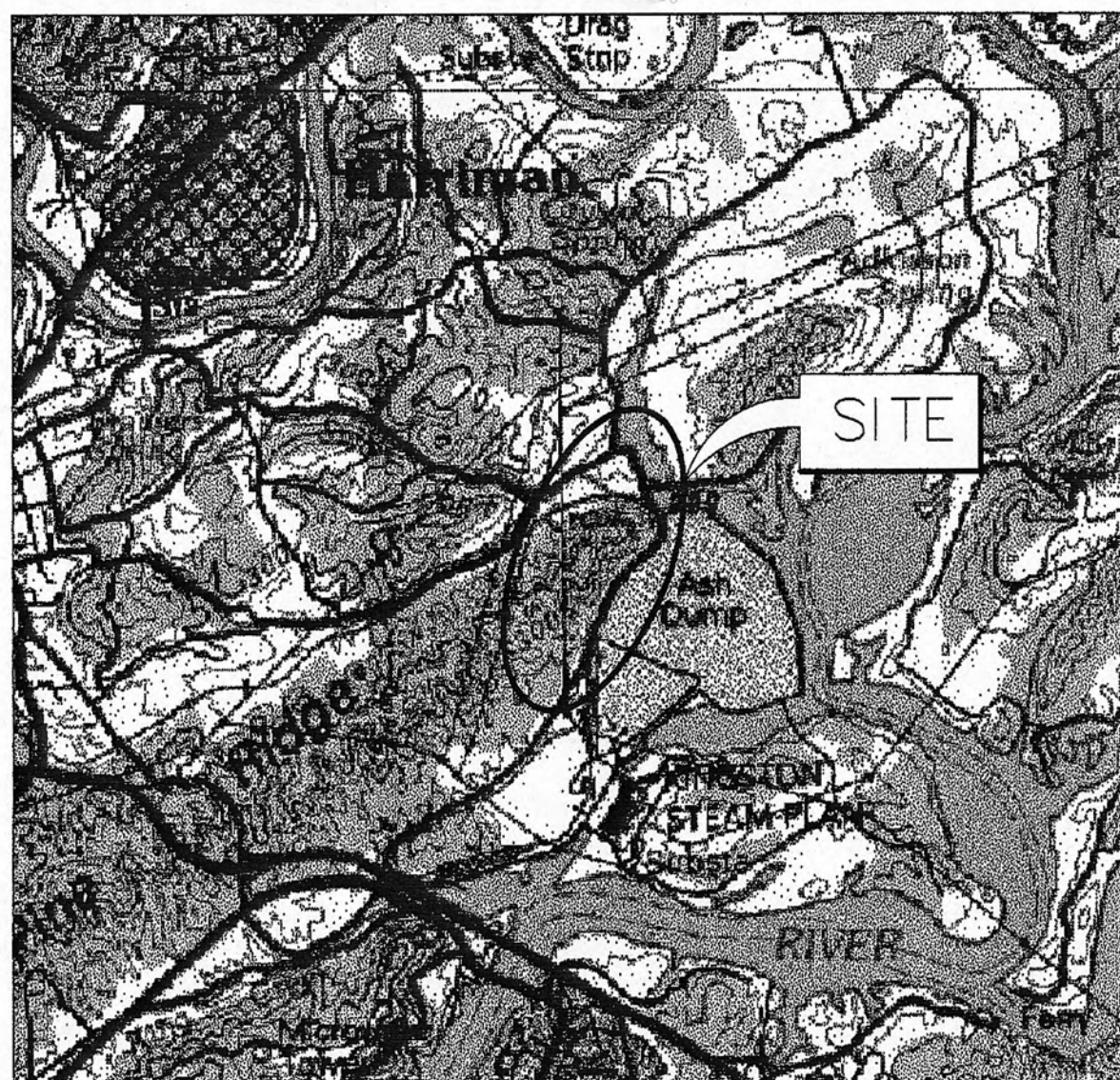
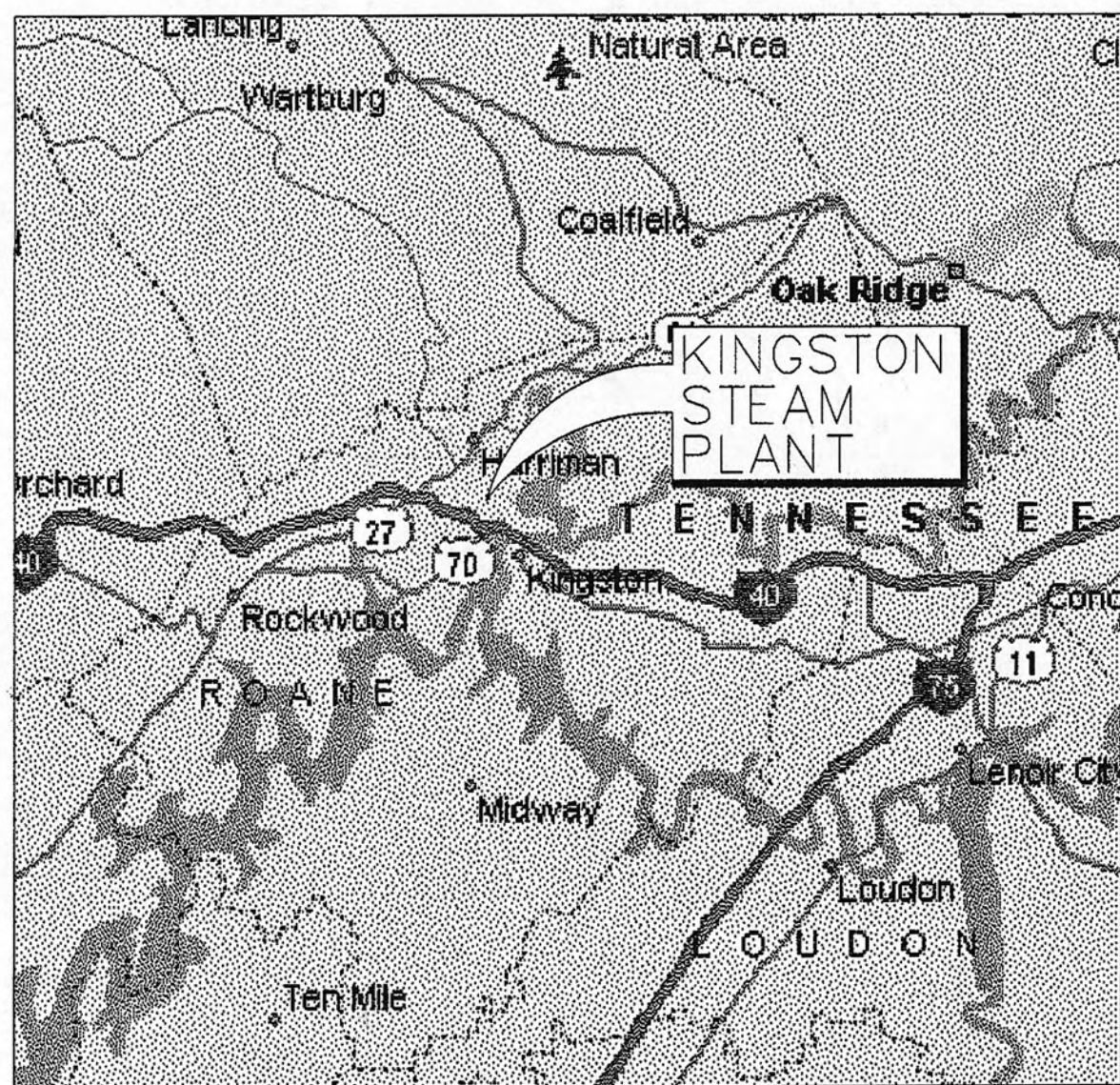


KIF - UTILITY RESTORATION HARRIMAN UTILITY BOARD - EFFLUENT



SITE MAP



VICINITY MAP

DRAWING INDEX

670-HE001	TITLE SHEET
670-HE002	PLAN AND PROFILE SHEET 1 OF 3
670-HE003	PLAN AND PROFILE SHEET 2 OF 3
670-HE004	PLAN AND PROFILE SHEET 3 OF 3
670-HE005	DETAIL SHEET
670-HE006	EROSION CONTROL DETAIL SHEET



PREPARED BY:
CTI ENGINEERS, INC.
112 DURWOOD ROAD SUITE A
KNOXVILLE, TN 37922
866-246-2750

JOHN L. KING, PE
TENNESSEE LICENSE NO. 103702
7/31/09
DATE

NOTE:
THESE RECORD DRAWINGS PREPARED BY CTI ARE BASED UPON THE REPRESENTATIONS OF OTHERS (MAYSE CONSTRUCTION COMPANY, OF CHATTANOOGA, TENNESSEE AND THE R.L.S. GROUP, LLC OF HIXSON, TENNESSEE) AND ARE NOT FOR BIDDING, PERMIT OR CONSTRUCTION PURPOSES. THESE DRAWINGS HAVE BEEN REVIEWED BY CTI AND ARE BELIEVED TO REFLECT, TO THE BEST OF OUR KNOWLEDGE, AN ACCURATE RECORD OF THE WORK AS CONSTRUCTED. THE INFORMATION CONTAINED HEREIN SHOULD BE FIELD-VERIFIED PRIOR TO BEING USED FOR FUTURE DESIGN AND/OR CONSTRUCTION.

