

24TH JUNE 1994

**BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL BRANCH  
ELECTROLYSIS SECTION  
EAGLE FARM PUMPING STATION**

**OPERATING MANUAL FOR:**

**WARRIGAL ROAD 600MM DIAMETER TRUNK WATER MAIN CATHODIC  
PROTECTION SYSTEM.**

**CLIENT:**

**DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
WATER MAINTENANCE SECTION**

## MANUAL CONTENTS

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## DRAWINGS

JE02/104

(No Number)

Standard Rectifier Wiring Diagram

Monthly Maintenance Program.

## (1.0) INTRODUCTION

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

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

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

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

## (2.0) CORROSION AND CATHODIC PROTECTION

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

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

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

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

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

### (3.0) **MAINS DETAILS**

Size: Dia 600 mild steel cement lined.

Coating: Low density fusion bonded polyethylene outer coating.

Length: 1.4km.

Location: Warrigal Rd, Eight Mile Plains :- Lindstrom Crescent to Daw Rd..

Construction Drawings: 486/4/6-W10023P to 486/4/6-W10028P.

C.P. Details: 486/6/UEICOOO6E

Locality Plan: 486/4/6-W10022L0

#### (4.0) CATHODIC PROTECTION DETAILS

- (4.1) Type of Cathodic Protection: Impressed Current.
- (4.2) Rectifier: Standard 32V Volt, 10 amp direct current output enclosed in a stainless steel switchboard. Rectifier has a 240V supply from a nearby SEQEB piller box No 41165.  
Rectifier is located near piller box No41165,in the park at the end of Palms Woods Cresent,Eight Mile Plains..
- (4.3) Cathode: The cathode point is located on the 600 dia. main near SEQEB Polc No 22914 on Warrigal Rd opposite Pear St,where a coupon test point has been installed. The cathode point is where the cabling from the rectifier is attached to the structure under cathodic protection.
- (4.4) Anodes: One 1500 x 75mm silicone iron anode was installed approximately 130 metres from the trunk mains in a vertical bed. The anodes were firstly packaged with cokebreeze thereby improving anode – ground resistance. The anodes are identified by a marker pit and label. Refer dwg no 2/14.213.
- (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 four test points have been installed for details see dwg no 2/14.213.
- (4.6) Associated Drawings:  
Cathodic Protection Details - 2/14.213  
Cathodic Protection Test Point Details - 2/14.199  
Standard Rectifier Wiring Diagram - JE02/104
- (4.7) Associated Standards:  
AS 3000 1986 Australia Wiring Rules  
AS 2832.1 1985 . Pipes, Cables, Ducts, Guide to Cathodic Protection,  
Part One.
- (4.8) Government Regulations:  
Queensland Electricity Acts and Regulations.

## (5.0) **PERFORMED TESTING**

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

NOTE: Details of above testing have not been included in this manual but are available upon request.

## (6.0) **CONCLUSION**

Full Cathodic protection has been achieved on this section of trunk mains. The cathodic protection system is registered with the Queensland Electricity Commission and has approval to operate.

## (7.0) **MAINTENANCE**

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

12th October 1992  
Electrical Workshop  
Cathodic Protection

**CPS Monthly Maintenance Details.**

**Required:**

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

**Labour:**

One tradesperson, one vehicle. 20 minutes per site.

**Procedure:**

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

13th October 1992  
Electrical Workshop  
Cathodic Protection

### CPS 6 Monthly Maintenance Details.

#### Required:

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

#### Labour:

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

#### Procedure:

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

13th October 1992  
Electrical Workshop  
Cathodic Protection

### CPS 60 Monthly Maintenance Details.

#### Required:

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

#### Labour:

One tradesperson electrical, one laborer, one vehicle.

Eight hours per site.

#### Procedure:

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

**Brisbane City Council**  
**Dept. W.S. & S.**  
**Metropolitan Division**  
**Eagle Farm Pump Station**

**Cathodic Protection System Loop Resistance**

Date: 27th JUNE 1994

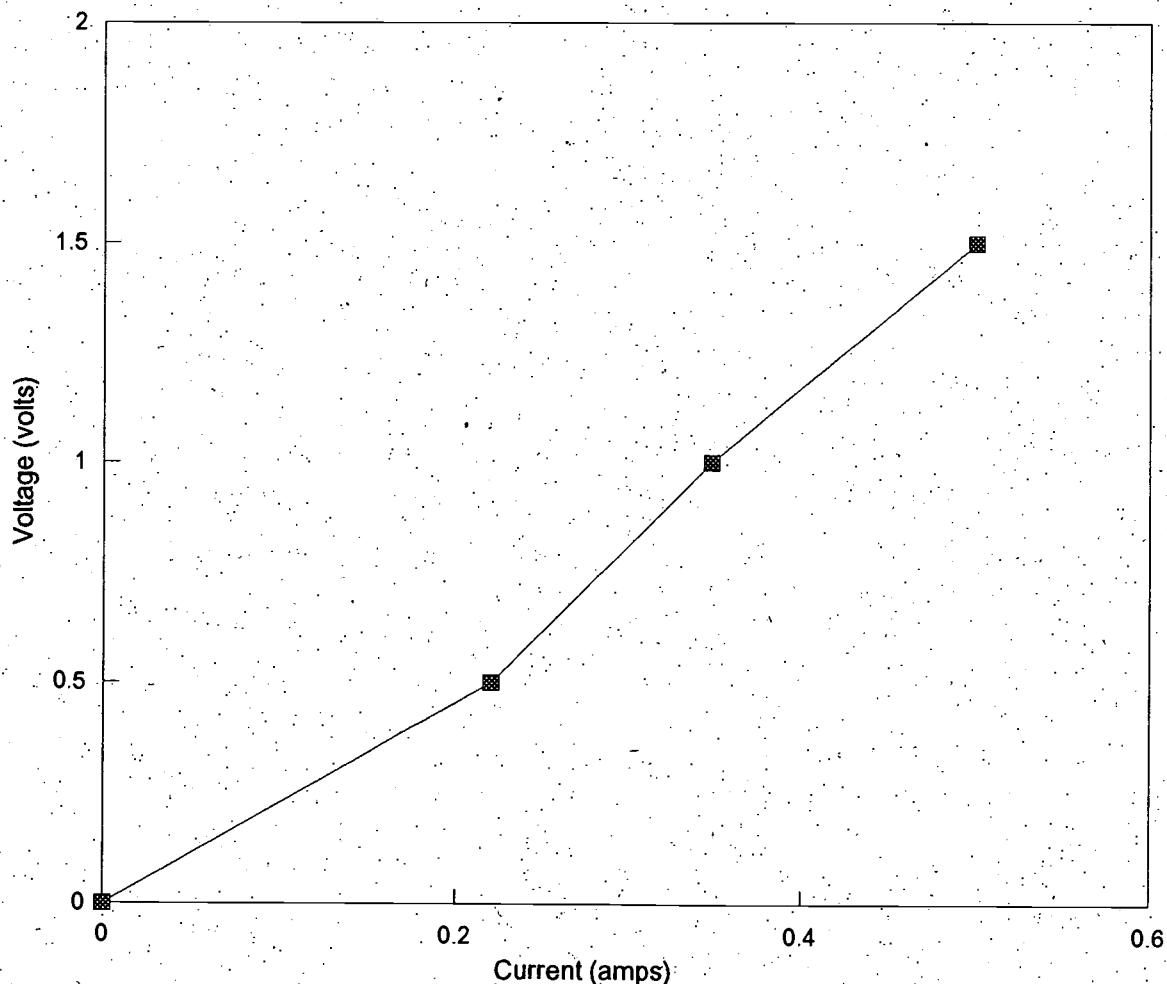
Cathodic Protection System: Warrigal Rd 600 Dia MSCL Trunk Main

