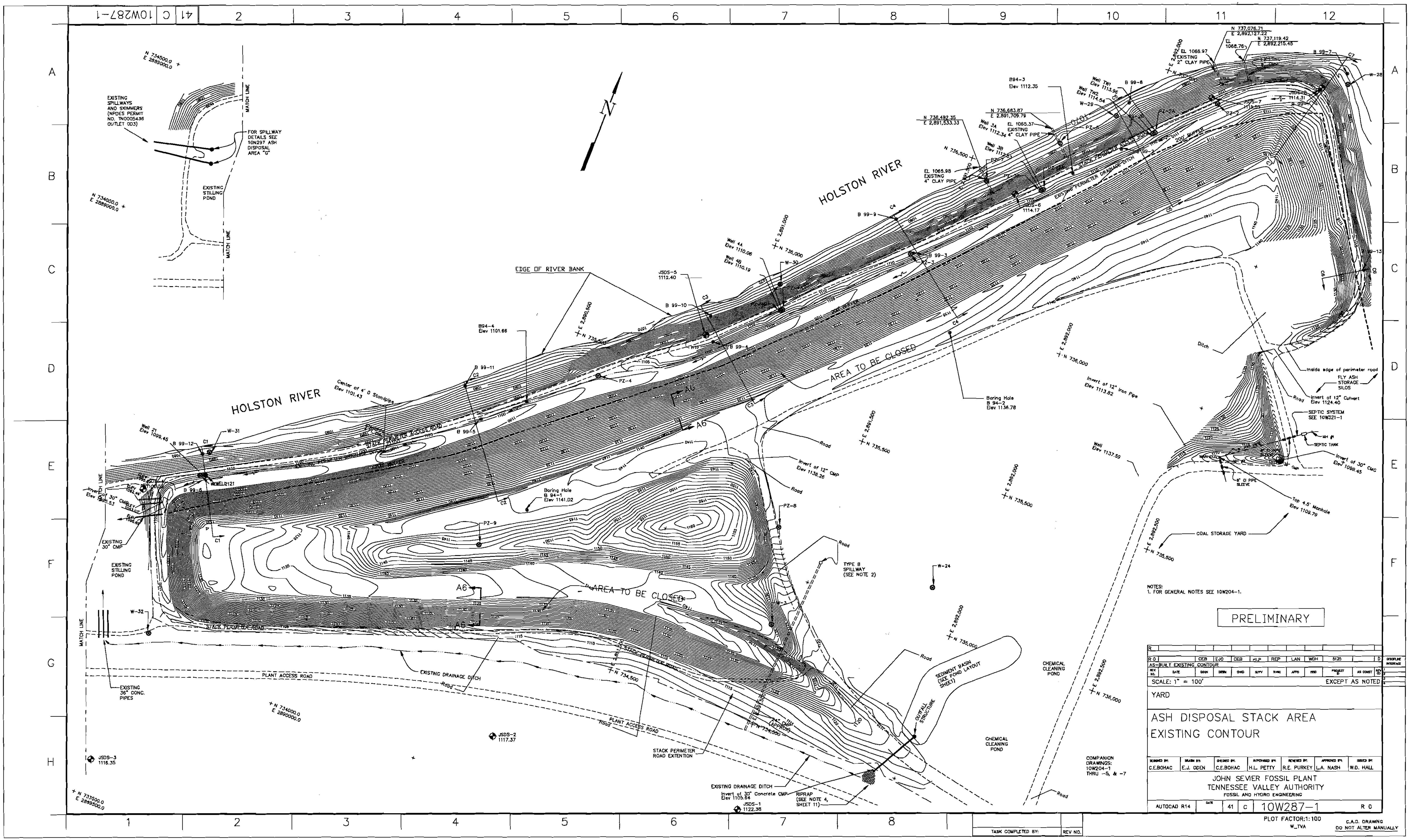
C:\STEDWIN\TVA_JS\C6C6_31.PL2 Run By: KS @ Parson's Power, Reading, PA 10/21/1999 2:26PM

