



Electrical Mechanical Water Meters
25 Bunya Street Eagle Farm Q 4009
Ph. (07) 3403 1849
Fx. (07) 3403 1898

15th November.2000

OPERATING MANUAL FOR:

ROCKLEA to SUNNYBANK TRUNK MAIN S18 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

- (1.0) Introduction
- (2.0) Corrosion and Cathodic Protection
- (3.0) Mains Details
- (4.0) Cathodic Protection
- (4.1) Type of System
- (4.2) Rectifier
- (4.3) Cathode
- (4.4) Anodes
- (4.5) Test Points
- (4.6) Associated Drawings
- (4.7) Associated Standards
- (4.8) Government Regulations
- (5.0) Performed Testing
- (6.0) Conclusion
- (7.0) Maintenance

DRAWINGS

486/6/25-AA1C0021E

Standard Rectifier Wiring Diagram

(No Number)

Monthly Maintenance Program

(1.0) INTRODUCTION

Steel when immersed or covered in water has a tendency to corrode (or rust) as the oxidized form is more stable than the metal.

Because of this, precaution must be taken to stop or minimize the corrosion reaction to an acceptable level consistent with the design life of the structure. This is normally achieved by the use of protective coatings which control the corrosion reaction by isolating the steel from its surrounding environment.

However, it is not practical to achieve a perfect coating and coating damage will always occur with time. Because of this, corrosion may occur at imperfections in the paint coating, causing further deterioration in the coating as well as loss of metal.

As a result of this, the coating defects must be rectified by periodic maintenance or an additional method of protection used to prevent this deterioration and corrosion occurring. This additional protection is achieved by the cathodic protection system.

(2.0) CORROSION AND CATHODIC PROTECTION

Corrosion is an electrochemical process in that it is accompanied by a flow of electrical current.

Corrosion occurs on the surface of metals at active areas known as anodes, which are electrically continuous with less active or passive areas known as cathodes. The electric current flows from the anode through the electrolyte to the cathode, with the circuit being completed by the electrical continuity between the cathode and anode. In practice anodes and cathodes are generally part of the same metallic surface and individual anodic areas may be small.

In applying cathodic protection an external current is applied to the surface so that the entire surface to be protected acts as a cathode. This involves the use of an auxiliary anode and when the current flow from this anode is sufficient, no part of the structure acts as an anode.

An external source of direct current such as a transformer rectifier is used in conjunction with an anode consisting of material with a very slow corrosion rate.

While it is the flow of current which achieves the cathodic protection of the surface it is impractical to measure these currents over individual anodic areas to determine when cathodic protection has been achieved. However, with the flow of cathodic protection current, the structure becomes more negative with respect to the surrounding electrolyte. Because of this, it is possible to state values of metal/electrolyte potential at which corrosion does not occur. This metal/electrolyte potential is generally measured against a standard reference electrode which allows a reproducible potential at which corrosion does not occur to be quoted.

(3.0) **MAINS DETAILS**

Size: 1220 mm Dia mild steel cement lined.

Coating: Fibreglass Enamel Coated.

Length: Appox 9.0 Km.

Location: From Valve 780 Golf Links Rd. Rocklea to Header Chamber Valves
at Sunnybank Reservoir Stones Rd. Sunnybank.

Construction

Drawings:

486/1/22-CC0024E Cathodic Protection Standard Switchboard Cabinet

486/1/22-AA1T0001E Cathodic Protection Test Points

(4.0)

CATHODIC PROTECTION DETAILS

- (4.1) Type of Cathodic Protection: Impressed Current.
- (4.2) Rectifier: Standard 32 Volt, 25 amp direct current output enclosed in a stainless steel switchboard. This system has 1 rectifier installed. The rectifier is in the park at the corner of Leeds and Tramore Sts. Rocklea and has a 240V supply from Energex Pole No.19073, located in Leeds St.
- (4.3) Cathode: The cathode point is located on the 1220 mm dia mains, opposite the rectifier at Leeds St.Rocklea. The point is located approx. 40 metres from the rectifier in the Air Valve pit. The cathode point is where the cabling from the rectifier is attached to the structure under cathodic protection.
- (4.4) Anodes: Four 1500 x 75mm silicone iron anodes were installed approximately 40 metres from the trunk mains, in a vertical bed 5 metres deep, at the rear corner of the park at Leeds St. The anodes are backfilled with cokebreeze thereby improving anode - ground resistance. The anodes are identified by a marker post and label. See layout drawing.
- (4.5) Test Points: Test points are installed on cathodically protected structures to enable testing to ensure full protection of the mains. On these mains seventeen test points have been installed on the trunk main which can be identified from the layout drawing.
- (4.6) Associated Drawings:
Cathodic Protection Test Point Details - 486/1/22-AA1T0001E
Standard Rectifier Wiring Diagram - 486/6/25-AA1C0021
- (4.7) Associated Standards:
AS 3000 1991 Australia Wiring Rules
AS 2832.1 1991 Pipes, Cables, Ducts, Guide to Cathodic Protection, Part One.
- (4.8) Government Regulations:
Queensland Electricity Acts and Regulations.

(5.0)

PERFORMED TESTING

- (1) Natural Potential Survey.
- (2) Testing of Insulated Flanges, Joints.
- (3) Soil Resistance Testing.
- (4) Current Drain Survey.
- (5) Pipe Coating Anomaly Survey.
- (6) Rectifier Loop Resistance.
- (7) Foreign Structure Interference Survey and Mitigation.
- (8) Final Potential Survey and Commissioning.

(6.0)

CONCLUSION

Full Cathodic protection has been achieved on this section of trunk mains. The cathodic protection system is registered with the Electrical Safety Office, Department of Mines and Energy, and has approval to operate.

(7.0)

MAINTENANCE

The cathodic protection system is maintained on a monthly basis after commissioning. These checks involve testing rectifier operation and recording of pipe to soil potentials.

CPS Monthly Maintenance Details.

Required:

- 1/ Notify plant operator and/or sign entry logs where necessary.
- 2/ Have appropriate keying.

Labour:

One tradesperson, one vehicle. 20 minutes per site.

Procedure:

- 1/ Identify installation.
- 2/ Check system for operation.
- 3/ Record voltmeter.
- 4/ Record ammeter.
- 5/ Comments.
- 6/ Log entry.

CPS 6 Monthly Maintenance Details.

Required:

- 1/ Notify plant operator and/or sign entry logs where necessary.
- 2/ Have appropriate keying.
- 3/ Set of tools. (Electricians)
- 4/ Multimeter.
- 5/ DC clampmeter.
- 6/ Copper sulphate reference cell and leads.
- 7/ Cleaning equipment.
- 8/ Gatic cover lifters.

Labour:

One tradesperson electrical, one laborer, one vehicle.
Two hours per site.

Procedure:

- 1/ Identify system.
- 2/ Check system for operation.
- 3/ Record voltmeter.
- 4/ Record ammeter.
- 5/ Record "on" potentials for all test points.
- 6/ Record "instant off" potentials for all test points.
- 7/ Record "off" potentials for all test points.
- 8/ Perform loop resistance and record.
- 9/ Check and record anode string currents.
- 10/ Comments.
- 11/ Log entry.

CPS 60 Monthly Maintenance Details.

Required:

- 1/ Notify plant operator and/or sign entry logs where necessary.
- 2/ Have appropriate keying.
- 3/ Set of tools. (Electricians)
- 4/ Multimeter.
- 5/ DC clampmeter.
- 6/ Copper sulphate reference cell and leads.
- 7/ Cleaning equipment.
- 8/ Gatic cover lifters.
- 9/ Rectifier load bank.
- 10/ PCS2000 Detection Equipment.

Labour:

One tradesperson electrical, one laborer, one vehicle.
Eight hours per site.

Procedure:

- 1/ Identify system.
- 2/ Check system for operation.
- 3/ Record voltmeter.
- 4/ Record ammeter.
- 5/ Record "on" potentials for all test points.
- 6/ Record "instant off" potentials for all test points.
- 7/ Record "off" potentials for all test points.
- 8/ Perform loop resistance and record.
- 9/ Check and record anode string currents.
- 10/ Load test rectifier for 10 minutes.
- 11/ Check all switchboard and testpoint terminals for tightness.
- 12/ Check all switchboard and testpoints are labelled and I.D. tags attached.
- 13/ Check plans are correctly drawn and modify if necessary.
- 14/ Remove and inspect anodes.
- 15/ Recheck all interference (CPS) bleeds.
- 16/ Pipecamp structure if applicable.
- 17/ Apply to reregister system if applicable

Brisbane Water

Network Services

Cathodic Protection System Loop Resistance

Leeds St. Rectifier. CPS163

Date: 25th November 2000

Cathodic Protection System:

System Operating Volts:

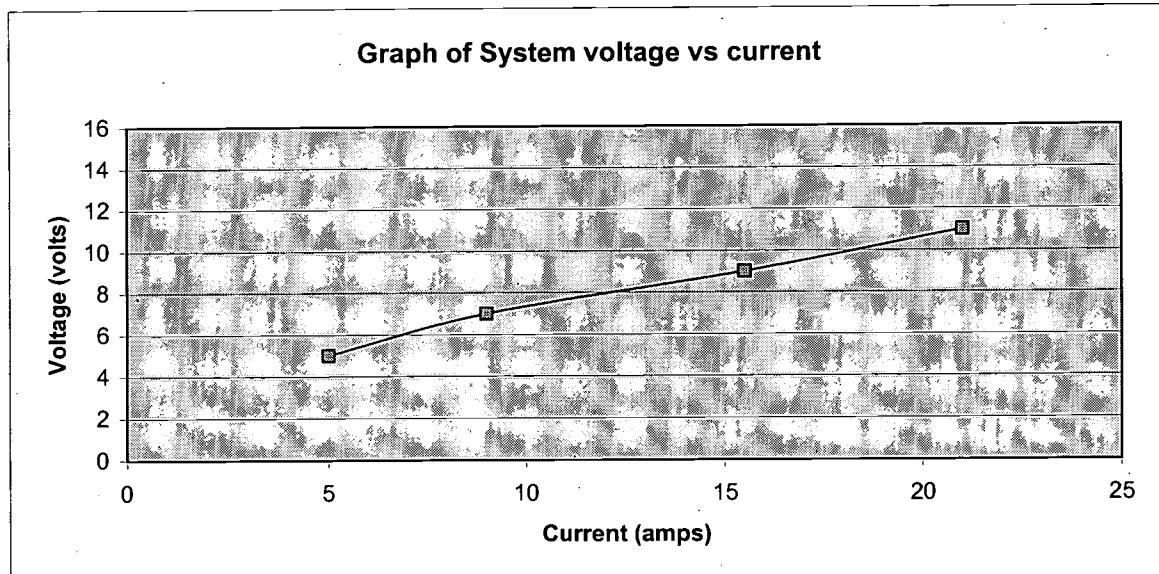
Rocklea to Sunnybank Trunk Main S18

System Operating amps:

10

Test Voltage:		Test Current:	
(volts)		(amps)	
5		5	
7		9	
9		15.5	
11		21	

Loop Resistance (ohms)
0.58064516

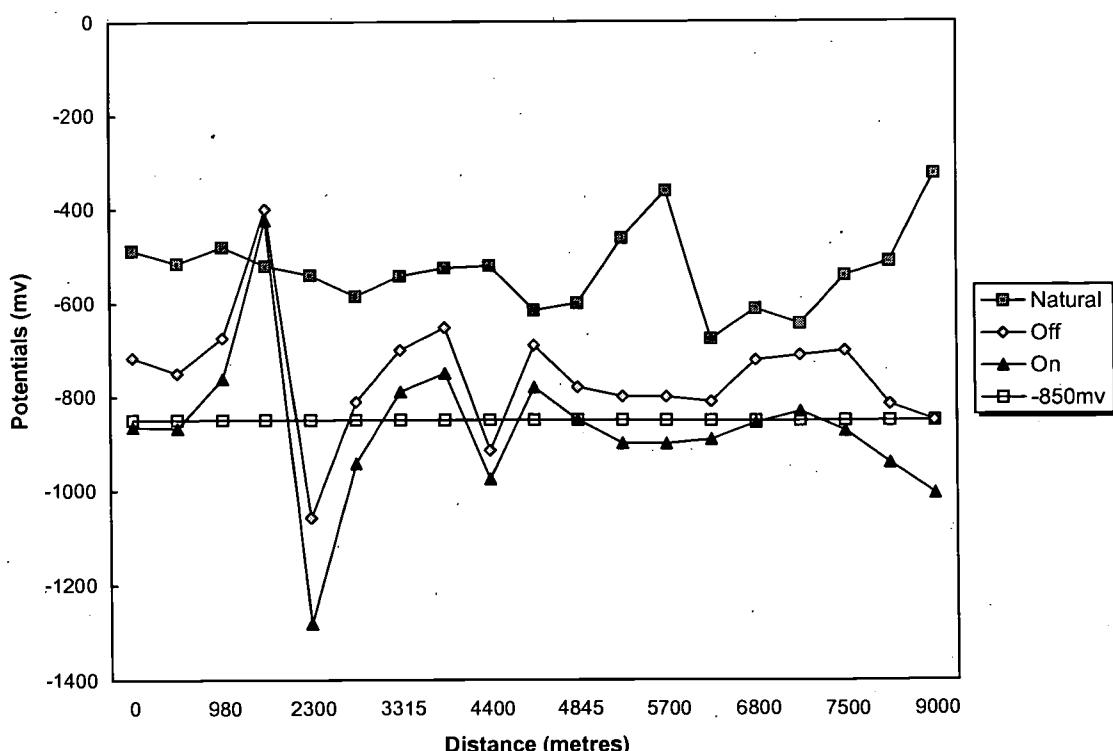


Brisbane Water

CP Form No. 23

Network Services**Cathodic Protection System Potential Recording Form****Project** S18 Trunk Main.Rocklea to Sunnybank**Date** 25th November 2000

Test Point number	Distances to T.P. (metres)	Potentials to CuSO ₄			
		Natural	Off	On	
		(mV)	(mV)	(mV)	
1	0	-488	-717	-865	-850
2	500	-515	-750	-868	-850
3	980	-480	-674	-762	-850
4	1800	-520	-400	-423	-850
5	2300	-540	-1058	-1281	-850
6	2700	-585	-812	-943	-850
7	3315	-542	-700	-790	-850
8	3900	-525	-652	-750	-850
9	4400	-520	-915	-976	-850
10	4800	-615	-690	-780	-850
11	4845	-600	-780	-850	-850
12	5110	-461	-800	-900	-850
13	5700	-360	-800	-900	-850
14	6310	-675	-810	-890	-850
15	6800	-610	-720	-854	-850
16	6300	-642	-710	-830	-850
17	7500	-540	-700	-872	-850
18	8000	-510	-815	-940	-850
19	9000	-324	-850	-1005	-850

