25 Bunya Street
Eagle Farm Q
4009
Ph. (07) 3403 8888
Fx. (07) 3403 1898

16 th June 2004

OPERATING MANUAL FOR:

MUIR ST. to NORTHCLIFFE ST. to TINGALPA TRUNK MAINS

S39 and S53 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

MANUAL CONTENTS

DRAWINGS

(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: 755 mm Dia mild steel cement lined.

Coating: Enamel Coated.

Length: Appox 2.7 Km.

Location: From Valve 203 cnr Wynnum Rd.and Muir St. Murarrie to Valve 206 Wynnum Rd near Graystone St.

Construction Drawings:

486/1/22-C0024E	Cathodic Protection Standard Switchboard Cabinet
486/1/22-AAT0001E	Cathodic Protection Test Points

(4.0) CATHODIC PROTECTION DETAILS

(4.1) Type of Cathodic Protection: Impressed Current.

(4.2) Rectifier: Standard 30 Volt, 30 amp direct current output enclosed in a stainless steel switchboard. This system has 1 rectifier installed. The rectifier is in the park, Wynnum Rd. near Northcliffe St, and has a 240V supply from the distribution board at Submersible Pump Station SP112.

(4.3) Cathode: The cathode point is located on the 755 mm dia mains, approx 30 metres from the rectifier. 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 30 metres from the trunk mains, in a vertical bed 5 metres deep, in the park adjacent to the creek. 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 mains which can be identified from the layout drawing. Three test points are on S53 and four test points are on S39.

(4.6) Associated Drawings:

Cathodic Protection Test Point Details	- 486/1/22-AAT0001E
Standard Rectifier Wiring Diagram	- 486/6/25-AA1C0021
Cathodic Protection Test Point & Anode Bed Locations S39 Trunk Main.	-2 / 10.2256-01 Sheets 1 to 2
Cathodic Protection Test Point & Anode Bed Locations S53 Trunk Main.	-2 / 10.804-01

(4.7) Associated Standards:

AS/NZS 3000	2000	Electrical Installations
AS/NZS 2832.1	1998	Cathodic Protection of Metals-Pipes and Cables.

(4.8) Government Regulations:
Queensland Electricity Safety Rules and Regulations. 2002

(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 Industrial Relations, and has approval to operate.

(7.0) MAINTENANCE

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

16 th June, 2004.
Cathodic Protection Unit.

CPS Bimonthly 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.

16 th June. 2004.
Cathodic Protection Unit

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.

16 th June, 2004.
Cathodic Protection Unit

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

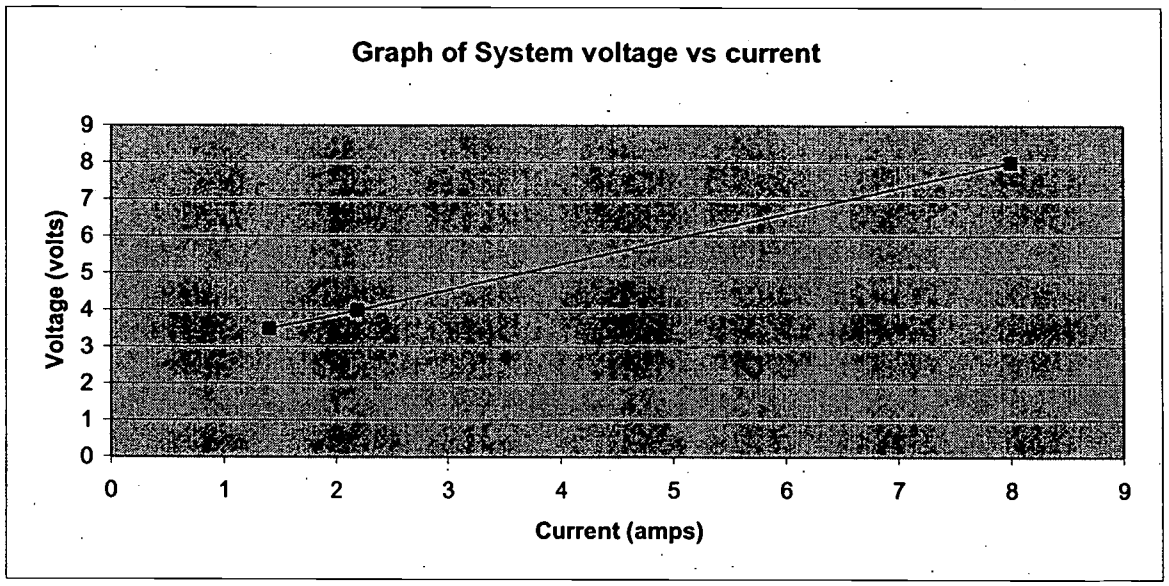
Network Services

Cathodic Protection System Loop Resistance — Wynnum Rd. Rectifier. CPS 207

Date:13th April 2004
Cathodic Protection System: Muir St. to Northcliffe St. to Tingalpa S53 & S39
System Operating Volts: 3.5 System Operating amps: 1.4

Test Voltage: (volts)		Test Current: (amps)	
3.5		1.4	
4		2.2	
8		8	

Loop Resistance (ohms)
1



15/04/2004

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit

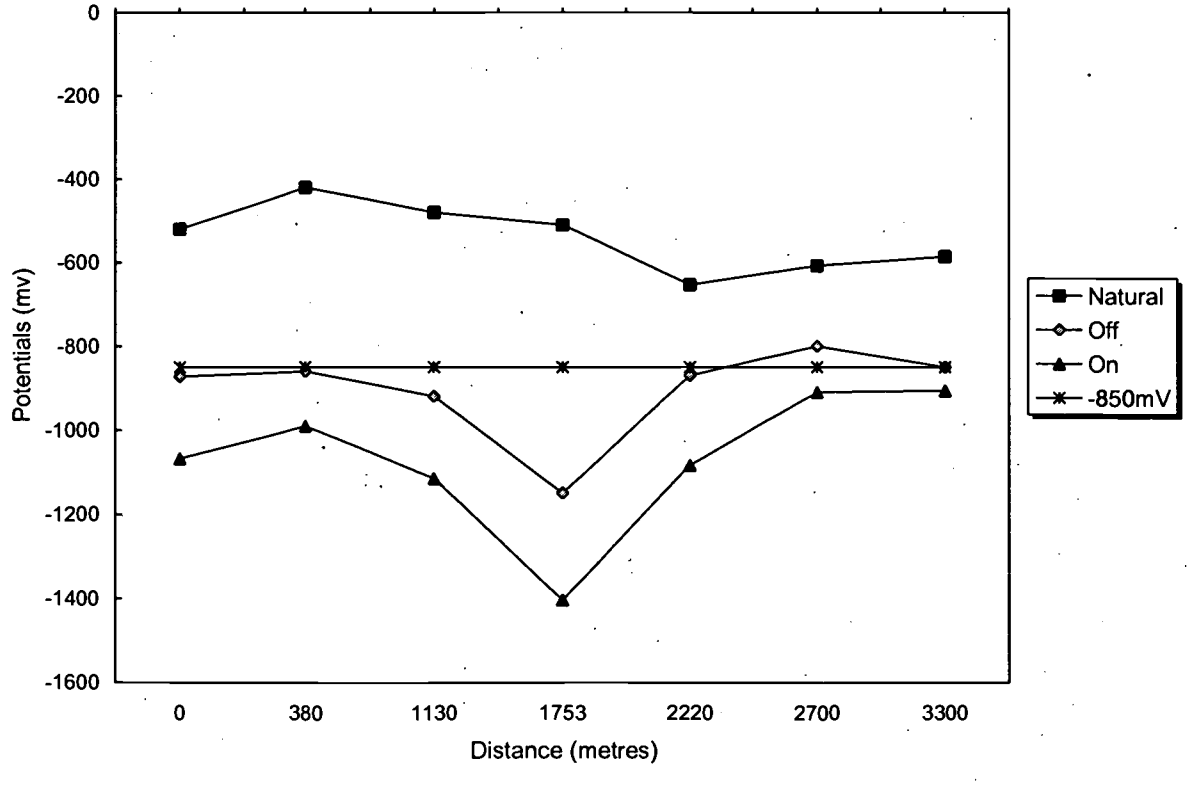
Cathodic Protection System Potential Recording Form

Project Muir St to Northcliffe St to Tingalpa S39 &S53 **Date** 16th June 2004

Test Point Nos 1,2 and 3 are S53 and Test Point Nos 4 to 7 are S39

Test Point number	Distances to T.P. (metres)	Potentials to CuSO4 Natural (mV)	Off (mV)	On (mV)	Distance	
1	0	-520	-872	-1068	0	
2	380	-420	-860	-990	380	
3	1130	-480	-920	-1115	1130	
4	1753	-510	-1150	-1404	1753	Rectifier at TP. No4
5	2220	-653	-870	-1084	2220	
6	2700	-608	-800	-910	2700	
7	3300	-586	-850	-906	3300	
8						
9						
10						
11						
12						
13						
14						

Graph of potentials vs pipelength



Revision 21/07/2004 PTMUIRTING3953

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit

Cathodic Protection System Resistivities Recording Form

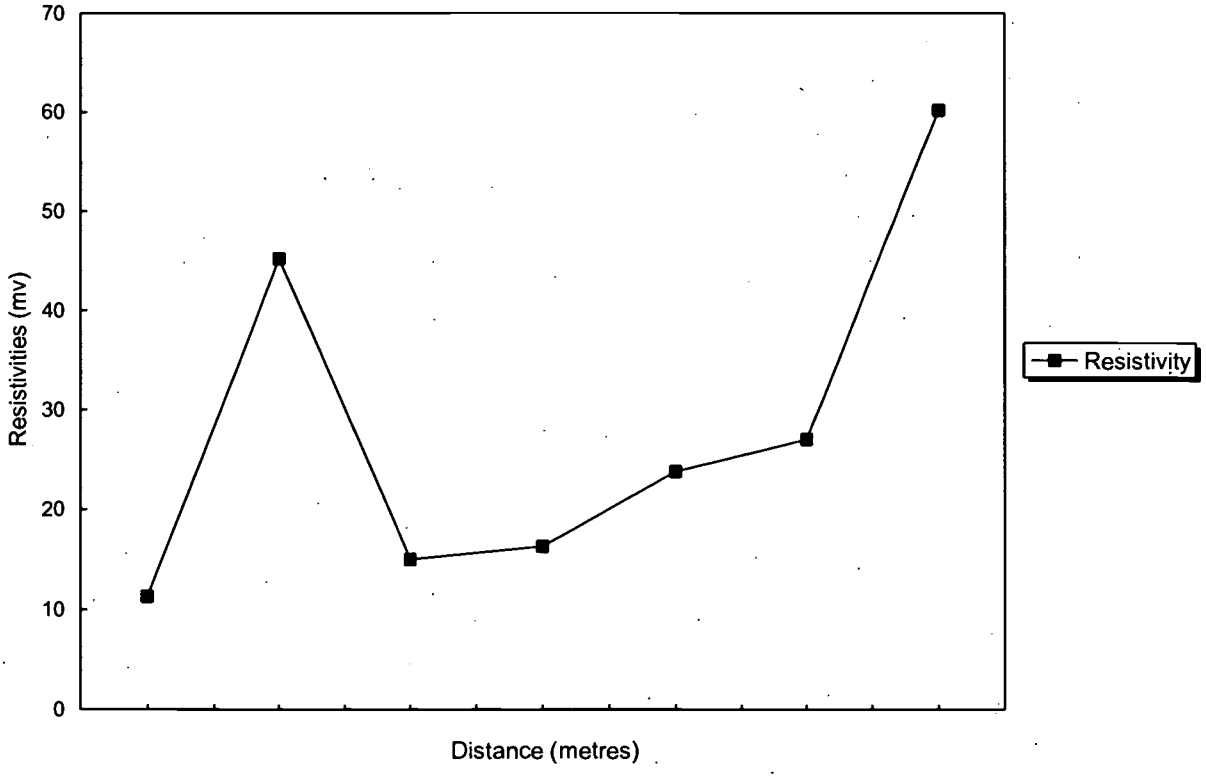
Project Muir St to Northcliffe St to Tingalpa S39 &S53 **Date** 16th June 2004

