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Eagle Farm Q

4009

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16th March 2005

OPERATING MANUAL FOR:

KENMORE to TARINGA TRUNK MAIN S60 TRUNK MAINS

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WATER SYSTEM SERVICES

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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: 1370 mm dia mild steel cement lined.

Coating: Tar Epoxy.

Length: Appox 2.7 km.

Location: From Valve 221 cnr Russell Tce. and Jenkinson St. Indooroopilly
to Valve 70 cnr. Moggill Rd. and Morrow St. Taringa.

Construction

Drawings:

486/1/22-C0024E Cathodic Protection Standard Switchboard Cabinet

486/1/22-AAT0001E Cathodic Protection Test Points

(4.0) CATHODIC PROTECTION DETAILS**(4.1)** Type of Cathodic Protection: Impressed Current.**(4.2)** Rectifier: Standard 30 Volt, 30 amp direct current output enclosed in a stainless steel switchboard. This system has 1 rectifier installed. The rectifier is in the park, bounded by Moorak St. and Marmion Pde, and has a 240V supply from Energex pole No.26825, to a Council property pole, at Marmion Parade Taringa.**(4.3)** Cathode: The cathode point is located on the 1370 mm dia mains, adjacent to the scour valve, SC1022, approx 140 metres from the rectifier. The cathode point is where the cabling from the rectifier is attached to the structure under cathodic protection.**(4.4)** Anodes: Four 1500 x 75mm silicone iron anodes were installed approximately 85 metres from the trunk mains, in a vertical bed 5 metres deep, in the park adjacent to the rectifier. The anodes are backfilled with cokebreeze thereby improving anode - ground resistance. The anodes are identified by a marker post and label. See layout drawing.**(4.5)** Test Points: Test points are installed on cathodically protected structures to enable testing to ensure full protection of the mains. On these mains seven test points have been installed on the trunk main which can be identified from the layout drawing.**(4.6)** Associated Drawings:
Cathodic Protection Test Point Details - 486/1/22-AAT0001E
Standard Rectifier Wiring Diagram - 486/6/25-AA1C0021
Cathodic Protection Test Point & Anode -2/10.450-01
Bed Locations S60 Trunk Main.**(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

Some 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.

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.

16th June, 2005.

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 June, 2005.

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

Electrical Engineering Unit

Cathodic Protection System Loop Resistance

Marmion Pde. Rectifier CPS 217

Date: 23rd August 2005

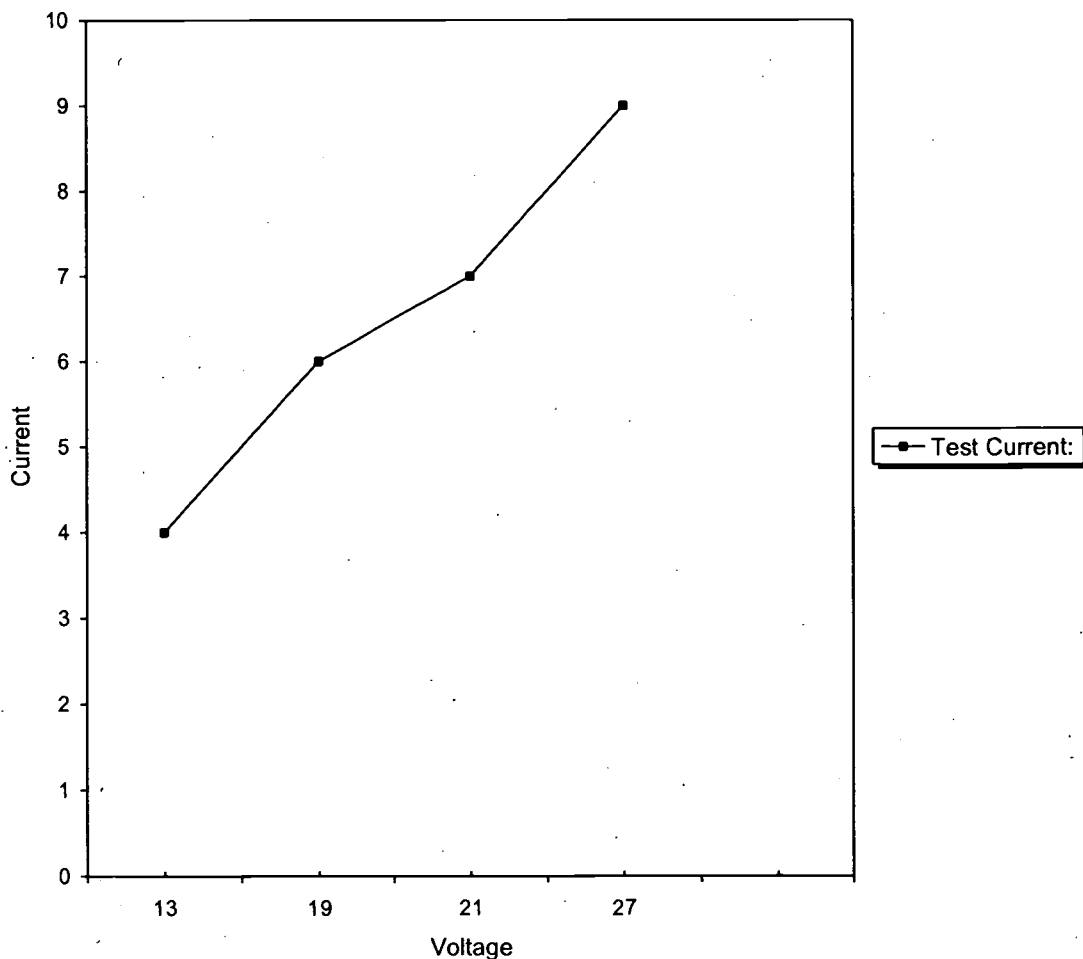
Cathodic Protection System: Kenmore to Taringa S60 Trunk Main

System Operating Volts: 21 System Operating amps: 7

Test Voltage:		Test Current:	
(volts)		(amps)	
13		4	
19		6	
21		7	
27		9	

Loop Resistance (ohms)
3

Loop Resistance



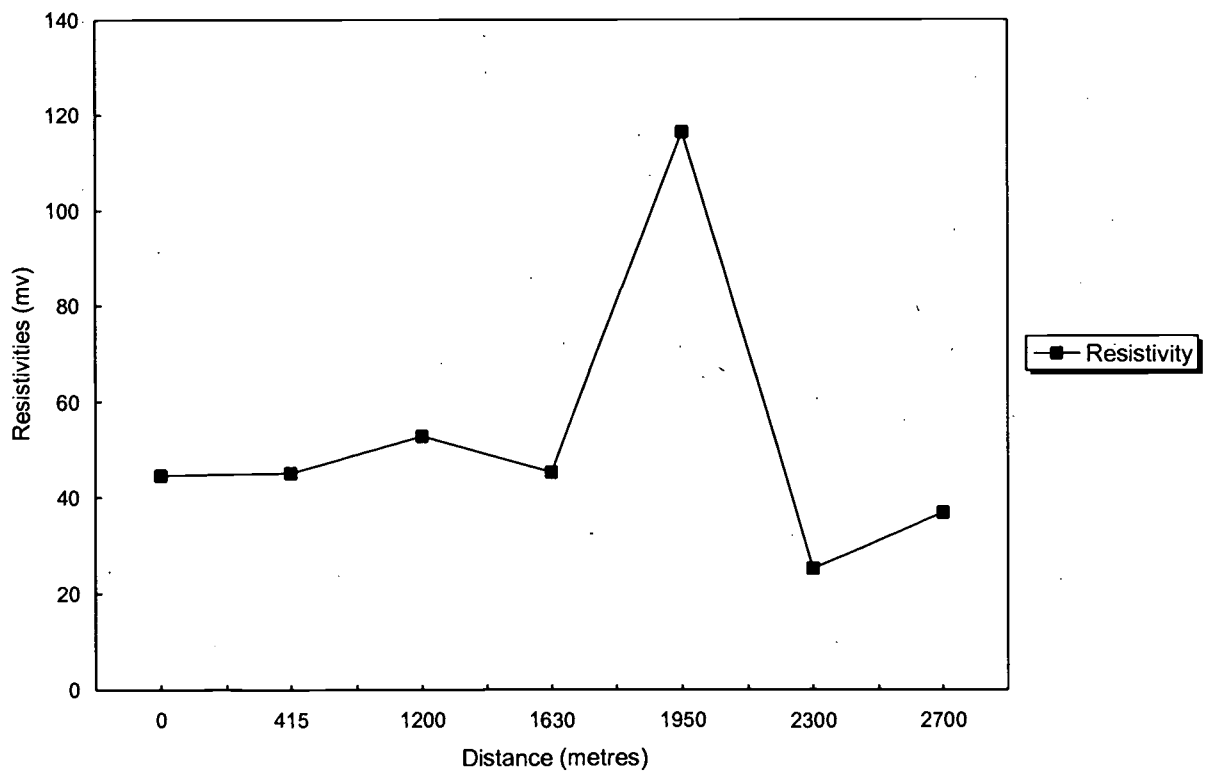
16/03/2006

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit**Cathodic Protection System Resistivities Recording Form****Project** Kenmore to Taringa S60**Date** 16th June 2005

Test Point number	Distances to T.P. (metres)	Resistivities at 2 metres ohm metres
1	0	44.5
2	415	45
3	1200	52.7
4	1630	45.2
5	1950	116.5
6	2300	25.12
7	2700	36.8
8		
9		
10		
11		
12		
13		
14		

