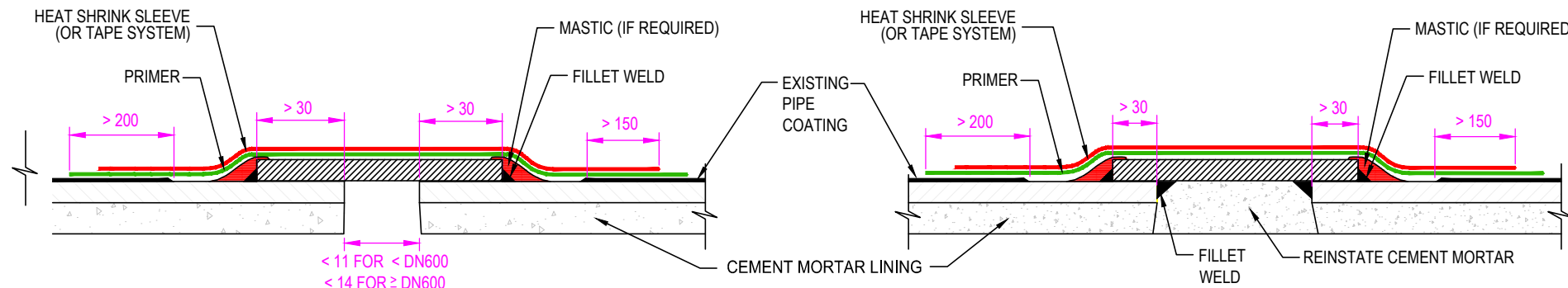


**FIGURE 400-A: SPHERICAL SLIP-IN WELDED JOINT (SSJ)**

SPHERICAL SLIP IN JOINTS ARE THE DEFAULT JOINT FOR MAINS ≤ DN900.

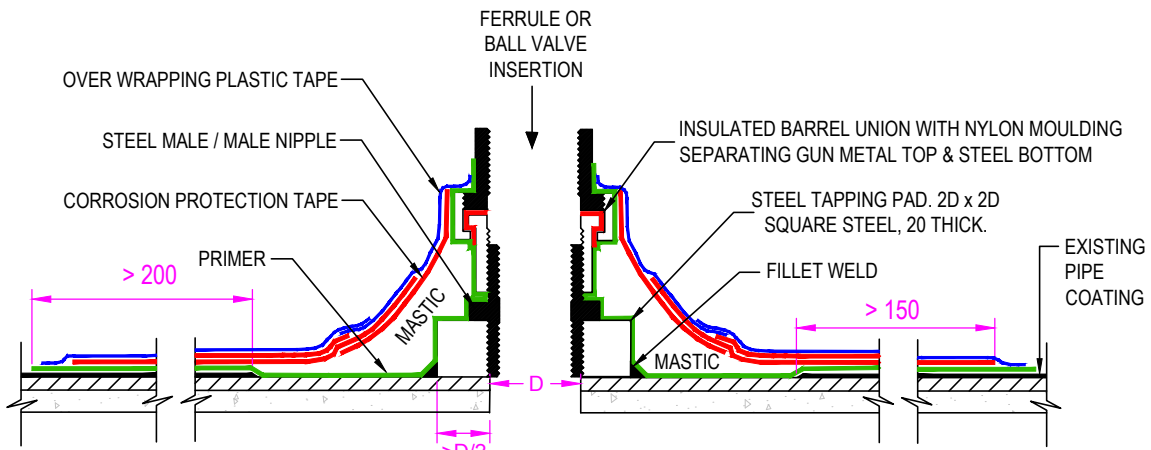
**FIGURE 400-B: BALL AND SOCKET JOINT (B&S)**

BALL AND SOCKET JOINTS ARE THE DEFAULT JOINT FOR MAINS > DN900 AND PROVIDE A GREATER DEGREE OF JOINT FLEXIBILITY AT THESE SIZES.



**FIGURE 400-C: PLAIN END WELDED COLLAR JOINT (WC)**

**FIGURE 400-D: PLAIN ENLD WEDED COLLAR JOINT (WC) FOR MAINS ≥ DN750**



**FIGURE 400-D: STEEL MAIN INSULATED TAPPING ARRANGEMENT**

**NOTES Regarding Insulated Tappings:**

- Tapping of steel mains is generally not acceptable for mains ≥ DN375 and requires water agency approval.
- Steel tapping pad shall be pre tapped and fillet welded onto the pipe around the entire perimeter.
- All exposed steel shall be covered by protective tape to 150mm over native pipe coating as described in drawing MRWA-W-306A.
- Only protective tape and mastic system shall be used (not PE shrink wrap).
- Stretch tape tightly around barrel union, mastic and tapping pad to prevent water / air ingress.
- Tape shall be wound continuously over clean and primed pipe.