System Operating Volts: 0.25 System Operating amps: 0.03

Test Voltage: (volts)	Test Current: (amps)
0	0
0	0
0.5	0.22
1	0.348
1.5	0.5

Loop Resistance (ohms)
3.571429

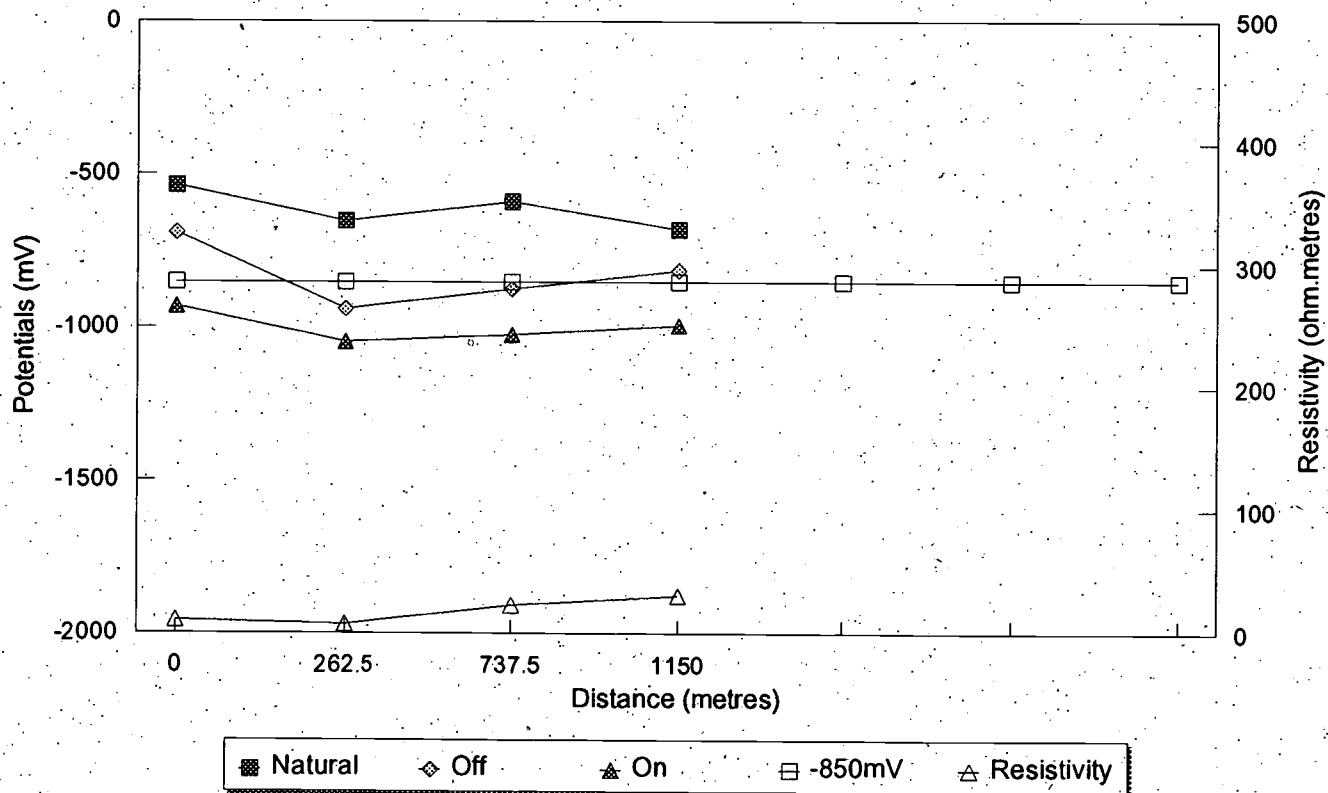
**Graph of System voltage vs current.**



**Brisbane City Council****Dept. W.S.& S.****Metropolitan Division****Eagle Farm Pumping Station****Date: 30th April 1993****Electrical Workshop****System: Dairyswamp Rd. 750mm to 1200mm diameter trunk main.****Cathodic Protection System reference potential and earth resistivity graph.**

Test Point number	Distances to T.P. (metres)	Potentials to CuSO <sub>4</sub>			Resistivities at 2 metres (ohm.metres)
		Natural (mV)	Off (mV)	On (mV)	
1	0	-538	-691	-930	10.2
2	262.5	-654	-939	-1048	7.01
3	737.5	-590	-873	-1025	22.6
4	1150	-680	-814	-993	30.1
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

### Graph of potentials and resistivity vs pipelength



Rectifier located at 1300M.

