



BRISBANE WATER

Network Control Systems

FUNCTIONAL SPECIFICATION

SP268 Central Macarthur Ave

Vacuum Sewage Pumping Station

2 Vacuum Pumps and 2 Discharge Pumps





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Document Signoff**Approval**

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Revision Control

Revision Number	Date	Amendment Details	Responsible Officer
Version 0.00	11/11/2004	Original Draft – Developed from SPXXX Revised Functional Spec – Version 3	Michael Thorpe
Version 0.01	09/07/2006	Control information added	Tim Waggett

Document Consultation

Please review the attached document and add your comments where necessary. To ensure that the process is kept within reasonable timeframes, it would be appreciated if you could return this document by the **Requested Return Date** listed below.

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Definitions

IDTS	Integrated Departmental Telemetry System
RTU	Remote Telemetry Unit
SCADA	Supervisory Control And Data Acquisition
MAHD	Metres above Australia Height Datum

1 INTRODUCTION

This document contains the site specific details and describes the non standard functional requirements for control, monitoring and telemetry at sewage pump station SP268 at Central Macarthur Avenue, Pinkenba.

The site specific details and the non standard functional requirements in this document have been provided by Hepburn & Thorpe (Qld) Pty Ltd.

SP268 is a vacuum sewage pump station incorporating two D.O.L driven 2.2 kW dry mounted air cooled bearing frame pumps operating in a duty/standby arrangement. The vacuum is provided by D.O.L. driven 2 aircooled integrated 4.5kw motor claw vane vacuum pumps, operating in a duty /standby arrangement.

The vacuum sewer station requires two separate control circuits to operate, one for the discharge pumps taking the sewage out of the collection vessel to the rising main, and the second a pressure switch controlling the vacuum pumps to ensure the system pressure as measured at the vessel remains in the operating vacuum range.

SP268 is located in a dedicated easement in the car park of the Helitech, Central Macarthur Ave, Pinkenba.

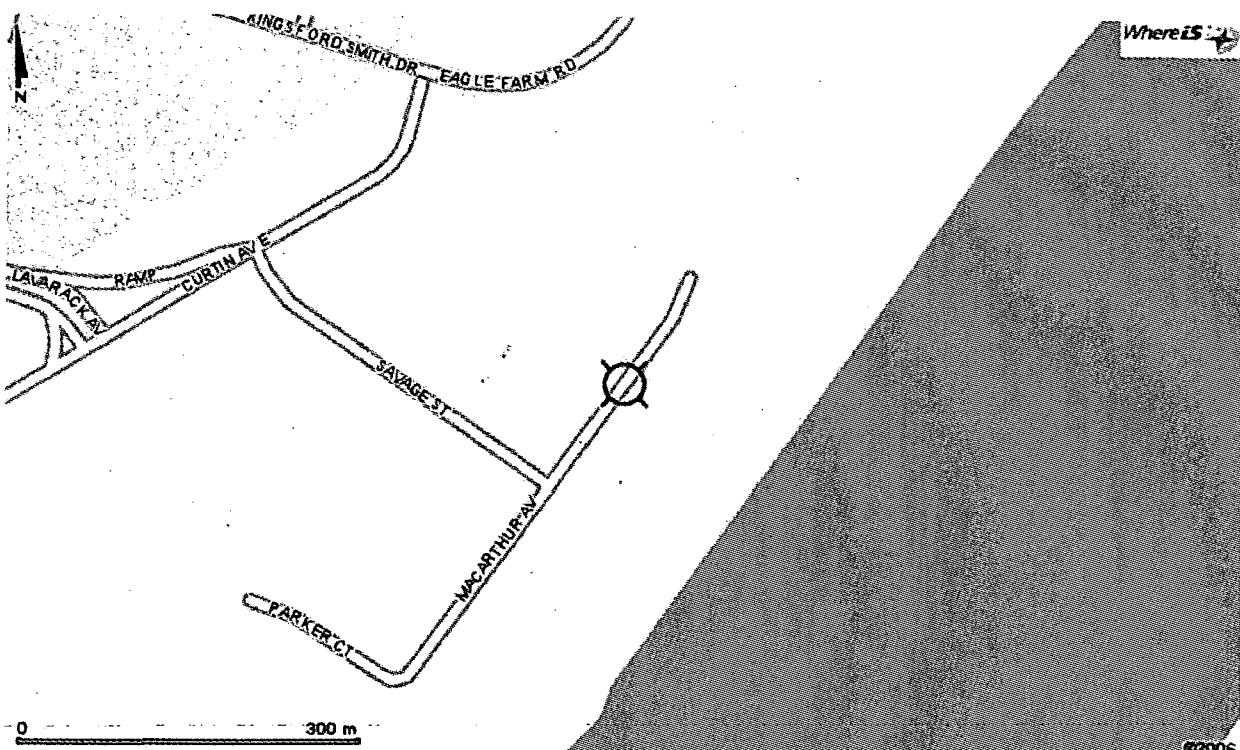


Figure 1: SP268 Location Map

1.1 General Process Description

The incoming flow to the pump station comes from the associated vacuum sewerage reticulation system. The system comprises of a trunk main running the length of Central Macarthur Avenue, with Vacuum interface chambers at each property. In some locations these chambers are located within the property boundaries. In these instances, the line work internal to the property may be isolated from the trunk main by means of resilient seated sluice valves located at the property boundary.

The vacuum vessel located in the station is evacuated to maintain an operating range of -55kPa to -75 kPa of vacuum. The differential pressure between atmospheric (0kPa relative) and the vessel pressure drives the flows along the line work to the station. The only power connection input to the reticulation/collection system is at the pump station. The indication to control the vacuum pumps is provided by Allan Bradley diaphragm differential pressure switches (duty on/off, standby on/off, alarm on/off).

Once the flows have arrived inside the vacuum collection vessel, the level is kept within the working range (1/4 to ¾ full) by a multitrode indicator and relay system. The indication from this system (duty on/off, standby on/off, alarm – high-high) is fed into the plc/telemetry unit, which controls the discharge pumps.

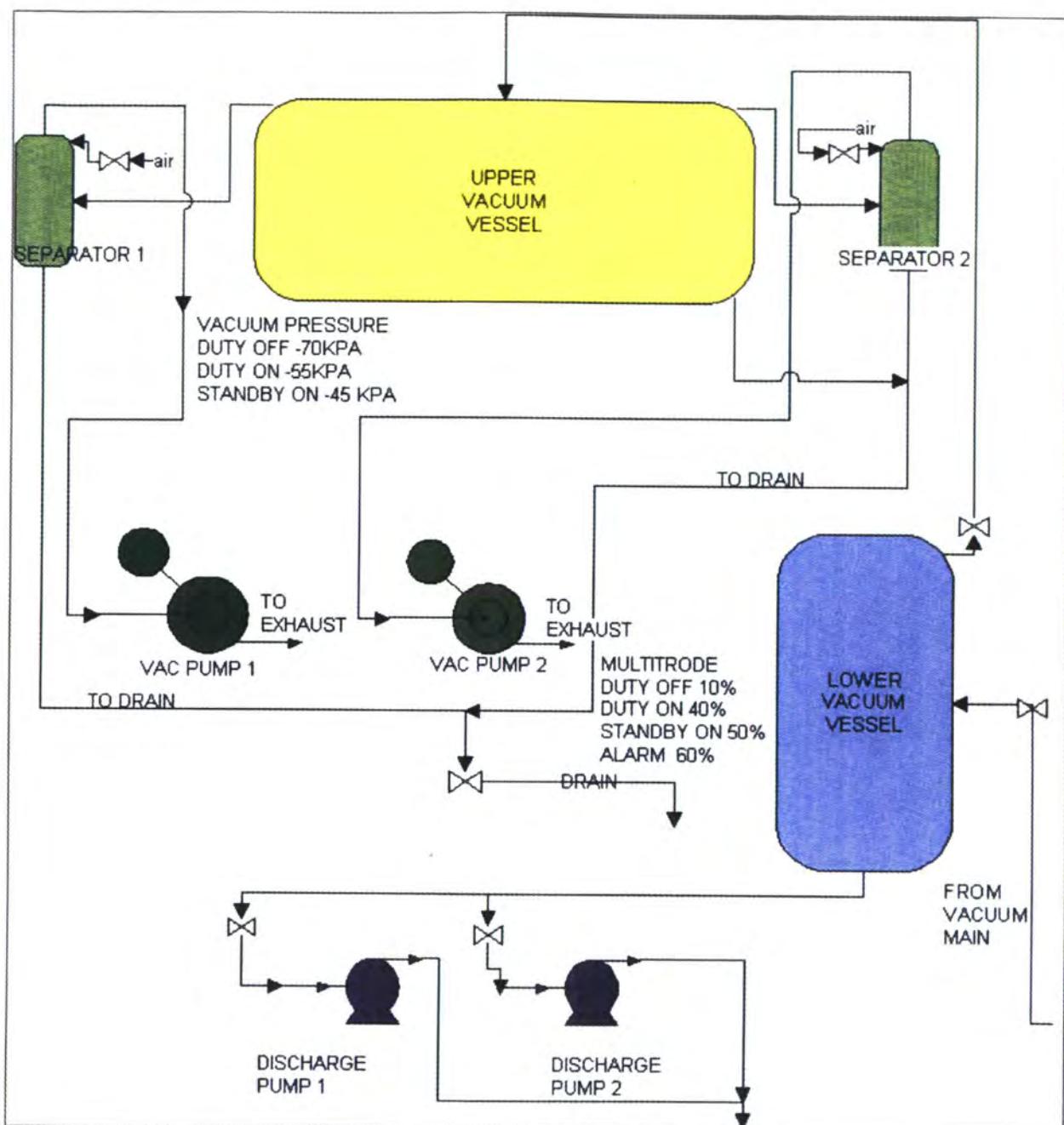


Figure 2: SP268 Process and Instrumentation Overview

The discharge pumps within the station will output 20l/s each into the main, running in parallel they will discharge approximately 28l/s.

The vacuum pumps will evacuate 200m³/hr from the system, working together they will achieve an effective 400m³/hr. The amount of sewage able to be collected by the system is a function of the air/water ratio on which the system operates. As the maximum length of vacuum main is approximately 1.8km, a design ration of 6 parts air to 1 part sewage would be appropriate. As a result, the maximum flow through the station is calculated to be $200,000/(60 \times 60 \times 6) = 9.25l/s$

The station is limited by the ability of the vacuum pumps to generate vacuum to transport the required air to push the flows into the station, and the ability of the discharge pumps to evacuate the chamber. As flows are increased, there is also the storage capacity of the vacuum vessel. Higher flows incoming mean the vacuum pumps need to start more often to maintain the vacuum within the working range. A second pressure vessel has been installed to the pump station extension to increase the active storage, to limit this effect. Likewise, higher flows entering the station will fill the pressure vessel faster, making the discharge pumps start more often. The working levels in the pressure vessel have been changed to allow a greater storage of sewage in the vessel before the duty pump starts, cutting the number of starts required.

The two vessels combined have a volume of $1.4m^3 + 1.8m^3 = 3.2m^3$

The active sewage storage volume is $1.8 \times (3/4 - 1/4) = 0.9m^3$

The active air storage volume is $3.2 - (1.8 \times 3/4) = 2.05m^3$

2 EQUIPMENT INSTALLED

SP268 Central MacArthur Ave Vacuum pump station has the following equipment installed. The functionality for the control, monitoring and alarming for these items is fully described in the standard functional specification.

Pumps	Two Hidrostal bearing frame pumps with 2.2 kW four pole electric motors are installed in the dry well.
Pump Starters	DOL.
Flow meters	Nil
Level Sensors	Multitrode.
Pressure Transmitters	Three Allen Bradley diaphragm vacuum switches
Internal sump drain	Airvac 2" vacuum valve
Internal crane	2 custom build 0.5ton gantry cane

Table 1 – Installed Equipment

2.1.1 Internal Sump Drain

The internal sump is drained using an Airvac 2" vacuum valve. Parts and Service are available from Airvac RSM/ Flowvac, Sydney. There is an external drain for the hand basin, draining to the vacuum pit servicing Helitech adjacent the station, located immediately north of the station wall, outside the station but inside the station fenced enclosure.

2.1.2 Internal Crane

The building is fitted with two custom built 0.5 ton cranes. The vacuum pumps are fitted below the air/water separator, and are also fitted with wheels to allow them to roll out from the tank shadow into the open to be picked up by the crane. These can then be moved to the doorway to be put onto a truck by hiab. Likewise the discharge pumps are lifted by the fixed rail crane, and placed in the doorway to be picked up by hiab.

When removing pumps for servicing and repairs, it is advisable to fit blanking flanges/caps over pipework to prevent leakage/outgassing that may occur around incompletely sealed valvework.

3 CONTROL PHILOSOPHY

The pump system at SP268 Parker Island is NOT a standard vacuum system and the standard pumpstation document DOES NOT apply.

Macarthur Ave Vacuum station control can be considered as two separate entities: Vacuum Control System working off Vacuum Line Suction, and Sewage Pump system working off the level in the storage tank.

3.1 Vacuum System

The Vacuum system tries to keep the pressure in the pipeline between ~50 and ~70kPa. These pressure setpoints are manually adjusted on the actual pressure gauge and are hard-wired back as Digital Inputs to the PLC. The two (2) vacuum gauge signals are:

1. Vacuum Pressure High High: The Vacuum pressure is above the adjusted setpoint.
2. Vacuum Pressure High - Run Duty: The Vacuum pressure is above the adjusted setpoint and the duty Vacuum pump is required to run to bring the pressure back down (less pressure = more suction). Nominally set at ~50kPa.
3. Vacuum Pressure Low - Stop Vacuum Pumps: The Vacuum pressure is at the low setting which indicates that there is sufficient vacuum in the pipeline for reliable operation and the Vacuum Pump can stop. Nominally set at ~70kPa

The vacuum pumps are controlled by binary switch control – there is no continuous pressure sensing, but rather setpoint indication only. The vacuum switches should be confirmed in their operation as holding settings at 12 monthly intervals

3.1.1 Vacuum Pumps

The Vacuum pumps can be controlled in Automatic (Pressure Control) or Manual via start/stop pushbuttons from the Switchboard front panel. Only one pump can be run in Manual at a time.

The Vacuum pumps operate in a duty/standby configuration. The Standby Vacuum pump starts if the Duty Vacuum pump has been running for 5 minutes and has not sucked the pressure down below the Vacuum Pressure High High setpoint.

The Vacuum Pumps cycle duty after each operation (i.e if Vacuum Pump 1 is duty, and it brings the pressure down to the stop point and stops, then Vacuum Pump 2 will become duty pump for the next cycle. If the duty Vacuum pump fails, then control is automatically switched to the other Vacuum pump if available).

After a Vacuum Pump has run and stops under normal operating conditions, it is locked out from restarting for 2 minutes to prevent excessive cycling.

Both Vacuum Pumps are interlocked with Vacuum Tank 1 & Vacuum Tank 2 Level High High switches to prevent liquid being drawn by the Vacuum Pumps.

3.1.2 Vacuum Pump Alarms

The following alarms determine the availability of a Vacuum Pump for Control:

- If a vacuum pump runs for 5 minutes without bringing the Vacuum pressure below the High setpoint, the pump is marked as 'failed to Operate' and made unavailable.
- Vacuum pump contactor operation is monitored to provide a 'Fail to Start' fault. This is reset by switching the system out of Automatic.
- Vacuum Pump Overload which is monitored to provide Electrical protection.

3.2 Sewage Pump System

The Sewage pump system draws sewage out of the bottom of the Vacuum Tanks and pumps it into the main sewer. The Sewage system keeps the level in the Vacuum Storage tanks to a minimum. The Sewage Pumps are controlled by Multitrodes which are hardwired to the PLC to provide the following signals:

1. Vacuum Tank 1 Level High High – Run Standby Sewage Pump if available
2. Vacuum Tank 1 Level High – Run Duty Sewage Pump
3. Vacuum Tank 1 Level Low
4. Vacuum Tank 1 Level Low Low. – Stop Sewage Pumps
5. Vacuum Tank 2 Level High High – Run Standby Sewage Pump if available

Note that the segmented Multitrode is only connected to Vacuum Tank 1 (lower Vacuum Vessel) as this is the main vessel for sewage to settle in.

The Duty Sewage Pump starts whenever a Vacuum Tank Level High signal is received from either of the Vacuum storage tanks, and continues to run until the Vacuum Tank 1 Level Low Low level is reached. In the event of a Vacuum Tank High High level switch being operated, then both sewage pumps are called to run.

3.2.1 Sewage Pumps

The Sewage pumps can be controlled in Automatic (Level Control) or Manual via start/stop pushbuttons from the Switchboard front panel. Only one pump can be run in Manual at a time.

The Sewage pumps operate in a duty/standby configuration. The Standby pump is only called to run under emergency conditions if a Vacuum Tank Level High High switch is activated.

The Sewage Pumps cycle duty after each operation (i.e if Sewage Pump 1 is duty, and it brings the level down to the stop point and stops, then Sewage Pump 2 will become duty pump for the next cycle). If the duty Sewage pump fails, then control is automatically switched to the other Sewage pump if available.

Both Sewage Pumps are interlocked with Sewage Pump Pit Flooded switches to prevent operation of pumps whilst submerged.

3.2.2 Sewage Pump Alarms

The following alarms determine the availability of a Sewage Pump for Control:

- Sewage pump contactor operation is monitored to provide a ‘Fail to Start’ fault. This is reset by switching the system out of Automatic.
- Sewage Pump Overload which is monitored to provide Electrical protection.

3.3 Site Specific Values

Tagname	Signal	Operation	Value	Units
%I0016	Vacuum Pressure High High	Determines Faulty Vacuum Pump	-20	kPa
%I0015	Vacuum Pressure High	Starts Vacuum Pumps	-50	kPa
%I0014	Vacuum Pressure Low	Stops Vacuum Pumps	-70	kPa
%I0017	Vacuum Tank 1 or 2 Level High High	Starts Standby Sewage Pump	50	%
%I0018	Vacuum Tank 1 Level High	Starts Duty Sewage Pump	40	%
%I0019	Vacuum Tank 1 Level Low		20	%
%I0020	Vacuum Tank 1 Level Low Low	Stops Sewage Pumps	10	%

Table 2: Site Specific Constants

Table 3: Wet Tank Level vs Volume Data

	Height (m above lower tank invert)	Volume m ³	Remaining Storage m ³	% Level (by multitrode)	% Volume
1	0	0.000	1.41	0%	0%
2	0.2	0.27	1.24	20%	19%
3	0.4	0.44	1.07	40%	0.31%
4	0.6	0.61	0.95	60%	43%
5	0.8	0.78	0.78	80%	55%
6	1.0	0.95	0.61	100%	67%
7	1.2	1.07	0.44	120%	70%
8	1.4	1.24	0.27	140%	88%
9	1.5	1.41	0	160%	100%

3.4 Valve Control

The station is fitted with a manually operated resilient seated isolation valve for the incoming vacuum sewerage mains. This enables the station to be operated automatically with the external reticulation disabled. Running in this fashion allows any operational issues to be quickly identified as stemming from either internal or external issues.

3.4.1 Failure States

There are three failure modes that will prevent a successful mode change. These failure modes and their respective recovery procedures are as follows.

Failure Mode	Diagnostic action	Outcome
Fail to achieve vacuum	Manually close vacuum mains isolation valve. Vacuum will immediately either climb to duty off level, or remain at low level	Vacuum Recovers – air is being admitted into the reticulation system externally – start fault identification operation for vacuum reticulation system. Vacuum does not recover – suspect vacuum pump system is faulty. Fault find starting at vacuum pumps, and confirm internal pipework is also functional.
Fail to empty wet vessel – alarm float locks out vacuum pumps	Remove multitrode, clean and test.	Multitrode system if faulted will need resetting, otherwise suspect discharge pump failure.

3.5 Telemetry Monitoring and Alarms

Signals from the PLC are hardwired to the Motorola RTU and provide limited annunciation back to the control room at Eagle Farm. There is no facility for remote control of pumpstation SP268.

3.5.1 PLC Signals

The PLC signals to the RTU are as follows:

PLC Output	Description	Priority
%Q0017	PLC Running/Site Power Fail	1
%Q0018	Station Automatic Mode	1
%Q0019	Level High High Alarm (from either Vacuum Tank 1/2 or Pump Pit Flooded)	1
%Q0020	Vacuum Pressure High High (No vacuum in line)	1
%Q0021	Vacuum Pump 1 Unavailable (Overload/Fail to Start/Fail to Operate)	n/a
%Q0022	Vacuum Pump 2 Unavailable (Overload/Fail to Start/Fail to Operate)	n/a
%Q0023	Sewage Pump 1 Unavailable (Overload/Fail to Start)	n/a
%Q0024	Sewage Pump 2 Unavailable (Overload/Fail to Start)	n/a
%Q0025	Vacuum Pump 1 Running	n/a
%Q0026	Vacuum Pump 2 Running	n/a
%Q0027	Sewage Pump 1 Running	n/a
%Q0028	Sewage Pump 2 Running	n/a

Table 4 - PLC Hardwired signals to Motorola RTU

3.5.2 IDTS Monitoring and Alarms

The following points are generated back to the IDTS system from the Motorola RTU.

Description	Type
Dry Well 1 High	Digital
PLC1 Comms Fault	Digital
Pressure Gauge 1 Low	Digital
RTU Battery Status	Digital
RTU CPU Battery Status	Digital
RTU Heartbeat	Analog
RTU Heartbeat Failed	Digital
RTU IO Module Failed	Digital
RTU Mains Fail	Digital
Sewage Pumpstation Availability Index	Analog
Sewage Pumpstation Current Availability	Analog
Sewage Pumpstation Current Utilisation	Analog
Sewage Pumpstation Local/Remote	Digital
Sewage Pumpstation Mains Fail	Digital
Sewage Pumpstation Outage	Digital
Sewage Pumpstation Utility Index	Analog
Sewage Pump 1 Constant Average	Analog
Sewage Pump 1 Constant High Limit	Analog
Sewage Pump 1 Constant Low Limit	Analog
Sewage Pump 1 Daily Average	Analog
Sewage Pump 1 Daily High Limit	Analog
Sewage Pump 1 Daily Low Limit	Analog
Sewage Pump 1 High Run Hours	Digital
Sewage Pump 1 High Running Behaviour	Digital
Sewage Pump 1 Hours Run	Analog
Sewage Pump 1 & 2 Hours Run	Analog
Sewage Pump 1 & 2 Hours Run Yesterday	Analog
Sewage Pump 1 Hours Run Indication	Analog
Sewage Pump 1 Hours Run Yesterday	Analog
Sewage Pump 1 Hours Run Yesterday Ind	Analog
Sewage Pump 1 Low Hours Run	Digital
Sewage Pump 1 Low Running Behaviour	Digital
Sewage Pump 1 Number of Starts	Analog
Sewage Pump 1 Running	Digital
Sewage Pump 2 Constant Average	Analog
Sewage Pump 2 Constant High Limit	Analog
Sewage Pump 2 Constant Low Limit	Analog
Sewage Pump 2 Daily Average	Analog
Sewage Pump 2 Daily High Limit	Analog
Sewage Pump 2 Daily Low Limit	Analog
Sewage Pump 2 High Run Hours	Digital
Sewage Pump 2 High Running Behaviour	Digital
Sewage Pump 2 Hours Run	Analog
Sewage Pump 2 Hours Run Indication	Analog
Sewage Pump 2 Hours Run Yesterday	Analog
Sewage Pump 2 Hours Run Yesterday Ind	Analog
Sewage Pump 2 Low Hours Run	Digital
Sewage Pump 2 Low Running Behaviour	Digital
Sewage Pump 2 Number of Starts	Analog

SP268 Central Macarthur Ave Vacuum Sewerage Pumping Station – Functional Specification

Brisbane Water

Sewage Pump 2 Running	Digital
Vacuum Pump 1 Available	Digital
Vacuum Pump 1 Hours Run	Analog
Vacuum Pump 1 & 2 Hours Run	Analog
Vacuum Pump 1 & 2 Hours Run Yesterday	Analog
Vacuum Pump 1 Hours Run Yesterday	Analog
Vacuum Pump 1 Number of Starts	Analog
Vacuum Pump 1 Running	Digital
Vacuum Pump 1 Water Fault	Digital
Vacuum Pump 2 Available	Digital
Vacuum Pump 2 Hours Run	Analog
Vacuum Pump 2 Hours Run Yesterday	Analog
Vacuum Pump 2 Number of Starts	Analog
Vacuum Pump 2 Running	Digital
Vacuum Pump 2 Water Fault	Digital
Vacuum Tank Level High High	Digital

Table 5 - IDTS Points

3.6 Non Standard IDTS Picture

Due to the non-standard board installed at SP268, limited information is available on the IDTS system. The current IDTS picture is as follows:

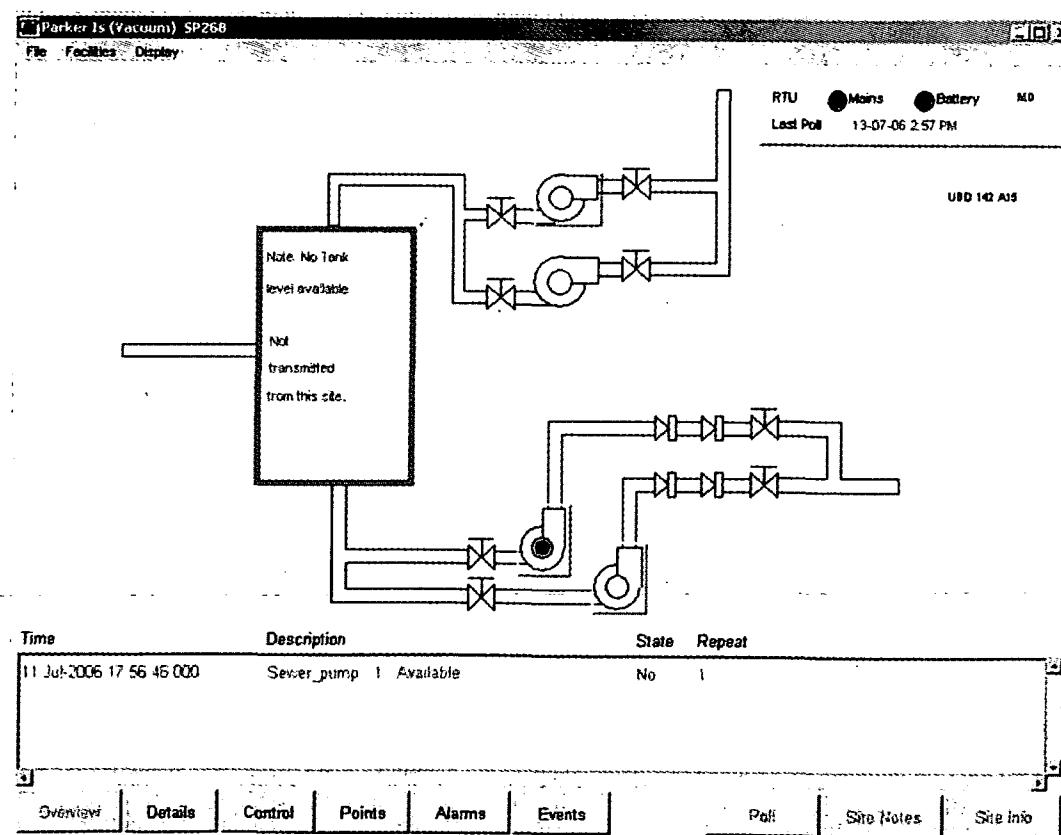
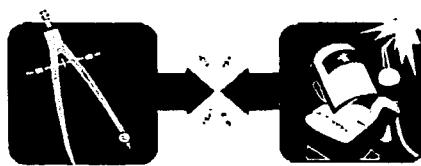


Figure 3 – IDTS Overview

Information conveyed is limited to Pump Availability/Running Status and RTU communications status.

