History of Construction Report

Lower AQC Impoundment

La Cygne Generating Station

Kansas City Power & Light Company

October 6, 2016

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1 INTRODUCTION

1.1. ***Purpose***

On behalf of Kansas City Power & Light Company (KCP&L), AECOM has prepared the following history of construction for the Lower Air Quality Control (AQC) Impoundment (formerly known as the "Lower Air Quality Control pond") at the La Cygne Generating Station in accordance with 40 C.F.R. § 257.73(c).

1.2. ***Background***

40 C.F.R. § 257.73(c)(1) requires the owner or operator of an existing coal combustion residual (CCR) surface impoundment that exceeds a specified size threshold to compile a history of construction that contains, to the extent feasible, the information specified in § 257.73(c)(1)(i)–(xii). Specifically, by October 17, 2016, a history of construction is required for each existing CCR surface impoundment that either (i) has a height of five feet or more and a storage volume of 20 acre-feet or more, or (ii) has a height of 20 feet or more (40 C.F.R. § 257.73(b)).

2 HISTORY OF CONSTRUCTION

§257.73 (c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

Operator: Kansas City Power & Light Company

Address: 25166 East 2200th Rd.
La Cygne, KS 66040

CCR Unit: Lower AQC Impoundment

The above named CCR unit does not have a state assigned identification number.

§257.73 (c)(1)(ii): The location of the CCR unit identified on the most recent U.S. Geological Survey (USGS) 7½ minute or 15 minute topographic quadrangle map, or a topographic map of equivalent scale if a USGS map is not available.

See **Attachment A** – Boicourt Quadrangle, Kansas 7.5-Minute Series.

§257.73 (c)(1)(iii): A statement of the purpose for which the CCR unit is being used.

The Lower AQC Impoundment is primarily used as a holding basin for formerly sluiced CCR water and materials from the La Cygne Generating Station; AQC recycling water; gypsum runoff pond discharge; and stormwater management. The watershed for the Lower AQC Impoundment includes the on-site CCR landfill and overflow from the Upper AQC Impoundment, as well as other areas.

§257.73 (c)(1)(iv): The name and size in acres of the watershed within which the CCR unit is located.

The Lower AQC Impoundment is located in the Lower Marais Des Cygnes Watershed with a drainage area of 1,029,100 acres per United States Geological Survey[1] (USGS).

§257.73 (c)(1)(v): A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.

The available drawings and geotechnical data show that the foundation materials typically consist, from the top downward, of residual soils over primarily shale bedrock. Thin stringers of limestone and sandstone are present at some of the boring locations.

The Ebasco Services Incorporated As-Built Drawing[2] show that the embankment was not constructed around the entire perimeter of the impoundment. The embankment was constructed around portions of the perimeter where the ground surface elevation was less than 864 ft. The embankments abut into natural ground at the locations shown on the drawings. Details of the abutment materials were not described or referenced in the drawings. It is expected and assumed that the abutment materials are native materials similar to the foundation materials.

An available summary of engineering properties of the foundation and abutment materials for the Lower AQC Impoundment from the Geotechnical Report[3] is presented in **Table 1**.

Table 1. Summary of Foundation Material Engineering Properties from Geotechnical Report[3]

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		Cohesion, c′ (psf)	Friction Angle, Φ' (deg)	Cohesion, c (psf)	Friction Angle, Φ (deg)
Residual Soil	126	150	25	500	15
Weathered Shale	130	150	25	500	15
Bedrock	140	5,000	35	5,000	35

§257.73 (c)(1)(vi): A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.

Ebasco Drawings show that the La Cygne Generating Station's Lower AQC Impoundment (referred to as 'Ash Impoundment' in the drawings) is formed by an approximately 10,500 ft long embankment. The embankment is a homogenous, earth fill structure and is not zoned. Information on the method of site preparation is not reasonably or readily available. The geotechnical investigation by AECOM in 2010 determined the materials composing the embankment were primarily stiff, high plastic clay with minor rock fragments that was well-compacted[9]. Ebasco Drawing G-693[4] notes the following regarding the method of embankment construction:

Fill material in this dike shall be compacted to 95% of standard proctor density. The moisture content of the backfill shall be within the limits of the optimum moisture required to obtain the percent compaction requirement. Additional requirements for the fill are noted in paragraph D9 of the grading and drainage specifications for Contract LA C1. Density tests of the compacted fill shall be performed for every 30,000 square feet per 6-inch lift with a minimum of one test per day for the dike section adjacent to the discharge canal. The fill material for the north dike section from centerline coordinates East 3,105,832 and North 638,100 to the east will be tested once for every 100,000 square feet per life with a minimum of one test per day.

An available summary of the physical and engineering properties of the construction materials for the Lower AQC Impoundment from the Geotechnical Report[3] is presented in **Tables 2 and 3** below.

Table 2. Summary of Embankment Material Engineering Properties from Geotechnical Report[3]

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
Embankment Fill	129	200	23	432	15

Table 3. Summary of Embankment Material Physical Properties from Geotechnical Report[3]

Test		Min	Max	Average
Water Content (%)		23	29	26
Atterberg Limits*	**Liquid Limit**	N/A	N/A	61
	Plastic Limit	N/A	N/A	15
	Plasticity Index	N/A	N/A	46

* Only one Atterberg Limit test result was available.

Available information indicates that the impoundment was constructed between 1971 and October 1973.

§257.73 (c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Drawings that contain items pertaining to the requested information for the Lower AQC Impoundment are listed in **Table 4**. Items marked as "Not Found" are items not found in available record documentation. The available construction plans for the Lower AQC Impoundment are included in Attachment B.

Table 4. Reference Drawings with Design Information Requested in § 257.73(c)(1)(vii)

Dimensional plan view (all zones)	Ebasco Services Incorporated Drawing No. AN8980 G-693[4] and G-162[2] (1971 and 1973)
Dimensional cross sections	Ebasco Services Incorporated Drawing No. AN8980 G-693[4] and G-694[5] (1971)
Foundation Improvements	Not Found
Drainage Provisions	Ebasco Services Incorporated Drawing No. AN8980 G-693[4] (1971)
Spillways	Ebasco Services Incorporated Drawing No. AN8980 G-693[4], 1718 G-582[6], and AN8980 G-162[2] (1971, 1971, and 1973)
Diversion Ditches	Ebasco Services Incorporated Drawing No. AN8980 G-693[4] (1971)
Outlets	Ebasco Services Incorporated Drawing No. AN8980 G-693[4] (1971)

Instrument Locations	Figure 1: Existing Instrumentation Locations – Lower AQC Impoundment (AECOM, 2016)
Slope Protection	None Included in Original Design
Normal Operating Pool Elevation	Ebasco Services Incorporated Drawing No. 1718 G-582[6] (1971)
Maximum Pool Elevation	Ebasco Services Incorporated Drawing No. 1718 G-582[6] (1971)
Expected Maximum Depth of CCR	Ebasco Services Incorporated Drawing No. AN8980 G-693[4] (1971)
Identifiable Natural or Manmade Features That Could Adversely Affect Operation of the Lower AQC Impoundment	Woodward-Clyde Consultants Sheet 6[7] and 8[8] (1979)

All reference drawings listed in **Table 4** are included in **Attachment B**. (Figure 1 is located before **Attachment A**.)

Erosion control for the downstream slopes is provided by topsoil and vegetation. Inspections by AECOM show that these measures are effectively protecting the slope.

§257.73 (c)(1)(viii): A description of the type, purpose, and location of existing instrumentation.

The Lower AQC Impoundment has three piezometers that were installed on the dam crest in 2010 as part of a geotechnical investigation conducted by URS Corporation[9]. A water level gauge has been installed in the southwest corner of the impoundment. The three piezometers and the water level gauge are monitored no less than every 30 days to provide data on water levels within the embankment (piezometers) and water levels within the impoundment (water level gauge). The locations of these instruments are shown in Figure 1.

