Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
Dike C Buttress Work Plan - Segment B Part 1 of 2 (Revised)
RAWP - 092

Date Submitted:
05/26/2011

Submitted to whom
Leo Francendese, EPA

Concurrence

Received	Not Applicable	TVA
☐	☒	Steve McCracken
☒	☐	Kathryn Nash
☒	☐	Dwayne Rushing for
☒	☐	Michelle Cagley mc

Received	Not Applicable	Jacobs
☒	☐	Jack Howard
☒	☐	Todd Woodson
☐	☐	
☐	☐	
☐	☐	
☐	☐	

Approvals

TVA Kathryn Nash Date 5/26/11

EPA _____ Date _____

Leo Francendese

Digitally signed by Leo Francendese
DN: cn=Leo Francendese, c=US, o=EPA/WMD, ou=ERRB, email=francendese.leo@epa.gov
Reason: I am approving this document in consult w TDEC
Date: 2011.05.31 13:22:21 -04'00'

cc:

- ☒ Anda Ray, TVA
- ☒ Barbara Scott, TDEC
- ☒ Brenda Brickhouse, TVA
- ☒ John Dizer, TVA
- ☒ Craig Zeller, EPA
- ☒ Dennis Yankee, TVA
- ☒ Kathryn Nash, TVA
- ☒ Cynthia Anderson, TVA
- ☒ Steve McCracken, TVA
- ☒ EDM
- ☒ Jack Howard, Jacobs
- ☒ Michelle Cagley, TVA
- ☒ Greg Signer, TVA
- ☒ KIF Incident Document Control
- ☒ Katie Kline, TVA
- ☒ Robert Pullen, Jacobs

April 7, 2011

Memo To: Leo Francendesce, OSC

Response to Bureau of Reclamation Review Comments Dated March 30, 2011

Dike C Buttress Work Plan – Segment B (Part 1 of 2) dated March 11, 2011.

Please see response to comments below

Bureau of Reclamation Review Comments:

1. The work plan proposes construction of the southeast corner of the Dike C buttress. An existing pipe is shown on drawing 10-W229-71 which will be removed and replaced with compacted clay. We would like to know if other buried utilities are in the area. It was thought that there was at least a buried power line in the peninsula area. Has this been previously removed?

   Response: There is an abandoned electric line that runs along the top of the raised dike to the skimmer wall. The line provided power to a navigation light. The light has been replaced with a solar powered light. The line will be removed in the area where the buttress will be constructed. No other utilities have been identified during utility clearance procedures.

2. The drawings show the buttress transitioning in the peninsula area from approximately stations 126+40 to 127+ 40 with only minimal placement of the filter and buttress fill. While the peninsula is believed to be an adequate reinforcement from a slope stability standpoint, the buttress also provides a critical seepage filtration function which apparently will not be provided. The logic for not providing seepage protection in this area needs to be documented in writing. At this point in time Reclamation is not convinced that the design is adequate. It is noted that the dike construction is an outside bend in this area (potentially subject to tension forces) and that seepage risks typically are higher for such outside bends. It is also important to note that the peninsula has been modified on several occasions during the ash removal operations. The work plan talks about the need to excavate to 3 feet to remove shot rock fill that was placed in the area (with which we agree); but it goes on to state that "Existing shot rock that is significantly embedded within the soils of the Dike C embankment shall be left in place." Such rock mixed with soil may not be completely impervious and may be internally unstable and could be affected by seepage over a long period of time. In a situation like this, Reclamation would extend the filter down the slope similar to the adjacent full buttress and then excavate a vertical trench a few feet into the ground and backfill it with filter sand to ensure the filter is tied to impervious foundation.

   Response: See attached letter provided by Stantec.

3. Reclamation recommends that EPA only approve proceeding with the work from stations 124 + 50 to 126 + 40 and from 127 + 40 to 128 + 00. The construction from station 126 + 40 to 127 +

40 should be delayed until the existing filter design is either justified by written design documentation that can be reviewed or revised to a more robust configuration.

Response: If the responses above do not resolve the concerns expressed in the comments. It is asked that approval be given to proceed with work from stations 124 + 50 to 126 + 40 and from 127 + 40 to 128 + 00 identified above as acceptable until a resolution can be reached on station 126 + 40 to 127 + 40.

Memo

Stantec Consulting Ltd.
4370 Dominion Street, 5th Floor
Burnaby, BC V5G 4L7
Tel: (604) 436-3014
Fax: (604) 436-3752

To: Tod Woodson **From:** Tom Crilly

Project: Kingston Fossil Plant Date: April 7, 2011

Reference: **Tennessee Valley Authority, Kingston Site**
Dike C Buttress Construction
Segment B (Part 1 of 2) Seepage Review

As part of the on-going seepage and slope stability upgrading of Dike C at the Kingston Fossil Plant, Stantec has issued the construction drawings for Segment B (Part 1 of 2) dated March 11, 2011 which included the buttress construction through the skimmer wall peninsula area.

Upon review of the construction drawings, the Bureau of Reclamation has issued a memo (dated March 30, 2011) asking for clarification for not providing the seepage filter protection from Sta. 126+40 to 127+40 (area of the peninsula). A copy of the BoR memo is included in Appendix A.

This current memo has been prepared to review additional field investigation work in the area of the skimmer wall peninsula and to review the seepage assessment that has been performed through this area. In particular, this memo has been prepared to answer Bullet 2 of the BoR memo.

Field Investigation

To confirm the subsurface soil conditions for the skimmer wall peninsula (skimmer wall access road), a test pit program was completed on February 24, 2011. The test pit program consisted of three (3) shallow test pits, excavated with a tracked excavator. The test pits locations are shown in plan and section on Figure 1 and 2 in Appendix B. The type of materials encountered and their respective thicknesses are summarized on Table 1 below.

Table 1. Summary of Skimmer Wall Peninsula Test Pits

Test Pit No.	Material Type	Material Thickness(ft)
TP11-01	Crushed Rock	1.87
	Clay Fill	1.07
	Bottom Ash Fill	1.35
	Clay Fill	2.37
TP11-02	Crushed Rock	1.65
	Clay Fill	2.37
	Bottom Ash Fill	1.92
	Clay Fill	1.98
TP11-03	Crushed Rock	2.61
	Clay Fill	3.64
	Bottom Ash Fill	0.57
	Clay Fill	2.95
	Gravel to Clayey Gravel	1.86

As shown on Table 1 above, the materials encountered during the test pit excavation program consisted of a 2 ft surface layer of crushed rock fill overlying interlayered clay and ash fill to depths ranging from 7 to 12 ft. Photographs taken during the test pit excavation program are included in Appendix C. The clay fill and ash fill layers that were encountered were each generally 1 to 3 ft thick, with the clay fill generally moist, firm in consistency and of intermediate to high plasticity. The ash fill was generally bottom ash. There was no water seepage into the test pits at the time of the investigation. At the base of each test pit, a course gravel to clayey gravel layer was encountered consisting of cobble and gravel sized rockfill particles, with the void space within the particles infilled with sand, silt and clay.

From the test pit program through the fill soils that make up the skimmer wall peninsula, the following may be summarized:

1. The upper portion of the peninsula fill is primarily fine grained soils that are reasonably consistent with the starter dike fill soils.
2. There appears to be a layer of coarser grained fill soils underlying the upper fill soils. From discussions with TVA, this layer was likely placed below the lake level during the original peninsula construction.
3. The entire make up of the skimmer wall peninsula is significantly different from what was originally assumed (i.e. larger diameter rockfill). It appears that the peninsula actually

consists of a lower coarser grained gravel layer (with a top elevation of 738 ft) with an upper layer of low permeability soils that act as a seepage barrier preventing the warmer Watts Bar Lake water bypassing the skimmer wall and entering the intake channel.

Seepage Assessment and Results

Using the results of the test pit information coupled with the seepage analyses already documented for the site, a revised seepage assessment has been performed for the skimmer wall peninsula area. This revised seepage assessment has been performed as follows:

- The base cross section model at Sta. 132+37 has been used for the assessment, with the starter dike, raised dike and native soils at Sta. 132+37 assumed to be indicative of the peninsula area at Sta. 127+00.
- Using the base model from Sta. 132+37, the additional peninsula soil layers were added consisting of a lower gravel to clayey gravel layer from the lake bottom up to Elev. 738 ft overlain by a clay fill layer to the top of the peninsula ground surface. The general cross section showing the pre-buttress construction ground geometry at Sta. 132+37 along with the fill soils of the peninsula is shown on Figure 2 in Appendix B.
- The seepage cross section for the idealized Sta. 127+00 section is shown in Appendix D. For the seepage assessment, the material properties for the starter dike, raised dike, and native soils are as shown in Stantec's "Design Report for Dike C Buttress" dated March 1, 2011. The seepage parameters for the peninsula fill soils are as shown below in Table 2, and have been derived considering the overall material type and the anticipated horizontal to vertical hydraulic conductivity ratios.

Table 2. Material Properties for SEEP/W Analysis

Soil Horizon	Saturated Hydraulic Conductivity (k_v) (cm/s)	Ratio k_h / k_v	Specific Gravity G_s	Void Ratio e	Volumetric Water Content		Basis
					Saturated (%)	Residual (%)	
Peninsula Clay Fill	1.0e-5	10	2.69	0.61	38	2	Based on Typical Values
Gravel to Clayey Gravel	1.0e-3	50	2.70	0.65	39	1	Based on Typical Values

Note: SEEP/W requires input parameters k_h and ratio of k_v/k_h

For the boundary conditions of the stilling basin water elevation of 754.7 ft, and the winter lake level condition (738 ft), the seepage model for the peninsula area is as shown on Figure D-1 in Appendix D. Based on the seepage model in Appendix D, the exit gradients and corresponding factor of safety against piping have been estimated at both 3 ft depth below ground surface within the peninsula clay fill at approximately 85 ft from the project baseline and also near the original starter dike toe (the general location of the highest vertical exit gradients).

Based on our analyses, the factor of safety against piping at 3 ft depth below ground surface within the peninsula clay fill is estimated at 8.3. The factor of safety against piping near the original starter dike toe (the location of the highest vertical exit gradient of 0.4) is estimated at greater than 25.

Summary

Following a field review of the fill soils that make up the skimmer wall peninsula, a seepage analyses was performed to model the anticipated exit gradients through the dike and to estimate the anticipated factors of safety against piping. Based on the seepage assessment, the factors of safety against piping range from approximately 8 near the ground surface within the peninsula clay fill to over 25 at the toe of the original starter dike (i.e. at the base of the peninsula fill). These factors of safety against piping values are significantly higher than the minimum of 4 that is required.

When developing the construction drawings for Segment B (Part 1 of 2), Stantec considered that the removal of the existing peninsula material for buttress filter material placement was not required and that the buttress could be constructed extending from the northern and southern outslopes of the peninsula, as shown on the construction drawings. We believe the existing conditions satisfy the overall minimum requirements for seepage protection and slope stability. Section 3.4 of the Construction Specifications outlines the method for the existing surface crushed rock fill removal at the northern and southern outslopes so that the filter can be placed against the peninsula clay fill.

Respectively submitted,

Stantec Consulting Ltd.

Tom Crilly

Appendix A: BoR Memo

Appendix B: Figures

Appendix C: Photographs

Appendix D: Seepage Assessment

APPENDIX A

BoR Memo

March 30, 2011

Memo To: Leo Francendesce, OSC

Re: Review of Dike C Buttress Work Plan – Segment B (Part 1 of 2) dated March 11, 2011.

Review By: Michael J. Gobla, P.E.

Peer Review By: Jamie Macartney, P.E

Bureau of Reclamation Review Comments:

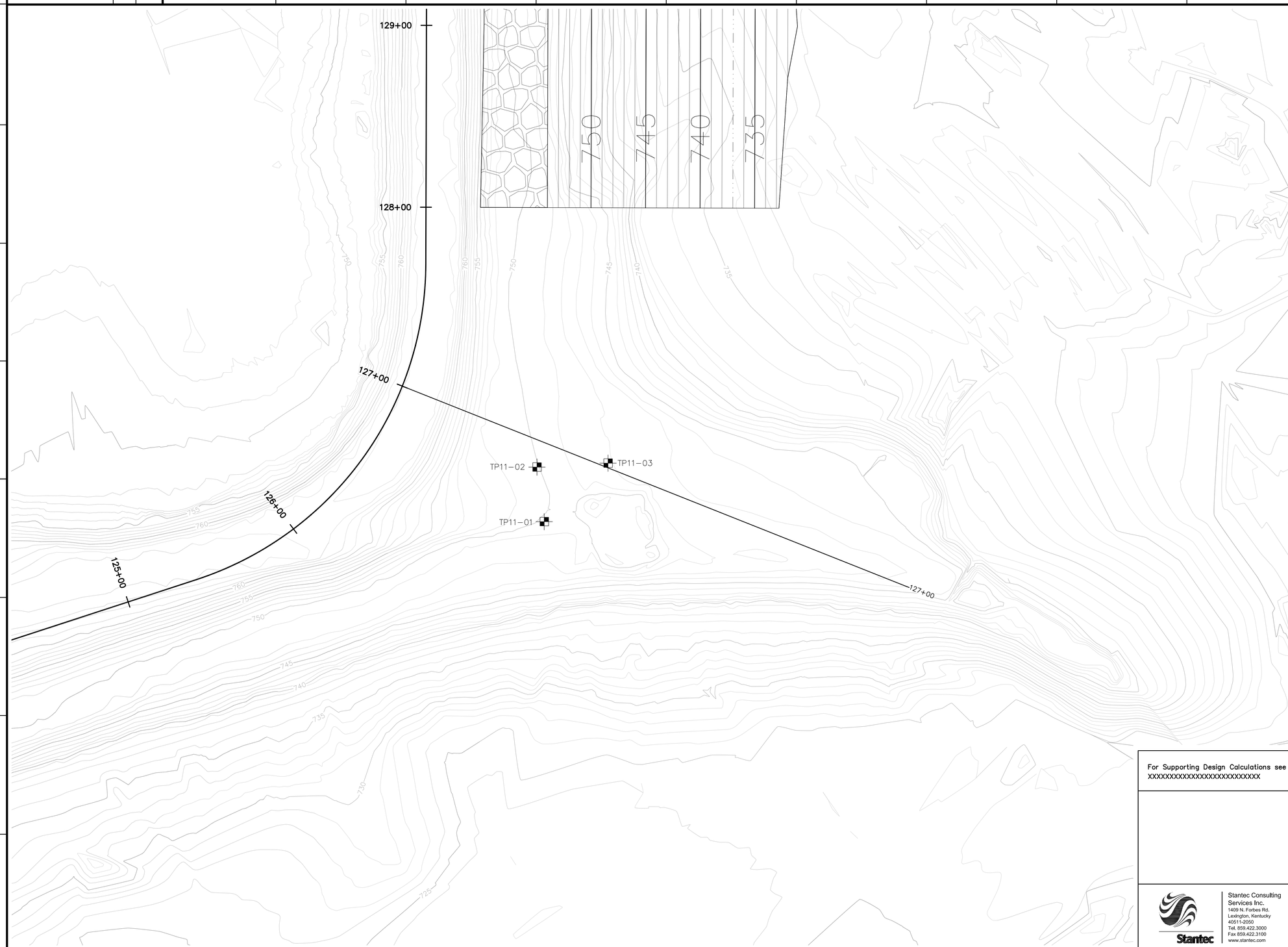
1. The work plan proposes construction of the southeast corner of the Dike C buttress. An existing pipe is shown on drawing 10-W229-71 which will be removed and replaced with compacted clay. We would like to know if other buried utilities are in the area. It was thought that there was at least a buried power line in the peninsula area. Has this been previously removed?

2. The drawings show the buttress transitioning in the peninsula area from approximately stations 126+40 to 127+ 40 with only minimal placement of the filter and buttress fill. While the peninsula is believed to be an adequate reinforcement from a slope stability standpoint, the buttress also provides a critical seepage filtration function which apparently will not be provided. The logic for not providing seepage protection in this area needs to be documented in writing. At this point in time Reclamation is not convinced that the design is adequate. It is noted that the dike construction is an outside bend in this area (potentially subject to tension forces) and that seepage risks typically are higher for such outside bends. It is also important to note that the peninsula has been modified on several occasions during the ash removal operations. The work plan talks about the need to excavate to 3 feet to remove shot rock fill that was placed in the area (with which we agree); but it goes on to state that "Existing shot rock that is significantly embedded within the soils of the Dike C embankment shall be left in place." Such rock mixed with soil may not be completely impervious and may be internally unstable and could be affected by seepage over a long period of time. In a situation like this, Reclamation would extend the filter down the slope similar to the adjacent full buttress and then excavate a vertical trench a few feet into the ground and backfill it with filter sand to ensure the filter is tied to impervious foundation.

3. Reclamation recommends that EPA only approve proceeding with the work from stations 124 + 50 to 126 + 40 and from 127 + 40 to 128 + 00. The construction from station 126 + 40 to 127 + 40 should be delayed until the existing filter design is either justified by written design documentation that can be reviewed or revised to a more robust configuration.

APPENDIX B

Figures



ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NOTE: This drawing is originally produced in a 27.44" x 46" full-sized sheet.

For Supporting Design Calculations see XXXXXXXXXXXXXXXXXXXXXXXXXXX

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	04/05/11	JP	GH	TC	DWF	DWF	DWF	TJ	–	–	–

ISSUED FOR –REVIEW

DISCIPLINE INTERFACE

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

MEMO
SKIMMER WALL PENINSULA
TEST PIT LOCATIONS

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J. PINEAU	G. HUYNH	T. CRILLY	D. FULLER	D. FULLER	D. FULLER	T. JOHNSON

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 04/05/11 | 36 | C | FIGURE 1 | R 0

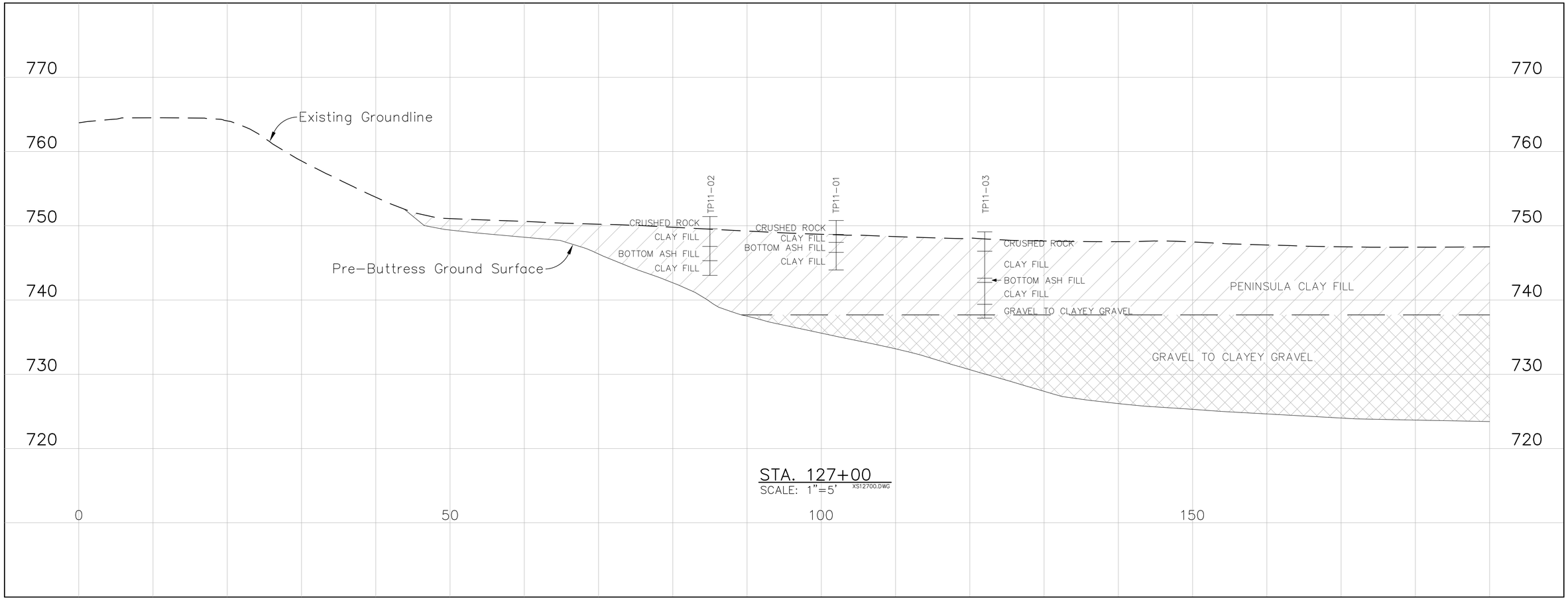
STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C FIGURE 1

PLOT DATE: 02/28/2011 USER: HUYNH, DORSON
FILENAME:\\STANTEC\HYDRO\KINGSTON\CAD-DWG\CAD\GEOTECH\1-ANAL\FOSSITUFF-2011\SKIMMERWALL_SURVEYPOINTS_11-02-25\SKIMMERWALL_11-02-25.DWG



ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

For Supporting Design Calculations see FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	04/05/11	DWF	DMG	TC	DWF	DWF	DWF	TJ	–	–	–
ISSUE FOR REVIEW											

DISCIPLINE INTERFACE

SCALE: 1"=10' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

MEMO
SKIMMER WALL PENINSULA
CROSS SECTION 127+00

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D. HERRON	D. GRAHAM	T. CRILLY	D. FULLER	J. MONTGOMERY	D. FULLER	T. JOHNSON

Stantec

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 04/05/11 | 36 | C | FIGURE 2 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:XX
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C FIGURE 2

APPENDIX C

Photographs

One Team. Infinite Solutions.

Stantec

Photo 1: Test Pit Excavation

Photo 2: Test Pit Excavation

APPENDIX D

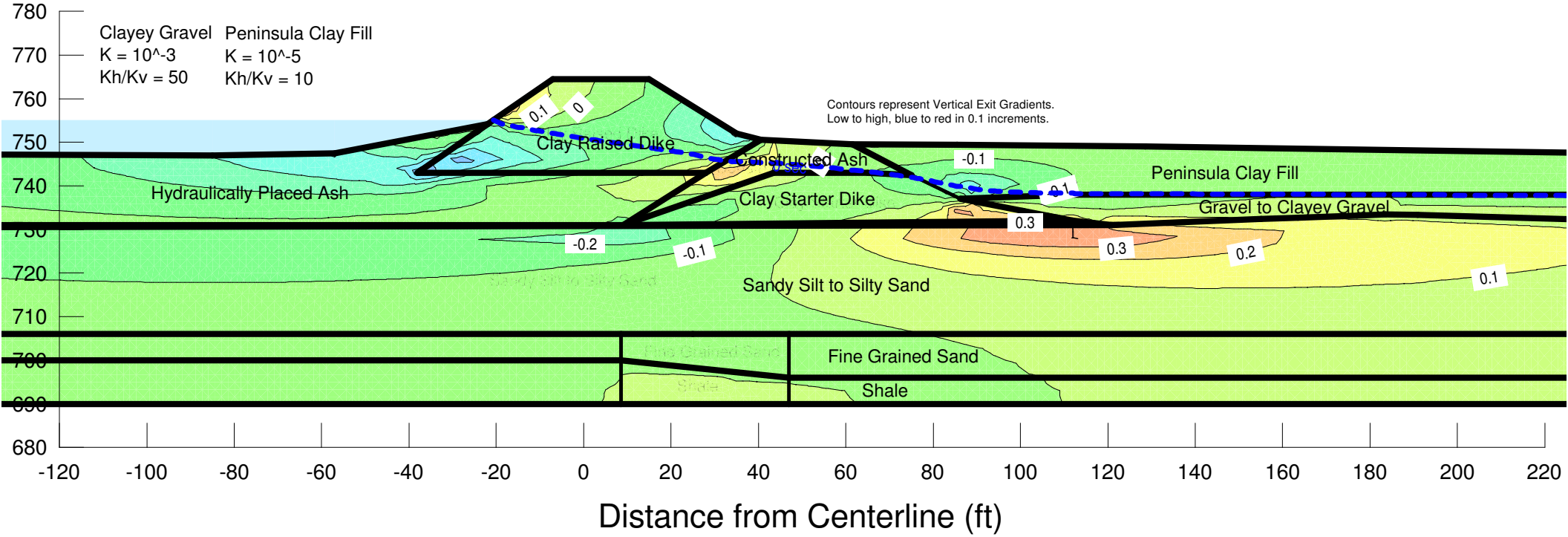
Seepage Assessment

One Team. Infinite Solutions.

Stantec

Kingston Fossil Plant
Dike C - Station 127+00
Vertical Gradient Contours

Figure D-1



KINGSTON DIKE C
STA. 127+00
PIPING CHECKS

SURFACE EXIT GRADIENT

WHERE:

$$FS = \frac{i_c}{i_{EXIT}}$$

$i_c = 1.0$

$i_{EXIT} = 0.12$

$$FS = \frac{1.0}{0.12} = 8.3 > 4.0 \checkmark$$

DEEP PIPING CONCERNS

$$FS = \frac{\gamma_A d_A + \gamma_{SUBB} d_B + \gamma_{SUBC} d_C}{i_{EXIT} \cdot \gamma_W \cdot d_C}$$

WHERE:

$\gamma_A = 129\ lb/ft^3$
$d_A = 11\ ft$
$\gamma_B = 118\ lb/ft^3$ $\gamma_{SUBB} = 55.6\ lb/ft^3$
$d_B = 7\ ft$
$\gamma_C = 113\ lb/ft^3$ $\gamma_{SUBC} = 50.6\ lb/ft^3$
$d_C = 3\ ft$
$\gamma_W = 62.4\ lb/ft^3$
$i_{EXIT} = 0.40$

$$FS = \frac{\left(129 \frac{lb}{ft^3} \cdot 11\ ft\right) + \left(55.6 \frac{lb}{ft^3} \cdot 7\ ft\right) + \left(50.6 \frac{lb}{ft^3} \cdot 3\ ft\right)}{62.4 \frac{lb}{ft^3} \cdot 3\ ft \cdot 0.40}$$

$$FS = 26.2 > 4.0 \checkmark$$

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RAWP-092

Kingston Ash Recovery Project
Time Critical Removal Action for the
Dike C Buttress Work Plan – Segment B
Part 1 of 2

Prepared by:
Jacobs

for the Tennessee Valley Authority

Revision	Description	Date
00	Dike C Buttress Work Plan – Segment B (Part 1 of 2) for TVA Review	March 11, 2011
01	Issued for Regulatory Review	May 25, 2011

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Appendices

Appendix A: Design Drawings

Appendix B: Design Specifications

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1 INTRODUCTION AND PURPOSE

The scope of this Work Plan is to describe the construction activities for a portion of the fourth and final section of the *Dike C Risk Mitigation Plan*, Document No. EPA-AWP-035. This section, identified as Segment B, covers buttress construction from Stations 128+00 to 123+50 as defined in the Stantec Consulting Services Inc. (Stantec) Design Drawings (Appendix A). Similar work is currently being performed on Segment A. The work plan for Segment A was approved in January 2011. Stantec remains the Engineer of Record (EOR) for the dikes and has designed the buttress system to increase the stability of the dike system at the Kingston Ash Recovery Project site. Work will be completed per the Specifications (Appendix B), the Quality Control (QC) Plan (Appendix C), and Design Drawings. The buttress will consist of a sand filter overlain by gravel and riprap. Work to be performed includes the removal of loose material, removal of topsoil, removal of tree stumps, and the placement of the graded filter system.

The buttress, as a whole, will extend from Dike D, in the north along the Emory River, to the Red Water Wetlands, along the plant intake channel in the south.

Stantec performed modeling of slope stability for Dike C and based on the information TVA determined that improvements were needed to prevent any sloughing of the slopes along the dike. Stantec developed a plan to buttress the dike and TVA, with the concurrence of the U.S. Environmental Protection Agency (EPA) implemented the plan. Material used for the construction of this section of Segment B remains the same as those previously approved for Segments A, C, and D. Since the material has not changed, no additional calculations have been provided.

2 DESIGN AND CONSTRUCTION COMPONENTS

This section of Segment B is to be constructed according to the Drawings, Specifications, and QC Plan developed by Stantec and included in the appendices of this document. As defined in the documents, the buttress is a sand filter system designed to allow water to seep out from the dike without displacing dike material. The sand filter is held in place by larger stone and covered with riprap. The riprap provides additional mass to prevent sloughing and is of the right size to reduce scouring during high flow events. TVA Civil Projects is responsible for the construction of the buttress. Civil Projects will utilize excavators and dozers to place the material. For placement of materials in water where excavators cannot easily reach, a rock slinger will be used to place the material. The rock slinger has been successfully used on Segments A and C to place the sand, the #57 stone, and the #2 stone. Survey crews utilizing boats will collect elevations of the material placed in the water. Crews will collect elevations during placement of the material in the water to ensure that the minimum required thicknesses are obtained. Excavators with global positioning systems will be utilized as needed to assist the surveying crews in obtaining elevations. Survey crews will also collect elevations for each of the materials placed.

Material will be delivered to the site in a two-stage approach. The first stage will receive the material at the Material Access and Processing or MAP area. The material will be stockpiled until needed. The stockpile area is set up to allow the material to be delivered without the trucks entering the Exclusion Zone. This reduces the need to decontaminate each delivery truck. The second phase of material delivery is to transport the material from the stockpile area to the buttress construction area using dedicated articulating dump trucks. The two-stage approach causes double handling which may alter the size of the material, but it is more practical than decontaminating each delivery truck. To ensure that the material placed for construction meets the design criteria, gradation samples of in-place material are collected at intervals specified in the Stantec QC Plan. Tested materials which do not meet specification are identified with a nonconformance report and the acceptability of the material is reviewed by the Stantec Quality Assurance (QA) Manager. Material that is not acceptable is to be removed.

Construction through the skimmer wall peninsula will require that the existing “shot rock” be removed to expose the underlying berm. The graded filter will be built up and over this berm. The berm will remain in place as it works with the skimmer to control the temperature of the water entering the plant intake. The removed shot rock can be reused on and can be used on top of the buttress to establish access to the skimmer wall.

3 CONSTRUCTION QUALITY CONTROL

A Construction Quality Control (CQC) Plan was originally developed by Stantec and approved by TVA and EPA for Segments A, C, and D buttress construction. The CQC Plan was amended with Addendum 1 to increase the tolerances for material acceptance. Addendum 1 has been incorporated into the QC Plan for Segment C. At this time, no material changes have been approved for Segment B. However, the Bureau of Reclamation (BoR) has allowed for an increase in the tolerance for the #30 sieve for the sand material from 60% passing to 70% passing with the understanding that a filter test will be performed. Stantec will provide a letter detailing the results of the filter test. Preliminary results indicate that the sand material meets acceptable standards. Materials placed for construction of the buttress must be tested for acceptance at the intervals specified in the plan. In-place materials that do not meet the acceptance criteria will be documented with a nonconformance report and reviewed by the Stantec QA Manager for acceptability. Material that is not acceptable will be removed, replaced, and retested.

Stantec will provide the field QC to ensure that construction is progressing according to design. The Stantec QA Manager will provide guidance and work with the Stantec EOR to resolve any deviations from the design documents. MACTEC Engineering and Consulting, Inc. (MACTEC) will provide independent testing of the material used for the construction of the buttress. Jacobs Engineering Group Inc. (Jacobs) will provide project QA support to ensure that construction is being documented as required. The Jacobs QA Manager or designee will also collect a photographic record of the cleaned dike surface to be approved by the onsite EPA representative prior to placement of material. The photographs and sign-off forms will be sent to the EPA for final acceptance, however work may proceed on concurrence from the onsite representative that the area is ready for material placement.

4 SAFETY AND HEALTH

The newly established Work Process Plan will be utilized for each contractor working on this project. The plans will be approved by the designated person. Task not previously identified in the work plans will require separate plans and work on these tasks will not begin until the Work Process Plan is approved.

5 TRANSPORTATION MANAGEMENT

No specific transportation management requirements are planned for this project.

6 WASTE MANAGEMENT

No specific wastes are planned to be generated from this project.

7 PROJECT MANAGEMENT

7.1 Organization

7.1.1 TVA Technical Contract Manager – Jamey Dotson

7.1.2 Jacobs Project Manager – Tod Woodson

7.1.3 Jacobs Construction Manager – Jim Sells

7.1.4 Jacobs Quality Assurance – Jim Moore

7.2 Contractors

7.2.1 Civil Projects Construction – John Miller

7.2.2 Stantec QC – Skip Layton

7.2.3 Stantec EOR – Don Fuller

7.2.4 MACTEC Materials and Testing – Jim Law

7.2.5 BOR Consultants to the EPA for Work Approval – Jim Lawrence

7.2.6 TVA Surveying – Surveying services

7.3 Work Breakdown Structure (WBS)

7.3.1 The WBS has already been developed and work will continue to follow the established structure. The general WBS number is 001108.

7.4 Cost Estimate

7.4.1 The baseline budget has already been established for Stage 1 and includes construction of this section of Segment B.

7.5 Schedule

7.5.1 The schedule for this section of Segment B has been developed. Work on this Segment will begin once the work plan is approved. Completion is scheduled for May 19, 2011.

8 REFERENCES

Dike C Risk Mitigation Plan – Section D, Document No. EPA-RAWP-035. Prepared by TVA, December 1, 2009.

Dike C Risk Mitigation Plan – Section C, Document No. EPA-RAWP-035B. Prepared by TVA, April 13, 2010.

Construction Quality Control Plan Dike C Buttress – Addendum 001, Document No. EPA-AWP-035B. Prepared by Stantec, March 24, 2010.

Dike C Risk Mitigation Plan – Section A, Document No. EPA-RAWP-035C. Prepared by TVA, December 12, 2010.

Appendix A

Design Drawings

36 | C | 10W229-67

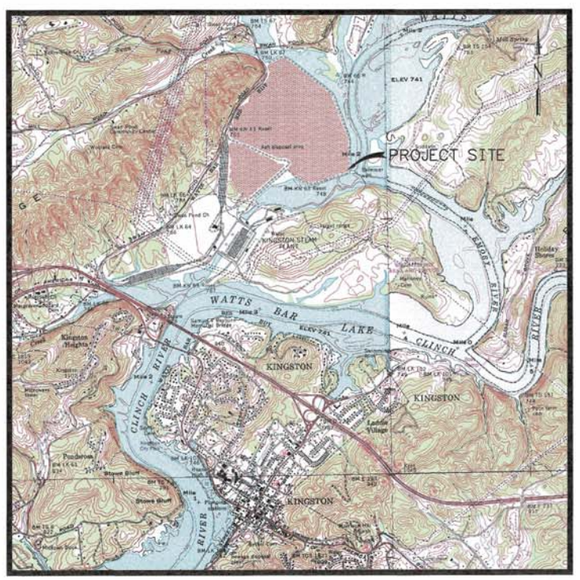
PLANS FOR CONSTRUCTION

DIKE C BUTTRESS
STAGE 1 - SEGMENT 'B'
WORK PLAN 3 (KIF-110316-WP-3)
KINGSTON FOSSIL PLANT

HARRIMAN, ROANE COUNTY, TENNESSEE

PREPARED FOR

TENNESSEE VALLEY AUTHORITY



VICINITY MAP

1000 0 2000 4000 FEET
GRAPHIC SCALE

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PREPARED BY

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ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	-	-	-
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	-	-	-
ISSUED FOR CONSTRUCTION											

DISCIPLI INTERFAC

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
COVER SHEET
WORK PLAN 3 (KIF-110316-WP-3)

DON W FULLER REGISTERED PROFESSIONAL ENGINEER 5/25/2011 STATE OF TENNESSEE

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. ORILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-67 | R 1

STANTEC | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011 USER: ELLISON, DOC
V:\1756\ACTIVE\156600431\ENVIRONMENTAL\DRAWING\WP3\REV1_JF\10W229-67-R1.DWG

GENERAL NOTES

1. DEFINITIONS: WHENEVER THE FOLLOWING TERMS ARE USED IN THESE DRAWINGS, IT IS UNDERSTOOD THAT THEY REPRESENT THE FOLLOWING:

   CP: THE TENNESSEE VALLEY AUTHORITY (TVA) CIVIL PROJECTS WHICH IS RESPONSIBLE FOR CONSTRUCTION FOR THIS PROJECT (OR THEIR DESIGNEE).

   EPA: THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WHICH IS THE REGULATORY AUTHORITY FOR THE SITE.

   ENGINEER: STANTEC CONSULTING SERVICES INC.

   OWNER: TENNESSEE VALLEY AUTHORITY (TVA) – KINGSTON FOSSIL PLANT

   TDOT: THIS MEANS THE TENNESSEE DEPARTMENT OF TRANSPORTATION AND SPECIFICALLY REFERENCES THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION. ANY MATERIAL DESIGNATED AS "TDOT" IS TO CONFORM TO THE MATERIAL STANDARDS NOTED AND PLACEMENT/INSTALLATION METHODOLOGY SPECIFIED IN THE CURRENT EDITION OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION".

   QUALITY CONTROL (QC) PLAN: REFERS TO A DOCUMENT THAT ESTABLISHES MINIMUM QUALITY CONTROL REQUIREMENTS, TESTING FREQUENCY AND QUALITY OVERSIGHT RESPONSIBILITY.

   QUALITY CONTROL (QC) MANAGER: A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TENNESSEE THAT IS RESPONSIBLE FOR THE QUALITY OF THE CONSTRUCTED PROJECT AS DEFINED IN THE QC PLAN. THE QC TEAM CONSISTS OF QUALIFIED PERSONNEL THAT WORK UNDER THE DIRECT SUPERVISION OF THE QC MANAGER. QC TEAM PERSONNEL ARE INDIVIDUALS THAT ARE FAMILIAR WITH THE MATERIALS UTILIZED AND THE BUTTRESS CONSTRUCTION COMPONENTS.

   CONSTRUCTION MANAGER: RESPONSIBLE FOR CONSTRUCTION ACTIVITY TO INCLUDE BUT NOT BE LIMITED TO THE CHARACTER AND SEQUENCE OF WORK, COORDINATION AND SCHEDULING.

2. THE PROJECT WILL BE CONSTRUCTED IN ONE STAGE. THE STAGE SHOWN ON THESE DRAWINGS INVOLVES THE BUTTRESS CONSTRUCTION FOR THE STARTER DIKE. THE WORK IS DIVIDED INTO LINEAR SEGMENTS NOTED AS A, B, C AND D RESPECTIVELY.

3. THESE DRAWINGS ARE PRESENTED AS AN AID IN PROJECT CONSTRUCTION BUT SHOULD NOT BE CONSTRUED AS THE ONLY REFERENCE NEEDED. CP SHALL BECOME FAMILIAR WITH AND ADHERE TO THE TECHNICAL SPECIFICATIONS, THE QC PLAN AND APPLICABLE ENVIRONMENTAL AND SAFETY REGULATIONS. NO MATERIALS SHALL BE PLACED IN WATTS BAR LAKE OR THE INTAKE CHANNEL UNTIL APPROVED BY THE REGULATORY AUTHORITY AND THE OWNER.

4. TOPOGRAPHIC INFORMATION SHOWN IN THE DRAWINGS IS DATED AND DOES NOT REFLECT CHANGES SINCE THE TIME OF AERIAL PHOTOGRAPHY. AREAS OF HYDROGRAPHIC SURVEYING MAY NOT REFLECT CURRENT CONDITIONS AS THE UNDERWATER SURFACE CONSTANTLY CHANGES.

5. IT SHALL BE THE CP'S RESPONSIBILITY TO VERIFY THAT ALL UNDERGROUND UTILITIES DISCOVERED DURING THE UNDERGROUND LOCATING SWEEPS ARE RELOCATED OR OTHERWISE PROTECTED IN FULL COMPLIANCE WITH ANY REQUIREMENTS OF THE PLANT–ISSUED EXCAVATION PERMIT TO THE SATISFACTION OF THE OWNER AND IN ACCORDANCE WITH TVA PROCESSES AND PROCEDURES PRIOR TO THE GROUND DISTURBING ACTIVITIES, INCLUDING THE BORROW AREAS. WHERE UTILITIES ARE SHOWN OR INDICATED ON THE DRAWINGS, THE INFORMATION GIVEN IS IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION IN THE ENGINEER'S POSSESSION, BUT IS APPROXIMATE IN NATURE. THE DATA IS NOT WARRANTED TO BE EITHER COMPLETE OR CORRECT.

6. THE CP SHALL MAKE A CONCERTED EFFORT TO PREVENT ANY DISRUPTION OF UTILITY SERVICES, AND IF ANY UNINTENDED DISRUPTION OCCURS, THE CP SHALL COORDINATE THE SAFE AND IMMEDIATE RESTORATION OF THE SERVICE. IF DISRUPTION OF ANY UTILITY SERVICES IS UNAVOIDABLE, IT SHALL BE THE RESPONSIBILITY OF CP TO NOTIFY AFFECTED UTILITY USERS AND UTILITY OWNERS 48 HOURS IN ADVANCE. THE CP SHALL ALSO MAKE EVERY EFFORT TO RESTORE SAID SERVICES BEFORE QUITTING WORK FOR THE DAY. IN THE EVENT THIS CANNOT BE DONE, THE CP SHALL PROVIDE TEMPORARY SERVICE TO THE PROPERTY OWNERS UNTIL PERMANENT SERVICE CAN BE RESTORED.

7. EXISTING GEOTECHNICAL INSTRUMENTATION IS SHOWN ON THE DRAWINGS. THE CP SHALL PROTECT THIS INSTRUMENTATION FROM DAMAGE. THIS INSTRUMENTATION SHALL BE EXTENDED UPWARD DURING THE COURSE OF THE WORK.

8. ALL ENTITIES SHALL BE RESPONSIBLE FOR HEALTH AND SAFETY OF THEIR PERSONNEL AND SHALL MEET INDUSTRY STANDARD REQUIREMENTS. ALL ENTITIES SHALL ADHERE TO TVA REQUIREMENTS FOR SAFETY AND CONSTRUCTION.

9. THE CP SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL ACCESS ROADS, STAGING AREAS AND STORAGE AREAS USED DURING CONSTRUCTION, AND SHALL RESTORE SAID AREAS TO THEIR ORIGINAL CONDITION, OR BETTER ONCE CONSTRUCTION IS COMPLETE UNLESS DIRECTED BY THE OWNER TO RETAIN THE AREA "AS IS".

10. THE CP SHALL CONDUCT ALL OPERATIONS IN ACCORDANCE WITH APPLICABLE ENVIRONMENTAL PERMITS, RULES, LAWS AND REGULATIONS INCLUDED BUT NOT LIMITED TO THOSE SET FORTH IN CEC 19966, 20065 OR OTHER ENVIRONMENTAL REVIEW DOCUMENTS FOR THIS PROJECT.

11. THE CP IS RESPONSIBLE FOR SITE DRAINAGE THROUGHOUT CONSTRUCTION AND SHALL INSTALL TEMPORARY DRAINAGE STRUCTURES OR PUMP WATER AS NECESSARY TO PREVENT INTERFERENCE WITH THE WORK. SUCH TEMPORARY DRAINAGE FEATURES SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ENVIRONMENTAL PERMITS AND THE KINGSTON STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

12. THE CP SHALL NOTE SEQUENCING OF OPERATIONS IDENTIFIED IN THE DRAWINGS.

13. VEGETATIVE AND ORGANIC MATERIALS SHALL BE REMOVED AS DESCRIBED IN THE SPECIFICATIONS.

14. DRAINAGE CONDITIONS SURROUNDING EXISTING FACILITIES OUTSIDE THE PROJECT LIMITS ARE NOT ADDRESSED BY THE DRAWINGS. GRADING, SHAPING AND INSTALLATION OF DRAINAGE STRUCTURES MAY BE REQUIRED TO PROMOTE POSITIVE DRAINAGE. SUCH WORK SHALL BE DIRECTED BY OTHERS.

15. MATERIALS DELIVERED FOR INCORPORATION INTO THE WORK SHALL BE TEMPORARILY STORED IN AREAS SELECTED BY THE CP AND APPROVED BY THE OWNER. NO MATERIAL IS TO BE STOCKPILED WITHIN THE FORMER DREDGE CELL FOOTPRINT WITHOUT APPROVAL OF TVA, STANTEC, OR THE QC MANAGER. MATERIALS SHALL BE STORED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

16. THE EROSION AND SEDIMENT CONTROL MEASURES SHOWN AND AS INCLUDED WITHIN THE SPECIFICATIONS SHALL BE CONSIDERED THE MINIMUM; SUPPLEMENTAL MEASURES SHALL BE PROVIDED BY THE CP AS FIELD CONDITIONS DICTATE OR AS DIRECTED BY THE REGULATORY AUTHORITY.

17. BORROW AREAS SHALL BE GRADED AND VEGETATED IN CONFORMANCE WITH PROJECT REQUIREMENTS, SUBJECT TO ENVIRONMENTAL REGULATIONS FROM OTHER AGENCIES, AND SHALL BE PERMITTED IF REQUIRED BY REGULATION. IT SHOULD BE NOTED THAT THERE MAY BE REGULATORY RESTRICTIONS ASSOCIATED WITH CLEARING A SITE.

18. DURING CONSTRUCTION, THE CP SHALL INSPECT, CLEAN, AND MAINTAIN ALL SEDIMENT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND PROVIDE REPORTING AS REQUIRED BY THE SPECIFICATIONS AND REGULATIONS ON SAID ITEMS.

19. THE CP SHALL CONTROL FUGITIVE DUST EMISSIONS DURING CONSTRUCTION IN SUCH A MANNER AS TO COMPLY WITH APPLICABLE REGULATIONS. DUST CONTROL MEASURES SHALL BE SUBJECT TO APPROVAL OF THE QC MANAGER AND THE OWNER.

20. BORROW AREAS SHALL BE MAINTAINED IN SUCH A MANNER AS TO PROMOTE POSITIVE DRAINAGE, REDUCE EROSION OF SOILS AND PROVIDE STABLE EXCAVATIONS. FINAL GRADE SLOPES SHALL BE NO STEEPER THAN 3H:1V AND INTERIM SLOPE CONDITIONS SHALL NOT ABRUPTLY TERMINATE OR IMPOUND WATER.

21. DURING BORROW EXCAVATION, SATISFACTORY MATERIALS SHALL BE SEGREGATED FOR USE AS STARTER DIKE BENCH EMBANKMENT. SATISFACTORY MATERIALS ARE SOILS THAT CLASSIFY AS CL OR CH ACCORDING TO THE UNIFIED SOILS CLASSIFICATION SYSTEM. SATISFACTORY MATERIALS WHICH CONTAIN EXCESSIVE MOISTURE SHALL BE STOCKPILED, BLADED, DISKED, OR CHEMICALLY TREATED AS NECESSARY TO PERMIT ADEQUATE DRYING. CLASSIFICATION OF SOIL AS SATISFACTORY OR UNSATISFACTORY SHALL BE DETERMINED BY THE QC MANAGER.

22. UNSATISFACTORY MATERIALS SHALL REMAIN AT THE BORROW SITE. NO SATISFACTORY MATERIAL SHALL BE WASTED WITHOUT AUTHORIZATION BY THE OWNER. MOISTURE CONTENT SHALL NOT BE DEEMED AN APPROPRIATE CAUSE TO HAVE A MATERIAL DEFINED AS UNSATISFACTORY.

23. GRADING OF STOCKPILES SHOULD BE MINIMIZED. HOWEVER, STOCKPILES SHALL BE GRADED TO MAINTAIN POSITIVE DRAINAGE AT ALL TIMES. THE SIDE SLOPES SHALL HAVE MAXIMUM 3H:1V SLOPE. THE TOP OF THE STOCKPILE SHALL HAVE A MINIMUM TWO PERCENT SLOPE. MATERIALS SHALL BE SEGREGATED AS DIRECTED BY THE QC MANAGER.

24. SOIL STOCKPILES THAT WILL NOT BE DISTURBED FOR 21 DAYS OR MORE SHALL BE TEMPORARILY SEEDED WITH WHEAT OR RYE AT A RATE OF 60 LBS/ACRE AND SHALL BE COVERED WITH MULCH.

25. ALL PIPE REMOVAL AND TRENCHING SHALL BE CONDUCTED IN STRICT ACCORDANCE WITH APPLICABLE TVA PROCESS AND PROCEDURE REQUIREMENTS.

26. PIPE REMOVAL AT THE LOCATIONS NOTED ON THE DRAWINGS SHALL REQUIRE BACKFILL. SOIL BACKFILL AND EMBANKMENT SHALL BE PLACED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.

27. GEOTEXTILES USED FOR CONSTRUCTION SHALL BE CERTIFIED BY THE MANUFACTURER AS CONFORMING TO THE PROJECT REQUIREMENTS. GEOTEXTILES SHALL NOT BE UTILIZED AS FILTER UNLESS APPROVED BY TVA. IT MAY BE USED AS A TEMPORARY MEASURE AND REMOVED.

28. CERTIFICATIONS OF MATERIAL QUALITY AND CONFORMANCE TO PROJECT REQUIREMENTS SHALL BE SUBMITTED TO THE QC MANAGER FOR APPROVAL PRIOR TO INSTALLATION.

29. ALL SURFACES SHALL BE APPROVED BY THE QC MANAGER PRIOR TO EMBANKMENT OR BUTTRESS CONSTRUCTION.

30. THE CP SHALL DEVELOP A HAUL ROAD PLAN PRIOR TO INITIATION OF CONSTRUCTION AND SUBMIT IT TO THE QC MANAGER FOR APPROVAL.

31. THE CP SHALL BE RESPONSIBLE FOR CONSTRUCTION SURVEYOR SELECTION AND COORDINATION OF ALL CONSTRUCTION RELATED SURVEYING. ALL ESTABLISHED TVA BENCH MARKS OR OTHER MONUMENTS SHALL BE PRESERVED AND PROTECTED, ANY ESTABLISHED MARKER OR BENCHMARK THAT IS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY TVA SURVEYING SERVICES.

32. THE CONSTRUCTION MANAGER SHALL COMMUNICATE CONSTRUCTION ISSUES, PROBLEMS OR DISCREPANCIES IN THE DRAWINGS TO THE QC MANAGER AND OWNER IMMEDIATELY UPON BECOMING AWARE OF SUCH PROBLEMS.