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	11.3
2	380	45.2
3	1130	15
4	1753	16.3
5	2220	23.8
6	2700	27
7	3300	60.2
8		
9		
10		
11		
12		
13		
14		

Note.
Test Points 1,2 and 3 are for S53

Test Points 4,5,6 and 7 are for S39

Graph of resistivities vs pipelength



Revision 21/07/2004

FORM 9
V3.01-04

Queensland Government

Department of Industrial Relations
ABN 52 293 849 579

APPLICATION TO REGISTER A REGISTERABLE CATHODIC PROTECTION SYSTEM

PLEASE COMPLETE ALL SECTIONS OF THIS FORM- PLEASE PRINT

Application Details

Name of system owner:	**Brisbane City Council / Brisbane Water**	
		ABN 72002765795
Postal address:	**GPO Box 1434 Brisbane 4001**	
Contact name:		**TEL**

Name of authorised agent of system owner:	**Brisbane Water Network Services**	
		ABN 72002765795
Postal Address:	**268 Cullen Ave Eagle Farm 4009**	
Contact Name:	**Jeff Say**	
		TEL 07 34078365

Type of Application: (Tick as appropriate)			
√	New System		
☐	Alteration to an existing system, Registration No:		
☐	Renewal of system, Registration No:		
Location of system:	From cnr Wynnum Rd & Muir St Cannon Hill to cnr Wynnum Rd & Graystone St. Tingalpa		
	Rectifier cnr Wynnum Rd & Northcliffe St Murarrie	POST CODE 4170	
Structure to be protected:	**755 mm dia Mild Steel Trunk Main**		
Maximum operating current:	**3.00** **Amperes DC**	**Water or Marine environment Maximum operating voltage:**	**Volts**

Declaration

I/We, being the owner/operators 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 11 of *Electrical Safety Regulation 2002*;
(ii) tests pursuant to section 177 of *Electrical Safety Regulation 2002*, based on the maximum operating current stated this application have been performed;
(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 (ii); and
(iv) any necessary interference mitigation measures for foreign structures (in the case where the system is currently registered) have been tested and are operating satisfactorily.

Signature of system owner: _____ **Day** **Month** **Year**

PRIVACY STATEMENT. The Department of Industrial Relations respects your privacy and is committed to protecting your personal information. The information provided on this form is for the purpose of applying for the registration of a cathodic protections system and monitoring compliance under the Electrical Safety Act 2002, and will be managed within the requirements of Information Standard 42. The Department may be required to disclose your personal information to other government agencies, entities, or persons as may be required by law or that are outsourced functions. This information may also be used for statistical research, information provision and evaluation of our services. We will assume that we have your permission to do this unless you tell us otherwise. You can do this at any time by contacting Equipment Safety on (07) 3237 0281. Further information on our privacy policy is available at www.dir.qld.gov.au

Application of accompany registration fee of $205.00
Application for systems to be immersed in a marine environment must have technical schedule attached.
Forward to: Electrical Safety Office, LMB 2234 Brisbane Qld 4001
Please note: This is a GST free supply. No tax invoice will be issued.

Queensland Government
Department of Industrial Relations

Electrical Safety Act 2002

NOTICE OF REGISTRATION OF CATHODIC PROTECTION SYSTEM

Registration No: 3334

Date of Registration: 01 March 2006 **Expiry Date:** 01 March 2011

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 Electrical Safety Act and Electrical Safety Regulation 2002.

Name and Postal Address of System Owner	Brisbane City Council Brisbane Water GPO Box 1434 BRISBANE QLD 4001
Location of System	From Cnr Wynnum Rd and Muir St Cannon Hill to Cnr Wynnum Rd and Graystone St Tingalpa Rectifier Cnr Wynnum Rd and Northcliffe St Murarrie - Post Code: 4170
Structure to be Protected	Mild Steel Trunk Main

CONDITIONS OF REGISTRATION

Maximum Operating Current: **8.00 Amperes DC**

DES EDE
Director – Equipment Safety

21/3/2006

Brisbane Water Engineering Services

CP Form No. 18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 53 Muir - Northcliffe Date 15-3-04

TP Location Cnr Wynnum & Barrack TP No. 1

Mains Size ..... TP Type B P/I

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	-2 Ω -2 Ω
ZINC REFERENCE TO PIPE	
CuSo4 REFERENCE TO PIPE	West -680 East-520
ZINC TO CuSo4	

EARTH TESTING

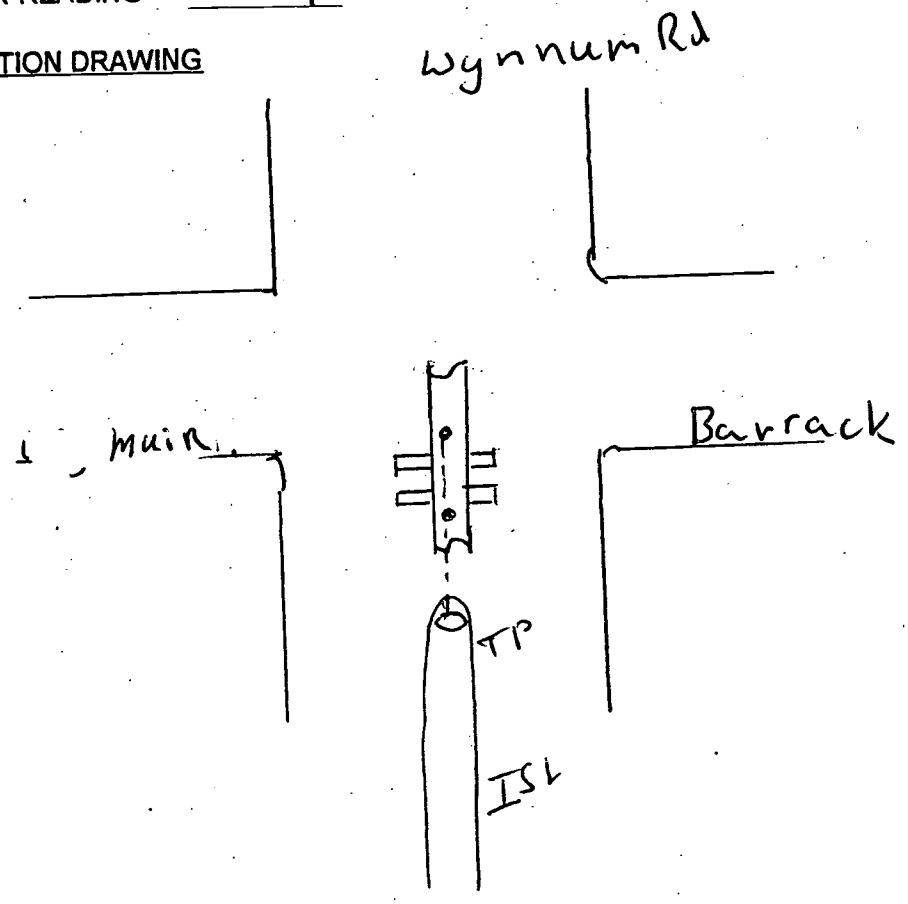
TEST NO. 1

PIN SPACING 2

MEGGER READING 0.9

RESISTIVITY 11.3 Ω Pm

COMMENTS / LOCATION DRAWING



INSTALLED BY P. Smyth

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 53 Muir St Northcliff Date 26-1-04

TP Location 1000 Wynnum Rd TP No. 2

Mains Size ..... TP Type B Pit

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+540
CuSo4 REFERENCE TO PIPE	−420
ZINC TO CuSo4	−970

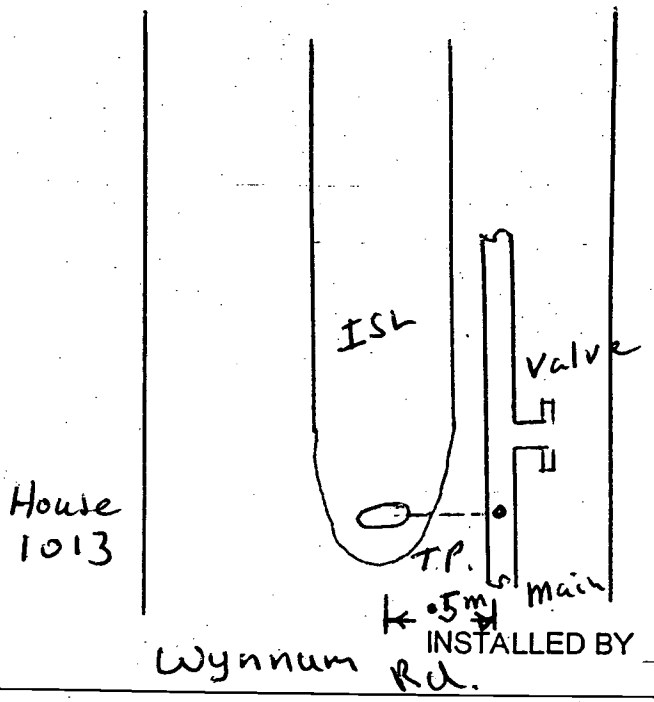
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 45-2Ω PM
MEGGER READING 3-6

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



INSTALLED BY P. Smyth.

