HISTORY OF CONSTRUCTION

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Bottom Ash CCR Surface Impoundment
Stanton Station
Great River Energy

Submitted To: Great River Energy
Stanton Station
4001 Highway 200A
Stanton, North Dakota 58571

Submitted By: Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228

October 13, 2016 **1649580**

Golder Associates

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1.0 INTRODUCTION

1.1 Purpose

Golder Associates Inc. (Golder) has prepared the following History of Construction for the Bottom Ash CCR Surface Impoundment (Bottom Ash Impoundment) at Great River Energy's (GRE's) Stanton Station (SS). The Environmental Protection Agency's (EPA's) Coal Combustion Residual (CCR) Rule, 40 Code of Federal Regulations (CFR) Part 257, promulgated April 17, 2015 and effective October 19, 2015, requires compilation of the information specified in § 257.73(c) to detail the construction history of CCR facilities no later than October 17, 2016 for facilities with either height of 5 feet or more and a storage volume of 20 acre-feet, or a height of more than 20 feet (EPA 2015).

1.2 Site Background

Stanton Station is located in Mercer County, approximately 3 miles southeast of Stanton, North Dakota. The Bottom Ash Impoundment consists of three cells. The north cell (approximately 3.7 acres of lined area), the center cell (3.3 acres of lined area), and the south cell (4.2 acres of lined area) combined for a total facility footprint of approximately 11.2 acres. The north and south cells are active cells used to temporarily store and dewater bottom ash and the center cell functions as a retention cell. Bottom ash and economizer rejects (hereafter referred to as bottom ash) is sluiced into one of the active cells until the cell reaches capacity. Water is continually decanted from the active cell to the retention cell during filling. Once capacity is reached, bottom ash deposition is directed to the other active cell and the filled cell is dewatered by decanting water through the outlet structure to the center cell. Bottom ash remaining in the filled cell is excavated and hauled to the adjacent Bottom Ash CCR Landfill for disposal.

2.0 OWNER, OPERATOR, AND UNIT IDENTIFICATION (§257.73(C)(1)(I))

SS (and the Bottom Ash Impoundment) is currently owned and operated by Great River Energy (GRE).

Corporate Address:

Great River Energy
12300 Elm Creek Boulevard
Maple Grove, Minnesota 55369

Stanton Station Address:

Great River Energy
Stanton Station
4001 Highway 200A
Stanton, North Dakota 58571

The North Dakota Department of Health (NDDH) Division of Waste Management is the environmental regulatory body for the CCR facilities at SS. The Bottom Ash Impoundment is currently permitted with the North Dakota Department of Health (NDDH) under Permit Number SP-043 (NDDH 2005).

3.0 HISTORY OF CONSTRUCTION

3.1 Location of Unit (§257.73(c)(1)(ii))

The Bottom Ash Impoundment is located in Sections 16 and 21 of Township 144 North, Range 84 West, in Mercer County, North Dakota. Figure 1 shows the location of the Bottom Ash Impoundment on the most recent USGS topographic map and Figure 2 shows the location of the Bottom Ash Impoundment on a recent aerial photograph.

3.2 Purpose (§257.73(c)(1)(iii))

The Bottom Ash Impoundment is used as a combined dewatering and storage facility for bottom ash and will be closed with CCR materials in place.

3.3 Watershed Information (§257.73(c)(1)(iv))

The Bottom Ash Impoundment is located within the following Hydrologic Unit (Watershed-Based Performance Management Using Hydrologic Unit, ND 2016) per the Natural Resources Conservation Service (NRCS): Hydrologic Unit 12 Subwatershed 101301010104 Alderin Creek-Missouri River (64,563 acres).

3.4 Foundation Information (§257.73(c)(1)(v))

The foundation soils of the Bottom Ash Surface Impoundment consist of native soils (silty sand and clay) and some clay fill. Geologic and hydrogeologic information about Stanton Station was first presented in the *Reports of Soil Explorations for the Steam Generator Addition* and *for the Supplemental Steam Generator*, prepared by the Soil Exploration Company and dated October 14, 1977 and May 10, 1978, respectively.

The locations of the historic ash disposal ponds (i.e., Ash Ponds A, B, and C) and the closed special waste landfill were later characterized by Braun Intertec in the report titled *Hydrogeological Assessment – Stanton Station Ash Ponds* (Braun 1993). The Bottom Ash Impoundment is located within the historic limits of Ash Pond A.

According to the *Hydrogeological Assessment*, the Stanton Station site is located in the Missouri Slope district of the glaciated Missouri Plateau section of the Great Plains physiographic province. The Bottom Ash Surface Impoundment is constructed in Missouri River alluvial deposits. The alluvial deposits have two distinct subunits: upper and lower. The upper subunit consists of a silty sand and clay and the lower subunit is an outwash sand and gravel (Barr 2011). Results of tests performed on the foundation soils are summarized in the Hazard Potential Classification, Structural Stability and Safety Factor Assessments Report (Golder 2016a). The natural soils are described as predominantly silty sands (SM) with layers of fat clay (CH).

In addition to the natural soils, the Bottom Ash Impoundment is also partially founded on historic embankment fill. Historic embankment fill properties are discussed in the Hazard Potential Classification, Structural Stability and Safety Factor Assessments Report (Golder 2016a), and are classified as silty sands (SM). A three-point triaxial shear test was performed to determine the effective stress shear strength parameters of embankment fill materials and produced an effective stress friction angle of 30 degrees and an effective cohesion intercept of 100 pounds per square foot (psf).

Based on historic site information, materials testing, and observations, the Bottom Ash Impoundment is not built over wet ash or other unsuitable materials, and the foundation soils are stable.

3.5 Materials and Site Preparation (§257.73(c)(1)(vi))

The Bottom Ash Impoundment is located within the footprint of original Ash Pond A ash disposal area. Ash Pond A was reconfigured to the current Bottom Ash Impoundment in 1994. A composite liner was constructed during the conversion of Ash Pond A to the bottom ash surface impoundment. The composite liner system at the bottom of impoundment cells consists of the following (listed from top to bottom, Stone & Webster 1994a):

- 2 feet of protective soil cover material
- 60-mil high density polyethylene (HDPE) geomembrane liner
- 2 feet of compacted clay material

The side slopes of the impoundment cells are lined with the following liner system (listed from top to bottom, Stone & Webster 1994a):

- 60-mil high density polyethylene (HDPE) geomembrane liner
- Approximately 3 feet of compacted clay material

Design and technical specifications for the composite liner are contained in the Stone & Webster Design Report – Stanton Station Ash Pond Modifications (Stone & Webster 1994a). The Bottom Ash Impoundment composite liner was constructed in 1995, and construction quality assurance (CQA) of the 60-mil smooth HDPE liner and the compacted clay liner was performed by Huntingdon Engineering & Environmental, Inc. d/b/a Maxim Technologies Inc. (UPA 1996).

Clay fill was placed a minimum of two feet thick in horizontal loose lifts of no more than 8 inches in thickness and compacted to near optimum moisture content and to at least 95% maximum density as determined from a Standard Proctor (Stone & Webster 1994a). Testing conducted on the clay liner during construction consisted of grain size distribution, Proctor compaction curves, Atterberg limits, and field density and moisture testing. Field density measurements averaged 97% maximum density with average moisture content 1% above optimum moisture content.

The clay fill used for liner construction was collected from a borrow location at the Glenharold ash disposal site. Laboratory hydraulic conductivity testing was performed for 17 borrow soil samples taken from the Glenharold ash disposal area (Stone & Webster 1994a). The samples were compacted to between 90% and 100% of maximum dry density.

3.6 Detailed Dimensional Drawings (§257.73(c)(1)(vii))

Design drawings for the Bottom Ash Impoundment are included in Appendix A and show facility dimensions, drainage pathways, and facility surroundings.

The Bottom Ash Impoundment operates with a minimum freeboard of approximately 2 feet (embankment crest and top of composite liner at elevation 1720 feet, maximum water elevation of 1718 feet). An inflow flood control analysis was performed as part of the inflow design flood control system plan (Golder 2016b) indicating that the Bottom Ash Impoundment is operated with adequate freeboard to contain the 24-hour, 100-year storm event.

3.7 Instrumentation (§257.73(c)(1)(viii))

The Bottom Ash Impoundment has two piezometers (P-1 and P-2) on the eastern downstream slope of the center cell to measure water levels through the embankment. A plan view showing the location of the piezometers is shown in Figure 3.

3.8 Area-Capacity Curves (§257.73(c)(1)(ix))

Elevation-capacity information for the Bottom Ash Impoundment during normal operation is shown in Figure 4. Areas were calculated using as-built topography and design grades. CCR capacities are approximate and were calculated using an average end area method. CCR capacities shown on Figure 4 do not include CCRs that will be placed above elevation 1720 after the facility is de-watered and closed (see Closure and Post-Closure Plan, Golder 2016c). At closure, the total inventory of CCR in the Bottom Ash Impoundment is approximately 275,100 cubic yards: 90,600 cubic yards in the north cell, 83,500 cubic yards in the center cell, and 101,000 cubic yards in the south cell.

3.9 Spillways and Diversion Features (§257.73(c)(1)(x))

There are no spillways associated with the Bottom Ash Impoundment. Existing controls are in place to monitor water levels in the Bottom Ash Impoundment and limit potential overtopping of the impoundment. Flow between cells is managed via weir discharge structures with removable stop logs, preventing the active cells from reaching water levels above elevation 1718 feet. A weir discharge structure with removable stop logs at the east end of the center cell is set so that the cell continuously decants water to a discharge pipe with a maximum water level set at approximately 1717.5 feet. The design crest of the soil embankments surrounding the Bottom Ash Impoundment are approximately 15 to 20 feet above

surrounding topography (elevation 1720 feet), preventing stormwater run-on into the Bottom Ash Impoundment.

Existing controls in place to monitor the water levels in the Bottom Ash Impoundment include weekly observations of water levels by SS personnel, and daily observations by SS operations personnel. Additional observations are noted by GRE employees familiar with site CCR units. After large storm events, SS personnel evaluate site conditions, including impoundment water levels, and are able to adjust operations to maintain water levels below design maximum elevations.

3.10 Construction Specifications and Provisions (§257.73(c)(1)(xi))

The following documents contain the specifications, construction quality assurance reports, and provisions for operation of the Bottom Ash Impoundment.

- Stone & Webster 1994. *Design Report – Stanton Station Ash Pond Modifications*. April 1994 (Stone & Webster 1994a).
- Stone & Webster 1994. *Plan of Operations – Stanton Station – Bottom Ash Surface Impoundment and Bottom Ash Landfill*. June 1994 (Stone & Webster 1994b).
- Stone & Webster 1994. *Technical Specifications for the Stanton Station Phase I Ash Pond Modifications and Materials Testing, and QA and Construction Monitoring Plan*. June 1994 (Stone & Webster 1994c).
- United Power Association – Stanton Station. *Construction Report – Stanton Plant Bottom Ash Retention Ponds and Fly Ash Disposal Site.* September 1996 (UPA 1996).

3.11 Record of Structural Instability (§257.73(c)(1)(xii))

No record of structural instability has been noted for the Bottom Ash Impoundment. Weekly Inspections are performed by site personnel and annual inspections are performed by a registered professional engineer.

4.0 CLOSING

The undersigned attest to the completeness and accuracy of the above written History of Construction for the Bottom Ash CCR Surface Impoundment at Great River Energy's Stanton Station. Based on our review of the available information, to the extent feasible, this report provides the information required by 40 CFR §257.73(c)(i) through (xii), as related to the construction of the Bottom Ash CCR Surface Impoundment.

GOLDER ASSOCIATES INC.

Todd Stong, PE
Senior Engineer/Associate

Craig Schuettpelz, PE
Senior Project Engineer

TS/CS/rjg

5.0 REFERENCES

Barr. 2011. 2010 Annual Groundwater Monitoring Report, Stanton Station Ash Disposal Facility, NDDH Solid Waste Permit # SP043. Prepared for Great River Energy, February.

Braun. 1993. Hydrogeologic Assessment Report for Stanton Station. January.

EPA 2015. Environmental Protection Agency, Code of Federal Regulations Title 40 Parts 257: Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities. April.

Golder. 2016a. Hazard Potential Classification, Structural Stability, and Safety Factor Assessments – Bottom Ash Surface Impoundment. October.

Golder. 2016b. Inflow Design Flood Control System Plan – Bottom Ash Surface Impoundment. October.

Golder. 2016c. Closure and Post-Closure Plan – Bottom Ash Surface Impoundment, October.

NDDH. 2005. North Dakota Department of Health Permit for a Solid Waste Management Facility, North Dakota Department of Health – Division of Waste Management Permit No. SP-043. March.

Stone & Webster. 1993. Proposed Ash Pond Modifications, Stanton Station. December.