Graph of resistivities vs pipelength

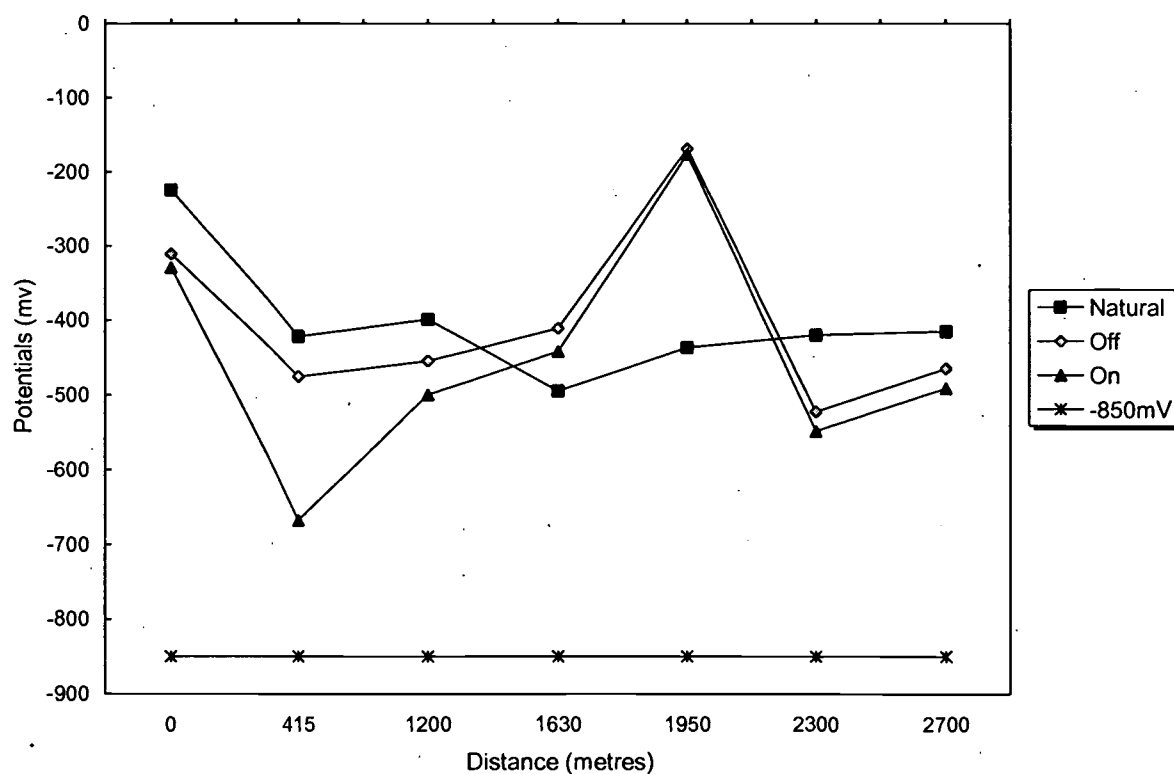
Revision 10/05/2006

Brisbane Water Engineering Services

CP Form No. 23

Electrical Engineering Unit**Cathodic Protection System Potential Recording Form**Project Kenmore to Taringa S60Date 16th June 2005

Test Point number	Distances to T.P. (metres)	Potentials to CuSO ₄			Distance
		Natural (mV)	Off (mV)	On (mV)	
1	0	-225	-311	-329	0
2	415	-422	-476	-668	415
3	1200	-399	-455	-500	1200
4	1630	-495	-411	-442	1630
5	1950	-437	-169	-176	1950
6	2300	-420	-523	-549	2300
7	2700	-415	-465	-491	2700
8					
9					
10					
11					
12					
13					
14					

Rectifier at
TP. No6**Graph of potentials vs pipelength**

FORM 9
V3.01-04Department 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)

<input checked="" type="checkbox"/>	New System
<input type="checkbox"/>	Alteration to an existing system, Registration No:
<input type="checkbox"/>	Renewal of system, Registration No:
Location of system:	From Valve221 Russell Tce, Indooroopilly to Valve70 cnr. Moggill Rd. & Morrow St, Taringa
	Rectifier in park Marmion Parade Taringa. POST CODE 4068
Structure to be protected:	1370 mm dia Mild Steel Trunk Main
Maximum operating current:	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px; margin-right: 10px;">10.00</div> <div style="margin-right: 10px;">Amperes DC</div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px 10px; margin-right: 10px;"></div> <div>Volts</div> </div> </div>

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 protection 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.

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project S36 & S60

Marrion.

Unit Reading 28v 9a

Caryna 26v 5a

Date 8-9-05

*

	Reading	Test Point I. D.	Location	Swing
On	-1019	Earth.		
Off	-535	Peg.	Marrion.	-484
On	-1698		Marrion.	
Off	-900	Mem	Pole no 517	-798
On	-80		Hilsdon.	
Off	-80	Men	Pole no 40935	0
On	-444		Goldsbrough	
Off	-444	Men	Pole no 28830	0
On	-275		Goldsbrough	
Off	-305	Men	Pole no 458	+30
On	-271		Woodstock	
Off	-280	Men	Pole no 13625	-9
On	-256		woolley	
Off	-256	Men	Pole no 38835	0
On	-223		Taringa.	
Off	-229	Men	Pole no 25564	-6
On	-1000	Earth	Caryna	
Off	-640	Peg.	Distribution Board	-360
On	-1069		Caryna.	
Off	-666	Earth	Park Lights	-403
On	-1569		Caryna	
Off	-1050	Earth	Park Lights	-519
On	-1732		Caryna	
Off	-550	Earth	Park Lights	-1182
On	-239		Caryna	
Off	-239	Earth.	Park Lights	0
On	-160		Pole no 379545.	
Off	-200	Men	Jenkinson St	+40
On	-580			
Off	-420	Men	Jenkinson St.	-160

CPB115

*

CPB116

*See Bleed Sheet

TESTED BY

P SMYTH

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details FormProject S36 + S60Date 8-9-05Bleed Location Goldsborough St.CPB No. 115FOREIGN STRUCTURE OWNER: EnergexF.S. LOCATION: Goldsborough StF.S. IDENTIFICATION: Men Pole no 458.**REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:**REFERENCE TYPE: CuSO₄POTENTIAL OFF: -350 ON: 392 SW: 42BLEED TYPE: ZN Reference CellBLEED MATERIAL: ZN

BLEED WEIGHT: _____

BLEED O/C POTENTIAL: -1065 mVBLEED CURRENT OFF: 1 ma ON: 1 ma**REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:**

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-390	-735	-345	-735	-721	+14	-331

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N) YesIDENTIFICATION TAG INSTALLED? (Y/N) Yes CPB 115**COMMENTS:**INSTALLED / TESTED BY P. Smith

Brisbane Water Engineering Services

CP Form No. 28

Electrical Engineering Unit

Cathodic Protection Bleed Point Details FormProject S 36 & S 60Date 8-8-05Bleed Location Jenkson StCPB No. 116FOREIGN STRUCTURE OWNER: EnergexF.S. LOCATION: Jenkson St Green HillF.S. IDENTIFICATION: Men 379545

REFERENCE POTENTIALS TO F.S. PRIOR TO BLEED CONNECTION:

REFERENCE TYPE: CuSO₄POTENTIAL OFF: -209 ON: 169 SW: +40BLEED TYPE: ZN Reference CellBLEED MATERIAL: ZN

BLEED WEIGHT: _____

BLEED O/C POTENTIAL: -1080 mVBLEED CURRENT OFF: 1 mA ON: 1 mA

REFERENCE POTENTIALS AFTER CONNECTION TO FOREIGN STRUCTURE:

Bond Off (Rectifier Off)			Bleed On			Resultant Swing
Bleed Off	Bleed On	Swing	Bond Off	Bond On	Swing	
-209	-475	-266	-475	-438	+37	-229

FOREIGN STRUCTURE OWNER AGREEABLE WITH MITIGATION? (Y/N) YesIDENTIFICATION TAG INSTALLED? (Y/N) CPB 116**COMMENTS:**INSTALLED / TESTED BY P. Smyth

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering FormProject Kenmore - Taringa
Rafting Ground - TaringaDate 26-10-04T P Location RUSSELL TCET P No. 1 + 1

Mains Size

T P Type B**POTENTIAL TESTING**

CATHODE TO CATHODE RETURN (RESISTANCE)

ZINC REFERENCE TO PIPE

CuSo4 REFERENCE TO PIPE

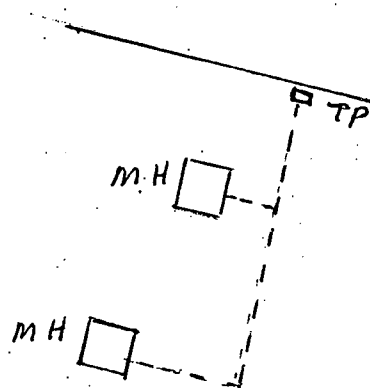
ZINC TO CuSo4

0.1**EARTH TESTING**TEST NO. 1

PIN SPACING

MEGGER READING

RESISTIVITY

COMMENTS / LOCATION DRAWINGMove T P^s from Valve Pits222 + 221 To T P atProperty AlignmentOriginals left in Pit

INSTALLED BY

J Taylor

Revision 08/01/96

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering FormProject Raffling Ground - TaringaDate 25-10-04T P Location Caringa + Crotty St 178 E2T P No. 2Mains Size S36 = 54" S60 = 60"T P Type Double B**POTENTIAL TESTING**

CATHODE TO CATHODE RETURN (RESISTANCE)

ZINC REFERENCE TO PIPE

CuSo4 REFERENCE TO PIPE

ZINC TO CuSo4

S36

S60

0.1

0.1

+622

+610

-420

-422

-1059

-1005

EARTH TESTING

TEST NO. 1

PIN SPACING

2m

MEGGER READING

3.59 Ω

RESISTIVITY

COMMENTS / LOCATION DRAWINGTeague StCrotty StCaringa St

60"

54"