Brisbane Water Engineering Services

CP Form No. 18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set Muir – Northcliffe Date 15-3-04

T P Location cnr Northcliffe + Wynnum T P No. 3

Mains Size ..... T P Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1Ω
ZINC REFERENCE TO PIPE	
CuSo4 REFERENCE TO PIPE	-480
ZINC TO CuSo4	

EARTH TESTING

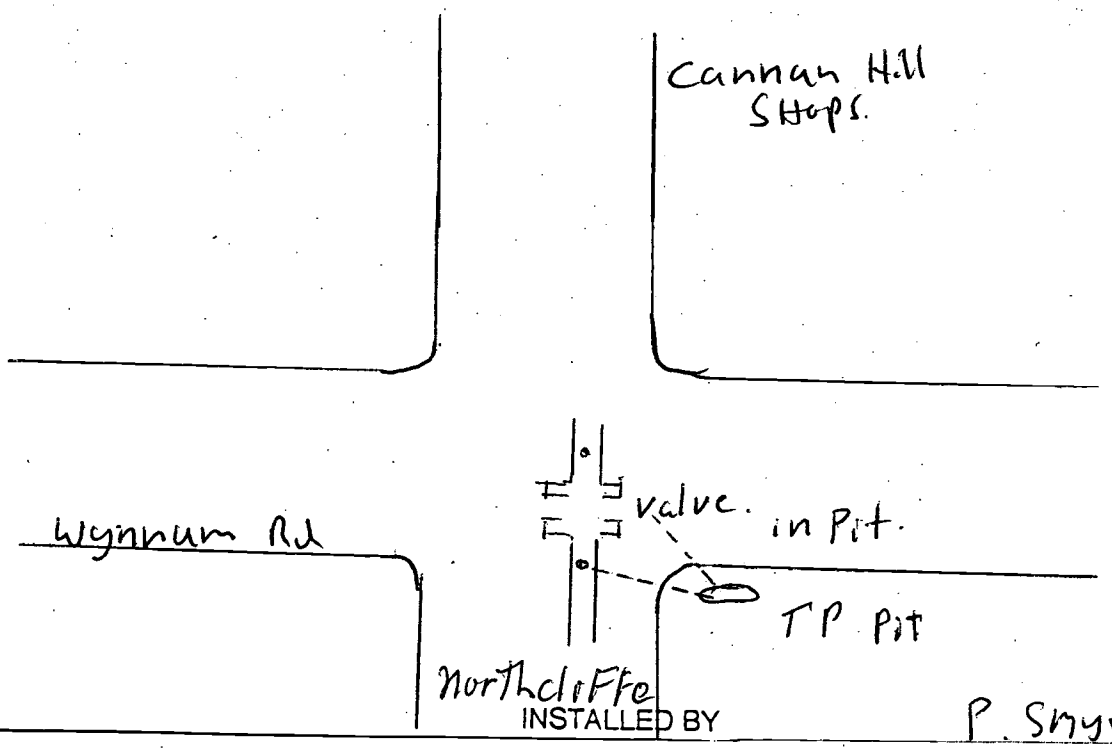
TEST NO. 1

PIN SPACING 2

MEGGER READING 1-2

RESISTIVITY 15-5Ωm

COMMENTS / LOCATION DRAWING



INSTALLED BY P. Smyth

Revision 08/01/96

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 39 Northcliffe-Tingalpa Date 10-2-04

TP Location 1247 Wynnum Rd Vane St TP No. 1

Mains Size ..... TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+411
CuSo4 REFERENCE TO PIPE	−653
ZINC TO CuSo4	−1064

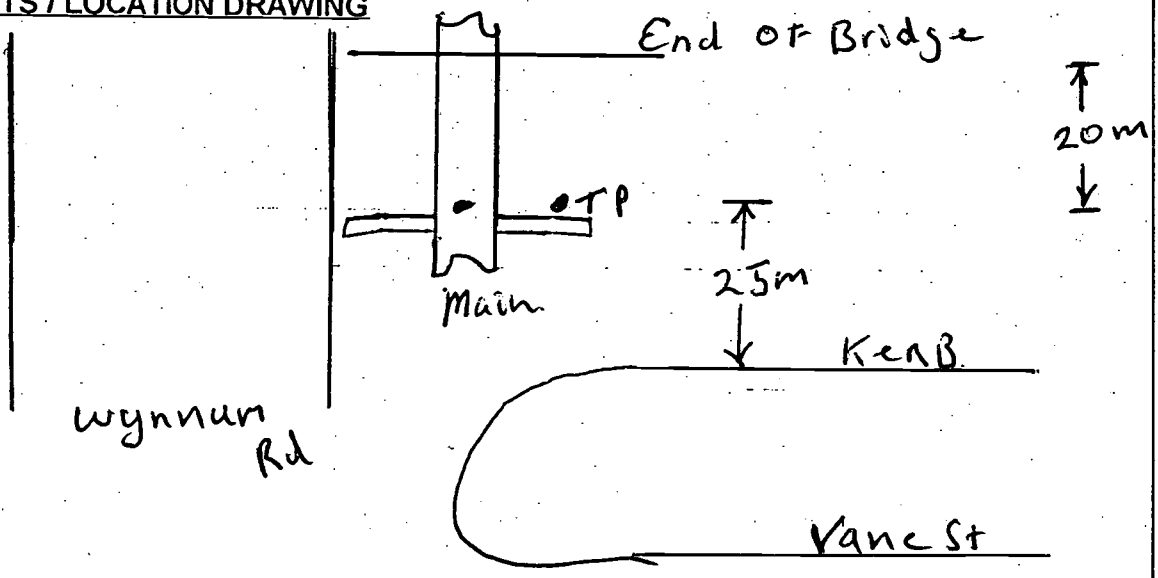
EARTH TESTING

TEST NO. 1
PIN SPACING 2m RESISTIVITY 23.8 Ω Pm
MEGGER READING 1.9 Ω

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



INSTALLED BY P. Smyth.

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 39 Northcliffe Tingalpa Date 26-1-04

TP Location Wynnum Rd & Villiers TP No. 2

Mains Size ..... TP Type B Pit

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+500
CuSo4 REFERENCE TO PIPE	−608
ZINC TO CuSo4	−1099

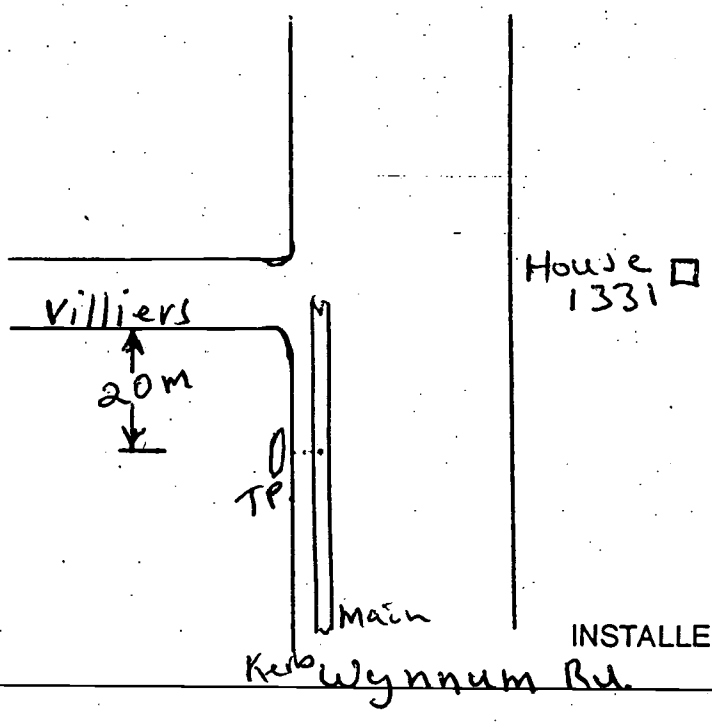
EARTH TESTING

TEST NO. 1
PIN SPACING 2 m RESISTIVITY 27 Ω PM
MEGGER READING 2·2

TEST NO 2
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

TEST NO 3
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

COMMENTS / LOCATION DRAWING



INSTALLED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 39 Northcliffe - Tingalpa Date 27-1-04

TP Location 1376 Wynnum Rd TP No. 3

Mains Size ..... TP Type B Pit

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+443
CuSo4 REFERENCE TO PIPE	-586
ZINC TO CuSo4	-1030

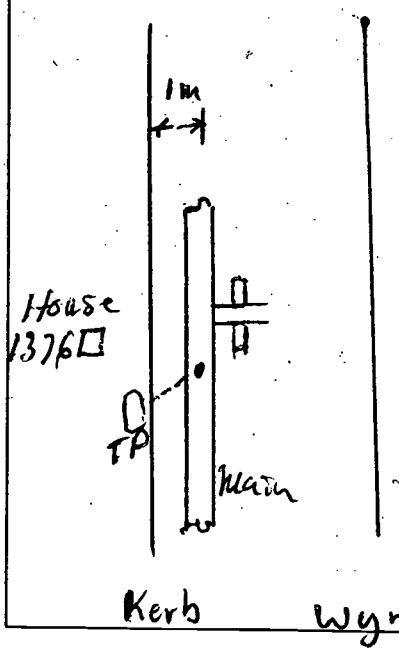
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 60.2 Ω pm
MEGGER READING 4.8

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



INSTALLED BY P Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 17

Electrical Engineering Unit

Cathodic Protection Anode Bed Testing

Project S39 Northcliffe St - Tingalpa Date 4-5-04

TP 4

ANODE MATERIAL:	Silicone Iron.	BURIAL:	Vertical
ANODE SIZE/WEIGHT:	50 mm	TEST POINT TYPE:	Rectifier
ANODE PACKAGING:		SOIL RESISTIVITY:	16.3 Ω
ANODE DEPTH: *		SIGNAGE:	Yes.

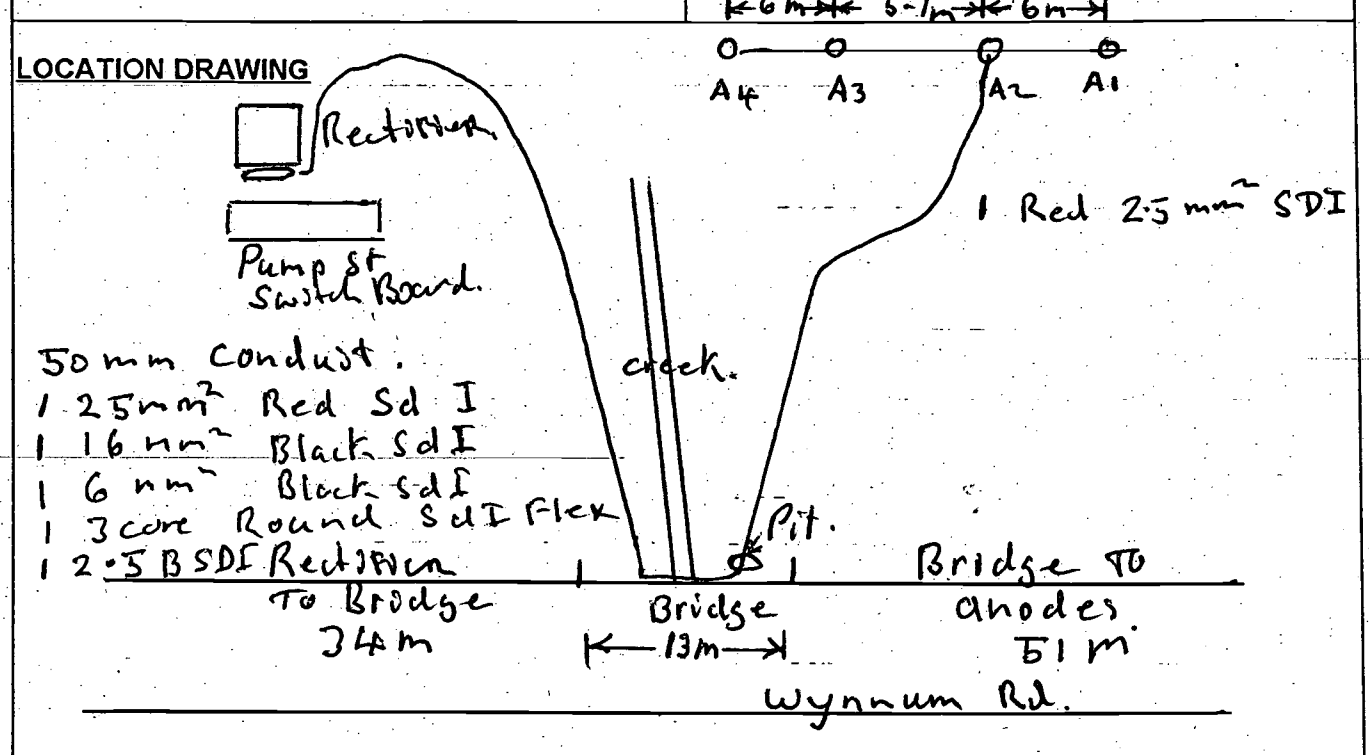
RESISTANCE TO GROUND:

