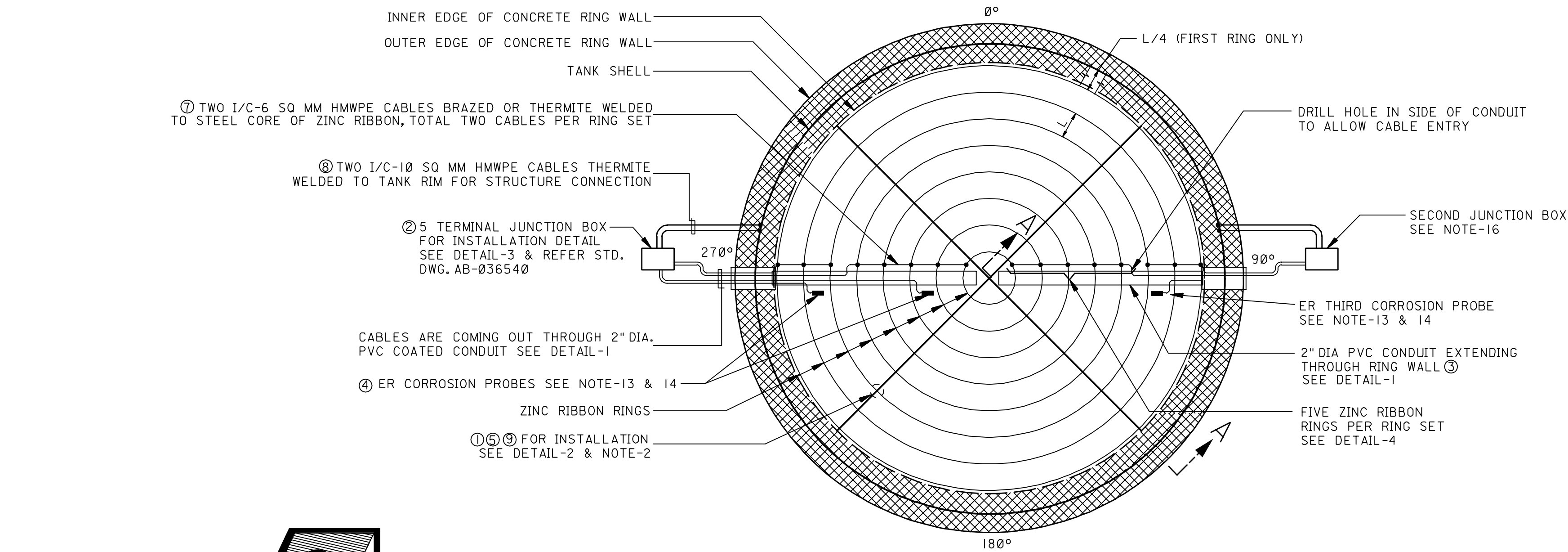
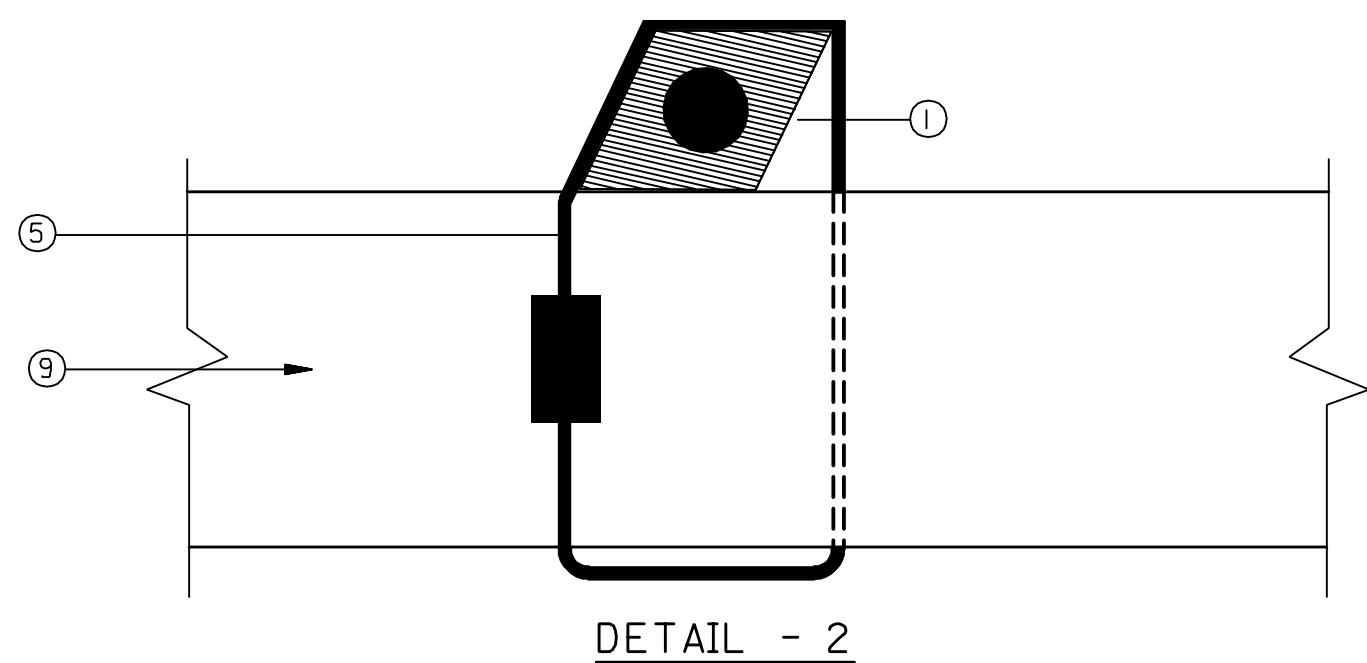
