



☐ Electrical ☐ Mechanical ☐ Water Meters
25 Bunya Street Eagle Farm Q 4009
Ph. (07) 3403 1849
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25th July.2000

OPERATING MANUAL FOR:

MOUNT GRAVATT to NATHAN TRUNK MAIN S22 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

**BRISBANE WATER
WATER SYSTEM SERVICES**

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DRAWINGS

486/6/25-AA1C0021E	Standard Rectifier Wiring Diagram
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(No Number)	Monthly Maintenance Program
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(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: 500mm, 600mm & 755mm Dia mild steel cement lined.

Coating: Fibreglass Enamel Coated.

Length: Appox 2.8 Km.

Location: From Valve 613 at Holland Park Reservoir to deadplate at Air Valve 26 5
673 Mains Road Macgregor.

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, 12.5 amp direct current output enclosed in a stainless steel switchboard. This system has 1 rectifier installed. The rectifier is in the park at the end of Meckiff St. Macgregor and has a 240V supply from Energex Pole No.41814, located at the corner Meckiff and Rosewall Sts and via a Telstra property pole in the park.

(4.3) Cathode: The cathode point is located on the 755 mm dia mains, opposite the rectifier at Meckiff St. Macgregor. The point is located approx. 40 metres from the rectifier and marked by a 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 6 metres deep, at the rear corner of the park at Meckiff 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 seven 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-AA1C0021E

(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.

25th July, 2000.

Electrical Engineering Unit.

Cathodic Protection

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.

25th July, 2000.

Electrical Engineering Unit.

Cathodic Protection

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.

25th July, 2000 .
Electrical Engineering Unit.
Cathodic Protection

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:

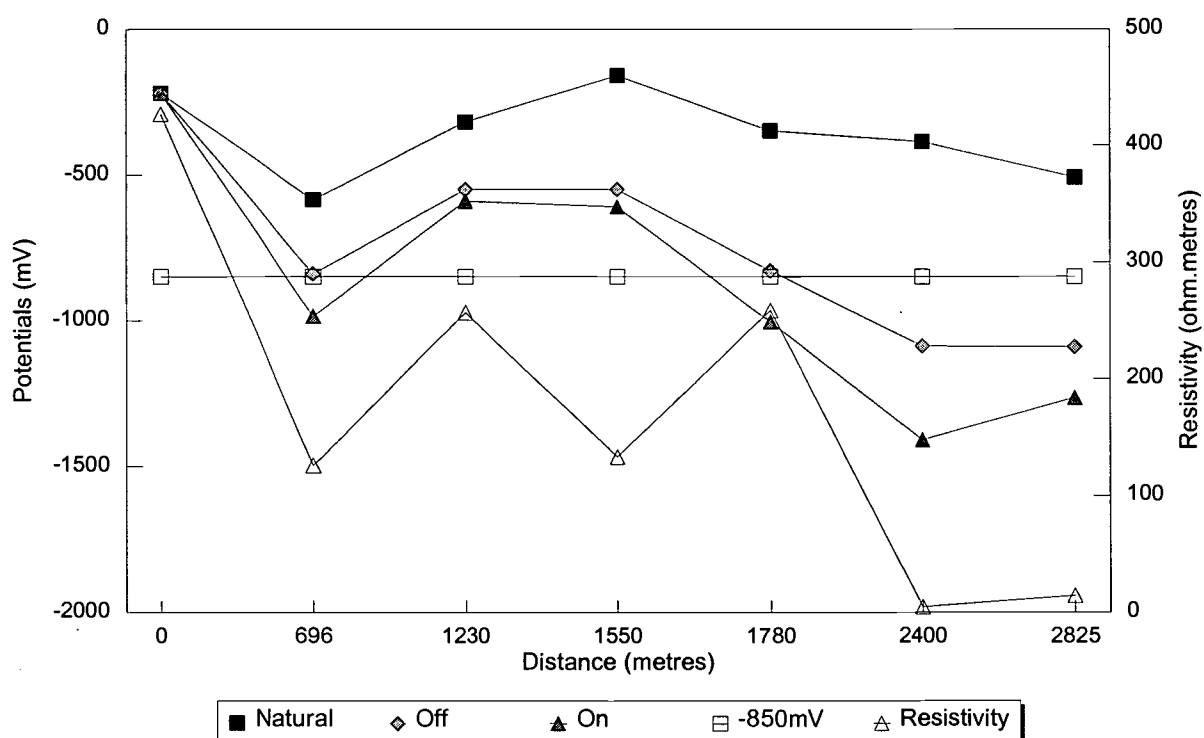
- 1/ Identify system.
- 2/ Check system for operation.
- 3/ Record voltmeter.
- 4/ Record ammeter.
- 5/ Record "on" potentials for all test points.
- 6/ Record "instant off" potentials for all test points.
- 7/ Record "off" potentials for all test points.
- 8/ Perform loop resistance and record.
- 9/ 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 Engineering Services

CP Form No. 23

Electrical Engineering Unit**Cathodic Protection System Potential Recording Form****Project** Mt Gravatt to Nathan Trunk Main**Date** 16th January 2001

Test Point number	Distances to T.P. (metres)	Potentials to CuSO ₄			Resistivities at 2 metres (ohm.metres)
		Natural (mV)	Off (mV)	On (mV)	
1	0	-220	-220	-220	427
2	696	-585	-840	-985	126
3	1230	-320	-550	-590	257
4	1550	-160	-550	-610	133
5	1780	-350	-830	-1005	259
6	2400	-388	-1087	-1410	4.8
7	2825	-510	-1090	-1265	14.4
8					
9					
10					

Graph of potentials and resistivity vs pipelength

Rectifier located at 2400M.

Brisbane Water Engineering Services

Ph. 34031838 Fx. 34031839

Electrical Engineering Unit5 Bunya Street
Eagle Farm Q 4009Cathodic Protection System Loop Resistance

Date: 24 th October 2000

Cathodic Protection System:

Mt.Gravatt to Nathan Trunk Main.