**NOTES on Corrosion Protection:**

- Corrosion protection described here is required for all steel surfaces which do not have a high integrity coating consisting of one of the following:
  - Heat applied MDPE coating to AS4321.
  - Fusion bonded epoxy coating to AS/NZS 4158.
- Bare, bitumen coated or painted surfaces are not acceptable coatings. These surfaces will be referred to as uncoated.
- All corrosion protection products shall be as per the water agency product catalogue. The manufacturers instructions must be available for reference on site.
- Products from a single manufacturer shall be used to ensure compatibility of products. All products shall be applied as per the manufacturers instructions.
- Step 1: Surface Preparation- All surfaces to be primed shall be prepared to a finish of class SA2.5 according to AS1627.2. Power wire brush remove all scale, loose rust and old flanking coating. Chisel off all weld splutter and slag.
- Step 2: Primer- Shall be applied by brush or spray to all uncoated surfaces to a distance of 200mm over the pipe native coating. The entire area to be wrapped shall be primed, including all flanges and bolts.
- Step 3: Mastic- Mastic is only required where projections greater than 3mm occur (therefor fillet welds will only need to be mastic contoured when the plate thickness is > 3mm thicker than the fillet weld). Mastic will be required around all tappings. Apply mastic to create a gradual and smooth transition from the pipe to the outer surface. Apply mastic by hand, ensuring no significant voids are present.
- Step 4- Option A: MDPE shrink wrap- MDPE shrink wrap shall be undertaken in accordance with clause "reinstatement using heat shrinkable wrapping system" clause in Part 2 of WSA03, MRWA edition. Only suitable for flat surfaces (ie: SSJ, B&S or WC joints).
- Step 6: DCVG Holiday Testing- Where requested or specified by the water agency, DCVG holiday detection testing shall be undertaken to confirm the integrity of the pipeline coating system in accordance with AS4827.1- coating defect surveys for buried pipelines- direct current voltage gradient (DCVG).

**GENERAL NOTES:**

- For steel pipelines, only SSJ, B&S, WC and flanged joints are acceptable. RRJ mains require water agency approval.
- Pipes to be joined in accordance with manufacturers handling and installation manual.
- Gaps in the internal cement mortar lining shall be reinstated and internal seams welded for all mains ≥ DN750.
- Welding and the non destructively testing of welds shall be undertaken in accordance with clause "welding of steel pipelines" clause in Part 2 of WSA03, MRWA edition.
- Fitting shall be fabricated in accordance with clause "fabrication of steel fittings" clause in Part 2 of WSA03, MRWA edition.
- For steel flange arrangements, refer to MRWA-W-306A & 306B.
- For Cathodic Protection requirements of steel mains, refer to the Water Agency's Cathodic Protection Standards (CORR specifications).
- Ensure test points are installed on cathodic protected mains as per the Cathodic Protection design and that mains on both sides of valves are protected (via bonding across a valve, separate anodes or separate ICCP units etc).

DESIGNED:	R. JAGGER	DATE:	20/01/2011
DRAWN:	R. JAGGER	DATE:	20/01/2011
CHECKED:	NAME	DATE	APPROVED: NAME
	☑ CWW C. RIVETTE	04/04/12	☑ CWW R.CARRUTHERS
	☑ SEWL C.PAXMAN	04/04/12	☑ SEWL G.REYNOLDS
	☑ YVW K.DAWSON	04/04/12	☑ YVW A.COSHAM