ANODE NO.1	2 Ω
ANODE No.2	1.5 Ω
ANODE No.3	1.9 Ω
ANODE No.4	1.8 Ω
ANODE No.5	
TOTAL	

ANODE CURRENT

ANODE No.1	.3 a
ANODE No.2	.2 a
ANODE No.3	.4 a
ANODE No.4	.25 a
ANODE No.5	
TOTAL	

LOCATION DRAWING



A1, 1.8 m.

* A2 2 m

A3 1.5 m

A4 1.7 m

TESTED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION N°1

Project S.e.t. 53 Muir To Northcliffe Date 13-3-06

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Cnr Barrack & Wynnum Rd
SIZE:
MATERIAL: Mild Steel
COATING: TA.
VALVE No. 203

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 200Ω
INSULATION CHECKER MODEL 702: N/A.

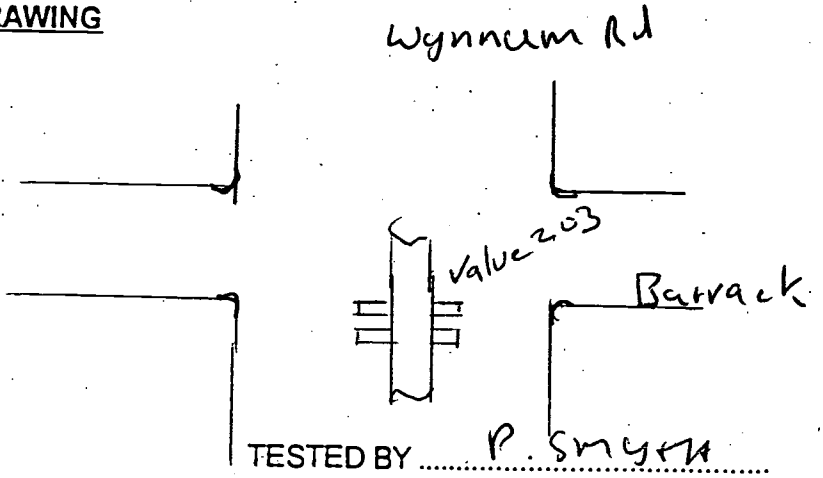
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -526
UNPROTECTED SIDE: -680

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION N°2

Project S.39 53 Muir St Northcliffe Date 26-1-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: 1000 Wynnum Rd
SIZE:
MATERIAL: Mild Steel
COATING: T/A.
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200 Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .6 KΩ
INSULATION CHECKER MODEL 702: N/A.

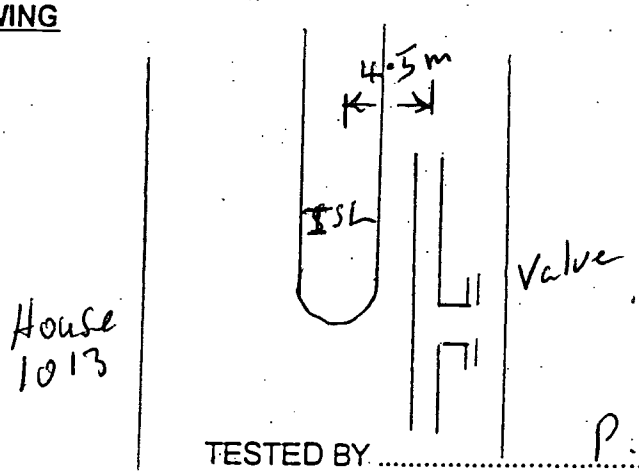
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -420
UNPROTECTED SIDE: -359

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth
Wynnum Rd

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 4

Project Sct 53 Muir St Northcliffe Date 15-3-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Cnr Wynnum & Northcliffe
SIZE:
MATERIAL: Mild Steel
COATING: T/A.
VALVE No. 300mm take off. RV23676

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 120Ω
INSULATION CHECKER MODEL 702: N/A.

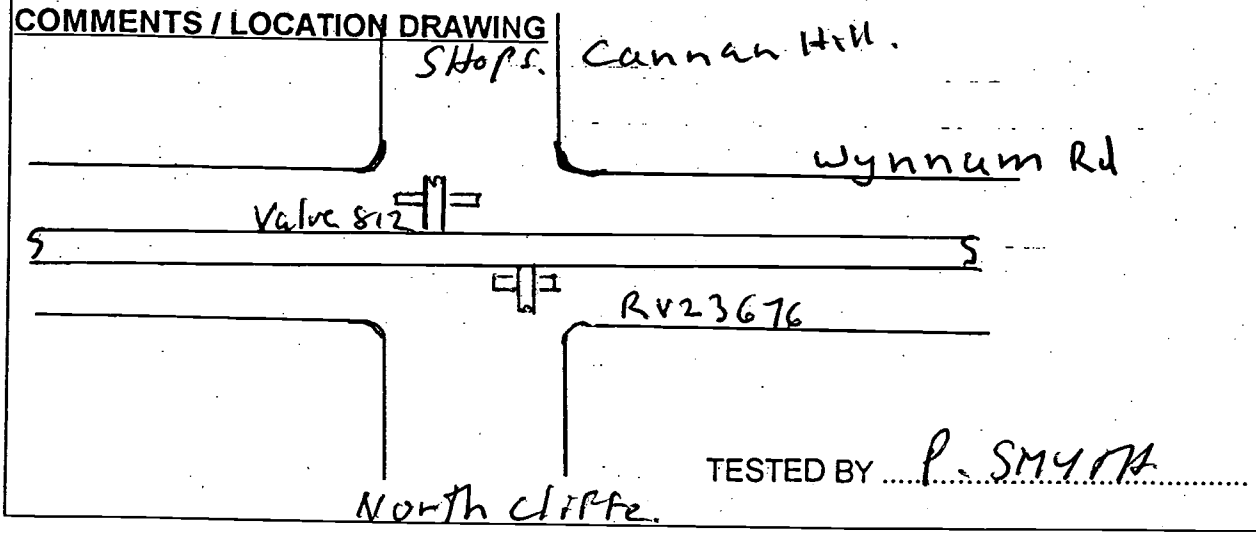
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -425 mV

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P. SMYTH

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 5

Project Set 53 Muir St - Northcliffe **Date** 15-3-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Cnr Wynnum & Northcliffe
SIZE:
MATERIAL: Mild Steel
COATING: T/A.
VALVE No. 300 ϕ Take off V812

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 3KΩ
INSULATION CHECKER MODEL 702: N/A.

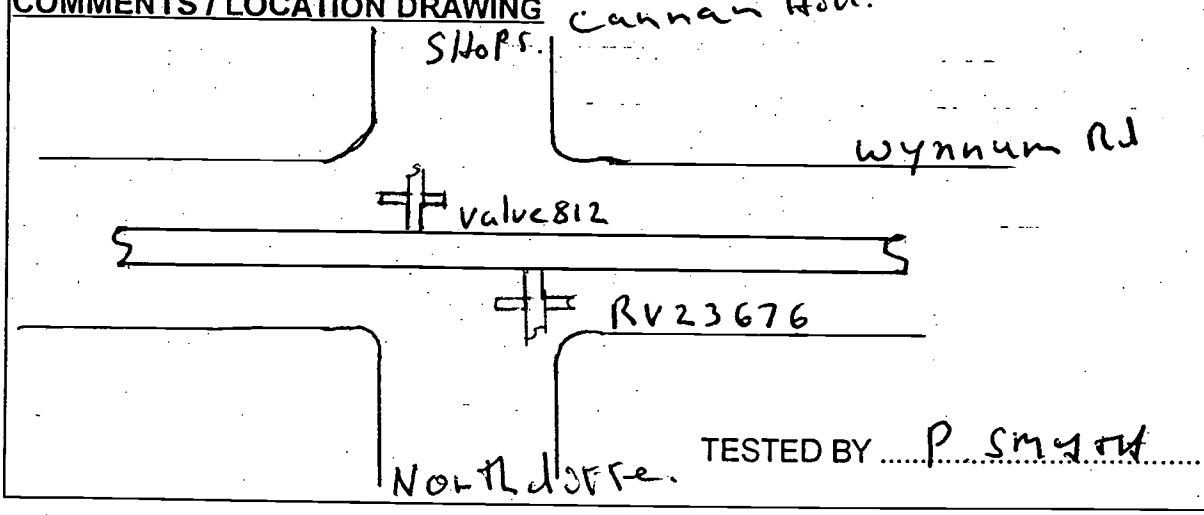
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -450 mv
UNPROTECTED SIDE: -430 mv

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P Smyth

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 7

Project Sc. 39 Date 20-2-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: bwn Northcliffe and Vane St
SIZE:
MATERIAL: Mild Steel
COATING: T/A.
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 3 MΩ
INSULATION CHECKER MODEL 702: N/A

POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -340
UNPROTECTED SIDE: -640

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING

Wynnum Rd

Main

6" Brand.

4-10m

En Trance To Park.

TESTED BY P SMYTH

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 8

Project Sct 39 Date 20-2-04

DESCRIPTION

MAINS DETAILS: Balimba
LOCATIONS: bwn / Vane St
SIZE:
MATERIAL: Mild Steel
COATING: Power Coat
VALVE No. 300 ϕ Take OFF.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 1.5 mΩ
INSULATION CHECKER MODEL 702: N/A.

