Robert Bird Group

Site Services Report and Site Based Stormwater Management Plan

Proposed Jubilee Hotel Redevelopment at 470 St Pauls Terrace, Fortitude Valley

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2017/891

Date: 19 February 2018

Queensland Government

AMENDED IN RED

By: Tom Barker

Date: 12 February 2018

Queensland Government

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15th November 2017

Prepared For: Bennett & Associates Pty Ltd

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Report Amendment Register

Issue	Section & Page No.	Issue / Amendment Details	Author	Reviewer	Date
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B	2.1, pg 1 7.2, pg 10 16, pg 13	Draft Issue	Aaron Wilss	Antony Pearson	01/11/2017
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1.0 Purpose of Document

This document has been prepared by Robert Bird Group (RBG) as part of the Development Application submission to the Department of Infrastructure, Local Government and Planning (DILGP) for the Jubilee Hotel Redevelopment located at 470 St Pauls Terrace, Fortitude Valley.

The purpose of this report is to address the engineering infrastructure that will be required to service the proposed development.

This report was prepared using information obtained from the following sources:

- Architectural Plans of the proposed development prepared by Blight Rayner;
- Brisbane City Council EBIMAP information;
- Dial-Before-You-Dig (DBYD) services;
- Brisbane City Council Floodwise Property Report;
- RNA Showground Development drawings by Cardno.

2.0 Introduction

2.1 Project Description

The proposed development is situated on land described as:

Street Address	470 St Pauls Terrace, Fortitude Valley
Real Property Description	Lot 30 on RP9713 Lot 31 on SP196762 Lot 32 on SP196761 Lot 33 on SP196760 Lot 34 on SP196759 Lot 35 on SP196758 Lot 36 on SP196757 Lot 37 on SP196756 Lot 38 on SP192468

The site is surrounded by St Pauls Terrace, Constance St, Symes St and Brewers St. It is also adjacent to an undeveloped lot to the north of the site.

Under the BCC City Plan Area Classification, the site is classified as EC – Emerging Community. However the development is subject to the Bowen Hills PDA Development Scheme. Under the Bowen Hills PDA Development Scheme, the site is located in Precinct 2: Ekka Precinct and wihin the Mixed Use Zone.

The site is currently contains the existing Jubilee Hotel, adjoining bottle shop and car parking. The Clem 7 tunnel runs directly below the site, approximately 30m below current ground level.

The total area of the existing site is 2,916m^2, which includes 1,661m^2 of roof area. Total impervious area approximately 2,840m^2.

Proposal Details

The proposed development comprises a 14 storey building primarily for commercial office space with some retail on the ground floor. There are 2 levels of basement carparks. The development also includes and refurbishment of the Jubilee Hotel. Refer to Appendix A for architectural plans.

Vehicle Access and Parking

Currently vehicles can access the site from a crossover on St Pauls Terrace and exit the site from a crossover in Symes St. A second crossover is located in Symes St which is used to access a parking area.

The proposed vehicular access into the loading dock and basement is from Symes St only.

Car parking for the proposed development will be provided at basement and lower ground levels.

Refer to Appendix A for the Architectural drawings.

2.2 Topography

The site generally slopes from the south-west to the north-east at approximately 5.5%. The lowest point on the site is along the Symes St frontage at approximately the mid-point along Symes St. The levels on the site vary from approximately RL7.5m to RL11.5m.

2.3 Location

The site is located at 470 St Pauls Terrace, Fortitude Valley.

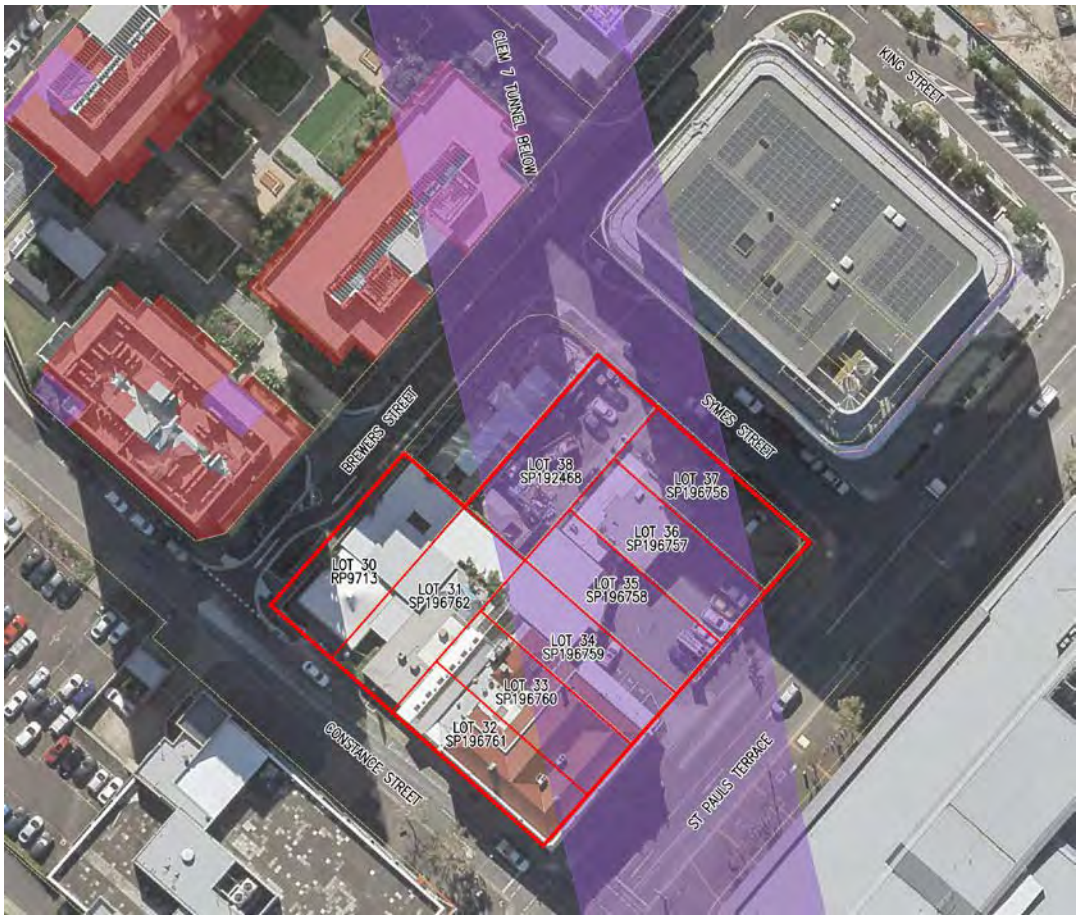


Figure 2.1 – Site Location

Image Source: DNRM, Queensland Orthophoto Image Data

3.0 Density

Density calculations are based on the development summary provided by Blight Rayner dated 9th October 2017.

Table 3.1 and Table 3.2 below provide a summary of the proposed land usage of the site and the estimated Equivalent Persons (EP's) generated by the proposed development.

Table 3.1 Estimated Equivalent Persons (EP's) for Water Supply

Development Type	GFA	ET Conversion Rate	Total ET's	EP/ET Conversion Ratio	Total EP's
Commercial/Retail	18,097m²	0.0021 / m² GFA	38.00	2.7/1	103
				Total	**103**

Note: EP's have been calculated using Brisbane City Council – Brisbane City Plan 2014 – Part 4.3 Planning Assumptions. The EP/ET conversion ratio is implied based upon QUU guidelines.

Table 3.2 Estimated Equivalent Persons (EP's) for Sewerage

Development Type	GFA	ET Conversion Rate	Total ET's	EP/ET Conversion Ratio	Total EP's
Commercial/Retail	18,097m²	0.0021 / m² GFA	38.00	2.7/1	103
				Total	**103**

Note: EP's have been calculated using Brisbane City Council – Brisbane City Plan 2014 – Part 4.3 Planning Assumptions. The EP/ET conversion ratio is implied based upon QUU guidelines.

4.0 Water Supply

4.1 Existing Infrastructure

Appendix B provides a copy of Brisbane City Council's EBIMAP, along with Cardno drawings in Appendix D showing sewer infrastructure in the immediate vicinity of the site. The details of the existing water infrastructure are recorded in Table 4.1 below:

Table 4.1 Existing Water Reticulation Infrastructure

Council ID	Size (mm)	Material	Location	Description
WS418632	20	Unknown	Located on St Pauls Terrace, providing connection to Lot 35 on SP196758 and 34 on SP196759.	Water Service
RS201833	150	Cast Iron	Located on St Pauls Terrace, adjacent to the south eastern side of site.	Reticulation Main
RS201830	150	Cast Iron	Located on St Pauls Terrace, eastern corner of site.	Reticulation Main
RS30275	80	Cast Iron	Located on Symes Street, adjacent to the north eastern side of the site.	Reticulation Main

RHY72991	N/A	N/A	Located on Symes Street, north of Lot 37 on SP196756	Inline Hydrant
RS460783	150	Cast Iron	At the corner of Constance Street and St Pauls Terrace	Capped pipe
RS131842	100	Cast Iron	Located on Constance St, adjacent to south western side of the site	Reticulation Main
W1	150	DICL	On Constance Street, west of the site	Reticulation Main
W2	150	PVC	Located on Brewer Street, north of Lot 30 on RP9713	Reticulation Main
FH	N/A	N/A	On Brewer Street, between Lot 30 on RP9713 and Lot 121 on SP238200	Fire Hydrant
W3	150	PVC	Located on Brewer Street, north of Lot 121 on SP238200	Reticulation Main
W4	150	PVC	Located on Symes Street, north eastern side of site	Reticulation Main

4.2 Proposed Demand

In accordance with the BCC – Brisbane City Plan 2014 – Part 4.5.2, the water demand for the proposed development will be designed as per the Queensland Urban Utilities Design and Construction Standards, incorporating the South East Queensland Water Supply and Sewerage Design and Construction Code (SEQ WS&S D&C Code). An average day consumption rate of 230 L/EP/day has been stipulated in this code. The following Water Agency (QUU) procedure is to be used in accordance with SEQ WS&S D&C Code:

Table 4.2 Proposed Water Demands

Description	Design Flow/Unit	Flow (L/s)
QUU Average Day Demand (AD)	230L/EP/Day	0.274
QUU None Revenue Water (NRW)	30L/EP/Day	0.036
QUU Peak Day Demand (PD)	(1.4 x AD) + NRW	0.420
QUU Peak Hour Demand (PH)	(2.8 x AD) + NRW	0.803

Note: The above calculations are in accordance with the South East Queensland Water Supply and Sewerage Design and Construction Code. These figures are to be used as a guide only and for planning purposes only. Hydraulic engineer will provide the demand in details in the future.

The required peak hour water demand for the proposed development is 0.803 L/s. This water demand is to be provided at a minimum pressure of 22m (220kPa) and at a maximum pressure of 55m (550kPa).

The site will require suitable property connection/s to be installed to meet the water supply demands for the proposed development.

The project's hydraulics services consultant will address any specific requirements for firefighting during the design development stage (i.e. booster pump may be required to be installed on the fire mains supply to assist with the pressure requirements for firefighting demands).

The project's hydraulics consultant will address these specific requirements during the design development stage.

4.3 Point of Connection

The details of the property connection will be subject to further discussions with Queensland Urban Utilities (QUU) and the hydraulic consultant during detailed design stage.

4.4 Preliminary Assessment of Existing Water Network Capacity

Based on previous discussions with QUU, the potable water reticulation system in the area has adequate capacity under peak and fire flow conditions to services new developments. A Services Advice Notice (SAN) has been submitted to QUU to confirm this assessment.