S60

S36

kerb

Cathode

Cathode

Rising Elbow
RSV 22298

TP

Pit

RPL

→ Rect

INSTALLED BY

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering FormProject Kenmore - TaringaDate 28-10-04T P Location Taringa Goldsbrough 178 G1T P No. 3Mains Size S60T P Type B Pit**POTENTIAL TESTING**

CATHODE TO CATHODE RETURN (RESISTANCE)

0.1

ZINC REFERENCE TO PIPE

+ 646

CuSo4 REFERENCE TO PIPE

- 399

ZINC TO CuSo4

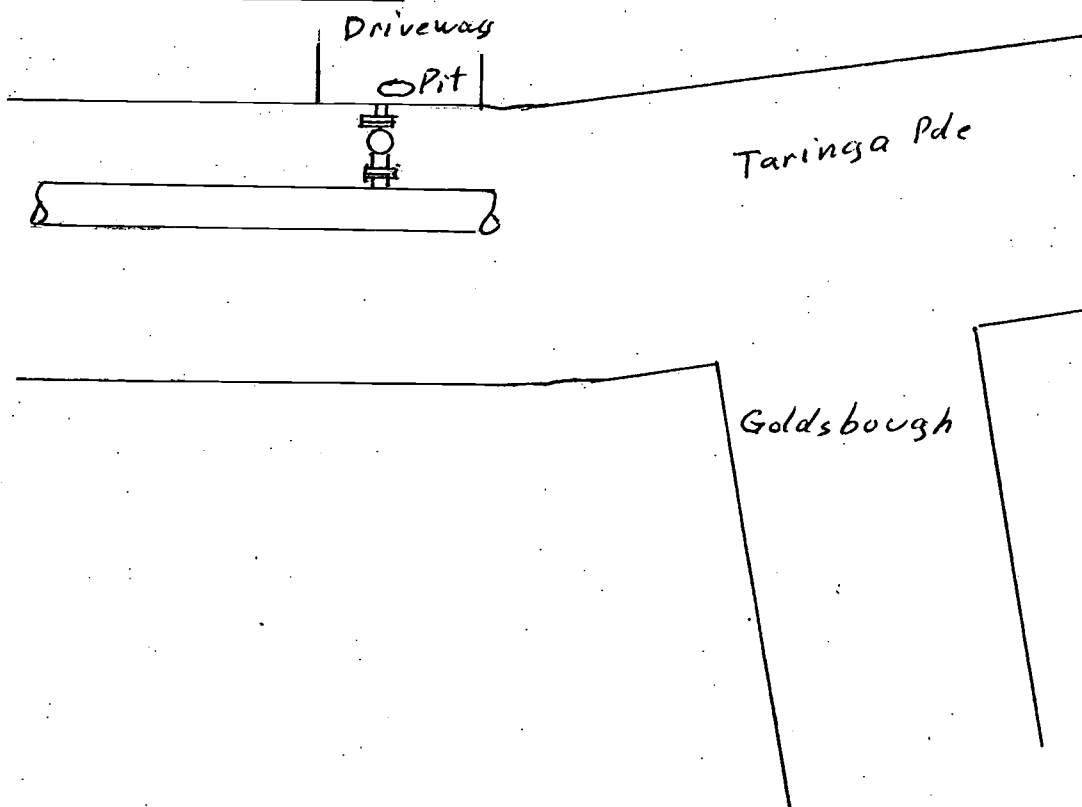
- 1034**EARTH TESTING**TEST NO. 1

PIN SPACING

2 m

RESISTIVITY

MEGGER READING

4.2**COMMENTS / LOCATION DRAWING**

INSTALLED BY

J Taylor

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CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering FormProject S60 Kenmore - taringaDate 1-11-04T.P Location Golds Brough & HillsdonT.P No. 4Mains Size 54"T.P Type B**POTENTIAL TESTING**

CATHODE TO CATHODE RETURN (RESISTANCE)

ZINC REFERENCE TO PIPE

CuSo4 REFERENCE TO PIPE

ZINC TO CuSo4

0.2 Ω+602-495-1092**EARTH TESTING**

TEST NO. 1

PIN SPACING

MEGGER READING

23.6RESISTIVITY 2x2x3.14x3.6=

TEST NO 2

PIN SPACING

MEGGER READING

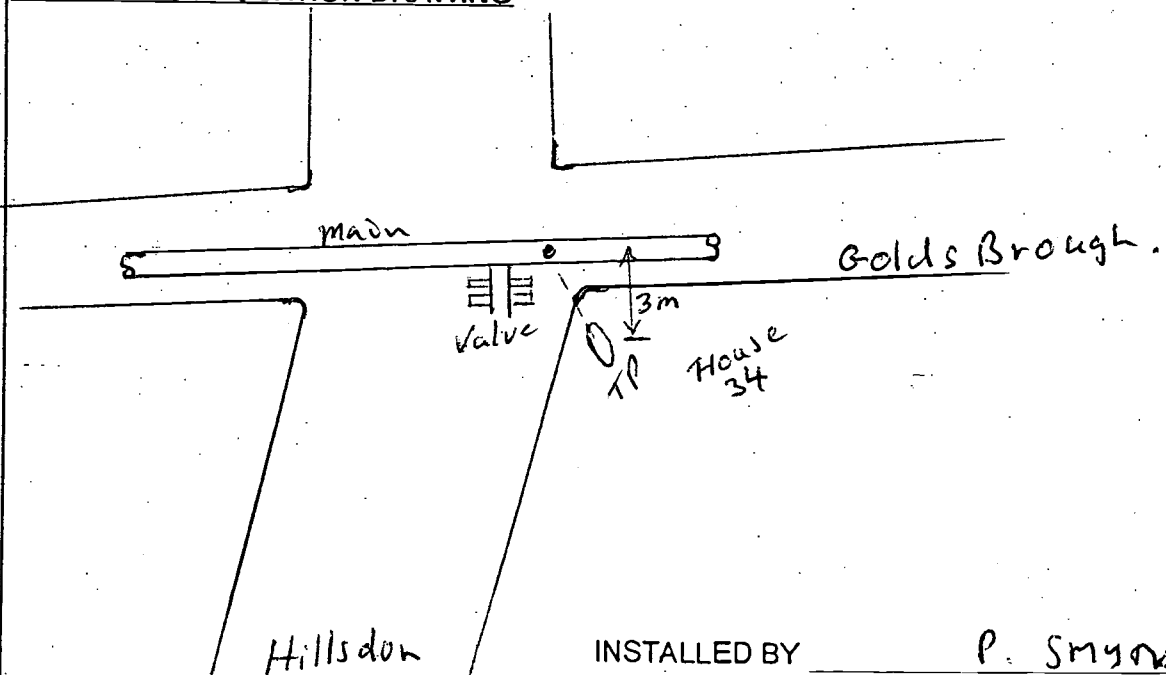
RESISTIVITY

TEST NO 3

PIN SPACING

MEGGER READING

RESISTIVITY

COMMENTS / LOCATION DRAWING

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

S60 TP 5.

Standard Cathodic Protection Test Point Data Gathering FormProject Taringa - Enoggera Th.Date 26-8-02TP Location Woodstock aveTP No. 5Mains Size 1580TP Type B**POTENTIAL TESTING**

un protected

CATHODE TO CATHODE RETURN (RESISTANCE)

-2 Ω

ZINC REFERENCE TO PIPE

+655

CuSo4 REFERENCE TO PIPE

-437

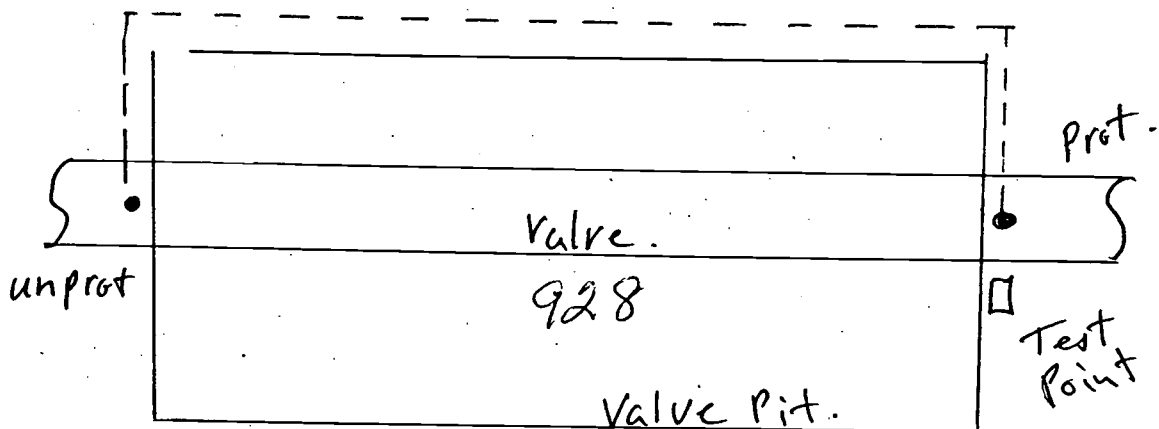
ZINC TO CuSo4

-1020**EARTH TESTING**TEST NO. 1

PIN SPACING

2RESISTIVITY 40.192 Ω pm

MEGGER READING

3.2**COMMENTS / LOCATION DRAWING**

INSTALLED BY

P. SMYTH.

Brisbane Water Engineering Services

CP Form No.18

Electrical Engineering Unit

Standard Cathodic Protection Test Point Data Gathering FormProject Kenmore To Taringa SET 60Date 18-11-04TP Location Moggil Rd Morrow StTP No. 7Mains Size 36" inchTP Type 2 B**POTENTIAL TESTING**

CATHODE TO CATHODE RETURN (RESISTANCE)

