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

16 th April 2004

OPERATING MANUAL FOR:

TARRAGINDI to WYNNUM RD to LYTTON RD TRUNK MAINS

S54 and S35 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

MANUAL CONTENTS

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DRAWINGS

486/6/25-AA1C0021E	Standard Rectifier Wiring Diagram
(No Number)	Bimonthly 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:	1060, 910 and 600 mm Dia mild steel cement lined.
Coating:	Enamel Coated.
Length:	Appox 11.6 Km.
Location:	From Valve 188 cnr Tarragindi Rd.and Autumn St. Tarragindi to Valve 214 Lytton Rd. Murarrie.

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 2 rectifiers installed. One rectifier is in Mott Park, corner Logan Rd. and Abbotsleigh St.Holland Park and has a 240V supply from Mott Park toilet block.The second rectifier is in Majestic Park Camp Hill and has a 240V supply from Energex pole No12681 near 70 Eva St Camp Hill.

(4.3) Cathode: One cathode point is located on the 1060 mm dia mains, adjacent to scour valve 514 in Mott Park , while the second cathode point is located on the 910 mm dia mains adjacent to valve 200 at Majestic Park.. 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 90 metres from the trunk mains, in a vertical bed 5 metres deep, in the park adjacent to the stormwater drain in Mott Park. Another four anodes were installed approximately 100 metres from the trunk main in a vertical bed 5 metres deep in Majestic Park. 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 eighteen 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-AAT0001E
Standard Rectifier Wiring Diagram	- 486/6/25-AA1C0021
Cathodic Protection Test Point & Anode Bed Locations S54 & S35 Trunk Mains.	- 2 / 10.677-01 to 2 / 10.677-05 - 2 / 10.2315-01

(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 April, 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 April, 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 April, 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 Engineering Services

CP Form No. 23

Electrical Engineering Unit

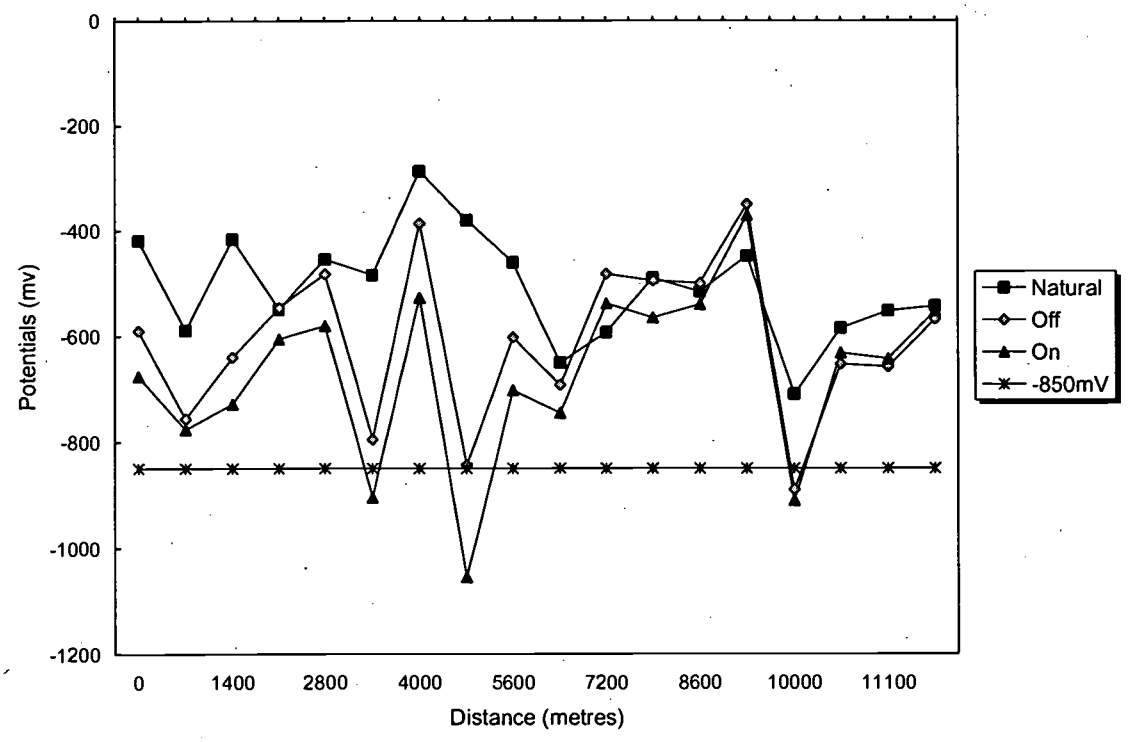
Cathodic Protection System Potential Recording Form

Project Tarragindi to Wynnum Rd.to Lytton Rd S35&S54 **Date** 16th June 2004

Test Point Nos 1 to 15 are S54 and Test Points 16 to 18 are S35

Test Point number	Distances to T.P. (metres)	Potentials to CuSO4 Natural (mV)	Off (mV)	On (mV)	Distance	
1	0	-419	-590	-676	0	
2	700	-589	-756	-776	700	
3	1400	-416	-640	-728	1400	
4	1900	-549	-546	-605	1900	Rectifiers at
5	2800	-454	-482	-580	2800	TPs.No6&8
6	3400	-484	-795	-905	3400	
7	4000	-287	-386	-527	4000	
8	4800	-380	-844	-1055	4800	
9	5600	-460	-602	-702	5600	
10	6400	-650	-692	-745	6400	
11	7200	-593	-482	-538	7200	
12	7900	-490	-495	-565	7900	
13	8600	-516	-500	-540	8600	
14	9200	-448	-350	-371	9200	
15	10000	-710	-890	-910	10000	
16	10400	-585	-653	-632	10400	
17	11100	-552	-658	-643	11100	
18	11600	-543	-568	-552	11600	

Graph of potentials vs pipelength



Revision 18/05/2005

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit

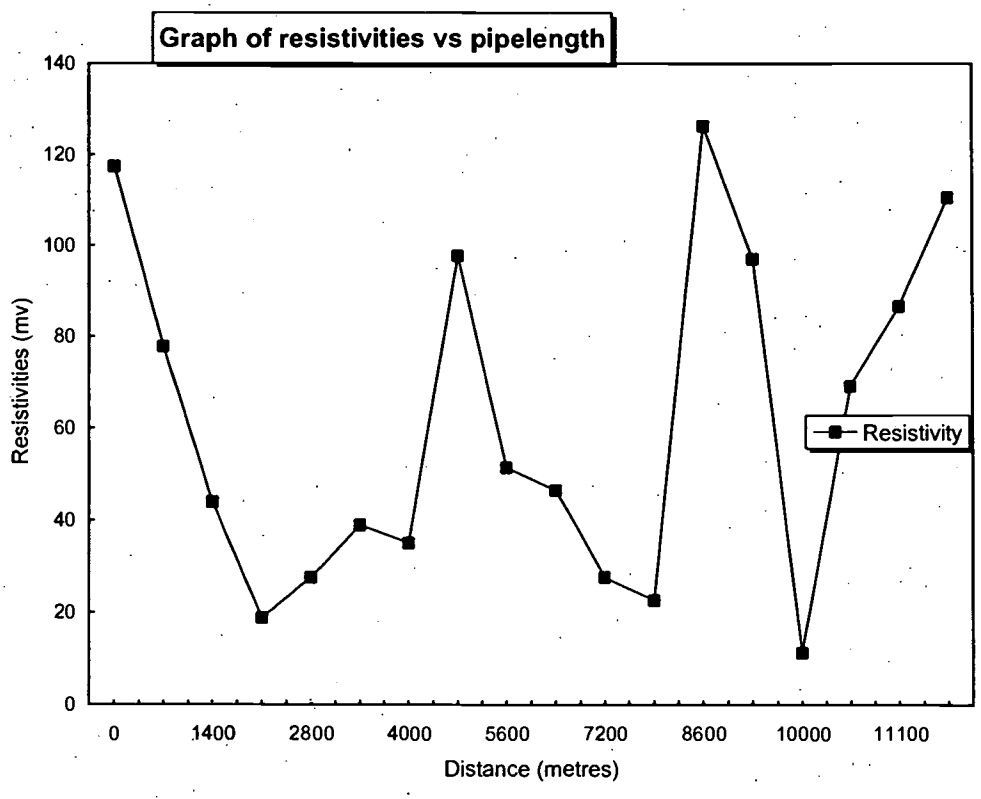
Cathodic Protection System Resistivities Recording Form

Project Tarragindi to Wynnum Rd. to Lytton Rd. S35 & S54 **Date** 16th June 2004

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	117.4
2	700	77.8
3	1400	43.9
4	1900	18.8
5	2800	27.6
6	3400	38.9
7	4000	35.1
8	4800	97.7
9	5600	51.4
10	6400	46.4
11	7200	27.6
12	7900	22.6
13	8600	126.3
14	9200	97
15	10000	11.3
16	10400	69.1
17	11100	86.6
18	11600	110.5

Note.
Test Points 1 to 15 are for S54

Test Points 16,17 & 18 are for S35



Revision 21/07/2004

Brisbane Water Engineering Services

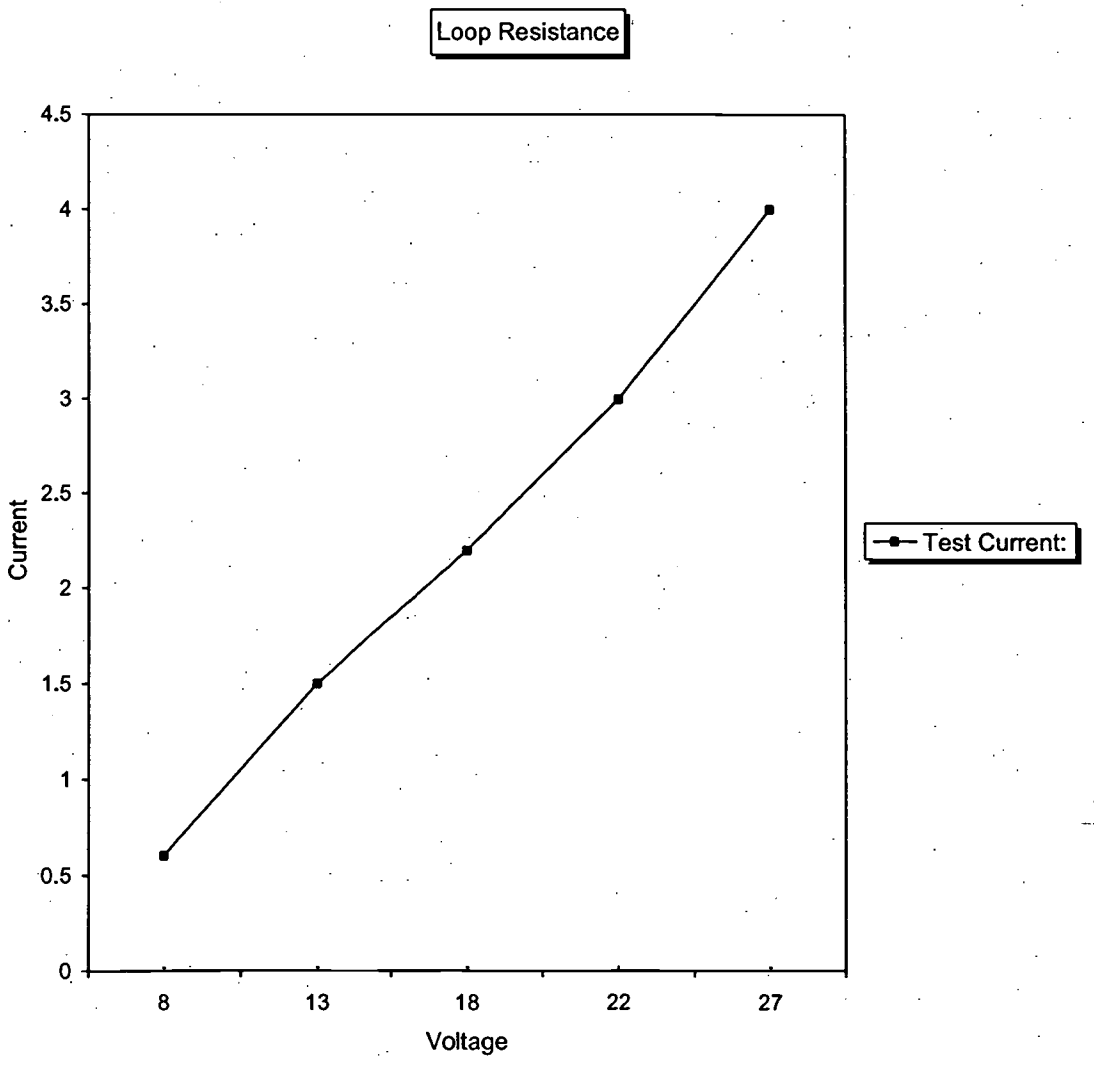
Electrical Engineering Unit

Cathodic Protection System Loop Resistance — Mott Park Rectifier CPS 202

Date: 12th May 2005
Cathodic Protection System: Tarragindi to Wynnum Rd. S54 Trunk Main
System Operating Volts: 27 System Operating amps 4

Test Voltage: (volts)	Test Current: (amps)
8	0.6
13	1.5
18	2.2
22	3
27	4

Loop Resistance (ohms)
5



13/05/2005

Brisbane Water Engineering Services

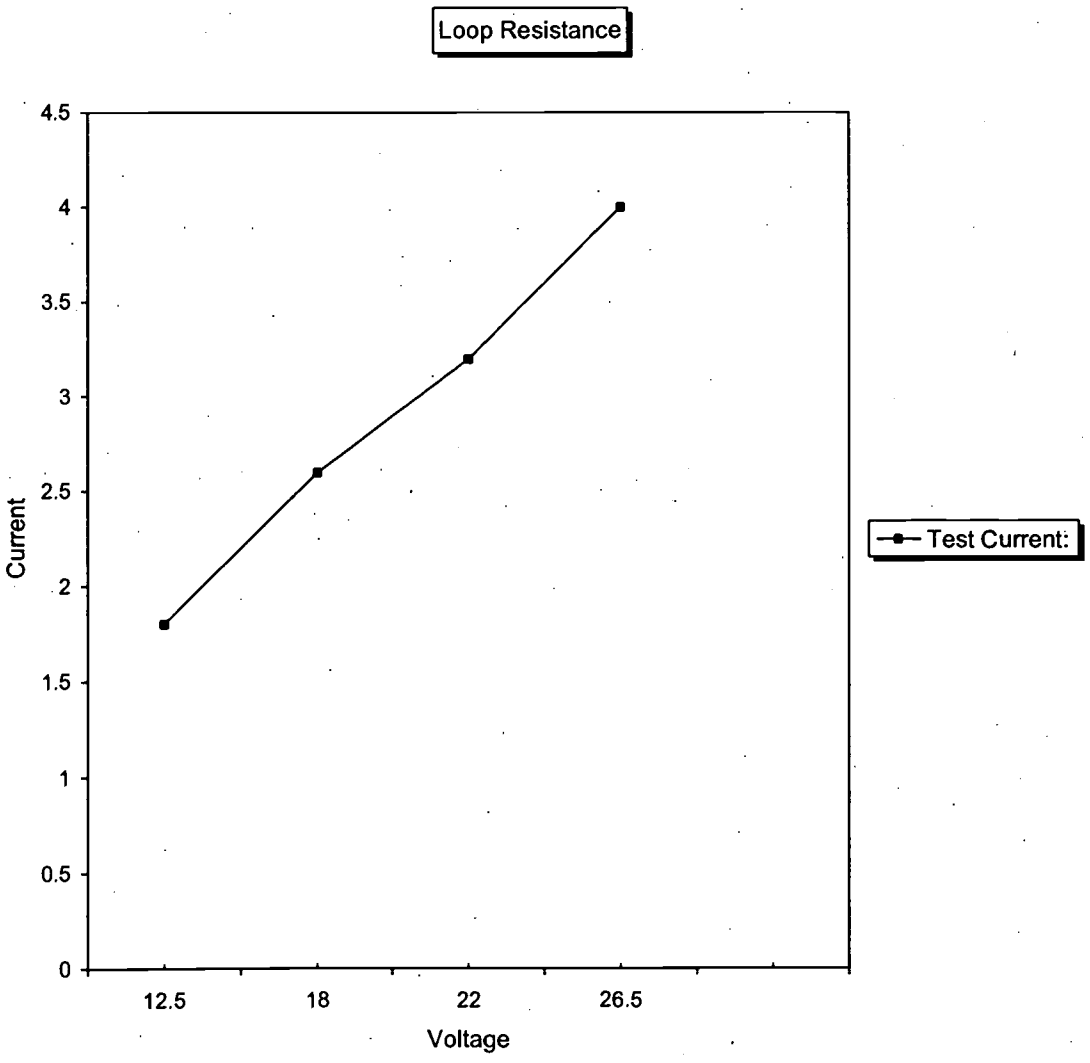
Electrical Engineering Unit

Cathodic Protection System Loop Resistance — Eva St. Rectifier CPS 206

Date: 12th May 2005
Cathodic Protection System: Tarragindi to Wynnum Rd. S54 Trunk Main
System Operating Volts: 27 System Operating amps 4.7

Test Voltage: (volts)		Test Current: (amps)	
12.5		1.8	
18		2.6	
22		3.2	
26.5		4	

Loop Resistance (ohms)
6.875



18/05/2005

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:	Kerry McGovern	
		TEL 07 34078364

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 Tarragindi Rd & Autumn St. Tarragindi to Lytton Rd near Metroplex Ave Murarrie		
	Rectifier No1(Mott Park) Abbotsleigh St Holland Pk	POST CODE 4121	
Structure to be protected:	900 mm and 1060 mm dia Mild Steel Trunk Main		
Maximum operating current:	5.00 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.

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

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		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:	Kerry McGovern	
		TEL 07 34078364

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 Tarragindi Rd & Autumn St. Tarragindi to Lytton Rd near Metroplex Ave Murarrie		
	Rectifier No2 (Majestic Park) Eva St Coorparoo		POST CODE 4151
Structure to be protected:	900 mm and 1060 mm dia Mild Steel Trunk Main		
Maximum operating current:	6.00 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**

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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: 3332

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 Tarragindi Rd and Autum St Tarragindi to Lytton Rd near Metroplex Ave Murarrie Rectifier No1 (Mott Park) Abbotsleigh St Holland Park - Post Code: 4121
Structure to be Protected	Mild Steel Trunk Main

CONDITIONS OF REGISTRATION

Maximum Operating Current: **5.00 Amperes DC**

DES EDE
Director – Equipment Safety

21/3/2006

Queensland Government
Department of Industrial Relations

Electrical Safety Act 2002

NOTICE OF REGISTRATION OF CATHODIC PROTECTION SYSTEM

Registration No: 3335

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 Tarragindi Rd and Autumn St Tarragindi to Lytton Rd near Metroplex Ave Murarrie Recrifier No2 (Majestic Park) Eva St Coorparoo - Post Code: 4151
Structure to be Protected	Mild Steel Tunk Main

CONDITIONS OF REGISTRATION

Maximum Operating Current: **6.00 Amperes DC**

DES EDE
Director – Equipment Safety

2/3/2006

Brisbane Water Engineering Services CP Form No. 27

Electrical Engineering Unit

Eva ST. 27V 6a

Cathodic Protection Interference Survey Results Form

Tarragindi to Wynnum Rd Mott Park 27V 5a.

Project S54 **Unit Reading** ..... **Date** 5-5-05

	Reading	Test Point I. D.	Location	Swing
On	-1040	-	Mott Park	
Off	-594	Light	Park Light	-446
On	-830			
Off	-502	Light	Park Light	-328
On	-752			
Off	-530	Light	Park Light	-222
On	-532		Logan Rd	
Off	-270	Men	Pole no 21287	-262
On	-329		NAVY	
Off	-250	Men	Pole no 10836	-79
On	-303		Sexton	
Off	-303	Men	Pole no 32200	0
On	-310		Sexton	
Off	-310	men	Pole no 32199	0
On	-322		Sexton	
Off	-322	Men	Pole no 39903	0
On	-109		Ferndale	
Off	-109	Men	Pole no 43890	0
On	-687		Ferndale	
Off	-683	Men	Pole no 20507	0
On	-233		Ferndale	
Off	-233	Men	Pole no 23116	0
On	-584		Ferndale	
Off	-584	Men	Pole no 23117	0
On	-382		Ferndale	
Off	-382	men	Pole no 23118	0
On	-424		ADerfield	
Off	-424	Men	Pole no 349450	0
On	-146		ARlington	0
Off	-146	Men	Pole no 33108	

TESTED BY ..... P. SMYTH

Revision 09/28/95

Brisbane Water Engineering Services CP Form No. 27

Electrical Engineering Unit Eva St 21V 6 a

Cathodic Protection Interference Survey Results Form Tarragindi To Wynnum Rd Mott Park 27V 5 a

Project S54 **Unit Reading** ..... **Date** 5-5-05

	Reading	Test Point I. D.	Location	Swing
On	-226		Eva St	
Off	-175	Men	Pole no 185	-51
On	-414		CHatsworth	
Off	-416	Men	Pole no 26522	0
On	-283		CityView	
Off	-289	men	Pole no 9590	+6
On	-003		Fergision	
Off	-003	Men	Pole no 17735	0
On	-488		Fergision.	
OFF	-382	Men	Pole no 17734	-106
On	-084		Fergision	
Off	-084	Men	Pole no 29009	-0
On	-260		Fergision	
Off	-260	Men	Pole no 27011	0
On	-011		The Promand	
Off	-011	Men	Pole no 1454	0
On	-172		The Promand	
Off	-172	Men	Pole no X19640	0
On	-12		Muir	
Off	-12	Men	Pole no 40265.	0
On				
Off				
On				
Off				
On				
Off				
On				
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On				
Off				

TESTED 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 S54 TARRAGINDI TO WYNNUM RD Date 3-11-03.

TP Location AUTUMN & TARRAGINDI RD TP No. 1

Mains Size 1060 m.m. TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.25V
ZINC REFERENCE TO PIPE	+ 774
CuSo4 REFERENCE TO PIPE	- 419
ZINC TO CuSo4	- 1194

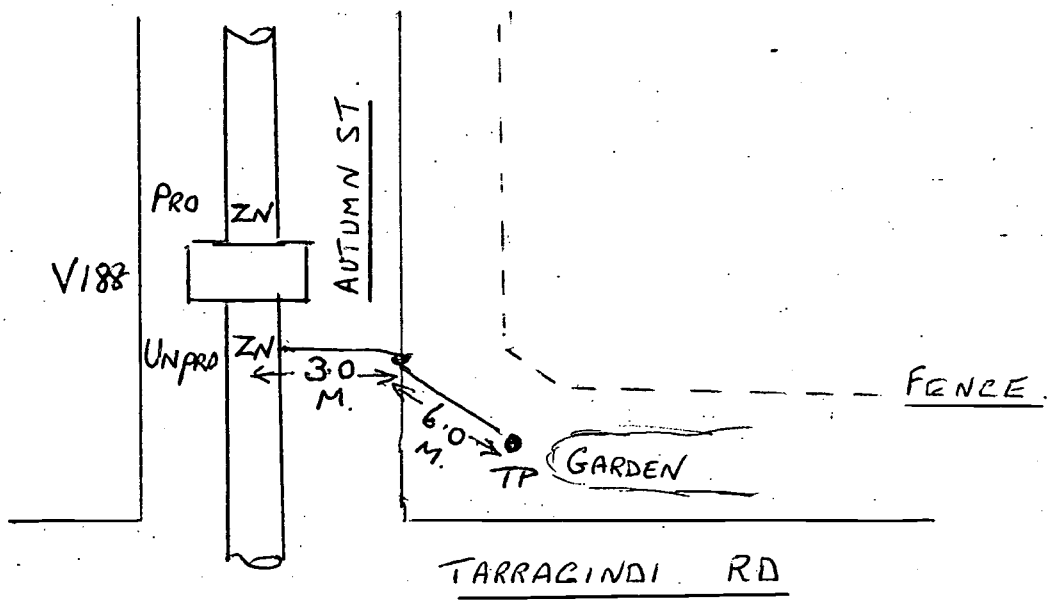
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 117.4 Ω PM
MEGGER READING 9.35

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



INSTALLED BY L. GREAVES

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Weller's Hill - Mt Gravatt Date 19-4-03

TP Location Weller's Rd Fernvale TP No. 2

Mains Size ..... TP Type B x 2

POTENTIAL TESTING

	P	UP
CATHODE TO CATHODE RETURN (RESISTANCE)	0.15	0.15
ZINC REFERENCE TO PIPE	+614	+601
CuSo4 REFERENCE TO PIPE	-589	-614
ZINC TO CuSo4	-1203	-1216

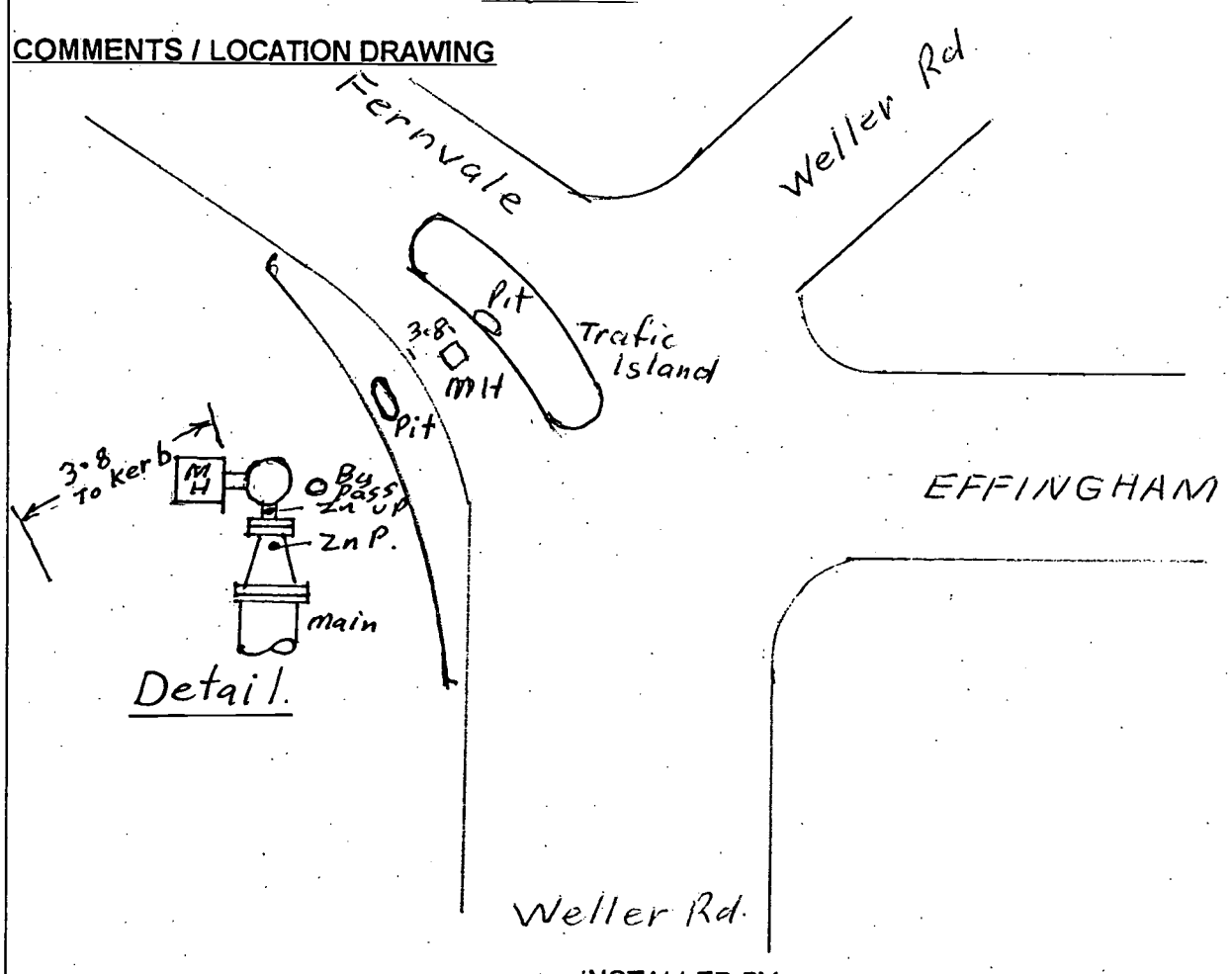
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 77-8 Ωpm

MEGGER READING 6-2

COMMENTS / LOCATION DRAWING



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Revision 08/01/96

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 2-7-03

TP Location 18 EFFINGHAM ST. TP No. 3

Mains Size 42" to 36" TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2Ω
ZINC REFERENCE TO PIPE	+585
CuSo4 REFERENCE TO PIPE	−416
ZINC TO CuSo4	−111

EARTH TESTING

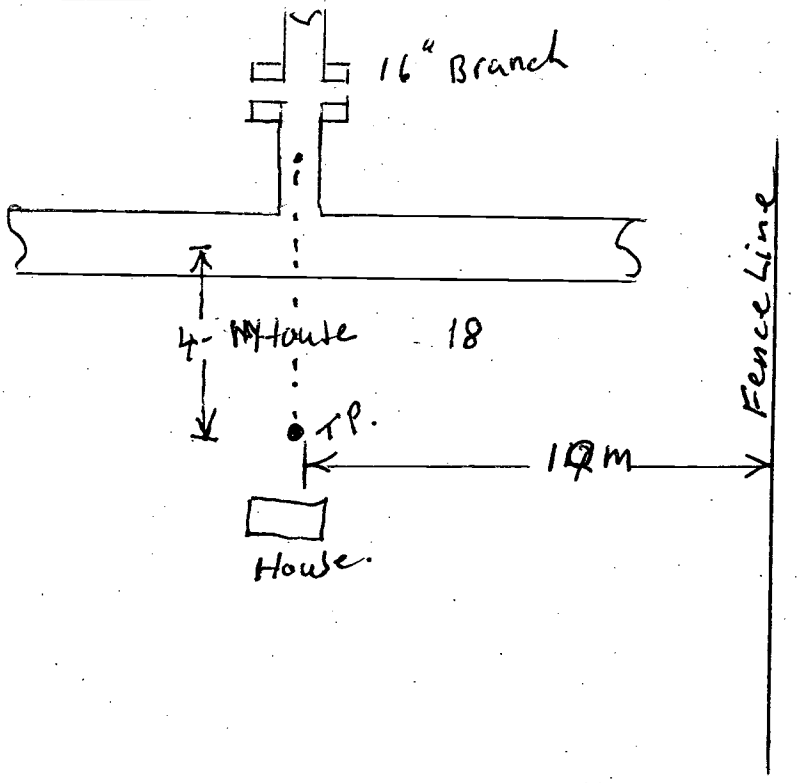
TEST NO. 1

PIN SPACING 2

MEGGER READING 3.5

RESISTIVITY 43.9 ΩPM

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnam Date 10-4-03

TP Location Sexton. TP No. 4

Mains Size 4" - 3" TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+689
CuSo4 REFERENCE TO PIPE	-549
ZINC TO CuSo4	-1124

EARTH TESTING

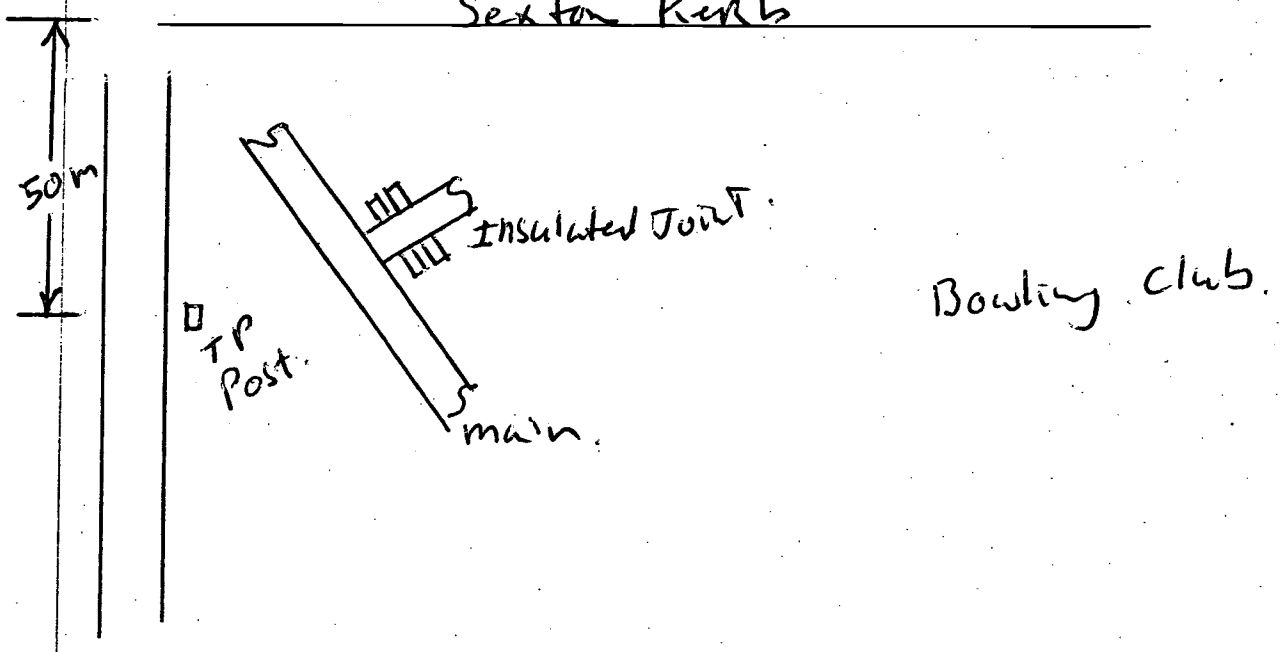
TEST NO. 1

PIN SPACING 2

MEGGER READING ~~1.45~~ 1.5

RESISTIVITY 18.8Ω pm

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tavragindi Wynnum. Date 28-10-03

TP Location Cnr Birdwood & Navy TP No. 5

Mains Size 42" to 36" TP Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1 Ω
ZINC REFERENCE TO PIPE	+590
CuSo4 REFERENCE TO PIPE	-454
ZINC TO CuSo4	-1093

EARTH TESTING

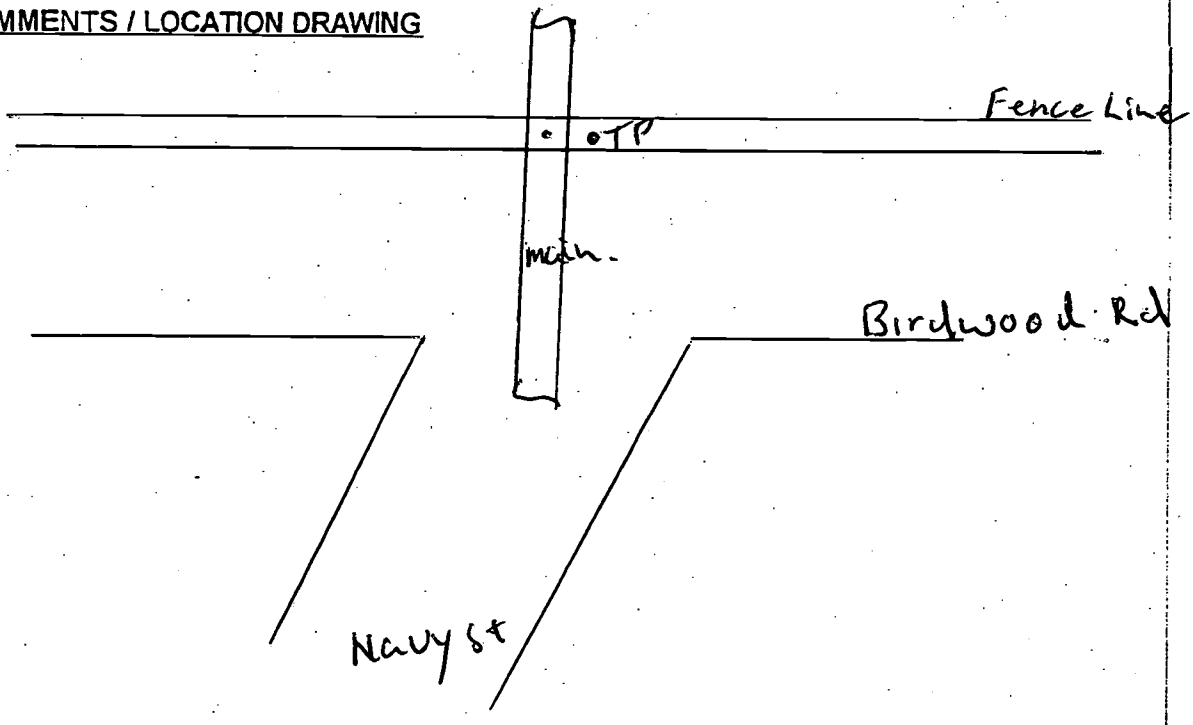
TEST NO. 1

PIN SPACING 2

MEGGER READING 2.2

RESISTIVITY 21.6 Ω PM

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S 54 Tarragindi - Wynnum Date 10-4-03

T P Location Mott Park T P No. 6

Mains Size 42" - 36" T P Type Rectifier 13

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+ 585
CuSo4 REFERENCE TO PIPE	- 1060
ZINC TO CuSo4	- 484

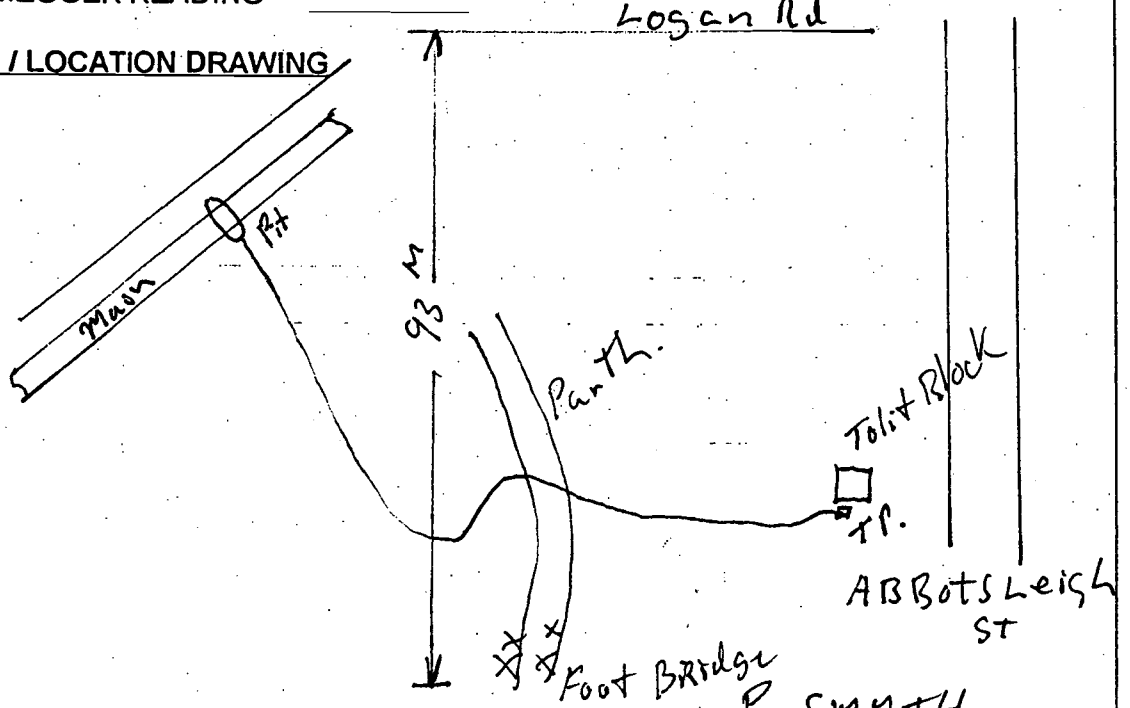
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 16.3
MEGGER READING 1.3

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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TP. 176m to Main

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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 10-4-03

TP Location 40 Geelong av TP No. 7

Mains Size 4½" - 36 TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1Ω
ZINC REFERENCE TO PIPE	+720
CuSo4 REFERENCE TO PIPE	−287
ZINC TO CuSo4	−1006

EARTH TESTING

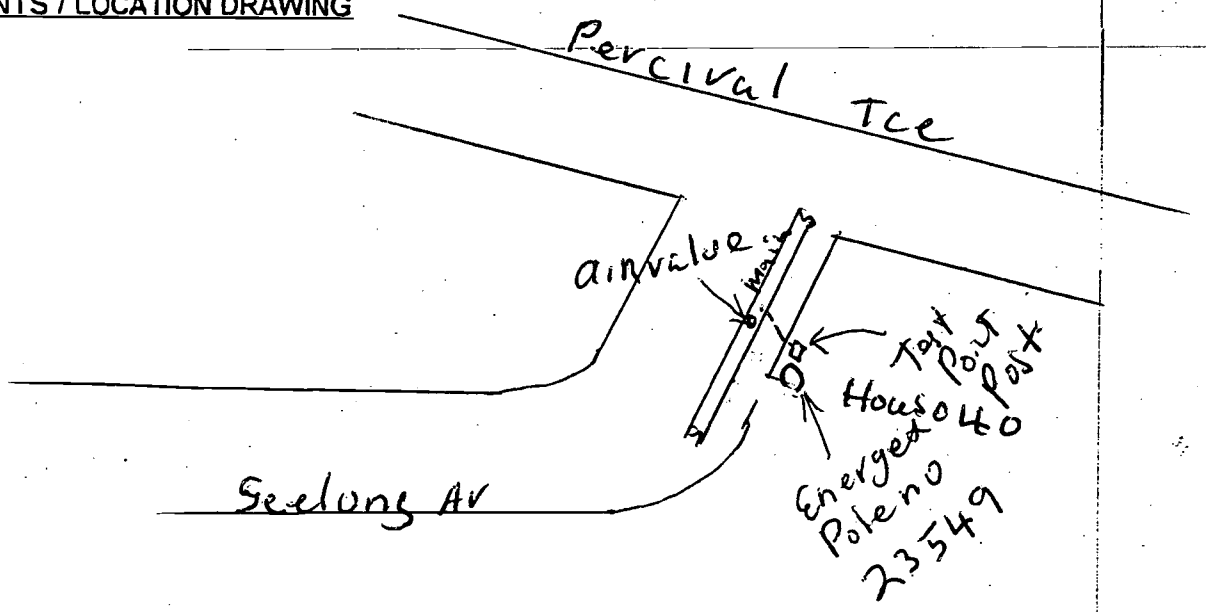
TEST NO. 1

PIN SPACING 2m

MEGGER READING 2.8

RESISTIVITY 35.16 ΩPM

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tarragindi – Wynnum Date 28-10-03

TP Location Eva St in Magestic Park TP No. 8

Mains Size 42" – 36" TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+726
CuSo4 REFERENCE TO PIPE	−380
ZINC TO CuSo4	−1100

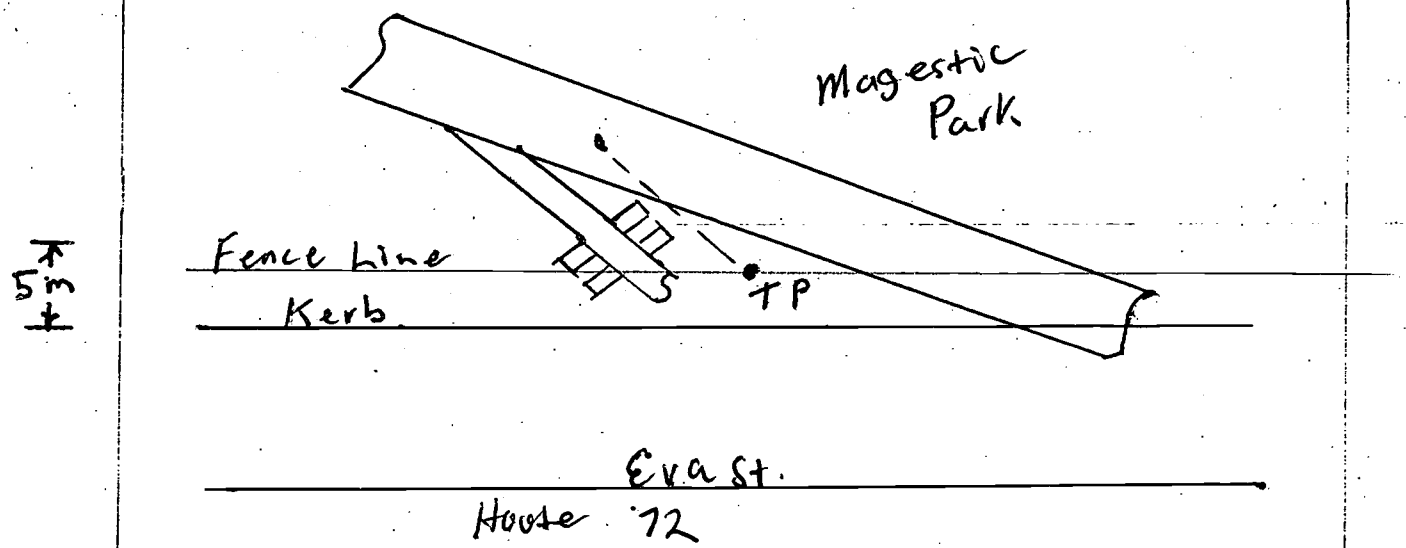
EARTH TESTING

TEST NO. 1

PIN SPACING 2 m RESISTIVITY 97.7 Ω pm

MEGGER READING 7.78

COMMENTS / LOCATION DRAWING



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Standard Cathodic Protection Test Point Data Gathering Form