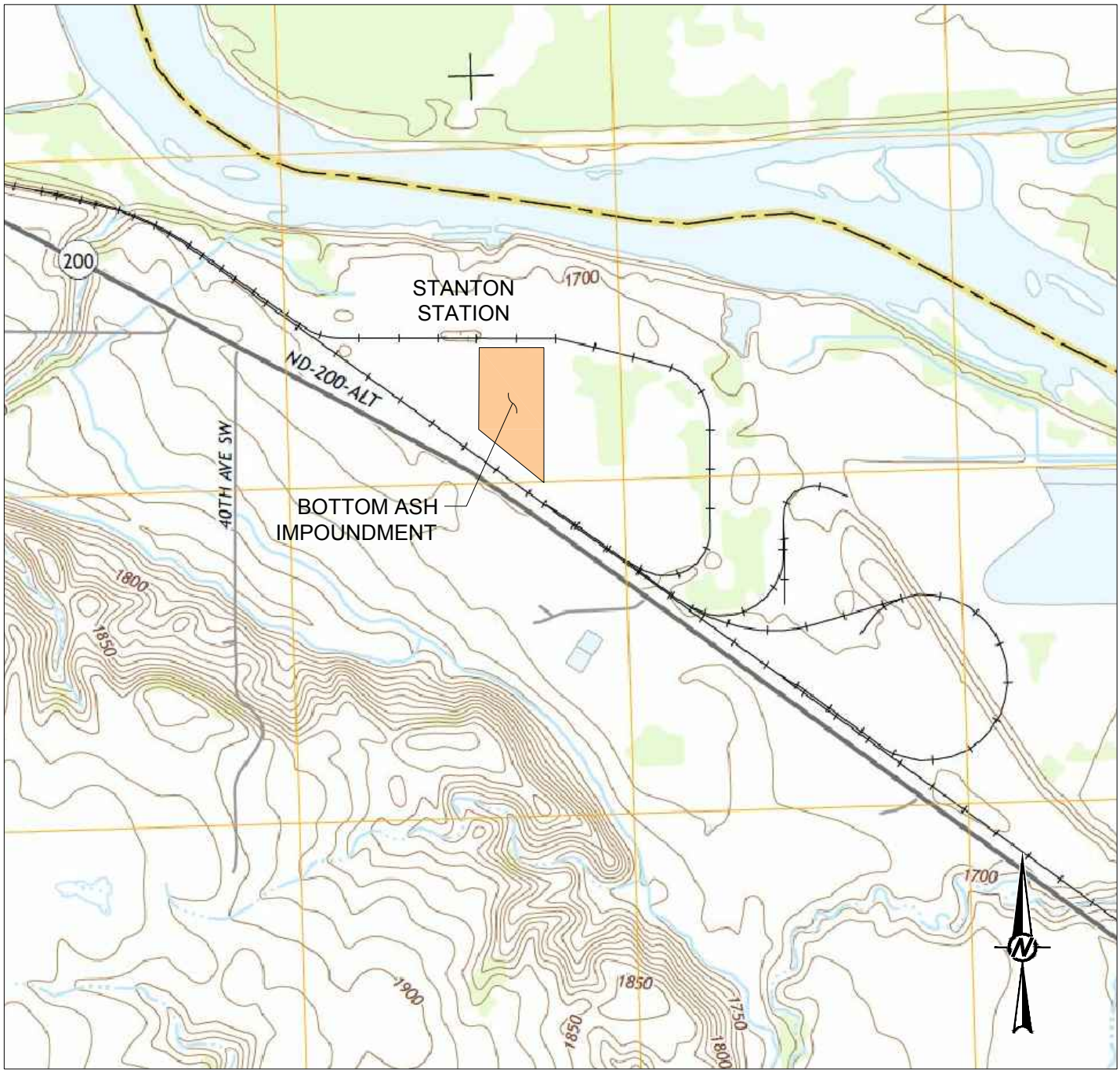
Stone & Webster. 1994a. Design Report – Stanton Station Ash Pond Modifications. April.

Stone & Webster. 1994b. Plan of Operations – Stanton Station – Bottom Ash Surface Impoundment and Bottom Ash Landfill. June.

Stone & Webster. 1994c. Technical Specifications for the Stanton Station Phase I Ash Pond Modifications and Materials Testing, and QA and Construction Monitoring Plan. June.

UPA. 1996. United Power Association Construction Report – Stanton Plant Bottom Ash Retention Ponds and Fly Ash Disposal Site. September.

FIGURES



REFERENCES

1. USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: STANTON SE, NORTH DAKOTA (2014)

GREAT RIVER ENERGY
STANTON STATION
BOTTOM ASH IMPOUNDMENT SITE LOCATION (USGS TOPOGRAPHIC MAP)

FIGURE 1

Golder Associates

Path: C:\Users\CSchuettpelz\desktop\ | File Name: StantonFigures.dwg

GREAT RIVER ENERGY
STANTON STATION
BOTTOM ASH IMPOUNDMENT SITE LOCATION (AERIAL PHOTOGRAPH)

FIGURE 2

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GREAT RIVER ENERGY
STANTON STATION
BOTTOM ASH IMPOUNDMENT INSTRUMENTATION OVERVIEW

FIGURE 3

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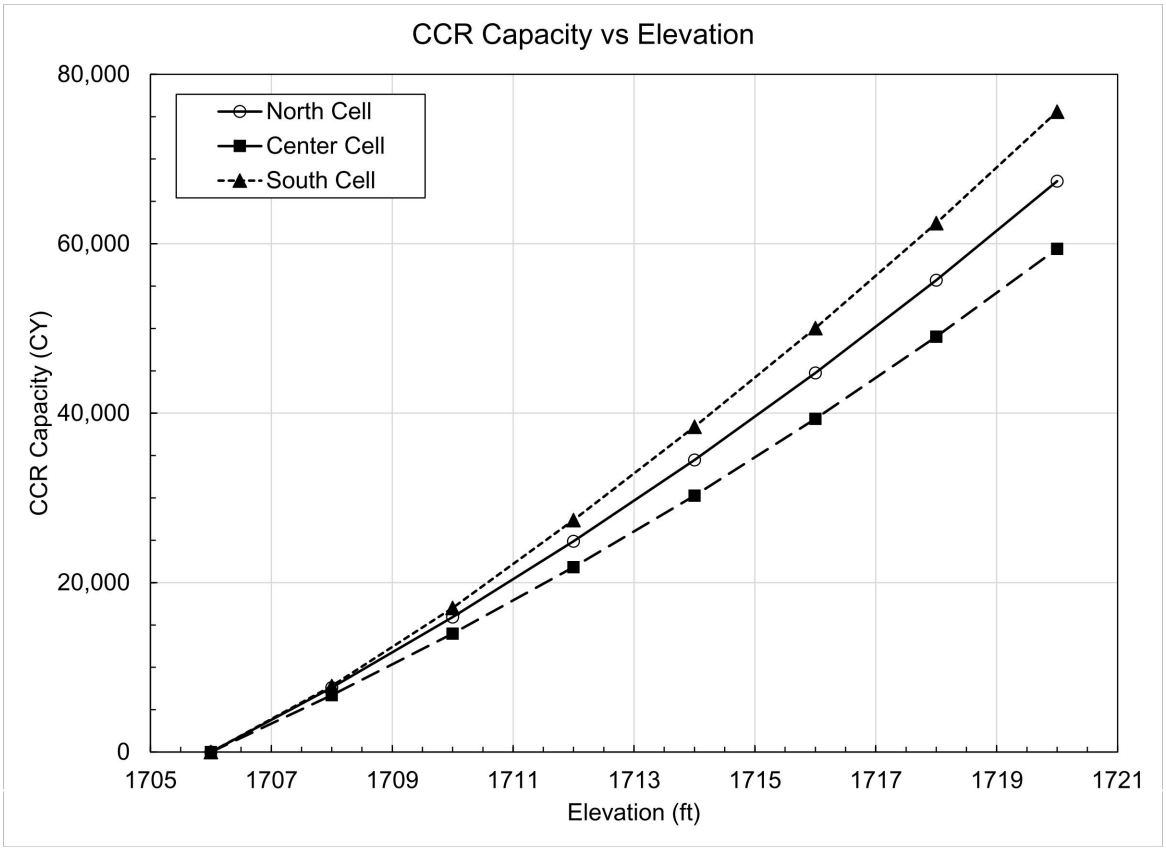

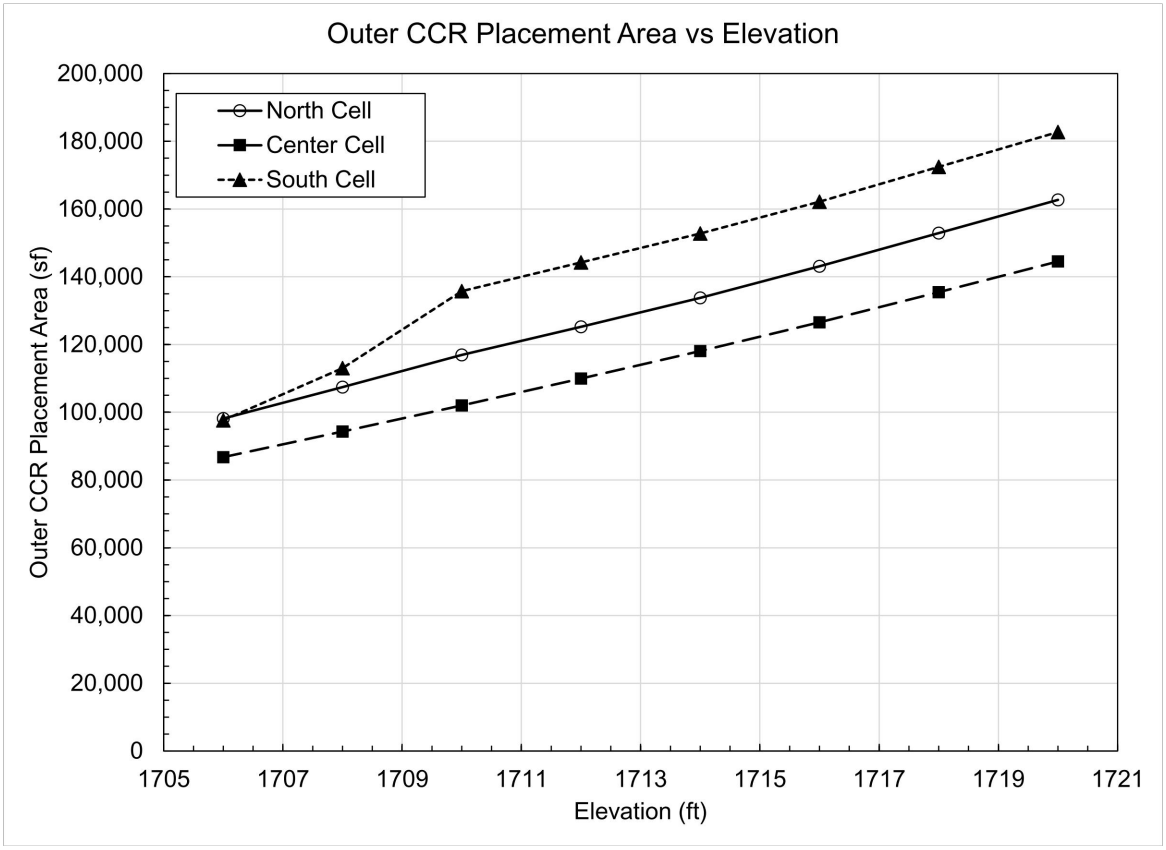

GREAT RIVER ENERGY
STANTON STATION
BOTTOM ASH IMPOUNDMENT AREA-CAPACITY INFORMATION

FIGURE 4

Golder Associates

APPENDIX A
DESIGN DRAWINGS (1994 PERMIT)

STANTON STATION ASH POND MODIFICATIONS

United Power Association

UNITED POWER ASSOCIATION

PROJECT NO. 4177

DRAWING INDEX

NUMBER	TITLE
S1001	COVER SHEET
S1002	FACILITIES SITE PLAN
S1003	MODIFICATION PLAN
S1004	DEMOLITION PLAN
S1005	POND A CONVERSION PLAN
S1006	POND A SECTIONS AND DETAILS, SHEET 1
S1007	POND A SECTIONS AND DETAILS, SHEET 2
S1008	POND A SECTIONS AND DETAILS, SHEET 3
S1009	OUTFALL STRUCTURES OUTLINE, PLANS, AND SECTIONS
S1010	OUTFALL STRUCTURES REINFORCEMENT, SHEET 1
S1011	OUTFALL STRUCTURES REINFORCEMENT, SHEET 2
S1012	POND A PIPING
S1013	PIPING DETAILS
S1014	POND B AND C CLOSURE PLAN
S1015	POND B AND C SECTIONS AND DETAILS, SHEET 1
S1016	POND B AND C SECTIONS AND DETAILS, SHEET 2
S1017	ABANDONED ASH DISPOSAL AREA CLOSURE PLAN
S1018	ABANDONED ASH DISPOSAL AREA SECTIONS AND DETAILS, SHEET 1
S1019	ABANDONED ASH DISPOSAL AREA SECTIONS AND DETAILS, SHEET 2
S1020	DISPOSAL AREA SITE PLAN
S1021	DISPOSAL AREA BORROW PLAN
S1022	DISPOSAL AREA GRADING PLAN
S1023	DISPOSAL AREA CLOSURE PLAN
S1024	SECTION AND DETAILS, SHEET 1
S1025	SECTION AND DETAILS, SHEET 2
S1026	EROSION AND SEDIMENT CONTROL TYPICAL DETAILS
S1027	BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING PLAN
S1028	BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING SECTIONS & DETAILS