(§257.73 (c)(1)(ix): Area-capacity curves for the CCR unit.

An Area-capacity curve is shown on Drawing G-693[4] (see **Attachment B**).

(§257.73 (c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

Drawing G-693[4] shows two spillways. The spillway near the southwest corner of the impoundment is not given a title (e.g. principal spillway). The drawings show inlet consisting of a pipe (diameter not noted) along the upstream slope of the embankment. The inlet elevation of the pipe is shown at 858.0 ft. The pipe is shown to discharge into a box structure located at the toe of the upstream slope. Two, 48-inch diameter reinforced concrete pipes exit the box and flow into a discharge box located within the discharge canal (toe of the downstream slope) west of the impoundment. Field observations and a bathymetric survey by AECOM found no evidence of the existence of this structure. The other feature is labeled "Overflow from Runoff." The plans show that this feature is present along the embankment crest and consists of a 120 ft. long depressed section with an elevation of 861 ft. The sides of the depressed section slope at 3H:1V a length of 15 ft. up to the top of embankment elevation (864 ft.).

Ebasco Sheet G-582[6] shows a weir structure designed for the 100-year flood condition (210 cfs) centered along the 120 ft. long depressed section designed for a maximum probable flood of 1,303 cfs.

The calculations used in the determination of the capacities of the spillways are not reasonably or readily available. A pump system for water recirculation to and from the plant exists in the southwest corner of the impoundment. The As-Built (Drawing G162[2]) shows a pump station, “Pump A”, “Pump B”, and “Centerline Suct & Disch CLE WTP”.

§257.73 (c)(1)(xi): The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.

Other than the construction drawings included in Attachment B, construction specifications are not reasonably or readily available. Provisions for surveillance include the piezometers and water level gauge indicated in **Figure 1**.

KCP&L provisions for surveillance, maintenance, and repair of Lower AQC Impoundment in compliance with the USEPA CCR Rule include the following:

- La Cygne Generating Station accomplishes 7-day and 30-day inspections on the Lower AQC Impoundment in compliance with the CCR Rule[10].
- La Cygne Generating Station supervisory staff reviews inspection documentation.
- In the event further evaluation is needed, station management and/or corporate staff will be consulted as appropriate.
- Follow-on work is scheduled to repair issues determined to be in need of remediation.

§257.73 (c)(1)(xii): Any record or knowledge of structural instability of the CCR unit.

No signs of structural instability have been reported.

3 LIMITATIONS

The signature of AECOM's authorized representative on this document represents that to the best of AECOM's knowledge, information and belief in the exercise of its professional judgment, it is AECOM's professional opinion that the aforementioned information is accurate as of the date of such signature. Any recommendation, opinion or decisions by AECOM are made on the basis of AECOM's experience, qualifications and professional judgment and are not to be construed as warranties or guarantees. In addition, opinions relating to environmental, geologic, and geotechnical conditions or other estimates are based on available data and that actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

4 ENGINEER'S CERTIFICATION

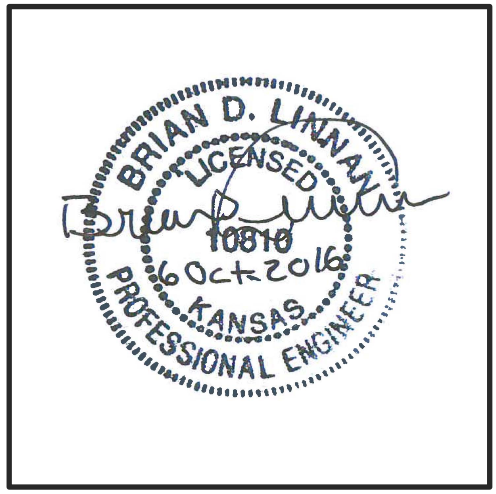
This document was prepared under the direct personal supervision of Brian D. Linnan, a Registered Professional Engineer in good standing in the State of Kansas. I certify, the History of Construction for the La Cygne Lower AQC Impoundment, dated October 6, 2016, which includes all pages in Sections 1 and 2, meets the requirements of 40 CFR § 257.82.

Brian D. Linnan

Printed Name

October 6, 2016

Date



AECOM
2380 McGee Street, Suite 200
Kansas City, Missouri 64108
1-816-561-4443

5 REFERENCES

1. United States Geological Survey (USGS), The National Map Viewer. http://viewer.nationalmap.gov/viewer/. USGS data first accessed in April of 2016.

2. Ebasco Services Incorporated, *Kansas City Power & Light Company, Kansas Gas & Electric Company La Cygne Steam Electric Station 1973, 848 MW (Net) Installation, Unit No. 1 Plot Plan – As-Built Construction (Drawing No AN8980 G-162),* October 2, 1973.

3. AECOM, *Geotechnical Report, Kansas City Power & Light Company, Lower AQC Impoundment, La Cygne Generating Station,* October 2016.

4. Ebasco Services Incorporated, *Kansas City Power & Light Company, Kansas Gas & Electric Company La Cygne Steam Electric Station 1973 – 848 MW (Net) Installation – Unit No. 1 Ash Pond Dike Plan & Sect (Drawing No AN8980 G-693),* March 22, 1971.

5. Ebasco Services Incorporated, *Kansas City Power & Light Company, Kansas Gas & Electric Company La Cygne Steam Electric Station 1973 – 848 MW (Net) Installation – Ash Pond Dike Dets – MAS & REINF (Drawing No AN8980 G-694),* March 19, 1971.

6. Ebasco Services Incorporated, *Kansas City Power & Light Company, La Cygne Station Air Quality Control - AQC Structural - Miscellaneous Ash Pond Weir Structure M&R Diagram (Drawing No 1718 G-582),* December 28, 1971.

7. Woodward-Clyde Consultants Kansas City, *Kansas City Power & Light Company, Kansas Gas & Electric Company La Cygne Steam Electric Station New F.G.D. Sludge Retention Dam – Stage 1 Dam Foundation Grade and Excavation Plan (Sheet 6),* January 30, 1979.

8. Woodward-Clyde Consultants Kansas City, *Kansas City Power & Light Company, Kansas Gas & Electric Company La Cygne Steam Electric Station New F.G.D. Sludge Retention Dam – Stage 1 Dam and Spillways Plan (Sheet 8),* January 30, 1979.

9. URS Corporation, *Geotechnical Evaluation: AQC Ponds – Kansas City Power & Light La Cygne Generating Station,* September, 2010.

10 KCP&L, *Coal Combustion Residuals (CCR) Inspection Program, La Cygne Generating Station*, Rev. 3, August 2016.

Figure 1
Existing Instrument Locations – Lower AQC Impoundment

September 27, 2016 11:34:20 pm (mik)
J:\KCPL La Cygne Upper AQC Pond\CAD\Plan Sheets\Exist Instruments Lower AQC.dwg

LEGEND

P-601 PIEZOMETER LOCATION AND NUMBER

SOURCE: EXISTING TOPOGRAPHY WAS PRODUCED FROM AERIAL MAPPING PROVIDED BY M. J. HARDEN ASSOCIATES INC., DATED 2001.