Project Set 54 Tarragindi - Wynnum Date 18 - 2 - 04

TP Location Chatsworth at Illidge TP No. 9

Mains Size 42" - 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+578
CuSo4 REFERENCE TO PIPE	-460
ZINC TO CuSo4	-1095

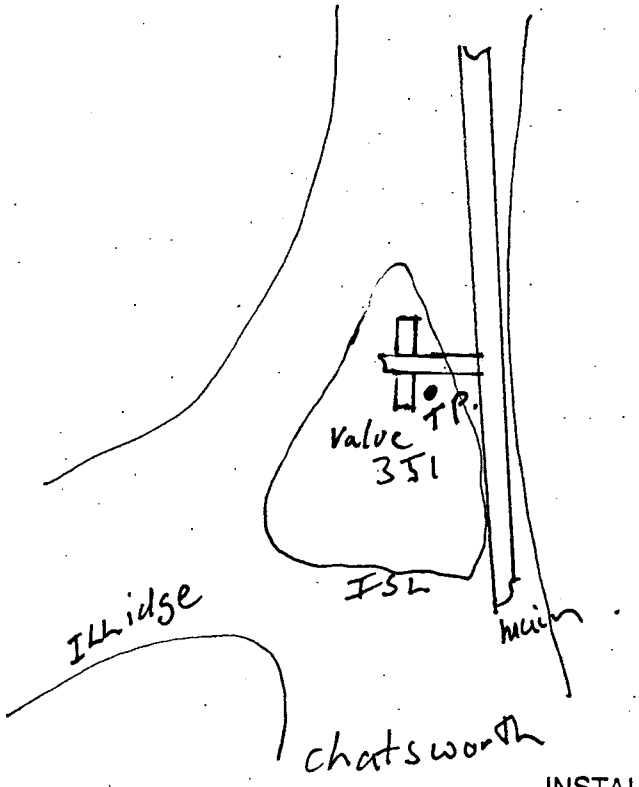
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 51.4 Ω pm

MEGGER READING 4.1

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tarragindi To Wynnum Date 10-10-03

TP Location Thomas and Prout TP No. 10

Mains Size 42" TO 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+443
CuSo4 REFERENCE TO PIPE	-650
ZINC TO CuSo4	-1090

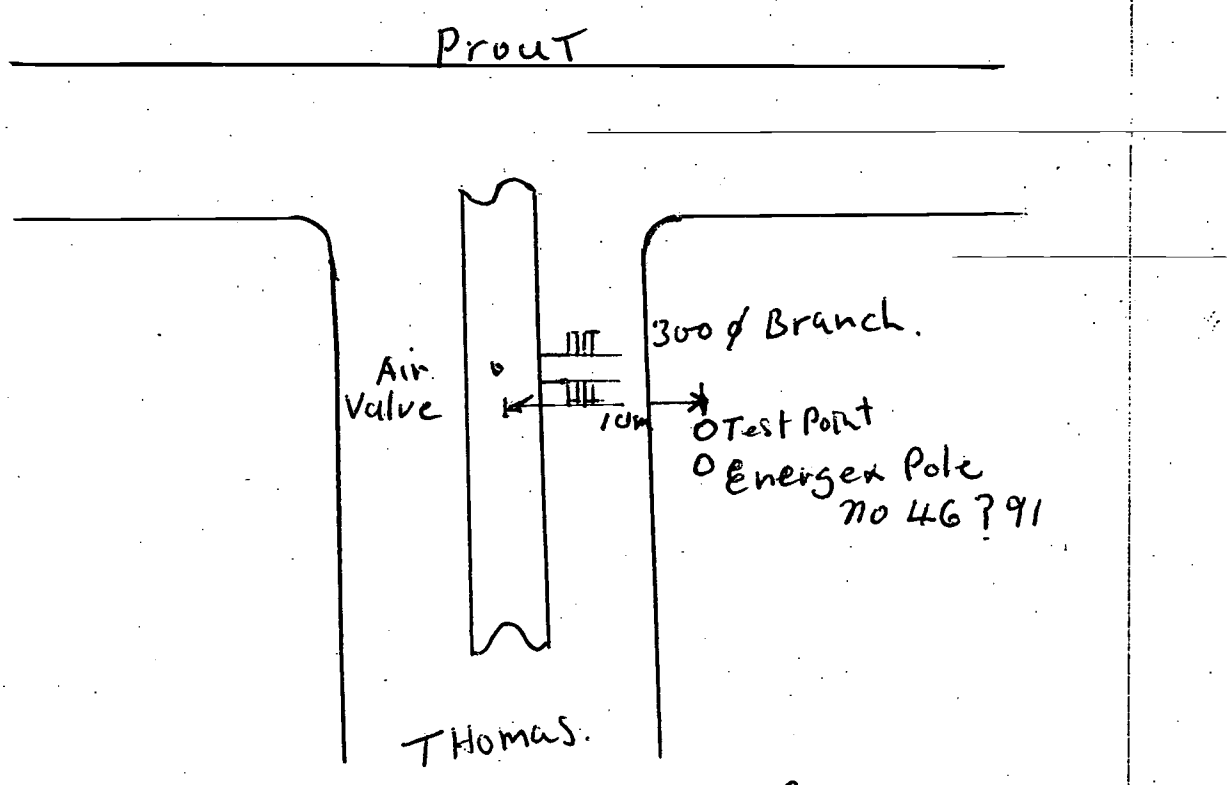
EARTH TESTING

TEST NO. 1

PIN SPACING ~~3.7~~ 2m RESISTIVITY 46.4 ΩPm

MEGGER READING 3.7

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 28-4-03

TP Location Old Cleavland Rd TP No. 112

Mains Size 42" - 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1Ω
ZINC REFERENCE TO PIPE	+434
CuSo4 REFERENCE TO PIPE	-593
ZINC TO CuSo4	-938

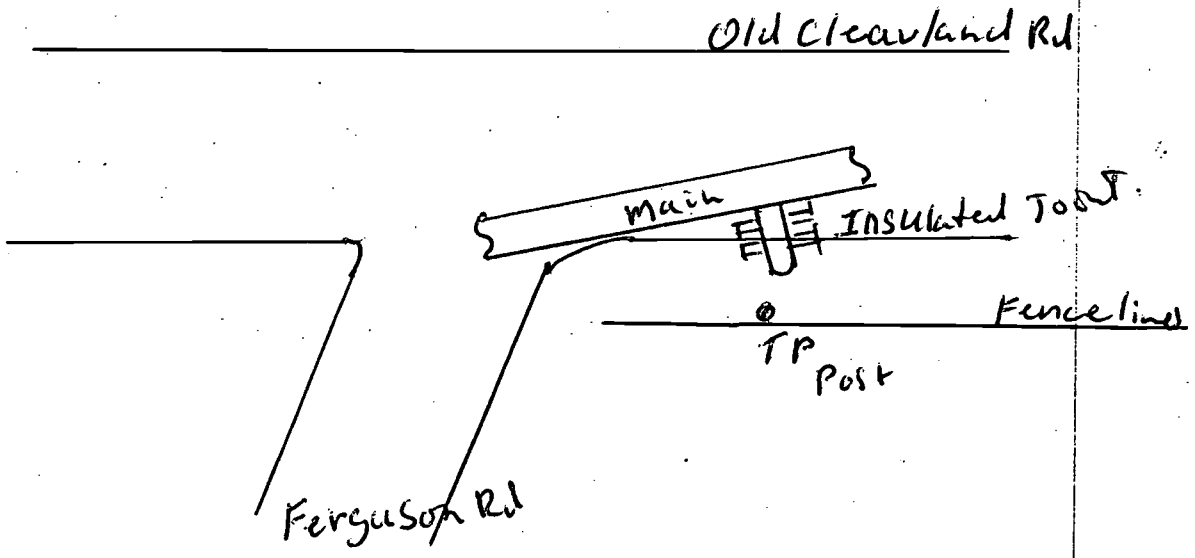
EARTH TESTING

TEST NO. 1

PIN SPACING 2m RESISTIVITY 27.6 Ω Pm

MEGGER READING 2.2

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tarragindi - Wynnan Rd Date 19-4-07

TP Location The Promenade. TP No. 12

Mains Size 42" - 36" TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1Ω
ZINC REFERENCE TO PIPE	+446
CuSo4 REFERENCE TO PIPE	-490
ZINC TO CuSo4	-952

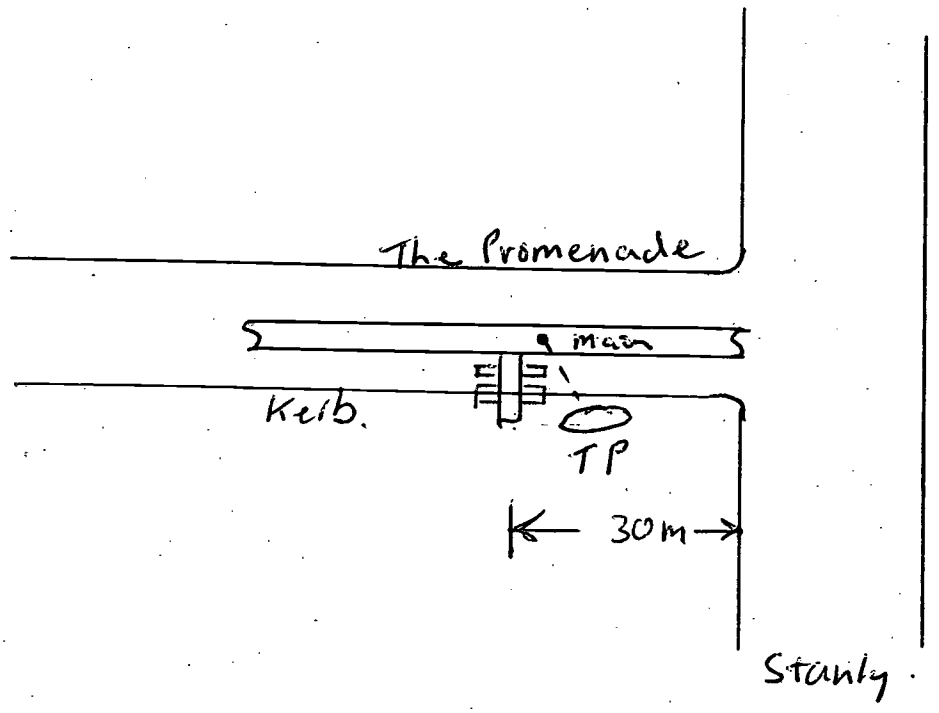
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 22.6ΩPm

MEGGER READING 1.8

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Date 13-4-03

TP Location 511 Darcy Rd TP No. 13

Mains Size 42" - 36" TP Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+709
CuSo4 REFERENCE TO PIPE	-516
ZINC TO CuSo4	-1225

EARTH TESTING

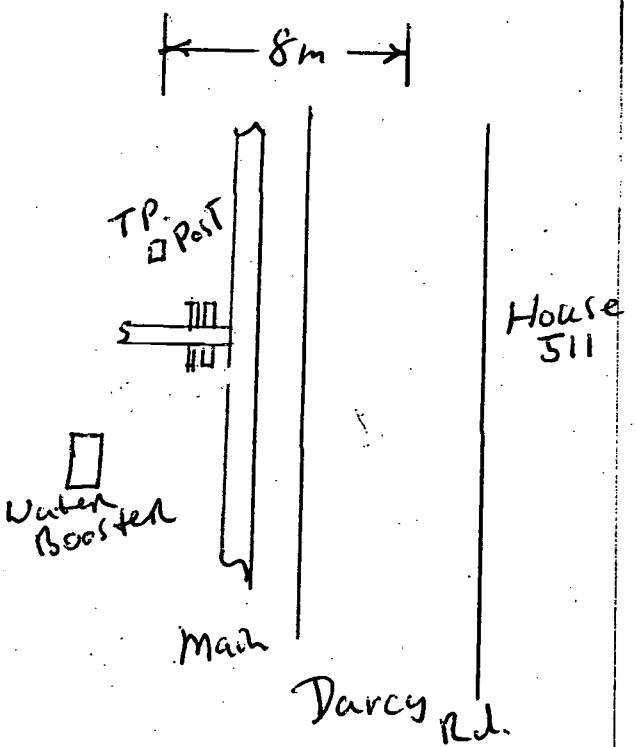
TEST NO. 1

PIN SPACING 2

MEGGER READING 10.06

RESISTIVITY 126.35 Ω PM

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

UBD 161G13

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Rd. Date .....

T P Location Baguette St Seven hills T P No. 14

Mains Size 900 mm T P Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.02.
ZINC REFERENCE TO PIPE	+558
CuSo4 REFERENCE TO PIPE	-448
ZINC TO CuSo4	-1002

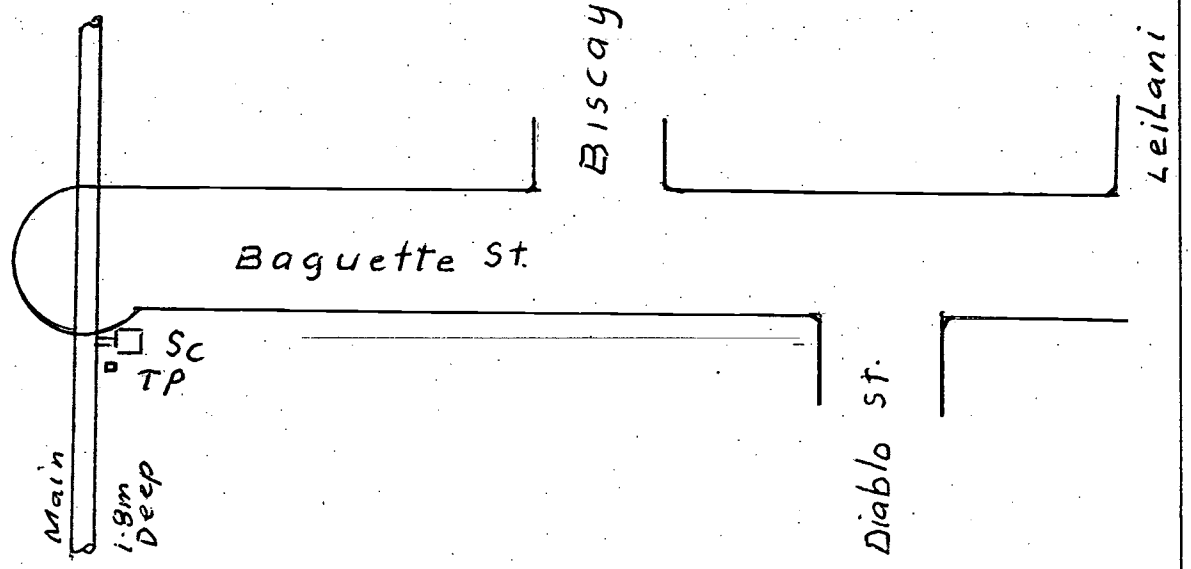
EARTH TESTING

TEST NO. 1
PIN SPACING 2 mtrs RESISTIVITY 97 Ω mtrs
MEGGER READING 7·7

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 3-2-04

TP Location Cnr Wynnum & Barrack TP No. 15

Mains Size 42" TO 30" TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+680
CuSo4 REFERENCE TO PIPE	-710
ZINC TO CuSo4	-1111

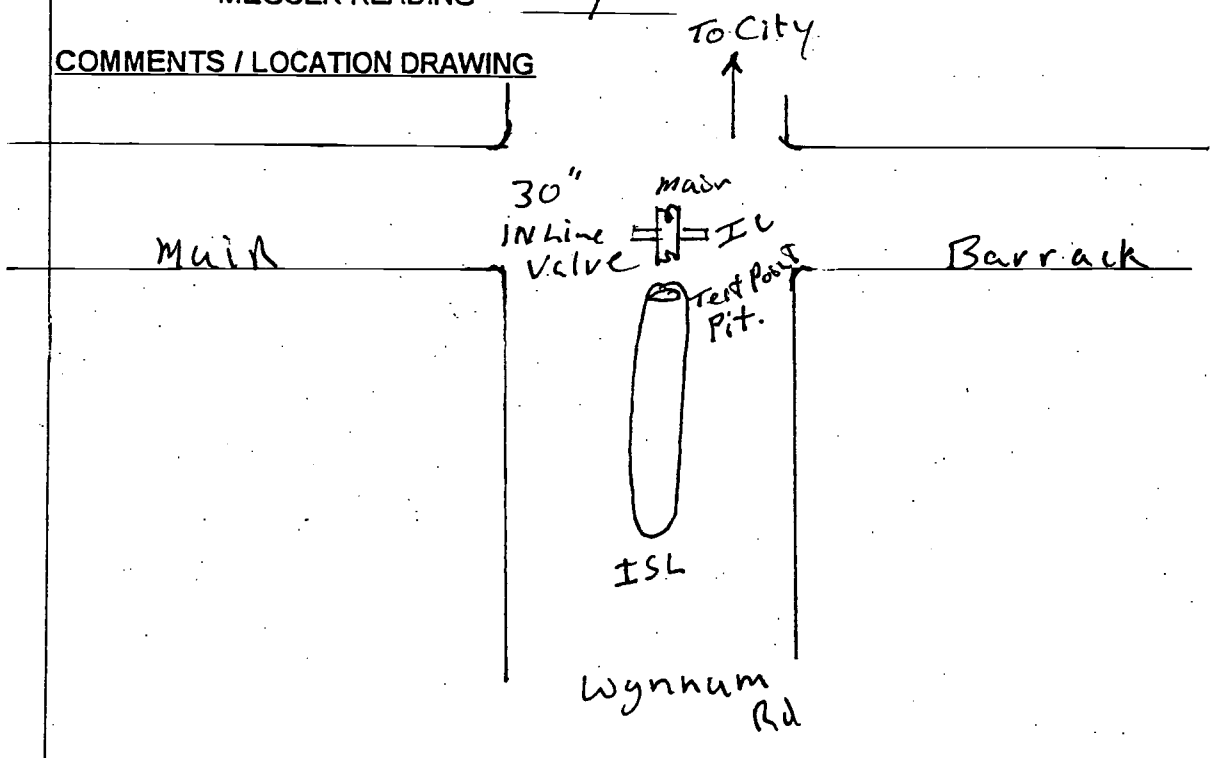
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 11.3Ω pm

MEGGER READING .9

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 35 Wynnum Rd. Date 20-1-04

T P Location 88 Barrack Rd T P No. 1

Mains Size ..... T P Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.02 Ω
ZINC REFERENCE TO PIPE	+559
CuSo4 REFERENCE TO PIPE	−585
ZINC TO CuSo4	−1143.

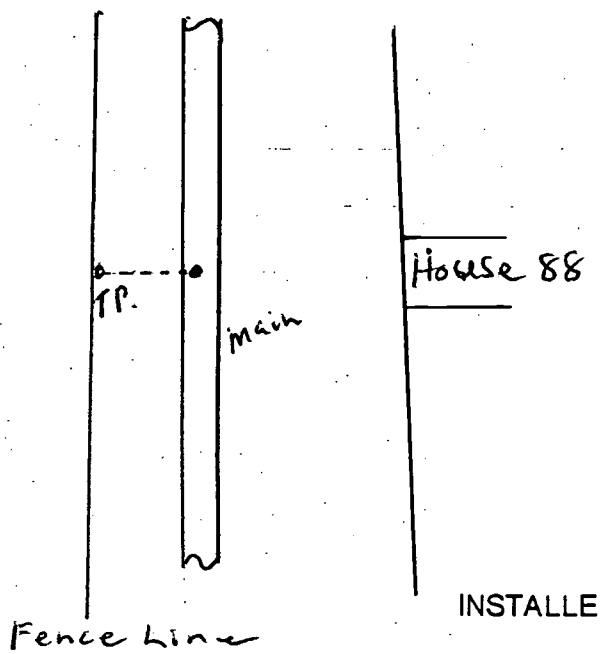
EARTH TESTING

TEST NO. 1
PIN SPACING 2m RESISTIVITY 69.08 Ω pm
MEGGER READING 5.5

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 35 Wynnum Rd Date 21-1-04

TP Location Cnr Barrack & Lytton TP No. 2

Mains Size ..... TP Type B. Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+569
CuSo4 REFERENCE TO PIPE	−552
ZINC TO CuSo4	−1122

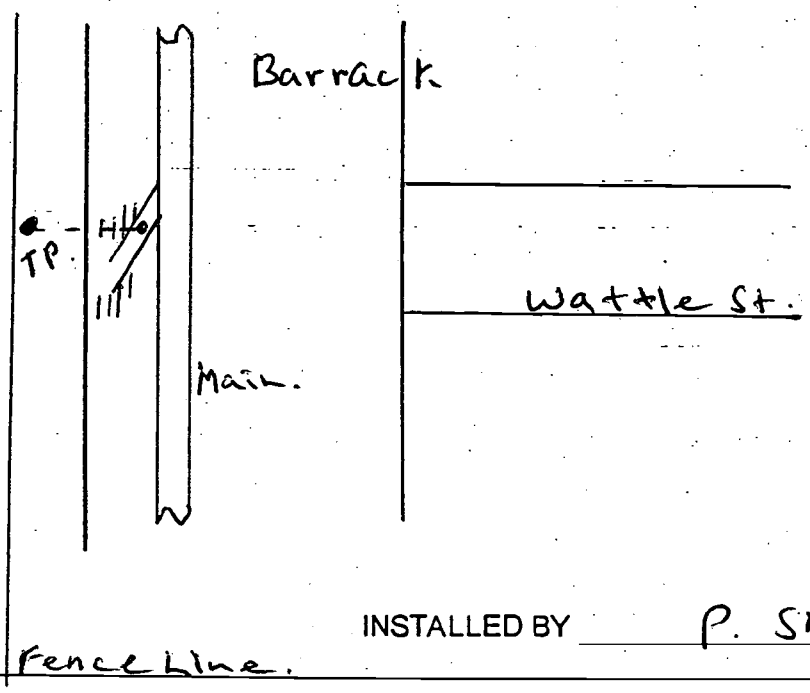
EARTH TESTING

TEST NO. 1
PIN SPACING 2m RESISTIVITY 86.6 Ω PM
MEGGER READING 6-9

TEST NO 2
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

TEST NO 3
PIN SPACING ____ RESISTIVITY ____
MEGGER READING ____

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 35 Wynnum Rd Date 22-1-04

TP Location Lytton Rd by Metroplex TP No. 3

Mains Size ..... TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+461
CuSo4 REFERENCE TO PIPE	-543
ZINC TO CuSo4	-1002

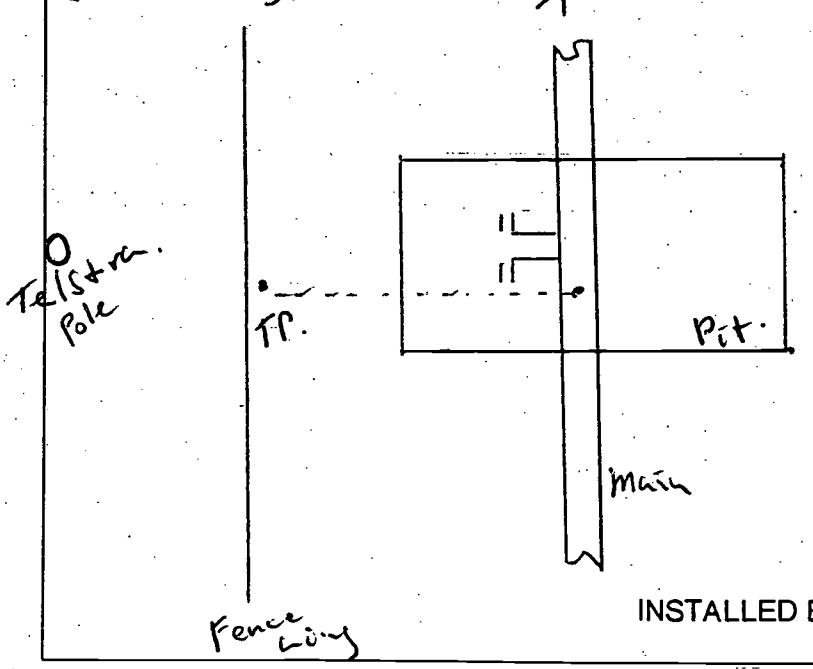
EARTH TESTING

TEST NO. 1
PIN SPACING 0.2m RESISTIVITY 110.5 Ω Pm
MEGGER READING 8.8

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 1

Project S54 TARRAGINDI TO WYNNUM RD. **Date** 3-11-03

DESCRIPTION

MAINS DETAILS: TARRAGINDI TO WYNNUM RD
LOCATIONS: TARRAGINDI AND AUTUMN RD.
SIZE: 1060 MM
MATERIAL: MILD STEEL
COATING: TAR EPOXY
VALVE No. V188

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: ALL > 1.0 MSU
NUMBER OF BOLT: 16
FLANGE TO FLANGE RESISTANCE: 35.0 SU
INSULATION CHECKER MODEL 702:

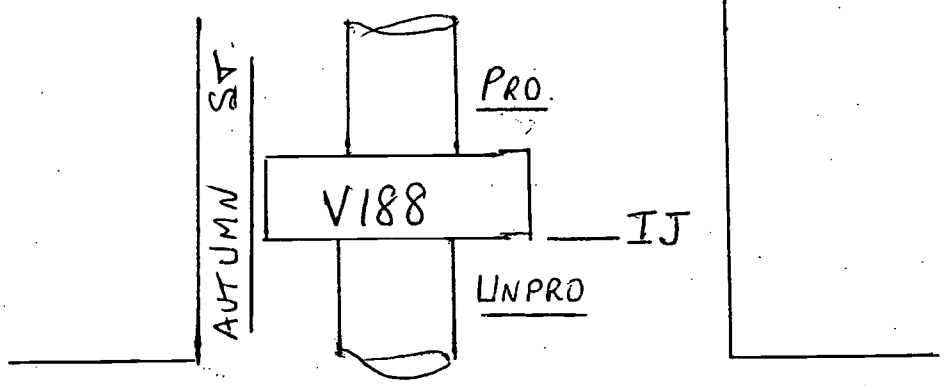
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -313 MV
UNPROTECTED SIDE: -303 MV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 2

Project S54 TARRAGINDI TO WYNNUM RD **Date** 4-11-03

DESCRIPTION

MAINS DETAILS:	TARRAGINDI TO WYNNUM RD
LOCATIONS:	AUTUMN ST
SIZE:	1060 MM
MATERIAL:	MILD STEEL
COATING:	TAR EPOXY
VALVE No.	150 MM RETIC

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:	ALL > 1.5 MΩ
NUMBER OF BOLT:	8
FLANGE TO FLANGE RESISTANCE:	56.0 Ω
INSULATION CHECKER MODEL 702:	

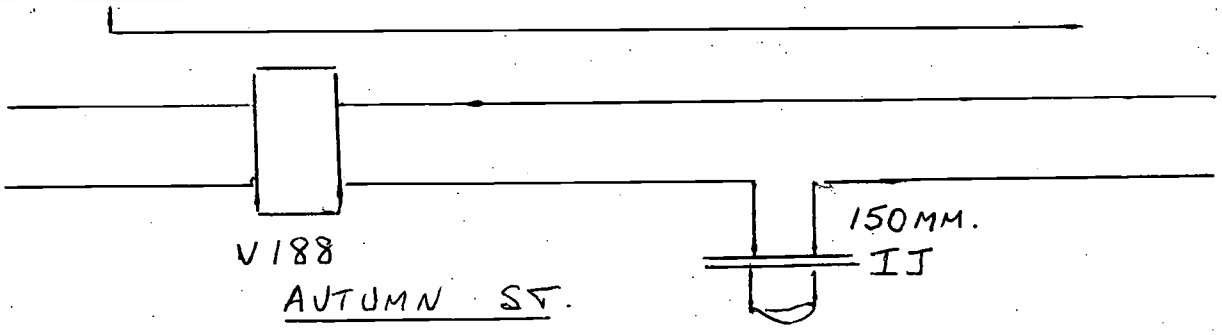
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE:	- 394 MV
UNPROTECTED SIDE:	- 371 MV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY L. GREAVES

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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Tarragindi – Wynnum **Date** 17-2-04

Isolation 3

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Tarragindi Rd & Autumn Rd
SIZE: 42" to 36"
MATERIAL: Mild Steel
COATING: P.C
VALVE No. 254

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE:
INSULATION CHECKER MODEL 702:

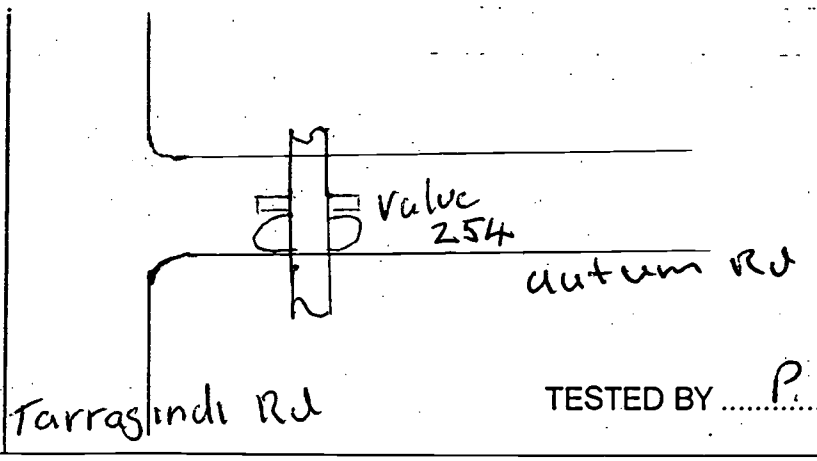
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -375
UNPROTECTED SIDE: -250

ABOVE TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE: 70KΩ

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation. No 3a

Project Tarragindi - Wynnum Date 26-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: andrew & Ferndale
SIZE: 42" to 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .78 MΩ
INSULATION CHECKER MODEL 702: N/A.

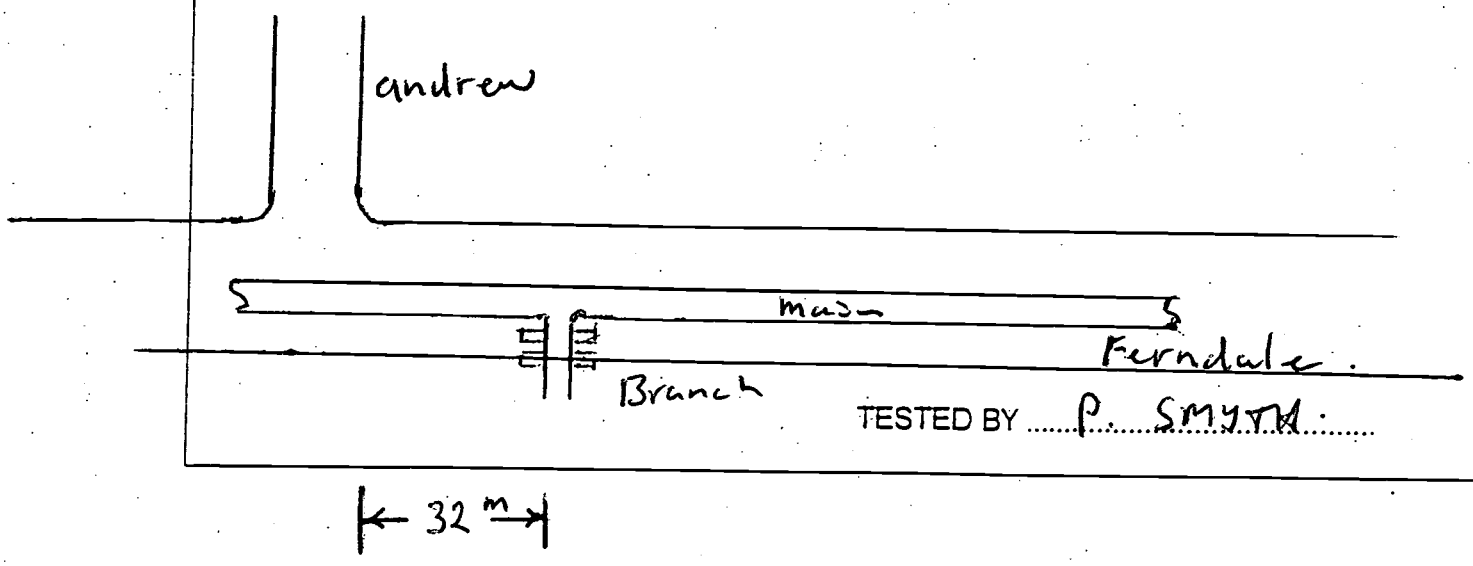
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -250 mv
UNPROTECTED SIDE: -150mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Wellers hill - MT Gravatt **Date** 19-4-07

Isolation 4

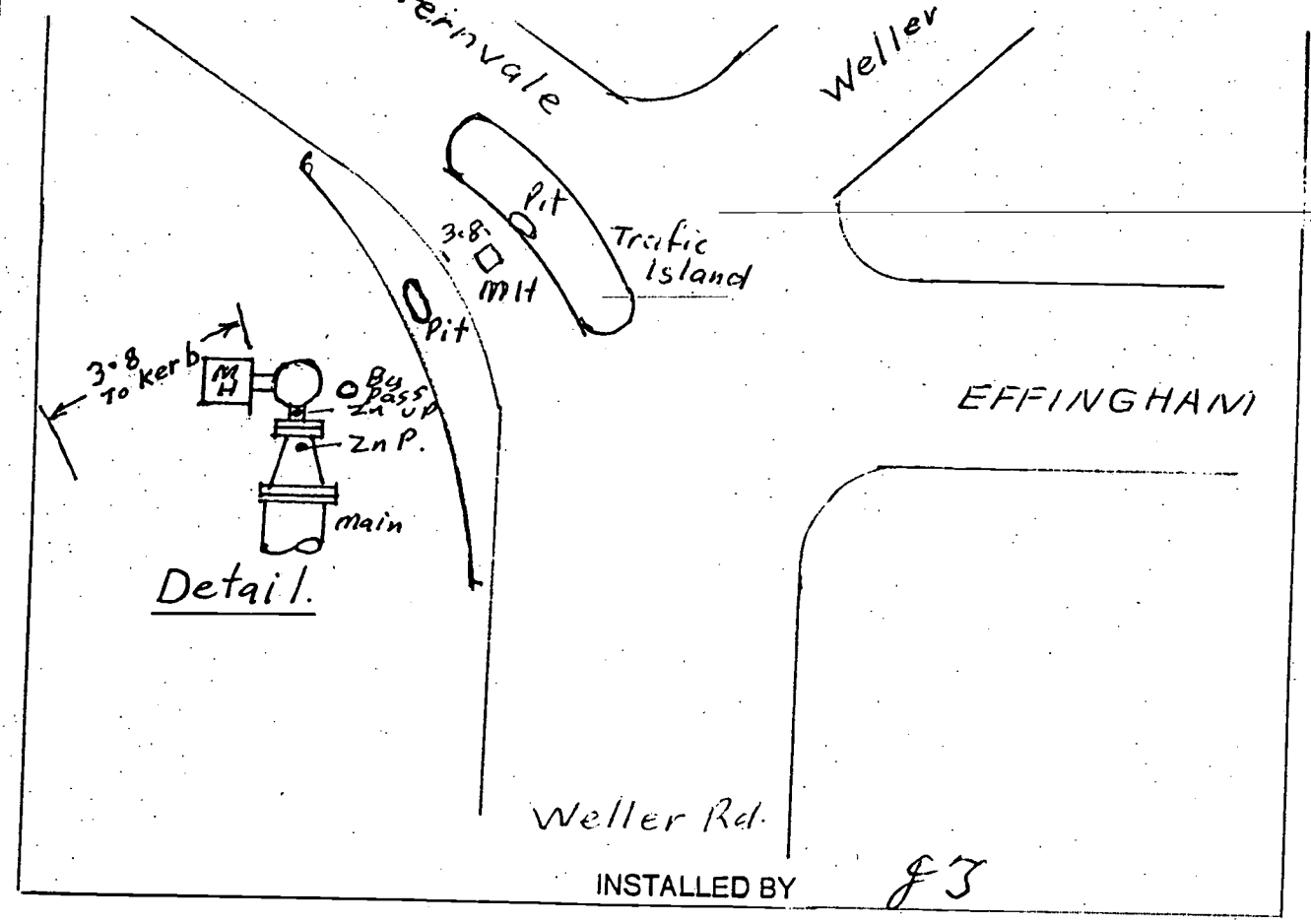
DESCRIPTION

MAINS DETAILS:
LOCATIONS: Intersections as below
SIZE:
MATERIAL: MSCL
COATING: Tar asbestos
VALVE No.

.N GROUND TESTING

BOLT TO FLANGE RESISTANCE: > 5 mΩ
NUMBER OF BOLT: 36 off 4½" x 1"
FLANGE TO FLANGE RESISTANCE: 0.7 mΩ
INSULATION CHECKER MODEL 702: 1 N 11

POTENTIAL DIFFERENCE TO REFERENCE CELL:



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 **Date** 2-7-03

Isolation 5

DESCRIPTION

- MAINS DETAILS:
- LOCATIONS: no 46 Effingham St
- SIZE: 42" - 36"
- MATERIAL: Mild Steel
- COATING:
- VALVE No. 16"BR 796

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 20ΩR
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: > KΩ
INSULATION CHECKER MODEL 702: N/A.

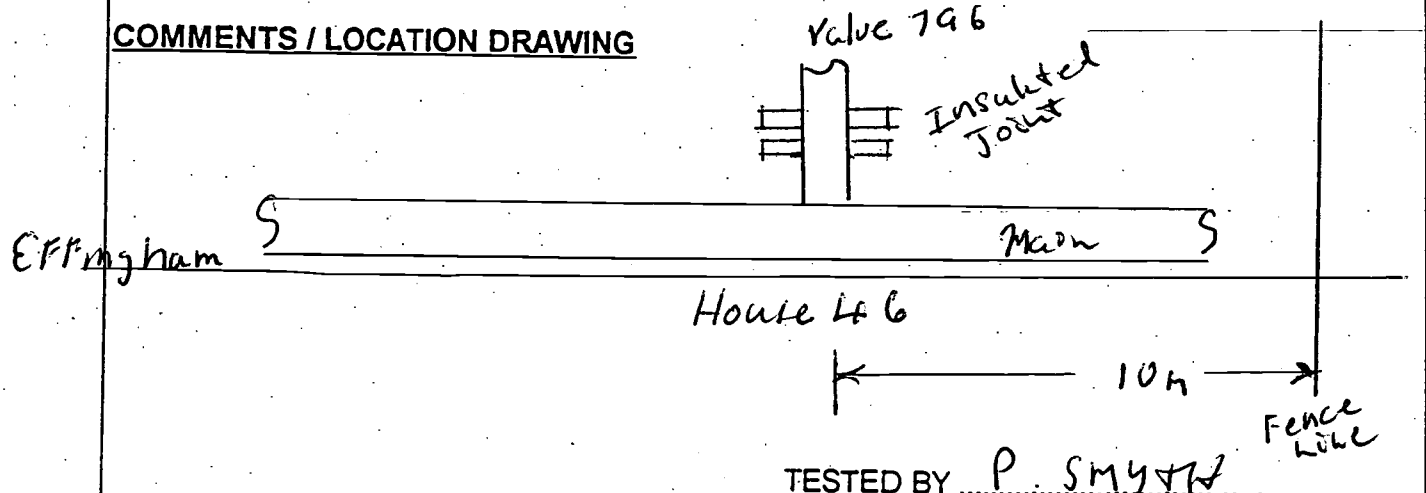
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -416
UNPROTECTED SIDE: -350

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Date 26-4-07

Isolation 7

DESCRIPTION

MAINS DETAILS: Tarragindi To Wynnam
LOCATIONS: Sexton Bowling club.
SIZE: 42 36
MATERIAL: Mild Steel
COATING:
VALVE No.

IN GROUND TESTING

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

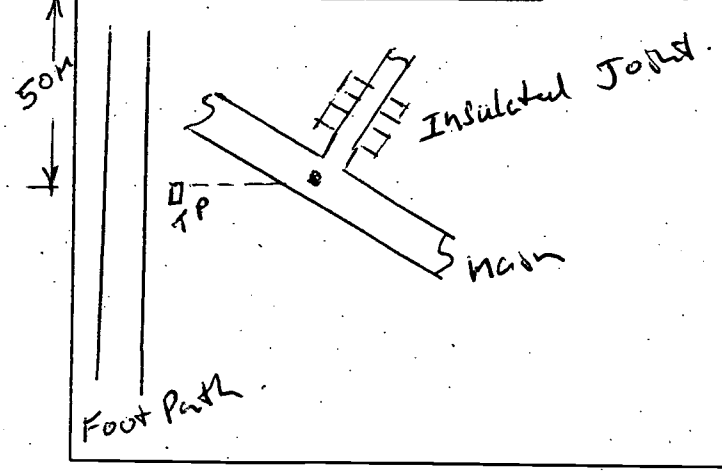
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -549
UNPROTECTED SIDE: -447

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING Sexton. Kerb.



TESTED BY P SMYTH

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S 54 **Date** 29-4-03

Isolation 8

DESCRIPTION

MAINS DETAILS: Tarragindi to Wynnum
LOCATIONS: 4 Merrell St
SIZE: 42 - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .68mΩ
INSULATION CHECKER MODEL 702: N/A

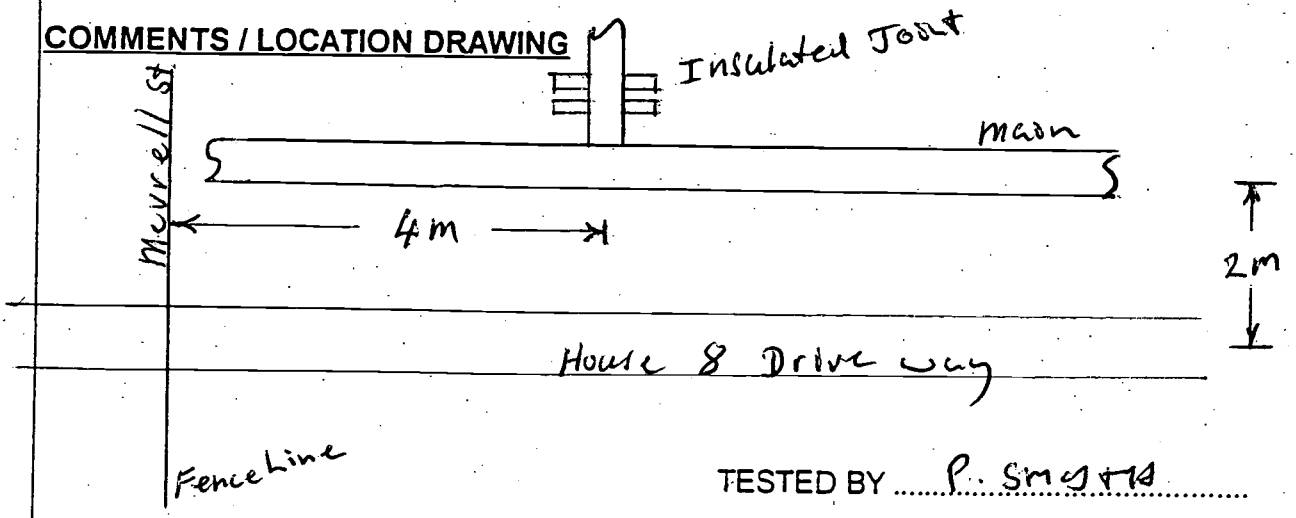
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -455
UNPROTECTED SIDE: -359

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 9

Project Tarragindi – Wynnum Date 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: 42 Swain St
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 6" Branch.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7 zero Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .8 MΩ
INSULATION CHECKER MODEL 702: N/A.