0.1 0.1

ZINC REFERENCE TO PIPE

+520 +547

CuSo4 REFERENCE TO PIPE

-510 -447

ZINC TO CuSo4

-1032 -1088**EARTH TESTING**TEST NO. 1

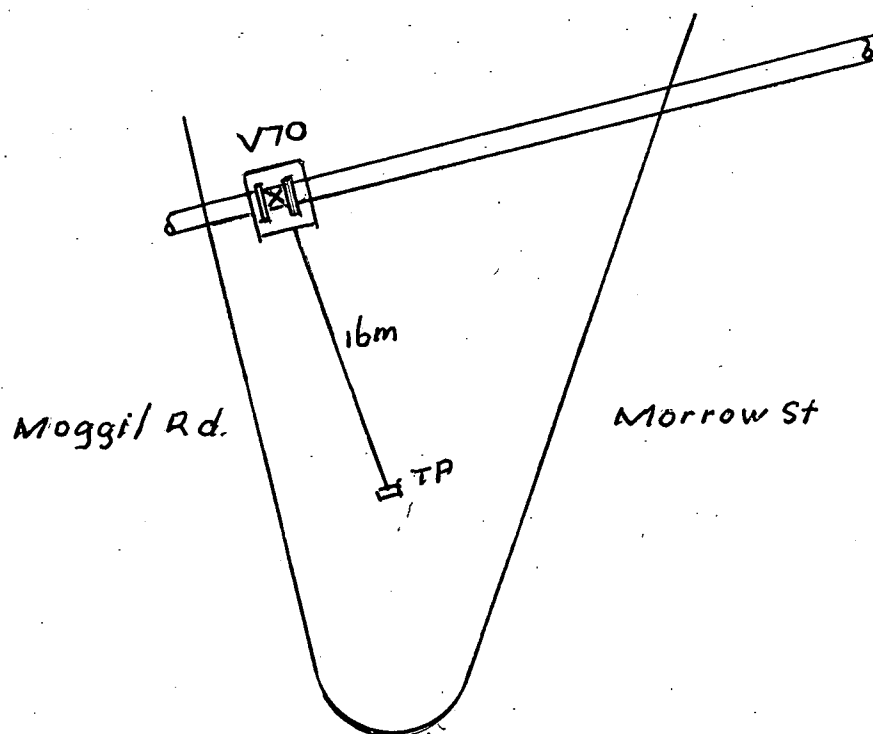
PIN SPACING

2mtr

RESISTIVITY

36.8 ohm mtr

MEGGER READING

3**COMMENTS / LOCATION DRAWING**INSTALLED BY J. Taylor

Brisbane Water Engineering Services

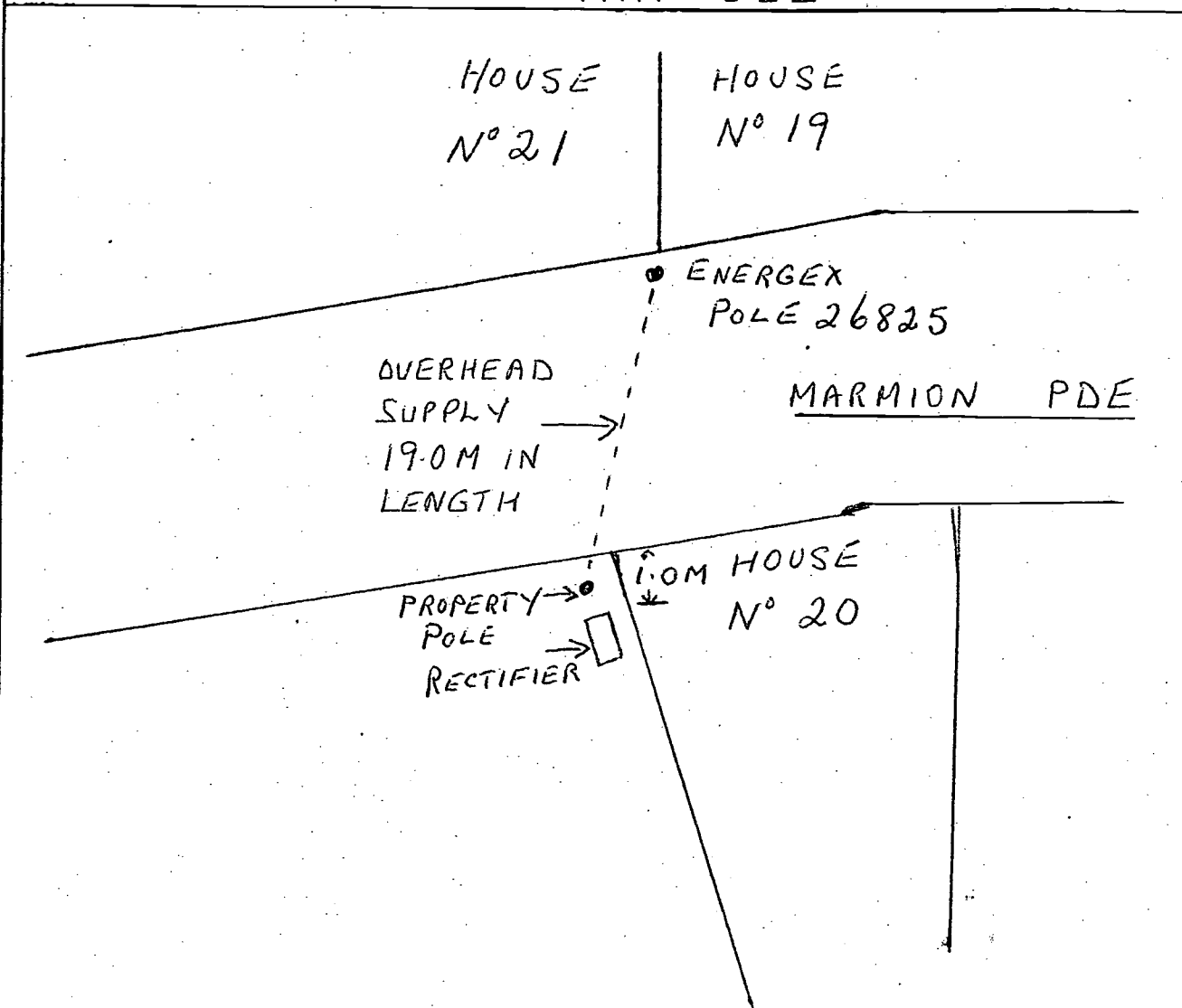
CP Form No. 16

Electrical Engineering Unit

Site Plan Drawing Sheet

Project MARMION PDE ENERGEX SUPPLYDate 16-05-05

MAP UBD 178 M1

PROJECT N° PA 003527COMPILED BY L. GREAVES

Brisbane Water Engineering Services

CP Form No. 17

Electrical Engineering Unit

Cathodic Protection Anode Bed Testing

Project Marrion PDeDate 14-6-05

ANODE MATERIAL: Silicon Iron BURIAL: Vertical

ANODE SIZE/WEIGHT: 1.5 m x 75 mm 76 kg TEST POINT TYPE: Rectifier Coupon

ANODE PACKAGING: Direct + Coke Breeze SOIL RESISTIVITY: 62 ohm Mtrs

ANODE DEPTH: 4 m SIGNAGE: Yes

RESISTANCE TO GROUND:

ANODE No.1 7

ANODE No.2 5

ANODE No.3 4

ANODE No.4 4

ANODE No.5

TOTAL

ANODE CURRENT

ANODE No.1

ANODE No.2

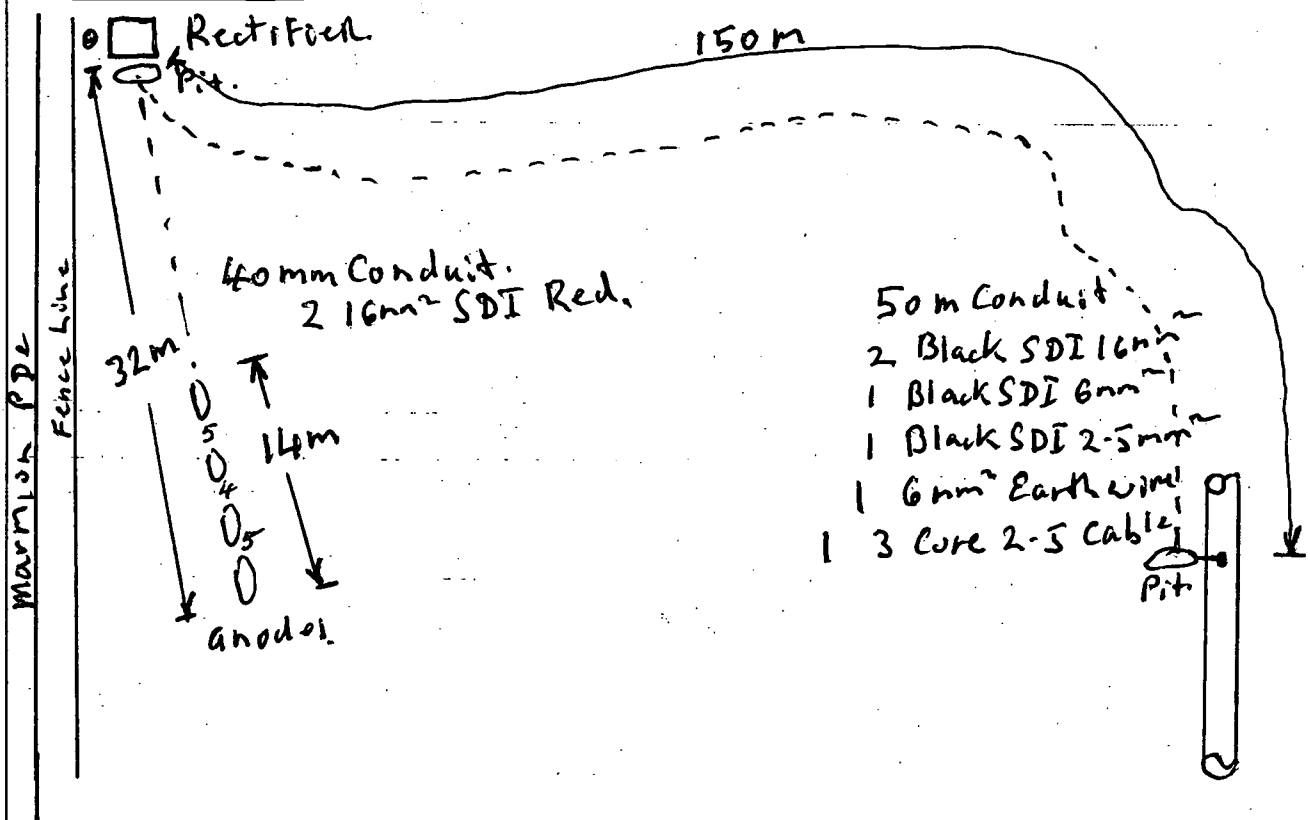
ANODE No.3

ANODE No.4

ANODE No.5

TOTAL

LOCATION DRAWING

TESTED BY P. Smyth

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details FormProject ~~Raffling Gnd~~ Taringa
KenmoreDate 28-10-04**DESCRIPTION**

MAINS DETAILS:

LOCATIONS:

SIZE:

MATERIAL:

COATING:

VALVE No.