MELBOURNE RETAIL WATER AGENCIES

MRWA WATER SUPPLY STANDARDS

STEEL PIPELINE JOINTING

NOT TO SCALE

MRWA-W-400

ISSUED 2012 REVISION NO. 3

1 2 3 4 5 6 7 8 9 10 11 12

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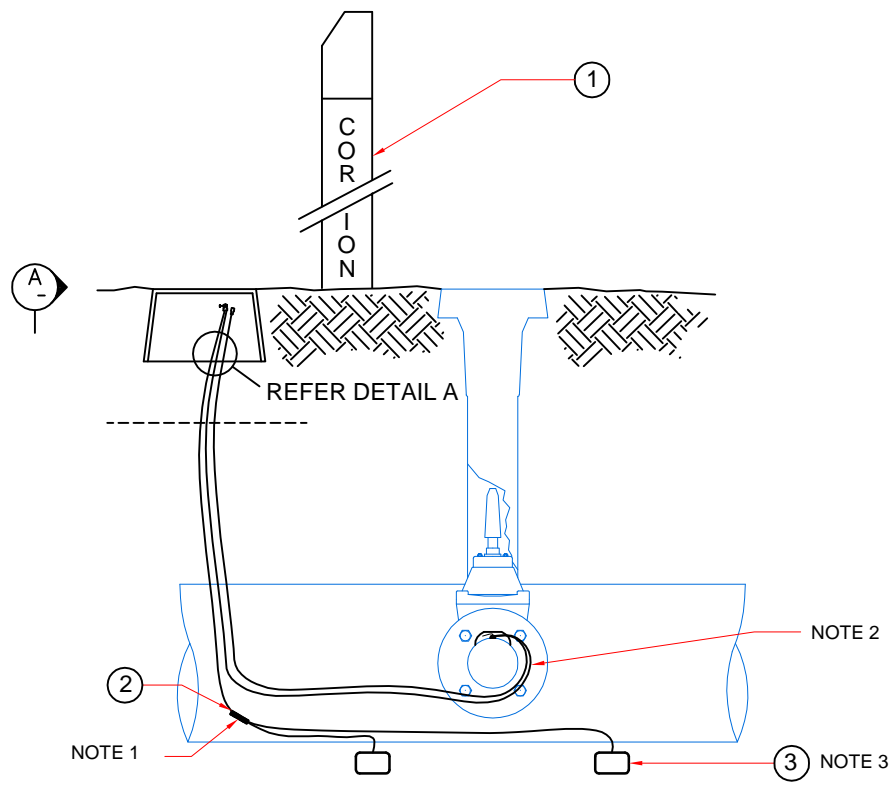
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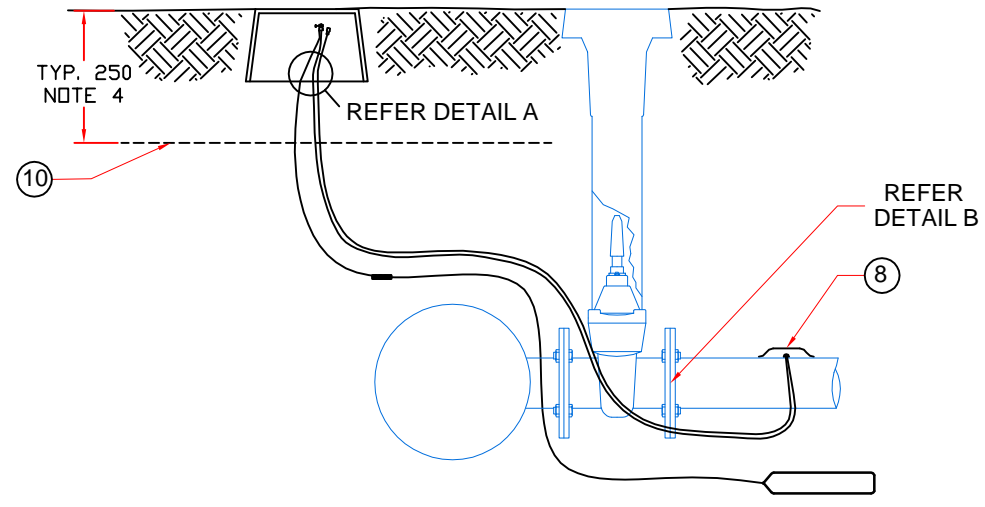
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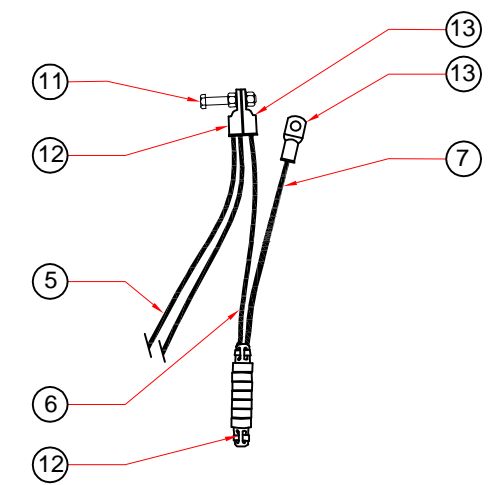
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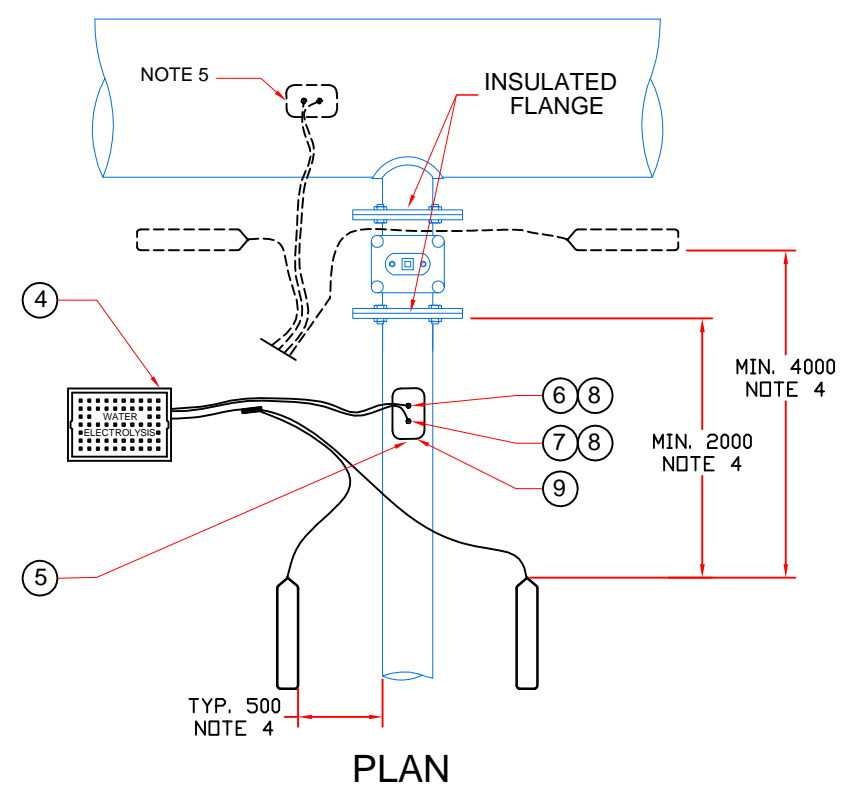
**SIDE ELEVATION**