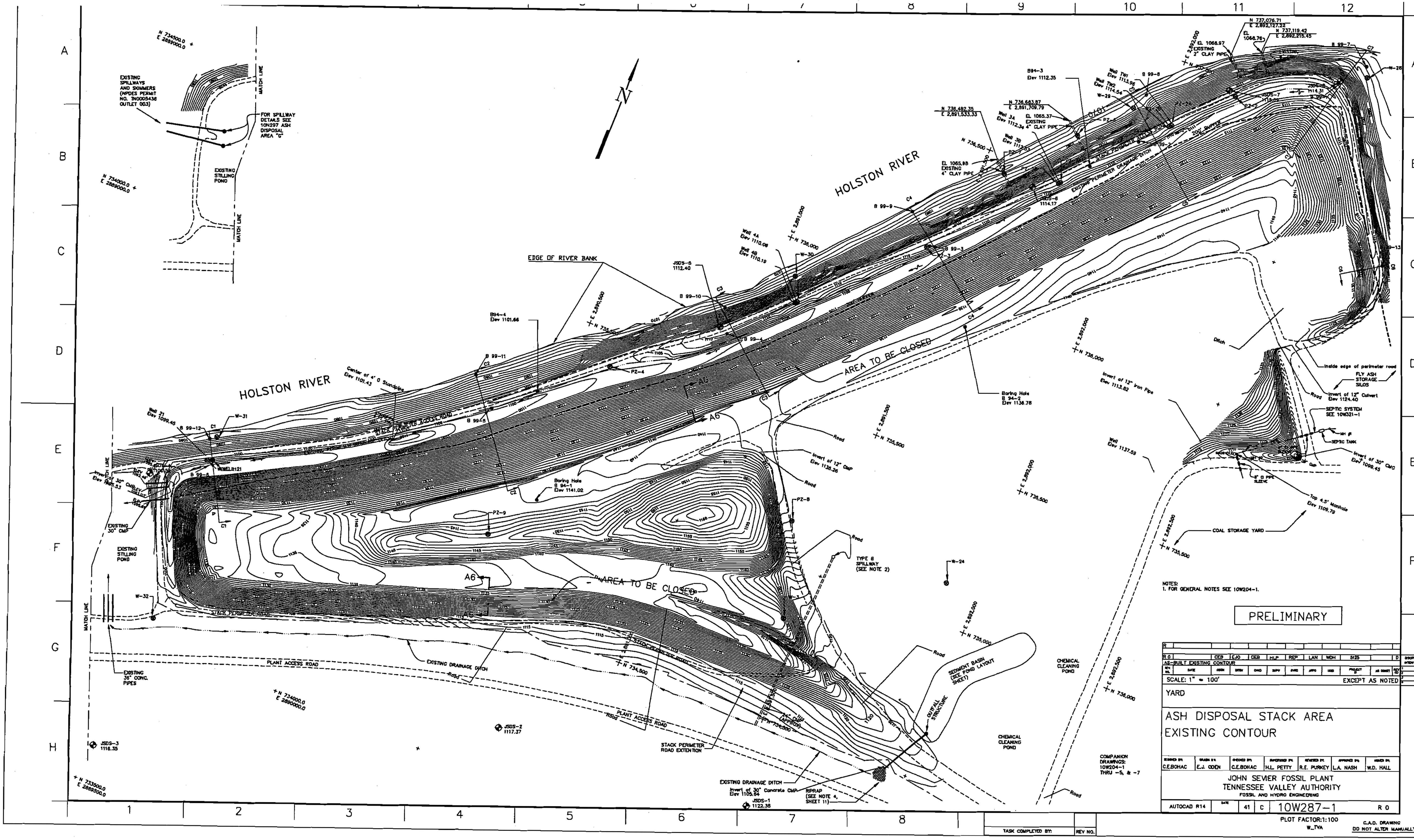


PCSTABL5M/si FSmin=1.31

Safety Factors Are Calculated By The Modified Bishop Method

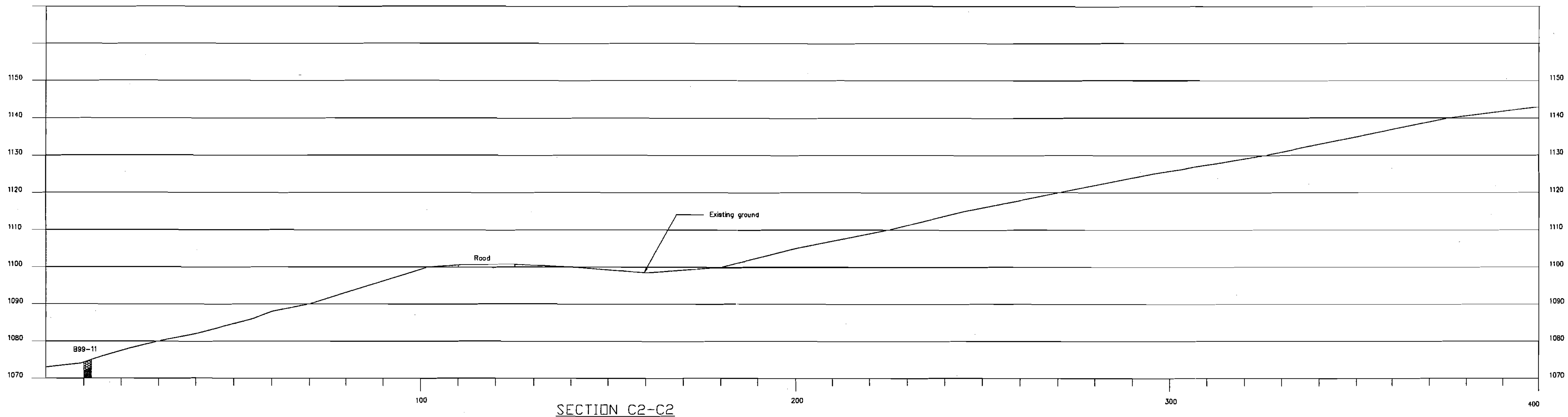
STED


10W287-1
HOLSTON RIVER
HOLSTON RIVER
EDGE OF RIVER BANK
AREA TO BE CLOSED
AREA TO BE CLOSED
EXISTING SPILLWAYS AND SKIMMERS (NPDES PERMIT NO. TN0005436 OUTLET 003)
FOR SPILLWAY DETAILS SEE 10N297 ASH DISPOSAL AREA "G"
EXISTING STILLING POND
MATCH LINE
EXISTING 30" CMP
EXISTING STILLING POND
EXISTING 36" CONC. PIPES
EXISTING DRAINAGE DITCH
PLANT ACCESS ROAD
STACK PERIMETER ROAD
STACK PERIMETER ROAD EXTENTION
EXISTING DRAINAGE DITCH
Invert of 30" Concrete CMP Elev 1105.64
RIPRAP (SEE NOTE 4, SHEET 11)
JSDS-1 1122.38
JSDS-2 1117.37
JSDS-3 1116.35
SEDIMENT BASIN (SEE POND LAYOUT SHEET1)
OUTFALL STRUCTURE
CHEMICAL CLEANING POND
CHEMICAL CLEANING POND
COMPANION DRAWINGS: 10W204-1 THRU -5, & -7
TYPE B SPILLWAY (SEE NOTE 2)
Boring Hole B 94-1 Elev 1141.02
Boring Hole B 94-2 Elev 1136.78
Invert of 12" CMP Elev 1136.26
Invert of 12" Iron Pipe Elev 1113.82
COAL STORAGE YARD
FLY ASH STORAGE SILOS
Inside edge of perimeter road
Invert of 12" Culvert Elev 1124.40
SEPTIC SYSTEM SEE 10W321-1
SEPTIC TANK
Invert of 30" CMG Elev 1099.45
Top 4.5' Manhole Elev 1105.79
Well Elev 1137.55
Ditch
Road
EXISTING PERIMETER DRAINAGE DITCH
B94-3 Elev 1112.35
B94-4 Elev 1101.66
JSDS-5 1112.40
JSDS-6 1114.17
Center of 4' 0 Standpipe Elev 1101.43
Well 21 Elev 1099.45
EL 1065.98 EXISTING 4" CLAY PIPE
EL 1065.37 EXISTING 4" CLAY PIPE
EL 1066.97 EXISTING 2" CLAY PIPE
N 737,076.71 E 2,892,127.22
N 737,119.42 E 2,892,215.45
N 736,663.87 E 2,891,709.79
N 736,482.35 E 2,891,533.33
NOTES:
1. FOR GENERAL NOTES SEE 10W204-1.
PRELIMINARY
AS-BUILT EXISTING CONTOUR
SCALE: 1" = 100' EXCEPT AS NOTED
YARD
ASH DISPOSAL STACK AREA
EXISTING CONTOUR
C.E.BOHAC E.J. ODEN C.E.BOHAC H.L. PETTY R.E. PURKEY L.A. NASH W.D. HALL
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING
AUTOCAD R14 41 C 10W287-1 R 0
PLOT FACTOR:1:100
W_TVA
C.A.D. DRAWING DO NOT ALTER MANUALLY
TASK COMPLETED BY: REV NO.