N

700 0 700

SCALE IN FEET

AECOM

2380 McGee Street, Suite 200
Kansas City, Missouri 64108

CLIENT: KANSAS CITY POWER & LIGHT COMPANY

LOCATION: LA CYGNE GENERATING STATION

TITLE:

EXISTING INSTRUMENTATION LOCATIONS
LOWER AQC IMPOUNDMENT

DRAWN BY	CHECKED BY	APPROVED BY
TMS	BDL	BDL
PROJECT NO.	DATE	FIGURE NO.
60505710	AUG. 2016	1

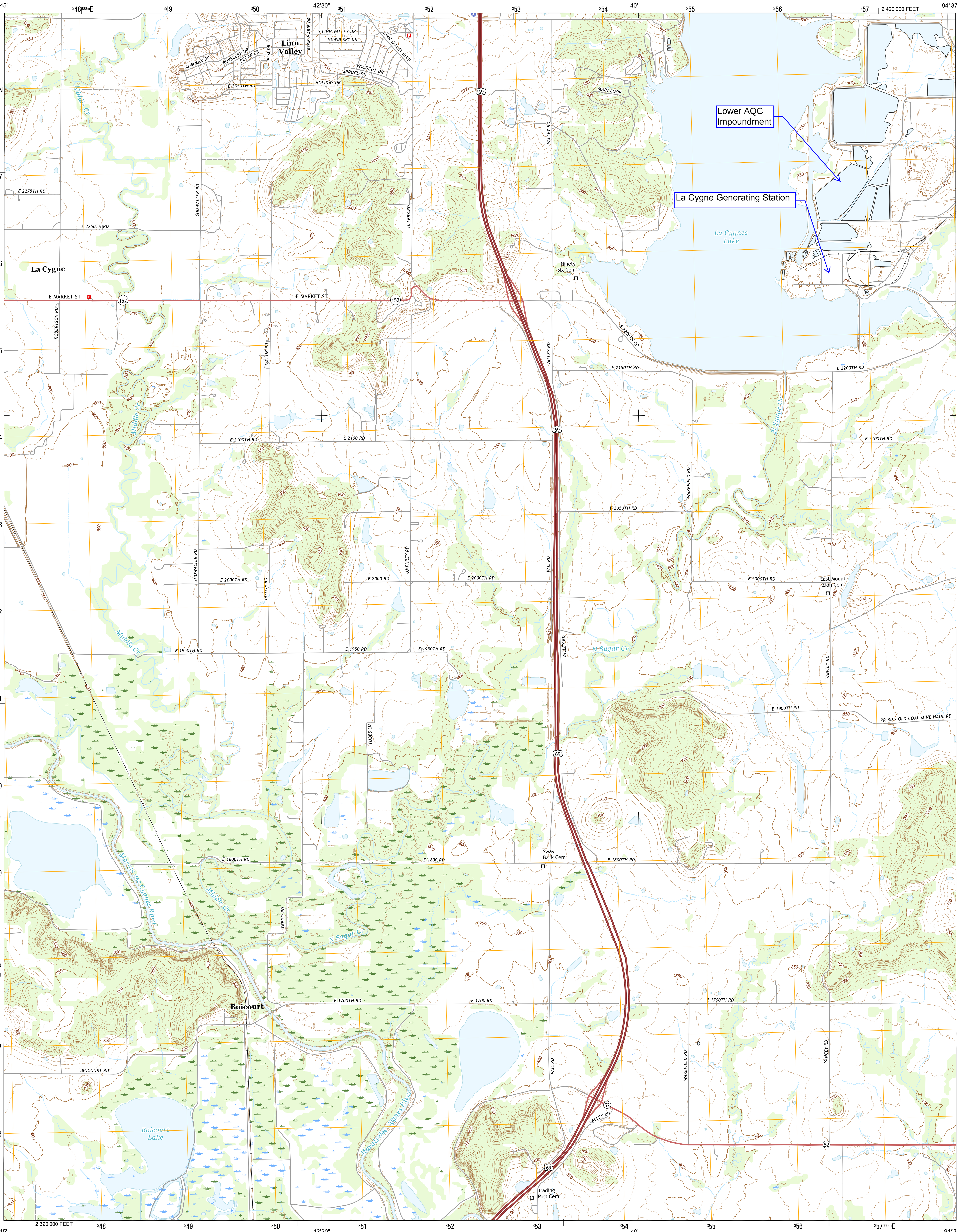
Attachment A
Boicourt Quadrangle, Kansas 7.5-Minute Series

USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

BOICOURT QUADRANGLE
KANSAS-LINN CO.
7.5-MINUTE SERIES



94°45' 38°22'30" 348000mE 349 350 42'30" 351 352 353 354 40' 355 356 357 2 420 000 FEET 94°37'30" 38°22'30"

38°15' 94°45' 2 390 000 FEET 348 349 350 42'30" 351 352 353 354 40' 355 356 357000mE 38°15' 94°37'30"

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 15S
10 000-foot ticks: Kansas Coordinate System of 1983 (south zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.......................NAIP, July 2014
Roads.................U.S. Census Bureau, 2014 - 2015
Names.......................GNIS, 2015
Hydrography..........National Hydrography Dataset, 2014
Contours...........National Elevation Dataset, 2014
Boundaries.......Multiple sources; see metadata file 1972 - 2015
Public Land Survey System................BLM, 2015
Wetlands.......FWS National Wetlands Inventory 1977 - 2014

MN
GN
2° 4´
37 MILS
1° 3´
19 MILS

UTM GRID AND 2015 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
UC
Grid Zone Designation
15S

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 MILES 1
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.19

KANSAS
QUADRANGLE LOCATION

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES

1 Fontana
2 New Lancaster
3 Drexel
4 La Cygne
5 Amoret
6 Mound City
7 Pleasanton
8 Worland

ROAD CLASSIFICATION

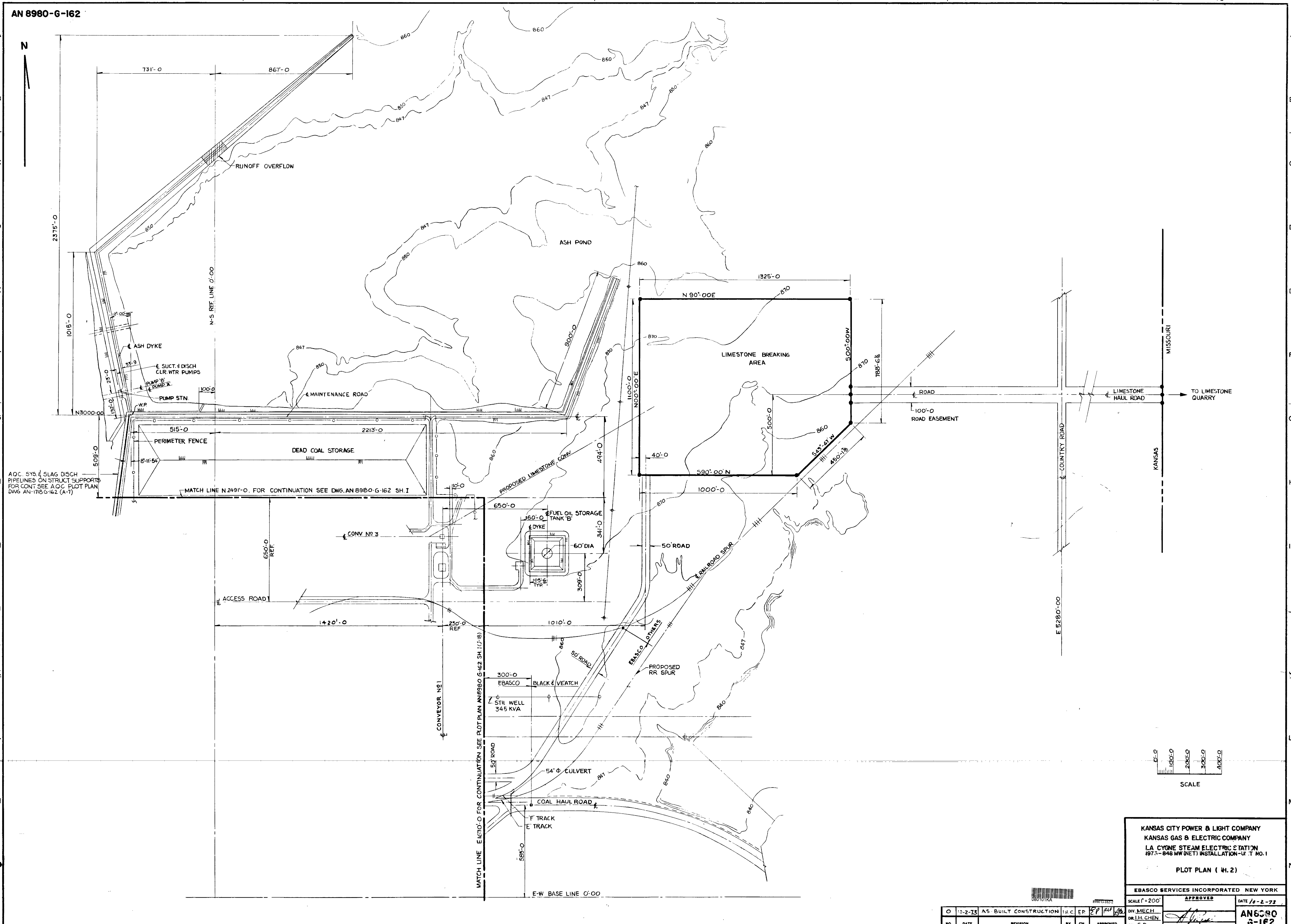
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