33. ADDITIONAL GEOTECHNICAL INSTRUMENTATION BEYOND THAT CURRENTLY DEPICTED MAY BE INSTALLED DURING CONSTRUCTION.

[redacted] FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV NO.	DATE	DRWN	DSGN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	03/09/11	DWF	DMG	TC	DWF	–	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLINE INTERFACE

SCALE: NONE — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
GENERAL NOTES
WORK PLAN 3 (KIF–110028–WP–3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	–	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 03/09/11 | 36 | C | 10W229–68 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

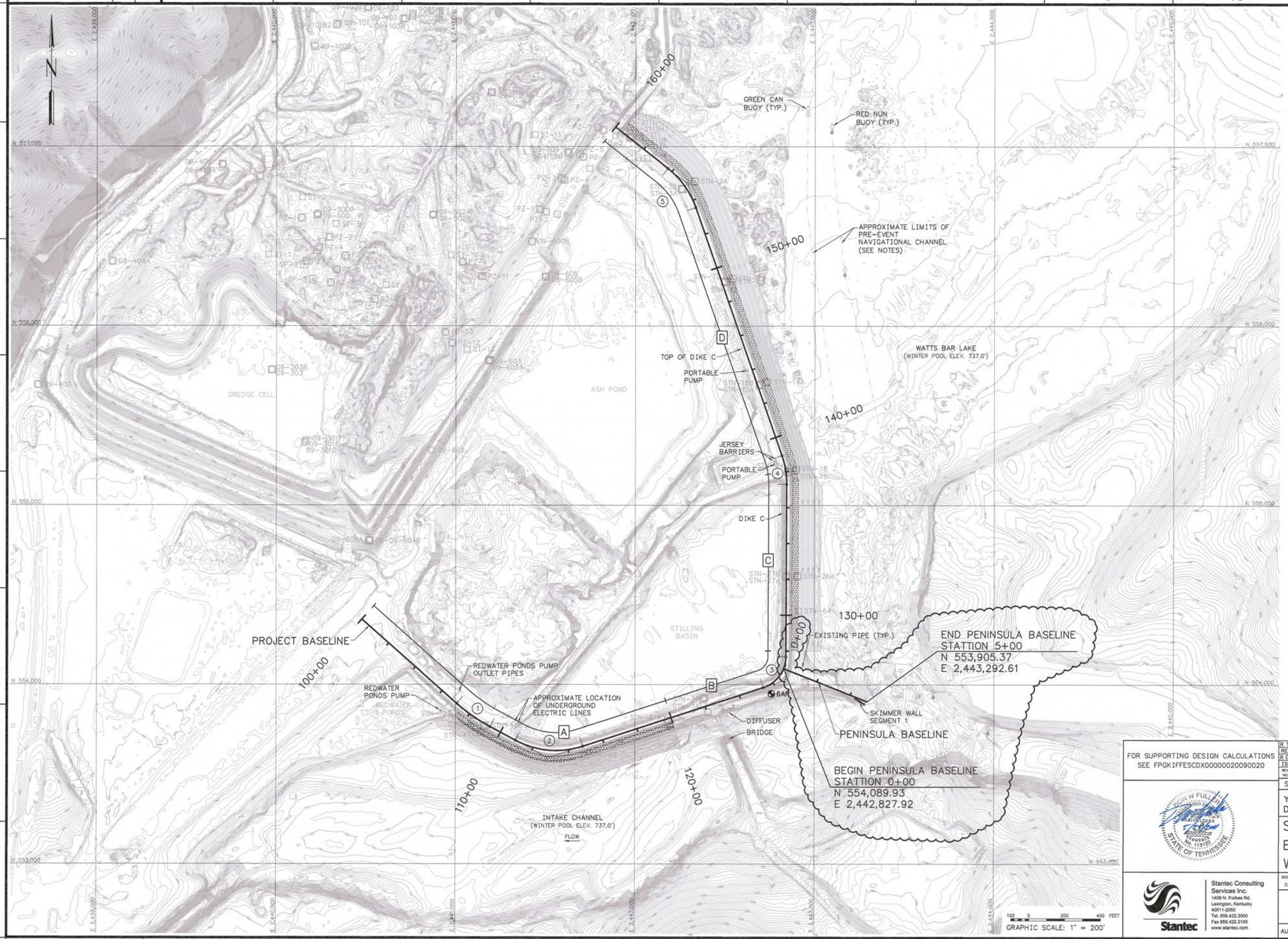

TABLE OF BASELINE COORDINATES			
PROJECT BASELINE	STATION	NORTHING	EASTING
BEGIN	100+00.00	554,363.86	2,440,477.77
END	160+00.00	557,109.43	2,441,888.38

BASELINE CURVE DATA

①
P.I. STA. = 108+20.74
NORTHING = 553,819.18
EASTING = 2,441,091.71
Δ = 13°20'06"
R = 974.68'
T = 113.94'
L = 226.85'
E = 6.64'
P.C. STA. = 107+06.80
P.T. STA. = 109+33.65

②
P.I. STA. = 112+99.93
NORTHING = 553,591.92
EASTING = 2,441,514.77
Δ = 46°19'10"
R = 479.84'
T = 205.26'
L = 387.92'
E = 42.06'
P.C. STA. = 110+94.67
P.T. STA. = 114+82.59

③
P.I. STA. = 126+71.85
NORTHING = 554,024.61
EASTING = 2,442,840.47
Δ = 71°45'50"
R = 182.94'
T = 132.33'
L = 229.13'
E = 42.85'
P.C. STA. = 125+39.52
P.T. STA. = 127+68.65

④
P.I. STA. = 138+12.12
NORTHING = 555,200.41
EASTING = 2,442,843.77
Δ = 19°21'32"
R = 479.84'
T = 81.84'
L = 162.13'
E = 6.93'
P.C. STA. = 137+30.28
P.T. STA. = 138+92.41

⑤
P.I. STA. = 154+96.30
NORTHING = 556,792.40
EASTING = 2,442,289.43
Δ = 32°28'34"
R = 479.84'
T = 139.75'
L = 271.98'
E = 19.94'
P.C. STA. = 153+56.55
P.T. STA. = 156+28.53

SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

LEGEND

STN-1 SLOPE INCLINOMETER
STN-2 PIEZOMETER
STN-3 SETTLEMENT PLATFORM

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES:

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
4. SEGMENTS A,C & D AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
5. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/24/2011 USER: ELLISON, DOC
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FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: 1"=200' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
EXISTING CONDITIONS
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
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AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-69 | R 1

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TASK COMPLETED BY: | REV NO.

PLOT FACTOR:200
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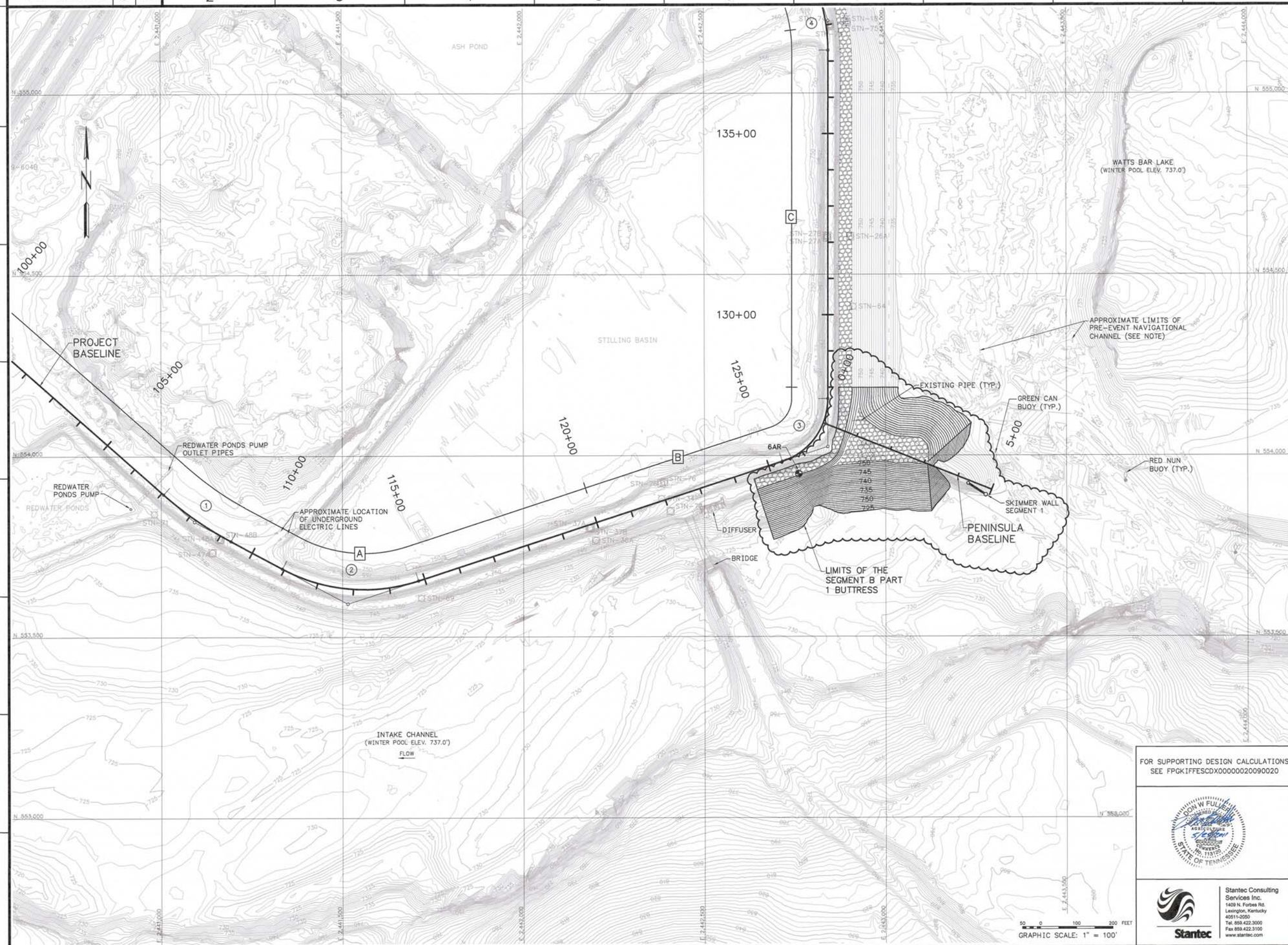

SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

LEGEND

STN-1 SLOPE INCLINOMETER
STN-2 PIEZOMETER
STN-3 SETTLEMENT PLATFORM

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ISSUED FOR CONSTRUCTION											

DISCIPLINE INTERFACE

SCALE: 1"=100' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PROJECT SETTING
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. ORILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
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AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-70 | R 1

STANTEC | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:100
W_TVA

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PLOT DATE: 05/24/2011 USER: ELLISON, DOC
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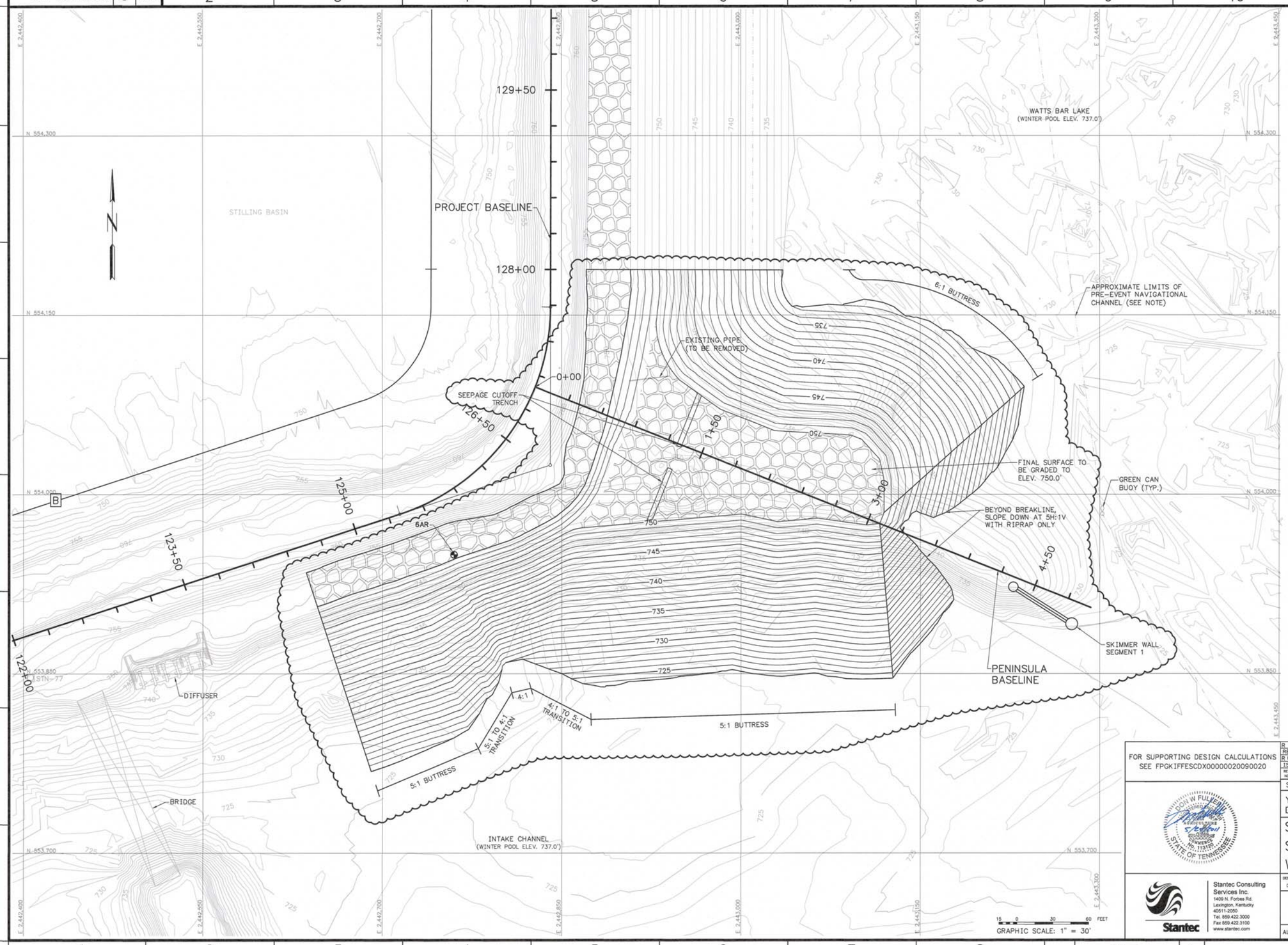

SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

LEGEND

STN-1 SLOPE INCLINOMETER
STN-2 PIEZOMETER
STN-3 SETTLEMENT PLATFORM

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES:

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. SEE 10W299-69 FOR PROJECT BASELINE COORDINATES AND CURVE DATA.
4. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
5. SEGMENT C AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
6. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/24/2011 USER: ELLISDAL DGN
V:\795\ACTIVE\7595900\ENVIRONMENTAL\DRAWING\WP3\REV1_IFC\10W229-71-B1.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000200900 20

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT CO	AS CONST	REV CO
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLIN INTERFAC

SCALE: 1"=30' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – GRADING PLAN
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-71 | R 1

Stantec Consulting Services Inc.
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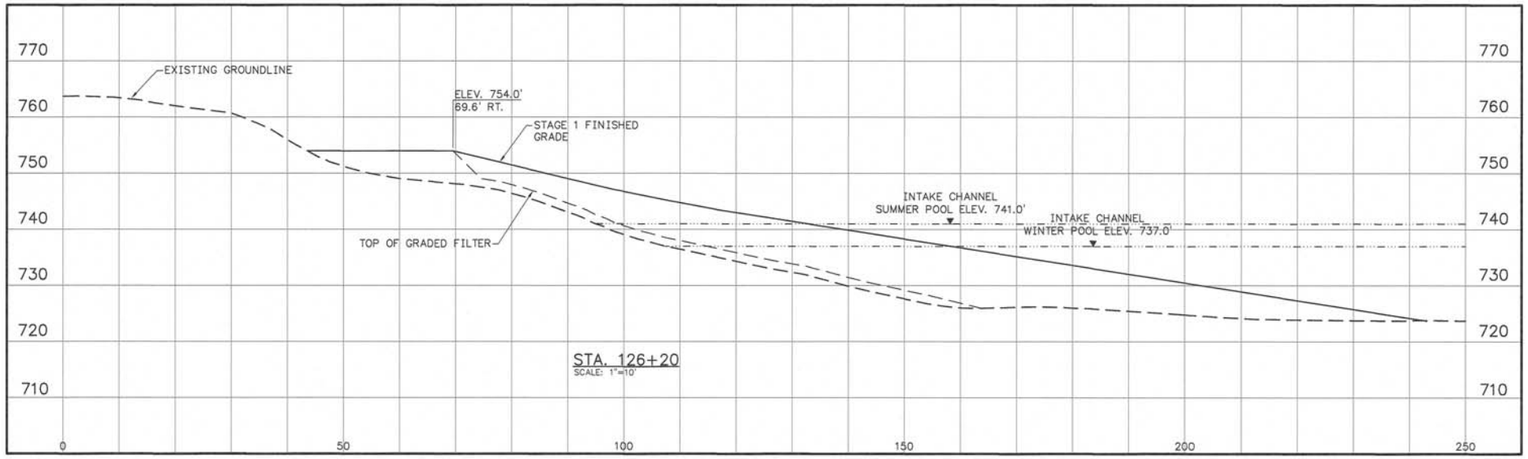
Fax 859.422.3100
www.stantec.com

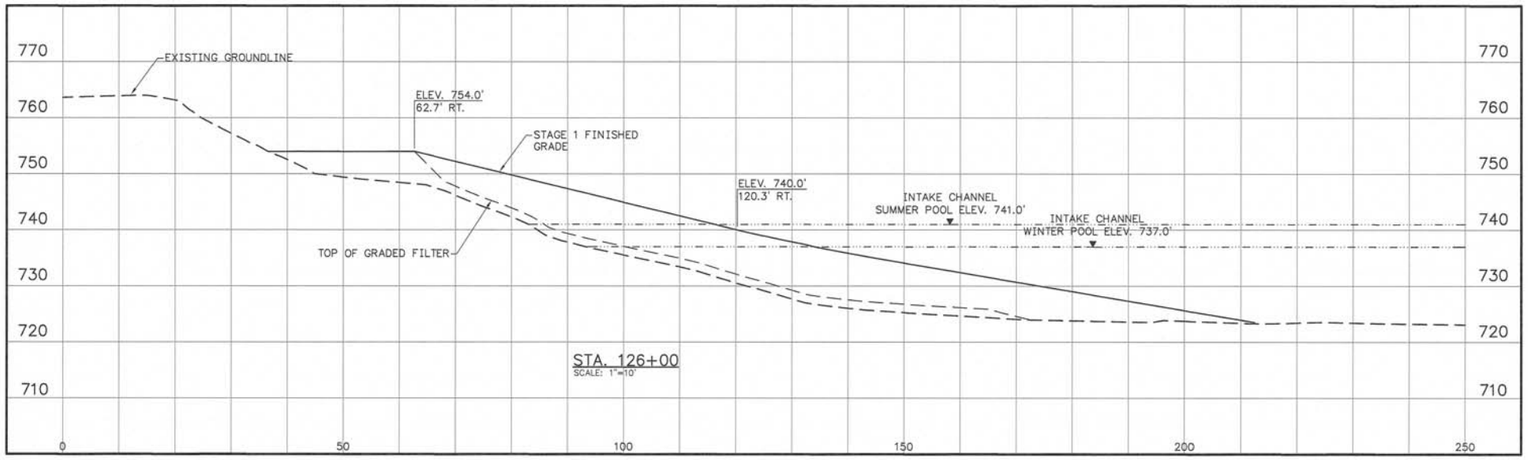
STANTEC	1
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:30
W_TVA

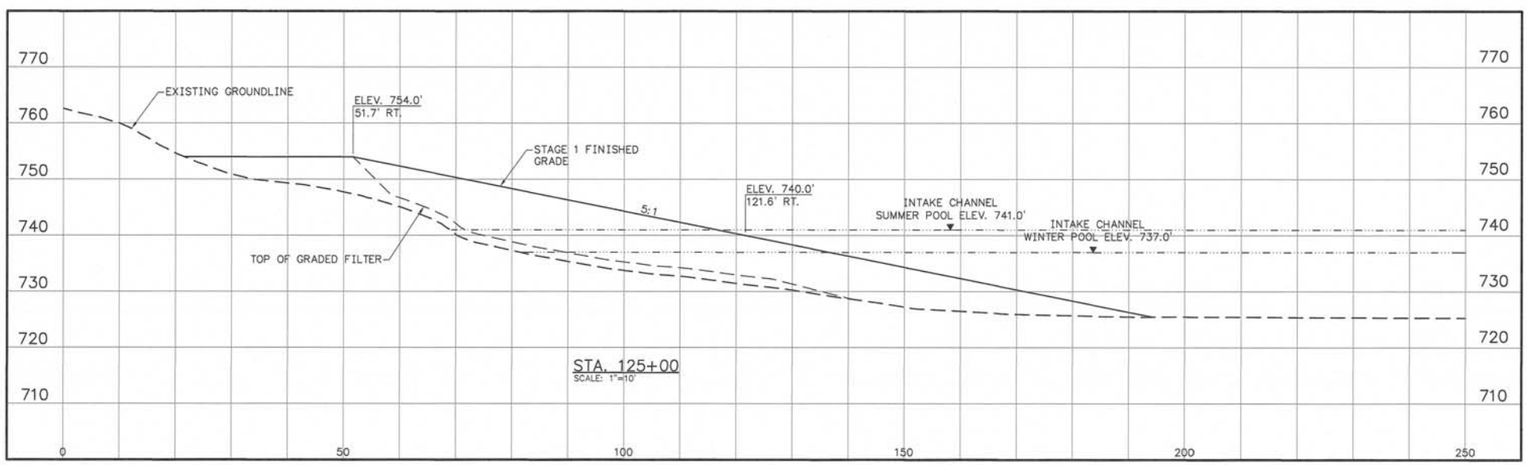
C.A.D. DRAWING DO NOT ALTER MANUALLY



STA. 126+20
SCALE: 1"=10'



STA. 126+00
SCALE: 1"=10'



STA. 125+00
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLINE INTERFACE

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

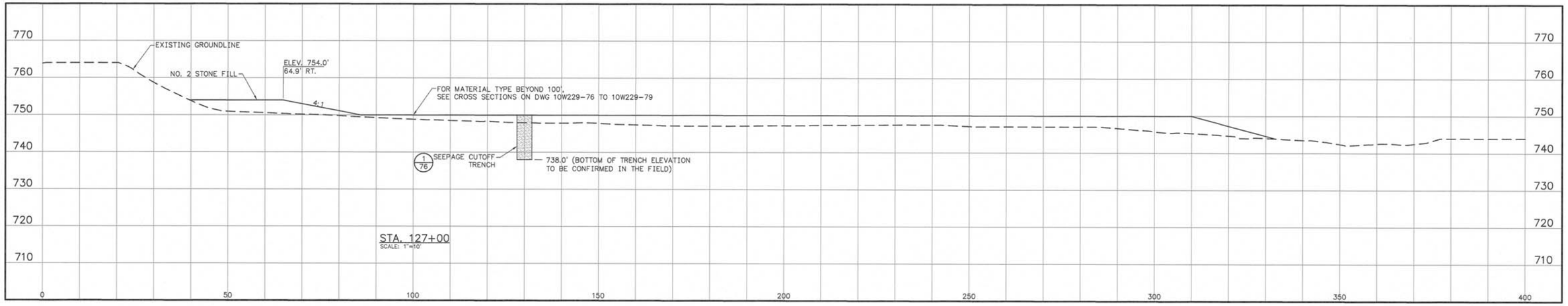
AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-72 | R 1

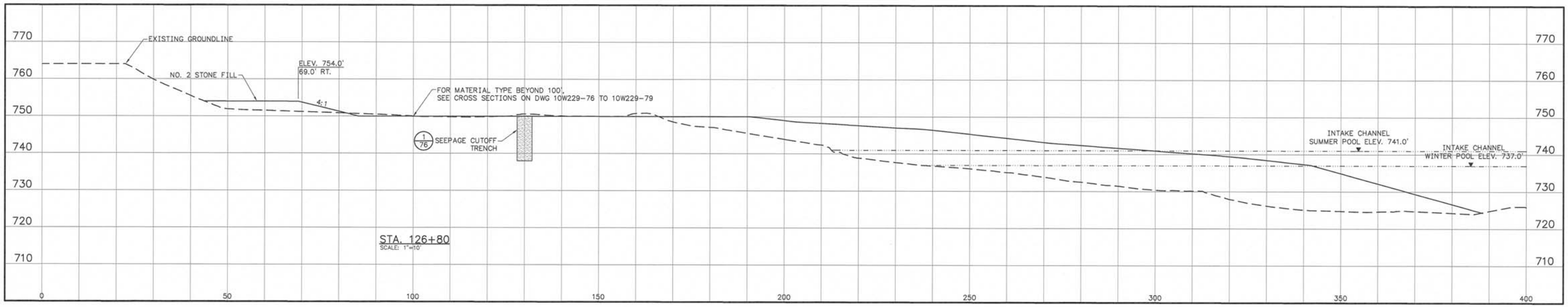
STANTEC | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C 10W229-72





NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV ID
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLI INTERFAC

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DON W FULLER
REGISTERED
AGRICULTURE
COLLEGE
TENNESSEE
No. 113125
STATE OF TENNESSEE

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

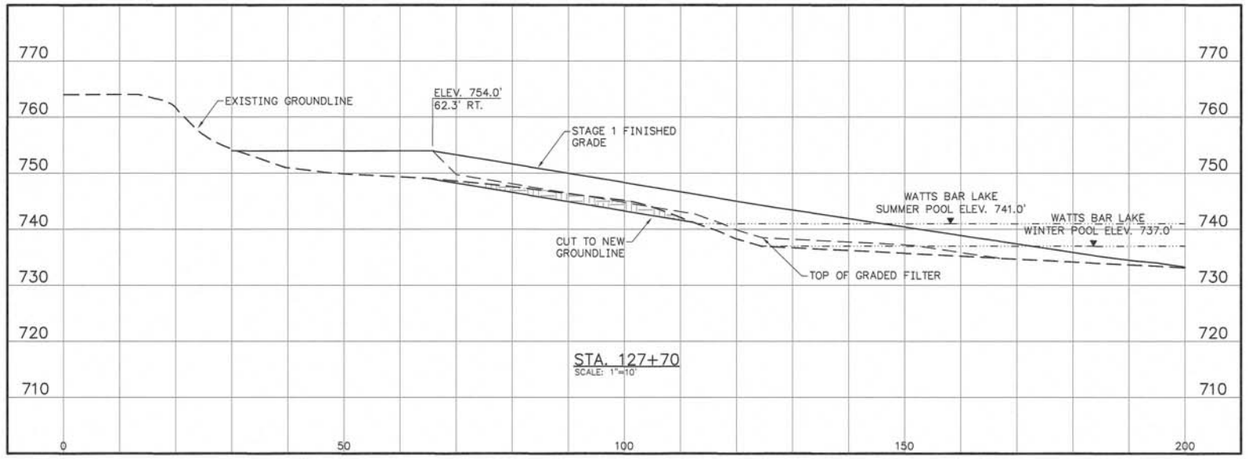
AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-73 | R 1

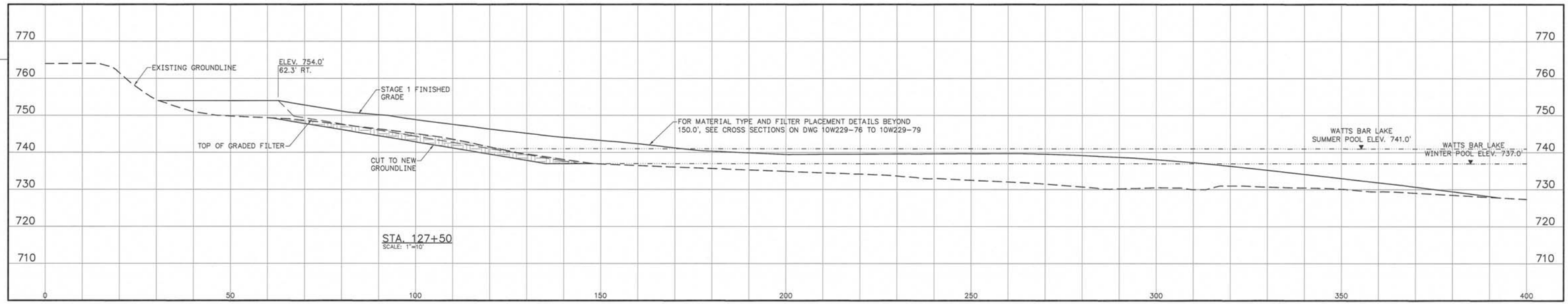
STANTEC	1
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 06/24/2011 USER: ELLISDL DOC
N:\TVA\ACTIVE\175860008\ENVIRONMENTAL\DRAWING\WP3\WP3_IFC\10W229-73-R1.DWG





NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

REVISION NO. 1
ISSUED FOR CONSTRUCTION

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-74 | R 1

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STANTEC | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011 USER: ELLISDN, DOC
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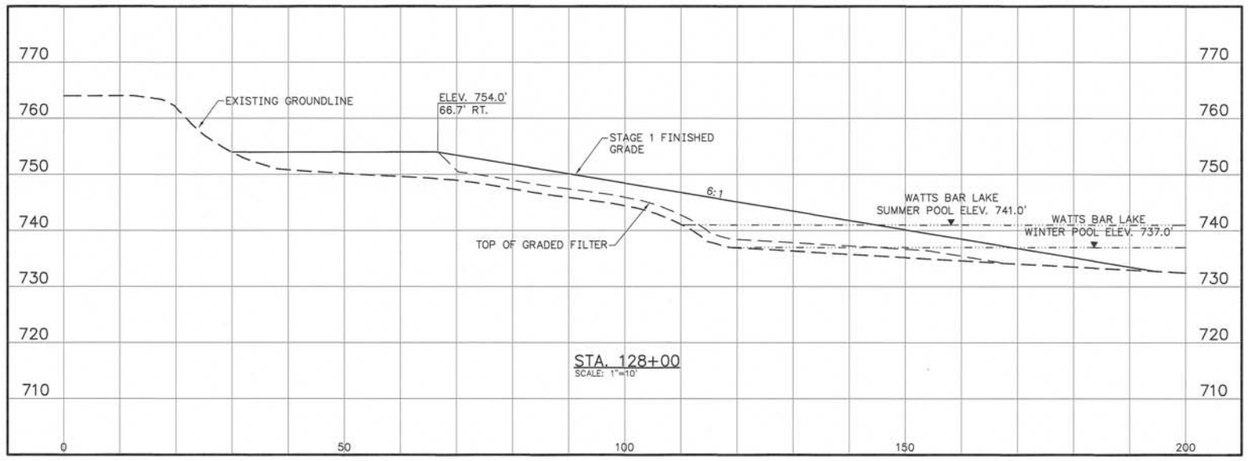

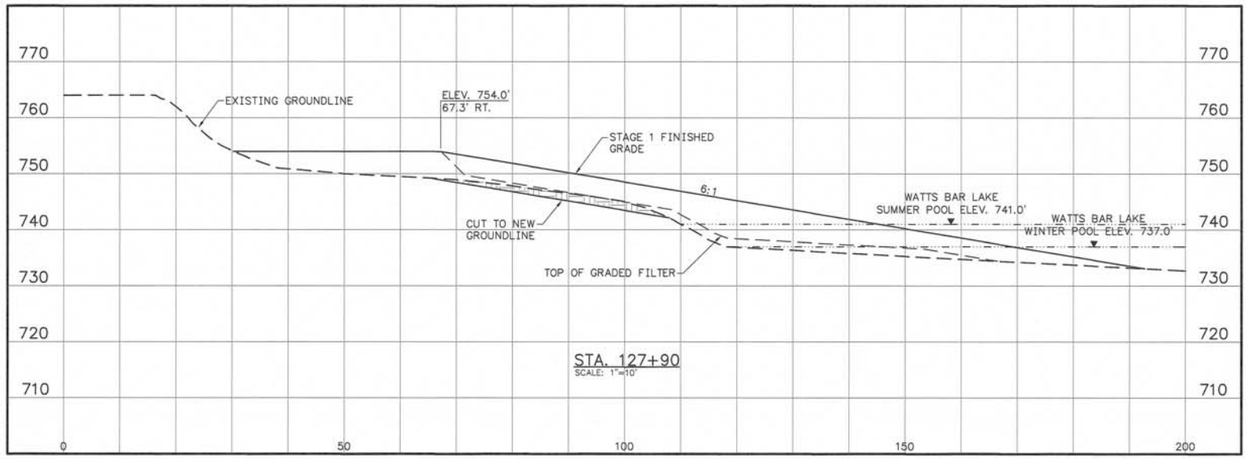

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000200900 20

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV TYPE
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLI INTERFAC

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-75 | R 1

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www.stantec.com

STANTEC | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011 USER: ELLISON, DOC
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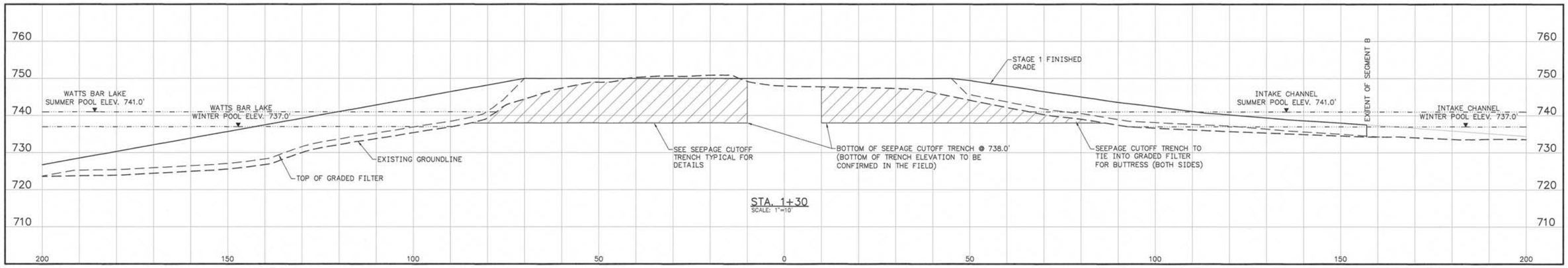
36 | C | 10W229-75



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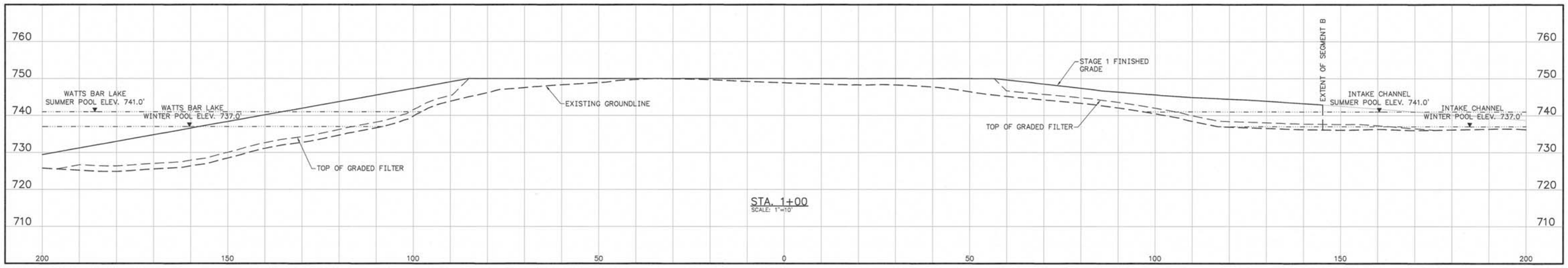

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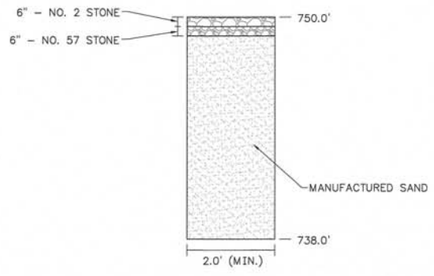

1/76 TYPICAL SEEPAGE CUTOFF TRENCH
SCALE: NOT TO SCALE

NOTE:
FOR FILTER CONFIGURATIONS SEE
TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS
SEE FPGKIFFESCDX000000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PENINSULA – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

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AUTOCAD R 2000 | DATE 03/16/11 | 36 | C | 10W229-76 | R 1

STANTEC | 1
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011 USER: ELLISDL DOC
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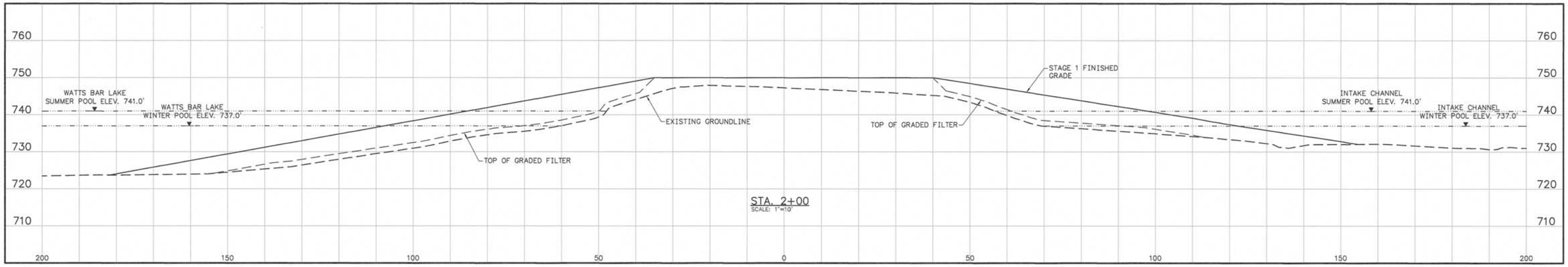

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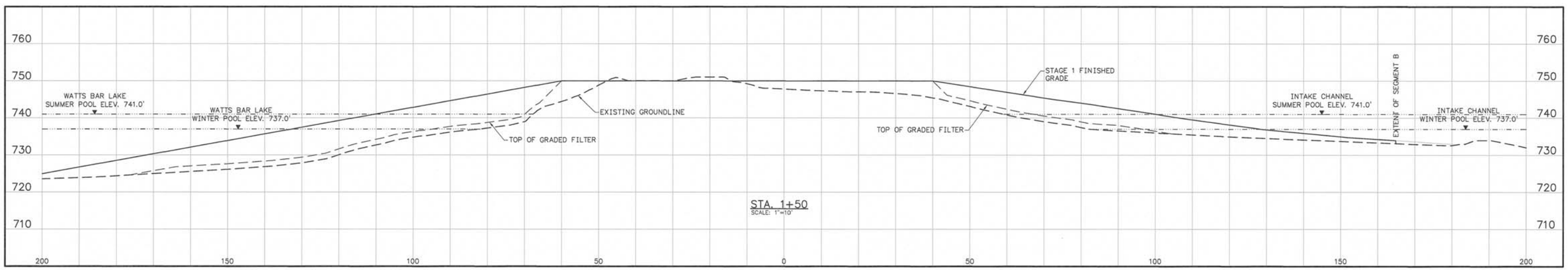
SCALE: 1"=10'



STA. 1+50
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 1	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	--	--	-
REVISION NO. 1											
R 0	03/16/11	DWF	DMG	TC	DWF	VJD	MST	JCK	--	--	-
ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PENINSULA – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DON W. FULLER
REGISTERED
ENGINEER
AND LICENSED
ARCHITECT
5/25/2011
No. 119119
STATE OF TENNESSEE

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Lexington, Kentucky
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Fax 859.422.3100
www.stantec.com

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE: 03/16/11 | 36 | C | 10W229-77 | R 1

STANTEC	1
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011, USER: ELLISON, DOC
V:\TVR\VECTOR\T\56600063\ENVIRONMENTAL\DRAWINGS\WP3\REV1_JPG\10W229-77-R1.DWG

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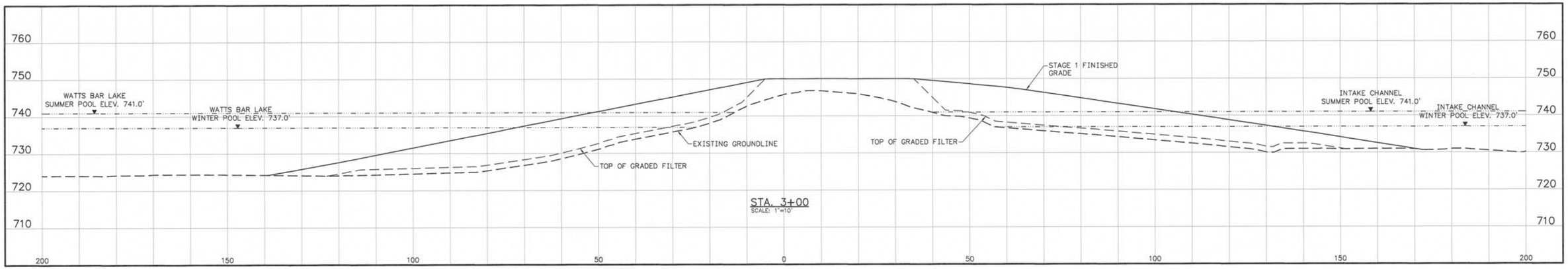
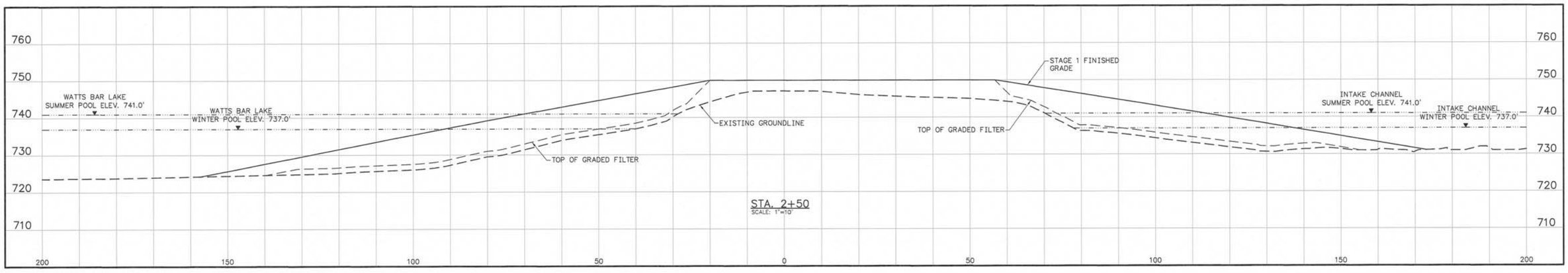
INTERFAC



STA. 3+00
SCALE: 1"=10'



STA. 2+50
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PENINSULA – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DON W FULLER
REGISTERED PROFESSIONAL ENGINEER
AGRICULTURE
5/25/2011
NO. 113130
STATE OF TENNESSEE

Stantec

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Fax 859.422.3100
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DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. ORILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

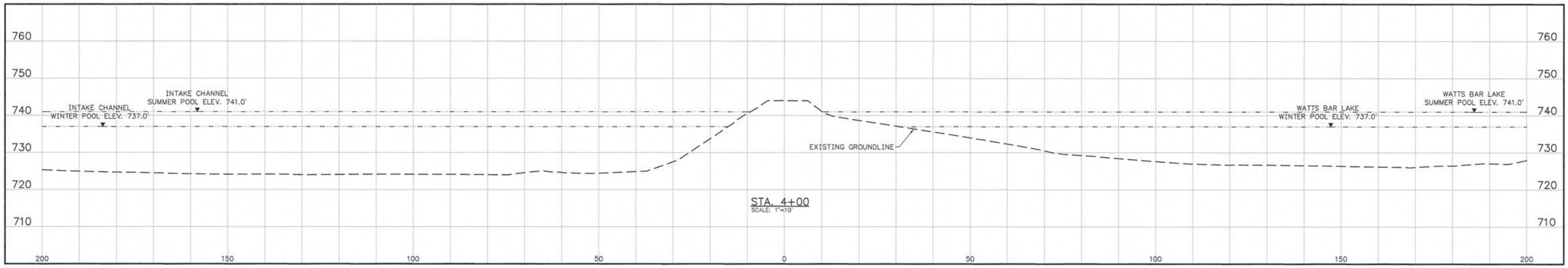
AUTOCAD R 2000 | DATE 05/25/11 | 36 | C | 10W229-78 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

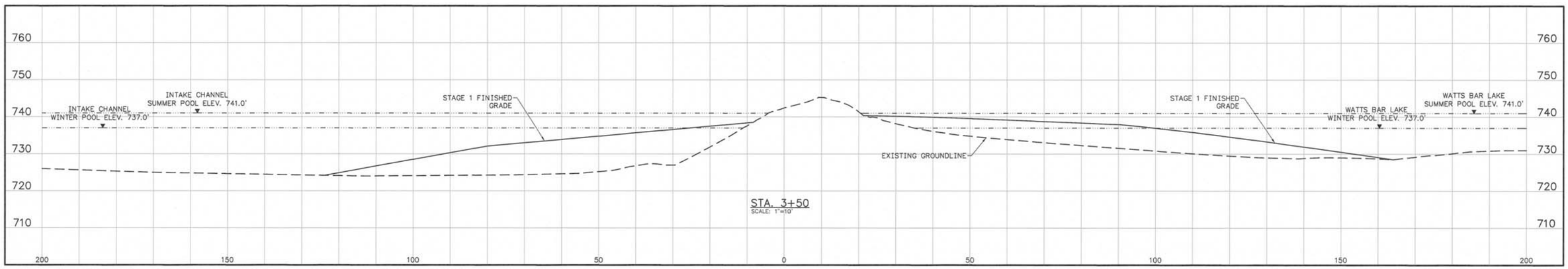
PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011 USER: ELLISON, DOC
V:\TFS_ACTIVE\C\356690\DOCUMENTS_DRAWING\WP3\REV1_JFC\10W229-78-R0.DWG



STA. 4+00
SCALE: 1"=10'



STA. 3+50
SCALE: 1"=10'

ISSUED FOR CONSTRUCTION

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-80).

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CDE
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLI INTERFAC

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PENINSULA – CROSS SECTIONS
WORK PLAN 3 (KIF-110316-WP-3)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

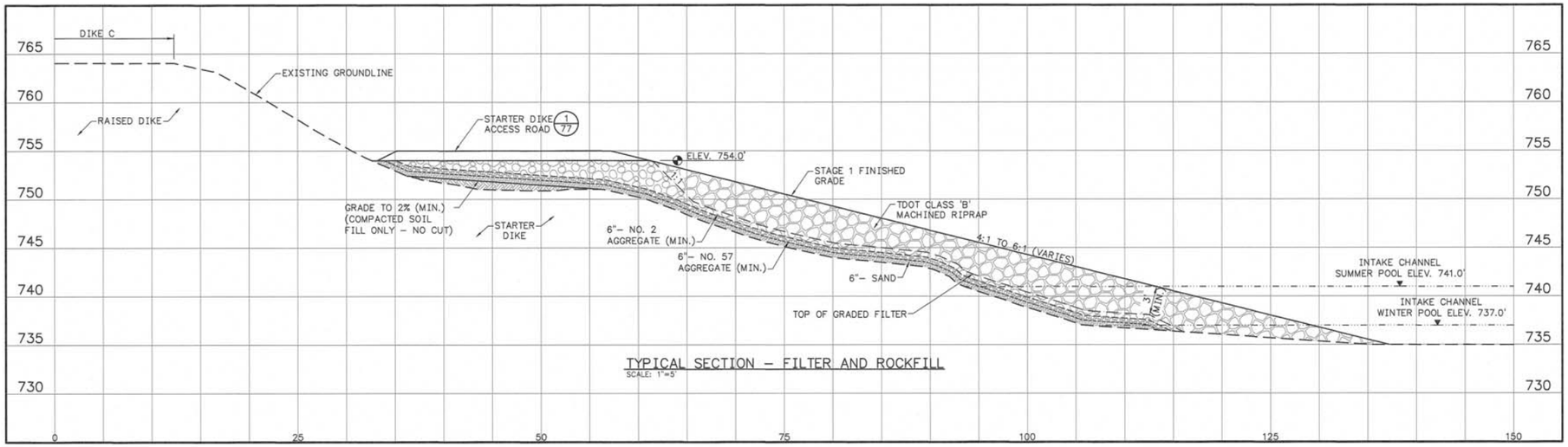
AUTOCAD R 2000 | DATE 05/25/11 | 36 | C | 10W229-79 | R 0

Stantec Consulting Services Inc.
1409 N. Forbes Rd.
Lexington, Kentucky
40511-2050
Tel. 859.422.3000
Fax 859.422.3100
www.stantec.com

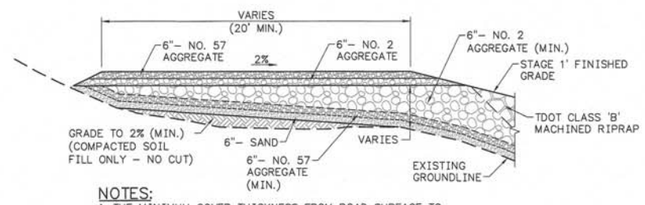
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



TYPICAL SECTION - FILTER AND ROCKFILL
SCALE: 1"=5'



NOTES:
1. THE MINIMUM COVER THICKNESS FROM ROAD SURFACE TO TOP OF SAND FILTER IS 36-INCHES.
2. PLACE NO. 2 AGGREGATE AND NO. 57 AGGREGATE ON RIPRAP OR NO. 2 AGGREGATE AS APPLICABLE TO FORM A REVERSE FILTER FOR ROAD SURFACE.
3. REMOVE AGGREGATE CONTAMINATED WITH ASH AS DIRECTED BY THE QC MANAGER.

1/77 DETAIL - STARTER DIKE ACCESS ROAD
SCALE: 1/4"=1'-0"

ISSUED FOR CONSTRUCTION

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	05/25/11	DWF	DMG	TC	DWF	VJD	MST	JCK	-	-	-
ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL SECTIONS AND DETAILS
WORK PLAN 3 (KIF-110316-WP-3)

DON W. FULLER REGISTERED ENGINEER AGRICULTURE No. 113135 STATE OF TENNESSEE

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DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/25/11 | 36 | C | 10W229-80 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:5
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/24/2011 USER: ELLISDN, DOC
W:\TSR\ACTIVE\110316000\DRAWING\WP3\REV1_IFC\10W229-80-R0.DWG

Appendix B

Design Specifications

Stantec

Technical Specifications

Dike C Buttress
Segment B Construction
Work Plan 3
Kingston Fossil Plant
Harriman, Roane County, Tennessee

ISSUED FOR CONSTRUCTION

Prepared for

Tennessee Valley Authority
Kingston, Tennessee

May 25, 2011

Stantec Consulting Services Inc.
One Team. Infinite Solutions

TECHNICAL SPECIFICATIONS

SECTION 02100 – EROSION CONTROL AND STABILIZATION

PART 1 - GENERAL

1.1. Descriptions

1.1.1. This Section includes provisions for erosion control and stabilization. All construction activities shall be conducted in accordance with applicable environmental requirements. Install sediment and erosion control measures prior to disturbance where applicable.

1.1.2. CIVIL PROJECTS (CP) shall become familiar with the Final Grading Plan, Erosion and Sediment Control Details and Best Management Practices (BMP) Plan, and shall anticipate, and therefore plan in advance for each construction activity.

1.2. Related Documents

1.2.1. The Quality Control Plan and Engineering Drawings apply to the work of this section.

PART 2 - MATERIALS

2.1. Refer to the BMP Plan at the end of this Specification, the Sediment and Erosion Control Plan, the Details, and Section 02936 – Revegetation for products and materials to be employed in erosion control and stabilization efforts.

2.2. This Section provides material requirements for silt fence, and fiber rolls.

PART 3 - EXECUTION

3.1. Construction Phase Operations

3.1.1. CP shall evaluate the work of the project and plan to minimize the surface area disturbed at any one time.

3.1.1.1. Perform clearing and grubbing, excavation or grading, rock cover and riprap buttress construction at the site in stages to avoid exposing large areas of bare soil. Excavate and place earth fill material during dry weather, when possible.