RECORD DRAWING
12-17-2010

I CERTIFY THAT THESE PLANS HAVE BEEN REVIEWED
AND APPROVED BY THE HARRIMAN UTILITY BOARD

CHUCK FLORA, GENERAL MANAGER
DATE

R 1										DISORU INTERFA									
R 1 12/17/10 JLK JMG JLK - - JLK - - - D										DISORU INTERFA									
RECORD DRAWING										DISORU INTERFA									
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SCALE: NOT TO SCALE										EXCEPT AS NOTED									
YARD CIVIL																			
KIF - UTILITY RESTORATION																			
HARRIMAN UTILITY BOARD - EFFLUENT																			
TITLE SHEET																			
DESIGNED BY:	JLK.	DRAWN BY:	JMG.	CHECKED BY:	D.L.J.	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:										
KINGSTON FOSSIL PLANT																			
TENNESSEE VALLEY AUTHORITY																			
FOSSIL AND HYDRO ENGINEERING																			
AUTOCAD R07	DATE	3/17/08	36	C	670-HE001.1										R 1				

A

B

C

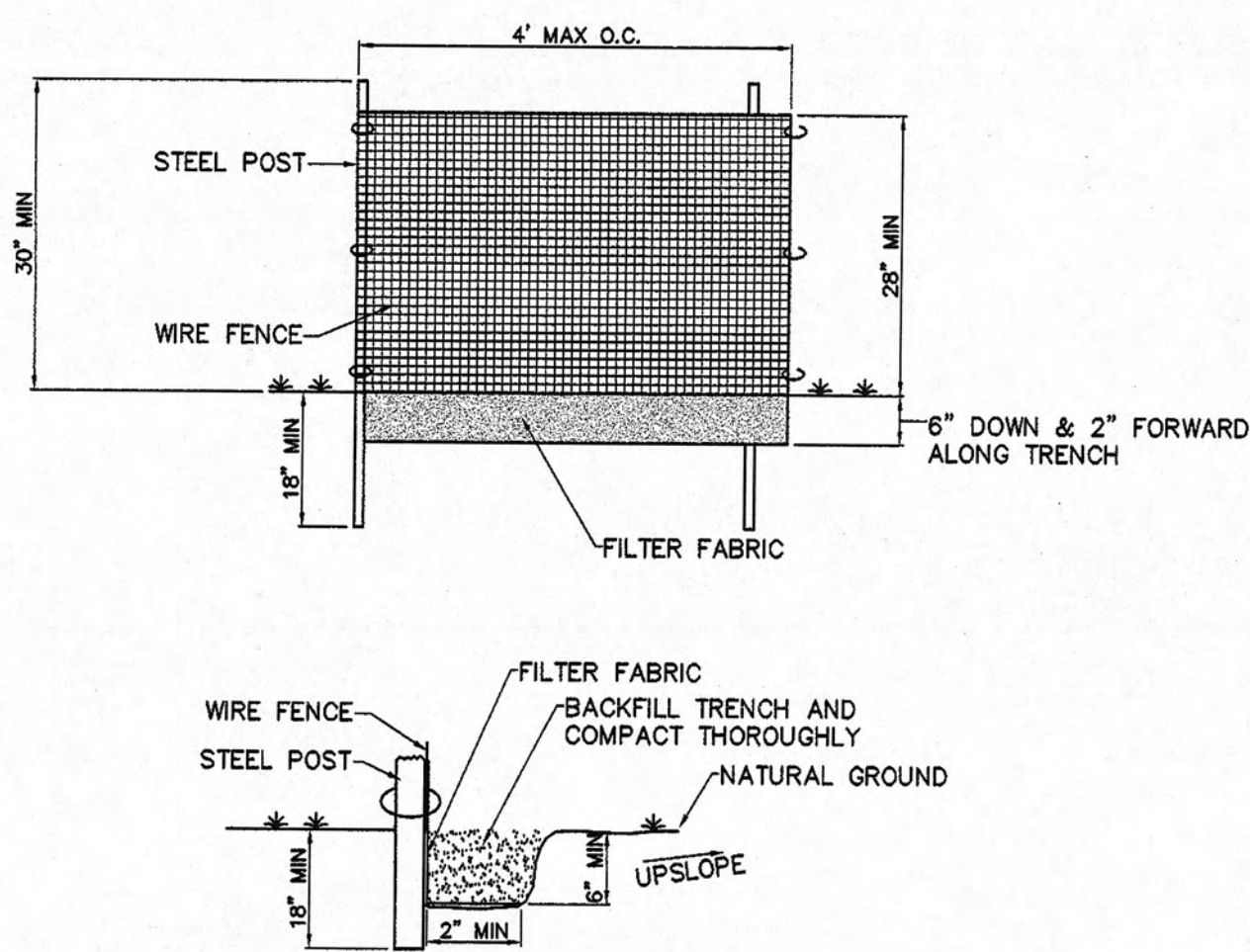
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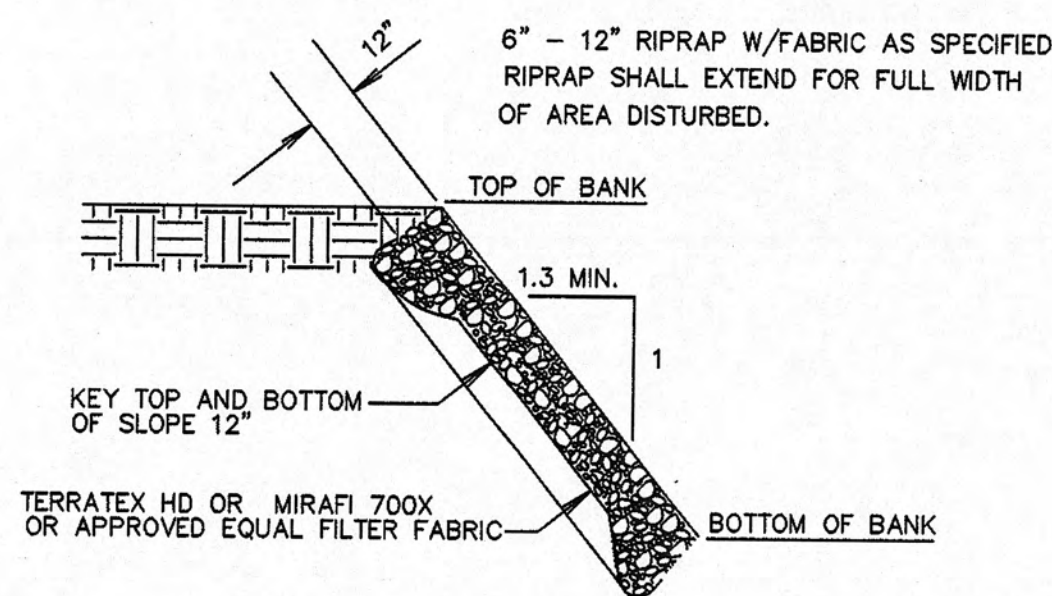
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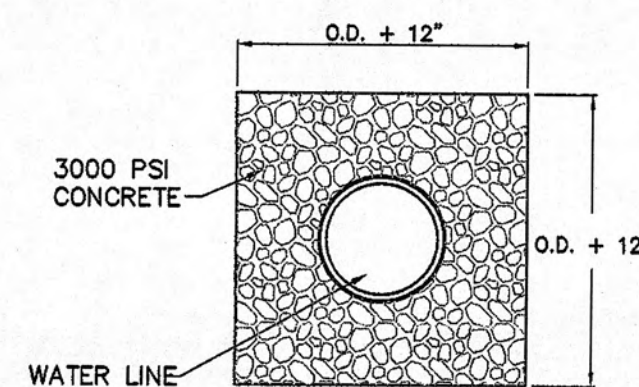
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TYPICAL SILT FENCE TYPE C [SF]
NOT TO SCALE
(TYPE C TO BE USED FOR THIS PROJECT)