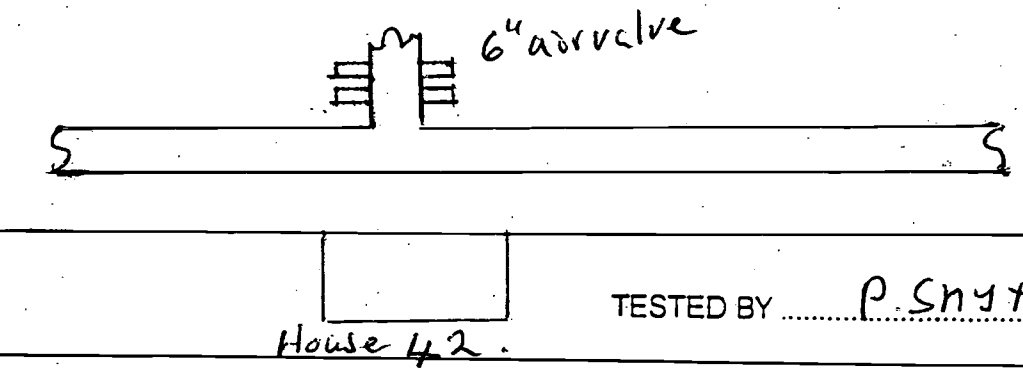
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -390 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S 54 **Date** 14 - 4 - 07

Isolation 10

DESCRIPTION

MAINS DETAILS: Tarragindi to Wynnum
LOCATIONS: Abbotsleigh & Cavendish Rd
SIZE: 42 - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 12" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 0.2 MΩ
INSULATION CHECKER MODEL 702: N/A

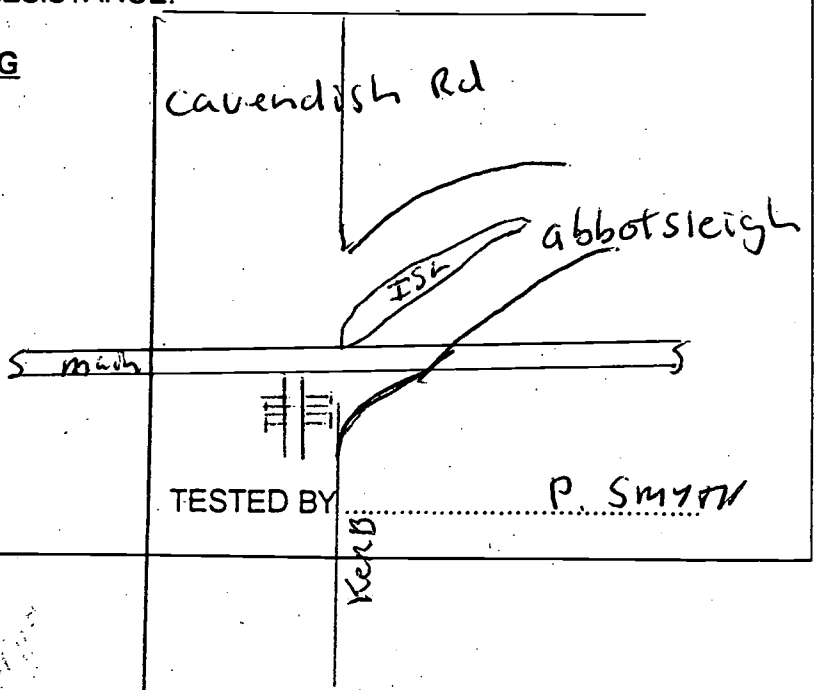
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -414
UNPROTECTED SIDE: -356

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 10a

Project Tarragindi - Wynnum Date 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Arlington St.
SIZE: 42" - 36"
MATERIAL: Mild Steel.
COATING: T/E
VALVE No. 12" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 3.8 KΩ
INSULATION CHECKER MODEL 702: N/A.

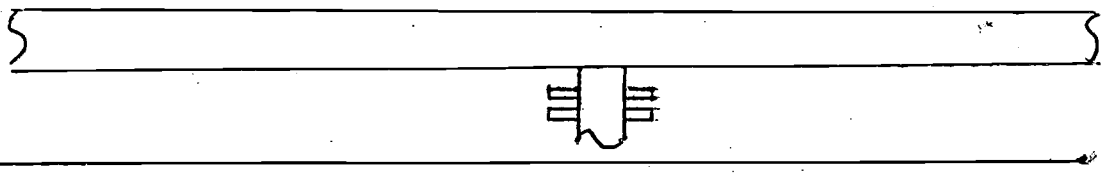
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -465 mV
UNPROTECTED SIDE: -415 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING House 29



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation no # 11

Project Tarragindi to Wynnum Date 28-10-03

DESCRIPTION

- MAINS DETAILS:
- LOCATIONS: Eva St
- SIZE: 42" to 36"
- MATERIAL: Mild Steel
- COATING:
- VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts >200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 2ΜΩ
INSULATION CHECKER MODEL 702: N/A

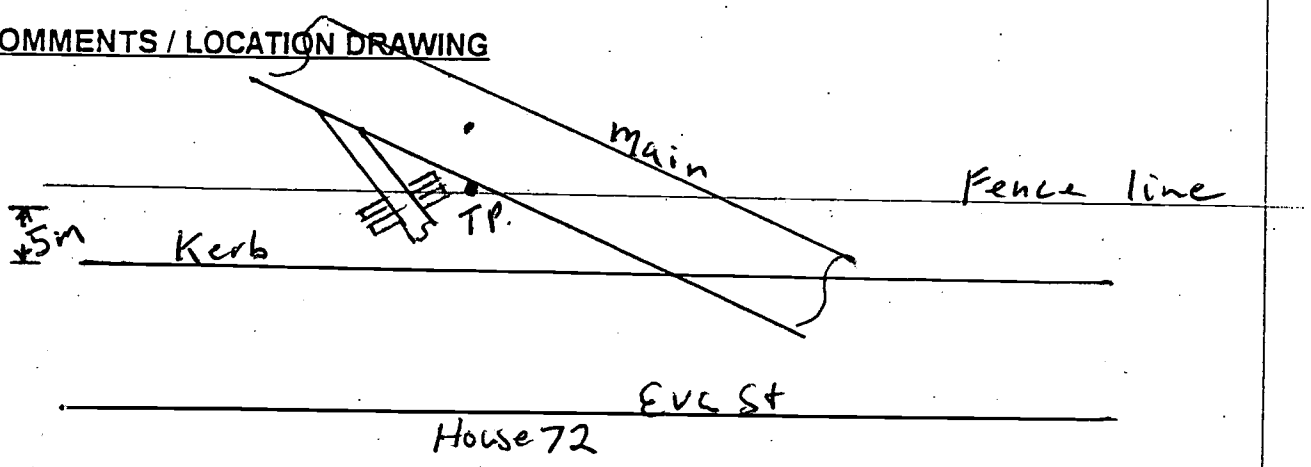
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -310 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION 12.

Project S54 Tarragindi wynnum Date 16-3-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Cnr ILLIDGE & Chatsworth.
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING: T/A.
VALVE No. 351

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 45 Ω
INSULATION CHECKER MODEL 702: N/A.

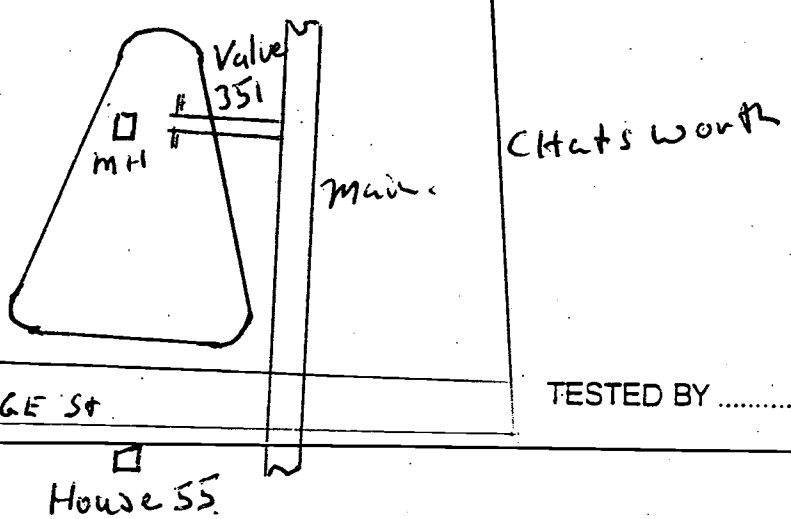
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -480 mV
UNPROTECTED SIDE: -430 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 13

Project S.C.P. 54 Tarragindi - Wynnam Date 14-3-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Chatsworth & Boundary
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING: T/E
VALVE No. 12" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .8KΩ
INSULATION CHECKER MODEL 702: N/A

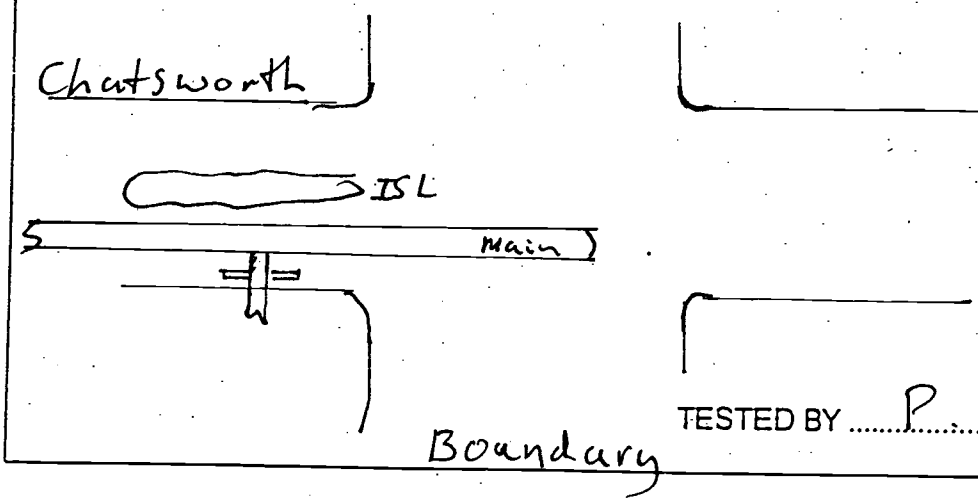
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -560
UNPROTECTED SIDE: -480

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Tarragindi To Wynnum Date 14-10-03

ISOLATION N° 14

DESCRIPTION

MAINS DETAILS: S54
LOCATIONS: Prout + Thomas.
SIZE: 42" to 36"
MATERIAL: Mild Steel.
COATING:
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts > 200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 2-5 MΩ
INSULATION CHECKER MODEL 702: N/A.

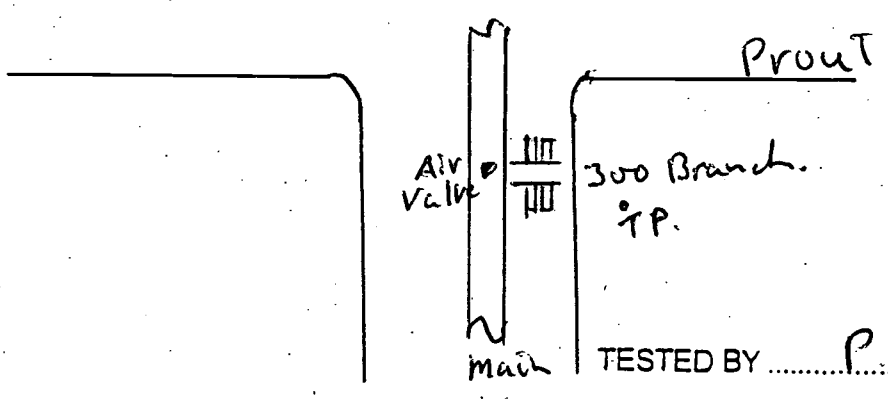
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -580
UNPROTECTED SIDE: -318

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. Smyth

THOMAS.

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Date 28-10-03

Isolation No 15

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Old Cleveland Rd
SIZE: 42"-36"
MATERIAL: Mild Steel
COATING: T/A.
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 1MΩ
INSULATION CHECKER MODEL 702: N/A

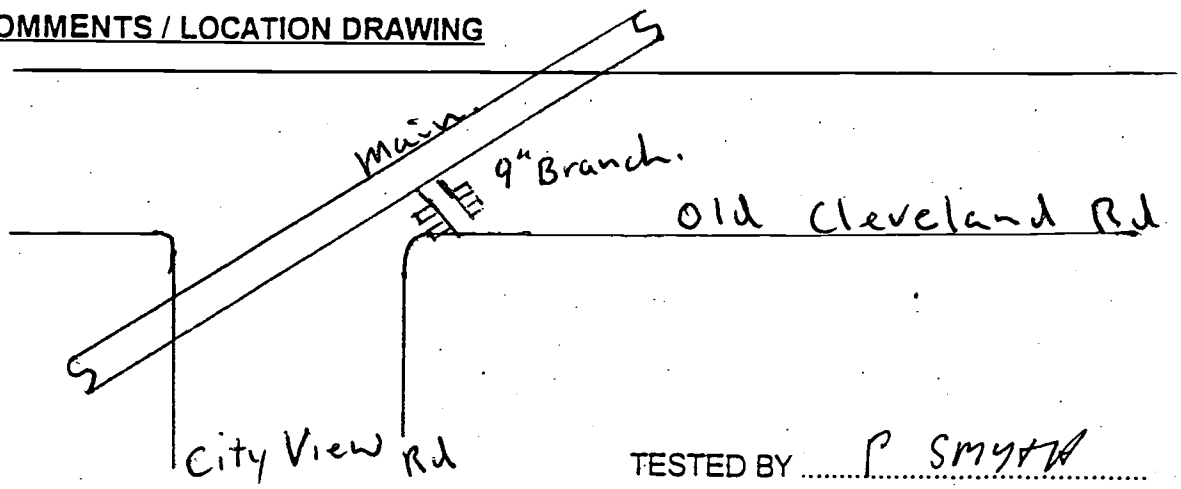
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -550 mv
UNPROTECTED SIDE: -388 mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Tarragindi – Wynnum. Date 29-4-03

Isolation 16

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Old Cleveland Rd
SIZE: 42" – 36"
MATERIAL: Mild Steel.
COATING:
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts. 7200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 4.5 KΩ
INSULATION CHECKER MODEL 702:

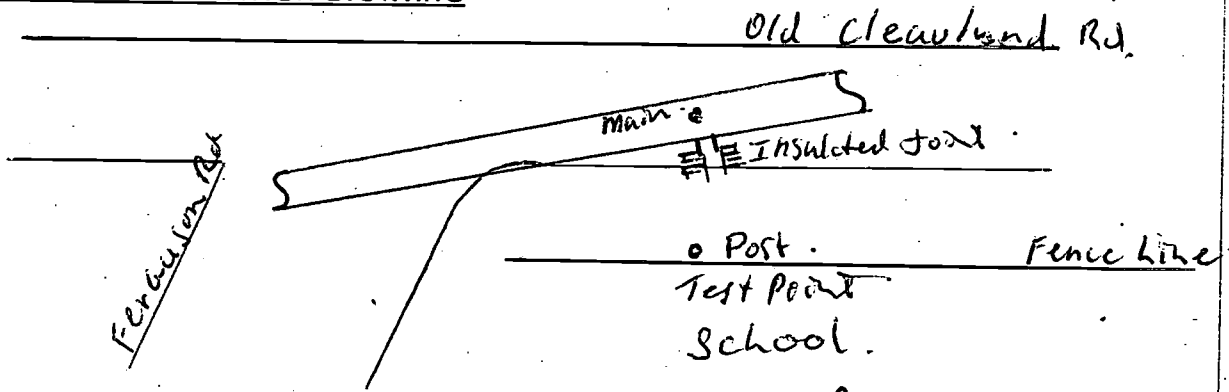
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -593 mV
UNPROTECTED SIDE: -533. mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Date 29-4-03

Isolation 17

DESCRIPTION

MAINS DETAILS: Tarragindi Wynnum
LOCATIONS: Cnr The Promenade + Stanley
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bdts 7200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 2 KΩ
INSULATION CHECKER MODEL 702: N/A.

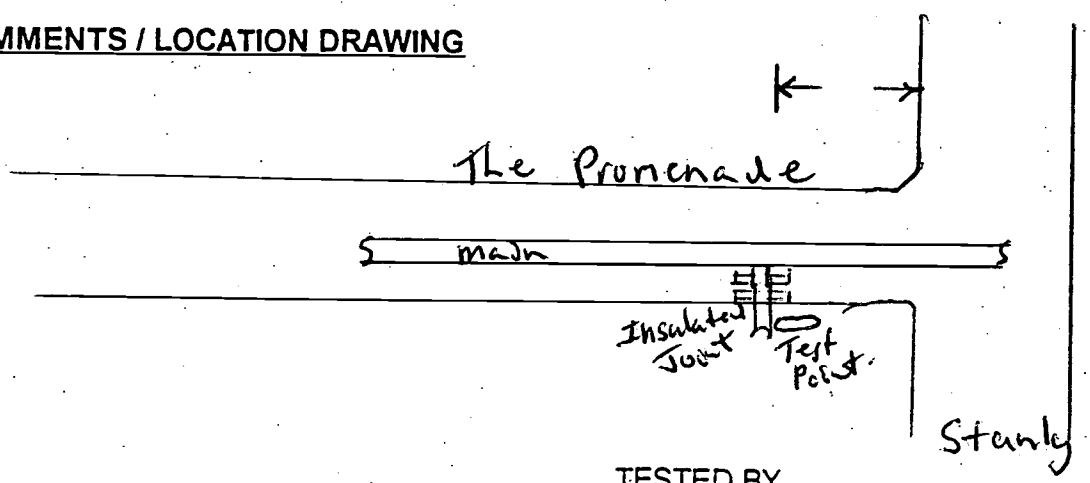
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -493
UNPROTECTED SIDE: -345

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P. Skyon

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 18

Project S.54 **Date** 15-4-03

DESCRIPTION

MAINS DETAILS: Tarragindi - Wynnum Rd
LOCATIONS: 511 Darcy Rd
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .25mΩ
INSULATION CHECKER MODEL 702: N/A

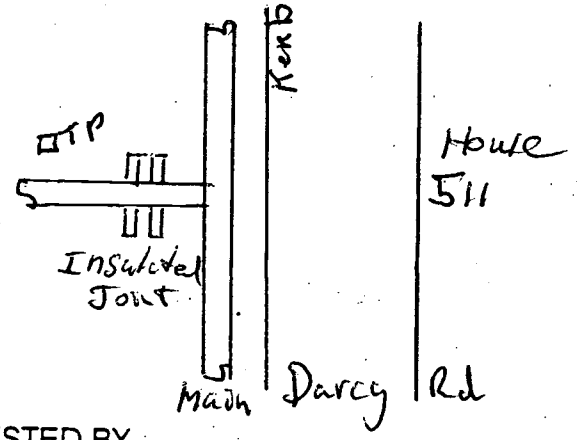
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -516
UNPROTECTED SIDE: -465

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE: 8m

COMMENTS / LOCATION DRAWING



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 19

Project S54 Tarragindi - Wynnum Date 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: 534 Darcy Rd
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: 7 all Bolts. 7200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .875 MΩ
INSULATION CHECKER MODEL 702: N/A.

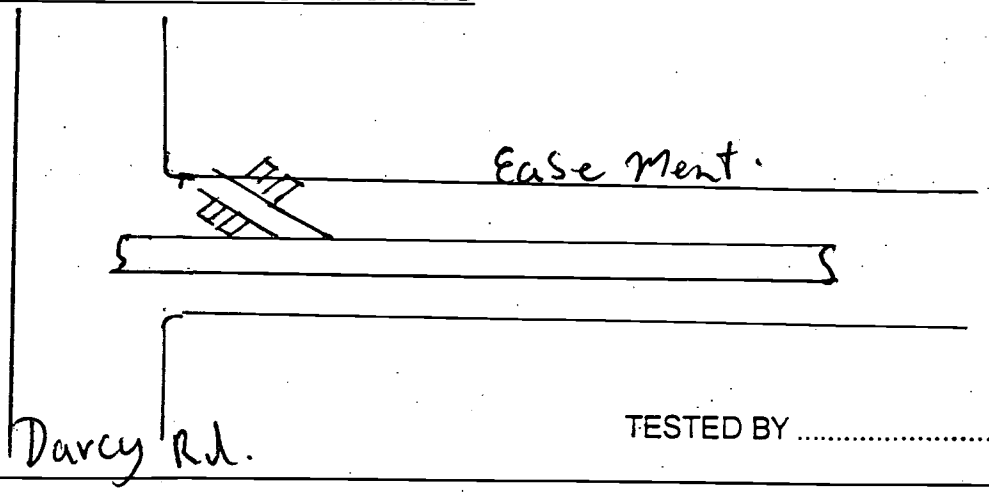
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -410 mV
UNPROTECTED SIDE: -300 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Tarragindi – Wynnum Rd. **Date** 11-11-03

Isolation 20

DESCRIPTION

MAINS DETAILS: S54
LOCATIONS: Richmand + Muir Rd.
SIZE:
MATERIAL: M S C L
COATING: Tar Asbestos
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: > 0·4 mΩ
NUMBER OF BOLT: 8
FLANGE TO FLANGE RESISTANCE: 17 Ω
INSULATION CHECKER MODEL 702: INIL

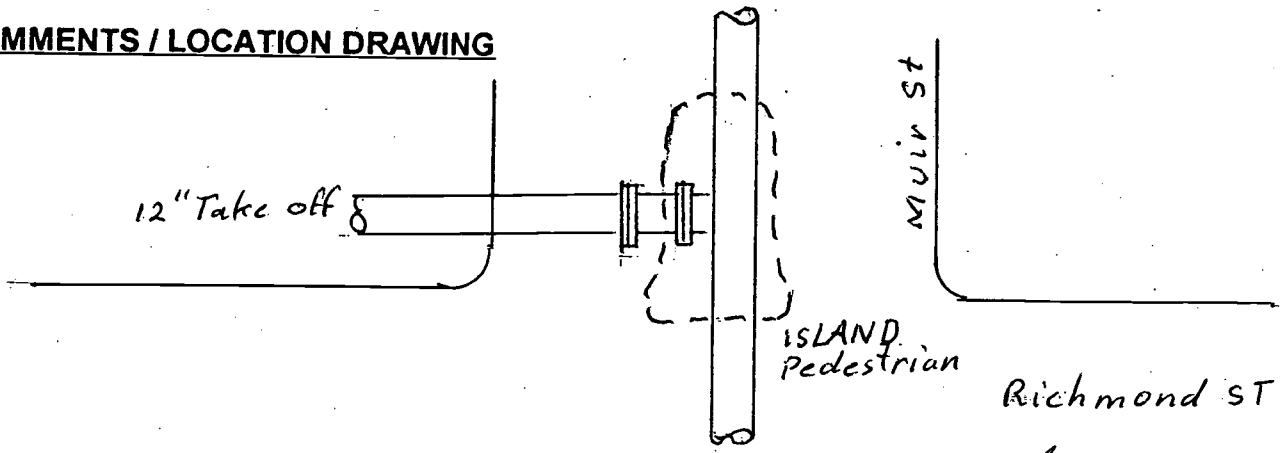
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE:
UNPROTECTED SIDE:

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY J Taylor

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 21

Project Tarragindi - Wynnum. **Date** 30-10-03

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: Cnr Muir & Wynnum
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING: T/E
VALVE No. 12" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 69 KΩ
INSULATION CHECKER MODEL 702: N/A

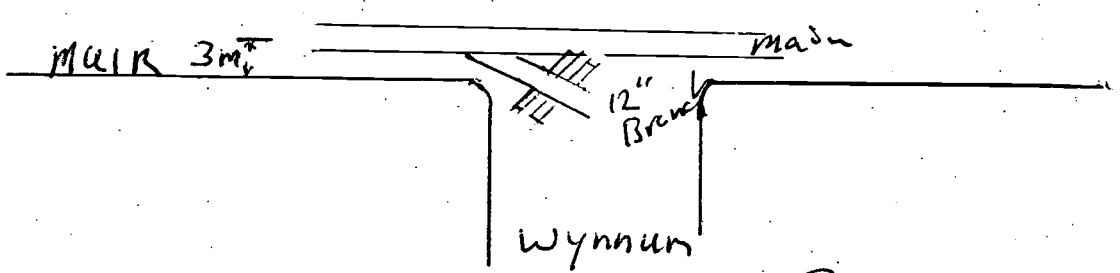
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -380 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 22

Project S54 Tarragindi To Wynnum Date 11-11-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Cnr Muir & Wynnum Rd
SIZE: 42" TO 36"
MATERIAL: Mild Steel
COATING: T/E
VALVE No. 12" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .2 KΩ
INSULATION CHECKER MODEL 702: N/A

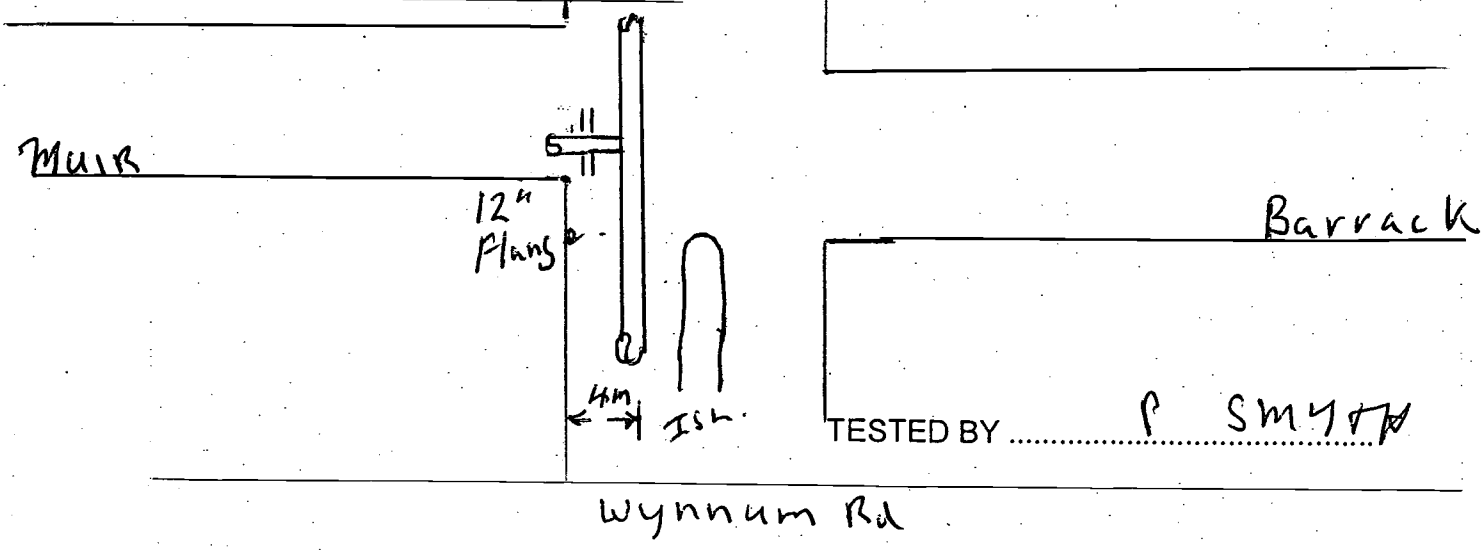
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -485 mv
UNPROTECTED SIDE: -310 mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION N° 24

Project S.54 53 Mains to Northcliffe Date 13-3-04

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.

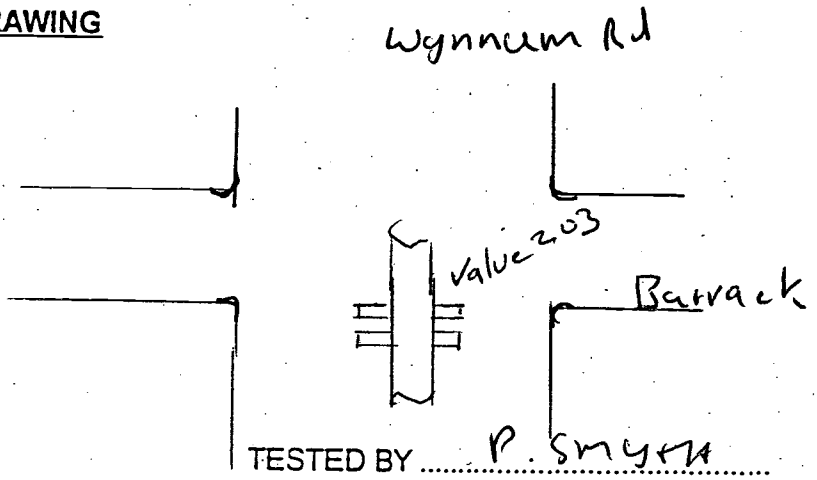
POTENTIAL DIFFERENCE TO REFERENCE CELL.

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. 23

Electrical Engineering Unit

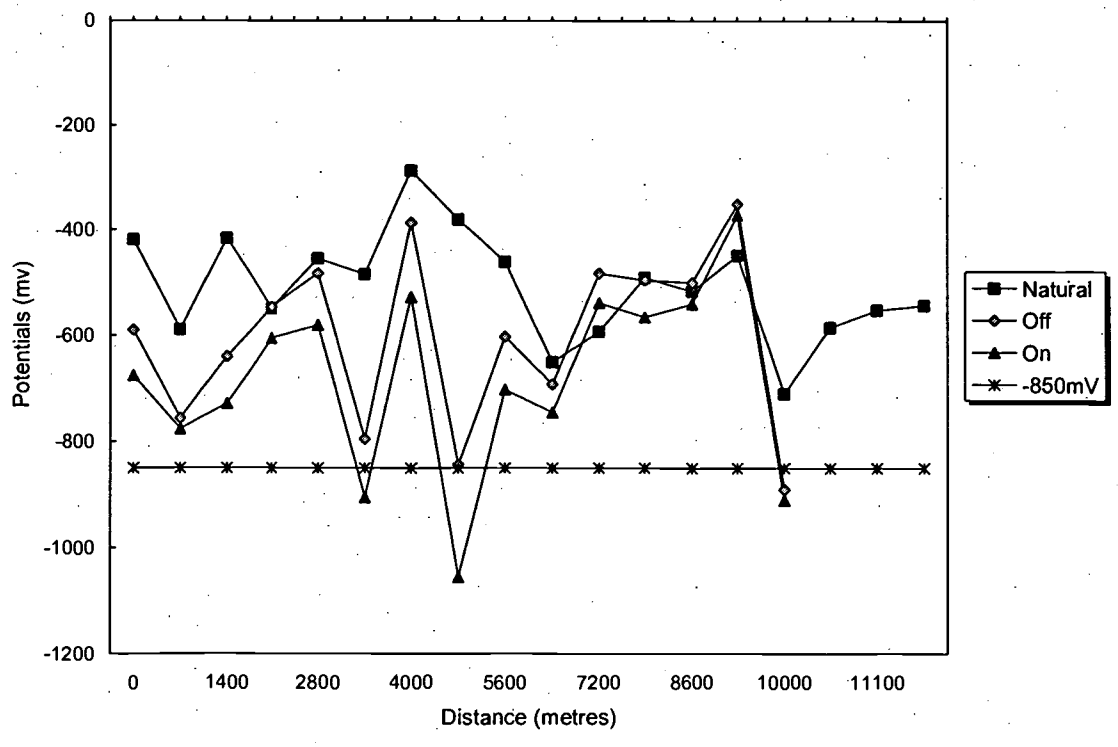
Cathodic Protection System Potential Recording Form

Project Tarragindi to Wynnum Rd.to Lytton Rd S35&S54 **Date** 16th June 2004

Test Point Nos 1 to 15 are S54 and Test Points 16 to 18 are S35

Test Point number	Distances to T.P. (metres)	Potentials to CuSO4 Natural (mV)	Off (mV)	On (mV)	Distance	
1	0	-419	-590	-676	0	
2	700	-589	-756	-776	700	
3	1400	-416	-640	-728	1400	
4	1900	-549	-546	-605	1900	Rectifiers at
5	2800	-454	-482	-580	2800	TPs.No6&8
6	3400	-484	-795	-905	3400	
7	4000	-287	-386	-527	4000	
8	4800	-380	-844	-1055	4800	
9	5600	-460	-602	-702	5600	
10	6400	-650	-692	-745	6400	
11	7200	-593	-482	-538	7200	
12	7900	-490	-495	-565	7900	
13	8600	-516	-500	-540	8600	
14	9200	-448	-350	-371	9200	
15	10000	-710	-890	-910	10000	
16	10400	-585			10400	
17	11100	-552			11100	
18	11600	-543			11600	

Graph of potentials vs pipelength



Revision 13/05/2005

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit

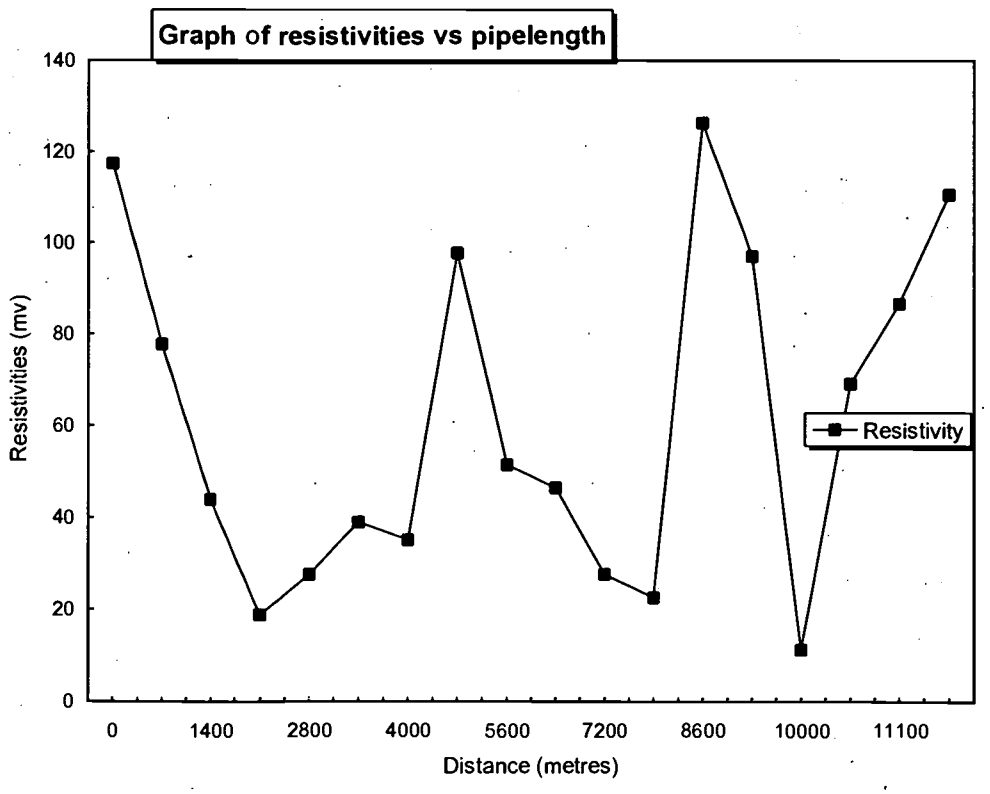
Cathodic Protection System Resistivities Recording Form

Project Tarragindi to Wynnum Rd. to Lytton Rd. S35 & S54 **Date** 16th June 2004

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	117.4
2	700	77.8
3	1400	43.9
4	1900	18.8
5	2800	27.6
6	3400	38.9
7	4000	35.1
8	4800	97.7
9	5600	51.4
10	6400	46.4
11	7200	27.6
12	7900	22.6
13	8600	126.3
14	9200	97
15	10000	11.3
16	10400	69.1
17	11100	86.6
18	11600	110.5

Note.
Test Points 1 to 15 are for S54

Test Points 16,17 & 18 are for S35



Revision 21/07/2004

Brisbane Water Engineering Services

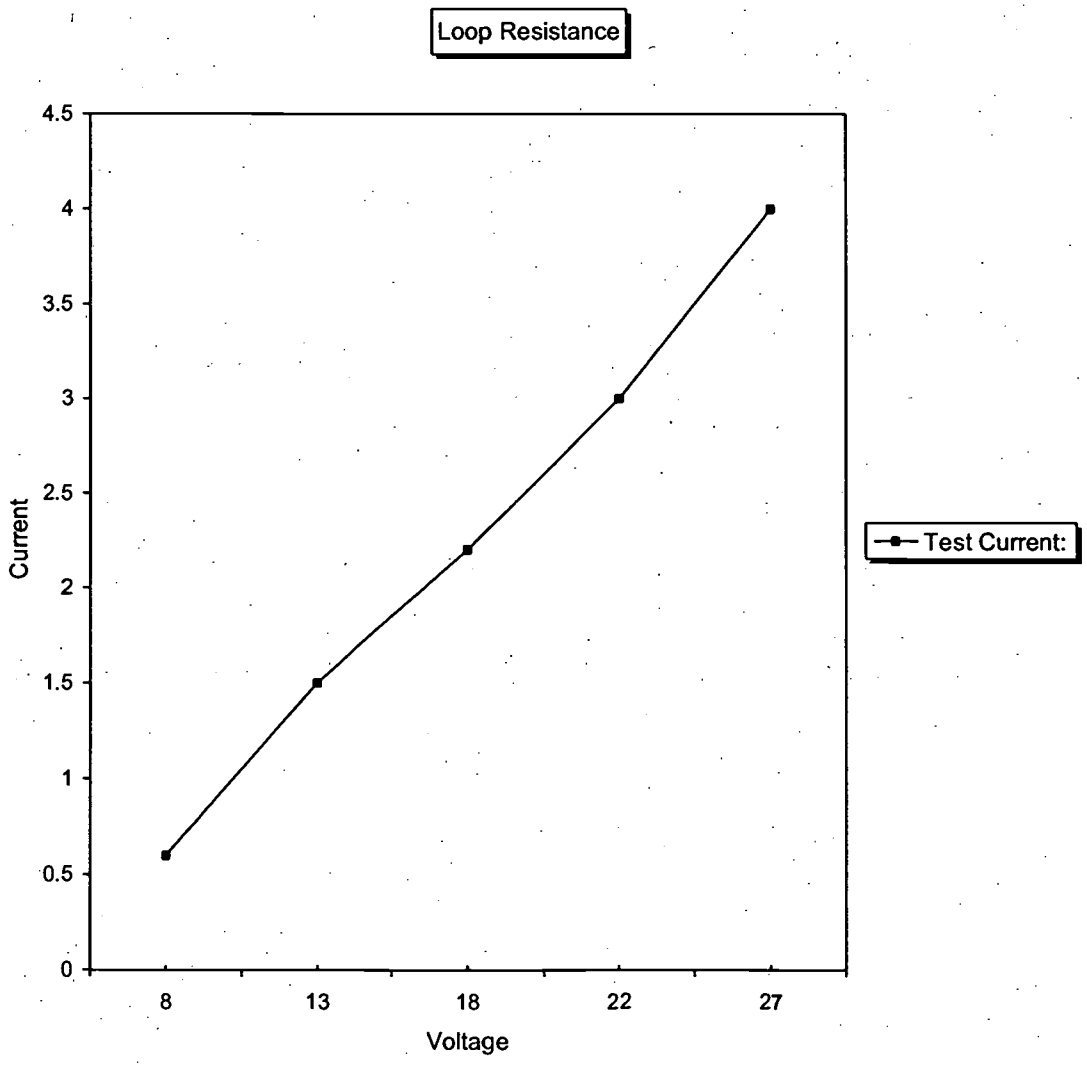
Electrical Engineering Unit

Cathodic Protection System Loop Resistance — Mott Park Rectifier CPS 202

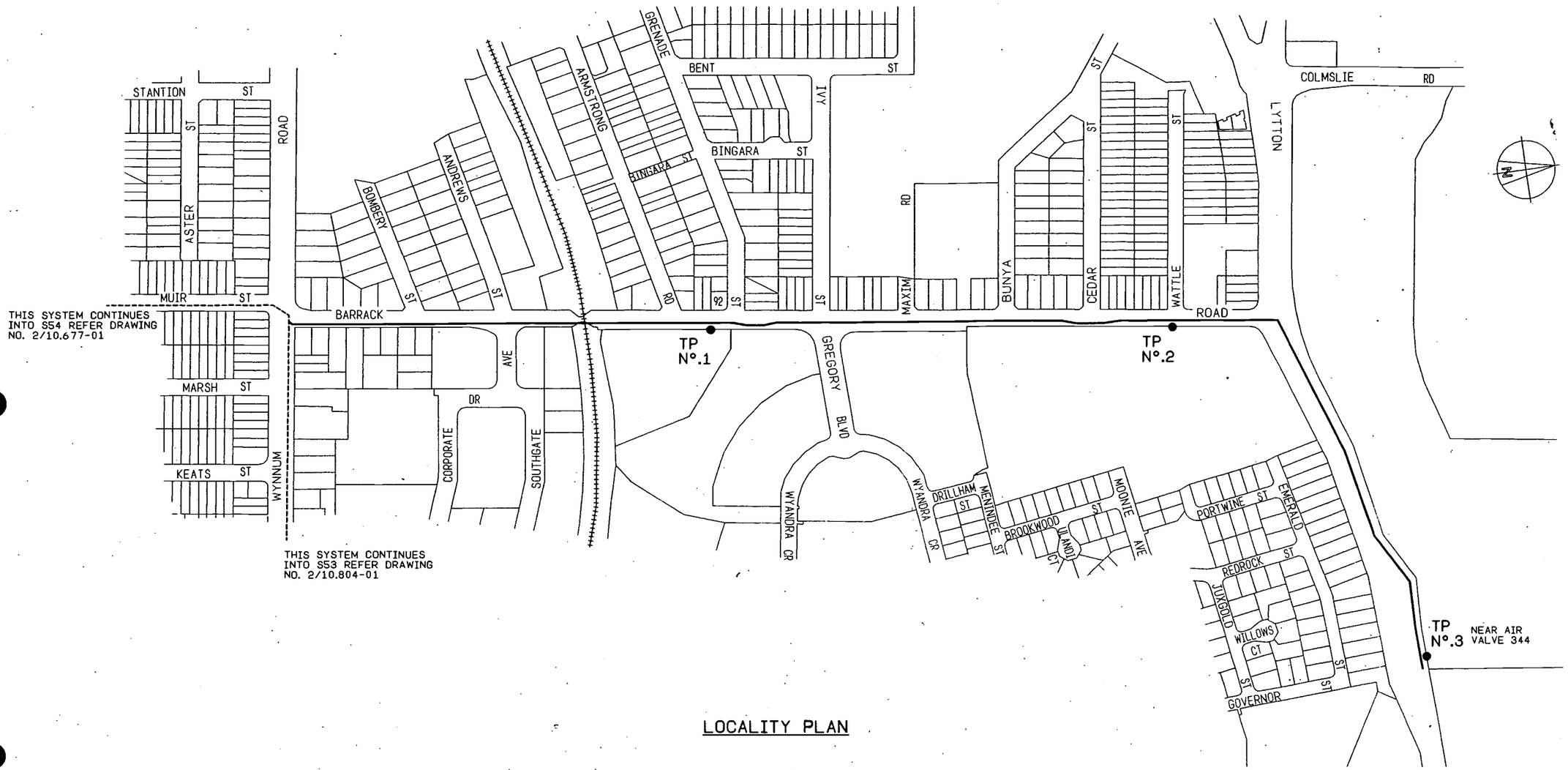
Date: 12th May 2005
Cathodic Protection System: Tarragindi to Wynnum Rd. S54 Trunk Main
System Operating Volts: 27 System Operating amps 4

Test Voltage: (volts)	Test Current: (amps)
8	0.6
13	1.5
18	2.2
22	3
27	4

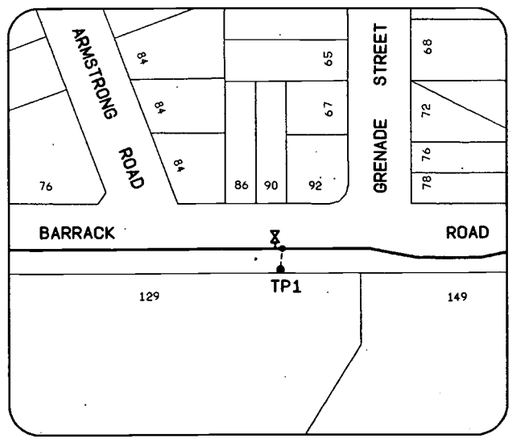
Loop Resistance (ohms)
5



13/05/2005



LOCALITY PLAN



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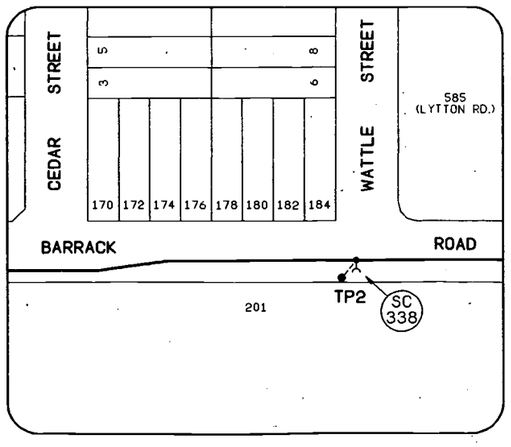

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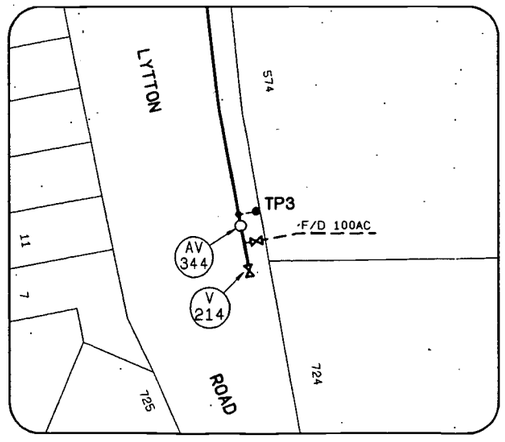