3.1.1.2. Establish final grade as quickly as possible.

3.1.1.3. Seed and mulch disturbed areas of soil adjacent to work areas as soon as possible.

3.1.2. CP shall control fugitive dust emissions.

3.1.2.1. Control dust generation by covering disturbed areas promptly with the geotextile fabric and by wetting haul roads or applying approved (by TVA) chemical soil binders, as needed.

3.1.3. CP shall not discharge raw silt and sediment laden water from the site without providing for removal of soil particles.

3.1.3.1. Use rock filters or sediment filter bags, fiber rolls and/or use silt fence enclosures or de-silting basins.

3.1.3.2. Use rock silt checks and rip-rap or channel lining when dewatering through ditches and swales.

3.1.3.3. TVA shall provide inspection and maintenance of best management practices at minimum on a weekly basis.

3.1.3.4. In addition, inspect all best management practices after each rainfall of 0.5 inches or more.

3.1.3.5. Maintain all best management devices by removing accumulated silt, repairing or replacing damaged devices and by cleaning up any excess discharges, or mud on gravel roads.

3.2. Sediment Barriers

CP shall install silt fences, and/or fiber rolls or other suitable measures as practicable along the contour adjacent to the Intake Channel prior to any disturbance above the area. Silt fence may also be required at other locations based upon field conditions. The silt fence shall be removed segmentally as an area is ready for granular filter and rockfill buttress overlay. Floating turbidity curtains shall be installed as needed to protect intake locations. If an area is completed in terms of armoring within one day of initial disturbance and no rain is forecast, then sediment barriers may not be required.

3.2.1. Silt Fences

Silt fences shall be installed below proposed disturbed areas in accordance with the plans and details and as needed in other areas. Turn ends of silt fence slightly toward the uphill side to mitigate against bypassing.

3.2.2. Fiber Rolls

Fiber rolls and other commercial products made from coconut fiber, rice straw, plastic, wood shavings, or other material can also be used as sediment barriers along streams. Follow manufacturers' installation instructions and ensure that sediment filter spacing on slopes is correct. Make sure runoff does not bypass barriers, coconut rolls, or other barriers underneath or around the ends.

3.2.3. Maintenance

Inspect silt fences and other installed manmade barriers once a week and after rainfalls of 0.5 inch or more. Remove sediment before it reaches six inches in depth. Traps and basins are to be cleaned out when half full. Reinstall sections of fence which have washed out underneath the fence. Replace broken, torn or worn fences. Rebuild or replace damaged brush barriers and fiber rolls. Make repairs within three days of discovering.

3.2.4. Turbidity Curtains

Turbidity curtains may be needed in the intake channel to control sediment advance towards plant intake points.

3.3. Slope Protection

3.3.1. The CP shall take measures as necessary to minimize sheet, rill and gully erosion prior to placing filter material. Slopes shall be stabilized immediately after tree removal and grubbing with measures as described below.

A. **Divert Upland Runoff** – Use diversion berms as practicable to control flow and route around work areas.

B. **Sediment Barriers** – See paragraph 3.2.

3.4. Sediment Traps and Basins

TVA shall observe effluent leaving the site during rainfall events. If water appears to be excessively muddy or silt-laden, TVA shall review the BMP Plan and insure that all structures are properly installed and functioning, and that all prescribed measures have been taken to minimize erosion. If they appear to be functioning properly upon inspection or after necessary repairs and the effluent is still not acceptable, then TVA shall take immediate action to have CP construct sediment traps as indicated herein. TVA will support CP in the design and location of such traps.

3.4.1. Sediment Traps

Any depression, swale or low-lying place that receives muddy flows from exposed soil areas can serve as a sediment trap. Installing several small traps at strategic locations is often better than building one large basin. The simplest approach is to dig a hole or build a dike (berm) of earth or stone where concentrated flows are present. This will help to detain runoff so sediment can settle out. The outlet can be a rock-lined depression in the containment berm.

3.4.2. Sizing and Design Considerations

3.4.2.1. A minimum storage of 134 cubic yards per acre of exposed soil drained is required for basins and traps. Traps and basins are designed so that flow paths through the trap or basin are as long as possible, to promote greater settling of soil particles. Sediment basin length must be twice the width or more if possible – the longer the flow path through the basin, the better. Side slopes for the excavation or earthen containment berms are 2:1 or flatter. Berms are made of well compacted clayey soil, with a height of 5 feet or less. Well mixed rock can also be used as a containment berm for traps. Place soil fill for the berm or dam in 6" layers and compact. The entire trap or basin, including the ponding area, berms, outlet, and discharge area, must be seeded and mulched immediately after construction.

3.4.2.2. An overflow outlet can be made by making a notch in the containment berm and lining it with rock. Rock in the notch must be large enough to handle overflows, and the downhill outlet should be stabilized with rock or other flow dissipaters similar to a culvert outlet. The overflow should be at an elevation so the dam will not overtop. Allow at least one foot of

freeboard. Outlets must be designed to promote sheet flow of discharges onto vegetated areas if possible. If the discharge will enter a ditch or channel, make sure it is stabilized with vegetation or lined.

3.4.3. Inspection and Maintenance

Inspect inlets, berms, spillways, and outlet areas for erosion after each rain exceeding 0.5 inch and every seven days. Repair gullied areas and any upslope areas contributing large volumes of sediment. Repair and reseed bare areas. Ensure that downstream receiving area is stable. Remove sediment before it fills half the trap or basin volume.

3.5. Inspection and Maintenance

3.5.1. CP is responsible for maintaining the construction site in accordance with the site wide storm water management plan.

3.5.2. Inspection

Erosion and sediment controls must be inspected weekly and after each rain exceeding 0.5 inch. Keep records of inspection observations and actions taken, and file with other erosion and sediment control plan paperwork.

3.5.3. Maintenance

Daily inspect equipment and hydraulic oil systems at the beginning of the day. Repair or replace frayed or damaged lines or hoses before use in or near water and provide containment measures if required.

3.5.3.1. Keep erosion and sediment controls in good working order until the project is completed. Brush and other debris should be removed from work areas. Sediment accumulating behind silt fences or other sediment filters should be removed regularly. All structures that have become dislodged or damaged (such as silt fences, etc.) should be repaired within three days of discovery.

3.5.3.2. Make sure that waste materials, building materials, and supplies are properly tied down or contained so that wind and storm water runoff cannot carry the materials away. Fuel, lubricants, and hazardous waste products should be stored in an approved tank or other structure to avoid spills and runoff. Provide spill kits and containment material on-site, especially near fueling or equipment service areas. Maintain vehicles and equipment away from the site if possible. If maintenance must occur on-site, ensure that spills are cleaned up quickly.

Best Management Practices Plan
Dike C Buttress Construction – Phase 1

Purpose of the Best Management Practices Plan

The purpose of the Best Management Practices (BMP) plan is to evaluate potential sources of sediment and other pollutants at the project site and put controls in place that will effectively prevent pollutant discharges to surface and ground waters. Construction activities shall be performed in accordance with the Kingston site wide Storm Water Management Plan. This BMP is a guideline for the Dike C work activities. The following general pollution control requirements have been addressed in the BMP Plan, as applicable:

1. Control limited threat discharges to minimize impacts to water quality;
2. Prevent the discharge of pollutants associated with construction activities to surface waters;
3. Retain soil and sediment on site;
4. Permanently stabilize disturbed soils.

This plan has been developed based on an understanding of the current conditions of the watershed, a general knowledge of the previous activities at the site, and an anticipation of the proposed remediation activities scheduled for the site. This plan is intended to be a “living” document, in that as the Work at the site progresses, this plan must be periodically reviewed and adjusted to suit the actual conditions and situations as they develop. CIVIL PROJECTS and all SUBCONTRACTORS shall become familiar with this plan, and shall constantly monitor the site conditions, making appropriate modifications as needed.

Site Description:

The Kingston Fossil Plant Dike C is located along the Emory River / Watts Bar Lake in Roane County, Tennessee. Dike C is the containment embankment for the Kingston Fossil Plant ash pond and stilling basin. The toe of the embankment extends into Watts Bar Lake and the plant intake channel and is being armored with riprap and other materials to improve the stability of the containment structure.

Construction Activities Proposed:

This work involves buttressing Dike C of the ash pond/ stilling basin at the Kingston Fossil Plant. Work measures required to stabilize the site include:

A. Installation of sediment and erosion control measures for the site
B. Shaping of starter dike bench to improve drainage including the removal of existing pipes and placement of embankment fill.
C. Documentation of location and removal of trees and rootwads on the embankment
D. Surface preparation to allow filter placement.
E. Placement of sand filter on designated areas of slope above and below the water surface.
F. Installation of sand filter seepage cutoff trench through the Skimmer Wall Peninsula.
G. Placement of stone cover on the sand and construction of riprap buttress.
H. Revegetation of disturbed areas outside limits of riprap placement.
I. Removal of temporary sediment control measures.

Work Sequence:

1. Installation of perimeter sediment and erosion control measures in accordance with Section 02100 of the Specifications and the Sediment and Erosion Control Measures Section below.
2. Protection of existing geotechnical instrumentation as described in Section 02150 of these Specifications.
3. Surveying and photographing trees to be removed as described in Section 02150 of these Specifications.
4. Excavation and stockpiling of gravel from starter dike bench road as described in Section 02150 of these Specifications.
5. Shaping the starter dike bench to drain towards the Intake Channel as described in Section 02150 of these Specifications.
6. Removing drain pipes from starter dike bench and backfilling as described in Section 02150 of these Specifications.
7. Removing trees and other vegetation as described in Section 02150 of these Specifications.
8. Grubbing of rootwads as described in Section 02150 of these Specifications.
9. Removal of organic materials and topsoil as described in Section 02150 of these Specifications.
10. Placing manufactured sand product in tree rootwad removal areas as described in Section 02150 of these Specifications.
11. Excavation of existing embankment materials as described in Section 02150 of these Specifications.
12. Excavation of seepage cutoff trench through the Skimmer Wall Peninsula and backfill with manufactured sand material as described in Section 02410 of these Specifications.
13. Grading surface to allow placement of granular filter as described in Section and 02410 of these Specifications.
14. Construction of access roads or temporary access ramps as described in Section 02410 of these Specifications.
15. Construction of riprap buttress as described in Section 02410 of these Specifications.
16. Removal of temporary sediment control measures in a segmental manner. Protection of existing site improvements or utilities from damage.

Sediment and Erosion Control Measures:

Due to the lack of available area downstream of the limits of disturbance caused by the presence of work extending into the Intake Channel there is inadequate area for a sediment pond. Alternative measures have been analyzed and will be employed to reduce total suspended solids (TSS) during construction. Measures to reduce TSS for the remainder of the site are described below:

1. Use of geotextile filter on the slopes, roads and other disturbed areas.
2. Placement of aggregate and riprap armor on slopes along the Intake Channel.

3. Installation of silt fence and fiber logs around the perimeter of the disturbed areas.
4. Seeding of areas disturbed by Construction activity outside of buttress placement.
5. The installation of rock check dams in temporary diversion ditches.
6. The use of booms or berms to contain sediment from affecting other portions of the Lake or Intake Channel.

Other Control Measures:

Dust generation shall be minimized by spraying with water.

Other State or Local Plans:

Work on-site shall adhere to all applicable state and local laws.

Maintenance:

All silt fences, fiber coils, booms and other sediment control devices shall be inspected as described below. Tears in the fence shall be repaired or portions of the fence replaced within 3 days of discovery. Sumps shall be cleaned of accumulated sediment when sediment depths exceed six inches. CP shall likewise ensure that all roads maintain adequate gravel cover and replace same to maintain the design template.

Inspections:

Qualified personnel shall inspect storm water control measures, discharge locations, vehicle exits, disturbed areas of the site and material storage areas at a minimum of every 7 calendar days and within 24 hours of every 0.5 inch precipitation event. Areas that have been temporarily stabilized shall be inspected at least once per month. Revisions to the BMP Plan based on the results of these inspections shall be implemented within seven days.

A report summarizing the scope of the inspection, names and qualifications of the inspecting personnel, the date of the inspection, observations as they relate to the BMP Plan and corrective actions shall be noted in the report. All reports shall be kept for at least three years after the date of the inspection or for one year after coverage under the site specific stormwater prevention plan. Each report shall be signed, and shall be available at the site for review.

Non-Storm Water Discharges:

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Preventive maintenance such as changing oil shall be performed off-site. Any spills of hydraulic fluid or oil from machinery shall be immediately cleaned up using rags, mops, kitty litter, sand, sawdust and placed in plastic cans before being disposed of in a legal manner. Containment of any spill using dikes, plastic liners or other methods will be used as necessary. Manufacturer's methods for spill cleanup will be posted on-site and site personnel will be made aware of the location of the procedural information and cleanup supplies. Any spill of toxic or hazardous substances will be immediately reported to the EPA. The site superintendent will ensure TVA has been notified and will assist with the clean up effort.

Materials expected to be on-site include: Petroleum based products, fertilizer, grass seed, mulch, geotextiles, geomembranes, steel, stone, coal combustion products and agricultural lime.

CP, Subcontractors and Owner:

The CP and each subcontractor shall implement the appropriate control measures outlined in this BMP plan. The project OWNER for the purpose of this submittal is the Tennessee Valley Authority.

Certification:

I certify under penalty of the law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this Certification"

_____

Printed or Typed Name and Title

_____

Signature

Representing:

Phone: Office:

Date: _____

END OF SECTION 02100

TECHNICAL SPECIFICATIONS

SECTION 02150 – SITE PREPARATION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

The conditions and description of work shown in other sections of these Specifications as well as the Engineering Drawings and Quality Control Plan apply to this Section.

1.2. SUMMARY

1.2.1. This section includes the following:

- Surveying and photographing trees to be removed.
- Excavation and stockpiling of gravel from starter dike bench road
- Shaping the starter dike bench to drain towards the Intake Channel/Watts Bar Lake.
- Removing drain pipes from starter dike bench and backfilling
- Removing trees and other vegetation.
- Grubbing of rootwads.
- Removal of organic materials and topsoil
- Placing manufactured sand product in tree rootwad removal areas
- Excavation of existing rockfill/dike fill from the starter dike outslope to allow for minimum thickness of filter and buttress riprap.
- Grading or smoothing of surface to allow placement of filter
- Removal of temporary sediment control measures in a segmental manner. Protection of existing site improvements or utilities from damage.

1.2.2. Related Sections include the following:

- Section 02100 – Erosion Control and Stabilization
- Section 02410 – Rock Buttress and Granular Filter Components

1.3. DEFINITIONS

1.3.1. Starter Dike

The starter dike is the lower in elevation portion of Dike C at approximate elevation 748 feet and below immediately adjacent to the Intake Channel/Watts Bar Lake.

1.3.2. Dike Bench

The dike bench is the relatively flat area at the top of the starter bench upon which the raised dike was constructed at approximate elevation 748 feet. A portion of this area remains and is currently covered with gravel and being used as a road.

1.3.3. Rootwads

Rootwads consist of the tree stump as well as roots greater than 2 inches in mean diameter.

1.3.4. Topsoil

Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than two inches in diameter; and free of weeds, roots and other deleterious materials.

1.3.5. Drain Pipes

Steel or plastic piping previously installed to drain the dike bench.

PART 2 - PRODUCTS

2.1. Remove cleared topsoil for use elsewhere or dispose of as it is not required in the landfill area but is required in borrow areas for use in re-vegetation.

2.2. Manufactured Sand Product is a durable quarry produced material free of deleterious amounts of shale conforming to Rogers Group Inc., Roane County, Quarry Manufactured Sand Product, Tennessee Department of Transportation Concrete Sand or QC Manager approved equal (Crab Orchard Manufactured Limestone Sand). The gradation shall conform to the following:

Sieve/Screen Size	Percent Passing
3/8	100
No. 4	70-100
No. 8	50-100
No.16	35-85
No. 30	15-60
No. 50	10-45
No. 100	2-25
No. 200	0-5

2.3. Embankment soils used for promoting positive drainage on the dike bench shall consist of clean soils that classify as CL or CH according to the Unified Soil Classification System. These soils shall not contain organic debris, ash or contain rock exceeding two inches in diameter

PART 3 - EXECUTION

3.1. PREPARATION

3.1.1. Protect and maintain geotechnical instrumentation from disturbance during construction. Install silt fencing along furthest downstream point practicable.

3.1.2. Locate and survey trees to be removed to document their position in case seeps occur. Photograph trees and relate them to the survey positions. Photography of trees is to be completed as per TVA-KIF-SOP-26, *Standard Operating Procedure For: Photograph Management For the TVA Kingston Fossil Plant Ash Recovery Project.*

3.1.3. Remove gravel from the starter dike bench road and stockpile for later use. Protect exposed areas as per Section 02100.

3.1.4. Through the placement of embankment material, shape the starter dike bench to slope towards the Intake Channel at 2% minimum slope. In the area of the starter dike bench directly on the skimmer wall peninsula, the existing slope provides adequate positive drainage and there will be no need for the excavation and placement of embankment material. Prior to placement of embankment materials, exposed surfaces shall be stripped of all vegetation, organic soils and vegetative cover soils as well as any other deleterious materials. Exposed surfaces shall be scarified to promote lift bonding. The sequence of filling shall commence at the lowest section (in elevation) of the subject footprint and proceed upward in maximum eight-inch loose lifts in a manner to maintain positive drainage at all times. Positive drainage through minimum two percent cross slopes shall be maintained on all fill surfaces. The fill sequence shall also be performed in a manner that reduces the potential for uncontrolled sediment runoff.

Each lift of soil embankment shall be compacted with a tamping foot or sheep foot roller, or equivalent approved by the QC MANAGER, to a minimum of 95 percent of standard Proctor maximum dry density. Following initial compaction, the surface shall be sealed with a smooth drum roller to reduce the potential for surface water infiltration. Prior to placement of subsequent lifts the surface shall be scarified to promote lift bonding.

3.1.5. Remove piping below starter dike bench and place and compact clay fill into excavated areas. Compact clay fill using manual tampers or other means to achieve 95% of standard Proctor maximum dry density.

3.2. CLEARING AND GRUBBING

Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade. In general, all trees and brush with a mean diameter of 2-inches or greater at ground level shall be grubbed out. Where it is not reasonable to remove trees by a mowing with a bush hog or with similar mowing equipment the following guidelines apply:

3.2.1. All trees 2-inches in diameter or greater are to be surveyed in-place by TVA

3.2.2. All trees shall be cut using a handsaw or chainsaw and the cut tree and branches discarded.

3.2.3. Remove the remaining tree trunk, stump, and rootwad

3.2.4. Grub any remaining roots of the tree so that only 2 inches or smaller roots are left in place

3.2.5. The resulting cavity from removal of the rootwad shall be cleaned of loose soil and debris

3.2.6. The cavity shall then be backfilled with manufactured sand product and graded to blend and match adjacent slopes. If the rootwad cavity is below the water level at the time of the tree removal, the back of the excavation bucket shall be used to compact the sand material into the cavity and to grade the sand to match exiting slopes.

3.3. TOPSOIL STRIPPING

3.3.1. Sod and grass will be removed during topsoil stripping.

3.3.2. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other materials. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

3.3.3. Dispose of excess topsoil as specified for materials disposal. All topsoil shall be immediately removed from the work area, with stockpiling of excavated topsoil on the embankment not permitted.

3.3.4. Employ perimeter Best Management Practices, such as silt fences or berms, to minimize runoff of silt and sediment laden waters from the stockpiled topsoil and waste materials.

3.4. SKIMMER WALL PENINSULA EXCAVATION

To allow for adequate thickness of granular filter and rockfill buttress materials, outslopes of the skimmer wall peninsula shall be excavated to the limits shown on the drawings (Typically between 1 to 3 ft depth). Based upon the test pits performed along the peninsula, there may be a surface layer of shot rock fill overlying clay fill. Existing shot rock that is significantly embedded within the soils of the Dike C embankment shall be left in place. However, to enable the placement of granular filter and rockfill buttress, some excavation of the peninsula clay embankment fills may be necessary. If excavation of the surface shot rock alone does meet the limits shown on the drawings, the clay embankment fill shall be excavated to the limits shown on the drawings.

3.5. PREPARE SURFACE FOR GRANULAR FILTER

3.5.1. CP shall prepare the exposed surface to receive granular filter placement by grading, blading, tamping or use of backhoe bucket to provide a relatively even, smooth surface free of protrusions, rocks, roots and other items that would keep the filter from making contact with the soil. This may also be achieved using an excavator with no teeth and a welded plate. Surfaces not immediately receiving filter shall be tracked as practicable with

equipment moving up and down slopes. If tracking results in an irregular surface, utilize a plate tamper mounted on the excavator or the back of the bucket to "iron" or smooth the area. Tamp soft areas as practicable to obtain a smooth surface.

3.5.2. The removal of trees, organic material and root wads in accordance with this specification may extend to approximately 100 feet beyond the limits of the buttress construction, with the following provisions:

- The rootwad holes are filled with manufactured sand in accordance with this specification immediately upon excavation.
- The exposed soil area is inspected by CP on a daily basis for signs of erosion.
- Any area that is stripped of organics has the buttress placed in accordance with this specification within one week of stripping.

3.5.3 The thickness of each filter layer shall be determined for the QC Manager on a daily basis by the use of stakes. Stakes shall be installed at 25' increments and at slope breaks as a method of measuring the thickness of the filter layers. TVA shall perform complete surveys of prepared subgrade, the surface of each completed filter layer, and the final grade of the rip rap at 100' intervals corresponding to the intervals shown on the construction drawings. In addition to the standard 100' survey intervals, cross section surveys at Sta. 127+50 and 127+70 along the main project baseline and at Sta. 1+00, 1+30, 2+00, 3+00, and 3+50 along the Peninsula baseline shall also be performed. This survey information shall be submitted to the QC Manager at the completion of each survey interval.

END OF SECTION 02150

TECHNICAL SPECIFICATIONS

SECTION 02410 – ROCK BUTTRESS AND GRANULAR FILTER COMPONENTS

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK

This Specification covers placement of manufactured sand, No. 57 aggregate, No. 2 aggregate and riprap to construct the granular filter and rock buttress for Dike C of the Ash Pond and Stilling Pool for the Kingston Fossil plant. This Specification shall also cover the excavation and backfill of the seepage cutoff trench through the Skimmer Wall Peninsula. Erosion and sediment control measures shall conform to Section 02100– Erosion Control and Stabilization of these Specifications.

1.2. SUBMITTALS

Certification statements shall be provided by each supplier that the product conforms to these specifications. In addition all materials shall meet the testing schedules noted in the QC Plan.

PART 2 - MATERIALS

2.1. AGGREGATE

No. 2 aggregate and No. 57 aggregate shall consist of quarried stone generally meeting the requirements of Section 903 of the Tennessee Department of Transportation (TDOT) “Standard Specifications for Road and Bridge Construction” (Standard Specifications) latest edition. The gradation shall conform to the following:

No. 57 Aggregate

Sieve/Screen Size	Percent Passing
1.5	100
1	70-100
1/2	25-85
No. 4	0-35
3.5 mm	0-15
No. 8	0-5

No. 2 Aggregate:

Sieve/Screen Size	Percent Passing
3	100
2.5	90-100
2.0	10-100
1.5	0-100
1.0	0-15
3/4	0-5

2.2. TDOT CLASS B MACHINED RIPRAP

Riprap buttress stone shall consist of quarry stone meeting the requirements of Section 709 of the Tennessee Department of Transportation "Standard Specifications for Road and Bridge Construction" latest edition. Machined Riprap (Class B) shall vary in size from 3 inches to 2.25 feet (from 75 to 675 mm) with no more than 20% by weight being less than 6 inches in size (150 mm).

2.3. MANUFACTURED SAND PRODUCT

This product shall conform to Section 02150, Part 2, Paragraph 2.2 of these specifications.

Other sources of sand product may be approved by QC MANAGER subject to filter analysis based on gradation and the quality of the sand.

PART 3 - EXECUTION

3.1. GRANULAR FILTER

Granular filter shall consist of a minimum of six inches manufactured sand product placed on soil subgrade with the sand then overlain by six inches TDOT No. 57 aggregate which is in turn overlain by six inches TDOT No. 2 aggregate. Surfaces to receive granular filter shall be prepared to a condition free of large protrusions in accordance with this specification and as directed by the QC MANAGER. No filter shall be placed until the subgrade is approved by the QC Manager or the designated representative on the QC Team.

3.1.1. Sand Placement

The sand component of the graded filter shall be placed to a minimum thickness of six inches. This measurement shall be made perpendicular to the surface of the dike.

3.1.2. Underwater Placement

The sand component of the filter placed under water shall be performed in such a manner as to provide a minimum thickness of six inches and to prevent the segregation of the material during placement. One such method involves placement by excavator of overlapping buckets of sand. In some areas the sand thickness will likely exceed six inches and form a sinusoidal wave pattern of placement.

3.1.3. Stone Placement

Stone and riprap shall be placed to the minimum thickness indicated on the Drawings. Measurement shall be made perpendicular to the slope. All rip rap shall be placed using a bottom up placement methodology.

3.1.4. Contamination Issues

Placed sand shall be covered with No. 57 stone as quickly as practicable. In no event shall sand remain exposed for more than 24 hours. Any contamination of sand from soil or ash shall be cause to remove and replace the sand. The action of covering of sand by No. 57 stone and No. 2 stone shall be performed in such a manner that aggregate cover will lag sand placement by five feet to reduce contamination risk. This lag may be adjusted based on field operations and conditions as deemed necessary by the QC Manager.

3.1.5. Riprap Replacement

Riprap may be placed by mechanical means using an excavator or loader. The maximum allowable drop height for riprap placement is two feet. The rock shall be placed to the depths, extents and template shown in the drawings. The surface of the riprap, upon completion, shall be graded as practicable into final position to ensure proper thickness and a uniform surface. Larger rocks shall be uniformly distributed with the small rocks and spalls filling the voids between the larger rocks.

3.1.6. Seepage Cutoff Trench

The seepage cutoff trench shall be installed to the general grades and dimensions as shown on the drawings. The seepage cutoff trench shall involve the excavation and disposal of existing peninsula fill materials, and backfill with manufactured sand with No. 57 and No. 2 aggregate capping.

3.1.6.1. Seepage Cutoff Trench Excavation

The seepage cutoff trench shall be excavated through the existing Skimmer Wall Peninsula materials down to approximate elevation 738 ft. The excavated materials are likely to consist of granular fill, shot rock, ash fill, silt fill and clay fill. The seepage cutoff trench is to be excavated through the lower permeability fill soils down to the underlying higher permeability crushed rock with clay fill. The bottom elevation of the seepage cutoff trench may vary depending on actual conditions found in the field, with the trench excavation depths to be approved by the QC manager. The excavation shall extend through the north and south side slopes of the peninsula so that the manufactured sand fill within the trench ties into the graded filter of the rockfill buttress. All excavated materials shall be removed from the area. A minimum 20 ft wide gap in the middle of the trench shall remain unexcavated to prevent water migration from Watts Bar Lake into the intake channel.

3.1.6.2. Seepage Cutoff Trench Backfill

Upon completion of the seepage cutoff trench excavation to the satisfaction of the QC manager, the trench shall be backfilled with Manufactured Sand material conforming to Section 02150 of these Specifications. The manufactured sand shall be placed to within 1 ft of final ground surface along the top of the peninsula and to the original ground surface along the north and south side slopes of the peninsula ensuring a direct hydraulic connection with the seepage cutoff trench fill and the adjoining buttress filter materials. During placement, the sand backfill shall be compacted using the back of the excavator bucket at 2 ft thick intervals to eliminate voids within the material. The surface of the trench shall be capped with No. 57 and No. 2 aggregate to the dimensions as shown on the drawings.

3.2. ACCESS TO CONSTRUCTION

3.2.1. Access to Work – Areas of Granular Filter

Riprap shall not be placed until the granular filter has been approved by the QC MANAGER or the designated representative on the QC Team. In order to access locations of riprap placement, temporary access ramps or roads may be needed. Where operating heavy equipment or trucks over the filter, additional cover shall be placed to a minimum total depth of 36 inches over the sand component of the filter. This cover shall consist of an additional 18 inches of No. 2 aggregate spread on access areas and covered on the surface with 6 inches of No. 57 aggregate. The No. 2 aggregate shall be spread in a single lift utilizing low ground pressure equipment conforming to Table 2 of

Section 02373 of these Specifications or by using excavator buckets. The No. 57 aggregate shall be spread in a single lift. The temporary road surface can be reclaimed and re-used as needed. If aggregate is left in place a minimum cover of 3 feet of riprap is required. Where the No. 57 aggregate surface has been contaminated with ash, it shall be removed and wasted as directed by the QC MANAGER.

END OF SECTION 02410

TECHNICAL SPECIFICATIONS

SECTION 02936 – REVEGETATION

PART 1 - GENERAL

1.1. DESCRIPTION

This Work consists of furnishing all labor, equipment and materials for preparing the seedbed, adding soil amendments, and seeding disturbed areas both in borrow areas and adjacent to work zones.

1.2. RELATED WORK

A. Quality Control Plan

B. Section 02100 – Erosion Control and Stabilization

C. Section 02150 – Site Preparation

D. Section 02410 – Rock Buttress and Granular Filter Components

1.3. SUBMITTALS

A. Agronomic soil test results shall be submitted to the QC MANAGER.

B. Seed tickets, fertilizer certification and CaC03 equivalency certification shall be submitted to the QC MANAGER.

C. A sample of the netting proposed by CP shall be submitted to the QC MANAGER.

D. A sample of the Erosion Control Blanket shall be submitted to the QC MANAGER.

1.4. QUALITY CONTROL

1.4.1. Agricultural limestone shall be purchased from quarries approved by the Tennessee Department of Agriculture.

1.4.2. Fertilizer (bagged or bulk) either dry or liquid, must be manufactured and sold under the jurisdiction of the Tennessee Department of Agriculture, Ag Inputs Section.

1.4.3. All seed shall be certified by an Official Seed Certifying Agency. Seeds shall have been tested within nine months prior to use. Each kind of seed shall be separately packed and delivered to the project in a seed-tight bag. Each bag shall bear a tag or label bearing the seal of the Official Seed Certifying Agency. The analysis of the seed (% pure seed, % germination, date tested, etc.) shall be attached to the bag.

PART 2 - PRODUCTS

2.1. LIME

Agricultural ground limestone or its equivalent shall be used. The ground limestone must meet the following requirements: contain sufficient calcium and magnesium carbonate and be equivalent to not less than 80 percent calcium carbonate and must be fine enough so that not less than 90 percent shall pass through a US Standard No. 10 sieve and not less than 35 percent shall pass through a US Standard No. 50 sieve. Lime shall be applied at the rate specified in Paragraph 3.1. Agricultural ground limestone shall be purchased from quarries approved by the Tennessee Department of Agriculture.

2.2. FERTILIZER

The fertilizer shall be a commercial fertilizer containing the plant nutrients of nitrogen (N), available phosphoric acid (P2O5) and soluble potash (K2O) and shall be applied at the rate specified in Section 3.1. Bagged fertilizer shall display the following information on the bag or on a sticker or tag attached to the bag: net weight, brand and grade, guaranteed analysis, and name and address of manufacturer. Bulk fertilizer (dry or liquid) shall be accompanied by a statement from the manufacturer which contains the same information required for the bagged fertilizer.

2.3. SEED

2.3.1. Seed shall be applied to all disturbed areas, in accordance with Table 1 with no alterations except with the written consent of the QC MANAGER. The seed mixture shall be totally free of any wild onion, giant foxtail, nodding thistle, Johnsongrass, and Canada thistle seed and contain less than two percent other crop seed. The seed shall also comply with all Tennessee seed laws and regulations.

2.3.2. Seed shall be furnished fully tagged and labeled in accordance with the state laws and the US Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitations for bid. All seed must be from the latest crop available. No seed will be accepted with a date of test of more than nine (9) months prior to the date of delivery to the site. Any seed which has become wet, moldy or otherwise damaged in transit or storage will not be accepted.

2.3.3. All seed shall be delivered in separate bags or packages according to species or be a certified seed mixture. The tags from each seed bag shall be given to the QC MANAGER at the site. These tags will be required for final payment.

2.3.4. All legume seed shall be treated with inoculant prior to seeding in accordance with Paragraph 2.6 (Inoculants).

Table 1

Seed Mixtures	Hydroseed Rate (pounds/acre PLS*)
Application Period: February 1 to May 15	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
Korean Lespedeza	10
White Sweet Clover	10
Plus:	
Perennial or Annual Rye (2/15 to 4/15)	15
or	
Weeping Lovegrass (4/15 to 5/15)	3
Application Period: May 15 to August 1	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
Birdsfoot Trefoil	3
Weeping Lovegrass	3
Application Period: August 1 to November 15	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
White Sweet Clover	12
Birdsfoot Trefoil	8
Perennial Rye	15

*PLS Pure Live Seed is determined by multiplying the percent germination of the seed times the percent purity

Note: Any lawn areas disturbed shall be seeded with an approved lawn seed mixture. Mulch areas and plant 60 lbs. per acre winter wheat between November 15th and February 1st.

2.4. MULCH

The mulch shall consist of wheat straw, hay or rye straw. The mulch material shall be air dry, reasonably light in color and shall not be musty, moldy, caked or otherwise of low quality. The use of mulch that contains noxious weeds will not be permitted. Mulch shall be applied at the rate specified in Paragraph 3.3.

2.5. NETTING

Plastic netting manufactured from extruded rectangular mesh plastic, a minimum of 45-inches wide with approximately ¾-inch by 1-inch mesh openings, weighing not less than 2.6 pounds per 1,000 square feet (± ½ pound) shall be used. Other netting may be used if approved by the QC MANAGER. Staples will be U-shaped and made from steel wire of No. W1-W1.5 or W2 or adequate polymaterial fasteners as needed for installation conditions. The staples shall have a minimum length of six (6) inches. Staples shall be driven flush with the soil surface. Netting shall be installed per the specifications in Paragraph 3.3.

2.6. INOCULANTS

The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container or otherwise specified. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Four times the amount of the inoculant recommended by the manufacturer shall be used. Seed shall be sown within 24 hours of treatment and shall not remain in a hydroseeder longer than four (4) hours.

2.7. EROSION CONTROL BLANKET

Erosion control blanket shall be a manufactured product consisting of plastic netting on both sides with excelsior or coconut in between.

PART 3 - EXECUTION

3.1. SEEDBED PREPARATION

3.1.1. Immediately following final grading, the areas to be seeded shall be dressed to a reasonably smooth, firm surface, as determined by the QC MANAGER. Sludge shall be placed to a depth of two inches and incorporated into the top six inches of soil by disking or tilling. Lime shall be applied uniformly at the rate of seven (7) tons per acre. Fertilizer shall be applied at a rate sufficient to supply a minimum of 70 pounds of nitrogen (N), 145 pounds of phosphorus (P2O5) and 70 pounds of potash (K2O) per acre. These rates are subject to change depending on results of soil tests to be performed immediately prior to seeding. These soil tests shall be the responsibility of TVA.

3.1.2. The surface shall be tilled to a minimum depth of six (6) inches with either a tandem or offset disk meeting the following specifications:

A. Disk Size: 22 inches minimum

B. Disk Spacing: 13 inches maximum

C. Weight: 400 pounds per foot of cut minimum

D. Equipped with a drag of sufficient weight to remove any furrows left by the disk.

3.1.3. Seedbed preparation shall be suspended when soil conditions are not suitable for the preparation of a satisfactory seedbed. The QC MANAGER shall make this determination.

3.2. SEEDING

3.2.1. The specified mixtures of pure live seed (PLS) will be used on all disturbed areas using the seasonal variations shown.

3.2.2. All areas shall be seeded immediately following seedbed preparation. In the event the date does not concur with the seeding schedules specified, seeding shall be accomplished using any one of the specified rates or an equivalent rate designed to fit the site and weather conditions, as directed by the QC MANAGER.

3.2.3. All seed shall be broadcast evenly over the area immediately following tilling using a hydroseeder. The slurry PH shall not be allowed to drop below a pH of 5.0. In addition, the CP shall provide an accurate pH meter to monitor the slurry at all times.

3.3. MULCHING

3.3.1. Mulch materials shall be spread uniformly over all seeded areas. The mulch shall be applied uniformly over all seeded areas of less than 33% slope at the rate of two (2) tons per acre immediately following seeding.

3.3.2. Mulch netting meeting the requirements of Paragraph 2.5 shall be installed on all disturbed areas with slopes less than 33%. The netting shall be installed with a minimum six-inch overlap with adjacent rows. Staples shall be installed at four-foot maximum spacing on all edges and laps. Interior rows of staples shall be at four-foot maximum spacing with staples spaced at eight-foot maximum spacing along each row. Staples in interior row shall alternate in spacing with staples in an adjacent rows.

3.3.3. Erosion control blankets shall be employed to protect slopes 3H:1V or steeper unless otherwise shown on the Drawings. Install up and down the hill (vertical) for long slopes. Walk blankets down to ensure good contact with the soil. Use plenty of staples to keep blankets flat. Overlap blankets at 6 to 8 inches on sides, tops and bottoms. Do not stretch blankets, and do not exceed manufacturer's directions on maximum slope angle for the product. Refer to the Manufacturer's recommendations for installation patterns and stapling.

3.4. MEASUREMENT OF PERFORMANCE

3.4.1. TVA shall achieve 90 percent vegetative cover at the end of the second growing season. Such vegetative cover shall be measured using a transects method along the project baseline or other convenient baseline in borrow areas. This method shall involve taping along chosen transects and observing vegetation at each one-foot interval. At each observation point it will be noted whether vegetation is in contact with the transect. The sum of positive observations divided by total observations will determine compliance. Noticeably bare or eroded areas along or between transects shall be repaired even if the overall vegetative cover exceeds 90 percent.

3.5. EQUIVALENCY

3.5.1. These seeding specifications are intended to stabilize the project area through establishment of an adequate vegetative cover to provide interim protection and to enhance the wildlife utilization and development of the project area and the surrounding environment. The CP may be permitted to incorporate alternate seeding, fertilization and/or protection techniques which produce the intended results. The CP is encouraged to consider such applications. However, the CP is cautioned that if an alternate technique is utilized, the CP must assume the responsibility for the deviation from this specification and shall still meet the requirements of Paragraph 3.4.

3.5.2. Use of alternative techniques or other deviations from the standards and instructions provided herein must be approved by the QC MANAGER prior to implementation. The QC MANAGER will partially base his assessment on the purity of the constituents proposed, as well as the potential for interference of the proposed alternate techniques with other elements of the project and the overall design intent.

END OF SECTION 02936

Appendix C

Quality Control Plan

Quality Control Plan

Dike C Buttress
Segment B Construction
Work Plan 3
Kingston Fossil Plant
Harriman, Roane County, Tennessee

1. Purpose and Scope

This document is a site specific Quality Control (QC) plan that addresses construction and monitoring in association with the Dike C buttress project. The QC plan is intended to present minimum project requirements and shall serve as an outline for use in developing site specific protocols based on conditions encountered during the work.

2. Responsibility and Authority

A summary of QC personnel and associated responsibilities is presented below.

2.1. Regulatory Agency

Work conducted under this project shall be coordinated with the U.S. Environmental Protection Agency (EPA). Designated EPA personnel shall serve as the regulatory contact.

2.2. Quality Control Manager and Team

A professional engineer licensed in the state of Tennessee shall be designated as the QC Manager and shall be responsible for overall management of construction monitoring, testing and related documentation as outlined herein. The QC Manager shall determine appropriate test standards and methods for designated field observations and/or laboratory testing and shall be responsible for review of QC data to assess conformance with project requirements. At this time, the QC Manager is Jim Andrew, PE of Stantec Consulting Services Inc. or his duly appointed successor.

The QC Team shall consist of qualified personnel working under the direct supervision of the QC Manager. The QC Team shall be familiar with the materials used and the functional intent of the respective buttress components.

2.3. Owner

The plant and its ancillary functions are owned by the Tennessee Valley Authority (Owner). The Owner shall be responsible for overall management of construction activities to include but not be limited to contracting, administration and retaining the services of qualified consultants as required during the project.

The Owner and/or their Designee shall appoint one representative to serve as the Construction Manager. The Construction Manager shall be responsible for construction activities to include but not be limited to the character and sequence of work, coordination and scheduling.

The Owner's Civil Projects (CP) shall serve as the prime contractor for the Dike C buttress project. Any portion(s) of the work designated to others shall be conducted under the direct supervision of CP.

The Owner shall be responsible for providing qualified professionals to establish and enforce safety protocols related to the project.

3. Quality Control Activities

3.1. Meetings

Meetings shall be coordinated and conducted by the QC Manager and/or the Construction Manager on a weekly basis. The primary purpose of these meetings shall be to confirm that all parties involved are familiar with the project, required procedures and associated QC objectives along with any safety issues related to construction. Specific safety issues shall be the responsibility of designated safety professionals. Minutes of each meeting shall be prepared and distributed to all parties prior to the next meeting. These minutes shall be documented for inclusion with the project records.

Pre-construction meetings shall be held prior to initiating individual phases of construction. The QC Manager and other parties that will actively participate in the construction activities shall attend these meetings. Minutes shall be prepared and distributed as noted above.

3.2. Alternative Methods

Consistent with the overall objectives of the project, alternative construction and QC methods may be used during the course of the work. Proposed modifications shall be developed by the QC Manager and submitted to the Owner for review prior to incorporation into the project. Documentation of these alternative methods shall be prepared with copies retained for inclusion with the project records.

3.3. Contractor Submittals

Contractor submittals shall be reviewed and approved by the QC Manager prior to delivery and/or use of the respective construction materials. Copies of all submittals shall be included with the project records.

3.4. Conformance Testing

Conformance testing consists of periodic testing of materials and/or constructed products. Conformance testing shall be conducted by the QC Team as required by this plan and by additional discretion of the QC Manager. Results of conformance testing shall be reviewed by the QC Manager to assess conformance with project requirements. Copies of all conformance testing results shall be included with the project records.

3.5. Field Observations

The QC Team shall observe and document (as outlined herein) all construction activities associated with the project. Results shall be reported to the QC Manager (with the Owner copied) on a daily basis.

4. Ash Removal (within project limits)

Ash removal within the project limits shall be conducted under separate authority. Prior to construction of Dike C buttress components within subject areas, the Owner and/or their Designee shall obtain written approval from the regulatory contact and/or other appropriate parties that ash has been removed consistent with established guidelines and that construction may proceed.

5. Shot Rock Removal

Shot rock shall be excavated as practicable down to the original Dike C embankment soils. Care should be taken to ensure over excavation into the existing Dike C soils does not occur. Shot rock significantly embedded into the existing Dike C embankment can remain in-place.

6. Embankment

6.1. General

Embankment materials shall conform to the requirements established in Section 02150 of the technical specifications. Embankment shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

6.2. Quality Control Requirements

QC requirements are as follows:

a. Prior to placement, laboratory testing data shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. The exposed surface was inspected to:

   i. confirm embankment layers are properly compacted and uniform;

   ii. confirm that elevations are consistent with the project design;

iii. confirm that foundation benching has been provided which is conducive to horizontal lift construction.

c. Laboratory conformance testing for soil embankment shall consist of one natural moisture content test, standard engineering classification (i.e. sieve and hydrometer, Atterberg Limits and specific gravity) and standard Proctor test per source. This testing is in association with embankment placed on the starter bench road to promote positive drainage.

d. Field conformance testing shall include in-place density testing to provide documentation of the compaction operations at a minimum one test per two hundred linear feet of starter dike bench length or one test per day whichever is greater or at prescribed intervals established by the QC Manager.

e. Construction monitoring and field acceptance of embankment placement shall be documented by the QC Team

7. Manufactured Sand Product

7.1. General

Manufactured sand product materials shall conform to the requirements established in Section 02150 of the technical specifications. Manufactured sand product shall be placed as directed by the QC Manager.

7.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation for every 10,000 tons delivered to the site. This conformance test shall be termed “stockpiled materials”. Conformance testing shall also be performed on in-place material with gradation performed for every 500 tons placed, or as otherwise directed by the QC Manager.

c. Construction monitoring and field acceptance of manufactured sand product placement shall be documented by the QC Team.

d. For acceptance of the stockpiled manufactured sand material, the following must be shown:

   i. The conformance testing for every 10,000 tons delivered to the site meets all gradation specifications.

e. For acceptance of the in-place material, the following must be shown:

i. A running average of the last 10 conformance tests must have a result of 5.0% or less on average passing the No. 200 sieve, independent of samples taken from the slope or bench areas.

ii. Maximum allowable percent passing the 200 sieve is less than 7.0% for any individual test.

iii. Running average conformance testing results for 10 tests cannot exceed 5.0 % passing the 200 sieve.

iv. In the event that conformance testing does not meet the criteria designated above, subject in-place material shall be removed as practical and replaced with a minimum of 6-inches of sand. Complete removal of the rejected sand is not necessary and removal is not to result in additional disturbance of the underlying subgrade.

v. If the average of the last 10 conformance tests is not in compliance with (iii) above, the subject material that contains the conformance test(s) that has exceeded 5.0% passing the No. 200 sieve by the greatest margin(s) shall be removed and replaced until the revised running average is in compliance with (iii) above. The length of material to be removed along the dike shall be the limits documented on the failing test result(s), but shall not be less than 20 feet.

vi. For grain size limits not including the #200 sieve, a maximum of one (1) test out of the most recent 10 tests may be outside the designated gradation ranges. For in-place testing not in compliance with this specification, the material shall be removed and replaced as per (v) above.

8. Aggregate

8.1. General

Aggregate materials shall conform to the requirements established in Section 02410 of the technical specifications. Aggregate shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

8.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation at every 30,000 tons delivered to the site. Gradation tests shall be performed on in-place materials at the rate of one test per 1,000 tons placed, or as otherwise directed by the QC Manager.

c. Construction monitoring and field acceptance of aggregate placement shall be documented by the QC Team.

d.

   i. A maximum of one (1) test out of the most recent ten (10) may be outside of the designated gradation ranges.

   ii. In the event conformance tests do not meet the designated criteria, the subject material shall be removed and replaced. The length of material to be removed along the dike shall be the limits referenced on the failing test result, but shall not be less than 20 feet.

9. Tennessee Department of Transportation Class B Machined Riprap

9.1. General

Riprap materials shall conform to the requirements established in Section 02410 of the technical specifications. Riprap shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

9.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation at every 30,000 tons delivered to the site or at any visual change in gradation as determined by the QC Team. The gradation test shall conform to ASTM D 5519-07 Test Method B.

c. Construction monitoring and field acceptance of riprap placement shall be documented by the QC Team.

10. Revegetation

10.1. General

Revegetation activities shall conform to the requirements established in Section 02936 of the technical specifications.

10.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. The QC Team shall observe seedbed preparation, fertilizer and lime application, seeding and mulching activities to confirm appropriate revegetation procedures per the project requirements. Construction monitoring and field acceptance shall be documented by the QC Team.

11. Project Documentation

Documentation shall be collected and maintained by the QC Manager (copied to the Owner) during the Dike C buttress project. Survey and generation of as-built drawings shall be performed by TVA. The QC Manager shall review as-built Drawings for completeness. This documentation shall include but not be limited to the following:

- Daily construction field reports;
- Observation reports;
- Contractor submittals;
- Material conformance data;
- Photographic documentation;
- Survey and as-built data;
- Construction issue and solution reports;
- Plan modifications; and
- Meeting minutes.

The digital location and access information for all project documentation will be supplied prior to the start of construction.

Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
Dike C Buttress Work Plan - Segment B Part 2 of 2
RAWP - 095

Date Submitted:
05/24/2011

Submitted to whom
Leo Francendese, EPA

Concurrence

Received	Not Applicable	TVA
☐	☒	Steve McCracken
☒	☐	Kathryn Nash
☒	☐	Ben Obrien 7DR for BObrien
☒	☐	Michelle Cagley MC

Received	Not Applicable	Jacobs
☒	☐	Jack Howard
☒	☐	Todd Woodson
☐	☐	
☐	☐	
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Approvals

TVA Kathryn Nash Date 5/25/11

EPA _____ Date _____

Leo Francendese

Digitally signed by Leo Francendese
DN: cn=Leo Francendese, c=US, o=EPA/WMD, ou=ERRB, email=francendese.leo@epa.gov
Reason: I am approving this document in consult w TDEC
Date: 2011.05.31 13:20:57 -04'00'

cc:

- ☒ Anda Ray, TVA
- ☒ Barbara Scott, TDEC
- ☒ Brenda Brickhouse, TVA
- ☒ John Dizer, TVA
- ☒ Craig Zeller, EPA
- ☒ Dennis Yankee, TVA
- ☒ Kathryn Nash, TVA
- ☒ Cynthia Anderson, TVA
- ☒ Steve McCracken, TVA
- ☒ EDM
- ☒ Jack Howard, Jacobs
- ☒ Michelle Cagley, TVA
- ☒ Greg Signer, TVA
- ☒ KIF Incident Document Control
- ☒ Katie Kline, TVA
- ☒ Robert Pullen, Jacobs

RAWP-095

Kingston Ash Recovery Project
Time Critical Removal Action for the
Dike C Buttress Work Plan – Segment B
Part 2 of 2

Prepared by:
Jacobs

for the Tennessee Valley Authority

Revision	Description	Date
00	Dike C Buttress Work Plan – Segment B (Part 2 of 2) for TVA Review	May 17, 2011

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1 INTRODUCTION AND PURPOSE

The scope of this Work Plan is to describe the construction activities for a portion of the fourth and final section of the *Dike C Risk Mitigation Plan*, Document No. EPA-AWP-035. This section, identified as Segment B, covers buttress construction from Stations 128+00 to 123+50 as defined in the Stantec Consulting Services Inc. (Stantec) Design Drawings (Appendix A). Similar work is currently being performed on Segment A. The work plan for Segment A was approved in January 2011. Stantec remains the Engineer of Record (EOR) for the dikes and has designed the buttress system to increase the stability of the dike system at the Kingston Ash Recovery Project site. Work will be completed per the Specifications (Appendix B), the Quality Control (QC) Plan (Appendix C), and Design Drawings. The buttress will consist of a sand filter overlain by gravel and riprap. Work to be performed includes the removal of loose material, removal of topsoil, removal of tree stumps, and the placement of the graded filter system.

The buttress, as a whole, will extend from Dike D, in the north along the Emory River, to the Red Water Wetlands, along the plant intake channel in the south.

Stantec performed modeling of slope stability for Dike C and based on the information TVA determined that improvements were needed to prevent any sloughing of the slopes along the dike. Stantec developed a plan to buttress the dike and TVA, with the concurrence of the U.S. Environmental Protection Agency (EPA) implemented the plan. Material used for the construction of this section of Segment B remains the same as those previously approved for Segments A, C, and D. Since the material has not changed, no additional calculations have been provided.

2 DESIGN AND CONSTRUCTION COMPONENTS

This section of Segment B is to be constructed according to the Drawings, Specifications, and QC Plan developed by Stantec and included in the appendices of this Work Plan. As defined in the documents, the buttress is a sand filter system designed to allow water to seep out from the dike without displacing dike material. The sand filter is held in place by larger stone and covered with riprap. The riprap provides additional mass to prevent sloughing and is of the right size to reduce scouring during high flow events. TVA Civil Projects is responsible for the construction of the buttress. Civil Projects will utilize excavators and dozers to place the material. For placement of materials in water where excavators cannot easily reach, a rock slinger will be used to place the material. The rock slinger has been successfully used on Segments A and C to place the sand, the #57 stone, and the #2 stone. Survey crews utilizing boats will collect elevations of the material placed in the water. Crews will collect elevations during placement of the material in the water to ensure that the minimum required thicknesses are obtained. Excavators with global positioning systems will be utilized as needed to assist the surveying crews in obtaining elevations. Survey crews will also collect elevations for each of the materials placed.