System Operating Volts

3

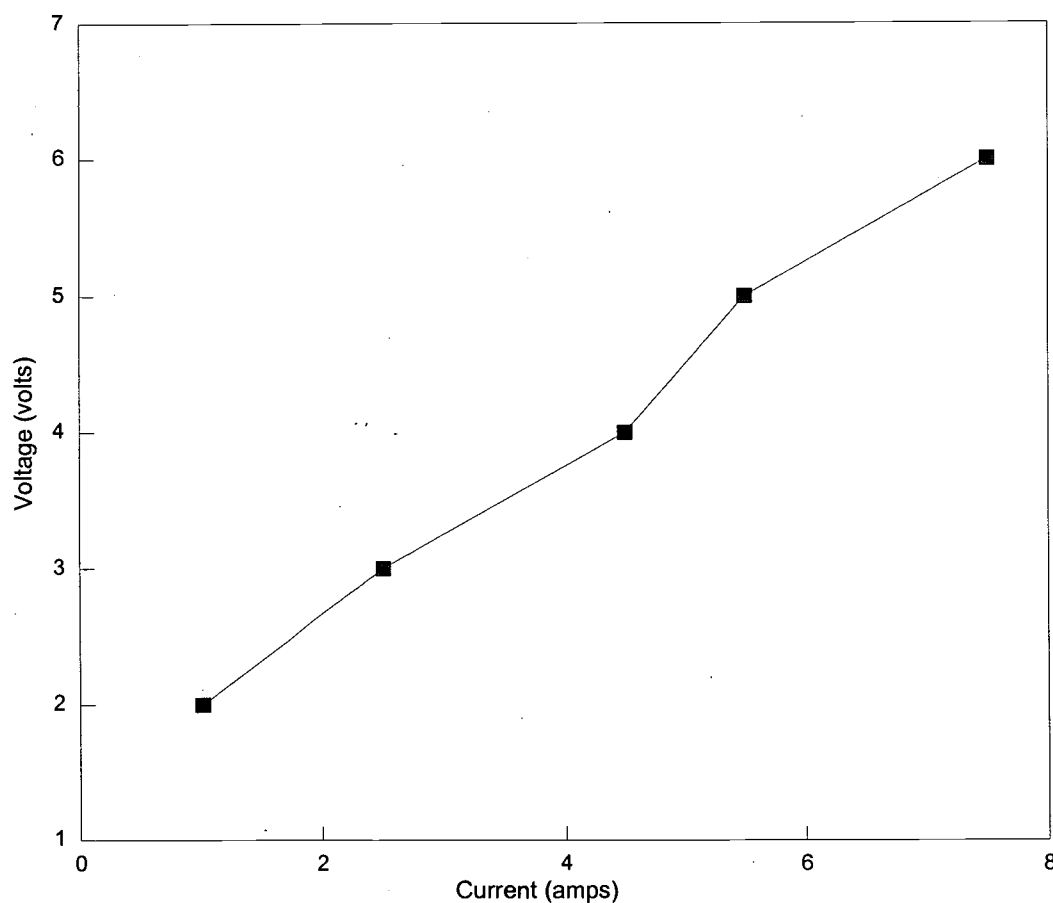
System Operating amps

2.5

Test Voltage:		Test Current:	
(volts)		(amps)	
2		1	
3		2.5	
4		4.5	
5		5.5	
6		7.5	

Loop Resistance (ohms)

0.666667

Graph of System voltage vs current.



TECHNOLOGY SERVICES
Brisbane Water Engineering Services

Electrical Co-ordinator, Kerry McGovern ✓
 Facsimile
 Mechanical Co-ordinator, Duncan Berrie
 QA Co-ordinator, Paul Tuckey
 Water Meters Co-ordinator, Don Crook

(ext. 31838)
 (ext. 31839)
 (ext. 31843)
 (ext. 31841)
 (ext. 31842)

FACSIMILE

To: Bob Bell	From: Les Greaves
Company: Energex	Phone: 34031840
Fax. No.: 3407 5496	Date: 17/01/2001

Pages: 6

Subject: Test results for Mt. Gravatt to Nathan Trunk Mains.

Please find attached interference test results for application for licence to operate a cathodic protection system.

The rectifier is located in the park at the end of Meckiff St Macgregor. The anode bed is at the rear of the same park. The trunk main runs from the corner of Mains Rd and Laver St, Nathan along O Grady St, through the Reserve to Mt. Gravatt Reservoir, Outlook Drive Mt. Gravatt. We have installed two zinc bleeds, one on MEN Energex Pole No. 46572 in Azanian St. Upper Mt. Gravatt and the other one on MEN Energex Pole No. 44395 in Mt. Gravatt Rd Upper Mt. Gravatt.

Please sign one of the lines below and return via fax at 34031839.

Do you accept the results ----- Yes signed _____ Date _____

Do you require witness testing. ----- Yes signed _____ Date _____

Regards

Les Greaves

PROUD TO BE A BUSINESS OF BRISBANE CITY

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)	Meckiff St. Macgregor. 4122 From Holland Park Reservoir to Mains Rd. near Laver St. Macgregpr.	
Structure to be protected:	500mm,755mm and 910mm Dia Mild Steel Trunk Main.	
Maximum operating current:....5.5 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 two bleeds on the Meckiff St. System.

Brisbane Water identification No.CPB 82 is on the earth at Energex Pole No 46572 Azanian St Mt Gravatt.

Brisbane Water identification No.CPB 83 is on the earth at Energex Pole No 44395 Mt. Gravatt Rd.



(ext. 31838)
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(ext. 31843)
(ext. 31841)
(ext. 31842)



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

Interference Testing

Exchange : MT GRAVATT

Related System : 6-6277

or Other Location : Brisbane Water/ICU. Water Main M

Testing Date : Monday 2 April 2001

1:00 pm

Voltage : 7 Volts

Current : 10 Amps

Comments : Brisbane Water rep J Taylor. No interference Recommend no further required.

Test Point	Interference Type	Location	Bond Off V	Bond On V	Swing V	Anode or Cathode	Distance A/K m	Comment
1	Lds, MB5	M/H O/s # Logan Rd	-1.273	-1.265	+(0.008)	Anode	0	
79	MB 45	M/H Rhs Derwent St o/s N0 59	-0.940	-0.928	+(0.012)	Anode	0	
	PJ 45	M/H Rhs Klump Rd 30m # Timor St	-0.850	-0.940	-0.090	Anode	0	
	Cx PJ 45	M/H Rhs Mountain St dist cnr Roger St	-0.595	-0.595	0	Anode	0	
	GI Earth Strap	At Mobile Tower near ICU.	-0.465	-0.490	-0.025	Anode	0	
67	MB 45	M/H Rhs Nagle St # Sobers St	-0.548	-0.553	-0.005	Anode	0	
	Lds 45	M/H Lhs Logan Rd # cnr Virgil St	-0.738	-0.736	+(0.002)	Anode	0	



QUEENSLAND GOVERNMENT

Electricity Act 1994

NOTICE OF REGISTRATION OF CATHODIC PROTECTION SYSTEM**Registration No: 3289****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	Meckiff St (from Holland Park Reservoir to Mains Rd near Laver St Macgregor) MACGREGOR - Post Code: 4122
Structure to be Protected	500mm, 755mm and 910mm Dia Mild Steel Trunk Main

CONDITIONS OF REGISTRATION**Maximum Operating Current:** 5.50 Amperes DC
Regulator