HOLSTON RIVER
HOLSTON RIVER
EDGE OF RIVER BANK
AREA TO BE CLOSED
AREA TO BE CLOSED
PLANT ACCESS ROAD
PLANT ACCESS ROAD
EXISTING DRAINAGE DITCH
STACK PERIMETER ROAD EXTENTION
EXISTING STILLING POND
EXISTING 30" CMP
EXISTING 36" CONC. PIPES
SEDIMENT BASIN (SEE POND LAYOUT SHEET)
OUTFALL STRUCTURE
CHEMICAL CLEANING POND
CHEMICAL CLEANING POND
COAL STORAGE YARD
FLY ASH STORAGE SILOS
SEPTIC SYSTEM SEE 10W321-1
TYPE B SPILLWAY (SEE NOTE 2)
NOTES:
1. FOR GENERAL NOTES SEE 10W204-1.
PRELIMINARY
COMPANION DRAWINGS: 10W204-1 THRU -5, & -7
AS-BUILT EXISTING CONTOUR
SCALE: 1" = 100'
EXCEPT AS NOTED
YARD
ASH DISPOSAL STACK AREA
EXISTING CONTOUR
C.E.BOHAC
E.J. ODEN
C.E.BOHAC
H.L. PETTY
R.E. PURKEY
L.A. NASH
W.D. HALL
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING
AUTOCAD R14
41
C
10W287-1
R 0
PLOT FACTOR:1:100
W_TVA
C.A.D. DRAWING
DO NOT ALTER MANUALLY
TASK COMPLETED BY:
REV NO.

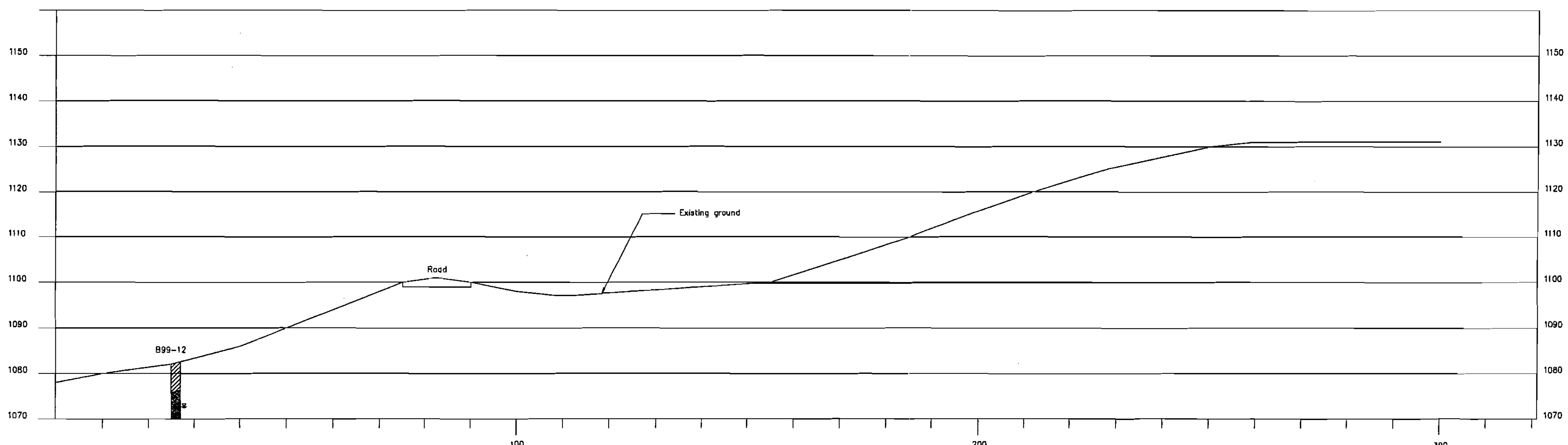
APPENDIX A

XX X 10W287-2



SECTION C2-C2

SCALE: HORIZ 1"=10'
VERT 1"=10'



SECTION C1-C1

SCALE: HORIZ 1"=10'
VERT 1"=10'