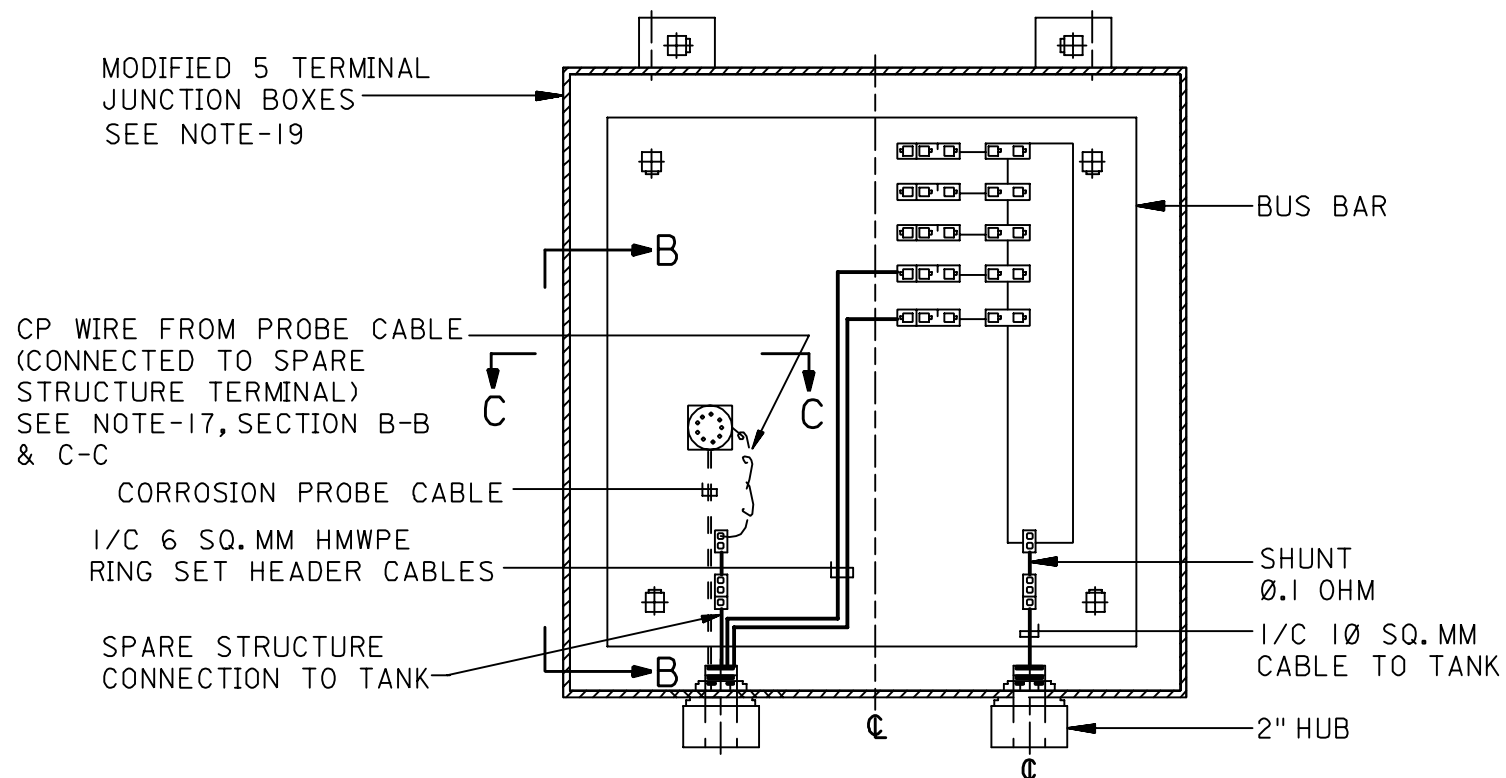