TEST POINT NO.3

NO.	DATE	AMENDMENT	INITIALS	PRINCIPAL ENGINEER	RPEQ NO.	DATE	CADD FILE	\WATER\INFRASTRUCTURE\210231501.DTA	
				MANAGER ENGINEERING		DATE	FILE NO.		
				PRODUCTION / NETWORK DELEGATE		DATE	SURVEYED		
							SURVEY NO.		FIELD BOOK

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

Brisbane Water

PROJECT: S35-WYNNUM RD. CANNON HILL TO Q.M.I ABATTOIR

TITLE: CATHODIC PROTECTION TEST POINT AND ANODE BED LOCATIONS

SCALE: A.H. DATUM

DRAWING N°: 2/10.2315-01

AMEND.: P1

N° 1 OF 1 SHEETS

DESIGN CHARGE N°: PA000820

CONSTRUCTION PROJECT N°:

AS BUILT RECEIVED	
BY	
ORDER CODE	
DATE	

ON MAINTENANCE DETAILS	
START	FINISH

D.R.S. COMMENTS

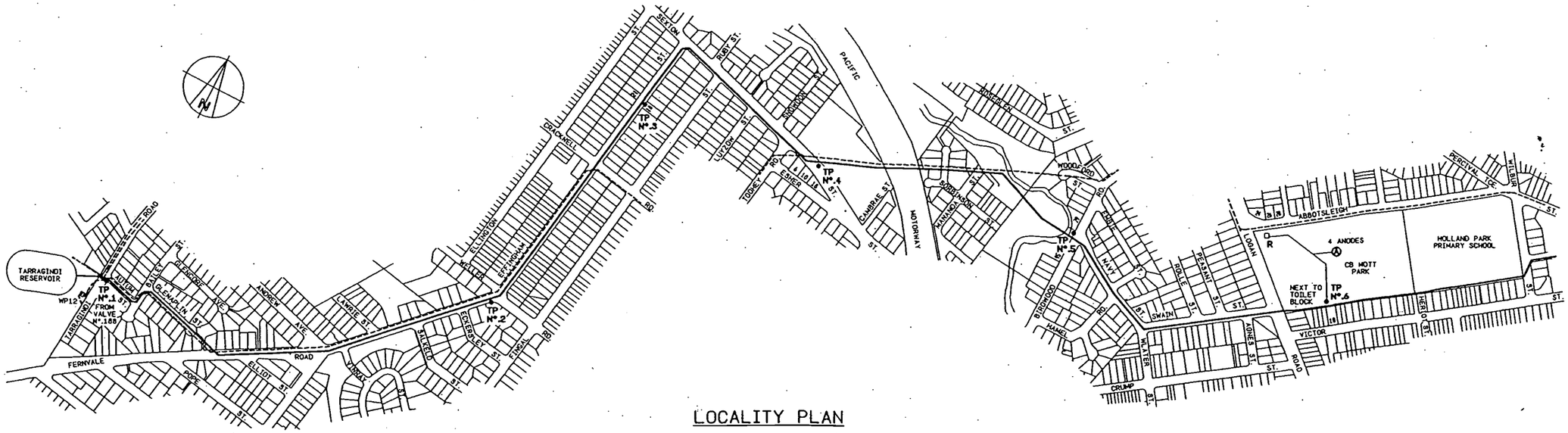
FUNDING	
PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOV'T ( )	STATE ( ) OTHER ( )
DRS ORDER	
DATE RELEASED	

PLAN CUSTODIAN	
ORDER/REC'D	
DATE RELEASED	

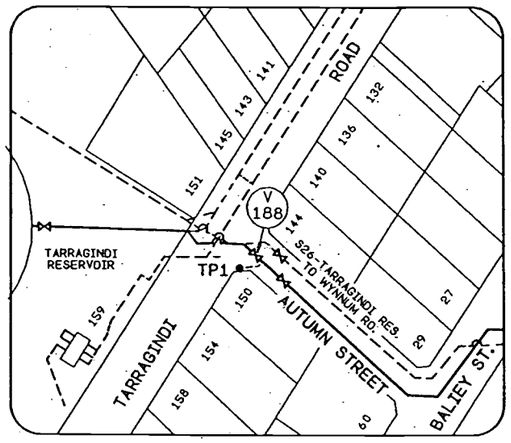
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	

BMAP CAPTURE	
JOB NUMBER	
ORDER CODE	
DATE	

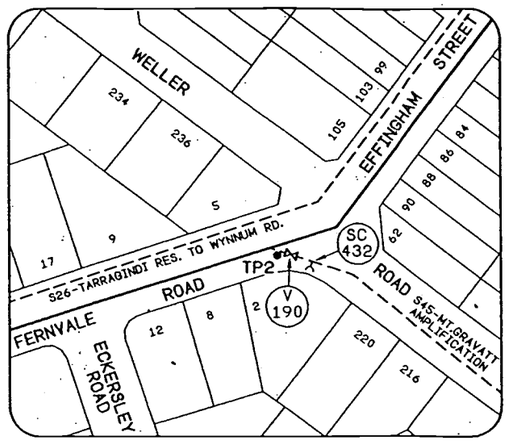
BMAP COMMENTS



LOCALITY PLAN



TEST POINT NO.1



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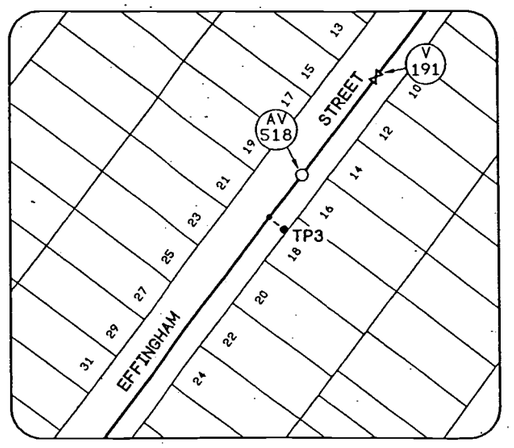

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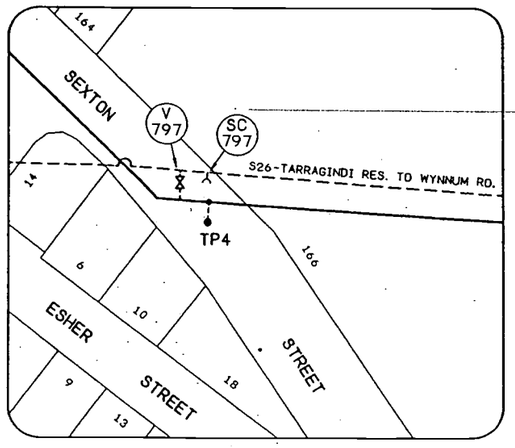

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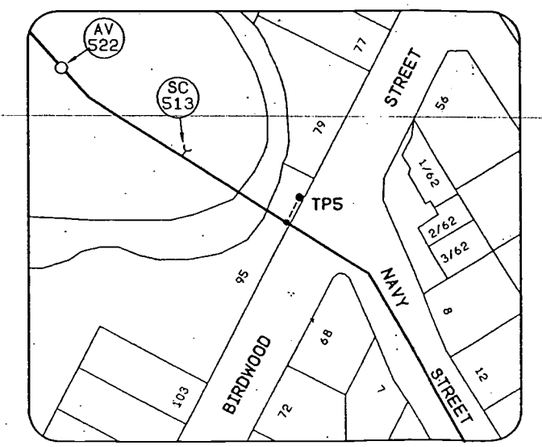

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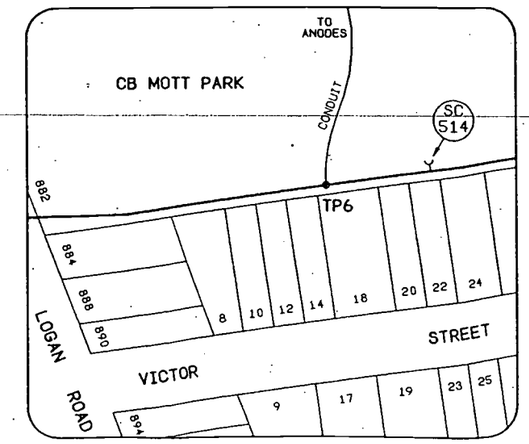


TEST POINT NO.6

NO.	DATE	AMENDMENT	INITIALS	PRINCIPAL ENGINEER	RPEQ NO.	DATE	CADD FILE	\WATER\INFRASTRUCTURE\21067701.DTA	
				MANAGER ENGINEERING		DATE	FILE NO.		
				PRODUCTION / NETWORK DELEGATE		DATE	SURVEYED		
							SURVEY NO.	FIELD BOOK	

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

Brisbane Water

PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 1 TO 5

SCALE: AS SHOWN | A.H. DATUM | N° 1 OF 5 SHEETS

DRAWING N°: 2/10.677-01 | AMEND. P1

DESIGN CHARGE N°: PA000820

CONSTRUCTION PROJECT N°:

AS BUILT RECEIVED
BY
OFFICER CODE
DATE

ON MAINTENANCE DETAILS
START | FINISH

D.R.S. COMMENTS

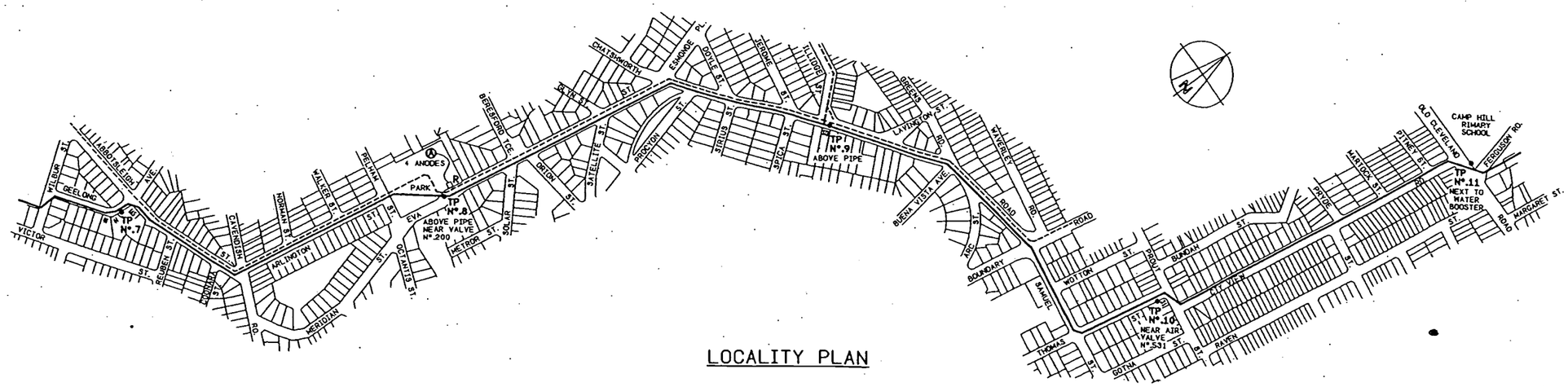
FUNDING
PRIVATE BOOSTER REQUIRED? YES / NO
FUNDED BY B.C.C. (✓) DEVELOPER ( )
FED. GOVT ( ) STATE ( ) OTHER ( )
DRS OFFICER
DATE RELEASED

PLAN CUSTODIAN
OFFICER/RECD
DATE RELEASED

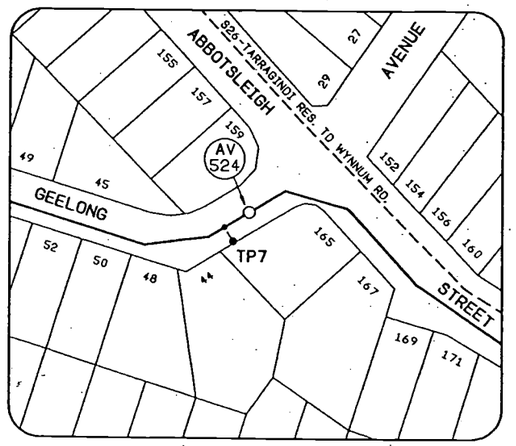
LIVE CONNECTION(S) / PASSED(W)
REFERENCE
DATE

BMAP CAPTURE
JOB NUMBER
OFFICER CODE
DATE

BMAP COMMENTS



LOCALITY PLAN



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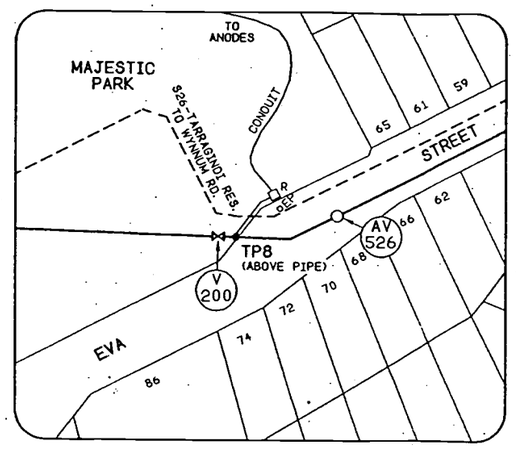

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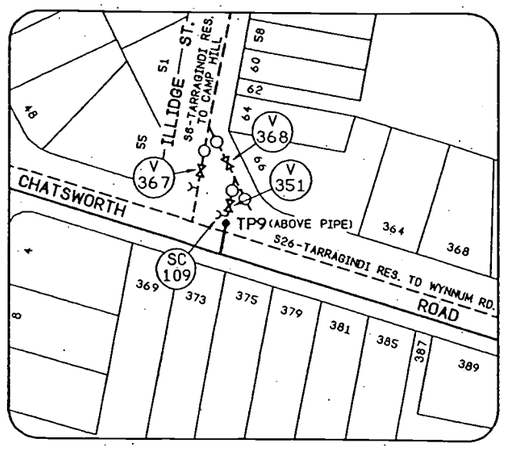
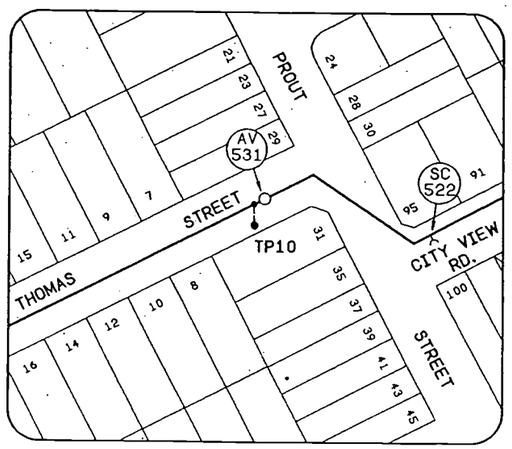
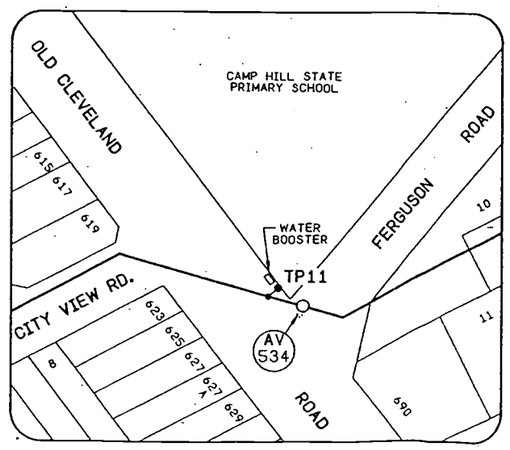


TEST POINT NO.9



TEST POINT NO.10



TEST POINT NO.11

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

CADD FILE	\WATER\INFRASTRUCTURE\21067702.DTA		DESIGN			
FILE NO.			DESIGN CHECK			
SURVEYED			DRAWN	B.O.B	OCT. 2004	
SURVEY NO.		FIELD BOOK	DRAFTING CHECK			

Brisbane Water

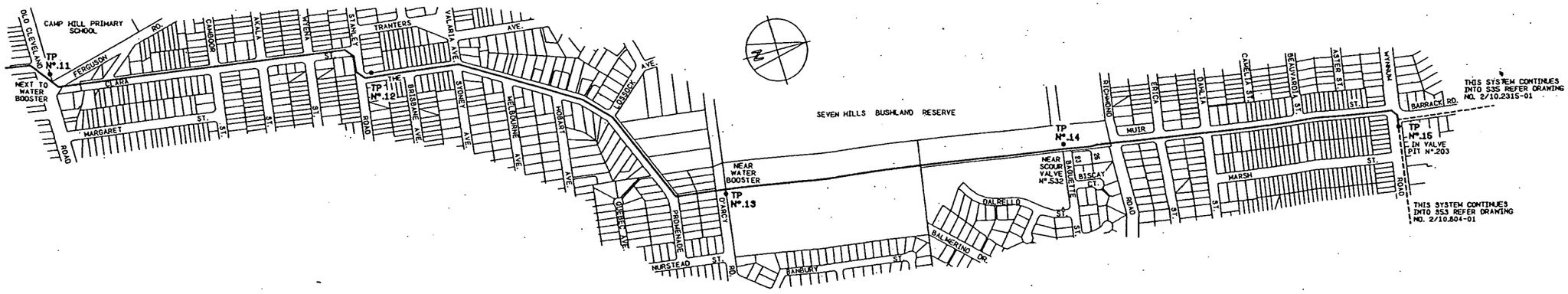
PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS
TEST POINT NOS. 7 TO 11

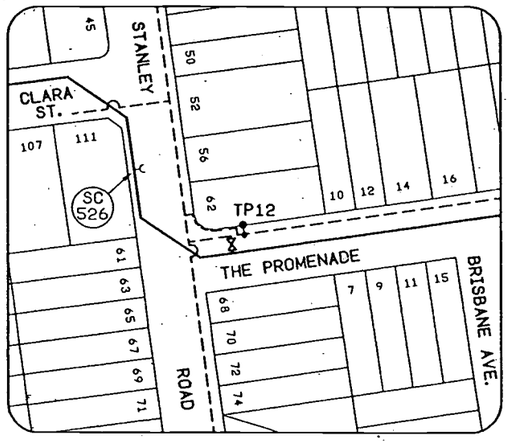
DESIGN CHARGE N°	PA000820
CONSTRUCTION PROJECT N°	

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. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	
PLAN CUSTODIAN	
OFFICER/RECD	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	
BMAP COMMENTS	

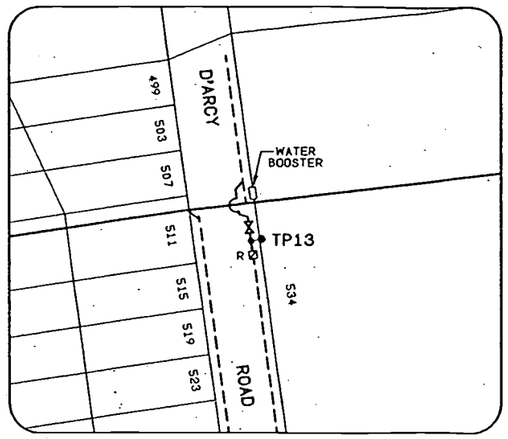
SCALE: AS SHOWN	A.H. DATUM
	N° 2 OF 5 SHEETS
DRAWING N°	AMEND.
2/10.677-02	P



LOCALITY PLAN



TEST POINT NO.12



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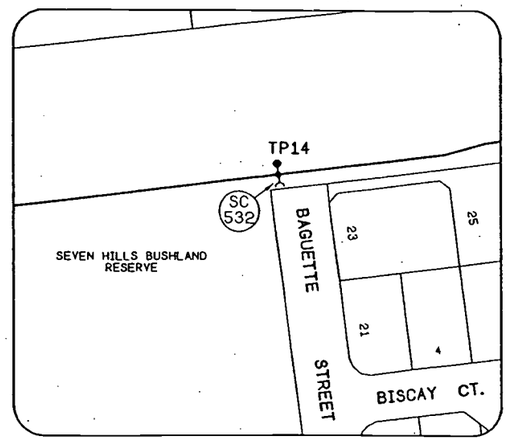
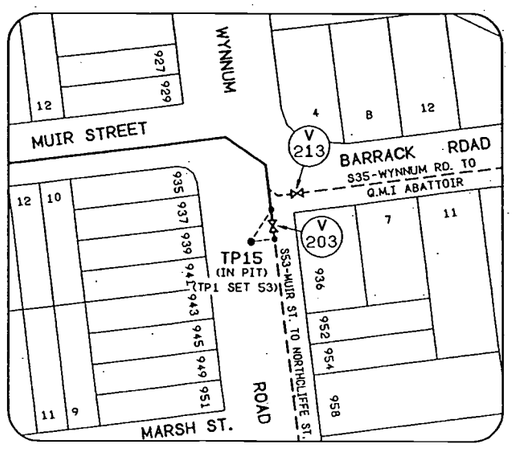


TEST POINT NO.14



TEST POINT NO.15

DESIGN CHARGE N^	PA000820
CONSTRUCTION PROJECT N^	

AS BUILT RECEIVED	
BY	
ORDER 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 ORDER	
DATE RELEASED	
PLAN CUSTODIAN	
ORDER/RECD	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BIMAP CAPTURE	
JOB NUMBER	
ORDER CODE	
DATE	
BIMAP COMMENTS	

NO.	DATE	AMENDMENT	INITIALS

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

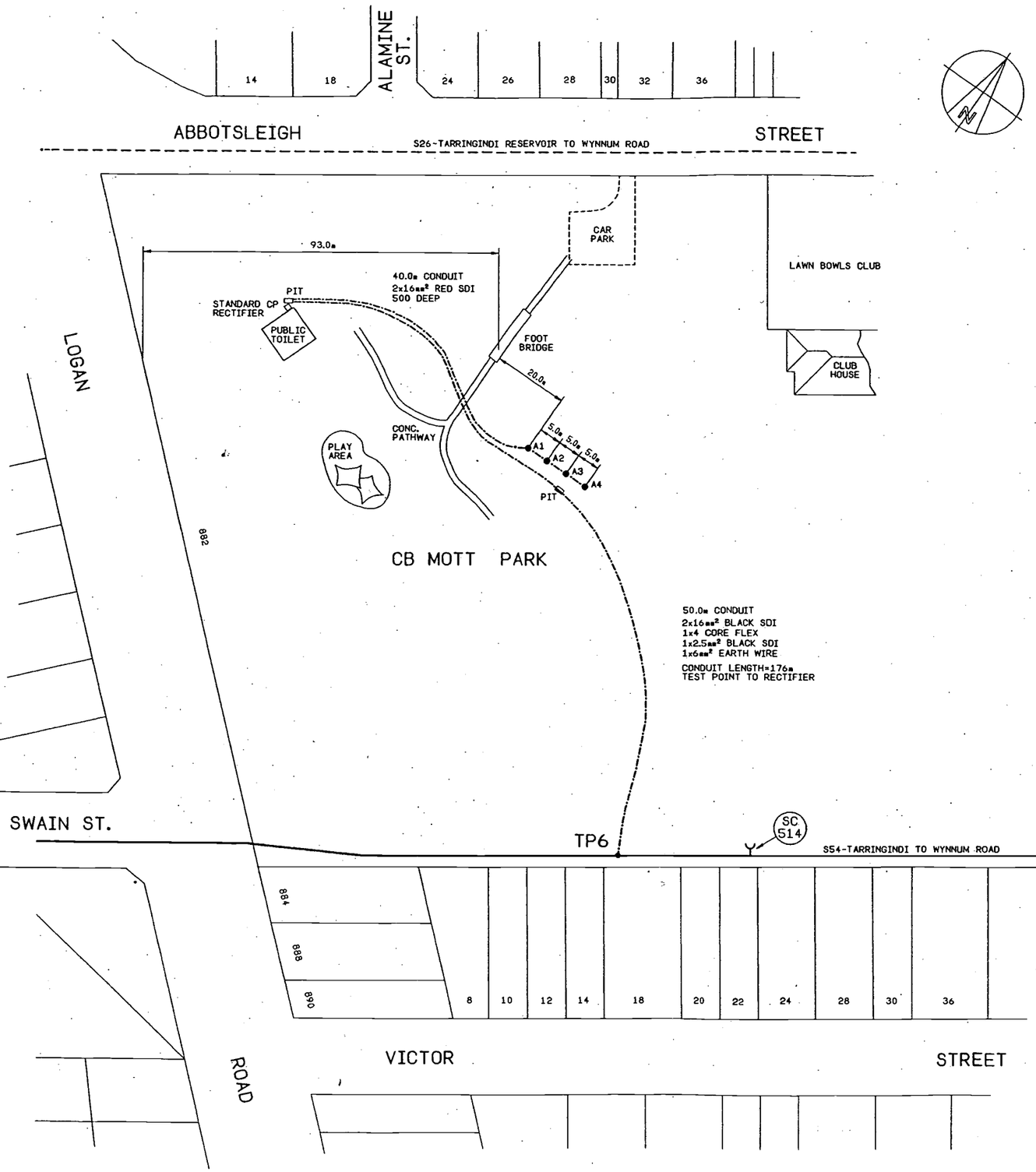
CADD FILE	\WATER\INFRASTRUCTURE\21067703.DTA		DESIGN		
FILE NO.			DESIGN CHECK		
SURVEYED			DRAWN	B.O.B	OCT. 2004
SURVEY NO.		FIELD BOOK	DRAFTING CHECK		

Brisbane Water

PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 12 TO 15

SCALE	A.H. DATUM
AS SHOWN	N^ 3 OF 5 SHEETS
DRAWING N^ 2/10.677-03	AMEND. P



TEST POINT NO.6 AND ANODE BED DETAILS

NO.	DATE	AMENDMENT	INITIALS

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

CADD FILE	\WATER\INFRASTRUCTURE\21067704.DTA	DESIGN	
FILE NO.		DESIGN CHECK	
SURVEYED		DRAWN	B.O.B OCT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK	

Brisbane Water

PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST NO. 6 AND ANODE BED DETAILS

SCALE: AS SHOWN — A.H. DATUM

Nº 4 OF 5 SHEETS

DRAWING Nº: 2/10.677-04 — AMEND. P

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/RECTD	
DATE RELEASED	

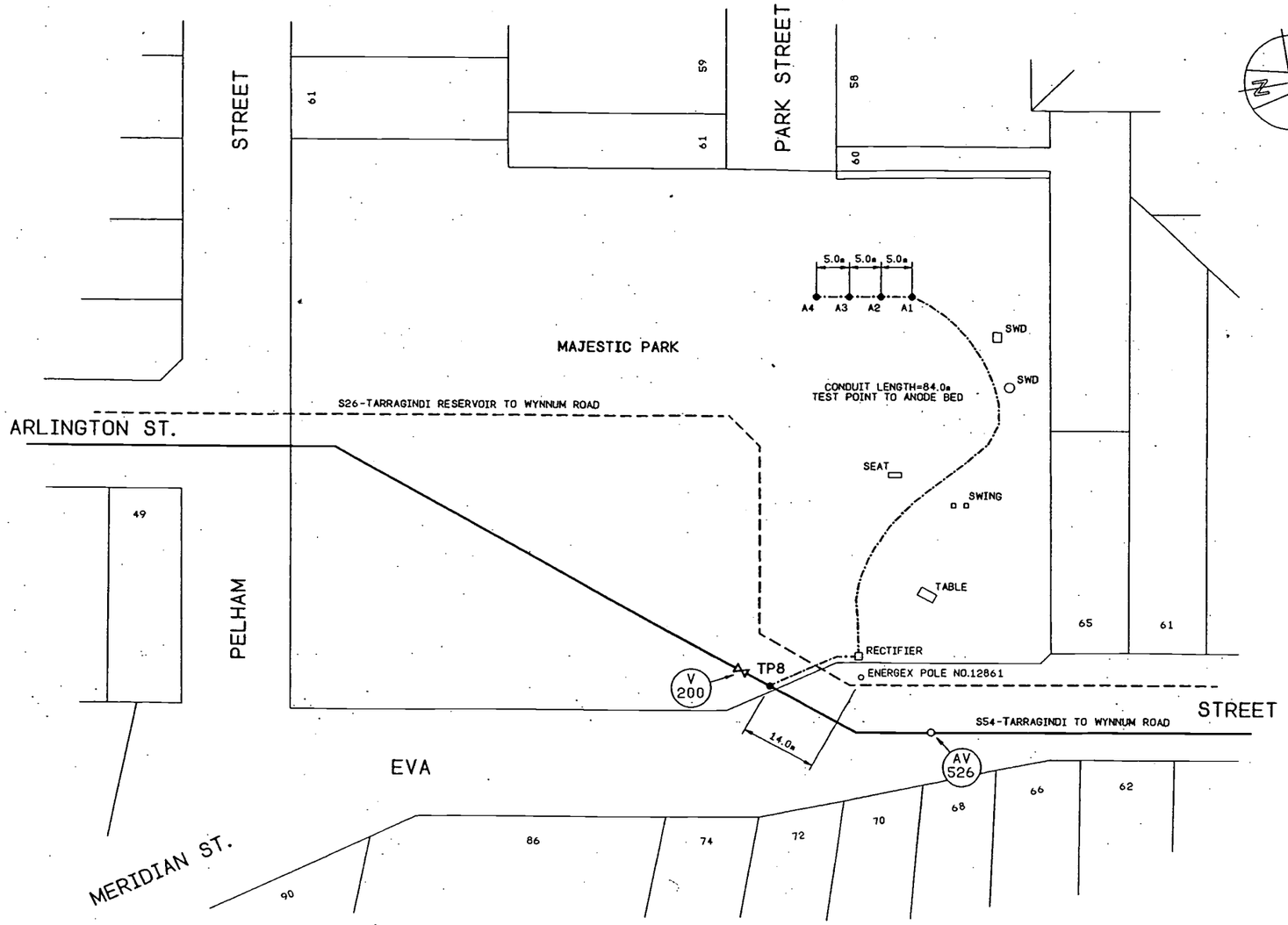
LIVE CONNECTION(S) / PASSED(W)

REFERENCE	
DATE	

BIMAP CAPTURE

JOB NUMBER	
OFFICER CODE	
DATE	

BIMAP COMMENTS



TEST POINT NO.8 AND ANODE BED DETAILS

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

CADD FILE	\WATER\INFRASTRUCTURE\2106770S.DTA	DESIGN	
FILE NO.		DESIGN CHECK	
SURVEYED		DRAWN	B.O.B. OCT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK	

Brisbane Water

PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST NO. 8 AND ANODE BED DETAILS

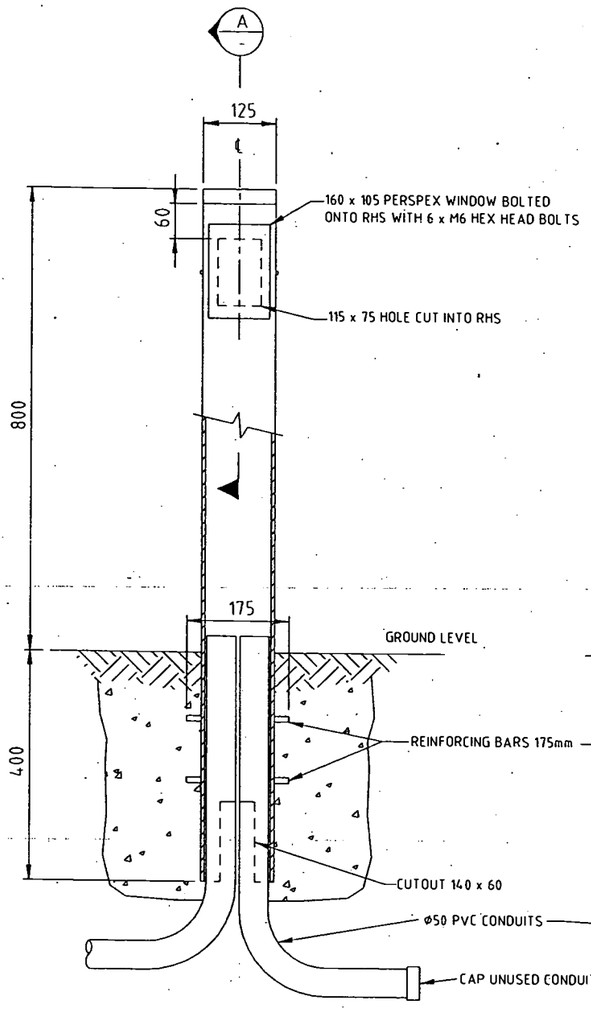
DESIGN CHARGE No: PA000820
CONSTRUCTION PROJECT No:

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. 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	

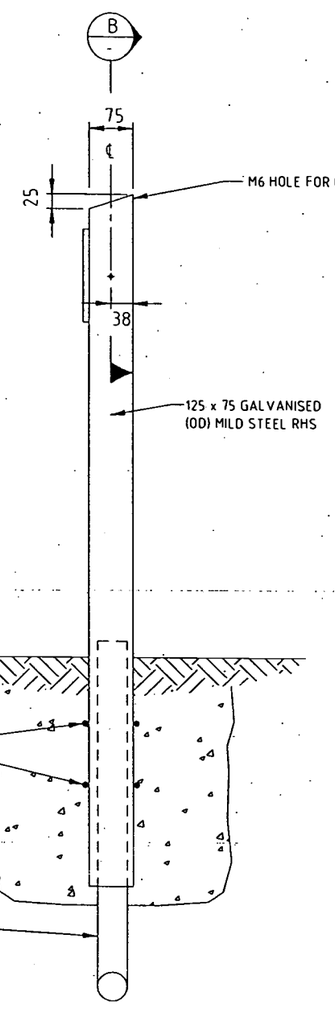
SCALE: AS SHOWN — A.H. DATUM
N° 5 OF 5 SHEETS
DRAWING N°: 2/10.677-05
AMEND. P

NOTES

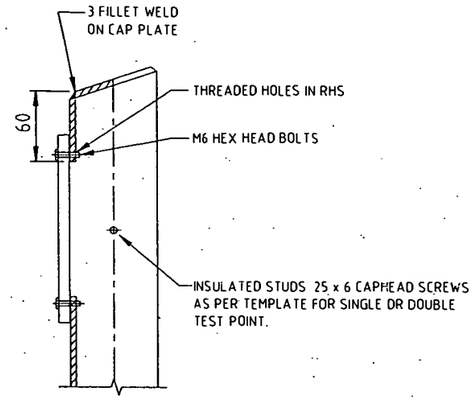
1. HOT DIP GALVANISE AFTER FABRICATION.



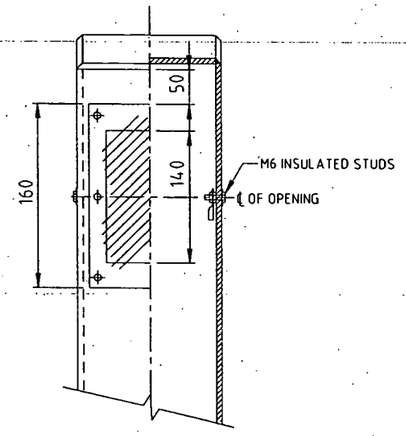
FRONT ELEVATION SECTIONED



SIDE ELEVATION



SECTION A-A



SECTION B-B

NO.	DATE	AMENDMENT	INITIALS
C	9-92	NOTE 3 REVISED	HT
B	11-95	MODIFIED	O.L.P.
A	5-92	ISSUED FOR APPROVAL	O.L.P

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	O.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	

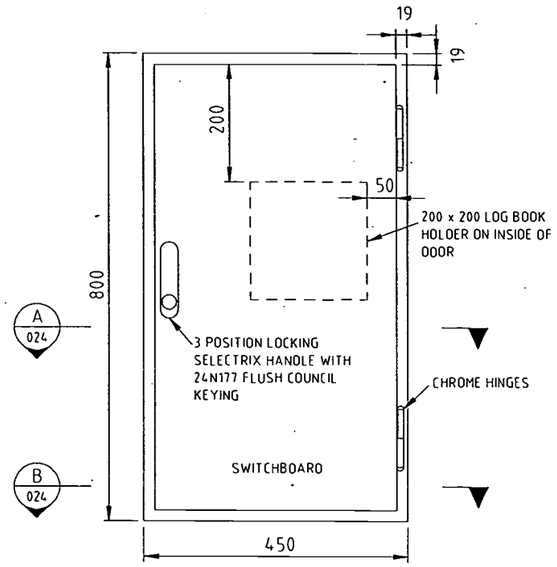
Brisbane Water — Professional Services — Engineering

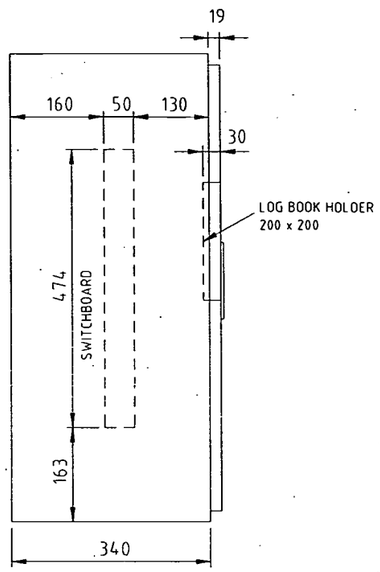
PROJECT: CATHODIC PROTECTON

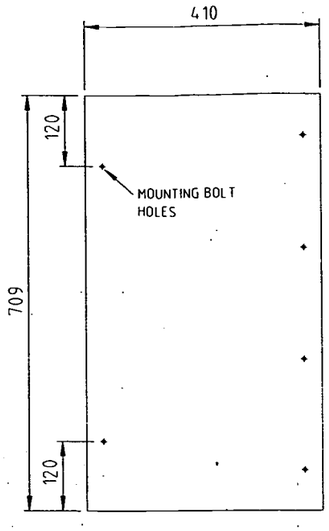
TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS

SCALE NTS | N° 1 OF 1 SHEETS

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







FRONT INSULATED PANEL
(6mm THICK SUPPLIED)

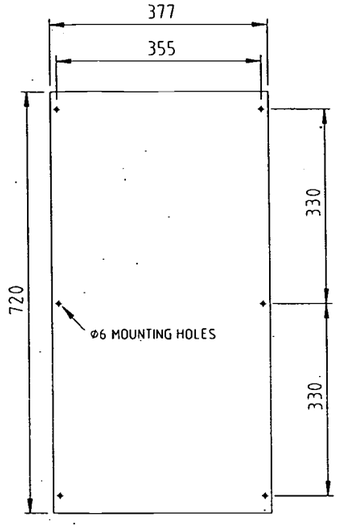


FIG.1
EQUIPMENT PANEL DETAILS

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.

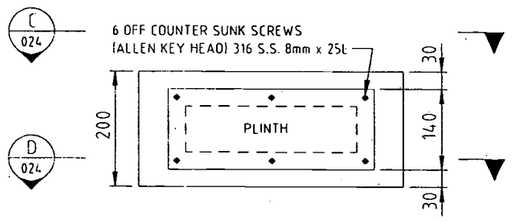
4. DOUBLE HINGED PANEL SUPPLIED BY B.C.C.

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

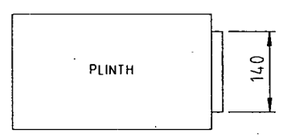
6. DEGREE OF WEATHER PROTECTION IP55.

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

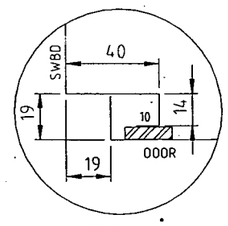
8. DOUBLE HINGED PANEL MOUNT TO BE SUPPLIED WITH MOUNTING BOLTS & NUTSERTS TOP & BOTTOM. SEE DETAIL A.



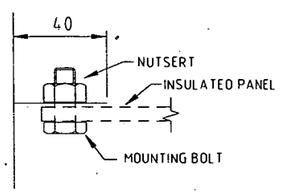
FRONT ELEVATION
SWITCHBOARD & PLINTH



SIDE ELEVATION
SWITCHBOARD & PLINTH

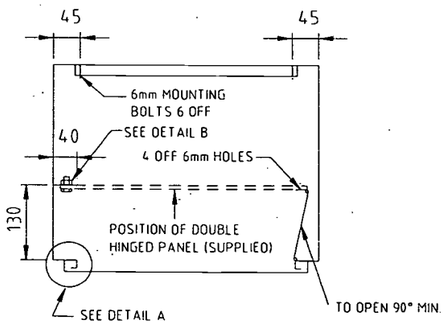


DETAIL A
DOOR/CORNER DETAIL

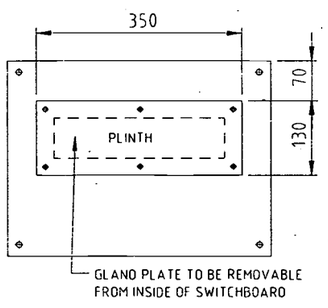


DETAIL B

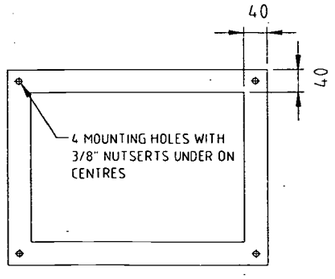
NUMBER OF SWITCHBOARDS REQUIRED	
NUMBER OF PLINTHS REQUIRED	



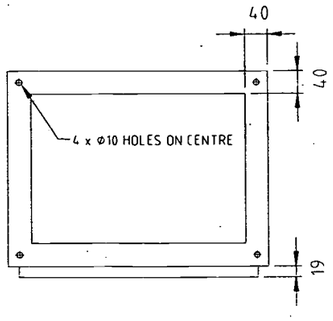
SECTION A-A
(SHOWING HINGED PANEL)



SECTION B-B
(SHOWING GLAND PLATE)



SECTION C-C
PLINTH MOUNTING DETAILS



SECTION D-D
PLINTH MOUNTING DETAILS

NO.	DATE	AMENDMENT	INITIALS
C	9-92	NOTE 7 REVISED	HT
B	11-55	MODIFIED	D.L.P.
A	5-92	ISSUED FOR APPROVAL	D.L.P.

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

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

Brisbane City

JOB FILE
ACAD FILE 22C0024-Rev-C — SHEET SIZE A1
SURVEY No. — FIELD BOOK
SURVEYED — A.H. DATUM

Brisbane Water — Professional Services by Engineers

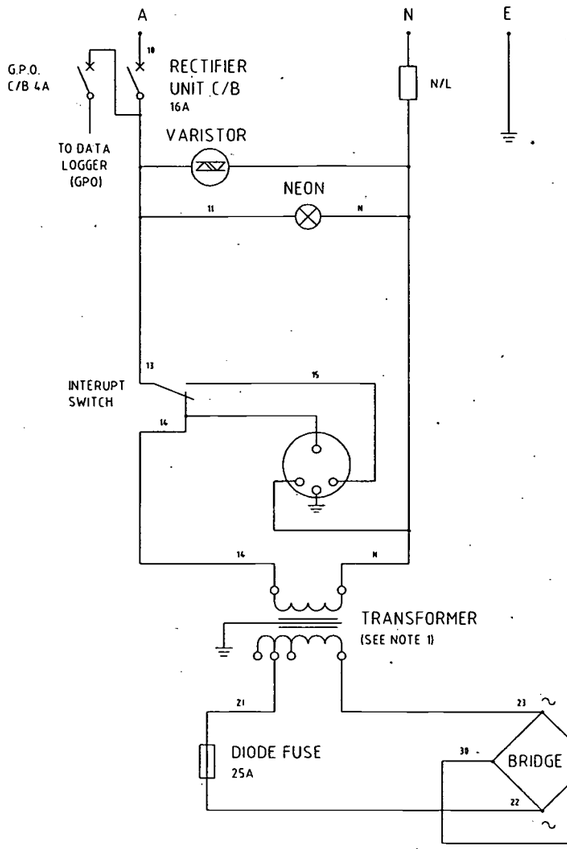
PROJECT: CATHODIC PROTECTON

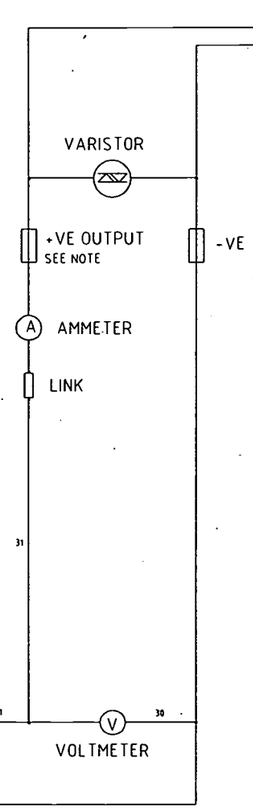
TITLE: STANDARD SWITCHBOARD CABINET

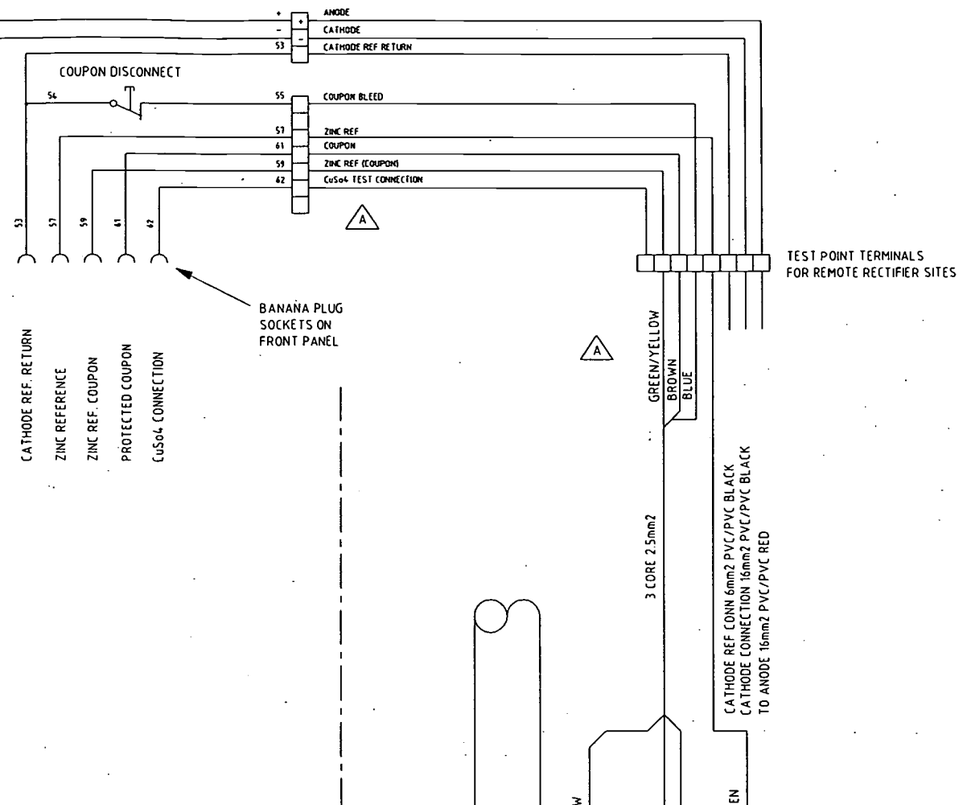
SCALE NTS — N° 1 OF 1 SHEETS
DRAWING N° 486/1/22-C0024E — AMEND C

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	17.03.95	VARIAC REMOVED, TRANSFORMER MULTI-TAP SEC ADDED	DPH
C	16.10.84	TELEMETRY REMOVED, BW BORDER UPDATED	DPH
B	11.1.94	CHANGES AS SHOWN	R.L.
A	18.10.93	CHANGES AS SHOWN	R.L.
1	25.8.93	ISSUED FOR CONSTRUCTION	R.L.