PRELIMINARY

SCALE: 1"=10' EXCEPT AS NOTED

ASH DISPOSAL STACK AREA
CROSS-SECTIONS

R.G. JOHNSON

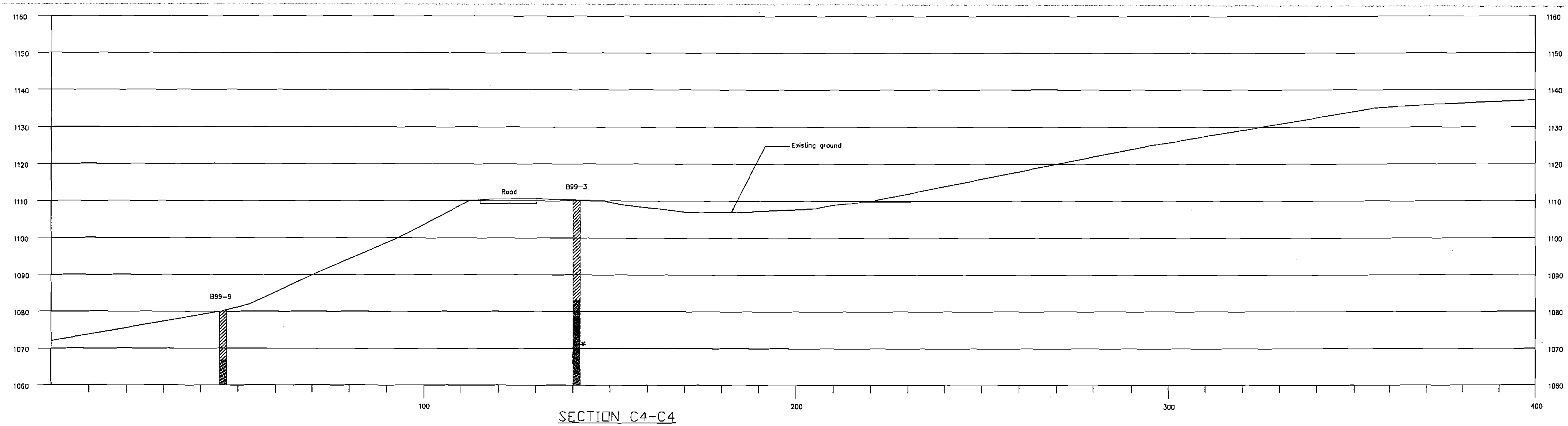
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 ## X 10W287-2.DWG R #

PARSONS
TASK COMPLETED BY: REV NO.

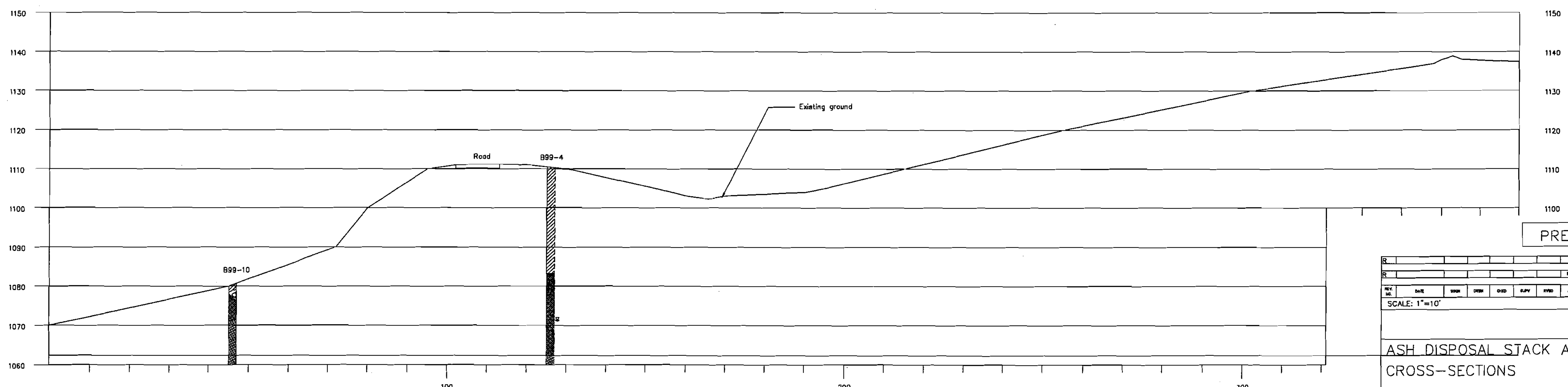
PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



SECTION C4-C4

SCALE: HORIZ 1"=10'
VERT 1"=10'



SECTION C3-C3

SCALE: HORIZ 1"=10'
VERT 1"=10'

PRELIMINARY

SCALE: 1"=10' EXCEPT AS NOTED

ASH DISPOSAL STACK AREA
CROSS-SECTIONS

R.C. JOHNSON

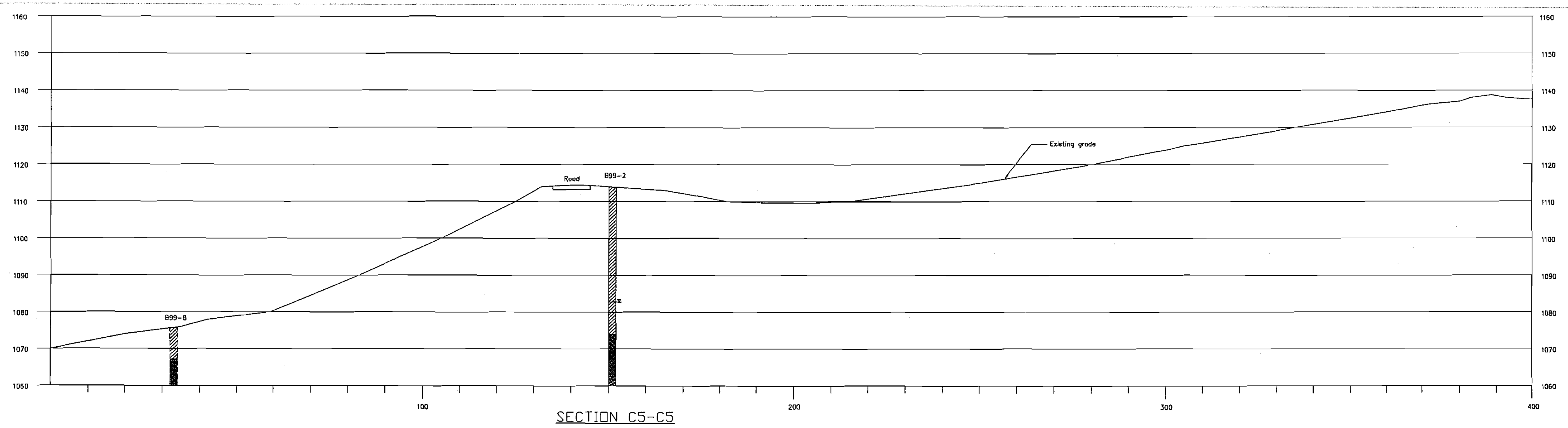
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | ## | X | 10W287-3.DWG | R #