SCHEMATIC PLAN VIEW

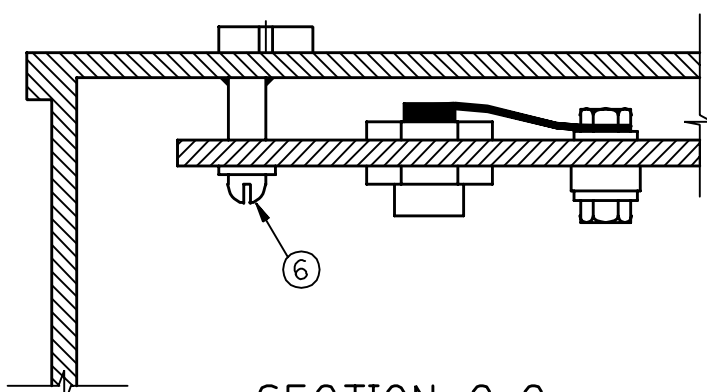


DETAIL - 2

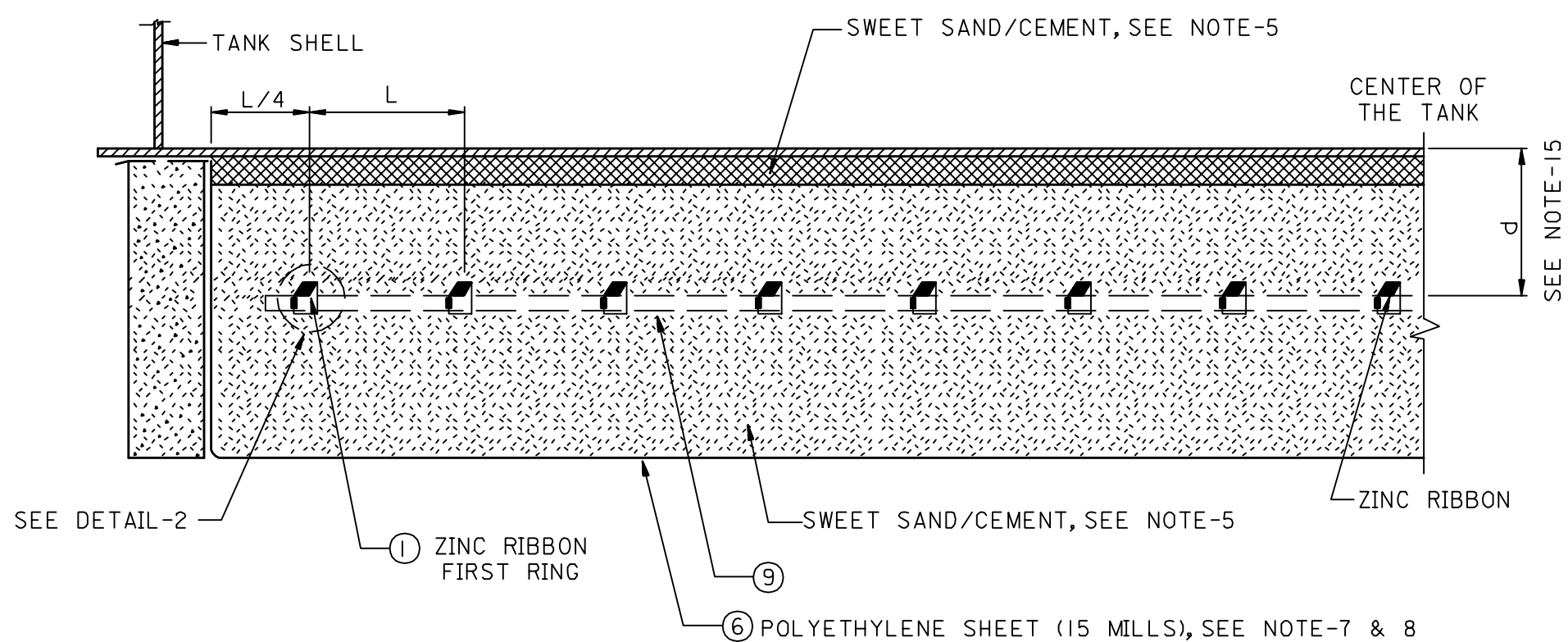


DETAIL - 3