Russell St opp Jenkinson St 178 D3MSCLTar AsbestosRV 88290**IN GROUND TESTING**

BOLT TO FLANGE RESISTANCE:

> 5.2 m Ω

NUMBER OF BOLT:

4 off 3 1/2" x 3/4"

FLANGE TO FLANGE RESISTANCE:

537 k

INSULATION CHECKER MODEL 702:

1N11POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE:

-396

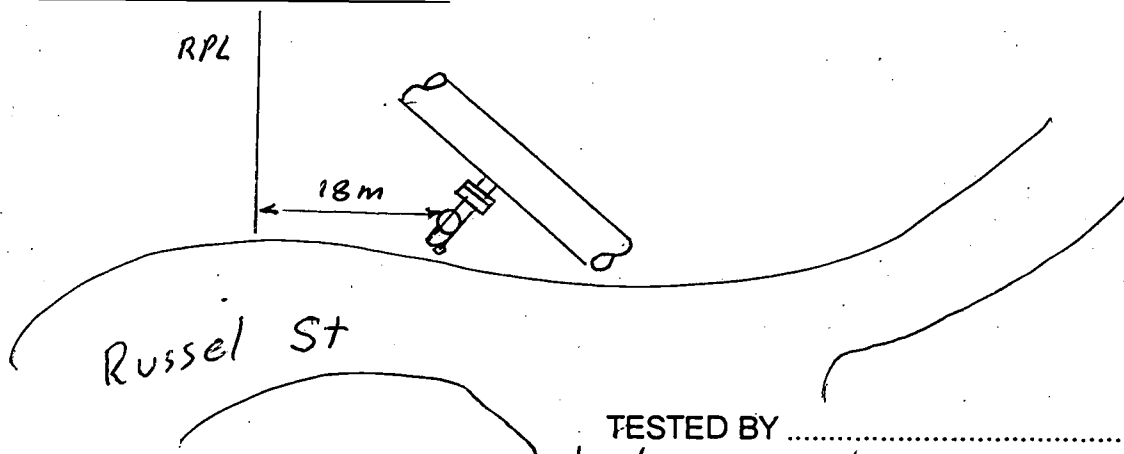
UNPROTECTED SIDE:

-324**ABOVE TESTING**

BOLT TO FLANGE RESISTANCE:

NUMBER OF BOLTS:

FLANGE TO FLANGE RESISTANCE:

COMMENTS / LOCATION DRAWINGRef 16.

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit**Insulated Joint Testing Details Form**Project Kenmore - TaringaDate 28-10-04**DESCRIPTION**

MAINS DETAILS: S60
 LOCATIONS: Taringa Pde opp Golds bough Rd
 SIZE: _____
 MATERIAL: MSCL
 COATING: Tar Asbestos
 VALVE No. RV 22241

IN GROUND TESTING

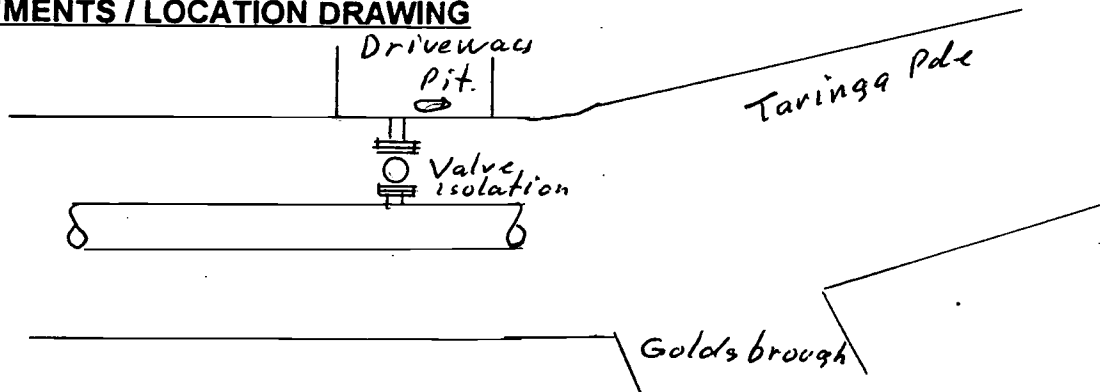
BOLT TO FLANGE RESISTANCE: 1.4 m Ω
 NUMBER OF BOLT: 8
 FLANGE TO FLANGE RESISTANCE: 700 k Ω
 INSULATION CHECKER MODEL 702: 1N11

POTENTIAL DIFFERENCE TO REFERENCE CELL:

PROTECTED SIDE: - 420
 UNPROTECTED SIDE: - 454

ABOVE TESTING

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

COMMENTS / LOCATION DRAWINGTESTED BY J. Taylor

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit**Insulated Joint Testing Details Form**Project ~~S60~~ S60
Kenmore To TaringaDate 8-9-05**DESCRIPTION**

MAINS DETAILS:

S36 & S60

LOCATIONS:

Cnr Jenkinson St + Rashell St.

SIZE:

1370

MATERIAL:

Mild Steel.

COATING:

T/E

VALVE No.

787**IN GROUND TESTING**BOLT TO FLANGE RESISTANCE: all Bolts $> 200 \Omega$

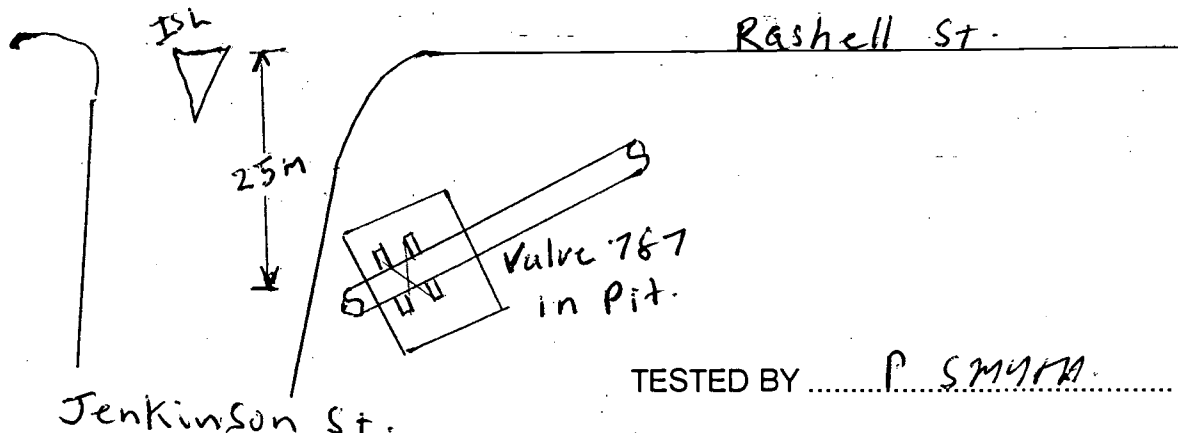
NUMBER OF BOLT:

FLANGE TO FLANGE RESISTANCE: 150 K Ω INSULATION CHECKER MODEL 702: N/APOTENTIAL DIFFERENCE TO REFERENCE CELL:PROTECTED SIDE: - 540 mVUNPROTECTED SIDE: - 370 mV**ABOVE TESTING**

BOLT TO FLANGE RESISTANCE: _____

NUMBER OF BOLTS: _____

FLANGE TO FLANGE RESISTANCE: _____

COMMENTS / LOCATION DRAWINGTESTED BY P. Smyth

Brisbane Water Engineering Services

CP Form No. 21

Electrical Engineering Unit

Insulated Joint Testing Details Form

Isolation 23

Project Kenmore-Taringa SET 60Date 14-3-05**DESCRIPTION**

MAINS DETAILS:

LOCATIONS:

SIZE:

MATERIAL:

COATING:

VALVE No.