Material will be delivered to the site in a two-stage approach. The first stage will receive the material at the Material Access and Processing or MAP area. The material will be stockpiled until needed. The stockpile area is set up to allow the material to be delivered without the trucks entering the Exclusion Zone. This reduces the need to decontaminate each delivery truck. The second phase of material delivery is to transport the material from the stockpile area to the buttress construction area using dedicated articulating dump trucks. The two-stage approach causes double handling which may alter the size of the material, but it is more practical than decontaminating each delivery truck. To ensure that the material placed for construction meets the design criteria, gradation samples of in-place material are collected at intervals specified in the Stantec QC Plan. Tested materials which do not meet specification are identified with a nonconformance report and the acceptability of the material is reviewed by the Stantec Quality Assurance (QA) Manager. Material that is not acceptable is to be removed.

Removal of the earthen causeway which leads to the bridge will be removed as part of this design. A specific work plan, *Intake Channel Causeway Removal Work Plan*, Document No. RAWP-094, for the removal of the material and the storage of the material has been prepared. Civil Projects plans to place riprap along the new bottom as they removal the causeway. The intake channel bridge is currently being removed by DEMCO under the *Intake Channel Bridge Removal Work Plan, Revision 3*, Document No. RAWP-087. A siphon system will be installed over the constructed buttress to allow the Stilling Pond to continue operations while the diffusers are removed to allow filter to be placed in this area. Siphon installation and diffuser removal is being handled separately under the, *Siphon Installation/Diffuser Removal Work Plan*, Document No. RAWP-093.

3 CONSTRUCTION QUALITY CONTROL

A Construction Quality Control (CQC) Plan was originally developed by Stantec and approved by TVA and EPA for Segments A, C, and D buttress construction. The CQC Plan was amended with Addendum 1 to increase the tolerances for material acceptance. Addendum 1 has been incorporated into the QC Plan for Segment C. At this time, no material changes have been approved for Segment B. However, the Bureau of Reclamation (BoR) has allowed for an increase in the tolerance for the #30 sieve for the sand material from 60 to 70% passing with the understanding that a filter test will be performed. Stantec has provided a letter detailing the results of the filter test indicating that the sand material meets acceptable standards. Materials placed for construction of the buttress must be tested for acceptance at the intervals specified in the plan. In-place materials that do not meet the acceptance criteria will be documented with a nonconformance report and reviewed by the Stantec QA Manager for acceptability. Material that is not acceptable will be removed, replaced, and retested.

Stantec will provide the field QC to ensure that construction is progressing according to design. The Stantec QA Manager will provide guidance and work with the Stantec EOR to resolve any deviations from the design documents. MACTEC Engineering and Consulting, Inc. (MACTEC) will provide independent testing of the material used for the construction of the buttress. Jacobs Engineering Group Inc. (Jacobs) will provide project QA support to ensure that construction is being documented as required. The Jacobs QA Manager or designee will also collect a photographic record of the cleaned dike surface to be approved by the onsite EPA representative prior to placement of material. The photographs and sign-off forms will be sent to the EPA for final acceptance, however work may proceed on concurrence from the onsite representative that the area is ready for material placement.

4 SAFETY AND HEALTH

The newly established Work Process Plan will be utilized for each contractor working on this project. The plans will be approved by the designated person. Task not previously identified in the work plans will require separate plans and work on these tasks will not begin until the Work Process Plan is approved.

5 TRANSPORTATION MANAGEMENT

No specific transportation management requirements are planned for this project.

6 WASTE MANAGEMENT

No specific wastes are planned to be generated from this project.

7 PROJECT MANAGEMENT

7.1 Organization

7.1.1 TVA Technical Contract Manager – Jamey Dotson

7.1.2 Jacobs Project Manager – Tod Woodson

7.1.3 Jacobs Construction Manager – Jim Sells

7.1.4 Jacobs Quality Assurance – Jim Moore

7.2 Contractors

7.2.1 Civil Projects Construction – John Miller

7.2.2 Stantec QC – Skip Layton

7.2.3 Stantec EOR – Don Fuller

7.2.4 MACTEC Materials and Testing – Jim Law

7.2.5 BoR Consultants to the EPA for Work Approval – Jim Lawrence

7.2.6 TVA Surveying – Surveying services

7.3 Work Breakdown Structure (WBS)

7.3.1 The WBS has already been developed and work will continue to follow the established structure. The general WBS number is 001108.

7.4 Cost Estimate

7.4.1 The baseline budget has already been established and includes construction of this section of Segment B.

7.5 Schedule

7.5.1 The schedule for this section of Segment B has been developed. Work on this Segment will begin once the work plan is approved. Completion is scheduled for August 23, 2011.

8 REFERENCES

Dike C Risk Mitigation Plan – Section D, Document No. EPA-RAWP-035. Prepared by TVA, December 1, 2009.

Dike C Risk Mitigation Plan – Section C, Document No. EPA-RAWP-035B. Prepared by TVA, April 13, 2010.

Construction Quality Control Plan Dike C Buttress – Addendum 001, Document No. EPA-AWP-035B. Prepared by Stantec, March 24, 2010.

Dike C Risk Mitigation Plan – Section A, Document No. EPA-RAWP-035C. Prepared by TVA, December 12, 2010.

Dike C Risk Mitigation Plan – Section A, Document No. EPA-RAWP-092. Prepared by TVA, March 11, 2011.

Intake Channel Bridge Removal Work Plan, Revision 3, Document No. RAWP-087. Prepared by Jacobs. Reissued to TVA with changes on April 5, 2011.

Siphon Installation/Diffuser Removal Work Plan, Document No. RAWP-093. Prepared by Jacobs. Issued for TVA review on April 26, 2011.

RAWP-094 Intake Channel Causeway Removal Work Plan, Document No. RAWP-094. Prepared by Jacobs. Issued for TVA review on May 9, 2011.

Appendix A

Design Drawings

36 | C | 10W229-91

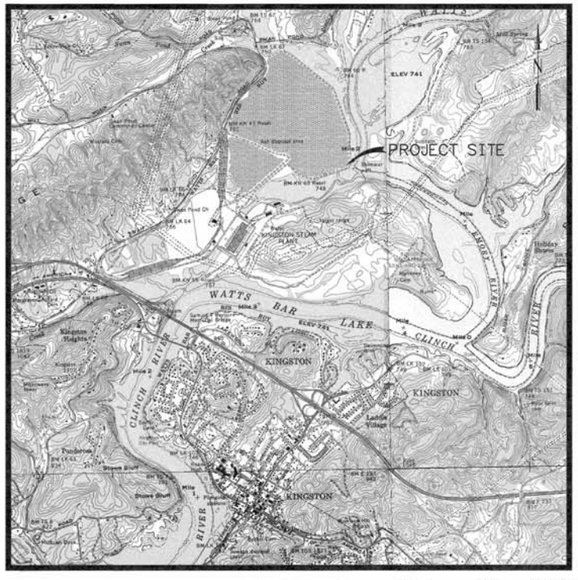
PLANS FOR CONSTRUCTION

DIKE C BUTTRESS
STAGE 1 - SEGMENT 'B'
WORK PLAN 5 (KIF-110028-WP-5)
KINGSTON FOSSIL PLANT

HARRIMAN, ROANE COUNTY, TENNESSEE

PREPARED FOR

TENNESSEE VALLEY AUTHORITY



VICINITY MAP

1000 0 2000 4000 FEET
GRAPHIC SCALE

PREPARED BY

Stantec

Stantec Consulting Services Inc.
1409 N. Forbes Rd.
Lexington, Kentucky
40511-2050
Tel. 859.422.3000
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INDEX OF SHEETS

10W229-91	COVER SHEET
10W229-92	GENERAL NOTES
10W229-93	EXISTING CONDITIONS
10W229-94	PROJECT SETTING
10W229-95	SEGMENT 'B' - GRADING PLAN
10W229-96	SEGMENT 'B' - EROSION PROTECTION LIMITS
10W229-97 - 10W229-103	SEGMENT 'B' - CROSS SECTIONS
10W229-104	CAUSEWAY SECTION
10W229-105	TYPICAL SECTIONS AND DETAILS
10W229-106	INSTRUMENTATION EXTENSION DETAIL

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
FILE: J:\CIVIL\DRAWINGS\PROJECTS\KIF\DIKE C BUTTRESS\DRAWINGS\WP5\10W229-91.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD
R -	-	-	-	-	-	-	-	-	-	-	-
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	-	-	-

ISSUED FOR CONSTRUCTION

DISCIPLINE: ENTERPAC

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
COVER SHEET
WORK PLAN 5 (KIF-110028-WP-5)

DON W FULLER II — REGISTERED ENGINEER — AGRICULTURE — COMMERCE — NO. 113120 — STATE OF TENNESSEE

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000	DATE 05/06/11	36	C	10W229-91	R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

GENERAL NOTES

1. DEFINITIONS: WHENEVER THE FOLLOWING TERMS ARE USED IN THESE DRAWINGS, IT IS UNDERSTOOD THAT THEY REPRESENT THE FOLLOWING:

   CP: THE TENNESSEE VALLEY AUTHORITY (TVA) CIVIL PROJECTS WHICH IS RESPONSIBLE FOR CONSTRUCTION FOR THIS PROJECT (OR THEIR DESIGNEE).

   EPA: THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WHICH IS THE REGULATORY AUTHORITY FOR THE SITE.

   ENGINEER: STANTEC CONSULTING SERVICES INC.

   OWNER: TENNESSEE VALLEY AUTHORITY (TVA) – KINGSTON FOSSIL PLANT

   TDOT: THIS MEANS THE TENNESSEE DEPARTMENT OF TRANSPORTATION AND SPECIFICALLY REFERENCES THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION. ANY MATERIAL DESIGNATED AS "TDOT" IS TO CONFORM TO THE MATERIAL STANDARDS NOTED AND PLACEMENT/INSTALLATION METHODOLOGY SPECIFIED IN THE CURRENT EDITION OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION".

   QUALITY CONTROL (QC) PLAN: REFERS TO A DOCUMENT THAT ESTABLISHES MINIMUM QUALITY CONTROL REQUIREMENTS, TESTING FREQUENCY AND QUALITY OVERSIGHT RESPONSIBILITY.

   QUALITY CONTROL (QC) MANAGER: A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TENNESSEE THAT IS RESPONSIBLE FOR THE QUALITY OF THE CONSTRUCTED PROJECT AS DEFINED IN THE QC PLAN. THE QC TEAM CONSISTS OF QUALIFIED PERSONNEL THAT WORK UNDER THE DIRECT SUPERVISION OF THE QC MANAGER. QC TEAM PERSONNEL ARE INDIVIDUALS THAT ARE FAMILIAR WITH THE MATERIALS UTILIZED AND THE BUTTRESS CONSTRUCTION COMPONENTS.

   CONSTRUCTION MANAGER: RESPONSIBLE FOR CONSTRUCTION ACTIVITY TO INCLUDE BUT NOT BE LIMITED TO THE CHARACTER AND SEQUENCE OF WORK, COORDINATION AND SCHEDULING.
2. THE PROJECT WILL BE CONSTRUCTED IN ONE STAGE. THE STAGE SHOWN ON THESE DRAWINGS INVOLVES THE BUTTRESS CONSTRUCTION FOR THE STARTER DIKE. THE WORK IS DIVIDED INTO LINEAR SEGMENTS NOTED AS A, B, C AND D RESPECTIVELY.
3. THESE DRAWINGS ARE PRESENTED AS AN AID IN PROJECT CONSTRUCTION BUT SHOULD NOT BE CONSTRUED AS THE ONLY REFERENCE NEEDED. CP SHALL BECOME FAMILIAR WITH AND ADHERE TO THE TECHNICAL SPECIFICATIONS, THE QC PLAN AND APPLICABLE ENVIRONMENTAL AND SAFETY REGULATIONS. NO MATERIALS SHALL BE PLACED IN THE INTAKE CHANNEL UNTIL APPROVED BY THE REGULATORY AUTHORITY AND THE OWNER.
4. TOPOGRAPHIC INFORMATION SHOWN IN THE DRAWINGS IS DATED AND DOES NOT REFLECT CHANGES SINCE THE TIME OF AERIAL PHOTOGRAPHY. AREAS OF HYDROGRAPHIC SURVEYING MAY NOT REFLECT CURRENT CONDITIONS AS THE UNDERWATER SURFACE CONSTANTLY CHANGES.
5. IT SHALL BE THE CP'S RESPONSIBILITY TO VERIFY THAT ALL UNDERGROUND UTILITIES DISCOVERED DURING THE UNDERGROUND LOCATING SWEEPS ARE RELOCATED OR OTHERWISE PROTECTED IN FULL COMPLIANCE WITH ANY REQUIREMENTS OF THE PLANT–ISSUED EXCAVATION PERMIT TO THE SATISFACTION OF THE OWNER AND IN ACCORDANCE WITH TVA PROCESSES AND PROCEDURES PRIOR TO THE GROUND DISTURBING ACTIVITIES, INCLUDING THE BORROW AREAS. WHERE UTILITIES ARE SHOWN OR INDICATED ON THE DRAWINGS, THE INFORMATION GIVEN IS IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION IN THE ENGINEER'S POSSESSION, BUT IS APPROXIMATE IN NATURE. THE DATA IS NOT WARRANTED TO BE EITHER COMPLETE OR CORRECT.
6. THE CP SHALL MAKE A CONCERTED EFFORT TO PREVENT ANY DISRUPTION OF UTILITY SERVICES, AND IF ANY UNINTENDED DISRUPTION OCCURS, THE CP SHALL COORDINATE THE SAFE AND IMMEDIATE RESTORATION OF THE SERVICE. IF DISRUPTION OF ANY UTILITY SERVICES IS UNAVOIDABLE, IT SHALL BE THE RESPONSIBILITY OF CP TO NOTIFY AFFECTED UTILITY USERS AND UTILITY OWNERS 48 HOURS IN ADVANCE. THE CP SHALL ALSO MAKE EVERY EFFORT TO RESTORE SAID SERVICES BEFORE QUITTING WORK FOR THE DAY. IN THE EVENT THIS CANNOT BE DONE, THE CP SHALL PROVIDE TEMPORARY SERVICE TO THE PROPERTY OWNERS UNTIL PERMANENT SERVICE CAN BE RESTORED.
7. EXISTING GEOTECHNICAL INSTRUMENTATION IS SHOWN ON THE DRAWINGS. THE CP SHALL PROTECT THIS INSTRUMENTATION FROM DAMAGE. THIS INSTRUMENTATION SHALL BE EXTENDED UPWARD DURING THE COURSE OF THE WORK.
8. ALL ENTITIES SHALL BE RESPONSIBLE FOR HEALTH AND SAFETY OF THEIR PERSONNEL AND SHALL MEET INDUSTRY STANDARD REQUIREMENTS. ALL ENTITIES SHALL ADHERE TO TVA REQUIREMENTS FOR SAFETY AND CONSTRUCTION.
9. THE CP SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL ACCESS ROADS, STAGING AREAS AND STORAGE AREAS USED DURING CONSTRUCTION, AND SHALL RESTORE SAID AREAS TO THEIR ORIGINAL CONDITION, OR BETTER ONCE CONSTRUCTION IS COMPLETE UNLESS DIRECTED BY THE OWNER TO RETAIN THE AREA "AS IS".
10. THE CP SHALL CONDUCT ALL OPERATIONS IN ACCORDANCE WITH APPLICABLE ENVIRONMENTAL PERMITS, RULES, LAWS AND REGULATIONS INCLUDED BUT NOT LIMITED TO THOSE SET FORTH IN CEC 19966, 20065 OR OTHER ENVIRONMENTAL REVIEW DOCUMENTS FOR THIS PROJECT.
11. THE CP IS RESPONSIBLE FOR SITE DRAINAGE THROUGHOUT CONSTRUCTION AND SHALL INSTALL TEMPORARY DRAINAGE STRUCTURES OR PUMP WATER AS NECESSARY TO PREVENT INTERFERENCE WITH THE WORK. SUCH TEMPORARY DRAINAGE FEATURES SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ENVIRONMENTAL PERMITS AND THE KINGSTON STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
12. THE CP SHALL NOTE SEQUENCING OF OPERATIONS IDENTIFIED IN THE DRAWINGS.
13. VEGETATIVE AND ORGANIC MATERIALS SHALL BE REMOVED AS DESCRIBED IN THE SPECIFICATIONS.
14. DRAINAGE CONDITIONS SURROUNDING EXISTING FACILITIES OUTSIDE THE PROJECT LIMITS ARE NOT ADDRESSED BY THE DRAWINGS. GRADING, SHAPING AND INSTALLATION OF DRAINAGE STRUCTURES MAY BE REQUIRED TO PROMOTE POSITIVE DRAINAGE. SUCH WORK SHALL BE DIRECTED BY OTHERS.
15. MATERIALS DELIVERED FOR INCORPORATION INTO THE WORK SHALL BE TEMPORARILY STORED IN AREAS SELECTED BY THE CP AND APPROVED BY THE OWNER. NO MATERIAL IS TO BE STOCKPILED WITHIN THE FORMER DREDGE CELL FOOTPRINT WITHOUT APPROVAL OF TVA, STANTEC, OR THE QC MANAGER. MATERIALS SHALL BE STORED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
16. THE EROSION AND SEDIMENT CONTROL MEASURES SHOWN AND AS INCLUDED WITHIN THE SPECIFICATIONS SHALL BE CONSIDERED THE MINIMUM; SUPPLEMENTAL MEASURES SHALL BE PROVIDED BY THE CP AS FIELD CONDITIONS DICTATE OR AS DIRECTED BY THE REGULATORY AUTHORITY.
17. BORROW AREAS SHALL BE GRADED AND VEGETATED IN CONFORMANCE WITH PROJECT REQUIREMENTS, SUBJECT TO ENVIRONMENTAL REGULATIONS FROM OTHER AGENCIES, AND SHALL BE PERMITTED IF REQUIRED BY REGULATION. IT SHOULD BE NOTED THAT THERE MAY BE REGULATORY RESTRICTIONS ASSOCIATED WITH CLEARING A SITE.
18. DURING CONSTRUCTION, THE CP SHALL INSPECT, CLEAN, AND MAINTAIN ALL SEDIMENT CONTROL DEVICES AND PROVIDE REPORTING AS REQUIRED BY THE SPECIFICATIONS AND REGULATIONS ON SAID ITEMS.
19. THE CP SHALL CONTROL FUGITIVE DUST EMISSIONS DURING CONSTRUCTION IN SUCH A MANNER AS TO COMPLY WITH APPLICABLE REGULATIONS. DUST CONTROL MEASURES SHALL BE SUBJECT TO APPROVAL OF THE QC MANAGER AND THE OWNER.
20. BORROW AREAS SHALL BE MAINTAINED IN SUCH A MANNER AS TO PROMOTE POSITIVE DRAINAGE, REDUCE EROSION OF SOILS AND PROVIDE STABLE EXCAVATIONS. FINAL GRADE SLOPES SHALL BE NO STEEPER THAN 3H:1V AND INTERIM SLOPE CONDITIONS SHALL NOT ABRUPTLY TERMINATE OR IMPOUND WATER.
21. DURING BORROW EXCAVATION, SATISFACTORY MATERIALS SHALL BE SEGREGATED FOR USE AS STARTER DIKE BENCH EMBANKMENT. SATISFACTORY MATERIALS ARE SOILS THAT CLASSIFY AS CL OR CH ACCORDING TO THE UNIFIED SOILS CLASSIFICATION SYSTEM. SATISFACTORY MATERIALS WHICH CONTAIN EXCESSIVE MOISTURE SHALL BE STOCKPILED, BLADED, DISKED, OR CHEMICALLY TREATED AS NECESSARY TO PERMIT ADEQUATE DRYING. CLASSIFICATION OF SOIL AS SATISFACTORY OR UNSATISFACTORY SHALL BE DETERMINED BY THE QC MANAGER.
22. UNSATISFACTORY MATERIALS SHALL REMAIN AT THE BORROW SITE. NO SATISFACTORY MATERIAL SHALL BE WASTED WITHOUT AUTHORIZATION BY THE OWNER. MOISTURE CONTENT SHALL NOT BE DEEMED AN APPROPRIATE CAUSE TO HAVE A MATERIAL DEFINED AS UNSATISFACTORY.
23. GRADING OF STOCKPILES SHOULD BE MINIMIZED. HOWEVER, STOCKPILES SHALL BE GRADED TO MAINTAIN POSITIVE DRAINAGE AT ALL TIMES. THE SIDE SLOPES SHALL HAVE 3H:1V SLOPES OR FLATTER. THE TOP OF THE STOCKPILE SHALL HAVE A MINIMUM TWO PERCENT SLOPE. MATERIALS SHALL BE SEGREGATED AS DIRECTED BY THE QC MANAGER.
24. SOIL STOCKPILES THAT WILL NOT BE DISTURBED FOR 21 DAYS OR MORE SHALL BE TEMPORARILY SEEDED WITH WHEAT OR RYE AT A RATE OF 60 LBS/ACRE AND SHALL BE COVERED WITH MULCH.
25. ALL PIPE REMOVAL AND TRENCHING SHALL BE CONDUCTED IN STRICT ACCORDANCE WITH APPLICABLE TVA PROCESS AND PROCEDURE REQUIREMENTS.
26. PIPE REMOVAL AT THE LOCATIONS NOTED ON THE DRAWINGS SHALL REQUIRE BACKFILL. SOIL BACKFILL AND EMBANKMENT SHALL BE PLACED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
27. GEOTEXTILES USED FOR CONSTRUCTION SHALL BE CERTIFIED BY THE MANUFACTURER AS CONFORMING TO THE PROJECT REQUIREMENTS. GEOTEXTILES SHALL NOT BE UTILIZED AS FILTER UNLESS APPROVED BY TVA. IT MAY BE USED AS A TEMPORARY MEASURE AND REMOVED.
28. CERTIFICATIONS OF MATERIAL QUALITY AND CONFORMANCE TO PROJECT REQUIREMENTS SHALL BE SUBMITTED TO THE QC MANAGER FOR APPROVAL PRIOR TO INSTALLATION.
29. ALL SURFACES SHALL BE APPROVED BY THE QC MANAGER PRIOR TO EMBANKMENT OR BUTTRESS CONSTRUCTION.
30. THE CP SHALL DEVELOP A HAUL ROAD PLAN PRIOR TO INITIATION OF CONSTRUCTION AND SUBMIT IT TO THE QC MANAGER FOR APPROVAL.
31. THE CP SHALL BE RESPONSIBLE FOR CONSTRUCTION SURVEYOR SELECTION AND COORDINATION OF ALL CONSTRUCTION RELATED SURVEYING. ALL ESTABLISHED TVA BENCH MARKS OR OTHER MONUMENTS SHALL BE PRESERVED AND PROTECTED, ANY ESTABLISHED MARKER OR BENCHMARK THAT IS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY TVA SURVEYING SERVICES.
32. THE CONSTRUCTION MANAGER SHALL COMMUNICATE CONSTRUCTION ISSUES, PROBLEMS OR DISCREPANCIES IN THE DRAWINGS TO THE QC MANAGER AND OWNER IMMEDIATELY UPON BECOMING AWARE OF SUCH PROBLEMS.
33. ADDITIONAL GEOTECHNICAL INSTRUMENTATION BEYOND THAT CURRENTLY DEPICTED MAY BE INSTALLED DURING CONSTRUCTION.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

R 0: ISSUED FOR CONSTRUCTION

SCALE: NONE EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
GENERAL NOTES
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-92 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

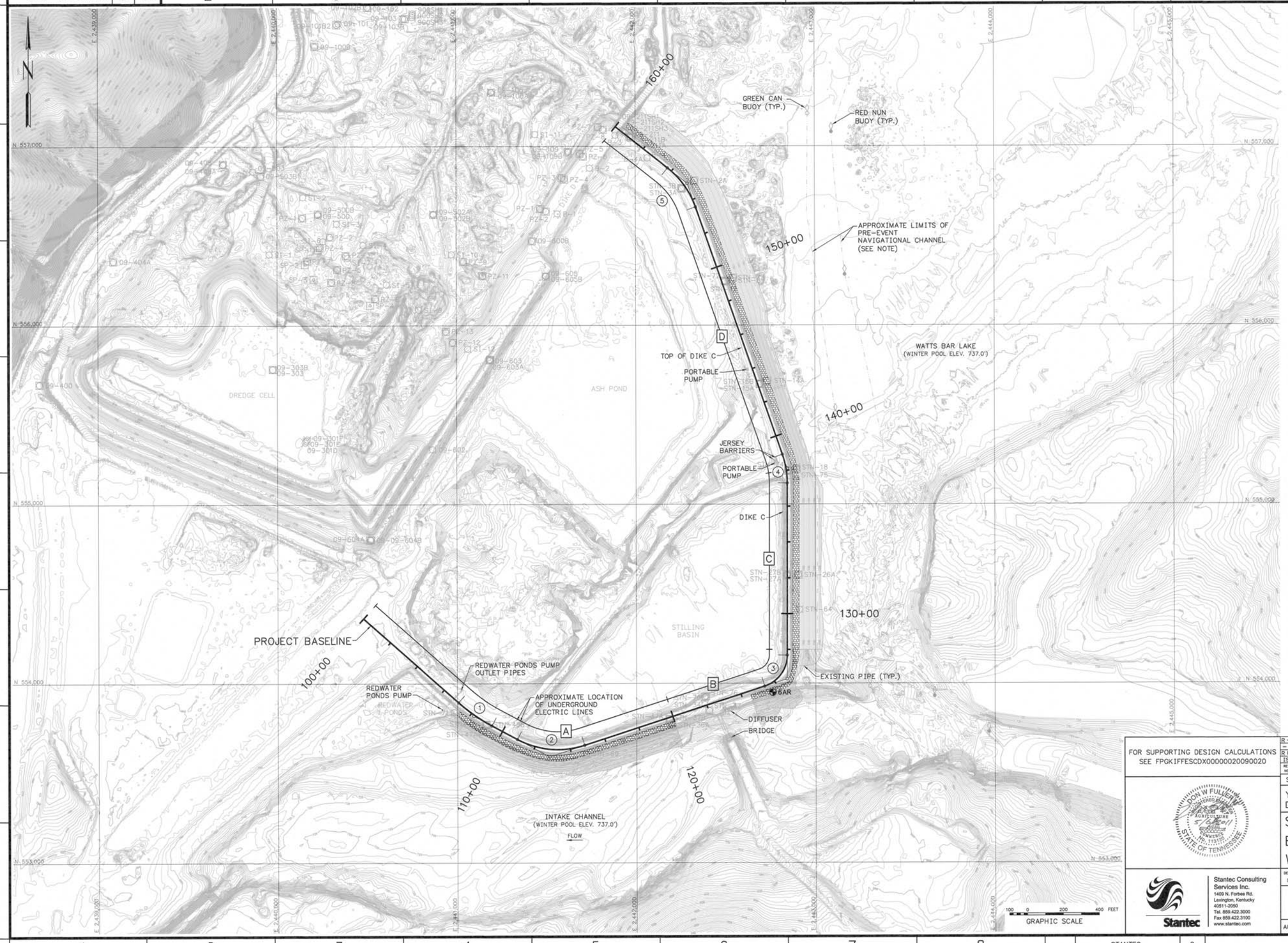

TABLE OF BASELINE COORDINATES			
PROJECT BASELINE	STATION	NORTHING	EASTING
BEGIN	100+00.00	554,363.86	2,440,477.77
END	160+00.00	557,109.43	2,441,888.38

BASELINE CURVE DATA

①
P.I. STA. = 108+20.74
NORTHING = 553,819.18
EASTING = 2,441,091.71
Δ = 13°20'06"
R = 974.68'
T = 113.94'
L = 226.85'
E = 6.64'
P.C. STA. = 107+06.80
P.T. STA. = 109+33.65

②
P.I. STA. = 112+99.93
NORTHING = 553,591.92
EASTING = 2,441,514.77
Δ = 46°19'10"
R = 479.84'
T = 205.26'
L = 387.92'
E = 42.06'
P.C. STA. = 110+94.67
P.T. STA. = 114+82.59

③
P.I. STA. = 126+71.85
NORTHING = 554,024.61
EASTING = 2,442,840.47
Δ = 71°45'50"
R = 182.94'
T = 132.33'
L = 229.13'
E = 42.85'
P.C. STA. = 125+39.52
P.T. STA. = 127+68.65

④
P.I. STA. = 138+12.12
NORTHING = 555,200.41
EASTING = 2,442,843.77
Δ = 19°21'32"
R = 479.84'
T = 81.84'
L = 162.13'
E = 6.93'
P.C. STA. = 137+30.28
P.T. STA. = 138+92.41

⑤
P.I. STA. = 154+96.30
NORTHING = 556,792.40
EASTING = 2,442,289.43
Δ = 32°28'34"
R = 479.84'
T = 139.75'
L = 271.98'
E = 19.94'
P.C. STA. = 153+56.55
P.T. STA. = 156+28.53

SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
4. SEGMENTS D, C, B (WP3), & A AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
5. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/06/2011 USER: ELLISDA, DOC
\\SERVER-SCI\SCI\ENVIRONMENTAL\DRAWINGS\WP5\WP5_SFC\10W229-93.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	DISCIPLINE/INTERIM
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: 1"=200' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
EXISTING CONDITIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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www.stantec.com

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-93 | R 0

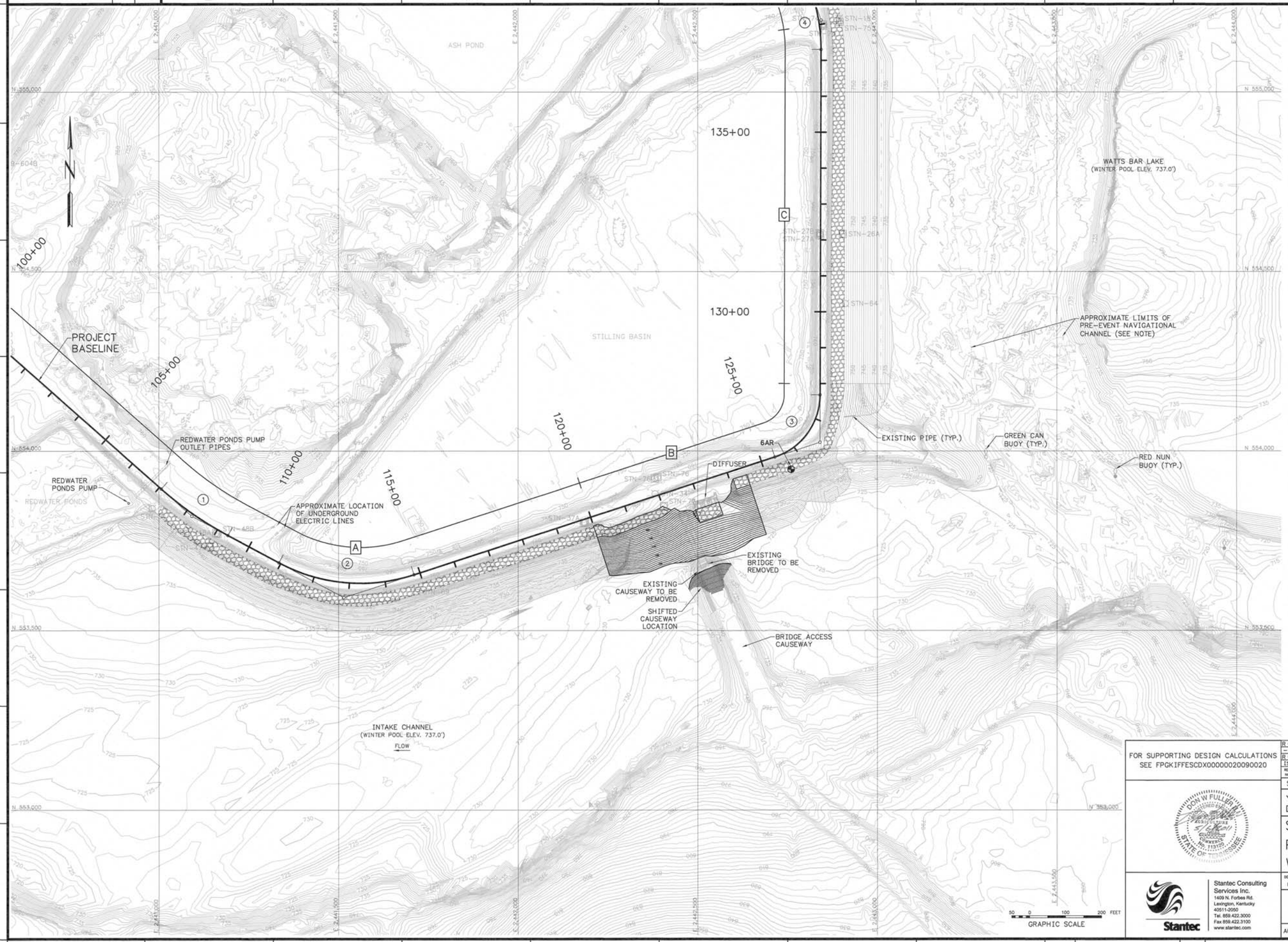
STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:200
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

36 C 10W229-93

36 | C | 10W229-94



SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES

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3. SEE 10W229-93 FOR PROJECT BASELINE COORDINATES AND CURVE DATA.
4. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
5. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLI INTERFAC

SCALE: 1"=100' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PROJECT SETTING
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

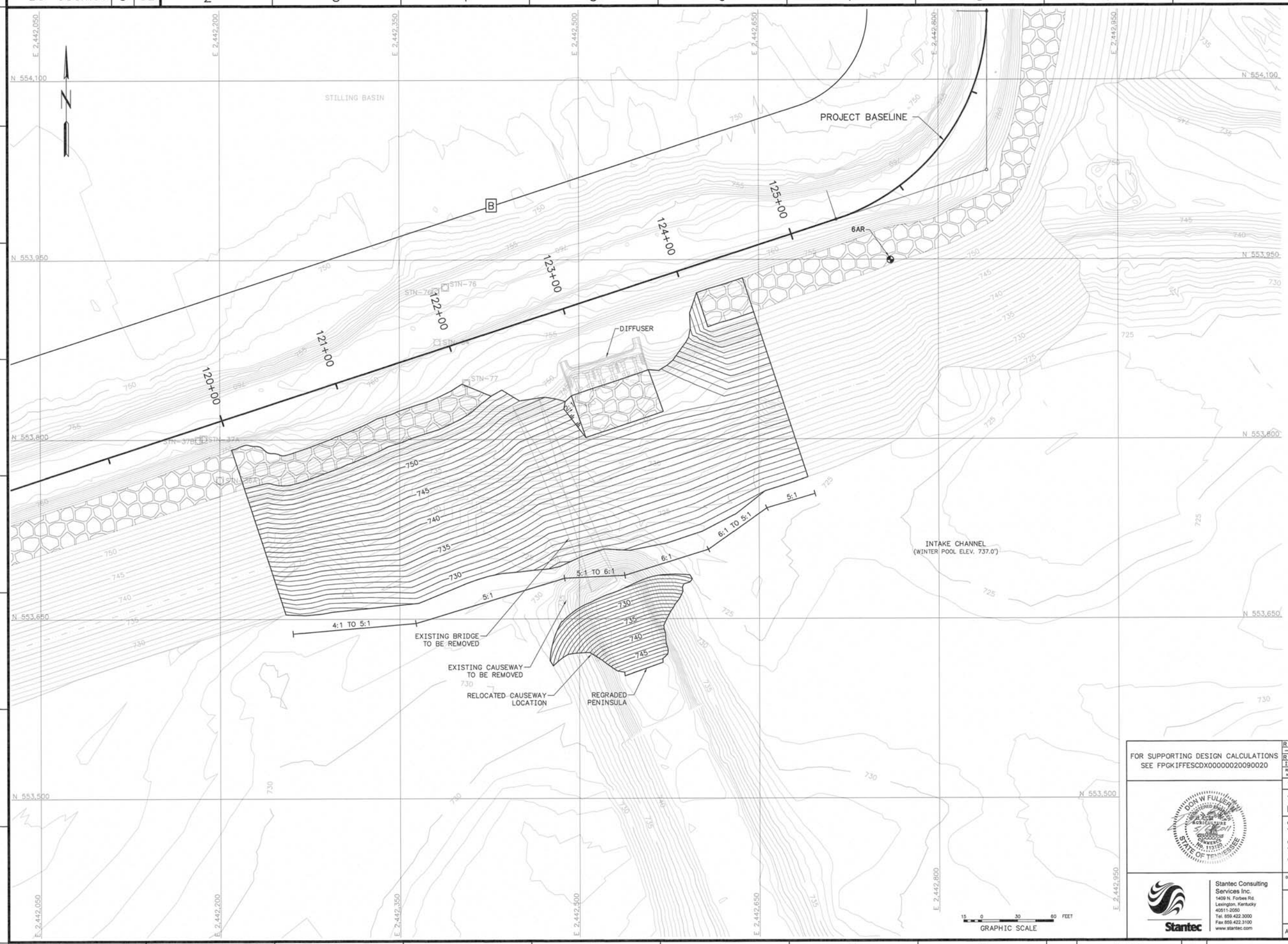
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-94 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:100
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISDL DGN: \\US1243-PW\WORKGROUP\TVA\ACTIVE\1729566\ENVIRONMENTAL\DRAWING\WP5\10W229-94.DGN



SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

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5. SEGMENT B (WP-3) AND SEGMENT A AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
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ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: 1"=30' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – GRADING PLAN
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-95 | R 0

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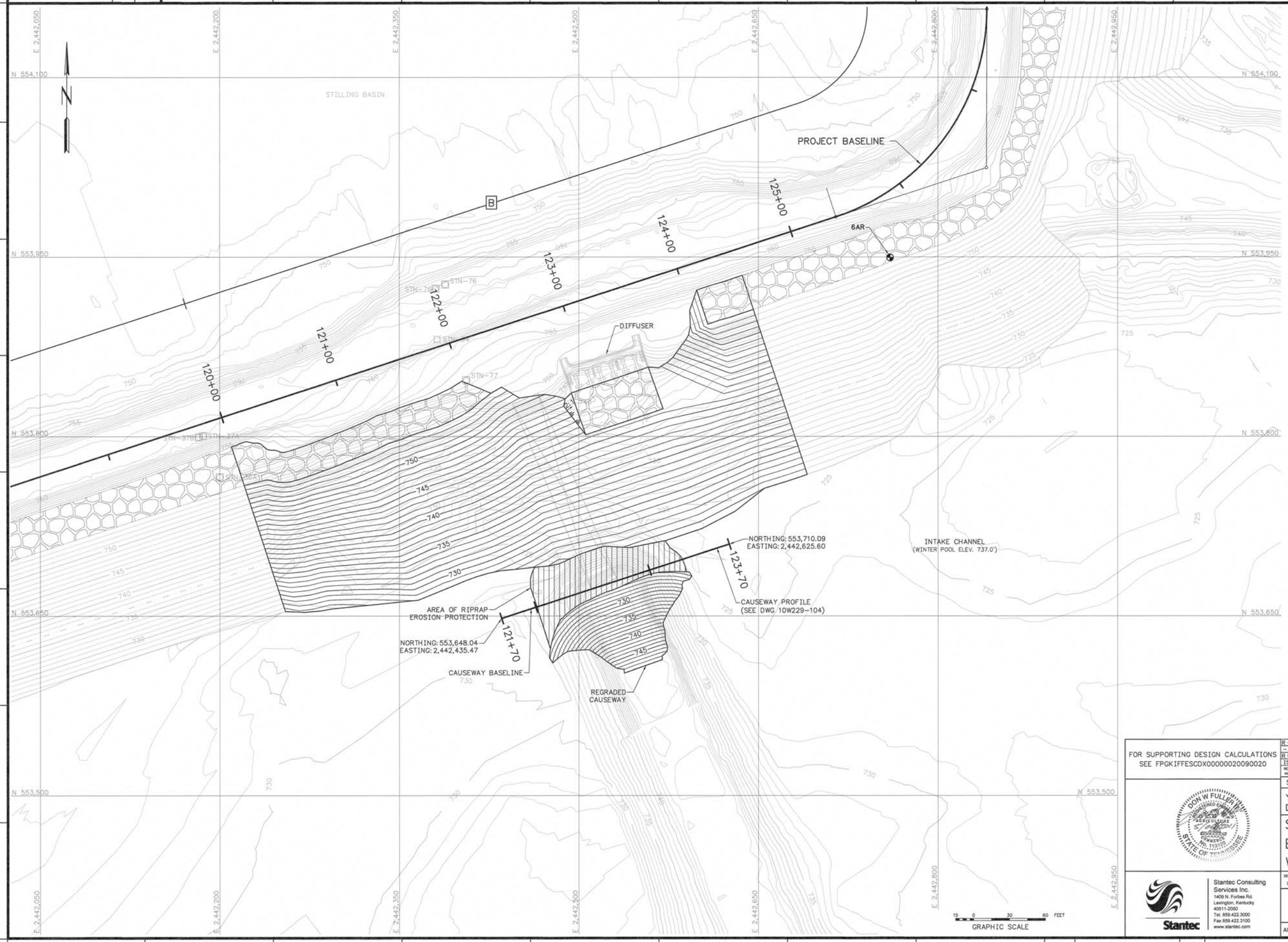
Tel. 859.422.3000
Fax 859.422.3100
www.stantec.com

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:30
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

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ISSUED FOR CONSTRUCTION

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
\\US1243-F01\WORKGROUP\17361\ACTIVE\175660003\ENVIRONMENTAL\DRAWING\WP5\REVISE_IFC\10W229-96.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APVD	ISSD	PROJECT ID	AS CONST	REV CD
R-0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: 1"=30' EXCEPT AS NOTED

DISCIPLINE: HYDRAUL

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
EROSION PROTECTION LIMITS
WORK PLAN 5 (KIF-110028-WP-5)

DON W FULLER III REGISTERED ENGINEER AGRICULTURE COMMERCE No. 113131 STATE OF TENNESSEE

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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Fax 859.422.3100
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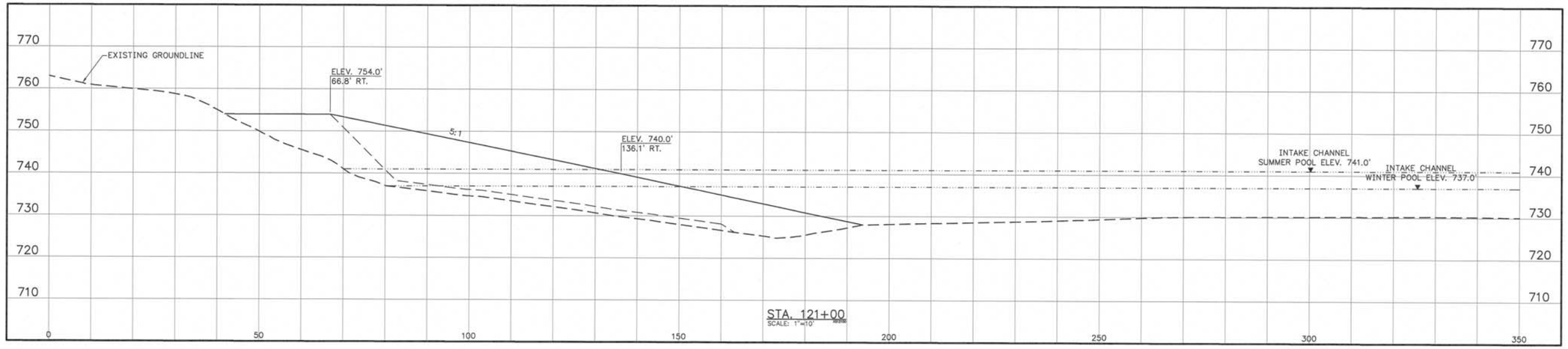
KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-96 | R 0

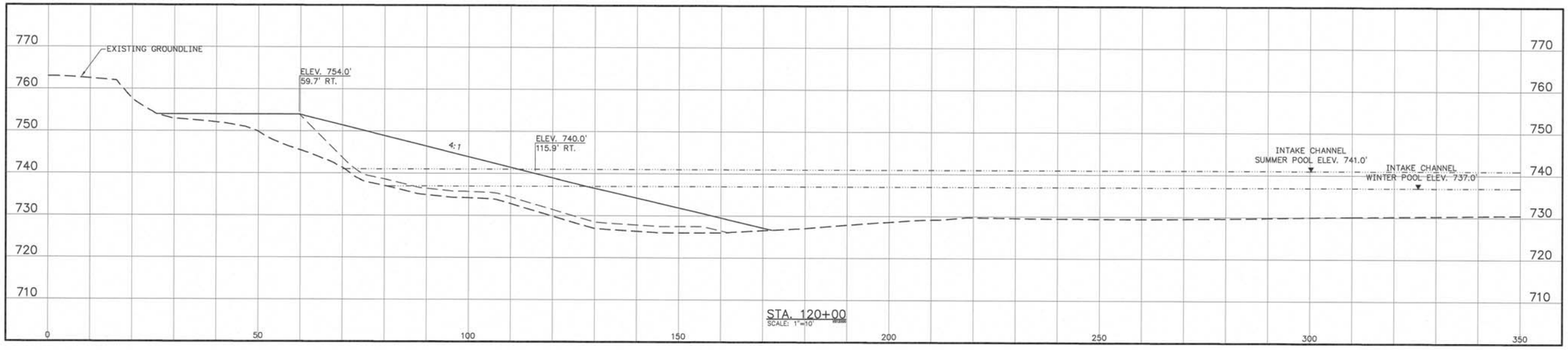
PLOT FACTOR:30
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

STANTEC	0
TASK COMPLETED BY:	REV NO.