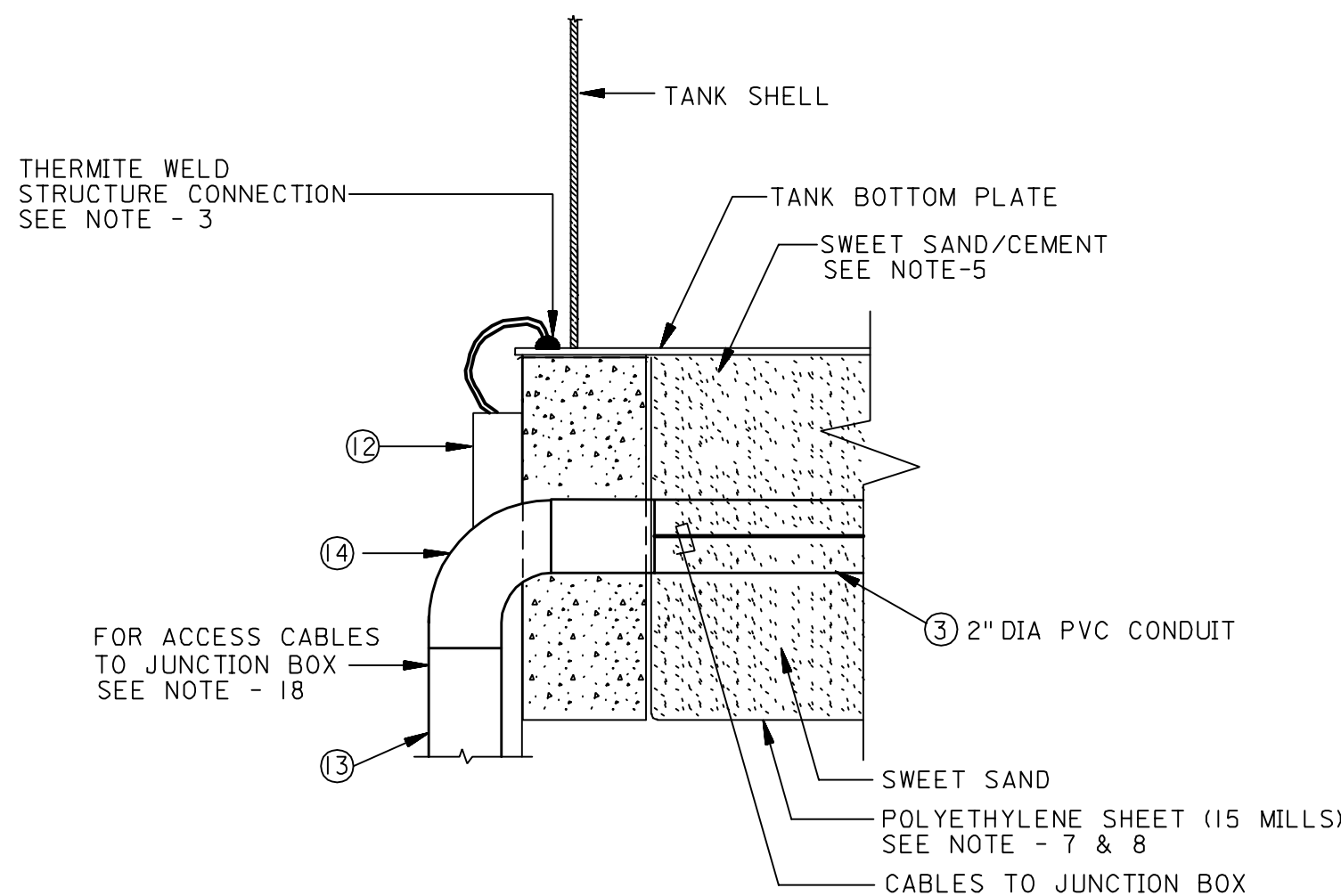
5 TERMINAL JUNCTION BOX TERMINATION DETAIL
FOR INSTALLATION DETAIL SEE SAUDI ARAMCO DWG. NO: AA-036274 & AB-036540