Graph of potentials vs pipelength

Brisbane Water Engineering Services

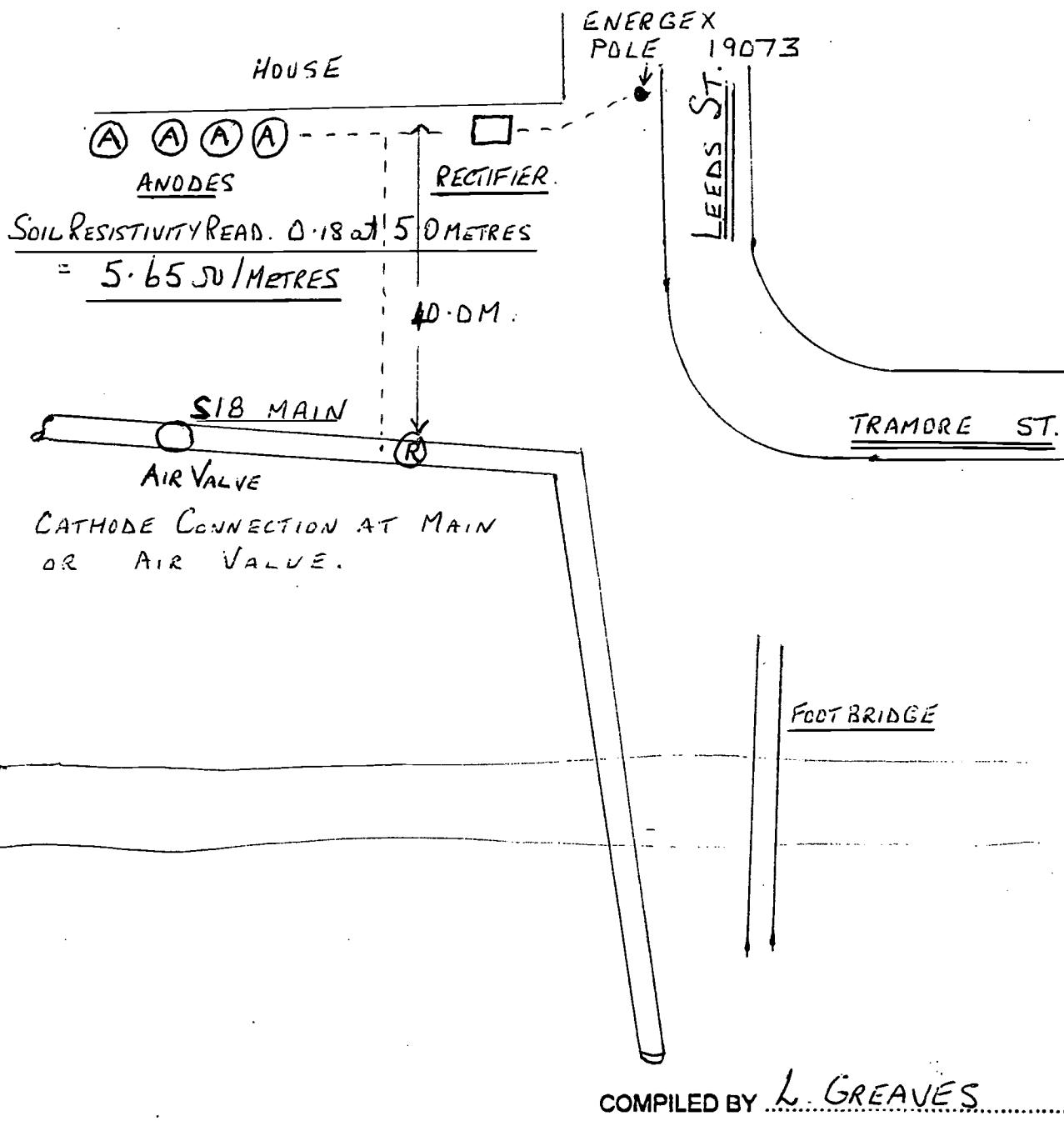
CP Form No. 16

Electrical Engineering Unit

Site Plan Drawing Sheet

Project ROCKLEA TO SUNNYBANK TRUNK MAINDate 5-9-2000

<u>PROPOSED ANODE BED LOCATION</u>	<u>NAP199K7</u>
------------------------------------	-----------------

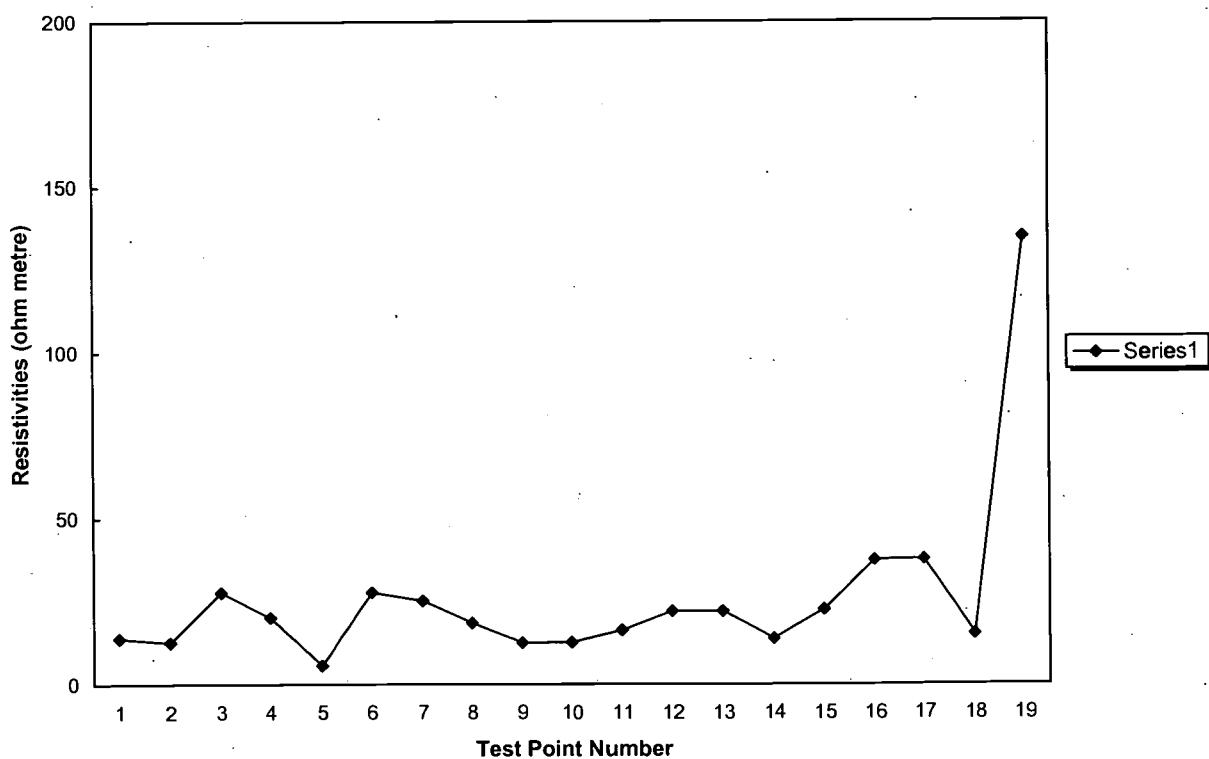


Brisbane Water

CP Form No. 23

Network Services**Cathodic Protection System Resistivities Recording Form**Project S18 Trunk Main.Rocklea to SunnybankDate 25th November 2000

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres
		ohm metres
1	0	13.8
2	500	12.5
3	980	27.6
4	1800	20.1
5	2300	5.6
6	2700	27.6
7	3315	25.1
8	3900	18.4
9	4400	12.5
10	4800	12.6
11	4845	16.3
12	5110	22
13	5700	22
14	6310	13.8
15	6800	22.6
16	6300	37.6
17	7500	37.8
18	8000	15.1
19	9000	135

Graph of resistivities vs pipelength

Please note:
This application must be
accompanied by a fee of
\$200.00

Electricity Act 1994 (Queensland) (160 and 265)
Electricity Regulation 1994 (186 to 210)

Office Use Only:
Fees Paid:
Receipt No:

**APPLICATION TO REGISTER A REGISTRABLE CATHODIC PROTECTION SYSTEM
(Note 1)**

I/We, as system owner/s, hereby make application to register the registrable Cathodic Protection System described below:

Name and postal address of system owner:	Brisbane City Council / Brisbane Water. 5 Bunya Street. Eagle Farm. 4009.
Contact Name:	Contact Phone:
Name and postal address of authorised agent of system owner:	Brisbane Water Engineering Services 5 Bunya Street Eagle Farm. 4009 Telephone No: 07...../34031849.....
Contact Name: Jeff Say	Contact Phone: 07-34031854
Type of application: (tick as appropriate)	<input checked="" type="checkbox"/> New system (Note 2) <input type="checkbox"/> Alteration to an existing system, Registration No:.....(Note 3) <input type="checkbox"/> Existing system, Registration No:.....
Location of application: (Note 4)	Leeds St. System. Rocklea 4106 From V780 Golf Links Rd. to V779 cnr Beenleigh Rd & Gay St. / V156 Boundary Rd. Coopers Plains.
Structure to be protected:	1200 mm Dia Mild Steel Trunk Main
Maximum operating current:...15. 0 A.....Amperes DC	Maximum operating voltage (note 5).....Volts

I/We, being the owner/s of the Cathodic Protection System described above, make application for the registration of this system and certify with respect to the system that:

- (i) I/We have complied with the requirements of Part 4 of Chapter 3 of Electricity Regulation 1994;
- (ii) the tests pursuant to section 190 of Electricity Regulation 1994 were based on the maximum operating current stated in this Application;
- (iii) the maximum operating voltage stated in this Application (in the case of the system operating with an anode/s immersed in water or a marine environment) corresponds to the maximum operating current mentioned in paragraph (i); and
- (iv) any necessary interference mitigation measures for foreign structures (in case where the system is currently registered) have been tested and are operating satisfactorily.

Signature of System owner:..... Date:...../...../.....

**Application should be forwarded with registration fee of \$200.00 to: Electrical Safety Office,
Department of Mines and Energy, GPO Box 995, Spring Hill Q 4004**

NOTES:

- 1(a) A Registrable Cathodic Protection System is an impressed current system the converter of which is capable of delivering a current greater than 0.25A.
- (b) A separate application is required for each Registrable Cathodic Protection System.
- 2 The application with respect to a new system is to be accompanied by a plan indicating full particulars about the system including the names of the owners and location of underground and immersed foreign structures.
- 3 Application submitted pursuant to section 209 of the Electrical Regulation 1994.
- 4 Sufficient details are required to correctly identify the geographical location of the system.
- 5 The maximum operating voltage is only required for a system operating with an anode (or anodes) immersed in water or marine environment.

For such systems:

- Refer section 197 of Electricity Regulation 1994
- The application is to be accompanied by the "Technical Schedule Relating to a Registrable Cathodic Protection Installation in Water or a Marine Environment"

Note: There are no bleeds on the Leeds St. System.

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea-Sunnybank Unit Reading 15 A Date 8-02-01

System Separated @ Beatty Rd Pump Stn P1 of 13

	Reading	Test Point I. D.	Location	Swing
On	-930	Rect. Earth	Leeds st.	-15
Off	-915			
On	-904	Brace	Pole 19624 Leeds St	+2
Off	-906			
On	-941	Water Meter	41 "	-48
Off	-893			
On	-169	Optus		
Off	-166	Earth	Pole 19072 "	-3
On	-680	Water meter	37 "	-18
Off	-662			
On	-788	Retic		
Off	-687	value	35 "	-101
On	-945	Brace	Pole 2009 "	+2
Off	-947			
On	-646	Fence	33 "	+8
Off	-654			
On	-599	Fence	Cnr "	+1
Off	-600			
On	-633	Retic		
Off	-629	Cnr	Galah	-4
On	-561	F-H	" "	
Off	-564			+3
On	-660	Fence	" "	00
Off	-660			
On	-642	Water Meter	5 "	+20
Off	-662			
On	-645	Fence	10 "	+8
Off	-653			
On	-501	Fence	12	-4
Off	-497			

Instrument INV11

TESTED BY J.J.