1819101

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details FormProject MT Gravatt NathanDate 18-12-00Bleed Location MT Gravatt RdCPB No. 83FOREIGN STRUCTURE OWNER: EnergexF.S. LOCATION: MT Gravatt Rd UBD 201 B6F.S. IDENTIFICATION: Pole 44395**REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:**REFERENCE TYPE: Cu Cu SO4 Ref CellPOTENTIAL OFF: -43 ON: +9 SW: +52BLEED TYPE: SacrificialBLEED MATERIAL: ZincBLEED WEIGHT: 0.4 KG.BLEED O/C POTENTIAL: -1100BLEED CURRENT OFF: ON: 11ma**REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:**

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
<u>-158</u>	<u>-94</u>	<u>+64</u>	<u>-94</u>	<u>-393</u>	<u>-299</u>	<u>-235</u>

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N)

IDENTIFICATION TAG INSTALLED? (Y/N)

CP83 Y**COMMENTS:**INSTRUMENT IN IIINSTALLED / TESTED BY J3

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details FormProject MT Gravatt - NathanDate 18-12-00Bleed Location AZANIAN STCPB No. 82FOREIGN STRUCTURE OWNER: EnergexF.S. LOCATION: Azanian st UBD 201 A7F.S. IDENTIFICATION: Pole 46572 MEN**REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:**REFERENCE-TYPE: Cu CuSO4 Ref. CellPOTENTIAL OFF: -203 ON: -104 SW: +99BLEED TYPE: SacrificialBLEED MATERIAL: ZincBLEED WEIGHT: 0.4 kgBLEED O/C POTENTIAL: -1100BLEED CURRENT OFF: ON: 11ma**REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:**

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
<u>-144</u>	<u>-122</u>	<u>+22</u>	<u>-122</u>	<u>-370</u>	<u>-248</u>	<u>+222</u>

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N)

IDENTIFICATION TAG INSTALLED? (Y/N) CP 82**COMMENTS:**Instrument IN11INSTALLED / TESTED BY JS

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results FormProject MT GRAVATT TO NATHANUnit Reading 5.0V at 5.5ADate 23-11-00

	Reading	Test Point I. D.	Location	Swing
On	-510mV	BUILDING	MECKIFF ST.	
Off	-490mV	EARTH	TELSTRA BUILDING	-20mV
On	-486mV	STEEL	MECKIFF ST	
Off	-476mV	TOWER	TELSTRA TOWER	-10mV
On	-527mV	FIRE		
Off	-526mV	HYDRANT	ROSEWELL ST	-1mV
On	-829mV	FIRE		
Off	-829mV	HYDRANT	MECKIFF ST	0
On	-380mV		ENERGEX POLE 44815	
Off	-372mV	EARTH	MECKIFF ST.	-8mV
On	-207mV		ENERGEX POLE 47146	
Off	-211mV	EARTH	O'GRADY ST	+4mV
On	-305mV		ENERGEX POLE 47156	
Off	-310mV	EARTH	O'GRADY ST	+5mV
On	-206mV		ENERGEX POLE 46636	
Off	-209mV	EARTH	ARAFURA ST	+3mV
On	-98mV	STEEL	TRANSFORMER	
Off	-100mV	FRAME	ARCTIC ST	+2mV
On	-201mV		ENERGEX POLE 46573	
Off	-203mV	EARTH	ARCTIC ST	+2mV
On	-197mV	FIRE		
Off	-197mV	HYDRANT	AZANIAN ST.	0
On	-104mV		ENERGEX POLE 46572	
Off	-123mV	EARTH	AZANIAN ST	+19mV
On				
Off				
On				
Off				
On				
Off				

INSTRUMENT IN 12

TESTED BY L. Greaves

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results FormProject MT Gravatt - NathanUnit Reading 4.9V 5.5A Date 18.12.00

	Reading	Test Point I. D.	Location	Swing
On	-354	TP	MT Gravatt Rd.	- 57
Off	-297			
On	+9	MEN	Pole 44395	+52
Off	-43			
On	-790	Retic Valve	MT Gravatt Rd. 62	-00
Off	-790			
On	+13	Water meter	" 62	+2
Off	+11			
On	-881	Fence.	" 55	+1
Off	-882			
On	-217	Earth Stake	Optus Pole 13159.	+3
Off	-220			
On	-248	Water meter	Mascot 6	00
Off	-248			
On	-230	MEN	MT Gravatt Rd. Pole 40344	-3
Off	-247			
On	+452	MEN Broken	Pole 45920 Prenzler 47	-
Off	+520			
On	-103	Water meter	" 49	+6
Off	-109			
On	-131	Fire Hydrant	" 55	+9
Off	-140			
On	-430	Pole Guard	" 57	-11
Off	-419			
On	-347	Sw Board.	" 59	+2
Off	-349			
On	-516	Stay Wire	Pole 43886 "	+6
Off	-522			
On	+2	MEN	Pole 43861 "	+6
Off	-4			

Instrument IN 11TESTED BY JS

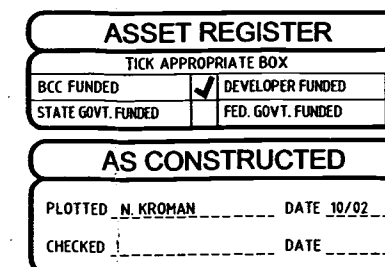
Brisbane Water Engineering Services

CP Form No. 27


Electrical Engineering Unit**Cathodic Protection Interference Survey Results Form**Project MT Gravatt NathanUnit Reading 4.9V 5.5ADate 13-12-00

	Reading	Test Point I. D.	Location	Swing
On	-13	MEN	Pole 43860 Preezler	-1
Off	-14			
On	-594	Pole Guard	Pole 39241 Branby	-00
Off	-594			
On	-410	Fence	52 Branby	-1
Off	-409			
On	-568	Earth Stake	Pole 9243 "	+2
Off	-570			
On	-361	Water Meter	48 "	-2
Off	-359			
On	-193	F/H	42 "	00
Off	-193			
On	-590	Earth A/B	Pole 39244 "	+3
Off	-593			
On	-993	TP 2	TM 36 "	-117
Off	-876			
On	-558	Tap	49 "	+2
Off	-560			
On	-637	Pole Guard	Pole 40941 Stanley	00
Off	-637			
On	-442	Water Pipe Cu	Service 45 "	+6
Off	-448			
On	-255	Water meter	47 "	+3
Off	-258			
On	-352	MEN	Pole 42811 "	+3
Off	-355			
On	-267	MEN	Pole 359102	-2
Off	-265			
On				
Off				