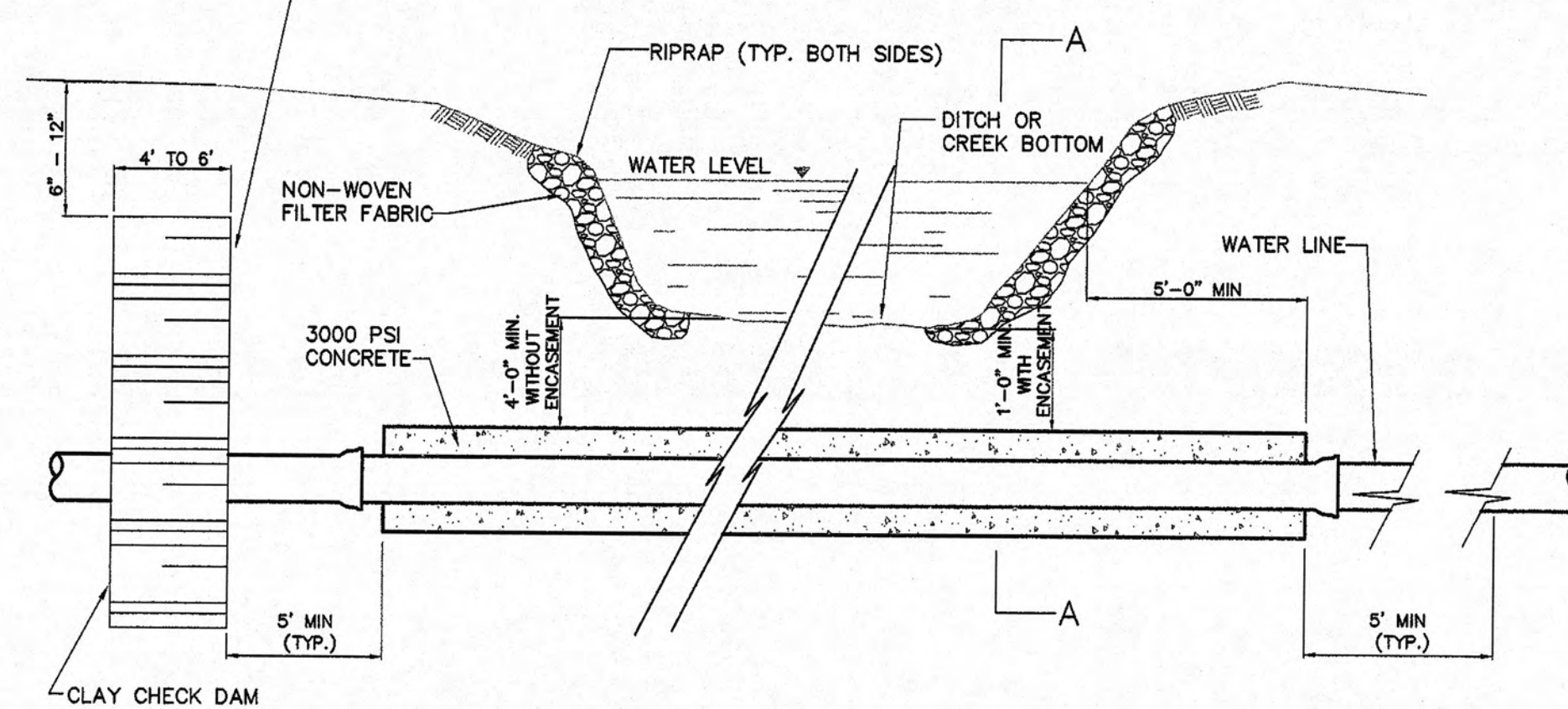


RIPRAP DETAIL
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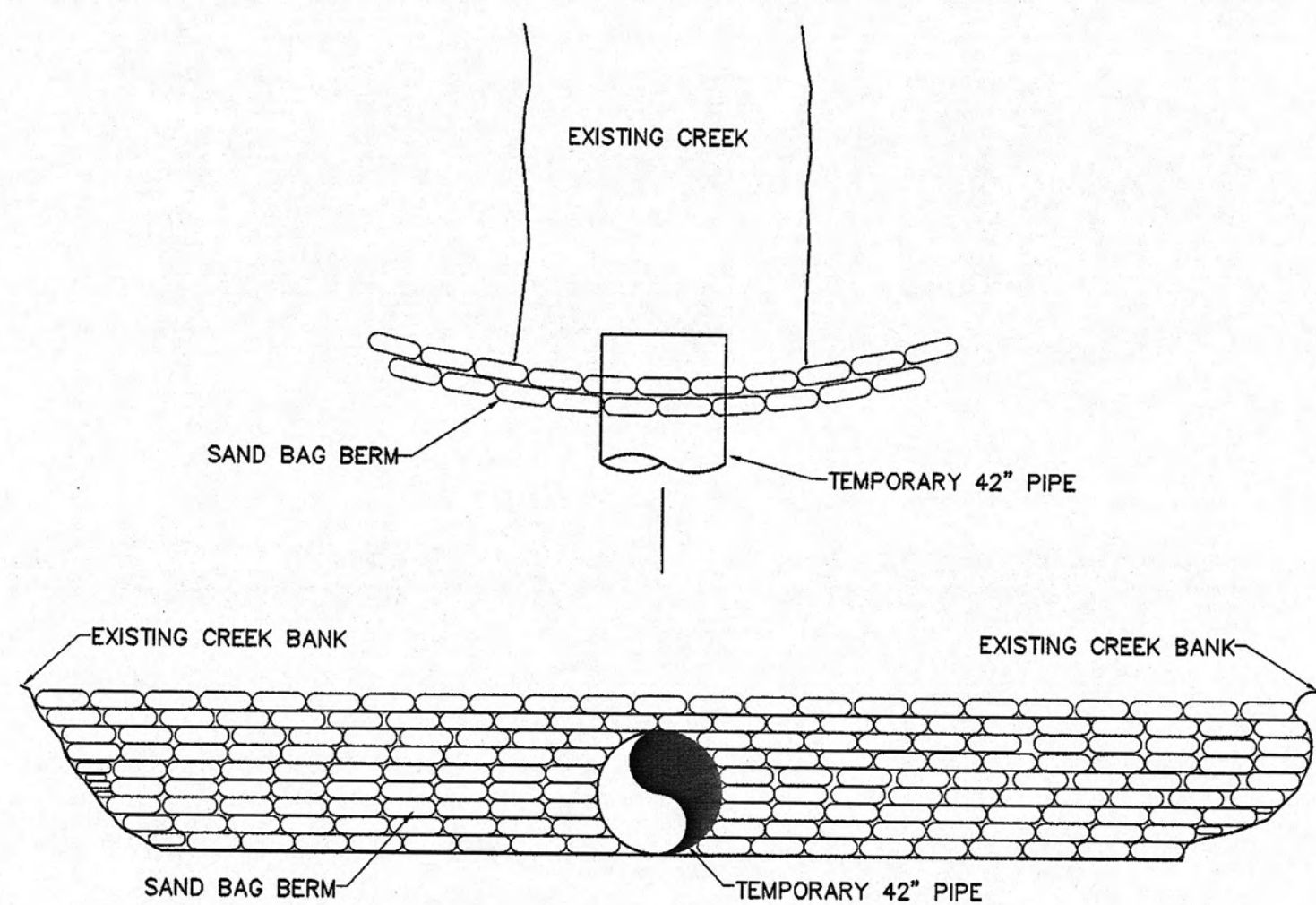
SECTION A-A

REQ'D ON BRANCH CROSSINGS AND/OR WHERE SHOWN ON DRAWINGS: BACKFILL WITH CLAY MATERIAL (NO ORGANIC MATERIAL); FROM 1-FOOT BELOW BOTTOM OF TRENCH TO WITHIN 6-INCHES TO 12-INCHES FROM TOP OF GROUND AND 1-FOOT OUTSIDE EACH SIDE OF TRENCH. (TYPICAL EACH SIDE)

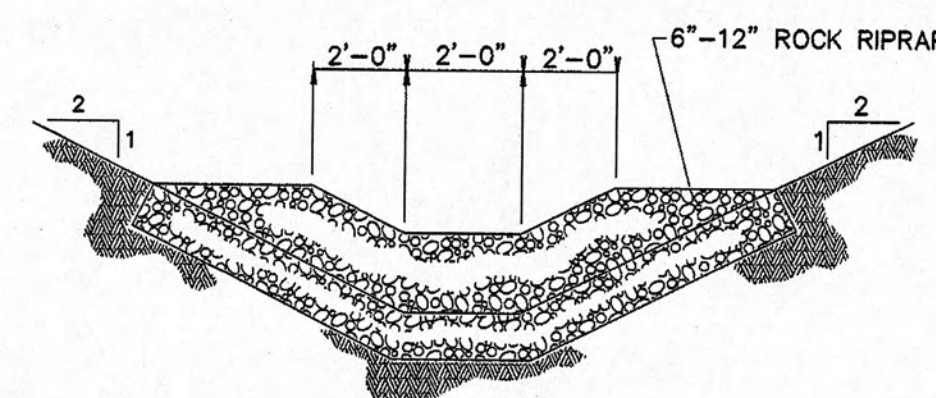


BRANCH OR DITCH CROSSING DETAIL
NOT TO SCALE

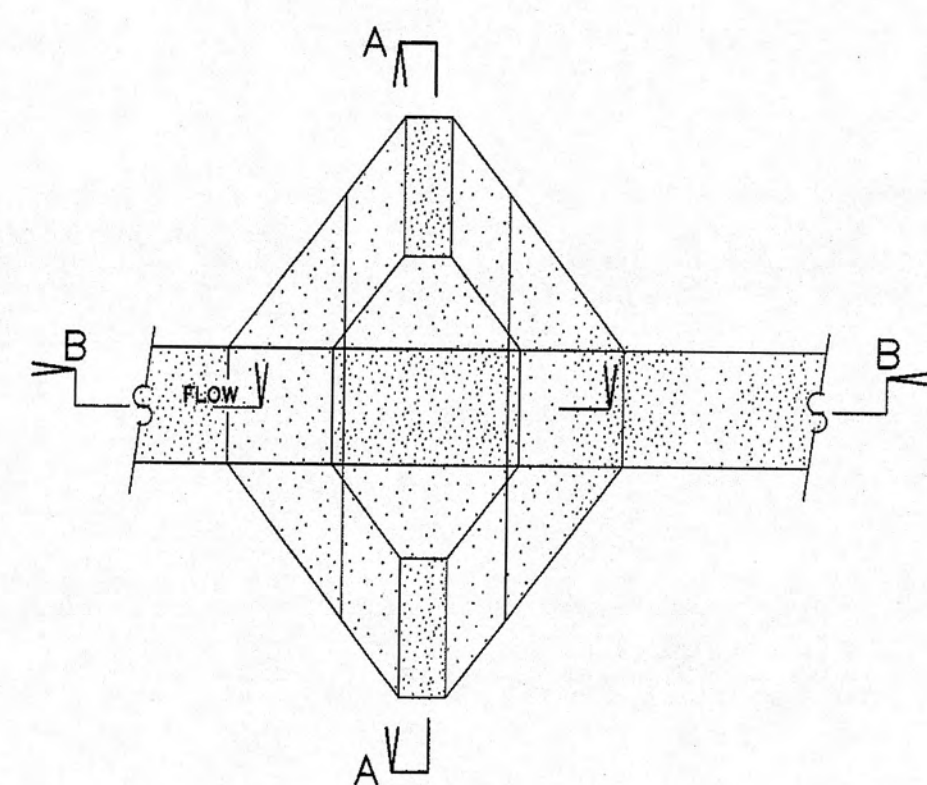
NOTE:
PROVIDE MIN. 4 FEET OF COVER UNLESS IN ROCK. IF ROCK IS ENCOUNTERED TOP OF PIPE SHALL BE 1 FOOT BELOW ROCK ENCASED IN CONCRETE. PIPING MATERIAL SHALL BE DUCTILE IRON UNLESS OTHERWISE SPECIFIED IN DRAWINGS.