**BRISBANE CITY COUNCIL  
MEMORANDUM**

To	File No.
From	Date
Subject	Warrigal Rd → Dan Rd

Loop Resistance	5 v	220 mA
	1 v	348 mA
	1.5 v	500 mA

Unit set at 250 mV 30 ml

At TR CuSO<sub>4</sub> to Pipe -1025 mV on -873 mV off  
Zink To Pipe +350 mV on +515 mV off  
CuSO<sub>4</sub> to Zink -1373 mV on -1258 mV off

TP one Protected

CuSO <sub>4</sub> To Pipe	-930 mV on	-691 mV off
Zink To Pipe	+253 mV on	+522 mV off
CuSO <sub>4</sub> To Zink	-1186 mV on	-1150 mV off

Unprotected

## Cusou To Pipe

Zink to Pipe

$\text{CuSO}_4 \text{ to Zink}$

TP Two

CuSO<sub>4</sub> To Pipe - 1048 mV on - 939 mV off  
 Zink To Pipe + 1480 mV on + 268 mV off  
 CuSO<sub>4</sub> To Zink - 1203 mV on - 1195 mV off

TP Four  $\text{CuSO}_4$  To Pipe -993 mV on -814 mV off  
Zink To Pipe +194 mV on +529 mV off  
 $\text{CuSO}_4$  To Zink -1130 mV on

Maxm Upr. CuSO<sub>4</sub> To Pipe - 939 mV on - 193 mV off  
Zinc To Pipe + 137 mV on + 373 mV off  
CuSO<sub>4</sub> To Zinc - 1124 mV on

**BRISBANE CITY COUNCIL**  
**DEPARTMENT OF WATER SUPPLY AND SEWERAGE**  
**MECHANICAL AND ELECTRICAL SECTION**

## INTERFERENCE SURVEY RESULTS

**JOB DESCRIPTION:** -

UNIT READING: 27 V 5 A

COMPILED BY:.....

**BRISBANE CITY COUNCIL  
EAGLE FARM PUMPING STATION  
CORROSION SECTION**

TP N°1

**STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING**

DATE: 22-12-93  
TEST POINT TYPE: B

LOCATION: WARRIGAL RD  
MAINS SIZE: 600 MM

**POTENTIAL TESTING**

	PROTECTED	UNPROTECTED
CATHODE TO CATHODE RETURN (RESISTANCE):	0.2 Ω	0.2 Ω
ZINC REFERENCE TO PIPE:	+415 mV	+425 mV
CuSO <sub>4</sub> REFERENCE TO PIPE:	-538 mV	
ZINC TO CuSO <sub>4</sub> :	-950 mV	

**EARTH TESTING**

PIN SPACING: 2.0M MEGGER READING: 0.8/Ω RESISTIVITY: 10.2 Ω/m

PIN SPACING: MEGGER READING: RESISTIVITY:

**SACRIFICIAL ANODE**

(IF INSTALLED)

ANODE TYPE:  
ANODE SIZE:  
ANODE TO PIPE POTENTIAL (OPEN CIRCUIT):  
ZINC REF TO PIPE:  
(ANODE CONNECTED)  
  
CUSO<sub>4</sub> REF TO PIPE:  
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:  
(IF INSTALLED)

INSTALLED BY: L.J. Greaves

COMMENTS:

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1 COPY TO T.O.

BRISBANE CITY COUNCIL  
EAGLE FARM PUMP STATION  
CORROSION SECTION

COUPON TYPE CATHODIC PROTECTIONTEST POINT: DATA GATHERING

DATE: 14-12-93

MAINS SIZE: 600 mm

TEST POINT TYPE: Coupon

TEST POINT NO 2

LOCATION: WARRIGAL RD

TYPE:

INITIAL POTENTIAL TESTING

(BOTH COUPONS DISCONNECTED)

ZINC TO PIPE: +327 mV

ZINC TO PROTECTED COUPON: +327 mV

ZINC TO UNPROTECTED COUPON: +326 mV

CuSO<sub>4</sub> TO PIPE: -654 mVCuSO<sub>4</sub> TO PROTECTED COUPON: -654 mVCuSO<sub>4</sub> TO UNPROTECTED COUPON: -461 mVCuSO<sub>4</sub> TO ZINC: +976 mV

PIPE CATHODE TO PIPE CATHODE RETURN (RESISTANCE): 0.1 u

COUPON CATHODE TO COUPON CATHODE RETURN (RESISTANCE):

CONNECTION OF TEST POINT

1. PIPE CATHODE IS CONNECTED TO IMPRESSED CURRENT RECTIFIER OR SACRIFICIAL ANODE.
2. PIPE CATHODE RETURN IS CONENCTED VIA TERMINAL STRIP TO PROTECTED COUPON CATHODE.
3. BETWEEN COUPON CATHODE RETURN AND REFERENCES AS SET OUT BELOW.

POTENTIAL TESTING IN SERVICE

AFTER CP SYSTEM HAS POLARIZED 'CARRY' OUT POTENTIAL TESTING AS DETAILED BELOW.

A) WITH SYSTEM ON (STATE IF CuSO<sub>4</sub> IS ON SURFACE OR ADJACENT PIPE)

WHILE COUPON IS CONNECTED TO PIPE CATHODE RETURN:

PROTECTED COUPON TO ZINC:

PROTECTED COUPON TO CuSO<sub>4</sub>:

UNPROTECTED COUPON TO ZINC:

UNPROTECTED COUPON TO CuSO<sub>4</sub>:

WHILE COUPON IS DISCONNECTED TO PIPE CATHODE RETURN:

PROTECTED COUPON TO ZINC:

PROTECFED COUPON TO CuSO<sub>4</sub>:

UNPROTECTED COUPON TO ZINC:

UNPROTECTED COUPON TO CuSO<sub>4</sub>:

RESISTIVITY

2 m. Pin Spacing - 55 N MEGGER READING 7.0150/M.

RESISTIVITY

A. J. Greaves

Brisbane City Council  
Dept of Water Supply and Sewerage  
Eagle Farm Pump Station  
Electrical Workshop

Date: 14-12-93

Site Plan for: TP NO 2 WARRIGAL RD.