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea-Sunnybank Unit Reading 15 A Date 8-02-01

System Separated @ Beatty Rd Pump stn Pg 2 of 13

	Reading	Test Point I.D.	Location	Swing
On	-945	MEN	Pole 16229 Galah	-9
Off	-936			
On	-848	Fence	@ Anode Bed "	-8
Off	-840			
On	-781	Baracabs	End of st "	-48
Off	-733			
On	-975	Other	@ creek Leeds	-104
Off	-971			
On	-510	Fence	3rd Hse Boobook	00
Off	-510			
On	-130	Water Meter	28 "	-3
Off	-127			
On	-646	Stag	Pole 26526 4 "	-1
Off	-645			
On	-981	Baracabs	end "	-5
Off	-976			
On	-496	Post	Retaining Wall 39 "	00
Off	-496			
On	-41	Water Meter	39 "	00
Off	-41			
On	-505	F-H	Cnr "	-1
Off	-504			
On	-524	Retic	" "	-2
Off	-522			
On	-497	MEN	Pole 34084 "	-5
Off	-492			
On	-683	Fence	35 Goburra	-1
Off	-682			
On	-506	Water Meter	37 "	-6
Off	-500			

Instrument INVII

TESTED BY J.J

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea - Sunnybank Unit Reading ...15 Amps... Date ...8-02-01...

System Separated @ Beatty Rd. Pump Stn Pg 3 of 13

	Reading	Test Point I.D.	Location	Swing
On	-687	Fence		
Off	-687		43 Goburra	00
On	-488			
Off	-486	FH	43 "	-2
On	-675			
Off	-667	Fence	51/53 "	-8
On	-448	Water Meter		
Off	-447		55 "	-1
On	-1094			
Off	-794	TP	Fremmy St	-300
On	-766	other		
Off	-738	Main	@ Creek "	-28
On	-547	Water Meter		
Off	-546		No Hse "	-1
On	-536			
Off	-536	FH	73 "	-00
On	-967	Pole		
Off	-967	Brace	Pole 12670 "	-00
On	-501	Water Meter		
Off	-498		45 "	-3
On	-404			
Off	-404	Fence	36/38 "	00
On				
Off				
On				
Off				
On				
Off				

Instrument Inv#

TESTED BY J.J.....

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results FormProject Rocklea - Sunnybank Unit Reading 8 Amps Date 14-02-01Section Beatty Rd Pstn to TP 15 Gag St. Pg 4 of 13

	Reading	Test Point I.D.	Location	Swing
On	-1172	TP8	Rodwell ST	-134
Off	-1038		"	
On	-601	Retic	"	-28
Off	-573		"	
On	-869	TP	"	-28
Off	-841	Gas	"	
On	-486	Water	"	-1
Off	-485	Meter	"	
On	-642	Fence	Formosa	-1
Off	-641		"	
On	-524	F H	"	-1
Off	-523		"	
On	-442	Light		
Off	-447	Pole	30 Rodwell	+5
On	-719	Fence	"	-2
Off	-717		"	
On	-585	Water		
Off	-585	Meter	Cnr Emsley	00
On	-480	Energen		
Off	-474	Stn	SC519625	-6
On	-466	MEN	"	-2
Off	-464		"	
On	-516	Earth		
Off	-503	A B	Pole 29575	-13
On	-670	Fence	Tarmac Co. Beatty	-5
Off	-665		"	
On	-667	Fence	P stn	+29
Off	-696		"	
On	-1410	Cable		
Off	-1186	Guard	Pole 369692	-214

Instrument 1111

TESTED BY J. J.

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea Sunnybank Unit Reading 8 Date 14-02-01

Section Beaty Rd Pstn - TP 15 Gas St Pg 5 of 13

	Reading	Test Point I. D.	Location	Swing
On	-500	Water Meter	Pstn Beaty Rd.	-1
Off	-499			
On	-1050	TP 9	Boniface	-130
Off	-920			
On	-490	MEN	Pole 2183 .. "	+6
Off	-496			
On	-501	Light Pole	2190 "	+3
Off	-504			
On	-535	Fence	Westrange	+8
Off	-543			
On	-372	Water Meter	84	+2
Off	-344			
On	-410	Earth AB	Pole 43804	00
Off	-410			
On	-903	TP 10	Beaudesert	-50
Off	-853			
On	-298	Light Pole	Property @ above "	+2
Off	-300			
On	-301	Tap	" "	+6
Off	-307			
On	-323	Earth AB	20173 "	+7
Off	-330			
On	-761	Stay	4 AB 20173 "	00
Off	-761			
On	-362	MEN	20174 "	+3
Off	-365			
On	-406	Water Meter	" "	+2
Off	-408			
On	-332	Light Pole	372331	+4
Off	-336			

Instrument INV11

TESTED BY J.S.....

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit**Cathodic Protection Interference Survey Results Form**Project Rocklea - Sunnybank Unit Reading 8 Date 14-02-01

Section Beaty Rd Pstn - TP 15 Gay St Pg 6 of 13

	Reading	Test Point I. D.	Location	Swing
On	-894	TP 11		
Off	-844		Bogland	-50
On	-376	Fence		
Off	-376		Advance Rental "	00
On	-337	MEN		
Off	-340		Pole 7232 "	+3
On	-560	FH		
Off	-560		Snap Print "	00
On	-309	Water Meter	28 "	-2
Off	-307			
On	-253	Water Meter	36 "	+2
Off	-255			
On	-742	Brace		
Off	-742		Pole 41914 "	-00
On	-468	Retic		
Off	-468		42 "	-00
On	-348	MEN		
Off	-346		Pole 3560 "	-2
On	-563	Fence		
Off	-564		Tradelink "	+1
On	-420	Water Meter		
Off	-421		Cementaid. "	+1
On	-680	Fence		
Off	-683		QGR "	+3
On	-370	MEN		
Off	-373		Pole 13185 Richlands "	+3
On	-384	Earth		
Off	-386	AB	Pole 48145 "	+2
On	-385	Water		
Off	-386	Meter	76 "	+1

Instrument 1V 11

TESTED BY JG

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea Sunnybank Unit Reading 8 Date 14-02-01

Section Beatty Rd Pump Stn - TP15 Gay ST. Pg 7 of 13

	Reading	Test Point I. D.	Location	Swing
On	-376	Earth		
Off	-377		Pole 15783 Richlands	+1
On	-370	FH		
Off	-371		Pole 16789 "	+1
On	-421	Retic		
Off	-421		50 "	00
On	-381	Water Meter		
Off	-381		Easy Gleam "	00
On	-512	Fence		
Off	-513		24 "	+1
On	-1070	TP 14		
Off	-970		Gag St	-100
On	-452	MEN		
Off	-454		Pole 44015 "	+2
On	-436	Earth		
Off	-440		Builders Pole "	+4
On	-624	Fence		
Off	-670		@ Builders Pole "	-9
On	-492	Water Meter		
Off	-492		61 "	00
On	-550	FH		
Off	-550		opp TP 14 "	00
On	-459	MEN		
Off	-461		Pole 60768 "	+2
On	-581	Fence		
Off	-581		60 "	00
On	-454	Earth		
Off	-452		Pole 44013 "	-2
On	-453	MEN		
Off	-450		Pole 44012 "	-3

Instrument IN11

TESTED BY J. J.

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit**Cathodic Protection Interference Survey Results Form**

Project Rocklea - Sunnybank Unit Reading 8 Date 14/02/01

Section Beatty Rd Pump St to TP 15 Gay St Pg 8 of 13

	Reading	Test Point I. D.	Location	Swing
On	-917	TP 15		
Off	-866			-41
On	-514	Light		
Off	-511	Pole	65641	-3
On	-34	Earth		
Off	-34	AB	Pole 23139	-06
On	-518	Water		
Off	-522	Meter	8	+4
On	-480	Fence		
Off	-475		BHP	-5
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				

Instrument IN11

TESTED BY J.S

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea - Sunnybank Unit Reading ... 12 Amps Date ... 15-02-01

Section TP 15 Gay St to Sunnybank Res Pg 9 of 13

	Reading	Test Point I.D.	Location	Swing
On	-834	TP15		
Off	-699		Gay ST	-135
On	-487	Light Pole		
Off	-491		65639 "	+4
On	-3	Earth AB	23139	"
Off	-5		Pole 65110	+2
On	-479	Light Pole	65640	"
Off	-482		"	-3
On	-625	Fence	@ above	"
Off	-624		"	-1
On	-523	Water Meter	793 Beenleigh	+2
Off	-521		"	
On	-412	Light Pole	65643	"
Off	-410		"	+8
On	-580	Water Meter	Lfm Kirkman	"
Off	-579		"	-1
On	-505	Retic	"	"
Off	-505		"	00
On	-595	Fence	Gate "	"
Off	-594		"	-1
On	-610	Fence	Gate "	"
Off	-611		"	+1
On	-450	MEN	S15116 Bradman	"
Off	-454		"	-4
On	-374	Water Meter	2 Bradman	"
Off	-375		"	-1
On	-690	TP Gas	159 Beenleigh	+23
Off	-713		"	
On	-367	MEN	Pole 40280 Morden	+2
Off	-369		"	

Instrument IN 11

TESTED BY J. J.