BOICOURT, KS
2015

Attachment B
Reference Drawings

Selected 1971 Ebasco Services Incorporated Drawings

AN 8980-G-162



KANSAS CITY POWER & LIGHT COMPANY
KANSAS GAS & ELECTRIC COMPANY
LA CYGNE STEAM ELECTRIC STATION
1973-848 MW (NET) INSTALLATION-UNIT NO. 1

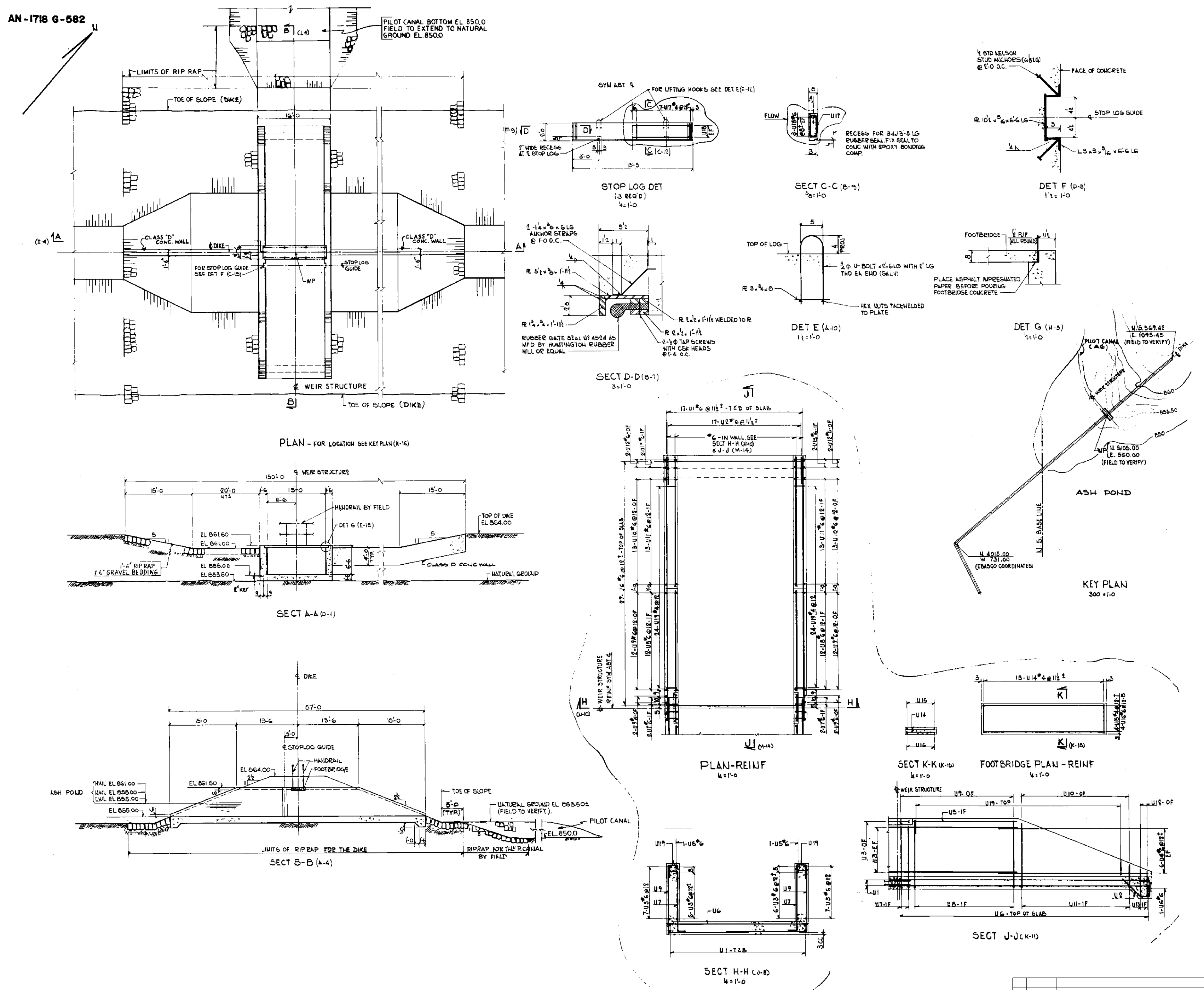
PLOT PLAN (SH. 2)

EBASCO SERVICES INCORPORATED NEW YORK

NO.	DATE	REVISION	BY	CH.	APPROVED
0	10-2-73	AS BUILT CONSTRUCTION	I.H.C.	EP	EP

SCALE 1" = 200'
APPROVED
DATE 10-2-73
DIV. MECH
DR. I.H. CHEN
CH. E.P.
AN8980 G-162

AN-1718 G-582



QUANTITIES (NET BY FIELD, UNLESS NOTED)

CONCRETE CLASS 'B' (3000 PSI)	86 CU YD
FOR REINF STEEL SEE BAR BENDING SCHEDULE	B-538-20
RIP-RAP	560 CU YD
GRAVEL	200 CU YD
STOP LOGS AS PER DETAIL (C-9)	3 REQ'D
STOP LOG GUIDES AS PER DETAIL F (C-15)	2 REQ'D
HANDRAIL	BY FIELD
½" PREMOLDED JOINT FILLER	5 SQ.FT.
CONCRETE CLASS 'D' (2000 PSI)	30 CU.YD.

NOTES

CURRENT ACI STANDARDS SHALL GOVERN FOR ALL DESIGN AND CONSTRUCTION UNLESS OTHERWISE NOTED.

CONCRETE SHALL BE CLASS 'B' (3000 PSI) & CLASS 'D' (2000 PSI) SEE SPECIFICATION EBASCO 14-65 CONC-MAS

ALL ANCHOR BOLTS, DRAIN PIPES, PIPE SLEEVES, ELECTRICAL CONDUITS AND EMBEDDED PARTS SHALL BE IN POSITION BEFORE CONCRETE IS PLACED.

FOR SPECIFICATIONS FOR STEEL FOR CONCRETE REINFORCING BARS AND FOR BAR DETAILS SEE BAR BENDING SCHEDULE (B-538-20)

PLACING DIMENSIONS ARE GIVEN TO CENTER OF BARS UNLESS NOTED.

ALL SPLICES IN REINFORCEMENT SHALL COMPLY WITH THE REQUIREMENTS OF CURRENT ACI STANDARDS, SECTION 805, BUT IN NO CASE SHALL LAP BE LESS THAN 24 BAR DIAMETERS.