For Future Conduit  
Run to Anode / Rectifier

180 MM.  
 $K > 1$

PIT

2.9 M.

SEQEB  
POLE N° 22914

2.8 M.

1-1.0 M-1

Brisbane City Council

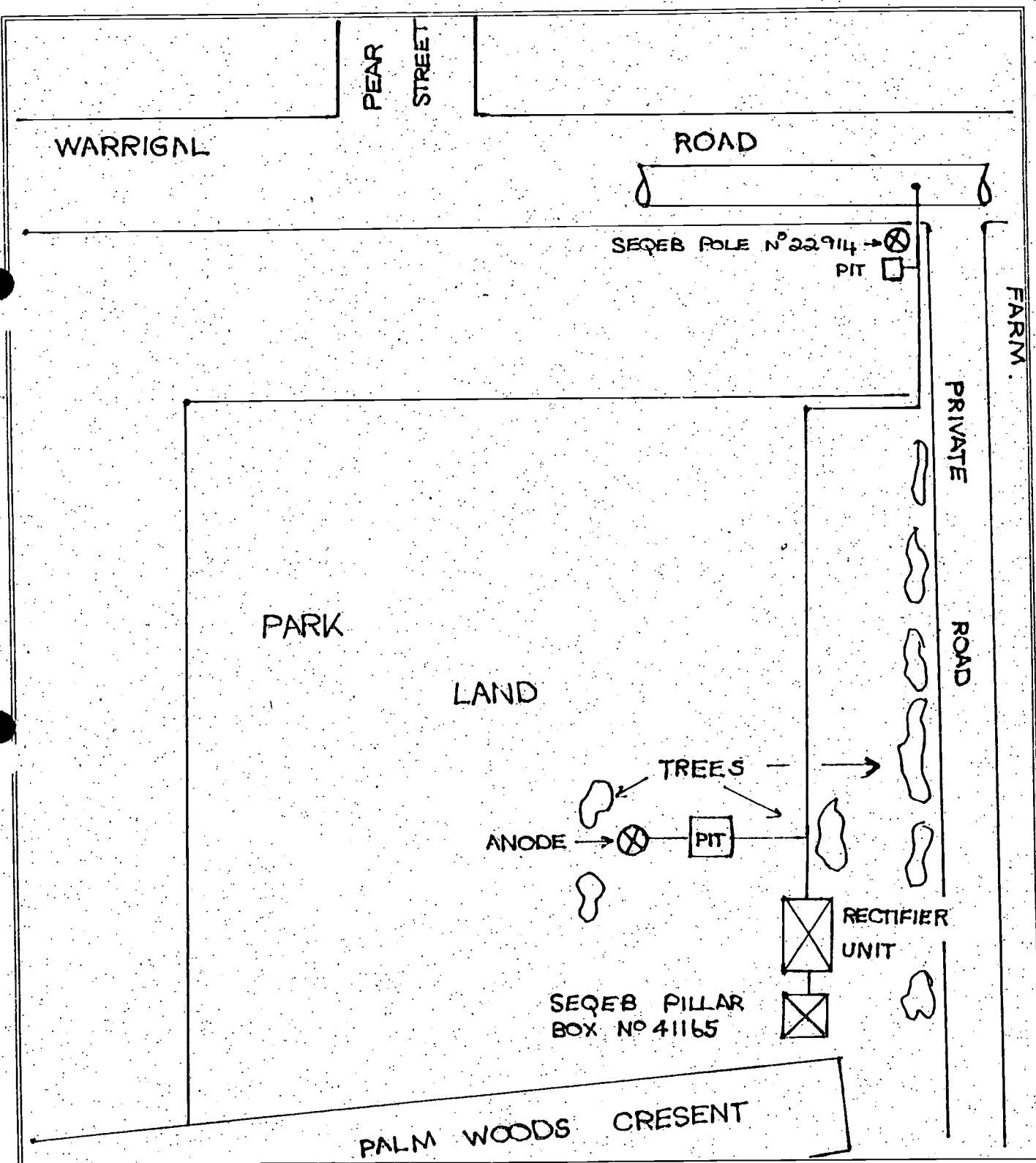
Dept of Water Supply and Sewerage

Eagle Farm Pump Station

Electrical Workshop

Date: 2-02-94

Site Plan for: WARRIGAL ROAD 600 DIA MSCL WATER TRUNK MAIN



**BRISBANE CITY COUNCIL  
EAGLE FARM PUMPING STATION  
CORROSION SECTION**

T.P. N° 3.

**STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING**

DATE: 22-12-93

LOCATION: WARRIGAL RD  
MAINS SIZE: 600 MM

TEST POINT TYPE: B

**POTENTIAL TESTING**

CATHODE TO CATHODE RETURN (RESISTANCE): 0.15V

+463 mV

ZINC REFERENCE TO PIPE:

-590 mV

CuSO<sub>4</sub> REFERENCE TO PIPE:

-1051 mV

ZINC TO CuSO<sub>4</sub>:

**EARTH TESTING**

PIN SPACING: 2.0M MEGGER READING: 1.85V RESISTIVITY: 22.6 ohm

PIN SPACING: MEGGER READING: RESISTIVITY:

**SACRIFICIAL ANODE**

(IF INSTALLED)

ANODE TYPE:

ANODE SIZE:

ANODE TO PIPE POTENTIAL (OPEN CIRCUIT):

ZINC REF TO PIPE:

(ANODE CONNECTED)

CUSO<sub>4</sub> REF TO PIPE:

(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:

(IF INSTALLED)

INSTALLED BY:

COMMENTS:

LOCATION

FENCE

T.P.

3.5M

GUTTER

5.0M

600 MM TRUNK MAIN

1 COPY TO FILE

ZN. REF. & CATHODE POINTS 1.2M DE

1 COPY TO T.O.

**BRISBANE CITY COUNCIL**  
**EAGLE FARM PUMPING STATION**  
**CORROSION SECTION**

T.P. N<sup>o</sup> 4**STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING**

DATE: 24/1/94  
TEST POINT TYPE: STD

LOCATION: WARRIGAL RD  
MAINS SIZE: 600MM

**POTENTIAL TESTING**

PROTECTED

CATHODE TO CATHODE RETURN (RESISTANCE): 0.1Ω  
ZINC REFERENCE TO PIPE: +461 mV  
CuSO<sub>4</sub> REFERENCE TO PIPE: -680 mV  
ZINC TO CuSO<sub>4</sub>: -1143 mV