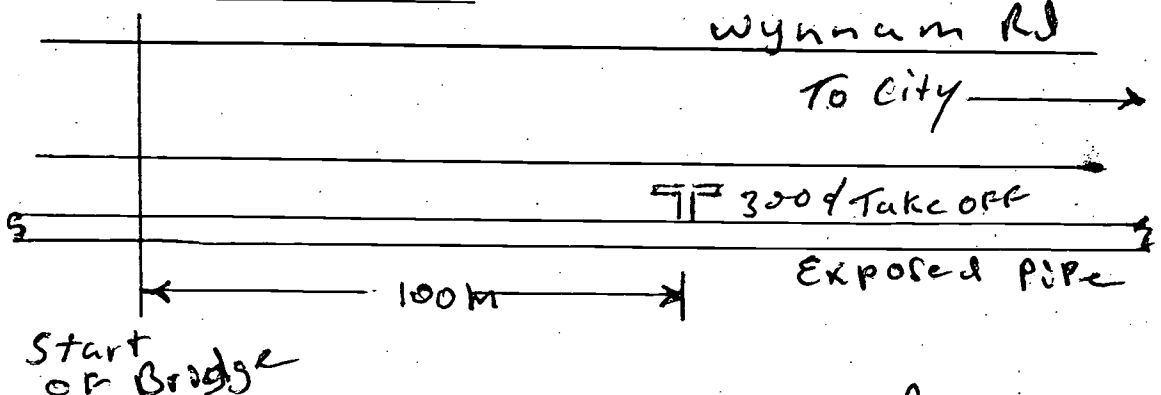
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -645.
UNPROTECTED SIDE: -445.

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

bun Northcliffe & Vane St

Project Sct 39 1221 Wynnum Rd **Date** 28-2-04

Isolation 9

DESCRIPTION

MAINS DETAILS:
LOCATIONS: bun Northcliffe & Vane St
SIZE: by Exposed Pipe
MATERIAL: Mild Steel
COATING: TA.
VALVE No. 150 Take OFF

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT: 6
FLANGE TO FLANGE RESISTANCE: 1.5 MΩ
INSULATION CHECKER MODEL 702: N/A.

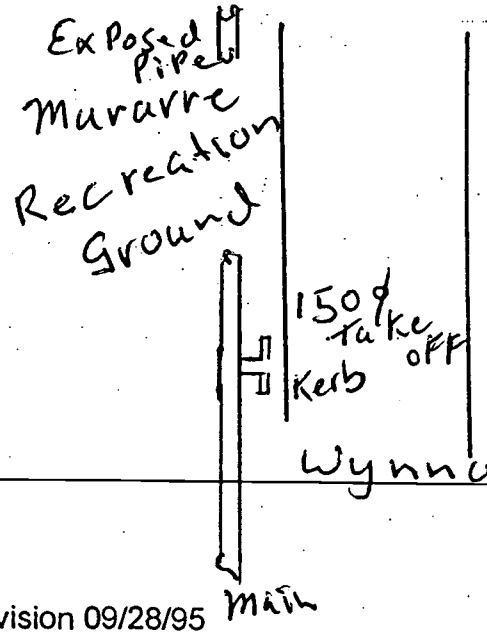
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -645
UNPROTECTED SIDE: -445

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING



TESTED BY P. SMYTH

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

CPS 207

Project Northcliffe – Tingalpa **Unit Reading** 8v 8a **Date** 16-9-06

	Reading	Test Point I. D.	Location	Swing
On	-1202		Murarrie Park	
Off	-804	Light		-398
On	-1502			
Off	-1100	Light	" "	-402
On	-1815			
Off	-1340	Light	" "	-475
On	-1556			
Off	-1120	Light	" "	-436
On	-1579			
Off	-1170	Light	" "	-409
On	-1013			
Off	-816	Light	" "	-197
On	-866			
Off	-685	Light	26985 Park	-181
On	-570			
Off	-570	Light	775777 Park	0
On	-524			
Off	-524	Earth P.	Switch Board Earth	0
On	-550		Wynnam Rd	
Off	-550	Light	775781	0
On	-299			
Off	-289	Mesh	Pole no 22677	-10
On	-327			
Off	-327	Mesh	Pole no 22675	0
On	-318			
Off	-318	Mesh	Pole no 22672	0
On	-288		Water Main outside	-20
Off	-268	Water	Bayside Premier adult Shop.	
On				
Off				

TESTED BY P. Smyth

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

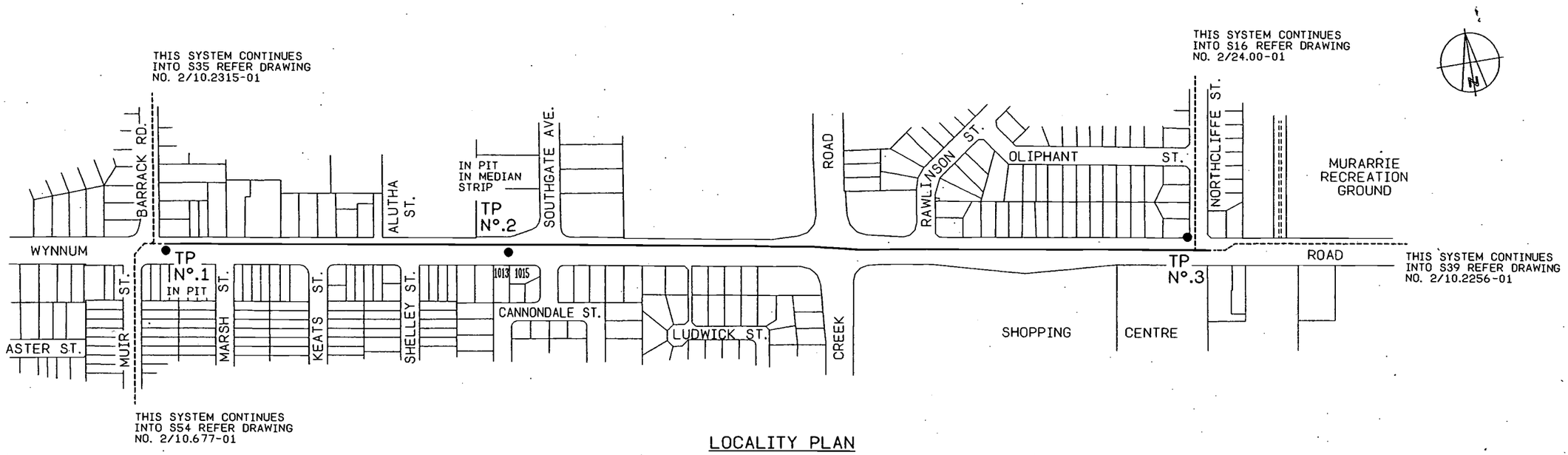
Cathodic Protection Interference Survey Results Form

Project Northcliffe – Tingalpa **Unit Reading** 8v 8c **Date** 16-9-06

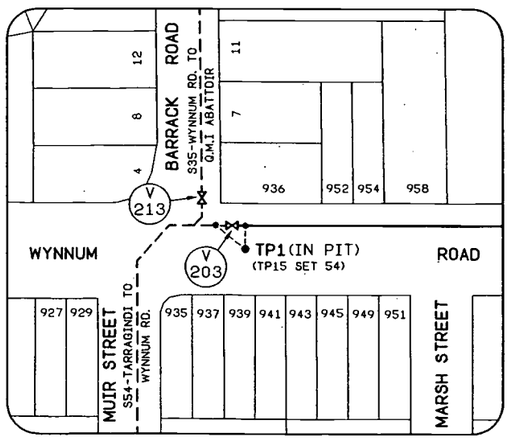
	Reading	Test Point I. D.	Location	Swing
On	-230		Wynnum Rd	
Off	-190	Men	22760	-40
On	-208			
Off	-208	Men	22668	0
On	-281			
Off	-281	Men	22666	0
On	-292			
Off	-292	Men	22619	0
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				

TESTED BY P. SMYTH

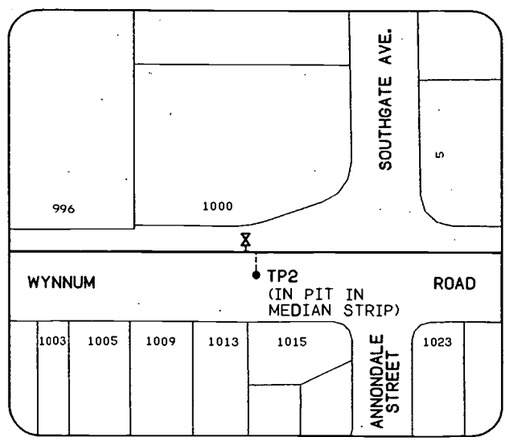
Revision 09/28/95



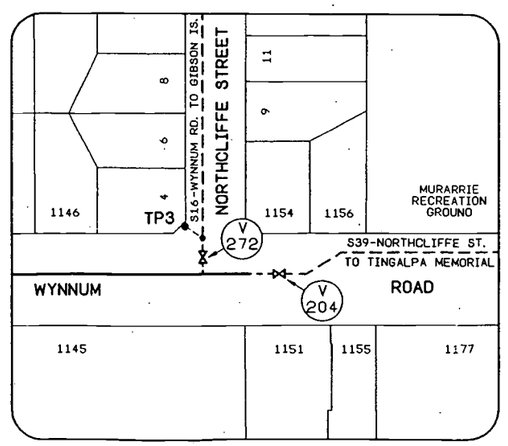
LOCALITY PLAN



TEST POINT NO.1



TEST POINT NO.2



TEST POINT NO.3

DESIGN CHARGE N^	PA000820		
CONSTRUCTION PROJECT N^			
AS BUILT RECEIVED			
BY			
OFFICER CODE			
DATE			
ON MAINTENANCE DETAILS			
START		FINISH	
D.R.S. COMMENTS			
FUNDING			
PRIVATE BOOSTER REQUIRED?	YES / NO		
FUNDED BY B.C.C. (✓)		DEVELOPER ( )	
FED. GOVT ( )	STATE ( )	OTHER ( )	
DRS OFFICER			
DATE RELEASED			
PLAN CUSTODIAN			
OFFICER/RECD			
DATE RELEASED			
LIVE CONNECTION(S) / PASSED(W)			
REFERENCE			
DATE			
BIMAP CAPTURE			
JOB NUMBER			
OFFICER CODE			
DATE			
BIMAP COMMENTS			

