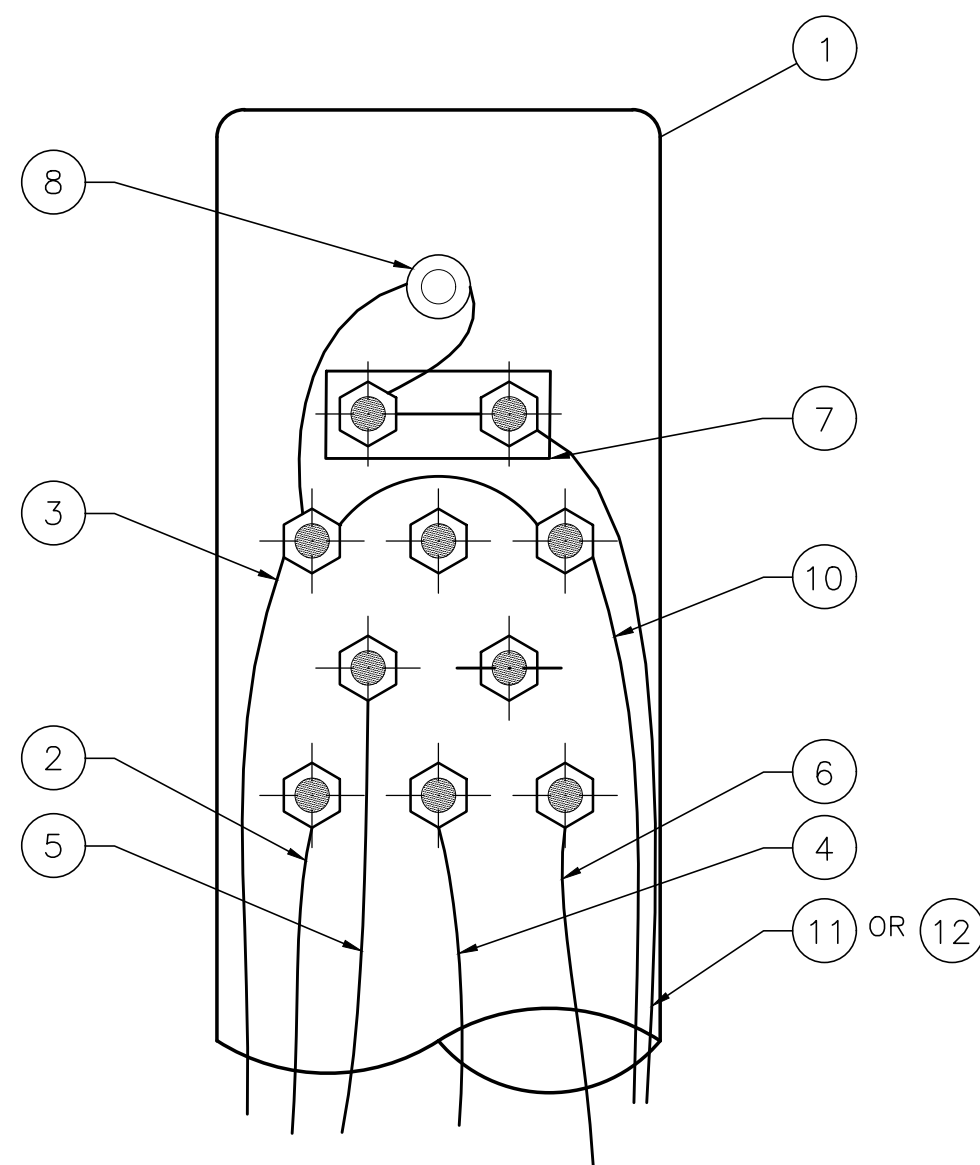
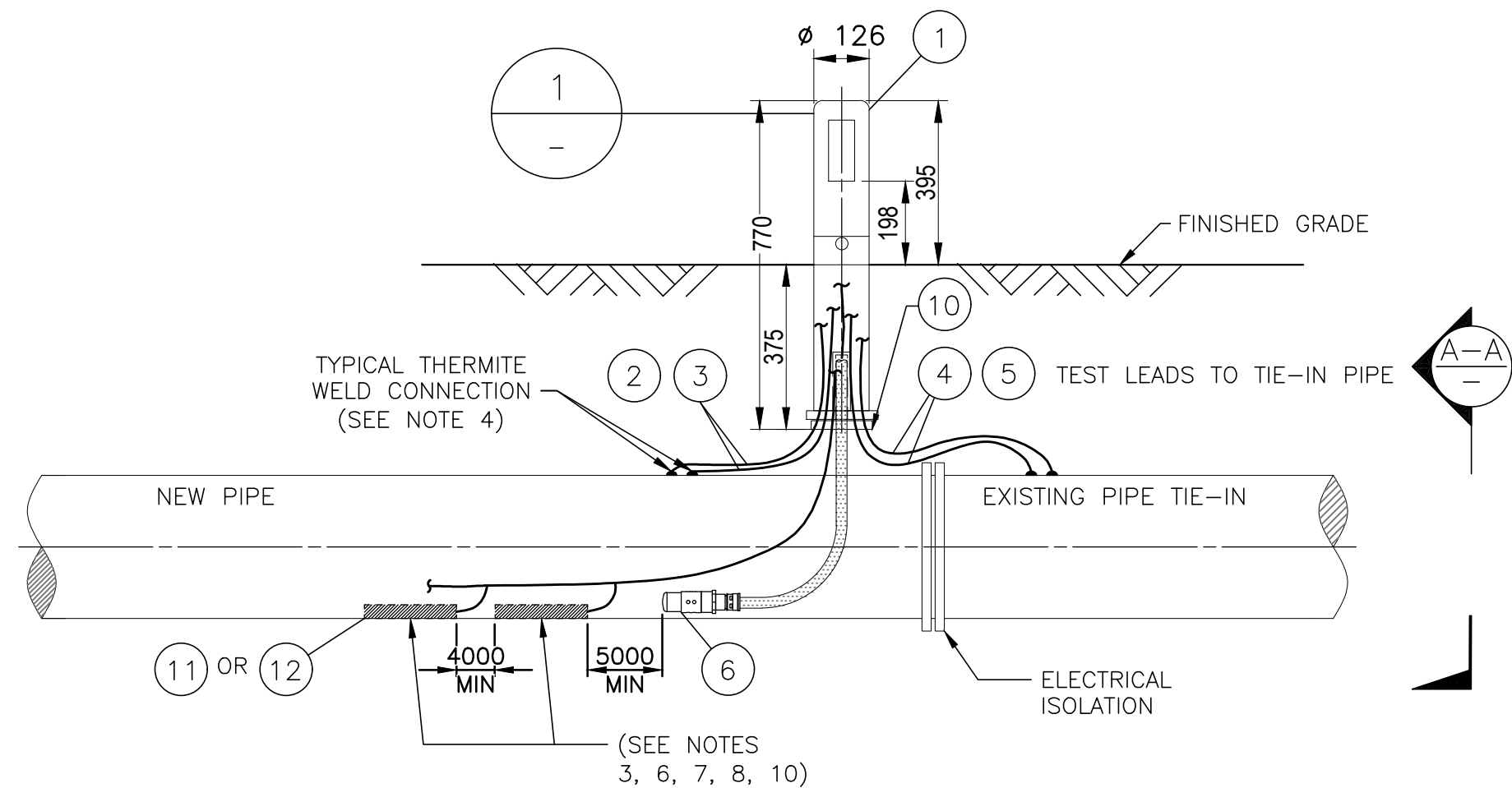