5.0 Sewerage

5.1 Existing Infrastructure

Appendix B provides a copy of Brisbane City Council's EBIMAP, along with Cardno drawings in Appendix D showing additional sewer infrastructure in the immediate vicinity of the site. The details of the existing sewer infrastructure are recorded in Table 5.1 below:

Table 5.1 Existing Sewerage Reticulation Infrastructure

Council ID	Size (mm)	Material	Location	Description
PC307549	100	Unknown	Connection to Lot 121 on SP238200, on Symes Street. Located on the north western side of Lot 121 on SP238200	Property Sewer Service
PC307548	150	Unknown	Connection to Lot 37 on SP196756, on Symes Street	Property Sewer Service
LS168721	300	Earthenware	Located on Symes Street, adjacent to north eastern side of site	Reticulation Main
LS168717	150	Earthenware	Located on St Pauls Terrace, south eastern side of the site	Reticulation Main
MH167210	1200	Unknown	Located on Constance Street	Maintenance Manhole
LS168726	150	Earthenware	Located on Constance Street, south western side of the site	Reticulation Main
PC307571	100	Unknown	Located on corner of Constance Street an Brewer Street, western side of site	Property Sewer Service

S1	160	Polyethylene	Connection to Lot 121 on SP238200, on Symes Street. Located on the north western side of Lot 121 on SP238200	Property Connection
4/8	Unknown	Concrete	On Symes Street. Located on the north western side of Lot 121 on SP238200	Maintenance Manhole
S2	160	Polyethylene	Located at the intersection of Symes Street and Brewer Street, northern side of the site.	Reticulation Main

5.2 Proposed Load

In accordance with the BCC – Brisbane City Plan 2014 – Part 4.5.3, the sewerage load for the proposed development will be designed as per the Queensland Urban Utilities Design and Construction Standards, incorporating the South East Queensland Water Supply and Sewerage Design and Construction Code (SEQ WS&S D&C Code). An average day consumption rate of 210 L/EP/day is stipulated in this code. The following Water Agency (QUU) procedure is to be used in accordance with SEQ WS&S D&C Code:

Table 5.2: Estimated Sewerage Demands

Description	*Design Flow/EP*	*Flow (L/s)*
Average Dry Weather Flow (ADWF)	210L/EP/Day	0.250
Peak Dry Weather Flow (PDWF)	D x 150L/EP/Day + 30L/EP/Day	1.231
Peak Wet Weather Flow (PWWF)	PDWF + 360L/EP/Day	1.660

The above flows are calculated as follows:

$$\text{Design Flow} = \frac{\text{EP x Flow L/EP/day}}{24 \times 3600}$$

5.3 Point of Connection

As the proposed site consists of multiple lots, there are two existing sewer property connections currently servicing the site with one off Constance Street and the other off Symes Street. The existing 150 diameter connection off Symes Street is the likely connection for the proposed development. If the existing sewer property connections are unsuitable to be reused, it is suggested that the proposed sewer connection is to be connected into the existing sewer manhole.

Any details of sewerage connections will be subject to further discussions with Queensland Urban Utilities (QUU) and the hydraulic consultant.

5.4 Preliminary Assessment of Existing Sewer Network Capacity

Based on previous discussions with QUU, advice was received that upon completion of the trunk sewer diversion from RNA to Ann Street, the existing downstream system will have sufficient capacity to service the developed catchment. As this trunk sewer diversion has been completed and is now commissioned, the system is expected to have sufficient capacity to service the development. An SAN has been submitted to QUU to confirm this assessment.

6.0 Stormwater

6.1 Existing Infrastructure

Appendix B provides a copy of BCC EBIMAP, along with Cardno Drawings in Appendix D. In the immediate vicinity of the site, there are two existing stormwater gully pits which provide connections to the proposed site. Details of the existing stormwater infrastructure are recorded in Table 6.1:

Table 6.1 Existing Stormwater Infrastructure

Council ID	Size (mm)	Material	Location	Description
L16092276	Unknown	Mild Steel	Located on the north eastern side of Lot 38 on SP192468	Grated Gully Inlet
L16035995	Unknown	Unknown	Located on the north eastern side of Lot 38 on SP192468	Gully Connection
L16092275	Unknown	Unknown	Located on the north eastern side of Lot 37 on SP196756	Grated Gully Inlet
L16035996	Unknown	Unknown	Traverses across Symes Street	Gully Connection
SW6	450	Concrete	Located north eastern side of site	Reinforced Concrete Pipe
1/1	2400	Concrete	Located south western side of Lot 30 on RP9713	Grated Gully Inlet
SW1	375	Concrete	Located south western side of Lot 30 on RP9713	Reinforced Concrete Pipe
2/1	1050	Concrete	Located western side of Lot 30 on RP9713	Maintenance Hole
SW2	375	Concrete	Located north western side of Lot 30 on RP9713	Reinforced Concrete Pipe
2a/1	1050	Concrete	Located north western side of Lot 30 on RP9713	Maintenance Hole
3/1	1200	Concrete	Located on corner of Brewer Street and Symes Street, north western side of Lot 121 on SP238200	Maintenance Hole
SW3	375	Concrete	Located on Brewer Street, north western side of the site	Reinforced Concrete Pipe
SW4	375	Concrete	Located on Brewer Street, north western side of Lot 121 on SP238200	Stub Connection
1/4	2400	Concrete	Located on north western side of Lot 121 on SP238200	Grated Gully Inlet
SW5	375	Concrete	Located on corner of Brewer Street and Symes Street, north western side of Lot 121 on SP238200	Reinforced Concrete Pipe

Refer to the Appendix M for the proposed concept stormwater layout.

6.2 Stormwater Detention

The existing site is currently fully developed with approximately 95% impervious areas. According to Brisbane City Plan 2014 – Schedule 6 PSP – Infrastructure design PSP Section 7.5.2, the site with greater than 60% existing sealed impervious surfaces will not require stormwater detention.

6.3 Flooding

BCC's interactive mapping does not indicate any flooding or overland flow paths surrounding the site. And in addition, the floodwise reports do not contain any information regarding flood levels or overland flow. Therefore, no flood risk management will be required for this development. Appendix E includes copies of the floodwise reports.

6.4 Legal Point of Discharge

The legal point of discharge for both major and minor storm events will be via the gully pit located on Symes Street, adjacent to Lot 38 on SP192468.

6.5 Erosion Hazard Assessment

According to BCC's Erosion Hazard Assessment - June 2014 form, the proposed development is located in a "Medium" risk site with respect to erosion and sediment control. Refer Appendix F for a copy of the completed form.

7.0 Stormwater Management Design Objectives

7.1 Construction Phase

During the construction phase of a development, the stormwater management design objectives in Queensland Government State Planning Policy (SPP) July 2014 Appendix 3 Table A are to be met. The stormwater management design objectives are reproduced in the Table 7.1 below:

Table 7.1 - Stormwater Management Design Objectives during the Construction Phase

Issue		Design objectives
Drainage control	Temporary drainage works	1. Design life and design storm for temporary drainage works: • Disturbed area open for <12 months—1 in 2-year ARI event. • Disturbed area open for 12–24 months—1 in 5-year ARI event. • Disturbed area open for > 24 months—1 in 10-year ARI event. 2. Design capacity excludes minimum 150 mm freeboard. 3. Temporary culvert crossing—minimum 1 in 1-year ARI hydraulic capacity.
Erosion control	Erosion control measures	1. Minimise exposure of disturbed soils at any time. 2. Divert water run-off from undisturbed areas around disturbed areas. 3. Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods. 4. Implement erosion control methods corresponding to identified erosion risk rating.

Sediment control	Sediment control measures Design storm for sediment control basins Sump pit dewatering	1. Determine appropriate sediment control measures using: • Potential soil loss rate, or • Monthly erosivity, or • Average monthly rainfall. 2. Collect and drain stormwater from disturbed soils to sump pit for design storm event: • Design storm for sump pit sizing is 80th% five-day event or similar 3. Site discharge during sump pit dewatering: • TSS < 50 mg/L TSS, and • Turbidity not >10% receiving waters turbidity, and • pH 6.5–8.5.
Water quality	Litter and other waste, hydrocarbons and other contaminants	1. Avoid wind-blown litter; remove gross pollutants. 2. Ensure there is no visible oil or grease sheen on released waters. 3. Dispose of waste containing contaminants at authorised facilities.
Waterway stability and flood flow management	Changes to the natural waterway hydraulics and hydrology	1. For peak flow for the 1-year and 100-year ARI event, use constructed sump pit to attenuate the discharge rate of stormwater from the site.

7.2 Post Construction Phase

The Bowen Hills development scheme states that the development is to demonstrate, to the greatest extent possible, current best practice Water Sensitive Urban Design and Integrated Water Cycle Management principles for Australia.

Developments within the Brisbane area are generally assessed against the Queensland Government State Planning Policy (SPP) July 2017 and BCC stormwater code. Based on the nature of the development proposed as described above we have assessed this site to be “medium-risk” development according to Brisbane City Plan 2014 - Stormwater code. A stormwater treatment train will be adopted for the stormwater quality design.

The performance of the proposed stormwater quality treatment train has been assessed with MUSIC modelling. The compliance of the proposed stormwater quality treatment train to the requirements as set out in BCC’s planning scheme policies for the stormwater quality has been assessed. The minimum WQO's as specified by BCC for best practice urban stormwater management are identified and are summarised in Table 7.2 below:

Table 7.2- BCC Stormwater Quality Management Design Objectives

Pollutants	WQO's
Total Suspended Solids	80%
Total Phosphorous	60%
Total Nitrogen	45%
Gross Pollutants	90%

Refer Concept Design Guidelines for Water Sensitive Urban Design (Water by Design, 2009) Table 3.

8.0 Proposed Stormwater Quality Management

8.1 Stormwater Quality Treatment Train

As the proposed development will consist of mainly roof areas and no uncovered car park, the pollutants generated from the proposed development will be minimal. The following stormwater quality improvement devices (SQIDs) which will suit the characteristic of the proposed development have been proposed:

Table 8.1 – Proposed SQIDs

SQID	Discussion
Stormwater360 Enviropod	Enviropod (gully pit basket) is designed to remove gross pollutants, coarse sediment and associated pollutants (Hydrocarbons, metals & nutrients) at high flows. Refer to Appendix L for details.
Stormwater360 Stormfilter	Stormfilter improves the quality of stormwater runoff by removing non-point source pollutants, including sediment, oil and grease, soluble metals, nutrients, organics, and trash and debris. Refer to Appendix L for details.

All stormwater runoff from the site will be discharged into a stormwater treatment tank. The stormwater treatment tank consists of 2 Enviropods and 4 Stormfilters. The treatment tank will be located on the ground level which is also maintenance purposes. The position of the stormwater treatment tank will ensure all stormwater runoff from the roof and the landscape area can be collected while the stormwater is able to be gravity fed to the existing council stormwater system.

Refer to Appendix M for the Concept Stormwater Management Plan, further detail will be provided by the services consultant during the building application submission.

8.2 MUSIC Model Parameters

The input parameters used in the MUSIC modelling for each proposed SQID are as listed below:

- Stormwater360 Enviropod and Stormfilter.
- Stormfilter and Enviropod nodes (SFEP USE 2011B) supplied by Stormwater360.

8.3 MUSIC Results

The MUSIC modelling results for the post-development scenario can be found in Appendix N and are summarised in Table 8.3 below.