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:\PSED\RAWING2\Standard Drawings\Sewerage\Infrastr\CathodicProtection\a625c21e-RevD.dwg, 08/03/2005 02:24:12 PM

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

16 th April 2004

OPERATING MANUAL FOR:

TARRAGINDI to WYNNUM RD to LYTTON RD TRUNK MAINS

S54 and S35 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

MANUAL CONTENTS

(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)	Bimonthly 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:	1060, 910 and 600 mm Dia mild steel cement lined.
Coating:	Enamel Coated.
Length:	Appox 11.6 Km.
Location:	From Valve 188 cnr Tarragindi Rd.and Autumn St. Tarragindi to Valve 214 Lytton Rd. Murarrie.

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 2 rectifiers installed. One rectifier is in Mott Park, corner Logan Rd. and Abbotsleigh St.Holland Park and has a 240V supply from Mott Park toilet block.The second rectifier is in Majestic Park Camp Hill and has a 240V supply from Energex pole No12681 near 70 Eva St Camp Hill.

(4.3) Cathode: One cathode point is located on the 1060 mm dia mains, adjacent to scour valve 514 in Mott Park , while the second cathode point is located on the 910 mm dia mains adjacent to valve 200 at Majestic Park.. 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 90 metres from the trunk mains, in a vertical bed 5 metres deep, in the park adjacent to the stormwater drain in Mott Park. Another four anodes were installed approximately 100 metres from the trunk main in a vertical bed 5 metres deep in Majestic Park. 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 eighteen 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-AAT0001E
Standard Rectifier Wiring Diagram	- 486/6/25-AA1C0021
Cathodic Protection Test Point & Anode Bed Locations S54 & S35 Trunk Mains.	- 2 / 10.677-01 to 2 / 10.677-05 - 2 / 10.2315-01

(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 April, 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 April, 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.

16th April, 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 Engineering Services

CP Form No. 23

Electrical Engineering Unit

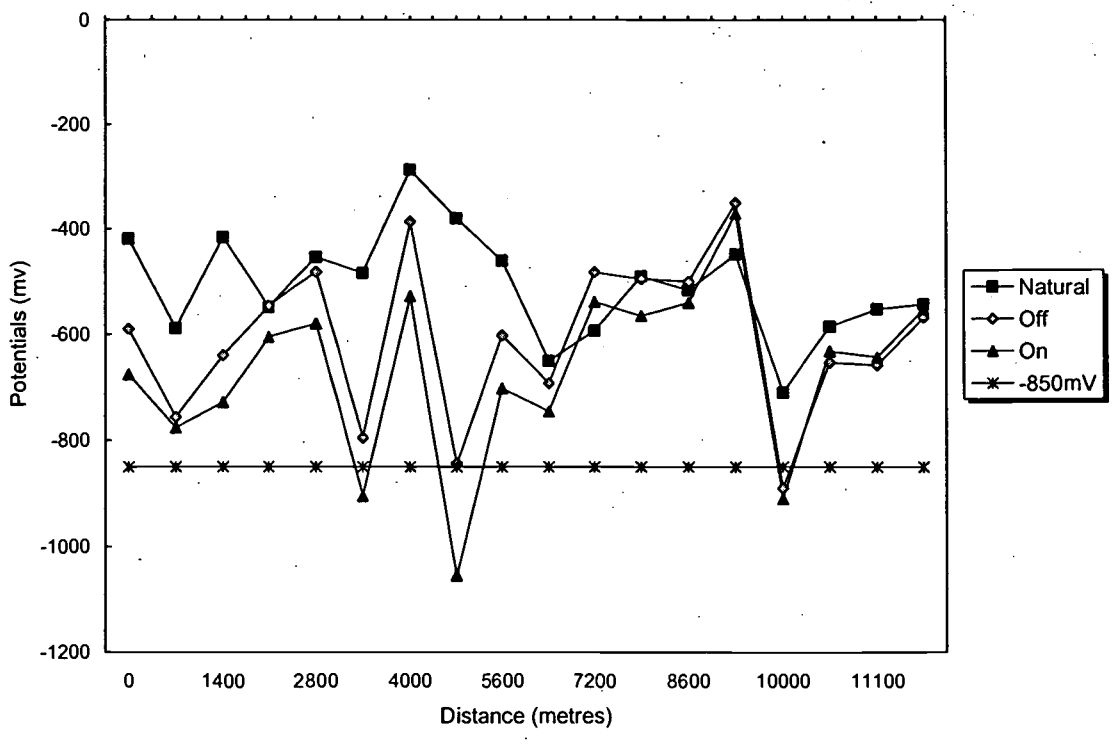
Cathodic Protection System Potential Recording Form

Project Tarragindi to Wynnum Rd.to Lytton Rd S35&S54 **Date** 16th June 2004

Test Point Nos 1 to 15 are S54 and Test Points 16 to 18 are S35

Test Point number	Distances to T.P. (metres)	Potentials to CuSO4 Natural (mV)	Off (mV)	On (mV)	Distance	
1	0	-419	-590	-676	0	
2	700	-589	-756	-776	700	
3	1400	-416	-640	-728	1400	
4	1900	-549	-546	-605	1900	Rectifiers at
5	2800	-454	-482	-580	2800	TPs.No6&8
6	3400	-484	-795	-905	3400	
7	4000	-287	-386	-527	4000	
8	4800	-380	-844	-1055	4800	
9	5600	-460	-602	-702	5600	
10	6400	-650	-692	-745	6400	
11	7200	-593	-482	-538	7200	
12	7900	-490	-495	-565	7900	
13	8600	-516	-500	-540	8600	
14	9200	-448	-350	-371	9200	
15	10000	-710	-890	-910	10000	
16	10400	-585	-653	-632	10400	
17	11100	-552	-658	-643	11100	
18	11600	-543	-568	-552	11600	

Graph of potentials vs pipelength



Revision 18/05/2005

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit

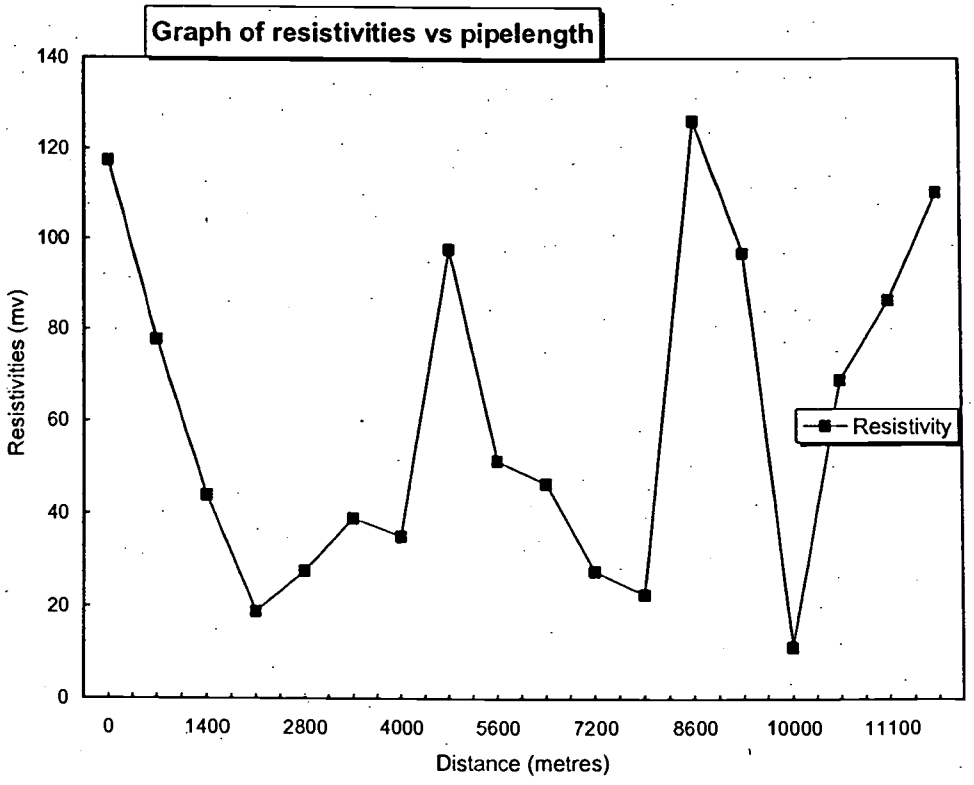
Cathodic Protection System Resistivities Recording Form

Project Tarragindi to Wynnum Rd. to Lytton Rd. S35 & S54 **Date** 16th June 2004

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	117.4
2	700	77.8
3	1400	43.9
4	1900	18.8
5	2800	27.6
6	3400	38.9
7	4000	35.1
8	4800	97.7
9	5600	51.4
10	6400	46.4
11	7200	27.6
12	7900	22.6
13	8600	126.3
14	9200	97
15	10000	11.3
16	10400	69.1
17	11100	86.6
18	11600	110.5

Note.
Test Points 1 to 15 are for S54

Test Points 16,17 & 18 are for S35



Revision 21/07/2004

Brisbane Water Engineering Services

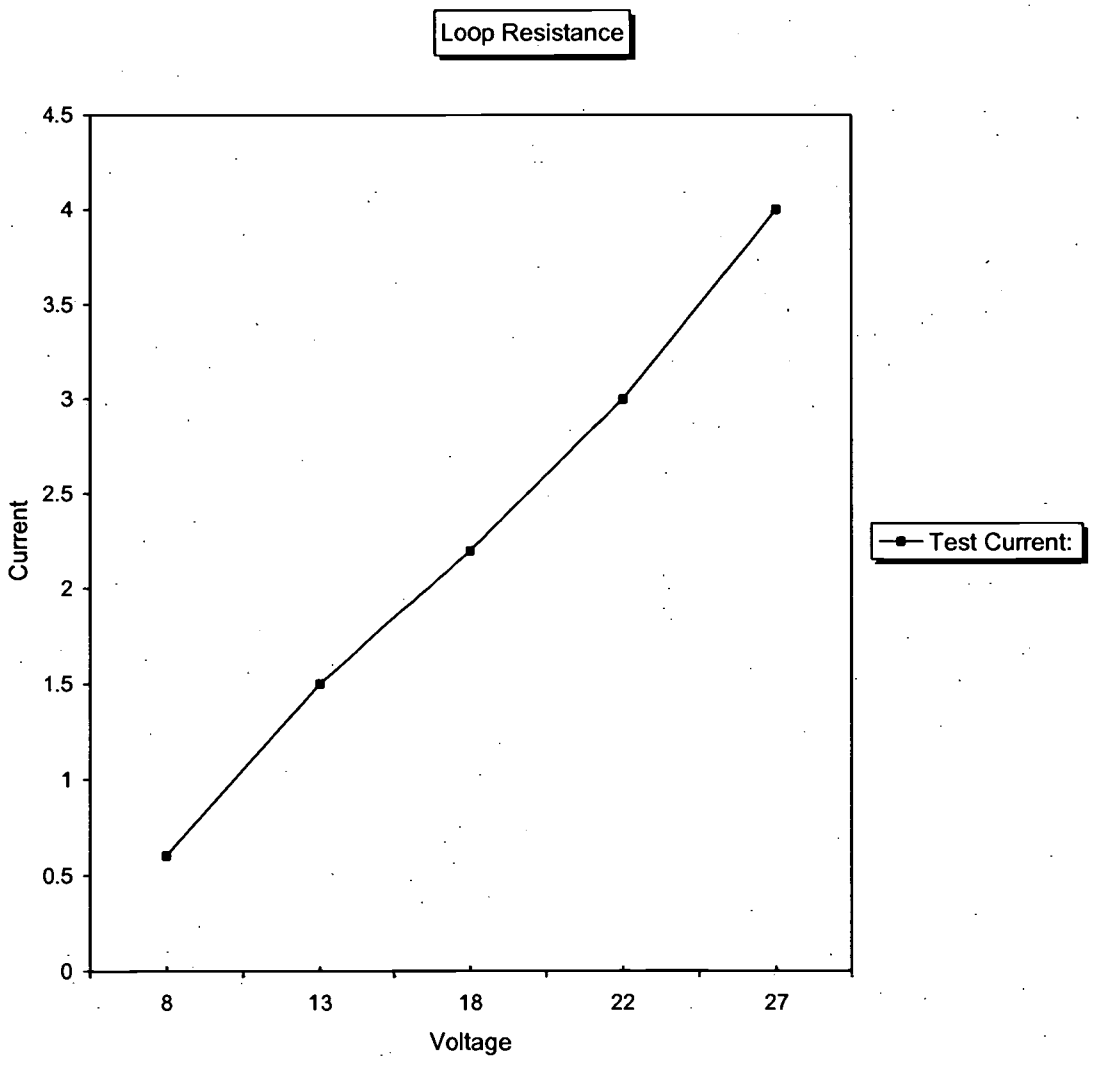
Electrical Engineering Unit

Cathodic Protection System Loop Resistance — Mott Park Rectifier CPS 202

Date: 12th May 2005
Cathodic Protection System: Tarragindi to Wynnum Rd. S54 Trunk Main
System Operating Volts: 27 System Operating amps 4

Test Voltage: (volts)		Test Current: (amps)	
8		0.6	
13		1.5	
18		2.2	
22		3	
27		4	

Loop Resistance (ohms)
5



13/05/2005

Brisbane Water Engineering Services

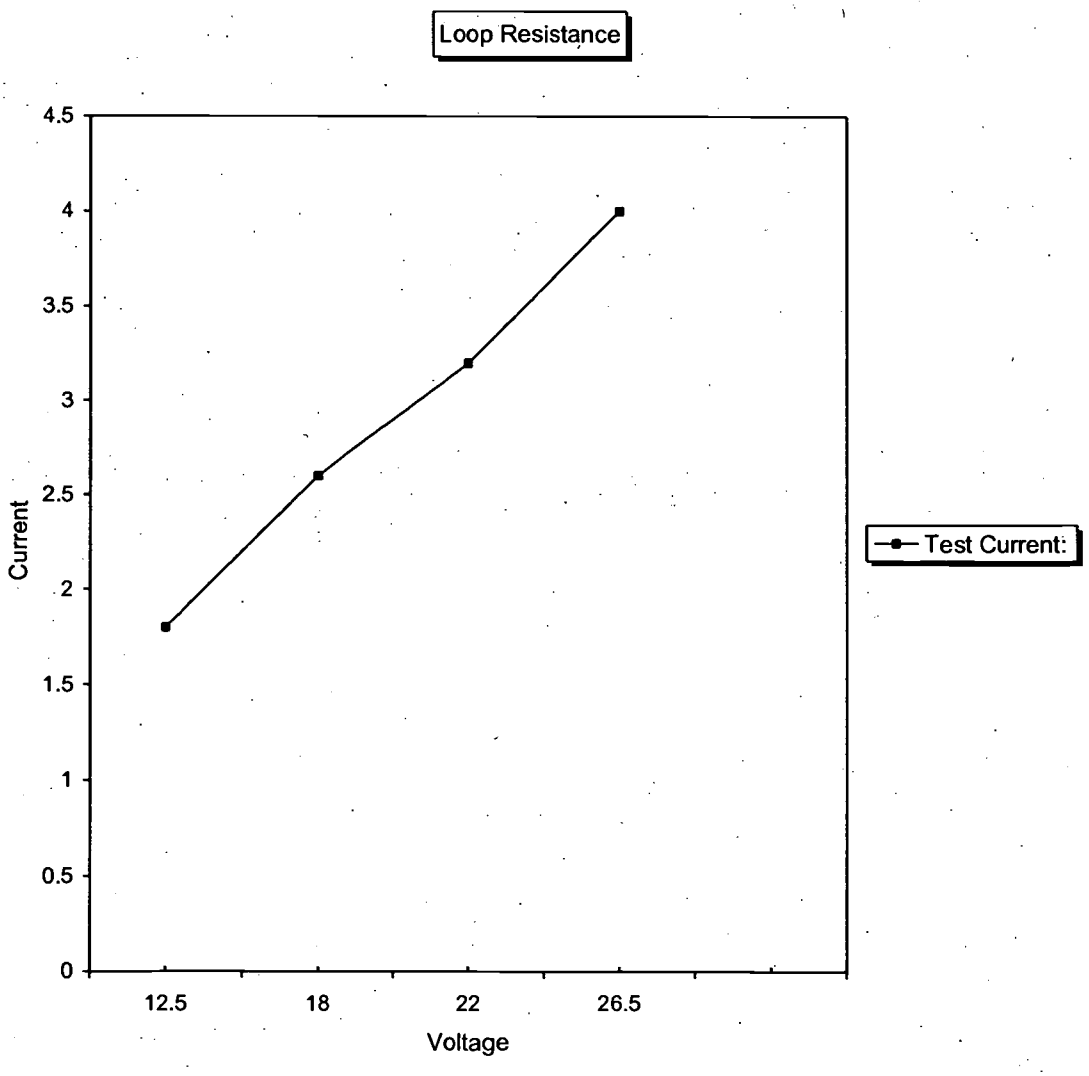
Electrical Engineering Unit

Cathodic Protection System Loop Resistance — Eva St. Rectifier CPS 206

Date: 12th May 2005
Cathodic Protection System: Tarragindi to Wynnum Rd. S54 Trunk Main
System Operating Volts: 27 System Operating amps 4.7

Test Voltage: (volts)	Test Current: (amps)
12.5	1.8
18	2.6
22	3.2
26.5	4

Loop Resistance (ohms)
6.875



18/05/2005

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:	Kerry McGovern	
		TEL 07 34078364

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 Tarragindi Rd & Autumn St. Tarragindi to Lytton Rd near Metroplex Ave Murarrie		
	Rectifier No1(Mott Park) Abbotsleigh St Holland Pk	POST CODE 4121	
Structure to be protected:	900 mm and 1060 mm dia Mild Steel Trunk Main		
Maximum operating current:	5.00 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.

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:	Kerry McGovern	
		TEL 07 34078364

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 Tarragindi Rd & Autumn St. Tarragindi to Lytton Rd near Metroplex Ave Murarrie		
	Rectifier No2 (Majestic Park) Eva St Coorparoo		POST CODE 4151
Structure to be protected:	900 mm and 1060 mm dia Mild Steel Trunk Main		
Maximum operating current:	6.00 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*;
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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: 3335

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 Tarragindi Rd and Autumn St Tarragindi to Lytton Rd near Metroplex Ave Murarrie Recrifier No2 (Majestic Park) Eva St Coorparoo - Post Code: 4151
Structure to be Protected	Mild Steel Tunk Main

CONDITIONS OF REGISTRATION

Maximum Operating Current: **6.00 Amperes DC**

DES EDE
Director – Equipment Safety

21/3/2006

Queensland Government
Department of Industrial Relations

Electrical Safety Act 2002

NOTICE OF REGISTRATION OF CATHODIC PROTECTION SYSTEM

Registration No: 3332

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 Tarragindi Rd and Autum St Tarragindi to Lytton Rd near Metroplex Ave Murarrie Rectifier No1 (Mott Park) Abbotsleigh St Holland Park - Post Code: 4121
Structure to be Protected	Mild Steel Trunk Main

CONDITIONS OF REGISTRATION

Maximum Operating Current: **5.00 Amperes DC**

DES EDE
Director – Equipment Safety

21/3/2006

Brisbane Water Engineering Services CP Form No. 27

Electrical Engineering Unit

Eva ST. 27V 6a

Cathodic Protection Interference Survey Results Form

Tarragindi to Wynnum Rd Mott Park 27V 5a.

Project S54 **Unit Reading** ..... **Date** 5-5-05

	Reading	Test Point I. D.	Location	Swing
On	-1040	-	Mott Park	
Off	-594	Light	Park Light	-446
On	-830			
Off	-502	Light	Park Light	-328
On	-752			
Off	-530	Light	Park Light	-222
On	-532		Logan Rd	
Off	-270	Men	Pole no 21287	-262
On	-329		NAVY	
Off	-250	Men	Pole no 10836	-79
On	-303		Sexton	
Off	-303	Men	Pole no 32200	0
On	-310		Sexton	
Off	-310	men	Pole no 32199	0
On	-322		Sexton	
Off	-322	Men	Pole no 39903	0
On	-109		Ferndale	
Off	-109	Men	Pole no 43890	0
On	-687		Ferndale	
Off	-683	Men	Pole no 20507	0
On	-233		Ferndale	
Off	-233	Men	Pole no 23116	0
On	-584		Ferndale	
Off	-584	Men	Pole no 23117	0
On	-382		Ferndale	
Off	-382	men	Pole no 23118	0
On	-424		ADerfield	
Off	-424	Men	Pole no 349450	0
On	-146		ARlington	0
Off	-146	Men	Pole no 33108	

TESTED BY ..... P. Smyth .....

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Eva St 27V 6a

Cathodic Protection Interference Survey Results Form

Tarragindi To Wynnum Rd Mott Park 27V 5a

Project S54 **Unit Reading** ..... **Date** 5-5-05

	Reading	Test Point I. D.	Location	Swing
On	-226		Eva St	
Off	-175	Men	Pole no 185	-51
On	-414		CHatsworth	
Off	-416	Men	Pole no 26522	0
On	-283		CityView	
Off	-289	men	Pole no 9590	+6
On	-003		Fergision	
Off	-003	Men	Pole no 17735	0
On	-488		Fergision.	
OFF	-382	Men	Pole no 17734	-106
On	-084		Fergision	
Off	-084	Men	Pole no 29009	-0
On	-260		Fergision	
Off	-260	Men	Pole no 27011	6
On	-011		The Promand	
Off	-011	Men	Pole no 1454	0
On	-172		The Promand	
Off	-172	Men	Pole no X19640	0
On	-12		Muir	
Off	-12	Men	Pole no 40265.	0
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				

TESTED 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 S54 TARRAGINDI TO WYNNUM RD Date 3-11-03.

TP Location AUTUMN & TARRAGINDI RD TP No. 1

Mains Size 1060 mm TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.25V
ZINC REFERENCE TO PIPE	+774
CuSo4 REFERENCE TO PIPE	-419
ZINC TO CuSo4	-1196

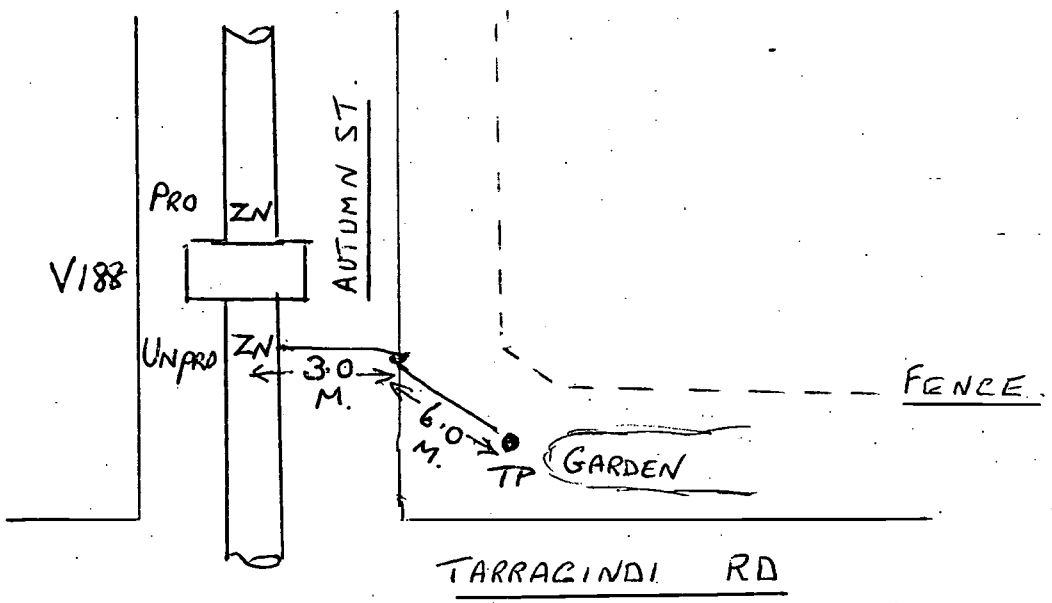
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 117.4 Ω PM
MEGGER READING 9.35

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Weller's Hill - M^t Gravatt — Date 19-4-03

TP Location Weller's Rd Fernvale — TP No. 2

Mains Size ..... — TP Type B x 2

POTENTIAL TESTING

	P	UP
CATHODE TO CATHODE RETURN (RESISTANCE)	0.15	0.15
ZINC REFERENCE TO PIPE	+614	+601
CuSo4 REFERENCE TO PIPE	-589	-614
ZINC TO CuSo4	-1203	-1216

EARTH TESTING

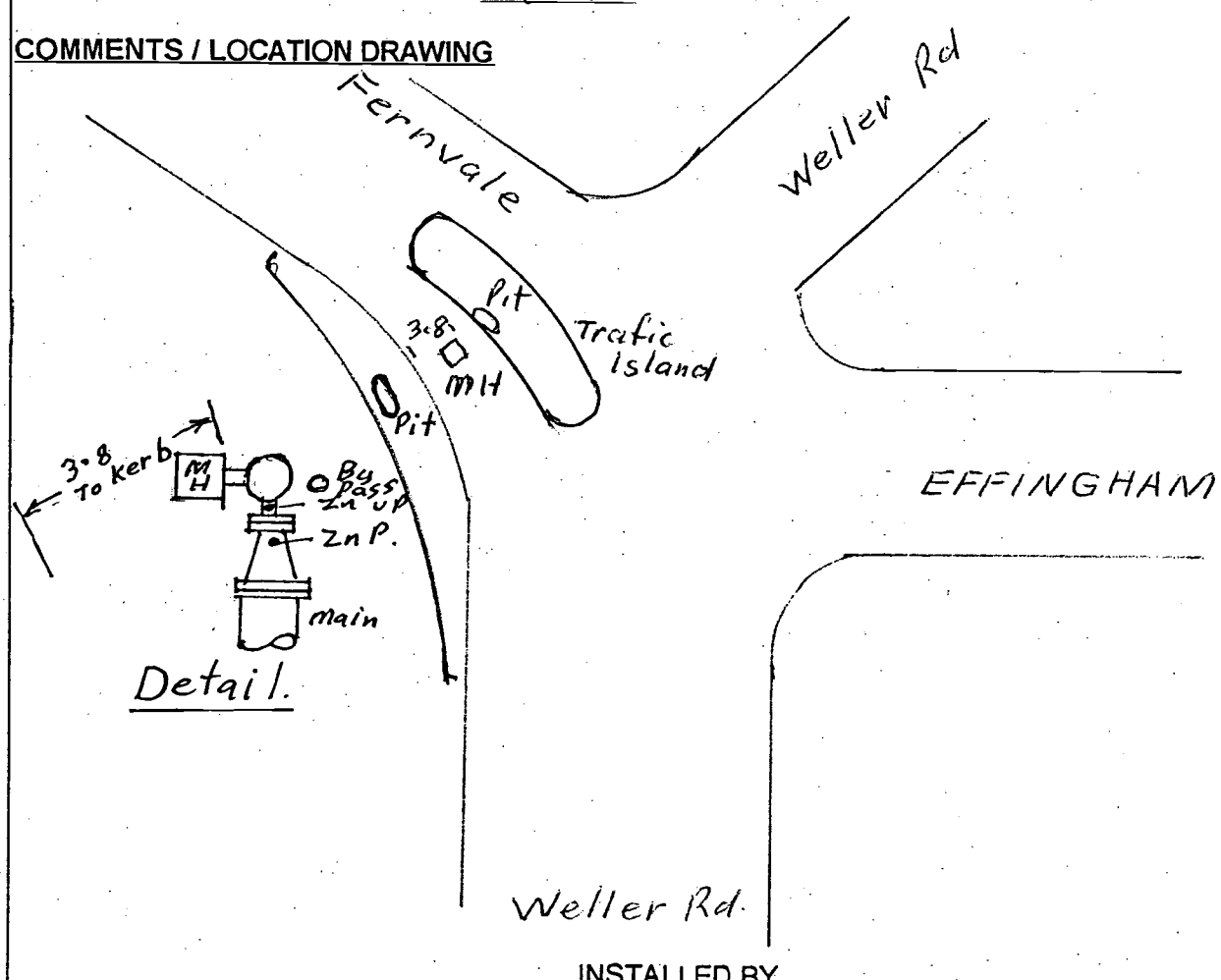
TEST NO. 1

PIN SPACING 2

MEGGER READING 6-2

RESISTIVITY 77-8 Ωpm

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S 54 Tarragindi - Wynnum Date 2-7-03

TP Location 18 EFFINGHAM ST. TP No. 3

Mains Size 42" to 36" TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+585
CuSo4 REFERENCE TO PIPE	-416
ZINC TO CuSo4	-111

EARTH TESTING

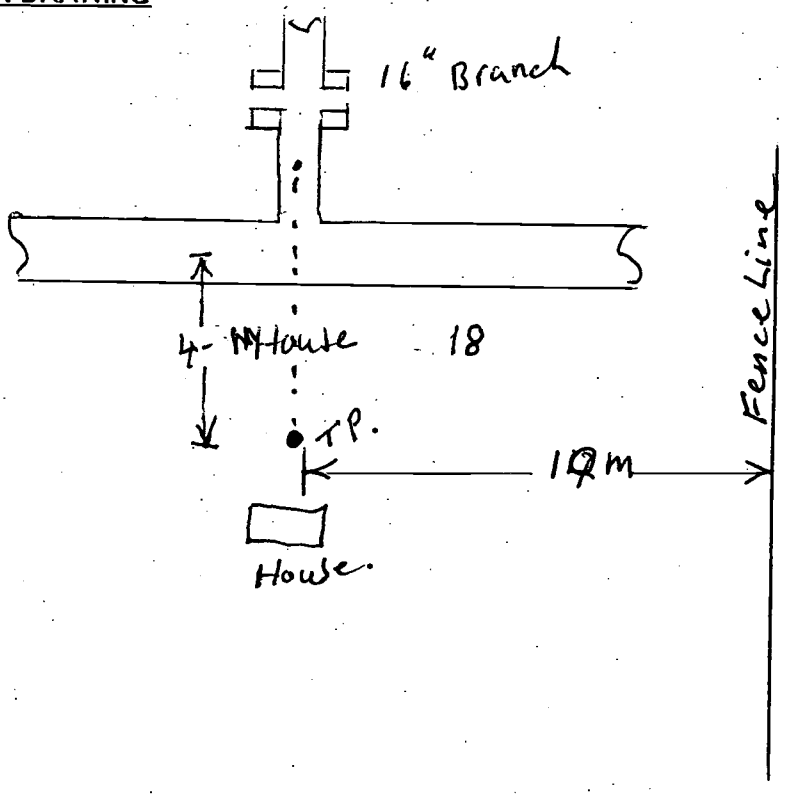
TEST NO. 1

PIN SPACING 2

MEGGER READING 3.5

RESISTIVITY 43.9 Ωpm

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnan Date 10-4-03

TP Location Sexton. TP No. 4

Mains Size 4" - 3" G TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+689
CuSo4 REFERENCE TO PIPE	-549
ZINC TO CuSo4	-1124

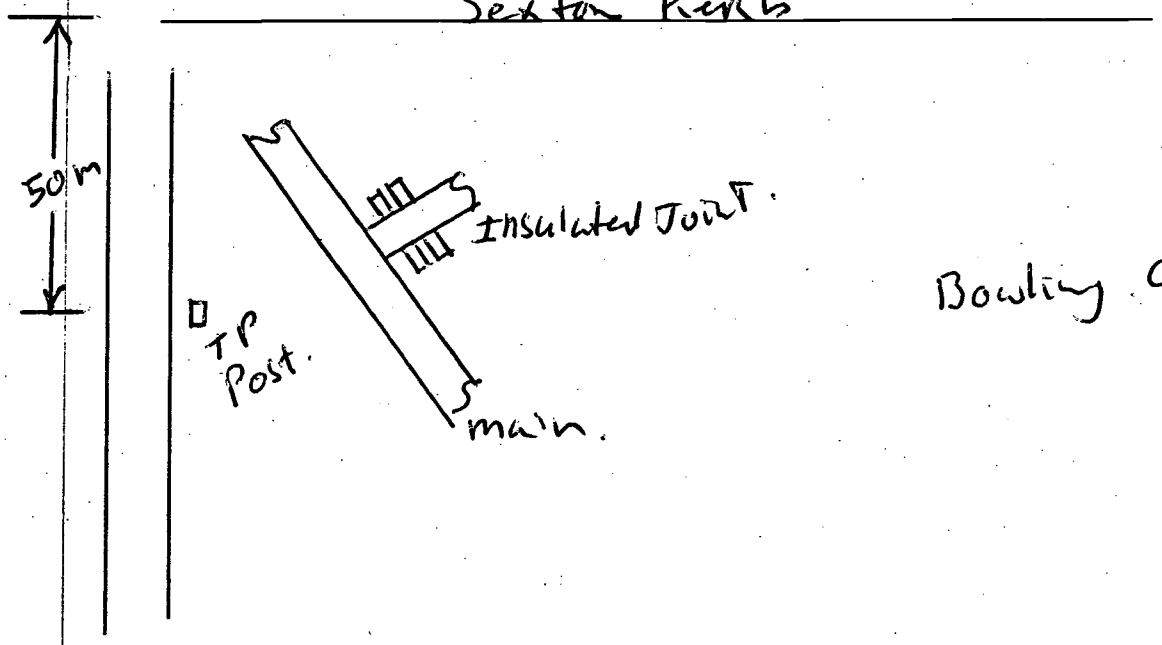
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 18.8Ω pm

MEGGER READING ~~1.45~~ 1.5

COMMENTS / LOCATION DRAWING



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CP Form No. 18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tavragindi Wynnum. Date 28-10-03

TP Location Cnr Birdwood & Navy TP No. 5

Mains Size 42" to 36" TP Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1 Ω
ZINC REFERENCE TO PIPE	+590
CuSo4 REFERENCE TO PIPE	-454
ZINC TO CuSo4	-1095

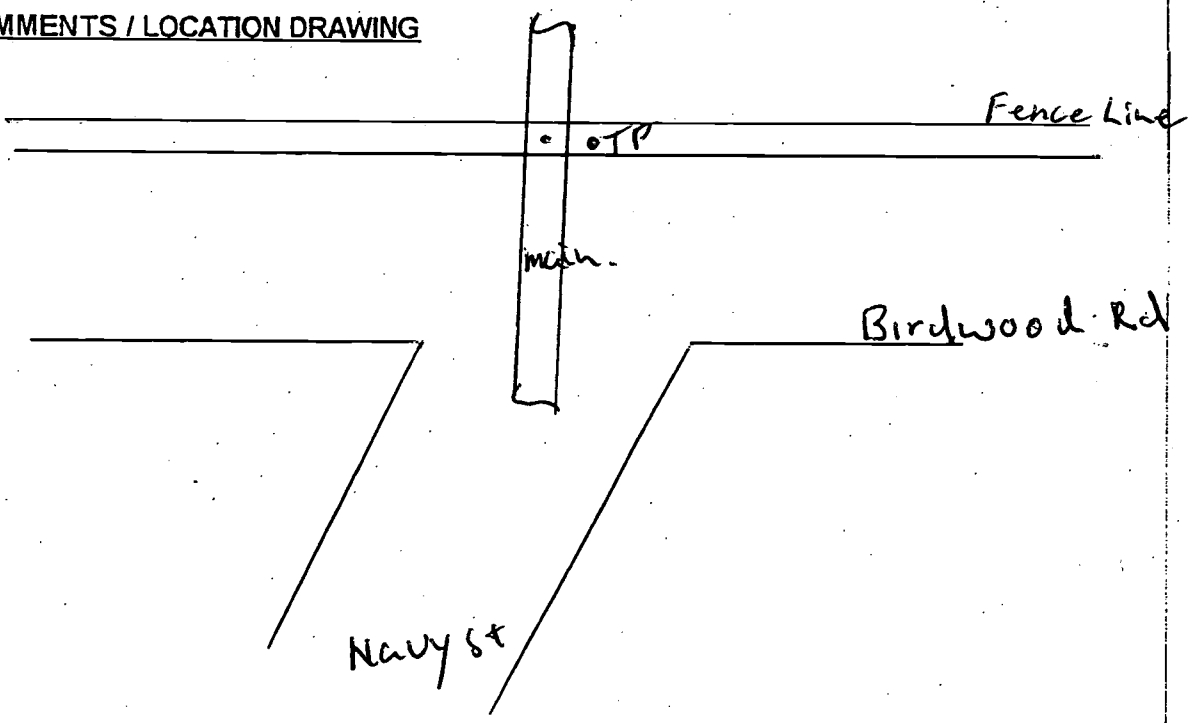
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 21.6 Ω PM

MEGGER READING 2.2

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 10-4-03

T P Location Mott Park T P No. 6

Mains Size 42" - 36" T P Type Rectifier 13

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+585
CuSo4 REFERENCE TO PIPE	−1060
ZINC TO CuSo4	−484

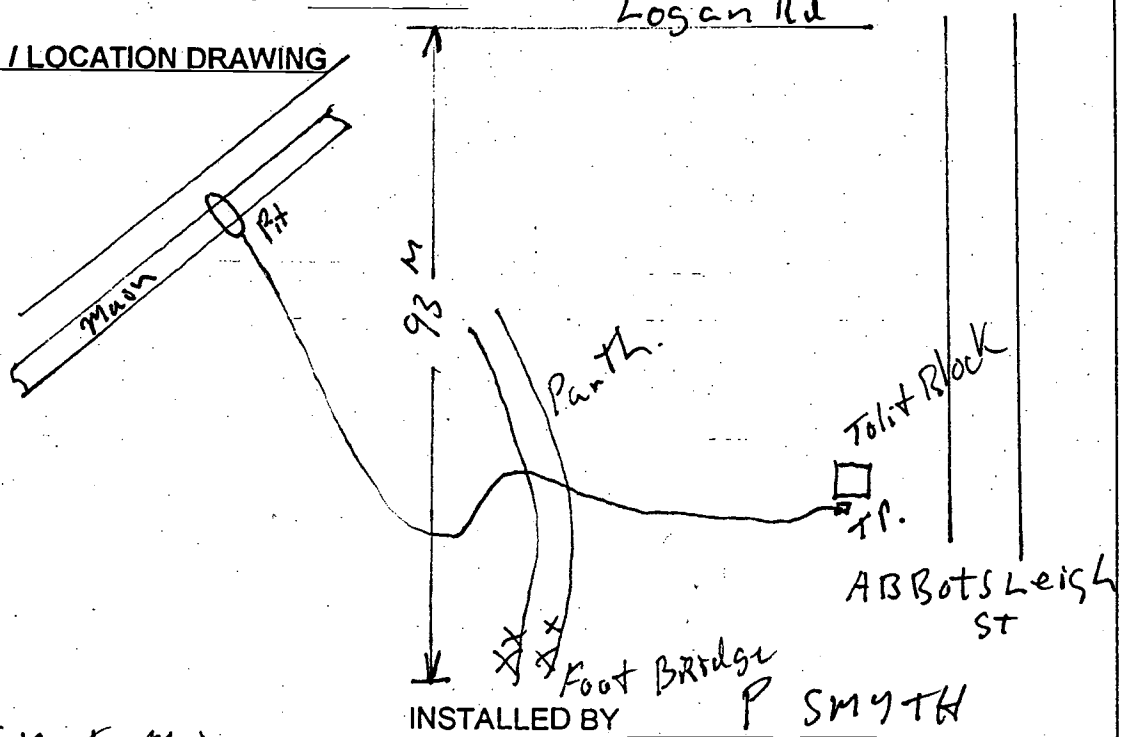
EARTH TESTING

TEST NO. 1
PIN SPACING 2 RESISTIVITY 16·3
MEGGER READING 1·3

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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TP. 176M to Main

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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 10-4-03

TP Location 460 Geelong av TP No. 7

Mains Size 4½" - 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+720
CuSo4 REFERENCE TO PIPE	-287
ZINC TO CuSo4	-1006

EARTH TESTING

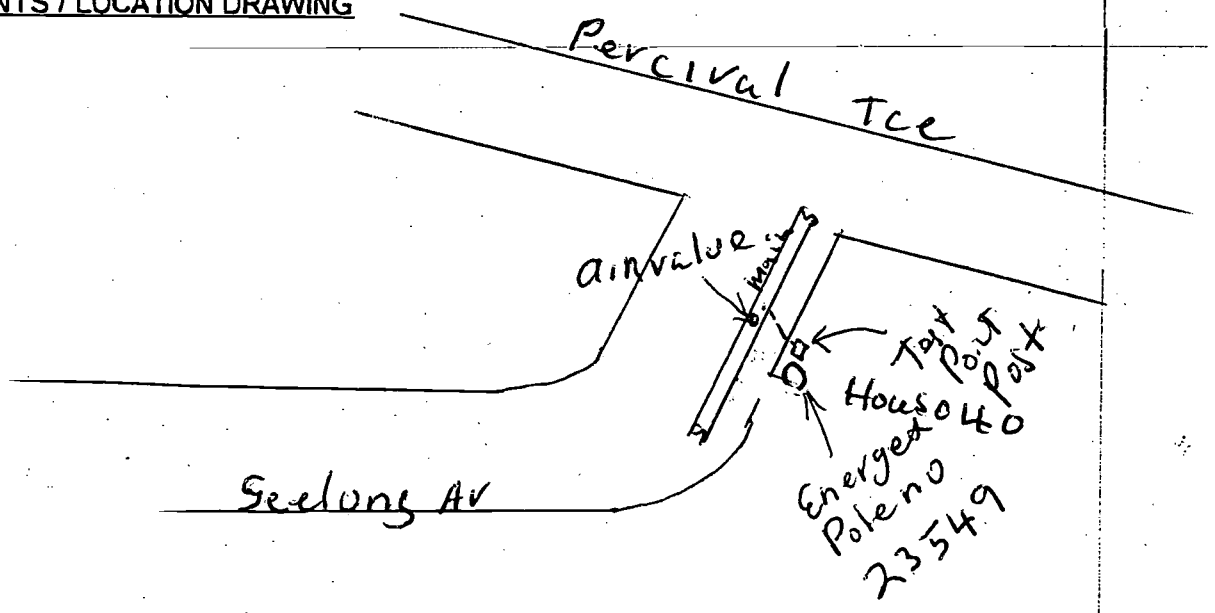
TEST NO. 1

PIN SPACING 2m

MEGGER READING 208

RESISTIVITY 35.16 ΩPM

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tarragindi - Wynnum Date 28-10-03

TP Location Era St in Magestic Park TP No. 8

Mains Size 42" - 36" TP Type B

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1 Ω
ZINC REFERENCE TO PIPE	+726
CuSo4 REFERENCE TO PIPE	−380
ZINC TO CuSo4	−1100