**DRAWING INDEX: CATHODIC PROTECTION INSTALLATION DETAILS**

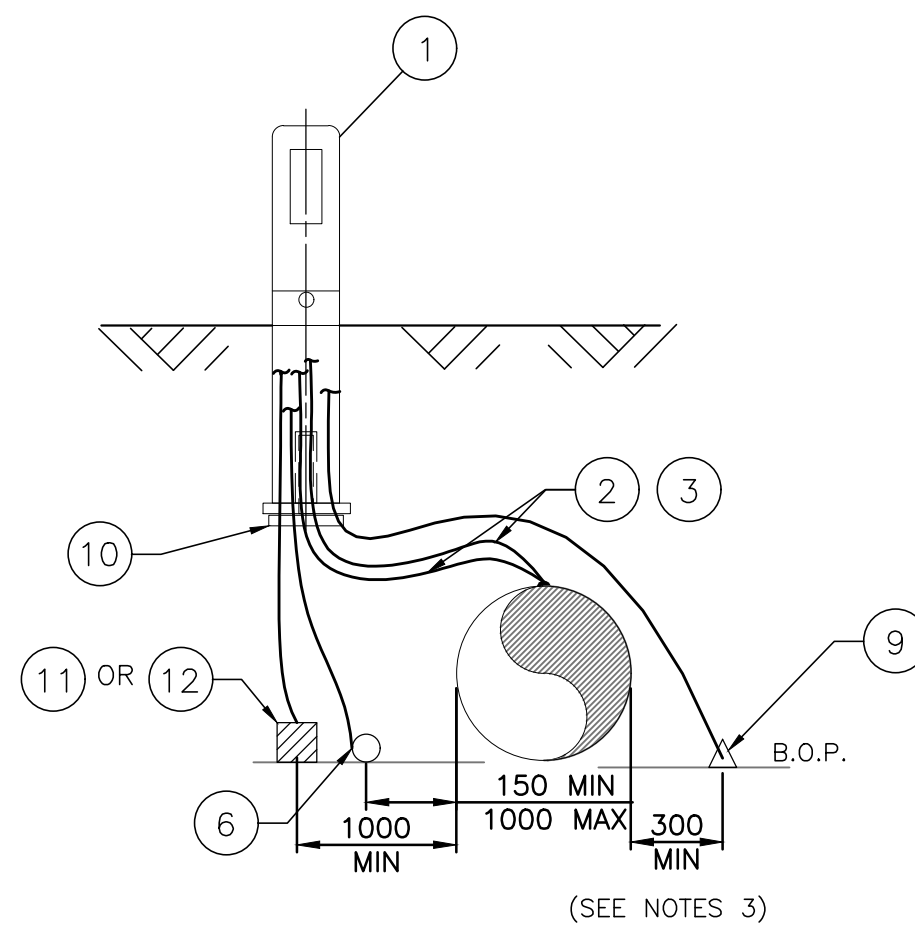
DRAWING NO.	REVISION	DRAWING TITLE
2001979.156	-	ISOLATION / BONDING TEST STATION INSTALLATION DETAILS
2001979.157	-	CASED CROSSING TEST STATION INSTALLATION DETAILS
2001979.158	-	STANDARD MONITORING TEST STATION INSTALLATION DETAIL
2001979.159	-	INTERFERENCE / FOREIGN CROSSING TEST STATION INSTALLATION DETAILS



DETAIL 1  
TERMINAL DETAIL TEST STATION HEAD  
N.T.S.



DETAIL 2  
N.T.S.



SECTION A-A  
END VIEW N.T.S.

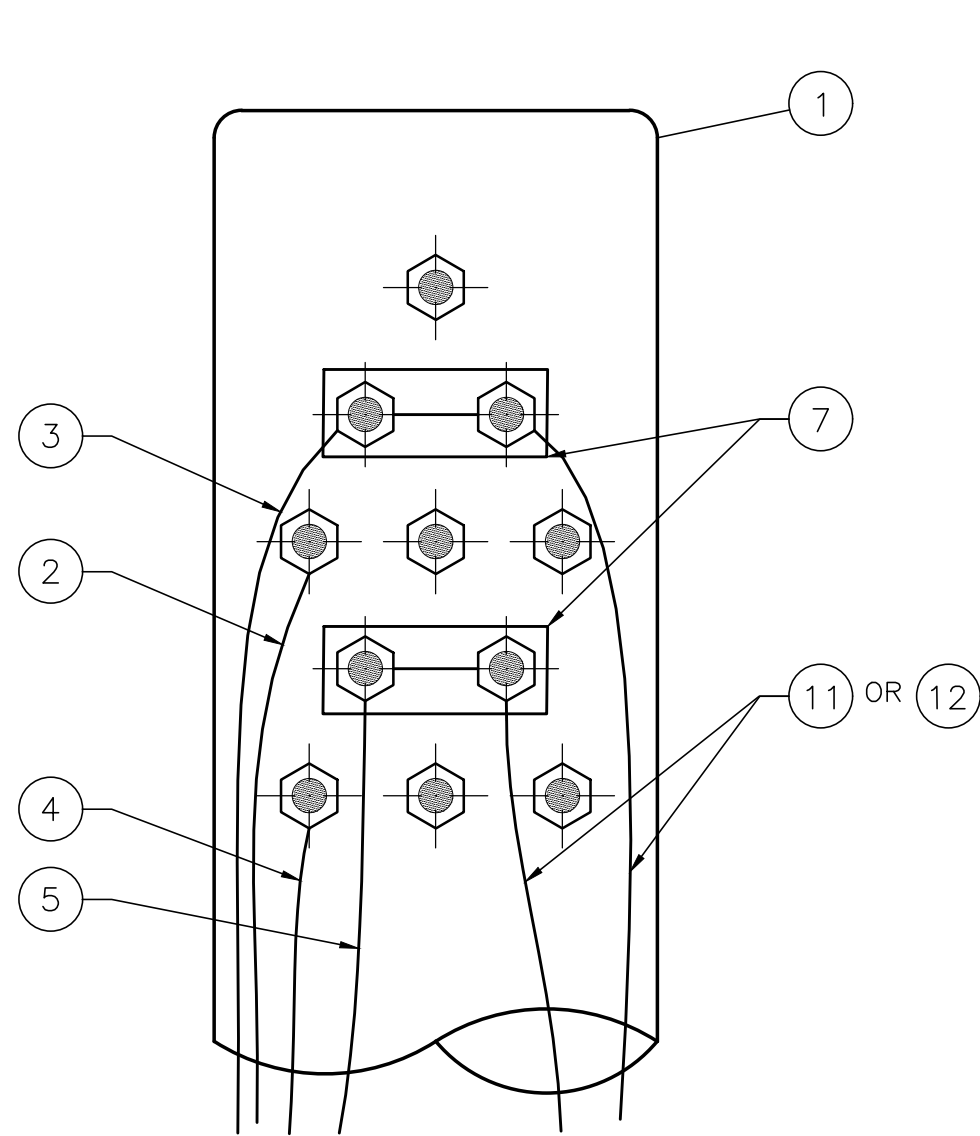
MATERIAL LIST	
ITEM #	DESCRIPTION
1	TEST STATION, 770mm X 126mm DIAMETER U.V. RESISTANT PLASTIC, 7 CONNECTION TERMINAL BOARD & CABLE LUGS, EPOXY
2	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #10 AWG (6mm <sup>2</sup> ), COLOUR: BLACK, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
3	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #8 AWG (10mm <sup>2</sup> ), COLOUR: BLACK, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
4	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #10 AWG (6mm <sup>2</sup> ), COLOUR: WHITE, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
5	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #8 AWG (10mm <sup>2</sup> ), COLOUR: WHITE, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
6	REFERENCE ELECTRODE, PREPACKAGED, MINIMUM 30 YR LIFE, 15m (50ft) MIN #14 AWG (2.5mm <sup>2</sup> ), XLPE (OR APPROVED EQUIVALENT)
7	SHUNT, 0.1ohm, RED (FOR USE WITH ITEMS 11 AND 12)
8	NORMALLY CLOSED PUSH BUTTON SWITCH (FOR USE WITH ITEMS 11 AND 12), USE MINIMUM #16 AWG (1.5mm <sup>2</sup> ) FOR TERMINAL WIRE CONNECTIONS
9	OPTIONAL: AC COUPON, AREA 1cm <sup>2</sup> , NOMINAL 20ml COATING THICKNESS, MINIMUM 10m #12 AWG (4mm <sup>2</sup> ), 7 STRAND, COPPER CABLE FOR DIRECT BURIAL, c/w 3 WATT 10ohm RESISTOR
10	OPTIONAL: CORROSION COUPON, ROHRBAK COSASCO SYSTEMS SMART TEST STATION ER PROBE, FOOT ONLY
11	OPTIONAL: ANODE, MAGNESIUM, HIGH POTENTIAL PER AS2239, SECTION 4.2 (DESIGN) c/w BACKFILL OF NOMINAL GYPSUM, BENTONITE, SODIUM SULPHATE COMPOSITION PACKAGED IN A WATER PERMEABLE MEMBRANE, 5m #10 AWG (6mm <sup>2</sup> ) COPPER WIRE, BLUE
12	OPTIONAL: ANODE, ZINC, PER AS2239, SECTION 4.2 (DESIGN) c/w BACKFILL OF NOMINAL GYPSUM, BENTONITE, SODIUM SULPHATE COMPOSITION PACKAGED IN A WATER PERMEABLE MEMBRANE, 5m #10 AWG (6mm <sup>2</sup> ) COPPER WIRE, WHITE