**SECTION A**

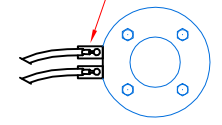


**DETAIL A**



**PLAN**

CABLE ENDS CAD WELDED TO 25 x 50 x 6 MILD STEEL TAB, WELDED TO PIPE FLANGE & SEALED



**DETAIL B**  
ALTERNATE CABLE TO PIPE CONNECTION

ITEM No	DESCRIPTION	DETAIL
1	TEST POINT MARKER POST	TO WATER AUTHORITY REQUIREMENTS
2	COPPER CRIMP LINK	TO SUIT 16 Sqmm CABLE, SEALED WITH HEAT SHRINK SLEEVE (ACTIVATED GLUE)
3	SACRIFICIAL ANODE	TYPE AND NUMBER DEPENDANT ON DESIGN REQUIREMENTS
4	ELECTROLYSIS TEST POINT BOX (TREGEAR BOX)	C/W CAST IRON LID EMBOSSED 'WATER ELECTROLYSIS. REFER REFERENCES
5	ANODE LEADS	6 Sqmm COPPER RED PVC
6	CABLE POTENTIAL LEAD	16 Sqmm SDI RED WITH WHITE PVC SHEATH
7	CABLE CURRENT LEAD	16 Sqmm SDI RED WITH WHITE PVC SHEATH
8	CABLE PIPE CONNECTION	THERMIT (CADWELD 15 GRAM WELDING CHARGE), LEADS AT min 30MM APART
9	COATING REINSTATEMENT	BUTYL MASTIC FILLER & REPAIR PATCH TO MANUFACTURERS GUIDELINES.
10	ELECTRICAL UNDERGROUND MARKER TAPE	ORANGE - 'DANGER BURIED ELECTRIC CABLE BELOW'.
11	ANODE CABLE LUG CONNECTION	M6, 25mm STAINLESS STEEL BOLT, 2 NUTS & 2 WASHERS ADAPT ASSEMBLY TO SUIT No OF ANODES / BOND CONNECTIONS
12	CABLE IDENTIFICATION	TO WATER AUTHORITY REQUIREMENTS
13	CABLE LUG	TO SUIT 16 Sqmm CONDUCTOR, 6mm HOLE

**NOTES**

- JOIN ANODE LEADS BENEATH SURFACE IF INDIVIDUAL CABLE LENGTHS ARE INSUFFICIENT OTHERWISE JOIN WITHIN TEST BOX.
- SAG CABLE AROUND AND BELOW PIPE TO REDUCE TENSION ON CABLE PIPE CONNECTION. TAPE CABLE TO PIPE WALL USING BUTYL TAPE (DENSO 60) OR EQUIVALENT.
- PLACE ANODES AT BOTTOM OF TRENCH AGAINST WALLS OF EXCAVATION OR ADJACENT TO TOP OF PIPE IF EXCAVATION DEPTHS ARE RESTRICTIVE. PROVIDE A MINIMUM CLEARANCE OF:
  - 1 METRE SEPARATION BETWEEN OTHER METALLIC SERVICES.
  - 2 METRE SEPARATION FROM PIPE FITTING & SIGNIFICANTLY DEGRADED OR DAMAGED PIPE COATINGS.
 WHERE ANODES ARE INSTALLED ON BOTH SIDES OF AN INSULATING JOINT, PLACE ANODES 2 METRES FROM OF THE INSULATING JOINT (TOTAL SEPARATION OF 4 METRES BETWEEN ANODES).
- ALTERNATE DIMENSION TO BE APPROVED BY WATER AUTHORITY.
- WAT-1410 OR WAT-1411 TEST POINT DEPENDANT ON DESIGN REQUIREMENT.
- ALL DIMENSIONS SHOWN IN MILLIMETRES.

**REFERENCES**

- DRAWING WAT-1411 STEEL MAIN CATHODIC PROTECTION SYSTEMS FULL CONSTRUCTION TEST POINT CONNECTION
- CORR-09 ELECTROLYSIS TEST POINT REQUIREMENTS; INSTALLATION, MAINTENANCE AND ABANDONMENT
- DRAWING SCP.02.03 ELECTROLYSIS TEST POINT SURROUND
- DRAWING ES-10-5 (MW DRAWING REFERENCE) LID FOR ELECTROLYSIS TEST POINT SURROUND
- DRAWING WCP.150 (WITS DRAWING REFERENCE) LID FOR ELECTROLYSIS TEST POINT SURROUND

DESIGNED	WG	DRAWN	J.MYYRLAINEN
DESIGN CHECK	WATER INDUSTRY GROUP	DRAFT CHECK	AUG 2018
APPROVED	WG	DATE	MAY-18
REV	DESCRIPTION	DATE	APP'D
1.2	REDRAWN FROM REV 1.1 ISSUED 2004		JM

Melbourne Water  
 Yarra Valley Water  
 City West Water

MELBOURNE WATER / MELBOURNE RETAIL WATER AGENCIES  
**STEEL MAIN CATHODIC PROTECTION SYSTEMS**  
 PART CONSTRUCTION ELECTROLYSIS TEST POINT CONNECTION  
 TYPICAL FOR ISOLATED PIPE SECTIONS - NO POTENTIAL LOG REQUIREMENT