STA. 121+00
SCALE: 1"=10'



STA. 120+00
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000200900 20

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–
ISSUED FOR CONSTRUCTION										

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRISLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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Fax 859.422.3100
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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

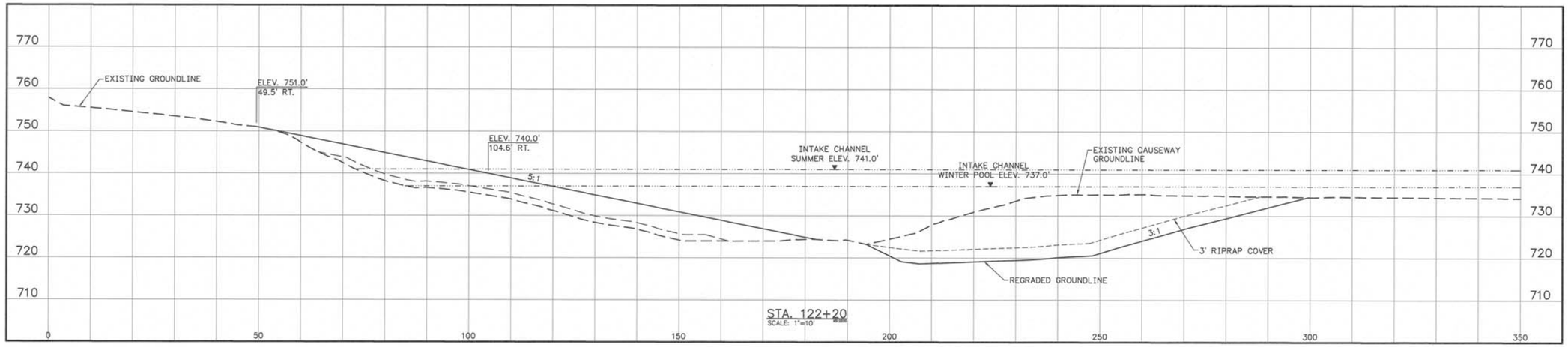
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-97 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

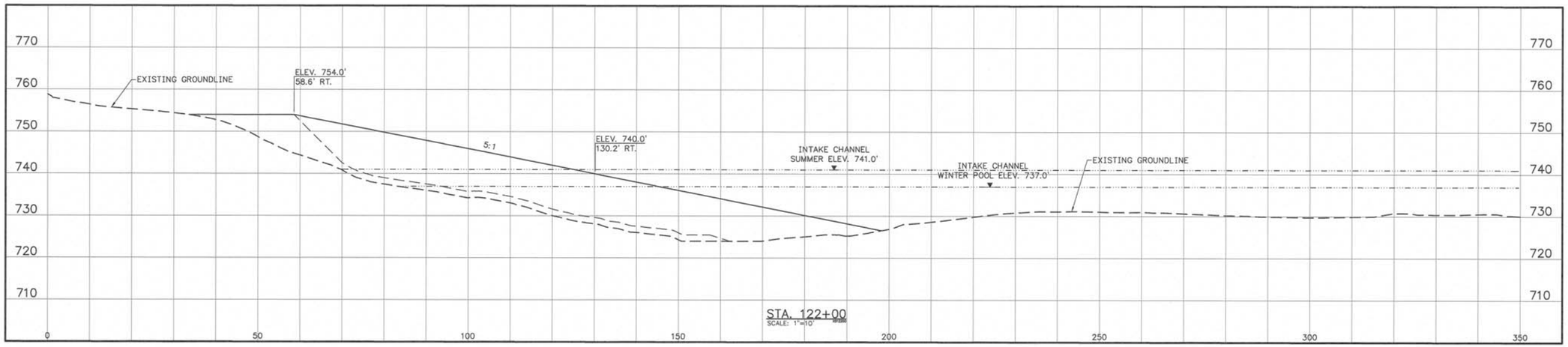
PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
\\SERVER-TFD\WORKGROUP\TVA\ACTIVE\10W229\DWG\DSN\DRAWINGS\DSN\DRAWING\WP5\DEVCL_DTC\10W229-97.DWG



STA. 122+20
SCALE: 1"=10'



STA. 122+00
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD.
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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www.stantec.com

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

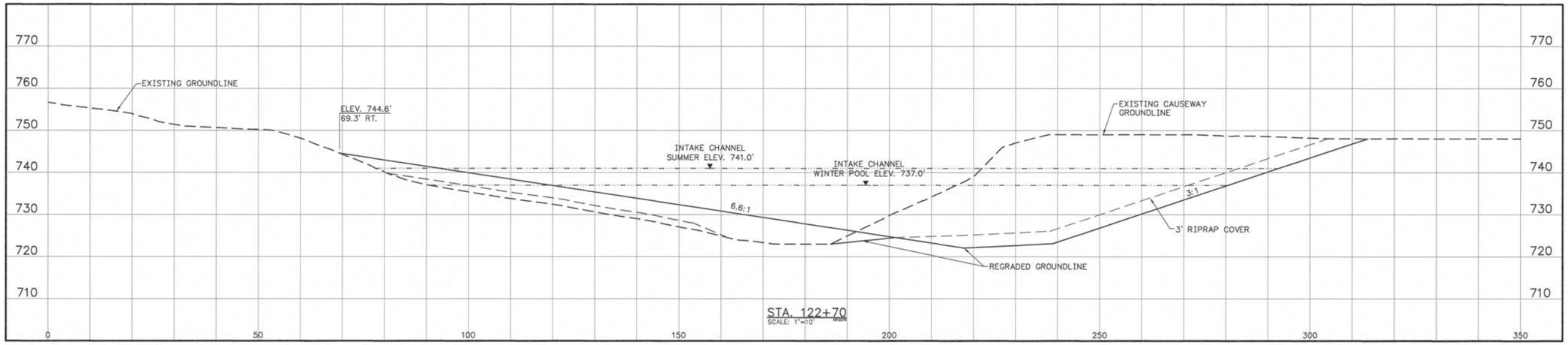
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-98 | R 0

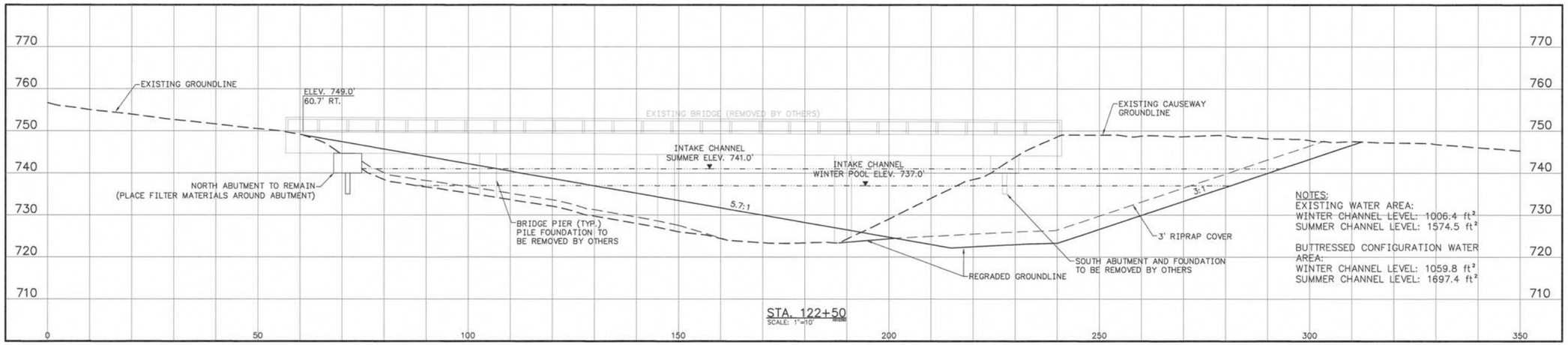
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C 10W229-98





NOTES:
EXISTING WATER AREA:
WINTER CHANNEL LEVEL: 1006.4 ft^2
SUMMER CHANNEL LEVEL: 1574.5 ft^2

BUTTRESSED CONFIGURATION WATER AREA:
WINTER CHANNEL LEVEL: 1059.8 ft^2
SUMMER CHANNEL LEVEL: 1697.4 ft^2

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	DISCIPLINE INTERFACE
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

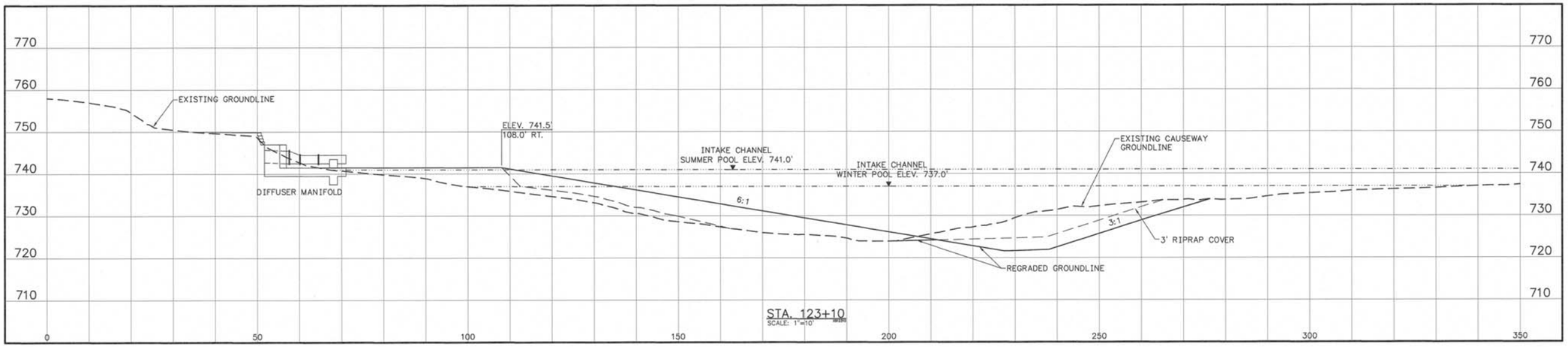
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-99 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

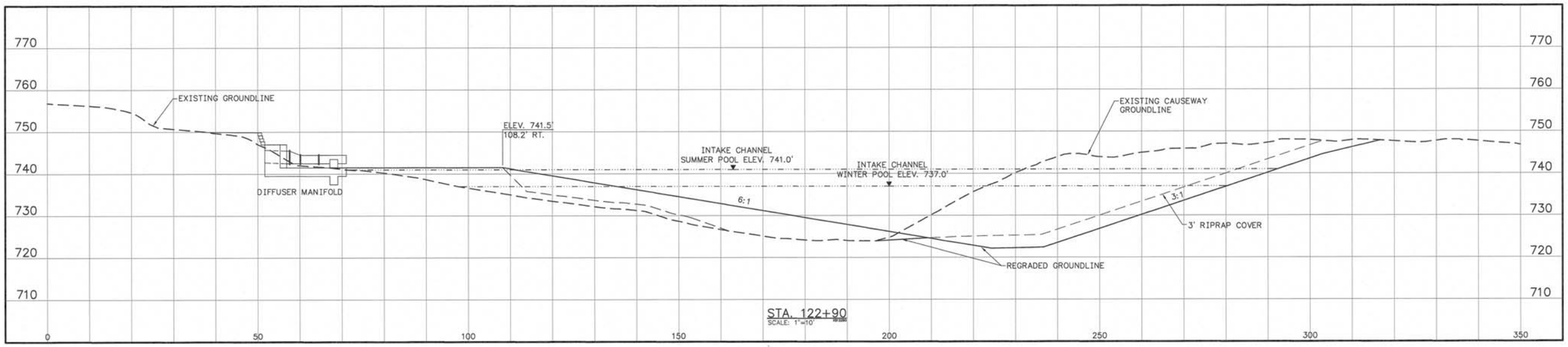
PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C 10W229-99



STA. 123+10
SCALE: 1"=10'



STA. 122+90
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

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ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-100 | R 0

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TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
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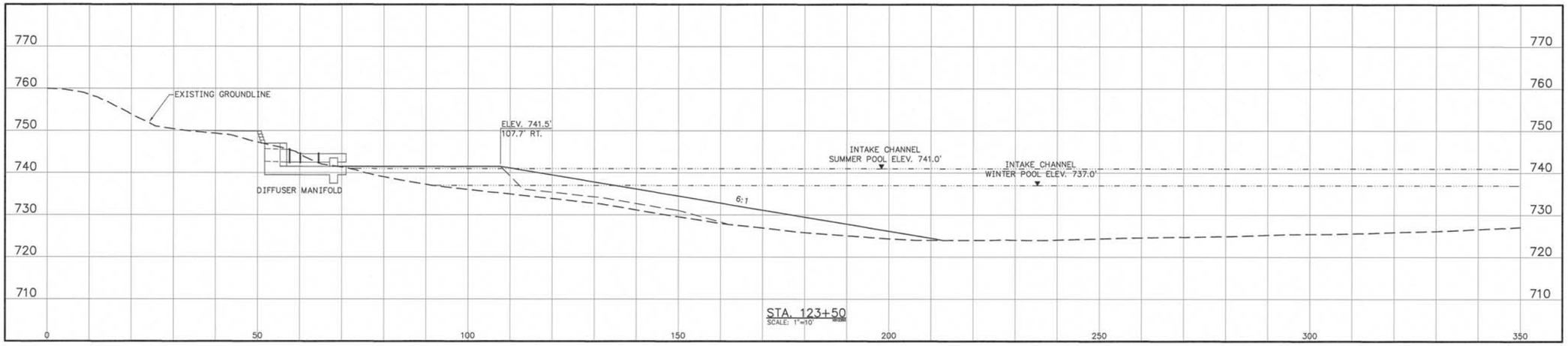
C.A.D. DRAWING
DO NOT ALTER MANUALLY



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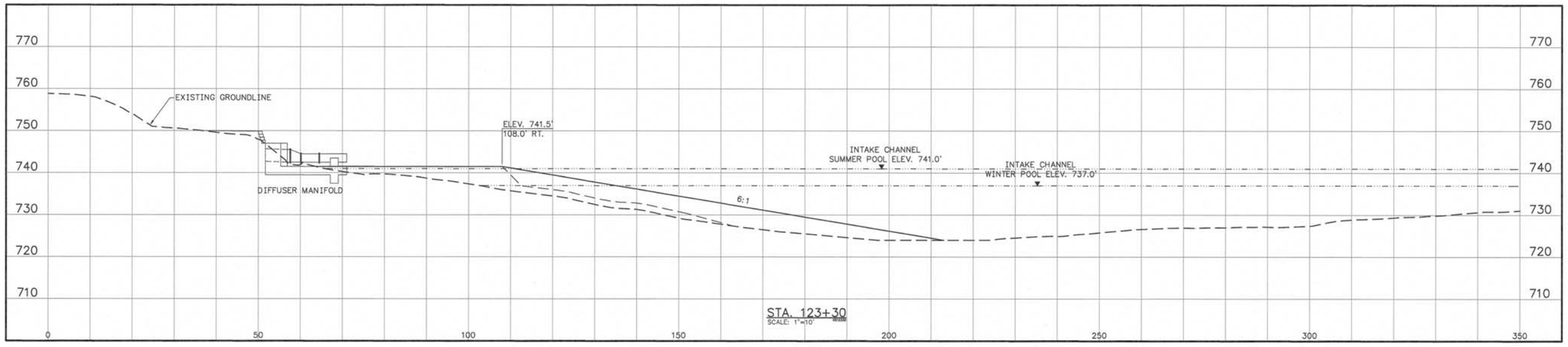

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NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-104).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
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ISSUED FOR CONSTRUCTION											

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SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DON W. FULLER
REGISTERED ENGINEER
AGRICULTURE
No. 113115
STATE OF TENNESSEE

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Stantec

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
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TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-101 | R 0

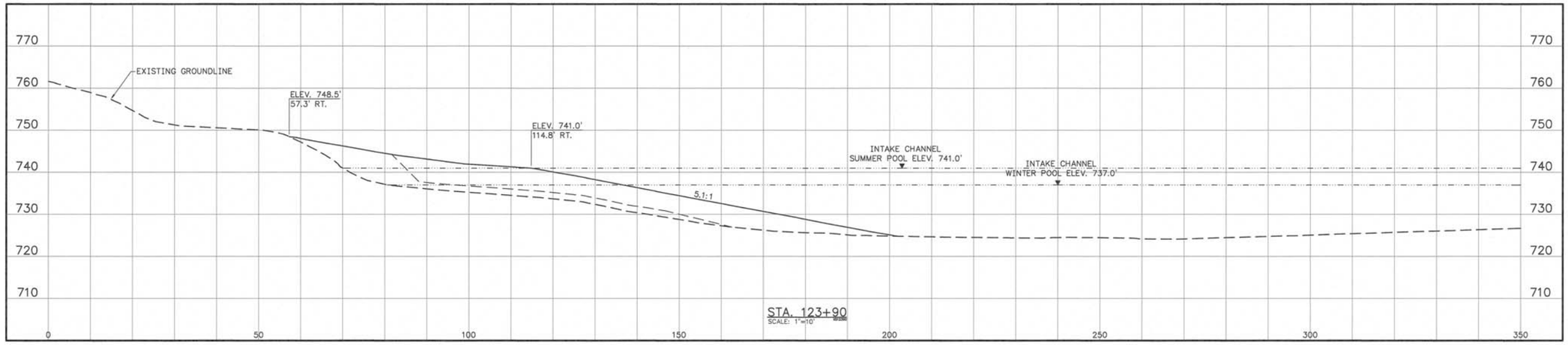
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 06/06/2011 USER: ELLISON, TOC
\\S1S143-F01\WORKGROUP\TVA\ACTEA\TD66660025\DIV\ENVIRONMENTAL\DRAWINGS\WP5\R\V0_JFC\10W229-103.DWG

36 C 10W229-101



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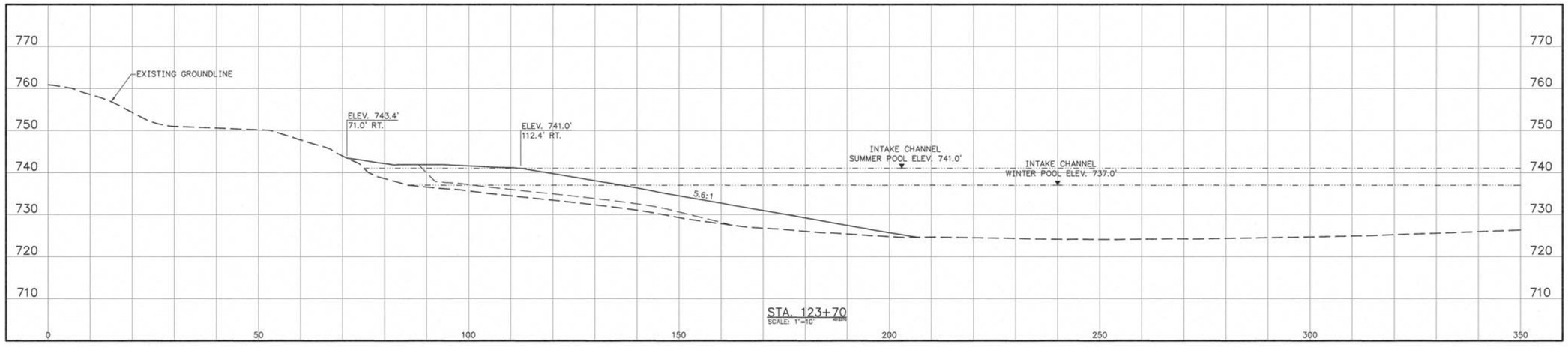

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SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

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R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

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SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
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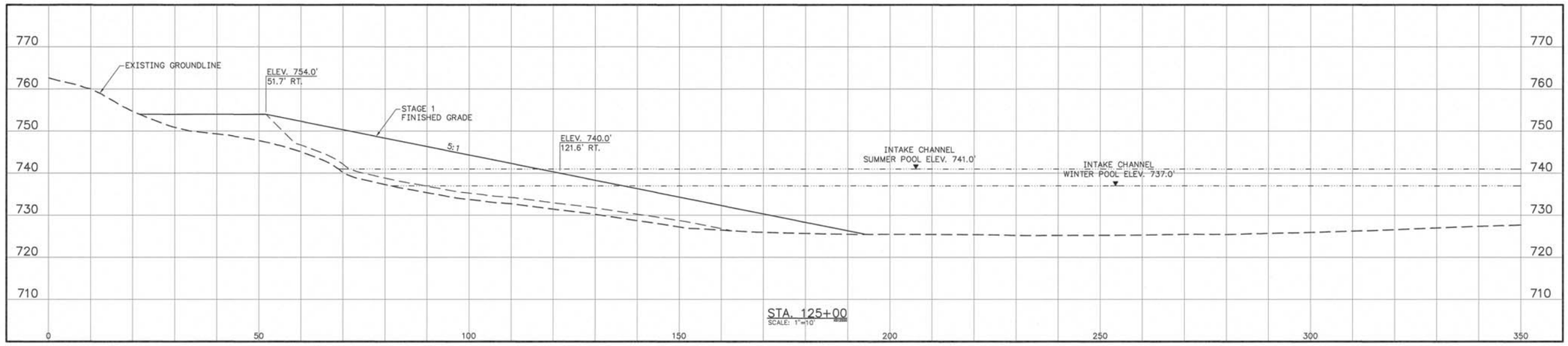
PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

STANTEC	0
TASK COMPLETED BY:	REV NO.

36 C 10W229-102



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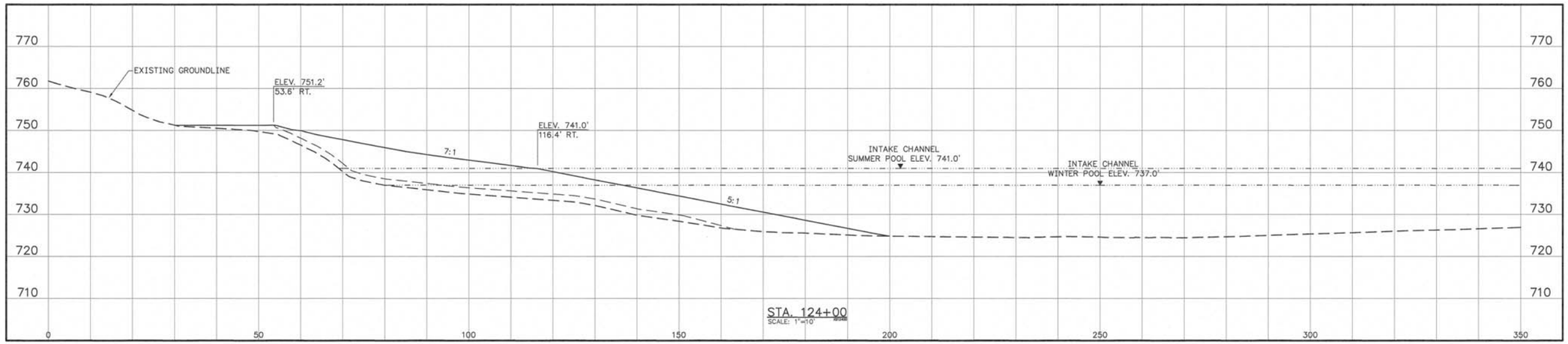

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NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
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ISSUED FOR CONSTRUCTION

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
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DO NOT ALTER MANUALLY

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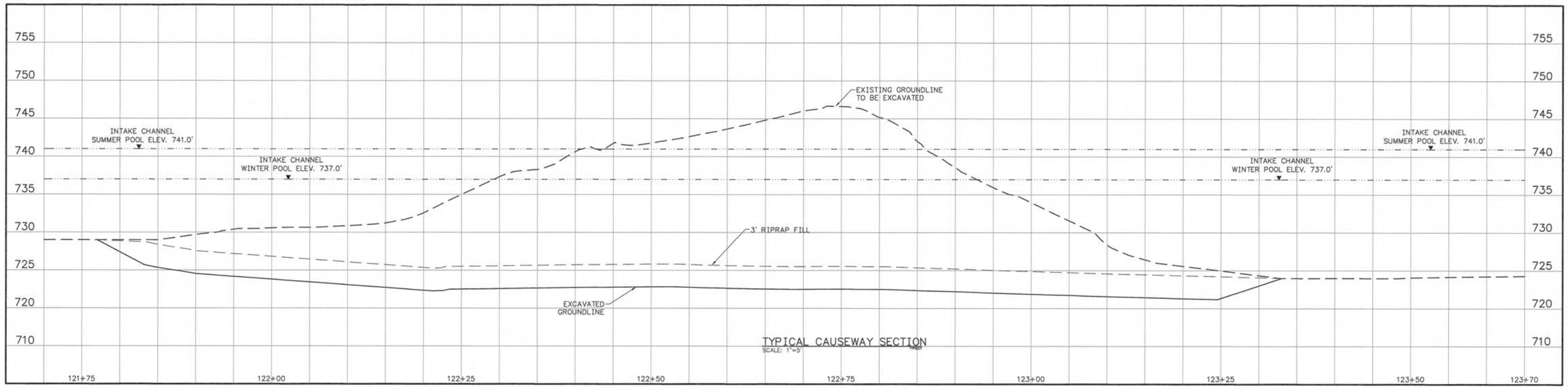

TYPICAL CAUSEWAY SECTION
SCALE: 1"=5'

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS
SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
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ISSUED FOR CONSTRUCTION

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INTERFAC

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL CAUSEWAY SECTION
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DGTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-104 | R 0

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SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:5
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
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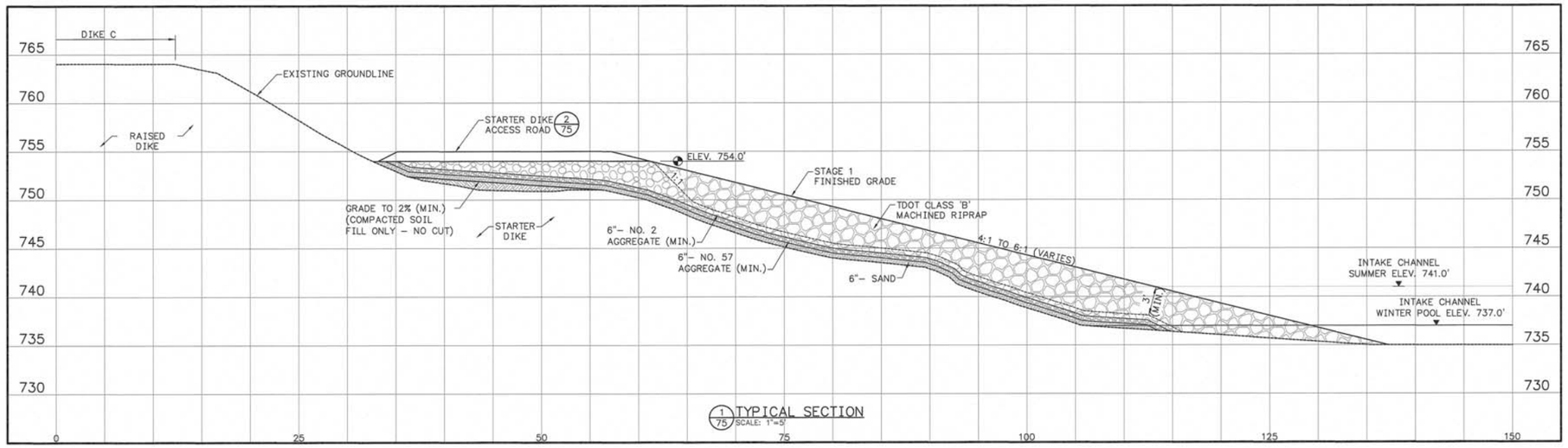
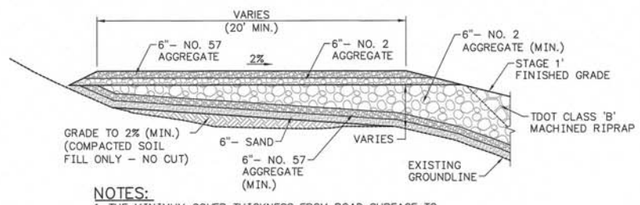
36 C 10W229-104



1/75 TYPICAL SECTION
SCALE: 1"=5'



NOTES:

1. THE MINIMUM COVER THICKNESS FROM ROAD SURFACE TO TOP OF SAND FILTER IS 36–INCHES.
2. PLACE NO. 2 AGGREGATE AND NO. 57 AGGREGATE ON RIPRAP OR NO. 2 AGGREGATE AS APPLICABLE TO FORM A REVERSE FILTER FOR ROAD SURFACE.
3. REMOVE AGGREGATE CONTAMINATED WITH ASH AS DIRECTED BY THE QC MANAGER.

2/75 DETAIL – STARTER DIKE ACCESS ROAD
SCALE: 1/4"=1'-0"

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD
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R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLINE: INTERIOR

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL SECTIONS AND DETAILS
WORK PLAN 5 (KIF–110028–WP–5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
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KINGSTON FOSSIL PLANT
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FOSSIL AND HYDRO ENGINEERING

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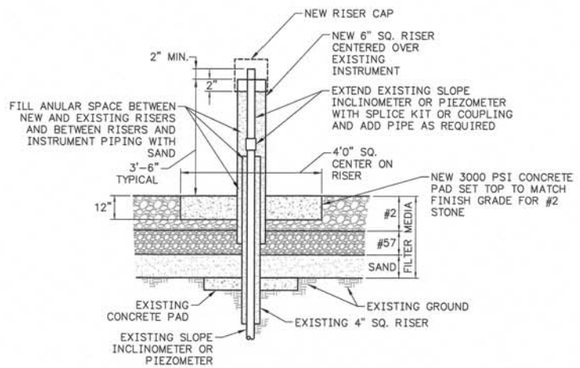
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:5
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISON, CDC
\\UTDC01-CHF\PROJECTS\PROJECTS\TENNESSEE\ENVIRONMENTAL\SBA\WTMP\WP5_DTC\10W229-105.DWG



TYPICAL ADJUSTMENT OF INSTRUMENTATION ON DIKE C
NOT TO SCALE

NOTES:

1. MATCH PVC RISER DIAMETER WITH EXTENSION PIPE AND INSTALL STANDARD COUPLING TO EXTEND RISER.
2. EXTEND RISER TO MINIMUM OF 3' ABOVE FINISHED GRADE.
3. INSTALL 6"X6" PROTECTIVE ALUMINUM WELL COVER OVER EXISTING COVER. FILL WITH SAND.
4. FILL WITHIN 3' AROUND CASING SHALL BE COMPACTED USING HAND OPERATED TAMPING EQUIPMENT AND SHALL BE ADVANCED A MINIMUM OF 2' ABOVE EMBANKMENT CONSTRUCTION.
5. 6"X6"X1/8" ALUMINUM CASING AND HAND COMPACTED EMBANKMENT MATERIAL SHALL BE COMPLETED AS EMBANKMENT CONSTRUCTION PROGRESSES.
6. WELL PAD MINIMUM DIMENSION OF 4'X4'X1' THICK.
7. FILL WITHIN 3' AROUND CASING SHALL BE COMPACTED USING HAND OPERATED TAMPING EQUIPMENT AND SHALL BE ADVANCED A MINIMUM OF 2' ABOVE EMBANKMENT CONSTRUCTION.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
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R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLINE INTERFACE

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL SECTIONS AND DETAILS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
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KINGSTON FOSSIL PLANT
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FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-106 | R 0

PLOT FACTOR:8
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

STANTEC	0
TASK COMPLETED BY:	REV NO.

36 C 10W229-106

PLOT DATE: 05/06/2011 USER: FULLERDW
\\US1243-F01\WORKGROUP\TSA\ACTIVE\75699005\ENVIRONMENTAL\DRAWING\WP5\REVD_IFC\10W229-106.DWG

Appendix B

Design Specifications

Stantec

Technical Specifications

Dike C Buttress
Segment B Construction
Work Plan 5
Kingston Fossil Plant
Harriman, Roane County, Tennessee

ISSUED FOR CONSTRUCTION

Prepared for

Tennessee Valley Authority
Kingston, Tennessee

May 6, 2011

Stantec Consulting Services Inc.
One Team. Infinite Solutions

TECHNICAL SPECIFICATIONS

SECTION 02100 – EROSION CONTROL AND STABILIZATION

PART 1 - GENERAL

1.1. Descriptions

1.1.1. This Section includes provisions for erosion control and stabilization. All construction activities shall be conducted in accordance with applicable environmental requirements. Install sediment and erosion control measures prior to disturbance where applicable.

1.1.2. CIVIL PROJECTS (CP) shall become familiar with the Final Grading Plan, Erosion and Sediment Control Details and Best Management Practices (BMP) Plan, and shall anticipate, and therefore plan in advance for each construction activity.

1.2. Related Documents

1.2.1. The Quality Control Plan and Engineering Drawings apply to the work of this section.

PART 2 - MATERIALS

2.1. Refer to the BMP Plan at the end of this Specification, the Sediment and Erosion Control Plan, the Details, and Section 02936 – Revegetation for products and materials to be employed in erosion control and stabilization efforts.

2.2. This Section provides material requirements for silt fence, and fiber rolls.

PART 3 - EXECUTION

3.1. Construction Phase Operations

3.1.1. CP shall evaluate the work of the project and plan to minimize the surface area disturbed at any one time.

3.1.1.1. Perform clearing and grubbing, excavation or grading, rock cover and riprap buttress construction at the site in stages to avoid exposing large areas of bare soil. Excavate and place earth fill material during dry weather, when possible.

3.1.1.2. Establish final grade as quickly as possible.

3.1.1.3. Seed and mulch disturbed areas of soil adjacent to work areas as soon as possible.

3.1.2. CP shall control fugitive dust emissions.

3.1.2.1. Control dust generation by wetting haul roads or applying approved (by TVA) chemical soil binders, as needed.

3.1.3. CP shall not discharge raw silt and sediment laden water from the site without providing for removal of soil particles.

3.1.3.1. Use rock filters or sediment filter bags, fiber rolls and/or use silt fence enclosures or de-silting basins.

3.1.3.2. Use rock silt checks and rip-rap or channel lining when dewatering through ditches and swales.

3.1.3.3. TVA shall provide inspection and maintenance of best management practices at minimum on a weekly basis.

3.1.3.4. In addition, inspect all best management practices after each rainfall of 0.5 inches or more.

3.1.3.5. Maintain all best management devices by removing accumulated silt, repairing or replacing damaged devices and by cleaning up any excess discharges, or mud on gravel roads.

3.2. Sediment Barriers

CP shall install silt fences, and/or fiber rolls or other suitable measures as practicable along the contour adjacent to the Intake Channel prior to any disturbance above the area. Silt fence may also be required at other locations based upon field conditions. The silt fence shall be removed segmentally as an area is ready for granular filter and rockfill buttress overlay. Floating turbidity curtains shall be installed as needed to protect intake locations. If an area is completed in terms of armoring within one day of initial disturbance and no rain is forecast, then sediment barriers may not be required.

3.2.1. Silt Fences

Silt fences shall be install below proposed disturbed areas in accordance with the plans and details and as needed in other areas. Turn ends of silt fence slightly toward the uphill side to mitigate against bypassing.

3.2.2. Fiber Rolls

Fiber rolls and other commercial products made from coconut fiber, rice straw, plastic, wood shavings, or other material can also be used as sediment barriers along streams. Follow manufacturers' installation instructions and ensure that sediment filter spacing on slopes is correct. Make sure runoff does not bypass barriers, coconut rolls, or other barriers underneath or around the ends.

3.2.3. Maintenance

Inspect silt fences and other installed manmade barriers once a week and after rainfalls of 0.5 inch or more. Remove sediment before it reaches six inches in depth. Traps and basins are to be cleaned out when half full. Reinstall sections of fence which have washed out underneath the fence. Replace broken, torn or worn fences. Rebuild or replace damaged brush barriers and fiber rolls. Make repairs within three days of discovering.

3.2.4. Turbidity Curtains

Turbidity curtains may be needed in the intake channel to control sediment advance towards plant intake points.

3.3. Slope Protection

3.3.1. The CP shall take measures as necessary to minimize sheet, rill and gully erosion prior to placing filter material. Slopes shall be stabilized immediately after tree removal and grubbing with measures as described below.

A. **Divert Upland Runoff** – Use diversion berms as practicable to control flow and route around work areas.

B. **Sediment Barriers** – See paragraph 3.2.

3.4. Sediment Traps and Basins

TVA shall observe effluent leaving the site during rainfall events. If water appears to be excessively muddy or silt-laden, TVA shall review the BMP Plan and insure that all structures are properly installed and functioning, and that all prescribed measures have been taken to minimize erosion. If they appear to be functioning properly upon inspection or after necessary repairs and the effluent is still not acceptable, then TVA shall take immediate action to have CP construct sediment traps as indicated herein. TVA will support CP in the design and location of such traps.

3.4.1. Sediment Traps

Any depression, swale or low-lying place that receives muddy flows from exposed soil areas can serve as a sediment trap. Installing several small traps at strategic locations is often better than building one large basin. The simplest approach is to dig a hole or build a dike (berm) of earth or stone where concentrated flows are present. This will help to detain runoff so sediment can settle out. The outlet can be a rock-lined depression in the containment berm.

3.4.2. Sizing and Design Considerations

3.4.2.1. A minimum storage of 134 cubic yards per acre of exposed soil drained is required for basins and traps. Traps and basins are designed so that flow paths through the trap or basin are as long as possible, to promote greater settling of soil particles. Sediment basin length must be twice the width or more if possible – the longer the flow path through the basin, the better. Side slopes for the excavation or earthen containment berms are 2:1 or flatter. Berms are made of well compacted clayey soil, with a height of 5 feet or less. Well mixed rock can also be used as a containment berm for traps. Place soil fill for the berm or dam in 6" layers and compact. The entire trap or basin, including the ponding area, berms, outlet, and discharge area, must be seeded and mulched immediately after construction.

3.4.2.2. An overflow outlet can be made by making a notch in the containment berm and lining it with rock. Rock in the notch must be large enough to handle overflows, and the downhill outlet should be stabilized with rock or other flow dissipaters similar to a culvert outlet. The overflow should be at an elevation so the dam will not overtop. Allow at least one foot of freeboard. Outlets must be designed to promote sheet flow of discharges onto vegetated

areas if possible. If the discharge will enter a ditch or channel, make sure it is stabilized with vegetation or lined.

3.4.3. Inspection and Maintenance

Inspect inlets, berms, spillways, and outlet areas for erosion after each rain exceeding 0.5 inch and every seven days. Repair gullied areas and any upslope areas contributing large volumes of sediment. Repair and reseed bare areas. Ensure that downstream receiving area is stable. Remove sediment before it fills half the trap or basin volume.

3.5. Inspection and Maintenance

3.5.1. CP is responsible for maintenaning the construction site in accordance with the site wide storm water management plan.

3.5.2. Inspection

Erosion and sediment controls must be inspected weekly and after each rain exceeding 0.5 inch. Keep records of inspection observations and actions taken, and file with other erosion and sediment control plan paperwork.

3.5.3. Maintenance

Daily inspect equipment and hydraulic oil systems at the beginning of the day. Repair or replace frayed or damaged lines or hoses before use in or near water and provide containment measures if required.

3.5.3.1. Keep erosion and sediment controls in good working order until the project is completed. Brush and other debris should be removed from work areas. Sediment accumulating behind silt fences or other sediment filters should be removed regularly. All structures that have become dislodged or damaged (such as silt fences, etc.) should be repaired within three days of discovery.

3.5.3.2. Make sure that waste materials, building materials, and supplies are properly tied down or contained so that wind and storm water runoff cannot carry the materials away. Fuel, lubricants, and hazardous waste products should be stored in an approved tank or other structure to avoid spills and runoff. Provide spill kits and containment material on-site, especially near fueling or equipment service areas. Maintain vehicles and equipment away from the site if possible. If maintenance must occur on-site, ensure that spills are cleaned up quickly.

Best Management Practices Plan
Dike C Buttress Construction – Phase 1

Purpose of the Best Management Practices Plan

The purpose of the Best Management Practices (BMP) plan is to evaluate potential sources of sediment and other pollutants at the project site and put controls in place that will effectively prevent pollutant discharges to surface and ground waters. Construction activities shall be performed in accordance with the Kingston site wide Storm Water Management Plan. This BMP is a guideline for the Dike C work activities. The following general pollution control requirements have been addressed in the BMP Plan, as applicable:

1. Control limited threat discharges to minimize impacts to water quality;
2. Prevent the discharge of pollutants associated with construction activities to surface waters;
3. Retain soil and sediment on site;
4. Permanently stabilize disturbed soils.

This plan has been developed based on an understanding of the current conditions of the watershed, a general knowledge of the previous activities at the site, and an anticipation of the proposed remediation activities scheduled for the site. This plan is intended to be a “living” document, in that as the Work at the site progresses, this plan must be periodically reviewed and adjusted to suit the actual conditions and situations as they develop. CIVIL PROJECTS and all SUBCONTRACTORS shall become familiar with this plan, and shall constantly monitor the site conditions, making appropriate modifications as needed.

Site Description:

The Kingston Fossil Plant Dike C is located along the Emory River / Watts Bar Lake in Roane County, Tennessee. Dike C is the containment embankment for the Kingston Fossil Plant ash pond and stilling basin. The toe of the embankment extends into Watts Bar Lake and is being armored with riprap and other materials to improve the stability of the containment structure.

Construction Activities Proposed:

This work involves buttressing Dike C of the ash pond/ stilling basin at the Kingston Fossil Plant. Work measures required to stabilize the site include:

A. Installation of sediment and erosion control measures for the site
B. Shaping of starter dike bench to improve drainage including the removal of existing pipes and placement of embankment fill.
C. Documentation of location and removal of trees and rootwads on the embankment
D. Surface preparation to allow filter placement.
E. Placement of sand filter on designated areas of slope above and below the water surface.
F. Placement of stone cover on the sand and construction of riprap buttress.
G. Revegetation of disturbed areas outside limits of riprap placement.
H. Removal of temporary sediment control measures.

Work Sequence:

1. Installation of perimeter sediment and erosion control measures in accordance with Section 02100 of the Specifications and the Sediment and Erosion Control Measures Section below.
2. Protection of existing geotechnical instrumentation as described in Section 02150 of these Specifications.
3. Surveying and photographing trees to be removed as described in Section 02150 of these Specifications.
4. Excavation and stockpiling of gravel from starter dike bench road as described in Section 02150 of these Specifications.
5. Shaping the starter dike bench to drain towards the Intake Channel as described in Section 02150 of these Specifications.
6. Removing drain pipes from starter dike bench and backfilling as described in Section 02150 of these Specifications.
7. Removing trees and other vegetation as described in Section 02150 of these Specifications.
8. Grubbing of rootwads as described in Section 02150 of these Specifications.
9. Removal of organic materials and topsoil as described in Section 02150 of these Specifications.
10. Placing manufactured sand product in tree rootwad removal areas as described in Section 02150 of these Specifications.
11. Grading surface to allow placement of granular filter as described in Section and 02410 of these Specifications.
12. Construction of access roads or temporary access ramps as described in Section 02410 of these Specifications.
13. Removal of the north limit of the existing bridge causeway as described in Section 02410 of these specifications.
14. Construction of riprap buttress as described in Section 02410 of these Specifications.
15. Removal of temporary sediment control measures in a segmental manner. Protection of existing site improvements or utilities from damage.

Sediment and Erosion Control Measures:

Due to the lack of available area downstream of the limits of disturbance caused by the presence of work extending into the Intake Channel there is inadequate area for a sediment pond. Alternative measures have been analyzed and will be employed to reduce total suspended solids (TSS) during construction. Measures to reduce TSS for the remainder of the site are described below:

1. Use of geotextile filter on the slopes, roads and other disturbed areas.
2. Placement of aggregate and riprap armor on slopes along the Intake Channel.
3. Installation of silt fence and fiber logs around the perimeter of the disturbed areas.
4. Seeding of areas disturbed by Construction activity outside of buttress placement.
5. The installation of rock check dams in temporary diversion ditches.

6. The use of booms or berms to contain sediment from affecting other portions of the Lake or Intake Channel.

Other Control Measures:

Dust generation shall be minimized by spraying with water.

Other State or Local Plans:

Work on-site shall adhere to all applicable state and local laws.

Maintenance:

All silt fences, fiber coils, booms and other sediment control devices shall be inspected as described below. Tears in the fence shall be repaired or portions of the fence replaced within 3 days of discovery. Sumps shall be cleaned of accumulated sediment when sediment depths exceed six inches. CP shall likewise ensure that all roads maintain adequate gravel cover and replace same to maintain the design template.

Inspections:

Qualified personnel shall inspect storm water control measures, discharge locations, vehicle exits, disturbed areas of the site and material storage areas at a minimum of every 7 calendar days and within 24 hours of every 0.5 inch precipitation event. Areas that have been temporarily stabilized shall be inspected at least once per month. Revisions to the BMP Plan based on the results of these inspections shall be implemented within seven days.

A report summarizing the scope of the inspection, names and qualifications of the inspecting personnel, the date of the inspection, observations as they relate to the BMP Plan and corrective actions shall be noted in the report. All reports shall be kept for at least three years after the date of the inspection or for one year after coverage under the site specific stormwater prevention plan. Each report shall be signed, and shall be available at the site for review.

Non-Storm Water Discharges:

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Preventive maintenance such as changing oil shall be performed off-site. Any spills of hydraulic fluid or oil from machinery shall be immediately cleaned up using rags, mops, kitty litter, sand, sawdust and placed in plastic cans before being disposed off in a legal manner. Containment of any spill using dikes, plastic liners or other methods will be used as necessary. Manufacturer's methods for spill cleanup will be posted on-site and site personnel will be made aware of the location of the procedural information and cleanup supplies. Any spill of toxic or hazardous substances will be immediately reported to the EPA. The site superintendent will ensure TVA has been notified and will assist with the clean up effort.

Materials expected to be on-site include: Petroleum based products, fertilizer, grass seed, mulch, geotextiles, geomembranes, steel, stone, coal combustion products and agricultural lime.

CP, Subcontractors and Owner:

The CP and each subcontractor shall implement the appropriate control measures outlined in this BMP plan. The project OWNER for the purpose of this submittal is the Tennessee Valley Authority.

Certification:

I certify under penalty of the law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this Certification"

_____

Printed or Typed Name and Title

_____

Signature

Representing:

Phone: Office:

Date: _____

END OF SECTION 02100

TECHNICAL SPECIFICATIONS

SECTION 02150 – SITE PREPARATION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

The conditions and description of work shown in other sections of these Specifications as well as the Engineering Drawings and Quality Control Plan apply to this Section.

1.2. SUMMARY

1.2.1. This section includes the following:

- Surveying and photographing trees to be removed.
- Excavation and stockpiling of gravel from starter dike bench road
- Shaping the starter dike bench to drain towards the Intake Channel.
- Removing drain pipes from starter dike bench and backfilling
- Removing trees and other vegetation.
- Grubbing of rootwads.
- Removal of organic materials and topsoil
- Placing manufactured sand product in tree rootwad removal areas
- Grading or smoothing of surface to allow placement of filter
- Removal of temporary sediment control measures in a segmental manner. Protection of existing site instrumentation or utilities from damage.

1.2.2. Related Sections include the following:

- Section 02100 – Erosion Control and Stabilization
- Section 02410 – Rock Buttress and Granular Filter Components

1.3. DEFINITIONS

1.3.1. Starter Dike

The starter dike is the lower in elevation portion of Dike C at approximate elevation 748 feet and below immediately adjacent to the Intake Channel/Watts Bar Lake.

1.3.2. Dike Bench

The dike bench is the relatively flat area at the top of the starter bench upon which the raised dike was constructed at approximate elevation 748 feet. A portion of this area remains and is currently covered with gravel and being used as a road.

1.3.3. Rootwads

Rootwads consist of the tree stump as well as roots greater than 2 inches in mean diameter.

1.3.4. Topsoil

Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than two inches in diameter; and free of weeds, roots and other deleterious materials.

1.3.5. Drain Pipes

Steel or plastic piping previously installed to drain the dike bench.

PART 2 - PRODUCTS

2.1. Remove cleared topsoil for use elsewhere or dispose of as it is not required in the landfill area but is required in borrow areas for use in re-vegetation.

2.2. Manufactured Sand Product is a durable quarry produced material free of deleterious amounts of shale conforming to Rogers Group Inc., Roane County, Quarry Manufactured Sand Product, Tennessee Department of Transportation Concrete Sand or QC Manager approved equal (Crab Orchard Manufactured Limestone Sand). The gradation shall conform to the following:

Sieve/Screen Size	Percent Passing
3/8	100
No. 4	70-100
No. 8	50-100
No.16	35-85
No. 30	15-60
No. 50	10-45
No. 100	2-25
No. 200	0-5

2.3. Embankment soils used for promoting positive drainage on the dike bench shall consist of clean soils that classify as CL or CH according to the Unified Soil Classification System. These soils shall not contain organic debris, ash or contain rock exceeding two inches in diameter

PART 3 - EXECUTION

3.1. PREPARATION

3.1.1. Protect and maintain geotechnical instrumentation from disturbance during construction. Install silt fencing along furthest downstream point practicable.

3.1.2. Locate and survey trees to be removed to document their position in case seeps occur. Photograph trees and relate them to the survey positions. Photography of trees is to be completed as per TVA-KIF-SOP-26, *Standard Operating Procedure For: Photograph Management For the TVA Kingston Fossil Plant Ash Recovery Project*.

3.1.3. Remove gravel from the starter dike bench road and stockpile for later use. Protect exposed areas as per Section 02100.

3.1.4. Through the placement of embankment material, shape the starter dike bench to slope towards the Intake Channel at 2% minimum slope. Prior to placement of embankment materials, exposed surfaces shall be stripped of all vegetation, organic soils and vegetative cover soils as well as any other deleterious materials. Exposed surfaces shall be scarified to promote lift bonding. The sequence of filling shall commence at the lowest section (in elevation) of the subject footprint and proceed upward in maximum eight-inch loose lifts in a manner to maintain positive drainage at all times. Positive drainage through minimum two percent cross slopes shall be maintained on all fill surfaces. The fill sequence shall also be performed in a manner that reduces the potential for uncontrolled sediment runoff.

Each lift of soil embankment shall be compacted with a tamping foot or sheep foot roller, or equivalent approved by the QC MANAGER, to a minimum of 95 percent of standard Proctor maximum dry density. Following initial compaction, the surface shall be sealed with a smooth drum roller to reduce the potential for surface water infiltration. Prior to placement of subsequent lifts the surface shall be scarified to promote lift bonding.

3.1.5. Remove piping below starter dike bench and place and compact clay fill into excavated areas. Compact clay fill using manual tampers or other means to achieve 95% of standard Proctor maximum dry density.

3.2. CLEARING AND GRUBBING

Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade. In general, all trees and brush with a mean diameter of 2-inches or greater at ground level shall be grubbed out. Where it is not reasonable to remove trees by a mowing with a bush hog or with similar mowing equipment the following guidelines apply:

3.2.1. All trees 2-inches in diameter or greater are to be surveyed in-place by TVA

3.2.2. All trees shall be cut using a handsaw or chainsaw and the cut tree and branches discarded.

3.2.3. Remove the remaining tree trunk, stump, and rootwad

3.2.4. Grub any remaining roots of the tree so that only 2 inches or smaller roots are left in place

3.2.5. The resulting cavity from removal of the rootwad shall be cleaned of loose soil and debris

3.2.6. The cavity shall then be backfilled with manufactured sand product and graded to blend and match adjacent slopes. If the rootwad cavity is below the water level at the time of the tree removal, the back of the excavation bucket shall be used to compact the sand material into the cavity and to grade the sand to match exiting slopes.

3.3. TOPSOIL STRIPPING

3.3.1. Sod and grass will be removed during topsoil strippingl.

3.3.2. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other materials. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

3.3.3. Dispose of excess topsoil as specified for materials disposal. All topsoil shall be immediately removed from the work area, with stockpiling of excavated topsoil on the embankment not permitted.

3.3.4. Employ perimeter Best Management Practices, such as silt fences or berms, to minimize runoff of silt and sediment laden waters from the stockpiled topsoil and waste materials.

3.4. PREPARE SURFACE FOR GRANULAR FILTER

3.4.1. CP shall prepare the exposed surface to receive granular filter placement by grading, blading, tamping or use of backhoe bucket to provide a relatively even, smooth surface free of protrusions, rocks, roots and other items that would keep the filter from making contact with the soil. This may also be achieved using an excavator with no teeth and a welded plate. Surfaces not immediately receiving filter shall be tracked as practicable with equipment moving up and down slopes. If tracking results in an irregular surface, utilize a plate tamper mounted on the excavator or the back of the bucket to “iron” or smooth the area. Tamp soft areas as practicable to obtain a smooth surface.

3.4.2. The removal of trees, organic material and root wads in accordance with this specification may extend to approximately 100 feet beyond the limits of the buttress construction, with the following provisions:

- The rootwad holes are filled with manufactured sand in accordance with this specification immediately upon excavation.
- The exposed soil area is inspected by CP on a daily basis for signs of erosion.
- Any area that is stripped of organics has the buttress placed in accordance with this specification within one week of stripping.

3.5.3 The thickness of each filter layer shall be determined for the QC Manager on a daily basis by the use of stakes. Stakes shall be installed at 25' increments and at slope breaks as a method of measuring the thickness of the filter layers. TVA shall perform complete surveys of prepared subgrade, the surface of each completed filter layer, and the final grade of the rip rap at 100' intervals corresponding to the intervals shown on the construction drawings. In addition to the standard 100' survey intervals, cross section surveys of Sta. 122+20, 122+50, 122+70, 122+90, 123+10, 123+30, 123+50, 123+70 and 123+90 shall also be performed. This survey information shall be submitted to the QC Manager at the completion of each survey interval.

END OF SECTION 02150

TECHNICAL SPECIFICATIONS

SECTION 02410 – ROCK BUTTRESS AND GRANULAR FILTER COMPONENTS

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK

This Specification covers placement of manufactured sand, No. 57 aggregate, No. 2 aggregate and riprap to construct the granular filter and rock buttress for Dike C of the Ash Pond and Stilling Basin for the Kingston Fossil plant. Erosion and sediment control measures shall conform to Section 02100– Erosion Control and Stabilization of these Specifications.

1.2. SUBMITTALS

Certification statements shall be provided by each supplier that the product conforms to these specifications. In addition all materials shall meet the testing schedules noted in the QC Plan.

PART 2 - MATERIALS

2.1. AGGREGATE

No. 2 aggregate and No. 57 aggregate shall consist of quarried stone generally meeting the requirements of Section 903 of the Tennessee Department of Transportation (TDOT) “Standard Specifications for Road and Bridge Construction” (Standard Specifications) latest edition. The gradation shall conform to the following:

No. 57 Aggregate

Sieve/Screen Size	Percent Passing
1.5	100
1	70-100
1/2	25-85
No. 4	0-35
3.5 mm	0-15
No. 8	0-5

No. 2 Aggregate:

Sieve/Screen Size	Percent Passing
3	100
2.5	90-100
2.0	10-100
1.5	0-100
1.0	0-15
3/4	0-5

2.2. TDOT CLASS B MACHINED RIPRAP

Riprap buttress stone shall consist of quarry stone meeting the requirements of Section 709 of the Tennessee Department of Transportation "Standard Specifications for Road and Bridge Construction" latest edition. Machined Riprap (Class B) shall vary in size from 3 inches to 2.25 feet (from 75 to 675 mm) with no more than 20% by weight being less than 6 inches in size (150 mm).

2.3. MANUFACTURED SAND PRODUCT

This product shall conform to Section 02150, Part 2, Paragraph 2.2 of these specifications.

Other sources of sand product may be approved by QC MANAGER subject to filter analysis based on gradation and the quality of the sand.

PART 3 - EXECUTION

3.1. GRANULAR FILTER

Granular filter shall consist of a minimum of six inches manufactured sand product placed on soil subgrade with the sand then overlain by six inches TDOT No. 57 aggregate which is in turn overlain by six inches TDOT No. 2 aggregate. Surfaces to receive granular filter shall be prepared to a condition free of large protrusions in accordance with this specification and as directed by the QC MANAGER. No filter shall be placed until the subgrade is approved by the QC Manager or the designated representative on the QC Team.

3.1.1. Sand Placement

The sand component of the graded filter shall be placed to a minimum thickness of six inches. This measurement shall be made perpendicular to the surface of the dike.

3.1.2. Underwater Placement

The sand component of the filter placed under water shall be performed in such a manner as to provide a minimum thickness of six inches and to prevent the segregation of the material during placement. One such method involves placement by excavator of overlapping buckets of sand. In some areas the sand thickness will likely exceed six inches and form a sinusoidal wave pattern of placement.