Table 8.3 - MUSIC Modelling Results – Post Development Scenario (Residential Development with Stormwater Treatment)

Pollutant	Min WQO's (%)	Objectives Achieved (%)
Total Suspended Solids	80	83.5
Total Phosphorous	60	63.2
Total Nitrogen	45	45.4
Gross Pollutants	90	99.1

The results in Table 8.3 have demonstrated that the proposed development will achieve all WQO's required by BCC.

9.0 Construction Phase Stormwater Quality Management Options

9.1 Pre-Construction

Before construction activities begin, the following measures need to be implemented to ensure minimal disturbance and adverse water quality impacts. These measures may be adopted in a staged approach, and may be implemented prior to commencement of construction in any one section of the project.

- Sediment fences constructed to the perimeter of the construction area as required.
- Designation of areas for plant and construction material storage.
- Diversion of upstream stormwater runoff around disturbed areas of the development if required.
- Immediate stabilisation of disturbed areas as required.
- Monitoring of stormwater quality discharging from the development and the implementation of additional measures / modification of existing measures if the quality of stormwater discharging from the site will have a negative impact.
- Designation and marking of transport routes across the site to minimise dust disturbance.
- Drainage structure protection devices installed to existing stormwater inlet structures within the site, and within the road ways adjacent to the site.
- Education of site personnel to the sediment and erosion control measures implemented on site.

9.2 During Construction

Runoff is proposed to be directed to a sump pit before discharging into stormwater utilities. The sump pit is to be located to suit the construction program as required. Measures to mitigate water quality impacts during construction will include:

- Provision of pump out facilities to the satisfaction of Brisbane City Council for the sump pit.
- Construction activities to be confined within the necessary construction area(s).
- Regular inspection and maintenance of the erosion control measures. Following rainfall events greater than 20 mm, inspection of erosion control measures and removal of collected material shall be undertaken. Replacement of any damaged equipment shall be performed immediately.
- Monitoring of water quality impacts from construction activities as appropriate.

10.0 Stormwater Maintenance Plans

Maintenance for the SQIDs proposed for the development is to be consistent with the requirements of this report and the manufacturer's recommendations. The general requirement of maintenance during the operational phase will be:

- Stormwater360 Enviropod and Stormfilter;
  - In accordance with the manufacturer's recommendations / owner's manual.
  - Refer to Appendix P for details.

11.0 Stormwater Asset Hand Over

It is intended that the stormwater quantity and quality controls detailed in this document will remain under private ownership and will not become a council asset. Therefore, no further assessment of asset handover is relevant to this site.

12.0 Electrical Supply

According to the DBYD information, Energex cables are located Brewer Street adjacent to the northern boundary of the site. Refer to the DBYD Energex plans in Appendix C.

Further investigation should be carried out by the electrical consultant to determine if any upgrade works and the extent of works that may be required due to the proposed development.

13.0 Telecommunications

According to the DBYD information, there are telecommunications and fibre optic cables located in all surround area of the site. The following provider services NBN, Optus, Telstra conduits could be affected. Refer to the DBYD plans in Appendix C.

Further investigation shall be carried out by the services consultant to determine if any upgrade works and the extent of works that may be required due to the proposed development.

14.0 Gas

According to DBYD information, varies medium pressure APA gas main is located on all surrounding parts of the proposed site. Refer to DBYD APA plans in Appendix C.

Any upgrading, extension or relocation works of the existing gas reticulation main would need to be undertaken by the services consultant in conjunction with the asset owner.

15.0 Traffic System Cable

The DBYD information from BCC indicates there are traffic signal cables near the southern side of the site, at the intersection of Constance Street and St Pauls Terrace. Refer to DBYD BCC plans in Appendix C.

16.0 Clem7 Tunnel

The Clem7 Tunnel is located beneath the proposed development at approximately 16.3m below basement 2. The proposed structure is required to be designed to comply with the North South Bypass Tunnel Performance Specification Exhibit A, Annexure 2, Part 1, Clause 6.2.2 which imposes the following requirements for building pressures above the Clem 7 tunnel being:

- Addition vertical building loads must not exceed 50 kPa (working load) at a level 1m above the tunnel crown.
- Building footings and excavations must not be within 7m of the tunnel crown.
- Additional filling of surface must not exceed 20 kPa.

The proposed building shall be designed to comply with the above requirements.

A preliminary assessment has been undertaken by Golder Associations (included in Appendix Q) which concludes this can be achieved for the proposed development.

17.0 Conclusions

The site is serviced by existing public utilities. All information discussed in this report is inferred from Brisbane City Council's EBIMAP information, site survey, Dial-Before-You-Dig records, Cardno drawings and Google Map satellite imagery.

Existing water and sewer services are located within the immediate vicinity of the site.

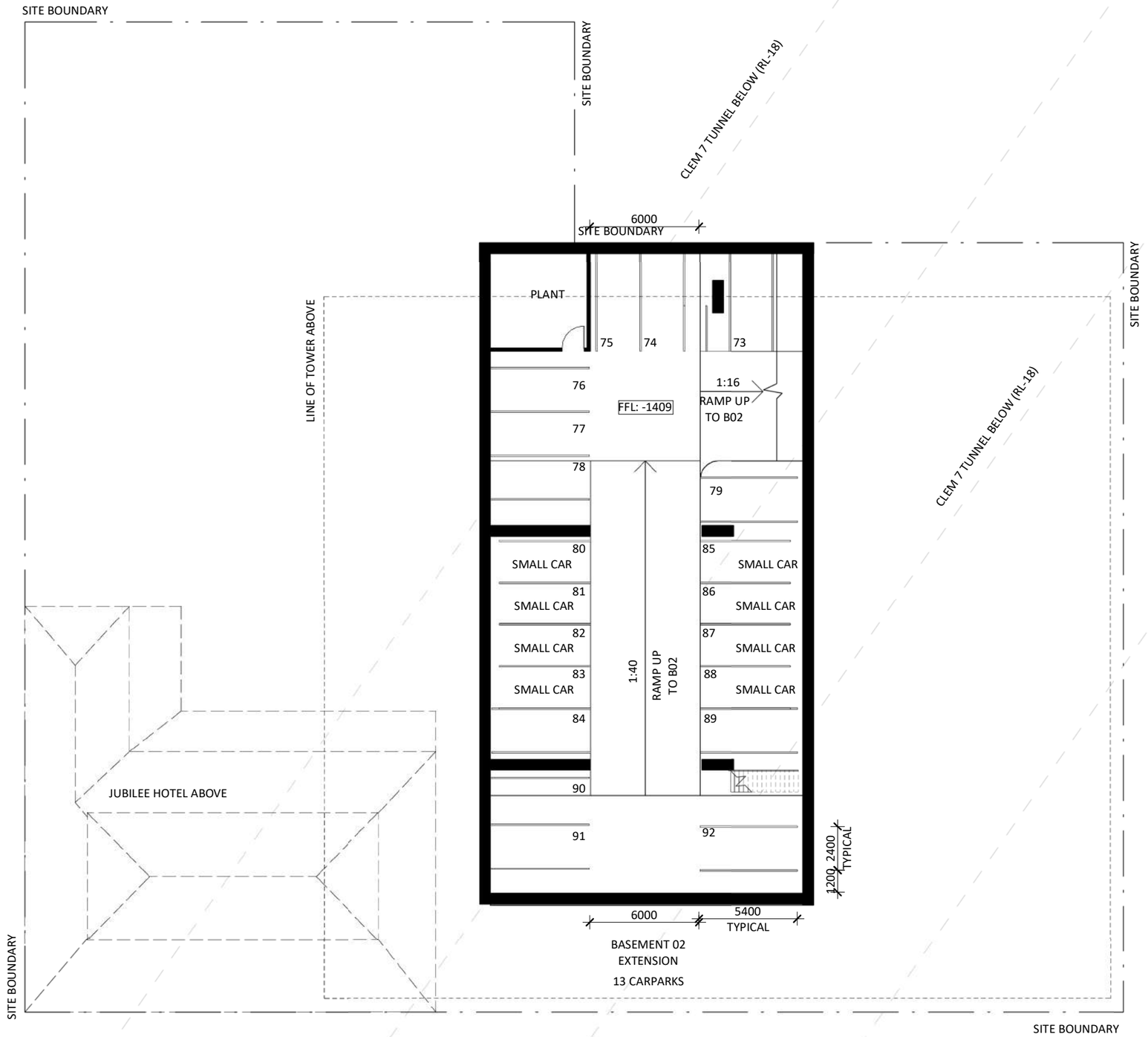
The stormwater from the site is proposed to be connected to the existing stormwater infrastructure on Symes Street.

The site has electrical, gas and telecommunications services located immediately adjacent to the site. If any of these services require an upgrade, this will be confirmed and addressed by the relevant service consultants at the detailed design stage of the project.

18.0 References

- Brisbane City Council City Plan 2014.
- Brisbane City Council EBIMAP information.
- Brisbane City Council FloodWise Property Report.
- Brisbane City Council Website.
- Concept Design Guidelines for Water Sensitive Urban Design (Water by Design, 2009).
- DERM's Urban Stormwater Quality Planning Guidelines 2010.
- DSDIP's State Planning Policy Code: Water Quality.
- Queensland Urban Drainage Manual (2007).
- Healthy Waterways Water by Design MUSIC Modelling Guidelines Version 1.0 - 2010.
- Satellite imagery from Google Map.

Appendix A
Architectural Plans by Blight Rayner



Client
JGL PROPERTIES

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Project Name
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470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN BASEMENT 2 - EXTENSION