PARSONS
TASK COMPLETED BY: | REV NO.

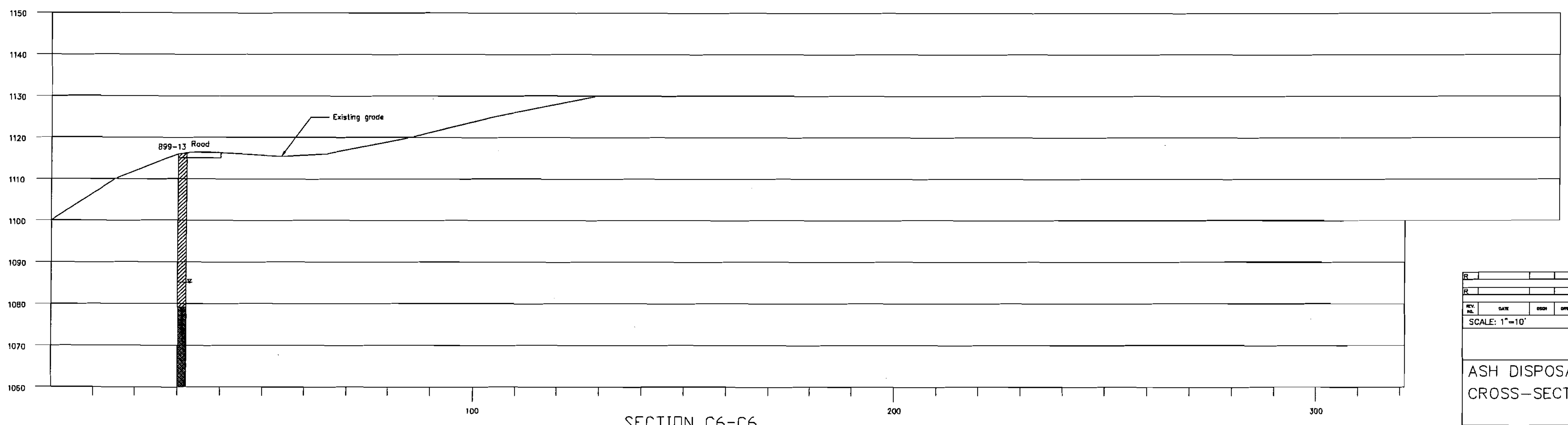
PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



SECTION C5-C5

SCALE: HORIZ 1"=10'
VERT 1"=10'



SECTION C6-C6

SCALE: HORIZ 1"=10'
VERT 1"=10'

PRELIMINARY

SCALE: 1"=10' EXCEPT AS NOTED

ASH DISPOSAL STACK AREA
CROSS-SECTIONS

R.G. JOHNSON

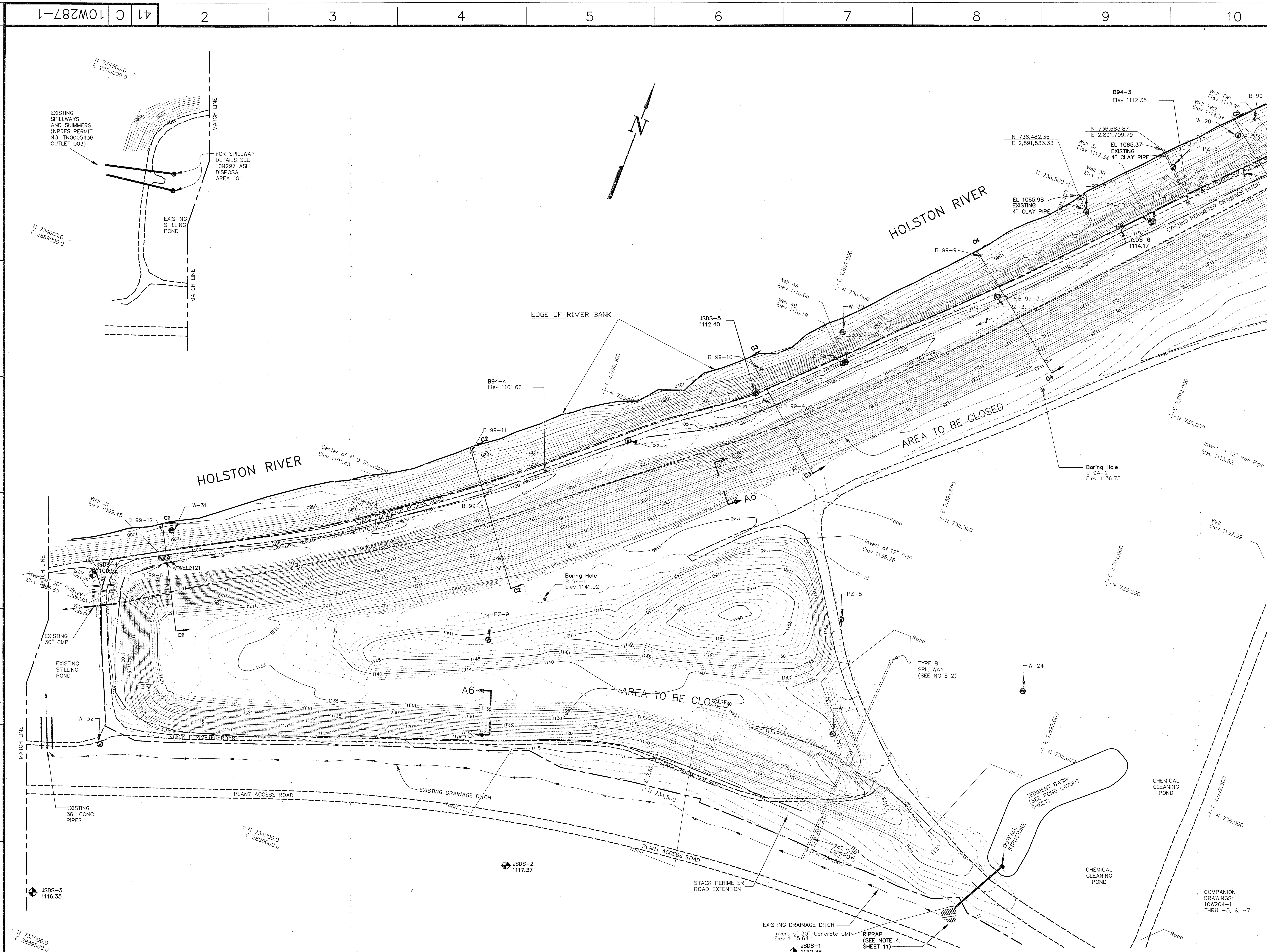
JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | ## | X | 10W287-4 | R #

PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PARSONS
TASK COMPLETED BY: | REV NO.



R 0 | AS-BUILT EXISTING CONTOUR | CEB | EJO | CEB | HLP | REP | LAN | WDH | 5125

SCALE: 1" = 100' EXCEPT AS NOTED

YARD

ASH DISPOSAL STACK AREA EXISTING CONTOUR

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
C.E.BOHAC	E.J. ODEN	C.E.BOHAC	H.L. PETTY	R.E. PURKEY	L.A. NASH	W.D. HALL

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

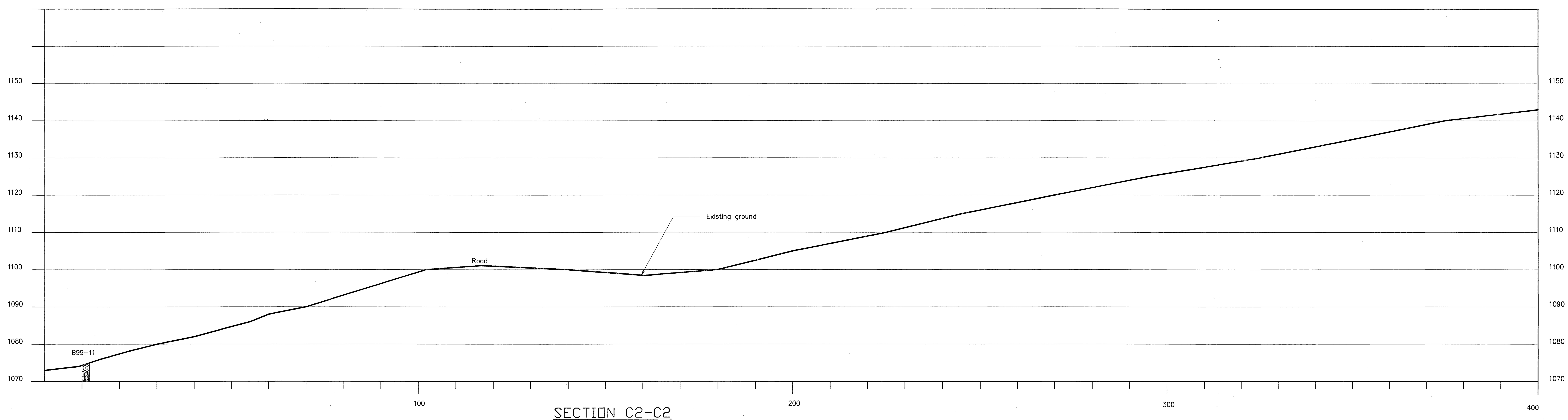
AUTOCAD R14 | 41 | C | 10W287-1 | R 0

PLOT FACTOR:1:100
W_TVA

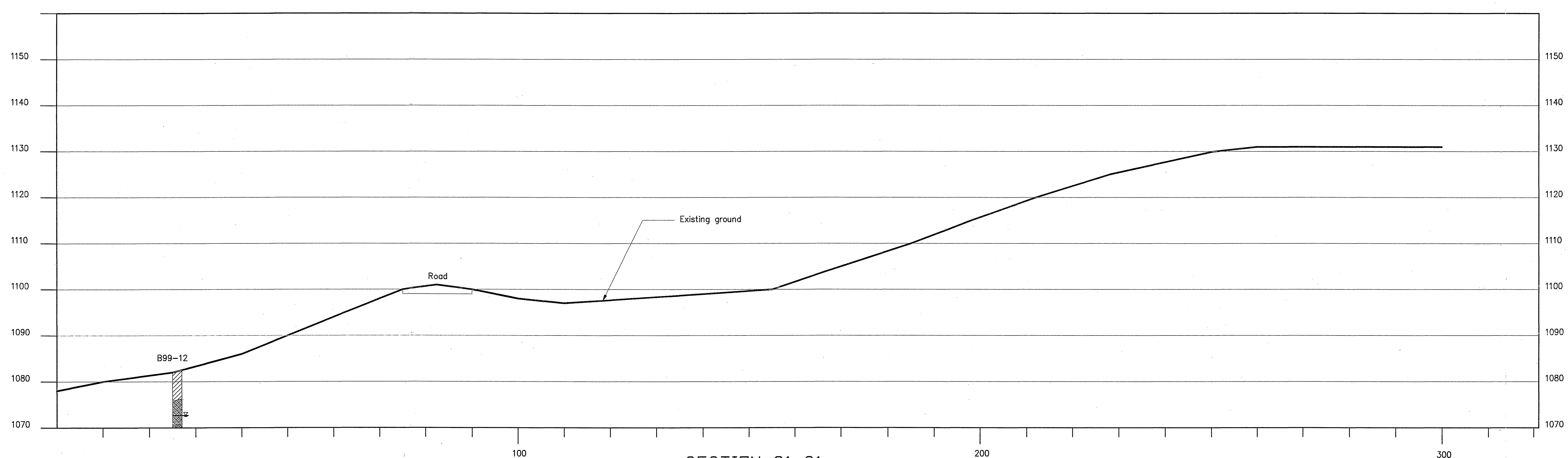
C.A.D. DRAWING DO NOT ALTER MANUALLY