DO NOT SCALE	
SCALE:	NTS
DRAWING NUMBER	
WAT-1410-M	
SHEET	OF
11	12
REV	1.2

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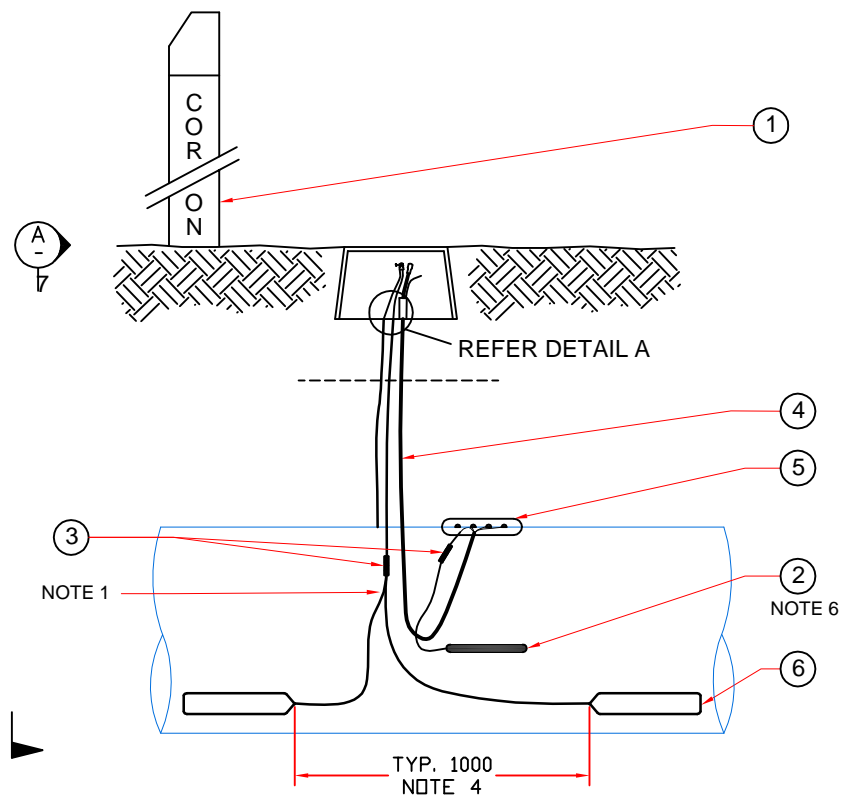
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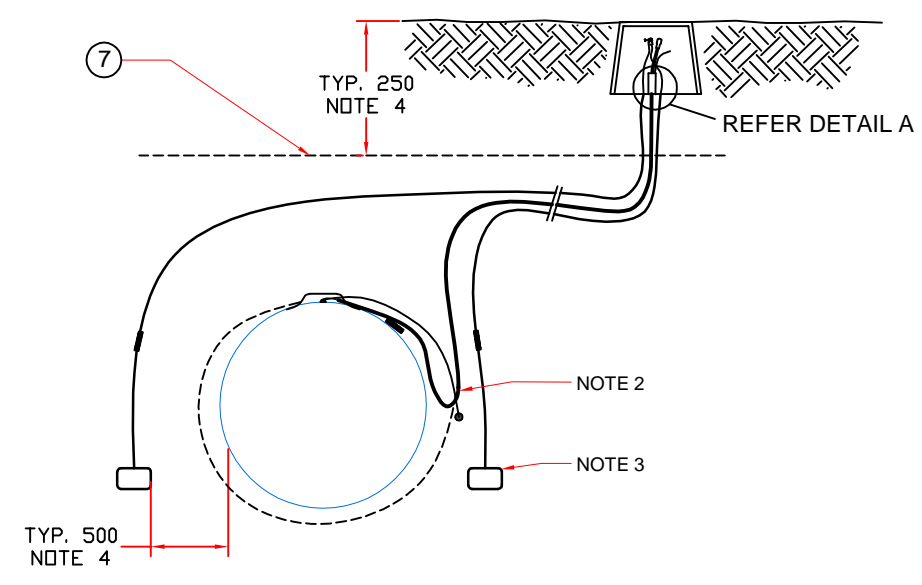
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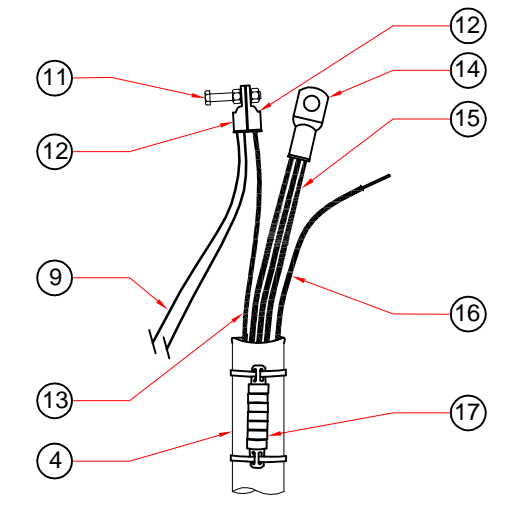
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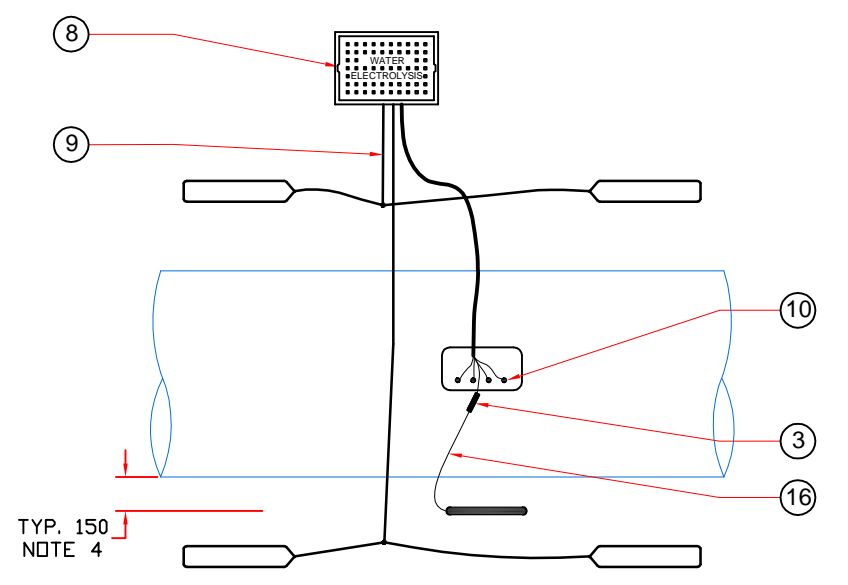
SIDE ELEVATION