Project No. 16008
Drawing No. 03.00
Revision 1

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Checked by Checker

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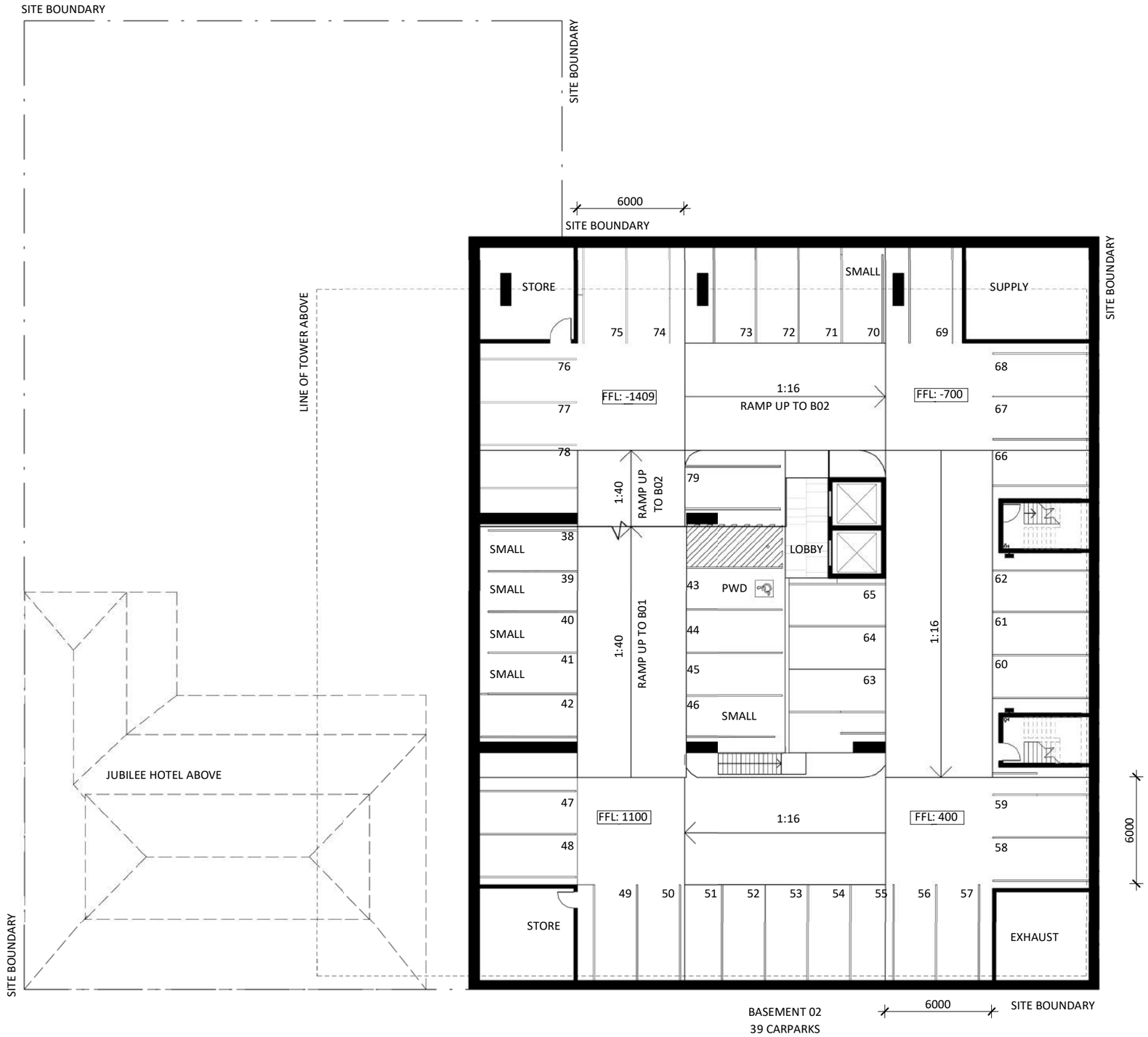

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JGL PROPERTIES

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Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN BASEMENT 02

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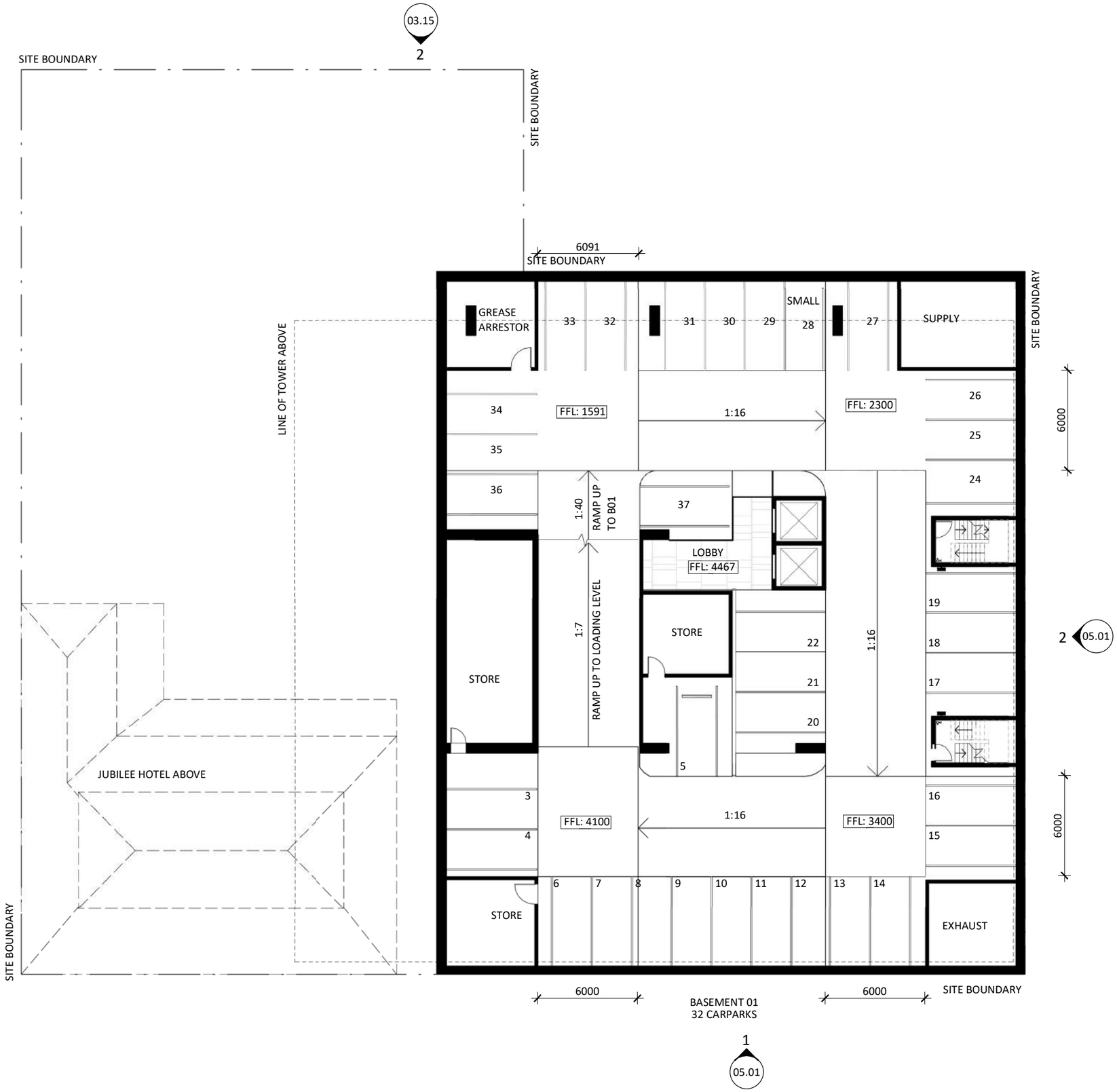

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN BASEMENT 01

Project No. 16008
Drawing No. 03.02
Revision 1
Date 140917
Drawn by
Checked by
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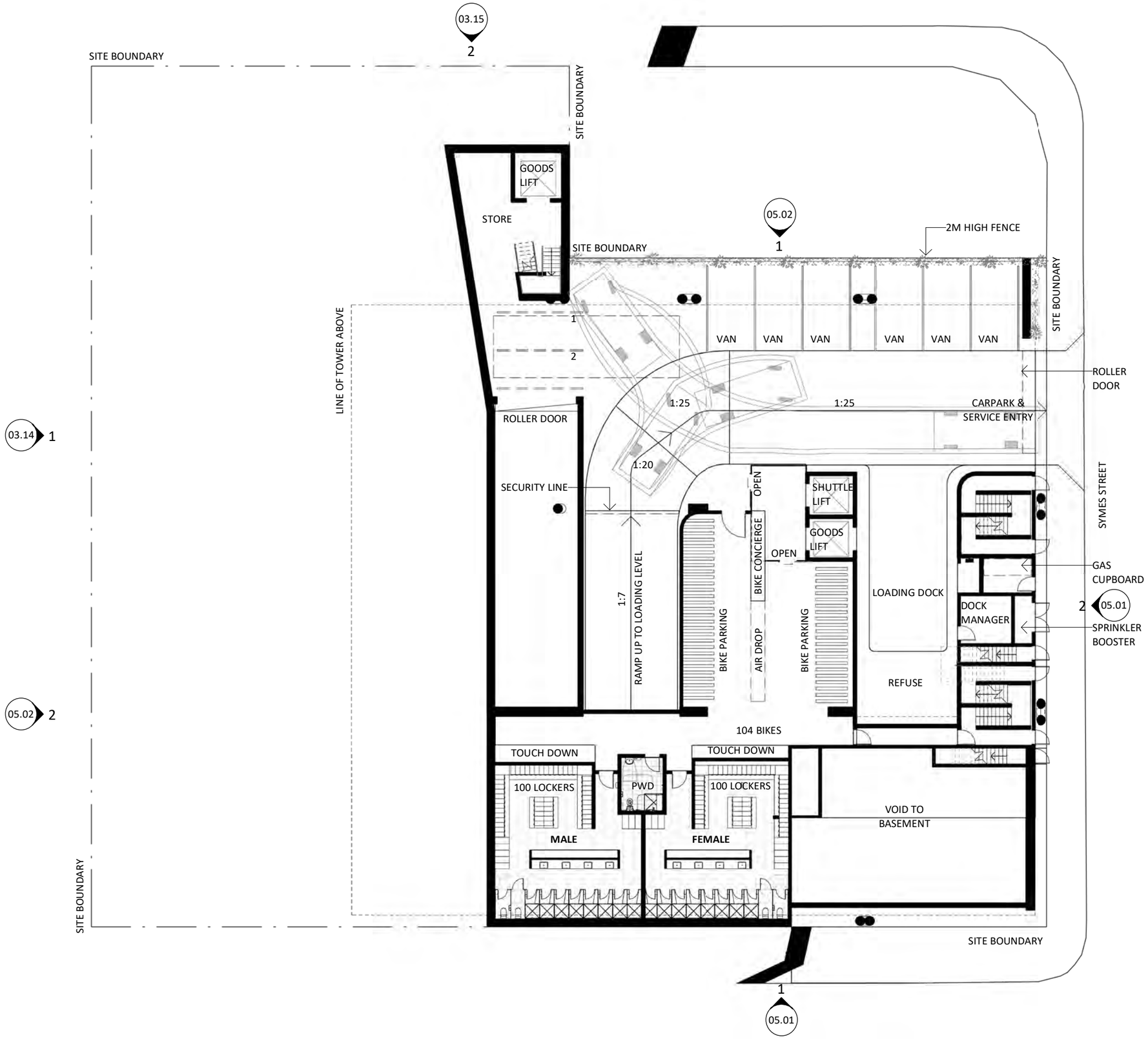