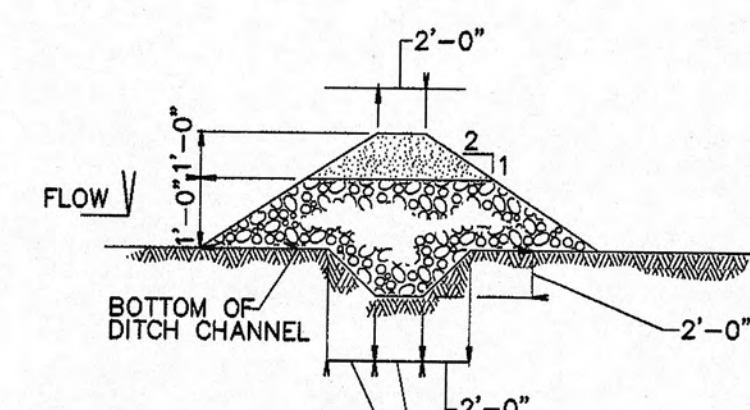
SAND BAG BERM
NOT TO SCALE



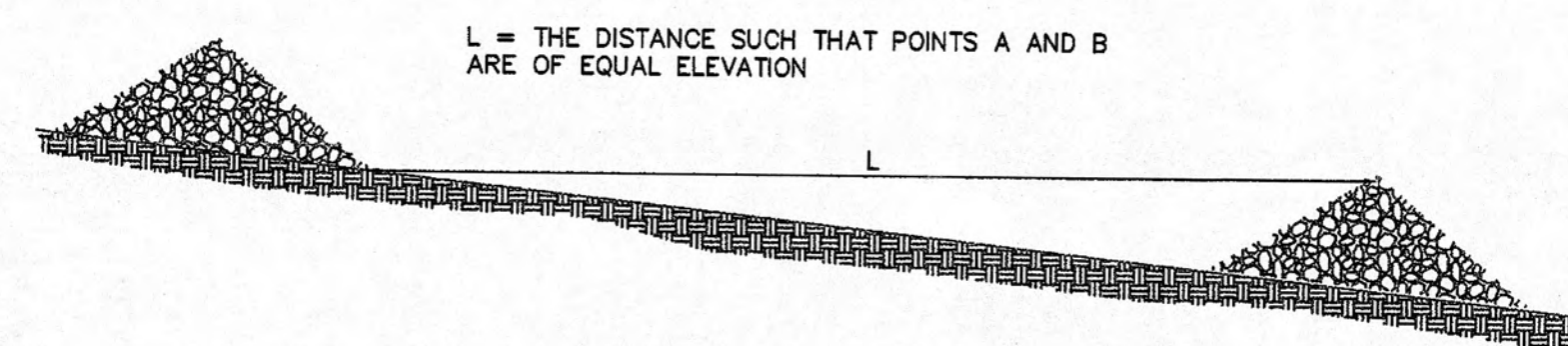
SECTION A-A



PLAN



SECTION B-B



SPACING BETWEEN CHECK DAMS

STONE CHECK DAM [CD]
NOT TO SCALE



RECORD DRAWING
12-17-2010

CONSOLIDATED TECH., INC.

TASK COMPLETED BY:

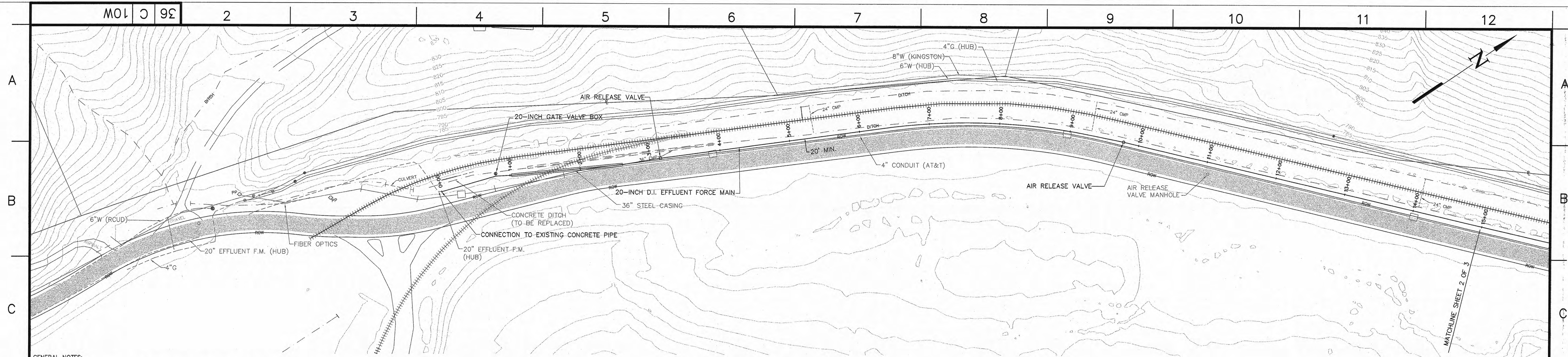
REV. NO.

PLOT FACTOR: 1:1

W_TVA

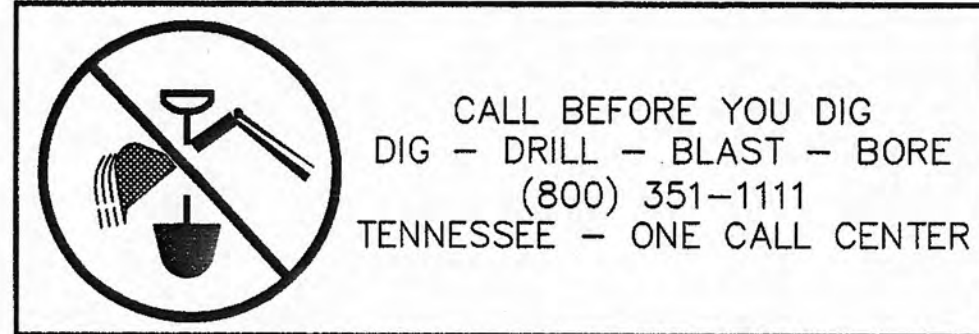
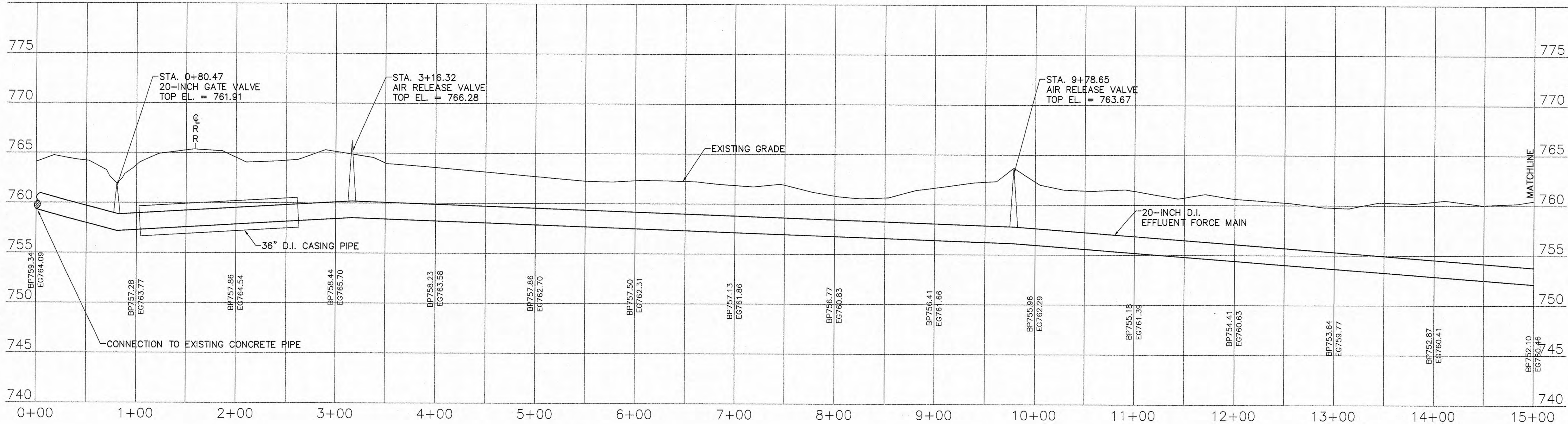
C.A.D. DRAWING
DO NOT ALTER MANUALLY