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results FormProject Rocklea - Sunnybank Unit Reading 12 Date 15-2-01

Section TP15 Gag St To Sunnybank Res Pg 10 of 13

	Reading	Test Point I. D.	Location	Swing
On	-379	MEN		
Off	-387		Pole 28270 Morden	+8
On	-456	Water Meter		
Off	-460		181 Beenleigh	+4
On	-417	FH		
Off	-420		189 "	+3
On	-315	Water Meter		
Off	-315		Rg Hill "	00
On	-523	FH	" "	
Off	-521		" "	-2
On	-741	TP Gas		
Off	-754		201 "	+13
On	-328	Earth AB		
Off	-387		Pole 62410 "	+9
On	-386	MEN		
Off	-395		Pole 23129 "	+9
On	-755	Fence		
Off	-755		172 "	00
On	-399	Earth AB		
Off	-408		Pole 22112 "	+9
On	-21	Earth AB		
Off	-23		Pole 23134 "	+2
On	-455	Light Pole		
Off	-461		65641 "	+6
On	-841	TP17		
Off	-683		" "	-158
On	-515	FH	223 "	-27
Off	-488		" "	
On	-13	Water Meter		
Off	-10		225 "	-3

Instrument INV

TESTED BY JJ

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea - Sunnybank Unit Reading 12 Amps Date 15-02-01

Section TP 15 Gay St to Sunnybank Res
Pg 11 of 13

	Reading	Test Point I.D.	Location	Swing
On	-505	Fence	227 Beenleigh	
Off	-505			00
On	-145	Water Meter	251 "	
Off	-143			-2
On	-927	TP Gas	" " +4	
Off	-931			
On	-573	FH	" " -1	
Off	-572			
On	-381	Water Meter	271 " +3	
Off	-384			
On	-705	Pit Gas	Lauriston " +3	
Off	-708			
On	-563	Fence	" " -1	
Off	-562			
On	-435	Light Pole	835099 " +2	
Off	-437			
On	-855	TP Gas	323 " -5	
Off	-850			
On	-1528	TP	Gay St Pineslands Rd Beenleigh	
Off	-1213			-315
On	-713	Earth	Pole 418899 " 00	
Off	-713			
On	-371	MEN	Pole 29889 " +3	
Off	-374			
On	-993	TP18	" " -110	
Off	-883			
On	-408	Earth	Pole 24906 " -3	
Off	-405			
On	-371	Earth	CP Telstra box Pole 29889 " +3	
Off	-374			

Instrument 1N11

TESTED BY J3

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea - Sunnybank Unit Reading 12 Date 15-2-01

Section TP 15 Gay St - Sunnybank Res Pg 12 of 13

	Reading	Test Point I. D.	Location	Swing
On	-297	Water Meter	361 Beenleigh	-1
Off	-296			
On	-301	FH	365 "	00
Off	-301			
On	-419	MEN Pole	5054 "	+1
Off	-420			
On	-994	TP Gas	377 "	-22
Off	-972			
On	-559	Water Meter	387 "	-1
Off	-558			
On	-522	Water Meter	397 "	-1
Off	-521			
On	-453	Light Pole	824669 "	+7
Off	-460			
On	-395	MEN	Pole 409894 "	-6
Off	-389			
On	-202	FH	Keats "	+3
Off	-203			
On	-409	Light Pole	414794 "	-6
Off	-403			
On	-405	MEN	Pole 5040 "	-12
Off	-393			
On	-425	MEN	Pole 5039 "	-14
Off	-411			
On	-417	Pole	146674 Stones	+7
Off	-424	T Light		
On	-1429	TP	Gay St Pinelands Stones	-173
Off	-1256			
On	-844	Water Meter	74 Stones	-160
Off	-684			

Instrument IN 11

TESTED BY J S

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Rocklea - Sunnybank Unit Reading 12 Date 15-02-01

Section TP15 Gag St - Sunnybank Res Pg 13 of 13

	Reading	Test Point I.D.	Location	Swing
On	-498	F 14		
Off	-498		80 Stones	00
On	-323	Water Meter	96 "	-6
Off	-317	MEN	Pole 47248 "	-2
On	-282	Water Meter	118 "	+1
Off	-284	MEN	131 "	+10
On	-218	Water Meter	131 "	+2
Off	-219			
On	-251	Water Meter	10134 "	+9
Off	-261	MEN	Pole 10133 "	+3
On	-211	F 4		
Off	-213		131 "	
On	-163	Earth AB		
Off	-172		10134 "	
On	-259	MEN		
Off	-262		Pole 10133 "	
On	-392	Water Meter		
Off	-391		103 "	-1
On	-869	Guard		
Off	-871		Pole 7518 "	+2
On	-447	Light		
Off	-451		Pole 27005 "	+4
On	-243	MEN		
Off	-241		Pole 27758 "	-2
On	-384	Guard		
Off	-377		Pole 5072 "	-7
On	-740	Fence		
Off	-744		73 "	+4
On	-332	MEN		
Off	-337		Pole 5091	+5

Instrument IN 11

TESTED BY J 3



Corrosion & Earthing
External Plant Technology
Locked Mail Bag 3583
Brisbane QLD 9008
PTTO2 Jim McMonagle
Ph (07) 3887 4879

Interference Testing

Exchange : SALISBURY

Related System : 6-6277

or Other Location : Brisbane Water ICU. Beatty Rd pu

Testing Date : Monday 2 April 2001 9:00 am

Voltage : 4 Volts Current : 8 Amps

Comments : Brisbane Water rep J Taylor. Interference problems .
Recommend raise Telstra ICU and recheck interference on
normal operating I (4A)

Test Point	Interference Type	Location	Bond Off V	Bond On V	Swing V	Anode or Cathode	Distance A/K m	Comment
MB 47		M/H Lhs Marshall Rd 20m # Short St	-1.020	-1.011	+ (0.009)	Anode	0	
MB 47		M/H Lhs Boundary Rd dist side rail cross	-0.360	-0.360	0	Anode	0	
Lds, MB7		M/H Rhs Beaudesert Rd opp # Boyland St	-0.920	-0.880	+ (0.040)	Anode	0	Current of 0.22A required to mitigate
74	MB 47	M/H Lhs Boniface St 20m dist Rodwell St	-0.940	-0.920	+ (0.020)	Anode	0	Current shift in earth stake +3ma.
29	Leads, MIBs	M/H Lhs Granard Rd # cnr Beatty Rd	-1.029	-1.045	-0.016	Anode	0	
57	MB 47	M/H Lhs Marshall Rd opp # Freny St	-1.012	-1.004	+ (0.008)	Anode	0	
	MB 47	M/H Lhs Beatty Rd 30m dist Rodwell St	-1.011	-1.076	-0.065	Anode	0	



Corrosion & Earthing
External Plant Technology
Locked Mail Bag 3583
Brisbane QLD 9008
PTTO2 Jim McMonagle
Ph (07) 3887 4879

Interference Testing

Exchange : SALISBURY

Related System : 6-6277

or Other Location : Brisbane Water ICU. Water main L

Testing Date : Friday 2 February 2001 8:00 am

Voltage : Current : 14 Amps

Comments : Brisbane Water rep J Taylor. Interference problems.
Recommend Brisbane Water to arrange Bleed Installation.

Test Point	Interference Type	Location	Bond Off V	Bond On V	Swing V	Anode or Cathode	Distance A/K m	Comment
Ld 48		9 Pit Lhs Pegg St o/s No90	-0.877	-0.865	+ (0.012)	Anode	0	
Ld 48		M/H Lhs Goburra St 10m # Pegg St	-0.858	-0.835	+ (0.023)	Anode	0	
MB 48		M/H Lhs Pegg St 20m dist Elmes St	-0.840	-0.790	+ (0.050)	Anode	0	Bleed of 0.15A required.



Corrosion & Earthing
External Plant Technology
Locked Mail Bag 3583
Brisbane QLD 9008
PTTO2 Jim McMonagle
Ph (07) 3887 4879

Interference Testing

Exchange : SUNNYBANK

Related System : 6-6277

or Other Location : Brisbane Water ICU. Water Main

Testing Date : Monday 2 April 2001 11:00 am

Voltage : 9 Volts Current : 10 Amps

Comments : Brisbane Water rep J Taylor. Interference only minimal as Telstra has ICU in area. Recommend no further action required.