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN LOWER GROUND

Project No. 16008
Drawing No. 03.03
Revision 1
Date 140917
Drawn by
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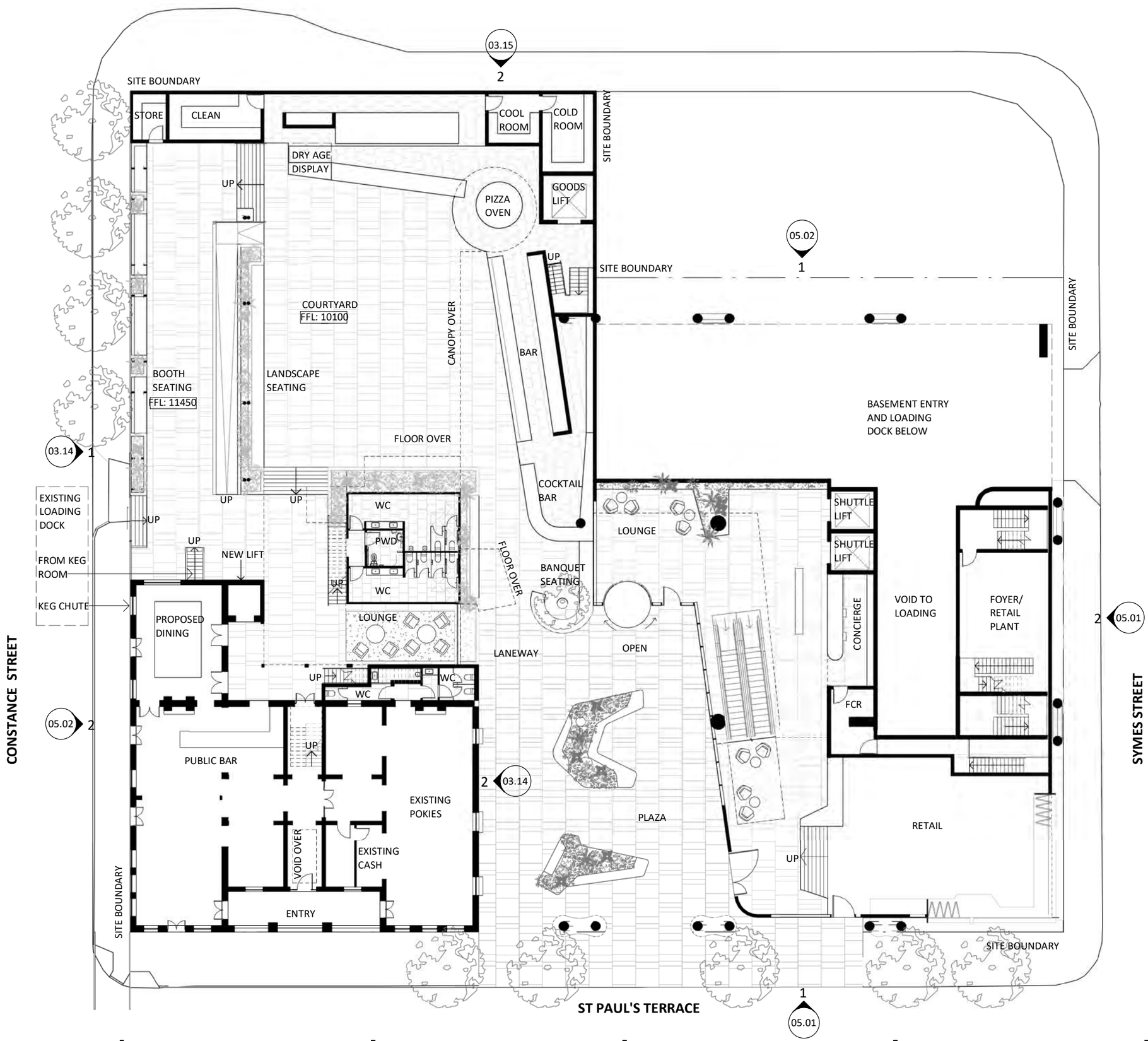

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN UPPER GROUND LEVEL

Project No. 16008
Drawing No. 03.04
Revision 1

Date 140917
Drawn by
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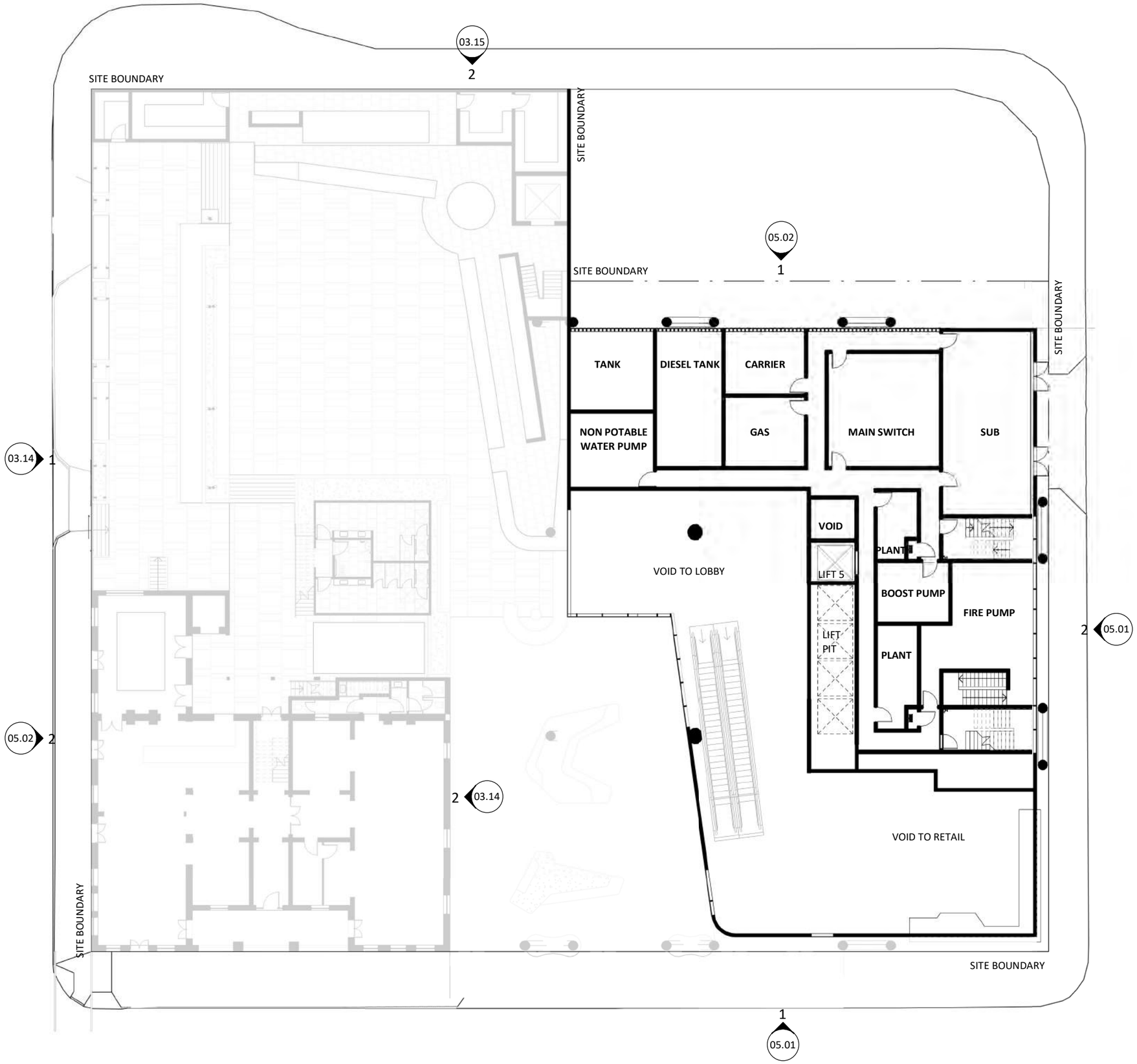

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLANT MEZZ

Project No. 16008
Drawing No. 03.05
Revision 1

Date 140917
Drawn by
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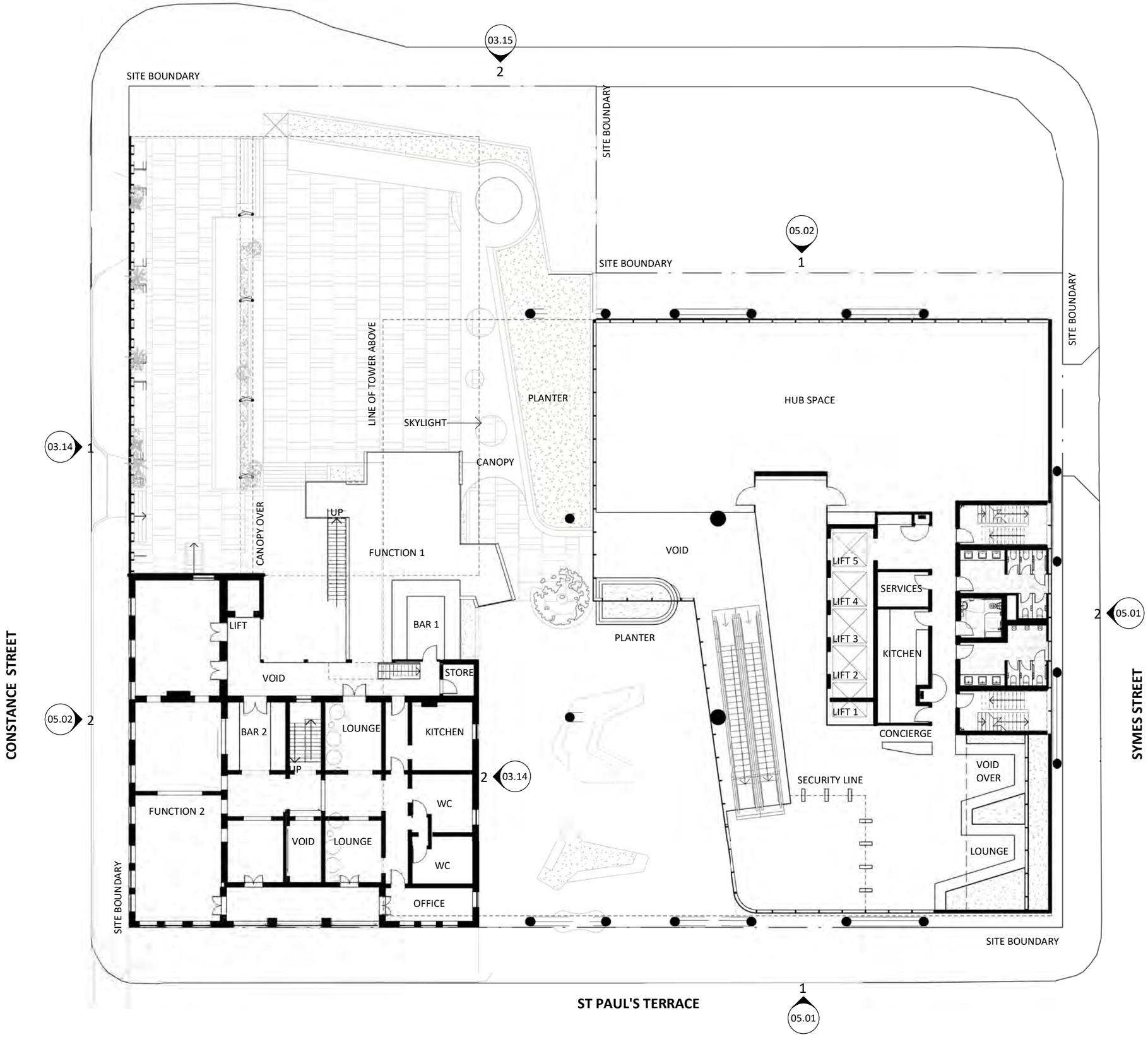