**EARTH TESTING**

PIN SPACING: 2.0M MEGGER READING: 2.45Ω RESISTIVITY: 30.1Ω/m

PIN SPACING: MEGGER READING: RESISTIVITY:

**SACRIFICIAL ANODE  
(IF INSTALLED)**

LOCATION

ANODE TYPE:

ANODE SIZE:

ANODE TO PIPE POTENTIAL (OPEN CIRCUIT):

ZINC REF TO PIPE:

(ANODE CONNECTED)

CUSO<sub>4</sub> REF TO PIPE:

(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

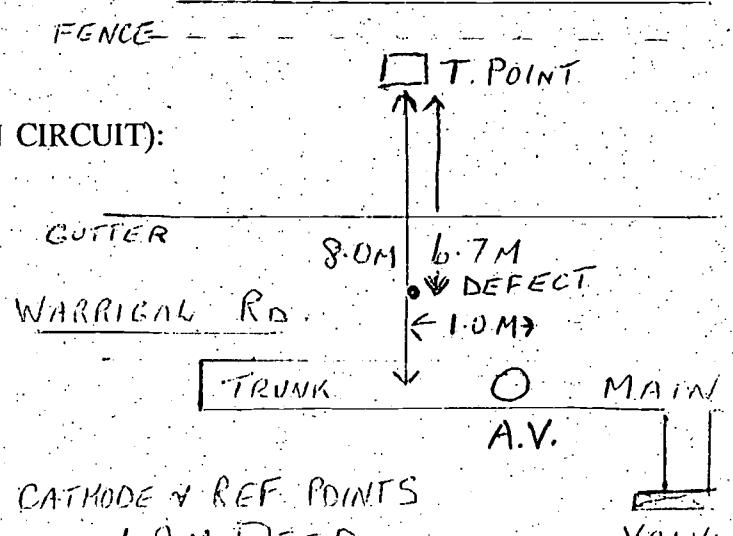
BLEED RESISTOR SIZE:  
(IF INSTALLED)

INSTALLED BY:

COMMENTS: Unprotected side not connected  
Defect installed at this T.P.

1 COPY TO FILE

1 COPY TO T.O.



CATHODE &amp; REF. POINTS

1.0M DEEP.

DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL BRANCH  
METROPOLITAN DIVISION  
EAGLE FARM PUMPING STATION

ELECTRICAL WORKSHOP

INSULATED JOINT TESTING DETAILS:

DATE: 24-1-94

DESCRIPTION

MAINS DETAILS:- 600 MM MSCL  
 LOCATIONS:- WARRIGAL RD OPP DAW  
 SIZE:- 600 MM  
 MATERIAL:- MILD STEEL C.L.  
 COATING:-  
 NUMBER:-

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:- ALL  $> 200 \Omega$   
 NUMBER OF BOLT:- 12  $> 200 \Omega$   
 FLANGE TO FLANGE RESISTANCE:-  
 INSULATION CHECKER MODEL 702:- OK  
 POTENTIAL DIFFERENCE TO REFERENCE CELL  
 PROTECTED SIDE:- +680 mV  
 UNPROTECTED SIDE:- +714 mV

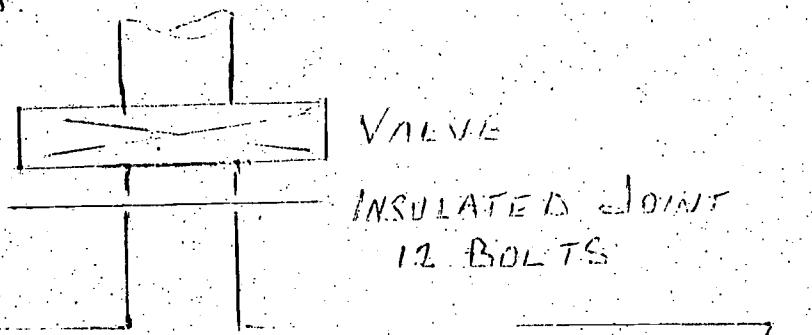
ABOVE TESTING

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

COMMENTS

TESTED BY

*J. Gleeson*



**DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL BRANCH  
METROPOLITAN DIVISION  
EAGLE FARM PUMPING STATION**

**ELECTRICAL WORKSHOP**

**INSULATED JOINT TESTING DETAILS:**

DATE 22-12-93

**DESCRIPTION**

MAINS DETAILS:- WARRIGAL RD TO DAW ST.  
 LOCATIONS:- WARRIGAL RD VALUE PIT NEAR PLUM ST.  
 SIZE:- 600 MM / 450 MM.  
 MATERIAL:- MSGL.  
 COATING:-  
 NUMBER:-

**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:-

UNPROTECTED SIDE:-

**ABOVE TESTING**

BOLT TO FLANGE RESISTANCE:- ALL  $\geq$  200 N

NUMBER OF BOLTS:- 4 Bolts BY PASSES & 12 ON MAIN.

FLANGE TO FLANGE RESISTANCE:- ALL  $\geq$  200 N

**COMMENTS**

Passed OK.

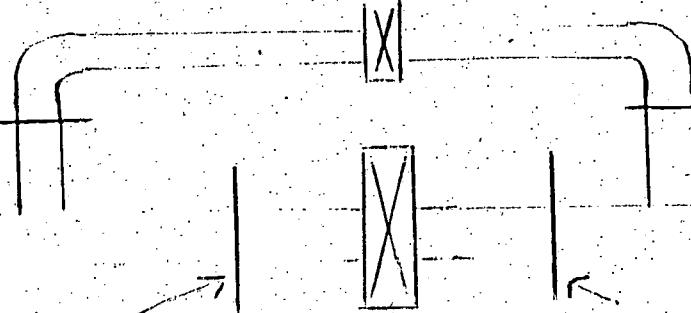
1 J. greased

**TESTED BY**

BY PASS

VALVE

INSULATED  $\rightarrow$   
JOINT 4 BOLTS



INSULATED Joint 4 BOLTS

INSULATED Joint 12 BOLTS

VALVE

INSULATED Joint 12 BOLTS

DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL BRANCH  
METROPOLITAN DIVISION  
EAGLE FARM PUMPING STATION

## ELECTRICAL WORKSHOP

WARRIGAL RD.