REV.	DATE	DSGN	DRWN	CHKD	SUPV	RWD	APPD	ISSD	PROJECT	AS CONST	REV
R 1	12/17/10	JLK	JMG	JLK			JLK				D
SCALE: AS SHOWN EXCEPT AS NOTED											
YARD CIVIL											
KIF - UTILITY RESTORATION											
HARRIMAN UTILITY BOARD - EFFLUENT											
EROSION CONTROL DETAIL SHEET											
DESIGNED BY:	J.L.K.	DRAWN BY:	J.M.G.	CHECKED BY:	D.L.J.	SUPERVISED BY:		REVIEWED BY:		APPROVED BY:	
KINGSTON FOSSIL PLANT											
TENNESSEE VALLEY AUTHORITY											
FOSSIL AND HYDRO ENGINEERING											
AUTOCAD R07	DATE	3/17/09	36	C	670-HE006.1	R 1					



GENERAL NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING "IN ONE-CALL" AND ALL NON-MEMBER UTILITY OWNERS IN THE PROJECT AREA AT LEAST 72 HOURS PRIOR TO ANY CONSTRUCTION ACTIVITY. ALL EXISTING UTILITIES ARE NOT SHOWN ON THESE PLANS AND LOCATIONS SHOWN HAVE BEEN APPROXIMATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATIONS OF ALL EXISTING UTILITIES AND PROTECT ALL EXISTING UTILITIES AND STRUCTURES FROM DAMAGE. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THESE PLANS, INCORRECTLY SHOWN ON THESE PLANS OR NOT SHOWN ON THESE PLANS, SHALL BE REPAIRED BY THE CONTRACTOR, AS HIS EXPENSE, TO THE SATISFACTION OF THE UTILITY OWNER.
2. THE CONTRACTOR SHALL PERFORM ALL WORK IN A LOGICAL CONSTRUCTION SEQUENCE AS REQUIRED TO STREAMLINE AND EXPEDITE THE COMPLETION OF THE PROJECT AS MUCH AS POSSIBLE. HOWEVER, IN CONSTRUCTING THE UTILITIES, PIPING INSTALLATION SHALL COMMENCE AT ONE LOCATION AND BE CONTINUOUS WITHOUT SKIPS TO AVOID ROCK OR OTHER OBSTACLES AND CONTINUE UNTIL COMPLETE. INSTALLATION OF SLEEVES IN NEW PIPING SHALL NOT BE PERMITTED.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CONSTRUCTION AND SCHEDULING WITH OTHER CONTRACTORS, UTILITIES AND ALL OTHER PARTIES WORKING WITHIN, UTILIZING, RESIDING OR OTHERWISE ACCESSING THE PROJECT AREA AS NEEDED TO EXPEDITE AND SUCCESSFULLY COMPLETE THE UTILITIES INSTALLATIONS. THE CONTRACTOR SHALL ALLOW TIME FOR COORDINATION AND DELAYS CAUSED BY OTHERS USING, WORKING WITHIN OR OTHERWISE ACCESSING THE PROJECT AREA.
4. THE CONTRACTOR IS RESPONSIBLE FOR ENGAGING THE SERVICES OF A TENNESSEE PROFESSIONAL LAND SURVEYOR, TO STAKE OUT ALL WORK RELATED TO THE PROJECT AND VERIFY ALL DIMENSIONS AND GRADES PRIOR TO COMMENCING CONSTRUCTION. SHOULD ANY CONFLICTS OR OTHER DISCREPANCIES EXIST, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER AND AWAIT FURTHER INSTRUCTION PRIOR TO COMMENCING CONSTRUCTION ON THE PROJECT.
5. THE CONTRACTOR IS RESPONSIBLE FOR ANY DEMOLITION, CLEARING, GRUBBING AND DISPOSAL OF ALL WASTE MATERIALS AS NECESSARY TO SATISFACTORILY COMPLETE ALL CONSTRUCTION. ALL WASTE MATERIALS SHALL BE REMOVED AND DISPOSED OF OFF THE PROJECT PROPERTY BY THE CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ACCEPTABLE ACCESS TO ALL PARTIES THROUGHOUT THE PROJECT AREA AND OTHER AFFECTED PROPERTIES THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE AND INSTALL MAINTENANCE STONE AND OTHER MEASURES AS MAY BE NECESSARY TO MAINTAIN PEDESTRIAN AND VEHICLE ACCESS IN A CONDITION ACCEPTABLE TO THE ENGINEER, TVA, TDOT, COUNTY ROAD DEPARTMENT, RAILROAD, AND OTHER PARTIES AFFECTED BY CONSTRUCTION ACTIVITIES.
7. SHOULD GROUNDWATER BE ENCOUNTERED DURING CONSTRUCTION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN AN ADEQUATE DEWATERING SYSTEM. DEWATERING EQUIPMENT SHALL BE USED IN A MANNER WHICH PREVENTS CONTAMINATION OF STREAMS OR DAMAGE TO ANY PUBLIC PROPERTIES, PRIVATE PROPERTIES, INCLUDING UTILITIES.
8. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION SIGNING AND TRAFFIC CONTROL. ALL CONSTRUCTION SIGNING AND TRAFFIC CONTROL MATERIALS, METHODS AND MEANS SHALL BE IN ACCORDANCE WITH TDOT, RAILROAD, AND COUNTY HIGHWAY STANDARDS AND ANY PROJECT SPECIFIC REQUIREMENTS IMPOSED BY LOCAL OFFICES AND BY TVA.
9. THE CONTRACTOR IS RESPONSIBLE FOR ALL SECURITY AND SAFETY RELATED TO THIS PROJECT.
10. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING PUBLIC AND PRIVATE PROPERTIES FROM DAMAGE RELATED TO CONSTRUCTION ACTIVITIES. ANY DAMAGE AS A RESULT OF CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE ENGINEER.
11. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AN ACCURATE SET OF AS-BUILT DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE ENGINEER WITH AN ACCURATE AS-BUILT SURVEY, COMPLETED BY A QUALIFIED TENNESSEE PROFESSIONAL LAND SURVEYOR. THE SURVEY SHALL BE PROVIDED IN BOTH SEALED HARDCOPY AND DIGITAL (AUTOCAD COMPATIBLE WITH ALL RAW SURVEY DATA POINTS) FORMATS. THE AS-BUILT SURVEY SHALL INCLUDE ALL AREAS AFFECTED BY CONSTRUCTION AND SHALL BE PREPARED ON PLAN HORIZONTAL AND VERTICAL DATUMS PROVIDED AND SHALL PROVIDE HORIZONTAL LOCATIONS OF ALL UTILITIES INSTALLATIONS AND OF EXISTING UNDERGROUND UTILITIES ENCOUNTERED AND INCLUDE VERTICAL LOCATIONS OF KINGSTON'S WATER LINE AND HUBS EFFLUENT FORCE MAIN.
12. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING AND PREVENTING PROBLEMS DUE TO DUST OR MUD TO THE SATISFACTION OF THE ENGINEER, TDOT, TVA, AND COUNTY HIGHWAY DEPARTMENT.
13. THE CONTRACTOR IS RESPONSIBLE FOR LIMITING ALL CONSTRUCTION ACTIVITIES TO AREAS WITHIN DESIGNATED EASEMENT OR RIGHT OF WAY AREAS. THE CONTRACTOR IS RESPONSIBLE FOR SECURING THE USE OF OFF-SITE STORAGE AND STAGING AREAS(S) AS NECESSARY TO COMPLETE THE PROJECT.
14. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL UTILITY TIE-INS/CONNECTIONS WITH THE ENGINEER AND APPROPRIATE UTILITY OWNER.
15. WHERE NECESSARY TO PREVENT EXTENDED DISRUPTION OF WATER, GAS, AND/OR COMMUNICATIONS SERVICE TO EXISTING CUSTOMERS, THE CONTRACTOR SHALL INSTALL, PROTECT AND MAINTAIN TEMPORARY SERVICES AS NEEDED.
16. THE CONTRACTOR IS RESPONSIBLE FOR PERFORMING WORK IN ACCORDANCE WITH THE TERMS AND CONDITIONS SET FORTH IN THE ENVIRONMENTAL PERMITS FOR THE PROJECT.