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN LEVEL 01

Project No. 16008
Drawing No. 03.06
Revision 1
Date 140917
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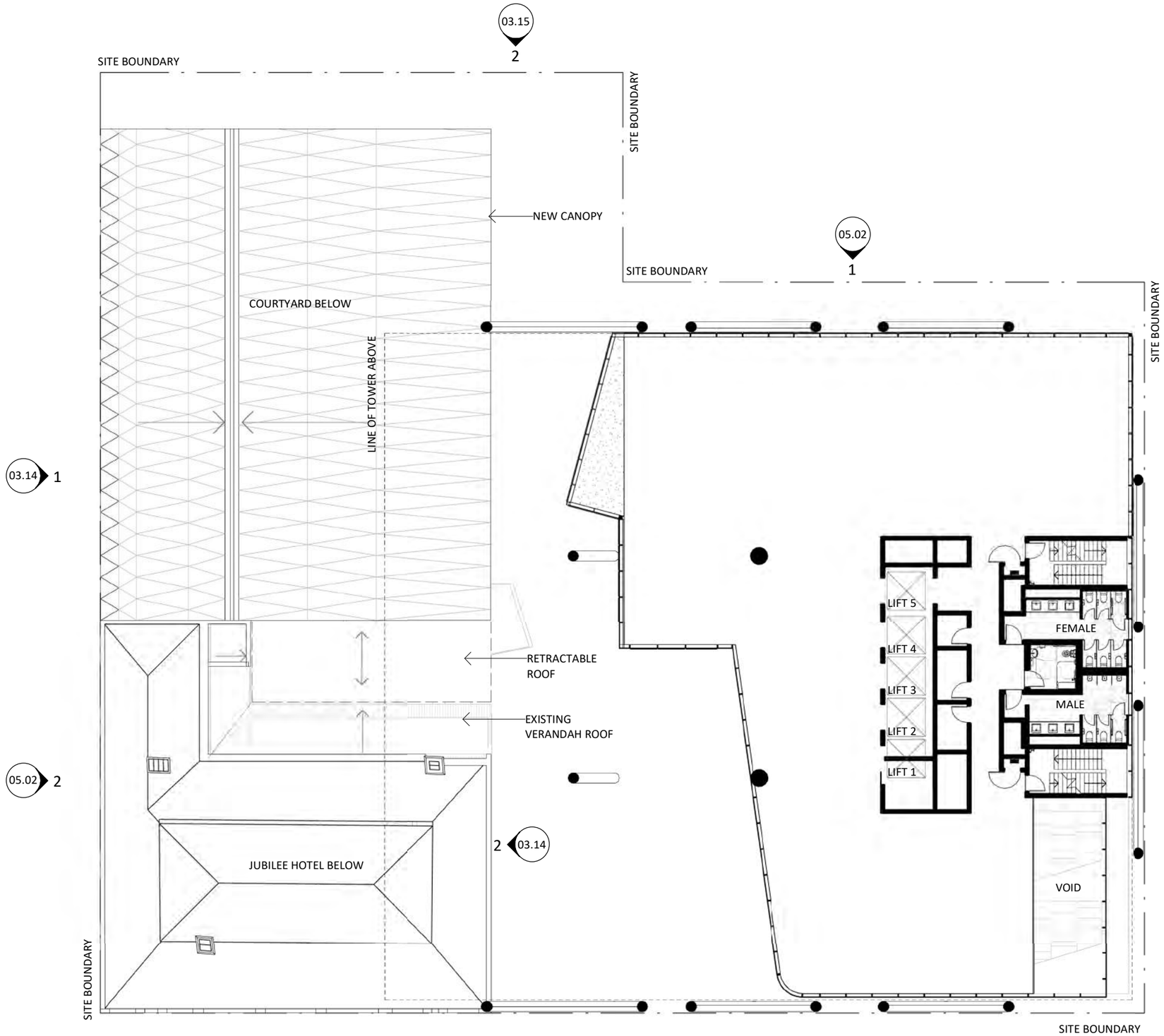

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN LEVEL 02

Project No. 16008
Drawing No. 03.07
Revision 1
Date 140917
Drawn by
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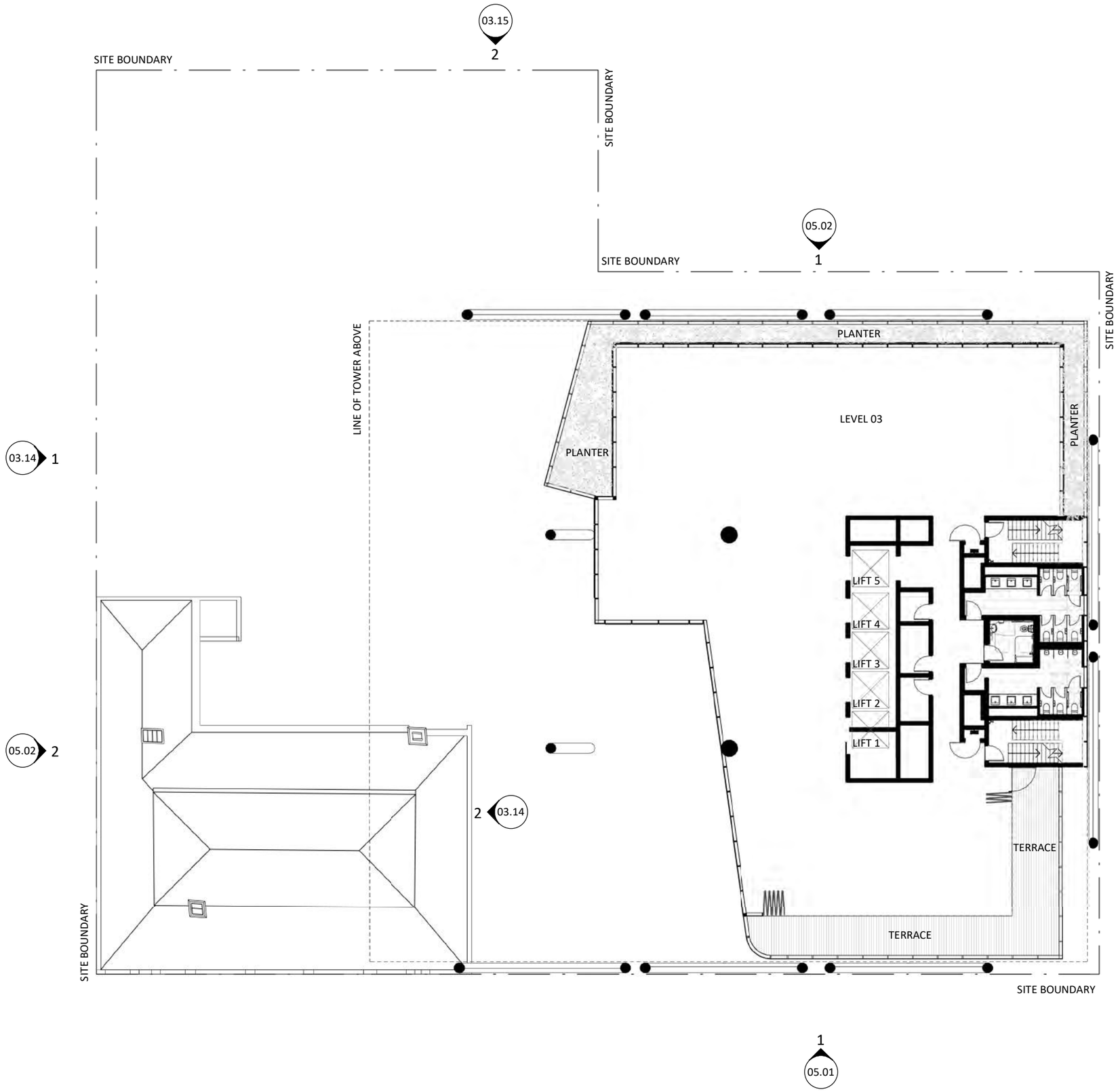

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN LEVEL 03

Project No. 16008
Drawing No. 03.08
Revision 1
Date 140917
Drawn by
Checked by
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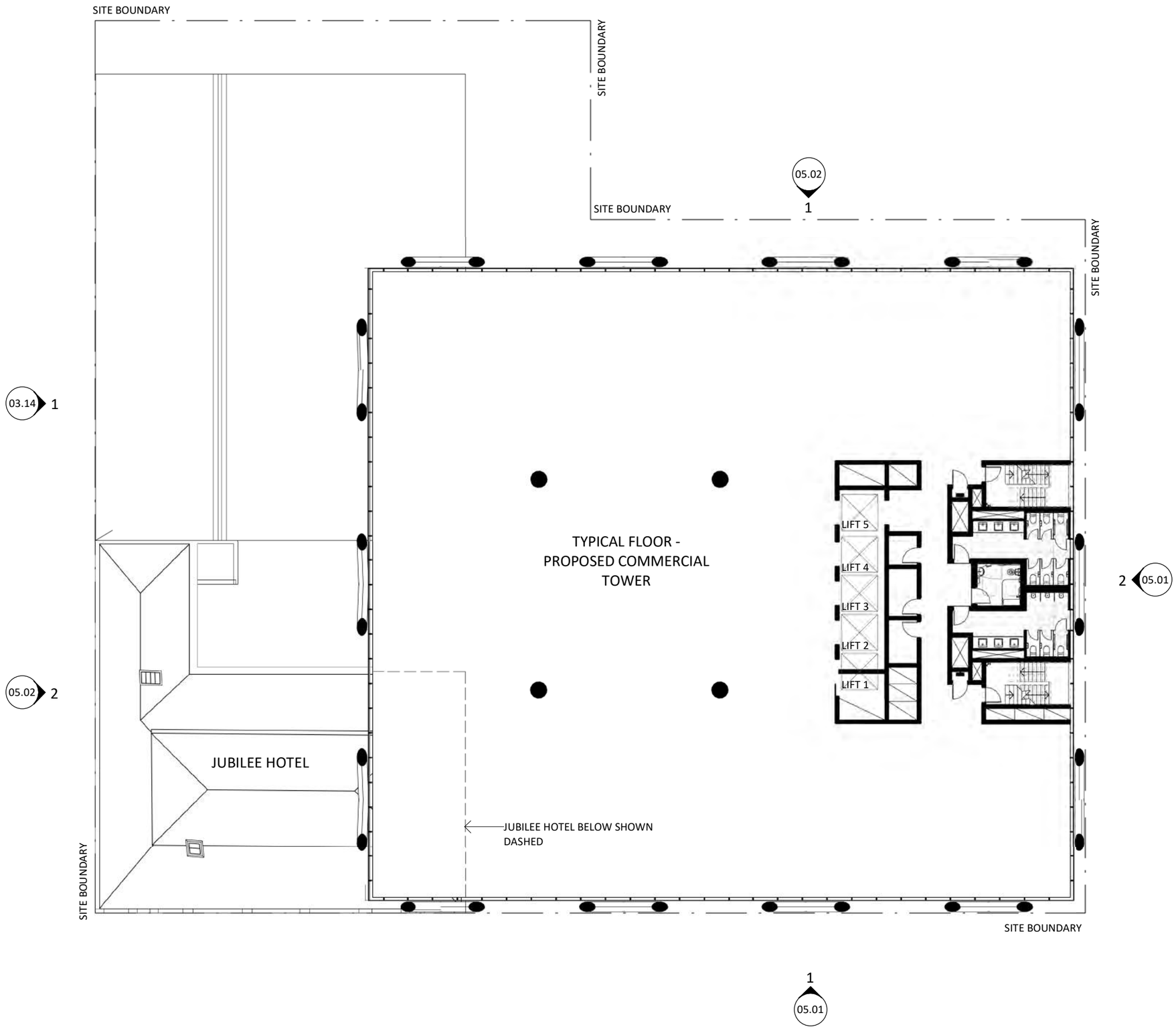