Tank Solutions

Test Certificate



Tank Solutions Pty Ltd

ABN 22 095 541 816

Unit 4, 15 Porter Street,

Hemmant, Qld. 4174

Ph 61 7 3390 4800

Fx: 61 7 3390 4667

TEST CERTIFICATE

This certifies that the 1 x 3,300 litre Vacuum Tank supplied to:-

Hepburn & Thorpe (QLD) Pty. Ltd
10A Industrial Avenue,
Moleninar QLD

For installation at:
Pinkenba (TBA)

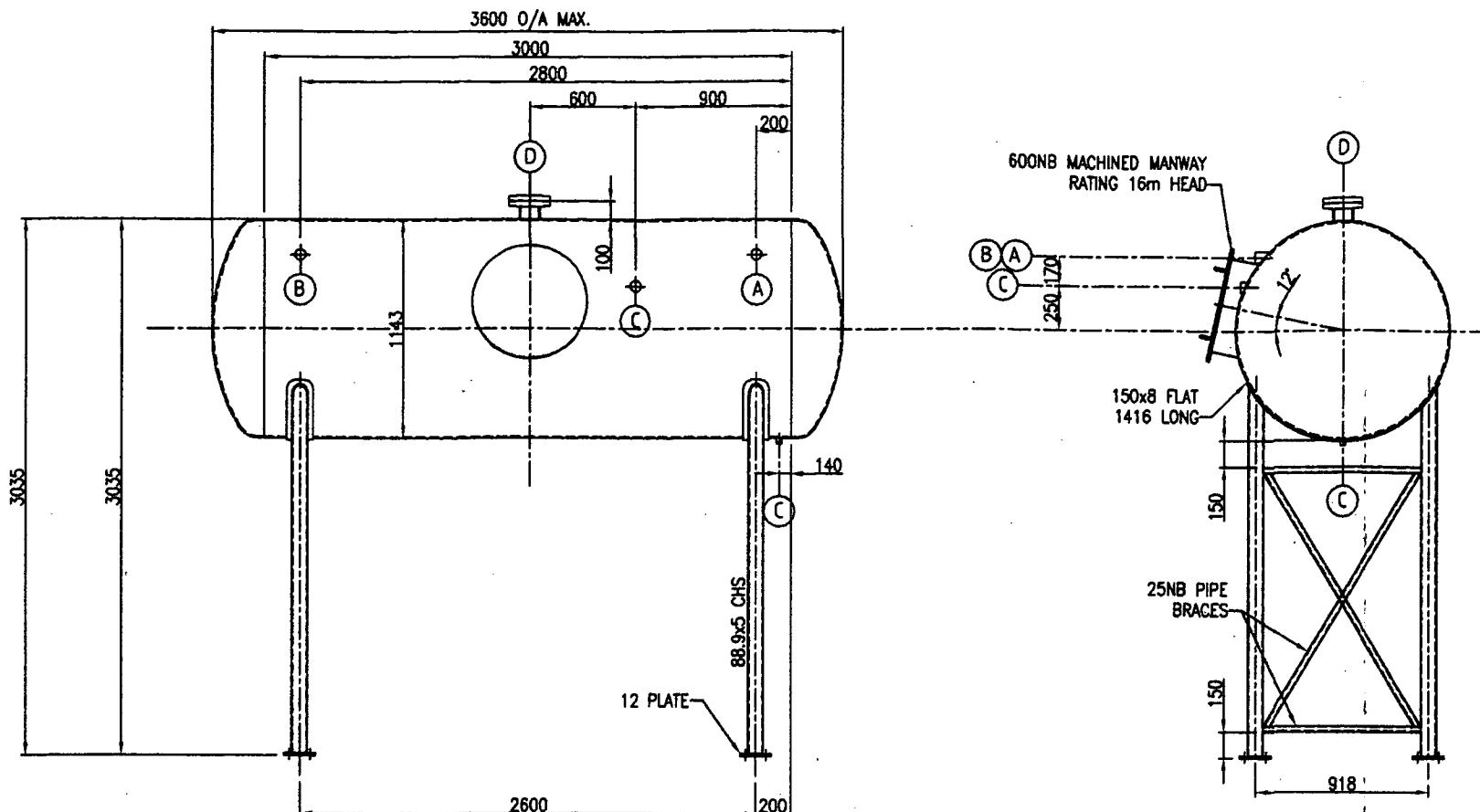
has been designed and manufactured to AS1210 Class 3 and hydrostatically tested to 600 kPa for 2hours.

Serial Numbers: **TS624**

Dated: **31st August 2004**

Signed on behalf of **Tank Solutions Pty Ltd**

Paul G Richardson

SPECIFICATIONMATERIAL

Shell	AS 3678 GR.250 6mm
Ends	AS 1548-7-460 8mm Trispherical
Pipe	SCH.40 SEAMLESS
Sockets	3000# BSP Couplings (U.N.O.)
Flanges	AS 2129 Table "E"
Supports	AS 3678 GR.250
<u>WELDING</u>	AS 1554 SP
<u>CONSTRUCTION</u>	Butt welded body & ends All welds 5mm continuous fillet U.N.O.

CORROSION ALLOWANCE

2mm

N.D.T TESTING

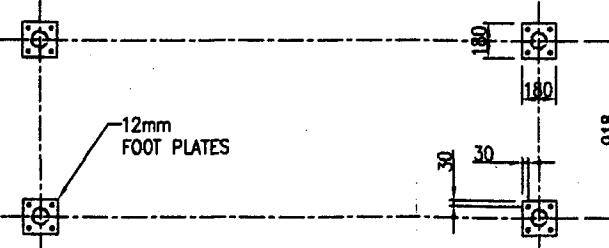
Hydrostatic	To 600kPag
	Hold for 2 hours

TANK DATA

Serial number	TS624
---------------	-------

SURFACE TREATMENT

Internal:-	Blast class 3
	2 coats each 250um Wattyl Sigmagard CSF 75-White
External:-	Blast class 2.5
	2 coats each 250um Wattyl Sigmagard CSF 75-White

PIPE LEGEND

- (A) 50Ø ABS VACUUM MAIN FROM VACUUM PUMP No 1 TO VACUUM VESSEL
- (B) 50Ø ABS VACUUM MAIN FROM VACUUM PUMP No 2 TO VACUUM VESSEL
- (C) 50Ø ABS VACUUM MAIN CONNECTING NEW AND EXISTING VACUUM VESSELS
- (D) 100NB TABLE "E" FLANGED SPARE C/W BLIND

- GENERAL NOTES
1. Tank Designed to AS1210 class 3
 2. Fabrication shall be in accordance with AS1210 class 3
 3. Examination and testing requirements shall be to AS1210 class 3
 4. Slagger stroke joints to suit fittings
 5. Mating parts & foundations to be site drilled U.N.O.
 6. Nominal dimensions not tolerated
 7. Bolt holes in all flanges shall straddle natural centres.
 8. Lifting lugs not shown for clarity.
 9. All openings blanked for transport.

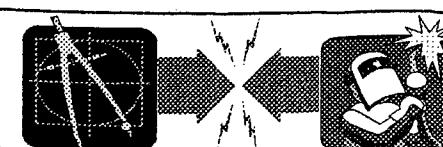
Approved for construction

Date: _____

	E	GENERAL AMENDMENTS	KJM 16.08.04
	D	REV "D" ADDED	KJM 09.08.04
	C	GENERAL AMENDMENTS	KJM 09.08.04
	B	GENERAL AMENDMENTS	KJM 30.07.04
	A	GENERAL AMENDMENTS	KJM 26.07.04
No.	REVISION	BY DATE	BY DATE

Tank Solutions

Tank Solutions PTY LTD
ABN 22 095 541 816
Unit 4/15 Porter Street, Hemmant QLD. 4171
Phone 61 7 3390 4800 Fax 61 7 3390 4667



SCALE	1:20
DRAWN	KJM 26.07.04
CHECKED	PAB 26.07.04
APPROVED	26.07.04

3kl VACUUM VESSEL
HEPBURN & THORPE
PINKENBA VACUUM STATION

DRAWING NO. SHT. 1 OF 1
SO-109
REVISION A B C D E
REVISION

Klauen-Vakuumpumpen
Rotary claw vacuum pumps
Pompes à vide à becs rotatifs



Mink
MM 1104 - 1322 AV/BV

Compliant with directive
94/9/EC (ATEX 95)
 II 3(i)/2(o) D 125°C(i)/125°C(o)
 II 3(i) D 125°C(i)
für Staub/for dust/pour poussière



Mink MM 1252 AV

Mink MM sind ATEX konforme Klaue-n-Vakuumpumpen für den Einsatz in der pneumatischen Saugförderung von staubexplosionsgefährdeten Produkten. Mink MM Klaue-n-Vakuumpumpen sind für zwei verschiedene Anwendungsbereiche zertifiziert:
1. Zone 22 in der Saugleitung der Vakuumpumpe, Zone 21 im Umfeld der Vakuumpumpe.
2. Zone 22 in der Saugleitung, keine Zonen in und außerhalb der Vakuumpumpe.

Mink MM are ATEX-conforming claw vacuum pumps for use in the pneumatic suction conveyance of products which are in danger of dust explosion. Mink MM claw vacuum pumps have been certified for two different areas of application:

1. Zone 22 inside the vacuum pump, zone 21 in the area surrounding the vacuum pump.
2. Zone 22 inside the vacuum pump, no zones inside and outside the vacuum pump.

Les pompes Mink MM sont des pom-pes à vide à becs rotatifs conformes aux normes ATEX destinées à être utilisées dans le domaine du transport pneumatique de produits en zone exposée aux poussières combustibles. Les pompes à vide à becs rotatifs sont certifiées pour deux domaines d'application :

1. Zone 22 dans la conduite d'aspiration de la pompe à vide, zone 21 dans l'environnement de la pompe à vide.
2. Zone 22 dans la conduite d'aspiration, aucune zone dans et hors de la pompe à vide.

Wirtschaftlich

Durch den guten Wirkungsgrad im Vergleich zu anderen Verdich-tungsprinzipien ist eine hohe Ener-gieeinsparung möglich. Durch die Reduzierung von Wartungsarbeiten entfallen Stillstandszeiten und Kosten für Verschleißteile und Betriebsmittel.

Efficient

The Mink MM is very efficient com-pared to other vacuum principles, therefore large energy savings are possible. The reduced maintenance means there are no shut-down periods or costs associated with wearing parts and operating fluids.

Economique

Un rendement élevé par rapport à d'autres principes de vide permet des économies d'énergie substantielles. Un entretien minimal permet d'éviter des temps d'arrêt ainsi que les coûts de pièces d'usure et de fluides d'étanchéité.

Sicherheit

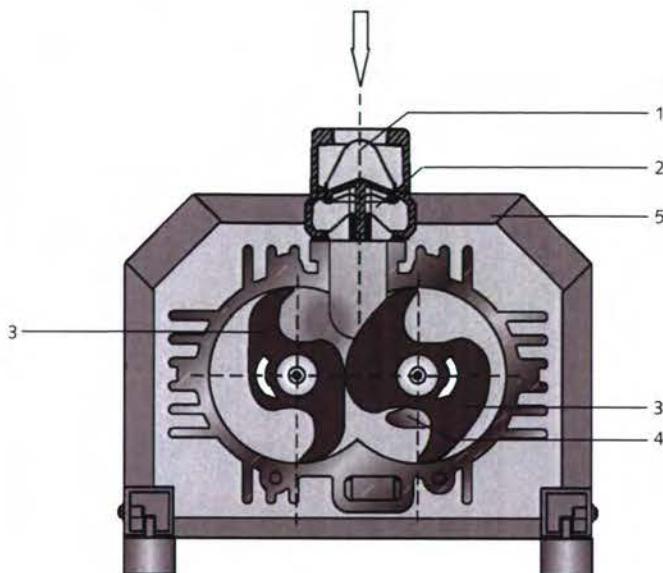
Zur Überwachung der Mink MM dient eine Temperaturmessung. Bei Erreichen der Abschalttemperatur wird die Mink MM über eine bausei-tige Steuerung abgeschaltet.

Safety

A temperature measurement is used to monitor the Mink MM. It is switched off via a controller when the cut-out temperature is reached.

Sécurité

La surveillance de la Mink MM est as-surée par contrôle de la température. Lorsque la température de déclen-vement est atteinte, la Mink MM doit être mise hors circuit par l'intermédiaire d'une commande ap-propriée.

Klauen-Vakuumpumpen**Rotary claw vacuum pumps****Pompes à vide à becs rotatifs****Funktionsprinzip****Principle of operation****Principe de fonctionnement**

- 1 Saugflansch
- 2 Rückschlagventil
- 3 Klauen
- 4 Gasaustritt
- 5 Schalldämmhaube

- 1 Inlet flange
- 2 Non-return valve
- 3 Claws
- 4 Gas outlet
- 5 Acoustic enclosure

- 1 Bride d'aspiration
- 2 Clapet anti-retour
- 3 Becs
- 4 Refoulement
- 5 Capot d'insonorisation

Funktionsprinzip und Arbeitsweise

Mink Vakuumpumpen arbeiten nach dem bewährten Klauprinzip. Sie verdichten vollkommen trocken, berührungslos und somit verschleißfrei. Zwei Klauen drehen sich gegensinnig in einem Zylinder, saugen das Medium an und verdichten es.

Die eng tolerierten Formen der Klauen und der Zylinderinnenwand ermöglichen eine gute Abdichtung, ohne einander zu berühren. Bei der Drehbewegung wird ständig Gas angesaugt, verdichtet und unter Druck ausgestoßen. Mink Vakuumpumpen sind Luft gekühlt. Angetrieben werden die Mink Klaup-Vakuumpumpen durch einen Normmotor. Ein Synchronisationsgetriebe sorgt für den exakten Gleichlauf der beiden Klauen. Durch das komplette Zubehörprogramm lassen sich diese Vakuumpumpen optional für jeden Einsatzfall ausrüsten.

Functional principle and mode of operation

Mink vacuum pumps work according to the rotary claw principle. They compress dry, contact free and hence free of wear. Two rotary claws rotate in opposite directions within a cylinder, inducting and compressing a gas medium. The shape of the claws is such that a small gauged clearance is maintained between the claw tips and the cylinder walls and also at the adjacent lobe surfaces. As the lobes rotate constantly, gas is sucked in, compressed and discharged under pressure. Mink rotary lobe vacuum pumps are air-cooled. Mink rotary claw vacuum pumps are directly driven by a flanged motor; the two claws are synchronized by gears. A large variety of accessories ensures an optimum adaption to every application.

Principe de fonctionnement et mode opératoire

Les pompes à vide Mink fonctionnent selon le principe des lobes rotatifs. Ils assurent une compression sèche, sans contact et donc sans usure. Deux lobes tournent en sens contraire, dans un cylindre, en aspirant le gaz et en le comprimant. Les formes précises des lobes et des parois du cylindre autorisent de très faibles tolérances qui assurent une bonne étanchéité sans contact. Pendant la rotation, le gaz est aspiré, puis comprimé et rejeté sous pression. Les pompes à vide à lobes rotatifs Mink sont refroidis par air. La pompe Mink est entraînée par un moteur normalisé. Des pignons de synchronisation assurent un entraînement précis des deux becs. Un vaste programme d'accessoires permet de configurer les pompes pour chaque besoin spécifique.

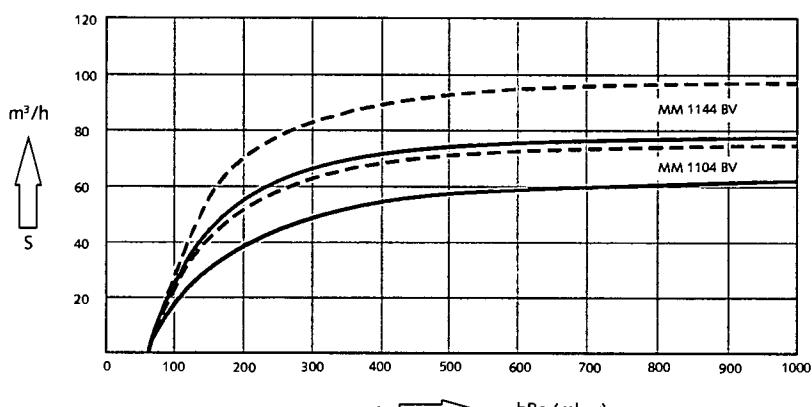
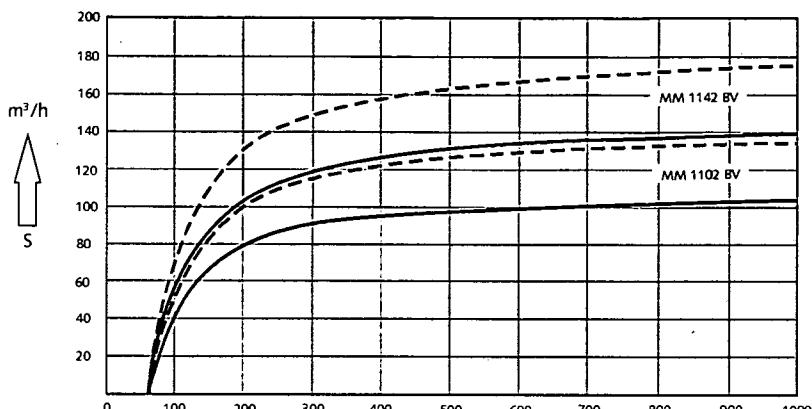


Technische Daten Mink MM 1104 BV/1144 BV/1102 BV/1142 BV

Technical data

Spécifications techniques

Saugvermögen
Suction capacity
Débit de pompage



Die Kennlinien sind nach DIN 28400 ermittelt und gelten für Luft von 20°C. Toleranz: $\pm 10\%$

The displacement curves are determined by DIN 28400 and are valid for air at 20°C. Tolerance: $\pm 10\%$

Les courbes sont calculées à DIN 28400 et sont données pour de l'air à 20°C. Tolérance: $\pm 10\%$

Technische Daten Technical data Spécifications techniques

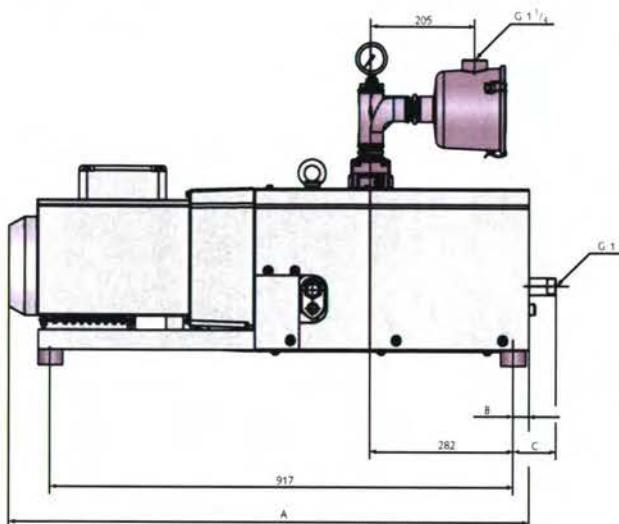
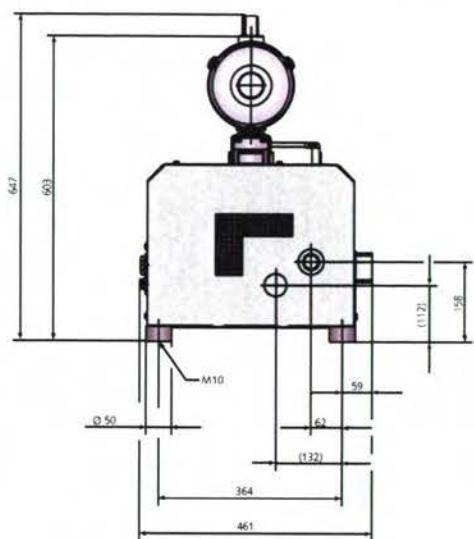
	50 Hz	m³/h	Mink MM 1104 BV	Mink MM 1144 BV	Mink MM 1102 BV	Mink MM 1142 BV
Nennsaugvermögen Nominal displacement	50 Hz	m³/h	62	78	105	140
Débit nominal Nominal flow	60 Hz	m³/h	75	96	135	175
Enddruck Ultimate pressure Pression finale		hPa (mbar)	60	60	60	60
Motornennleistung Nominal motor rating	50 Hz	kW	2,2	2,2	3	4
Puissance nominale du moteur	60 Hz	kW	2,6	2,6	3,6	4,8
Motorenndrehzahl Nominal motor speed	50 Hz	min⁻¹	1500	1500	3000	3000
Vitesse de rotation nominale	60 Hz	min⁻¹	1800	1800	3600	3600
Schalldruckpegel (DIN EN ISO 2151)* Sound level (DIN EN ISO 2151)*	50 Hz	dB(A)	66	66	75	75
Niveau sonore (DIN EN ISO 2151)*	60 Hz	dB(A)	70	70	79	79
Gewicht ca. Weight approx.	50 Hz	kg	210	210	210	240
Poids approx.	60 Hz	kg	210	210	210	240

*) bei 400 hPa Ansaugdruck *) at 400 hPa inlet pressure *) pression d'aspiration 400 hPa

Abmessungen Mink MM 1104 BV/MM 1144 BV/MM 1102 BV/MM 1142 BV

Dimensions

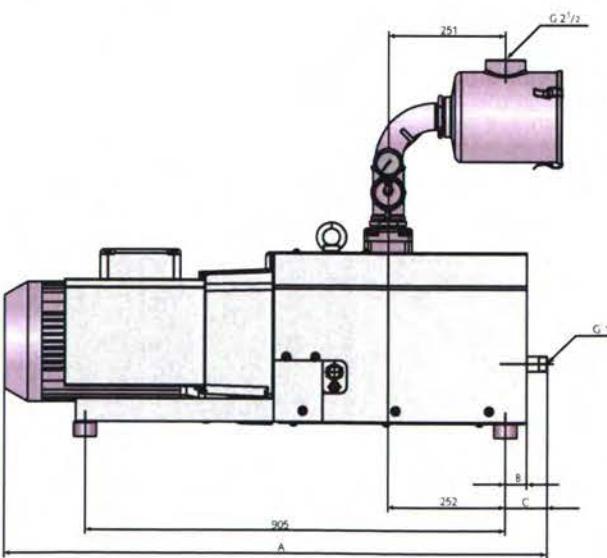
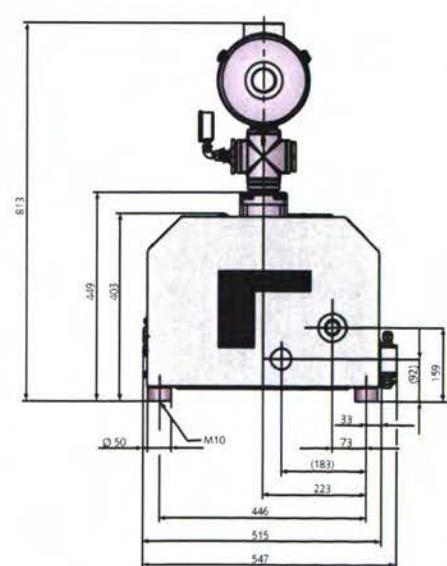
Dimensions