RECORD DRAWING
12-17-2010

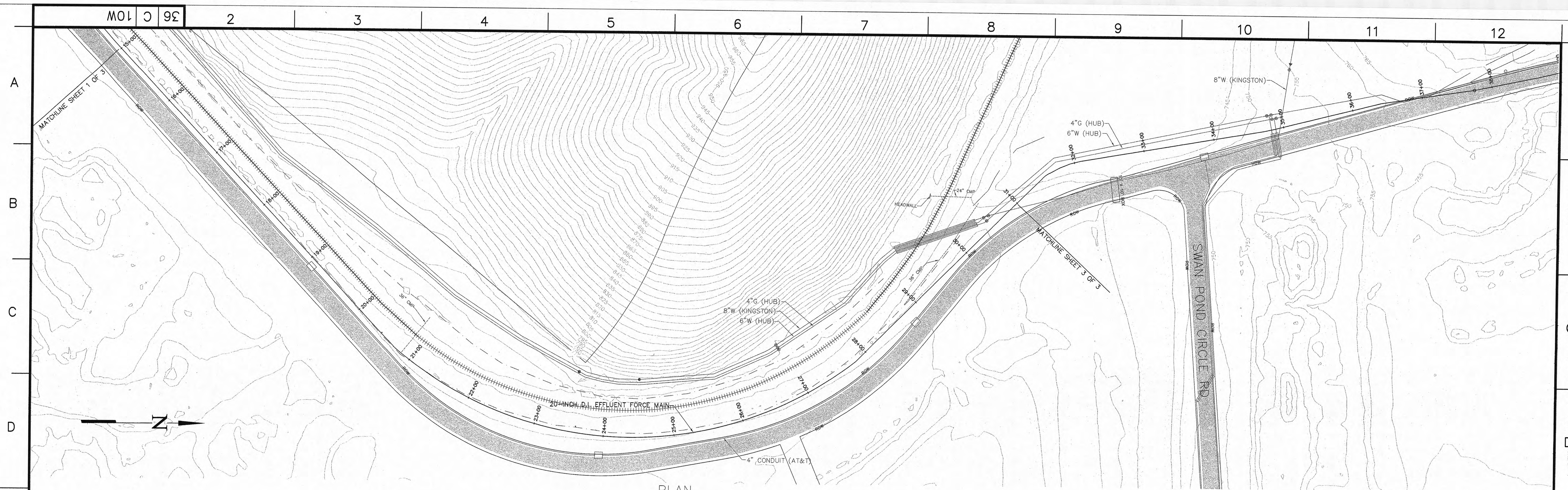


R 2	12/17/10	J.L.K.	J.M.G.	J.L.K.	--	--	J.L.K.	--	--	--	--	--	--	--	--	--	--	--	--
RECORD DRAWING																			
R 1	8/17/09	J.L.K.	J.M.G.	J.L.K.	--	--	J.L.K.	--	--	--	--	--	--	--	--	--	--	--	D
ADDED CASING, MOVED AIR RELEASE VALVE AND ADDED SWPPP INFORMATION																			
REV.	NO.	DATE	DSGN	DRWN	CHD	SUPV	RWDO	APPR	ISSD	PROJECT			AS CONST			NOTED			
SCALE: 1"=50'																			
EXCEPT AS NOTED																			
CIVIL YARD																			
KIF - UTILITY RESTORATION																			
HARRIMAN UTILITY BOARD - EFFLUENT																			
PLAN & PROFILE SHEET 1 OF 3																			
DESIGNED BY:		DRAWN BY:		CHECKED BY:		SUPERVISED BY:		REVIEWED BY:		APPROVED BY:		ISSUED BY:							
J.L.K.		J.M.G.		D.L.V.															
KINGSTON FOSSIL PLANT																			
TENNESSEE VALLEY AUTHORITY																			
FOSSIL AND HYDRO ENGINEERING																			
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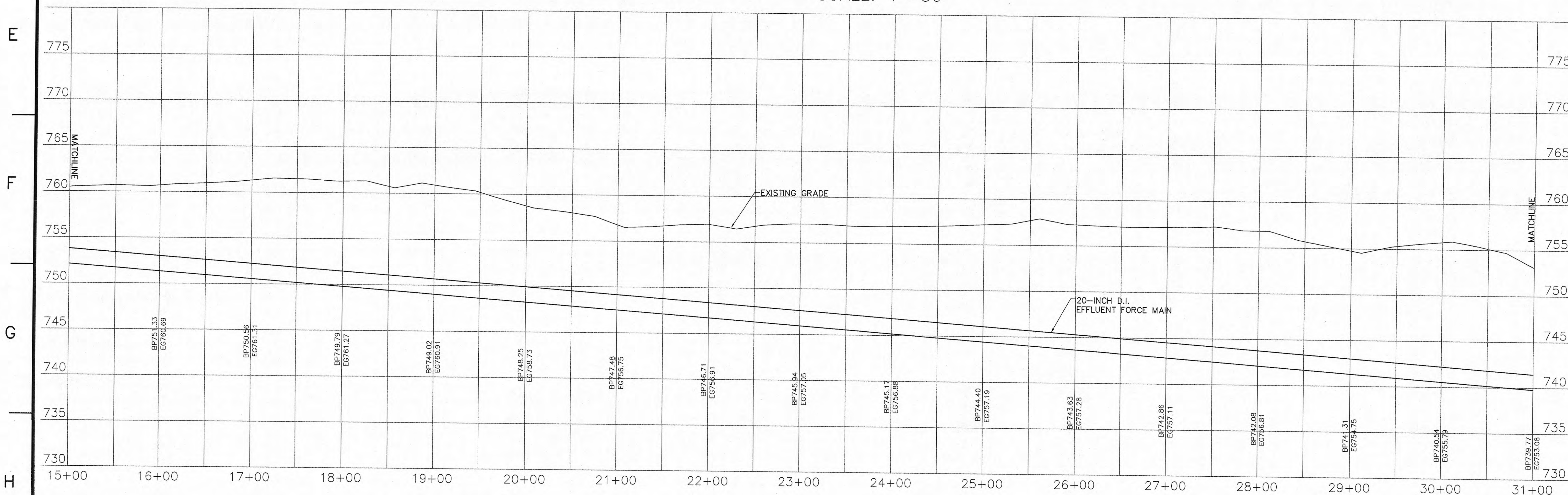
CTI ENGINEERS, INC.
TASK COMPLETED BY: REV NO.

PLOT FACTOR: 1:1
W-TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



PLAN
SCALE: 1"=50'



PROFILE
SCALE: 1"=50'H, 1"=5'V

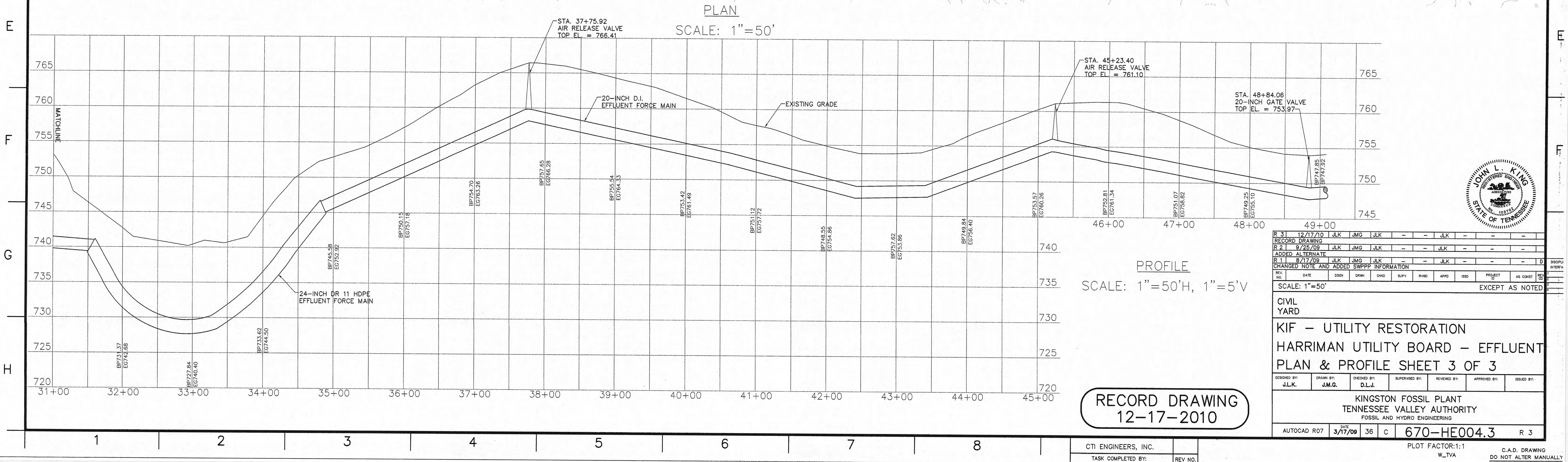
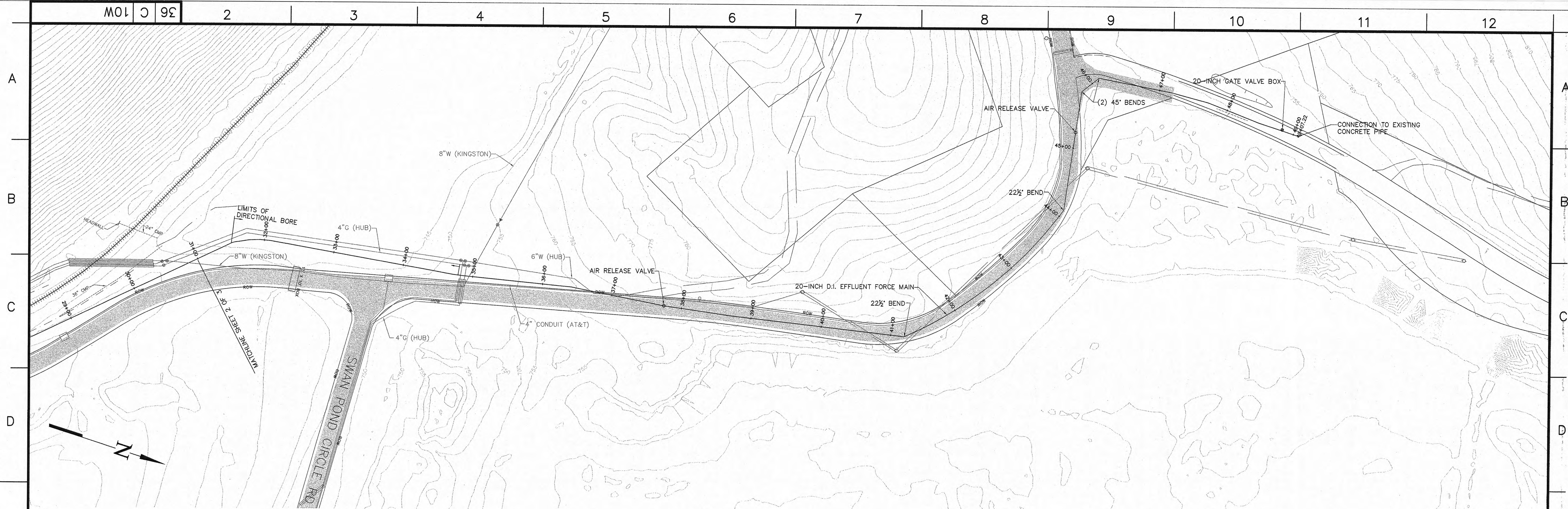
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12-17-2010