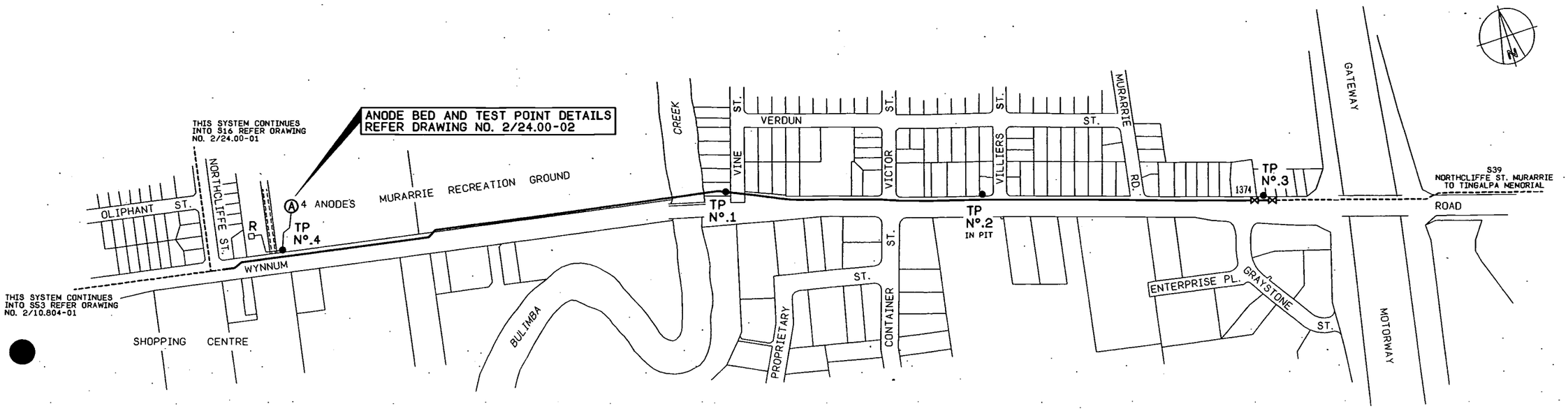
NO.	DATE	AMENDMENT	INITIALS

PRINCIPAL ENGINEER	RPEQ NO.	DATE	
MANAGER ENGINEERING		DATE	
PRODUCTION / NETWORK DELEGATE		DATE	

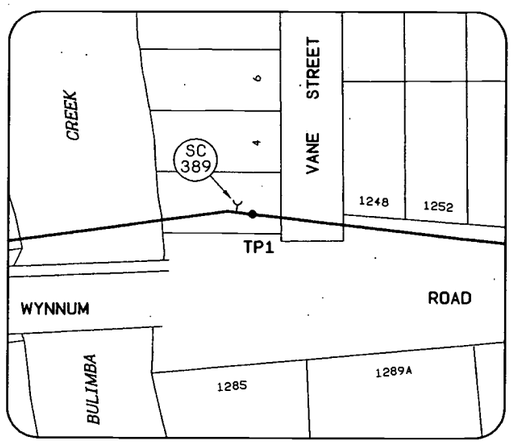
CADD FILE	\WATER\INFRASTRUCTURE\21080401.DTA	DESIGN	
FILE NO.		DESIGN CHECK	
SURVEYED		DRAWN	B.O.B. OCT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK	

Brisbane Water

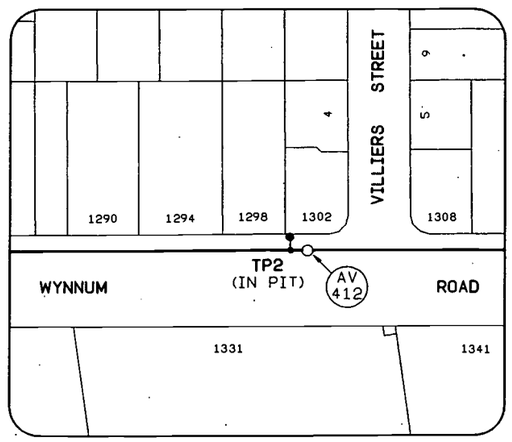
PROJECT	S53-MUIR ST. TO NORTHCLIFFE ST.
TITLE	CATHODIC PROTECTION TEST POINT AND ANODE BED LOCATIONS
SCALE	A.H. DATUM
	N^ 1 OF 1 SHEETS
DRAWING N^	2/10.804-01
AMEND.	P1



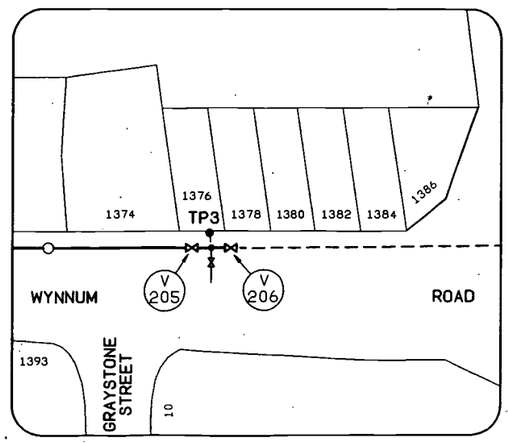
LOCALITY PLAN



TEST POINT NO.1



TEST POINT NO.2



TEST POINT NO.3

DESIGN CHARGE Nº	PA000820
CONSTRUCTION PROJECT Nº	

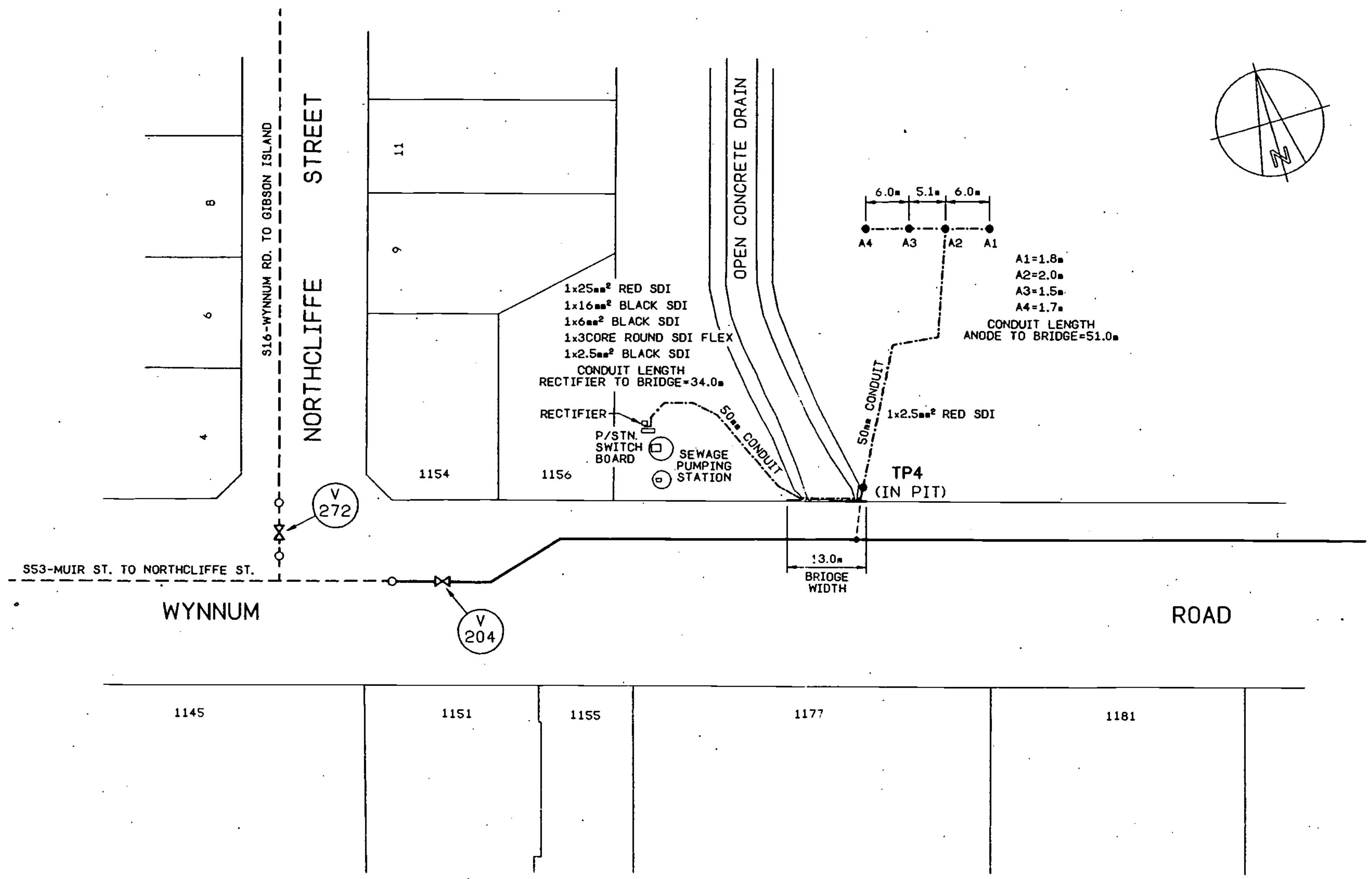
AS BUILT RECEIVED	
BY	
OFFICER CODE	
DATE	
ON MAINTENANCE DETAILS	
START	FINISH
D.R.S. COMMENTS	
FUNDING	
PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	
PLAN CUSTODIAN	
OFFICER/REC'D	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BIMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	
BIMAP COMMENTS	

ATE	AMENDMENT	INITIALS	PRINCIPAL ENGINEER	RPEQ NO.	DATE		
			MANAGER ENGINEERING		DATE		
			PRODUCTION / NETWORK DELEGATE		DATE		

CADD FILE	\WATER\INFRASTRUCTURE\210225601.DTA	DESIGN		
FILE NO.		DESIGN CHECK		
SURVEYED		DRAWN	B.O.B	OCT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK		

Brisbane Water

PROJECT	S39-NORTHCLIFFE ST. MURARRIE TO TINGALPA MEMORIAL
TITLE	CATHODIC PROTECTION TEST POINT AND ANODE BED LOCATIONS
SCALE	A.H. DATUM
	Nº 1 OF 2 SHEETS
DRAWING Nº	2/10.2256-01
AMEND.	P1



TEST POINT NO.4 AND ANODE BED DETAILS

DESIGN CHARGE Nº
PA000820
CONSTRUCTION PROJECT Nº

AS BUILT RECEIVED	
BY	
OFFICER CODE	
DATE	
ON MAINTENANCE DETAILS	
START	FINISH
D.R.S. COMMENTS	
FUNDING	
PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOV'T ( ) STATE ( )	OTHER ( )
DRS OFFICER	
DATE RELEASED	
PLAN CUSTODIAN	
OFFICER/REC'D	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BIMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	
BIMAP COMMENTS	