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2	FOR CONSTRUCTION REVISED PER ADDENDUM			
1	FOR CONSTRUCTION	WLZ	SGG KWC 6-6-94	
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC 4-13-94	

ISSUE	PC	ARCH	CIVIL	CONC	STL	L&P	INST	MD	P.S.	S.A.	FAC	ELEC	LTG	MATL
3														
2														
1														
0														

UPA PROJECT	4177
UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	
COVER SHEET	
DRAWING NO.	S1001
REV	2

STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

ISSUE

HALF-SIZE APP. CARD

CAD FILE UPAS1001.DWG

PLANT RETENTION POND

P-1
12" PLASTIC PIPE
N 92079.54
E 94233.51
INV. 1677.70

P-2
8" STEEL PIPE
N 91685.13
E 95404.25
INV. 1682.43

P-3
18" CMP
N 91602.82
E 95772.20
INV. 1679.02

P-4
18" CMP
N 91628.24
E 96040.47
INV. 1671.91

RETENTION POND OUTFALL

APPROXIMATE LIMITS OF ABANDONED ASH DISPOSAL AREA

RUNOFF RETENTION POND

ESTIMATED ELEVATION CONTOURS OF BOTTOM OF ASH

POND C OUTFALL

AREA OF ASH REMOVAL AFTER DECEMBER 1992

N 92,000

N 91,000

N 90,000

N 89,000

92,000 E

93,000 E

94,000 E

95,000 E

96,000 E

℄ LOOP TRACK

℄ SPUR MAINTENANCE TRACK

℄ MAINLINE TRACK

ASH POND "A"

ASH POND "B"

ASH POND "C"

HIGHWAY 200

MISSOURI RIVER

COAL PILE

SUB STATION

TANK

ROAD

24" RAMP
INLET 1710.74
OUTLET 1710.61

SCALE 1" = 200'

100 50 0 100 200 300

LEGEND:

- PAVED ROAD
- UNPAVED ROAD
- TRAIL
- RAILROAD
- BRIDGE
- CULVERT
- BUILDING
- FENCE
- FIELD LINE
- POLE
- LIGHT POLE
- SIGN
- STREAM
- LAKE OR POND
- MARSH (SWAMP)
- TREES
- BRUSH, SHRUBS
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- DEPRESSION CONTOUR
- FIELD ELEVATION
- PLOTTER ELEVATION
- HORIZONTAL CONTROL
- VERTICAL CONTROL
- CURB INLET
- MANHOLE
- HYDRANT
- 1690 — ESTIMATED ELEVATION OF BOTTOM OF ASH IN ABANDONED ASH DISPOSAL AREA

- WELL LOCATIONS
- PIPE LOCATIONS
- 84.8 SPOT ELEVATIONS

GENERAL NOTES:

1. THE NOTES AND LEGENDS SHOWN ON THIS DRAWING REFER TO THIS DRAWING AND TO DRAWINGS S1001 THROUGH S1019.
2. GROUND SURFACE ELEVATION CONTOURS WERE COMPILED BY INTERSTATE ENGINEERING, INC., USING PHOTOGRAMMETRIC METHODS AND ARE APPROXIMATE. MOST GROUND SURFACE ELEVATION CONTOURS WERE COMPILED FROM AERIAL PHOTOGRAPHS TAKEN ON SEPTEMBER 9, AND DECEMBER 12, 1992. THE ELEVATION CONTOURS OF THE SURFACE OF THE ASH PILED ON THE EASTERN SIDE OF PONDS B AND C WERE COMPILED FROM AERIAL PHOTOGRAPHS TAKEN DURING THE SUMMER OF 1993. GROUND SURFACE ELEVATION CONTOURS, PARTICULARLY THOSE WITHIN PONDS A, B, AND C, AT THE START OF CONSTRUCTION MAY VARY CONSIDERABLY FROM THOSE SHOWN ON THE DRAWINGS.
3. ASH WAS EXCAVATED FROM THE SOUTHEAST CORNER OF POND A AFTER THE DECEMBER 12, 1992 AERIAL PHOTOGRAPHS WERE TAKEN. THE CONFIGURATION SHOWN ON THE DRAWINGS OF THAT AREA IS APPROXIMATE AND IS NOT BASED ON SURVEY DATA.
4. LOCATIONS OF PIPES, WELLS, SPOT ELEVATIONS AND MISCELLANEOUS ITEMS SHOWN ON THE DRAWINGS ARE FROM INTERSTATE ENGINEERING, INC. SURVEYS OF OCTOBER 23, 1992.
5. THE ELEVATIONS OF THE BOTTOM OF THE ASH IN THE ABANDONED ASH DISPOSAL AREA ARE APPROXIMATE AND HAVE BEEN ESTIMATED BASED ON TEST BORINGS AND ORIGINAL GROUND SURFACE TOPOGRAPHY INFORMATION. THE ACTUAL ELEVATIONS OF THE BOTTOM OF THE ASH IN THE ABANDONED DISPOSAL AREA, AND IN PONDS A, B AND C, CAN ONLY BE DETERMINED AS EXCAVATIONS TO REMOVE IT ARE MADE.

ISSUE	DESCRIPTION	CHKD	CORRECT	APPS	DATE
3					
2					
1	FOR CONSTRUCTION				
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC		4-13-94

UPA PROJECT	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO.	REV
4177	FACILITIES SITE PLAN	S1002	1

STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

ISSUE
HALF-SIZE
APP. CARD
CAD FILE
UPAS1002.DWG

RETENTION POND RETURN LINE (BURIED)

P-1
12" PLASTIC PIPE
N 92079.54
E 94233.51
INV. 1677.70

18 INCH OUTFALL LINE (BURIED)

ABANDONED ASH DISPOSAL AREA CLOSURE PILE

P-2
8" STEEL PIPE
N 91685.13
E 95404.25
INV. 1682.43

P-3
18" CMP
N 91602.82
E 95772.20
INV. 1679.02

P-4
18" CMP
N 91628.24
E 96040.47
INV. 1671.91

DETENTION POND BERM

N 92,000

NEW 16 INCH OUTFALL LINE

℄ SPUR MAINTENANCE TRACK

℄ LOOP TRACK

REGRADED AREA

N 91,000

APPROXIMATE SOUTHERN LIMIT OF SITE GRADING

℄ LOOP TRACK

ASH POND "C"

HAUL ROAD

BOTTOM ASH LANDFILL AREA

N 90,000

BOTTOM ASH SURFACE IMPOUNDMENT

ASH POND "B"

℄ LOOP TRACK

℄ MAINLINE TRACK

POND B & C CLOSURE PILE

N 89,000

SCALE 1" = 200'

100 50 0 100 200 300

LEGEND:

EXISTING GROUND ELEVATION CONTOUR

NEW GROUND ELEVATION CONTOUR

NOTES:

1. SEE GENERAL NOTES, DRAWING S1002.

REFERENCE DRAWINGS:

S1002 FACILITIES SITE PLAN

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
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2	FOR CONSTRUCTION REVISED PER ADDENDUM 1			
1	FOR CONSTRUCTION	WLZ	RHH KWC 6-8-94	
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	RHH KWC 4-13-94	

PC	ARCH	CIVIL	CONC	STL	L&P	INST	MD	P.S.	S.A.	FAC	ELEC	LTG	MATL

UPA PROJECT	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO.	REV
4177	MODIFICATION PLAN	S1003	2

STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

ISSUE | HALF-SIZE | APP. CARD

CAD FILE UPAS1003.DWG

N 92,000

N 91,000

N 90,000

N 89,000

92,000 E

93,000 E

94,000 E

95,000 E

N

SCALE 1" = 200'

100 50 0 100 200 300

P-1
12" PLASTIC PIPE
N 92079.54
E 94233.51
INV. 1677.70

P-2
8" STEEL PIPE
N 91685.13
E 95404.25
INV. 1682.43

P-3
18" CMP
N 91602.82
E 95772.20
INV. 1679.02

P-4
18" CMP
N 91628.24
E 96040.47
INV. 1671.91

MISSOURI RIVER

REMOVE CE BUILDING, FLOOR, AND FOUNDATIONS

REMOVE DRAIN PIPES

C LOOP TRACK

C SPUR MAINTENANCE TRACK

PLUG MONITORING WELLS

PLUG MONITORING WELLS

GRAVEL PILES TO BE REMOVED BY OWNER

REMOVE OUTFALL STRUCTURE

REMOVE PIPE RACK AND PIPE

ASH POND "A"

ASH POND "C"

REMOVE OUTFALL STRUCTURE

REMOVE PIPE RACK, PIPE, AND 24": C.M.P.

24" C.M.P.
INLET 1710.74
OUTLET 1710.61

ASH POND "B"

C LOOP TRACK

C MAINLINE TRACK

PLUG MONITOR WELL

EXCAVATE ALL ASH WITHIN POND A EMBANKMENTS AND HAUL TO POND B AND C CLOSURE PILE AREA

PREPARE TEMPORARY FLY ASH TRUCK HAUL RAMP

PREPARE TEMPORARY FLY ASH TRUCK HAUL RAMP

EXCAVATE, AND REMOVE OR PLUG, ALL PIPES AND CULVERTS

REMOVE RETENTION POND OUTFALL STRUCTURE

REMOVE ABANDONED ASH PIPE SUPPORT TRESTLES

NOTES:

1. SEE GENERAL NOTES, DRAWING S1002.
2. IN ADDITION TO THE FACILITIES SHOWN ON THIS DRAWING, EMBANKMENTS, ASH, STRUCTURES, PIPES, SOILS, WELLS, ETC., SHALL BE EXCAVATED, REMOVED, OR PLUGGED, AS DISCUSSED IN THE SPECIFICATIONS.

REFERENCE DRAWINGS:

S1002 FACILITIES SITE PLAN

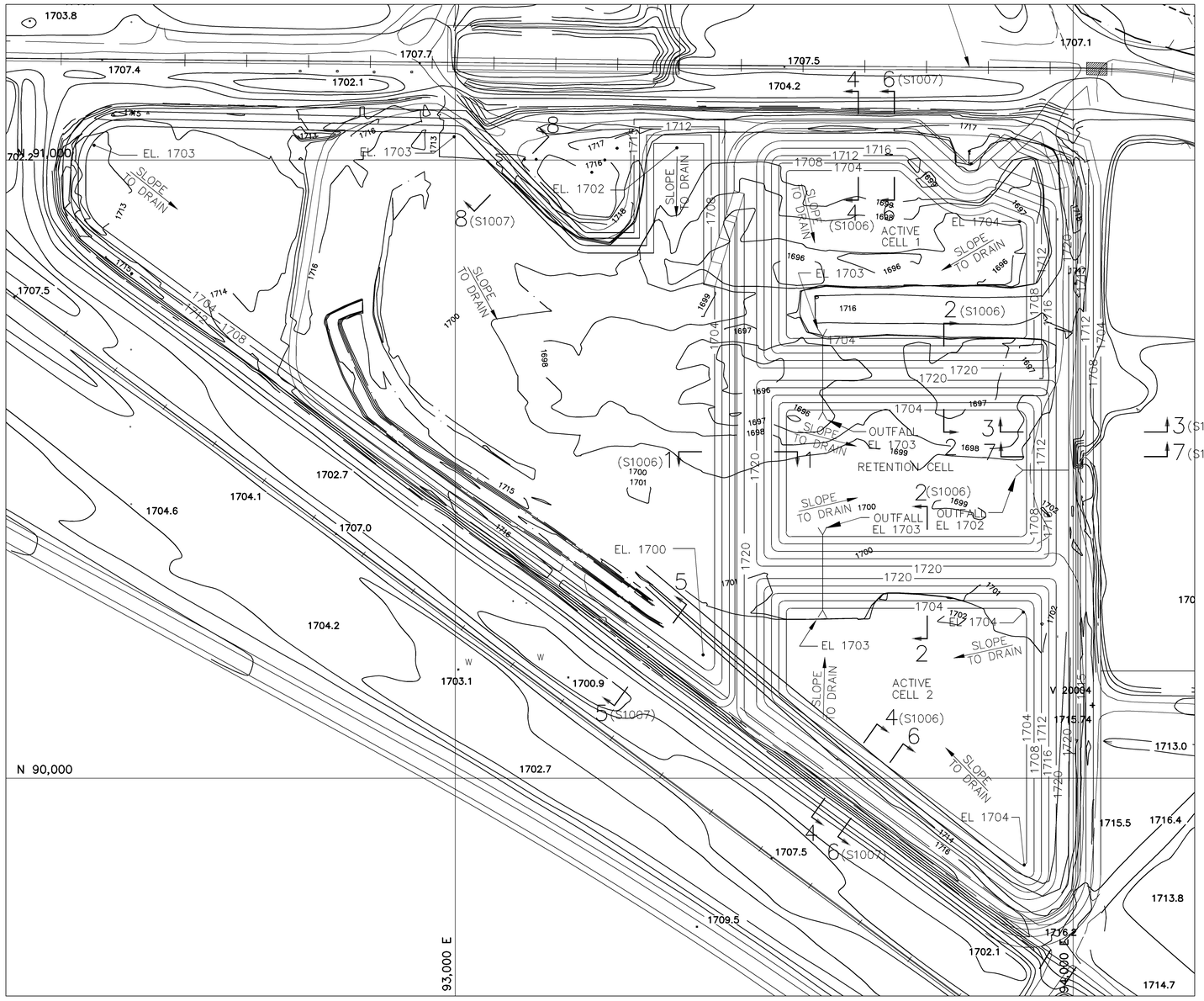
ISSUE	DESCRIPTION	CHKD	CORRECT	APPR.	DATE
3					
2					
1	FOR CONSTRUCTION				
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC		4-13-94

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO. S1004	REV 1
	DEMOLITION PLAN		
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

ISSUE

HALF-SIZE APP. CARD

CAD FILE UPAS1004.DWG



N

SCALE 1" = 100'

100 50 0 100 200 300

LEGEND:

EXISTING GROUND ELEVATION CONTOUR

NEW GROUND ELEVATION CONTOUR

NOTES:

1. SEE GENERAL NOTES, DRAWING S1002.
2. ELEVATIONS SHOWN AT THE BOTTOM OF IMPOUNDMENT CELLS ARE OF THE TOP OF THE CLAY FILL.