ALL BARS SHALL HAVE 2" MINIMUM CONCRETE COVER UNLESS OTHERWISE NOTED.

SHIFT OR BEND BARS TO CLEAR ANCHOR BOLTS, DRAINS PIPE SLEEVES AND EMBEDDED PARTS.

ALL EXPOSED STEEL TO BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASA SPEC G8.1 (ASTM A 123)

ALL MATERIAL FOR STOP LOGS TO BE FURNISHED BY FIELD

BACKFILL TO BE SELECT MATERIAL THOROUGHLY COMPACTED TO 95% STD PROCTOR DENSITY. FOR THE WEIR STR.

WEIR STRUCTURE, LESS STOPLOGS, DESIGNED FOR 100 YEAR FLOOD CONDITION (210 CFS)

DEPRESSED SECTION DESIGNED FOR MAXIMUM PROBABLE FLOOD CONDITION (1303 CFS)

NORMAL OPERATING CONDITION - 2 STOPLOGS IN PLACE

REFERENCE DRAWINGS

LIST OF DRAWINGS	A-557
BAR BENDING SCHEDULE	B-538-20
ASH POND DIKE - PLAN & SECTIONS	8980-G-693

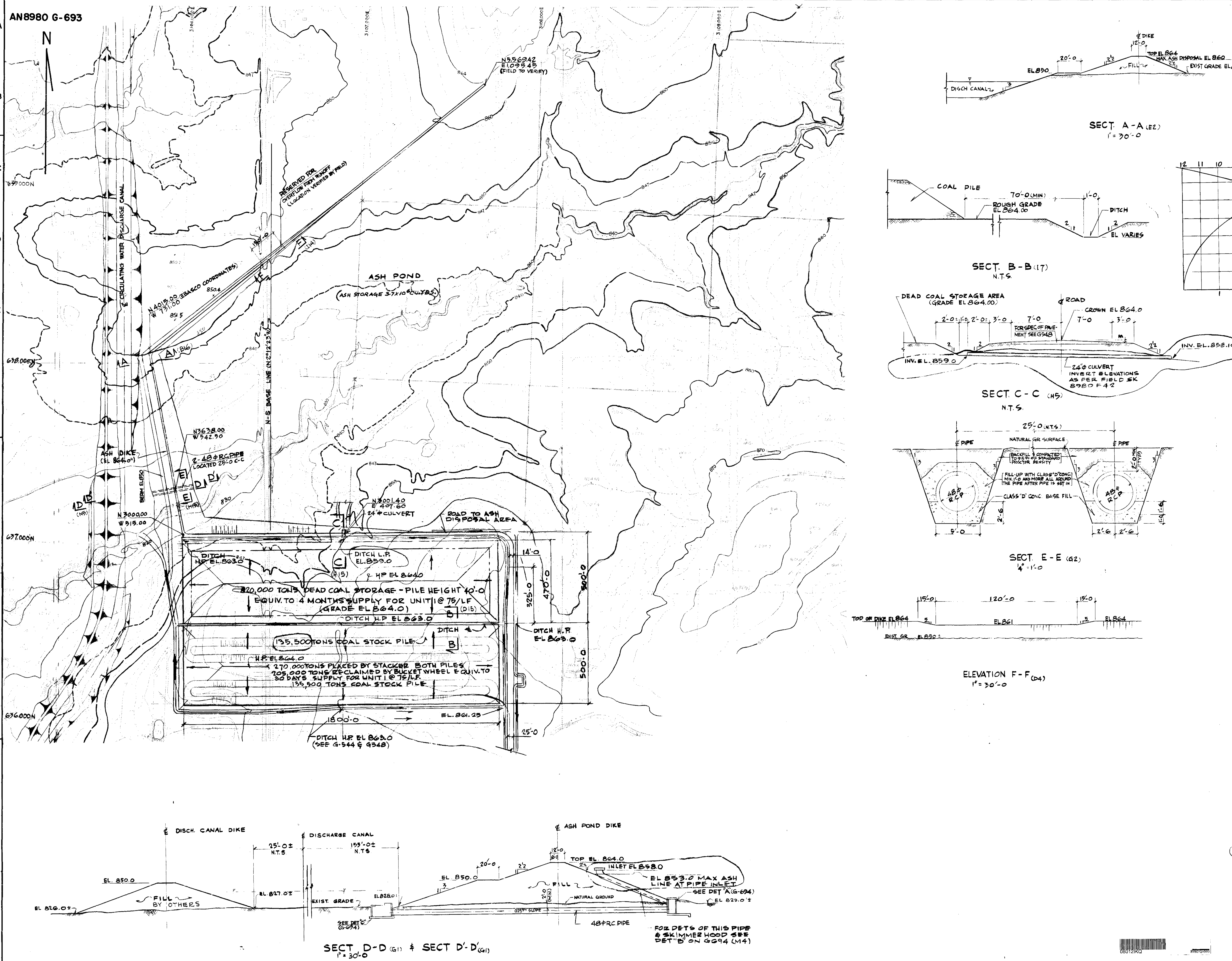
LA CYGNE STATION
AIR QUALITY CONTROL
AQC STRUCTURAL
MISCELLANEOUS ASH POND WEIR STRUCTURE M&R DIAGRAM

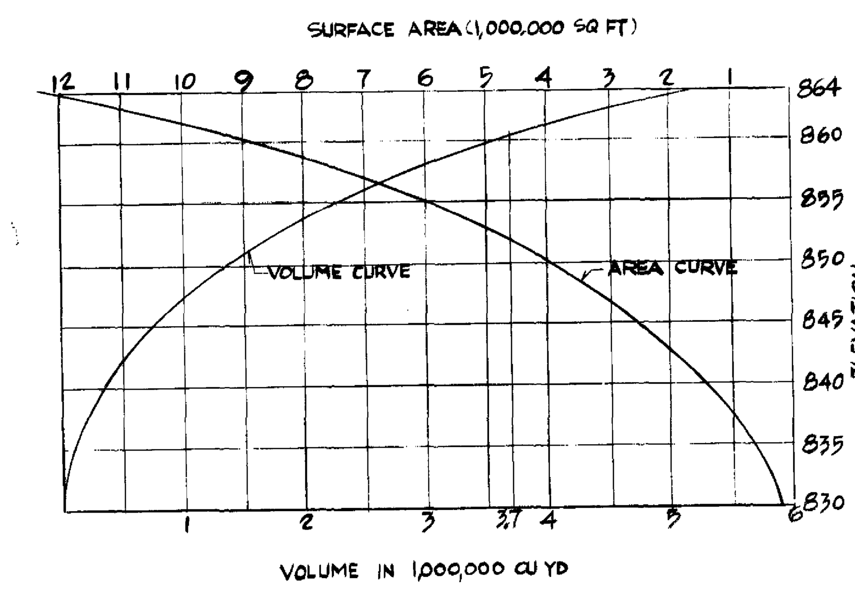
DRAWN	DATE	APPROVED	DATE
ESI	12/28/71	ESI	12/28/71
DRAFT. CK.	DATE	SCALE	
ENGR. CK.	DATE	JOB NO. 1718	

KANSAS CITY
POWER & LIGHT COMPANY

DWG. NO. 1718 G582

AN8980 G-693





APPROX STORAGE
(VOLUME OF DIKE FILL NOT INCLUDED)

QUANTITIES (NET, BY FIELD UNLESS NOTED)

AREA	EXCAVATION	FILL
ASH DISPOSAL AREA DIKE		115,100 CU.YDS

FILL QTY'S EXCLUDE FILLING OF REMOVED UNSUITABLE MATERIAL UNDERNEATH DIKE AND 10% SHRINKAGE

MAX. ASH STORAGE VOLUME 3.7×10^6 CU YDS
24"φ CULVERT — — — 30 LIN FT
48"φ R.C. PIPE — — — 470 LIN FT (VERIFIED BY FIELD)
PAVING MATERIALS (ASPHALT & CRUSHED STONE) BY FIELD