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN TYPICAL OFFICE
LEVEL

Project No. 16008
Drawing No. 03.09
Revision 1

Date 140917
Drawn by
Checked by

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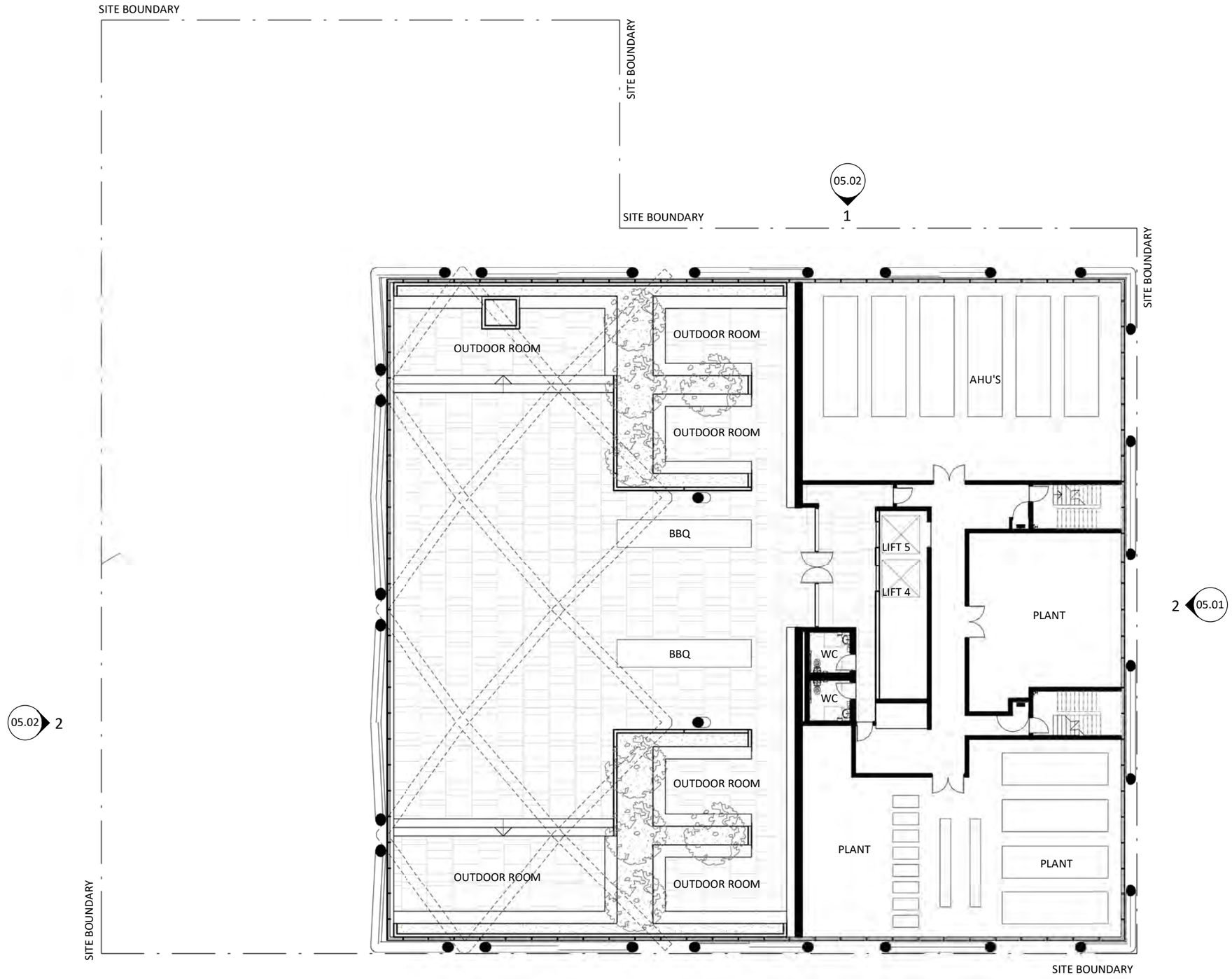

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN ROOF LEVEL

Project No. 16008
Drawing No. 03.10
Revision 1

Date 140917
Drawn by
Checked by

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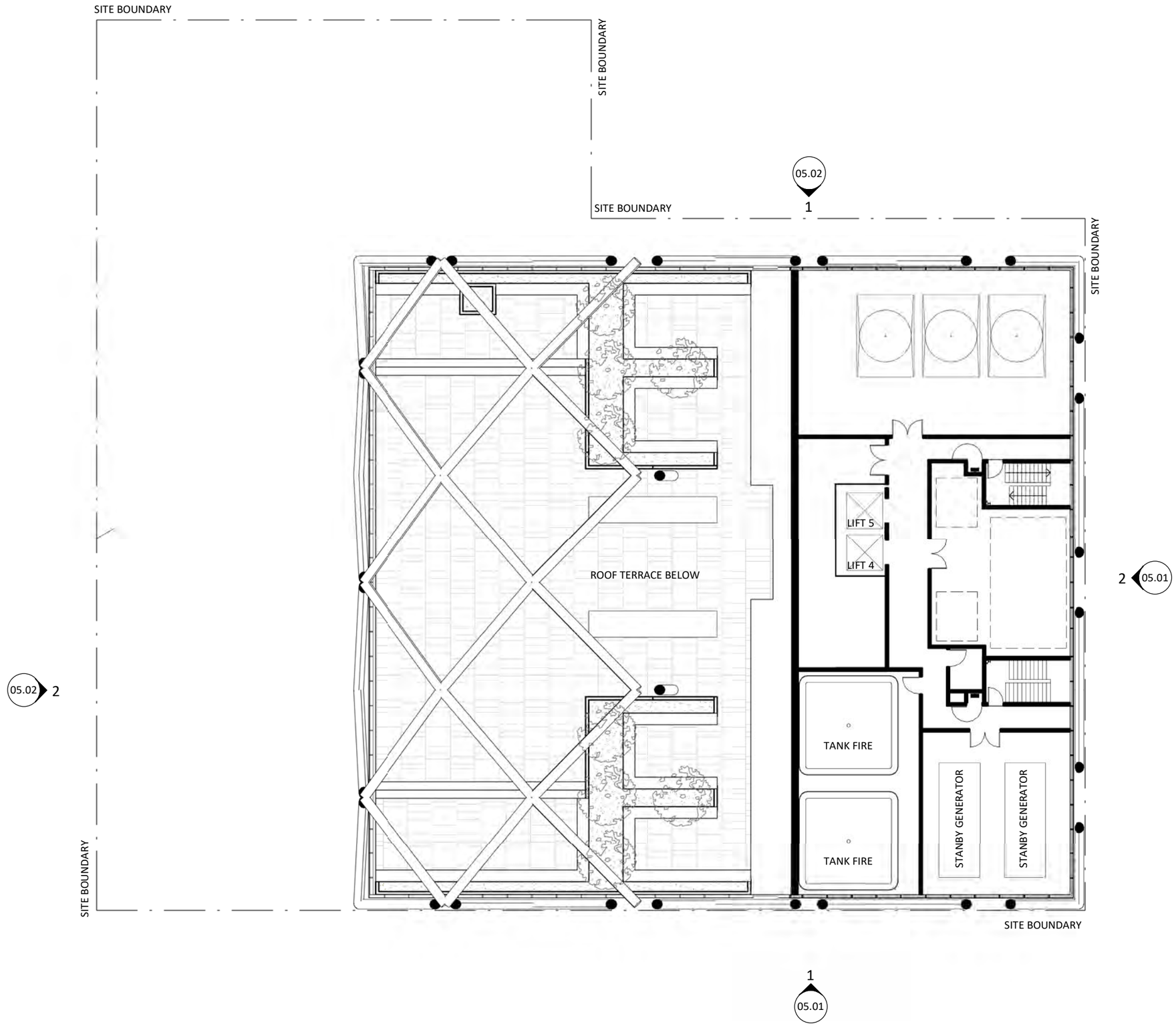

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN PLANT LEVEL

Project No. 16008
Drawing No. 03.11
Revision 1

Date 140917
Drawn by
Checked by

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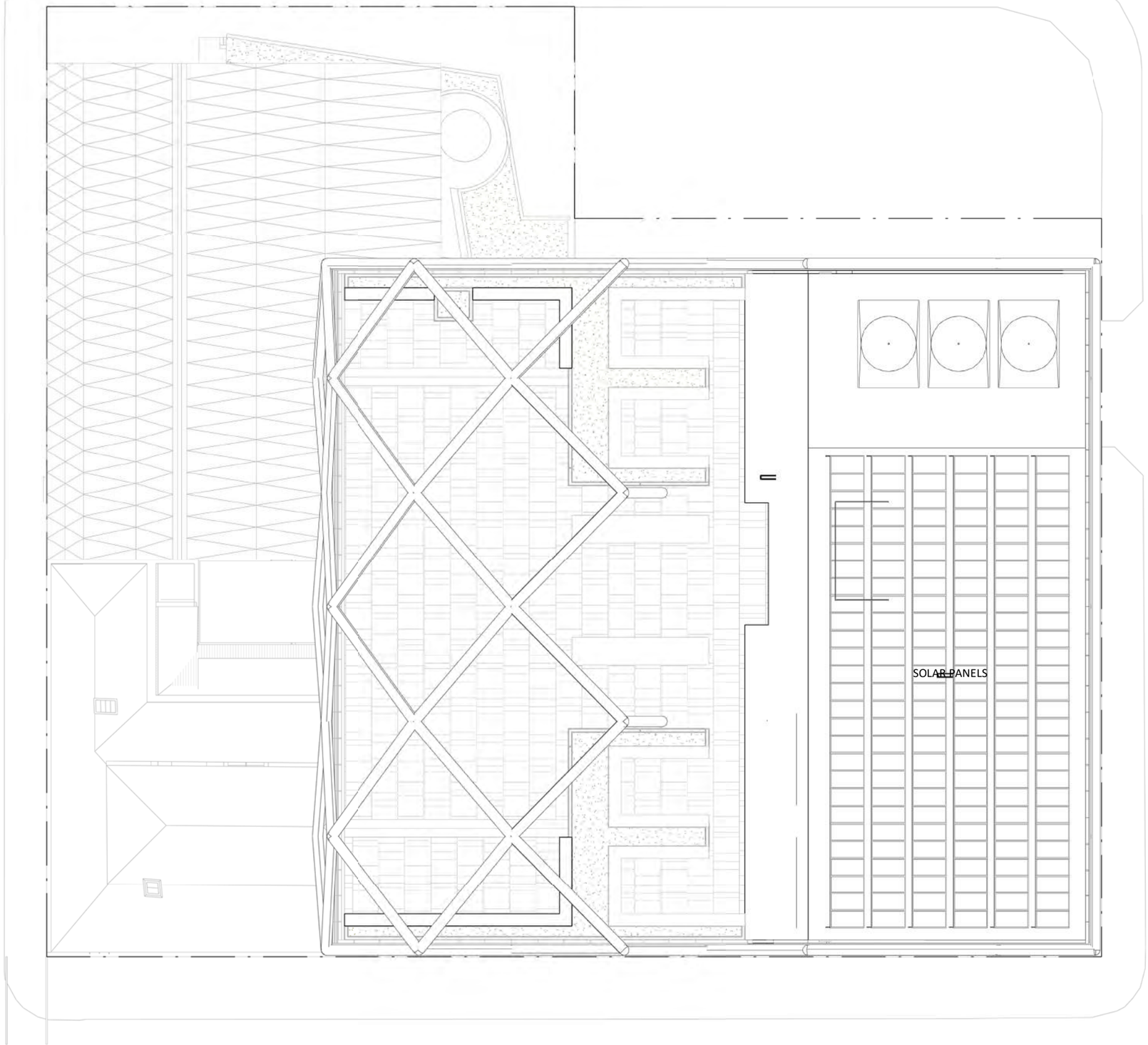

Client
JGL PROPERTIES

Architect
BlightRayner
Level 2, 88 Creek Street, Brisbane Qld 4000 Ph.39056500 info@blightrayner.com.au

Project Name
Jubilee Hotel Redevelopment
470 St Pauls Terrace, Fortitude Valley QLD 4006

Sheet Name
OVERALL FLOOR PLAN ROOF

Project No. 16008
Drawing No. 03.12
Revision 1

Date 140917
Drawn by Author
Checked by Checker

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Appendix B
BCC EBIMAP

While every care is taken to ensure the accuracy of this data, the Brisbane City Council and the copyright owners, in permitting the use of this data, make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason.