DESIGNED BY:	DATE:	CDSN:	DRWN:	CHD:	SUPV:	RVD:	APPD:	ISSD:	PROJECT:	AS CONST:	REV:
J.L.K.	3/17/09		J.M.G.						KINGSTON FOSSIL PLANT		
KINGSTON FOSSIL PLANT TENNESSEE VALLEY AUTHORITY FOSSIL AND HYDRO ENGINEERING											
AUTOCAD R07 DATE: 3/17/09 36 C										670-HE003.2 R 2	

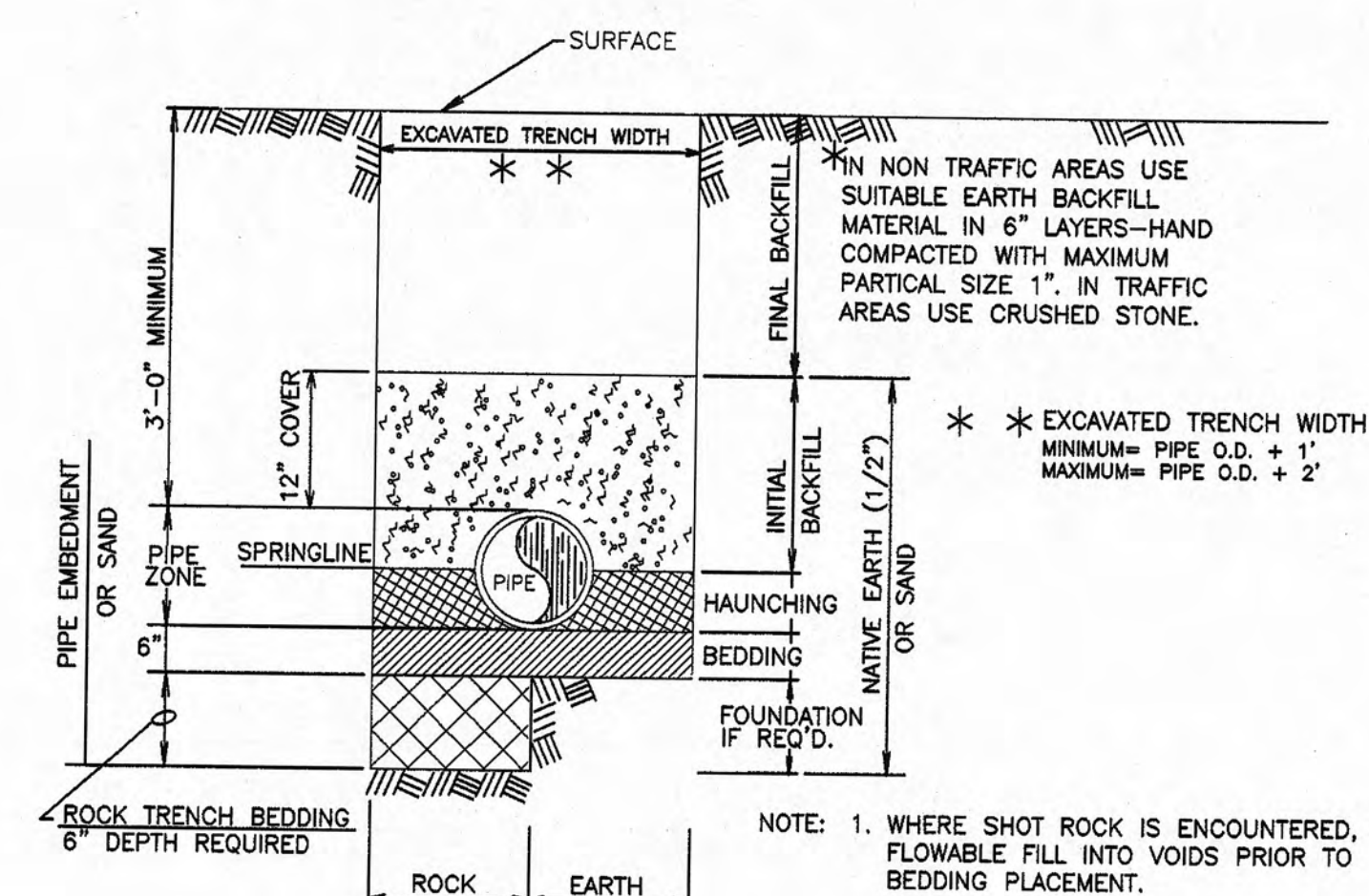
CTI ENGINEERS, INC.
TASK COMPLETED BY: REV NO.

PLOT FACTOR: 1:1
W_TVA
C.A.D. DRAWING
DO NOT ALTER MANUALLY



R 3 12/17/10 JLK JMG JULK -- -- JLK -- --											
RECORD DRAWING											
R 2 9/25/09 JLK JMG JULK -- -- JLK -- --											
ADDED ALTERNATE											
R 1 8/17/09 JLK JMG JULK -- -- JLK -- --											
CHANGED NOTE AND ADDED SWPPP INFORMATION											
REV. NO.	DATE	DSN	DRNK	CHD	SUPV	RVND	APPD	ISSD	PROJECT	AS CONST	REV.
SCALE: 1"=50'											
EXCEPT AS NOTED											
CIVIL YARD											
KIF - UTILITY RESTORATION											
HARRMAN UTILITY BOARD - EFFLUENT											
PLAN & PROFILE SHEET 3 OF 3											
DESIGNED BY:		DRAWN BY:		CHECKED BY:		SUPERVISED BY:		REVIEWED BY:		APPROVED BY:	
J.L.K.		J.M.G.		D.L.J.							
KINGSTON FOSSIL PLANT											
TENNESSEE VALLEY AUTHORITY											
FOSSIL AND HYDRO ENGINEERING											
AUTOCAD R07		DATE 3/17/09		36		C		670-HE004.3		R 3	

RECORD DRAWING
12-17-2010



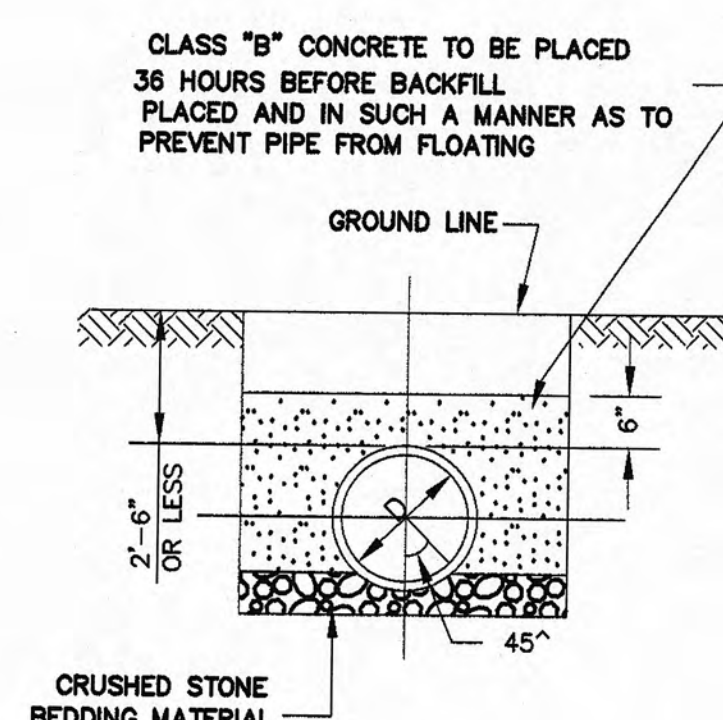
DUCTILE IRON PIPE INSTALLATION DETAIL
NOT TO SCALE

NOTE:

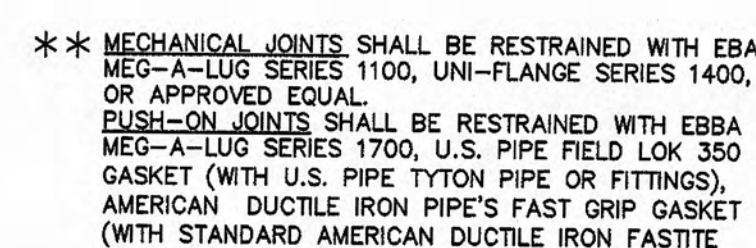
ALL CONCRETE FOR THRUST BLOCKS SHALL BE READY-MIXED 3000psi (MIN) CLASS "B" MIX DESIGN SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL PRIOR TO USE. THRUST BLOCKS BASED ON 225psi & 2000lb/h2 soil RESISTANCE TYPICAL FOR UNDISTURBED SAND AND GRAVEL CEMENTED WITH CLAY. FOR OTHER SOILS THE BEARING FACE OF THE THRUST BLOCKS SHOULD BE INCREASED BY THE FOLLOWING FACTORS:

SAND	2.00
SAND & GRAVEL	1.33
SHAKE	0.40

SOFT SLAYS, MUCK AND PEAT SHALL USE RESTRAINED JOINTS IN LIEU OF THRUST BLOCKS.