NOTES

FILL MATERIAL IN THIS DIKE SHALL BE COMPACTED TO 95% OF STANDARD PROCTER DENSITY. THE MOISTURE CONTENT OF THE BACKFILL SHALL BE WITHIN THE LIMITS OF THE OPTIMUM MOISTURE REQUIRED TO OBTAIN THE PERCENT COMPACTION REQUIRED. ADDITIONAL REQUIREMENTS FOR THE FILL ARE NOTED IN PARAGRAPH D9 OF THE GRADING AND DRAINAGE SPECIFICATIONS FOR CONTRACT LA C1. DENSITY TESTS OF THE COMPACTED FILL SHALL BE PERFORMED FOR EVERY 30,000 SQUARE FEET PER 6 INCH LIFT WITH A MINIMUM OF ONE TEST PER DAY FOR THE DIKE SECTION ADJACENT TO THE DISCHARGE CANAL. THE FILL MATERIAL FOR THE NORTH DIKE SECTION FROM CENTERLINE COORDINATES EAST 3,105,832 AND NORTH 638,100 TO THE EAST WILL BE TESTED ONCE FOR EVERY 100,000 SQUARE FEET PER LIFT WITH A MINIMUM OF ONE TEST PER DAY.

THE VOLUME OF STORAGE 3.7 MILLION CUBIC YARDS COVERS A DISPOSAL AREA OF APPROXIMATELY 160 ACRES AND PROVIDES 3 YEARS OF ASH STORAGE FOR UNIT NO. 1 AT MAXIMUM GUARANTEED LOAD AND BURNING A COAL HAVING A 24% ASH CONTENT.

THE QUANTITY OF WATER TO BE DISCHARGED TO ASH POND WILL BE FROM THE FOLLOWING SOURCES:

1. 10,000 gpm FROM THE ASH SLUICE PUMPS.
2. 15,000 gpm (MAXIMUM) FROM THE SO_2 SYSTEM PUMPS.
3. RAINFALL RUN-OFF FROM THE DRAINAGE AREA CONFINED WITHIN THE LIMITS OF THE ASH POND.*

* RUN-OFF VALUES OBTAINED FROM THE DATA PREPARED BY OTHERS.

THE 48"φ R.C. PIPES USED FOR DRAINING ABOVE QUANTITIES OF WATER UNDER THE EMBANKMENT SHALL BE IN ACCORDANCE WITH SPECIFICATION ASTM C76-64T AND SHALL BE CLASS III PIPE WITH A CLASS "A" BEDDING.

FOR DETAILS AND REINF. STEEL OF THE INLET AND OUTLET STRUCTURES OF THE DRAINAGE PIPE LINES SEE DWG AN8980 G694, AND BAR BENDING SCHEDULE B541-16.

REFERENCE DRAWINGS

LIST OF DRAWINGS — AN8980-A-160
PLAN AREA GRADING AND DRAINAGE PLAN — AN8980-G-545
ASH POND DIKE DET'S M & R — AN8980-G-694
PLANT SITE GRADING & DRAINAGE — AN8980-G-944
PLANT ROADS & RAILROAD SECT & PROFILE — AN8980-G-548
DRAINAGE COAL STORAGE AREA — AN8980 F-42
(FIELD SKETCH.

08012IKQ
8980 G-693

NO.	DATE	REVISION	BY	CH.	APPROVED
2	3-22-71	ADDED (K16) DITCH; (M18) REF. DWG REV. (M9) EL. OF PIPE & SKIMMER. (I9) EL. (F15) INVERT EL'S. (J4) [illegible]	ST	W.H.	O.K.
1	[illegible]	ADD'L (M10) NOTE & EL.	AL	DP	O.K.

KANSAS CITY POWER & LIGHT COMPANY
KANSAS GAS AND ELECTRIC COMPANY
LA CYGNE STEAM ELECTRIC STATION
1973-848 MW (NET) INSTALLATION - UNIT NO. 1

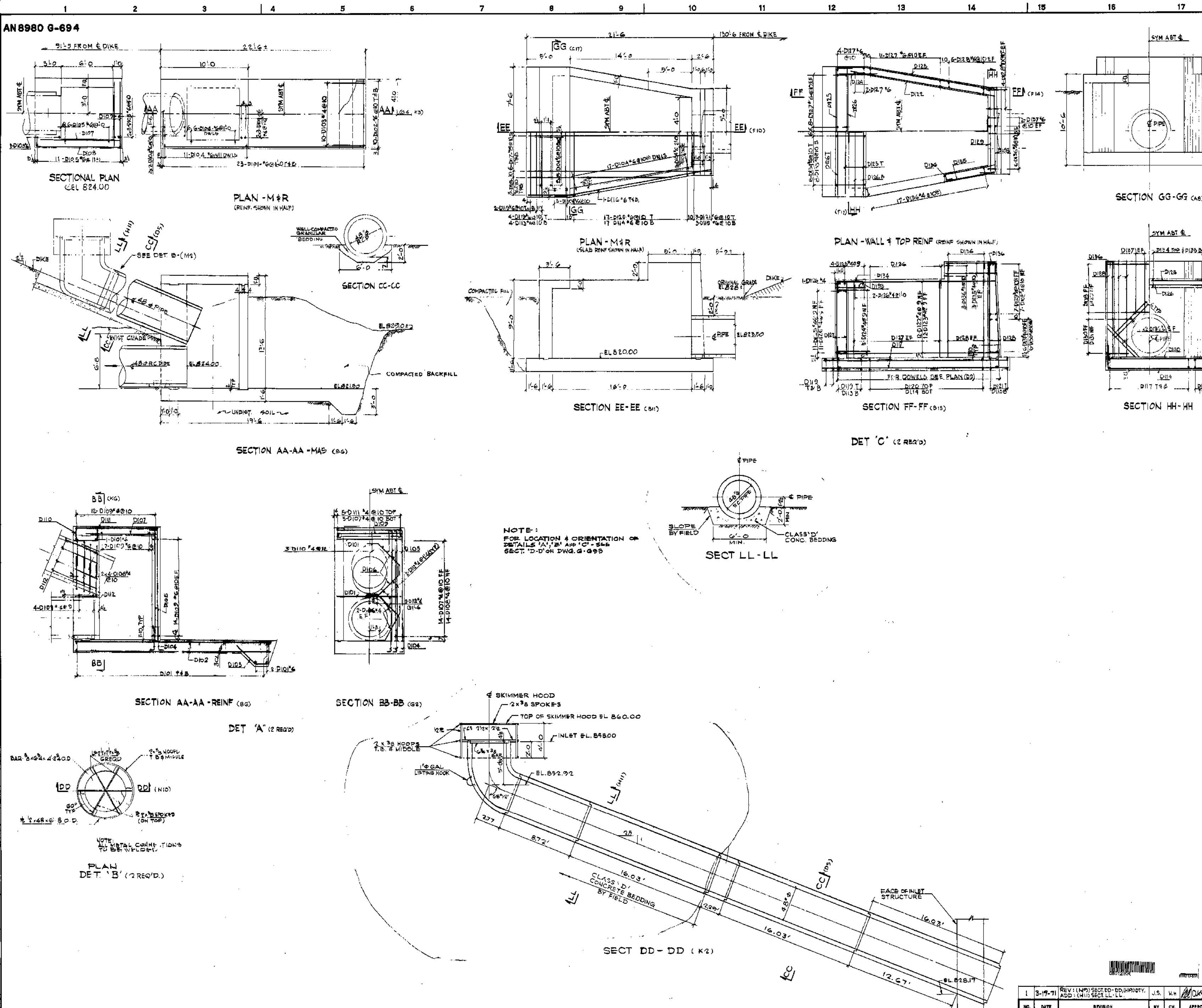
ASH POND DIKE PLAN & SECT

EBASCO SERVICES INCORPORATED NEW YORK

SCALE [illegible] | APPROVED G. A. Feit[illegible] | DATE [illegible]
DIV. C-H
DR. [illegible]
CH. [illegible]

AN8980
G-693

AN 8980 G-694



QUANTITIES (NET, BY FIELD U.N.)