SECTION A-A



DETAIL A



PLAN

ITEM No	DESCRIPTION	DETAIL
1	TEST POINT MARKER POST	TO WATER AUTHORITY REQUIREMENTS
2	MILD STEEL EARTH SPIKE	NOM. DIAMETER 38 x 450
3	COPPER CRIMP LINK	TO SUIT CABLE CROSS SECTION, SEALED WITH HEAT SHRINK SLEEVE (ACTIVATED GLUE)
4	ELECTROLYSIS TEST LEAD CABLE	ORANGE CIRCULAR - 16 Sqmm PVC COPPER 4 CORE + EARTH
5	COATING REINSTATEMENT	BUTYL MASTIC FILLER & REPAIR PATCH TO MANUFACTURERS GUIDELINES.
6	SACRIFICIAL ANODE	TYPE AND NUMBER DEPENDANT ON DESIGN REQUIREMENTS
7	ELECTRICAL UNDERGROUND MARKER TAPE	ORANGE - 'DANGER BURIED ELECTRIC CABLE BELOW'
8	ELECTROLYSIS TEST POINT BOX (TREGEAR BOX)	C/W CAST IRON LID EMBOSSED 'WATER ELECTROLYSIS'. REFER REFERENCES
9	ANODE LEADS	6 Sqmm COPPER RED PVC
10	CABLE PIPE CONNECTION	THERMIT (CADWELD 15 GRAM WELDING CHARGE), LEADS AT min 30MM APART
11	ANODE CABLE LUG CONNECTION	M6, 25mm 316 STAINLESS STEEL BOLT, 2 NUTS & 2 WASHERS ADAPT ASSEMBLY TO SUIT No OF ANODES / BOND CONNECTIONS
12	CABLE LUG	TO SUIT 16 Sqmm CONDUCTOR, 6mm HOLE
13	CABLE POTENTIAL LEAD	'RED' - SEE ITEM 4
14	CABLE LUG	TO SUIT 50 Sqmm CONDUCTOR, 10mm HOLE
15	CABLE CURRENT LEADS	'WHITE', 'BLUE', 'BLACK' - SEE ITEM 4
16	EARTH SPIKE LEAD	'GREEN/YELLOW' - SEE ITEM 4. CORE END BARED 50mm & TINNED WITHIN TEST POINT BOX
17	CABLE IDENTIFICATION	TO WATER AUTHORITY REQUIREMENTS

NOTES

- JOIN ANODE LEADS BENEATH SURFACE IF INDIVIDUAL CABLE LENGTHS ARE INSUFFICIENT OTHERWISE JOIN WITHIN TEST BOX.
- SAG CABLE TO REDUCE TENSION ON CABLE PIPE CONNECTION. PREFERABLY, IF THE PIPE IS FULLY EXPOSED RUN CABLE AROUND AND BELOW THE PIPE. TAPE CABLE TO PIPE WALL USING BUTYL TAPE (DENSO 60) OR EQUIVALENT.
- PLACE ANODES AT BOTTOM OF TRENCH AGAINST WALLS OF EXCAVATION OR ADJACENT TO TOP OF PIPE IF EXCAVATION DEPTHS ARE RESTRICTIVE. PROVIDE A MINIMUM CLEARANCE OF:
  - 1 METRE SEPARATION BETWEEN OTHER METALLIC SERVICES.
  - 3 METRE SEPARATION FROM EARTH SPIKE.
  - 2 METRE SEPARATION FROM PIPE FITTING & SIGNIFICANTLY DEGRADED OR DAMAGED PIPE COATINGS.
 WHERE ANODES ARE INSTALLED ON BOTH SIDES OF AN INSULATING JOINT, PLACE ANODES 2 METRES FROM OF THE INSULATING JOINT (TOTAL SEPARATION OF 4 METRES BETWEEN ANODES).
- ALTERNATE DIMENSION TO BE APPROVED BY WATER AUTHORITY.
- FOR A TEST POINT CONFIGURATION WITHOUT ANODES, EXCLUDE ITEMS 6, 9 AND 11.
- ENSURE 3 METRE CLEARANCE FROM ANODES.
- ALL DIMENSIONS SHOWN IN MILLIMETRES.