TASK COMPLETED BY: | REV NO.

XX	X	10W287-2



SECTION C2-C2
SCALE: HORIZ 1"=10'
VERT 1"=10'



SECTION C1-C1
SCALE: HORIZ 1"=10'
VERT 1"=10'

PRELIMINARY

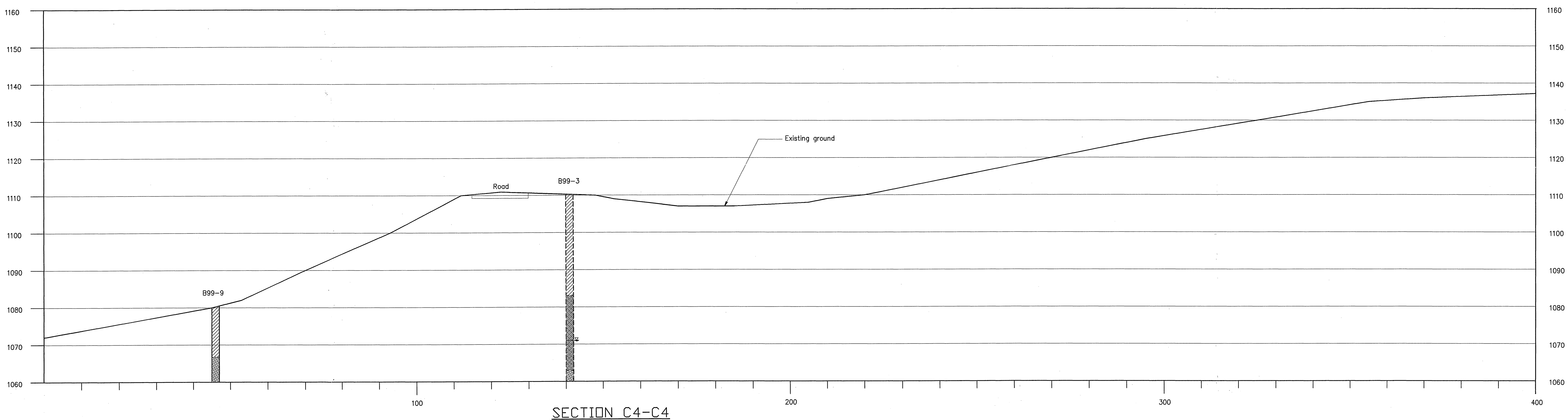
SCALE: 1"=10'	EXCEPT AS NOTED
ASH DISPOSAL STACK AREA CROSS-SECTIONS	
APPROVED BY: R.G. JOHNSON	RGJ
JOHN SEVIER FOSSIL PLANT TENNESSEE VALLEY AUTHORITY FOSSIL AND HYDRO ENGINEERING	
AUTOCAD R14	## X 10W287-2.DWG R #

PARSONS
TASK COMPLETED BY: REV NO.

PLOT FACTOR:XX
W_TVA

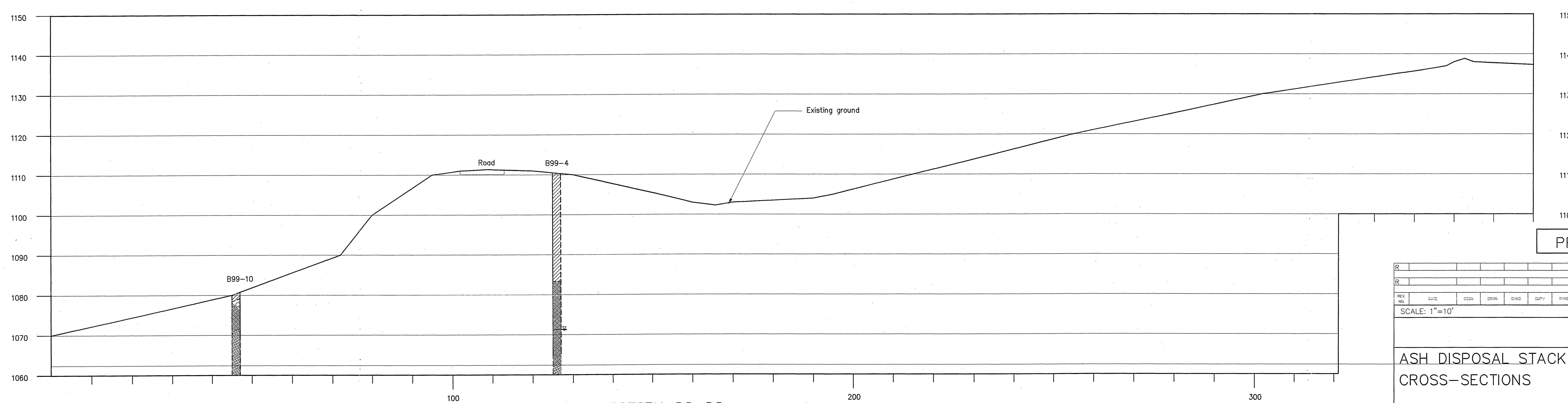
C.A.D. DRAWING
DO NOT ALTER MANUALLY

10W287-3 | X | XX



SECTION C4-C4

SCALE: HORIZ 1"=10'
VERT 1"=10'