Instrument IN 11TESTED BY g j



			DIRECTOR OF PD & PS		DATE	SUPERVISING ENGINEER		R.P.E.Q. NO.		DATE	DESIGN			
			ENGINEER IN CHARGE		DATE	CADD FILE		2490101			DESIGN CHECK			
			SUPERVISING ENGINEER		RPEQ No	DATE	JOB FILE		SURVEY NO.	NIL	DRAWN		N.K.	OCT 02
							SURVEYED		NIL		DRAFTING CHECK		H.W.	NOV 02
NO. DATE			AMENDMENT			INITIALS								



Brisbane Water

PROJECT

Mt. GRAVATT HIGH LEVEL RESERVOIR TO NATHAN S22 TRUNK WATER MAIN

TITLE

CATHODIC PROTECTION TEST POINT & ANODE BED LOCATIONS

SCALE

AS SHOWN

N° 1 OF 1 SHEET

A.H. DATUM

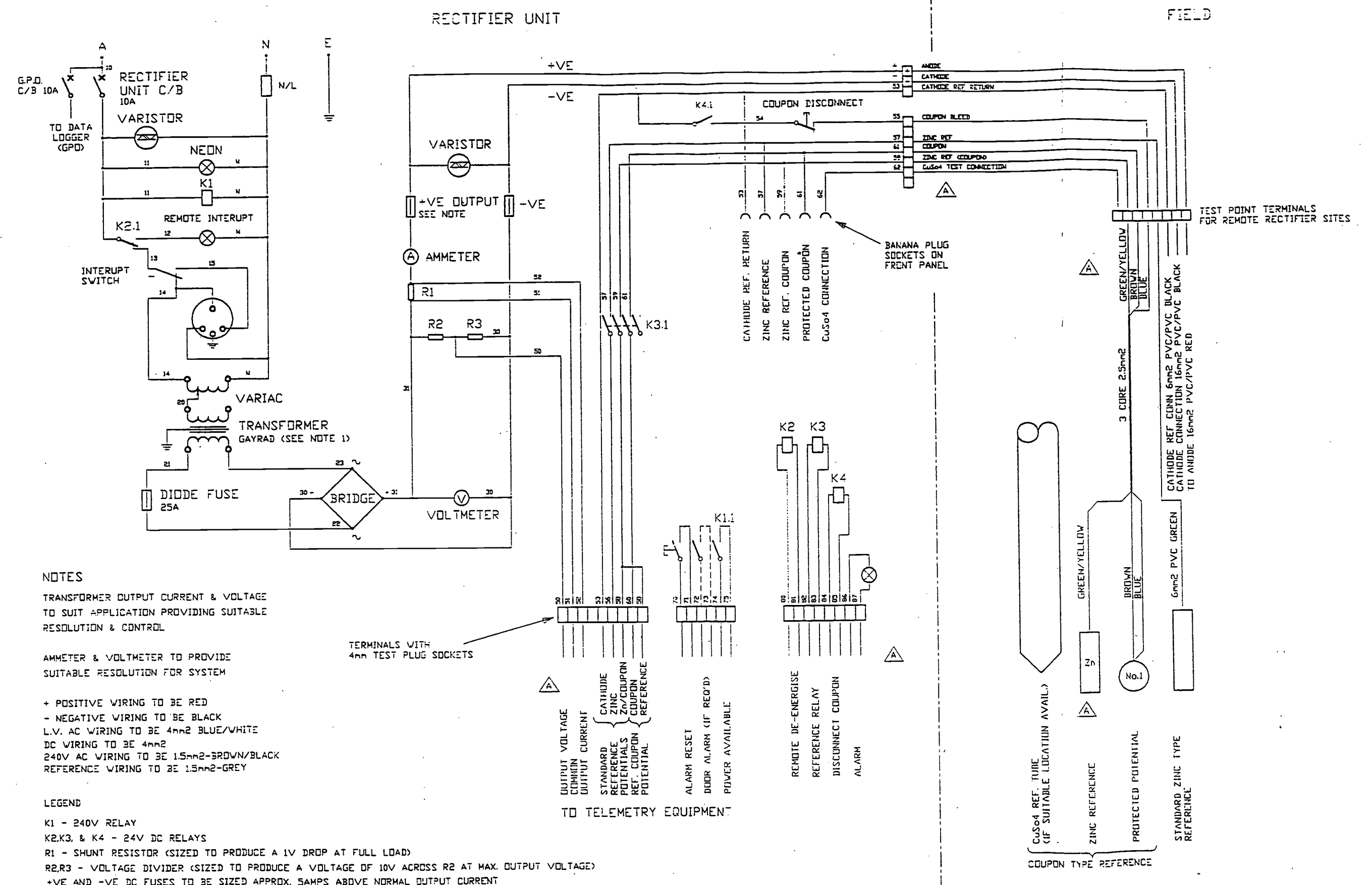
N° 1 OF 1 SHEET

DRAWING N°

2/49.01-01

AMEND

0



				BRISBANE CITY COUNCIL DEPARTMENT OF WATER SUPPLY & SEWERAGE MECHANICAL & ELECTRICAL SERVICES				PROJECT STANDARD CATHODIC PROTECTION				DRAWN R.L. 3.8.93 SUPER. ENG.				NAME M.J. 25.8.93 SCALE A3			
								TITLE RECTIFIER UNIT WITH DATA LOGGING FACILITIES WIRING DIAGRAM				DESIGN J.S. 3.8.93 SENIOR ENG.							
												CHECKED J.S. 25.8.93 ELECT. ENG.							
												DRAWING No. 486/6/25-AA1C0021E				ACAD12 FILE No. A625C21			
																A			

NOTES

1. CABINET TO BE MANUFACTURED FROM 1.6mm 316 2B STAINLESS STEEL.
2. UNLESS SPECIFIED, SUPPLY CABINET WITH PLINTH. (MOUNT PLINTH TO SWITCHBOARD CABINET USING STAINLESS STEEL SCREWS).
3. REAR EQUIPMENT PANEL TO BE ZINC PLATED STEEL, POWDER COATED 'ORANGE'. (FULL LENGTH & WIDTH & REMOVABLE). SEE FIG.1
4. DOUBLE HINGED PANEL SUPPLIED BY B.C.C.
5. PROVIDE 1/4" WW S.S. EARTH STUDS TO DOOR & SWITCHBOARD CABINET.
6. DEGREE OF WEATHER PROTECTION IP55.
7. SELECTRIX TYPE HANDLE TO BE SUPPLIED & FITTED BY SWITCHBOARD MANUFACTURER. HANDLE TO BE 1107 SS CUI KEY TO BE 1109071W
8. DOUBLE HINGED PANEL MOUNT TO BE SUPPLIED WITH MOUNTING BOLTS & NUTSERTS. TOP & BOTTOM. SEE DETAIL 'A'.