NO.	DATE	AMENDMENT	INITIALS

PRINCIPAL ENGINEER	R.P.E.Q. NO.	DATE
MANAGER ENGINEERING		DATE
PRODUCTION / NETWORK DELEGATE		DATE

CADD FILE	\WATER\INFRASTRUCTURE\21022S602.DTA		
FILE NO.			
SURVEYED			
SURVEY NO.		FIELD BOOK	

DESIGN		
DESIGN CHECK		
DRAWN	B.O.B	OCT. 2004
DRAFTING CHECK		

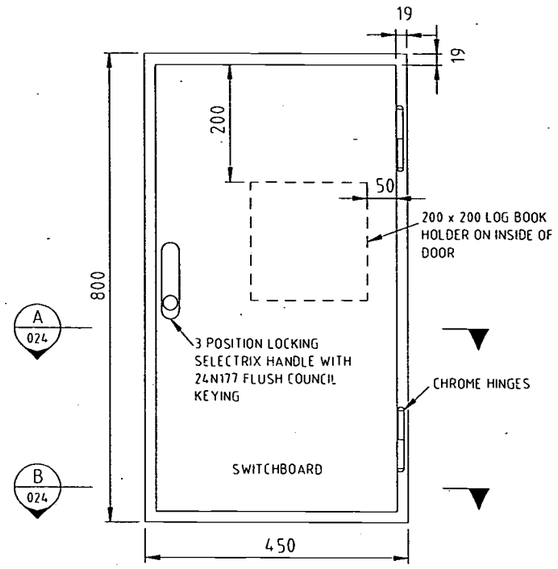
Brisbane Water

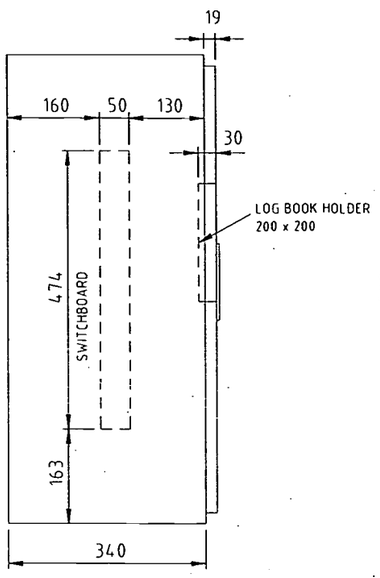
BRISBANE CITY

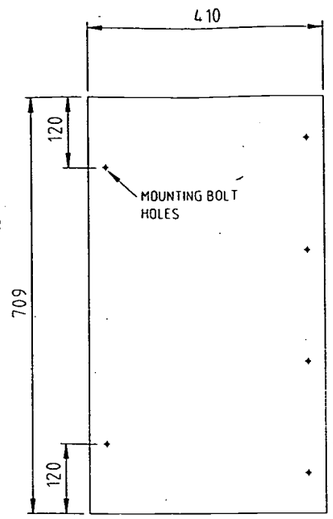
PROJECT
S39-NORTHCLIFFE ST. MURARRIE TO TINGALPA MEMORIAL

TITLE
CATHODIC PROTECTION TEST POINT NO.4 AND ANODE BED DETAILS

SCALE	A.H. DATUM
	Nº 2 OF 2 SHEETS
DRAWING Nº 2/10.2256-02	AMEND. P







FRONT INSULATED PANEL
(6mm THICK SUPPLIED)

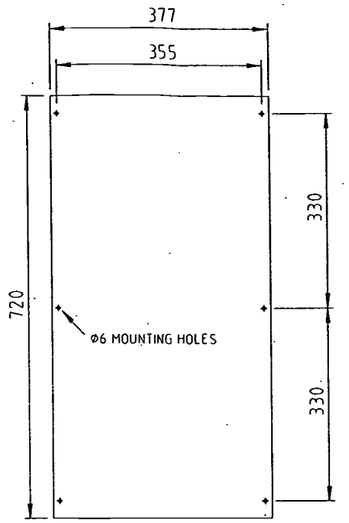


FIG.1
EQUIPMENT PANEL DETAILS

1. CABINET TO BE MANUFACTURED FROM 1.6mm 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, FULL WIDTH & REMOVABLE). SEE FIG.1.

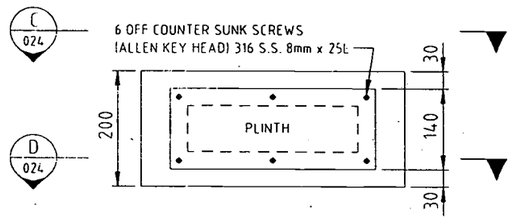
4. DOUBLE HINGED PANEL SUPPLIED BY B.C.C.

5. PROVIDE 1/4" WW STAINLESS STEEL STUDS TO DOOR & SWITCHBOARD CABINET.

6. DEGREE OF WEATHER PROTECTION IP55.

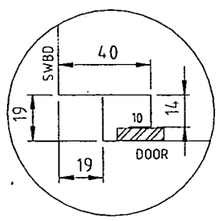
7. SELECTRIX TYPE HANDLE TO BE SUPPLIED & FITTED BY SWITCHBOARD MANUFACTURER. HANDLE TO BE 1107 SS CU1. KEY TO BE 24N177.

8. DOUBLE HINGED PANEL MOUNT TO BE SUPPLIED WITH MOUNTING BOLTS & NUTSERTS TOP & BOTTOM. SEE DETAIL A.

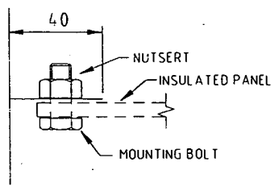


FRONT ELEVATION
SWITCHBOARD & PLINTH

SIDE ELEVATION
SWITCHBOARD & PLINTH

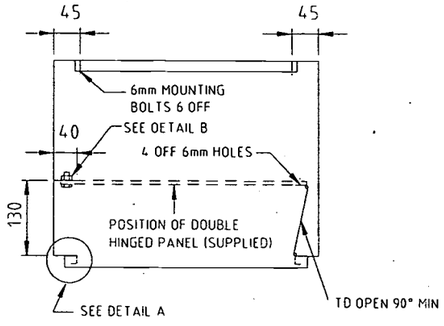


DETAIL A
DOOR/CORNER DETAIL

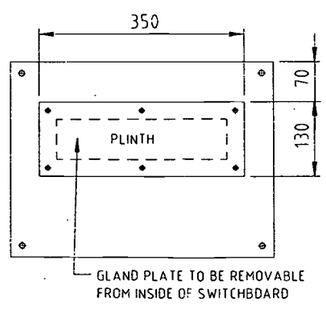


DETAIL B

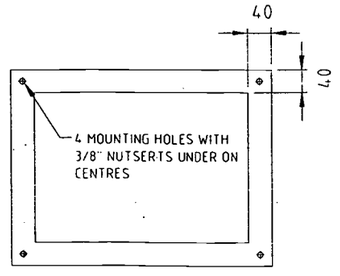
NUMBER OF SWITCHBOARDS REQUIRED	
NUMBER OF PLINTHS REQUIRED	



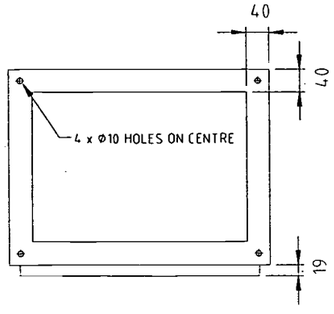
SECTION A-A
(SHOWING HINGED PANEL)



SECTION B-B
(SHOWING GLAND PLATE)



SECTION C-C
PLINTH MOUNTING DETAILS



SECTION D-D
PLINTH MOUNTING DETAILS

NO.	DATE	AMENDMENT	INITIALS
C	5-02	NOTE 7 REVISED	MT
B	11-95	MODIFIED	DLP.
A	5-92	ISSUED FOR APPROVAL	DLP.

DIRECTOR OF P.D. & P.S. — DATE
ENGINEER IN CHARGE — DATE
SUPERVISING ENGINEER — R.P.E.Q. NO. — DATE

	NAME	DATE
DESIGN	K.M.G	5-5-92
DRAWN	G.L.P	7-5-92
CHECKED		

Brisbane City

JOB FILE			
ACAD FILE	22E0024-Rev-C	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water — Professional Services Engineering

PROJECT: CATHODIC PROTECTON

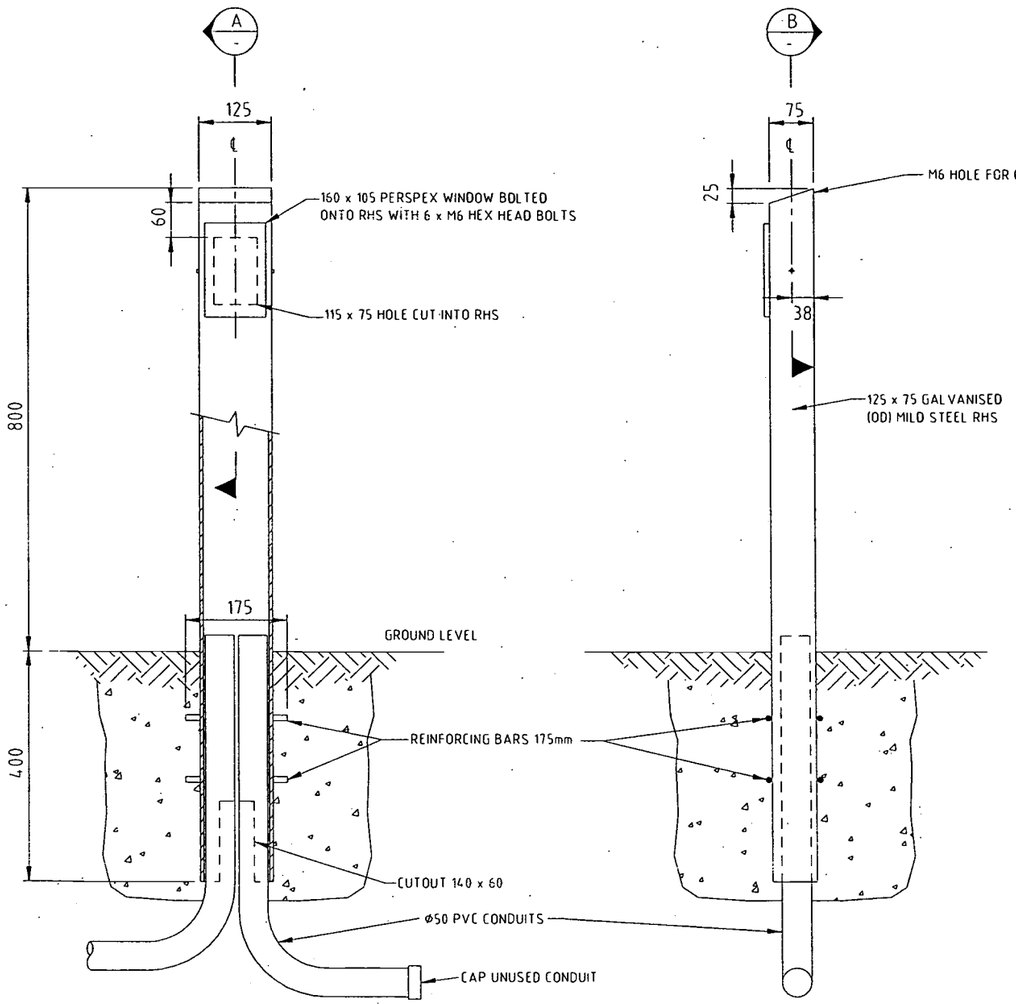
TITLE: STANDARD SWITCHBOARD CABINET

SCALE NTS | N° 1 OF 1 SHEETS

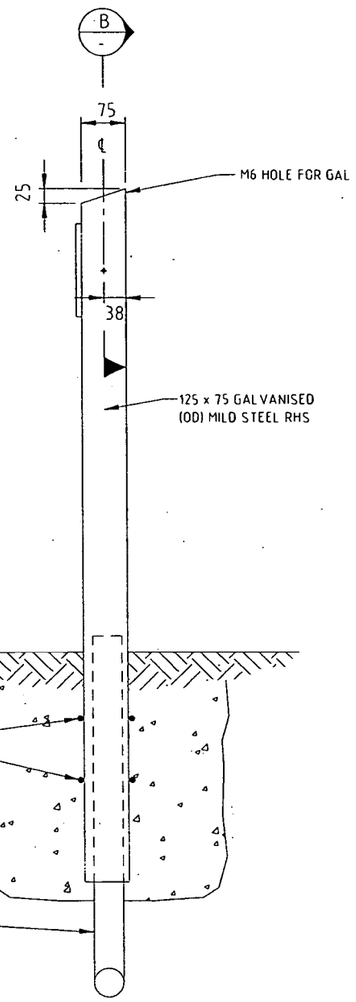
DRAWING N° 486/1/22-C0024E | AMEND C

NOTES

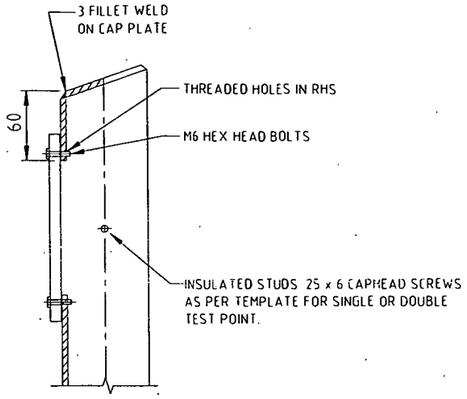
1. HOT DIP GALVANISE AFTER FABRICATION.