TYPICAL SECTION CONCRETE PROTECTION
(FOR PIPE 2 FT. - 6 IN. DEEP & LESS)
NOT TO SCALE



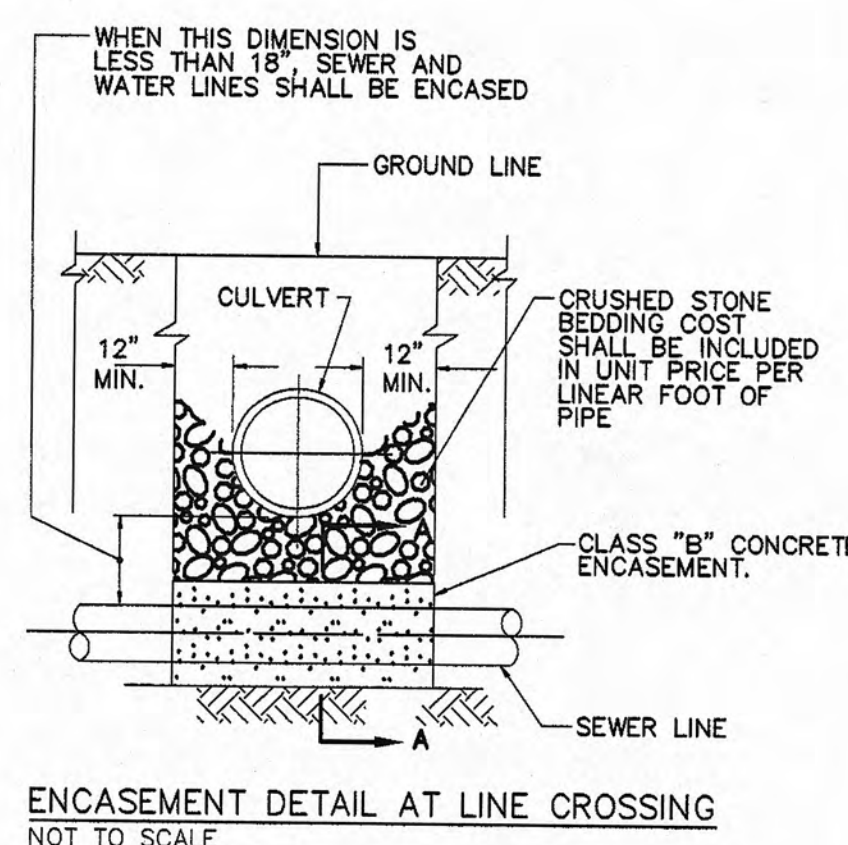
MECHANICALLY RESTRAINED JOINTS GENERAL NOTES:

1. THE RESTRAINED LENGTHS SHOWN IN THE TABLE ASSUME A WORST CASE SOIL CONDITION FOR THE BEDDING CONDITION AND DESIGN PRESSURE.
2. INSTALL THRUST RESTRAINTS IN STRICT CONFORMANCE WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
3. PIPE JOINTS WITHIN THE RESTRAINED LENGTHS, BUT PIPE LENGTHS WITHIN CASING PIPS WILL NOT BE CONSIDERED IN THE TOTAL LENGTH OF RESTRAINED LENGTHS.
4. "L" IN THE TABLE INDICATES THE MINIMUM LENGTH (IN FEET) TO BE RESTRAINED ON EACH SIDE OF THE RESPECTIVE FITTING LISTED.
5. THE FOLLOWING ARE THE MINIMUM RESTRAINED LENGTHS FOR THE MINIMUM RESTRAINED LENGTHS WHEN INSTALLING BENDS AND FITTINGS.
 - A. WHERE HORIZONTAL RESTRAINED ENCOACHING BENDS ARE ENCOUNTERED, USE "L" AS SHOWN IN THE TABLES.
 - B. WHERE HORIZONTAL RESTRAINED LENGTHS ENCOACH, RESTRAIN ALL JOINTS BETWEEN BENDS AND FITTINGS. IF THERE ARE NO JOINTS FOR NEW RESTRAINED LENGTH OPPOSITE THE FULLY RESTRAINED SECTION OF PIPING.
 - C. WHERE VERTICAL UP BENDS ARE ENCOUNTERED, USE "L" AS SHOWN IN TABLES.
 - D. WHERE VERTICAL DOWN BENDS ARE ENCOUNTERED, MULTIPLY "L" BY 1.5 FOR JOINT RESTRAINTS.
 - E. WHERE VERTICAL BENDS ENCOACH, RESTRAIN ALL JOINTS BETWEEN BENDS. FOR VERTICAL UP BENDS, MULTIPLY "L" BY 1.5 AND FOR VERTICAL DOWN BENDS, MULTIPLY "L" BY 1.5. RESTRAINED LENGTHS OPPOSITE THE FULLY RESTRAINED SECTION OF PIPE.
6. THE RESTRAINED LENGTH FOR REDUCTIONS IS SHOWN BASED ON A REDUCTION OF ONE SIZE DOWN (I.E. 8 TO 6, 4 TO 3, ETC.). IF A REDUCTION GREATER THAN ONE SIZE DOWN IS NECESSARY, USE THE LARGER SIZE FOR THE RESTRAINED LENGTH.

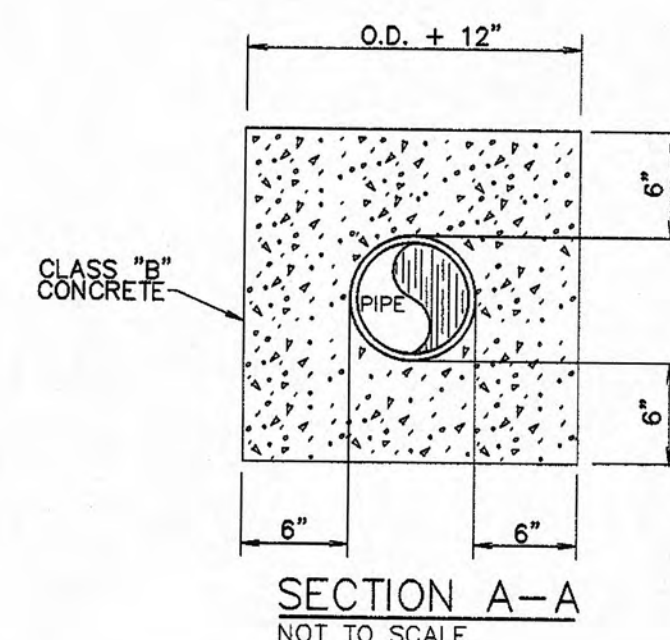
DEFINITIONS:

ENCROACHING: WHERE FITTINGS ARE INSTALLED AT LOCATIONS CLOSE ENOUGH TO ONE ANOTHER WHERE THE CALCULATED MINIMUM RESTRAINED LENGTHS OVERLAP.

NON ENCRoACHING: WHERE FITTINGS ARE INSTALLED AT LOCATIONS WHERE THE CALCULATED MINIMUM RESTRAINED LENGTHS DO NOT OVERLAP.



ENCASEMENT DETAIL AT LINE CROSSING
NOT TO SCALE



SECTION A-A
NOT TO SCALE

COMMENTS AND ASSUMPTIONS:

The tabulated values shown were generated using the DIPRA computer program.

Soil Type: Clay2

Trench Type: 2 (Flat-Bottom Trench
Backfill lightly consolidated
to centerline of pipe).

Depth of cover to top of pipe: 2.5 feet

Safety Factor: 1.5

The values shown for the Reducers were based on a reduction from the nominal pipe size to a pipe one-size smaller.

*Restraining one joint beyond the minimum length for all lengths over 10 feet from the last restrained joint

RECORD DRAWING
12-17-2010



R 1												
12/17/10		JLK	JMG	JLK	-	-	JLK	-	-	-	-	D
RECORD DRAWING												
REV.	DATE	DSGN	DRWN	CHGD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	ISSD	REV
SCALE: AS SHOWN												EXCEPT AS NOTED
YARD CIVIL												
KIF - UTILITY RESTORATION HARRIMAN UTILITY BOARD - EFFLUENT DETAIL SHEET												
DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:						
J.L.K.	J.M.G.	D.L.J.										
KINGSTON FOSSIL PLANT TENNESSEE VALLEY AUTHORITY FOSSIL AND HYDRO ENGINEERING												
AUTOCAD R07	DATE 3/17/09	36	C	670-HE005.1					R 1			

PLOT FACTOR:1:1

C.A.D. DRAWING