## INSULATED JOINT TESTING DETAILS:

DATE 14/12/93

DESCRIPTION

MAINS DETAILS:- 600 MM M.S.C.L.  
 LOCATIONS:- WARRIGAL RD EPP. PINE ST  
 SIZE:- 600 MM  
 MATERIAL:- MILD STEEL  
 COATING:- PVC  
 NUMBER:-

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:-  $\geq 200 \Omega$   
 NUMBER OF BOLT:- 12  $\geq 300 \Omega$   
 FLANGE TO FLANGE RESISTANCE:-  
 INSULATION CHECKER MODEL 702:- OK  
 POTENTIAL DIFFERENCE TO REFERENCE CELL  
 PROTECTED SIDE:-  $-450 \text{ mV}$   
 UNPROTECTED SIDE:-  $-440 \text{ mV}$

ABOVE TESTING

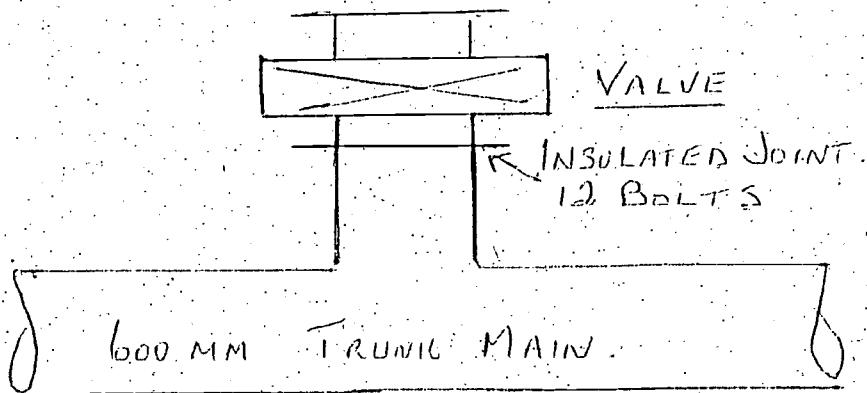
BOLT TO FLANGE RESISTANCE:-  
 NUMBER OF BOLTS:-  
 FLANGE TO FLANGE RESISTANCE:-

COMMENTS

Insulated washers on one side only.  
 Flange joint wrapped.

TESTED BY

A.J. Gleeson



Brisbane City Council

Dept. W.S. &amp; S.