3.1.3. Stone Placement

Stone and riprap shall be placed to the minimum thickness indicated on the Drawings. Measurement shall be made perpendicular to the slope. All riprap shall be placed using a bottom up placement methodology.

3.1.4. Contamination Issues

Placed sand shall be covered with No. 57 stone as quickly as practicable. In no event shall sand remain exposed for more than 24 hours. Any contamination of sand from soil or ash shall be cause to remove and replace the sand. The action of covering of sand by No. 57 stone and No. 2 stone shall be performed in such a manner that aggregate cover will lag sand placement by five feet to reduce contamination risk. This lag may be adjusted based on field operations and conditions as deemed necessary by the QC Manager.

3.1.5. Riprap Replacement

Riprap may be placed by mechanical means using an excavator or loader. The maximum allowable drop height for riprap placement is two feet. The rock shall be placed to the depths, extents and template shown in the drawings. The surface of the riprap, upon completion, shall be graded as practicable into final position to ensure proper thickness and a uniform surface. Larger rocks shall be uniformly distributed with the small rocks and spalls filling the voids between the larger rocks.

3.1.6. Bridge Causeway Removal

The existing bridge causeway shall be removed to the limits and grades as shown on the drawings. To minimize the water velocity through this section of the intake channel, the causeway removal shall be performed prior to placement of the filter materials or the rockfill buttress as described herein and as shown on the drawings. The causeway material shall be removed once the bridge removal has been completed, with all causeway material removal to occur from south of the causeway excavation. The materials that are likely to be encountered during the causeway removal include clay, silt, sand, gravel, ash, rockfill and concrete rubble.

3.2. ACCESS TO CONSTRUCTION

3.2.1. Access to Work – Areas of Granular Filter

Riprap shall not be placed until the granular filter has been approved by the QC MANAGER or the designated representative on the QC Team. In order to access locations of riprap placement, temporary access ramps or roads may be needed. Where operating heavy equipment or trucks over the filter, additional cover shall be placed to a minimum total depth of 36 inches over the sand component of the filter. This cover shall consist of an additional 18 inches of No. 2 aggregate spread on access areas and covered on the surface with 6 inches of No. 57 aggregate. The No. 2 aggregate shall be spread in a single lift utilizing low ground pressure equipment conforming to Table 2 of Section 02373 of these Specifications or by using excavator buckets. The No. 57 aggregate shall be spread in a single lift. The temporary road surface can be reclaimed and re-used as needed. If aggregate is left in place a minimum cover of 3 feet of riprap is required. Where the No. 57 aggregate surface has been contaminated with ash, it shall be removed and wasted as directed by the QC MANAGER.

END OF SECTION 02410

TECHNICAL SPECIFICATIONS

SECTION 02936 – REVEGETATION

PART 1 - GENERAL

1.1. DESCRIPTION

This Work consists of furnishing all labor, equipment and materials for preparing the seedbed, adding soil amendments, and seeding disturbed areas both in borrow areas and adjacent to work zones.

1.2. RELATED WORK

A. Quality Control Plan

B. Section 02100 – Erosion Control and Stabilization

C. Section 02150 – Site Preparation

D. Section 02410 – Rock Buttress and Granular Filter Components

1.3. SUBMITTALS

A. Agronomic soil test results shall be submitted to the QC MANAGER.

B. Seed tickets, fertilizer certification and CaC03 equivalency certification shall be submitted to the QC MANAGER.

C. A sample of the netting proposed by CP shall be submitted to the QC MANAGER.

D. A sample of the Erosion Control Blanket shall be submitted to the QC MANAGER.

1.4. QUALITY CONTROL

1.4.1. Agricultural limestone shall be purchased from quarries approved by the Tennessee Department of Agriculture.

1.4.2. Fertilizer (bagged or bulk) either dry or liquid, must be manufactured and sold under the jurisdiction of the Tennessee Department of Agriculture, Ag Inputs Section.

1.4.3. All seed shall be certified by an Official Seed Certifying Agency. Seeds shall have been tested within nine months prior to use. Each kind of seed shall be separately packed and delivered to the project in a seed-tight bag. Each bag shall bear a tag or label bearing the seal of the Official Seed Certifying Agency. The analysis of the seed (% pure seed, % germination, date tested, etc.) shall be attached to the bag.

PART 2 - PRODUCTS

2.1. LIME

Agricultural ground limestone or its equivalent shall be used. The ground limestone must meet the following requirements: contain sufficient calcium and magnesium carbonate and be equivalent to not less than 80 percent calcium carbonate and must be fine enough so that not less than 90 percent shall pass through a US Standard No. 10 sieve and not less than 35 percent shall pass through a US Standard No. 50 sieve. Lime shall be applied at the rate specified in Paragraph 3.1. Agricultural ground limestone shall be purchased from quarries approved by the Tennessee Department of Agriculture.

2.2. FERTILIZER

The fertilizer shall be a commercial fertilizer containing the plant nutrients of nitrogen (N), available phosphoric acid (P2O5) and soluble potash (K2O) and shall be applied at the rate specified in Section 3.1. Bagged fertilizer shall display the following information on the bag or on a sticker or tag attached to the bag: net weight, brand and grade, guaranteed analysis, and name and address of manufacturer. Bulk fertilizer (dry or liquid) shall be accompanied by a statement from the manufacturer which contains the same information required for the bagged fertilizer.

2.3. SEED

2.3.1. Seed shall be applied to all disturbed areas, in accordance with Table 1 with no alterations except with the written consent of the QC MANAGER. The seed mixture shall be totally free of any wild onion, giant foxtail, nodding thistle, Johnsongrass, and Canada thistle seed and contain less than two percent other crop seed. The seed shall also comply with all Tennessee seed laws and regulations.

2.3.2. Seed shall be furnished fully tagged and labeled in accordance with the state laws and the US Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitations for bid. All seed must be from the latest crop available. No seed will be accepted with a date of test of more than nine (9) months prior to the date of delivery to the site. Any seed which has become wet, moldy or otherwise damaged in transit or storage will not be accepted.

2.3.3. All seed shall be delivered in separate bags or packages according to species or be a certified seed mixture. The tags from each seed bag shall be given to the QC MANAGER at the site. These tags will be required for final payment.

2.3.4. All legume seed shall be treated with inoculant prior to seeding in accordance with Paragraph 2.6 (Inoculants).

Table 1

Seed Mixtures	Hydroseed Rate (pounds/acre PLS*)
Application Period: February 1 to May 15	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
Korean Lespedeza	10
White Sweet Clover	10
Plus:	
Perennial or Annual Rye (2/15 to 4/15)	15
or	
Weeping Lovegrass (4/15 to 5/15)	3
Application Period: May 15 to August 1	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
Birdsfoot Trefoil	3
Weeping Lovegrass	3
Application Period: August 1 to November 15	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
White Sweet Clover	12
Birdsfoot Trefoil	8
Perennial Rye	15

*PLS Pure Live Seed is determined by multiplying the percent germination of the seed times the percent purity

Note: Any lawn areas disturbed shall be seeded with an approved lawn seed mixture. Mulch areas and plant 60 lbs. per acre winter wheat between November 15th and February 1st.

2.4. MULCH

The mulch shall consist of wheat straw, hay or rye straw. The mulch material shall be air dry, reasonably light in color and shall not be musty, moldy, caked or otherwise of low quality. The use of mulch that contains noxious weeds will not be permitted. Mulch shall be applied at the rate specified in Paragraph 3.3.

2.5. NETTING

Plastic netting manufactured from extruded rectangular mesh plastic, a minimum of 45-inches wide with approximately ¾-inch by 1-inch mesh openings, weighing not less than 2.6 pounds per 1,000 square feet (± ½ pound) shall be used. Other netting may be used if approved by the QC MANAGER. Staples will be U-shaped and made from steel wire of No. W1-W1.5 or W2 or adequate polymaterial fasteners as needed for installation conditions. The staples shall have a minimum length of six (6) inches. Staples shall be driven flush with the soil surface. Netting shall be installed per the specifications in Paragraph 3.3.

2.6. INOCULANTS

The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container or otherwise specified. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Four times the amount of the inoculant recommended by the manufacturer shall be used. Seed shall be sown within 24 hours of treatment and shall not remain in a hydroseeder longer than four (4) hours.

2.7. EROSION CONTROL BLANKET

Erosion control blanket shall be a manufactured product consisting of plastic netting on both sides with excelsior or coconut in between.

PART 3 - EXECUTION

3.1. SEEDBED PREPARATION

3.1.1. Immediately following final grading, the areas to be seeded shall be dressed to a reasonably smooth, firm surface, as determined by the QC MANAGER. Sludge shall be placed to a depth of two inches and incorporated into the top six inches of soil by disking or tilling. Lime shall be applied uniformly at the rate of seven (7) tons per acre. Fertilizer shall be applied at a rate sufficient to supply a minimum of 70 pounds of nitrogen (N), 145 pounds of phosphorus (P2O5) and 70 pounds of potash (K2O) per acre. These rates are subject to change depending on results of soil tests to be performed immediately prior to seeding. These soil tests shall be the responsibility of TVA.

3.1.2. The surface shall be tilled to a minimum depth of six (6) inches with either a tandem or offset disk meeting the following specifications:

A. Disk Size: 22 inches minimum

B. Disk Spacing: 13 inches maximum

C. Weight: 400 pounds per foot of cut minimum

D. Equipped with a drag of sufficient weight to remove any furrows left by the disk.

3.1.3. Seedbed preparation shall be suspended when soil conditions are not suitable for the preparation of a satisfactory seedbed. The QC MANAGER shall make this determination.

3.2. SEEDING

3.2.1. The specified mixtures of pure live seed (PLS) will be used on all disturbed areas using the seasonal variations shown.

3.2.2. All areas shall be seeded immediately following seedbed preparation. In the event the date does not concur with the seeding schedules specified, seeding shall be accomplished using any one of the specified rates or an equivalent rate designed to fit the site and weather conditions, as directed by the QC MANAGER.

3.2.3. All seed shall be broadcast evenly over the area immediately following tilling using a hydroseeder. The slurry PH shall not be allowed to drop below a pH of 5.0. In addition, the CP shall provide an accurate pH meter to monitor the slurry at all times.

3.3. MULCHING

3.3.1. Mulch materials shall be spread uniformly over all seeded areas. The mulch shall be applied uniformly over all seeded areas of less than 33% slope at the rate of two (2) tons per acre immediately following seeding.

3.3.2. Mulch netting meeting the requirements of Paragraph 2.5 shall be installed on all disturbed areas with slopes less than 33%. The netting shall be installed with a minimum six-inch overlap with adjacent rows. Staples shall be installed at four-foot maximum spacing on all edges and laps. Interior rows of staples shall be at four-foot maximum spacing with staples spaced at eight-foot maximum spacing along each row. Staples in interior row shall alternate in spacing with staples in an adjacent rows.

3.3.3. Erosion control blankets shall be employed to protect slopes 3H:1V or steeper unless otherwise shown on the Drawings. Install up and down the hill (vertical) for long slopes. Walk blankets down to ensure good contact with the soil. Use plenty of staples to keep blankets flat. Overlap blankets at 6 to 8 inches on sides, tops and bottoms. Do not stretch blankets, and do not exceed manufacturer's directions on maximum slope angle for the product. Refer to the Manufacturer's recommendations for installation patterns and stapling.

3.4. MEASUREMENT OF PERFORMANCE

3.4.1. TVA shall achieve 90 percent vegetative cover at the end of the second growing season. Such vegetative cover shall be measured using a transects method along the project baseline or other convenient baseline in borrow areas. This method shall involve taping along chosen transects and observing vegetation at each one-foot interval. At each observation point it will be noted whether vegetation is in contact with the transect. The sum of positive observations divided by total observations will determine compliance. Noticeably bare or eroded areas along or between transects shall be repaired even if the overall vegetative cover exceeds 90 percent.

3.5. EQUIVALENCY

3.5.1. These seeding specifications are intended to stabilize the project area through establishment of an adequate vegetative cover to provide interim protection and to enhance the wildlife utilization and development of the project area and the surrounding environment. The CP may be permitted to incorporate alternate seeding, fertilization and/or protection techniques which produce the intended results. The CP is encouraged to consider such applications. However, the CP is cautioned that if an alternate technique is utilized, the CP must assume the responsibility for the deviation from this specification and shall still meet the requirements of Paragraph 3.4.

3.5.2. Use of alternative techniques or other deviations from the standards and instructions provided herein must be approved by the QC MANAGER prior to implementation. The QC MANAGER will partially base his assessment on the purity of the constituents proposed, as well as the potential for interference of the proposed alternate techniques with other elements of the project and the overall design intent.

END OF SECTION 02936

Appendix C

Quality Control Plan

Quality Control Plan

Dike C Buttress
Segment B Construction
Work Plan 5
Kingston Fossil Plant
Harriman, Roane County, Tennessee

1. Purpose and Scope

This document is a site specific Quality Control (QC) plan that addresses construction and monitoring in association with the Dike C buttress project. The QC plan is intended to present minimum project requirements and shall serve as an outline for use in developing site specific protocols based on conditions encountered during the work.

2. Responsibility and Authority

A summary of QC personnel and associated responsibilities is presented below.

2.1. Regulatory Agency

Work conducted under this project shall be coordinated with the U.S. Environmental Protection Agency (EPA). Designated EPA personnel shall serve as the regulatory contact.

2.2. Quality Control Manager and Team

A professional engineer licensed in the state of Tennessee shall be designated as the QC Manager and shall be responsible for overall management of construction monitoring, testing and related documentation as outlined herein. The QC Manager shall determine appropriate test standards and methods for designated field observations and/or laboratory testing and shall be responsible for review of QC data to assess conformance with project requirements. At this time, the QC Manager is Jim Andrew, PE of Stantec Consulting Services Inc. or his duly appointed successor.

The QC Team shall consist of qualified personnel working under the direct supervision of the QC Manager. The QC Team shall be familiar with the materials used and the functional intent of the respective buttress components.

2.3. Owner

The plant and its ancillary functions are owned by the Tennessee Valley Authority (Owner). The Owner shall be responsible for overall management of construction activities to include but not be limited to contracting, administration and retaining the services of qualified consultants as required during the project.

The Owner and/or their Designee shall appoint one representative to serve as the Construction Manager. The Construction Manager shall be responsible for construction activities to include but not be limited to the character and sequence of work, coordination and scheduling.

The Owner's Civil Projects (CP) shall serve as the prime contractor for the Dike C buttress project. Any portion(s) of the work designated to others shall be conducted under the direct supervision of CP.

The Owner shall be responsible for providing qualified professionals to establish and enforce safety protocols related to the project.

3. Quality Control Activities

3.1. Meetings

Meetings shall be coordinated and conducted by the QC Manager and/or the Construction Manager on a weekly basis. The primary purpose of these meetings shall be to confirm that all parties involved are familiar with the project, required procedures and associated QC objectives along with any safety issues related to construction. Specific safety issues shall be the responsibility of designated safety professionals. Minutes of each meeting shall be prepared and distributed to all parties prior to the next meeting. These minutes shall be documented for inclusion with the project records.

Pre-construction meetings shall be held prior to initiating individual phases of construction. The QC Manager and other parties that will actively participate in the construction activities shall attend these meetings. Minutes shall be prepared and distributed as noted above.

3.2. Alternative Methods

Consistent with the overall objectives of the project, alternative construction and QC methods may be used during the course of the work. Proposed modifications shall be developed by the QC Manager and submitted to the Owner for review prior to incorporation into the project. Documentation of these alternative methods shall be prepared with copies retained for inclusion with the project records.

3.3. Contractor Submittals

Contractor submittals shall be reviewed and approved by the QC Manager prior to delivery and/or use of the respective construction materials. Copies of all submittals shall be included with the project records.

3.4. Conformance Testing

Conformance testing consists of periodic testing of materials and/or constructed products. Conformance testing shall be conducted by the QC Team as required by this plan and by additional discretion of the QC Manager. Results of conformance testing shall be reviewed by the QC Manager to assess conformance with project requirements. Copies of all conformance testing results shall be included with the project records.

3.5. Field Observations

The QC Team shall observe and document (as outlined herein) all construction activities associated with the project. Results shall be reported to the QC Manager (with the Owner copied) on a daily basis.

4. Ash Removal (within project limits)

Ash removal within the project limits shall be conducted under separate authority. Prior to construction of Dike C buttress components within subject areas, the Owner and/or their Designee shall obtain written approval from the regulatory contact and/or other appropriate parties that ash has been removed consistent with established guidelines and that construction may proceed.

5. Shot Rock Removal

Shot rock shall be excavated as practicable down to the original Dike C embankment soils. Care should be taken to ensure over excavation into the existing Dike C soils does not occur. Shot rock significantly embedded into the existing Dike C embankment can remain in-place.

6. Embankment

6.1. General

Embankment materials shall conform to the requirements established in Section 02150 of the technical specifications. Embankment shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

6.2. Quality Control Requirements

QC requirements are as follows:

a. Prior to placement, laboratory testing data shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. The exposed surface was inspected to:

   i. confirm embankment layers are properly compacted and uniform;

   ii. confirm that elevations are consistent with the project design;

iii. confirm that foundation benching has been provided which is conducive to horizontal lift construction.

c. Laboratory conformance testing for soil embankment shall consist of one natural moisture content test, standard engineering classification (i.e. sieve and hydrometer, Atterberg Limits and specific gravity) and standard Proctor test per source. This testing is in association with embankment placed on the starter bench road to promote positive drainage.

d. Field conformance testing shall include in-place density testing to provide documentation of the compaction operations at a minimum one test per two hundred linear feet of starter dike bench length or one test per day whichever is greater or at prescribed intervals established by the QC Manager.

e. Construction monitoring and field acceptance of embankment placement shall be documented by the QC Team

7. Manufactured Sand Product

7.1. General

Manufactured sand product materials shall conform to the requirements established in Section 02150 of the technical specifications. Manufactured sand product shall be placed as directed by the QC Manager.

7.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation for every 10,000 tons delivered to the site. This conformance test shall be termed “stockpiled materials”. Conformance testing shall also be performed on in-place material with gradation performed for every 500 tons placed, or as otherwise directed by the QC Manager.

c. Construction monitoring and field acceptance of manufactured sand product placement shall be documented by the QC Team.

d. For acceptance of the stockpiled manufactured sand material, the following must be shown:

   i. The conformance testing for every 10,000 tons delivered to the site meets all gradation specifications.

e. For acceptance of the in-place material, the following must be shown:

   i. A running average of the last 10 conformance tests must have a result of 5.0% or less on average passing the No. 200 sieve, independent of samples taken from the slope or bench areas.

ii. Maximum allowable percent passing the 200 sieve is less than 7.0% for any individual test.

iii. Running average conformance testing results for 10 tests cannot exceed 5.0 % passing the 200 sieve.

iv. In the event that conformance testing does not meet the criteria designated above, subject in-place material shall be removed as practical and replaced with a minimum of 6-inches of sand. Complete removal of the rejected sand is not necessary and removal is not to result in additional disturbance of the underlying subgrade.

v. If the average of the last 10 conformance tests is not in compliance with (iii) above, the subject material that contains the conformance test(s) that has exceeded 5.0% passing the No. 200 sieve by the greatest margin(s) shall be removed and replaced until the revised running average is in compliance with (iii) above. The length of material to be removed along the dike shall be the limits documented on the failing test result(s), but shall not be less than 20 feet.

vi. For grain size limits not including the #200 sieve, a maximum of one (1) test out of the most recent 10 tests may be outside the designated gradation ranges. For in-place testing not in compliance with this specification, the material shall be removed and replaced as per (v) above.

8. Aggregate

8.1. General

Aggregate materials shall conform to the requirements established in Section 02410 of the technical specifications. Aggregate shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

8.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation at every 30,000 tons delivered to the site. Gradation tests shall be performed on in-place materials at the rate of one test per 1,000 tons placed, or as otherwise directed by the QC Manager.

c. Construction monitoring and field acceptance of aggregate placement shall be documented by the QC Team.

d.

i. A maximum of one (1) test out of the most recent ten (10) may be outside of the designated gradation ranges.

ii. In the event conformance tests do not meet the designated criteria, the subject material shall be removed and replaced. The length of material to be removed along the dike shall be the limits referenced on the failing test result, but shall not be less than 20 feet.

9. Tennessee Department of Transportation Class B Machined Riprap

9.1. General

Riprap materials shall conform to the requirements established in Section 02410 of the technical specifications. Riprap shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

9.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation at every 30,000 tons delivered to the site or at any visual change in gradation as determined by the QC Team. The gradation test shall conform to ASTM D 5519-07 Test Method B.

c. Construction monitoring and field acceptance of riprap placement shall be documented by the QC Team.

10. Revegetation

10.1. General

Revegetation activities shall conform to the requirements established in Section 02936 of the technical specifications.

10.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. The QC Team shall observe seedbed preparation, fertilizer and lime application, seeding and mulching activities to confirm appropriate revegetation procedures per the project requirements. Construction monitoring and field acceptance shall be documented by the QC Team.

11. Project Documentation

Documentation shall be collected and maintained by the QC Manager (copied to the Owner) during the Dike C buttress project. Survey and generation of as-built drawings shall be performed by TVA. The QC Manager shall review as-built Drawings for completeness. This documentation shall include but not be limited to the following:

- Daily construction field reports;
- Observation reports;
- Contractor submittals;
- Material conformance data;
- Photographic documentation;
- Survey and as-built data;
- Construction issue and solution reports;
- Plan modifications; and
- Meeting minutes.

The digital location and access information for all project documentation will be supplied prior to the start of construction.

Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
Dike C Buttress Work Plan - Segment B Part 2 of 2
RAWP - 095

Date Submitted:
05/24/2011

Submitted to whom
Leo Francendese, EPA

Concurrence

Received	Not Applicable	TVA
☐	☒	Steve McCracken
☒	☐	Kathryn Nash
☒	☐	Ben Obrien 7DR for BObrien
☒	☐	Michelle Cagley MC

Received	Not Applicable	Jacobs
☒	☐	Jack Howard
☒	☐	Todd Woodson
☐	☐	
☐	☐	
☐	☐	
☐	☐	

Approvals

TVA Kathryn Nash Date 5/25/11

EPA _____ Date _____

Leo Francendese

Digitally signed by Leo Francendese
DN: cn=Leo Francendese, c=US, o=EPA/WMD, ou=ERRB, email=francendese.leo@epa.gov
Reason: I am approving this document in consult w TDEC
Date: 2011.05.31 13:20:57 -04'00'

cc:

- ☒ Anda Ray, TVA
- ☒ Barbara Scott, TDEC
- ☒ Brenda Brickhouse, TVA
- ☒ John Dizer, TVA
- ☒ Craig Zeller, EPA
- ☒ Dennis Yankee, TVA
- ☒ Kathryn Nash, TVA
- ☒ Cynthia Anderson, TVA
- ☒ Steve McCracken, TVA
- ☒ EDM
- ☒ Jack Howard, Jacobs
- ☒ Michelle Cagley, TVA
- ☒ Greg Signer, TVA
- ☒ KIF Incident Document Control
- ☒ Katie Kline, TVA
- ☒ Robert Pullen, Jacobs

RAWP-095

Kingston Ash Recovery Project
Time Critical Removal Action for the
Dike C Buttress Work Plan – Segment B
Part 2 of 2

Prepared by:
Jacobs

for the Tennessee Valley Authority

Revision	Description	Date
00	Dike C Buttress Work Plan – Segment B (Part 2 of 2) for TVA Review	May 17, 2011

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Appendices

Appendix A: Design Drawings
Appendix B: Design Specifications
Appendix C: Quality Control Plan

1 INTRODUCTION AND PURPOSE

The scope of this Work Plan is to describe the construction activities for a portion of the fourth and final section of the *Dike C Risk Mitigation Plan*, Document No. EPA-AWP-035. This section, identified as Segment B, covers buttress construction from Stations 128+00 to 123+50 as defined in the Stantec Consulting Services Inc. (Stantec) Design Drawings (Appendix A). Similar work is currently being performed on Segment A. The work plan for Segment A was approved in January 2011. Stantec remains the Engineer of Record (EOR) for the dikes and has designed the buttress system to increase the stability of the dike system at the Kingston Ash Recovery Project site. Work will be completed per the Specifications (Appendix B), the Quality Control (QC) Plan (Appendix C), and Design Drawings. The buttress will consist of a sand filter overlain by gravel and riprap. Work to be performed includes the removal of loose material, removal of topsoil, removal of tree stumps, and the placement of the graded filter system.

The buttress, as a whole, will extend from Dike D, in the north along the Emory River, to the Red Water Wetlands, along the plant intake channel in the south.

Stantec performed modeling of slope stability for Dike C and based on the information TVA determined that improvements were needed to prevent any sloughing of the slopes along the dike. Stantec developed a plan to buttress the dike and TVA, with the concurrence of the U.S. Environmental Protection Agency (EPA) implemented the plan. Material used for the construction of this section of Segment B remains the same as those previously approved for Segments A, C, and D. Since the material has not changed, no additional calculations have been provided.

2 DESIGN AND CONSTRUCTION COMPONENTS

This section of Segment B is to be constructed according to the Drawings, Specifications, and QC Plan developed by Stantec and included in the appendices of this Work Plan. As defined in the documents, the buttress is a sand filter system designed to allow water to seep out from the dike without displacing dike material. The sand filter is held in place by larger stone and covered with riprap. The riprap provides additional mass to prevent sloughing and is of the right size to reduce scouring during high flow events. TVA Civil Projects is responsible for the construction of the buttress. Civil Projects will utilize excavators and dozers to place the material. For placement of materials in water where excavators cannot easily reach, a rock slinger will be used to place the material. The rock slinger has been successfully used on Segments A and C to place the sand, the #57 stone, and the #2 stone. Survey crews utilizing boats will collect elevations of the material placed in the water. Crews will collect elevations during placement of the material in the water to ensure that the minimum required thicknesses are obtained. Excavators with global positioning systems will be utilized as needed to assist the surveying crews in obtaining elevations. Survey crews will also collect elevations for each of the materials placed.

Material will be delivered to the site in a two-stage approach. The first stage will receive the material at the Material Access and Processing or MAP area. The material will be stockpiled until needed. The stockpile area is set up to allow the material to be delivered without the trucks entering the Exclusion Zone. This reduces the need to decontaminate each delivery truck. The second phase of material delivery is to transport the material from the stockpile area to the buttress construction area using dedicated articulating dump trucks. The two-stage approach causes double handling which may alter the size of the material, but it is more practical than decontaminating each delivery truck. To ensure that the material placed for construction meets the design criteria, gradation samples of in-place material are collected at intervals specified in the Stantec QC Plan. Tested materials which do not meet specification are identified with a nonconformance report and the acceptability of the material is reviewed by the Stantec Quality Assurance (QA) Manager. Material that is not acceptable is to be removed.

Removal of the earthen causeway which leads to the bridge will be removed as part of this design. A specific work plan, *Intake Channel Causeway Removal Work Plan*, Document No. RAWP-094, for the removal of the material and the storage of the material has been prepared. Civil Projects plans to place riprap along the new bottom as they removal the causeway. The intake channel bridge is currently being removed by DEMCO under the *Intake Channel Bridge Removal Work Plan, Revision 3*, Document No. RAWP-087. A siphon system will be installed over the constructed buttress to allow the Stilling Pond to continue operations while the diffusers are removed to allow filter to be placed in this area. Siphon installation and diffuser removal is being handled separately under the, *Siphon Installation/Diffuser Removal Work Plan*, Document No. RAWP-093.

3 CONSTRUCTION QUALITY CONTROL

A Construction Quality Control (CQC) Plan was originally developed by Stantec and approved by TVA and EPA for Segments A, C, and D buttress construction. The CQC Plan was amended with Addendum 1 to increase the tolerances for material acceptance. Addendum 1 has been incorporated into the QC Plan for Segment C. At this time, no material changes have been approved for Segment B. However, the Bureau of Reclamation (BoR) has allowed for an increase in the tolerance for the #30 sieve for the sand material from 60 to 70% passing with the understanding that a filter test will be performed. Stantec has provided a letter detailing the results of the filter test indicating that the sand material meets acceptable standards. Materials placed for construction of the buttress must be tested for acceptance at the intervals specified in the plan. In-place materials that do not meet the acceptance criteria will be documented with a nonconformance report and reviewed by the Stantec QA Manager for acceptability. Material that is not acceptable will be removed, replaced, and retested.

Stantec will provide the field QC to ensure that construction is progressing according to design. The Stantec QA Manager will provide guidance and work with the Stantec EOR to resolve any deviations from the design documents. MACTEC Engineering and Consulting, Inc. (MACTEC) will provide independent testing of the material used for the construction of the buttress. Jacobs Engineering Group Inc. (Jacobs) will provide project QA support to ensure that construction is being documented as required. The Jacobs QA Manager or designee will also collect a photographic record of the cleaned dike surface to be approved by the onsite EPA representative prior to placement of material. The photographs and sign-off forms will be sent to the EPA for final acceptance, however work may proceed on concurrence from the onsite representative that the area is ready for material placement.

4 SAFETY AND HEALTH

The newly established Work Process Plan will be utilized for each contractor working on this project. The plans will be approved by the designated person. Task not previously identified in the work plans will require separate plans and work on these tasks will not begin until the Work Process Plan is approved.

5 TRANSPORTATION MANAGEMENT

No specific transportation management requirements are planned for this project.

6 WASTE MANAGEMENT

No specific wastes are planned to be generated from this project.

7 PROJECT MANAGEMENT

7.1 Organization

7.1.1 TVA Technical Contract Manager – Jamey Dotson

7.1.2 Jacobs Project Manager – Tod Woodson

7.1.3 Jacobs Construction Manager – Jim Sells

7.1.4 Jacobs Quality Assurance – Jim Moore

7.2 Contractors

7.2.1 Civil Projects Construction – John Miller

7.2.2 Stantec QC – Skip Layton

7.2.3 Stantec EOR – Don Fuller

7.2.4 MACTEC Materials and Testing – Jim Law

7.2.5 BoR Consultants to the EPA for Work Approval – Jim Lawrence

7.2.6 TVA Surveying – Surveying services

7.3 Work Breakdown Structure (WBS)

7.3.1 The WBS has already been developed and work will continue to follow the established structure. The general WBS number is 001108.

7.4 Cost Estimate

7.4.1 The baseline budget has already been established and includes construction of this section of Segment B.

7.5 Schedule

7.5.1 The schedule for this section of Segment B has been developed. Work on this Segment will begin once the work plan is approved. Completion is scheduled for August 23, 2011.

8 REFERENCES

Dike C Risk Mitigation Plan – Section D, Document No. EPA-RAWP-035. Prepared by TVA, December 1, 2009.

Dike C Risk Mitigation Plan – Section C, Document No. EPA-RAWP-035B. Prepared by TVA, April 13, 2010.

Construction Quality Control Plan Dike C Buttress – Addendum 001, Document No. EPA-AWP-035B. Prepared by Stantec, March 24, 2010.

Dike C Risk Mitigation Plan – Section A, Document No. EPA-RAWP-035C. Prepared by TVA, December 12, 2010.

Dike C Risk Mitigation Plan – Section A, Document No. EPA-RAWP-092. Prepared by TVA, March 11, 2011.

Intake Channel Bridge Removal Work Plan, Revision 3, Document No. RAWP-087. Prepared by Jacobs. Reissued to TVA with changes on April 5, 2011.

Siphon Installation/Diffuser Removal Work Plan, Document No. RAWP-093. Prepared by Jacobs. Issued for TVA review on April 26, 2011.

RAWP-094 Intake Channel Causeway Removal Work Plan, Document No. RAWP-094. Prepared by Jacobs. Issued for TVA review on May 9, 2011.

Appendix A

Design Drawings

36 | C | 10W229-91

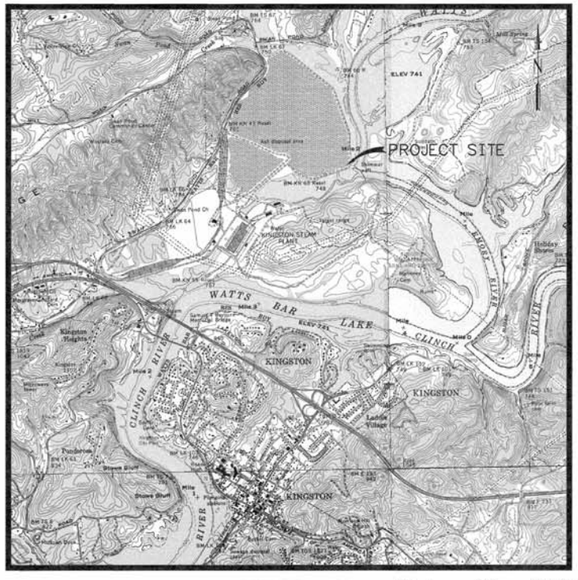
PLANS FOR CONSTRUCTION

DIKE C BUTTRESS
STAGE 1 - SEGMENT 'B'
WORK PLAN 5 (KIF-110028-WP-5)
KINGSTON FOSSIL PLANT

HARRIMAN, ROANE COUNTY, TENNESSEE

PREPARED FOR

TENNESSEE VALLEY AUTHORITY



VICINITY MAP

1000 0 2000 4000 FEET
GRAPHIC SCALE

PREPARED BY

Stantec

Stantec Consulting Services Inc.
1409 N. Forbes Rd.
Lexington, Kentucky
40511-2050
Tel. 859.422.3000
Fax 859.422.3100
www.stantec.com

INDEX OF SHEETS

10W229-91	COVER SHEET
10W229-92	GENERAL NOTES
10W229-93	EXISTING CONDITIONS
10W229-94	PROJECT SETTING
10W229-95	SEGMENT 'B' - GRADING PLAN
10W229-96	SEGMENT 'B' - EROSION PROTECTION LIMITS
10W229-97 - 10W229-103	SEGMENT 'B' - CROSS SECTIONS
10W229-104	CAUSEWAY SECTION
10W229-105	TYPICAL SECTIONS AND DETAILS
10W229-106	INSTRUMENTATION EXTENSION DETAIL

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
FILE: J:\CIVIL\DRAWINGS\PROJECTS\KIF\DIKE C BUTTRESS\DRAWINGS\WP5\10W229-91.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD
R -	-	-	-	-	-	-	-	-	-	-	-
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	-	-	-

ISSUED FOR CONSTRUCTION

DISCIPLINE: ENTERPAC

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
COVER SHEET
WORK PLAN 5 (KIF-110028-WP-5)

DON W FULLER II — REGISTERED ENGINEER — AGRICULTURE — COMMERCE — NO. 113120 — STATE OF TENNESSEE

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000	DATE 05/06/11	36	C	10W229-91	R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

GENERAL NOTES

1. DEFINITIONS: WHENEVER THE FOLLOWING TERMS ARE USED IN THESE DRAWINGS, IT IS UNDERSTOOD THAT THEY REPRESENT THE FOLLOWING:

   CP: THE TENNESSEE VALLEY AUTHORITY (TVA) CIVIL PROJECTS WHICH IS RESPONSIBLE FOR CONSTRUCTION FOR THIS PROJECT (OR THEIR DESIGNEE).

   EPA: THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WHICH IS THE REGULATORY AUTHORITY FOR THE SITE.

   ENGINEER: STANTEC CONSULTING SERVICES INC.

   OWNER: TENNESSEE VALLEY AUTHORITY (TVA) – KINGSTON FOSSIL PLANT

   TDOT: THIS MEANS THE TENNESSEE DEPARTMENT OF TRANSPORTATION AND SPECIFICALLY REFERENCES THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION. ANY MATERIAL DESIGNATED AS "TDOT" IS TO CONFORM TO THE MATERIAL STANDARDS NOTED AND PLACEMENT/INSTALLATION METHODOLOGY SPECIFIED IN THE CURRENT EDITION OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION".

   QUALITY CONTROL (QC) PLAN: REFERS TO A DOCUMENT THAT ESTABLISHES MINIMUM QUALITY CONTROL REQUIREMENTS, TESTING FREQUENCY AND QUALITY OVERSIGHT RESPONSIBILITY.

   QUALITY CONTROL (QC) MANAGER: A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TENNESSEE THAT IS RESPONSIBLE FOR THE QUALITY OF THE CONSTRUCTED PROJECT AS DEFINED IN THE QC PLAN. THE QC TEAM CONSISTS OF QUALIFIED PERSONNEL THAT WORK UNDER THE DIRECT SUPERVISION OF THE QC MANAGER. QC TEAM PERSONNEL ARE INDIVIDUALS THAT ARE FAMILIAR WITH THE MATERIALS UTILIZED AND THE BUTTRESS CONSTRUCTION COMPONENTS.

   CONSTRUCTION MANAGER: RESPONSIBLE FOR CONSTRUCTION ACTIVITY TO INCLUDE BUT NOT BE LIMITED TO THE CHARACTER AND SEQUENCE OF WORK, COORDINATION AND SCHEDULING.

2. THE PROJECT WILL BE CONSTRUCTED IN ONE STAGE. THE STAGE SHOWN ON THESE DRAWINGS INVOLVES THE BUTTRESS CONSTRUCTION FOR THE STARTER DIKE. THE WORK IS DIVIDED INTO LINEAR SEGMENTS NOTED AS A, B, C AND D RESPECTIVELY.

3. THESE DRAWINGS ARE PRESENTED AS AN AID IN PROJECT CONSTRUCTION BUT SHOULD NOT BE CONSTRUED AS THE ONLY REFERENCE NEEDED. CP SHALL BECOME FAMILIAR WITH AND ADHERE TO THE TECHNICAL SPECIFICATIONS, THE QC PLAN AND APPLICABLE ENVIRONMENTAL AND SAFETY REGULATIONS. NO MATERIALS SHALL BE PLACED IN THE INTAKE CHANNEL UNTIL APPROVED BY THE REGULATORY AUTHORITY AND THE OWNER.

4. TOPOGRAPHIC INFORMATION SHOWN IN THE DRAWINGS IS DATED AND DOES NOT REFLECT CHANGES SINCE THE TIME OF AERIAL PHOTOGRAPHY. AREAS OF HYDROGRAPHIC SURVEYING MAY NOT REFLECT CURRENT CONDITIONS AS THE UNDERWATER SURFACE CONSTANTLY CHANGES.

5. IT SHALL BE THE CP'S RESPONSIBILITY TO VERIFY THAT ALL UNDERGROUND UTILITIES DISCOVERED DURING THE UNDERGROUND LOCATING SWEEPS ARE RELOCATED OR OTHERWISE PROTECTED IN FULL COMPLIANCE WITH ANY REQUIREMENTS OF THE PLANT-ISSUED EXCAVATION PERMIT TO THE SATISFACTION OF THE OWNER AND IN ACCORDANCE WITH TVA PROCESSES AND PROCEDURES PRIOR TO THE GROUND DISTURBING ACTIVITIES, INCLUDING THE BORROW AREAS. WHERE UTILITIES ARE SHOWN OR INDICATED ON THE DRAWINGS, THE INFORMATION GIVEN IS IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION IN THE ENGINEER'S POSSESSION, BUT IS APPROXIMATE IN NATURE. THE DATA IS NOT WARRANTED TO BE EITHER COMPLETE OR CORRECT.

6. THE CP SHALL MAKE A CONCERTED EFFORT TO PREVENT ANY DISRUPTION OF UTILITY SERVICES, AND IF ANY UNINTENDED DISRUPTION OCCURS, THE CP SHALL COORDINATE THE SAFE AND IMMEDIATE RESTORATION OF THE SERVICE. IF DISRUPTION OF ANY UTILITY SERVICES IS UNAVOIDABLE, IT SHALL BE THE RESPONSIBILITY OF CP TO NOTIFY AFFECTED UTILITY USERS AND UTILITY OWNERS 48 HOURS IN ADVANCE. THE CP SHALL ALSO MAKE EVERY EFFORT TO RESTORE SAID SERVICES BEFORE QUITTING WORK FOR THE DAY. IN THE EVENT THIS CANNOT BE DONE, THE CP SHALL PROVIDE TEMPORARY SERVICE TO THE PROPERTY OWNERS UNTIL PERMANENT SERVICE CAN BE RESTORED.

7. EXISTING GEOTECHNICAL INSTRUMENTATION IS SHOWN ON THE DRAWINGS. THE CP SHALL PROTECT THIS INSTRUMENTATION FROM DAMAGE. THIS INSTRUMENTATION SHALL BE EXTENDED UPWARD DURING THE COURSE OF THE WORK.

8. ALL ENTITIES SHALL BE RESPONSIBLE FOR HEALTH AND SAFETY OF THEIR PERSONNEL AND SHALL MEET INDUSTRY STANDARD REQUIREMENTS. ALL ENTITIES SHALL ADHERE TO TVA REQUIREMENTS FOR SAFETY AND CONSTRUCTION.

9. THE CP SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL ACCESS ROADS, STAGING AREAS AND STORAGE AREAS USED DURING CONSTRUCTION, AND SHALL RESTORE SAID AREAS TO THEIR ORIGINAL CONDITION, OR BETTER ONCE CONSTRUCTION IS COMPLETE UNLESS DIRECTED BY THE OWNER TO RETAIN THE AREA "AS IS".

10. THE CP SHALL CONDUCT ALL OPERATIONS IN ACCORDANCE WITH APPLICABLE ENVIRONMENTAL PERMITS, RULES, LAWS AND REGULATIONS INCLUDED BUT NOT LIMITED TO THOSE SET FORTH IN CEC 19966, 20065 OR OTHER ENVIRONMENTAL REVIEW DOCUMENTS FOR THIS PROJECT.

11. THE CP IS RESPONSIBLE FOR SITE DRAINAGE THROUGHOUT CONSTRUCTION AND SHALL INSTALL TEMPORARY DRAINAGE STRUCTURES OR PUMP WATER AS NECESSARY TO PREVENT INTERFERENCE WITH THE WORK. SUCH TEMPORARY DRAINAGE FEATURES SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ENVIRONMENTAL PERMITS AND THE KINGSTON STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

12. THE CP SHALL NOTE SEQUENCING OF OPERATIONS IDENTIFIED IN THE DRAWINGS.

13. VEGETATIVE AND ORGANIC MATERIALS SHALL BE REMOVED AS DESCRIBED IN THE SPECIFICATIONS.

14. DRAINAGE CONDITIONS SURROUNDING EXISTING FACILITIES OUTSIDE THE PROJECT LIMITS ARE NOT ADDRESSED BY THE DRAWINGS. GRADING, SHAPING AND INSTALLATION OF DRAINAGE STRUCTURES MAY BE REQUIRED TO PROMOTE POSITIVE DRAINAGE. SUCH WORK SHALL BE DIRECTED BY OTHERS.

15. MATERIALS DELIVERED FOR INCORPORATION INTO THE WORK SHALL BE TEMPORARILY STORED IN AREAS SELECTED BY THE CP AND APPROVED BY THE OWNER. NO MATERIAL IS TO BE STOCKPILED WITHIN THE FORMER DREDGE CELL FOOTPRINT WITHOUT APPROVAL OF TVA, STANTEC, OR THE QC MANAGER. MATERIALS SHALL BE STORED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

16. THE EROSION AND SEDIMENT CONTROL MEASURES SHOWN AND AS INCLUDED WITHIN THE SPECIFICATIONS SHALL BE CONSIDERED THE MINIMUM; SUPPLEMENTAL MEASURES SHALL BE PROVIDED BY THE CP AS FIELD CONDITIONS DICTATE OR AS DIRECTED BY THE REGULATORY AUTHORITY.

17. BORROW AREAS SHALL BE GRADED AND VEGETATED IN CONFORMANCE WITH PROJECT REQUIREMENTS, SUBJECT TO ENVIRONMENTAL REGULATIONS FROM OTHER AGENCIES, AND SHALL BE PERMITTED IF REQUIRED BY REGULATION. IT SHOULD BE NOTED THAT THERE MAY BE REGULATORY RESTRICTIONS ASSOCIATED WITH CLEARING A SITE.

18. DURING CONSTRUCTION, THE CP SHALL INSPECT, CLEAN, AND MAINTAIN ALL SEDIMENT CONTROL DEVICES AND PROVIDE REPORTING AS REQUIRED BY THE SPECIFICATIONS AND REGULATIONS ON SAID ITEMS.

19. THE CP SHALL CONTROL FUGITIVE DUST EMISSIONS DURING CONSTRUCTION IN SUCH A MANNER AS TO COMPLY WITH APPLICABLE REGULATIONS. DUST CONTROL MEASURES SHALL BE SUBJECT TO APPROVAL OF THE QC MANAGER AND THE OWNER.

20. BORROW AREAS SHALL BE MAINTAINED IN SUCH A MANNER AS TO PROMOTE POSITIVE DRAINAGE, REDUCE EROSION OF SOILS AND PROVIDE STABLE EXCAVATIONS. FINAL GRADE SLOPES SHALL BE NO STEEPER THAN 3H:1V AND INTERIM SLOPE CONDITIONS SHALL NOT ABRUPTLY TERMINATE OR IMPOUND WATER.

21. DURING BORROW EXCAVATION, SATISFACTORY MATERIALS SHALL BE SEGREGATED FOR USE AS STARTER DIKE BENCH EMBANKMENT. SATISFACTORY MATERIALS ARE SOILS THAT CLASSIFY AS CL OR CH ACCORDING TO THE UNIFIED SOILS CLASSIFICATION SYSTEM. SATISFACTORY MATERIALS WHICH CONTAIN EXCESSIVE MOISTURE SHALL BE STOCKPILED, BLADED, DISKED, OR CHEMICALLY TREATED AS NECESSARY TO PERMIT ADEQUATE DRYING. CLASSIFICATION OF SOIL AS SATISFACTORY OR UNSATISFACTORY SHALL BE DETERMINED BY THE QC MANAGER.

22. UNSATISFACTORY MATERIALS SHALL REMAIN AT THE BORROW SITE. NO SATISFACTORY MATERIAL SHALL BE WASTED WITHOUT AUTHORIZATION BY THE OWNER. MOISTURE CONTENT SHALL NOT BE DEEMED AN APPROPRIATE CAUSE TO HAVE A MATERIAL DEFINED AS UNSATISFACTORY.

23. GRADING OF STOCKPILES SHOULD BE MINIMIZED. HOWEVER, STOCKPILES SHALL BE GRADED TO MAINTAIN POSITIVE DRAINAGE AT ALL TIMES. THE SIDE SLOPES SHALL HAVE 3H:1V SLOPES OR FLATTER. THE TOP OF THE STOCKPILE SHALL HAVE A MINIMUM TWO PERCENT SLOPE. MATERIALS SHALL BE SEGREGATED AS DIRECTED BY THE QC MANAGER.

24. SOIL STOCKPILES THAT WILL NOT BE DISTURBED FOR 21 DAYS OR MORE SHALL BE TEMPORARILY SEEDED WITH WHEAT OR RYE AT A RATE OF 60 LBS/ACRE AND SHALL BE COVERED WITH MULCH.

25. ALL PIPE REMOVAL AND TRENCHING SHALL BE CONDUCTED IN STRICT ACCORDANCE WITH APPLICABLE TVA PROCESS AND PROCEDURE REQUIREMENTS.

26. PIPE REMOVAL AT THE LOCATIONS NOTED ON THE DRAWINGS SHALL REQUIRE BACKFILL. SOIL BACKFILL AND EMBANKMENT SHALL BE PLACED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.

27. GEOTEXTILES USED FOR CONSTRUCTION SHALL BE CERTIFIED BY THE MANUFACTURER AS CONFORMING TO THE PROJECT REQUIREMENTS. GEOTEXTILES SHALL NOT BE UTILIZED AS FILTER UNLESS APPROVED BY TVA. IT MAY BE USED AS A TEMPORARY MEASURE AND REMOVED.

28. CERTIFICATIONS OF MATERIAL QUALITY AND CONFORMANCE TO PROJECT REQUIREMENTS SHALL BE SUBMITTED TO THE QC MANAGER FOR APPROVAL PRIOR TO INSTALLATION.

29. ALL SURFACES SHALL BE APPROVED BY THE QC MANAGER PRIOR TO EMBANKMENT OR BUTTRESS CONSTRUCTION.

30. THE CP SHALL DEVELOP A HAUL ROAD PLAN PRIOR TO INITIATION OF CONSTRUCTION AND SUBMIT IT TO THE QC MANAGER FOR APPROVAL.

31. THE CP SHALL BE RESPONSIBLE FOR CONSTRUCTION SURVEYOR SELECTION AND COORDINATION OF ALL CONSTRUCTION RELATED SURVEYING. ALL ESTABLISHED TVA BENCH MARKS OR OTHER MONUMENTS SHALL BE PRESERVED AND PROTECTED. ANY ESTABLISHED MARKER OR BENCHMARK THAT IS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED BY TVA SURVEYING SERVICES.

32. THE CONSTRUCTION MANAGER SHALL COMMUNICATE CONSTRUCTION ISSUES, PROBLEMS OR DISCREPANCIES IN THE DRAWINGS TO THE QC MANAGER AND OWNER IMMEDIATELY UPON BECOMING AWARE OF SUCH PROBLEMS.