#### GENERAL NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE SPECIFIED.
- FOR TEST STATIONS SEE CONSTRUCTION LAYOUT DRAWINGS.
- PREPACKAGED ANODE AND REFERENCE ELECTRODE SHALL BE PRESOAKED IN CLEAN FRESH WATER A MINIMUM OF 20 MINUTES BEFORE INSTALLATION. ONCE INSTALLED, COVER THE ANODE AND REFERENCE ELECTRODE WITH 150mm TO 200mm OF SELECT BACKFILL AND SOAK BACKFILL TO ACTIVATE PRIOR TO SAND INSTALLATION.
- REQUIREMENTS FOR CONNECTING CABLES TO PIPELINE ARE DETAILED IN THE LATEST VERSION OF DRAWING 2001979.091.
- TERMINATE WIRES FROM PIPELINE, ANODES AND REFERENCE ELECTRODE IN THE TEST STATION AS SHOWN IN DETAIL 1.
- GALVANIC ANODES ARE TO BE PLACED A MINIMUM OF 5m FROM THE NEAREST REFERENCE ELECTRODE COUPON OR ER PROBE AND A MINIMUM OF 1m FROM THE PIPELINE.
- FOR MULTIPLE ANODES, LONGER ANODE LEADS ARE REQUIRED FOR EACH SUBSEQUENT ANODE. EACH GALVANIC ANODE LEAD IS TO BE TERMINATED DIRECTLY IN THE TEST STATION.
- ANODES ARE TO BE SPACED A MINIMUM OF 4m APART.
- AC COUPON TO BE INSTALLED ON OPPOSITE SIDE OF PIPE FROM REFERENCE ELECTRODE WITH MINIMUM UPSTREAM/DOWNSTREAM SEPARATION DISTANCE OF 1m. AC COUPON NOT SHOWN IN DETAIL 2 FOR CLARITY.
- NO CABLE SPLICES PERMITTED.
- ALL WIRING TO BE APPROPRIATELY LABELLED INCLUDING PIPE SIZE, STRUCTURE NAME AND OWNER.
- ALL TEST LEADS MUST BE A MINIMUM OF 610mm BELOW GRADE ON HORIZONTAL CABLE RUNS.

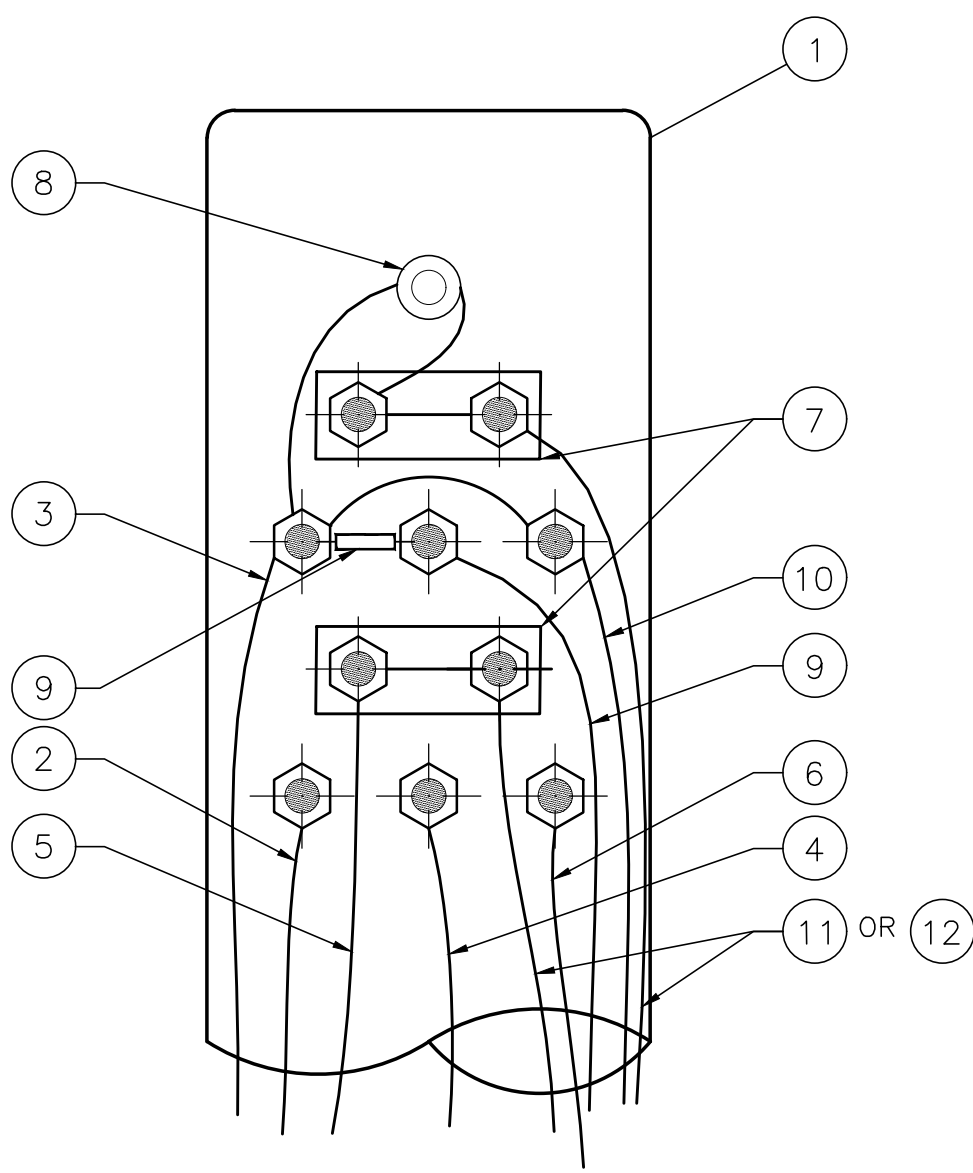
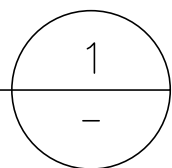
#### INSTALLATION OF MONITORING EQUIPMENT