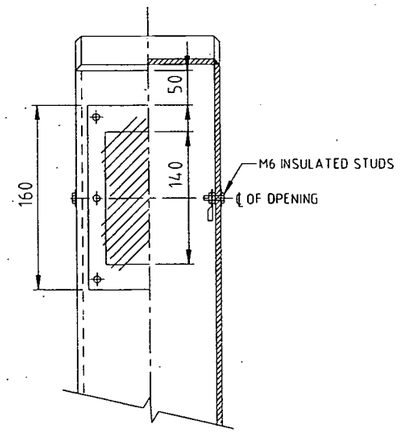
FRONT ELEVATION
SECTIONED



SIDE ELEVATION



SECTION A-A



SECTION B-B

NO.	DATE	AMENDMENT	INITIALS
C	3-02	NOTE 3 REVISED	HT
B	11-95	MODIFIED	DLP
A	5-92	ISSUED FOR APPROVAL	DLP

DIRECTOR OF P.D. & P.S. — DATE
ENGINEER IN CHARGE — DATE
SUPERVISING ENGINEER — R.P.E.Q. NO. — DATE

	NAME	DATE
DESIGN	K.McG.	5-5-92
DRAWN	D.L.P	7-5-92
CHECKED		

Brisbane City

JOB FILE			
ACAD FILE	2210001-RevA	SHEET SIZE	A1
SURVEY No.		FIELD BOOK	
SURVEYED		A.H. DATUM	

Brisbane Water — Professional Services Engineering

PROJECT: CATHODIC PROTECTON

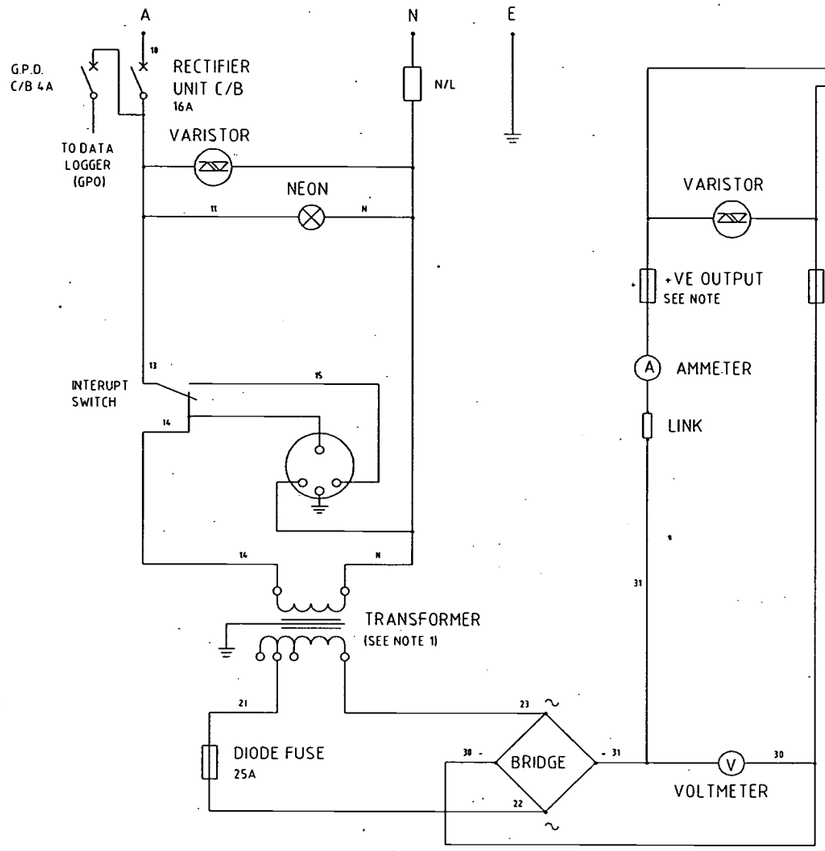
TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS

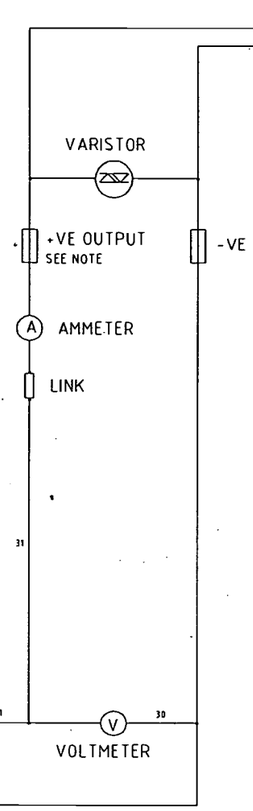
SCALE NTS | N° 1 OF 1 SHEETS

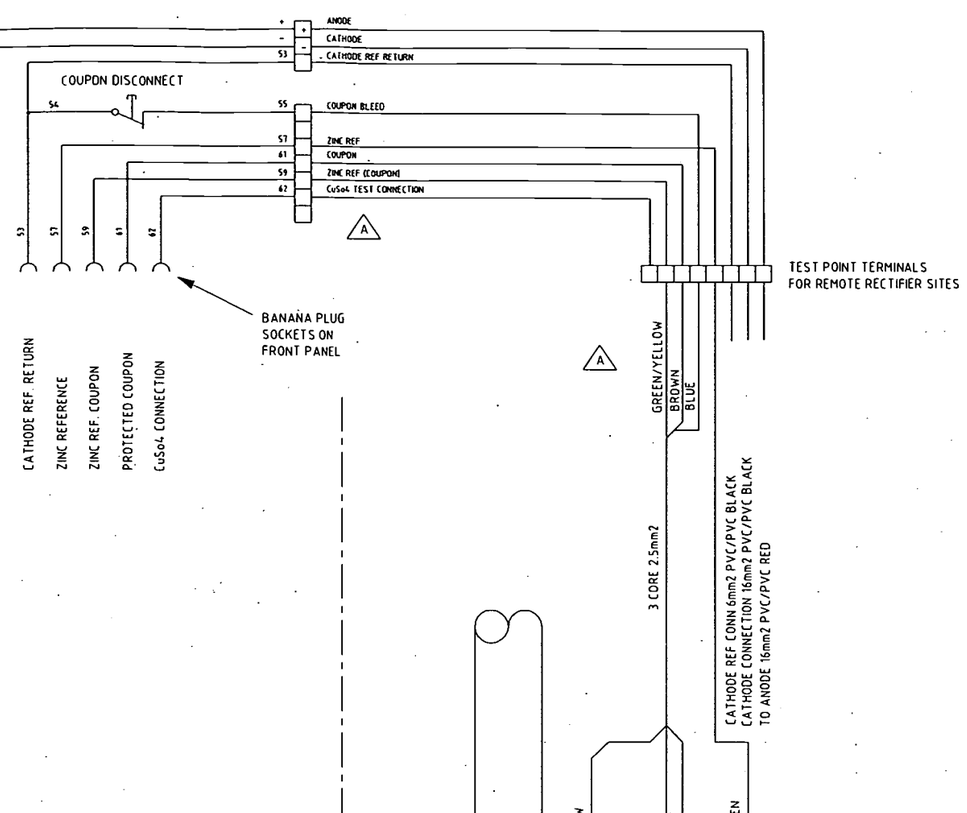
DRAWING N° 486/1/22-AAT0001E | AMEND C

RECTIFIER UNIT

FIELD







NOTES

1. TRANSFORMER OUTPUT CURRENT & VOLTAGE TO SUIT APPLICATION PROVIDING SUITABLE RESOLUTION & CONTROL

2. AMMETER & VOLTMETER TO PROVIDE SUITABLE RESOLUTION FOR SYSTEM

3. + POSITIVE WIRING TO BE RED
   - NEGATIVE WIRING TO BE BLACK
   L.V. AC WIRING TO BE 4mm2 BLUE/WHITE
   DC WIRING TO BE 4mm2
   240V AC WIRING TO BE 1.5mm2-BROWN/BLACK
   REFERENCE WIRING TO BE 1.5mm2-GREY

4. +VE AND -VE DC FUSES TO BE SIZED APPROX. 5AMPS ABOVE NORMAL OUTPUT CURRENT

NO.	DATE	AMENDMENT	INITIALS
B	07.03.95	VARAC REMOVED, TRANSFORMER MULTI-TAP SEC ADDED	DPH
C	16.10.96	TELEMETRY REMOVED, BW BORDER UPDATED	DPH
B	11.4.94	CHANGES AS SHOWN	RL.
A	18.10.93	CHANGES AS SHOWN	RL.
1	25.8.93	ISSUED FOR CONSTRUCTION	RL.

PRINCIPAL ENGINEER M.Jukes 25.8.93 R.P.E.Q. NO. DATE
MANAGER ENGINEERING DATE
PRODUCTION / NETWORK DELEGATE DATE

	NAME	DATE
DESIGN	J.S.	3.8.93
DRAWN	R.L.	3.8.93
CHECKED	J.S.	25.8.93

Brisbane City

JOB FILE
ACAD FILE A625C21e-RevD
SURVEY No. FIELD BOOK
SURVEYED A.H. DATUM

Brisbane Water Projects - Engineering

PROJECT
STANDARD
CATHODIC PROTECTION

TITLE
RECTIFIER UNIT
WITHOUT LOGGING FACILITIES
WIRING DIAGRAM

SCALE - - N° OF SHEETS
DRAWING N° 486/6/25-AA1C0021E
AMEND. D

Q:\PSEDRAWING2\Standard Drawings\Sewerage\Infrastr\CathodicProtection\a625c21e-RevD.dwg, 08/03/2005 02:24:12 PM