REFERENCE DRAWINGS:

S1002	FACILITIES SITE PLAN
S1006	POND A SECTIONS & DETAILS – SH. 1
S1007	POND A SECTIONS & DETAILS – SH. 2
S1008	POND A SECTIONS & DETAILS – SH. 3
S1009	OUTFALL STRUCTURES OUTLINE – PLAN & SECTIONS
S1010	OUTFALL STRUCTURES – REINFORCEMENT SH. 1
S1011	OUTFALL STRUCTURES – REINFORCEMENT SH. 2

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
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2				
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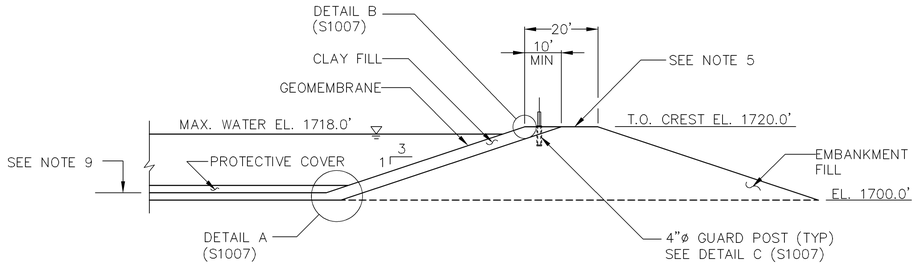
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC 4-13-94	

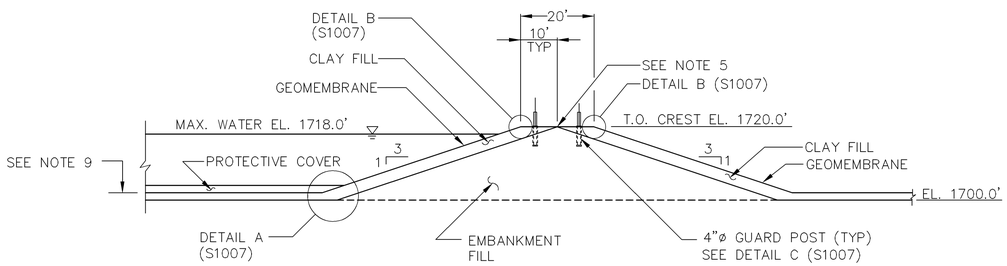
UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS POND A CONVERSION PLAN	DRAWING NO. S1005	REV 1

STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

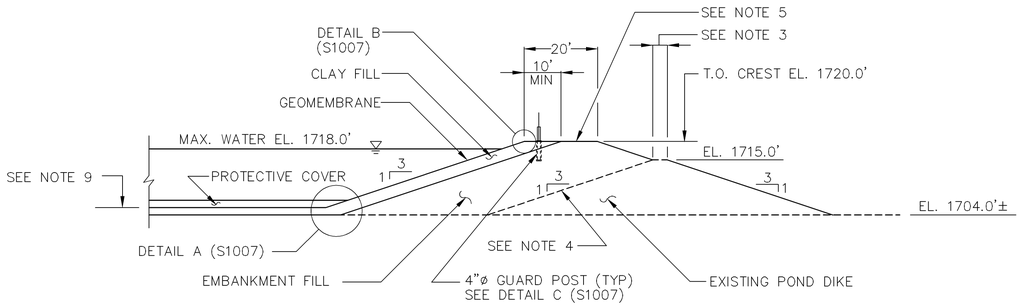
ISSUE | HALF-SIZE | APP. CARD | CAD FILE UPAS1005.DWG



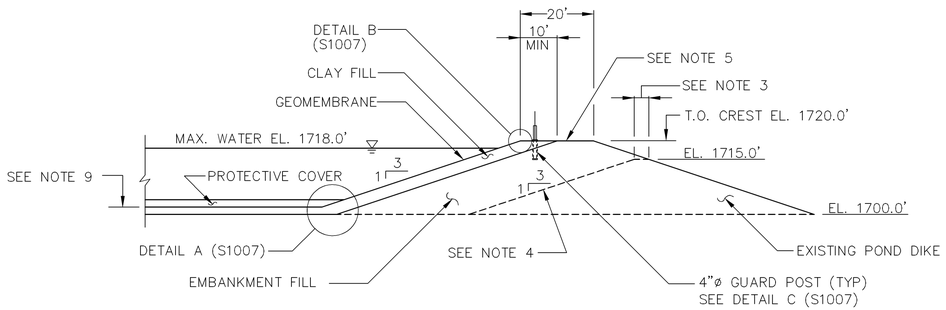
1–1
(S1005)



2–2
(S1005)



3–3
(S1005)



4–4
(S1005)

NOTES:

1. SCALE: 1" = 20' UNLESS NOTED.
2. SEE GENERAL NOTES, DRAWING S1002.
3. THE EXISTING POND DIKES WERE REPORTEDLY CONSTRUCTED TO HAVE 4 FOOT WIDE CRESTS AT ELEVATION 1715 FEET, AND 3:1 (HORIZONTAL VERTICAL) SIDE SLOPES. ACTUAL POND DIKE WIDTHS, ELEVATIONS AND SLOPES MAY VARY.
4. ASH, PVC LININGS AND OTHER NON–SOIL MATERIALS FOUND ALONG THE INSIDE OF EXISTING POND A DIKES SHALL BE REMOVED TO EXPOSE THE EXISTING DIKE SOIL FILL. EMBANKMENT FILL SHALL BE PLACED, AS NEEDED, TO FILL AREAS WHERE EXCAVATIONS TO REMOVE THE ASH, LININGS AND OTHER NON–SOIL MATERIALS EXTEND BEYOND THE LINE SHOWN.
5. THE TOP OF THE EMBANKMENT FILL OF THE SURFACE IMPOUNDMENT EMBANKMENTS SHALL BE GRADED TO BE AT ELEVATION 1720'–3" AT THE CENTERLINE AND TO SLOPE TO ELEVATION 1720'–0" AT 6 FEET EITHER SIDE OF THE CENTERLINE, AND SHALL BE COVERED WITH 6 INCHES OF COMPACTED BASE COURSE.
6. AN ANCHOR GUARD POST FOR THE SAFETY CABLE SHALL BE LOCATED AT EACH CORNER OF EACH IMPOUNDMENT CELL. LINE GUARD POSTS SHALL BE SPACED AT INTERVALS NO WIDER THAN 50 FEET BETWEEN THE CORNER ANCHOR POSTS. ANCHOR GUARD POSTS SHALL ALSO BE PLACED TO PROVIDE A 20 FOOT WIDE OPENING ALONG THE EAST SIDE OF ACTIVE CELLS 1 AND 2, AND A 10 FOOT WIDE OPENING AT EACH OUTFALL LOCATION, AS DIRECTED BY THE OWNER. THE WIRE ROPE SHALL BE INSTALLED TO BE A MINIMUM OF 3 FEET ABOVE THE GROUND SURFACE.
7. A ONE INCH DIAMETER, POLYPROPYLENE, TWISTED ROPE SHALL BE FASTENED TO THE BOTTOM OF EACH GUARD POST. THE ROPE SHALL BE FASTENED TO THE POSTS USING CABLE CLAMPS OR AN EQUIVALENT FITTING APPROVED BY THE OWNER. THE BOTTOM OF THE ROPE SHALL BE SECURELY ATTACHED TO A HEAVY DUTY POLYPROPYLENE BAG FILLED WITH A MINIMUM OF 50 LBS. OF CLEAN SAND, AND SHALL EXTEND TO WITHIN 3 FEET OF THE BOTTOM OF THE ADJACENT IMPOUNDMENT CELL.
8. IF ASH EXTENDS TO WITHIN 10 FEET OF EXISTING POWER POLES, THE POLES SHALL BE TEMPORARILY SUPPORTED WHILE THE ASH IS REMOVED AND THE EXCAVATION IS REFILLED WITH EMBANKMENT FILL.
9. SEE DRAWING S1005 FOR COMPLETED GRADE ELEVATIONS.

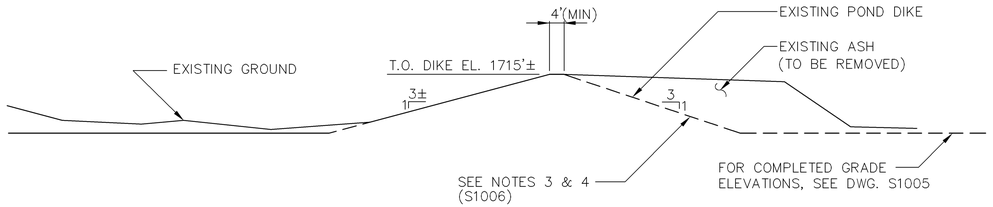
REFERENCE DRAWINGS:

S1002	FACILITIES SITE PLAN
S1005	POND A CONVERSION PLAN
S1007	POND A SECTIONS & DETAILS – SH.2
S1008	POND A SECTIONS & DETAILS – SH.3

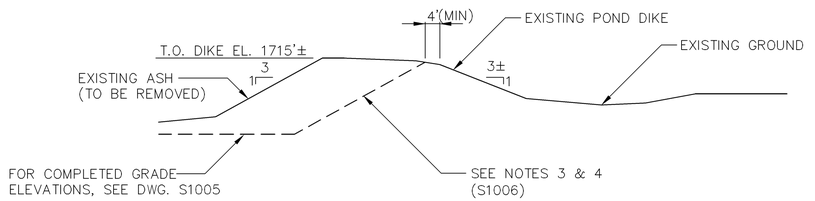
ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2				
1	FOR CONSTRUCTION			
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC 4-13-94	

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS POND A SECTIONS & DETAILS – SH. 1	DRAWING NO. S1006	REV 1
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

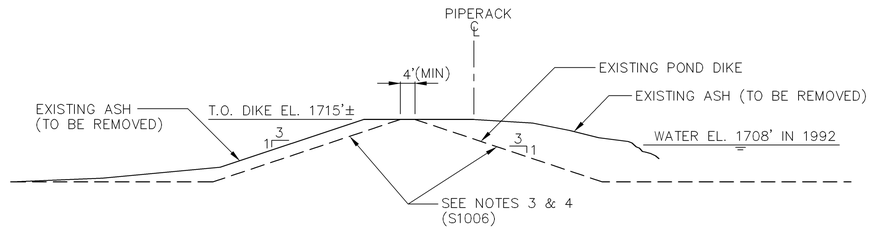
ISSUE
HALF-SIZE APP. CARD
CAD FILE UPAS1006.DWG



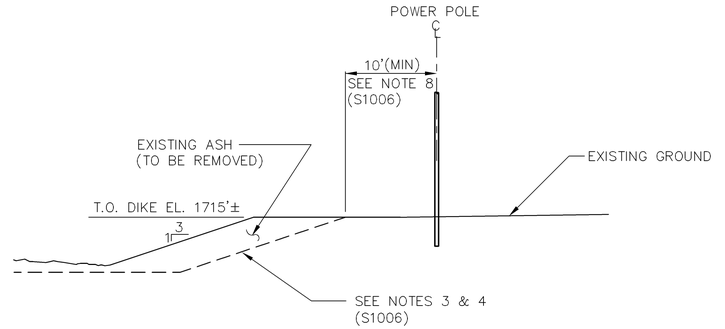
5–5
(S1005)



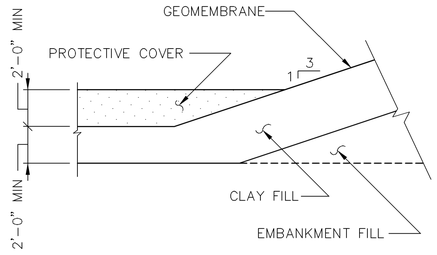
6–6
(S1005)



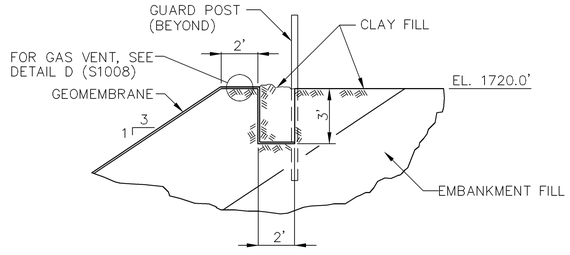
7–7
(S1005)