Test Point	Interference Type	Location	Bond Off V	Bond On V	Swing V	Anode or Cathode	Distance A/K m	Comment
14	Lds, MB6	M/H Rhs Boundary Rd 5m # Orange Grov	-1.005	-0.992	+0.014	Anode	0	
	MB 46	M/H Lhs Beenleigh Rd 50m dist Lenswort	-0.909	-0.892	+0.017	Anode	0	
	MBs 46	M/H Lhs Beenleigh Rd 10m # Morden Rd	-1.025	-1.004	+0.021	Anode	0	
	Ld, MB46	M/H Lhs Beenleigh Rd 80m dist Jackson	-1.374	-1.364	+0.010	Anode	0	
28	Ld, MB46	M/H Rhs Stones Rd 40m dist Clovelly St	-1.072	-1.052	+0.020	Anode	0	
	Lds, MB6	M/H Rhs Stones Rd 30m # Beenleigh Rd	-1.090	-1.104	-0.014	Anode	0	



QUEENSLAND GOVERNMENT

Electricity Act 1994

NOTICE OF REGISTRATION OF CATHODIC PROTECTION SYSTEM**Registration No: 3290****Date of Registration:** 17 September 2001 **Expiry Date:** 17 September 2006

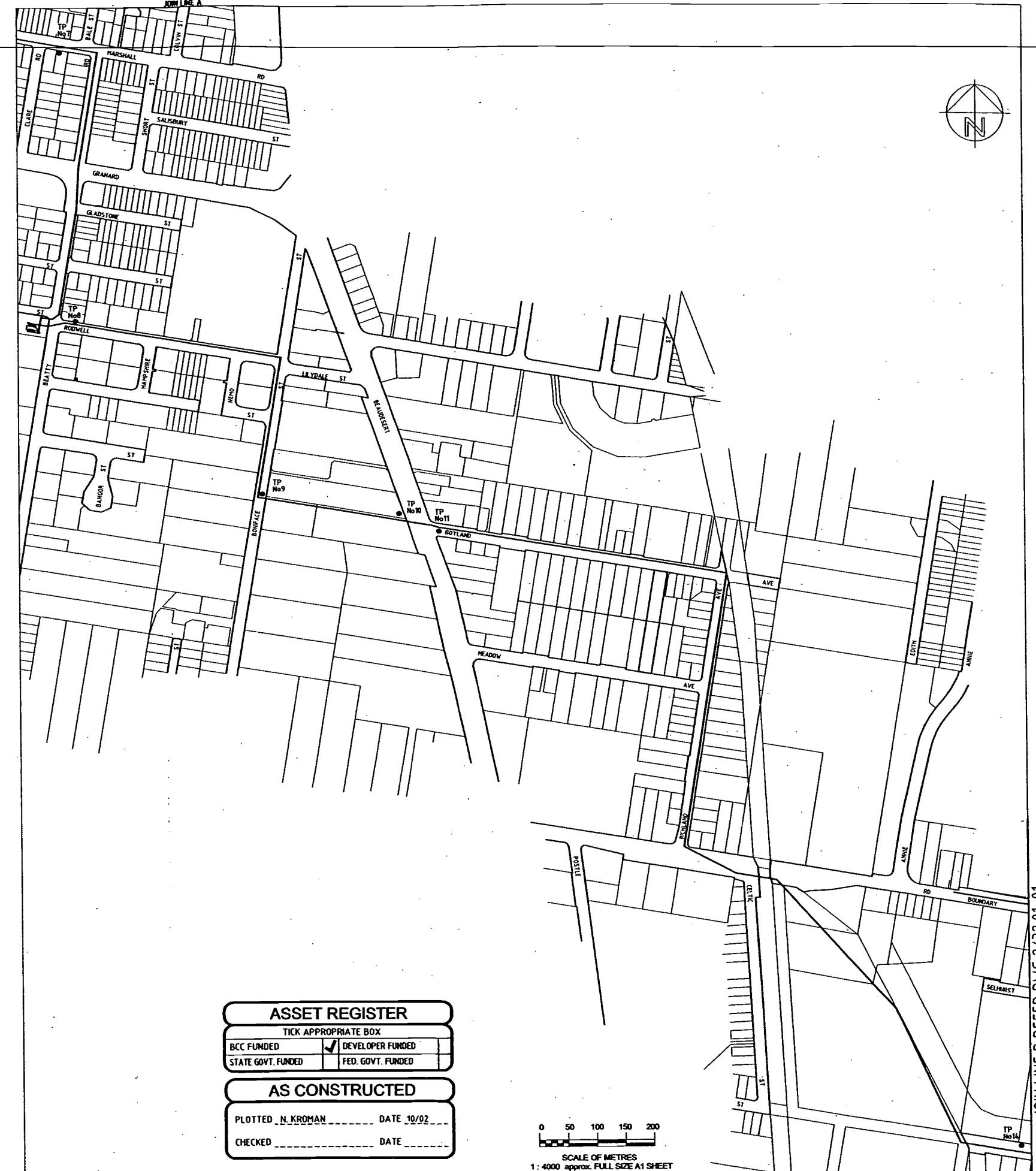
The cathodic protection system referred to below has been registered for a term of five years, and the conditions of registration shown hereunder shall apply in addition to the provisions of the Electricity Act 1994 and Electricity Regulation 1994.

Name and Postal Address of System Owner	Brisbane City Council/Brisbane Water 5 Bunya Street EAGLE FARM Q 4009
Location of System	Leeds St (From V780 Golf Links Rd to V779 Cnr Beenleigh Rd & Gay St. V156 Boundary Rd, Coopers Plains) ROCKLEA - Post Code: 4106
Structure to be Protected	1200mm Dia Mild Steel Trunk Main

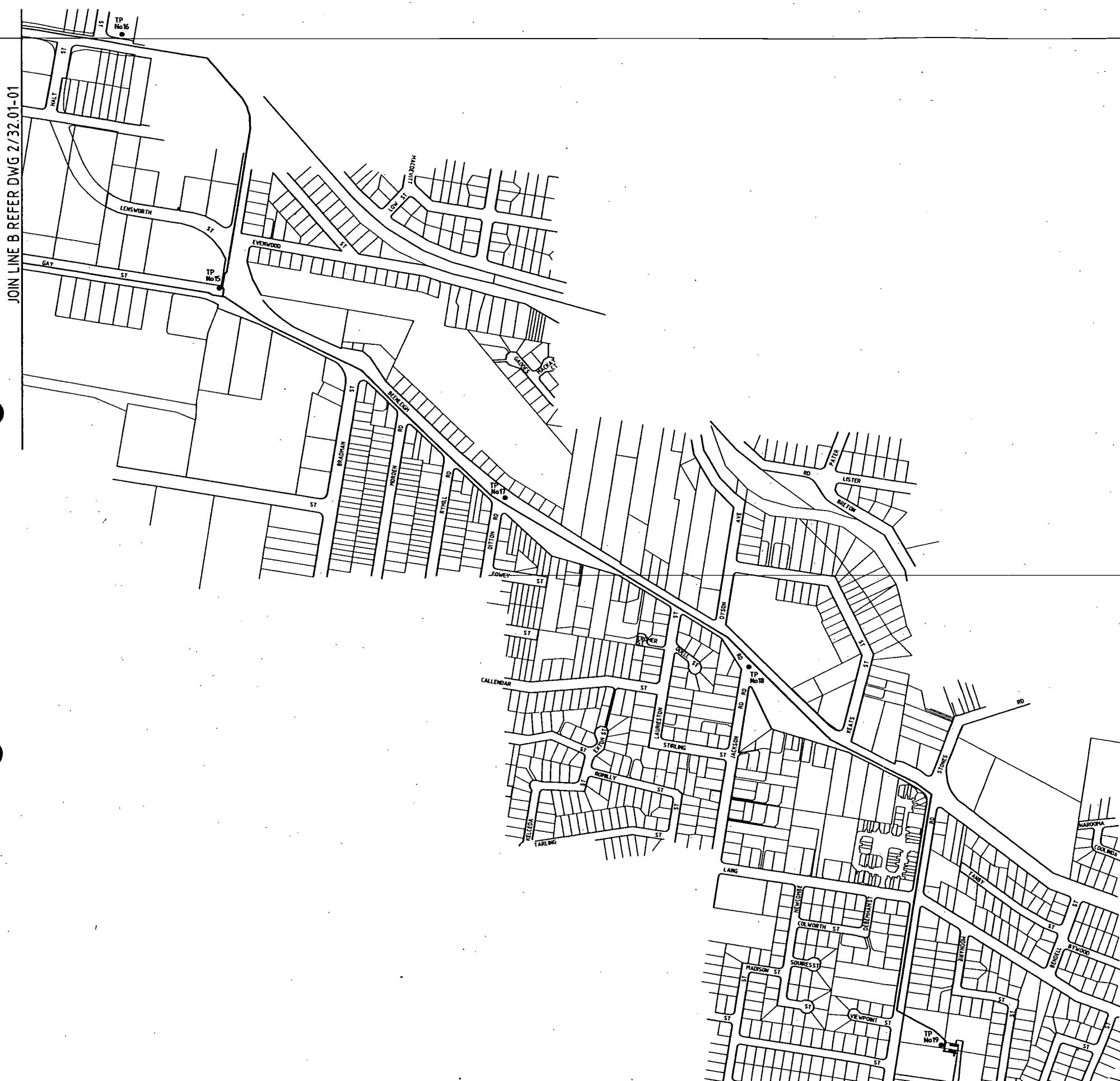
CONDITIONS OF REGISTRATION**Maximum Operating Current:** 15.00 Amperes DC

Regulator

1819101



NO.	DATE	DIRECTOR OF PD & PS	DATE	SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE	DESIGN			PROJECT	TITLE	SCALE AS SHOWN	A.H. DATUM
		ENGINEER IN CHARGE		CADD FILE			DESIGN CHECK			ROCKLEA TO SUNNYBANK S18 TRUNK WATER MAIN	CATHODIC PROTECTION TEST POINT & ANODE BED LOCATIONS	N° 1 OF 2 SHEETS	AMEND. 0
		SUPERVISING ENGINEER	RPEQ No	JOB FILE	SURVEY NO.		DRAWN			Brisbane Water	DRAWING NO.	2/32.01-01	
				SURVEYED	FIELD BOOK		DRAFTING CHECK						

**ASSET REGISTER**

TICK APPROPRIATE BOX

 BCC FUNDED DEVELOPER FUNDED STATE GOVT. FUNDED FED. GOVT. FUNDED**AS CONSTRUCTED**

PLOTTED N. KROMAN DATE 10/92

CHECKED _____ DATE _____

0 50 100 150 200

SCALE OF METRES

1:4000 APPROX. FULL SIZE A1 SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
NO.	DATE	AMENDMENT	INITIAL	DIRECTOR OF PD & PS	DATE	SUPERVISING ENGINEER	R.P.E.Q. NO.	DATE	DESIGN			PROJECT	SCALE AS SHOWN	A.H. DATUM	

ENGINEER IN CHARGE	DATE
SUPERVISING ENGINEER	DATE

RPEQ No	DATE
SURVEYED	FIELD BOOK

CADD FILE	
JOB FILE	SURVEY NO.