SECTION C-C

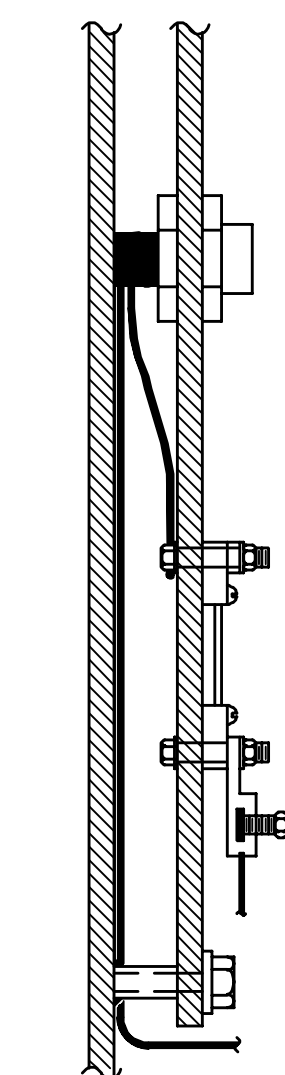


SECTION A-A



DETAIL - 1

SECTION THROUGH TANK FOUNDATION



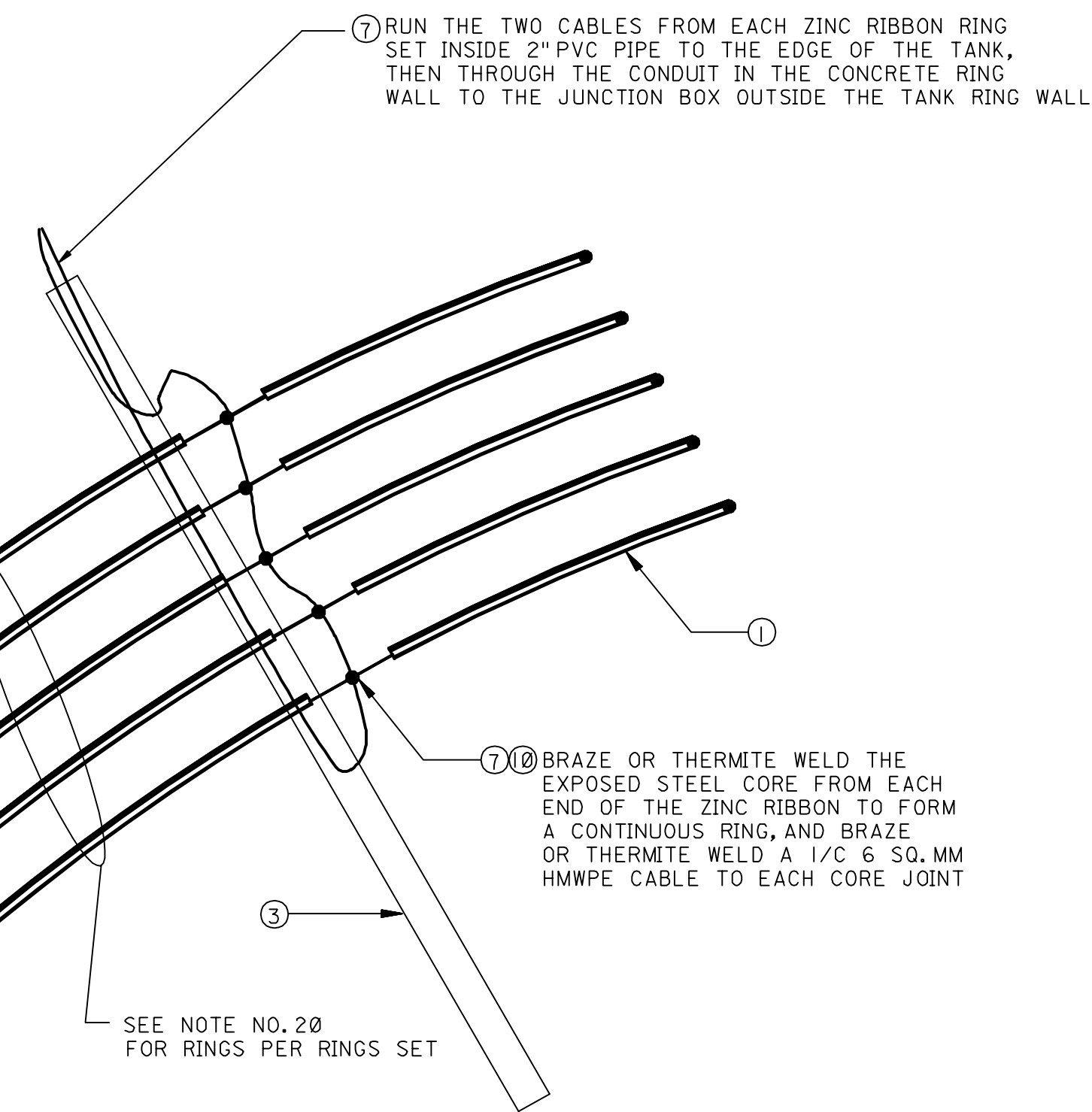
SECTION B-B

MATERIAL TAKE-OFF LIST	
CODE	DESCRIPTION
1	ZINC RIBBON ANODE 1/2" T x 3/16"W
2	5 TERMINAL ANODE JUNCTION BOX, C/W CONDUIT & SUPPORT
3	2" DIA PVC PIPE
4	ER CORROSION PROBES HD620
5	PLASTIC CABLE TIE
6	POLYETHYLENE SHEET 15 MILLS
7	1/2" - 6 SQ. MM HMWPE CABLE
8	1/2" - 10 SQ. MM HMWPE CABLE
9	1" SCH. 80 PVC PIPE TO SECURE ZINC RIBBON
10	THERMITE WELD MOLD, POWDER, FLINT GUN, DUCT SEAL, RUBBER TAPE
11	CABLE MARKERS
12	1" DIA PVC COATED CONDUIT
13	2" DIA PVC COATED CONDUIT
14	2" DIA PVC COATED ELBOW

ABBREVIATIONS	
n	= NUMBER OF RINGS REQUIRED
L	= SPACING BETWEEN ANODE RINGS
Dt	= DIAMETER OF THE TANK