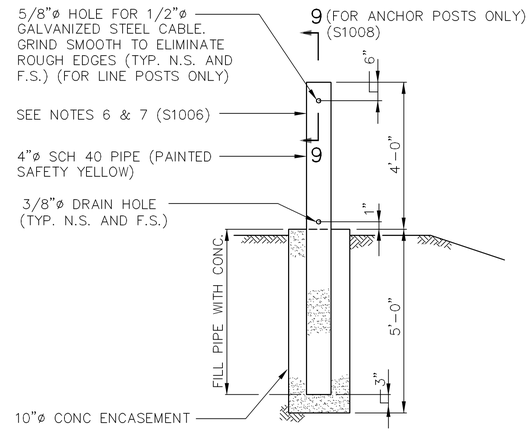
8–8
(S1005)



DETAIL A
(S1006)
SCALE: 1"=4'-0"



DETAIL B
(S1006)
SCALE: 1"=4'-0"



DETAIL C
(S1006)
NTS

NOTES:

1. SCALE: 1" = 20' UNLESS NOTED.
2. SEE GENERAL NOTES, DRAWING S1002.
3. FOR ADDITIONAL NOTES, SEE DRAWING S1006.

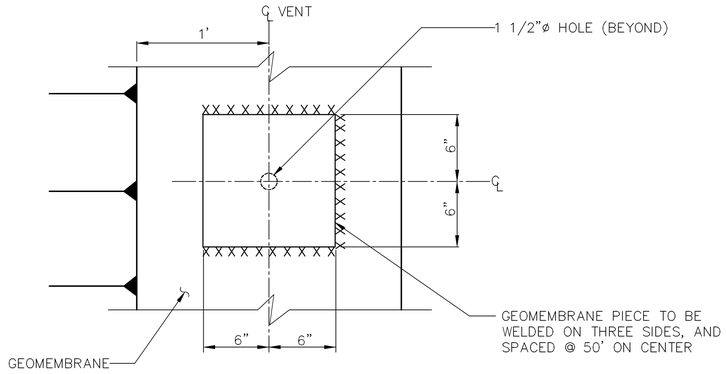
REFERENCE DRAWINGS:

S1002	FACILITIES SITE PLAN
S1005	POND A CONVERSION PLAN
S1006	POND A SECTIONS & DETAILS – SH. 1
S1008	POND A SECTIONS & DETAILS – SH. 3

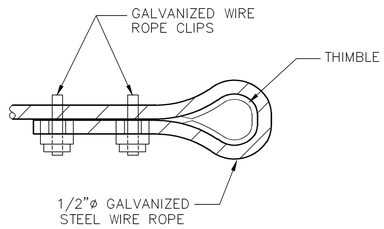
ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2				
1	FOR CONSTRUCTION			
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC 4-13-94	

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO. S1007	REV 1
	POND A SECTIONS & DETAILS – SH. 2		
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

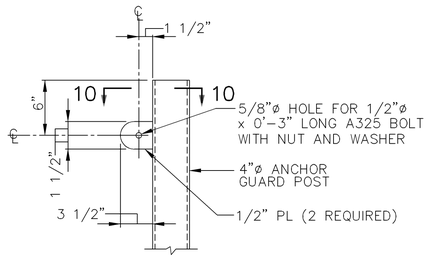
ISSUE
HALF-SIZE
APP. CARD
CAD FILE
UPAS1007.DWG



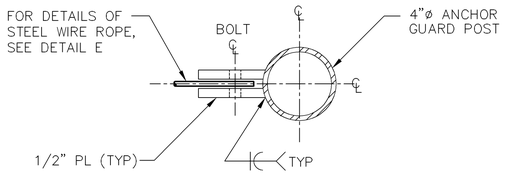
DETAIL D
(S1006)
NTS



DETAIL E
NTS



9–9
(S1007)
SCALE: 1 1/2" = 1'-0"



10–10
SCALE: 3" = 1'-0"

NOTES:

1. SCALE: 1" = 1' UNLESS NOTED.
2. SEE GENERAL NOTES, DRAWING S1002.
3. FOR ADDITIONAL NOTES, SEE DWG. S1006.

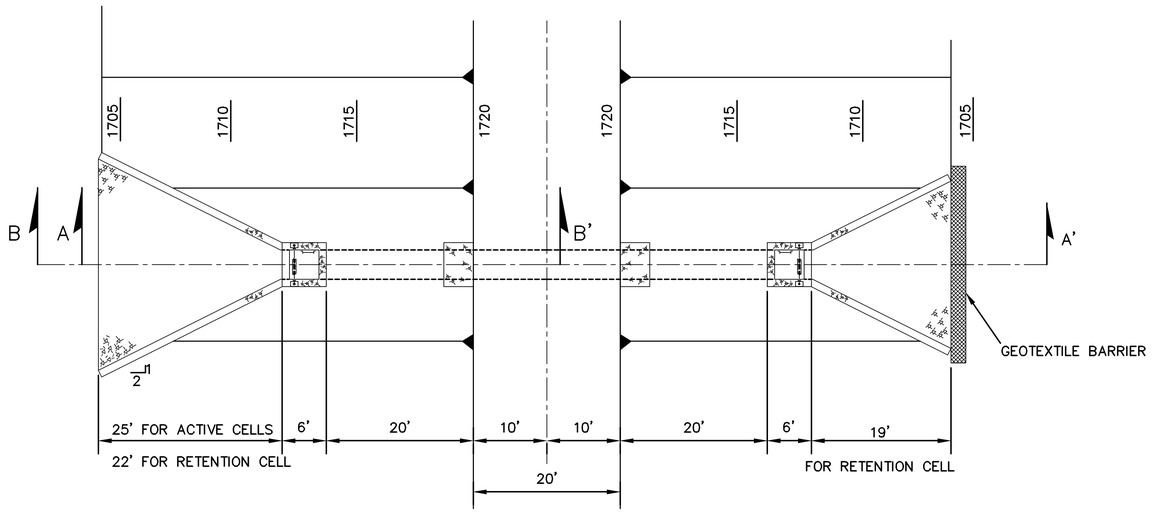
REFERENCE DRAWINGS:

S1002	FACILITIES SITE PLAN
S1005	POND A CONVERSION PLAN
S1006	POND A SECTIONS & DETAILS – SH. 1
S1007	POND A SECTIONS & DETAILS – SH. 2

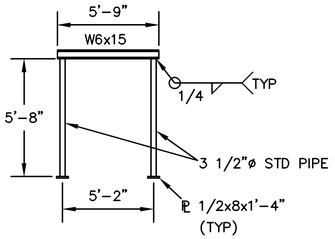
ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2				
1	FOR CONSTRUCTION			
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG	KWC 4-19-94

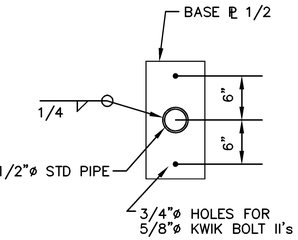
UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO. S1008	REV 1
	POND A SECTIONS & DETAILS – SH. 3		
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

ISSUE
HALF-SIZE
APP. CARD
CAD FILE
UPAS1008.DWG

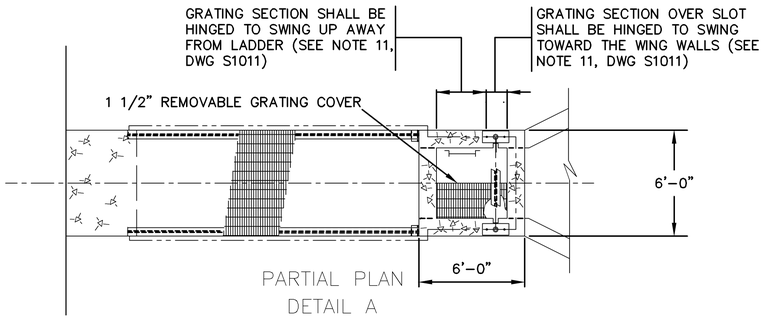


GENERAL PLAN
1"=10'

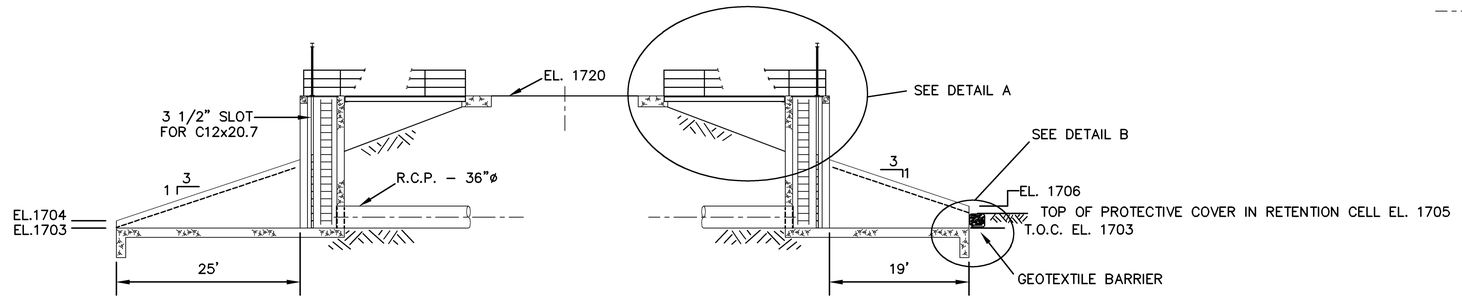




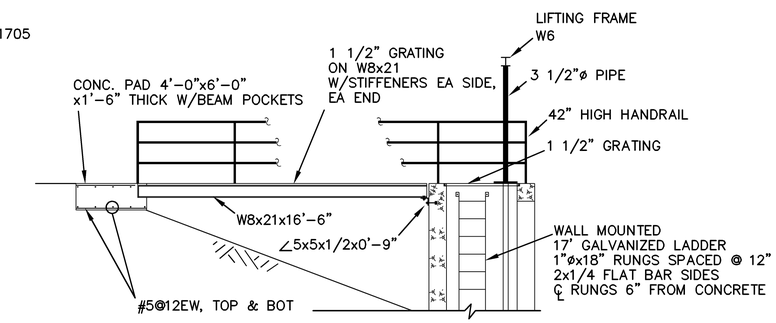
STOPLOG LIFTING FRAME
(5 – REQ'D)
N.T.S.



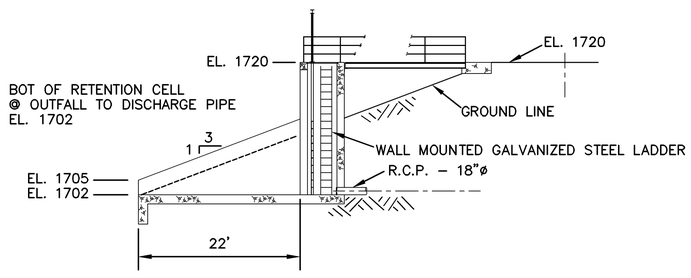
PARTIAL PLAN
DETAIL A
N.T.S.



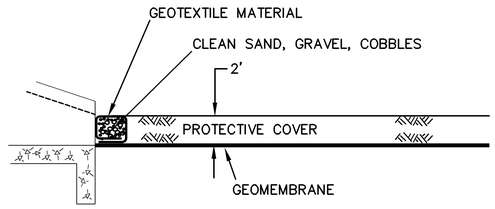
ELEVATION A–A'
ACTIVE CELL & RETENTION CELL
1"=10'



PARTIAL ELEV.
DETAIL A
N.T.S.



ELEVATION B–B'
OUTFALL OF RETENTION CELL
1"=10'



NOTE: THE GEOTEXTILE BARRIER SHALL EXTEND 2 FEET BEYOND THE RETENTION CELL OUTFALL WINGWALLS.

PARTIAL ELEV.
DETAIL B
N.T.S.