FOR REINF STL SEE BAR BENDING SCHEDULE	B-541-16
CONC. CLASS "B" (3000 PSI)	136 CU.YDS
SKIMMER HOOD AS PER DET B (M1)	2 REQ'D
48"Φ R.C. CYLINDER PIPE:	
STD. LGTH STR. PIPE (L.L. - 16.03')	16 REQ'D
SHORT LGTH STR. PIPE (L.L. - 2.29')	2 REQ'D
68°12' ELBOW (S=2.77', B=5.08')	2 REQ'D
SHORT LGTH STR. PIPE (L.L. - 8.72')	2 REQ'D

NOTES (NET BY FIELD UNLESS NOTED)

CONCRETE SHALL BE CLASS "B" (3000 PSI)
SEE SPECIFICATION EBASCO 14-65 CONCRETE MASONRY

ALL ANCHOR BOLTS, DRAIN PIPES, PIPE SLEEVES, ELECTRICAL CONDUITS AND EMBEDDED PARTS SHALL BE IN POSITION BEFORE CONCRETE IS PLACED.

FOR SPECIFICATIONS FOR STEEL FOR CONCRETE REINFORCING BARS AND FOR BAR DETAILS SEE BAR BENDING SCHEDULE.

PLACING DIMENSIONS ARE GIVEN TO CENTER OF BARS UNLESS NOTED.

ALL SPLICES IN REINFORCEMENT SHALL COMPLY WITH THE REQUIREMENTS OF CURRENT ACI STANDARDS, SECTION 805, BUT IN NO CASE SHALL LAP BE LESS THAN 24 BAR DIAMETERS.

ALL BARS SHALL HAVE 2" MINIMUM CONCRETE COVER UNLESS OTHERWISE NOTED.

SHIFT OR BEND BARS TO CLEAR ANCHOR BOLTS, DRAINS, PIPE SLEEVES AND EMBEDDED PARTS.

PIPE LAID ON SLOPE OF DIKE SHALL BE R.C. CYLINDER PIPE WITH RUBBER & STEEL JT. STR. PIPE SHALL BE INTERPACE SP-12 HEAVY CONC - SPEC. AWWA C301 OR EQUAL. ELBOWS SHALL BE INTERPACE SP-1 TYPE 'A' - SPEC. AWWA C-302 OR EQUAL.

REFERENCE DRAWINGS — AN 8980-

LIST OF DRAWINGS	A-160
ASH POND DIKE PLAN & SECT	G-613
BAR BENDING SCHEDULE	B-541-16

5946

WORK THIS DRAWING WITH DWG G-693

KANSAS CITY POWER & LIGHT COMPANY
KANSAS GAS AND ELECTRIC COMPANY
LA CYGNE STEAM ELECTRIC STATION
1973-848 MW (NET) INSTALLATION - UNIT NO. 1

ASH POND DIKE DETS - MAS & REINF

EBASCO SERVICES INCORPORATED NEW YORK

NO.	DATE	REVISION	BY	CH.	APPROVED
1	3-19-71	REV: (N9) SECT. DD-DD, (H19) QTY. ADD: (H11) SECT. LL-LL	J.S.	W.H	

SCALE 1/4" = 1'-0
DIV. C-H
DR. Schneider
CH. PATEL
APPROVED
DATE

AN 8980
G-694

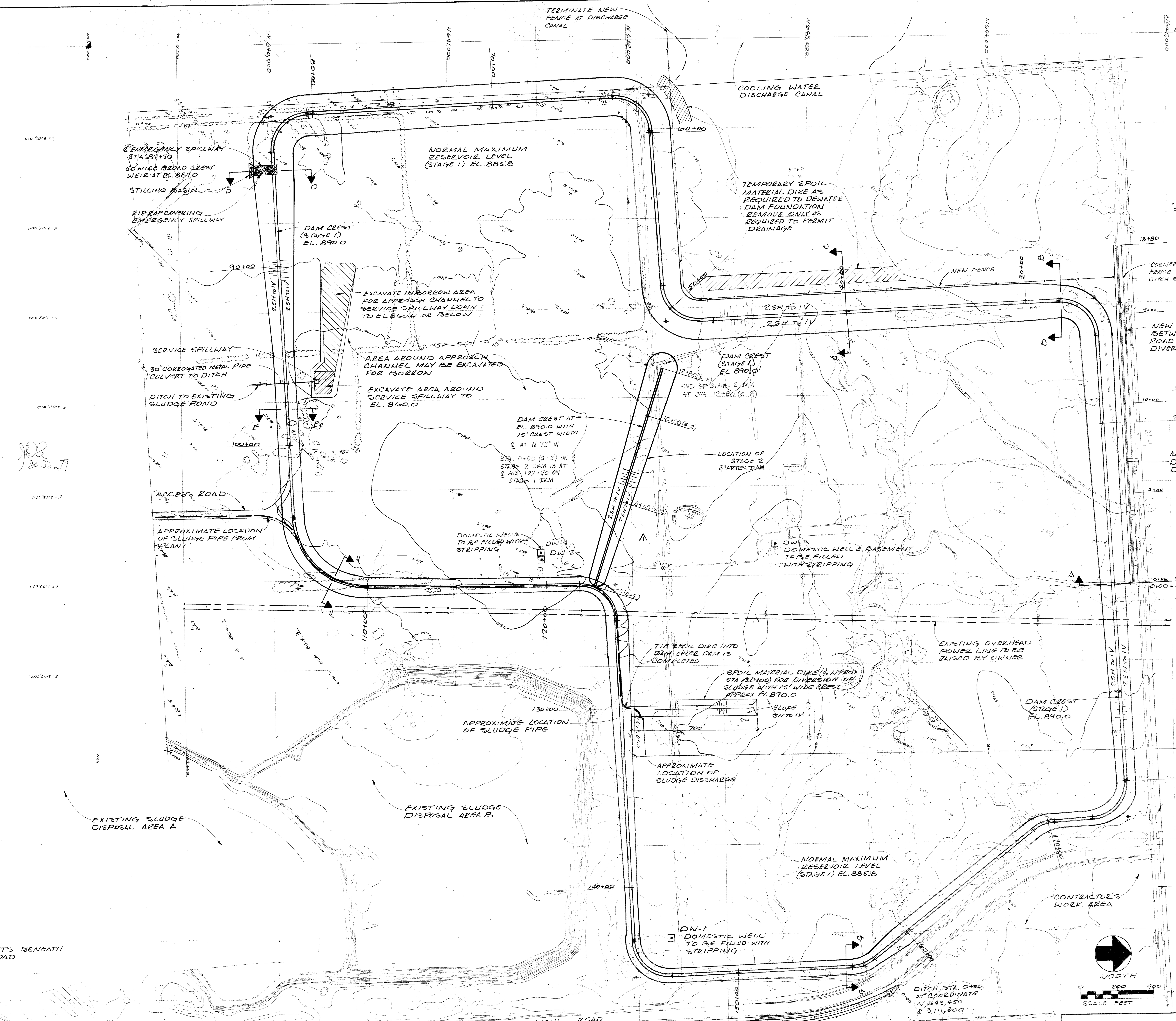
Selected 1979 Woodward-Clyde Consultants Drawings