33. ADDITIONAL GEOTECHNICAL INSTRUMENTATION BEYOND THAT CURRENTLY DEPICTED MAY BE INSTALLED DURING CONSTRUCTION.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST
R –	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–

R 0: ISSUED FOR CONSTRUCTION

SCALE: NONE EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
GENERAL NOTES
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-92 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

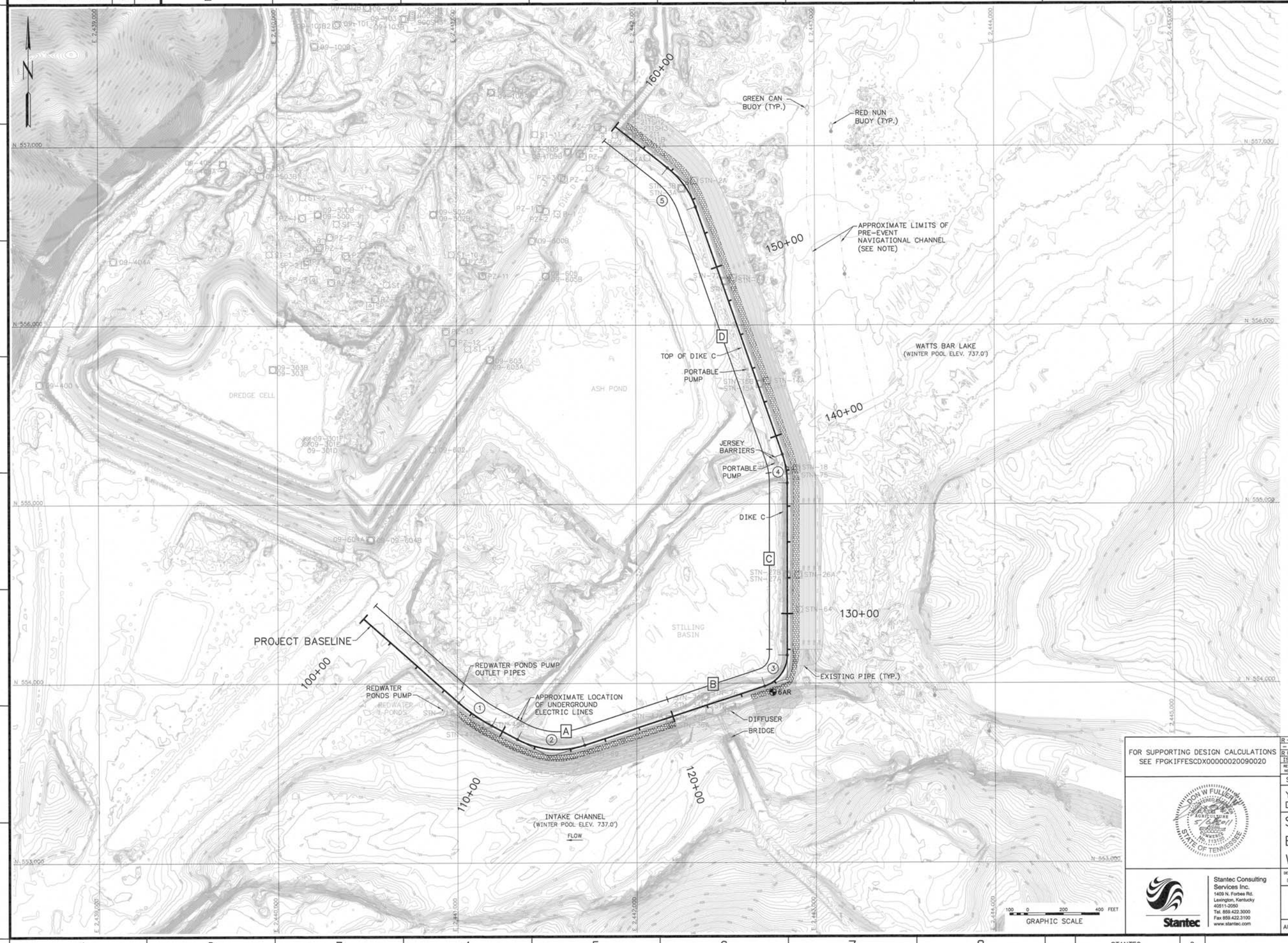

TABLE OF BASELINE COORDINATES			
PROJECT BASELINE	STATION	NORTHING	EASTING
BEGIN	100+00.00	554,363.86	2,440,477.77
END	160+00.00	557,109.43	2,441,888.38

BASELINE CURVE DATA

①
P.I. STA. = 108+20.74
NORTHING = 553,819.18
EASTING = 2,441,091.71
Δ = 13°20'06"
R = 974.68'
T = 113.94'
L = 226.85'
E = 6.64'
P.C. STA. = 107+06.80
P.T. STA. = 109+33.65

②
P.I. STA. = 112+99.93
NORTHING = 553,591.92
EASTING = 2,441,514.77
Δ = 46°19'10"
R = 479.84'
T = 205.26'
L = 387.92'
E = 42.06'
P.C. STA. = 110+94.67
P.T. STA. = 114+82.59

③
P.I. STA. = 126+71.85
NORTHING = 554,024.61
EASTING = 2,442,840.47
Δ = 71°45'50"
R = 182.94'
T = 132.33'
L = 229.13'
E = 42.85'
P.C. STA. = 125+39.52
P.T. STA. = 127+68.65

④
P.I. STA. = 138+12.12
NORTHING = 555,200.41
EASTING = 2,442,843.77
Δ = 19°21'32"
R = 479.84'
T = 81.84'
L = 162.13'
E = 6.93'
P.C. STA. = 137+30.28
P.T. STA. = 138+92.41

⑤
P.I. STA. = 154+96.30
NORTHING = 556,792.40
EASTING = 2,442,289.43
Δ = 32°28'34"
R = 479.84'
T = 139.75'
L = 271.98'
E = 19.94'
P.C. STA. = 153+56.55
P.T. STA. = 156+28.53

SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
4. SEGMENTS D, C, B (WP3), & A AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
5. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/06/2011 USER: ELLISDA, DOC
\\SERVER-SCI\SCI\ENVIRONMENTAL\DRAWINGS\WP5\WP5_SFC\10W229-93.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	DISCIPLINE/INTERIM
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: 1"=200' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
EXISTING CONDITIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-93 | R 0

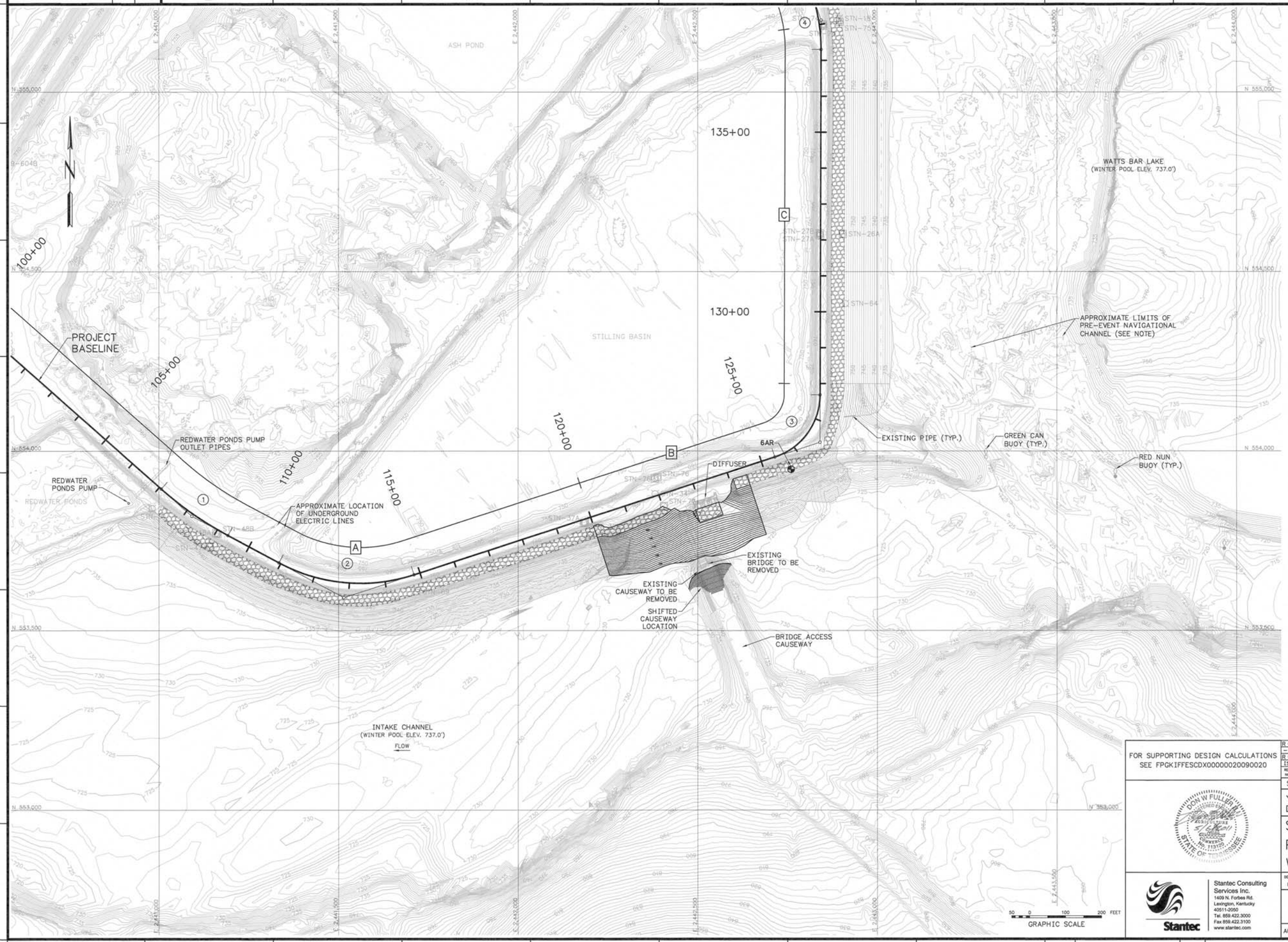
STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:200
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

36 C 10W229-93

36 | C | 10W229-94



SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. SEE 10W229-93 FOR PROJECT BASELINE COORDINATES AND CURVE DATA.
4. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
5. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLI INTERFAC

SCALE: 1"=100' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
PROJECT SETTING
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

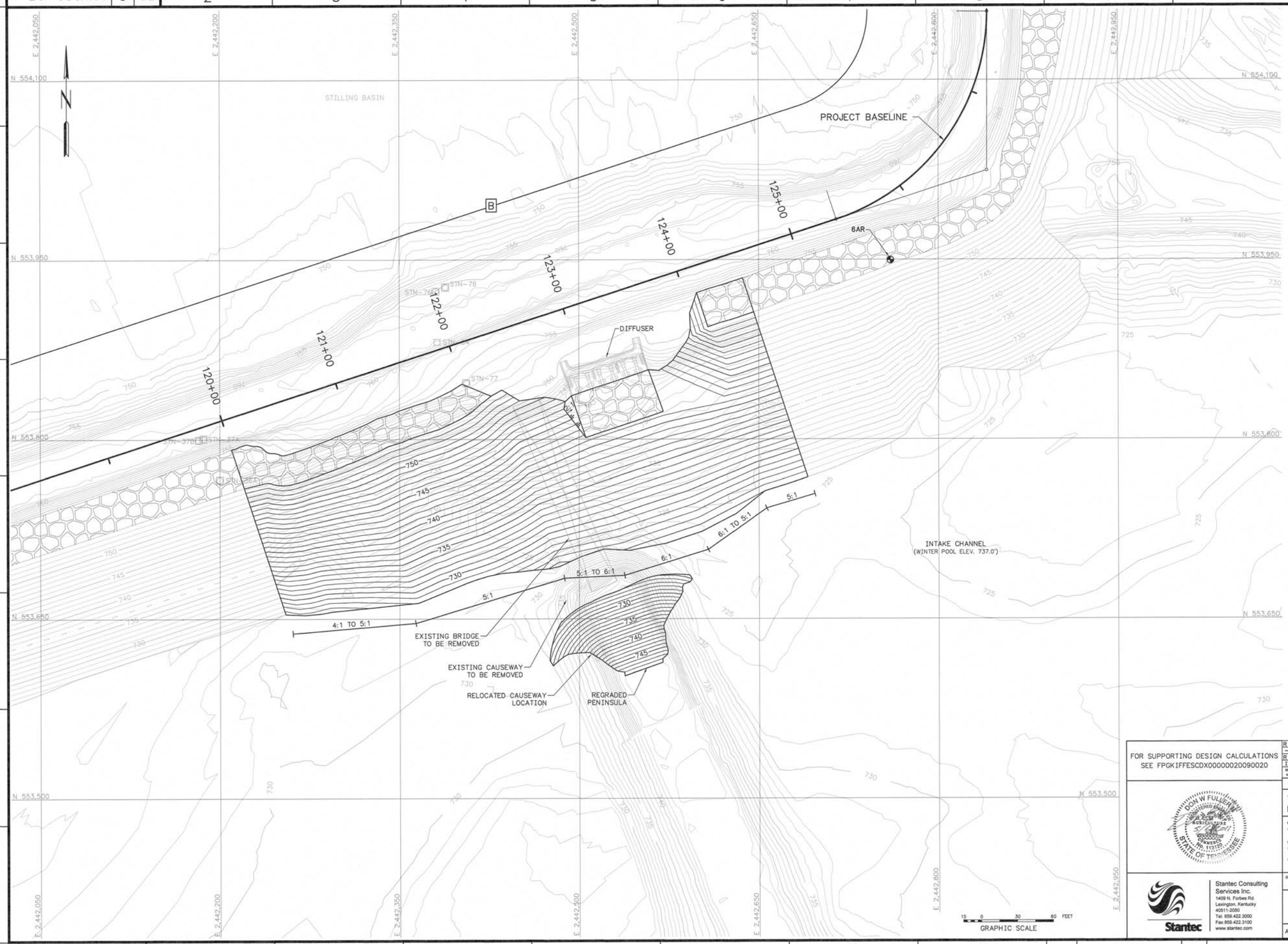
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-94 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:100
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISDL DGN: \\US1243-PW\WORKGROUP\TVA\ACTIVE\1729566\ENVIRONMENTAL\DRAWING\WP5\10W229-94.DGN



SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. SEE 10W299-93 FOR PROJECT BASELINE COORDINATES AND CURVE DATA.
4. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
5. SEGMENT B (WP-3) AND SEGMENT A AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
6. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: 1"=30' EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' – GRADING PLAN
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-95 | R 0

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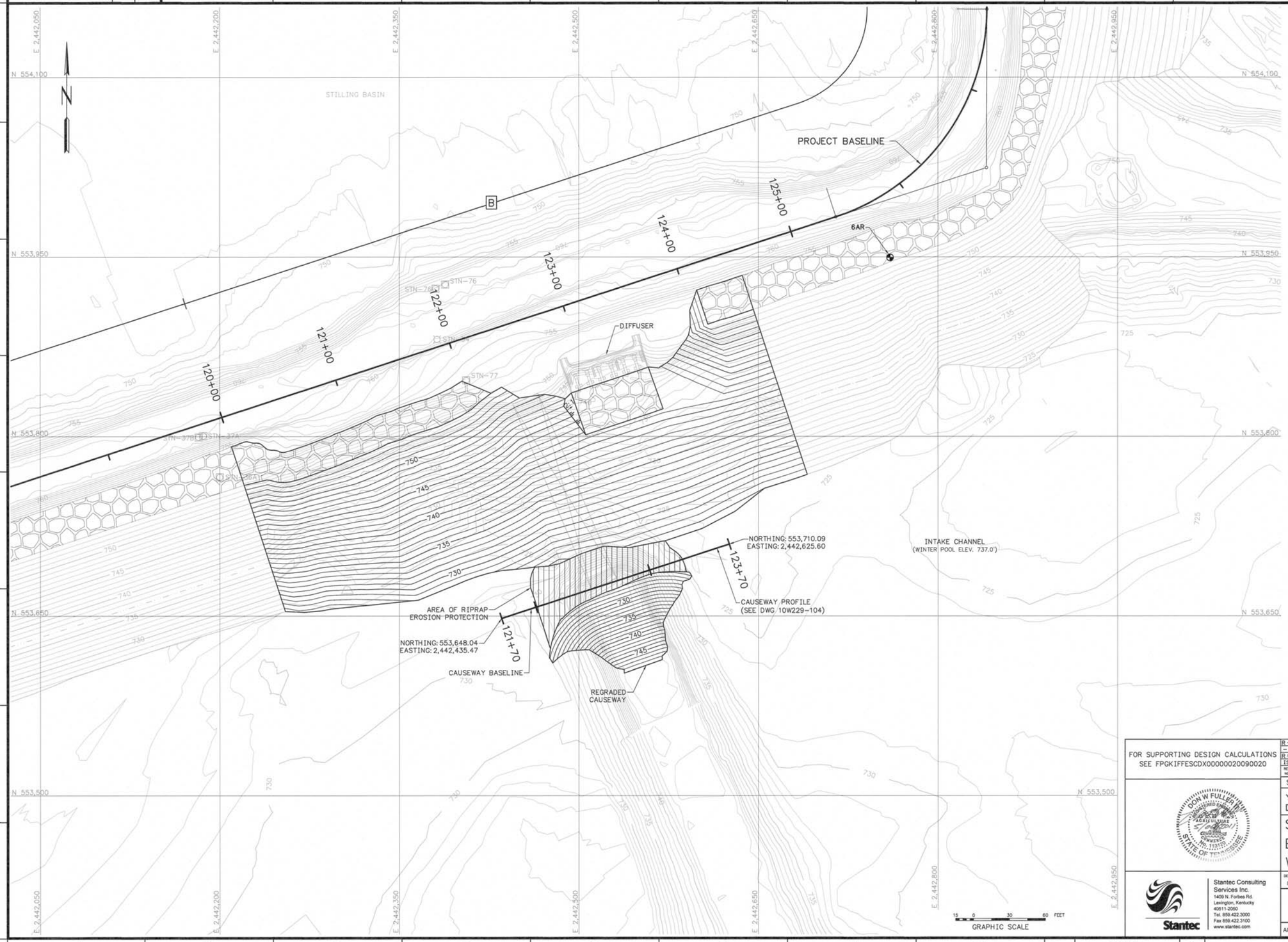
Fax 859.422.3100
www.stantec.com

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:30
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



SEGMENT STATIONS

SEGMENT 'A' – STA. 100+00.0 TO STA. 120+00.0
SEGMENT 'B' – STA. 120+00.0 TO STA. 128+00.0
SEGMENT 'C' – STA. 128+00.0 TO STA. 138+00.0
SEGMENT 'D' – STA. 138+00.0 TO STA. 160+00.0

INSTRUMENTATION LEGEND

STN-1 SLOPE INCLINOMETER (SI)
STN-2 PIEZOMETER (PZ)
STN-3 SETTLEMENT PLATFORM (SP)

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

NOTES

1. TOPOGRAPHIC MAPPING WAS GENERATED FROM A LIDAR SURVEY PERFORMED ON APRIL, 2009 BY TUCK MAPPING SOLUTIONS, INC.
2. THE HYDROGRAPHIC CONTOURS SHOWN HERE WERE PROVIDED BY TVA.
3. SEE 10W299-93 FOR PROJECT BASELINE COORDINATES AND CURVE DATA.
4. THE NAVIGATIONAL CHANNEL LIMITS SHOWN WERE PROVIDED BY TVA USING U.S. ARMY CORPS OF ENGINEERS NASHVILLE DISTRICT DATA AND WAS REVIEWED BY THE U.S. COAST GUARD FOR ITS APPROXIMATE LOCATION. THE LOCATION SHOWN IS PRE-EVENT AND IS SUBJECT TO CHANGE WHEN CLEAN-UP OPERATIONS ARE COMPLETED.
5. SEGMENT B (WP-3) AND SEGMENT A AS DEPICTED REPRESENTS THE PROPOSED DESIGN; NOT AN AS-BUILT CONFIGURATION.
6. 6AR IS AN ENVIRONMENTAL MONITORING WELL INSTALLED AND MAINTAINED BY TVA ENVIRONMENTAL GROUP. SPECIFICATIONS FOR IT'S EXTENSION SHOULD BE OBTAINED BY TVA.

ISSUED FOR CONSTRUCTION

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
\\US1243-F01\WORKGROUP\17361\ACTIVE\175660003\ENVIRONMENTAL\DRAWING\WP5\REVISE_IFC\10W229-96.DWG

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APVD	ISSD	PROJECT ID	AS CONST	REV CD
R-0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: 1"=30' EXCEPT AS NOTED

DISCIPLINE: HYDRAUL

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
EROSION PROTECTION LIMITS
WORK PLAN 5 (KIF-110028-WP-5)

DON W FULLER III REGISTERED ENGINEER AGRICULTURE COMMERCE No. 113131 STATE OF TENNESSEE

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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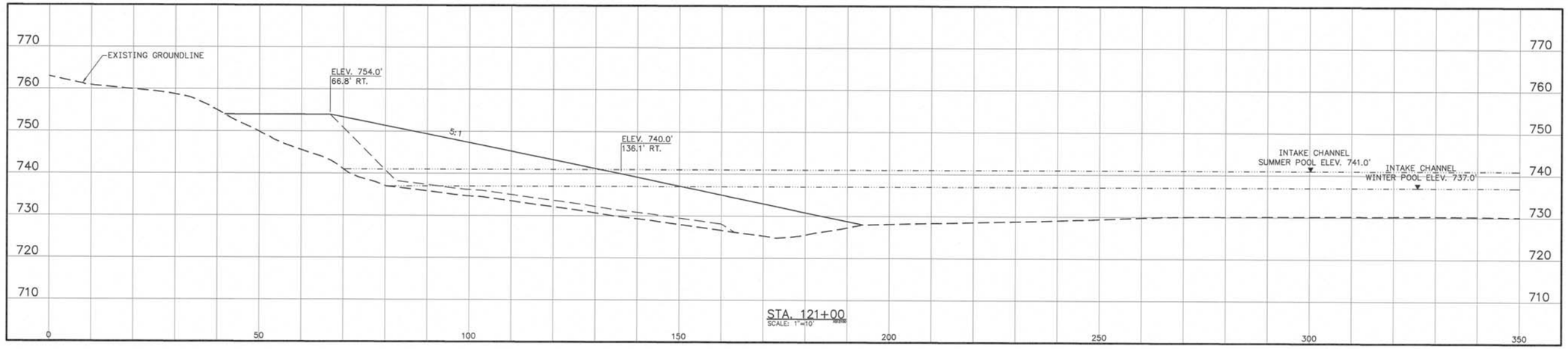
KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-96 | R 0

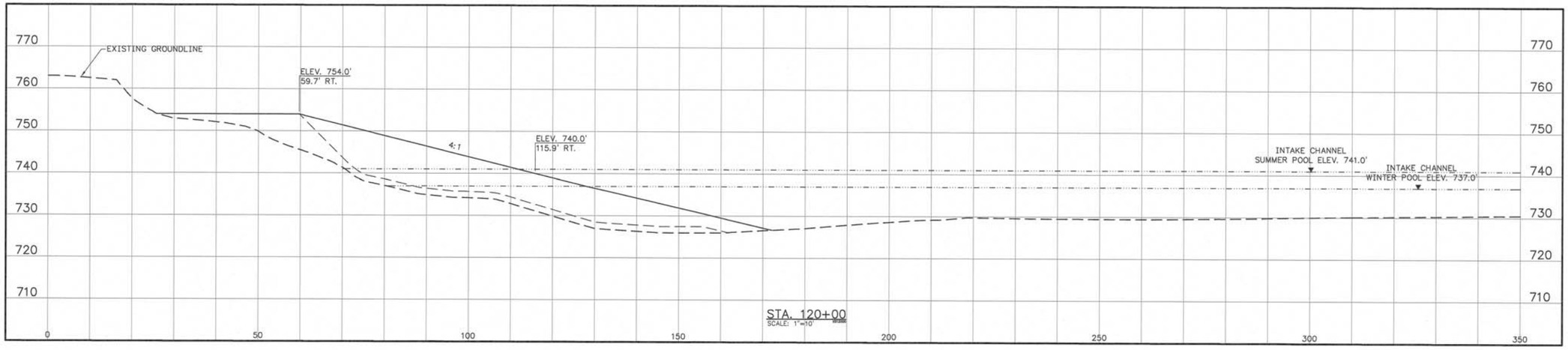
PLOT FACTOR:30
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

STANTEC	0
TASK COMPLETED BY:	REV NO.



STA. 121+00
SCALE: 1"=10'



STA. 120+00
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000200900 20

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–
ISSUED FOR CONSTRUCTION										

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRISLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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FOSSIL AND HYDRO ENGINEERING

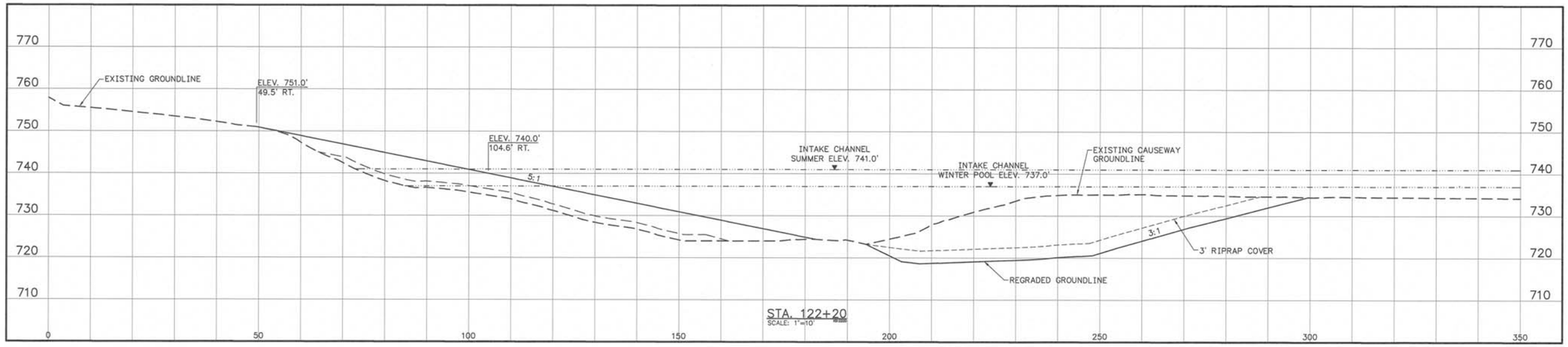
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-97 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
\\SERVER-TFD\WORKGROUP\TVA\ACTIVE\10W229\DWG\DSN\DRAWINGS\DSN\DRAWING\WP5\DEVCL_DTC\10W229-97.DWG



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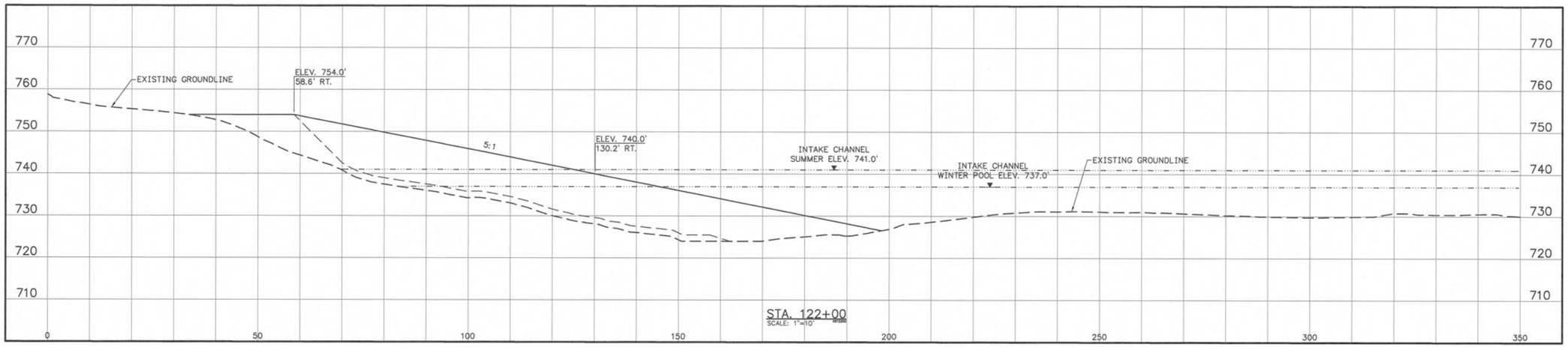

STA. 122+00
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD.
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

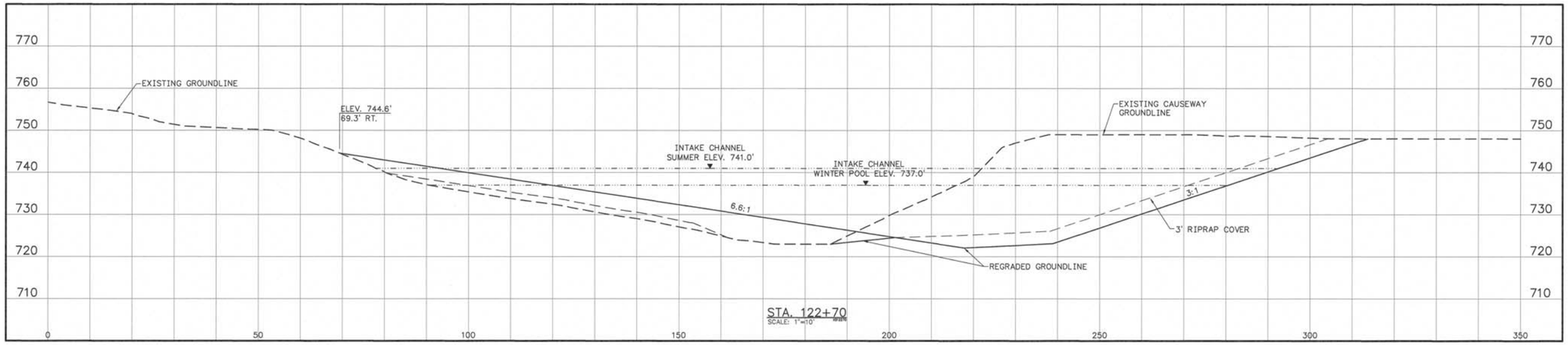
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-98 | R 0

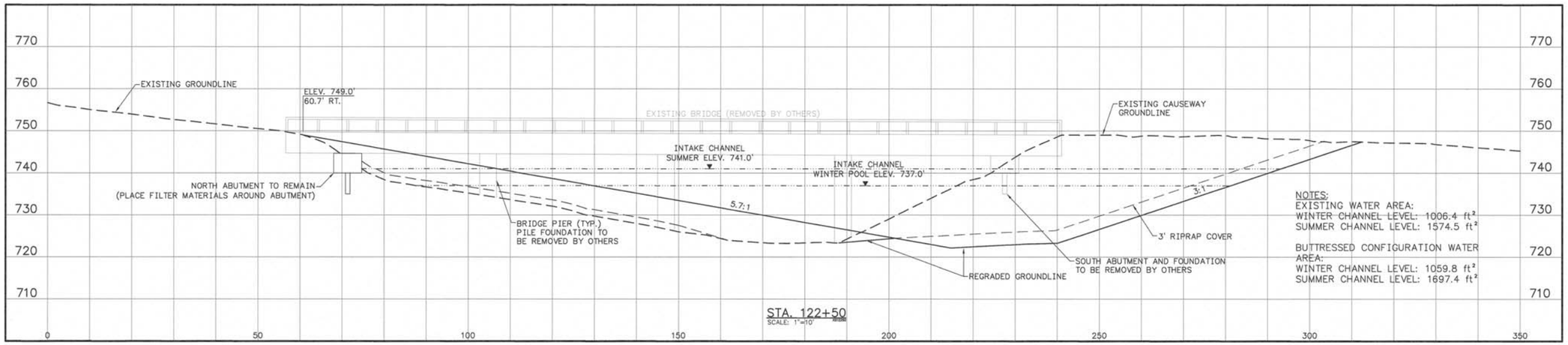
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C 10W229-98





NOTES:
EXISTING WATER AREA:
WINTER CHANNEL LEVEL: 1006.4 ft^2
SUMMER CHANNEL LEVEL: 1574.5 ft^2

BUTTRESSED CONFIGURATION WATER AREA:
WINTER CHANNEL LEVEL: 1059.8 ft^2
SUMMER CHANNEL LEVEL: 1697.4 ft^2

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	DISCIPLINE INTERFACE
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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FOSSIL AND HYDRO ENGINEERING

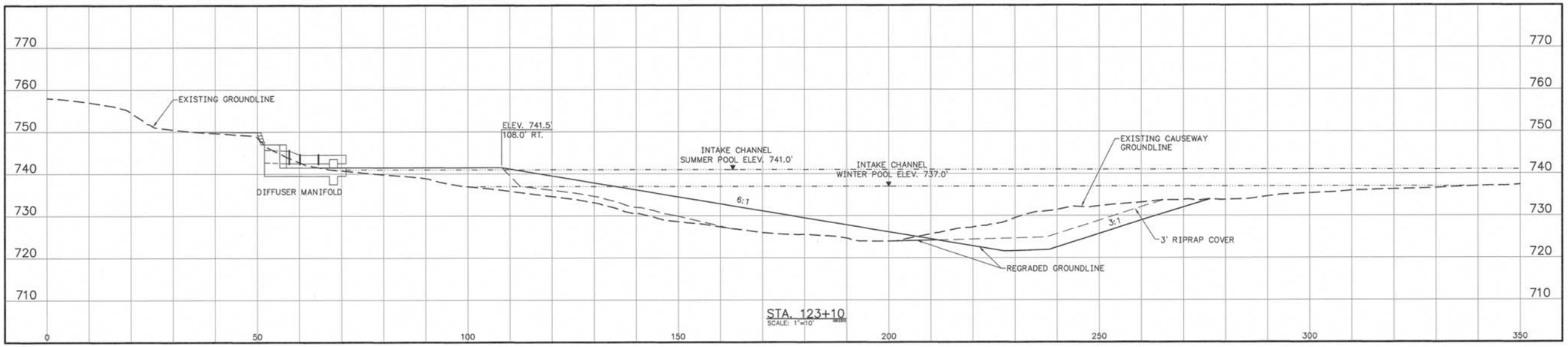
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-99 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

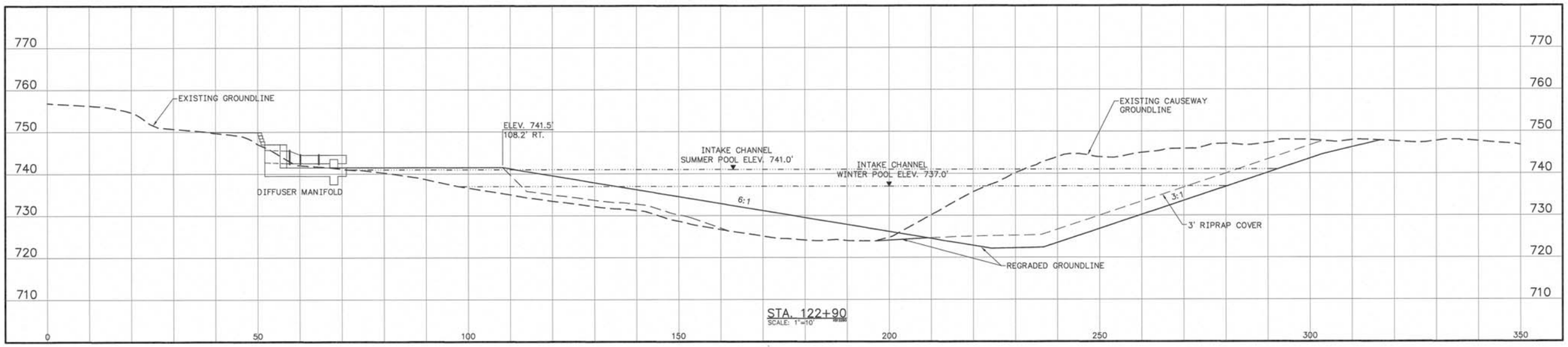
PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 C 10W229-99



STA. 123+10
SCALE: 1"=10'



STA. 122+90
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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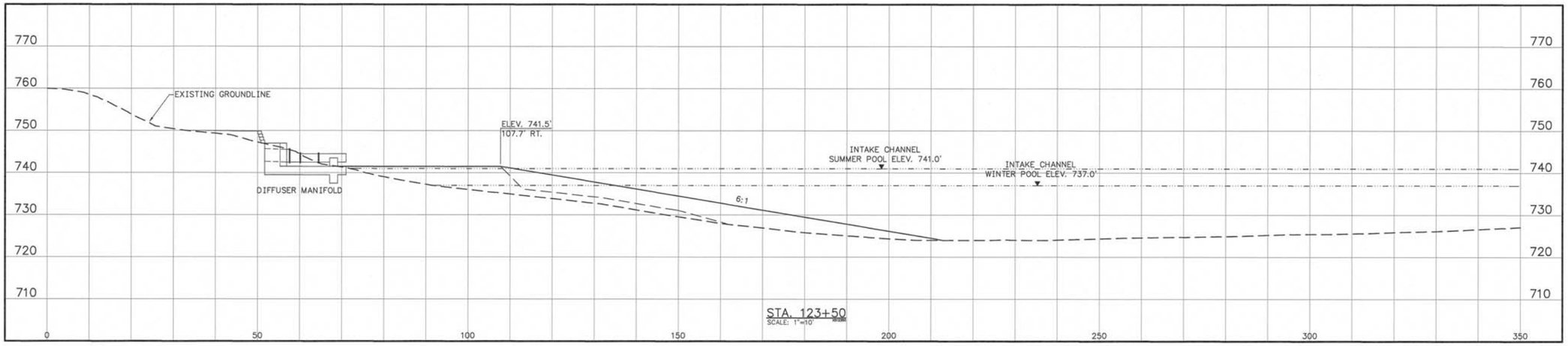
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-100 | R 0

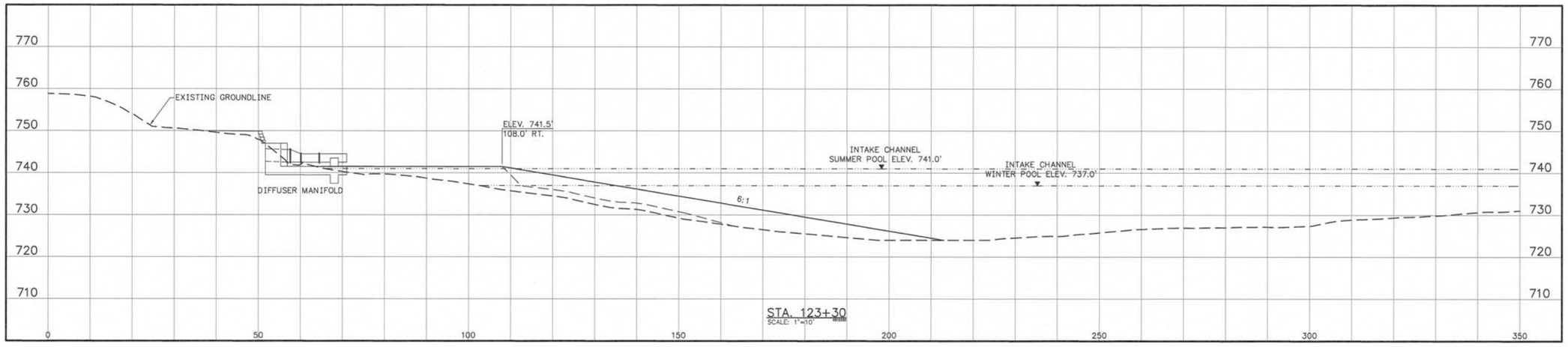
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



STA. 123+50
SCALE: 1"=10'



STA. 123+30
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-104).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
–	–										
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–
ISSUED FOR CONSTRUCTION											

DISCIPLI
ENGINEAC

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DON W. FULLER
REGISTERED ENGINEER
AGRICULTURE
No. 113115
STATE OF TENNESSEE

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Stantec

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-101 | R 0

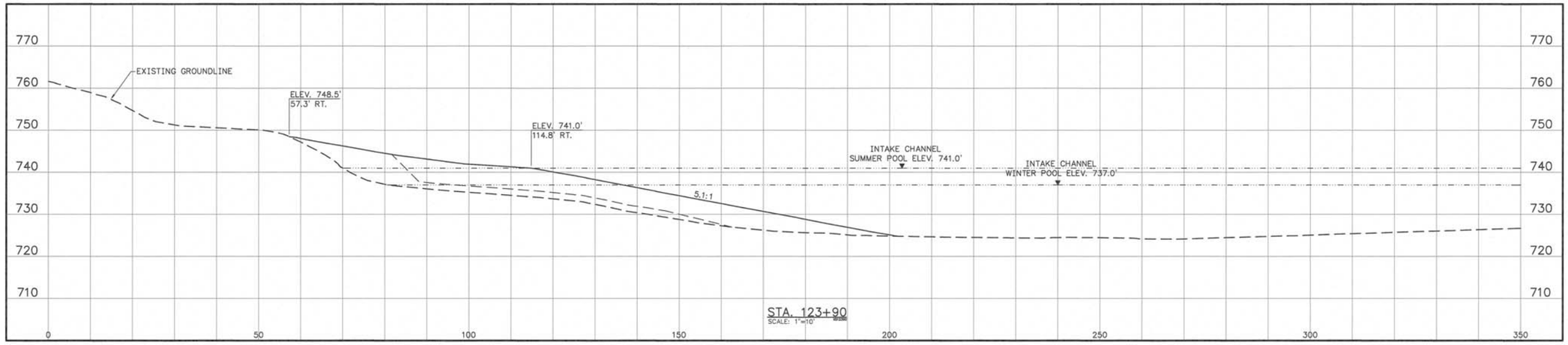
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:10
W_TVA

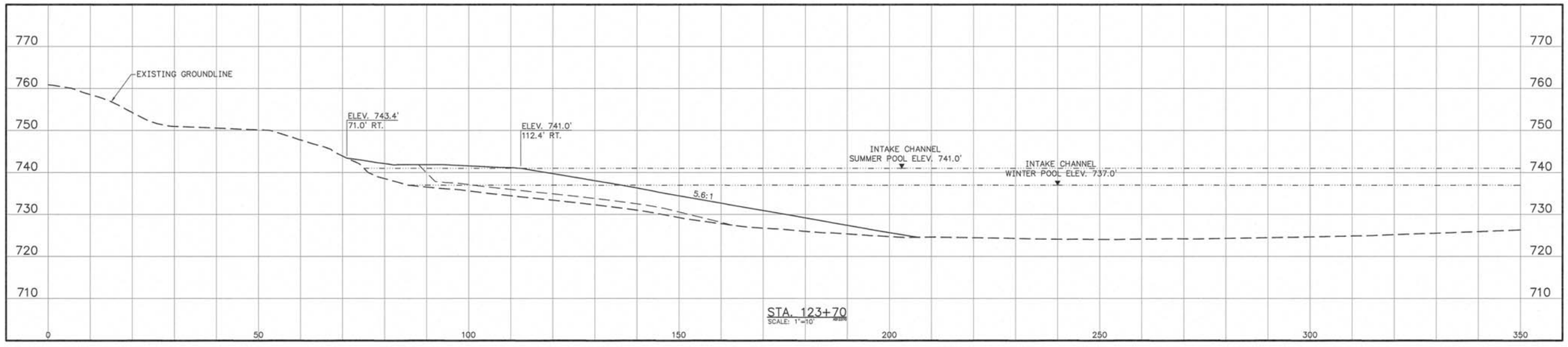
C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 06/06/2011 USER: ELLISON, TOC
\\S1S143-F01\WORKGROUP\TVA\ACTEA\TD66660025\DIV\ENVIRONMENTAL\DRAWINGS\WP5\R\V0_JFC\10W229-103.DWG

36 C 10W229-101



STA. 123+90
SCALE: 1"=10'



STA. 123+70
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLI INTERFAC

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

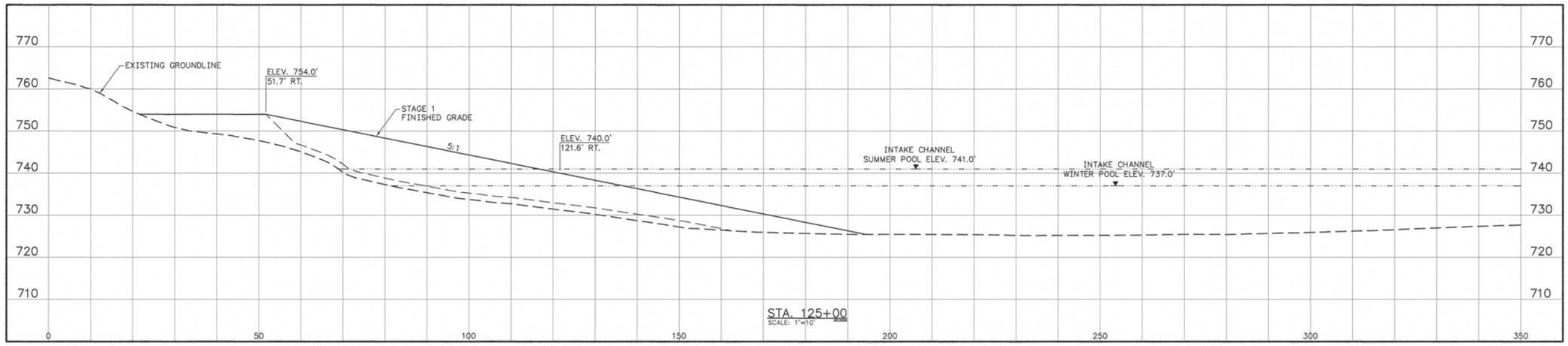
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-102 | R 0

PLOT FACTOR:10
W_TVA

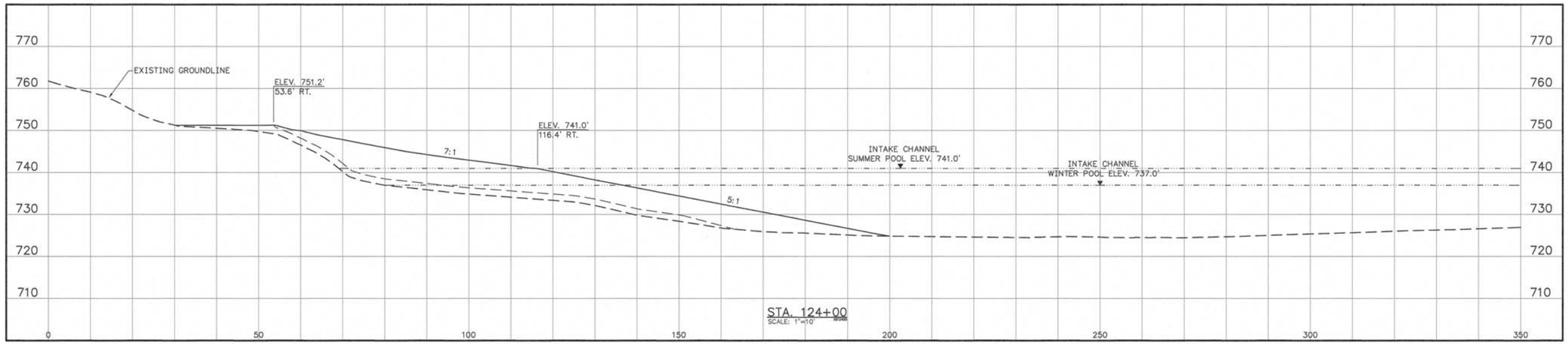
C.A.D. DRAWING
DO NOT ALTER MANUALLY

STANTEC	0
TASK COMPLETED BY:	REV NO.

36 C 10W229-102



STA. 125+00
SCALE: 1"=10'



STA. 124+00
SCALE: 1"=10'

NOTE:
FOR FILTER CONFIGURATIONS SEE TYPICAL SECTIONS (10W229-105).

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
SEGMENT 'B' CROSS SECTIONS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-103 | R 0

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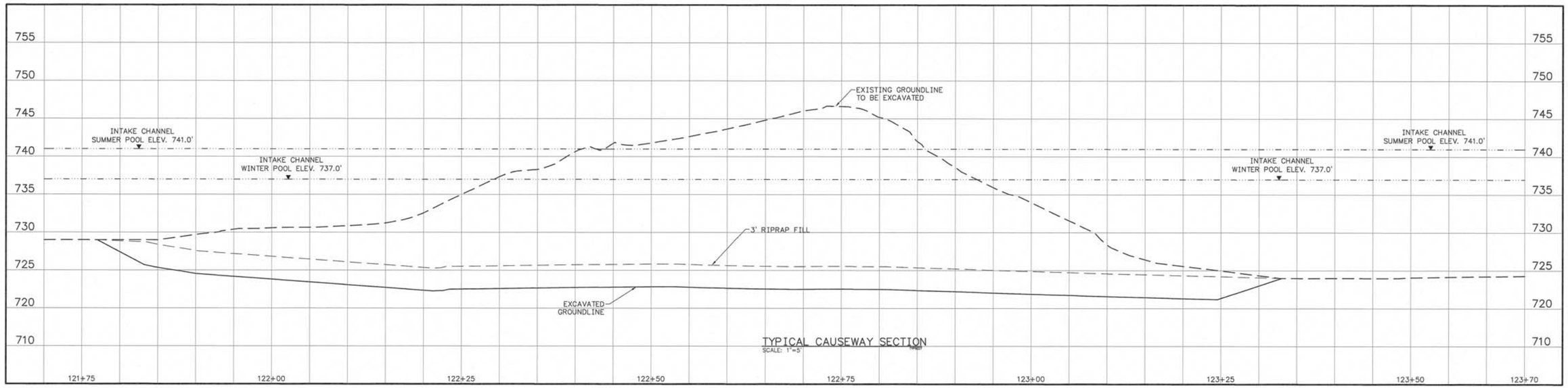
Fax 859.422.3100
www.stantec.com

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:10
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

36 | C | 10W229-103



TYPICAL CAUSEWAY SECTION
SCALE: 1"=5'

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS
SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLI
INTERFAC

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL CAUSEWAY SECTION
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DGTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-104 | R 0

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40511-2050
Tel. 859.422.3000
Fax 859.422.3100
www.stantec.com

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

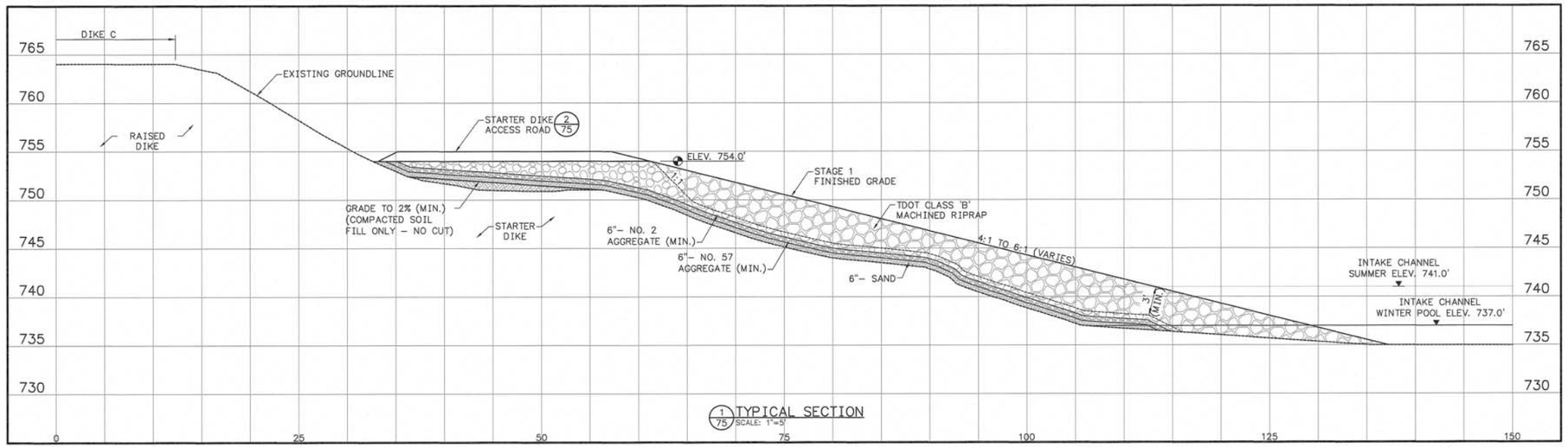
STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:5
W_TVA

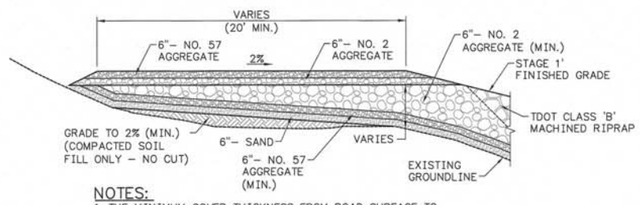
C.A.D. DRAWING
DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISON, DOC
\\US1242-F01\WRKGRP\U7361\ACTIVE\175666001\ENVIRONMENTAL\DRAWING\MPS\RCW_JFC\10W229-104.DWG

36 C 10W229-104



1/75 TYPICAL SECTION
SCALE: 1"=5'



NOTES:

1. THE MINIMUM COVER THICKNESS FROM ROAD SURFACE TO TOP OF SAND FILTER IS 36–INCHES.
2. PLACE NO. 2 AGGREGATE AND NO. 57 AGGREGATE ON RIPRAP OR NO. 2 AGGREGATE AS APPLICABLE TO FORM A REVERSE FILTER FOR ROAD SURFACE.
3. REMOVE AGGREGATE CONTAMINATED WITH ASH AS DIRECTED BY THE QC MANAGER.