NOTES:

1. SCALE: AS NOTED
2. FOR ADDITIONAL NOTES, SEE DRAWING S1011

REFERENCE DRAWINGS:

S1011 OUTFALL STRUCTURES REINFORCEMENT, SHEET 2

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. — DATE
3				
2	FOR CONSTRUCTION REVISED PER ADDENDUM 1			
1	FOR CONSTRUCTION	WLZ	MEB	KWC/WLZ 6-8-94
0	ORIGINAL ISSUE FOR UPA REVIEW	RLP	MEB	KWC 4-19-94

ISSUE	PC	ARCH	CIVIL	CONC	STL	L&P	INST	MD	P.S.	S.A.	FAC	ELEC	LTG	MATL
3														
2														
1														
0														

UPA PROJECT	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO.	REV
4177	OUTFALL STRUCTURES OUTLINE PLAN AND SECTIONS	S1009	2

STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

ISSUE
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CAD FILE
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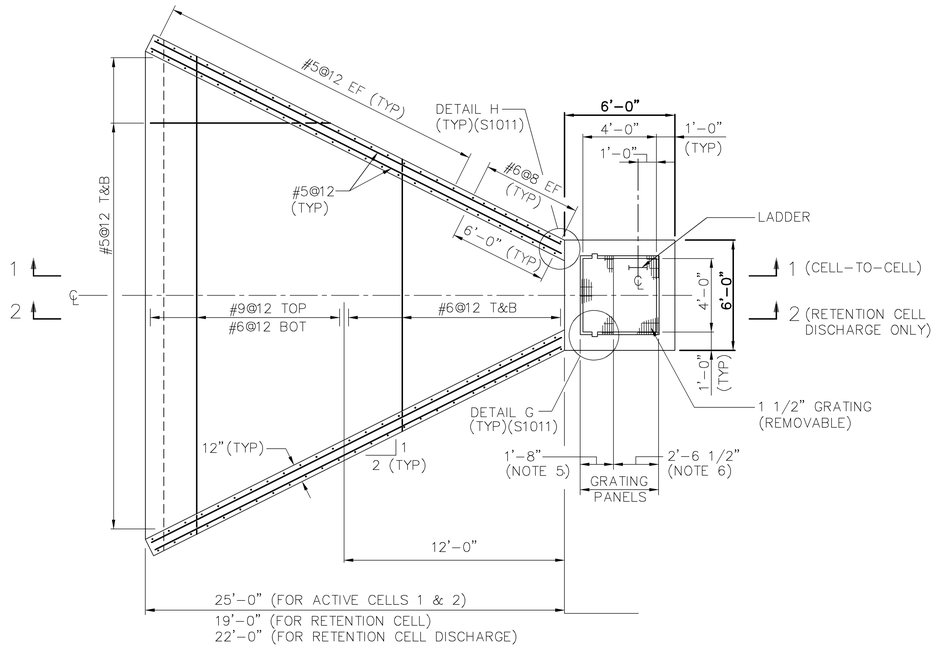
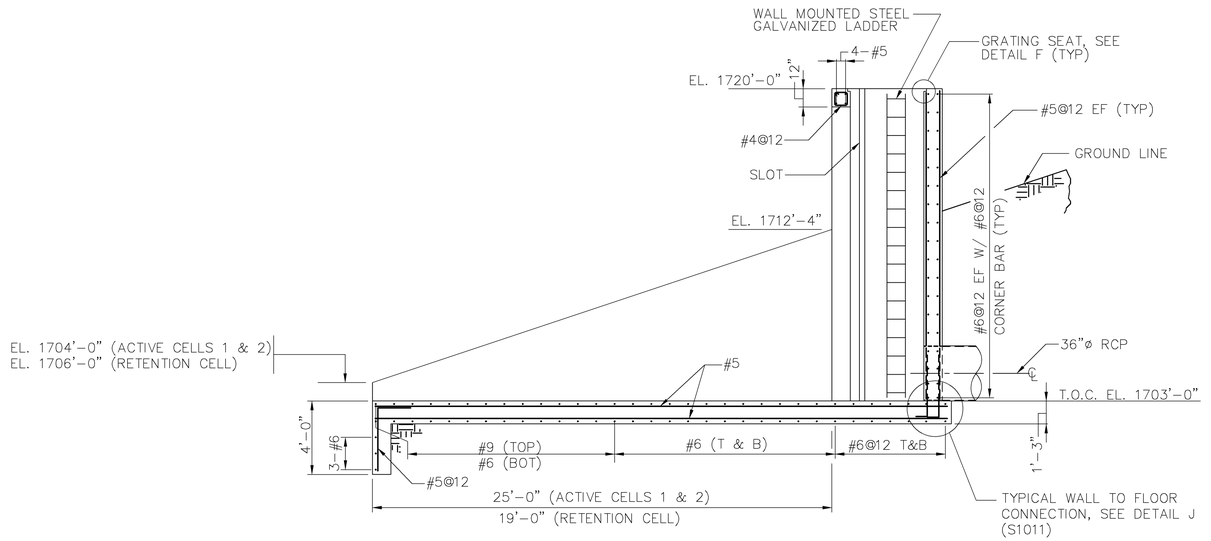
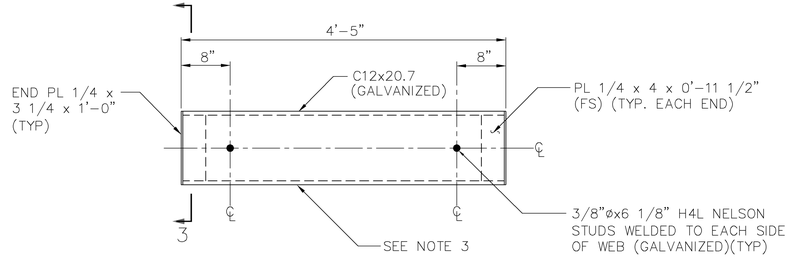


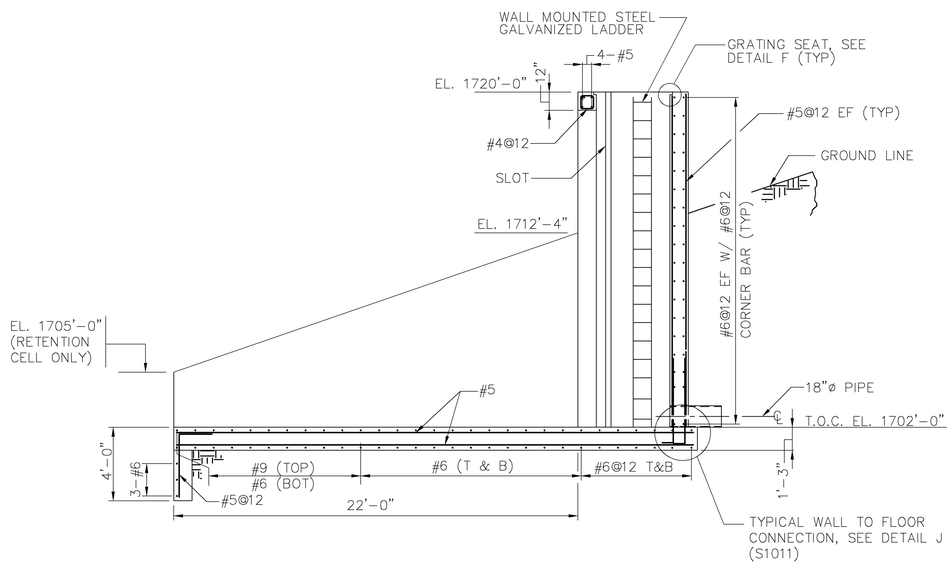
OUTFALL STRUCTURES – PLAN
SCALE: 1/4" = 1'-0"



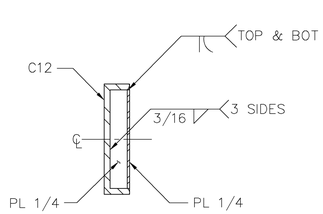
1–1
SCALE: 1/4" = 1'-0"



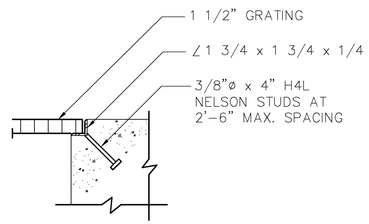
TYPICAL STOP LOG DETAIL
(76 REQUIRED)
SCALE: 1 " = 1'-0"



2–2
SCALE: 1/4" = 1'-0"



3–3
SCALE: 1 1/2" = 1'-0"



DETAIL F
SCALE: 1 1/2" = 1'-0"

NOTES:

1. SCALE: AS NOTED
2. FOR ADDITIONAL NOTES, SEE DRAWING S1011.
3. PLACE 40 MIL x 2 1/2" STRIP PVC ON TOP AND BOTTOM OF C12 WITH WATER RESISTANT ADHESIVE.
4. THE FABRICATOR SHALL VERIFY AND CONNECT, AS REQUIRED, THE SWEEP OF THE CHANNEL STOP LOGS TO WITHIN 3/16", AND THE CAMBER TO WITHIN 1/16". THE VARIATION OF OUT OF SQUARE OF THE FLANGES SHALL BE VERIFIED TO BE LESS THAN THE 1/32" THAT IS PERMISSIBLE BY STANDARD MILL PRACTICE.
5. THE GRATING SECTION OVER THE SLOT SHALL BE HINGED TO SWING TOWARD THE WING WALLS.
6. THE GRATING SECTION SHALL BE HINGED TO SWING UP AWAY FROM THE LADDER.

REFERENCE DRAWINGS:

S1009	OUTFALL STRUCTURES OUTLINE PLANS AND SECTIONS
S1011	OUTFALL STRUCTURES REINFORCEMENT, SHEET 2

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2	FOR CONSTRUCTION REVISED PER ADDENDUM 1			
1	FOR CONSTRUCTION	WLZ	SGG KWC/WLZ 6-8-94	
0	ORIGINAL ISSUE FOR UPA REVIEW	RLP	SGG KWC 4-19-94	

PC	ARCH	CIVIL	CONC	STL	L&P	INST	MD	P.S.	S.A.	FAC	ELEC	LTG	MATL

UPA PROJECT	4177
UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	
OUTFALL STRUCTURES REINFORCEMENT – SH. 1	
DRAWING NO.	S1010
REV	2

STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

ISSUE
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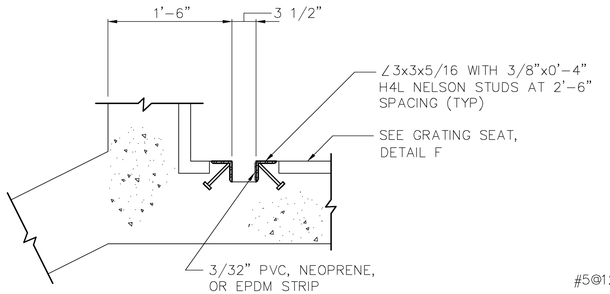
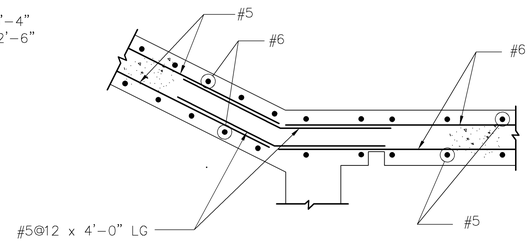
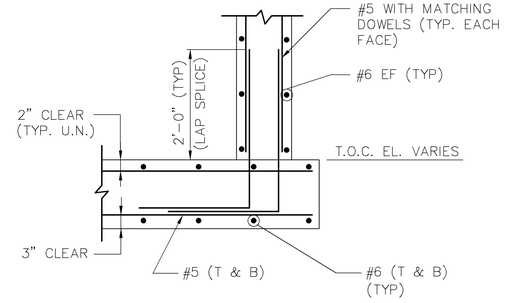
APP. CARD
CAD FILE UPAS1010.DWG



DETAIL G
(S1010)
SCALE: 3/4" = 1'-0"



DETAIL H
(S1010)
SCALE: 1" = 1'-0"



DETAIL J
(S1010)
SCALE: 3/4" = 1'-0"

NOTES:

1. SCALE: AS NOTED.
2. ALL WORK SHALL BE IN CONFORMANCE WITH STONE & WEBSTER ENGINEERING SPECIFICATION NO. 04362.01-S103B.
3. THE MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 3000 PSI.
4. REINFORCING STEEL SHALL BE DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GRADE 60, PLUS S1.
5. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36. STEEL SHALL BE CLEANED AND HOT DIP GALVANIZED FOLLOWING FABRICATION.
6. DRILLED IN EXPANSION ANCHORS SHALL BE KWIK BOLT II'S BY HILTI. INSTALLATION OF ANCHORS SHALL BE IN ACCORDANCE WITH HILTI INSTRUCTIONS.
7. STEEL BAR GRATING SHALL BE OF WELDING QUALITY, MILD CARBON STEEL CONFORMING TO ASTM A569. STEEL FOR CURB PLATE SHALL CONFORM TO ASTM A36. GRATING SHALL BE FABRICATED, CLEANED, AND HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.
8. HANDRAIL AND POSTS SHALL BE 1 1/2" DIAMETER STANDARD PIPE, AND SHALL BE CLEANED AND GALVANIZED FOLLOWING FABRICATION.
9. STREAM GAUGES SHALL BE PROVIDED AND INSTALLED AT THE TWO ACTIVE CELL DISCHARGE STRUCTURES AND THE RETENTION CELL DISCHARGE STRUCTURE. GAUGES SHALL BE STYLE E WITH SEPARATE FIGURES AS SUPPLIED BY STEVENS WATER RESOURCES PRODUCTS, LEUPOLD & . STEVENS, INC. OF BEAVERTON, OR.
10. ALL EXCAVATIONS FOR THE OUTFALL STRUCTURES SHALL BE BACKFILLED WITH CLAY FILL.
11. HINGES SHALL BE FITTED WITH REMOVABLE PINS SO THAT THE GRATING CAN BE REMOVED. HINGE DETAILS SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL.