Abmessungen Mink MM 1324 AV/MM 1202 AV/MM 1252 AV/MM 1322 AV

Dimensions

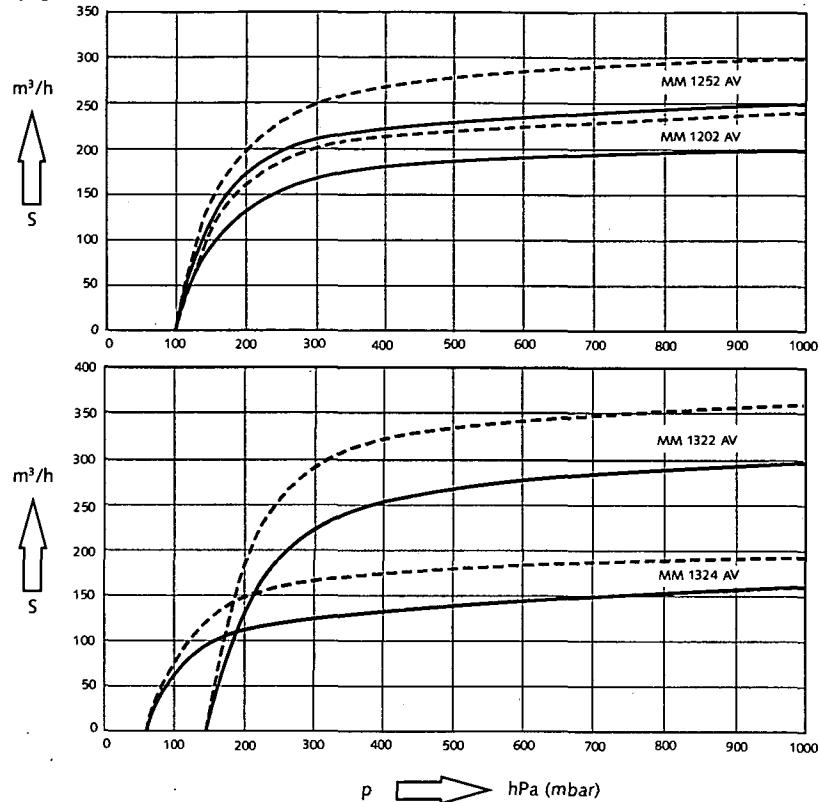
Dimensions



Abmessungen Dimensions Dimensions	A	B	C
Mink MM 1104 BV	1050	32	-
Mink MM 1144 BV	1050	32	-
Mink MM 1102 BV	1050	32	42
Mink MM 1142 BV	1085	32	57
Mink MM 1324 AV	1077	46	89
Mink MM 1202 AV	1173	46	95
Mink MM 1252 AV	1066	46	108
Mink MM 1322 AV	1201	80	123

**Technische Daten Mink MM 1324 AV/1202 AV/1252 AV/1322 AV****Technical data****Spécifications techniques**

Saugvermögen
Suction capacity
Débit de pompage



Die Kennlinien sind nach DIN 28400 ermittelt und gelten für Luft von 20°C.
Toleranz: ± 10%
The displacement curves are determined by DIN 28400 and are valid for air at 20°C. Tolerance: ± 10%
Les courbes sont calculées à DIN 28400 et sont données pour de l'air à 20°C.
Tolérance: ± 10%

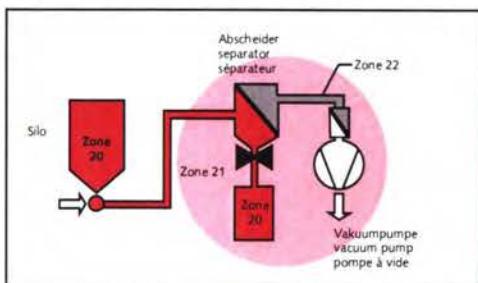
Technische Daten Technical data Spécifications techniques	Mink MM 1324 AV	Mink MM 1202 AV	Mink MM 1252 AV	Mink MM 1322 AV	
Nennsaugvermögen Nominal displacement	50 Hz m³/h	160	200	250	300
Débit nominal	60 Hz m³/h	192	240	300	360
Enddruck Ultimate pressure Pression finale	hPa (mbar)	60	100	100	150
Motornennleistung Nominal motor rating Puissance nominale du moteur	50 Hz kW	3	4	5,5	5,5
	60 Hz kW	3,6	4,8	6,6	6,6
Motorenndrehzahl Nominal motor speed Vitesse de rotation nominale	50 Hz min⁻¹	1500	3000	3000	3000
	60 Hz min⁻¹	1800	3600	3600	3600
Schalldruckpegel (DIN EN ISO 2151)* Sound level (DIN EN ISO 2151)* Niveau sonore (DIN EN ISO 2151)*	50 Hz dB(A)	70	75	75	77
	60 Hz dB(A)	74	79	79	82
Gewicht ca. Weight approx. Poids approx.	50 Hz kg	260	260	285	295
	60 Hz kg	260	260	285	295

*) bei 400 hPa Ansaugdruck *) at 400 hPa inlet pressure *) pression d'aspiration 400 hPa

Klauen-Vakuumpumpen
Rotary claw vacuum pumps
Pompes à vide à becs rotatifs



II 3(i)/2(o) D 125°C(i)/125°C (o)



Zone 20 Bereich, in dem explosionsfähige Atmosphäre in Form einer Wolke aus in der Luft enthaltenem brennbaren Staub ständig, über lange Zeiträume oder häufig vorhanden ist (Beispiele: Produktsilos, Dosierorgane, Produktabscheider, etc.)

Zone 21 Bereich, in dem sich bei Normalbetrieb gelegentlich eine explosionsfähige Atmosphäre in Form einer Wolke aus in der Luft enthaltenem brennbaren Staub bilden kann.

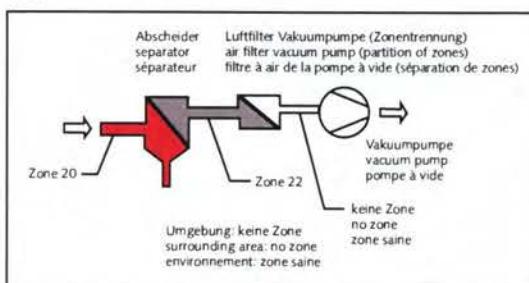
Zone 22 Bereich, in dem bei Normalbetrieb eine explosionsfähige Atmosphäre in Form einer Wolke aus in der Luft enthaltenem brennbaren Staub nicht oder aber nur kurzzeitig auftritt.

Zone 20 An area in which an explosive atmosphere in the form of a cloud of combustible dust in the air is present continuously, for long periods of time or frequently (examples: product silos, metering devices, product separators, etc.)

Zone 21 Areas in which an explosive atmosphere can occasionally form, as a cloud of combustible dust in the atmosphere.

Zone 22 Areas in which, in normal operations, an explosive atmosphere in the form of a cloud of combustible dust in the atmosphere occurs never or only briefly.

II 3(i) D 125°C(i)



Zone 20 Une zone dans laquelle l'atmosphère explosive est présente continuellement sous forme de nuage de poussière combustible, pendant une longue période, ou est fréquente (exemples: produits dans les silos, séparateurs de produits, équipements de comptage, etc.)

Zone 21 Zone dans laquelle l'atmosphère explosive peut occasionnellement se former, en nuage de poussière combustible dans l'atmosphère.

Zone 22 Zone dans laquelle, lors d'opérations normales, une atmosphère explosive présente sous forme de nuage de poussières combustibles ne se forme jamais ou seulement très brièvement.



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Busch – au cœur de l'industrie dans le monde entier



Dr.-Ing. K. Busch GmbH

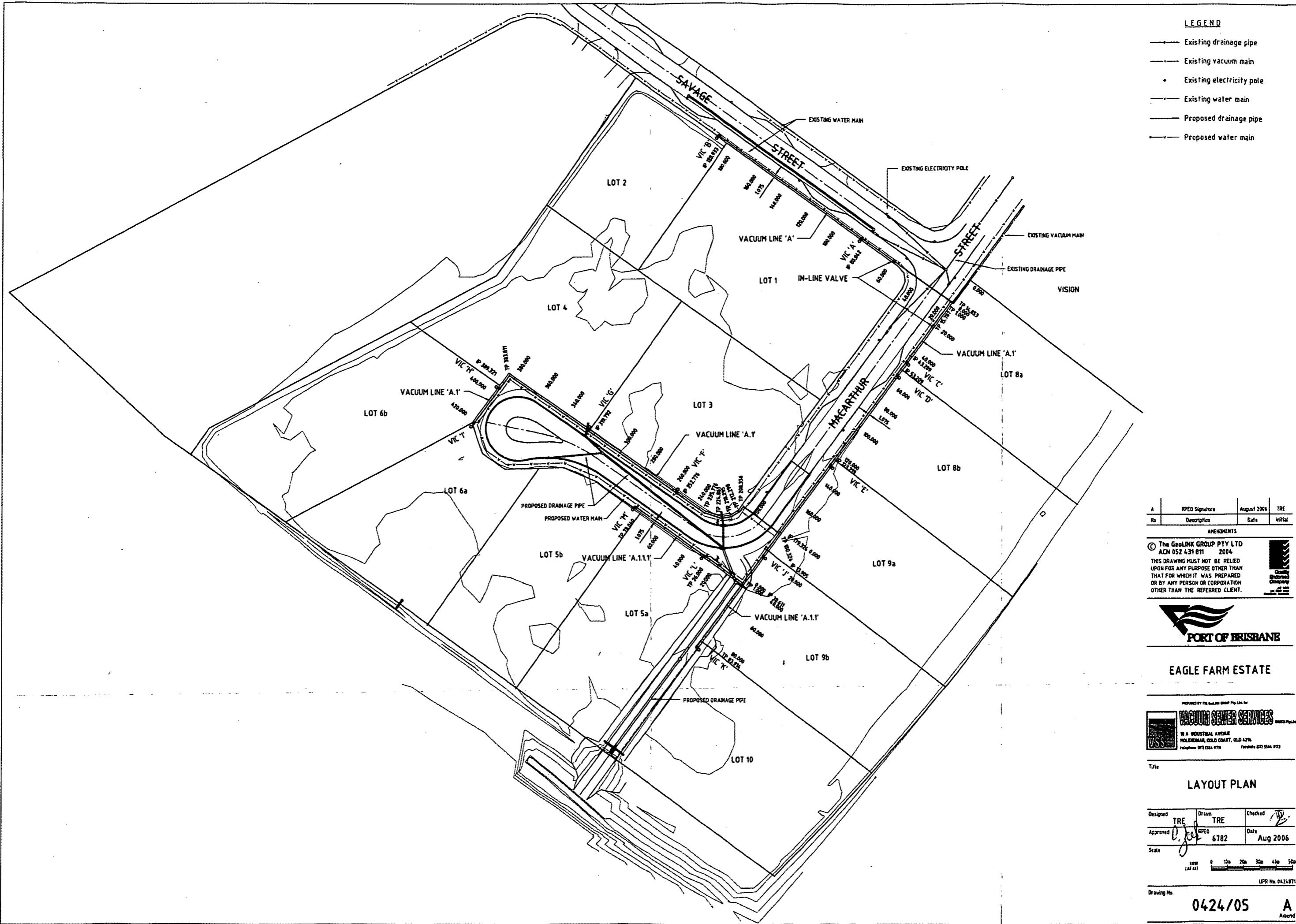
Schauinslandstraße 1 D 79689 Maulburg

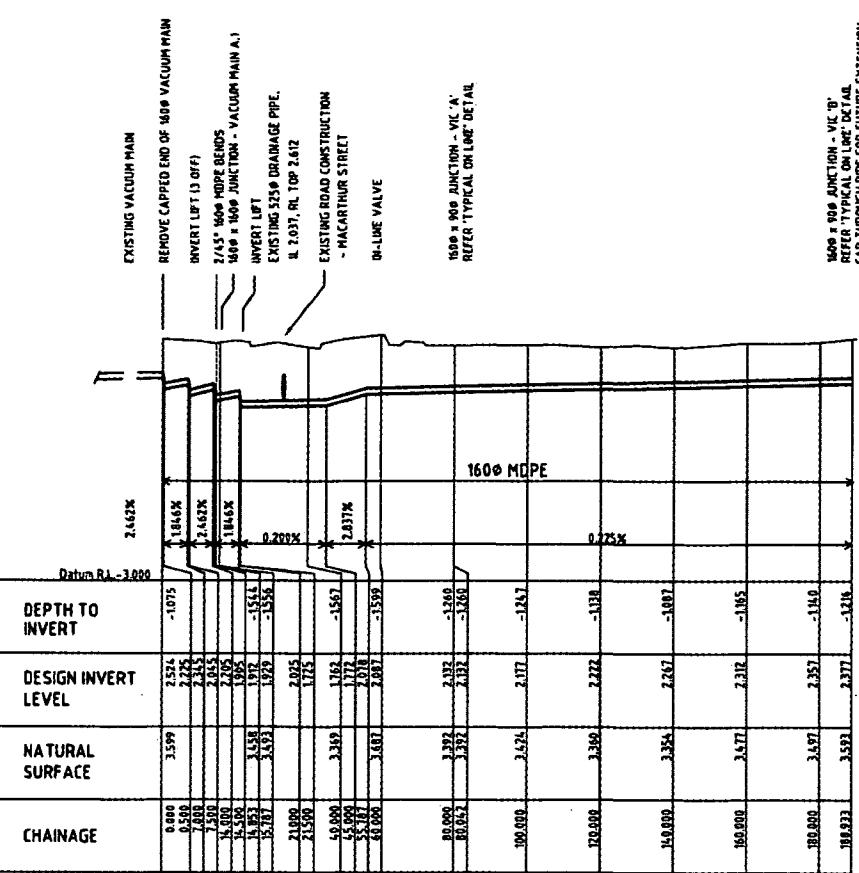
Phone +49 (0)7622 681-0 Fax +49 (0)7622 5484 www.busch-vacuum.com

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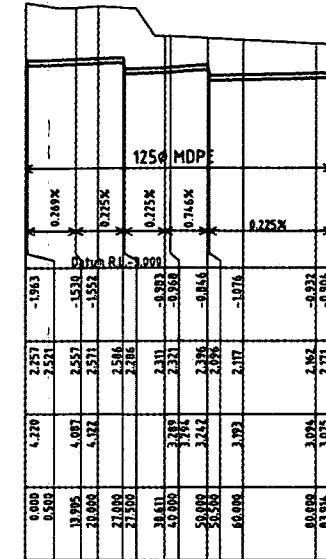
Technische Änderungen vorbehalten/Technical changes reserved/Sujet à modifications techniques.

Printed in Germany /BP 08/G - 0870 141 979

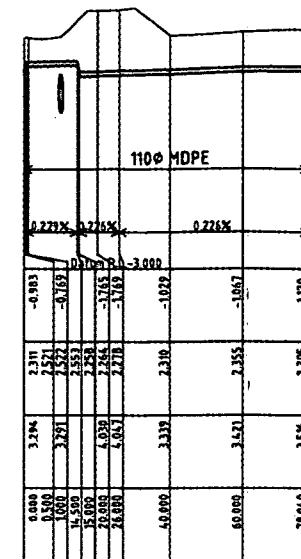




VACUUM MAIN 'A'



VACUUM MAIN 'A.1.1'



VACUUM MAIN 'A.1.1.1'

VACUUM MAIN 'A.1'

1 2 3 4

A	RPEQ Signature	August 2006	TRE
No	Description	Date	Initials



EAGLE FARM ESTATE

VACUUM SEWER SERVICES

LONGSECTIONS

Assigned	Drawn	Checked
TRE Approved <i>C. Jek</i>	TRE 6782	Date Aug 2006
State	HOR (AT 41)	0 1a 2a 3a 4a 5
VER	YES (AT 42)	0 1a 2a 3a 4a 5
UPR No. 04248		

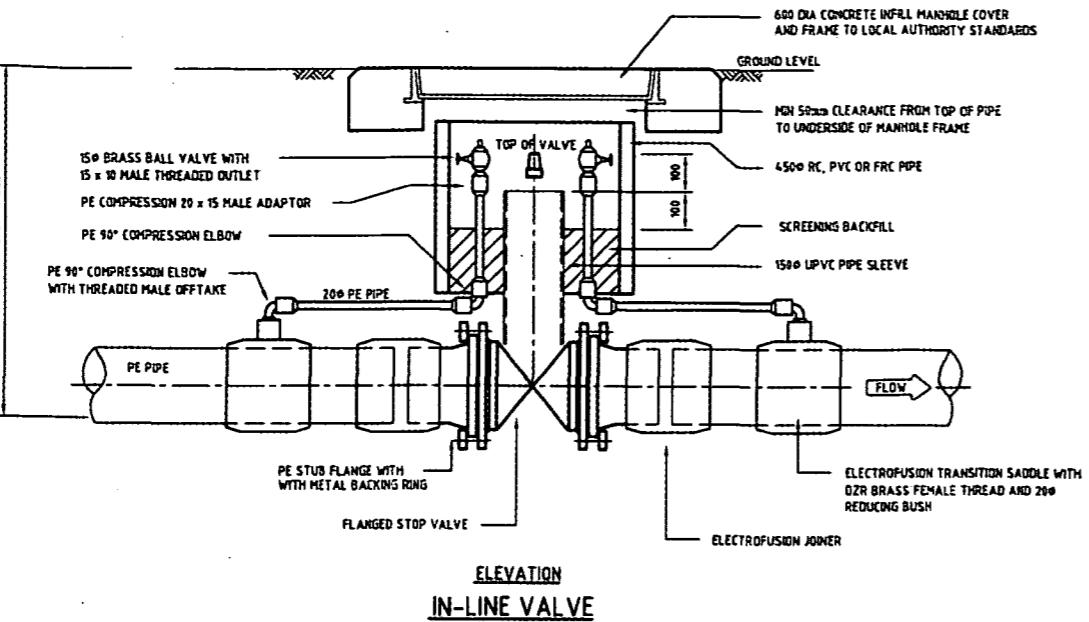
Training No.

0424/06

A

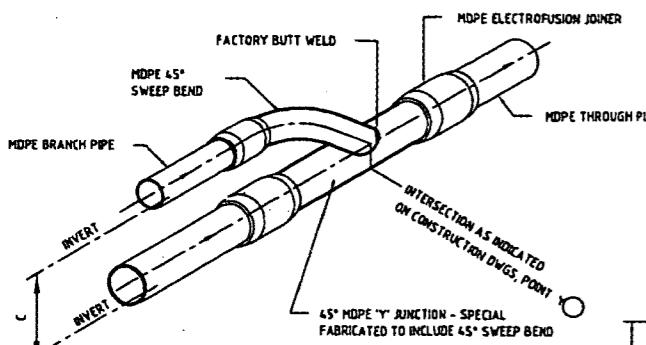
Ø	MIN DEPTH
1100	610
1250	625
1600	740
2000	875

MAXIMUM DEPTH - REFER TABLE

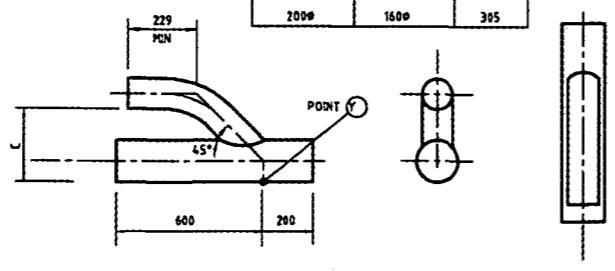


ELEVATION

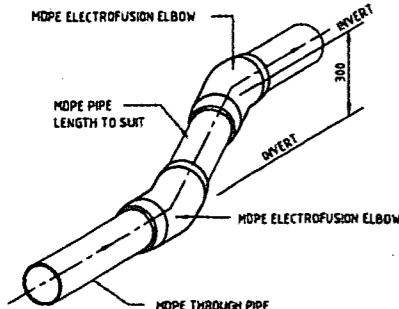
FABRICATED "Y" JUNCTION THROUGH PIPE	BRANCH PIPE	DIM. C mm
1100	900	195
1150	1150	195
1250	900	210
1250	1100	210
1250	1250	230
1600	900	245
1600	1100	245
1600	1250	265
1600	1600	265
2000	900	285
2000	1100	285
2000	1250	305
2000	1600	305



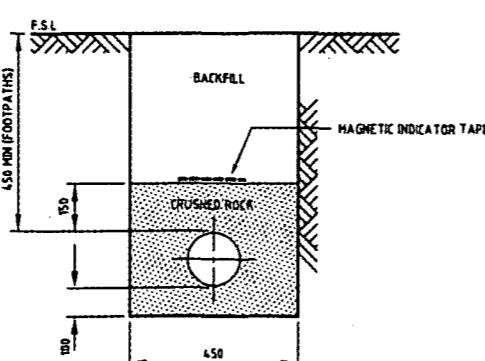
SCHEMATIC VIEW



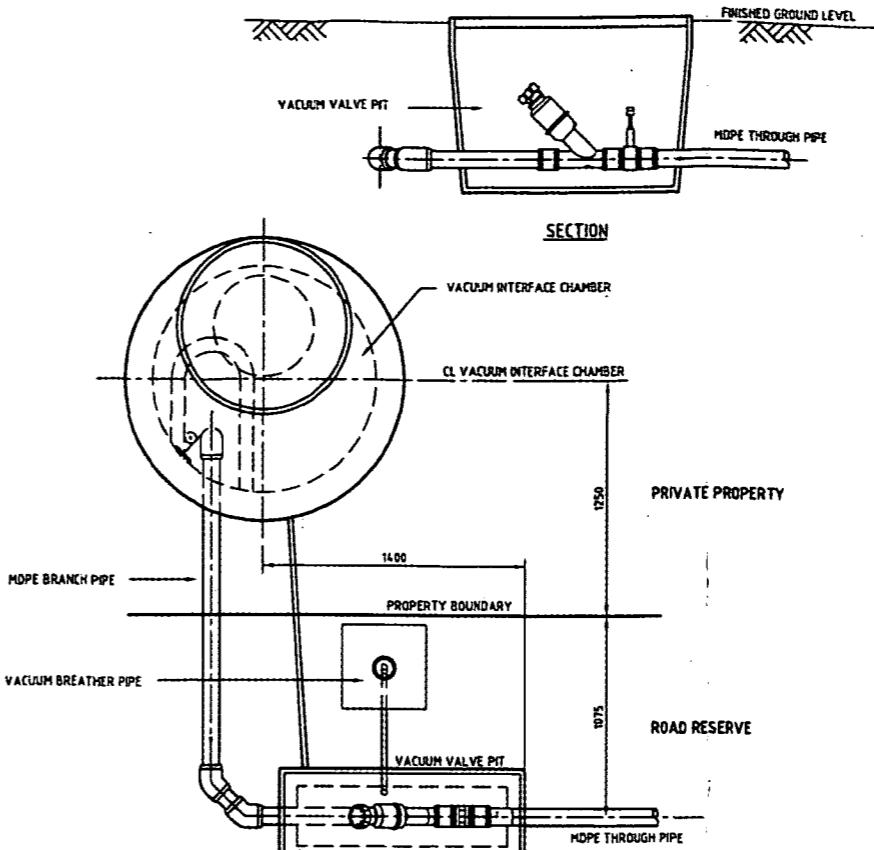
JUNCTION TYPE 'C'



SCHEMATIC VIEW
INVERT LIFT

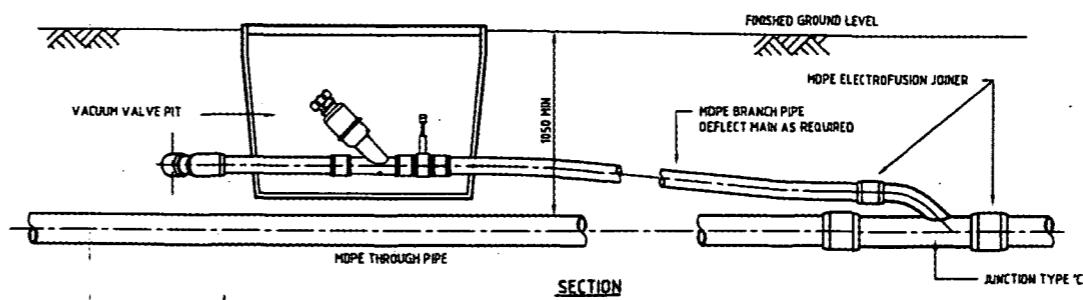


TYPICAL SECTION

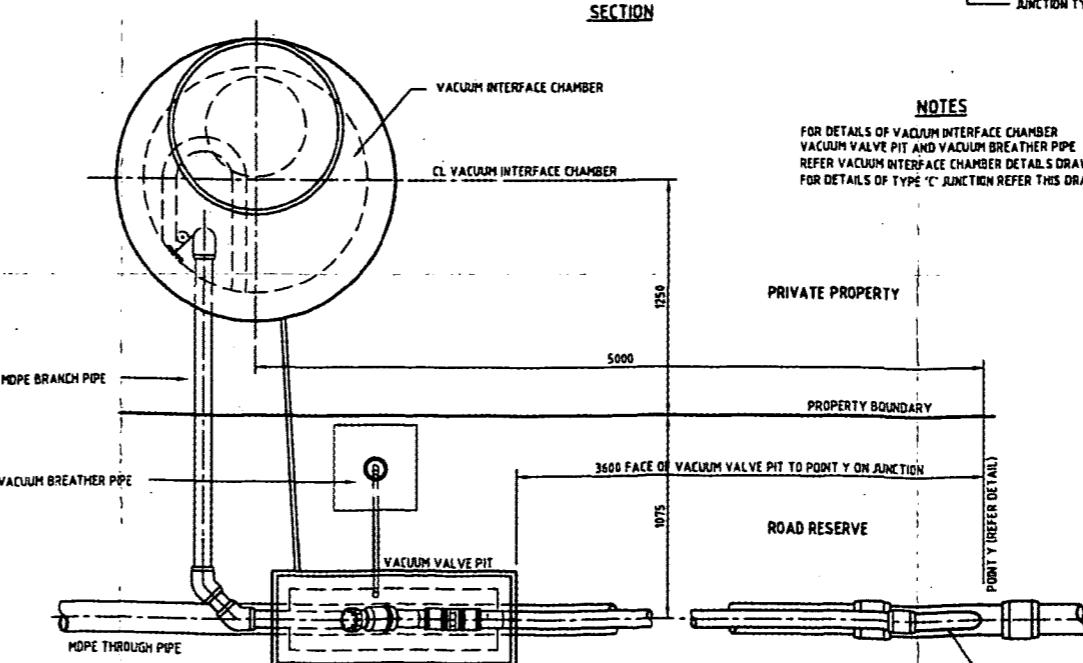


VACUUM INTERFACE CHAMBER - VACUUM MAIN CONNECTION

TYPICAL END OF LINE TREATMENT



SECTION **FRONT ELEVATION** **Rear Elevation** **Side Elevation** **PLAN**



VACUUM INTERFACE CHAMBER - VACUUM MAIN CONNECTION
TYPICAL ON LINE TREATMENT

- NOTES**

 1. DESIGN INVERT LEVELS ON BRANCH AND THROUGH MAINS SHOWN ON LONGITUDINAL SECTIONS ARE GIVEN AT THE INVERT BELOW THE BRANCH/THROUGH MAIN INTERSECTION POINTS DETAILED ON THIS DRAWING.
 2. ALL JOINTS SHALL BE ELECTROFUSION JOINTED EXCEPT FOR JOINTS ON THE FABRICATED "Y" JUNCTION WHICH SHALL BE FACTORY BUTT WELDED.
 3. 45° Y JUNCTIONS SHALL BE FABRICATED TO COMPLY WITH THE CLASSIFICATION OF ADJACENT PIPES.
 4. ALL FITTINGS SHALL BE A CLASS PN125.
 5. BEDDING, SURROUND, BACKFILL AND ROAD PAVEMENT MATERIAL SHALL BE PLACED AND COMPACTED TO THE REQUIREMENTS OF THE LOCAL AUTHORITY.