DESIGN CHECK	
DRAWN	
DRAFTING CHECK	
INITIAL	



PROJECT
ROCKLEA TO
SUNNYBANK
S18 TRUNK WATER MAIN

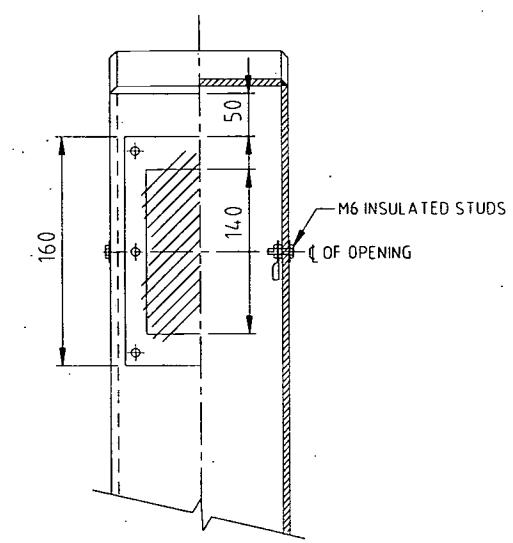
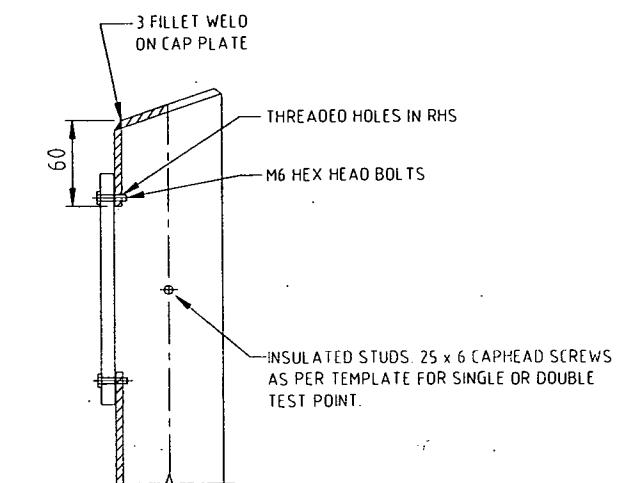
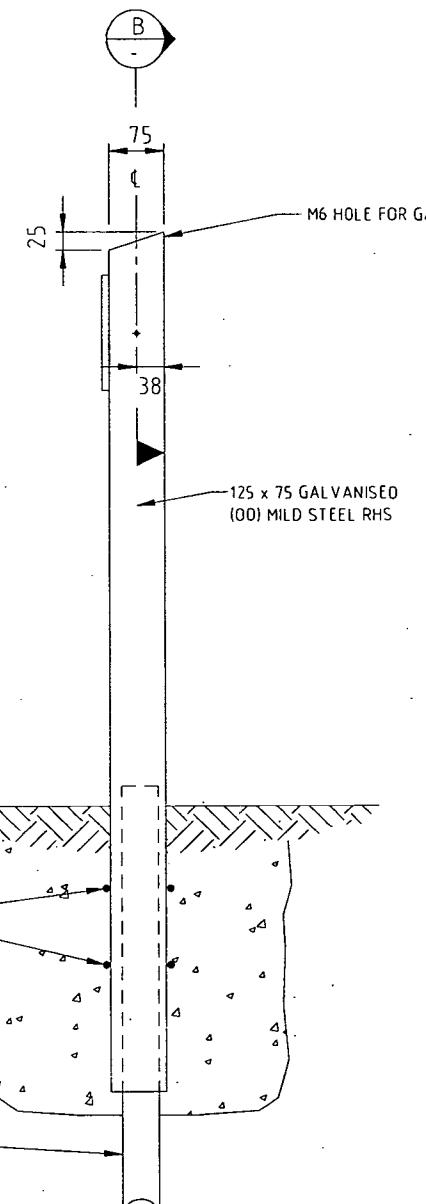
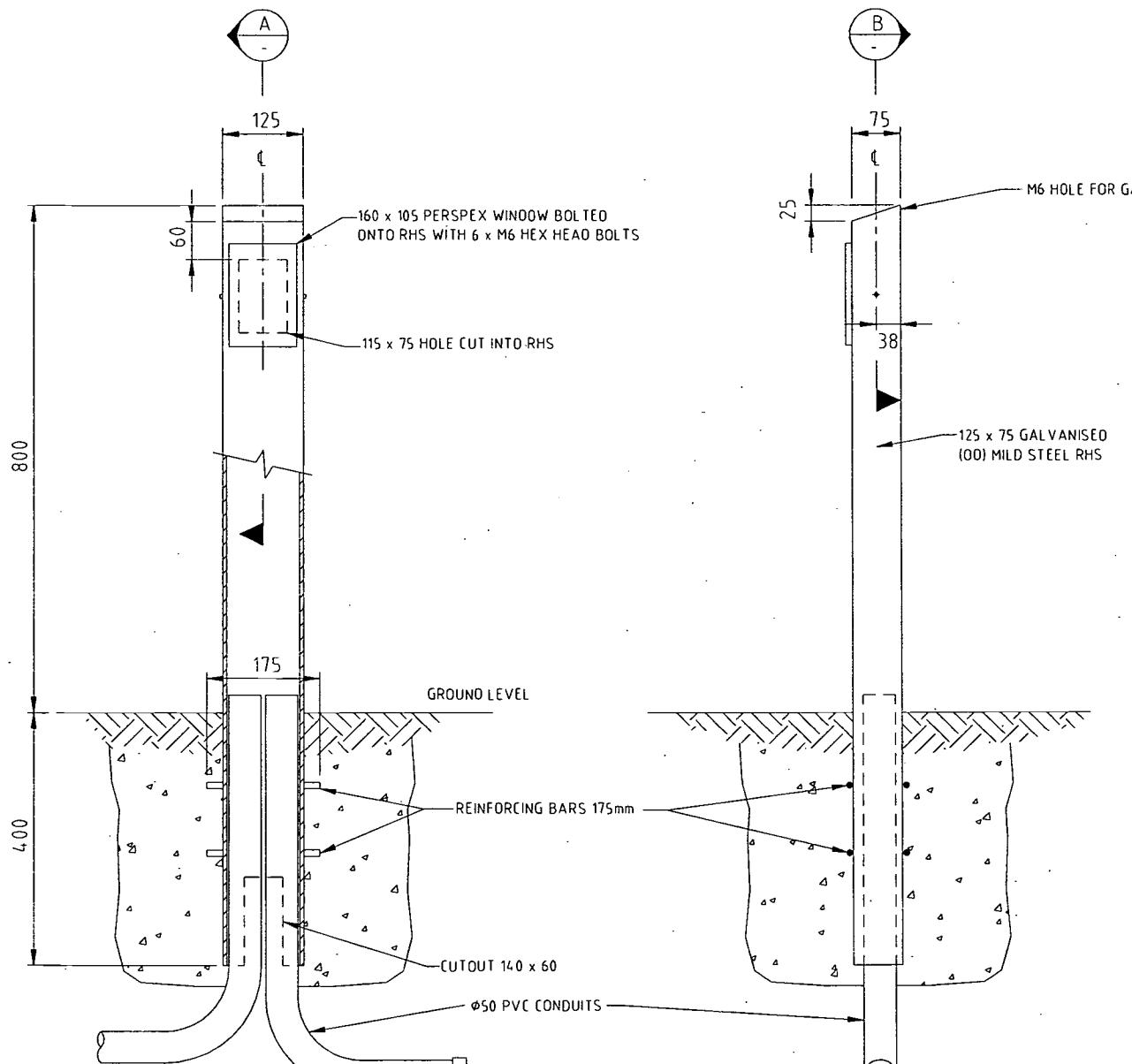
TITLE
CATHODIC PROTECTION
TEST POINT & ANODE
BED LOCATIONS