B	11.95	MODIFIED	O.L.P.
A	5.92	ISSUED FOR APPROVAL	O.L.P.
No	DATE	AMENDMENT	INITIALS

AMENDMENT & ISSUE REGISTER

MANAGER	DIRECTOR OF TECHNOLOGY SERVICES
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DATE: DATE:

DIRECTOR OF PLANNING & DESIGN	DIRECTOR OF WATER SUPPLY	DIRECTOR OF CONSTRUCTION
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DATE: DATE: DATE:

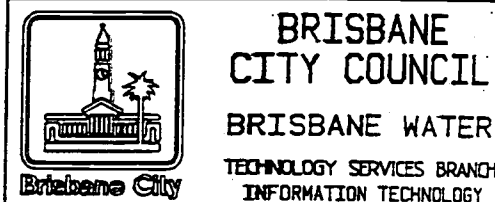
DESIGN	K.M.G.	5.5.92	ENGINEER IN CHARGE
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DRAWN	O.L.P.	7.5.92	SUPERVISING ENGINEER
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TRACED			
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CHECKED		A2	REDUCED
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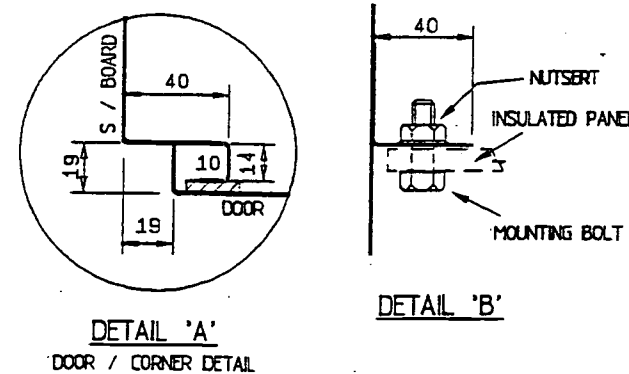
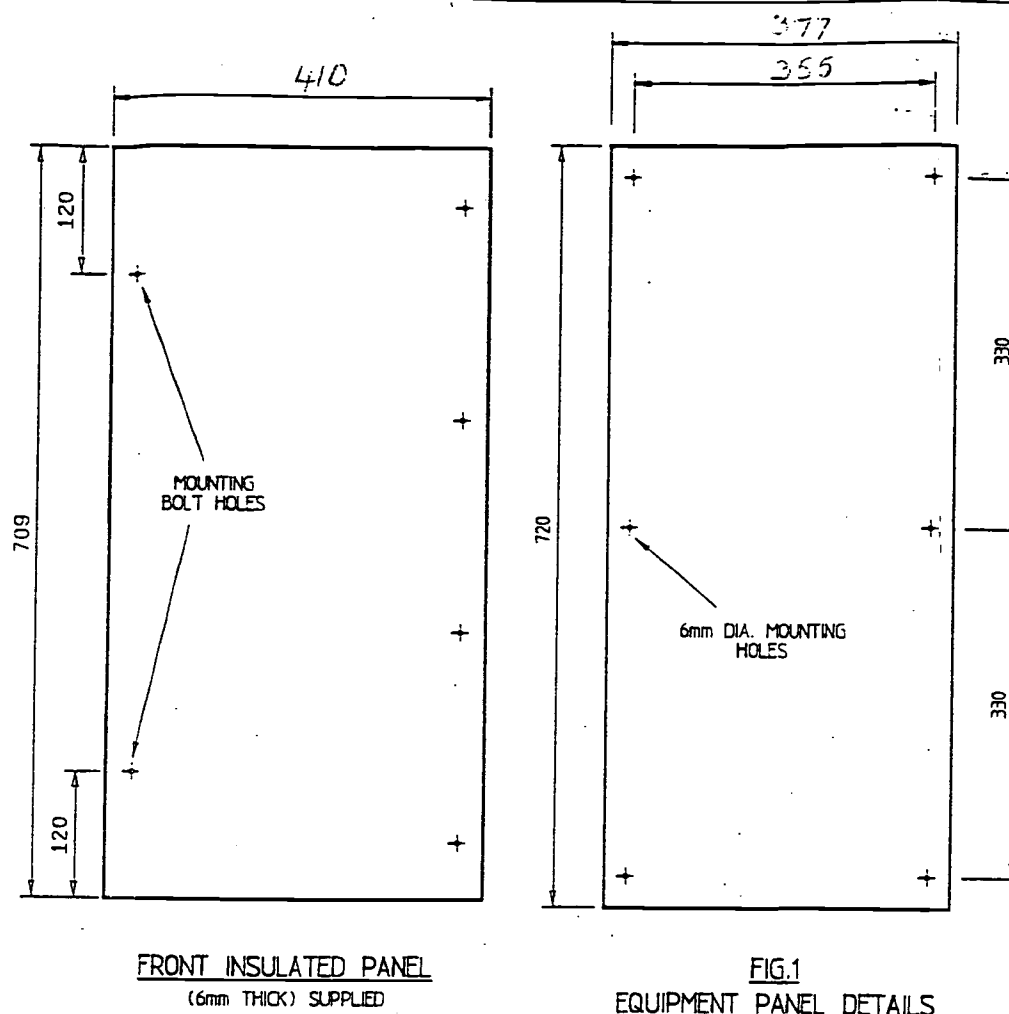