No	Description	Date	Initial
AMENDMENTS			
①	The GeoBLR GROUP PTY LTD ACN 652 431 071 - 2004. THIS DRAWING MUST NOT BE RELIED UPON FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT WAS PREPARED OR BY ANY PERSON OR CORPORATION OTHER THAN THE REFERRED CLIENT.		  
<input type="checkbox"/> Customer <input type="checkbox"/> Endorsement <input type="checkbox"/> Comments			



EAGLE FARM ESTATE



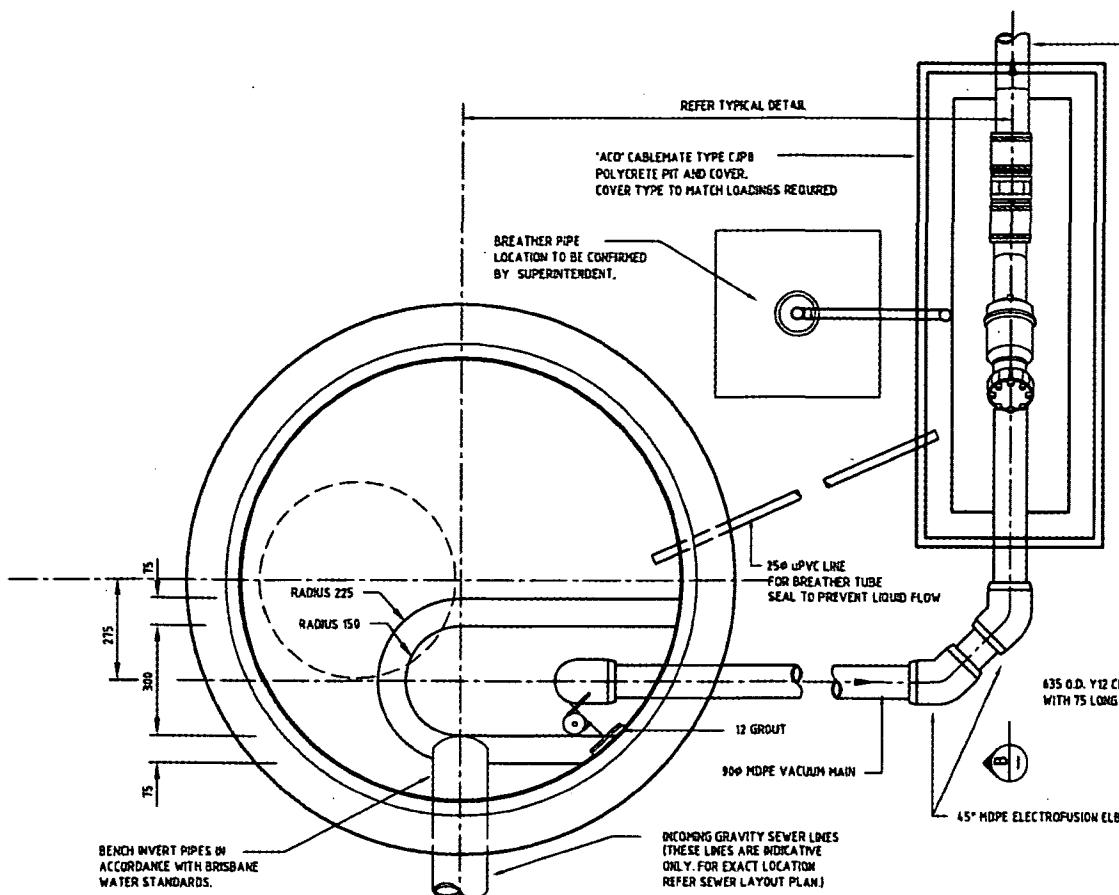
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VACUUM INTERFACE CHAMBER DETAILS

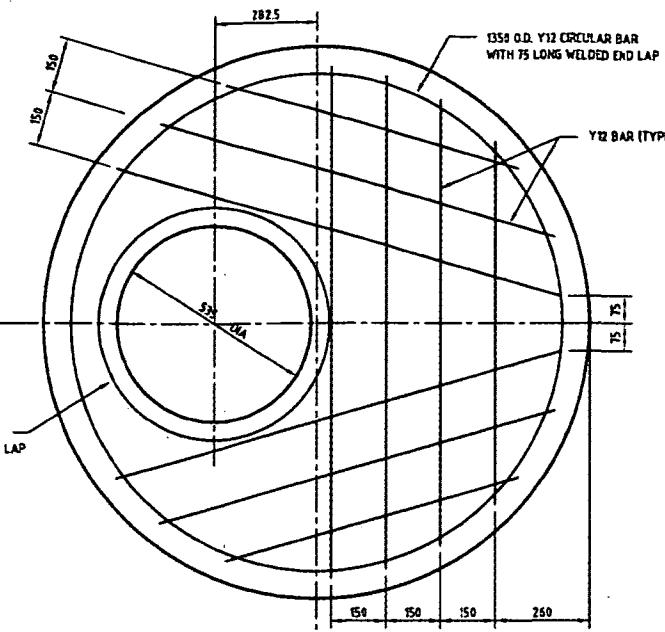
Designed	TRE	Drawn	Checked
Approved	<i>O. J. K.</i>		Date
Scale			

UPR No. 0424873

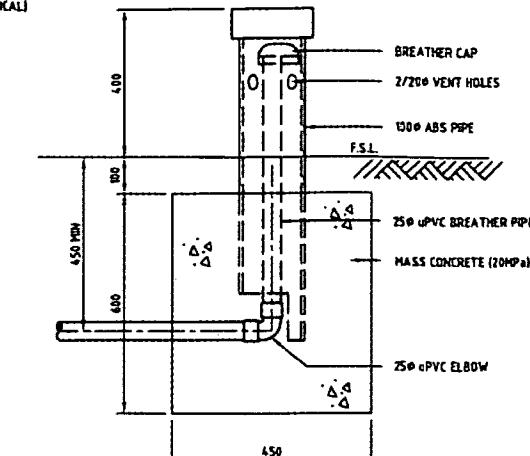
0424/07



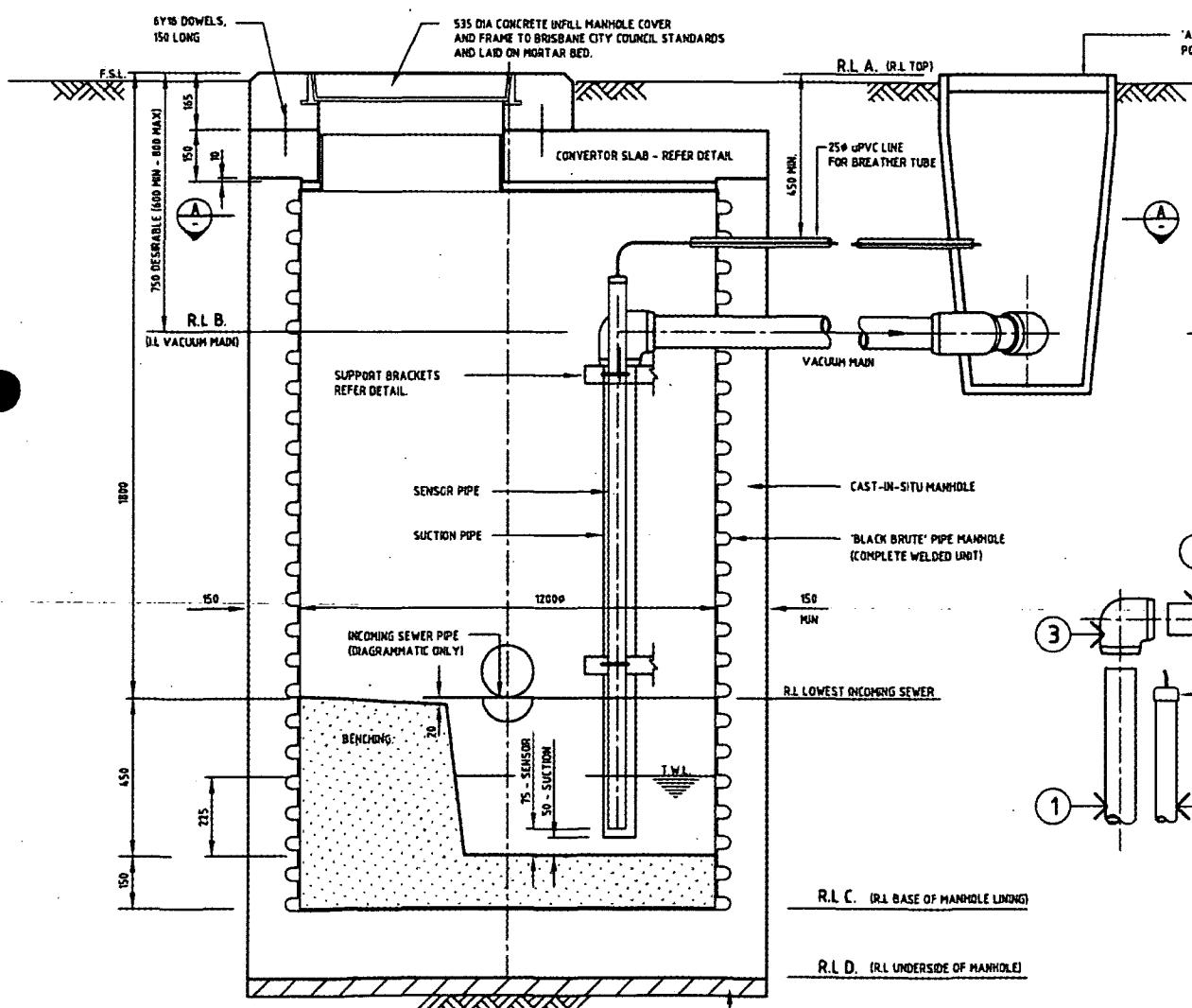
VIEW A - A



CONVERTOR SLAB REINFORCEMENT



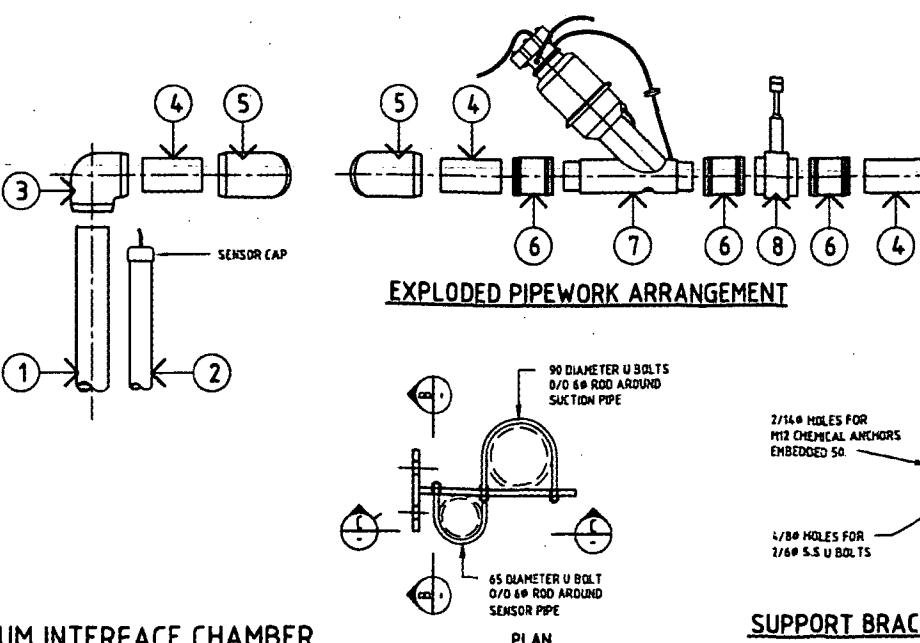
BREATHER PIPE DETAILS



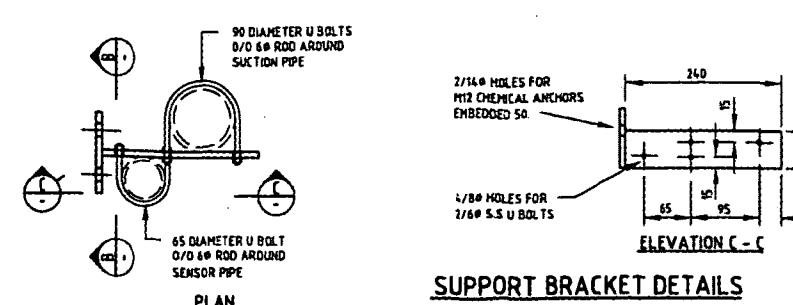
SECTIONAL ELEVATION

NOTE RL's A, B, C & D ARE GIVEN ON LAYOUT DRAWINGS

VACUUM INTERFACE CHAMBER



EXPLODED PIPEWORK ARRANGEMENT



SUPPORT BRACKET DETAILS

MARK	DESCRIPTION
8	90° SLIDE GATE VALVE - AS SUPPLIED *
7	VACUUM VALVE - AS SUPPLIED *
6	ELASTOMERIC CONNECTOR - 'PLUMB QUIK' *
5	90° 45° ELECTROFUSION ELBOW - MDPE
4	90° VACUUM MANIFOLD
3	90° 90° ELECTROFUSION ELBOW - MDPE
2	500 SENSOR PIPE - PVC CLASS 15
1	90° SUCTION PIPE - MDPE

ALL ITEMS TO BE FITTED IN ACCORDANCE WITH MANUFACTURERS DETAILS
OR EQUIVALENT APPROVED BY MAXIM SEWER SERVICES LTD T/PY LTD

A	RPEQ Signature	August 2004	TRE
No	Description	Date	Initial

AMENDMENTS

PORT OF BRISBANE

EAGLE FARM ESTATE

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VACUUM SEWER SERVICES

10 A INDUSTRIAL AVENUE
MOLESONGAR, GOLD COAST, QLD 4216

Telephone: 075 571 4200 Facsimile: 075 571 4201

Title

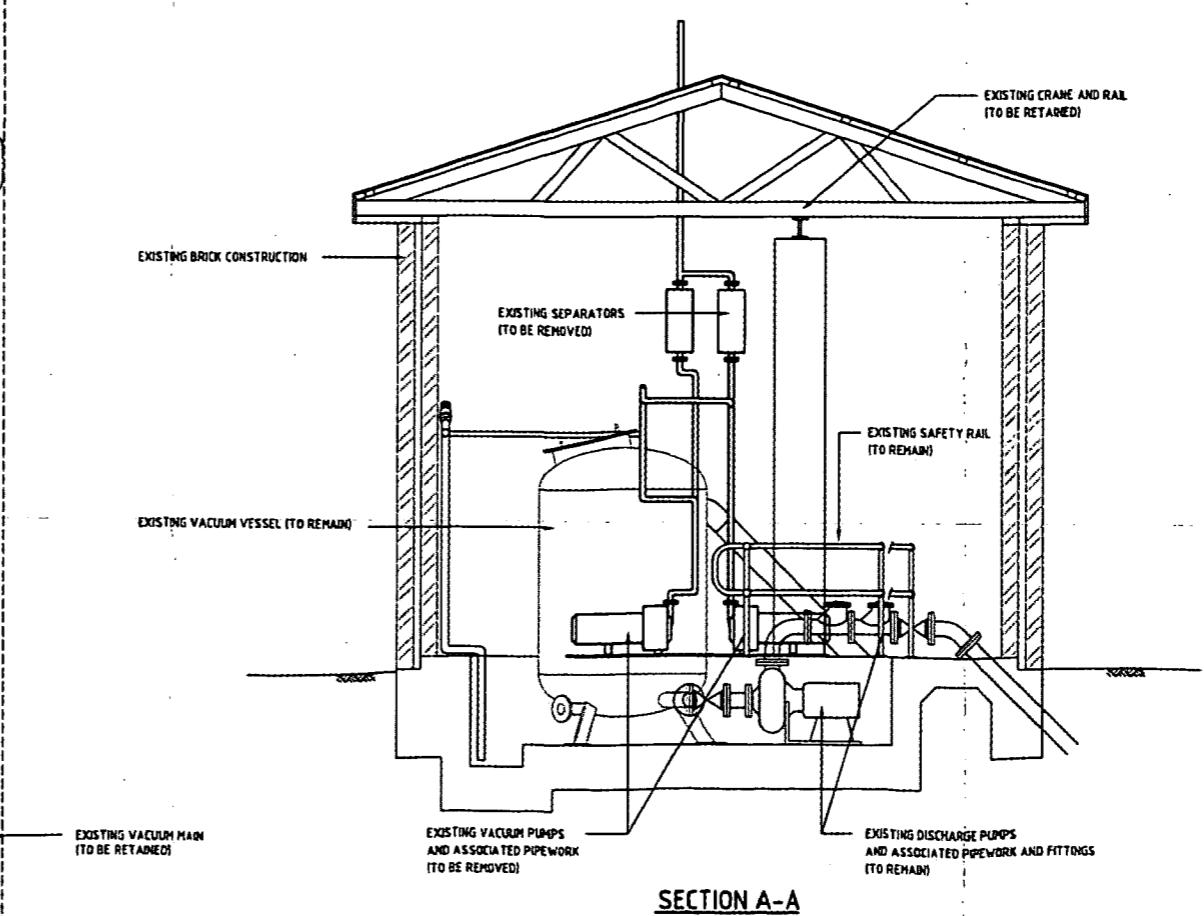
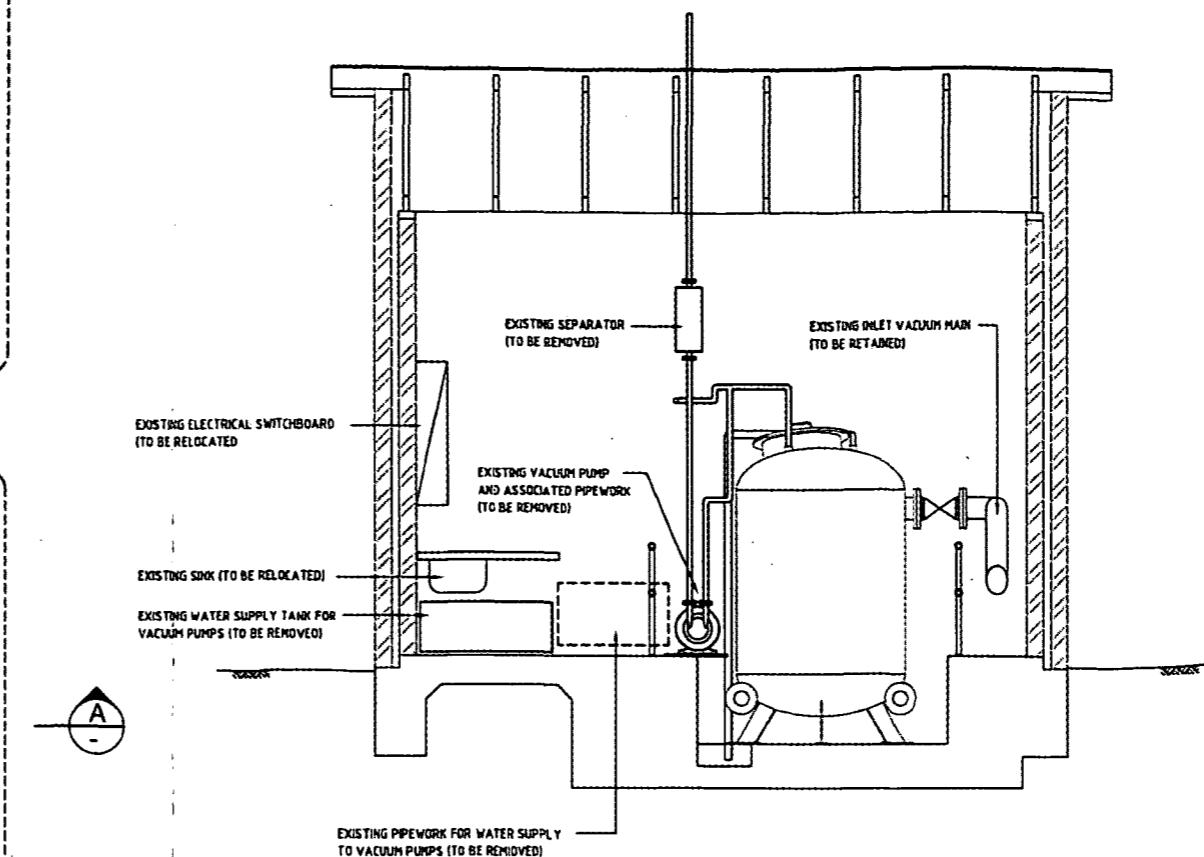
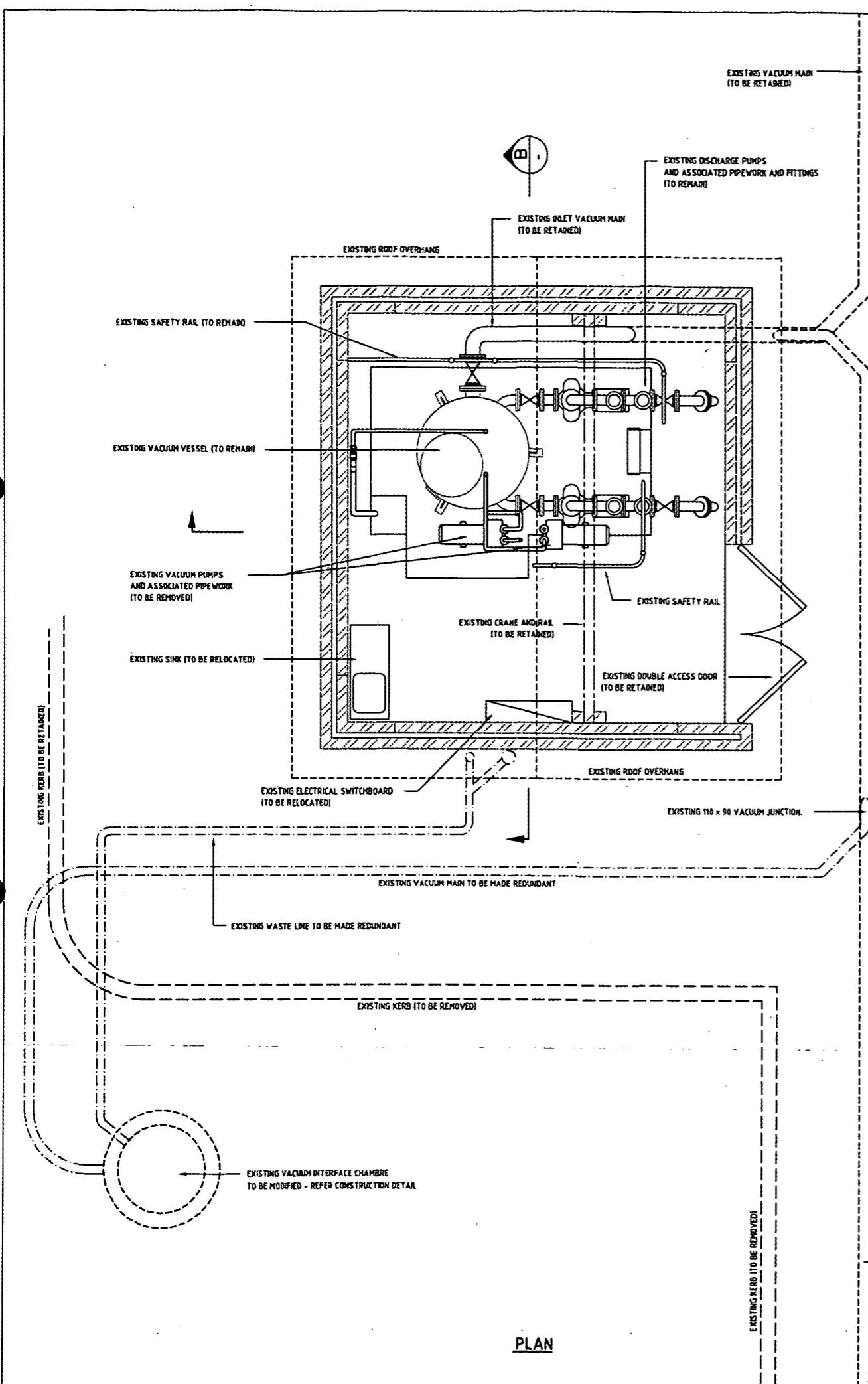
TYPICAL PIPEWORK AND BEDDING DETAILS

Designed	TRE	Drawn	TRE	Checked
Approved	<i>C. Jek</i>	6782	Date	Aug 2006

SEARCHED INDEXED SERIALIZED FILED
OCT 21 1968 6:42 AM

0424/08

A



B	RPEQ Signature Vacuum tank	Aug 2006	TRE
A	Description	Date	Initial
Amendments			

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This drawing as prepared under a quality system certified as complying with ISO/AS 9001 by an accredited certification body.