TL	= TOTAL REQUIRED LENGTH OF RIBBON
Df	= DIAMETER OF FIRST RING
d	= DEPTH OF THE ANODES, SEE NOTE-15
RING SET = FIVE ZINC RIBBON RINGS (TYPICAL)	

RELATED FORMULAS	
$L = 5.3 \times d$ (FOR d SEE NOTE-15)	
$n = (2 \times Dt - L - 120) / (4 \times L)$	
$TL = 3.14 \times (Dt - (L/2 + 60)) + n \times Df - n \times (n+1) \times L$	
$Df = (L/4) \times 2 - Dt$	

SAMPLE CALCULATION:
TANK DIAMETER (Dt) 10 METERS = 10,000MM,
SPACING BETWEEN ANODE RINGS (L) = 5.3 x 150 = 795MM
FIRST RING DISTANCE FROM TANK SHELL = L/4 = 795/4 = 198.75 = 199MM,
DIAMETER OF FIRST RING (Df) = (L/4) x 2 - Dt = 9602MM
NUMBER OF RINGS REQUIRED (n) = (2 x 10,000 - 795 - 120)/(4 x 795) = 6 RINGS
TOTAL REQUIRED LENGTH OF RIBBON (TL) = 3.14 x (10,000 - (795/2 + 60)) + (6 x 9602) - 6 x (6 + 1) x 795 = 106 METERS