						DESIGNED			S. DANKS	 <b>Watercare</b> <small>COPYRIGHT - This drawing, the design concept, remain the exclusive property of Watercare Services Limited and may not be used without approval. Copyright reserved.</small>	WATER RETICULATION CATHODIC PROTECTION AND AC MITIGATION TEST STATION ISOLATION / BONDING TEST STATION INSTALLATION DETAILS	CAD FILE 2001979.156		DATE 25-08-25		
						DES. CHECKED						ORIGINAL SCALE A3 N.T.S.		CONTRACT No.		
						DRAWN						REF No.		ISSUE		
						DWG. CHECKED	C.MECKLER	08-25				DWG No. 2001979.156		-		
						WSL PRINCIPAL ENG.	W.STRYDOM	08-25	T.SCHEIRLINCK							
-	08-25	FIRST ISSUE		C.M	W.S			STRATEGY AND PLANING: HEAD OF WATER								
ISSUE	DATE	AMENDMENT		BY	APPD.											



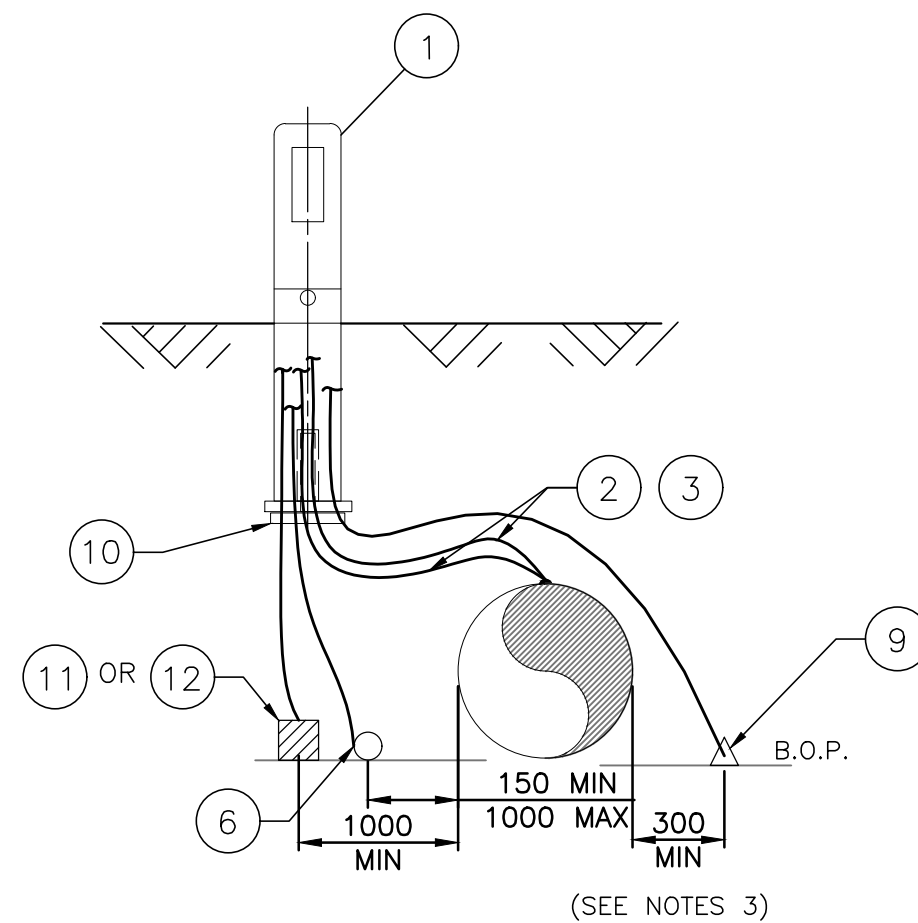
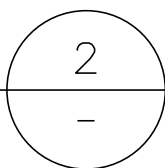
DETAIL

TERMINAL DETAIL TEST STN HEAD W/O COUPON  
N.T.S.



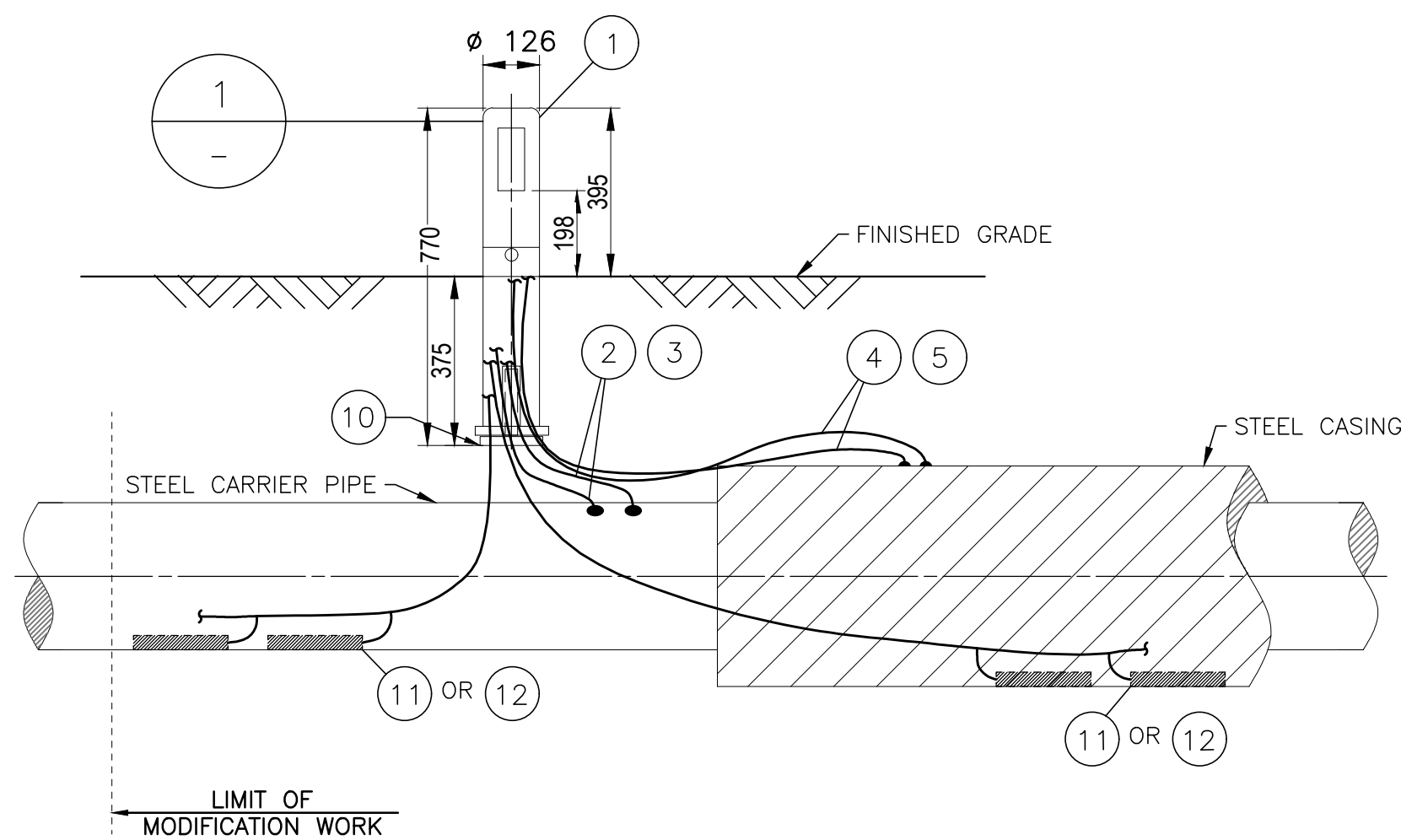
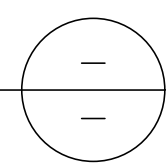
DETAIL