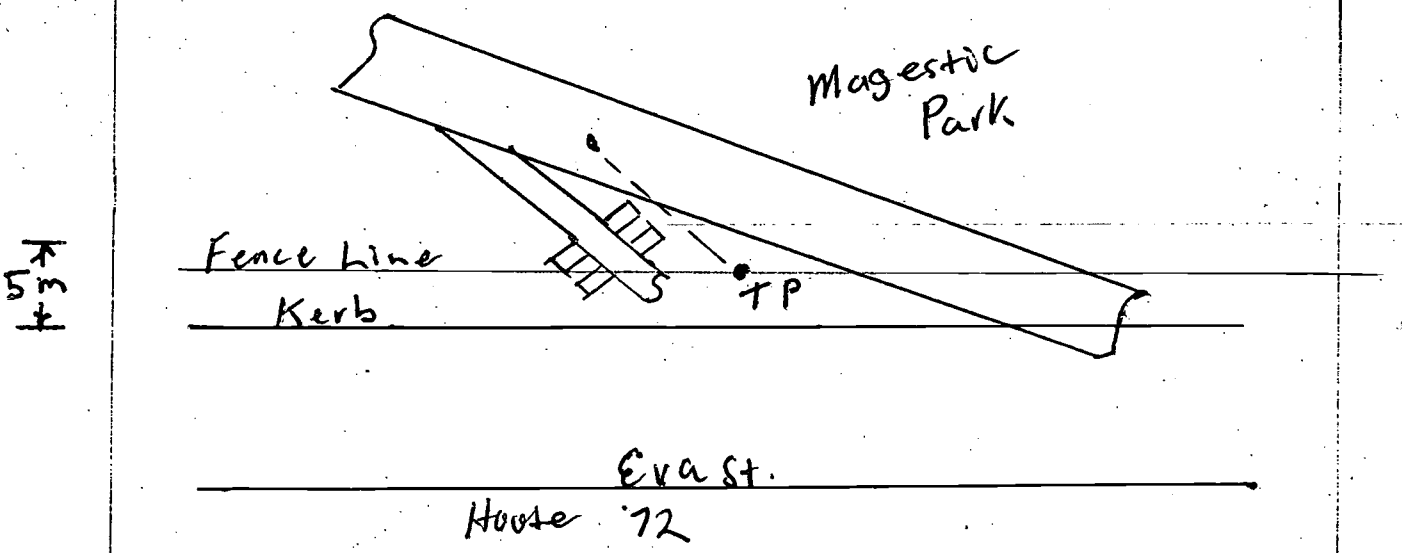
EARTH TESTING

TEST NO. 1

PIN SPACING 2m RESISTIVITY 97.7 Ω pm

MEGGER READING 7.78

COMMENTS / LOCATION DRAWING



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Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 54 Tarragindi - Wynnum Date 18-2-04

TP Location Chatsworth at Illidge TP No. 9

Mains Size 42" - 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+578
CuSo4 REFERENCE TO PIPE	-460
ZINC TO CuSo4	-1095

EARTH TESTING

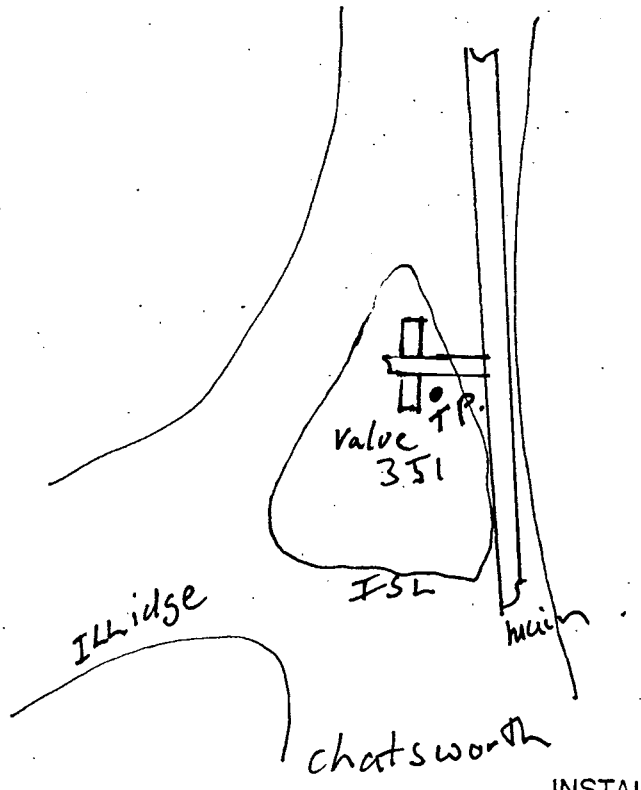
TEST NO. 1

PIN SPACING 2

MEGGER READING 4.1

RESISTIVITY 51.4 Ω PM

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tarragindi To Wynnum Date 10-10-03

TP Location Thomas and Prout TP No. 10

Mains Size 42" TO 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+443
CuSo4 REFERENCE TO PIPE	-650
ZINC TO CuSo4	-1090

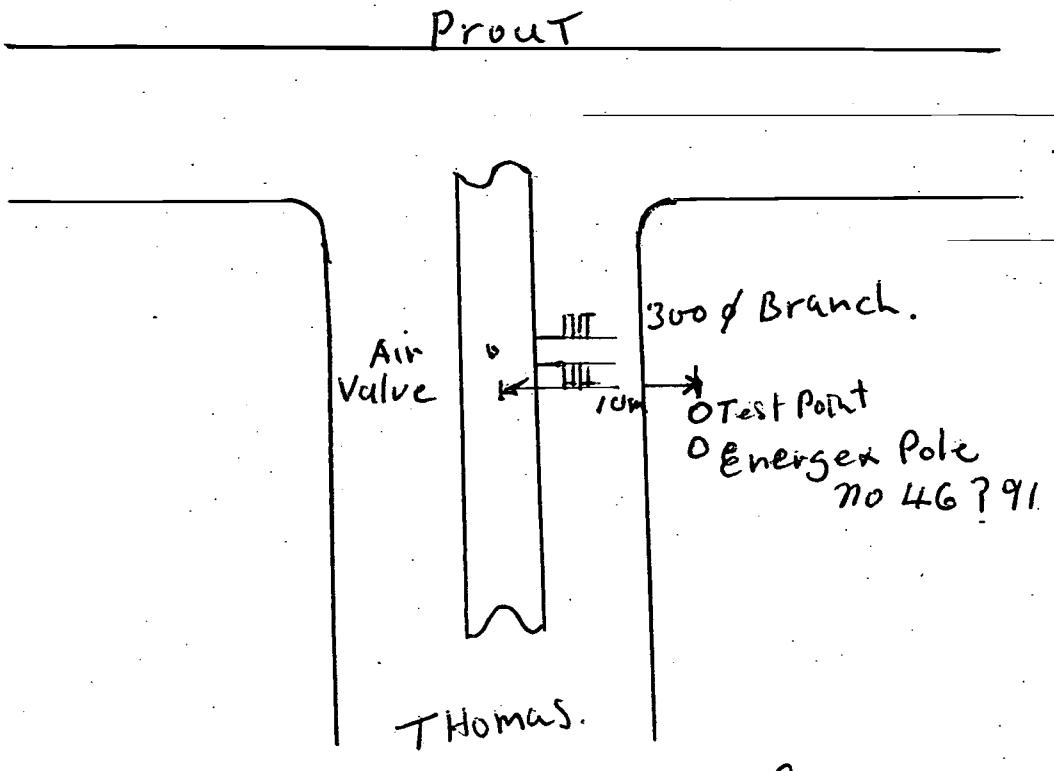
EARTH TESTING

TEST NO. 1

PIN SPACING ~~3.7~~ 2m RESISTIVITY 46.4 ΩPm

MEGGER READING 3.7

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnam Date 28-4-03

TP Location Old Cleavland Rd TP No. 112

Mains Size 42" - 36" TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1 Ω
ZINC REFERENCE TO PIPE	+434
CuSo4 REFERENCE TO PIPE	-593
ZINC TO CuSo4	-938

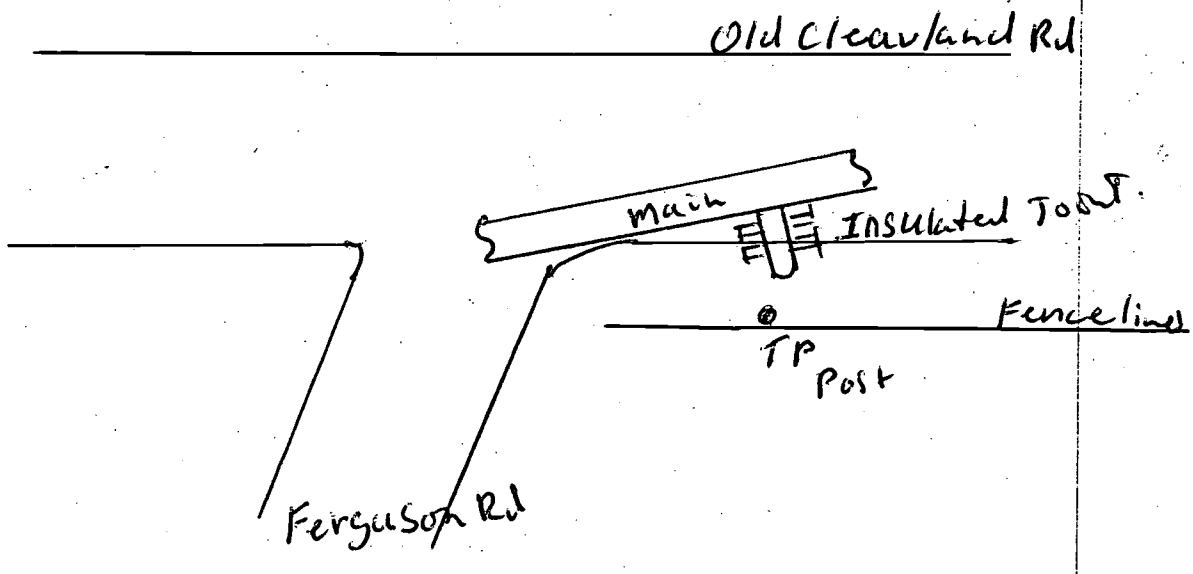
EARTH TESTING

TEST NO. 1

PIN SPACING 2m RESISTIVITY 27.6 Ω pm

MEGGER READING 2.2

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Tarragindi - Wynnan Rd Date 19-4-07

TP Location The Promenade. TP No. 12

Mains Size 42" - 36" TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	0.1Ω
ZINC REFERENCE TO PIPE	+446
CuSo4 REFERENCE TO PIPE	-490
ZINC TO CuSo4	-952

EARTH TESTING

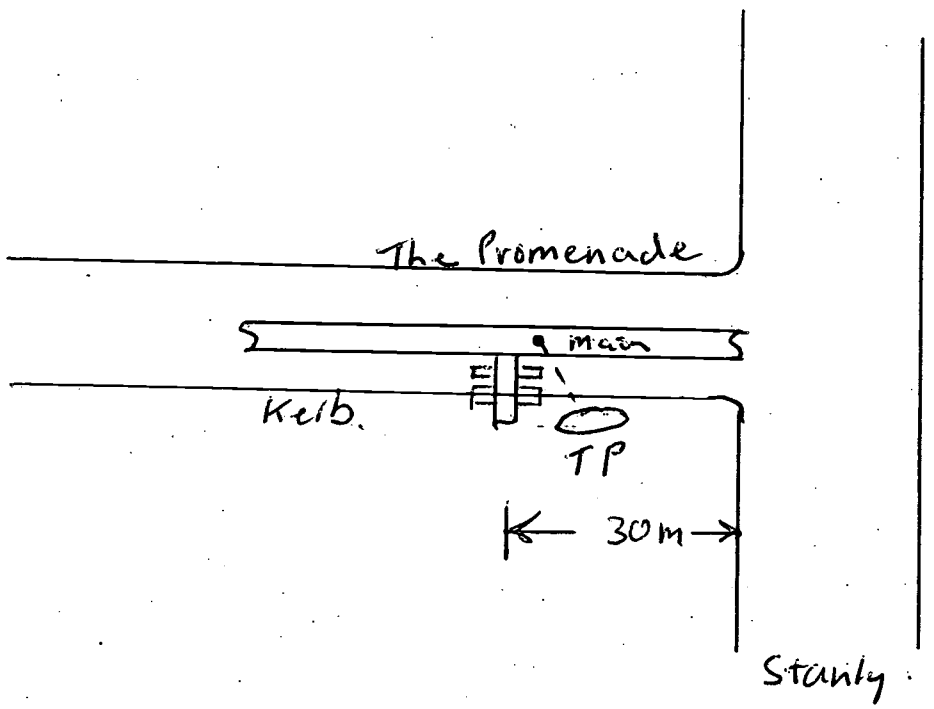
TEST NO. 1

PIN SPACING 2

MEGGER READING 1.8

RESISTIVITY 22.6 Ω PM

COMMENTS / LOCATION DRAWING



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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Date 13-4-03

TP Location 511 Darcy Rd TP No. 13

Mains Size 42" - 36" TP Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2Ω
ZINC REFERENCE TO PIPE	+709
CuSo4 REFERENCE TO PIPE	-516
ZINC TO CuSo4	-1225

EARTH TESTING

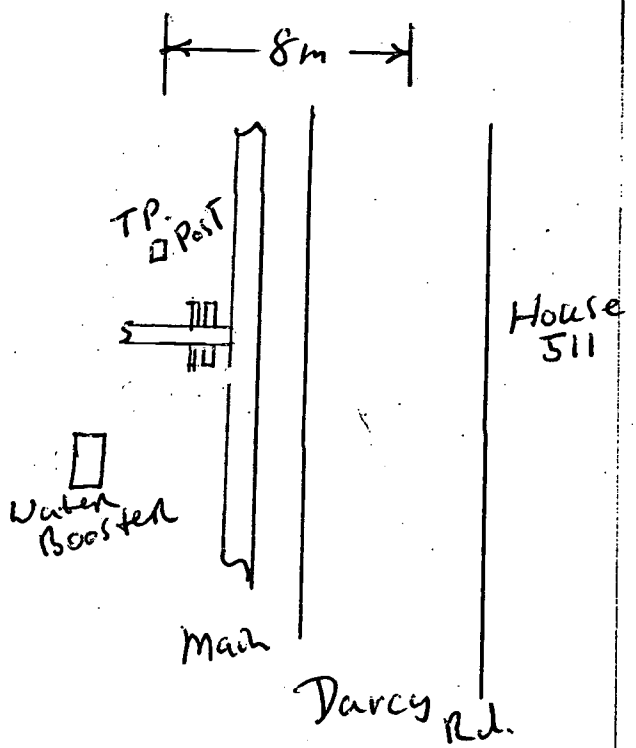
TEST NO. 1

PIN SPACING 2

MEGGER READING 10.06

RESISTIVITY 126.35 Ω PM

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

UBD 161G13

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Rd. Date .....

TP Location Baguette St Seven hills TP No. 14

Mains Size 900 mm TP Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.02.
ZINC REFERENCE TO PIPE	+558
CuSo4 REFERENCE TO PIPE	-448
ZINC TO CuSo4	-1002

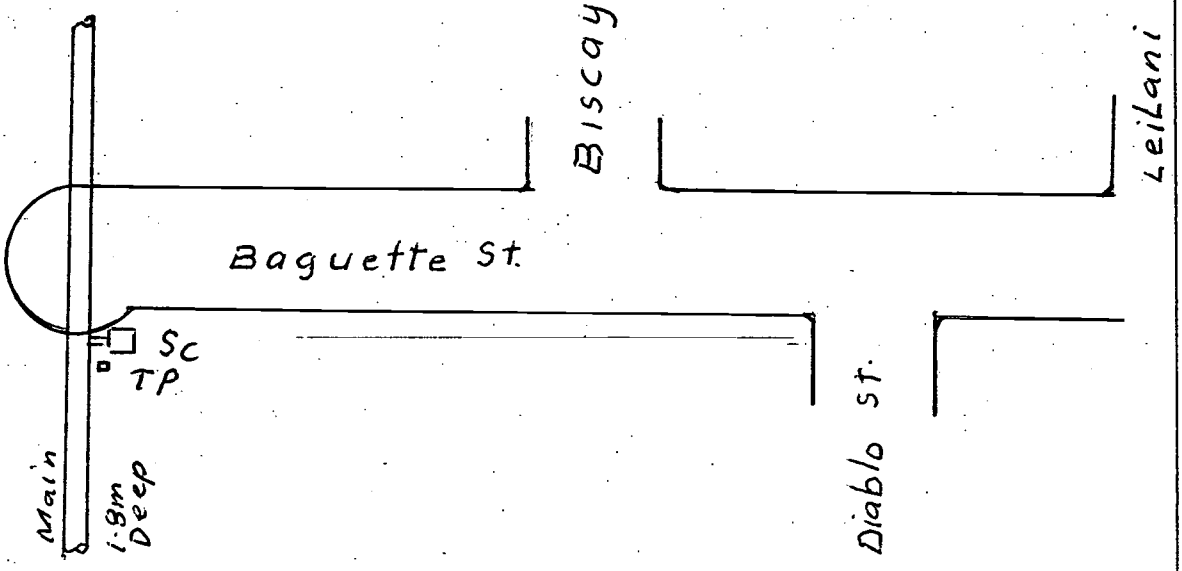
EARTH TESTING

TEST NO. 1
PIN SPACING 2 mtrs RESISTIVITY 97 Ωmtrs
MEGGER READING 7·7

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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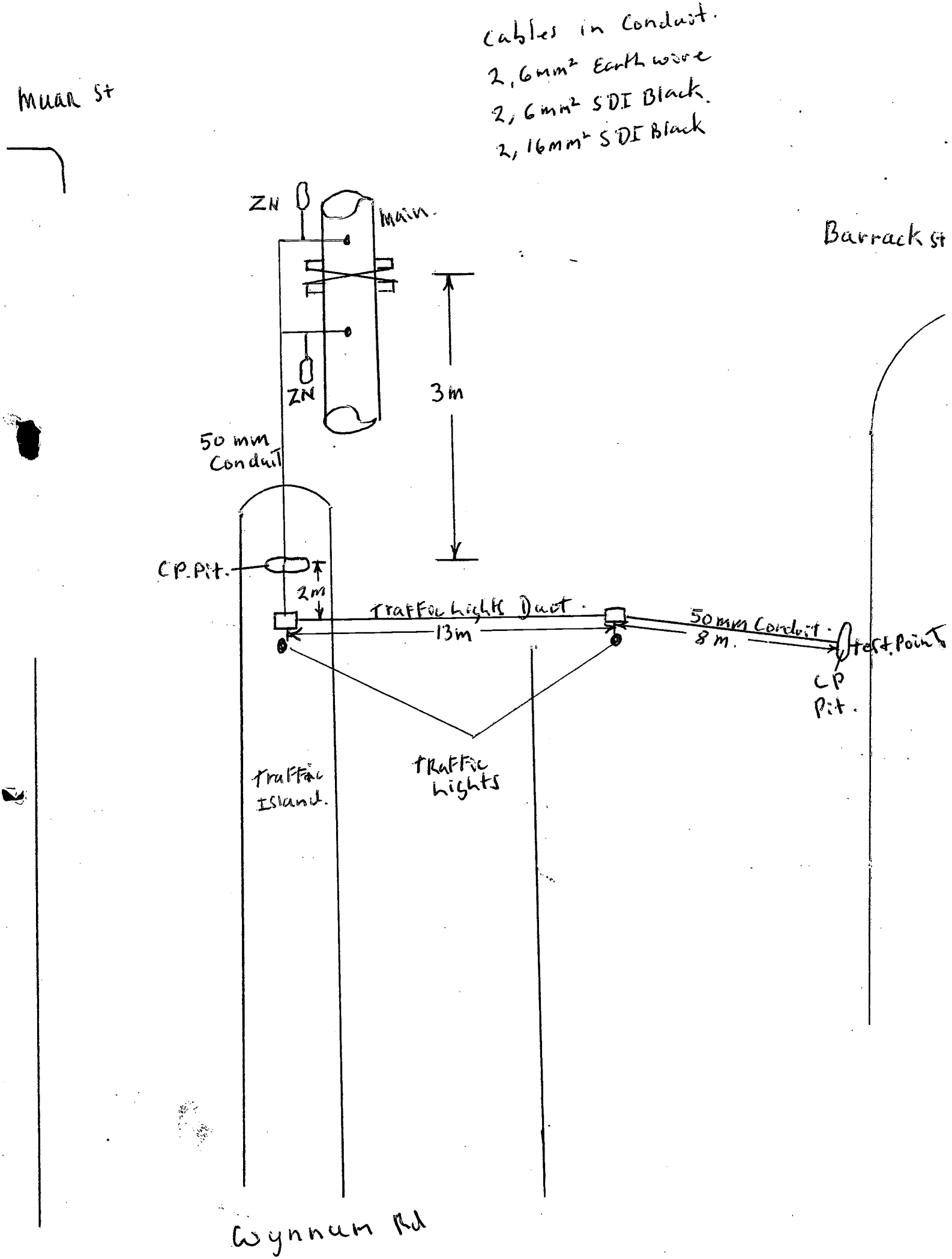

Cables in Conduit.
2,6mm² Earth wire
2,6mm² SDI Black.
2,16mm² SDI Black
Muar St
ZN
Main.
Barrack St
ZN
3m
50 mm Conduit
CP Pit.
2m
Traffic Lights Duct.
13m
50mm Conduit.
8m.
Test Point
CP Pit.
Traffic Island.
Traffic Lights
Wynnum Rd

Brisbane Water Engineering Services

CP Form No. 18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project S54 Tarragindi - Wynnum Date 3-2-04

TP Location Cnr Wynnum & Barrack TP No. 15

Mains Size 42" TO 30" TP Type B Pit.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+680
CuSo4 REFERENCE TO PIPE	-710
ZINC TO CuSo4	-1111

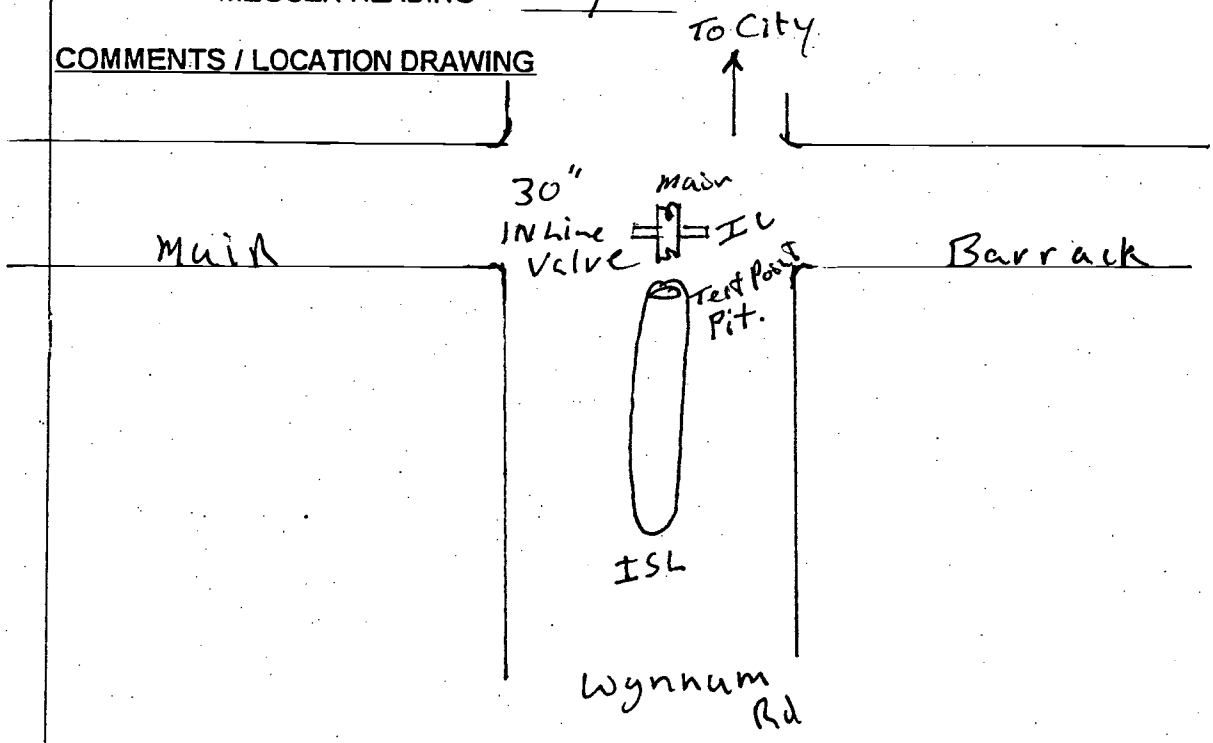
EARTH TESTING

TEST NO. 1

PIN SPACING 2 RESISTIVITY 11.3Ω pm

MEGGER READING .9

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 35 Wynnum Rd. Date 20-1-04

TP Location 88 Barrack Rd TP No. 1

Mains Size ..... TP Type B Post.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.02 Ω
ZINC REFERENCE TO PIPE	+559
CuSo4 REFERENCE TO PIPE	−585
ZINC TO CuSo4	−1143.

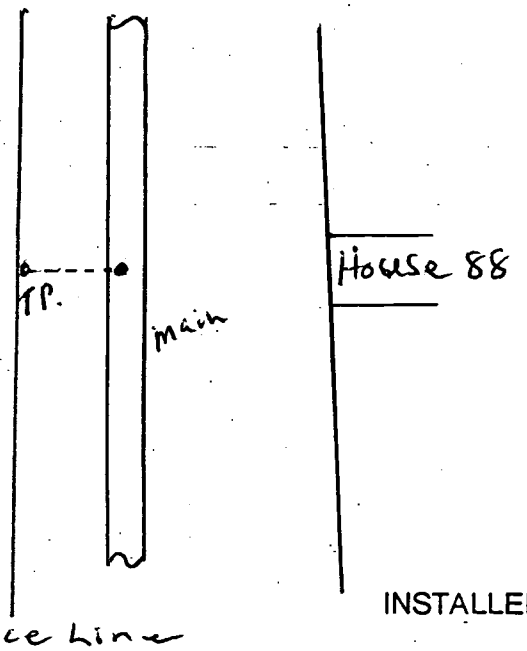
EARTH TESTING

TEST NO. 1
PIN SPACING 2m RESISTIVITY 69.08 Ω pm
MEGGER READING 5.5

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Set 35 Wynnum Rd Date 21-1-04

TP Location Cnr Barrack & Lytton TP No. 2

Mains Size ..... TP Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.2 Ω
ZINC REFERENCE TO PIPE	+569
CuSo4 REFERENCE TO PIPE	−552
ZINC TO CuSo4	−1122

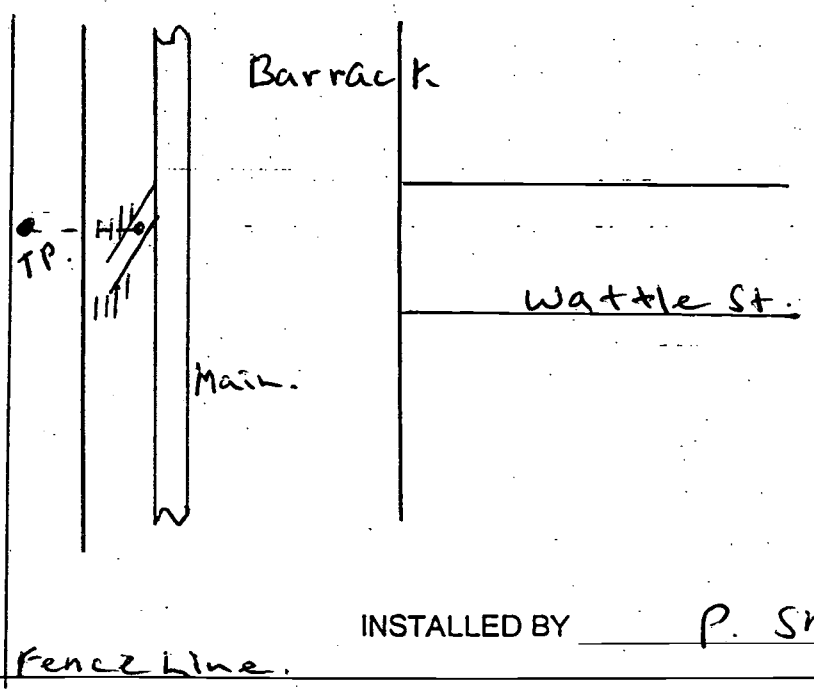
EARTH TESTING

TEST NO. 1
PIN SPACING 2 m RESISTIVITY 86·6 Ω PM
MEGGER READING 6·9

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering Form

Project Sct 35 Wynnum Rd Date 22-1-04

T P Location Lytton Rd by Metroplex T P No. 3

Mains Size ..... T P Type B Post

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE)	.1Ω
ZINC REFERENCE TO PIPE	+461
CuSo4 REFERENCE TO PIPE	-543
ZINC TO CuSo4	-1002

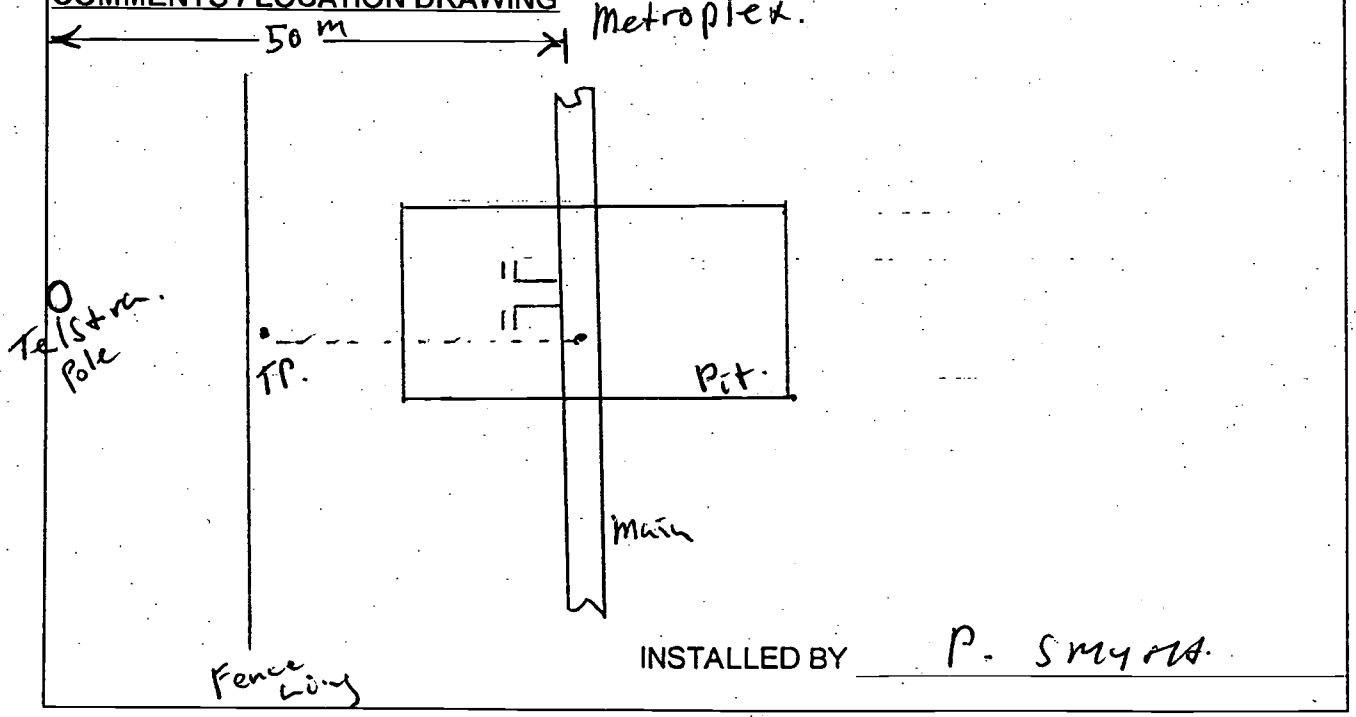
EARTH TESTING

TEST NO. 1
PIN SPACING 2m RESISTIVITY 110·5 Ω Pm
MEGGER READING 8·8

TEST NO 2
PIN SPACING RESISTIVITY
MEGGER READING

TEST NO 3
PIN SPACING RESISTIVITY
MEGGER READING

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 1

Project S54 TARRAGINDI TO WYNNUM RD. **Date** 3-11-03

DESCRIPTION

MAINS DETAILS: TARRAGINDI TO WYNNUM RD
LOCATIONS: TARRAGINDI AND AUTUMN RD.
SIZE: 1060 MM
MATERIAL: MILD STEEL
COATING: TAR EPOXY
VALVE No. V188

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: ALL > 1.0 MΩ
NUMBER OF BOLT: 16
FLANGE TO FLANGE RESISTANCE: 35.0 Ω
INSULATION CHECKER MODEL 702:

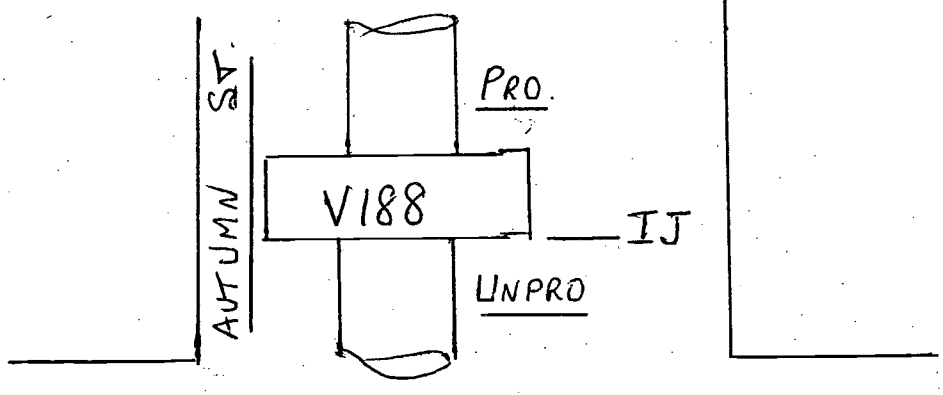
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -313 MV
UNPROTECTED SIDE: -303 MV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY L. GREAVES

Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 2

Project S54 TARRAGINDI TO WYNNUM RD **Date** 4-11-03

DESCRIPTION

MAINS DETAILS: TARRAGINDI TO WYNNUM RD
LOCATIONS: AUTUMN ST
SIZE: 1060 MM
MATERIAL: MILD STEEL
COATING: TAR EPOXY
VALVE No. 150 MM RETIC

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: ALL > 1.5 MΩ
NUMBER OF BOLT: 8
FLANGE TO FLANGE RESISTANCE: 56.0 Ω
INSULATION CHECKER MODEL 702:

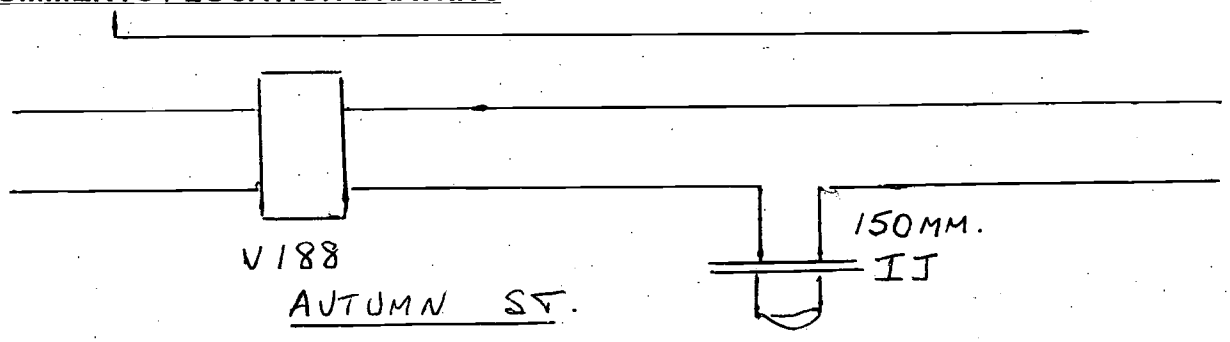
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -394 MV
UNPROTECTED SIDE: -371 MV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Tarragindi – Wynnum Date 17-2-04

Isolation 3

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Tarragindi Rd & Autumn Rd
SIZE: 42" to 36"
MATERIAL: Mild Steel
COATING: P.C
VALVE No. 254

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE:
INSULATION CHECKER MODEL 702:

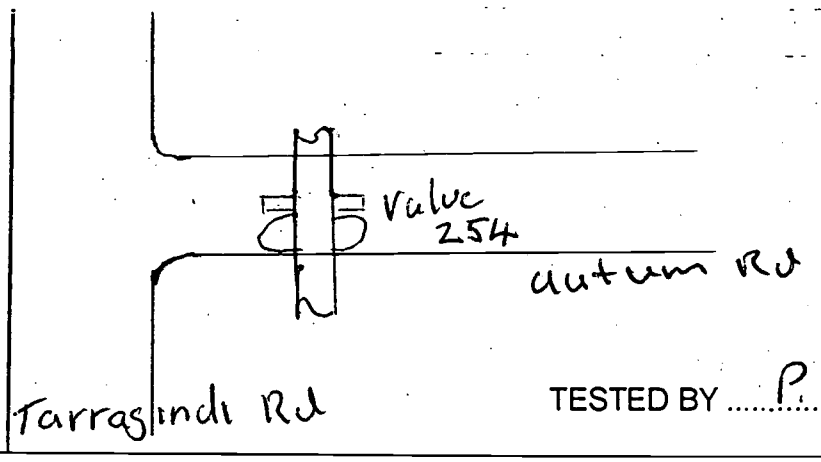
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -375
UNPROTECTED SIDE: -250

ABOVE TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200 Ω
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE: 70KΩ

COMMENTS / LOCATION DRAWING



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Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 3a

Project Tarragindi - Wynnum Date 26-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: andrew & Ferndale
SIZE: 42" to 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .78 MΩ
INSULATION CHECKER MODEL 702: N/A.

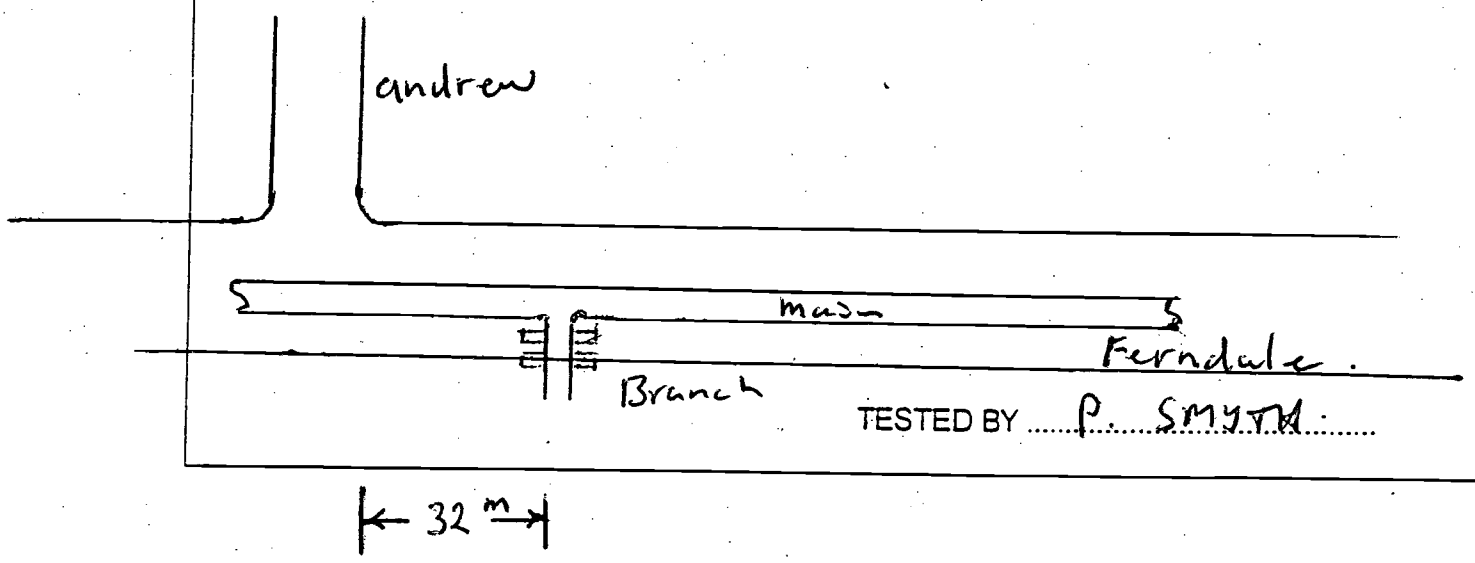
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -250 mv
UNPROTECTED SIDE: -150 mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Wellers hill - MT Gravatt **Date** 19-4-07

Isolation 4

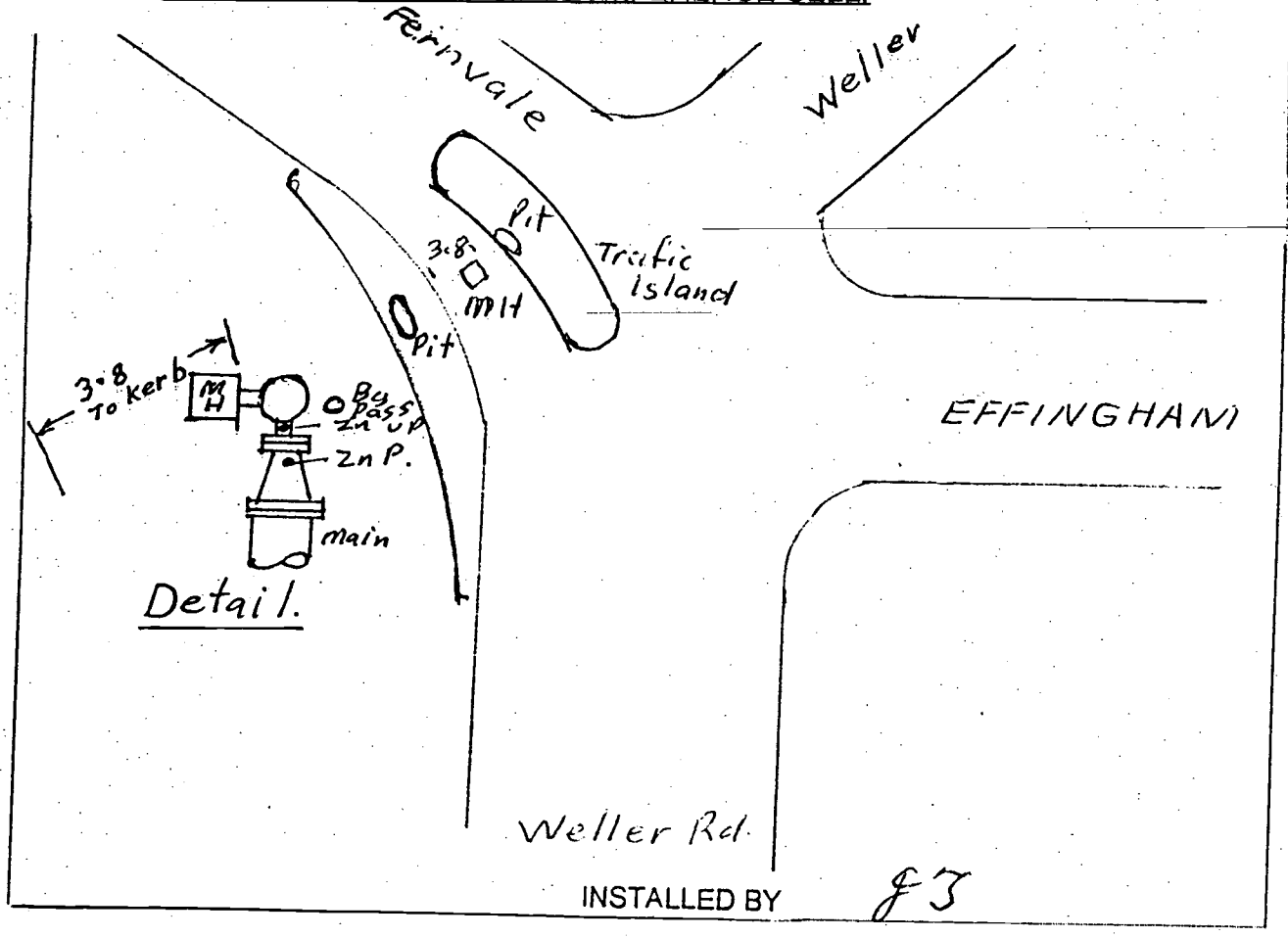
DESCRIPTION

MAINS DETAILS:
LOCATIONS: Intercetions as below
SIZE:
MATERIAL: MSCL
COATING: Tar asbestos
VALVE No.

.N GROUND TESTING

BOLT TO FLANGE RESISTANCE: > 5 mΩ
NUMBER OF BOLT: 36 off 4½" x 1"
FLANGE TO FLANGE RESISTANCE: 0.7 mΩ
INSULATION CHECKER MODEL 702: 1 N 11

POTENTIAL DIFFERENCE TO REFERENCE CELL:



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Revision 08/01/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 **Date** 2-7-03

Isolation 5

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: no 46 Effingham St
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 16" BR. 796

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 20ΩR
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 7 KΩ
INSULATION CHECKER MODEL 702: N/A.