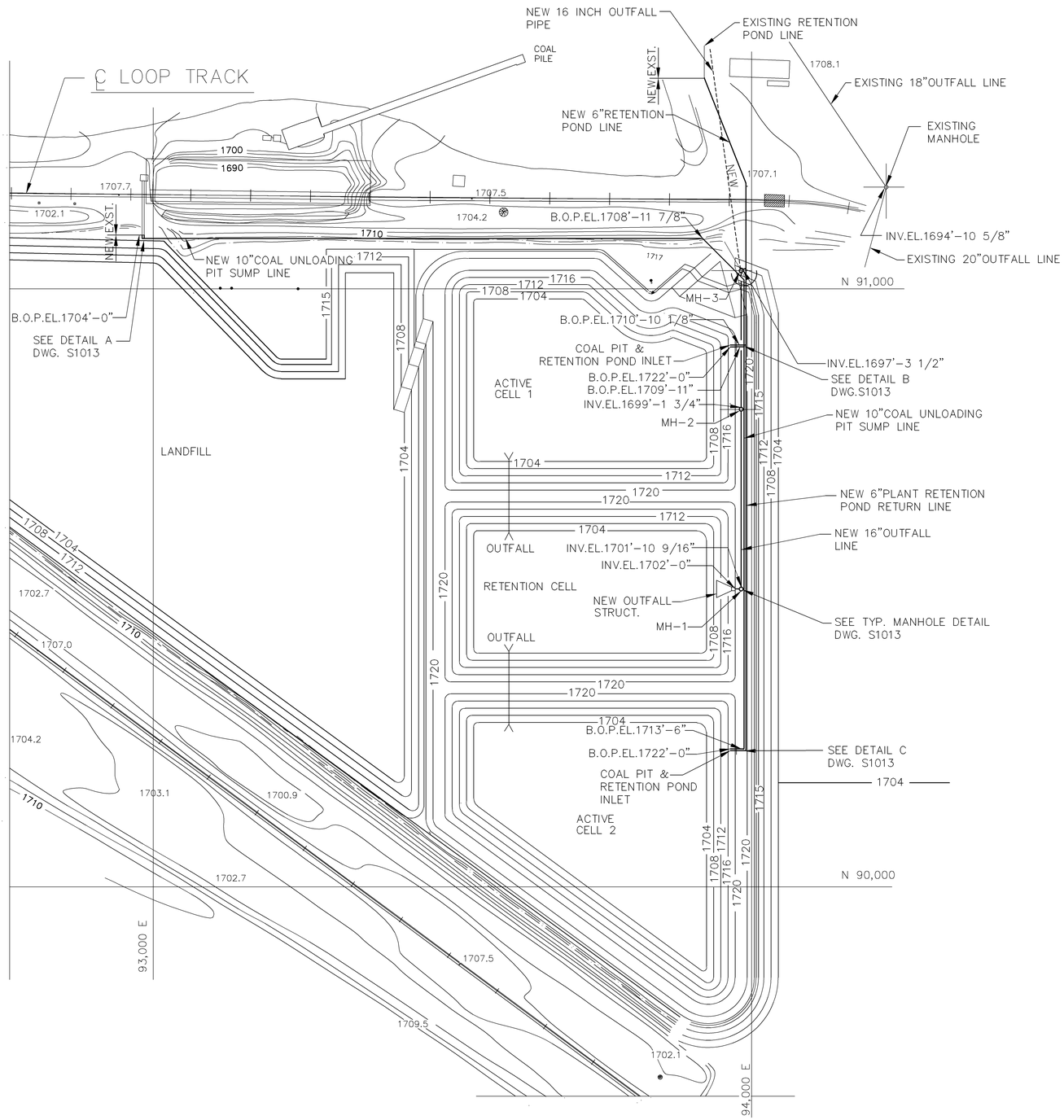
REFERENCE DRAWINGS:

S1009	OUTFALL STRUCTURES OUTLINE PLANS AND SECTIONS
S1010	OUTFALL STRUCTURES REINFORCEMENT, SHEET 2

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2				
1	FOR CONSTRUCTION			
0	ORIGINAL ISSUE FOR UPA REVIEW	WLZ	SGG KWC 4-19-94	

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS OUTFALL STRUCTURES REINFORCEMENT – SH. 2	DRAWING NO. S1011	REV 1
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

ISSUE
HALF-SIZE
APP. CARD
CAD FILE
UPAS1011.DWG



SCALE 1" = 100'

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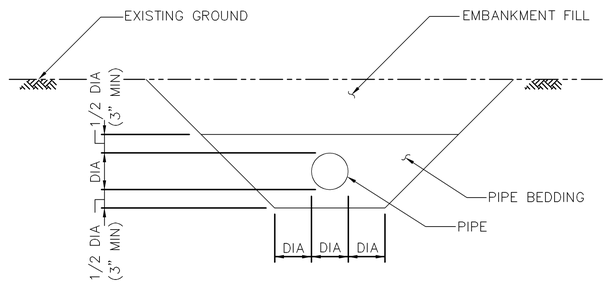


PIPE AND CULVERT TRENCH DETAIL
NTS

NOTE: PIPES AND/OR CULVERTS IN A SINGLE TRENCH SHALL HAVE A MINIMUM SPACING OF 12 INCHES (WALL-TO-WALL) BETWEEN ADJACENT PIPES.

NOTES:

1. FOR GENERAL NOTES, SEE DRAWING S1002.

REFERENCE DRAWINGS:

S1002 FACILITIES SITE PLAN
S1013 PIPING DETAILS
S1027 BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING PLAN

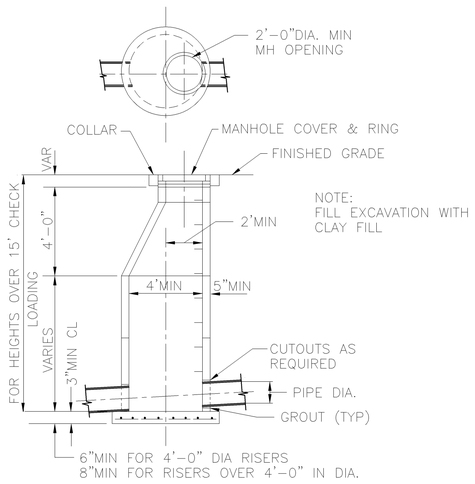
ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2	FOR CONSTRUCTION REVISED PER ADDENDUM 1			
1	FOR CONSTRUCTION	WLZ	WWG	KWC/WLZ 6-9-94
0	ORIGINAL ISSUE FOR UPA REVIEW	KWC	WWG	KWC 4-19-94

ISSUE	PC	ARCH	CIVIL	CONC	STL	L&P	INST	MD	P.S.	S.A.	FAC	ELEC	LTG	MATL

UPA PROJECT	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO.	REV
4177	POND A PIPING PLAN	SI012	2

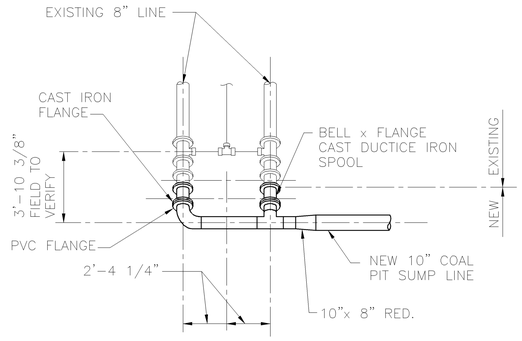
STONE & WEBSTER ENGINEERING CORPORATION
DENVER, CO.

ISSUE
HALF-SIZE APP. CARD
CAD FILE UPAS1012.DWG



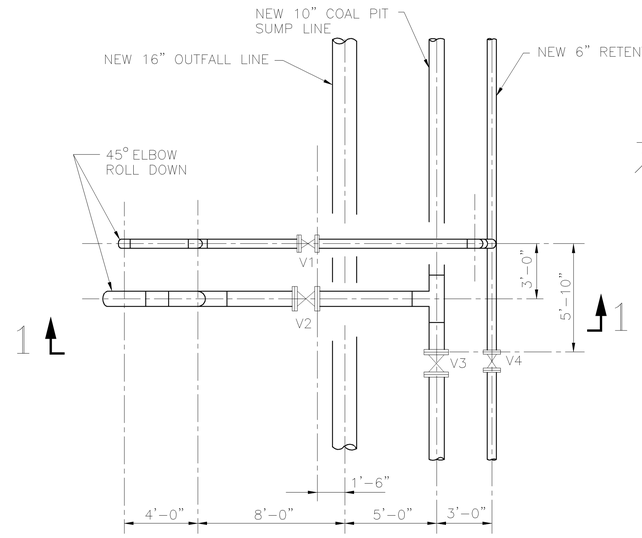
DETAIL
PRECAST MANHOLE

(DWG.S1012)
N.T.S.



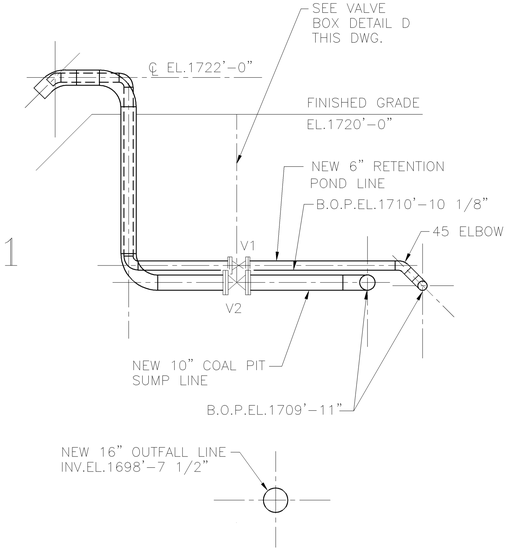
PLAN
DETAIL A

SCALE 1/4" = 1'-0"
(DWG.S1012)



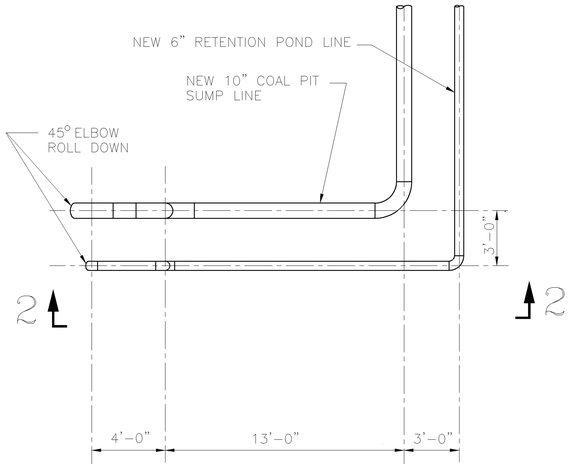
PLAN
DETAIL B

SCALE 1/4" = 1'-0"
(DWG.S1012)



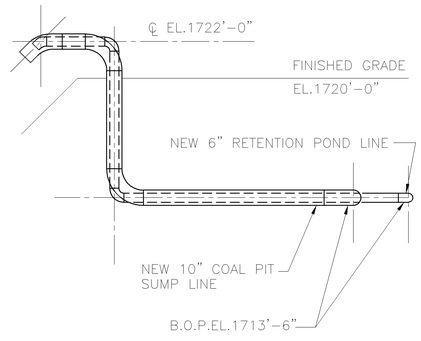
SECTION 1-1

SCALE 1/4" = 1'-0"



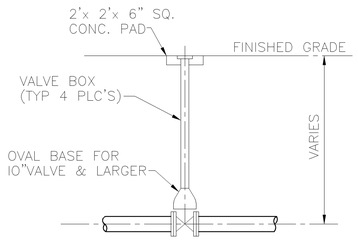
PLAN
DETAIL C

SCALE 1/4" = 1'-0"
(DWG.S1012)



SECTION 2-2

SCALE 1/4" = 1'-0"



VALVE BOX
DETAIL D

SCALE 1/4" = 1'-0"

NOTES:

1. SCALE: AS NOTED.
2. FOR ADDITIONAL NOTES, SEE DRAWING S1012.

REFERENCE DRAWINGS:

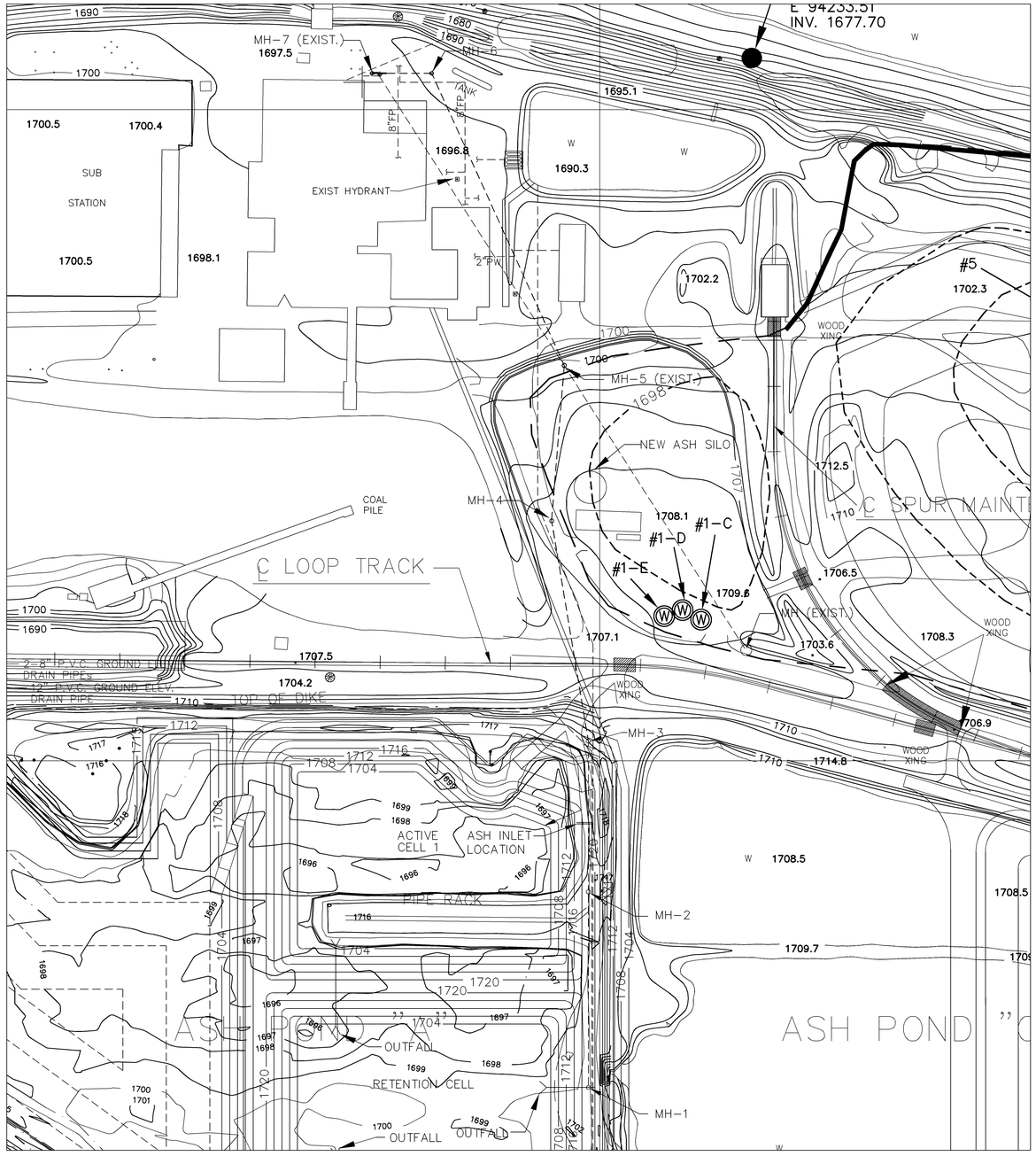
S1012	POND A PIPING PLAN
S1027	BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING PLAN
S1028	BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING SECTIONS & DETAILS