Metropolitan Division

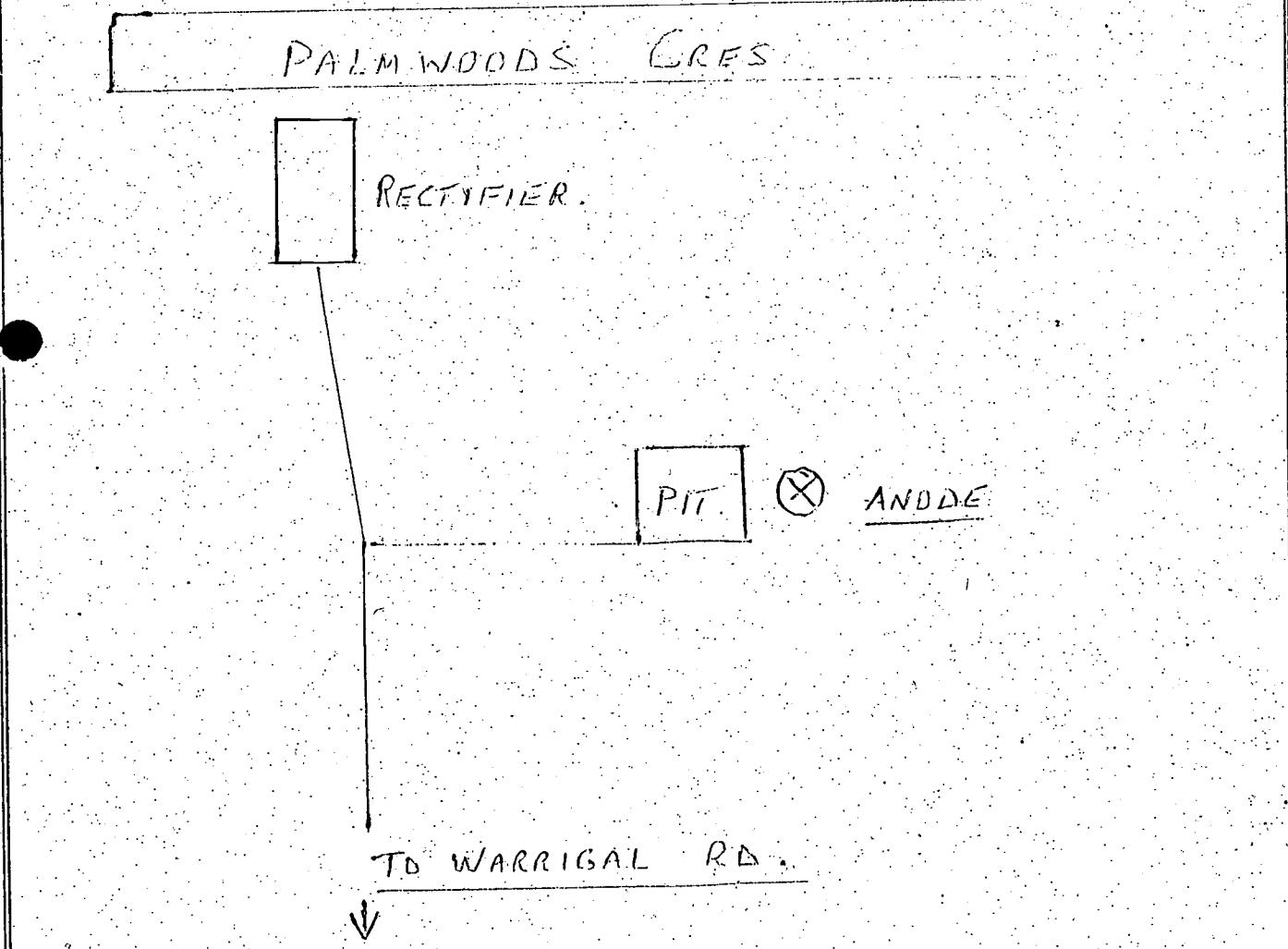
Eagle Farm Pump Station

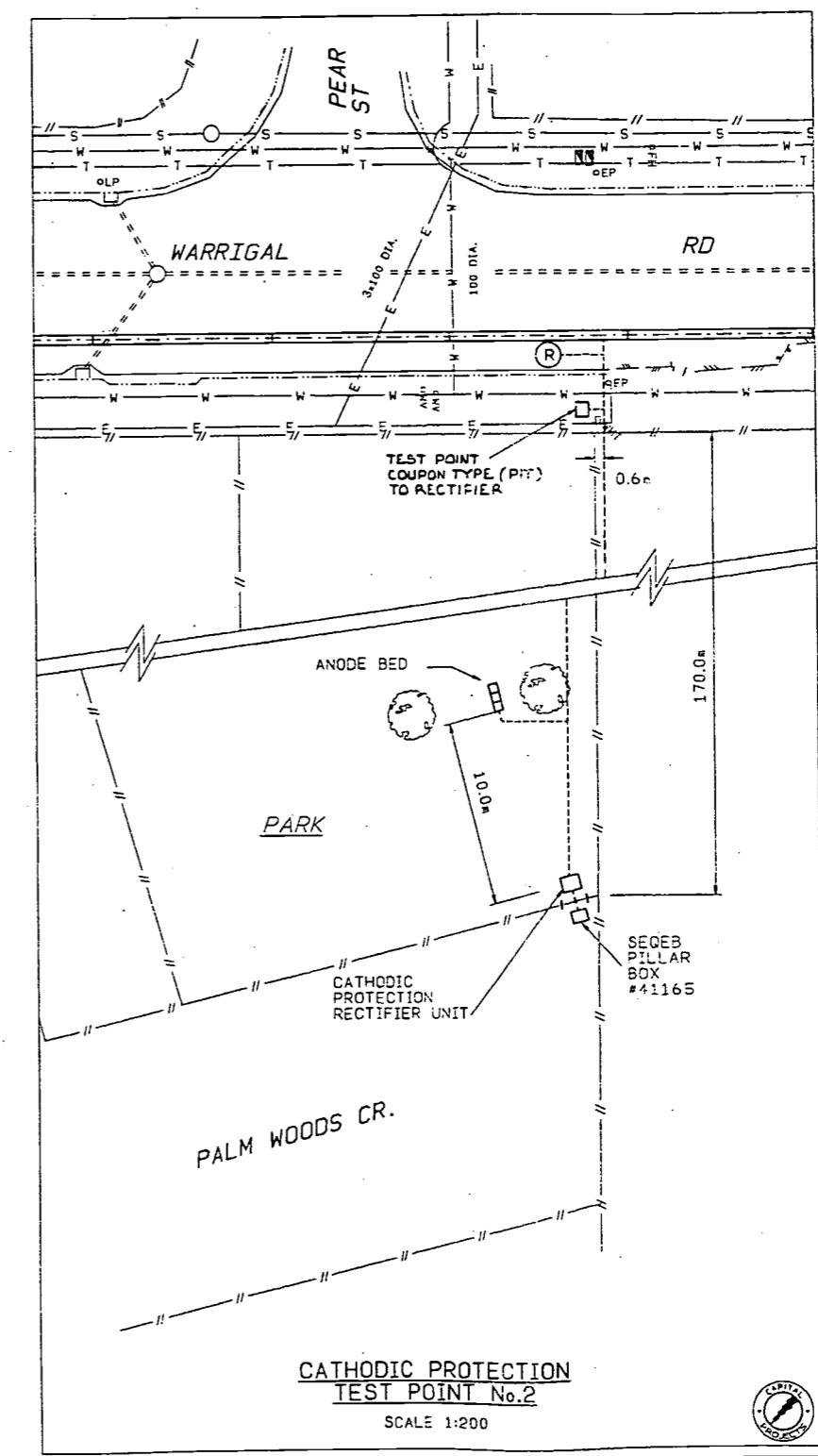
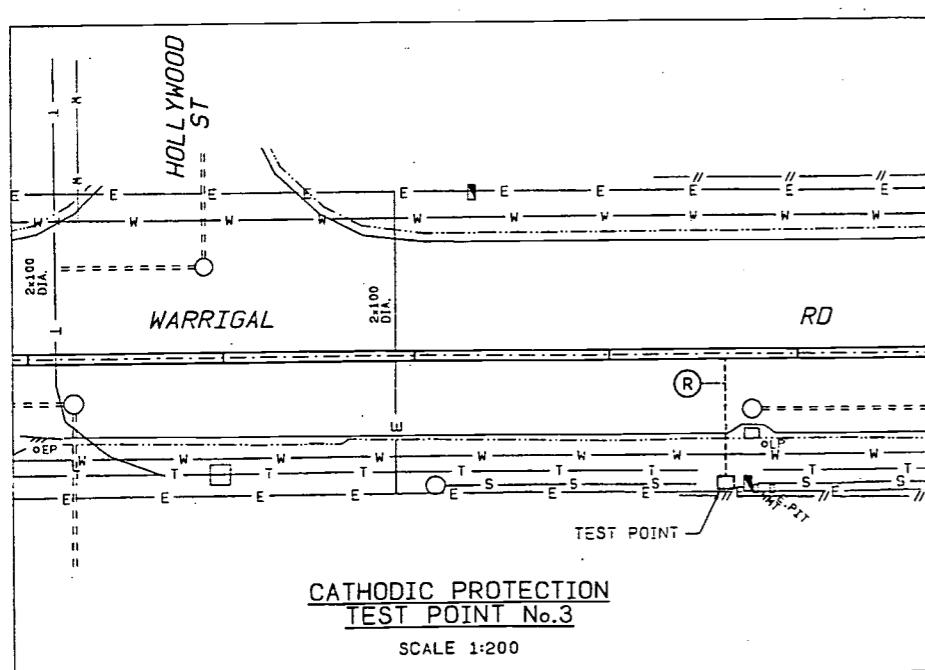
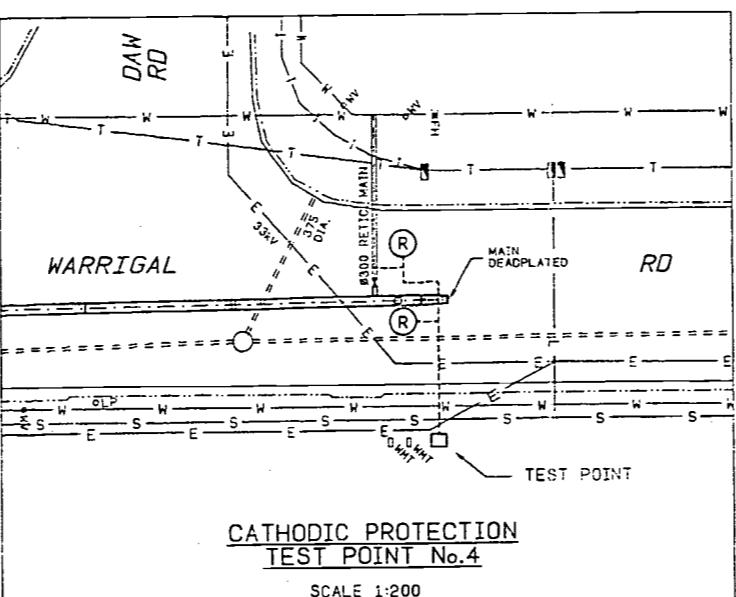
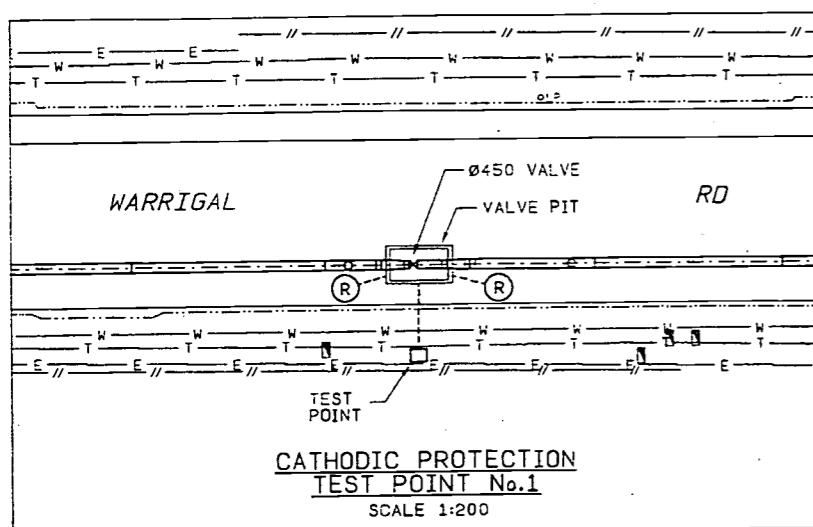
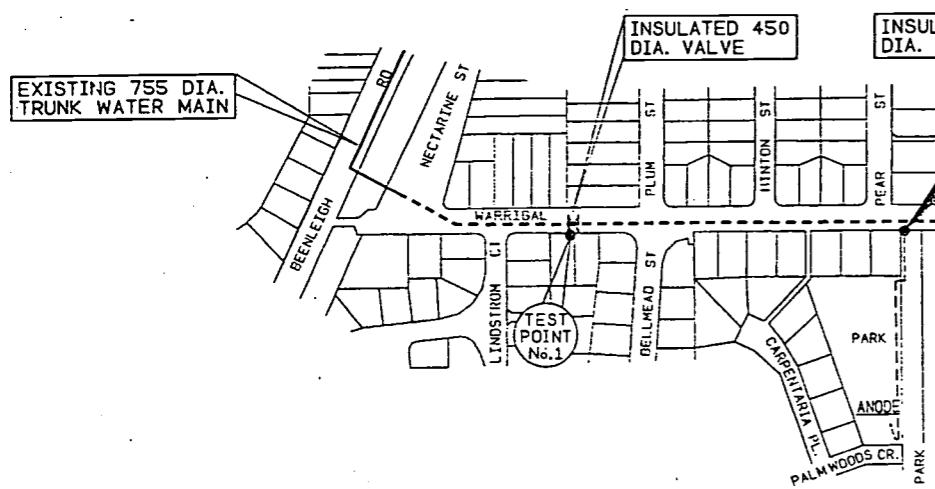
## Electrical Workshop