Moggil Rd. Morrow St36 inchMISCLTar AsbestosisS70**IN GROUND TESTING**BOLT TO FLANGE RESISTANCE: ALL BOLTS > 200 Ω

NUMBER OF BOLT:

FLANGE TO FLANGE RESISTANCE: 10.2 Ω INSULATION CHECKER MODEL 702: IN 11**POTENTIAL DIFFERENCE TO REFERENCE CELL:**

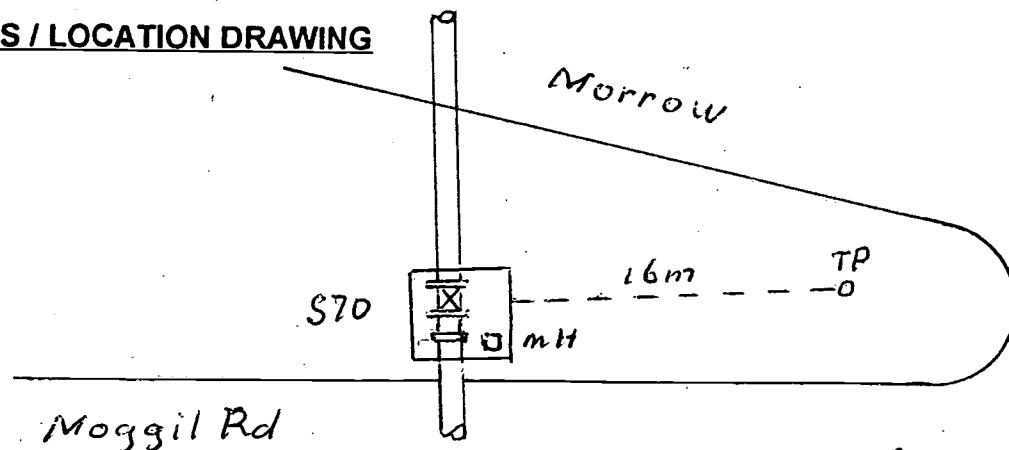
PROTECTED SIDE:

-587 mV RECTIFIER ON

UNPROTECTED SIDE:

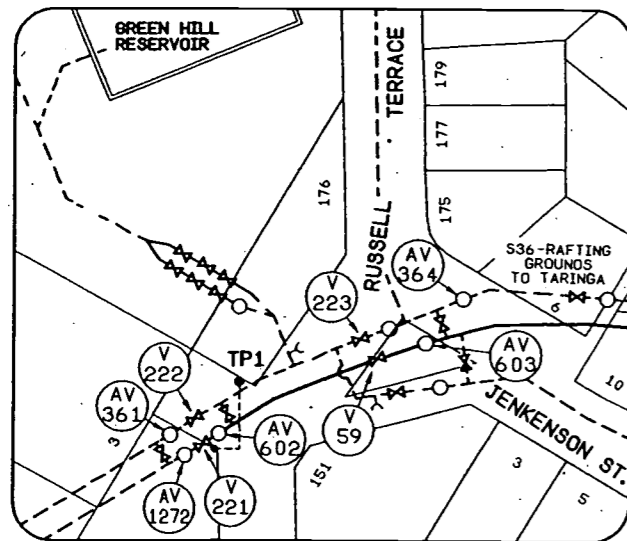
-575 mV**ABOVE TESTING**BOLT TO FLANGE RESISTANCE: > 200 Ω

NUMBER OF BOLTS:

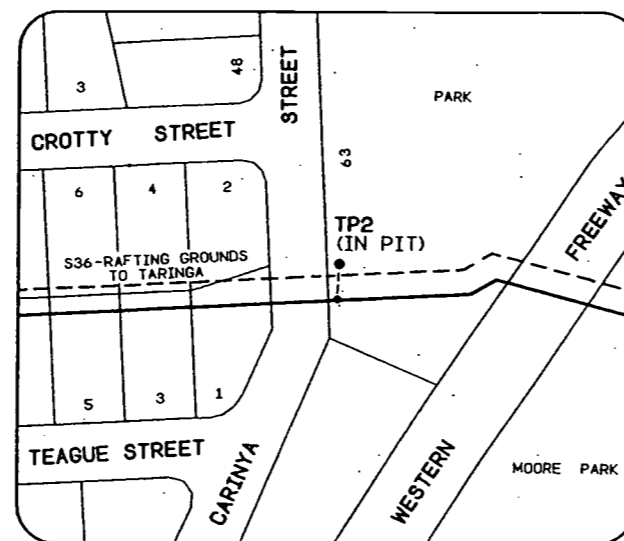
24 off 4" x 3/4"FLANGE TO FLANGE RESISTANCE: > 200 Ω **COMMENTS / LOCATION DRAWING**TESTED BY J. Taylor