REFERENCES

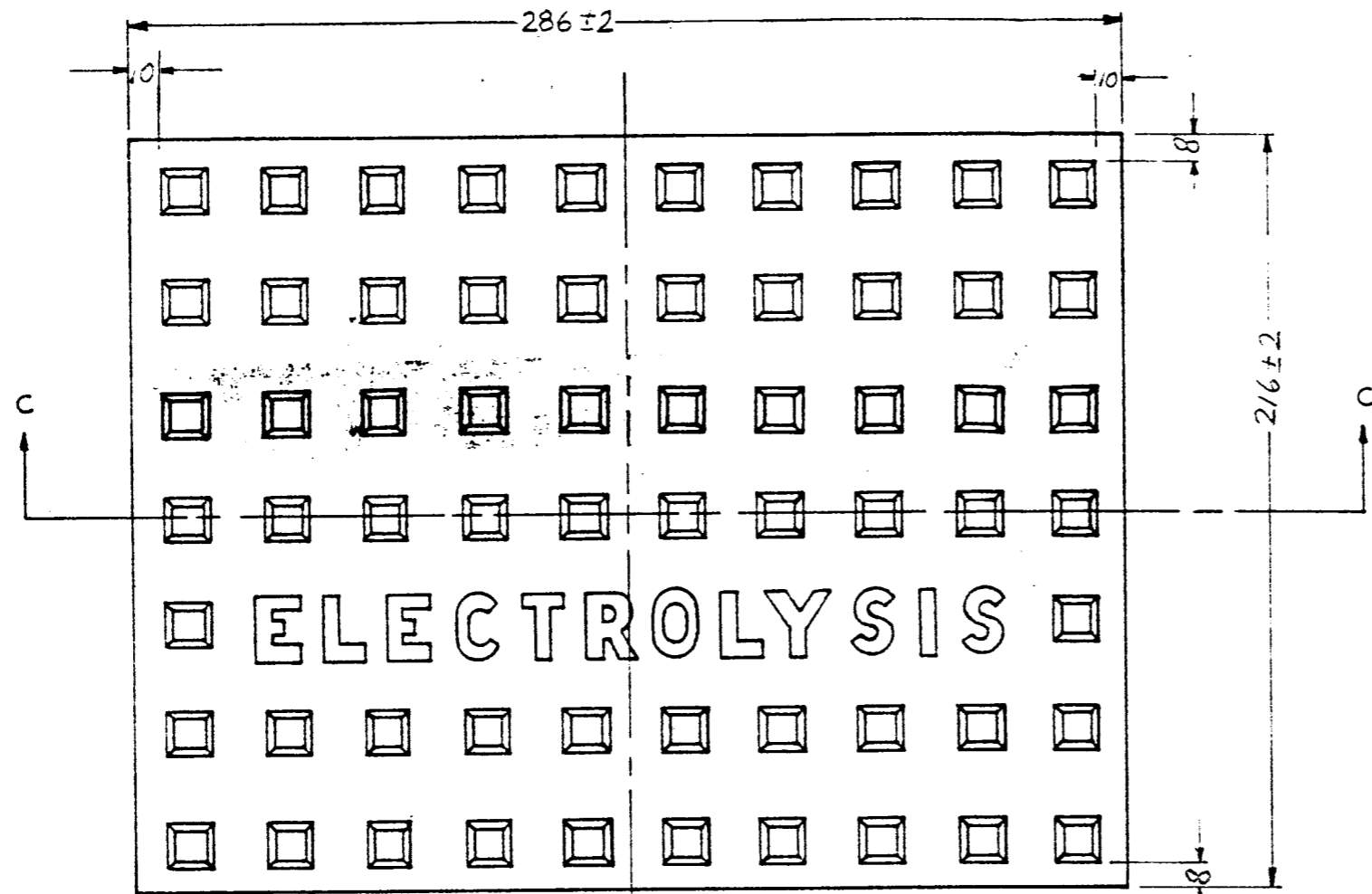
- DRAWING WAT-1410 STEEL MAIN CATHODIC PROTECTION SYSTEMS PART CONSTRUCTION TEST POINT CONNECTION
- CORR-09 ELECTROLYSIS TEST POINT REQUIREMENTS: INSTALLATION, MAINTENANCE AND ABANDONMENT
- DRAWING SCP.02.03 ELECTROLYSIS TEST POINT SURROUND
- DRAWING ES-10-5 (MW DRAWING REFERENCE) LID FOR ELECTROLYSIS TEST POINT SURROUND
- DRAWING WCP.150 (WITS DRAWING REFERENCE) LID FOR ELECTROLYSIS TEST POINT SURROUND

DESIGNED	WG	DRAWN	J.MYYRLAINEN
DESIGN CHECK	WATER INDUSTRY GROUP	DRAFT CHECK	AUG 2018
APPROVED	WG	DATE	MAY-18
REV	DESCRIPTION	DATE	APP'D
1.2	REDRAWN FROM REV 1.1 ISSUED 2004		JM



MELBOURNE WATER / MELBOURNE RETAIL WATER AGENCIES  
 STEEL MAIN CATHODIC PROTECTION SYSTEMS  
 FULL CONSTRUCTION ELECTROLYSIS TEST POINT CONNECTION

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DRAWING NUMBER	
WAT-1411-M	
SHEET	OF
11	12
REV	1.2

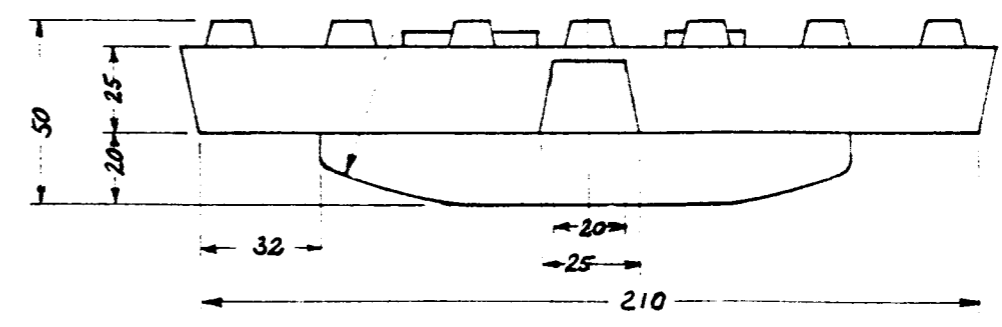
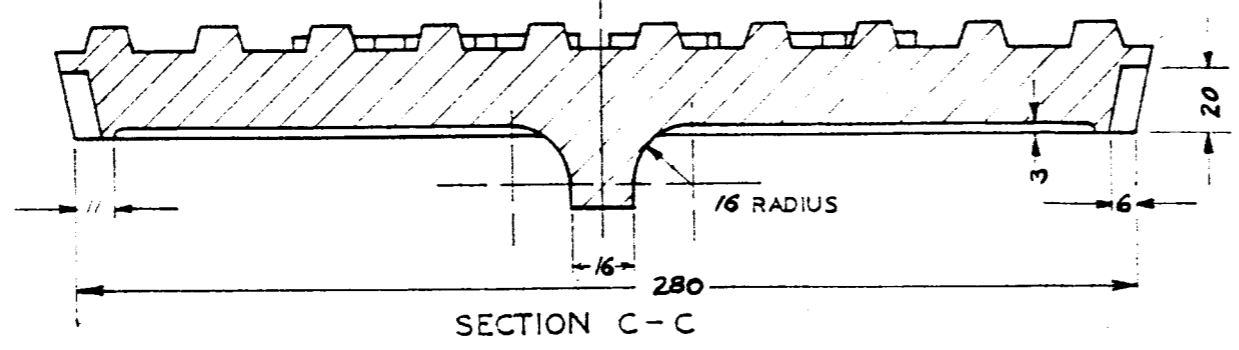


LETTERS TO BE 20 HIGH.