NOTES:

1. TOPOGRAPHIC DATA SHOWN ON THIS DRAWING WAS TAKEN FROM DRAWINGS AND DATA PREPARED FROM AERIAL PHOTOGRAPHY TAKEN APRIL 26, 1978 FOR KANSAS CITY POWER AND LIGHT BY WESTERN AIR MAPS, INC.
2. ELEVATIONS REFERENCED FROM USC AND GS DATUM.
3. TOPOGRAPHIC CONTOURS SHOWN REPRESENT EXISTING CONDITIONS.
4. CONTOURS AT 2-FOOT INTERVALS.
5. ALL EXCAVATION PROCEDURES SHALL BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
6. ALL MATERIALS AND PLACEMENT PROCEDURES SHALL BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
7. Crest width of dam shall be changed by a gradual transition over a 100 ft length. JDC 30 Jan 79

CREST WIDTH OF DAM

LOCATION ALONG DAM STATION	CREST WIDTH FEET	
0+00 - 24+00	13	
24+00 - 32+00	15	
32+00 - 93+00	18	
93+00 - 106+00	15	
106+00 - 114+00	15	INCLUDES AREA FOR RAMP FOR PIPE AND ROAD ACCESS
114+00 - 175+66	12	



APPROVED

This 30TH day of JANUARY 1979
Guy E. Gibson by Keller Cordon
Chief Engineer
Division of Water Resources
State Board of Agriculture

DIVISION OF WATER RESOURCES
GUY E. GIBSON
CHIEF ENGINEER
KANSAS STATE BOARD OF AGRICULTURE

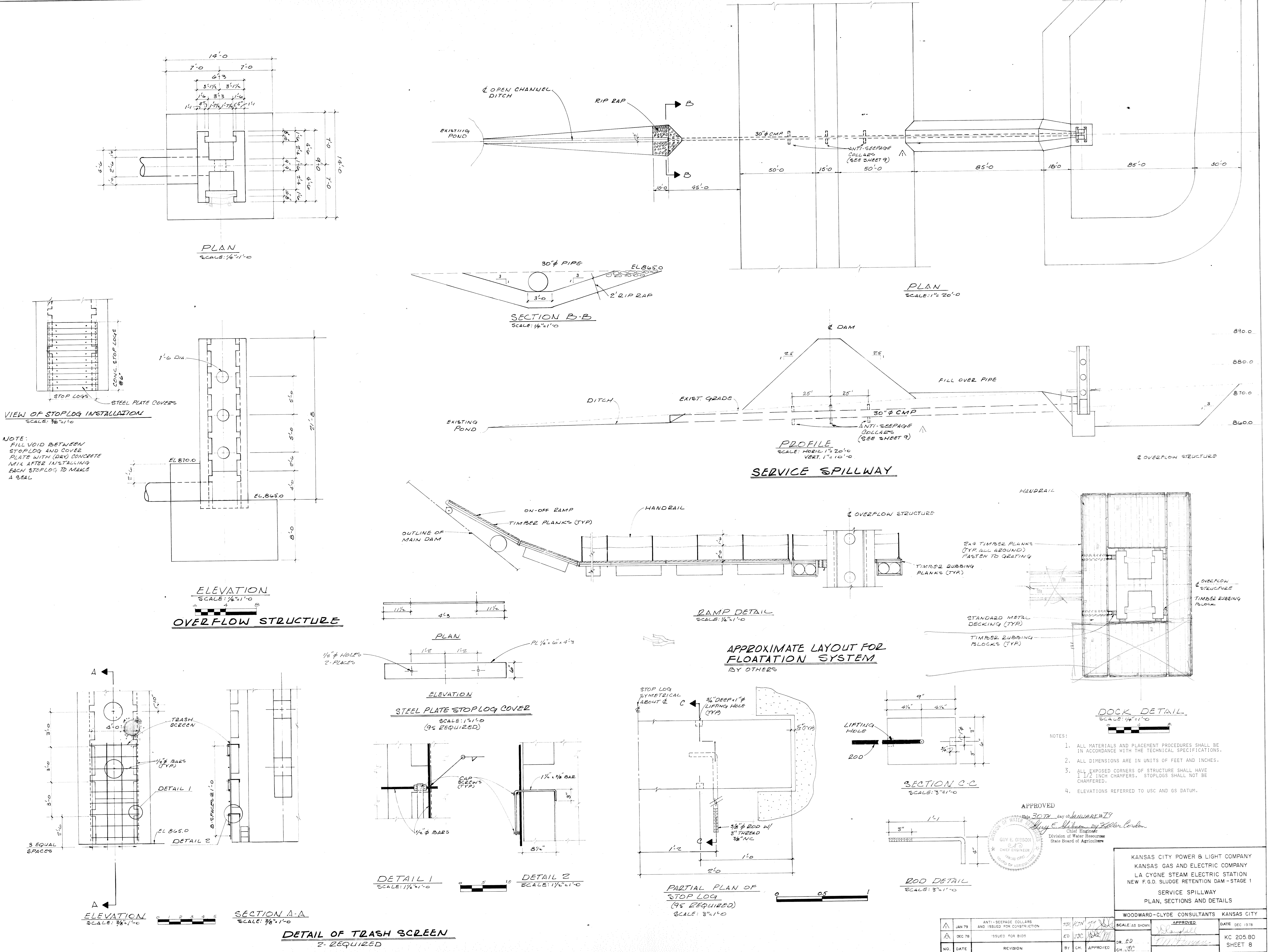
NO.	DATE	REVISION	BY	CH.	APPROVED
1	JAN 79	CREST WIDTH AND STAGE 2 DAM AND ISSUED FOR CONSTRUCTION	KM	KJN	KM JDC
0	DEC 78	ISSUED FOR BIDS	ED	JDC	JDC

KANSAS CITY POWER & LIGHT COMPANY
KANSAS GAS AND ELECTRIC COMPANY
LA CYGNE STEAM ELECTRIC STATION
NEW F.G.D. SLUDGE RETENTION DAM - STAGE 1

DAM AND SPILLWAYS PLAN

WOODWARD-CLYDE CONSULTANTS KANSAS CITY

SCALE: AS SHOWN
DR. ED
CH. JDC
APPROVED
DATE DEC 1978
KC 205.80
SHEET 6



NOTES:

1. ALL MATERIALS AND PLACEMENT PROCEDURES SHALL BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN UNITS OF FEET AND INCHES.
3. ALL EXPOSED CORNERS OF STRUCTURE SHALL HAVE 1 1/2 INCH CHAMFERS. STOPLOGS SHALL NOT BE CHAMFERED.
4. ELEVATIONS REFERRED TO USC AND GS DATUM.

APPROVED
This 30TH day of JANUARY 1979
Guy E. Gibson by Keller Cordon
Chief Engineer
Division of Water Resources
State Board of Agriculture

KANSAS CITY POWER & LIGHT COMPANY
KANSAS GAS AND ELECTRIC COMPANY
LA CYGNE STEAM ELECTRIC STATION
NEW F.G.D. SLUDGE RETENTION DAM - STAGE 1

SERVICE SPILLWAY
PLAN, SECTIONS AND DETAILS

WOODWARD-CLYDE CONSULTANTS KANSAS CITY

NO.	DATE	REVISION	BY	CH.	APPROVED
△	JAN 79	ANTI-SEEPAGE COLLARS AND ISSUED FOR CONSTRUCTION	KM	KJN	
△	DEC 78	ISSUED FOR BIDS	ED	JDC	

SCALE: AS SHOWN
APPROVED
DATE DEC 1978
DR. ED
CH. JDC
KC 205.80
SHEET 8

October 6, 2016

2380 McGee Street, Suite 200
Kansas City, Missouri 64108
1-816-561-4443

About AECOM

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