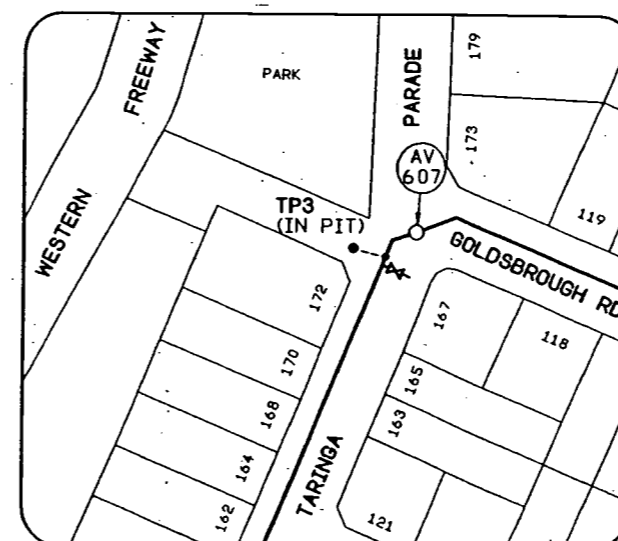
LOCALITY PLAN



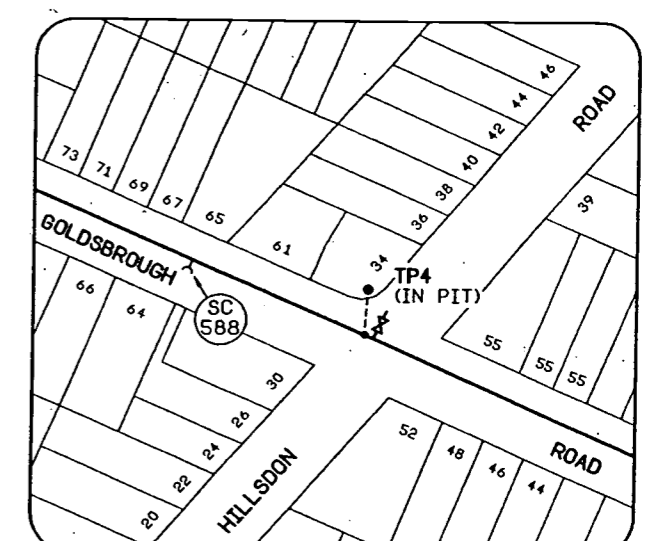
TEST POINT NO.1



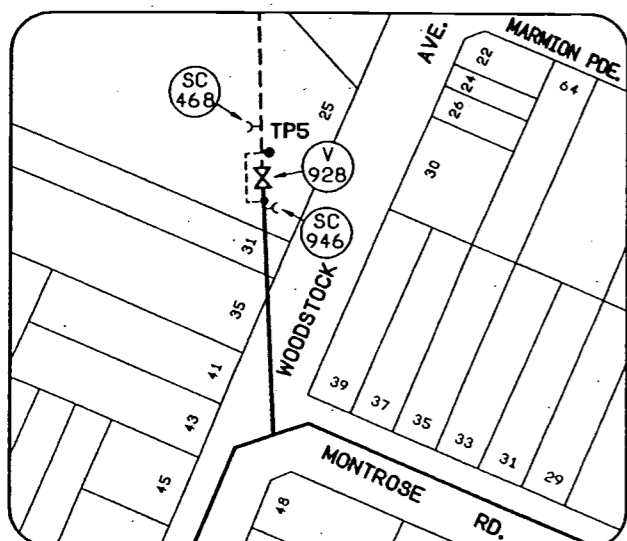
TEST POINT NO.2



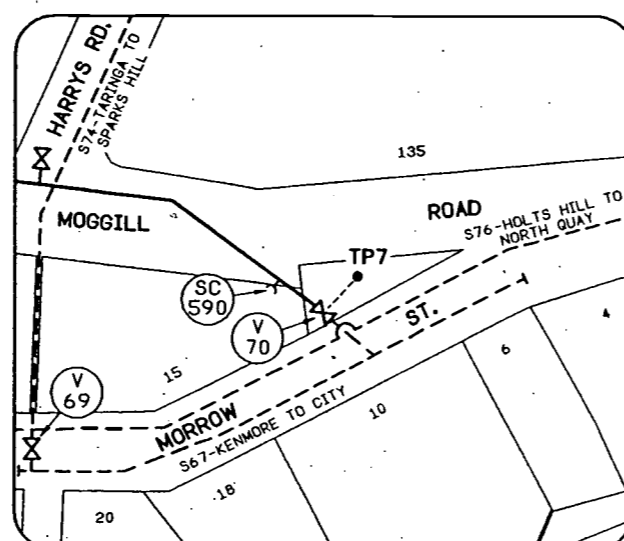
TEST POINT NO.3



TEST POINT NO.4



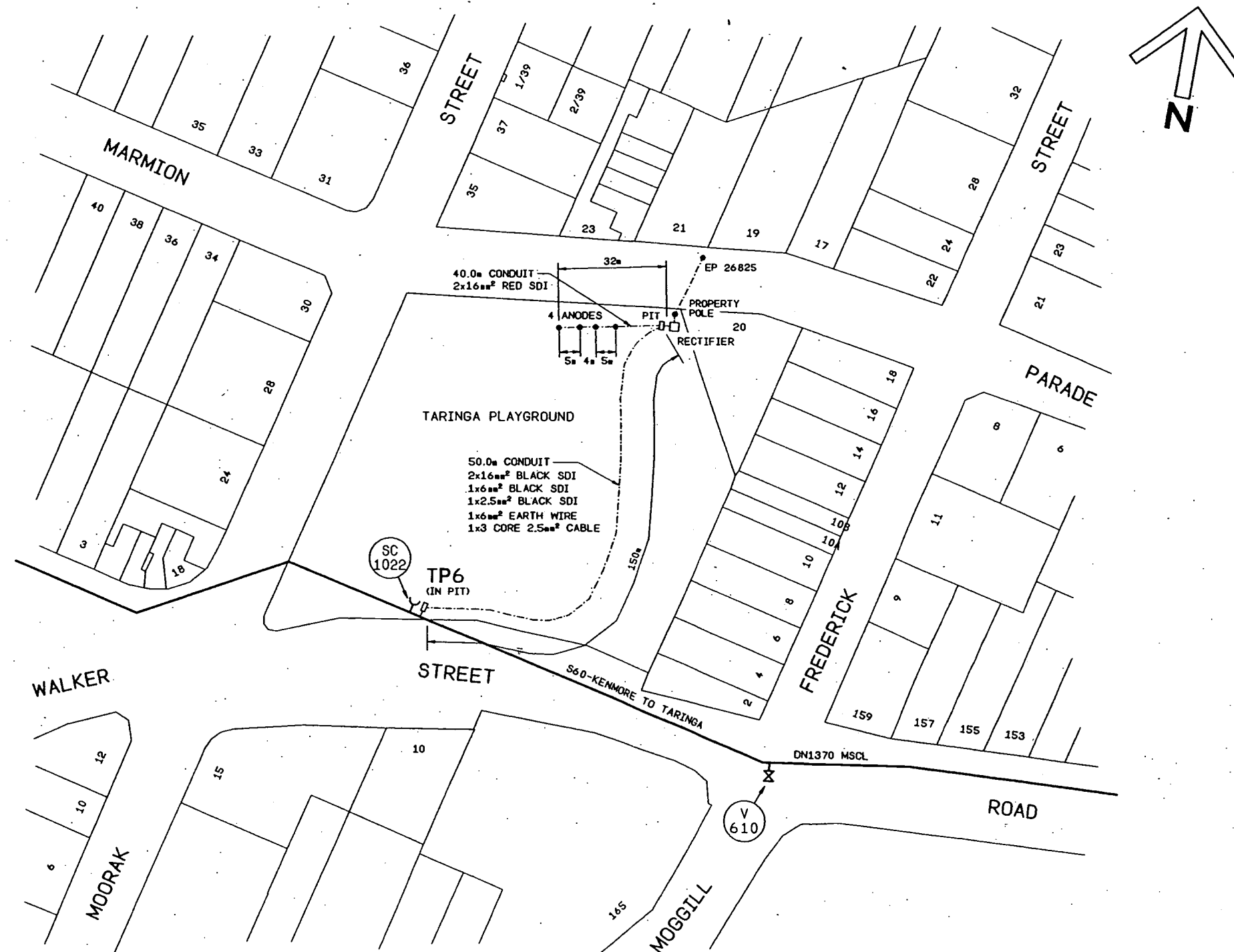
TEST POINT NO.5



TEST POINT NO.7

NO DATE		AMENDMENT	DRAFTED APPROVED	FUNDING	DRAFTED	8.0.8 NOV. 2005	DESIGN	RPEQ No. DATE	PRINCIPAL DESIGN MANAGER DATE	PROJECT	S60-KENMORE TO TARINGA	TITLE	CATHODIC PROTECTION TEST POINT LOCATIONS TEST POINT NOS. 1 TO 5 AND 7	SHEET No. 1 OF 2 SHEETS	BREBANE WATER DRAWING No.	2/10.450-01	AMEND.	P
DESIGN W.D. No.		PA000820	CONSTRUCTION W.D. No.	CONSTRUCTION W.D. No.	DESIGN	RPEQ No. DATE	PRINCIPAL DESIGN MANAGER DATE	DESIGN CHECK	RPEQ No. DATE	PRODUCTION NETWORK DELEGATE DATE								
FUNDED BY B.C.C. (X) EXTERNAL ()			B.C.C. FILE No.															

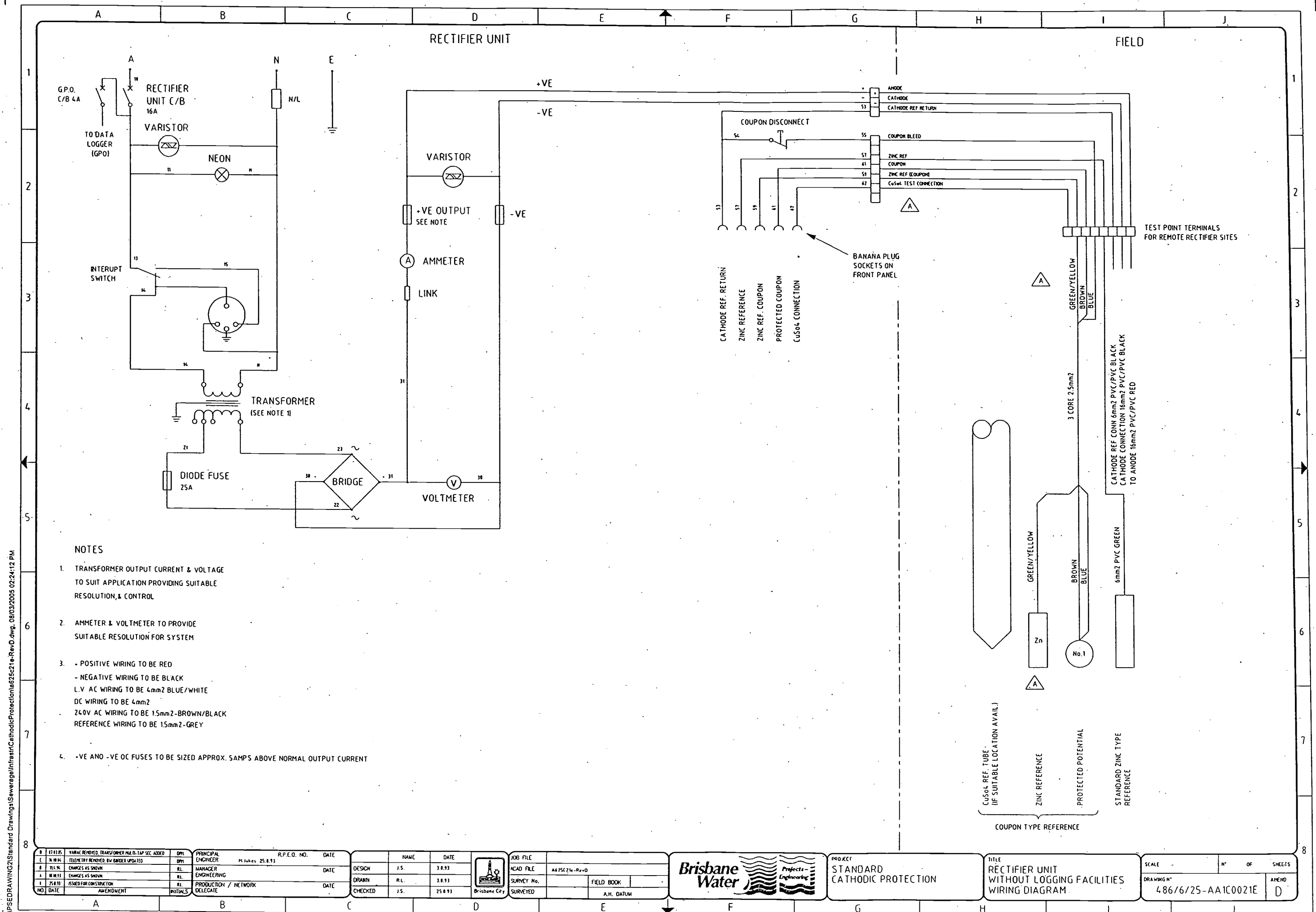
AS CONSTRUCTED	
PLOTTED	DATE
CHECKED	DATE