RAISED SQUARES TO BE 12 SQ. AT BASE  
9 SQ. AT TOP  
AND 6 HIGH.

- NOTE:**
1. ALL DIMENSIONS ARE IN MILLIMETRES.
  2. ALL DIMENSIONS ARE NOMINAL EXCEPT WHERE INDICATED WITH A TOLERANCE.
  3. FOR DETAIL OF ELECTROLYSIS TEST POINT SURROUND SEE DRG NO WCP.102

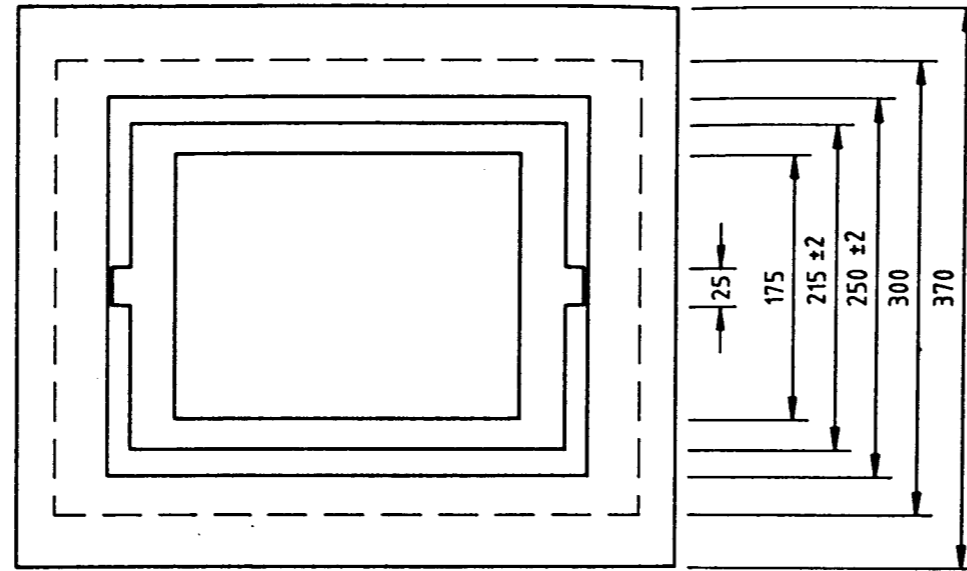
**MATERIAL:** CAST IRON



				DESIGNED
			ELEC. SERV. ENGR.	DRAWN <i>J.R.</i> TRACED <i>V.R.</i>
				CHECKED <i>D.WHIGHT</i> 30.6.73
				EXAMINED
				APPROVED
MARKING ALTERED				
ASSIGNED NEW DRAWING NUMBER		4/18/98	<i>BSF</i>	
REF.	REVISION	DATE	APP'D.	CHIEF M. & E. ENGR.

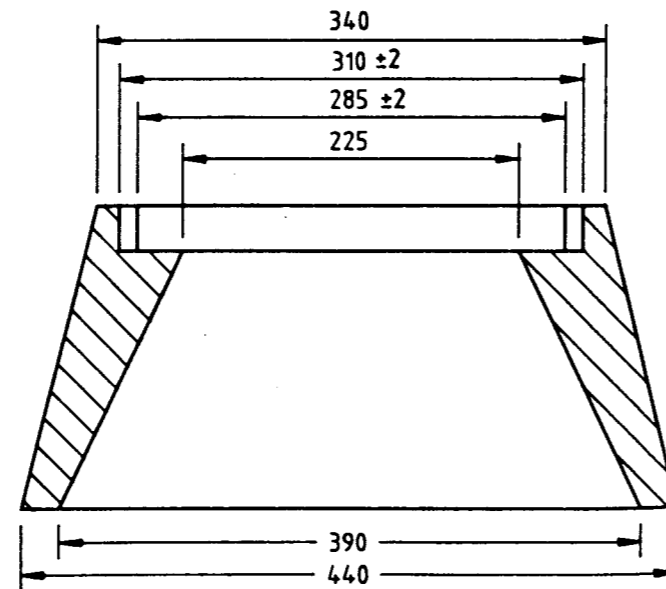
WATER INDUSTRY TECHNICAL STANDARDS - WATER SUPPLY DRAWING  
**LID FOR ELECTROLYSIS TEST POINT SURROUND**

SCALE 1/2 FULL SIZE
DRAWING No. <b>WCP.150</b>
SHEET No. 1 ISSUE <b>A3</b>







**NOTES**

1. All dimensions are in millimeters.
2. Tolerance on dimensions  $\pm 5$ mm unless specified otherwise.
3. Mass 8.5 Kg approx.
4. Product to be manufactured as per the relevant Melbourne Water Specification.
5. Refer Melbourne Water's Products Catalogue for further product details.
6. Colour : GREY



WCP.203

NOT TO SCALE

Janine Bruehwiler DRAWN	 MANAGER, RESEARCH & DEVELOPMENT					PRODUCED BY RESEARCH AND DEVELOPMENT SECTION	STANDARD DRAWING RECYCLED PLASTIC ELECTROLYSIS TEST POINT SURROUND	 MELBOURNE WATER	REF. FILE NUMBER	REV.
									527/101/0033	
 DRAWING CHECK	 MANAGER DEVELOPMENT DIVISION SOUTH EAST REGION								DRAWING NUMBER	
		REV.	DESCRIPTION	APP'D	DATE				SCP.02.03	