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2	FOR CONSTRUCTION REVISED PER ADDENDUM 1			
1	FOR CONSTRUCTION	WLZ	WWG WLZ 4-19-94	KWC 4-19-94
0	ORIGINAL ISSUE FOR UPA REVIEW	KWC	WWG KWC 4-19-94	KWC 4-19-94

ISSUE	PC	ARCH	CIVIL	CONC	STL	L&P	INST	MD	P.S.	S.A.	FAC	ELEC	LTG	MATL
3														
2														
1														
0														

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO. S1013	REV 2
	PIPING DETAILS		
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

ISSUE
HALF-SIZE
APP. CAND
CAD FILE
UPAS1013.DWG



N

SCALE 1" = 100'

100 50 0 100 200 300

LEGEND:

- EXISTING GROUND ELEVATION CONTOUR
- NEW GROUND ELEVATION CONTOUR
- EXISTING UNDERGROUND FACILITIES
- NEW UNDERGROUND FACILITIES

NOTES:

1. SEE GENERAL NOTES, DRAWING S1002.
2. THE OUTFALL PIPING INSTALLATION IS TO BE ACCOMPLISHED IN TWO PHASES. THE FIRST PHASE, FROM MH-7 TO SOUTH OF MH-4 IS TO BE COMPLETED BY 9/30/94. THE REMAINING PIPING WILL BE COMPLETED BY 9/30/95.
3. FOR MANHOLE DETAILS SEE DRAWING NO. S1028.

REFERENCE DRAWINGS

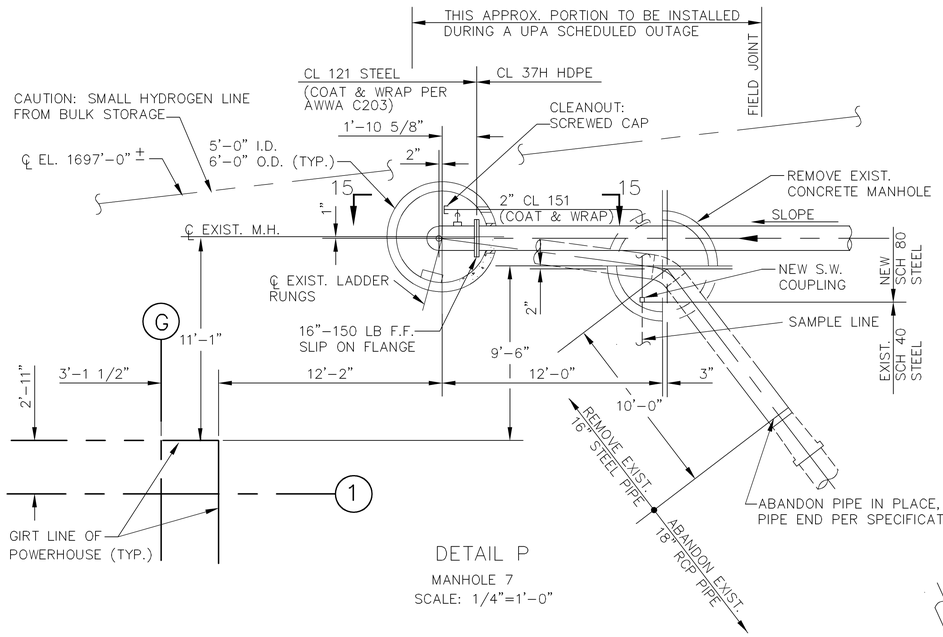
S1002	FACILITIES SITE PLAN
S1028	IMPOUNDMENT OUTFALL PIPING SECTIONS AND DETAILS

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2				
1	ISSUED FOR CONSTRUCTION			
0	ORIGINAL ISSUE	WLZ	ACZ	KWC/WLZ 6/29/94

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO. S1027	REV 1
	BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING PLAN		
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.		

ISSUE | HALF-SIZE | APP. CARD

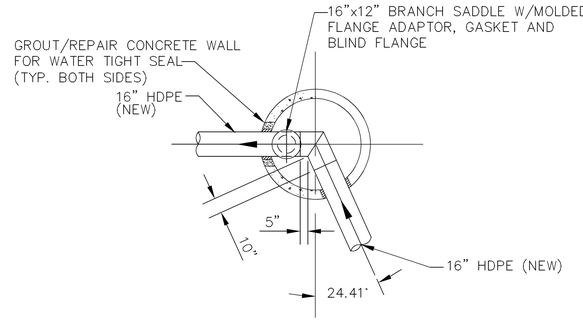
CAD FILE UPAS1027.DWG



DETAIL P

MANHOLE 7

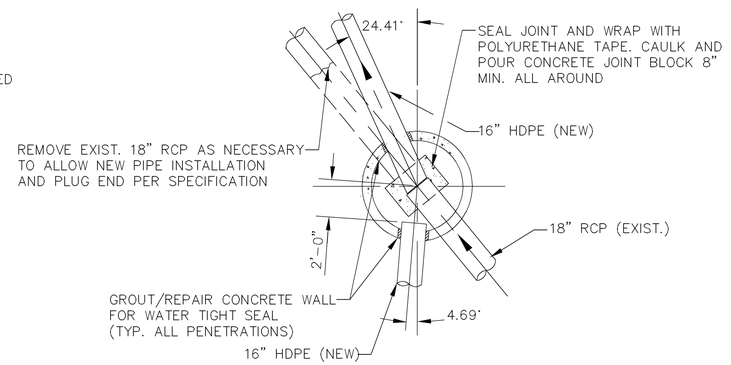
SCALE: 1/4"=1'-0"



DETAIL R

MANHOLE 6

SCALE: 1/4"=1'-0"

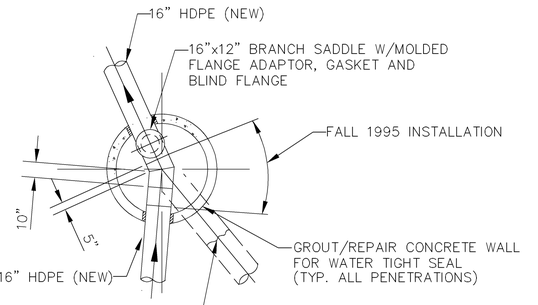


DETAIL S

9/94 MODIFICATIONS (FOR FALL 1995 MODIFICATIONS SEE DETAIL T)

MANHOLE 5 (EXIST.)

SCALE: 1/4"=1'-0"

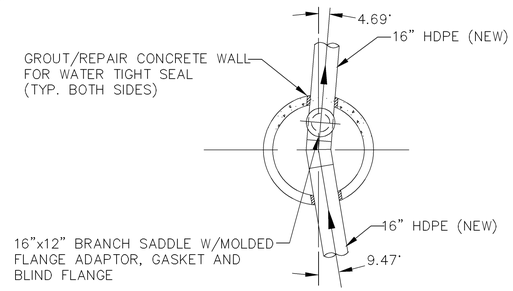


DETAIL T

FINAL INSTALLATION

MANHOLE 5

SCALE: 1/4"=1'-0"



DETAIL U

MANHOLE 4

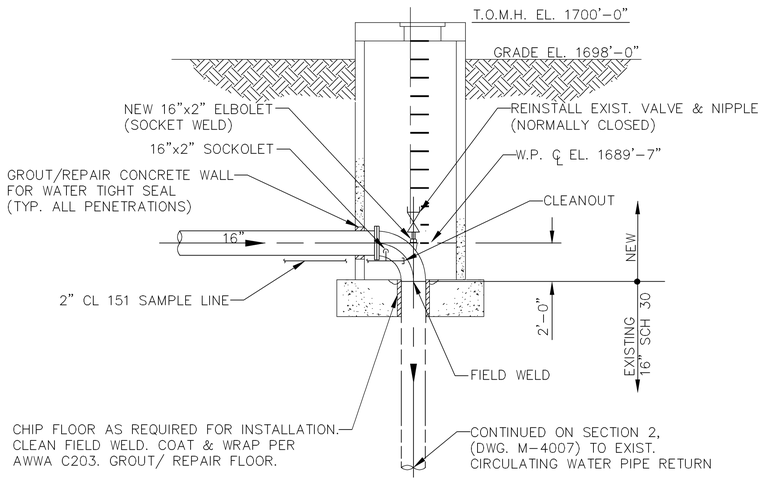
SCALE: 1/4"=1'-0"

NOTES:

1. SEE GENERAL NOTES, DRAWING S1002.
2. NEW MANHOLES NUMBER -1,-2 AND -3 HAVE NO ELBOWS INTERNAL TO THE MANHOLE.
3. FOR WATER SEAL USE ADEKA TYPE MK-2005T SEALER, OR APPROVED EQUAL.
4. IF FIELD JOINTS OTHER THAN FUSION WELDED ARE REQUIRED, USE CASCADE STYLE CR2 30" CLAMP, CATALOG NO. CR2-1592-30, OR APPROVED EQUAL.
5. FOR TYPICAL MANHOLE ELEVATION SEE DRAWING NO. S1013.
6. NEW PIPING SHALL BE SLOPED UNIFORMLY BETWEEN MH-3 AND MH-5, AND BETWEEN MH-5 AND MH-7.

REFERENCE DRAWINGS

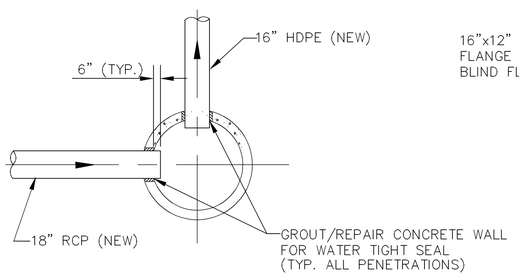
S1002	FACILITIES SITE PLAN
S1013	PIPING DETAILS
S1027	IMPOUNDMENT OUTFALL PIPING PLAN



15-15

LOOKING SOUTH

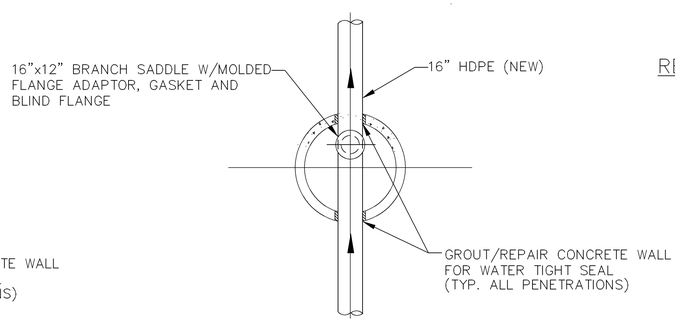
SCALE: 1/4"=1'-0"



DETAIL V

MANHOLE 1

SCALE: 1/4"=1'-0"



DETAIL W

MANHOLE 2 & 3

SCALE: 1/4"=1'-0"

ISSUE	DESCRIPTION	CHKD	CORRECT	APPR. DATE
3				
2				
1	ISSUED FOR CONSTRUCTION			
0	ORIGINAL ISSUE FOR BIDS	WLZ	ACZ KWC/WLZ 6/29/94	

UPA PROJECT 4177	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS BOTTOM ASH SURFACE IMPOUNDMENT OUTFALL PIPING SECTIONS & DETAILS	DRAWING NO. S1028 / REV 1
	STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.	

ISSUE | HALF-SIZE | APP. CARD | CAD FILE UPAS1028.DWG

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Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228 USA
Tel: (303) 980-0540
Fax: (303) 985-2080

Golder Associates