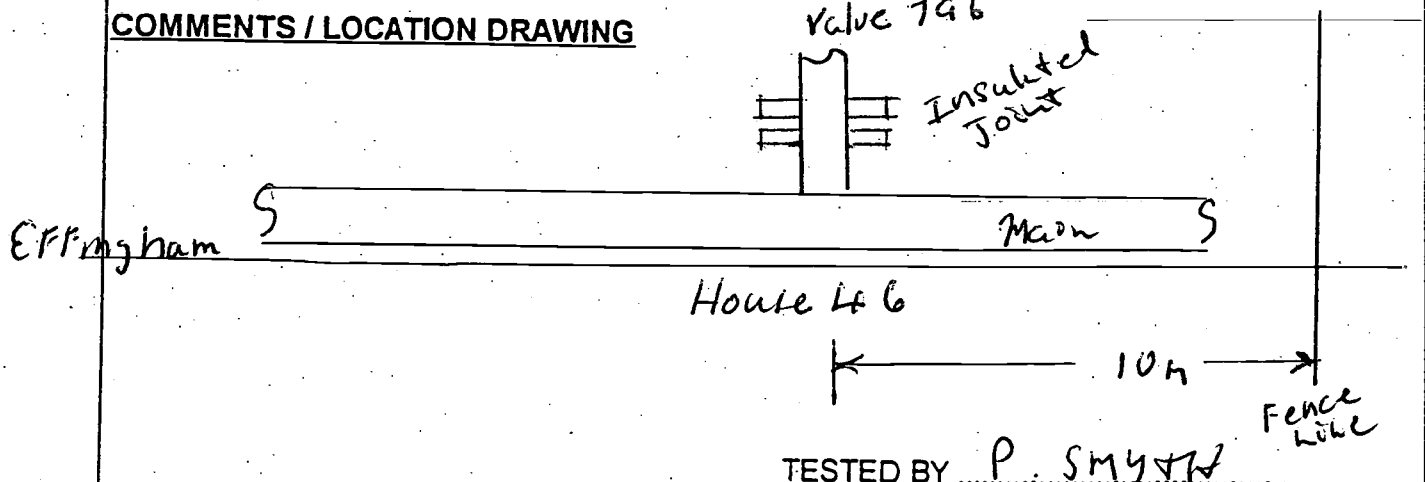
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -416
UNPROTECTED SIDE: -350

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Date 26-4-07

Isolation 7

DESCRIPTION

MAINS DETAILS: Tarragindi To Wynnam
LOCATIONS: Sexton Bowling club.
SIZE: 42 36
MATERIAL: Mild steel
COATING:
VALVE No.

IN GROUND TESTING

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

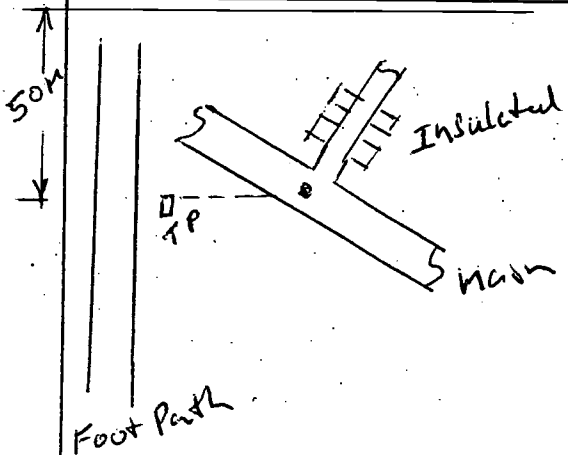
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -549
UNPROTECTED SIDE: -447

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING Sexton. Kerb.



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S 54 Date 29-4-03

Isolation 8

DESCRIPTION

MAINS DETAILS: Tarragindi to Wynnum
LOCATIONS: + 4 Merrell St
SIZE: 42 – 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .68mΩ
INSULATION CHECKER MODEL 702: N/A

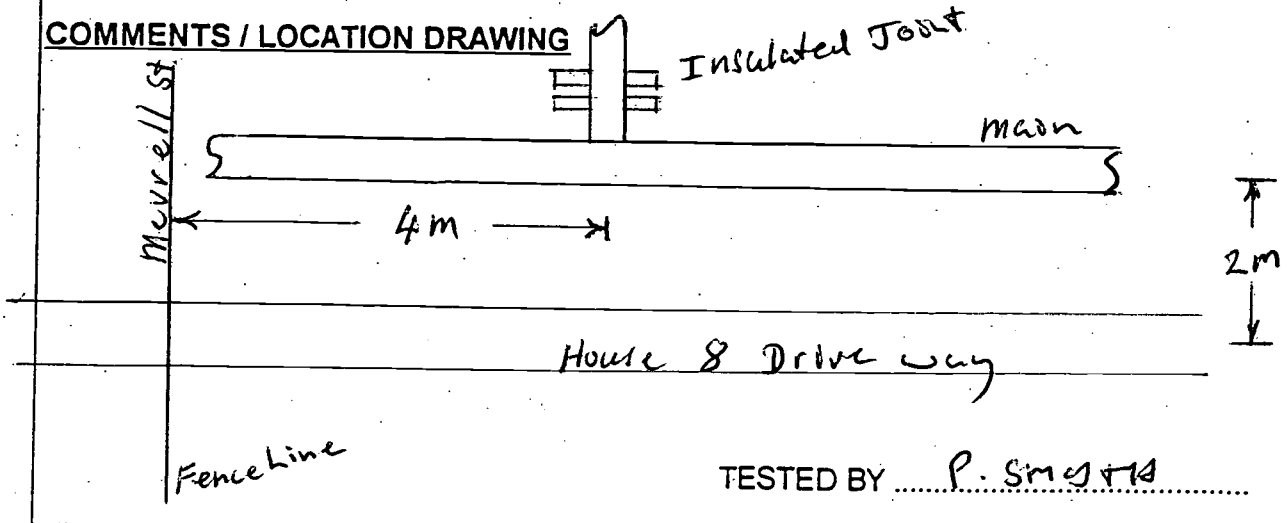
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -455
UNPROTECTED SIDE: -359

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 9

Project Tarragindi – Wynnum Date 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: 42 Swain St.
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 6" Branch.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7 zero Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .8 MΩ
INSULATION CHECKER MODEL 702: N/A.

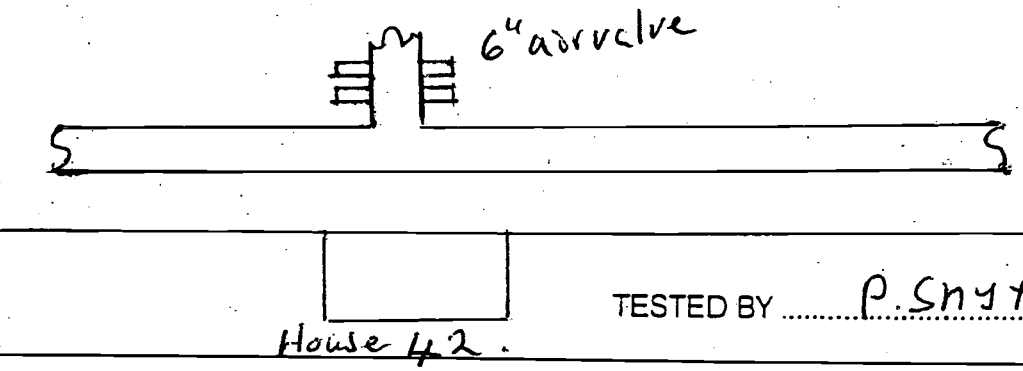
POTENTIAL DIFFERENCE TO REFERENCE CELL

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -390 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S 54 Date 14-4-07

Isolation 10

DESCRIPTION

MAINS DETAILS: Tarragindi to Wynnum
LOCATIONS: Abbotsleigh & Cavendish Rd
SIZE: 42-36"
MATERIAL: Mild Steel
COATING:
VALVE No. 12" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .2 MΩ
INSULATION CHECKER MODEL 702: N/A

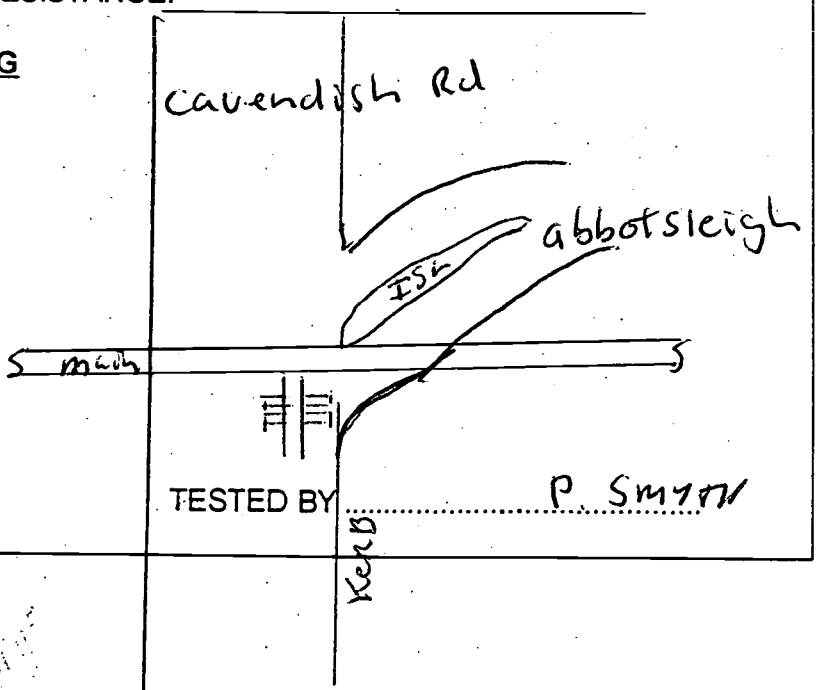
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -414
UNPROTECTED SIDE: -356

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 10a

Project Tarragindi - Wynnum **Date** 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Arlington St.
SIZE: 42" - 36"
MATERIAL: Mild Steel.
COATING: T/E
VALVE No. 12" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 3.8 KΩ
INSULATION CHECKER MODEL 702: N/A.

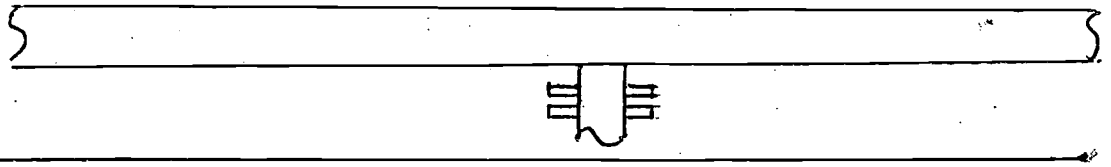
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -465 mV
UNPROTECTED SIDE: -415 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING House 29



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation no # 11

Project Tarragindi to Wynnum Date 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Era St
SIZE: 42" to 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

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

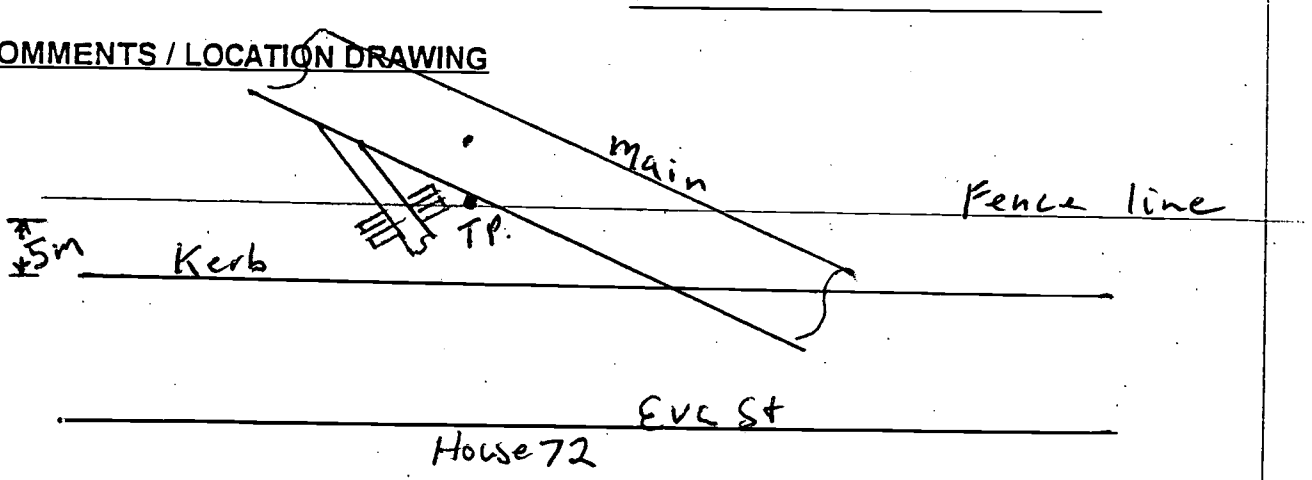
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -310 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION 12.

Project S54 Tarragindi wynnum Date 16-3-04

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: Cnr ILLIDGE & Chatsworth.
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING: T/A.
VALVE No. 351

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 45Ω
INSULATION CHECKER MODEL 702: N/A.

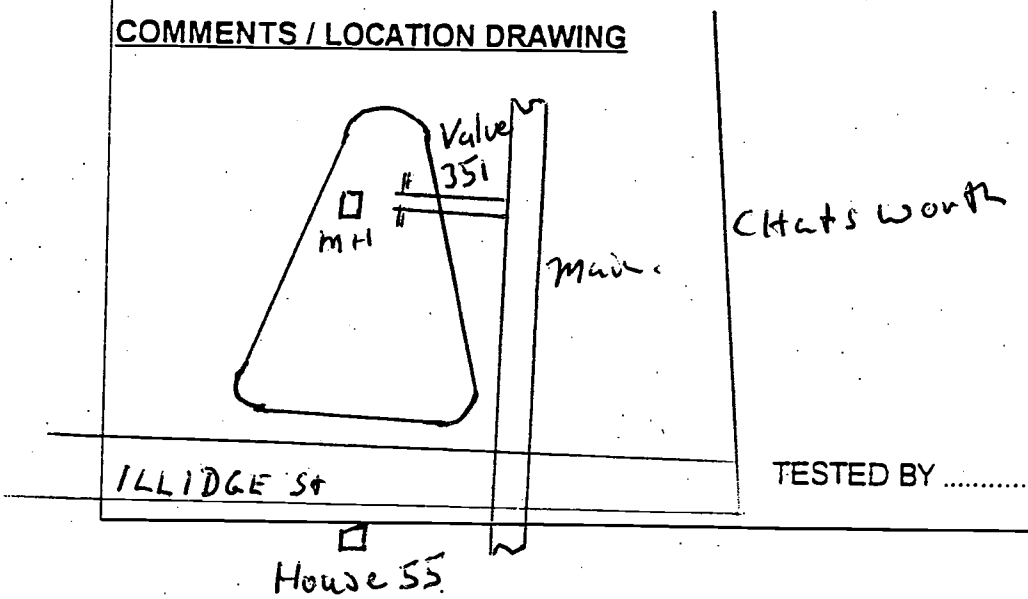
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -480 mV
UNPROTECTED SIDE: -430 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 13

Project S.C.T. 54 Tarragindi - Wynnam Date 14-3-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Chatsworth & Boundary
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING: T/E
VALVE No. 12" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .8KΩ
INSULATION CHECKER MODEL 702: N/A

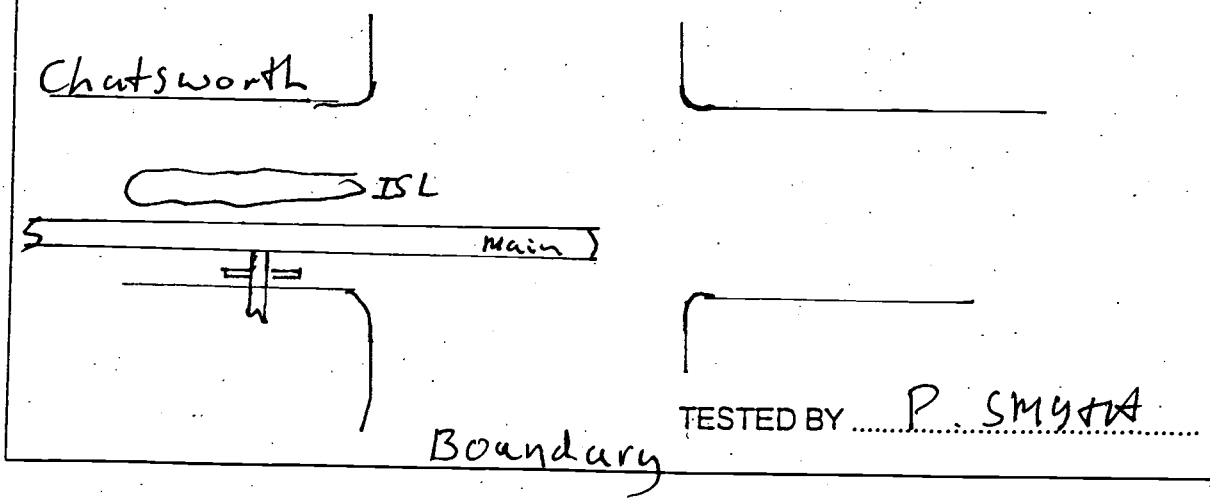
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -560
UNPROTECTED SIDE: -480

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Tarragindi To Wynnum Date 14-10-03

ISOLATION N° 14

DESCRIPTION

MAINS DETAILS: S54
LOCATIONS: Prout & Thomas.
SIZE: 42" to 36"
MATERIAL: Mild Steel.
COATING:
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 2-5 mΩ
INSULATION CHECKER MODEL 702: N/A.

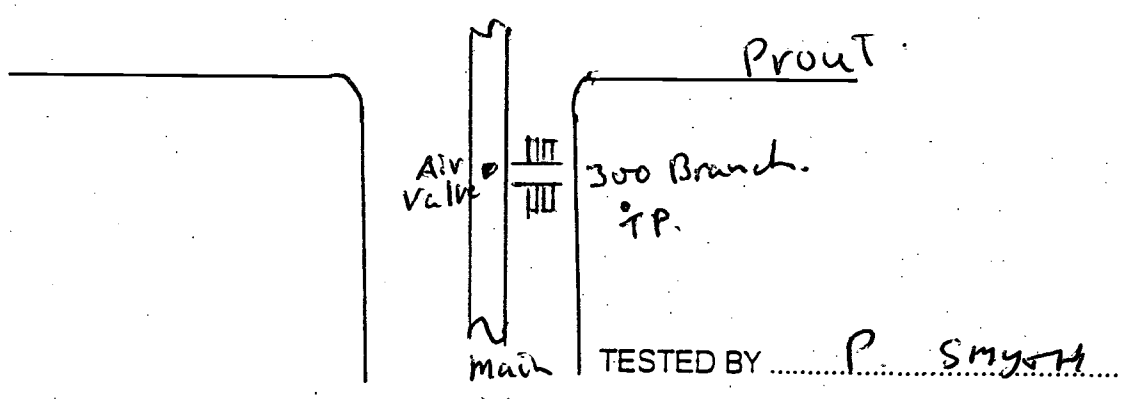
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -580
UNPROTECTED SIDE: -318

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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THOMAS.

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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Date 28-10-03

Isolation No 15

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: Old Cleveland Rd
SIZE: 42"-36"
MATERIAL: Mild Steel
COATING: T/A.
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 1MΩ
INSULATION CHECKER MODEL 702: N/A

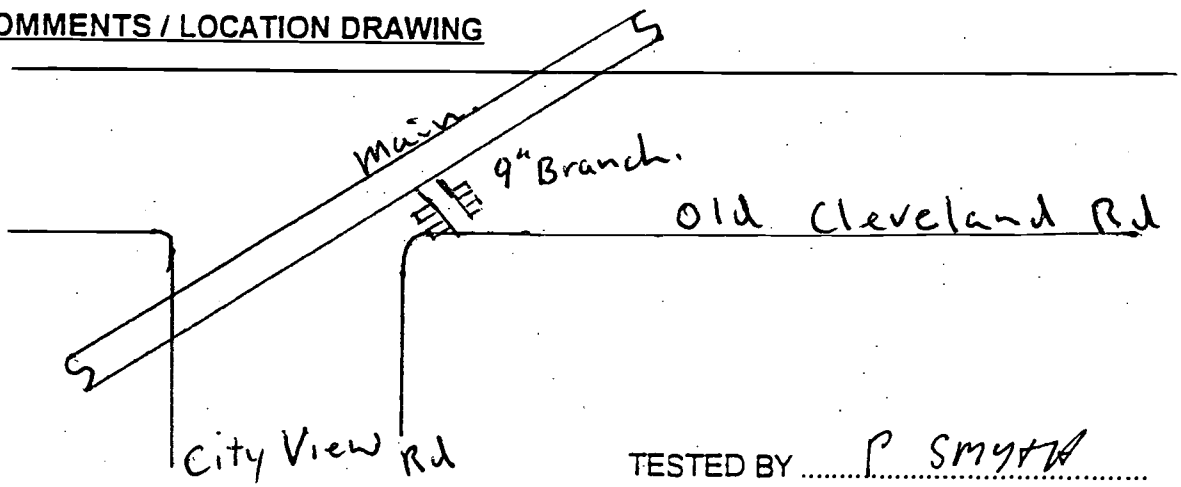
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -550 mv
UNPROTECTED SIDE: -388 mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 Tarragindi – Wynnam. Date 29-4-03

Isolation 16

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Old Cleveland Rd
SIZE: 42" – 36"
MATERIAL: Mild Steel.
COATING:
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: All Bolts >200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 4-5 KΩ
INSULATION CHECKER MODEL 702:

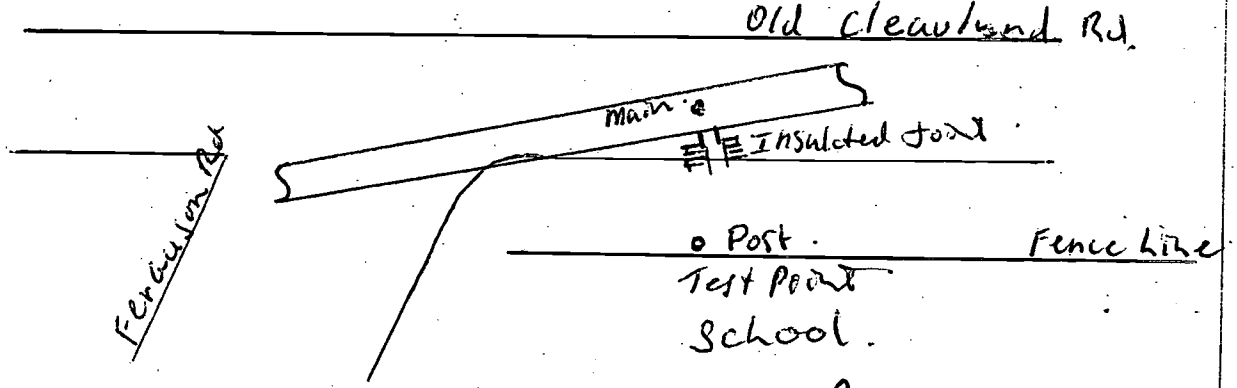
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -593 mv
UNPROTECTED SIDE: -533. mv

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project S54 **Date** 29-4-03

Isolation 17

DESCRIPTION

MAINS DETAILS: Tarragindi Wynnum
LOCATIONS: Cnr The Promenade & Stanley
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 2 KΩ
INSULATION CHECKER MODEL 702: N/A.

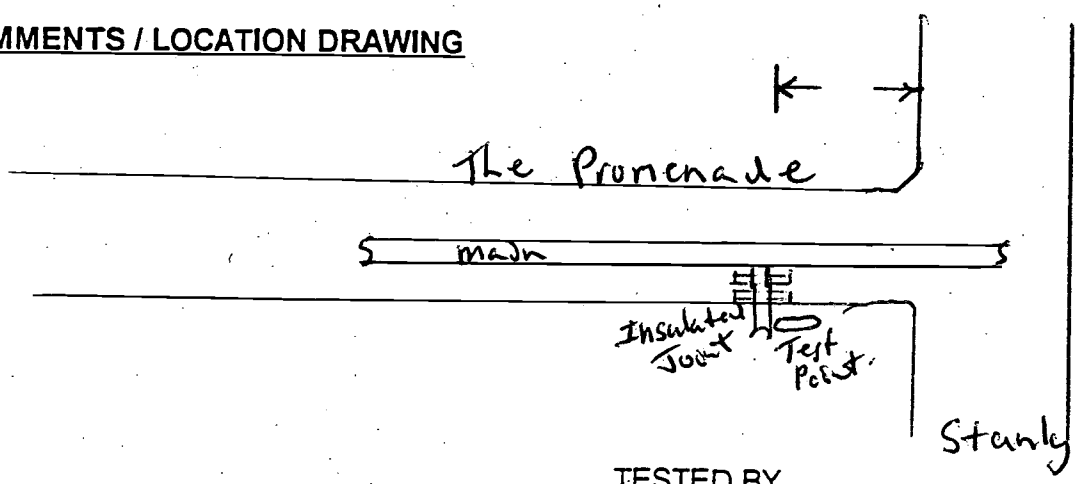
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -493
UNPROTECTED SIDE: -345

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation No 18

Project S.54 **Date** 15-4-03

DESCRIPTION

MAINS DETAILS: Tarragindi - Wynnum Rd
LOCATIONS: 511 Darcy Rd
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: .25 mΩ
INSULATION CHECKER MODEL 702: N/A

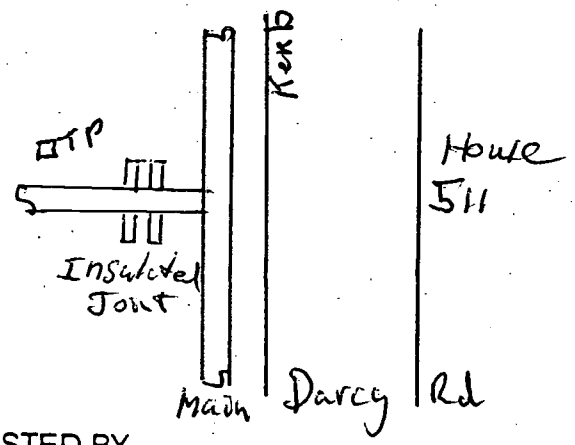
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -516
UNPROTECTED SIDE: -465

ABOVE TESTING

BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE: 8m

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

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Insulated Joint Testing Details Form

Isolation 19

Project S54 Tarragindi - Wynnum Date 28-10-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: 534 Darcy Rd
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING:
VALVE No. 9" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: 7 all Bolts. 7200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .875 mΩ
INSULATION CHECKER MODEL 702: N/A.

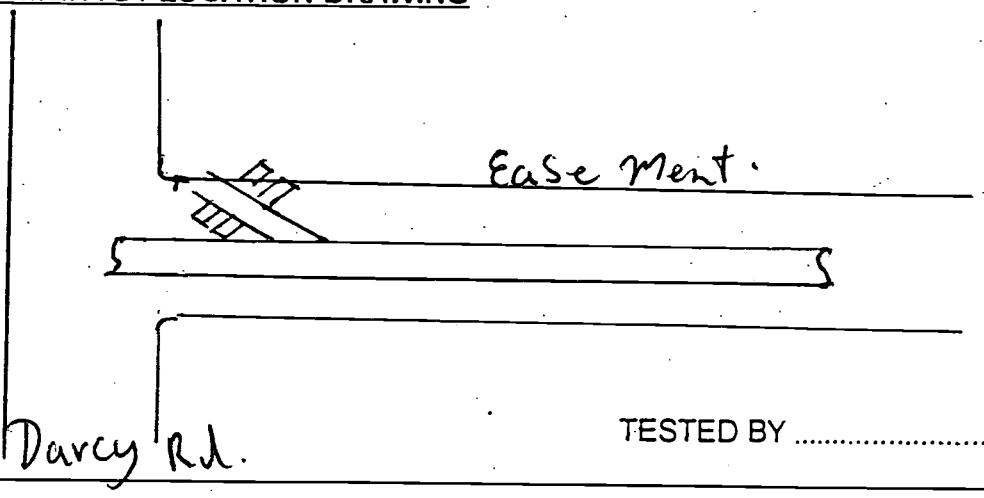
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -410 mV
UNPROTECTED SIDE: -300 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Project Tarragindi – Wynnum Rd. **Date** 11-11-03

Isolation 20

DESCRIPTION

MAINS DETAILS: S54
LOCATIONS: Richmand + Muir Rd.
SIZE:
MATERIAL: M S C L
COATING: Tar Asbestos
VALVE No.

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: > 0·4 mΩ
NUMBER OF BOLT: 8
FLANGE TO FLANGE RESISTANCE: 17 Ω
INSULATION CHECKER MODEL 702: INIL

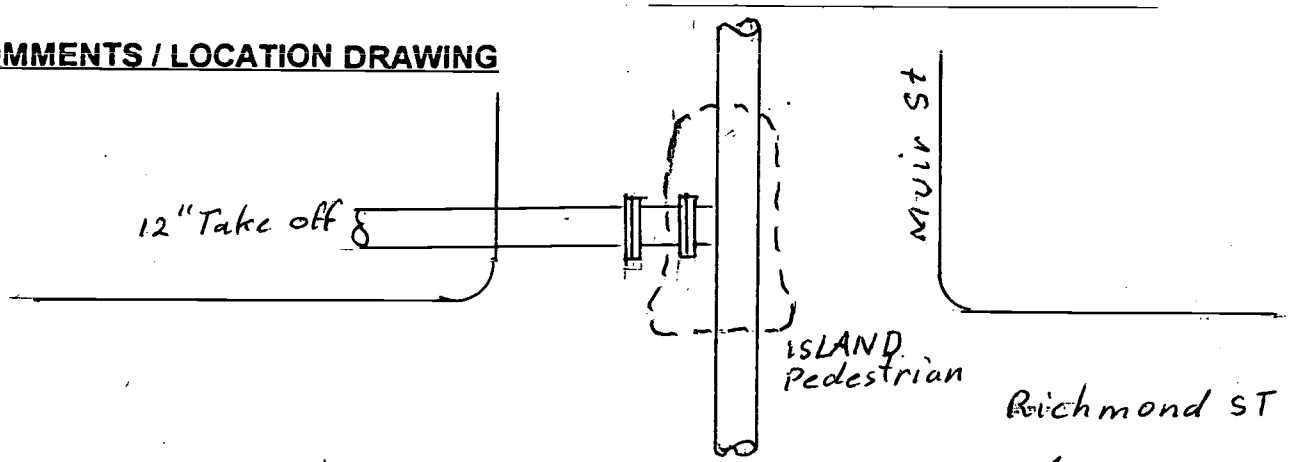
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE:
UNPROTECTED SIDE:

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY J Taylor

Revision 01/29/96

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 21

Project Tarragindi - Wynnum. **Date** 30-10-03

DESCRIPTION

- MAINS DETAILS:

LOCATIONS: Cnr Muir & Wynnum
SIZE: 42" - 36"
MATERIAL: Mild Steel
COATING: T/E
VALVE No. 12" Br

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts > 200 Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: 69 KΩ
INSULATION CHECKER MODEL 702: N/A.

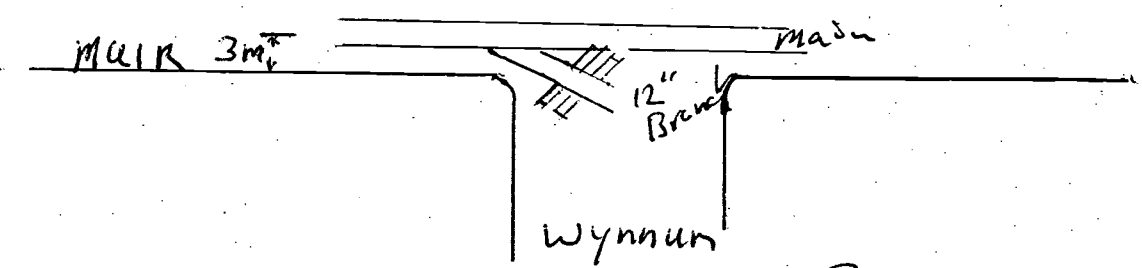
POTENTIAL DIFFERENCE TO REFERENCE CELL.

PROTECTED SIDE: -460 mV
UNPROTECTED SIDE: -380 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



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 No 22

Project S54 Tarragindi To Wynnum Date 11-11-03

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Cnr Muir & Wynnum Rd
SIZE: 42" TO 36"
MATERIAL: Mild Steel
COATING: T/E
VALVE No. 12" Branch

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts >200Ω
NUMBER OF BOLT: 12
FLANGE TO FLANGE RESISTANCE: .2 KΩ
INSULATION CHECKER MODEL 702: N/A

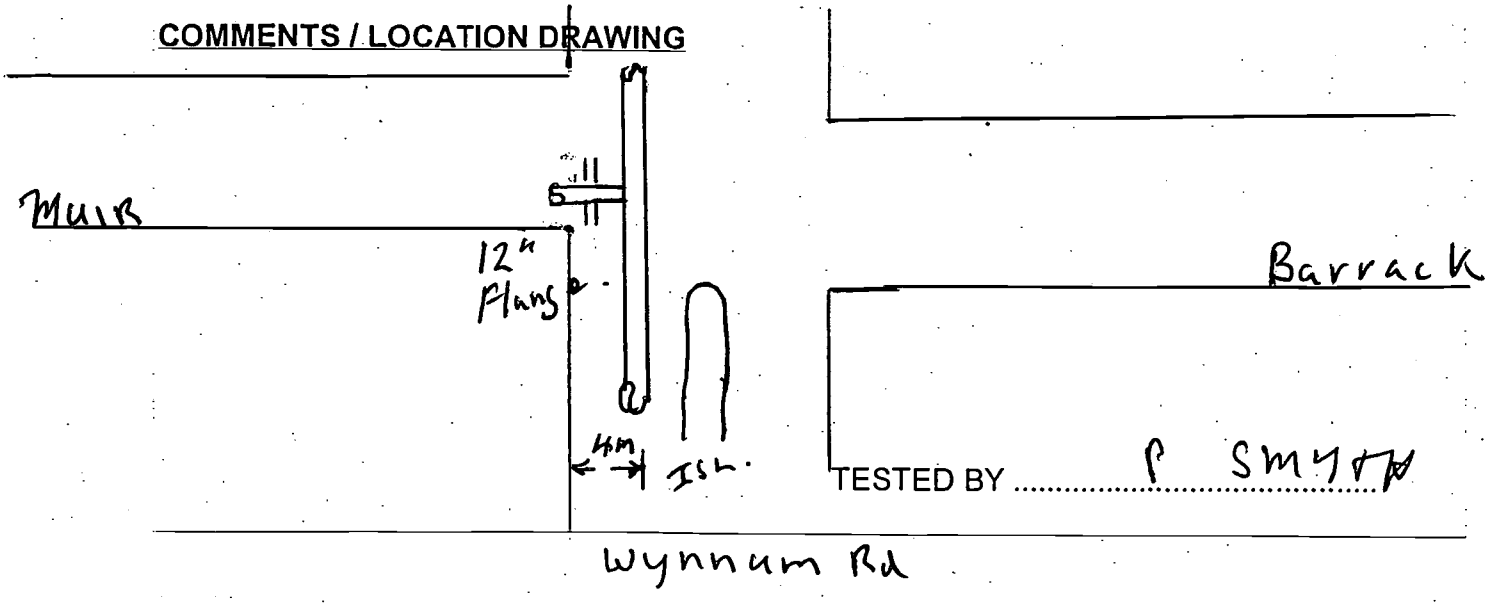
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: -485 mV
UNPROTECTED SIDE: -310 mV

ABOVE TESTING

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

COMMENTS / LOCATION DRAWING



TESTED BY P SMYTH

Revision 14/02/2000

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

ISOLATION N° 24

Project S.54 53 Main To North cliffe Date 13-3-04

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

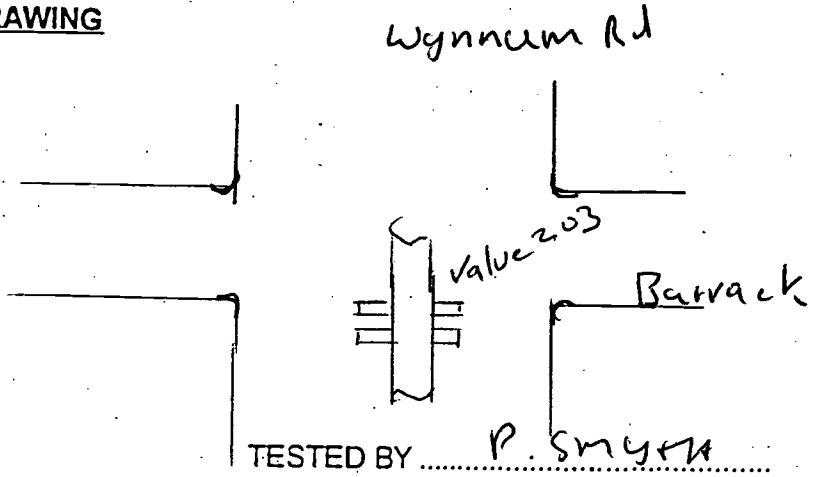
POTENTIAL DIFFERENCE TO REFERENCE CELL.

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 no 8

Project Sct 35 Wynnum – Valve 816 **Date** 20-2-04

DESCRIPTION

MAINS DETAILS:
LOCATIONS: Lytton Rd Metroplex
SIZE:
MATERIAL: Mild Steel
COATING: TA
VALVE No. 816

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE: all Bolts 7200Ω
NUMBER OF BOLT:
FLANGE TO FLANGE RESISTANCE: 70Ω
INSULATION CHECKER MODEL 702: N/A.

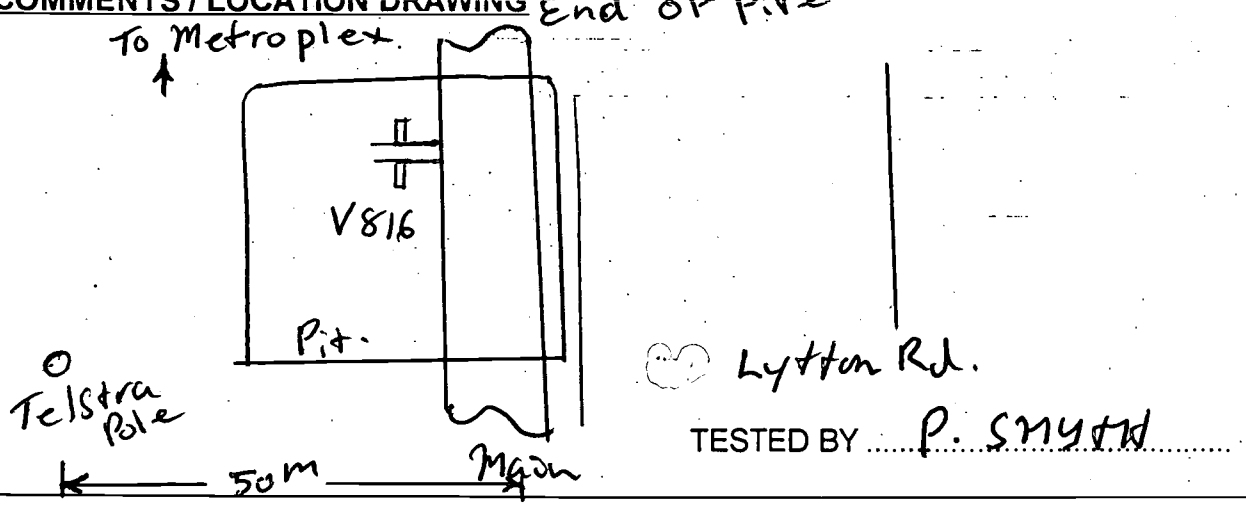
POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: – 540
UNPROTECTED SIDE: – 395

ABOVE TESTING

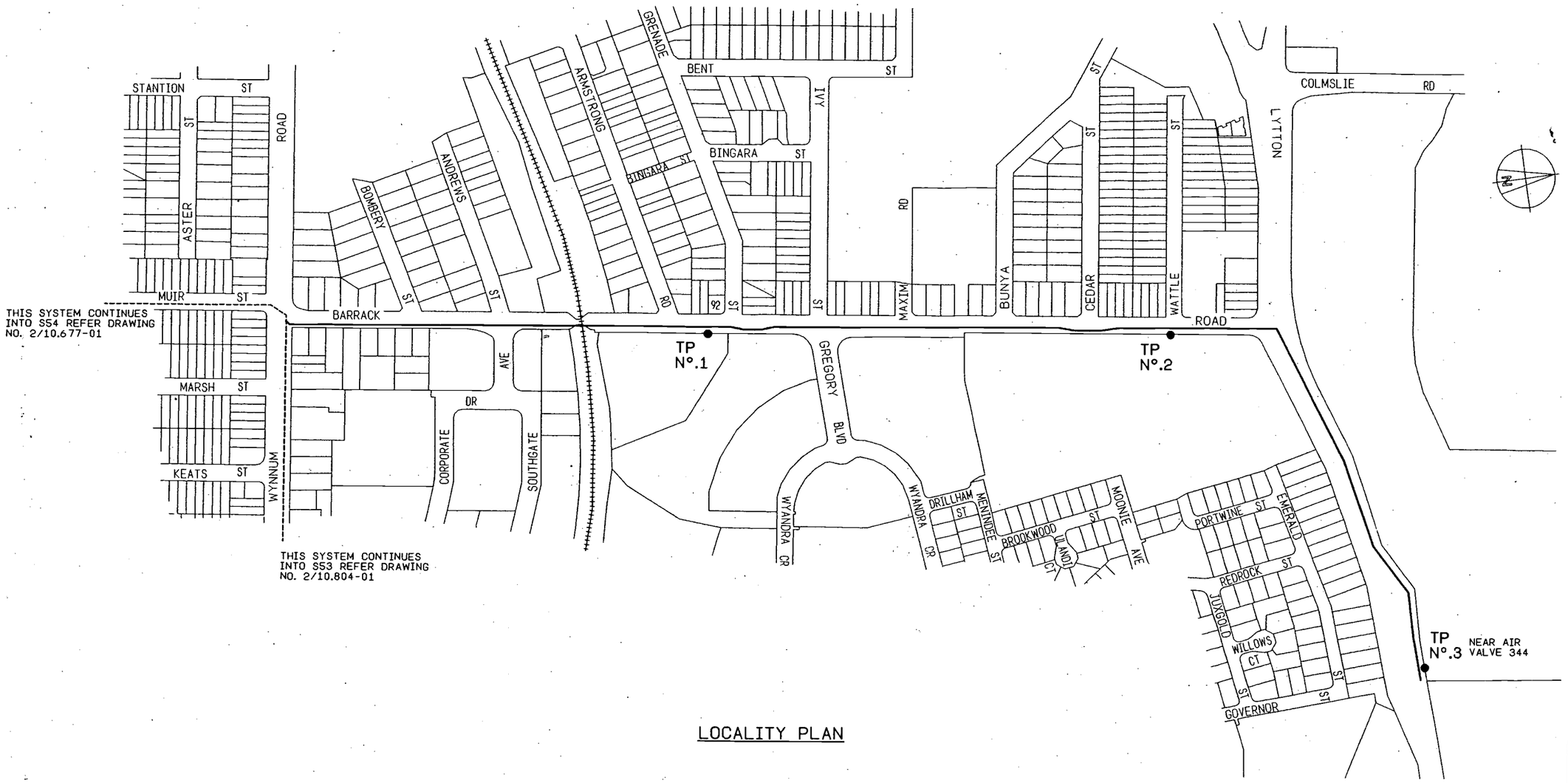
BOLT TO FLANGE RESISTANCE:
NUMBER OF BOLTS:
FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWING

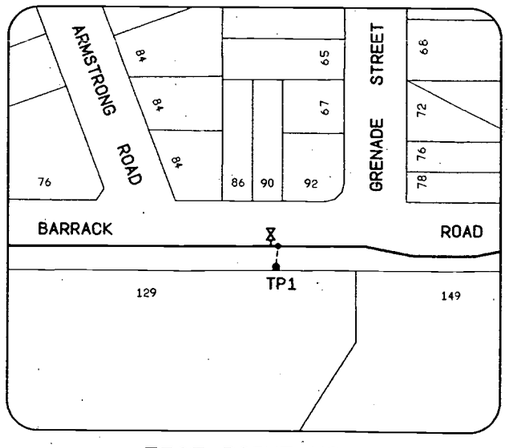


TESTED BY P. SMYTH

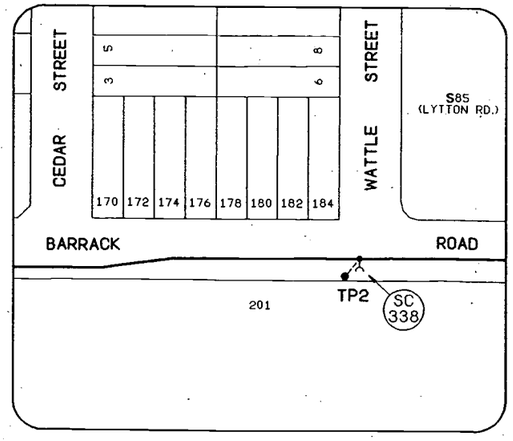
Revision 09/28/95



LOCALITY PLAN



TEST POINT NO.1



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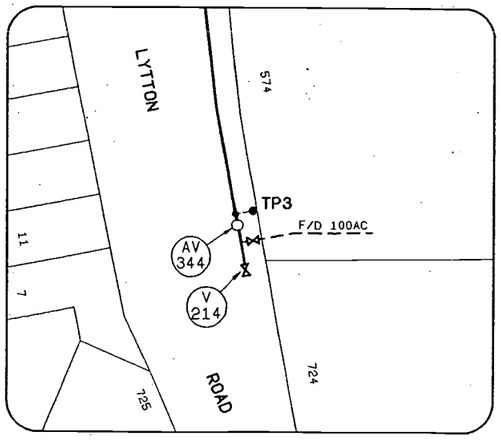


TEST POINT NO.3

DESIGN CHARGE N^
PA000820
CONSTRUCTION PROJECT N^

AS BUILT RECEIVED	
BY	
ORDER 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	
ORDER/RECD	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BMAP CAPTURE	
JOB NUMBER	
ORDER CODE	
DATE	
BMAP COMMENTS	

NO	DATE	AMENDMENT	INITIALS

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

CADD FILE	\WATER\INFRASTRUCTURE\210231501.DTA	DESIGN	
FILE NO.		DESIGN CHECK	
SURVEYED		DRAWN	B.O.B SEPT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK	

Brisbane Water

PROJECT
S35-WYNNUM RD. CANNON HILL TO Q.M.I ABATTOIR

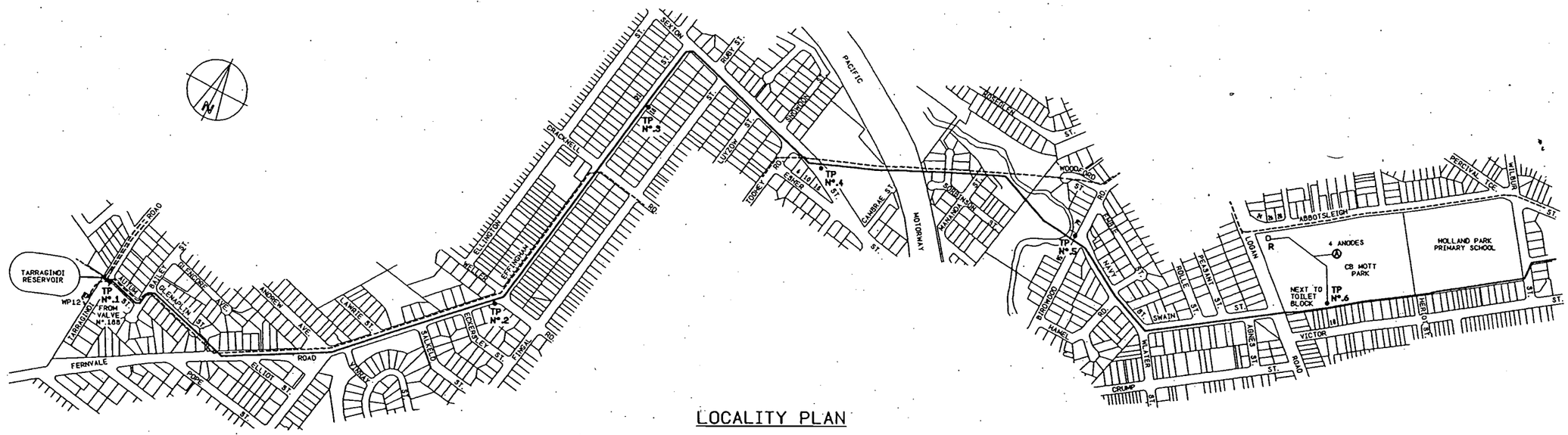
TITLE
CATHODIC PROTECTION TEST POINT AND ANODE BED LOCATIONS

SCALE — A.H. DATUM

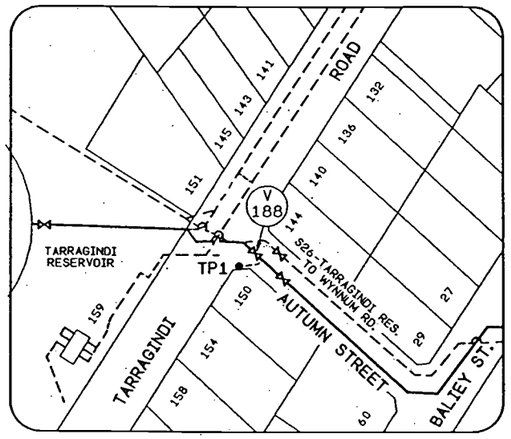
N^ 1 OF 1 SHEETS

DRAWING N^ 2/10.2315-01

AMEND. P1



LOCALITY PLAN



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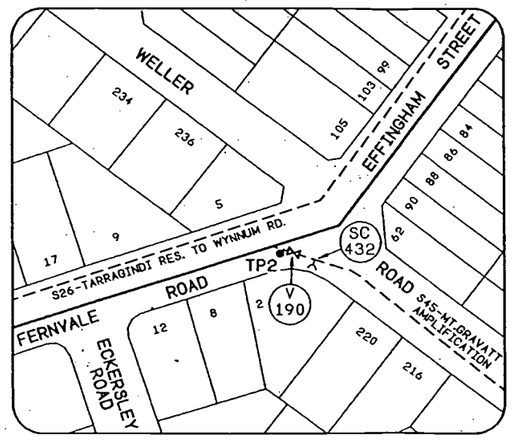

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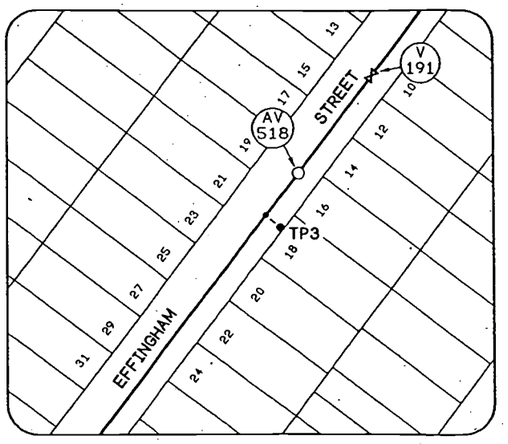

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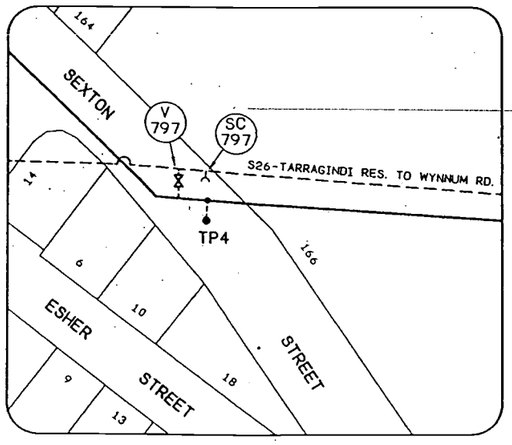

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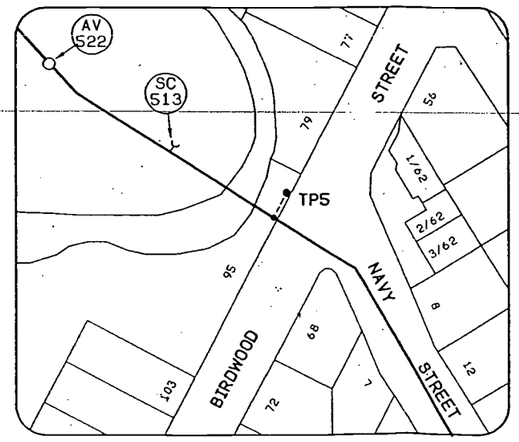

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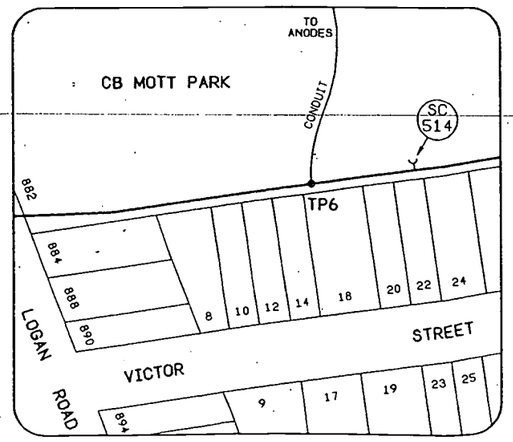


TEST POINT NO.6

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

CADD FILE	\WATER\INFRASTRUCTURE\2106770L.DTA	DESIGN	
FILE NO.		DESIGN CHECK	
SURVEYED		DRAWN	B.O.B OCT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK	

Brisbane Water

PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 1 TO 5

SCALE: AS SHOWN | A.H. DATUM

DRAWING N°: 2/10.677-01 | SHEETS: N° 1 OF 5 SHEETS | AMEND.: P1

DESIGN CHARGE N°: PA000820

CONSTRUCTION PROJECT N°:

AS BUILT RECEIVED	
BY	
OFFICER CODE	
DATE	

ON MAINTENANCE DETAILS

START / FINISH

D.R.S. COMMENTS

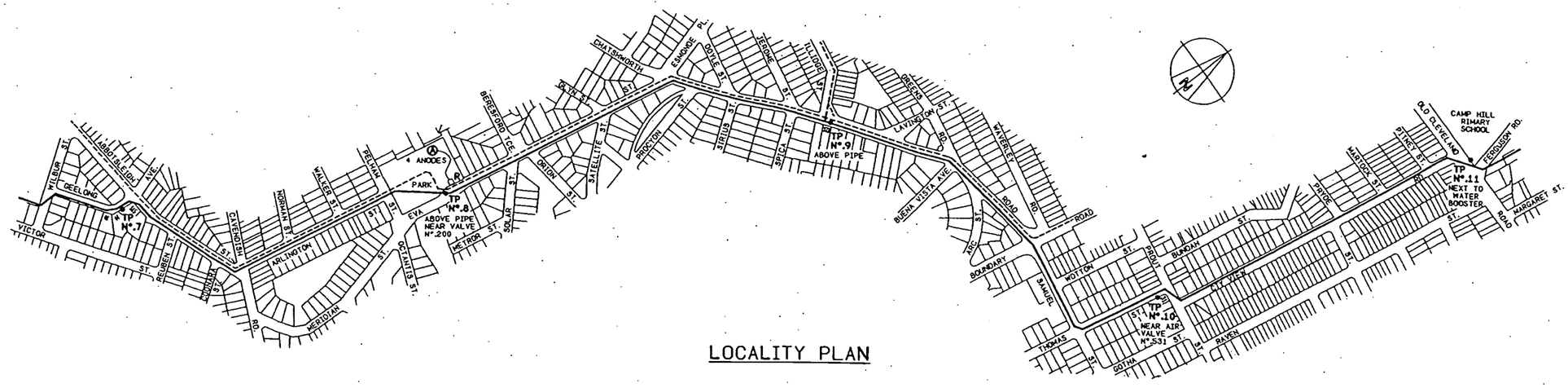
FUNDING	
PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	

PLAN CUSTODIAN	
OFFICER/RECD	
DATE RELEASED	

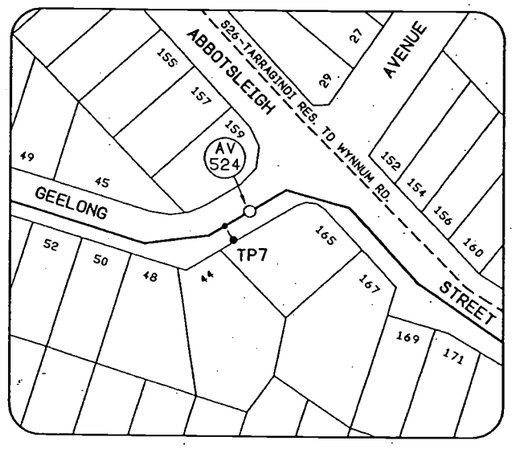
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	

BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	

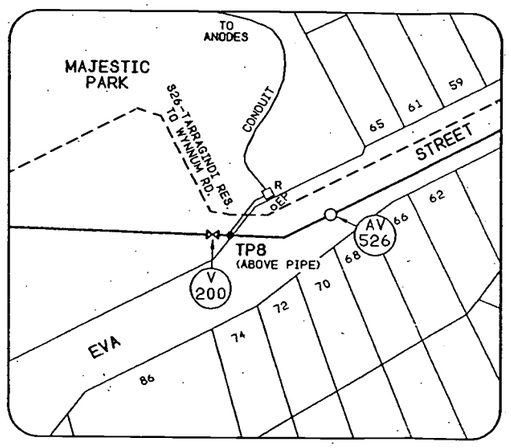
BMAP COMMENTS



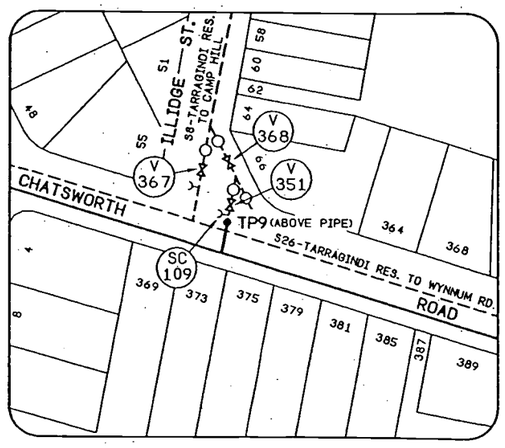
LOCALITY PLAN



TEST POINT NO.7



TEST POINT NO.8



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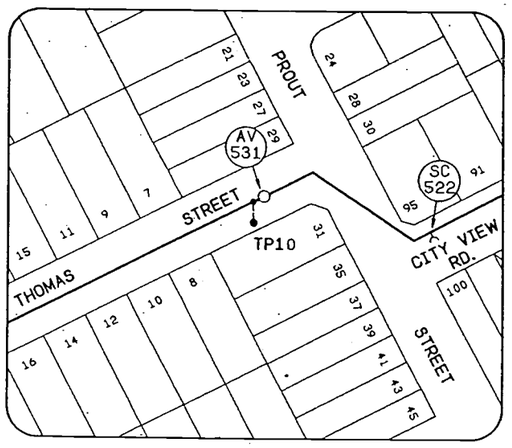
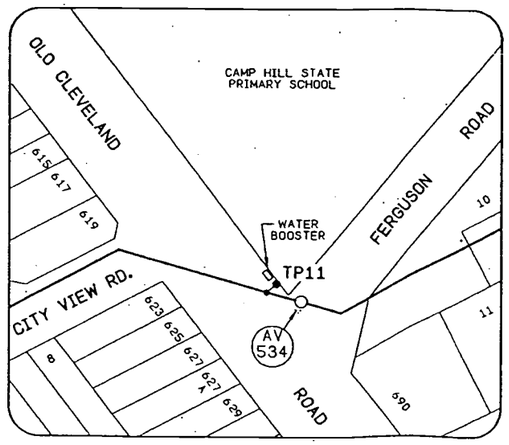


TEST POINT NO.10



TEST POINT NO.11

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

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FILE NO.			
SURVEYED			
SURVEY NO.		FIELD BOOK	
DESIGN			
DESIGN CHECK			
DRAWN	B.O.B	OCT. 2004	
DRAFTING CHECK			

Brisbane Water

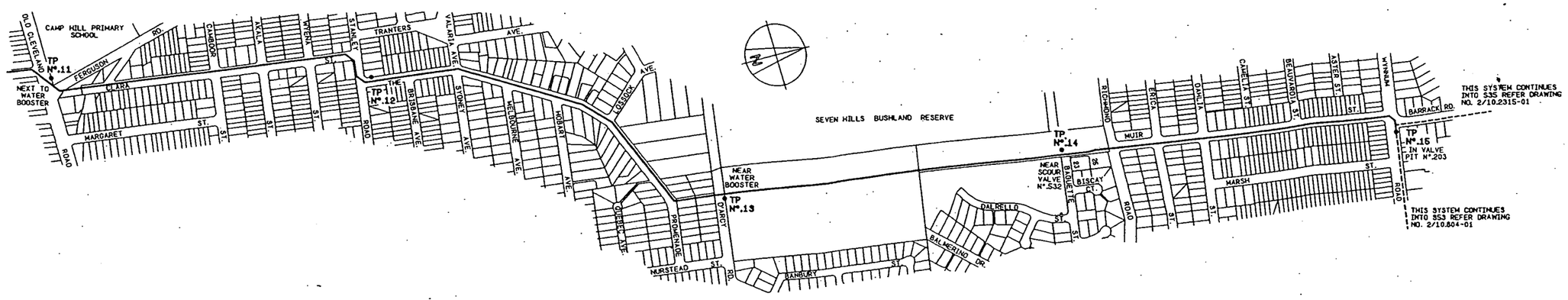
PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 7 TO 11

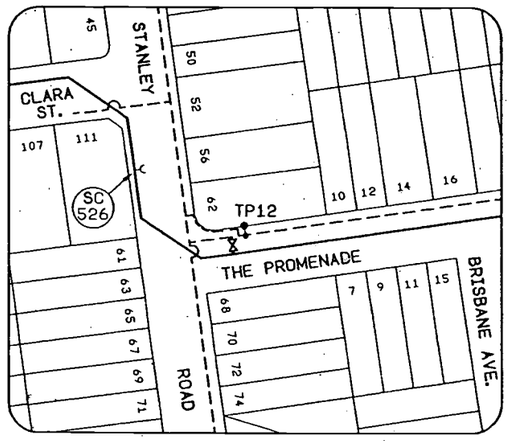
DESIGN CHARGE N°	PA000820
CONSTRUCTION PROJECT N°	

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. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	
PLAN CUSTODIAN	
OFFICER/RECD	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	
BMAP COMMENTS	

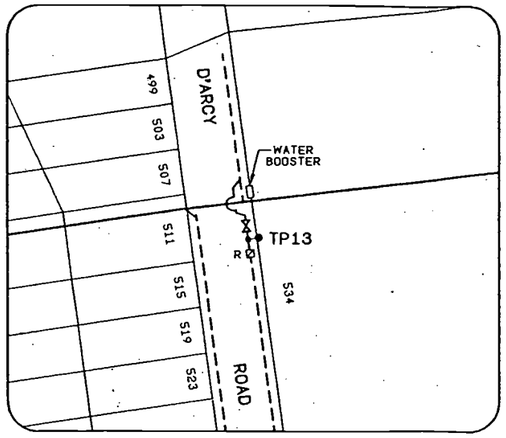
SCALE	A.H. DATUM
AS SHOWN	N° 2 OF 5 SHEETS
DRAWING N° 2/10.677-02	AMEND. P



LOCALITY PLAN



TEST POINT NO.12



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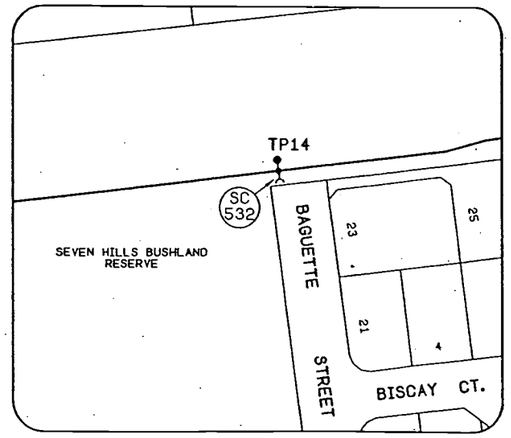
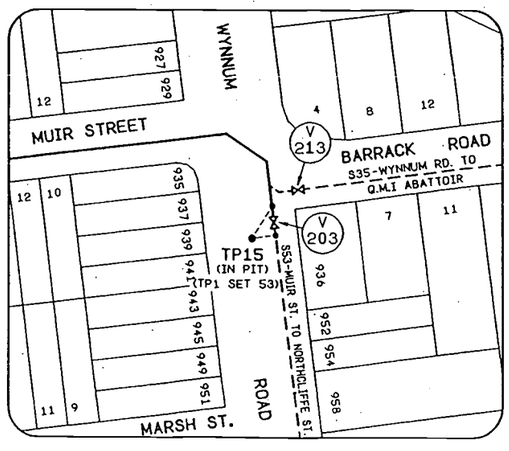


TEST POINT NO.14



TEST POINT NO.15

NO.	DATE	AMENDMENT	INITIALS	PRINCIPAL ENGINEER	RPEQ NO.	DATE	
				MANAGER ENGINEERING		DATE	
				PRODUCTION / NETWORK DELEGATE		DATE	
CADD FILE	\WATER\INFRASTRUCTURE\21067703.DTA			DESIGN			
FILE NO.				DESIGN CHECK			
SURVEYED				DRAWN	B.O.B	OCT. 2004	
SURVEY NO.		FIELD BOOK		DRAFTING CHECK			

Brisbane Water

PROJECT: S54-TARRAGINDI TO WYNNUM RD.

TITLE: CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 12 TO 15

SCALE: AS SHOWN | A.H. DATUM | N° 3 OF 5 SHEETS

DRAWING N°: 2/10.677-03 | AMEND. P

DESIGN CHARGE N°: PA000820

CONSTRUCTION PROJECT N°:

AS BUILT RECEIVED	
BY	
OFFICER CODE	
DATE	

ON MAINTENANCE DETAILS	
START	FINISH

D.R.S. COMMENTS

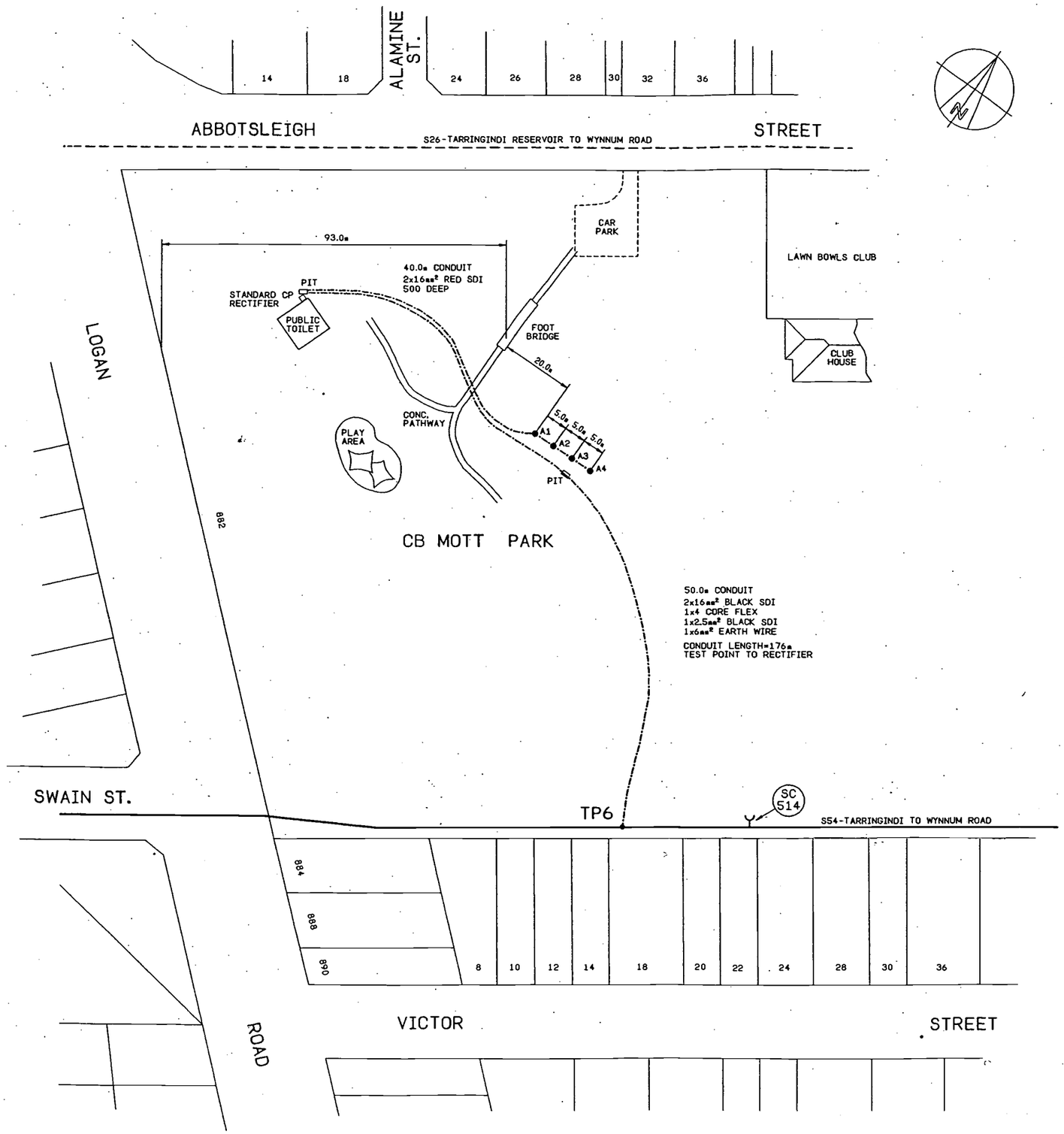
FUNDING	
PRIVATE BOOSTER REQUIRED?	YES / NO
FUNDED BY B.C.C. (✓)	DEVELOPER ( )
FED. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	

PLAN CUSTODIAN	
OFFICER/RECD	
DATE RELEASED	

LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	

BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	

BMAP COMMENTS



TEST POINT NO.6 AND ANODE BED DETAILS

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. GOV'T ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	
PLAN CUSTODIAN	
OFFICER/RECD	
DATE RELEASED	
LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	
BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	
BMAP COMMENTS	

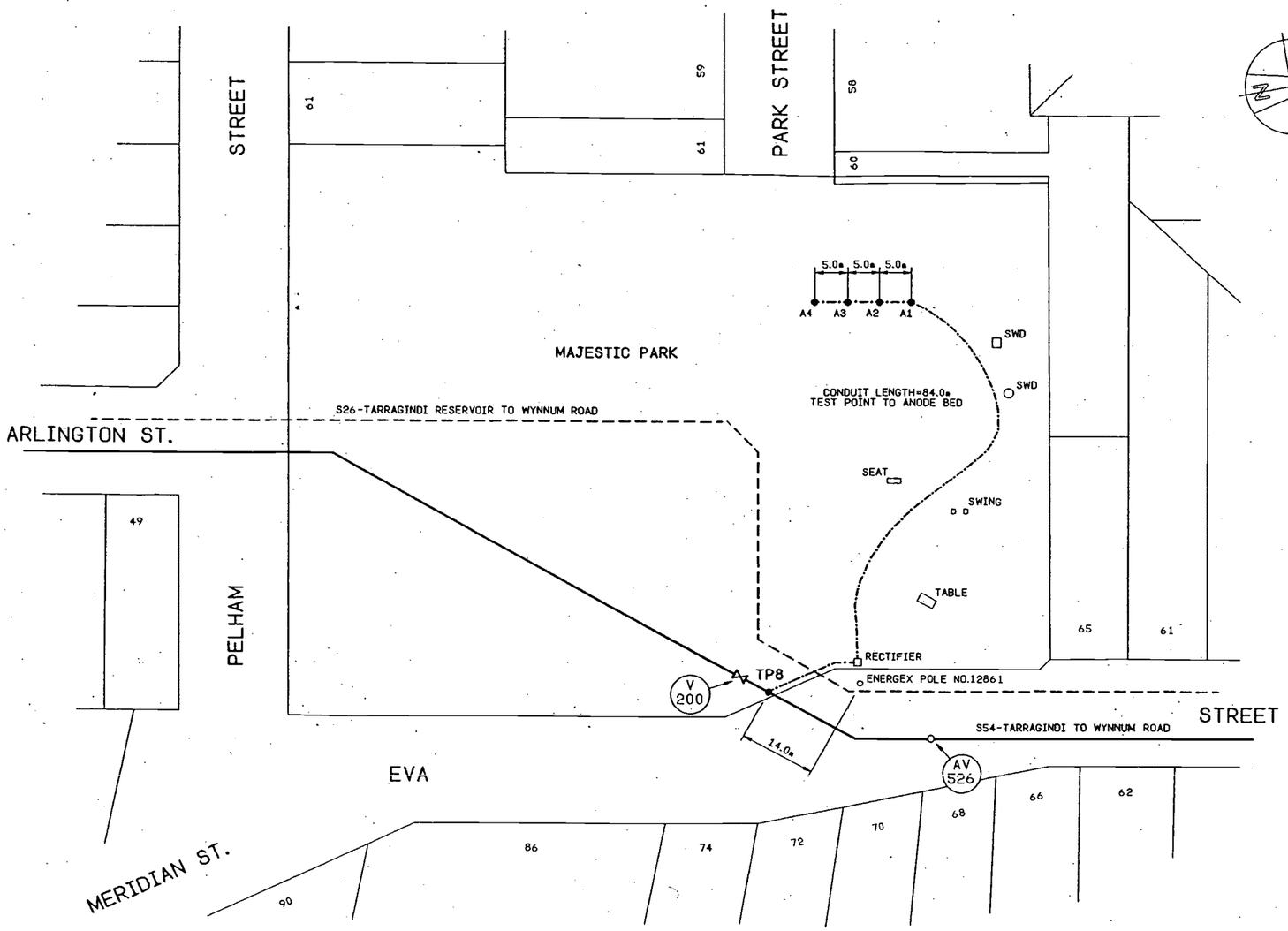
NO.	DATE	AMENDMENT	INITIALS

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

CADD FILE	\WATER\INFRASTRUCTURE\21067704.DTA	DESIGN	
FILE NO.		DESIGN CHECK	
SURVEYED		DRAWN	B.O.B. OCT. 2004
SURVEY NO.	FIELD BOOK	DRAFTING CHECK	

Brisbane Water

PROJECT	S54-TARRAGINDI TO WYNNUM RD.
TITLE	CATHODIC PROTECTION TEST NO. 6 AND ANODE BED DETAILS
SCALE	AS SHOWN
A.H. DATUM	
N° 4 OF 5 SHEETS	
DRAWING N°	2/10.677-04
AMEND.	P



TEST POINT NO.8 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. GOVT ( )	STATE ( ) OTHER ( )
DRS OFFICER	
DATE RELEASED	

PLAN CUSTODIAN	
OFFICER/RECD	
DATE RELEASED	

LIVE CONNECTION(S) / PASSED(W)	
REFERENCE	
DATE	

BMAP CAPTURE	
JOB NUMBER	
OFFICER CODE	
DATE	

BMAP COMMENTS

NO.	DATE	AMENDMENT	INITIALS

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

CADD FILE	\WATER\INFRASTRUCTURE\21067705.DTA		
FILE NO.			
SURVEYED			
SURVEY NO.		FIELD BOOK	

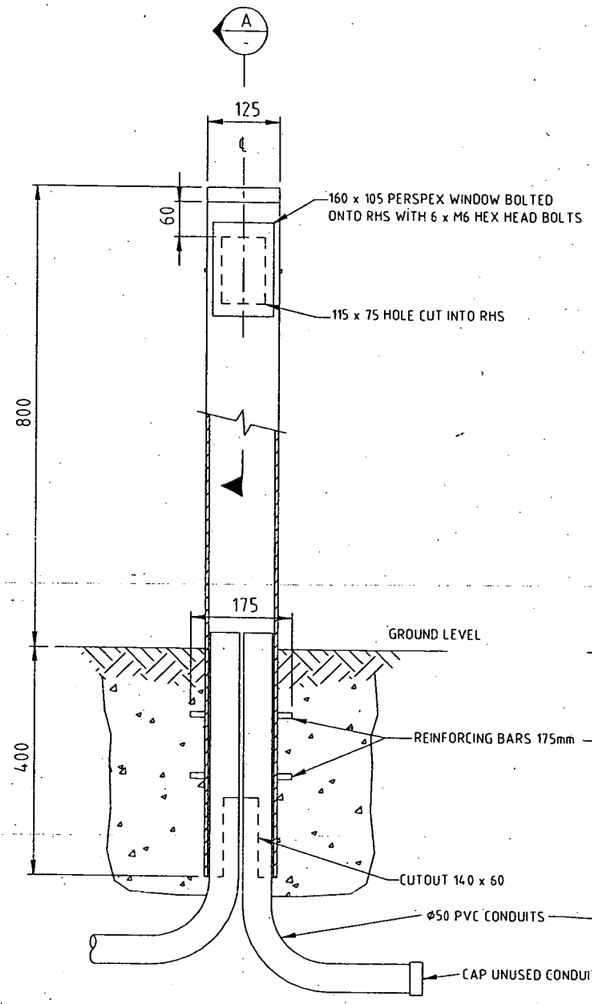
DESIGN			
DESIGN CHECK			
DRAWN	B.D.B.	OCT. 2004	
DRAFTING CHECK			

Brisbane Water

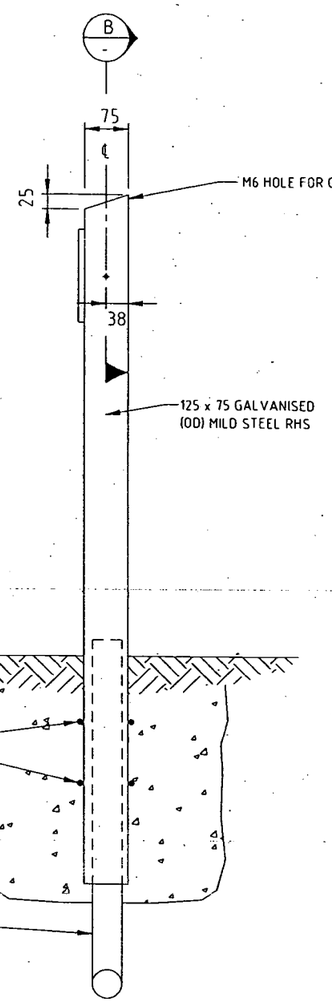
PROJECT	S54-TARRAGINDI TO WYNNUM RD.
TITLE	CATHODIC PROTECTION TEST NO. 8 AND ANODE BED DETAILS
SCALE	AS SHOWN
A.H. DATUM	
SHEETS	N° 5 OF 5 SHEETS
DRAWING N°	2/10.677-05
AMEND.	P

NOTES

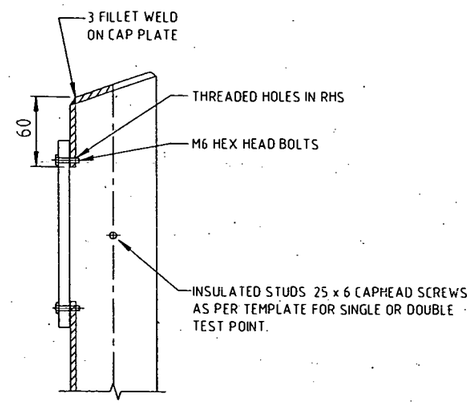
1. HOT DIP GALVANISE AFTER FABRICATION.



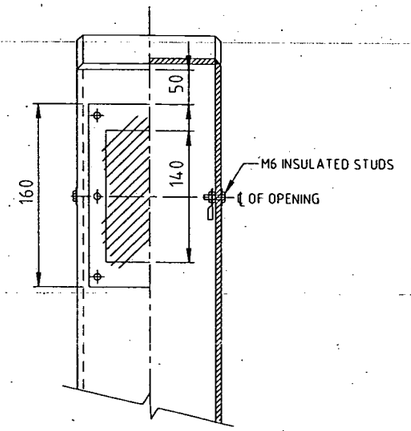
FRONT ELEVATION SECTIONED



SIDE ELEVATION



SECTION A-A



SECTION B-B

NO.	DATE	AMENDMENT	INITIALS
C	9-92	NOTE 3 REVISED	HI
B	11-91	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

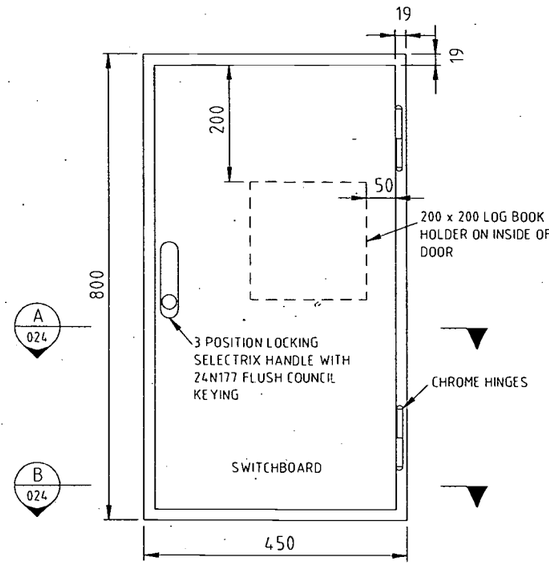
JOB FILE
ACAD FILE 2210001-RevA — SHEET SIZE A1
SURVEY No. — FIELD BOOK
SURVEYED — A.H. DATUM

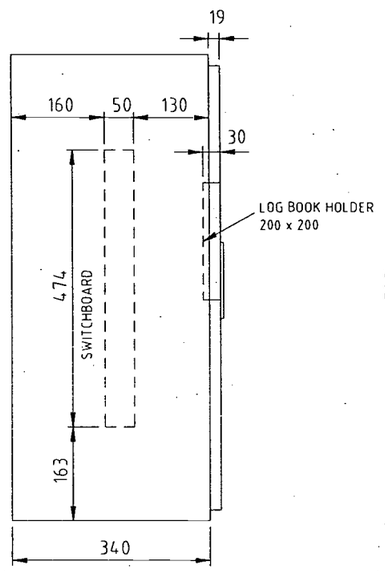
Brisbane Water — Professional Services Engineering

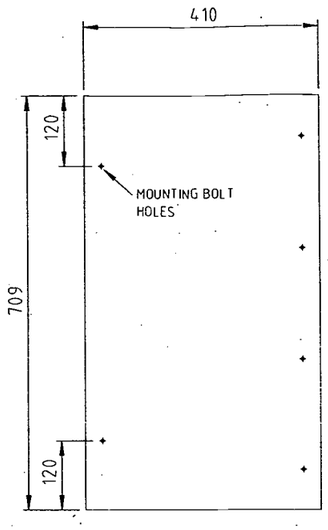
PROJECT: CATHODIC PROTECTON

TITLE: STANDARD TEST POINT CONSTRUCTION DETAILS

SCALE NTS — N° 1 OF 1 SHEETS
DRAWING N° 486/1/22-AAT0001E — AMEND. C







FRONT INSULATED PANEL
(6mm THICK SUPPLIED)

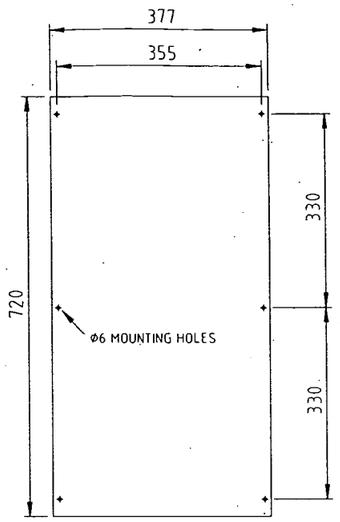


FIG.1
EQUIPMENT PANEL DETAILS

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.

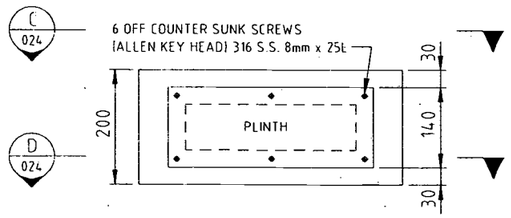
4. DOUBLE HINGED PANEL SUPPLIED BY B.C.C.

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

6. DEGREE OF WEATHER PROTECTION IP55.

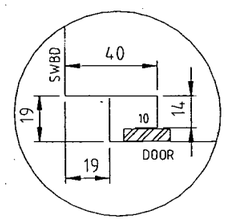
7. SELECTRIX TYPE HANDLE TO BE SUPPLIED & FITTED BY SWITCHBOARD MANUFACTURER. HANDLE TO BE 1107 SS CU1. KEY TO BE 24N177.

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

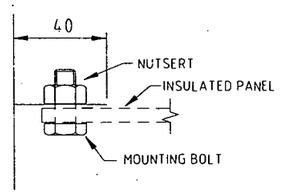


FRONT ELEVATION
SWITCHBOARD & PLINTH

SIDE ELEVATION
SWITCHBOARD & PLINTH

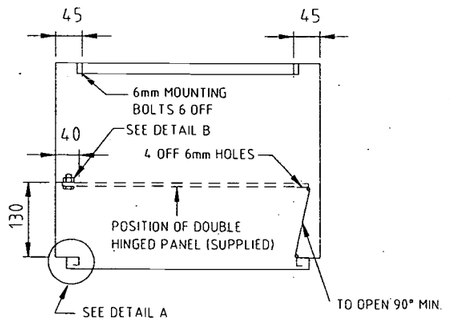


DETAIL A
DOOR/CORNER DETAIL

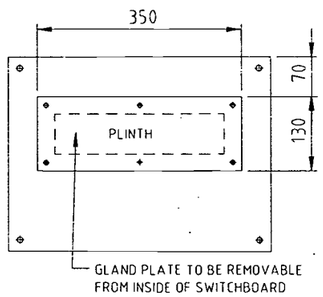


DETAIL B

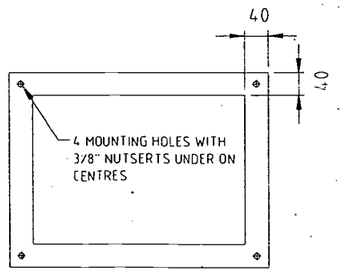
NUMBER OF SWITCHBOARDS REQUIRED	
NUMBER OF PLINTHS REQUIRED	



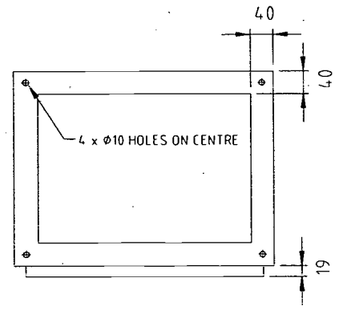
SECTION A-A
(SHOWING HINGED PANEL)



SECTION B-B
(SHOWING GLAND PLATE)



SECTION C-C
PLINTH MOUNTING DETAILS



SECTION D-D
PLINTH MOUNTING DETAILS

NO.	DATE	AMENDMENT	INITIALS
C	9-92	NOTE 3 REVISED	MT
B	11-91	MODIFIED	D.L.P.
A	5-92	ISSUED FOR APPROVAL	D.L.P.

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 22C0024-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

RECTIFIER UNIT

FIELD

A
N
E
G.P.O. C/B 4A
RECTIFIER UNIT C/B 16A
TO DATA LOGGER (GPO)
VARISTOR
NEON
INTERUPT SWITCH
TRANSFORMER (SEE NOTE 1)
DIODE FUSE 25A
BRIDGE
VOLTMETER
+VE
-VE
VARISTOR
+VE OUTPUT SEE NOTE
-VE
AMMETER
LINK
COUPON DISCONNECT
ANODE
CATHODE
CATHODE REF RETURN
COUPON BLEED
ZINC REF
COUPON
ZINC REF (COUPON)
CuSo4 TEST CONNECTION
BANANA PLUG SOCKETS ON FRONT PANEL
CATHODE REF. RETURN
ZINC REFERENCE
ZINC REF. COUPON
PROTECTED COUPON
CuSo4 CONNECTION
TEST POINT TERMINALS FOR REMOTE RECTIFIER SITES
GREEN/YELLOW
BROWN
BLUE
3 CORE 2.5mm2
CATHODE REF CONN 6mm2 PVC/PVC BLACK
CATHODE CONNECTION 16mm2 PVC/PVC BLACK
TO ANODE 16mm2 PVC/PVC RED
GREEN/YELLOW
BROWN
BLUE
6mm2 PVC GREEN
Zn
No.1
CuSo4 REF. TUBE (IF SUITABLE LOCATION AVAIL.)
ZINC REFERENCE
PROTECTED POTENTIAL
STANDARD ZINC TYPE REFERENCE
COUPON TYPE REFERENCE

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
D	17.03.95	VARIAC REMOVED, TRANSFORMER MULTI-TAP SEC ADDED	DPH
C	14.10.94	TELEMETRY REMOVED, BW BORDER UPDATED	DPH
B	11.4.94	CHANGES AS SHOWN	R.L.
A	18.10.93	CHANGES AS SHOWN	R.L.
1	25.8.93	ISSUED FOR CONSTRUCTION	R.L.

PRINCIPAL ENGINEER — R.P.E.Q. NO. — DATE — M.Jukes 25.8.93
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