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VSS Project No.: 03130

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quality solutions sustainable future

PORT OF BRISBANE
Project Title

EAGLE FARM ESTATE

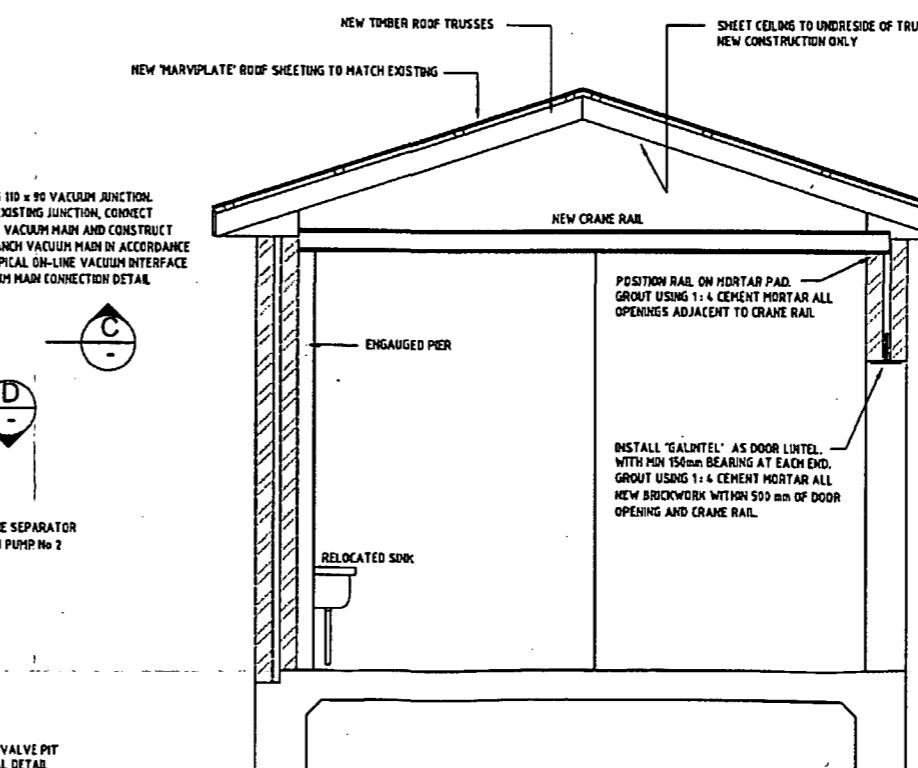
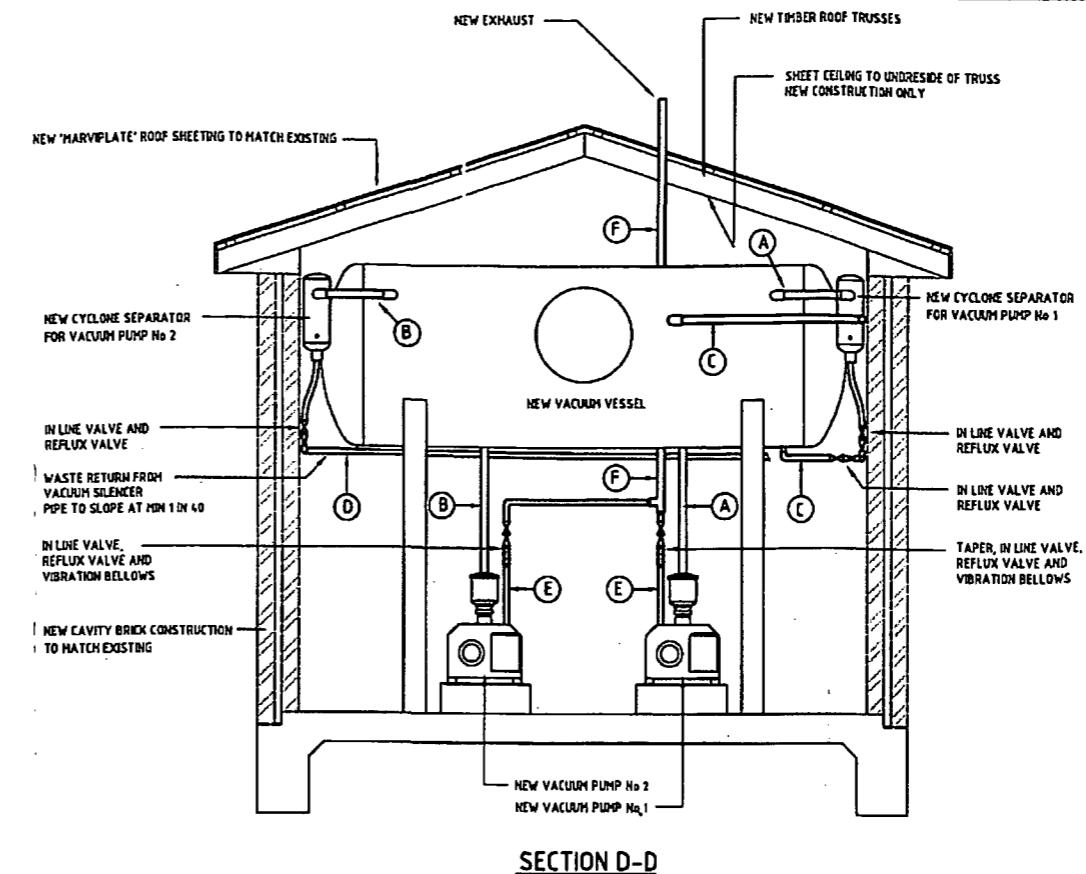
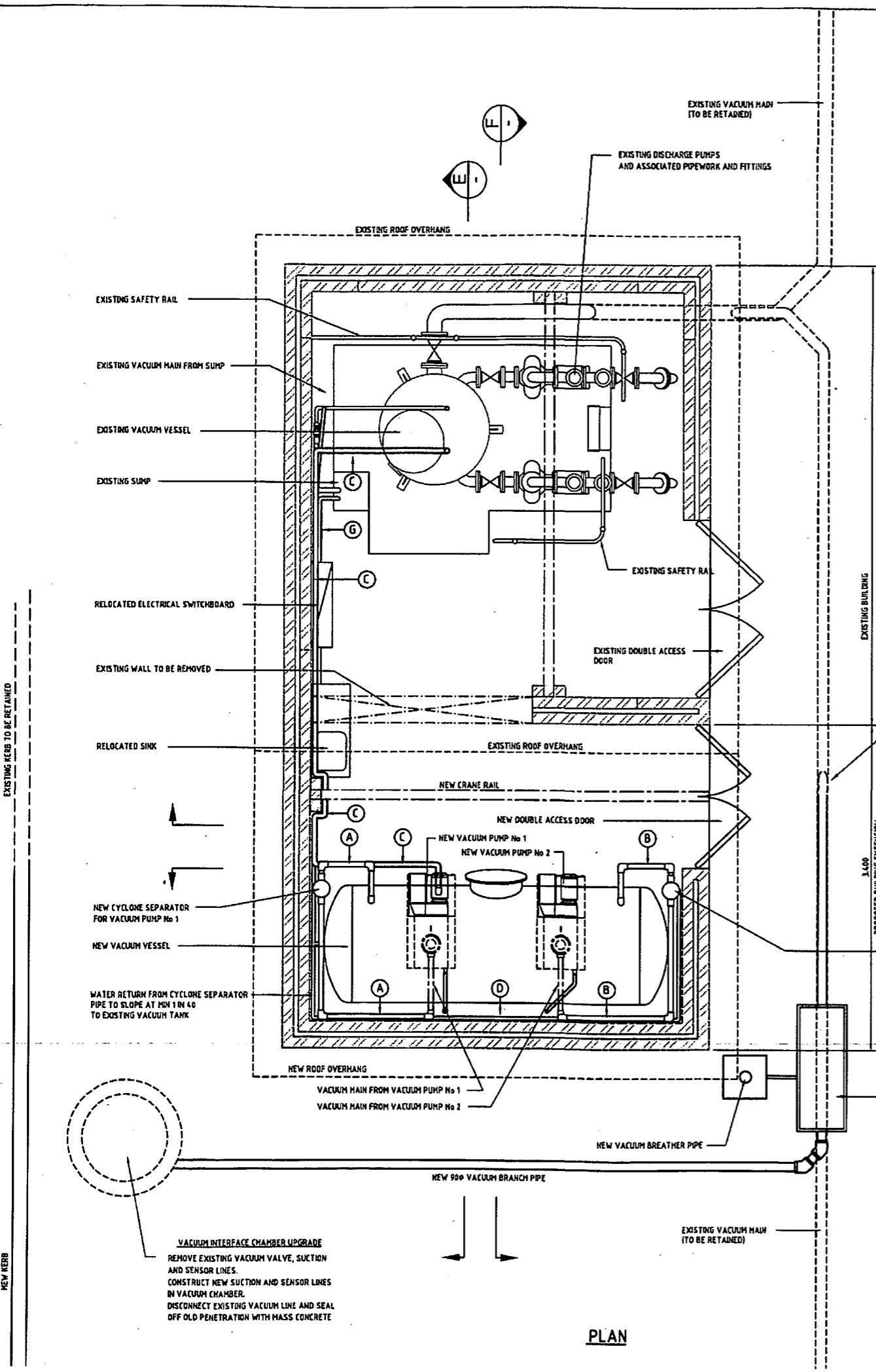
Designed	TRE	Drawn	ALS	Checked
Approved	C.J.W.	Date	Aug 2006	
RPEQ	6792	XREFs		
Scale				

Drawing Title
EXISTING VACUUM STATION SCHEMATICS

Drawing Number
0424/10

Revised

B

**PUMP AND EQUIPMENT STATISTICS**

VACUUM PUMP - 'BUSCH MINK MM1252 AV' WITH INLET FILTER 'FIL 0250'
CYCLONE SEPARATOR - 'BUSCH CYC0250'
VACUUM VESSEL - 'TANK SOLUTIONS - 1143 DD WITH TORISPERICAL ENDS'

PIPE LEGEND

- (A) 500 ABS VACUUM MAIN FROM VACUUM PUMP No 1 TO VACUUM VESSEL
- (B) 500 ABS VACUUM MAIN FROM VACUUM PUMP No 2 TO VACUUM VESSEL
- (C) 500 ABS VACUUM MAIN CONNECTING NEW AND EXISTING VACUUM VESSELS
- (D) 320 ABS CYCLONE WATER RETURN MAIN
- (E) 320 ABS VACUUM EXHAUST
- (F) 500 ABS VACUUM EXHAUST
- (G) 320 UPVC WASTE MAIN TO SUMP

PROPOSED VACUUM STATION PLAN & SECTIONS C & D

0424855

Drawing Number

0424/11 C

C	RPEO Signature	Aug 2006	TRE
B	Sink / Switchboard	Aug 2004	TRE
A	Vacuum tank	July 2004	AS

No. Description Date Initial

Amendments

GeoLINK 2004

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Telephone (07) 5575 3850 Facsimile (07) 5575 2952
VSS Project No.: 03130

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F 02 6687 7782
lemon.hd@geolink.net.au

10 Mooree Street
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Coffs Harbour NSW 2450
T 02 6651 7668

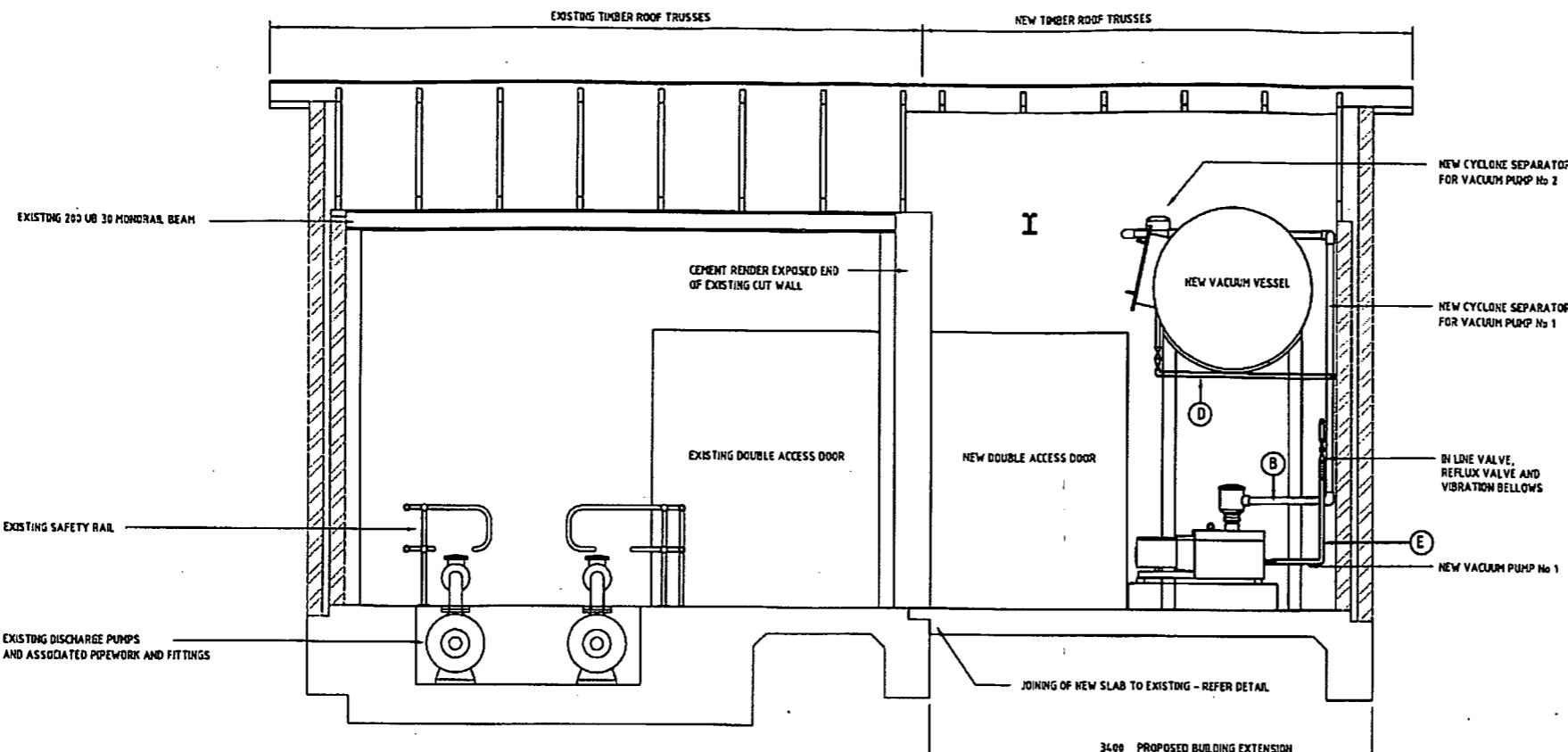
quality solutions sustainable future

**EAGLE FARM ESTATE**

Designed	TRE	Drawn	ALS	Checked
Approved	C. Jahr	Date	Aug 2006	
RPEQ	5782	XREF's		
Scale				

0 1.25 2.5 3.75 5.0 6.25

Drawing Tide

**SECTION F-F**

C	RPEQ Signature	Aug 2006	TRE
B	Sink / Switchboard Vacuum tank	Aug 2004	TRE
A		July 2004	AS

No. Description Date Initial
Amendment

(C) GeoLINK 2004

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VACUUM SEWER SERVICES

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VSS Project No.: 03130

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PORT OF BRISBANE
Project Title

EAGLE FARM ESTATE

Designed	TRE	Drawn	ALS	Checked
Approved	C. park	Date	Aug 2006	C
RPEQ	5742	XREFs		
Scale			0 1.25 2.5 3.75 5.0 6.25	

**PROPOSED VACUUM STATION
SECTIONS E & F**

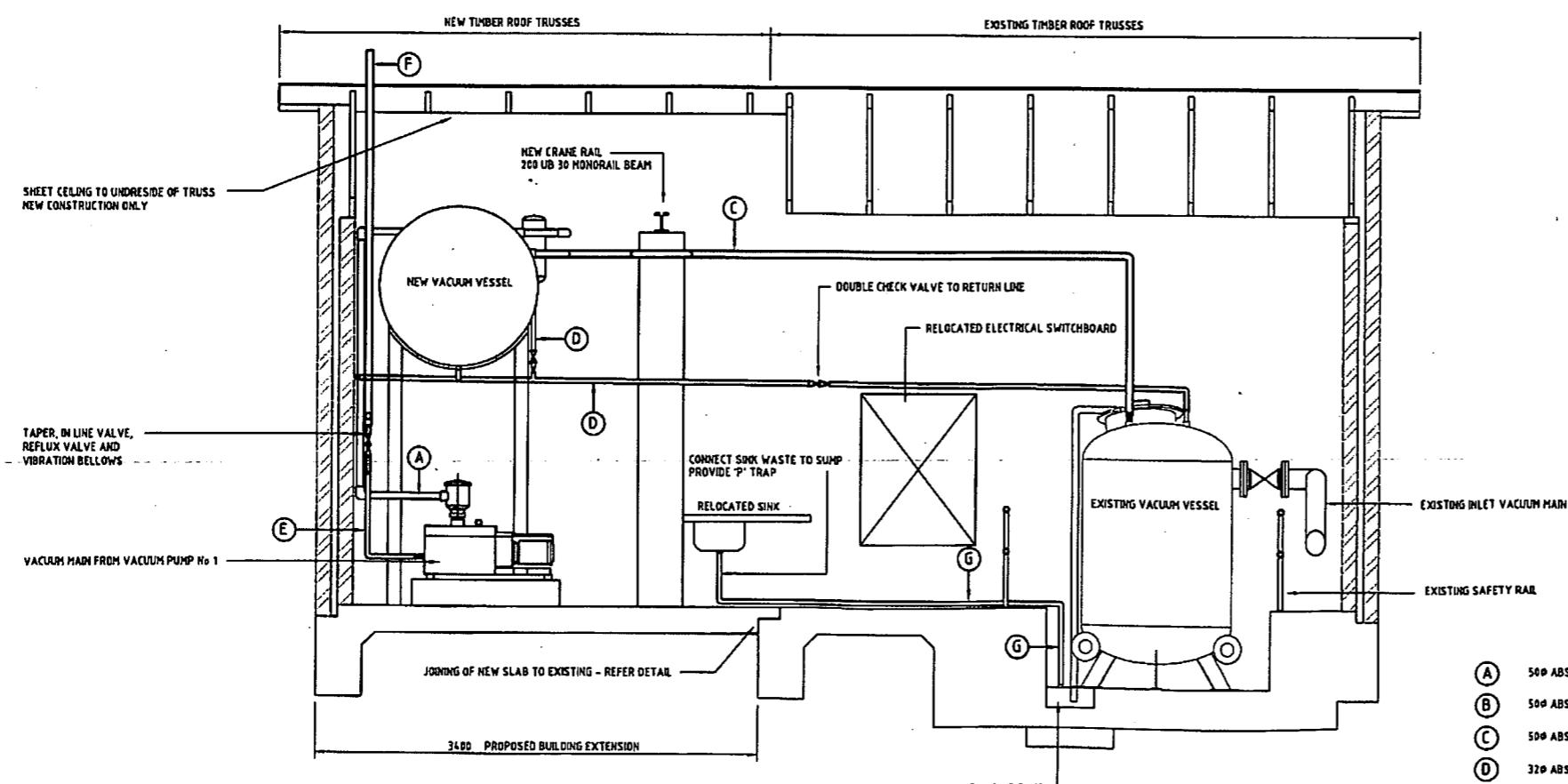
Drawing Title

0424856

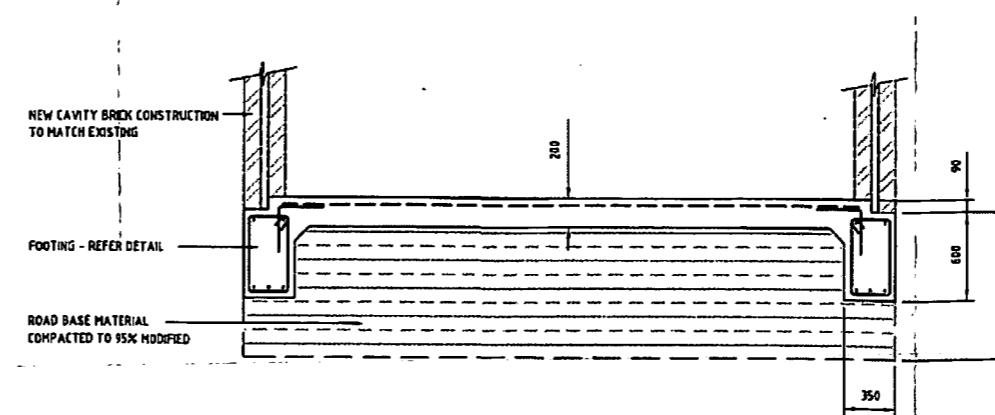
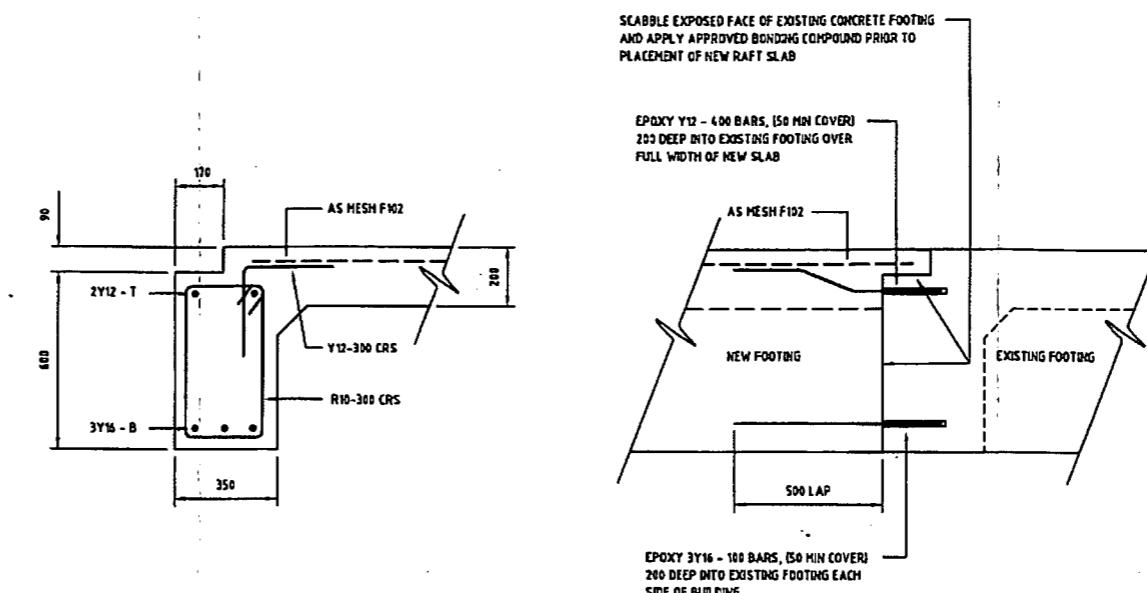
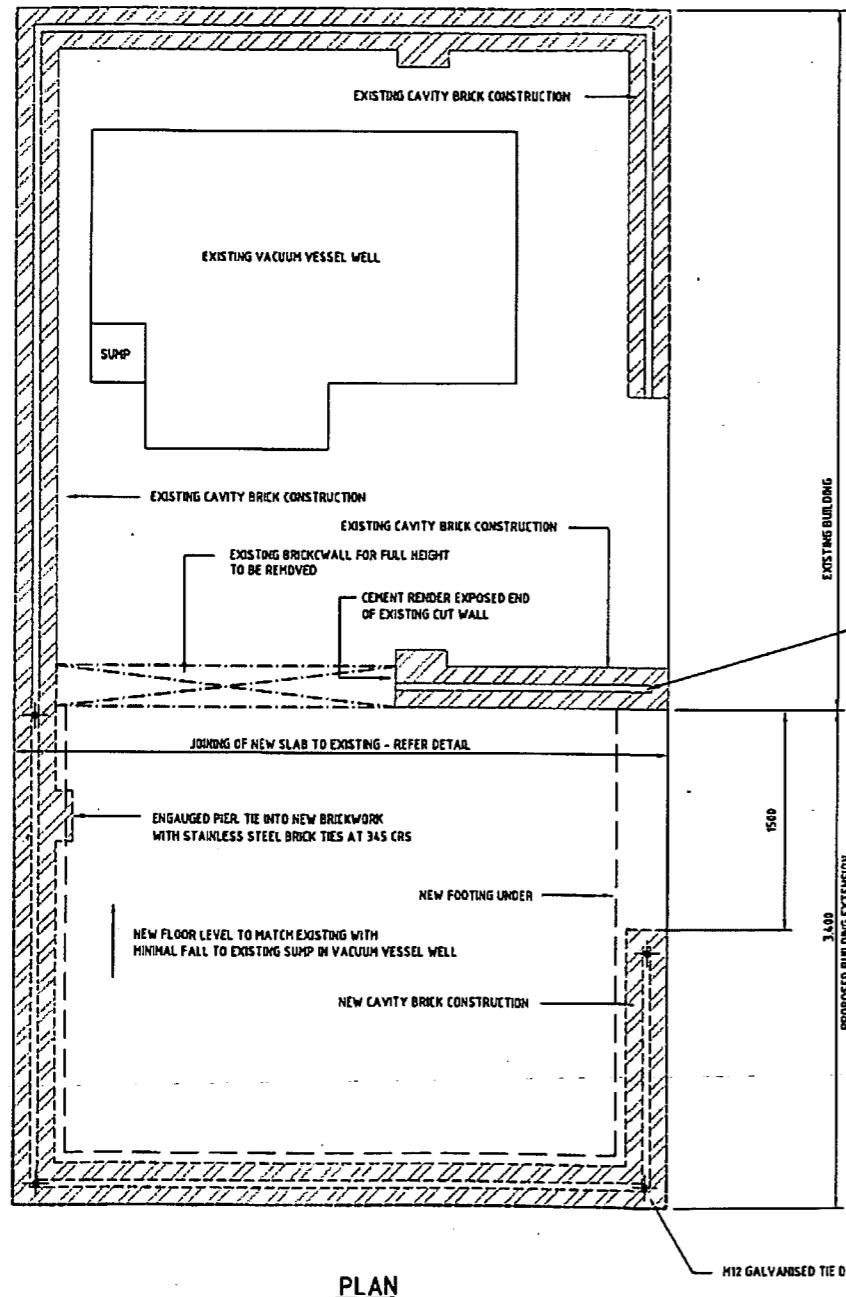
Drawing Number