TERMINAL DETAIL TEST STN HEAD WITH COUPON  
N.T.S.



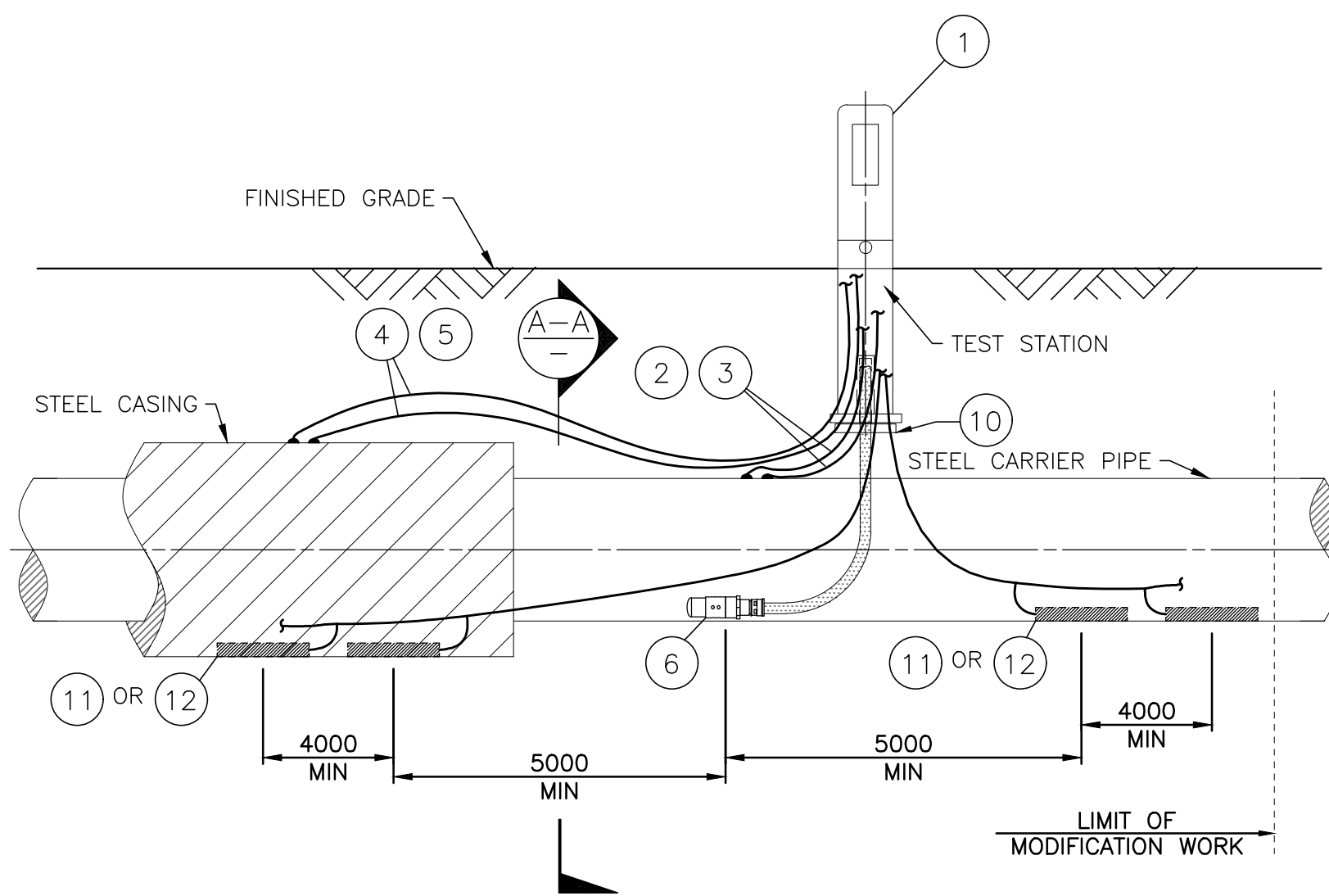
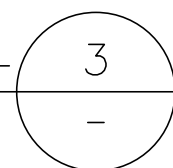
SECTION A-A

END VIEW N.T.S.



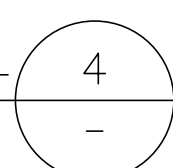
DETAIL

N.T.S.



DETAIL


N.T.S.