PROJECT: CATHODIC PROTECTION

TITLE: STANDARD SWITCHBOARD CABINET

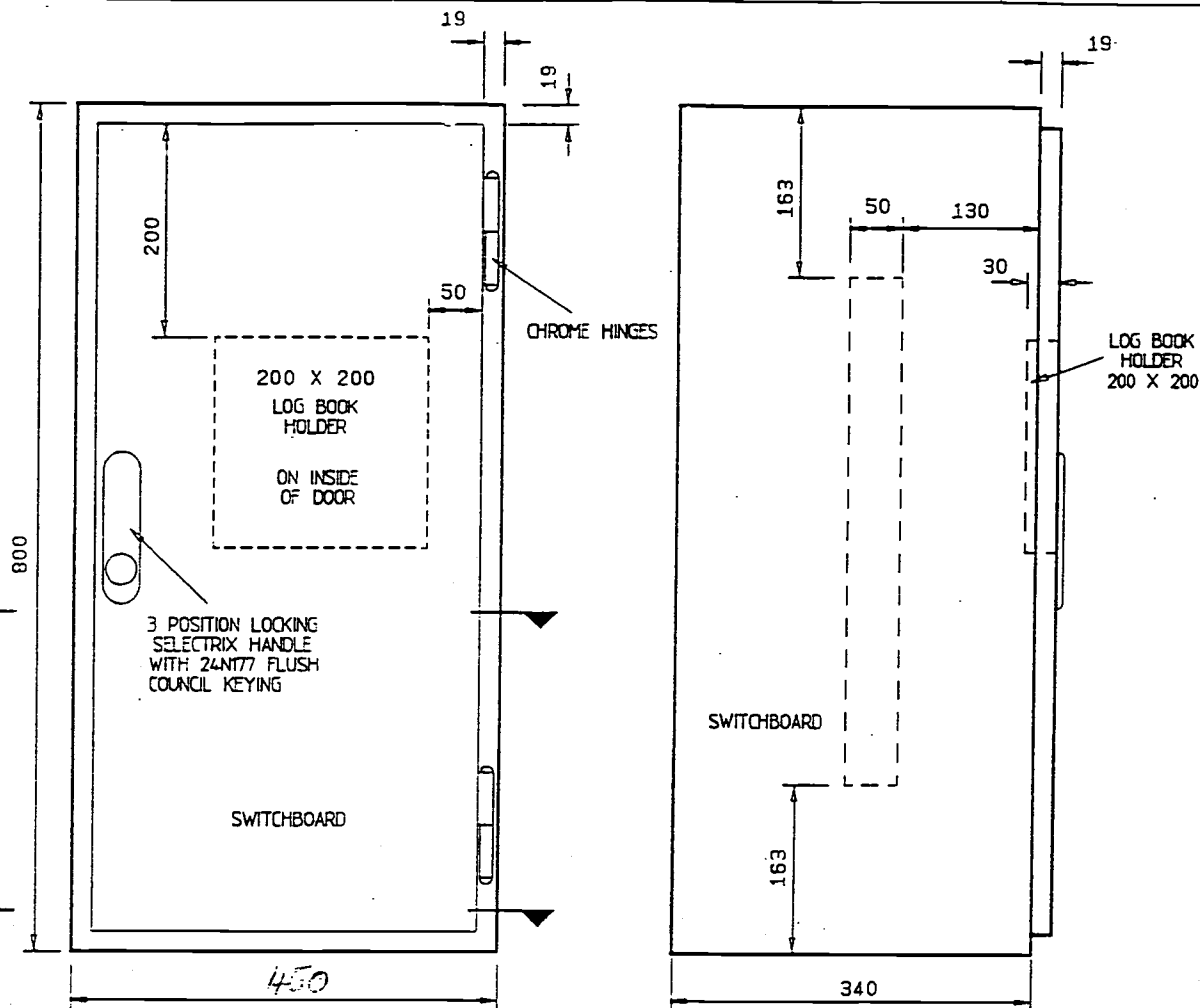
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DRAWING No. 486/1/22-C0024E AMEND. B



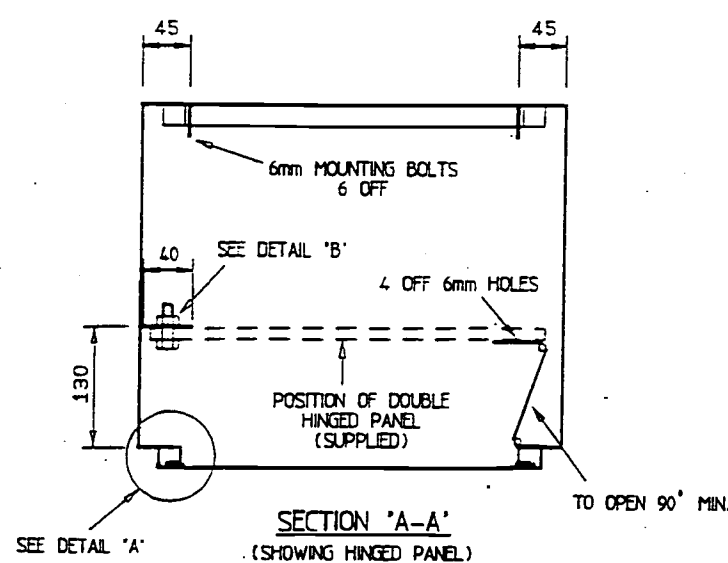
NUMBER OF SWITCHBOARDS REQUIRED

NUMBER OF PLINTHS REQUIRED

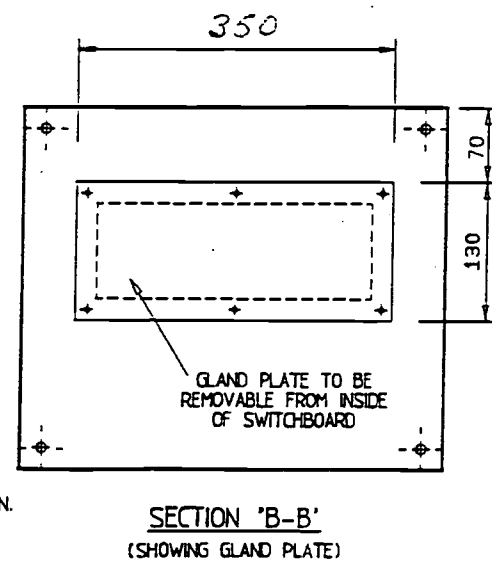


FRONT ELEVATION SWITCHBOARD & PLINTH

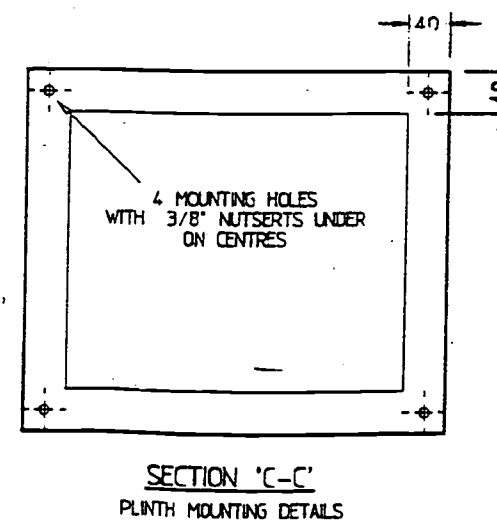
SIDE ELEVATION SWITCHBOARD & PLINTH



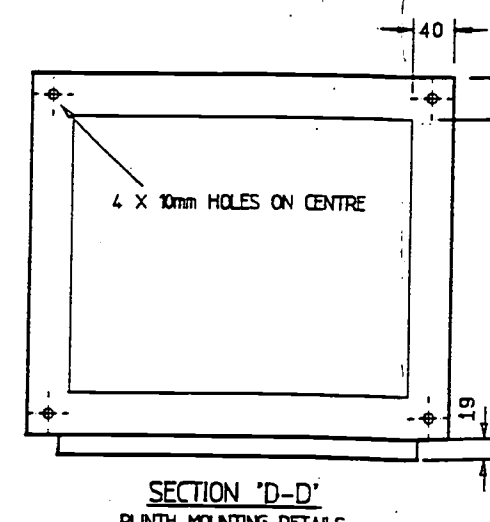
SECTION 'A-A' (SHOWING HINGED PANEL)