0424/12

C

**SECTION E-E****PIPE LEGEND**

- (A) 500 ABS VACUUM MAIN FROM VACUUM PUMP No 1 TO VACUUM VESSEL
- (B) 500 ABS VACUUM MAIN FROM VACUUM PUMP No 2 TO VACUUM VESSEL
- (C) 500 ABS VACUUM MAIN CONNECTING NEW AND EXISTING VACUUM VESSELS
- (D) 320 ABS CYCLONE WATER RETURN MAIN
- (E) 320 ABS VACUUM EXHAUSE
- (F) 500 ABS VACUUM EXHAUSE
- (G) 320 uPVC WASTE MAIN TO SUMP



B	RPEQ Signature	Aug 2006	TRE
A	Vacuum tank	July 2004	AS
No.	Description	Date	Initial

Amendment:

⑥ GeoLINK 2004

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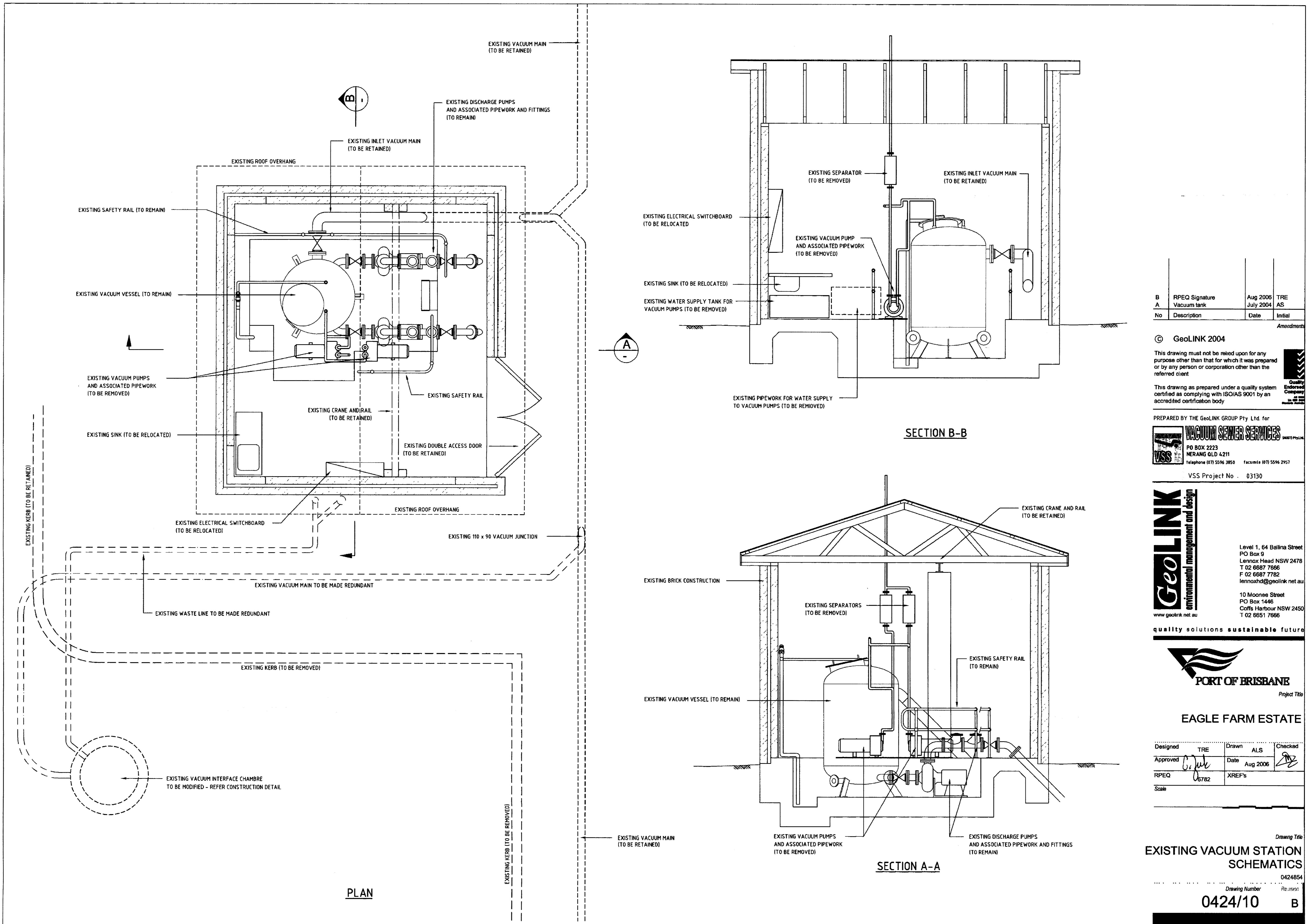
**EAGLE FARM ESTATE**

Designed	TRE	Drawn	ALS	Checked
Approved	C. Jek	Date	Aug 2006	
RPEQ	672	XREFS		
Scale				

PROPOSED VACUUM STATION SLAB REINFORCEMENT

Drawing Number: 0424/13

Section: B



B	RPEQ Signature Vacuum tank	Aug 2006	TRE
A	Description	Date	Initial
			Amendments

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NERANG QLD 4211 telephone (07) 5596 3850 facsimile (07) 5596 2957
VSS Project No 03130

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PORT OF BRISBANE
Project Title

EAGLE FARM ESTATE

Designed	TRE	Drawn	ALS	Checked
Approved	<i>C. Jule</i>	Date	Aug 2006	<i>[Signature]</i>
RPEQ	6782	XREF's		
Scale				

EXISTING VACUUM STATION SCHEMATICS

Drawing Title
0424/10 B
Drawing Number
Revision

0424854

0424854

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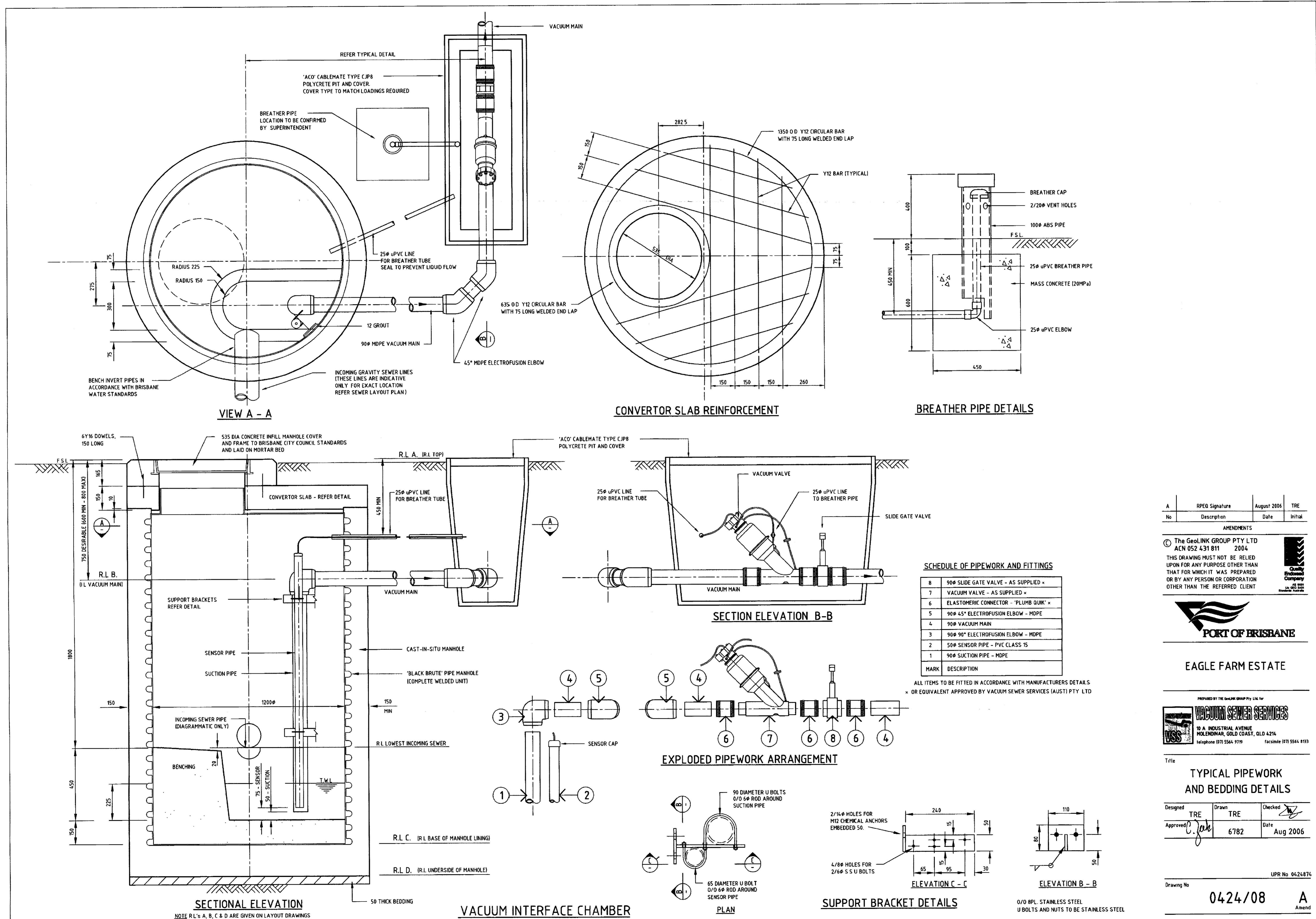
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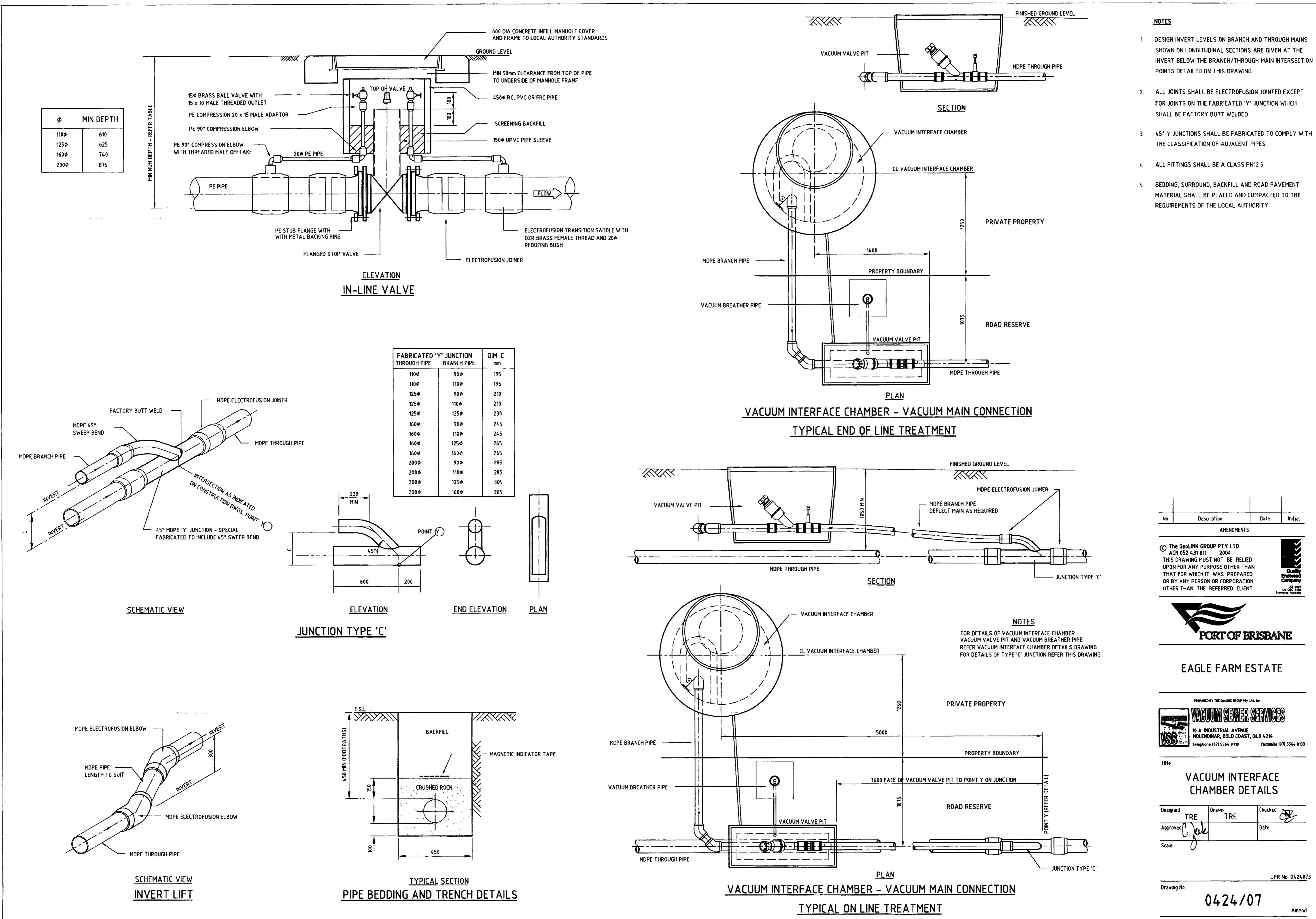
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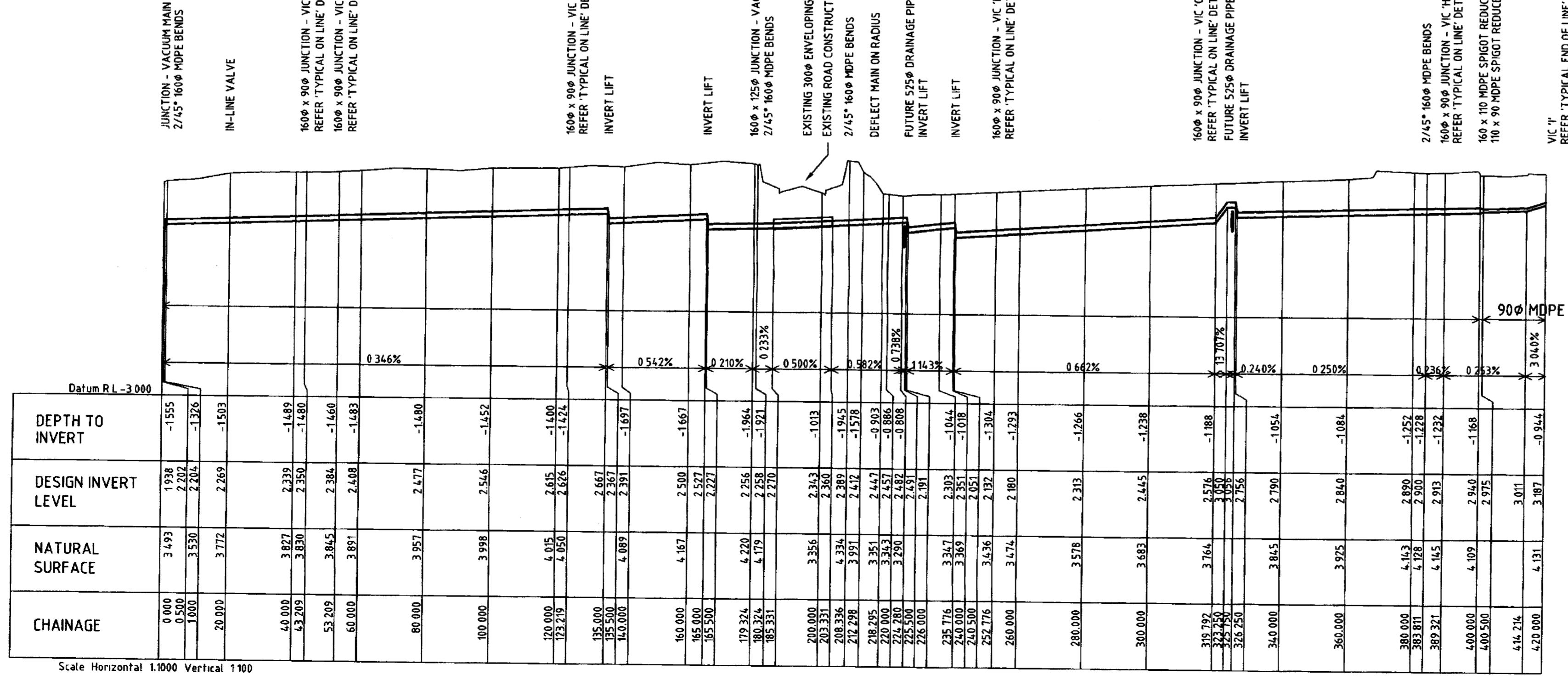
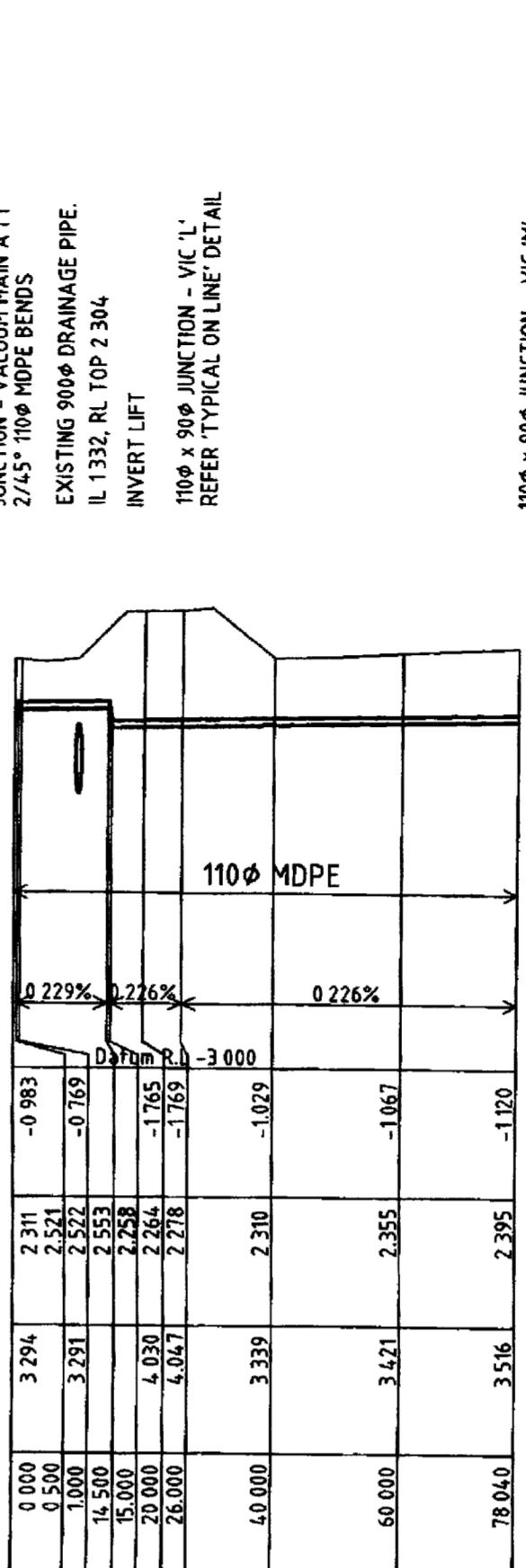
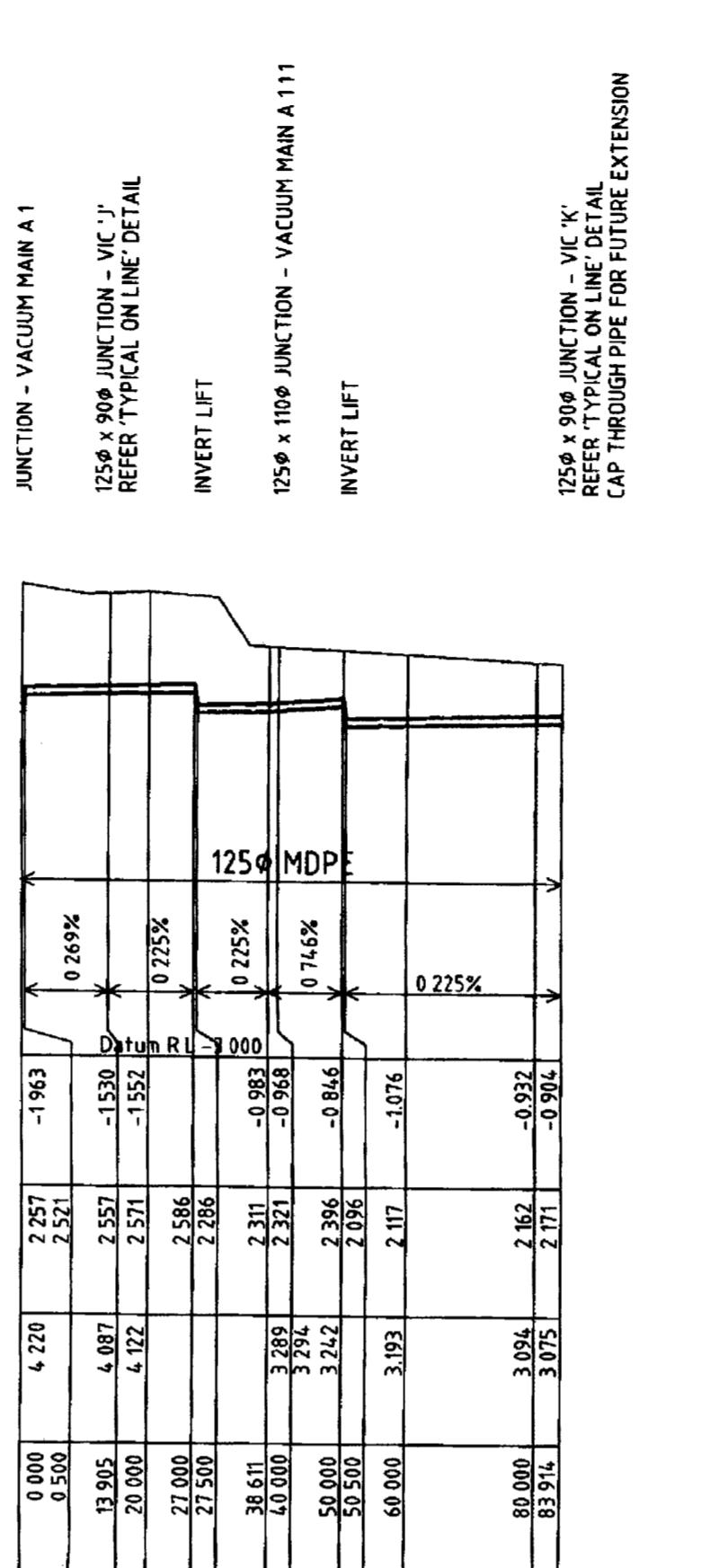
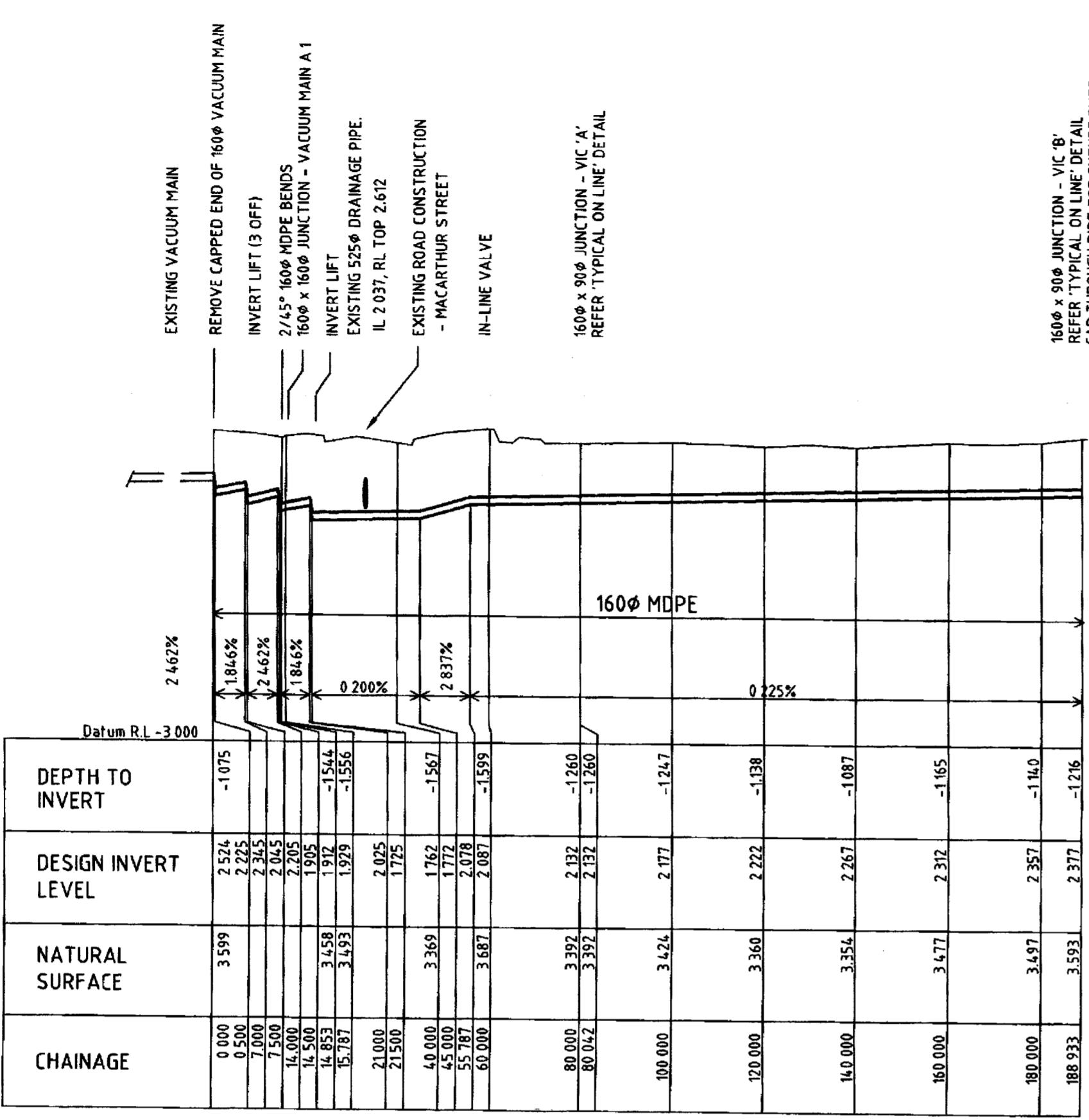
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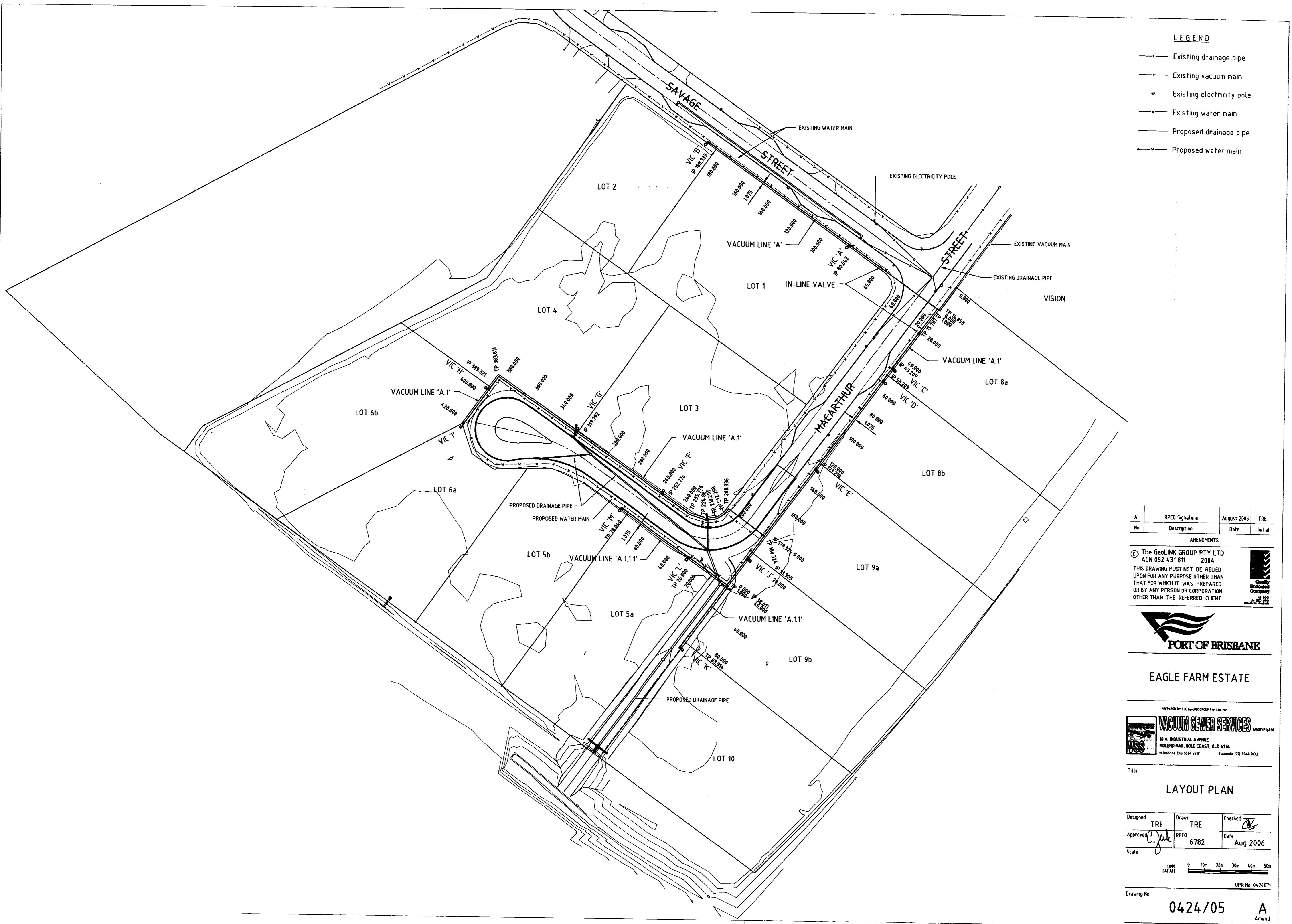