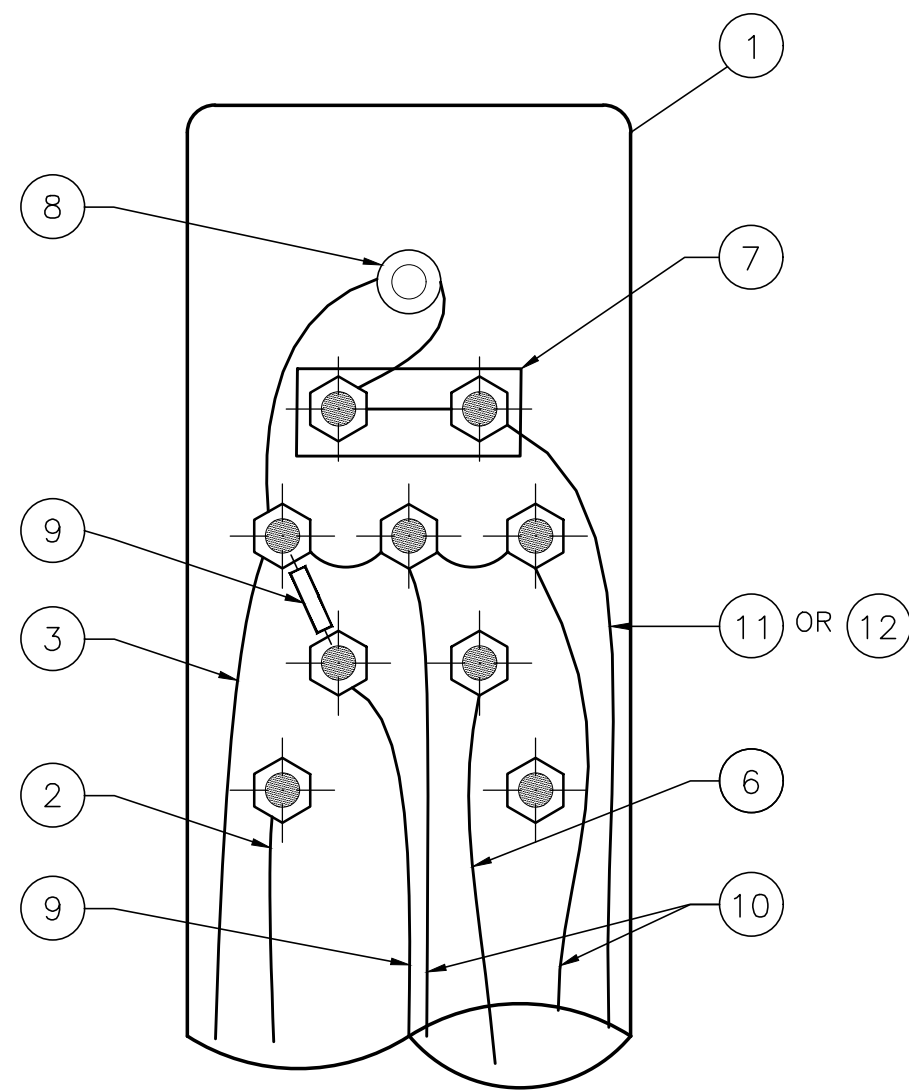
MATERIAL LIST	
ITEM #	DESCRIPTION
1	TEST STATION, 770mm X 126mm DIAMETER U.V. RESISTANT PLASTIC, 7 CONNECTION TERMINAL BOARD & CABLE LUGS, ECOPILLAR EP0
2	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #10 AWG (6mm²), COLOUR: BLACK, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
3	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #8 AWG (10mm²), COLOUR: BLACK, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
4	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #10 AWG (6mm²), COLOUR: GREEN, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
5	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #8 AWG (10mm²), COLOUR: GREEN, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
6	REFERENCE ELECTRODE, PREPACKAGED, MINIMUM 30 YR LIFE, 15m (50ft) MIN #14 AWG (2.5mm²), XLPE (OR APPROVED EQUIVALENT)
7	SHUNT, 0.1ohm, RED (FOR USE WITH ITEMS 11 AND 12)
8	NORMALLY CLOSED PUSH BUTTON SWITCH (FOR USE WITH ITEMS 11 AND 12), USE MINIMUM #16 AWG (1.5mm²) FOR TERMINAL WIRE CONNECTIONS
9	OPTIONAL: AC COUPON, AREA 1cm², NOMINAL 20mil COATING THICKNESS, MINIMUM 10m #12 AWG (4mm²), 7 STRAND, COPPER CABLE FOR DIRECT BURIAL, c/w 3 WATT 10ohm RESISTOR
10	OPTIONAL: CORROSION COUPON, ROHRBAK COSASCO SYSTEMS SMART TEST STATION ER PROBE, FOOT ONLY
11	OPTIONAL: ANODE, MAGNESIUM, HIGH POTENTIAL PER AS2239, SECTION 4.2 (DESIGN) c/w BACKFILL OF NOMINAL GYPSUM, BENTONITE, SODIUM SULPHATE COMPOSITION PACKAGED IN A WATER PERMEABLE MEMBRANE, 5m #10 AWG (6mm²) COPPER WIRE, BLUE
12	OPTIONAL: ANODE, ZINC, PER AS2239, SECTION 4.2 (DESIGN) c/w BACKFILL OF NOMINAL GYPSUM, BENTONITE, SODIUM SULPHATE COMPOSITION PACKAGED IN A WATER PERMEABLE MEMBRANE, 5m #10 AWG (6mm²) COPPER WIRE, WHITE

GENERAL NOTES:

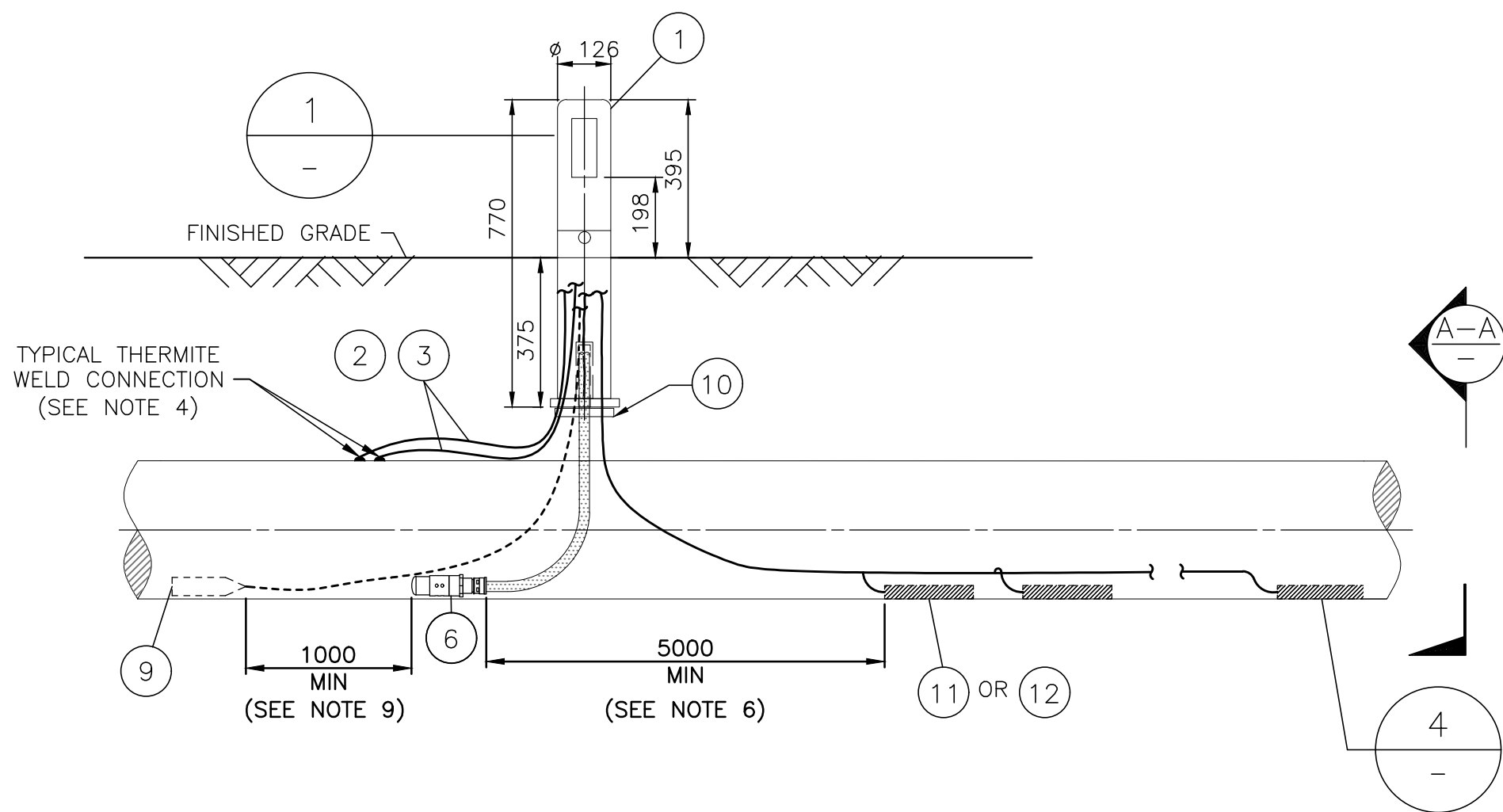
- ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE SPECIFIED.
- FOR TEST STATIONS SEE CONSTRUCTION LAYOUT DRAWINGS.
- PREPACKAGED ANODE AND REFERENCE ELECTRODE SHALL BE PRESOAKED IN CLEAN FRESH WATER A MINIMUM OF 20 MINUTES BEFORE INSTALLATION. ONCE INSTALLED, COVER THE ANODE AND REFERENCE ELECTRODE WITH 150mm TO 200mm OF SELECT BACKFILL AND SOAK BACKFILL TO ACTIVATE PRIOR TO SAND INSTALLATION.
- REQUIREMENTS FOR CONNECTING CABLES TO PIPELINE ARE DETAILED IN THE LATEST VERSION OF DRAWING 2001979.091.
- TERMINATE WIRES FROM PIPELINE, ANODES AND REFERENCE ELECTRODE IN THE TEST STATION AS SHOWN IN DETAILS 1 AND 2.
- GALVANIC ANODES ARE TO BE PLACED A MINIMUM OF 5m FROM THE NEAREST REFERENCE ELECTRODE COUPON OR ER PROBE AND A MINIMUM OF 1m FROM THE PIPELINE.
- FOR MULTIPLE ANODES, LONGER ANODE LEADS ARE REQUIRED FOR EACH SUBSEQUENT ANODE. EACH GALVANIC ANODE LEAD IS TO BE TERMINATED DIRECTLY IN THE TEST STATION.
- ANODES ARE TO BE SPACED A MINIMUM OF 4m APART.
- AC COUPON TO BE INSTALLED ON OPPOSITE SIDE OF PIPE FROM REFERENCE ELECTRODE WITH MINIMUM UPSTREAM/DOWNSTREAM SEPARATION DISTANCE OF 1m. AC COUPON NOT SHOWN IN DETAIL 4 FOR CLARITY.
- NO CABLE SPLICES PERMITTED.
- ALL WIRING TO BE APPROPRIATELY LABELLED INCLUDING PIPE SIZE, STRUCTURE NAME AND OWNER.
- ALL TEST LEADS MUST BE A MINIMUM OF 610mm BELOW GRADE ON HORIZONTAL CABLE RUNS.