SCALE AS SHOWN
N° 2 OF 2 SHEETS
DRAWING N° 2/32.01-02
AMEND. 0

A B C D E ↑ F G H I J

NOTES

1. HOT DIP GALVANISE AFTER FABRICATION.



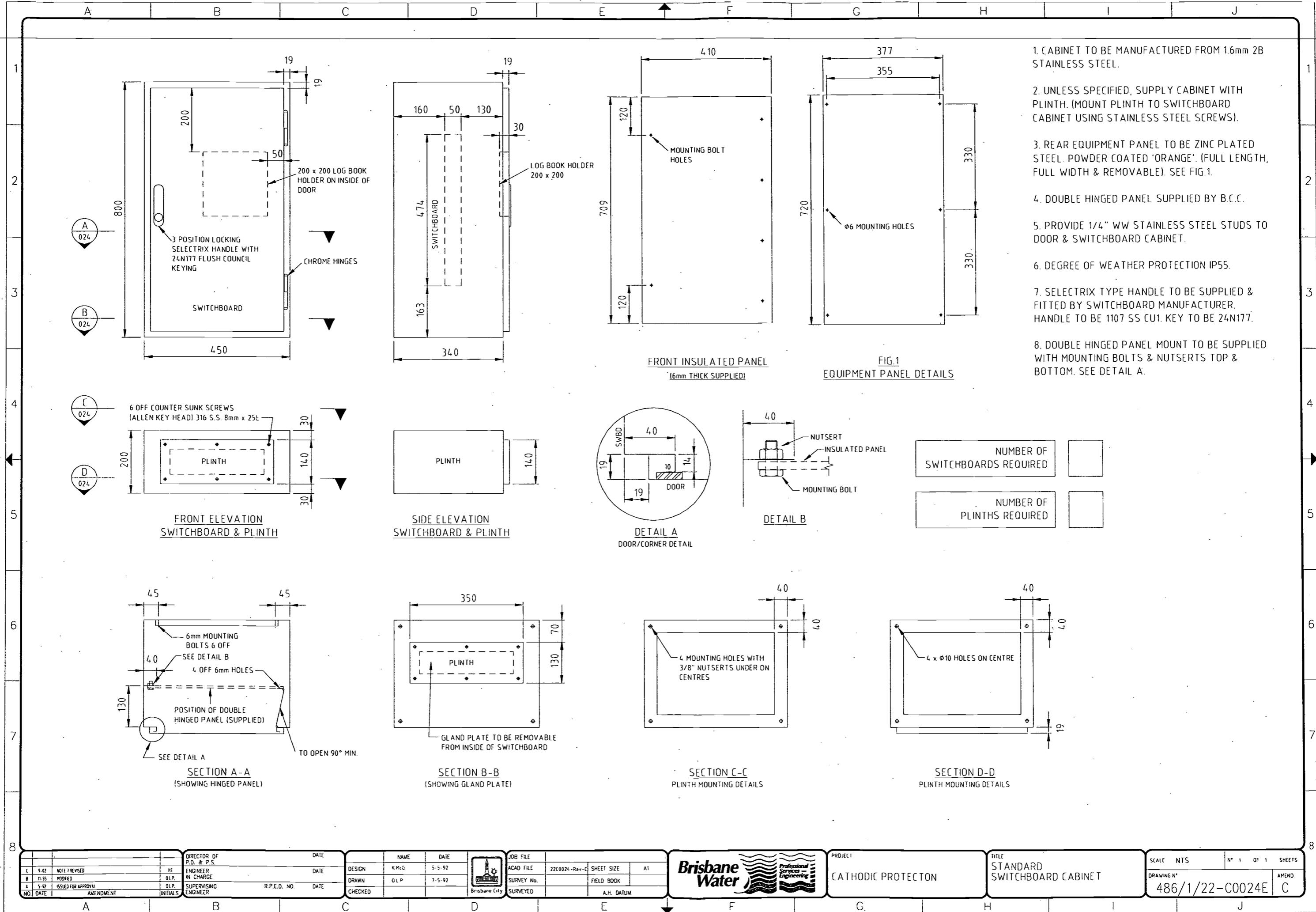
C 9-92 NOTE 1 REVISED	H 1 D.P. ENGINEER IN CHARGE	DIRECTOR OF P.D. & P.S.	DATE	NAME	DATE	JOB FILE	ACAD FILE	SHEET SIZE	A1
B 11-95 MODIFIED	I DLP SUPERVISING ENGINEER			K McG	5-5-92	2210001-RevA			
A 5-97 ISSUED FOR APPROVAL	R.P.E.O. NO.	AMENDMENT	DATE	DRAWN	7-5-92	Brisbane City		FIELD BOOK	
NO. DATE				CHECKED					

PROJECT: **Brisbane Water** Professional Services Engineering

TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS

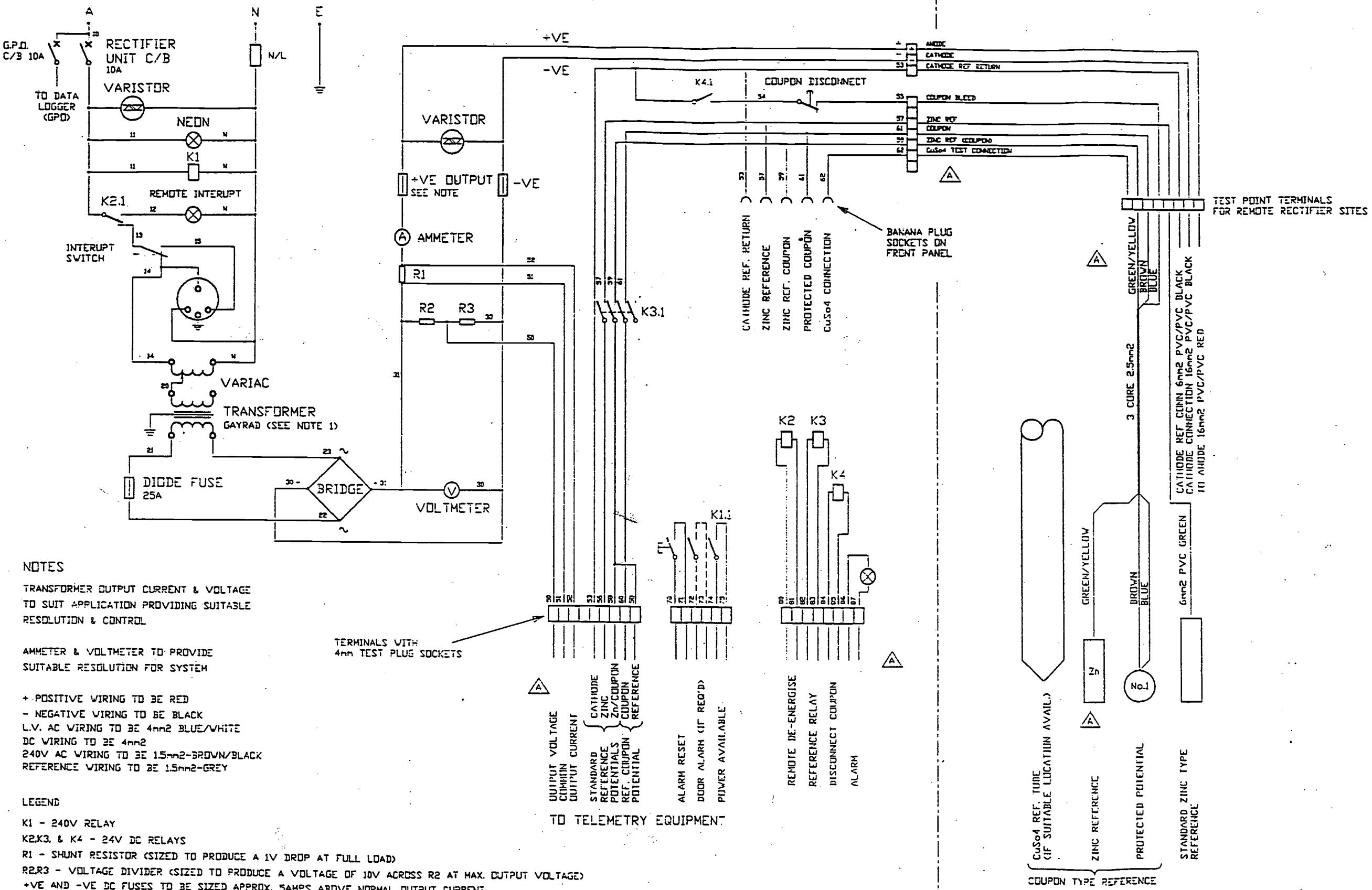
SCALE: NTS N° 1 OF 1 SHEETS

DRAWING N°: 486/1/22-AAT0001E AMEND C



RECTIFIER UNIT

FIELD



BRISBANE
CITY COUNCIL
DEPARTMENT OF WATER
SUPPLY & SEWERAGE
MECHANICAL & ELECTRICAL SERVICES

PROJECT: STANDARD
CATHODIC PROTECTION
TITLE: RECTIFIER UNIT
WITH DATA LOGGING FACILITIES
WIRING DIAGRAM

DRAWN	NAME	DATE	SUPER	NAME	DATE	SCALE	SIZE
DESIGN	J.S.	3.8.93	ENG.	M.J.	25.8.93		
CHECKED	J.S.	25.8.93	ELECT. ENG.				
DRAWING NO.	486/6/25-AA1C0021E		ACAD12 FILE NO.	A625C21		AMEND.	A