A RPEQ Signature August 2006 TRE
No Description Date Initial
AMENDMENTS
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ACN 052 431 811
2004
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OTHER THAN THE REFERRED CLIENT
GeoLINK Group Pty Ltd
Level 1, 100 Queen Street, Brisbane, QLD 4000
Phone: (07) 3211 1000 Fax: (07) 3211 1001

PORT OF BRISBANE
EAGLE FARM ESTATE
VACUUM SEWER SERVICES
10 A, INDUSTRIAL AVENUE
MOLENDAIR, GOLD COAST, QLD 4214
Telephone (07) 5564 9710 Facsimile (07) 5564 8193
Title

PREPARED BY THE GeoLINK GROUP Pty Ltd for
10 A. INDUSTRIAL AVENUE
MOLENDAIR, GOLD COAST, QLD 4214
Telephone (07) 5564 9710 Facsimile (07) 5564 8193
Drawing No. 0424/06 Amend A
Scale 1:500 1:1000 1:2000 1:3000 1:4000 1:5000
Scale Horizontal 1:1000 Vertical 1:1100
TRE Drawn Checked
Approved C.Jak 6782 Date Aug 2006
Scale HOR 1:500 1:1000 1:2000 1:3000 1:4000 1:5000
Scale VER 1:100 1:200 1:300 1:400 1:500
Drawing No. 0424/06 Amend A
Title
LONGSECTIONS
Designated TRE Drawn TRE Checked
Approved C.Jak 6782 Date Aug 2006
Scale HOR 1:500 1:1000 1:2000 1:3000 1:4000 1:5000
Scale VER 1:100 1:200 1:300 1:400 1:500
UPR No 0424872



MANUFACTURER'S DATA REPORT - PRESSURE VESSEL*

(To be Completed and Forwarded to Respective Statutory Authority where Installed)

**MANUFACTURED BY (Name and Address) MAXITHERM BOILERS PTY LTD
329 HORSLEY RD, MILPERRA NSW 2214**

MANUFACTURED FOR (Name and Address) EDWARDS ENVIRONMENTAL ENT.

TO BE INSTALLED AT (Name and Address) **TO BE ADVISED**

DESIGN APPROVAL --	S.A.	N.S.W.	VIC	QLD	W.A.	TAS
Number.....		INTERNAL				
Date						

MANUF. SERIAL NO. **MMV880** REGISTRATION NO.

TYPE 915V1.95/150 ITEM 1 TO 6 DES. PRESSURE 150 kPa MAX. TEMP 150°C MIN. TEMP
 ITEM 10 TO 12 DES. PRESSURE MAX. TEMP MIN. TEMP
 APPROVED DRG.NO 24/370/4 CODE AS1210-1989 CLASS OF CONSTRUCTION CLASS 3
 PRESSURISING MEDIUM NONE VOLUME OF PRESS.VESSEL 3.009 m³

ITEMS 1 TO 6 INCLUSIVE TO BE COMPLETED FOR ALL SINGLE WALL VESSELS, JACKETS OF JACKETS
VESSELS OR SHELLS OF HEAT EXCHANGERS

*Where Components are manufacture or assembled in different locations a part manufacturer's data report is to be completed by relevant manufacturer covering the extent of manufacture and testing involved.

ITEM 7 TO BE COMPLETED, AS APPLICABLE, FOR ALL VESSELS**7. NOZZLES**

Purpose	Matl. Spec.	Diam.	Thick	Nozzle Attach.	Reinf. Matl. And Attach.	Flange Spec. and Rating
INLET	ASTM A106 B	100NB		WELDED	WELDED	AS2129 TABLE 'E'
MANHOLE	AS1548-7-460R	450NB		WELDED	WELDED	AS1548-7-460R
VACUUM INLET	ASTM A106 B	150NB		WELDED	WELDED	AS2129 TABLE 'E'

ITEMS 8 AND 9 INCLUSIVE TO BE COMPLETED FOR TUBE SECTIONS**8. TUBEPLATES (State Stationary, Floating etc.)**

Type Matl.(Spec. and Grade) Diam. Thick Attach.....

9. TUBES Matl. O/Diam. Thick. No. Type. ("U" Straight)
(Spec. and Grade)Pitch.....
(Pattern and Size)**ITEMS 10 TO 12 INCLUSIVE TO BE COMPLETED FOR INNER CHAMBERS OF JACKETED VESSELS
CHANNELS OF HEAT EXCHANGERS.**10. SHELL Matl (Spec.and Grade) Actual Thickness Corr. Allow.....
Diameter..... Length.....11. SEAMS - Long H.T. R.T. Joint Eff.
(Weld,Double,Single Butt) (Yes/No) (Spot/Full)

Circum..... H.T. R.T. Joint Eff.

12. HEADS - Matl. Joint Eff. Shape. Side To.
(Spec. and Grade) (In Head) (Dish/Flat) Press (Concave/Convex)

Location Thick Crown Rad. Flange Rad. Ellip. Ratio Conic Angl.

(Top/Bottom Ends)

Channel
.....Floating
.....

If Removable - (a) Location Matl.(Spec. and Grade) Size and No.

Bolting Details - (b)
.....Other Fastenings
(Attach Sketch or Describe)**13. INSPECTION OPENINGS (State Manhole, Handhole, Socket etc)**

Type	No.	Size	Location	Reinf. Material	Reinf. Attach.
MANHOLE	1	450NB	SIDE		

REMARKS --

MATERIALS

Description (Shell, End, etc)	Certificate Number	Plate Number	Thickness mm	Standard Test Piece (Size, Gauge, Length)	Yield Point MPa	Ultimate Stress MPa	Elongation (percent)	Bend Test	Impact J	Code or Specification	Inspector's Initials
SHELL	P94448	MT873	6	A	410	500	36	-	-	7-460R	<i>L.M.</i>
DISHED END	J04051	EFF9761	6	A	365	500	38	-	-	7-460R	<i>L.M.</i>
MANWAY FLANGES	S81304	MT883	36	A	340	510	30	-	-	7-460R	<i>L.M.</i>
MANWAY PIPE	S71973	MT839	10	A	390	510	33	-	-	7-460R	<i>L.M.</i>
100NB ELBOW	4951200017	MT1764	6.02		305	490	65	-	-	A106B	<i>L.M.</i>
100NB PIPE	32.253/93	MT1666	8.56		313	467	39	-	-	A106B	<i>L.M.</i>

MECHANICAL TEST-WELDED JOINTS

Active 29/01/2014

Testing Authority	Branding	Dimensions mm	Yield MPa	Ultimate Tensile MPa	Elong. %	Impact J	Temp. of Impact Specimen	Remarks	Date of Test	Inspector's Initials
Tensile										
Bend (Inner)										
Bend (Outer)										
Impact (Root)										
Impact (Face)										
Impact (H.A.Z.)										
All Weld. Tensile										
Nick Break										
Macro										

NON-DESTRUCTIVE TESTING

Description (Radiological, Ultrasonic, etc)	Report No.	Order No.	Date	Code	Testing Authority	Remarks	Inspector's Initials
LIQUID DYE PENETRANT		10/03/97	AS1210	MAXITHERM	COMPLIES	<i>S.G.H.</i>	<i>S.G.H.</i>

WELDER'S CERTIFICATES

WELDERS		SUPERVISORS		Remarks
Name	Certificate No.	Name	Certificate No.	
Y B FU	23872 (W.C.A.-NSW)	LONG & CIRCS SEAMS (S.M.A.W.)	S STYLIANOU	15063 (W.C.A.-NSW)
Y B FU	23872 (W.C.A.-NSW)	FILLET WELDS (M.M.A.W.)	S STYLIANOU	15063 (W.C.A.-NSW)

HYDROSTATIC TESTS

Description	Hydrostatic Test	Date	Inspector	Remarks and Stampings
SHELL	225 kPa (30 MIN)	18/03/97	S STYLIANOU	STAMPING ON RIM OF MANWAY RING MMV880
				D.P. 150 kPa T.P. 225 kPa D.T. 150°C AS1210-3 09/QA/94 18/03/97

General Remarks

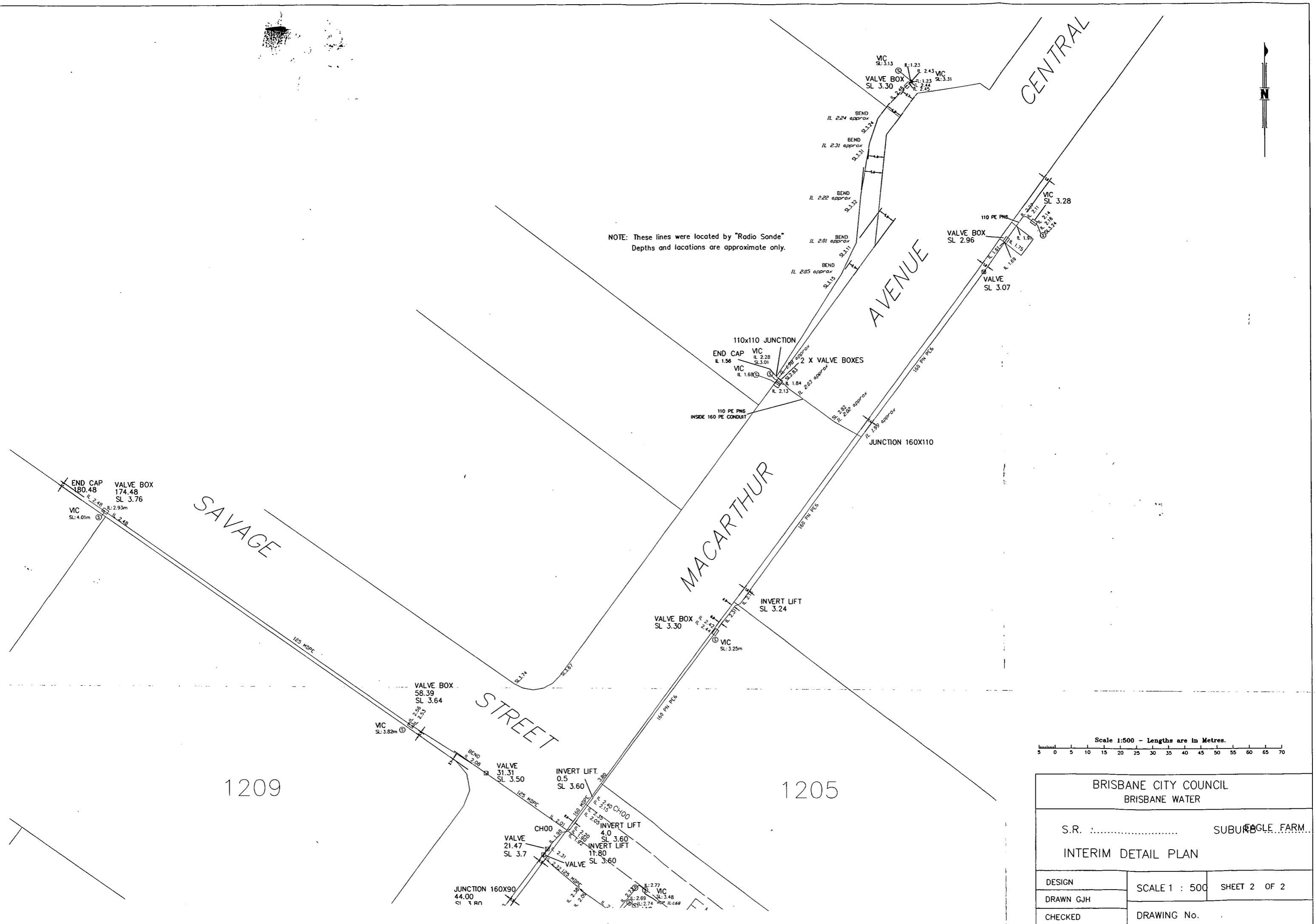
Does manufacture conform to approved drawings YES YES/NO*
Are all conditions in letter of approval complied with YES YES/NO*

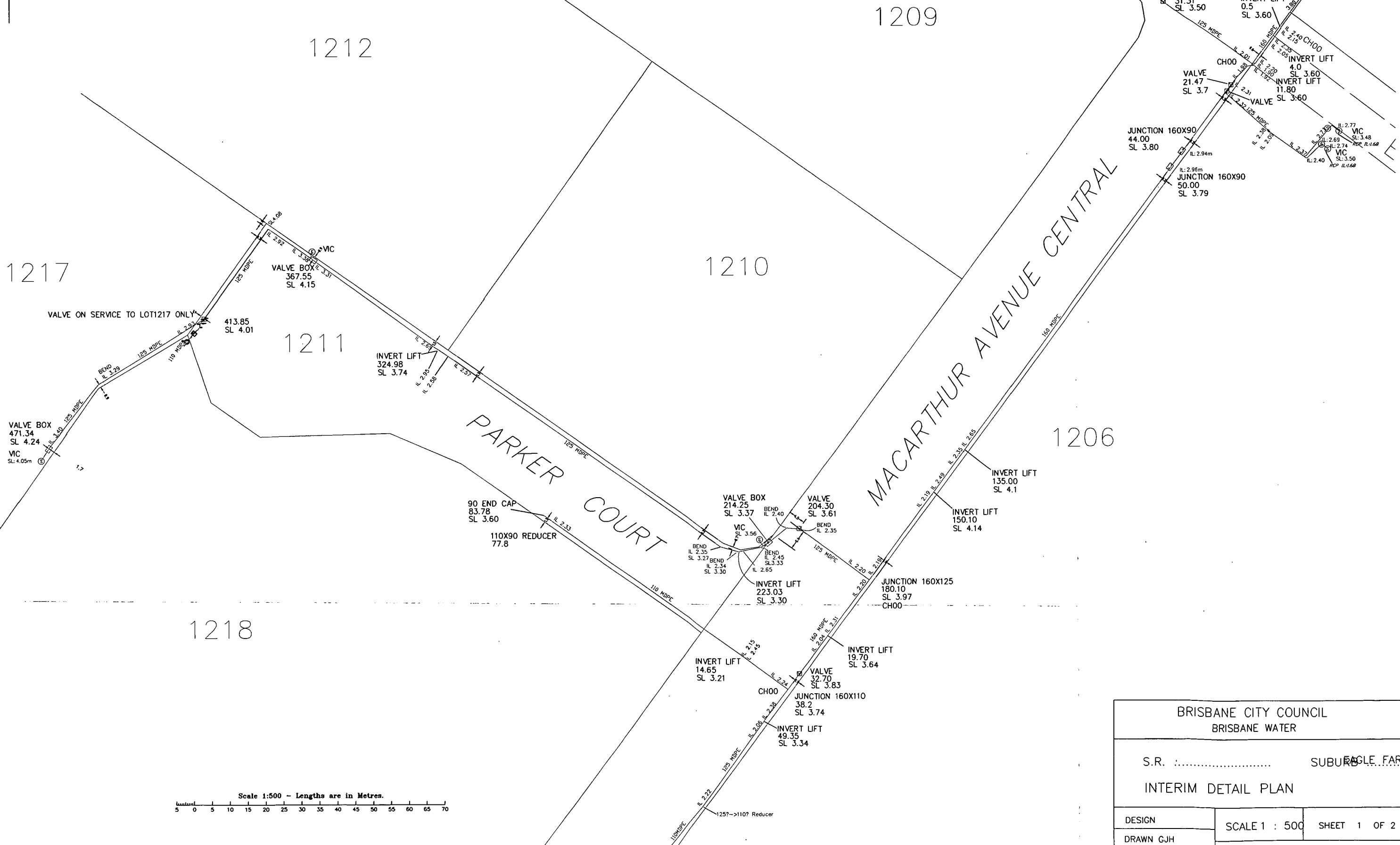
I/We certify the above data to be correct and that all details of material, construction and workmanship on this pressure vessel satisfy the provisions of the Boiler and Pressure Vessel Regulations under the relevant State legislation.

Signed..... S. Shley

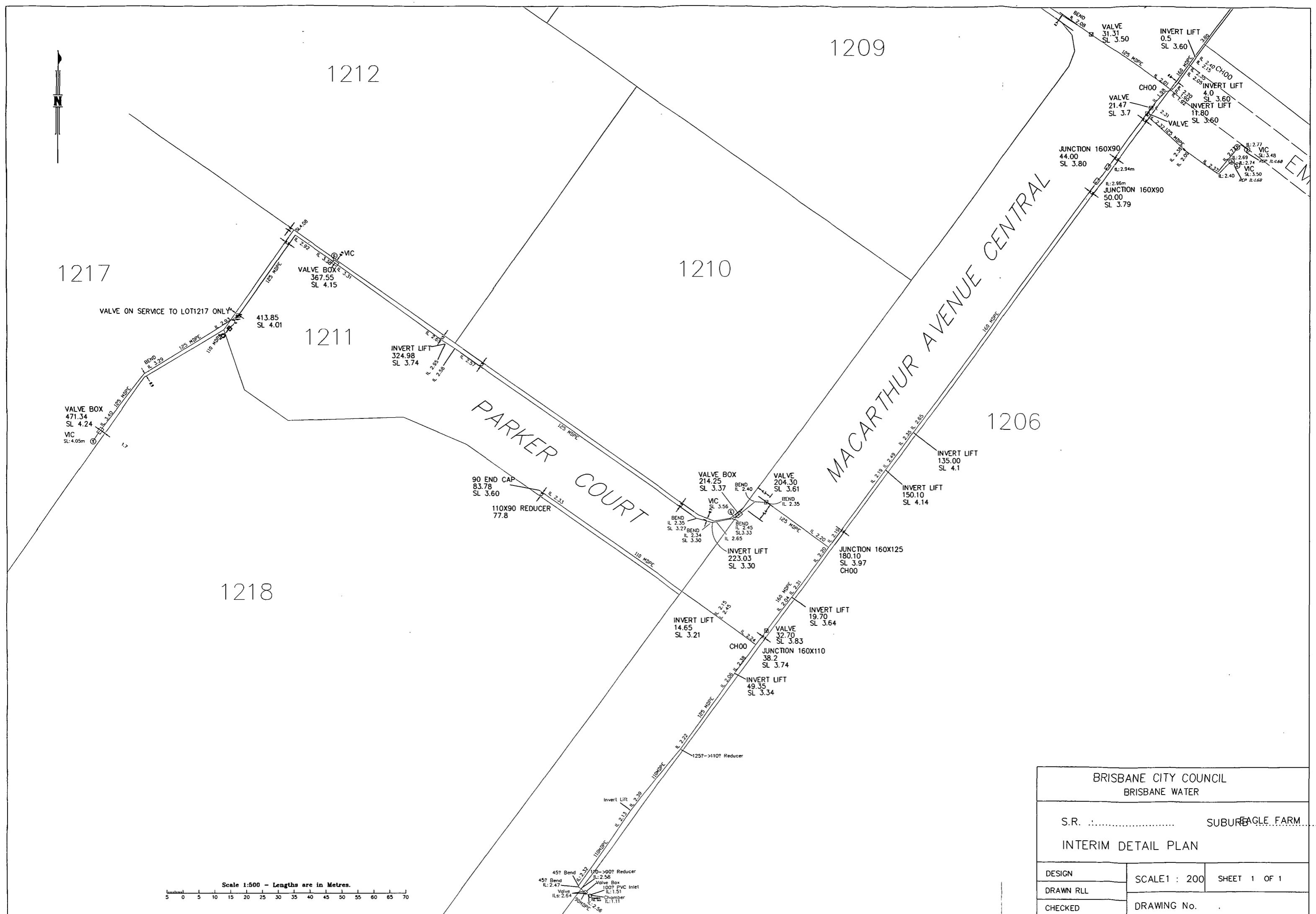
Manufacturer 1913 / 1997

Inspecting Authority /...../19.....





BRISBANE CITY COUNCIL BRISBANE WATER		
S.R.	SUBURB EAGLE FARM	
INTERIM DETAIL PLAN		
DESIGN	SCALE 1 : 500	sheet 1 OF 2
DRAWN GJH		
CHECKED	DRAWING No.	