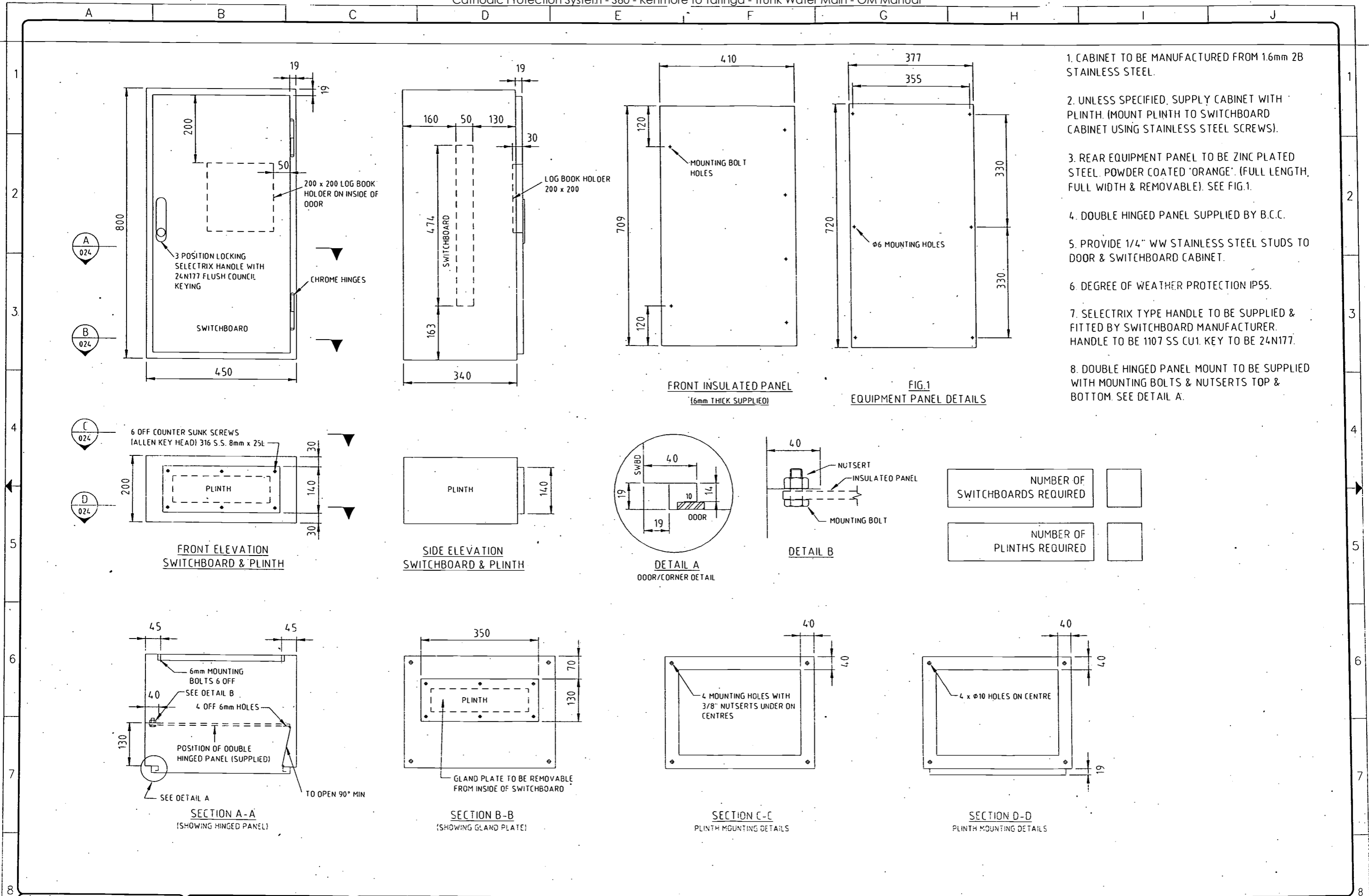


TEST POINT NO.6 AND ANODE BED DETAILS

NO. DATE		AMENDMENT	DRAFTED	APPROVED	FUNDING	DESIGN	RPEQ. No.	DATE	PRINCIPAL DESIGN MANAGER	DATE	PROJECT	TITLE	SHEET No. 2 OF 2 SHEETS	BREBANE WATER DRAWING N°	AMEND.
			DRAFTING CHECK		DESIGN W.D. No. PA000820	DESIGN					S60-KENMORE TO TARINGA	CATHODIC PROTECTION TEST POINT NO. 6 AND ANODE BED DETAILS			
			CAD FILE		CONSTRUCTION W.D. No.	DESIGN CHECK									
			BCC FILE No.		FUNDED BY BCC (X) EXTERNAL ()										

AS CONSTRUCTED	
PLOTTED	DATE
CHECKED	DATE
SHEET No. 2 OF 2 SHEETS	
BREBANE WATER DRAWING N°	
2/10.450-02	
P	

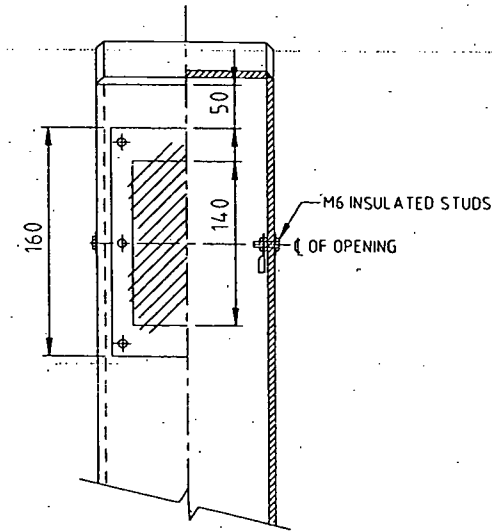
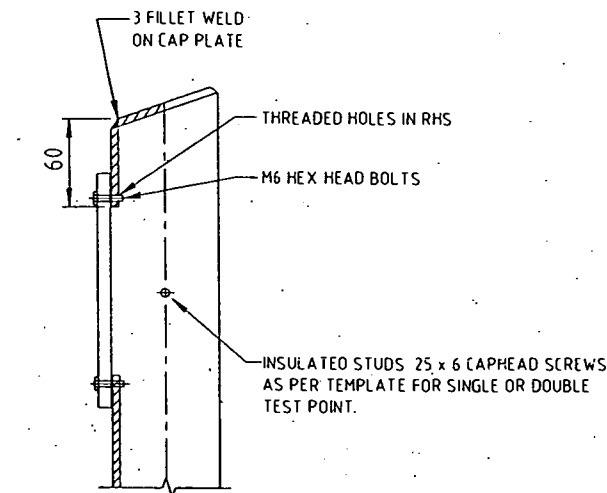
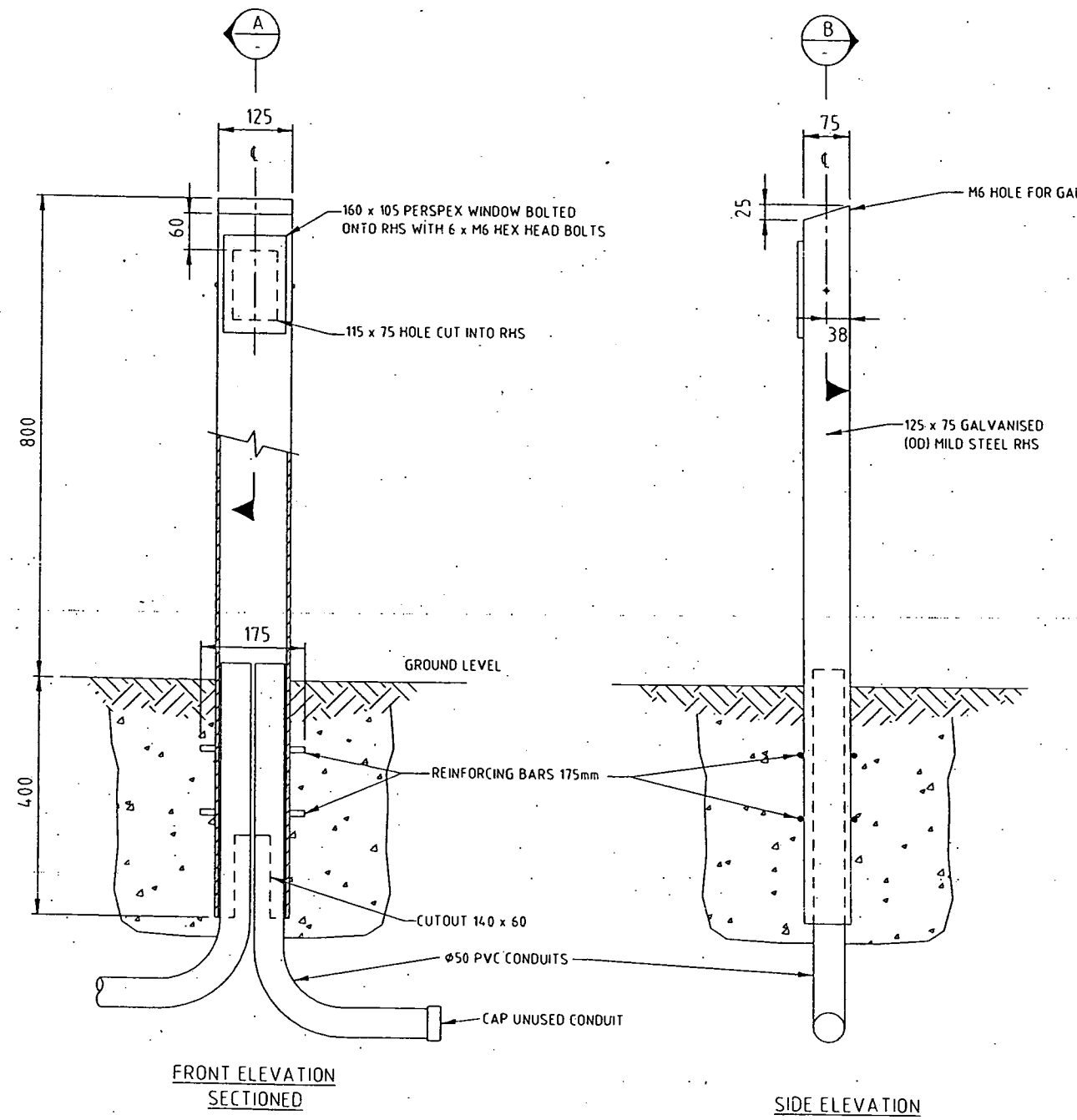




C 1-42 NOT REVISION		DIRECTOR OF P.D. & P.S.		DATE		DESIGN		NAME		DATE		JOB FILE		ACAD FILE		SHEET SIZE		A1		PROJECT		TITLE		SCALE		NTS		N° 1 OF 1 SHEETS	
B 1-45 MODIFIED		ENGINEER IN CHARGE		DATE		DRAWN		C.P.		7-5-92		SURVEY No.		FIELD BOOK		A.H. DATUM		CATHODIC PROTECTION		STANDARD SWITCHBOARD CABINET		DRAWING N°		486/1/22-C0024E		AMEND		C	
A 1-47 ISSUED FOR APPROVAL		SUPERVISING ENGINEER		R.P.E.Q. NO.		DATE		CHECKED		DATE		SURVEYED		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE	
ND DATE		AMENDMENT		INITIALS		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE		DATE	

NOTES

1. HOT DIP GALVANISE AFTER FABRICATION.



NO. DATE 1 10-92 2 11-92 3 12-92		AMENDMENT 1 2 3		DIRECTOR OF P.D. & P.S. ENGINEER IN CHARGE SUPERVISING ENGINEER		DATE DATE DATE		NAME K.M.G. D.L.P.		DATE 10-5-92 7-5-92		JOB FILE ACAD FILE SURVEY No. SURVEYED		2270001-RevA SHEET SIZE FIELD BOOK A1		PROJECT CATHODIC PROTECTION		TITLE STANDARD TEST POINT CONSTRUCTION DETAILS		SCALE NTS 486/1/22-AAT0001E		SHEETS 1 OF 1 C	
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