SECTION C3-C3

SCALE: HORIZ 1"=10'
VERT 1"=10'

PRELIMINARY

SCALE: 1"=10'	EXCEPT AS NOTED

ASH DISPOSAL STACK AREA
CROSS-SECTIONS

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
					R.G. JOHNSON	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

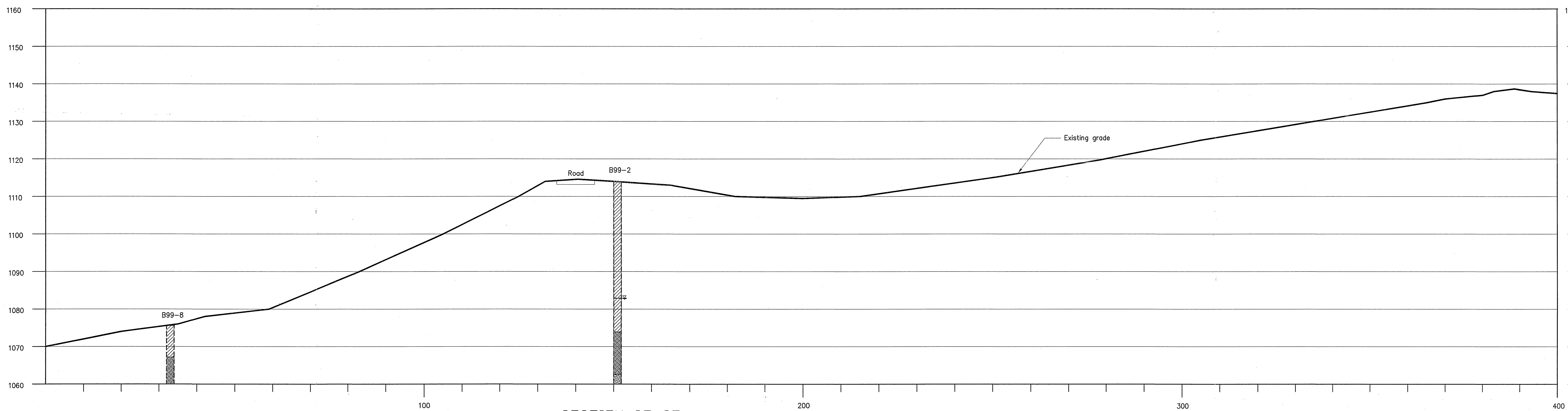
AUTOCAD R14 | DATE | ## | X | 10W287-3.DWG | R #

PLOT FACTOR:XX
W_TVA

PARSONS
TASK COMPLETED BY: | REV NO.

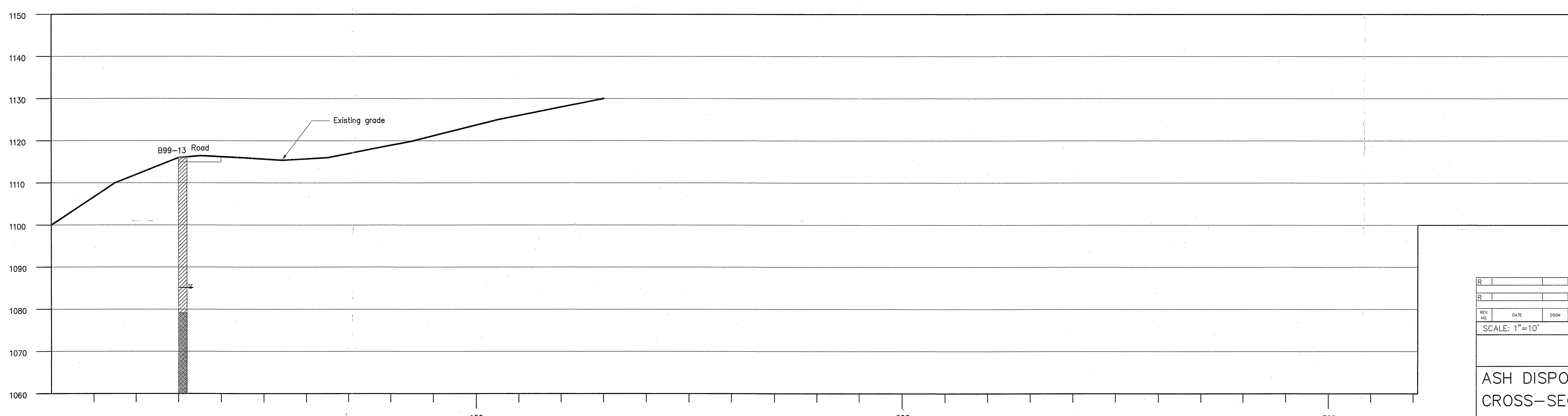
C.A.D. DRAWING
DO NOT ALTER MANUALLY

10W287-4 | X | XX



SECTION C5-C5

SCALE: HORIZ 1"=10'
VERT 1"=10'



SECTION C6-C6

SCALE: HORIZ 1"=10'
VERT 1"=10'

PRELIMINARY

RGJ

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV.	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD

SCALE: 1"=10' EXCEPT AS NOTED

ASH DISPOSAL STACK AREA
CROSS-SECTIONS

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
					R.G. JOHNSON	

JOHN SEVIER FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R14 | DATE | ## | X | 10W287-4 | R #

PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PARSONS
TASK COMPLETED BY: | REV NO.

PPG-DATE: 10/15/99 - 10:59 AM
PPG-FILE: 10W2874.dwg