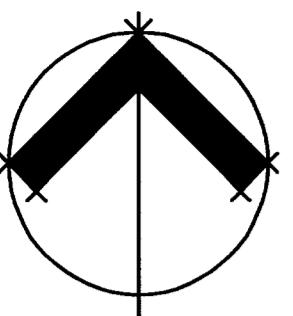


BRISBANE CITY COUNCIL
BRISBANE WATER

S.R. SUBURB EAGLE FARM

INTERIM DETAIL PLAN

BRISBANE CITY COUNCIL
BRISBANE WATER



1212

1217

1211

1218

VALVE ON SERVICE TO LOT1217 ONLY

VALVE BOX 367.55
SL 4.15

125 NPS

110 NPS

125 MOPF

110 MOPF

BEND IL 3.29

VIC
SL: 4.05m

413.85
SL 4.01

1218

1209

MACARTHUR AVENUE CENTRAL

1210

1206

VALVE BOX
214.25
SL 3.37

VALVE
204.30
SL 3.61

BEND
IL 2.40

BEND
IL 2.35

VIC
SL 3.56

BEND
IL 2.45

BEND
IL 2.35

BEND
IL 2.34

BEND
IL 2.65

INVERT LIFT
223.03
SL 3.30

JUNCTION 160X125
180.10
SL 3.97
CH00

INVERT LIFT
14.65
SL 3.21

INVERT LIFT
32.70
SL 3.83

INVERT LIFT
38.2
SL 3.74

INVERT LIFT
49.35
SL 3.34

INVERT LIFT
135.00
SL 4.1

INVERT LIFT
150.10
SL 4.14

160 MPE

125 MPE

160 MPE

125 MPE

160 MPE

125 MPE

S.P.
IN

No.	Description	Date	Initial	Amendment

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Quality System
Endorsement
Company

PREPARED BY THE GeoLINK GROUP Pty. Ltd. for

VACUUM SEWER SERVICES (AUST) Pty. Ltd.

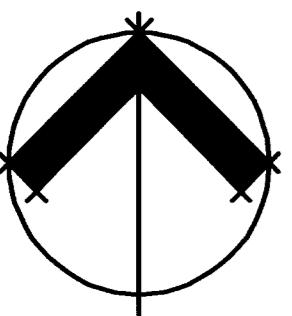
PO BOX 2223
NERANG QLD 4211

telephone (07) 5596 0566 facsimile (07) 5564 8133

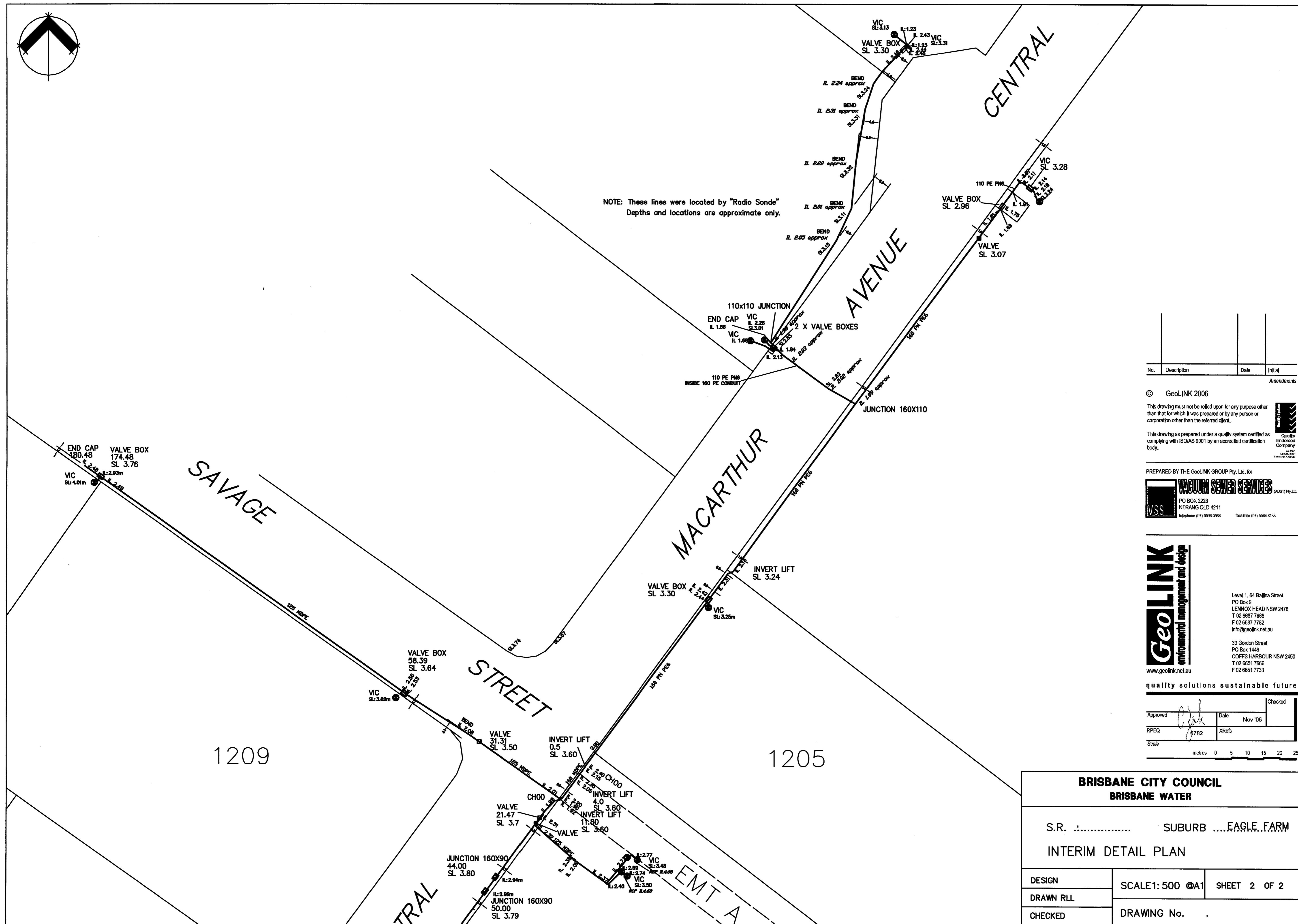
The logo for Geolink Environmental Management and Design. It features the word "Geolink" in a large, bold, black sans-serif font. To the right of "Geolink", the words "environmental management and design" are written in a smaller, black, lowercase sans-serif font. A thick vertical black line runs down the right side of the "Geolink" text. Below the main logo, the website "www.geolink.net.au" is displayed in a smaller, black, lowercase sans-serif font.

quality solutions sustainable future		
<i>C. J. Clark</i>		Checked
Approved	Date Nov '06	
RPEQ <i>6782</i>	XRefs	
Scale	metres	0 5 10 15 20

BRISBANE CITY COUNCIL
BRISBANE WATER



NOTE: These lines were located by "Radio Sonde"
Depths and locations are approximate only.



No.	Description	Date	Initial
<i>Amendments</i>			

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GeoLINK

environmental management and design

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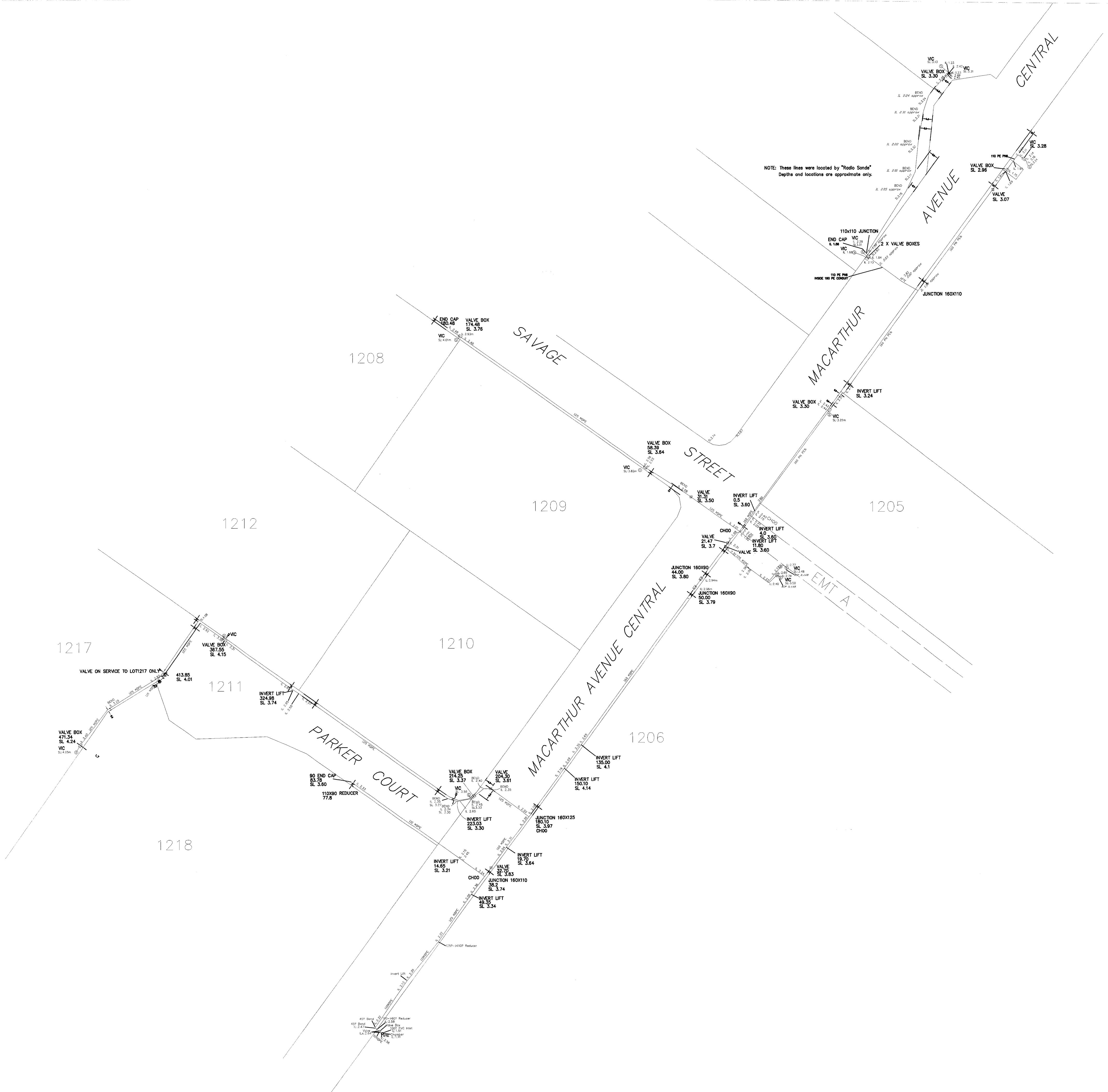
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Approved	<i>C. J. Smith</i>	Date Nov '06
RPEQ	6782	XRefs
Scale	metres 0 5 10 15 20 25	

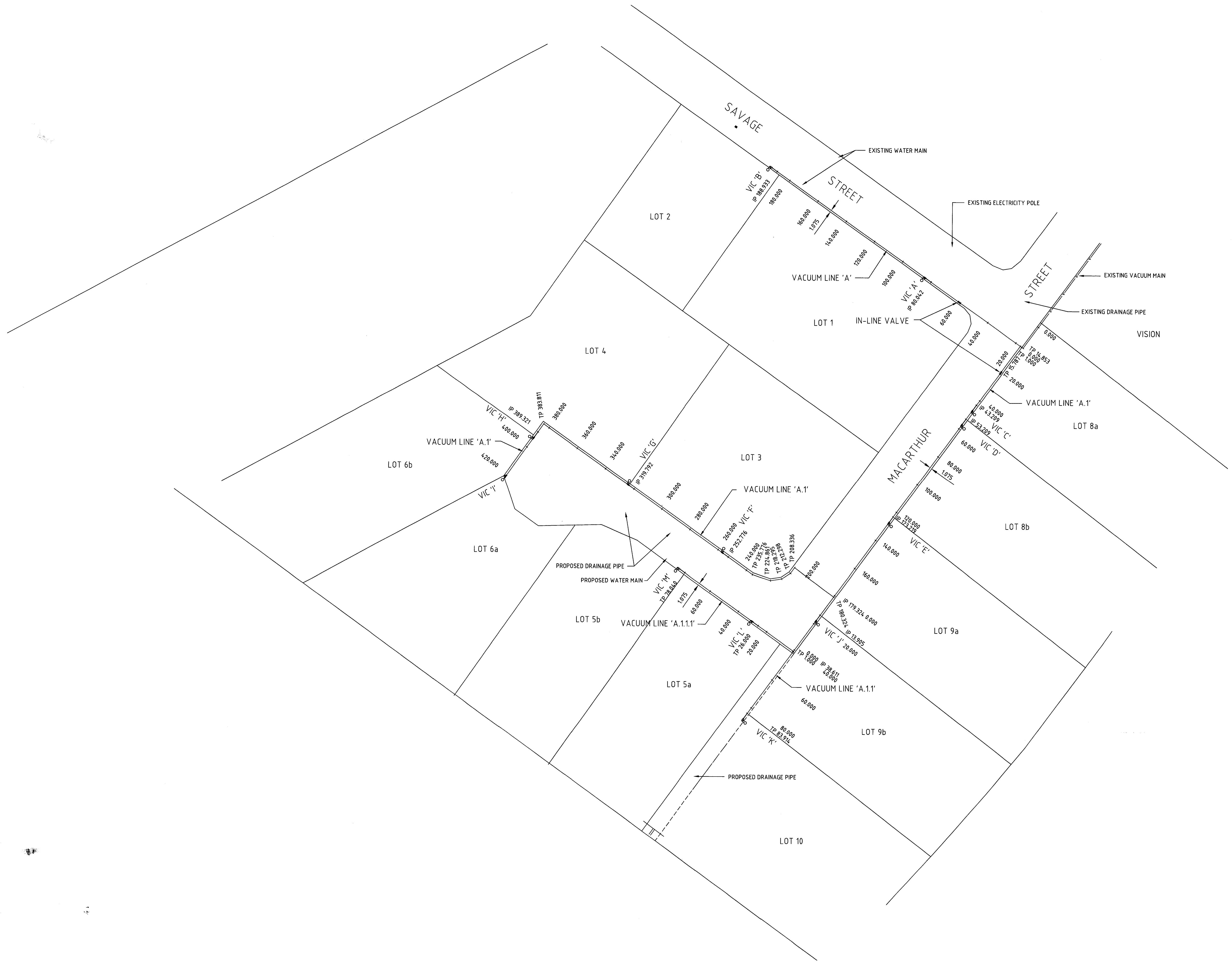
BRISBANE CITY COUNCIL

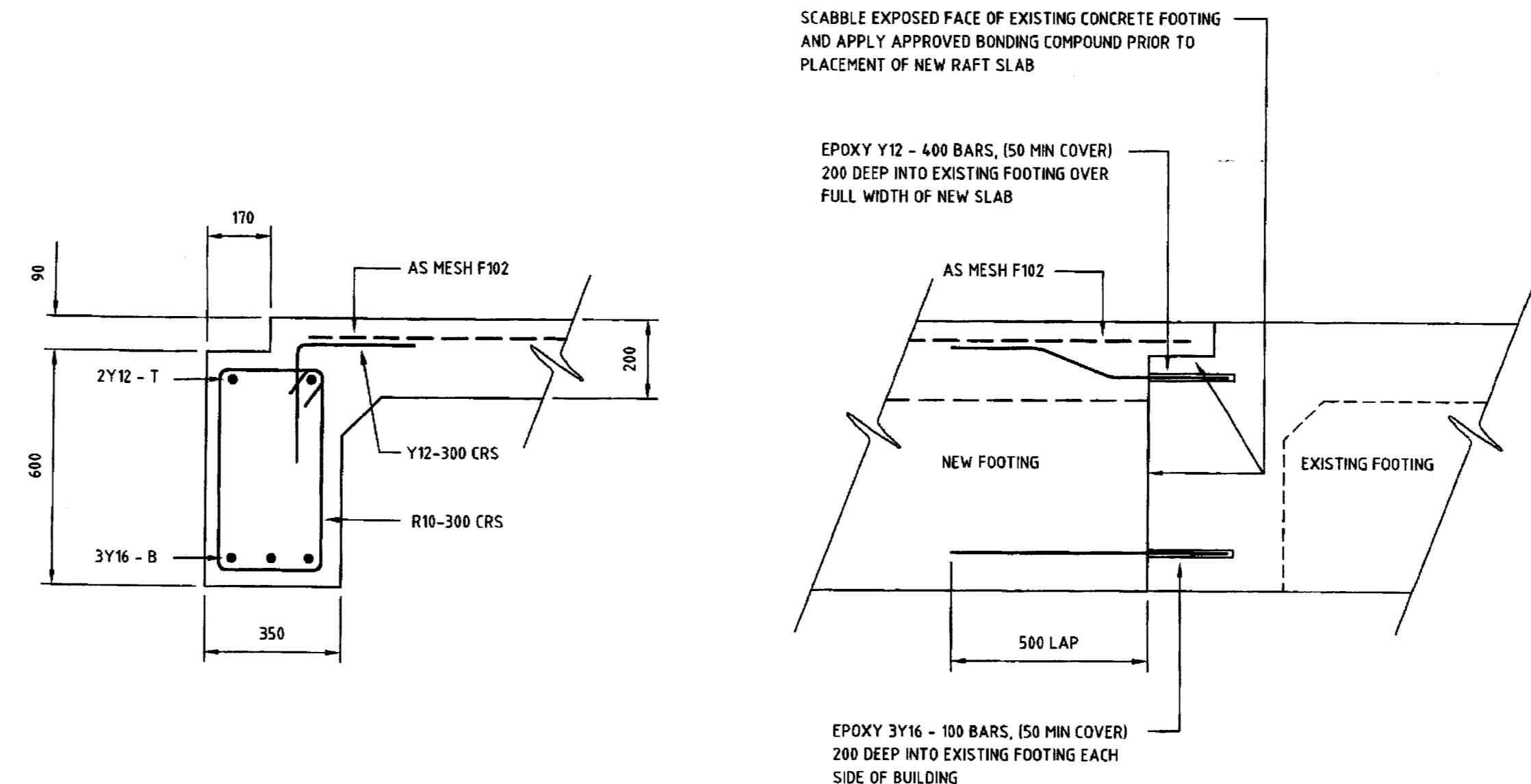
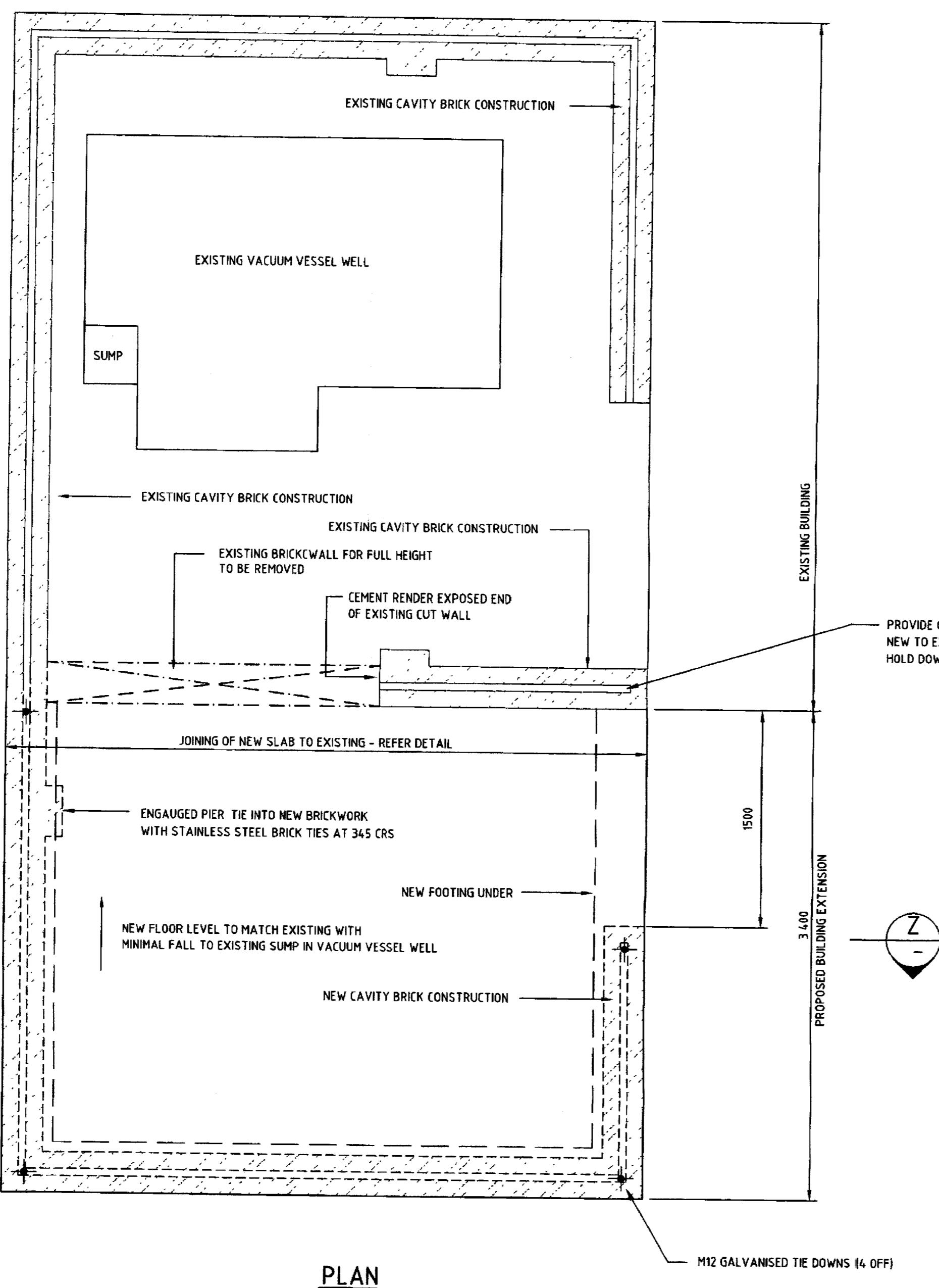
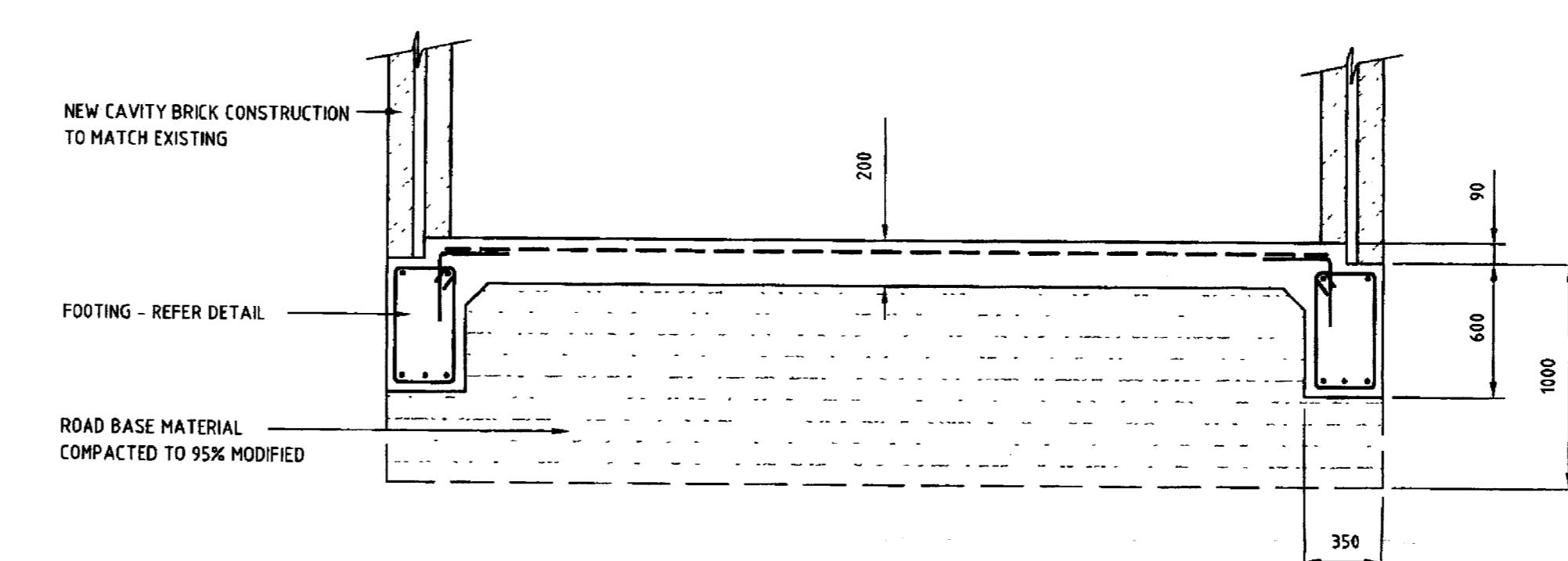
BRISBANE WATER

S.R. SUBURB EAGLE FARM
INTERIM DETAIL PLAN

DESIGN	SCALE 1: 500 @A1	SHEET 2 OF 2
DRAWN RLL		
CHECKED	DRAWING No.	.





TYPICAL FOOTING DETAILJOINING OF NEW SLAB TO EXISTINGSECTION Z-Z

B	RPEQ Signature	Aug 2006	TRE
A	Vacuum tank	July 2004	AS
No	Descriptor	Date	Initial

Amendments

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quality solutions sustainable future

**EAGLE FARM ESTATE**

Designed	TRE	Drawn	ALS	Checked
Approved	C.Juk	Date	Aug 2006	
RPEQ	G/B2	XREF's		
Scale				

Drawing Title
**PROPOSED VACUUM STATION
SLAB REINFORCEMENT**
Drawing Number
0424/13
Revision
B