2/75 DETAIL – STARTER DIKE ACCESS ROAD
SCALE: 1/4"=1'-0"

SECTION OR DETAIL NO.
SHEET WHERE SHOWN
REFERENCE KEY

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX000000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV. CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLINE: INTERIOR

SCALE: AS SHOWN — EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL SECTIONS AND DETAILS
WORK PLAN 5 (KIF–110028–WP–5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

Stantec Consulting Services Inc.
1409 N. Forbes Rd.
Lexington, Kentucky
40511-2050
Tel. 859.422.3000
Fax 859.422.3100
www.stantec.com

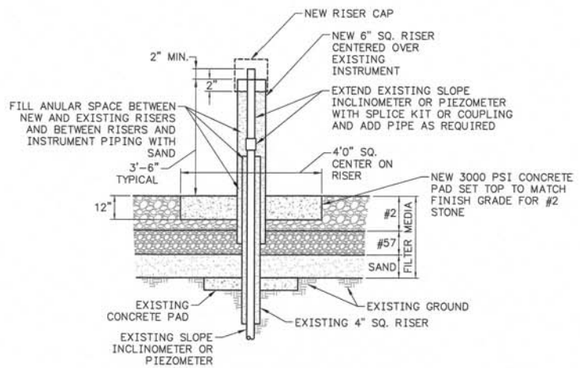
AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229–105 | R 0

STANTEC	0
TASK COMPLETED BY:	REV NO.

PLOT FACTOR:5
W_TVA

C.A.D. DRAWING DO NOT ALTER MANUALLY

PLOT DATE: 05/06/2011 USER: ELLISON, CDC
\\UTDC01-CHF\PROJECTS\PROJECTS\TENNESSEE\ENVIRONMENTAL\SBA\WTMP\WP5_DTC\10W229-105.DWG



TYPICAL ADJUSTMENT OF INSTRUMENTATION ON DIKE C
NOT TO SCALE

NOTES:

1. MATCH PVC RISER DIAMETER WITH EXTENSION PIPE AND INSTALL STANDARD COUPLING TO EXTEND RISER.
2. EXTEND RISER TO MINIMUM OF 3' ABOVE FINISHED GRADE.
3. INSTALL 6"X6" PROTECTIVE ALUMINUM WELL COVER OVER EXISTING COVER. FILL WITH SAND.
4. FILL WITHIN 3' AROUND CASING SHALL BE COMPACTED USING HAND OPERATED TAMPING EQUIPMENT AND SHALL BE ADVANCED A MINIMUM OF 2' ABOVE EMBANKMENT CONSTRUCTION.
5. 6"X6"X1/8" ALUMINUM CASING AND HAND COMPACTED EMBANKMENT MATERIAL SHALL BE COMPLETED AS EMBANKMENT CONSTRUCTION PROGRESSES.
6. WELL PAD MINIMUM DIMENSION OF 4'X4'X1' THICK.
7. FILL WITHIN 3' AROUND CASING SHALL BE COMPACTED USING HAND OPERATED TAMPING EQUIPMENT AND SHALL BE ADVANCED A MINIMUM OF 2' ABOVE EMBANKMENT CONSTRUCTION.

ISSUED FOR CONSTRUCTION

FOR SUPPORTING DESIGN CALCULATIONS SEE FPGKIFFESCDX00000020090020

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	05/06/11	DWF	DMG	TC	DWF	VJD	MST	JCK	–	–	–

ISSUED FOR CONSTRUCTION

DISCIPLINE INTERFACE

SCALE: AS SHOWN EXCEPT AS NOTED

YARD
DIKE C BUTTRESS

STAGE 1 CONSTRUCTION
TYPICAL SECTIONS AND DETAILS
WORK PLAN 5 (KIF-110028-WP-5)

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
D.W. FULLER	D.M. GRAHAM	T. CRILLY	D.W. FULLER	V.J. DOTSON	M.S. TURNBOW	J.C. KAMMEYER

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KINGSTON FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2000 | DATE 05/06/11 | 36 | C | 10W229-106 | R 0

PLOT FACTOR:8
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

STANTEC	0
TASK COMPLETED BY:	REV NO.

36 C 10W229-106

PLOT DATE: 05/06/2011 USER: FULLERDW
\\US1243-F01\WORKGROUP\TSA\ACTIVE\75699005\ENVIRONMENTAL\DRAWING\WP5\REVD_IFC\10W229-106.DWG

Appendix B

Design Specifications

Stantec

Technical Specifications

Dike C Buttress
Segment B Construction
Work Plan 5
Kingston Fossil Plant
Harriman, Roane County, Tennessee

ISSUED FOR CONSTRUCTION

Prepared for

Tennessee Valley Authority
Kingston, Tennessee

May 6, 2011

Stantec Consulting Services Inc.
One Team. Infinite Solutions

TECHNICAL SPECIFICATIONS

SECTION 02100 – EROSION CONTROL AND STABILIZATION

PART 1 - GENERAL

1.1. Descriptions

1.1.1. This Section includes provisions for erosion control and stabilization. All construction activities shall be conducted in accordance with applicable environmental requirements. Install sediment and erosion control measures prior to disturbance where applicable.

1.1.2. CIVIL PROJECTS (CP) shall become familiar with the Final Grading Plan, Erosion and Sediment Control Details and Best Management Practices (BMP) Plan, and shall anticipate, and therefore plan in advance for each construction activity.

1.2. Related Documents

1.2.1. The Quality Control Plan and Engineering Drawings apply to the work of this section.

PART 2 - MATERIALS

2.1. Refer to the BMP Plan at the end of this Specification, the Sediment and Erosion Control Plan, the Details, and Section 02936 – Revegetation for products and materials to be employed in erosion control and stabilization efforts.

2.2. This Section provides material requirements for silt fence, and fiber rolls.

PART 3 - EXECUTION

3.1. Construction Phase Operations

3.1.1. CP shall evaluate the work of the project and plan to minimize the surface area disturbed at any one time.

3.1.1.1. Perform clearing and grubbing, excavation or grading, rock cover and riprap buttress construction at the site in stages to avoid exposing large areas of bare soil. Excavate and place earth fill material during dry weather, when possible.

3.1.1.2. Establish final grade as quickly as possible.

3.1.1.3. Seed and mulch disturbed areas of soil adjacent to work areas as soon as possible.

3.1.2. CP shall control fugitive dust emissions.

3.1.2.1. Control dust generation by wetting haul roads or applying approved (by TVA) chemical soil binders, as needed.

3.1.3. CP shall not discharge raw silt and sediment laden water from the site without providing for removal of soil particles.

3.1.3.1. Use rock filters or sediment filter bags, fiber rolls and/or use silt fence enclosures or de-silting basins.

3.1.3.2. Use rock silt checks and rip-rap or channel lining when dewatering through ditches and swales.

3.1.3.3. TVA shall provide inspection and maintenance of best management practices at minimum on a weekly basis.

3.1.3.4. In addition, inspect all best management practices after each rainfall of 0.5 inches or more.

3.1.3.5. Maintain all best management devices by removing accumulated silt, repairing or replacing damaged devices and by cleaning up any excess discharges, or mud on gravel roads.

3.2. Sediment Barriers

CP shall install silt fences, and/or fiber rolls or other suitable measures as practicable along the contour adjacent to the Intake Channel prior to any disturbance above the area. Silt fence may also be required at other locations based upon field conditions. The silt fence shall be removed segmentally as an area is ready for granular filter and rockfill buttress overlay. Floating turbidity curtains shall be installed as needed to protect intake locations. If an area is completed in terms of armoring within one day of initial disturbance and no rain is forecast, then sediment barriers may not be required.

3.2.1. Silt Fences

Silt fences shall be install below proposed disturbed areas in accordance with the plans and details and as needed in other areas. Turn ends of silt fence slightly toward the uphill side to mitigate against bypassing.

3.2.2. Fiber Rolls

Fiber rolls and other commercial products made from coconut fiber, rice straw, plastic, wood shavings, or other material can also be used as sediment barriers along streams. Follow manufacturers' installation instructions and ensure that sediment filter spacing on slopes is correct. Make sure runoff does not bypass barriers, coconut rolls, or other barriers underneath or around the ends.

3.2.3. Maintenance

Inspect silt fences and other installed manmade barriers once a week and after rainfalls of 0.5 inch or more. Remove sediment before it reaches six inches in depth. Traps and basins are to be cleaned out when half full. Reinstall sections of fence which have washed out underneath the fence. Replace broken, torn or worn fences. Rebuild or replace damaged brush barriers and fiber rolls. Make repairs within three days of discovering.

3.2.4. Turbidity Curtains

Turbidity curtains may be needed in the intake channel to control sediment advance towards plant intake points.

3.3. Slope Protection

3.3.1. The CP shall take measures as necessary to minimize sheet, rill and gully erosion prior to placing filter material. Slopes shall be stabilized immediately after tree removal and grubbing with measures as described below.

A. **Divert Upland Runoff** – Use diversion berms as practicable to control flow and route around work areas.

B. **Sediment Barriers** – See paragraph 3.2.

3.4. Sediment Traps and Basins

TVA shall observe effluent leaving the site during rainfall events. If water appears to be excessively muddy or silt-laden, TVA shall review the BMP Plan and insure that all structures are properly installed and functioning, and that all prescribed measures have been taken to minimize erosion. If they appear to be functioning properly upon inspection or after necessary repairs and the effluent is still not acceptable, then TVA shall take immediate action to have CP construct sediment traps as indicated herein. TVA will support CP in the design and location of such traps.

3.4.1. Sediment Traps

Any depression, swale or low-lying place that receives muddy flows from exposed soil areas can serve as a sediment trap. Installing several small traps at strategic locations is often better than building one large basin. The simplest approach is to dig a hole or build a dike (berm) of earth or stone where concentrated flows are present. This will help to detain runoff so sediment can settle out. The outlet can be a rock-lined depression in the containment berm.

3.4.2. Sizing and Design Considerations

3.4.2.1. A minimum storage of 134 cubic yards per acre of exposed soil drained is required for basins and traps. Traps and basins are designed so that flow paths through the trap or basin are as long as possible, to promote greater settling of soil particles. Sediment basin length must be twice the width or more if possible – the longer the flow path through the basin, the better. Side slopes for the excavation or earthen containment berms are 2:1 or flatter. Berms are made of well compacted clayey soil, with a height of 5 feet or less. Well mixed rock can also be used as a containment berm for traps. Place soil fill for the berm or dam in 6" layers and compact. The entire trap or basin, including the ponding area, berms, outlet, and discharge area, must be seeded and mulched immediately after construction.

3.4.2.2. An overflow outlet can be made by making a notch in the containment berm and lining it with rock. Rock in the notch must be large enough to handle overflows, and the downhill outlet should be stabilized with rock or other flow dissipaters similar to a culvert outlet. The overflow should be at an elevation so the dam will not overtop. Allow at least one foot of freeboard. Outlets must be designed to promote sheet flow of discharges onto vegetated

areas if possible. If the discharge will enter a ditch or channel, make sure it is stabilized with vegetation or lined.

3.4.3. Inspection and Maintenance

Inspect inlets, berms, spillways, and outlet areas for erosion after each rain exceeding 0.5 inch and every seven days. Repair gullied areas and any upslope areas contributing large volumes of sediment. Repair and reseed bare areas. Ensure that downstream receiving area is stable. Remove sediment before it fills half the trap or basin volume.

3.5. Inspection and Maintenance

3.5.1. CP is responsible for maintenaning the construction site in accordance with the site wide storm water management plan.

3.5.2. Inspection

Erosion and sediment controls must be inspected weekly and after each rain exceeding 0.5 inch. Keep records of inspection observations and actions taken, and file with other erosion and sediment control plan paperwork.

3.5.3. Maintenance

Daily inspect equipment and hydraulic oil systems at the beginning of the day. Repair or replace frayed or damaged lines or hoses before use in or near water and provide containment measures if required.

3.5.3.1. Keep erosion and sediment controls in good working order until the project is completed. Brush and other debris should be removed from work areas. Sediment accumulating behind silt fences or other sediment filters should be removed regularly. All structures that have become dislodged or damaged (such as silt fences, etc.) should be repaired within three days of discovery.

3.5.3.2. Make sure that waste materials, building materials, and supplies are properly tied down or contained so that wind and storm water runoff cannot carry the materials away. Fuel, lubricants, and hazardous waste products should be stored in an approved tank or other structure to avoid spills and runoff. Provide spill kits and containment material on-site, especially near fueling or equipment service areas. Maintain vehicles and equipment away from the site if possible. If maintenance must occur on-site, ensure that spills are cleaned up quickly.

Best Management Practices Plan
Dike C Buttress Construction – Phase 1

Purpose of the Best Management Practices Plan

The purpose of the Best Management Practices (BMP) plan is to evaluate potential sources of sediment and other pollutants at the project site and put controls in place that will effectively prevent pollutant discharges to surface and ground waters. Construction activities shall be performed in accordance with the Kingston site wide Storm Water Management Plan. This BMP is a guideline for the Dike C work activities. The following general pollution control requirements have been addressed in the BMP Plan, as applicable:

1. Control limited threat discharges to minimize impacts to water quality;
2. Prevent the discharge of pollutants associated with construction activities to surface waters;
3. Retain soil and sediment on site;
4. Permanently stabilize disturbed soils.

This plan has been developed based on an understanding of the current conditions of the watershed, a general knowledge of the previous activities at the site, and an anticipation of the proposed remediation activities scheduled for the site. This plan is intended to be a “living” document, in that as the Work at the site progresses, this plan must be periodically reviewed and adjusted to suit the actual conditions and situations as they develop. CIVIL PROJECTS and all SUBCONTRACTORS shall become familiar with this plan, and shall constantly monitor the site conditions, making appropriate modifications as needed.

Site Description:

The Kingston Fossil Plant Dike C is located along the Emory River / Watts Bar Lake in Roane County, Tennessee. Dike C is the containment embankment for the Kingston Fossil Plant ash pond and stilling basin. The toe of the embankment extends into Watts Bar Lake and is being armored with riprap and other materials to improve the stability of the containment structure.

Construction Activities Proposed:

This work involves buttressing Dike C of the ash pond/ stilling basin at the Kingston Fossil Plant. Work measures required to stabilize the site include:

A. Installation of sediment and erosion control measures for the site
B. Shaping of starter dike bench to improve drainage including the removal of existing pipes and placement of embankment fill.
C. Documentation of location and removal of trees and rootwads on the embankment
D. Surface preparation to allow filter placement.
E. Placement of sand filter on designated areas of slope above and below the water surface.
F. Placement of stone cover on the sand and construction of riprap buttress.
G. Revegetation of disturbed areas outside limits of riprap placement.
H. Removal of temporary sediment control measures.

Work Sequence:

1. Installation of perimeter sediment and erosion control measures in accordance with Section 02100 of the Specifications and the Sediment and Erosion Control Measures Section below.
2. Protection of existing geotechnical instrumentation as described in Section 02150 of these Specifications.
3. Surveying and photographing trees to be removed as described in Section 02150 of these Specifications.
4. Excavation and stockpiling of gravel from starter dike bench road as described in Section 02150 of these Specifications.
5. Shaping the starter dike bench to drain towards the Intake Channel as described in Section 02150 of these Specifications.
6. Removing drain pipes from starter dike bench and backfilling as described in Section 02150 of these Specifications.
7. Removing trees and other vegetation as described in Section 02150 of these Specifications.
8. Grubbing of rootwads as described in Section 02150 of these Specifications.
9. Removal of organic materials and topsoil as described in Section 02150 of these Specifications.
10. Placing manufactured sand product in tree rootwad removal areas as described in Section 02150 of these Specifications.
11. Grading surface to allow placement of granular filter as described in Section and 02410 of these Specifications.
12. Construction of access roads or temporary access ramps as described in Section 02410 of these Specifications.
13. Removal of the north limit of the existing bridge causeway as described in Section 02410 of these specifications.
14. Construction of riprap buttress as described in Section 02410 of these Specifications.
15. Removal of temporary sediment control measures in a segmental manner. Protection of existing site improvements or utilities from damage.

Sediment and Erosion Control Measures:

Due to the lack of available area downstream of the limits of disturbance caused by the presence of work extending into the Intake Channel there is inadequate area for a sediment pond. Alternative measures have been analyzed and will be employed to reduce total suspended solids (TSS) during construction. Measures to reduce TSS for the remainder of the site are described below:

1. Use of geotextile filter on the slopes, roads and other disturbed areas.
2. Placement of aggregate and riprap armor on slopes along the Intake Channel.
3. Installation of silt fence and fiber logs around the perimeter of the disturbed areas.
4. Seeding of areas disturbed by Construction activity outside of buttress placement.
5. The installation of rock check dams in temporary diversion ditches.

6. The use of booms or berms to contain sediment from affecting other portions of the Lake or Intake Channel.

Other Control Measures:

Dust generation shall be minimized by spraying with water.

Other State or Local Plans:

Work on-site shall adhere to all applicable state and local laws.

Maintenance:

All silt fences, fiber coils, booms and other sediment control devices shall be inspected as described below. Tears in the fence shall be repaired or portions of the fence replaced within 3 days of discovery. Sumps shall be cleaned of accumulated sediment when sediment depths exceed six inches. CP shall likewise ensure that all roads maintain adequate gravel cover and replace same to maintain the design template.

Inspections:

Qualified personnel shall inspect storm water control measures, discharge locations, vehicle exits, disturbed areas of the site and material storage areas at a minimum of every 7 calendar days and within 24 hours of every 0.5 inch precipitation event. Areas that have been temporarily stabilized shall be inspected at least once per month. Revisions to the BMP Plan based on the results of these inspections shall be implemented within seven days.

A report summarizing the scope of the inspection, names and qualifications of the inspecting personnel, the date of the inspection, observations as they relate to the BMP Plan and corrective actions shall be noted in the report. All reports shall be kept for at least three years after the date of the inspection or for one year after coverage under the site specific stormwater prevention plan. Each report shall be signed, and shall be available at the site for review.

Non-Storm Water Discharges:

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Preventive maintenance such as changing oil shall be performed off-site. Any spills of hydraulic fluid or oil from machinery shall be immediately cleaned up using rags, mops, kitty litter, sand, sawdust and placed in plastic cans before being disposed off in a legal manner. Containment of any spill using dikes, plastic liners or other methods will be used as necessary. Manufacturer's methods for spill cleanup will be posted on-site and site personnel will be made aware of the location of the procedural information and cleanup supplies. Any spill of toxic or hazardous substances will be immediately reported to the EPA. The site superintendent will ensure TVA has been notified and will assist with the clean up effort.

Materials expected to be on-site include: Petroleum based products, fertilizer, grass seed, mulch, geotextiles, geomembranes, steel, stone, coal combustion products and agricultural lime.

CP, Subcontractors and Owner:

The CP and each subcontractor shall implement the appropriate control measures outlined in this BMP plan. The project OWNER for the purpose of this submittal is the Tennessee Valley Authority.

Certification:

I certify under penalty of the law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this Certification"

_____

Printed or Typed Name and Title

_____

Signature

Representing:

Phone: Office:

Date: _____

END OF SECTION 02100

TECHNICAL SPECIFICATIONS

SECTION 02150 – SITE PREPARATION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

The conditions and description of work shown in other sections of these Specifications as well as the Engineering Drawings and Quality Control Plan apply to this Section.

1.2. SUMMARY

1.2.1. This section includes the following:

- Surveying and photographing trees to be removed.
- Excavation and stockpiling of gravel from starter dike bench road
- Shaping the starter dike bench to drain towards the Intake Channel.
- Removing drain pipes from starter dike bench and backfilling
- Removing trees and other vegetation.
- Grubbing of rootwads.
- Removal of organic materials and topsoil
- Placing manufactured sand product in tree rootwad removal areas
- Grading or smoothing of surface to allow placement of filter
- Removal of temporary sediment control measures in a segmental manner. Protection of existing site instrumentation or utilities from damage.

1.2.2. Related Sections include the following:

- Section 02100 – Erosion Control and Stabilization
- Section 02410 – Rock Buttress and Granular Filter Components

1.3. DEFINITIONS

1.3.1. Starter Dike

The starter dike is the lower in elevation portion of Dike C at approximate elevation 748 feet and below immediately adjacent to the Intake Channel/Watts Bar Lake.

1.3.2. Dike Bench

The dike bench is the relatively flat area at the top of the starter bench upon which the raised dike was constructed at approximate elevation 748 feet. A portion of this area remains and is currently covered with gravel and being used as a road.

1.3.3. Rootwads

Rootwads consist of the tree stump as well as roots greater than 2 inches in mean diameter.

1.3.4. Topsoil

Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than two inches in diameter; and free of weeds, roots and other deleterious materials.

1.3.5. Drain Pipes

Steel or plastic piping previously installed to drain the dike bench.

PART 2 - PRODUCTS

2.1. Remove cleared topsoil for use elsewhere or dispose of as it is not required in the landfill area but is required in borrow areas for use in re-vegetation.

2.2. Manufactured Sand Product is a durable quarry produced material free of deleterious amounts of shale conforming to Rogers Group Inc., Roane County, Quarry Manufactured Sand Product, Tennessee Department of Transportation Concrete Sand or QC Manager approved equal (Crab Orchard Manufactured Limestone Sand). The gradation shall conform to the following:

Sieve/Screen Size	Percent Passing
3/8	100
No. 4	70-100
No. 8	50-100
No.16	35-85
No. 30	15-60
No. 50	10-45
No. 100	2-25
No. 200	0-5

2.3. Embankment soils used for promoting positive drainage on the dike bench shall consist of clean soils that classify as CL or CH according to the Unified Soil Classification System. These soils shall not contain organic debris, ash or contain rock exceeding two inches in diameter

PART 3 - EXECUTION

3.1. PREPARATION

3.1.1. Protect and maintain geotechnical instrumentation from disturbance during construction. Install silt fencing along furthest downstream point practicable.

3.1.2. Locate and survey trees to be removed to document their position in case seeps occur. Photograph trees and relate them to the survey positions. Photography of trees is to be completed as per TVA-KIF-SOP-26, *Standard Operating Procedure For: Photograph Management For the TVA Kingston Fossil Plant Ash Recovery Project*.

3.1.3. Remove gravel from the starter dike bench road and stockpile for later use. Protect exposed areas as per Section 02100.

3.1.4. Through the placement of embankment material, shape the starter dike bench to slope towards the Intake Channel at 2% minimum slope. Prior to placement of embankment materials, exposed surfaces shall be stripped of all vegetation, organic soils and vegetative cover soils as well as any other deleterious materials. Exposed surfaces shall be scarified to promote lift bonding. The sequence of filling shall commence at the lowest section (in elevation) of the subject footprint and proceed upward in maximum eight-inch loose lifts in a manner to maintain positive drainage at all times. Positive drainage through minimum two percent cross slopes shall be maintained on all fill surfaces. The fill sequence shall also be performed in a manner that reduces the potential for uncontrolled sediment runoff.

Each lift of soil embankment shall be compacted with a tamping foot or sheep foot roller, or equivalent approved by the QC MANAGER, to a minimum of 95 percent of standard Proctor maximum dry density. Following initial compaction, the surface shall be sealed with a smooth drum roller to reduce the potential for surface water infiltration. Prior to placement of subsequent lifts the surface shall be scarified to promote lift bonding.

3.1.5. Remove piping below starter dike bench and place and compact clay fill into excavated areas. Compact clay fill using manual tampers or other means to achieve 95% of standard Proctor maximum dry density.

3.2. CLEARING AND GRUBBING

Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade. In general, all trees and brush with a mean diameter of 2-inches or greater at ground level shall be grubbed out. Where it is not reasonable to remove trees by a mowing with a bush hog or with similar mowing equipment the following guidelines apply:

3.2.1. All trees 2-inches in diameter or greater are to be surveyed in-place by TVA

3.2.2. All trees shall be cut using a handsaw or chainsaw and the cut tree and branches discarded.

3.2.3. Remove the remaining tree trunk, stump, and rootwad

3.2.4. Grub any remaining roots of the tree so that only 2 inches or smaller roots are left in place

3.2.5. The resulting cavity from removal of the rootwad shall be cleaned of loose soil and debris

3.2.6. The cavity shall then be backfilled with manufactured sand product and graded to blend and match adjacent slopes. If the rootwad cavity is below the water level at the time of the tree removal, the back of the excavation bucket shall be used to compact the sand material into the cavity and to grade the sand to match exiting slopes.

3.3. TOPSOIL STRIPPING

3.3.1. Sod and grass will be removed during topsoil strippingl.

3.3.2. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other materials. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

3.3.3. Dispose of excess topsoil as specified for materials disposal. All topsoil shall be immediately removed from the work area, with stockpiling of excavated topsoil on the embankment not permitted.

3.3.4. Employ perimeter Best Management Practices, such as silt fences or berms, to minimize runoff of silt and sediment laden waters from the stockpiled topsoil and waste materials.

3.4. PREPARE SURFACE FOR GRANULAR FILTER

3.4.1. CP shall prepare the exposed surface to receive granular filter placement by grading, blading, tamping or use of backhoe bucket to provide a relatively even, smooth surface free of protrusions, rocks, roots and other items that would keep the filter from making contact with the soil. This may also be achieved using an excavator with no teeth and a welded plate. Surfaces not immediately receiving filter shall be tracked as practicable with equipment moving up and down slopes. If tracking results in an irregular surface, utilize a plate tamper mounted on the excavator or the back of the bucket to “iron” or smooth the area. Tamp soft areas as practicable to obtain a smooth surface.

3.4.2. The removal of trees, organic material and root wads in accordance with this specification may extend to approximately 100 feet beyond the limits of the buttress construction, with the following provisions:

- The rootwad holes are filled with manufactured sand in accordance with this specification immediately upon excavation.
- The exposed soil area is inspected by CP on a daily basis for signs of erosion.
- Any area that is stripped of organics has the buttress placed in accordance with this specification within one week of stripping.

3.5.3 The thickness of each filter layer shall be determined for the QC Manager on a daily basis by the use of stakes. Stakes shall be installed at 25' increments and at slope breaks as a method of measuring the thickness of the filter layers. TVA shall perform complete surveys of prepared subgrade, the surface of each completed filter layer, and the final grade of the rip rap at 100' intervals corresponding to the intervals shown on the construction drawings. In addition to the standard 100' survey intervals, cross section surveys of Sta. 122+20, 122+50, 122+70, 122+90, 123+10, 123+30, 123+50, 123+70 and 123+90 shall also be performed. This survey information shall be submitted to the QC Manager at the completion of each survey interval.

END OF SECTION 02150

TECHNICAL SPECIFICATIONS

SECTION 02410 – ROCK BUTTRESS AND GRANULAR FILTER COMPONENTS

PART 1 - GENERAL

1.1. DESCRIPTION OF WORK

This Specification covers placement of manufactured sand, No. 57 aggregate, No. 2 aggregate and riprap to construct the granular filter and rock buttress for Dike C of the Ash Pond and Stilling Basin for the Kingston Fossil plant. Erosion and sediment control measures shall conform to Section 02100– Erosion Control and Stabilization of these Specifications.

1.2. SUBMITTALS

Certification statements shall be provided by each supplier that the product conforms to these specifications. In addition all materials shall meet the testing schedules noted in the QC Plan.

PART 2 - MATERIALS

2.1. AGGREGATE

No. 2 aggregate and No. 57 aggregate shall consist of quarried stone generally meeting the requirements of Section 903 of the Tennessee Department of Transportation (TDOT) “Standard Specifications for Road and Bridge Construction” (Standard Specifications) latest edition. The gradation shall conform to the following:

No. 57 Aggregate

Sieve/Screen Size	Percent Passing
1.5	100
1	70-100
1/2	25-85
No. 4	0-35
3.5 mm	0-15
No. 8	0-5

No. 2 Aggregate:

Sieve/Screen Size	Percent Passing
3	100
2.5	90-100
2.0	10-100
1.5	0-100
1.0	0-15
3/4	0-5

2.2. TDOT CLASS B MACHINED RIPRAP

Riprap buttress stone shall consist of quarry stone meeting the requirements of Section 709 of the Tennessee Department of Transportation "Standard Specifications for Road and Bridge Construction" latest edition. Machined Riprap (Class B) shall vary in size from 3 inches to 2.25 feet (from 75 to 675 mm) with no more than 20% by weight being less than 6 inches in size (150 mm).

2.3. MANUFACTURED SAND PRODUCT

This product shall conform to Section 02150, Part 2, Paragraph 2.2 of these specifications.

Other sources of sand product may be approved by QC MANAGER subject to filter analysis based on gradation and the quality of the sand.

PART 3 - EXECUTION

3.1. GRANULAR FILTER

Granular filter shall consist of a minimum of six inches manufactured sand product placed on soil subgrade with the sand then overlain by six inches TDOT No. 57 aggregate which is in turn overlain by six inches TDOT No. 2 aggregate. Surfaces to receive granular filter shall be prepared to a condition free of large protrusions in accordance with this specification and as directed by the QC MANAGER. No filter shall be placed until the subgrade is approved by the QC Manager or the designated representative on the QC Team.

3.1.1. Sand Placement

The sand component of the graded filter shall be placed to a minimum thickness of six inches. This measurement shall be made perpendicular to the surface of the dike.

3.1.2. Underwater Placement

The sand component of the filter placed under water shall be performed in such a manner as to provide a minimum thickness of six inches and to prevent the segregation of the material during placement. One such method involves placement by excavator of overlapping buckets of sand. In some areas the sand thickness will likely exceed six inches and form a sinusoidal wave pattern of placement.

3.1.3. Stone Placement

Stone and riprap shall be placed to the minimum thickness indicated on the Drawings. Measurement shall be made perpendicular to the slope. All riprap shall be placed using a bottom up placement methodology.

3.1.4. Contamination Issues

Placed sand shall be covered with No. 57 stone as quickly as practicable. In no event shall sand remain exposed for more than 24 hours. Any contamination of sand from soil or ash shall be cause to remove and replace the sand. The action of covering of sand by No. 57 stone and No. 2 stone shall be performed in such a manner that aggregate cover will lag sand placement by five feet to reduce contamination risk. This lag may be adjusted based on field operations and conditions as deemed necessary by the QC Manager.

3.1.5. Riprap Replacement

Riprap may be placed by mechanical means using an excavator or loader. The maximum allowable drop height for riprap placement is two feet. The rock shall be placed to the depths, extents and template shown in the drawings. The surface of the riprap, upon completion, shall be graded as practicable into final position to ensure proper thickness and a uniform surface. Larger rocks shall be uniformly distributed with the small rocks and spalls filling the voids between the larger rocks.

3.1.6. Bridge Causeway Removal

The existing bridge causeway shall be removed to the limits and grades as shown on the drawings. To minimize the water velocity through this section of the intake channel, the causeway removal shall be performed prior to placement of the filter materials or the rockfill buttress as described herein and as shown on the drawings. The causeway material shall be removed once the bridge removal has been completed, with all causeway material removal to occur from south of the causeway excavation. The materials that are likely to be encountered during the causeway removal include clay, silt, sand, gravel, ash, rockfill and concrete rubble.

3.2. ACCESS TO CONSTRUCTION

3.2.1. Access to Work – Areas of Granular Filter

Riprap shall not be placed until the granular filter has been approved by the QC MANAGER or the designated representative on the QC Team. In order to access locations of riprap placement, temporary access ramps or roads may be needed. Where operating heavy equipment or trucks over the filter, additional cover shall be placed to a minimum total depth of 36 inches over the sand component of the filter. This cover shall consist of an additional 18 inches of No. 2 aggregate spread on access areas and covered on the surface with 6 inches of No. 57 aggregate. The No. 2 aggregate shall be spread in a single lift utilizing low ground pressure equipment conforming to Table 2 of Section 02373 of these Specifications or by using excavator buckets. The No. 57 aggregate shall be spread in a single lift. The temporary road surface can be reclaimed and re-used as needed. If aggregate is left in place a minimum cover of 3 feet of riprap is required. Where the No. 57 aggregate surface has been contaminated with ash, it shall be removed and wasted as directed by the QC MANAGER.

END OF SECTION 02410

TECHNICAL SPECIFICATIONS

SECTION 02936 – REVEGETATION

PART 1 - GENERAL

1.1. DESCRIPTION

This Work consists of furnishing all labor, equipment and materials for preparing the seedbed, adding soil amendments, and seeding disturbed areas both in borrow areas and adjacent to work zones.

1.2. RELATED WORK

A. Quality Control Plan

B. Section 02100 – Erosion Control and Stabilization

C. Section 02150 – Site Preparation

D. Section 02410 – Rock Buttress and Granular Filter Components

1.3. SUBMITTALS

A. Agronomic soil test results shall be submitted to the QC MANAGER.

B. Seed tickets, fertilizer certification and CaC03 equivalency certification shall be submitted to the QC MANAGER.

C. A sample of the netting proposed by CP shall be submitted to the QC MANAGER.

D. A sample of the Erosion Control Blanket shall be submitted to the QC MANAGER.

1.4. QUALITY CONTROL

1.4.1. Agricultural limestone shall be purchased from quarries approved by the Tennessee Department of Agriculture.

1.4.2. Fertilizer (bagged or bulk) either dry or liquid, must be manufactured and sold under the jurisdiction of the Tennessee Department of Agriculture, Ag Inputs Section.

1.4.3. All seed shall be certified by an Official Seed Certifying Agency. Seeds shall have been tested within nine months prior to use. Each kind of seed shall be separately packed and delivered to the project in a seed-tight bag. Each bag shall bear a tag or label bearing the seal of the Official Seed Certifying Agency. The analysis of the seed (% pure seed, % germination, date tested, etc.) shall be attached to the bag.

PART 2 - PRODUCTS

2.1. LIME

Agricultural ground limestone or its equivalent shall be used. The ground limestone must meet the following requirements: contain sufficient calcium and magnesium carbonate and be equivalent to not less than 80 percent calcium carbonate and must be fine enough so that not less than 90 percent shall pass through a US Standard No. 10 sieve and not less than 35 percent shall pass through a US Standard No. 50 sieve. Lime shall be applied at the rate specified in Paragraph 3.1. Agricultural ground limestone shall be purchased from quarries approved by the Tennessee Department of Agriculture.

2.2. FERTILIZER

The fertilizer shall be a commercial fertilizer containing the plant nutrients of nitrogen (N), available phosphoric acid (P2O5) and soluble potash (K2O) and shall be applied at the rate specified in Section 3.1. Bagged fertilizer shall display the following information on the bag or on a sticker or tag attached to the bag: net weight, brand and grade, guaranteed analysis, and name and address of manufacturer. Bulk fertilizer (dry or liquid) shall be accompanied by a statement from the manufacturer which contains the same information required for the bagged fertilizer.

2.3. SEED

2.3.1. Seed shall be applied to all disturbed areas, in accordance with Table 1 with no alterations except with the written consent of the QC MANAGER. The seed mixture shall be totally free of any wild onion, giant foxtail, nodding thistle, Johnsongrass, and Canada thistle seed and contain less than two percent other crop seed. The seed shall also comply with all Tennessee seed laws and regulations.

2.3.2. Seed shall be furnished fully tagged and labeled in accordance with the state laws and the US Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitations for bid. All seed must be from the latest crop available. No seed will be accepted with a date of test of more than nine (9) months prior to the date of delivery to the site. Any seed which has become wet, moldy or otherwise damaged in transit or storage will not be accepted.

2.3.3. All seed shall be delivered in separate bags or packages according to species or be a certified seed mixture. The tags from each seed bag shall be given to the QC MANAGER at the site. These tags will be required for final payment.

2.3.4. All legume seed shall be treated with inoculant prior to seeding in accordance with Paragraph 2.6 (Inoculants).

Table 1

Seed Mixtures	Hydroseed Rate (pounds/acre PLS*)
Application Period: February 1 to May 15	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
Korean Lespedeza	10
White Sweet Clover	10
Plus:	
Perennial or Annual Rye (2/15 to 4/15)	15
or	
Weeping Lovegrass (4/15 to 5/15)	3
Application Period: May 15 to August 1	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
Birdsfoot Trefoil	3
Weeping Lovegrass	3
Application Period: August 1 to November 15	
Endophyte Free Kentucky 31 Tall Fescue	40
Potomac or Boone Orchard Grass	20
White Sweet Clover	12
Birdsfoot Trefoil	8
Perennial Rye	15

*PLS Pure Live Seed is determined by multiplying the percent germination of the seed times the percent purity

Note: Any lawn areas disturbed shall be seeded with an approved lawn seed mixture. Mulch areas and plant 60 lbs. per acre winter wheat between November 15th and February 1st.

2.4. MULCH

The mulch shall consist of wheat straw, hay or rye straw. The mulch material shall be air dry, reasonably light in color and shall not be musty, moldy, caked or otherwise of low quality. The use of mulch that contains noxious weeds will not be permitted. Mulch shall be applied at the rate specified in Paragraph 3.3.

2.5. NETTING

Plastic netting manufactured from extruded rectangular mesh plastic, a minimum of 45-inches wide with approximately ¾-inch by 1-inch mesh openings, weighing not less than 2.6 pounds per 1,000 square feet (± ½ pound) shall be used. Other netting may be used if approved by the QC MANAGER. Staples will be U-shaped and made from steel wire of No. W1-W1.5 or W2 or adequate polymaterial fasteners as needed for installation conditions. The staples shall have a minimum length of six (6) inches. Staples shall be driven flush with the soil surface. Netting shall be installed per the specifications in Paragraph 3.3.

2.6. INOCULANTS

The inoculant for treating legume seeds shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container or otherwise specified. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed. Four times the amount of the inoculant recommended by the manufacturer shall be used. Seed shall be sown within 24 hours of treatment and shall not remain in a hydroseeder longer than four (4) hours.

2.7. EROSION CONTROL BLANKET

Erosion control blanket shall be a manufactured product consisting of plastic netting on both sides with excelsior or coconut in between.

PART 3 - EXECUTION

3.1. SEEDBED PREPARATION

3.1.1. Immediately following final grading, the areas to be seeded shall be dressed to a reasonably smooth, firm surface, as determined by the QC MANAGER. Sludge shall be placed to a depth of two inches and incorporated into the top six inches of soil by disking or tilling. Lime shall be applied uniformly at the rate of seven (7) tons per acre. Fertilizer shall be applied at a rate sufficient to supply a minimum of 70 pounds of nitrogen (N), 145 pounds of phosphorus (P2O5) and 70 pounds of potash (K2O) per acre. These rates are subject to change depending on results of soil tests to be performed immediately prior to seeding. These soil tests shall be the responsibility of TVA.

3.1.2. The surface shall be tilled to a minimum depth of six (6) inches with either a tandem or offset disk meeting the following specifications:

A. Disk Size: 22 inches minimum

B. Disk Spacing: 13 inches maximum

C. Weight: 400 pounds per foot of cut minimum

D. Equipped with a drag of sufficient weight to remove any furrows left by the disk.

3.1.3. Seedbed preparation shall be suspended when soil conditions are not suitable for the preparation of a satisfactory seedbed. The QC MANAGER shall make this determination.

3.2. SEEDING

3.2.1. The specified mixtures of pure live seed (PLS) will be used on all disturbed areas using the seasonal variations shown.

3.2.2. All areas shall be seeded immediately following seedbed preparation. In the event the date does not concur with the seeding schedules specified, seeding shall be accomplished using any one of the specified rates or an equivalent rate designed to fit the site and weather conditions, as directed by the QC MANAGER.

3.2.3. All seed shall be broadcast evenly over the area immediately following tilling using a hydroseeder. The slurry PH shall not be allowed to drop below a pH of 5.0. In addition, the CP shall provide an accurate pH meter to monitor the slurry at all times.

3.3. MULCHING

3.3.1. Mulch materials shall be spread uniformly over all seeded areas. The mulch shall be applied uniformly over all seeded areas of less than 33% slope at the rate of two (2) tons per acre immediately following seeding.

3.3.2. Mulch netting meeting the requirements of Paragraph 2.5 shall be installed on all disturbed areas with slopes less than 33%. The netting shall be installed with a minimum six-inch overlap with adjacent rows. Staples shall be installed at four-foot maximum spacing on all edges and laps. Interior rows of staples shall be at four-foot maximum spacing with staples spaced at eight-foot maximum spacing along each row. Staples in interior row shall alternate in spacing with staples in an adjacent rows.

3.3.3. Erosion control blankets shall be employed to protect slopes 3H:1V or steeper unless otherwise shown on the Drawings. Install up and down the hill (vertical) for long slopes. Walk blankets down to ensure good contact with the soil. Use plenty of staples to keep blankets flat. Overlap blankets at 6 to 8 inches on sides, tops and bottoms. Do not stretch blankets, and do not exceed manufacturer's directions on maximum slope angle for the product. Refer to the Manufacturer's recommendations for installation patterns and stapling.

3.4. MEASUREMENT OF PERFORMANCE

3.4.1. TVA shall achieve 90 percent vegetative cover at the end of the second growing season. Such vegetative cover shall be measured using a transects method along the project baseline or other convenient baseline in borrow areas. This method shall involve taping along chosen transects and observing vegetation at each one-foot interval. At each observation point it will be noted whether vegetation is in contact with the transect. The sum of positive observations divided by total observations will determine compliance. Noticeably bare or eroded areas along or between transects shall be repaired even if the overall vegetative cover exceeds 90 percent.

3.5. EQUIVALENCY

3.5.1. These seeding specifications are intended to stabilize the project area through establishment of an adequate vegetative cover to provide interim protection and to enhance the wildlife utilization and development of the project area and the surrounding environment. The CP may be permitted to incorporate alternate seeding, fertilization and/or protection techniques which produce the intended results. The CP is encouraged to consider such applications. However, the CP is cautioned that if an alternate technique is utilized, the CP must assume the responsibility for the deviation from this specification and shall still meet the requirements of Paragraph 3.4.

3.5.2. Use of alternative techniques or other deviations from the standards and instructions provided herein must be approved by the QC MANAGER prior to implementation. The QC MANAGER will partially base his assessment on the purity of the constituents proposed, as well as the potential for interference of the proposed alternate techniques with other elements of the project and the overall design intent.

END OF SECTION 02936

Appendix C

Quality Control Plan

Quality Control Plan

Dike C Buttress
Segment B Construction
Work Plan 5
Kingston Fossil Plant
Harriman, Roane County, Tennessee

1. Purpose and Scope

This document is a site specific Quality Control (QC) plan that addresses construction and monitoring in association with the Dike C buttress project. The QC plan is intended to present minimum project requirements and shall serve as an outline for use in developing site specific protocols based on conditions encountered during the work.

2. Responsibility and Authority

A summary of QC personnel and associated responsibilities is presented below.

2.1. Regulatory Agency

Work conducted under this project shall be coordinated with the U.S. Environmental Protection Agency (EPA). Designated EPA personnel shall serve as the regulatory contact.

2.2. Quality Control Manager and Team

A professional engineer licensed in the state of Tennessee shall be designated as the QC Manager and shall be responsible for overall management of construction monitoring, testing and related documentation as outlined herein. The QC Manager shall determine appropriate test standards and methods for designated field observations and/or laboratory testing and shall be responsible for review of QC data to assess conformance with project requirements. At this time, the QC Manager is Jim Andrew, PE of Stantec Consulting Services Inc. or his duly appointed successor.

The QC Team shall consist of qualified personnel working under the direct supervision of the QC Manager. The QC Team shall be familiar with the materials used and the functional intent of the respective buttress components.

2.3. Owner

The plant and its ancillary functions are owned by the Tennessee Valley Authority (Owner). The Owner shall be responsible for overall management of construction activities to include but not be limited to contracting, administration and retaining the services of qualified consultants as required during the project.

The Owner and/or their Designee shall appoint one representative to serve as the Construction Manager. The Construction Manager shall be responsible for construction activities to include but not be limited to the character and sequence of work, coordination and scheduling.

The Owner's Civil Projects (CP) shall serve as the prime contractor for the Dike C buttress project. Any portion(s) of the work designated to others shall be conducted under the direct supervision of CP.

The Owner shall be responsible for providing qualified professionals to establish and enforce safety protocols related to the project.

3. Quality Control Activities

3.1. Meetings

Meetings shall be coordinated and conducted by the QC Manager and/or the Construction Manager on a weekly basis. The primary purpose of these meetings shall be to confirm that all parties involved are familiar with the project, required procedures and associated QC objectives along with any safety issues related to construction. Specific safety issues shall be the responsibility of designated safety professionals. Minutes of each meeting shall be prepared and distributed to all parties prior to the next meeting. These minutes shall be documented for inclusion with the project records.

Pre-construction meetings shall be held prior to initiating individual phases of construction. The QC Manager and other parties that will actively participate in the construction activities shall attend these meetings. Minutes shall be prepared and distributed as noted above.

3.2. Alternative Methods

Consistent with the overall objectives of the project, alternative construction and QC methods may be used during the course of the work. Proposed modifications shall be developed by the QC Manager and submitted to the Owner for review prior to incorporation into the project. Documentation of these alternative methods shall be prepared with copies retained for inclusion with the project records.

3.3. Contractor Submittals

Contractor submittals shall be reviewed and approved by the QC Manager prior to delivery and/or use of the respective construction materials. Copies of all submittals shall be included with the project records.

3.4. Conformance Testing

Conformance testing consists of periodic testing of materials and/or constructed products. Conformance testing shall be conducted by the QC Team as required by this plan and by additional discretion of the QC Manager. Results of conformance testing shall be reviewed by the QC Manager to assess conformance with project requirements. Copies of all conformance testing results shall be included with the project records.

3.5. Field Observations

The QC Team shall observe and document (as outlined herein) all construction activities associated with the project. Results shall be reported to the QC Manager (with the Owner copied) on a daily basis.

4. Ash Removal (within project limits)

Ash removal within the project limits shall be conducted under separate authority. Prior to construction of Dike C buttress components within subject areas, the Owner and/or their Designee shall obtain written approval from the regulatory contact and/or other appropriate parties that ash has been removed consistent with established guidelines and that construction may proceed.

5. Shot Rock Removal

Shot rock shall be excavated as practicable down to the original Dike C embankment soils. Care should be taken to ensure over excavation into the existing Dike C soils does not occur. Shot rock significantly embedded into the existing Dike C embankment can remain in-place.

6. Embankment

6.1. General

Embankment materials shall conform to the requirements established in Section 02150 of the technical specifications. Embankment shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

6.2. Quality Control Requirements

QC requirements are as follows:

a. Prior to placement, laboratory testing data shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. The exposed surface was inspected to:

   i. confirm embankment layers are properly compacted and uniform;

   ii. confirm that elevations are consistent with the project design;

iii. confirm that foundation benching has been provided which is conducive to horizontal lift construction.

c. Laboratory conformance testing for soil embankment shall consist of one natural moisture content test, standard engineering classification (i.e. sieve and hydrometer, Atterberg Limits and specific gravity) and standard Proctor test per source. This testing is in association with embankment placed on the starter bench road to promote positive drainage.

d. Field conformance testing shall include in-place density testing to provide documentation of the compaction operations at a minimum one test per two hundred linear feet of starter dike bench length or one test per day whichever is greater or at prescribed intervals established by the QC Manager.

e. Construction monitoring and field acceptance of embankment placement shall be documented by the QC Team

7. Manufactured Sand Product

7.1. General

Manufactured sand product materials shall conform to the requirements established in Section 02150 of the technical specifications. Manufactured sand product shall be placed as directed by the QC Manager.

7.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation for every 10,000 tons delivered to the site. This conformance test shall be termed “stockpiled materials”. Conformance testing shall also be performed on in-place material with gradation performed for every 500 tons placed, or as otherwise directed by the QC Manager.

c. Construction monitoring and field acceptance of manufactured sand product placement shall be documented by the QC Team.

d. For acceptance of the stockpiled manufactured sand material, the following must be shown:

   i. The conformance testing for every 10,000 tons delivered to the site meets all gradation specifications.

e. For acceptance of the in-place material, the following must be shown:

   i. A running average of the last 10 conformance tests must have a result of 5.0% or less on average passing the No. 200 sieve, independent of samples taken from the slope or bench areas.

ii. Maximum allowable percent passing the 200 sieve is less than 7.0% for any individual test.

iii. Running average conformance testing results for 10 tests cannot exceed 5.0 % passing the 200 sieve.

iv. In the event that conformance testing does not meet the criteria designated above, subject in-place material shall be removed as practical and replaced with a minimum of 6-inches of sand. Complete removal of the rejected sand is not necessary and removal is not to result in additional disturbance of the underlying subgrade.

v. If the average of the last 10 conformance tests is not in compliance with (iii) above, the subject material that contains the conformance test(s) that has exceeded 5.0% passing the No. 200 sieve by the greatest margin(s) shall be removed and replaced until the revised running average is in compliance with (iii) above. The length of material to be removed along the dike shall be the limits documented on the failing test result(s), but shall not be less than 20 feet.

vi. For grain size limits not including the #200 sieve, a maximum of one (1) test out of the most recent 10 tests may be outside the designated gradation ranges. For in-place testing not in compliance with this specification, the material shall be removed and replaced as per (v) above.

8. Aggregate

8.1. General

Aggregate materials shall conform to the requirements established in Section 02410 of the technical specifications. Aggregate shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

8.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation at every 30,000 tons delivered to the site. Gradation tests shall be performed on in-place materials at the rate of one test per 1,000 tons placed, or as otherwise directed by the QC Manager.

c. Construction monitoring and field acceptance of aggregate placement shall be documented by the QC Team.

d.

i. A maximum of one (1) test out of the most recent ten (10) may be outside of the designated gradation ranges.

ii. In the event conformance tests do not meet the designated criteria, the subject material shall be removed and replaced. The length of material to be removed along the dike shall be the limits referenced on the failing test result, but shall not be less than 20 feet.

9. Tennessee Department of Transportation Class B Machined Riprap

9.1. General

Riprap materials shall conform to the requirements established in Section 02410 of the technical specifications. Riprap shall be placed to the lines and grades shown in the drawings in a manner that conforms to the technical specifications.

9.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. Conformance testing shall consist of one gradation at every 30,000 tons delivered to the site or at any visual change in gradation as determined by the QC Team. The gradation test shall conform to ASTM D 5519-07 Test Method B.

c. Construction monitoring and field acceptance of riprap placement shall be documented by the QC Team.

10. Revegetation

10.1. General

Revegetation activities shall conform to the requirements established in Section 02936 of the technical specifications.

10.2. QC Requirements

QC requirements are as follows:

a. Prior to delivery, supplier certifications shall be submitted to the QC Manager indicating that all materials meet, or exceed, the minimum established properties. Certifications shall be accompanied by supporting QC testing.

b. The QC Team shall observe seedbed preparation, fertilizer and lime application, seeding and mulching activities to confirm appropriate revegetation procedures per the project requirements. Construction monitoring and field acceptance shall be documented by the QC Team.

11. Project Documentation

Documentation shall be collected and maintained by the QC Manager (copied to the Owner) during the Dike C buttress project. Survey and generation of as-built drawings shall be performed by TVA. The QC Manager shall review as-built Drawings for completeness. This documentation shall include but not be limited to the following:

- Daily construction field reports;
- Observation reports;
- Contractor submittals;
- Material conformance data;
- Photographic documentation;
- Survey and as-built data;
- Construction issue and solution reports;
- Plan modifications; and
- Meeting minutes.

The digital location and access information for all project documentation will be supplied prior to the start of construction.