SECTION 'B-B' (SHOWING GLAND PLATE)



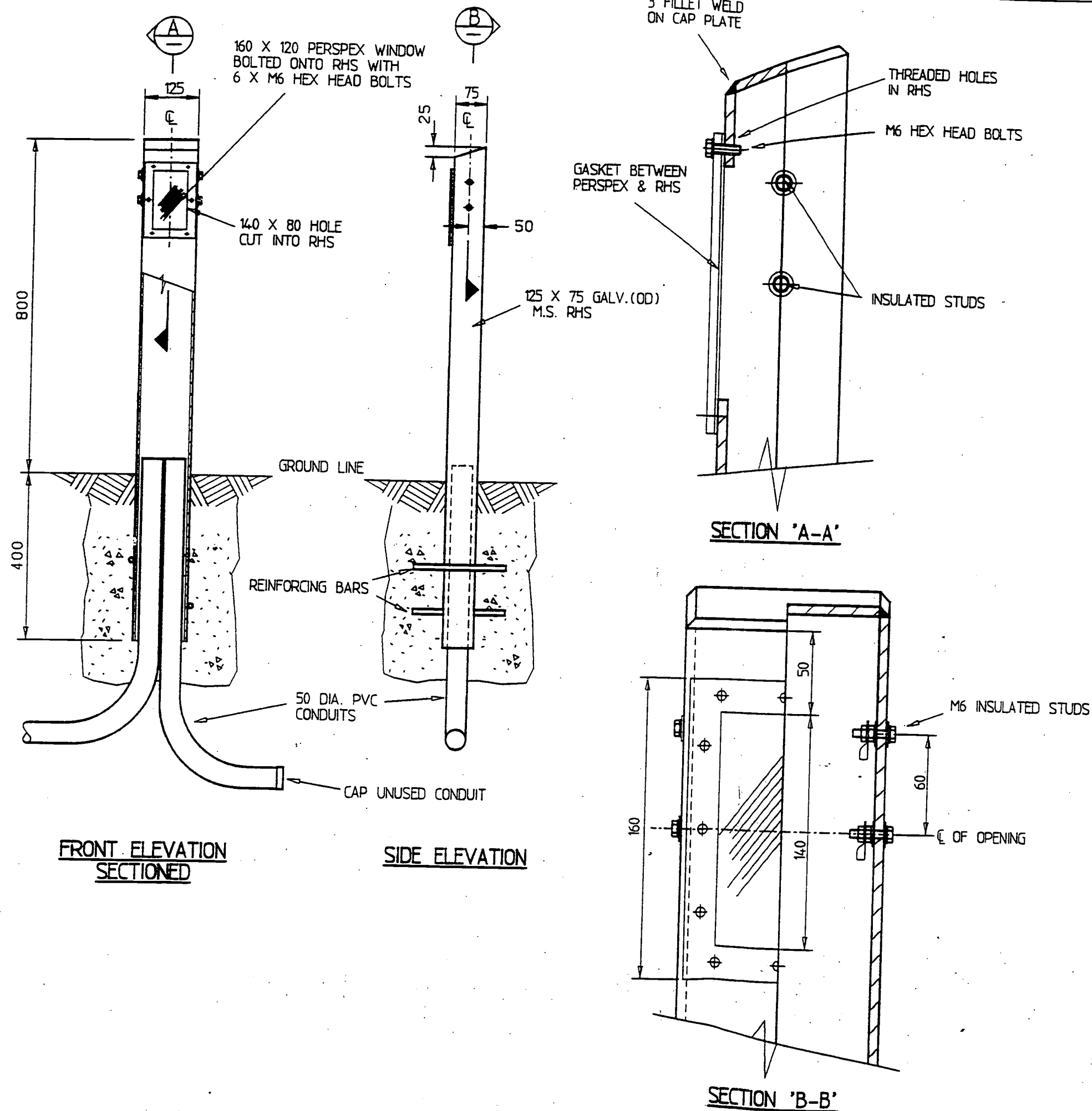
SECTION 'C-C' PLINTH MOUNTING DETAILS




SECTION 'D-D' PLINTH MOUNTING DETAILS

NOTES

1. HOT DIP GALVANISE AFTER FABRICATION.



O 4.96 ISSUED FOR APPROVAL		O.L.P.
No	DATE	AMENDMENT INITIALS
AMENDMENT & ISSUE REGISTER		
MANAGER		DIRECTOR OF TECHNOLOGY SERVICES
DATE:	DATE:	
DIRECTOR OF PLANNING & DESIGN	DIRECTOR OF WATER SUPPLY	DIRECTOR OF CONSTRUCTION
DATE:	DATE:	DATE:
DESIGN	J.S.	19.4.96
DRAWN	O.L.P.	22.4.96
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CHECKED		
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 BRISBANE CITY COUNCIL BRISBANE WATER TECHNOLOGY SERVICES BRANCH INFORMATION TECHNOLOGY		
PROJECT: CATHODIC PROTECTION		
TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS		
SCALE: N.T.S.	No. 1 OF 1 SHEETS	AMEND. 0
DRAWING No. 486/1/22-AA1T0001E		0

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Pg. 01



TECHNOLOGY SERVICES
Brisbane Water Engineering Services

Electrical Co-ordinator, Kerry McGovern ✓
 Facsimile
 Mechanical Co-ordinator, Duncan Berrie
 QA Co-ordinator, Pau Tuckey
 Water Meters Co-ordinator, Don Creek

(ext. 31838)
 (ext. 31839)
 (ext. 31843)
 (ext. 31841)
 (ext. 31842)

FACSIMILE

To: Bob Bell	From: Les Greaves
Company: Energex	Phone: 34031840
Fax. No.: 3407 5496	Date: 17/01/2001

Pages: 6

Subject: Test results for Mt. Gravatt to Nathan Trunk Mains.

Please find attached interference test results for application for licence to operate a cathodic protection system

The rectifier is located in the park at the end of Meckiff St Macgregor. The anode bed is at the rear of the same park. The trunk main runs from the corner of Mains Rd and Laver St, Nathan along O Grady St, through the Reserve to Mt. Gravatt Reservoir, Outlook Drive Mt. Gravatt. We have installed two zinc bleeds, one on MEN Energex Pole No. 46572 in Azanian St Upper Mt. Gravatt and the other one on MEN Energex Pole No. 44395 in Mt. Gravatt Rd Upper Mt. Gravatt.