DETAIL - 4

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- WRAP CABLE TIES ON 1" PVC PIPE TO RESTRAIN RIBBON ANODE DURING INSTALLATION.
- CONNECT THE NEGATIVE LEAD FROM THE JUNCTION BOX TO TANK RIM VIA THERMITE WELD.
- INSTALL THE ZINC RIBBON ANODES 150MM BELOW THE TANK BOTTOM IN SWEET SAND. SEE NOTE NO.15
- PROVIDE SWEET SAND AND CEMENT MIXTURE AS PER 32-SAMSS-005.
- COAT THE UNDER SIDE OF THE BOTTOM PLATES WITH APC-3.
- FOR DOUBLE BOTTOM OR OTHER INSTALLATIONS THAT DO NOT HAVE SECONDARY CONTAINMENT LINER INSTALLATION, LAY 2 LAYERS OF POLYETHYLENE SHEET OVER THE OLD STEEL BOTTOM WITH THE EDGES OVERLAPPED A MINIMUM OF 300MM.
- SPREAD AT LEAST 25MM OF SAND OVER THE POLYETHYLENE SHEET, OVER THIS SAND LAY RIBBON ANODE AT (L) SPACING BETWEEN RIBBON RINGS.
- CONNECT THE STEEL CORES AT THE ENDS OF THE RIBBON ANODE BY THERMITE WELDING TO MAKE A CONTINUOUS ANODE.
- CONNECT 6 SQ. MM CABLE TO THE STEEL CORE OF THE RIBBON ANODE AS SHOWN TO MAKE RING SET. ROUTE THE CABLE LEADS INTO THE JUNCTION BOX.
- CONNECT THE STRUCTURE LEAD FROM THE JUNCTION BOX VIA A THERMITE WELD TO TANK RIM.
- COAT THE THERMITE WELD WITH SPLASH ZONE COMPOUND.
- FOR TANKS OVER 30 METERS IN DIAMETER INSTALL THIRD PROBE.
- CORROSION PROBE CABLES SHALL BE ROUTED TO THE JUNCTION BOX AS SHOWN ON DETAIL NO. 3.
- "d" SHALL BE APPROXIMATELY 150 MM UNLESS THE SPACE BENEATH THE TANK BOTTOM IS LESS THAN 150 MM, IN WHICH CASE "d" SHALL BE 24 MM LESS THAN THE AVAILABLE SPACE.
- FOR TANK GREATER THAN 10 METERS IN DIAMETER INSTALL SECOND JUNCTION BOX.
- CP WIRE FROM PROBE CABLE SHALL BE CONNECTED TO THE BACK SIDE OF THE SPARE STRUCTURE CONNECTION TERMINAL TO PROVIDE CP CURRENT TO THE PROBE.
- THE 2" DIA PIPE SHALL BE INSTALLED BELOW THE ZINC RIBBON RINGS.
- THE 5 TERMINAL JUNCTION BOX PER STANDARD DRAWING NO. 036274 SHALL BE MODIFIED TO DETAIL NO. 3.
- RING SETS SHALL CONTAIN A MAXIMUM OF 6 RINGS AND MINIMUM OF 3 RINGS.

REFERENCE DRAWINGS

MOUNTING SUPPORT DETAILS	AB-036540
5 TERMINAL JUNCTION BOX	AA-036274
CABLE IDENTIFICATION TERMINATION DET.	AD-036132
THERMITE WELDING OF CABLES TO PIPELINES & STRUCTURES	AB-036381

TYPICAL INSTALLATION DRAWING

REV. NO.	DATE	BY	DESCRIPTION	CHKD.	CERT.	APPRO.
00	JAN2007	EXD	GENERAL REVISION			
01	JUL1995	ESSD	REVISED NOTES & LIST OF MATERIAL AND ADDED DETAIL 4. CHANGED DIM. SIZE FROM 1/2" TO 3/4"	ORL. SIGNED	ORL. SIGNED	ORL. SIGNED
02	NOV94	ESSD	REVISED NOTES & ADDED NOTE-1.	ORL. SIGNED	ORL. SIGNED	ORL. SIGNED

SAUDI ARABIAN OIL COMPANY

DRAWN BY: _____ CHECKED BY: _____ SCALE: _____
DATE STARTED: _____ DATE COMPLETED: _____
OPRG. DEPT.: _____ ENG. DEPT.: _____
APPRO. FOR CONST.: _____

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION OR FOR ORDERING MATERIAL UNLESS CERTIFIED AND DATED

CATHODIC PROTECTION

ZINC RIBBON INSTALLATION

UNDER A/G STORAGE TANKS

STD. DWG.		DRAWING NUMBER		SHT. NO.		REV. NO.	
990	D/X	AA-036905		001		08	

Saudi Aramco 2615 ENG.13/91

CADD-02