							DESIGNED			S. DANKS	 <b>Watercare</b>	WATER RETICULATION CATHODIC PROTECTION INSTALLATION DETAILS CASED CROSSING TEST STATION INSTALLATION DETAILS	CAD FILE 2001979.157		DATE 25-08-25	
							DES. CHECKED						ORIGINAL SCALE A3		CONTRACT No.	
							DRAWN			N.T.S.						
							DWG. CHECKED	C.MECKLER	08-25	OPERATIONS: HEAD OF WATER			REF No.		ISSUE	
							WSL PRINCIPAL ENG.	W.STRYDOM	08-25	T.SCHEIRLINCK			DWG No.		2001979 .157	
										STRATEGY AND PLANING: HEAD OF WATER					—	
—	08-25	FIRST ISSUE			C.M	W.S										
ISSUE	DATE	AMENDMENT			BY	APPD.										

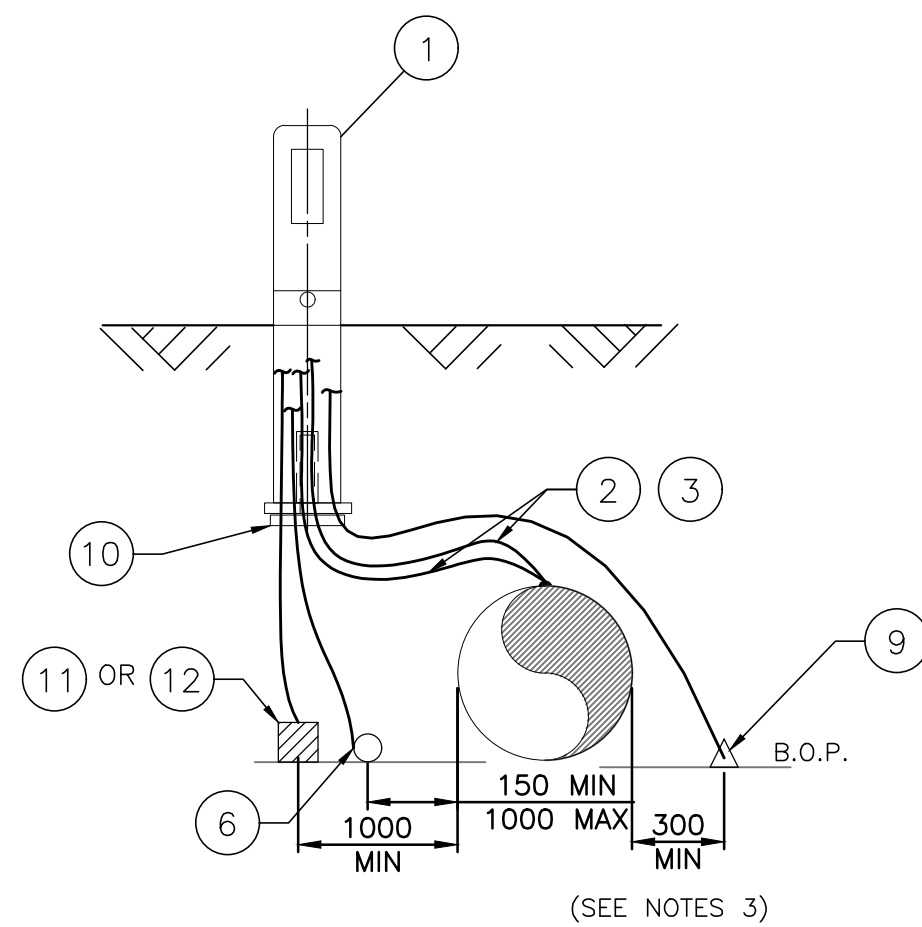




DETAIL 1  
TEST STATION HEAD  
N.T.S.



DETAIL 2  
INSTALLATION OF REFERENCE ELECTRODE AND GALVANIC ANODE  
N.T.S.



SECTION A-A  
END VIEW N.T.S.

MATERIAL LIST	
ITEM #	DESCRIPTION
1	TEST STATION, 770mm X 126mm DIAMETER U.V. RESISTANT PLASTIC, 7 CONNECTION TERMINAL BOARD & CABLE LUGS, ECOPILLAR EP0
2	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #10 AWG (6mm²), COLOUR: BLACK, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
3	CABLE, CATHODIC PROTECTION, CONDUCTOR SIZE: #8 AWG (10mm²), COLOUR: BLACK, XLPE, 1 CONDUCTOR, 7 STRAND, COPPER CABLE
4	NOT USED
5	NOT USED
6	REFERENCE ELECTRODE, PREPACKAGED, MINIMUM 30 YR LIFE, 15m (50ft) MIN #14 AWG (2.5mm²), XLPE (OR APPROVED EQUIVALENT)
7	SHUNT, 0.1ohm, RED (FOR USE WITH ITEMS 11 AND 12)
8	NORMALLY CLOSED PUSH BUTTON SWITCH (FOR USE WITH ITEMS 11 AND 12), USE MINIMUM #16 AWG (1.5mm²) FOR TERMINAL WIRE CONNECTIONS
9	OPTIONAL: AC COUPON, AREA 1cm², NOMINAL 20mil COATING THICKNESS, MINIMUM 10m #12 AWG (4mm²), 7 STRAND, COPPER CABLE FOR DIRECT BURIAL, c/w 3 WATT 10ohm RESISTOR
10	OPTIONAL: CORROSION COUPON, ROHRBAK COSASCO SYSTEMS SMART TEST STATION ER PROBE, FOOT ONLY
11	OPTIONAL: ANODE, MAGNESIUM, HIGH POTENTIAL PER AS2239, SECTION 4.2 (DESIGN) c/w BACKFILL OF NOMINAL GYPSUM, BENTONITE, SODIUM SULPHATE COMPOSITION PACKAGED IN A WATER PERMEABLE MEMBRANE, 5m #10 AWG (6mm²) COPPER WIRE, BLUE
12	OPTIONAL: ANODE, ZINC, PER AS2239, SECTION 4.2 (DESIGN) c/w BACKFILL OF NOMINAL GYPSUM, BENTONITE, SODIUM SULPHATE COMPOSITION PACKAGED IN A WATER PERMEABLE MEMBRANE, 5m #10 AWG (6mm²) COPPER WIRE, WHITE