Please sign one of the lines below and return via fax at 34031839

Do you accept the results ----- Yes signed DAVE SCARLE Date 31/1/01
 Do you require witness testing. NO ----- Yes signed _____ Date _____

Regards

Les Greaves

PROUD TO BE A BUSINESS OF BRISBANE CITY



TECHNOLOGY SERVICES
Brisbane Water Engineering Services

Electrical Co-ordinator, Kerry McGovern ✓
 Facsimile
 Mechanical Co-ordinator, Duncan Berrie
 QA Co-ordinator, Paul Tuckey
 Water Meters Co-ordinator, Don Crook

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Please sign one of the lines below and return via fax at 34031839.

Do you accept the results ----- Yes signed _____ Date _____

Do you require witness testing. ----- Yes signed _____ Date _____

Regards

Les Greaves

PROUD TO BE A BUSINESS OF BRISBANE CITY

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details FormProject MT Gravatt NathanDate 18-12-00Bleed Location MT Gravatt RdCPB No. 83FOREIGN STRUCTURE OWNER: EnergexF.S. LOCATION: MT Gravatt Rd UBD 201 B6F.S. IDENTIFICATION: Pole 44395**REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:**REFERENCE TYPE: Cu Cu SO4 Ref CellPOTENTIAL OFF: -43 ON: +9 SW: +52BLEED TYPE: SacrificialBLEED MATERIAL: ZincBLEED WEIGHT: 0.4 KG.BLEED O/C POTENTIAL: -1100BLEED CURRENT OFF: ON: 11mA**REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:**

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
<u>-158</u>	<u>-94</u>	<u>+64</u>	<u>-94</u>	<u>-393</u>	<u>-299</u>	<u>-235</u>

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N)

IDENTIFICATION TAG INSTALLED? (Y/N)

CP83 Y**COMMENTS:**INSTRUMENT IN IIINSTALLED / TESTED BY J3

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details FormProject MT Gravatt - NathanDate 18-12-00Bleed Location AZANIAN STCPB No. 82FOREIGN STRUCTURE OWNER: EnergexF.S. LOCATION: Azanian st UBD 201 A7F.S. IDENTIFICATION: Pole 46572 MEN**REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:**REFERENCE-TYPE: Cu CuSO₄ Ref CellPOTENTIAL OFF: -203 ON: -104 SW: +99BLEED TYPE: SacrificialBLEED MATERIAL: ZincBLEED WEIGHT: 0.4 kgBLEED O/C POTENTIAL: -1100BLEED CURRENT OFF: ON: 11ma**REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:**

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-144	-122	+22	-122	-370	-248	+222

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N)

IDENTIFICATION TAG INSTALLED? (Y/N) CP 82**COMMENTS:**Instrument IN11INSTALLED / TESTED BY JS

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Mt GRAVATT TO NATHANUnit Reading 5.0V at 5.5ADate 23-11-00

	Reading	Test Point I.D.	Location	Swing
On	-510mV	BUILDING	MECKIFF ST.	
Off	-490mV	EARTH	TELSTRA BUILDING	-20mV
On	-486mV	STEEL	MECKIFF ST	
Off	-476mV	TOWER	TELSTRA TOWER	-10mV
On	-527mV	FIRE		
Off	-526mV	HYDRANT	ROSEWELL ST	-1mV
On	-829mV	FIRE		
Off	-829mV	HYDRANT	MECKIFF ST	0
On	-380mV		ENERGEX POLE 41815	
Off	-372mV	EARTH	MECKIFF ST.	-8mV
On	-207mV		ENERGEX POLE 47146	
Off	-211mV	EARTH	O'GRADY ST	+4mV
On	-305mV		ENERGEX POLE 47156	
Off	-310mV	EARTH	O'GRADY ST	+5mV
On	-206mV		ENERGEX POLE 44636	
Off	-209mV	EARTH	ARAFURA ST	+3mV
On	-98mV	STEEL	TRANSFORMER	
Off	-100mV	FRAME	ARCTIC ST	+2mV
On	-201mV		ENERGEX POLE 46573	
Off	-203mV	EARTH	ARCTIC ST	+2mV
On	-197mV	FIRE		
Off	-197mV	HYDRANT	AZANIAN ST.	0
On	-104mV		ENERGEX POLE 46572	
Off	-123mV	EARTH	AZANIAN ST	+19mV
On				
Off				
On				
Off				
On				
Off				

INSTRUMENT IN 12

TESTED BY L. Greaves

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit**Cathodic Protection Interference Survey Results Form**Project MT Gravatt - NathanUnit Reading 4.9V 5.5A Date 18.12.00

	Reading	Test Point I. D.	Location	Swing
On	-354	TP	MT Gravatt Rd.	- 57
Off	-297			
On	+9	MEN	Pole 44395	+52
Off	-43			
On	-790	Retic Valve	MT Gravatt Rd. 62	-00
Off	-790			
On	+13	Water Meter	" 62	+2
Off	+11			
On	-881	Fence.	" 55	+1
Off	-882			
On	-217	Earth Stake	" Optus Pole 13159.	+3
Off	-220			
On	-248	Water meter	Mascot 6	00
Off	-248			
On	-230	MEN	MT Gravatt Rd. Pole 40344	-3
Off	-247			
On	+452	MEN Broken	Pole 45920 Prenzler 47	-
Off	+520			
On	-103	Water meter	" 49	+6
Off	-109			
On	-131	Fire Hydrant	" 55	+9
Off	-140			
On	-430	Pole Guard	" 57	-11
Off	-419			
On	-347	SW Board.	" 59	+2
Off	-349			
On	-516	Stay Wire	Pole 43886 "	+6
Off	-522			
On	+2	MEN	Pole 43861 "	+6
Off	-4			

Instrument IN 11TESTED BY JS

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project MT Gravatt NathanUnit Reading 4.9V 5.5ADate 13-12-00

	Reading	Test Point I.D.	Location	Swing
On	-13	MEN	Pole 43860 Picauler	-1
Off	-14			
On	-594	Pole	Pole 39241 Branby	-00
Off	-594	guard		
On	-410	Fence	52 Branby	-1
Off	-409			
On	-568	Earth	Pole 9243 "	+2
Off	-570	Stake		
On	-361	Water	48 "	-2
Off	-359	meter		
On	-193	F/H	42 "	00
Off	-193			
On	-590	Earth	Pole 39244 "	+3
Off	-593	A/B		
On	-993	TP	TM 36 "	-117
Off	-876	2		
On	-558	Tap	49 "	+2
Off	-560			
On	-637	Pole	Pole 40941 Standby	00
Off	-637	Guard		
On	-442	Water	service 45 "	+6
Off	-448	Pipe cu		
On	-255	Water	47 "	+3
Off	-258	meter		
On	-352	MEN	Pole 42811 "	+3
Off	-355			
On	-267	MEN	Pole 359102	-2
Off	-265			
On				
Off				

Instrument IN11TESTED BY g3

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