Cathodic Protection Anode Bed Testing

Date:	19-1-94	Structure:	WARRIGAL RD TRUNK MAIN
Anode material:	SILICONE IRON	Anode size/weight:	1500 x 75 MM
Packaging:	CANISTER	Burial:	VERTICAL
Depth:	5.0 M	Resistivity: 3M = 0.44 SV = 8.28 SV/M. 5M = 0.22 SV = 6.9 SV/M.	
Test Point type:	PIT	Signage:	YES
Resistance to ground:			
Anode 1	Anode 2	Anode 3	Anode 4
Tested by:			Anode 5

## Locality Plan:





NOTES	
1. REFER DRAWING - 486/4/6-W102220 TO 486/4/6-W102930 FOR TRUNK MAIN DETAILS.	
2. ALL SCOUR VALVES, AIR VALVES & FLANGED BRANCHES TO HAVE INSULATING BOLTS INSTALLED.	
A 354 RECTIFIER RELOCATED JF O 153 ISSUED FOR CONSTRUCTION JF NOTE: AMENDMENT/ISSUE TO ISSUE FOR INTALS AMENDMENT & ISSUE REGISTER	
MANAGER DIRECTOR OF PLANNING & DESIGN DATE	
DIRECTOR OF CONSTRUCTION	DIRECTOR OF SEWAGE & WASTE SERVICES
DESIGN J SAY 8/1993	ENGINEER IN CHARGE
DRAWN JNFIELD 8/1993	SUPERVISING ENGINEER M LILLES
TRACED	SENIOR ENGINEER
CHKD JW 12/1993	ENGINEER
CADD FILE NO. 660006A REFERENCES	
BRISBANE CITY COUNCIL DEPARTMENT OF WATER SUPPLY & SEWERAGE MECHANICAL & ELECTRICAL SERVICES	
PROJECT WARRIGAL RD C.P. SYSTEM WARRIGAL ROAD TO DAW ROAD TRUNK WATER MAIN	
TITLE 600 DIA. MSCL WATER TRUNK MAIN C.P. DETAILS	
SCALE AS SHOWN N° 1 OF 1 SHEETS	
DRAWING NO. 486/6/6-UE1C0006E	AMEND A