GENERAL NOTES:


- ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE SPECIFIED.
- FOR TEST STATIONS SEE CONSTRUCTION LAYOUT DRAWINGS.
- PREPACKAGED ANODE AND REFERENCE ELECTRODE SHALL BE PRESOAKED IN CLEAN FRESH WATER A MINIMUM OF 20 MINUTES BEFORE INSTALLATION. ONCE INSTALLED, COVER THE ANODE AND REFERENCE ELECTRODE WITH 150mm TO 200mm OF SELECT BACKFILL AND SOAK BACKFILL TO ACTIVATE PRIOR TO SAND INSTALLATION.
- REQUIREMENTS FOR CONNECTING CABLES TO PIPELINE ARE DETAILED IN THE LATEST VERSION OF DRAWING 2001979.091.
- TERMINATE WIRES FROM PIPELINE, ANODES AND REFERENCE ELECTRODE IN THE TEST STATION AS SHOWN IN DETAIL 1.
- GALVANIC ANODES ARE TO BE PLACED A MINIMUM OF 5m FROM THE NEAREST REFERENCE ELECTRODE COUPON OR ER PROBE AND A MINIMUM OF 1m FROM THE PIPELINE.
- FOR MULTIPLE ANODES, LONGER ANODE LEADS ARE REQUIRED FOR EACH SUBSEQUENT ANODE. EACH GALVANIC ANODE LEAD IS TO BE TERMINATED DIRECTLY IN THE TEST STATION.
- ANODES ARE TO BE SPACED A MINIMUM OF 4m APART.
- AC COUPON TO BE INSTALLED ON OPPOSITE SIDE OF PIPE FROM REFERENCE ELECTRODE WITH MINIMUM UPSTREAM/DOWNSTREAM SEPARATION DISTANCE OF 1m.
- NO CABLE SPLICES PERMITTED.
- ALL WIRING TO BE APPROPRIATELY LABELLED INCLUDING PIPE SIZE, STRUCTURE NAME AND OWNER.
- ALL TEST LEADS MUST BE A MINIMUM OF 610mm BELOW GRADE ON HORIZONTAL CABLE RUNS.

							DESIGNED			S. DANKS		WATER RETICULATION CATHODIC PROTECTION AND AC MITIGATION TEST STATION STANDARD MONITORING TEST STATION INSTALLATION DETAIL	CAD FILE 2001979.158		DATE 25-08-25	
							DES. CHECKED						ORIGINAL SCALE A3 N.T.S.		CONTRACT No.	
							DRAWN						REF No.		ISSUE	
							DWG. CHECKED	C.MECKLER	08-25				DWG No. 2001979 .158		-	
							WSL PRINCIPAL ENG.	W.STRYDOM	08-25	T.SCHEIRLINCK						
											COPYRIGHT - This drawing, the design concept, remain the exclusive property of Watercare Services Limited and may not be used without approval. Copyright reserved.					
											STRATEGY AND PLANNING: HEAD OF WATER					
-	08-25	FIRST ISSUE		C.M	W.S											
ISSUE	DATE	AMENDMENT				BY	APPD.									



SECTION A  
—

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS OTHERWISE SPECIFIED.
2. FOR TEST STATION LOCATIONS SEE CONSTRUCTION LAYOUT DRAWINGS.
3. PREPACKAGED ANODE AND REFERENCE ELECTRODE SHALL BE PRESOAKED IN CLEAN FRESH WATER A MINIMUM OF 20 MINUTES BEFORE INSTALLATION. ONCE INSTALLED, COVER THE ANODE AND REFERENCE ELECTRODE WITH 150mm TO 200mm OF SELECT BACKFILL AND SOAK BACKFILL TO ACTIVATE PRIOR TO SAND INSTALLATION.
4. REQUIREMENTS FOR CONNECTING CABLES TO PIPELINE ARE DETAILED IN THE LATEST VERSION OF DRAWING 2001979.091.
5. TERMINATE WIRES FROM PIPELINE, ANODES AND REFERENCE ELECTRODE IN THE TEST STATION AS SHOWN IN DETAIL 1.
6. GALVANIC ANODES ARE TO BE PLACED A MINIMUM OF 5m FROM THE NEAREST REFERENCE ELECTRODE COUPON OR ER PROBE AND A MINIMUM OF 1m FROM THE PIPELINE.
7. FOR MULTIPLE ANODES, LONGER ANODE LEADS ARE REQUIRED FOR EACH SUBSEQUENT ANODE. EACH GALVANIC ANODE LEAD IS TO BE TERMINATED DIRECTLY IN THE TEST STATION.
8. ANODES ARE TO BE SPACED A MINIMUM OF 4m APART.
9. AC COUPON TO BE INSTALLED ON OPPOSITE SIDE OF PIPE FROM REFERENCE ELECTRODE WITH MINIMUM UPSTREAM/DOWNSTREAM SEPARATION DISTANCE OF 1m.
10. NO CABLE SPLICES PERMITTED.
11. ALL WIRING TO BE APPROPRIATELY LABELLED INCLUDING PIPE SIZE, STRUCTURE NAME AND OWNER.
12. ALL TEST LEADS MUST BE A MINIMUM OF 610mm BELOW GRADE ON HORIZONTAL CABLE RUNS.
13. FOREIGN PIPELINE OWNER APPROVAL MUST BE OBTAINED PRIOR TO INSTALLATION OF LEAD WIRES ON THE FOREIGN FACILITY.
14. COLOUR AND CABLE SIZE(S) MAY BE SPECIFIED BY FOREIGN PIPELINE OWNER OR PROJECT DRAWINGS.

						DESIGNED			S. DANKS		WATER RETICULATION	CATHODIC PROTECTION INSTALLATION DETAILS	INTERFERENCE / FOREIGN CROSSING TEST STATION INSTALLATION DETAILS	CAD FILE 2001979.159		DATE 25-08-25	
						DES. CHECKED								ORIGINAL SCALE A3		CONTRACT No.	
						DRAWN								N.T.S.			
						DWG. CHECKED	C.MECKLER	08-25						OPERATIONS: HEAD OF WATER			
						WSL PRINCIPAL ENG.	W.STRYDOM	08-25						T.SCHEIRLINCK			
-	08-25	FIRST ISSUE			C.M	W.S			T.SCHEIRLINCK	COPYRIGHT - This drawing, the design concept, remain the exclusive property of Watercare Services Limited and may not be used without approval. Copyright reserved.				REF No.		ISSUE	
ISSUE	DATE	AMENDMENT			BY	APPD.			STRATEGY AND PLANNING: HEAD OF WATER					DWG No. 2001979 .159		-	