Print Date: 9/10/2017 - 2:01 PM

N

Dedicated to a better Brisbane

25 0 13 25

Metres

Scale: 1: 500

Projection: Web Mercator Auxiliary Sphere

Legend

- Local Government Areas
- CHAMBER - OFFLINE
- INLINE FLUSHING POINT
- Sewer Fitting - All Other Fittings
- RODDING JOINT
- END CAP
- TEE
- CROSS
- Sewer Structure - by Type
- ANCHOR BLOCK
- Sewer Support Structure Boundary
- MANHOLE
- End
- Sewer Control Valve - by Type
- VACCUM, AS CONSTRUCTED
- SCOUR - OFFLINE
- Sewer System Valve - by Type
- GATE
- GATE - OFFLINE
- TREATMENT PLANT, AS CONSTRUCTED
- STORAGE FACILITY
- STORAGE FACILITY - OFFLINE
- Sewer Pump Station
- Sewer Network Structure Boundary
- Sewer Service
- Service
- SYPHON
- RETICULATION MAIN
- SYPHON - OFFLINE
- RETICULATION MAIN - OFFLINE
- Sewer Pressure Main - by Type
- RISING MAIN
- LOW PRESSURE MAIN - OFFLINE
- Property Holding
- Parcel - Outside Brisbane
- Road Network
- Arterial Road
- Arterial Road
- StreetPro Drainage Regions
- Local Government Area
- Freeway
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
- High : 254
- Vegetation
- SHADING - Residential Area
- Road Network
- Arterial Road
- Arterial Road
- StreetPro Drainage Regions
- HillShade_25m
- Low : 0
- Vegetation External
- Road Network
- Arterial Road
- Tunnel Only

- Sewer Chamber
- Sewer Fitting - Main Fittings
- OUTLET
- <all other values>
- PROPERTY CONNECTION BOUNDARY
- BEND
- REDUCER
- INLET
- CONCRETE STOP
- HEAD WALL
- Sewer Manholes
- MANHOLE - OFFLINE
- Flume Pit
- AIR
- REFLUX
- VACCUM - OFFLINE
- <all other values>
- BUTTERFLY
- BUTTERFLY - OFFLINE
- TREATMENT PLANT - OFFLINE
- ODOUR CONTROL
- WET WELL - OFFLINE
- PUMP STATION
- Sewer Vertical Gravity Main
- <all other values>
- Sewer Gravity Main - by Type
- DISCHARGE
- OVERFLOW MAIN
- DISCHARGE - OFFLINE
- OVERFLOW MAIN - OFFLINE
- MODEL LINK
- VACUUM MAIN
- RISING MAIN - OFFLINE
- Sealed Plan
- Brisbane City Label
- Freeway
- Tunnel Only
- Waterbody
- HillShade_25m
- Low : 0
- Locality Names
- Highway
- Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
- Parks
- Local Government Area
- Freeway
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
- High : 254
- Vegetation
- SHADING - Residential Area
- Freeway
- Connector Road
- Freeway

- CHAMBER
- END FLUSHING POINT
- VACUUM LIFT
- JOINT
- JUNCTION
- WYE
- GIBAULT JOINT
- OUTLET
- PIPE BRIDGE
- PIER
- <all other values>
- Sewer Manhole -All Other Types
- Sewer Manhole Stub
- SCOUR
- AIR - OFFLINE
- REFLUX - OFFLINE
- SEWER DOOR
- SEWER DOOR - OFFLINE
- Sewer Network Structure -Treatment Plants
- Sewer Network Structure - All Features
- WET WELL
- ODOUR CONTROL - OFFLINE
- PUMP STATION - OFFLINE
- Sewer Vertical Pressure Main
- Model Link
- <all other values>
- TRUNK MAIN
- MODEL LINK
- TRUNK MAIN - OFFLINE
- MODEL LINK - OFFLINE
- LOW PRESSURE MAIN
- MODEL LINK - OFFLINE
- VACUUM MAIN - OFFLINE
- Parcel
- Local Government Area
- Highway
- Freeway
- Brisbane_River_Creek
- High : 254
- Vegetation External
- Road Network
- Arterial Road
- Arterial Road
- StreetPro Drainage Regions
- HillShade_25m
- Low : 0
- Vegetation External
- Locality Names
- Highway
- Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
- Parks
- Local Government Area
- Highway
- Railway Line
- Arterial Road

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Map Title

25 0 13 25

Metres

Scale: 1: 500

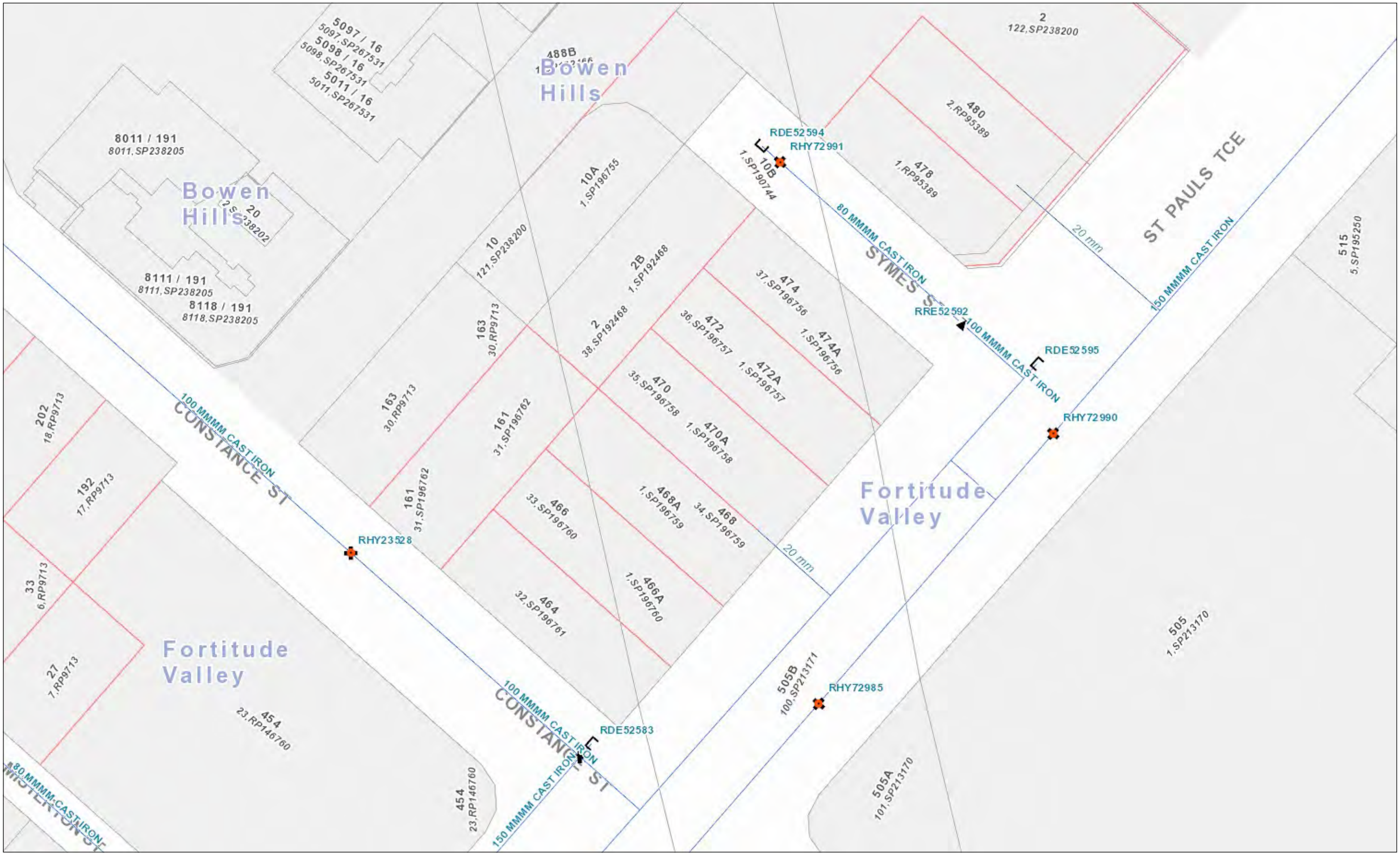
Projection: Web Mercator Auxiliary Sphere

Legend

- Local Government Areas
- SQID
  - Detention Basin
- Stormwater End Structure
  - Pipe End Outlet
- Drain
- Property Holding
- Parcel - Outside Brisbane
- Road Network
  - Arterial Road
  - Arterial Road
- StreetPro Drainage Regions
- Local Government Area
  - Freeway
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
  - High : 254
- Vegetation
- SHADING - Residential Area
- Road Network
  - Arterial Road
  - Arterial Road
- StreetPro Drainage Regions
- HillShade_25m
  - Low : 0
- Vegetation External
- Road Network
  - Arterial Road
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
  - High : 254
- HillShade_25m_exclude_BCC
  - Low : 0
- Vegetation External
- Railway Station
  - Highway
- Local Street
  - Freeway
- Brisbane_River_Creek
- Drainageline
  - High : 254
- HillShade_25m_exclude_BCC
  - Low : 0
- Vegetation External
- Railway Station
  - Highway
- Local Street
- Ferry Route
  - Arterial Road
- Tide HAT
- StreetPro Drainage Centrelines
- HillShade_1m
  - Low : 0
- Parks

- Gully
- Waterbody
  - Lake
  - End cap
- Culvert
- Gully Connect
- Sealed Plan
- Brisbane City Label
  - Freeway
- Tunnel Only
- Waterbody
- HillShade_25m
  - Low : 0
- Locality Names
  - Highway
  - Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
- Parks
- Local Government Area
  - Freeway
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
  - High : 254
- Vegetation
- SHADING - Residential Area
  - Freeway
  - Connector Road
  - Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
  - High : 254
- Vegetation
- SHADING - Residential Area
- Road Network
  - Arterial Road
- Railway Line
  - Arterial Road
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
- HillShade_25m_exclude_BCC
  - Low : 0
- Vegetation External
- Railway Station
  - Highway
- Local Street
  - Freeway
- Brisbane_River_Creek
- Drainageline
  - High : 254
- HillShade_25m_exclude_BCC
  - Low : 0
- Vegetation External
- Railway Station
  - Highway
- Local Street
- Bus Only
- Tunnel Only
- Waterbody
- Tide MHWS
- Drainageline
  - High : 254
- HillShade_25m_exclude_BCC
  - Low : 0
- Vegetation External

- Manhole
  - Artesian Well
- Stormwater Junction
  - Flood Gate
- Surface Drain
- Foul Water and Roof Water
- Parcel
- Local Government Area
  - Highway
  - Freeway
- Brisbane_River_Creek
  - High : 254
- Vegetation External
- Road Network
  - Arterial Road
  - Arterial Road
- StreetPro Drainage Regions
- HillShade_25m
  - Low : 0
- Vegetation External
- Locality Names
  - Highway
  - Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
- Parks
- Local Government Area
  - Highway
- Railway Line
  - Arterial Road
- StreetPro Drainage Regions
- HillShade_1m
  - Low : 0
- Parks
- Local Government Area
  - Freeway
  - Connector Road
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
- HillShade_1m
  - Low : 0
- Parks
- Local Government Area
  - Freeway
  - Connector Road
- Railway Line
  - Freeway
- Brisbane_River_Creek
- StreetPro Drainage Regions
- MASK - Land Outside BCC
  - High : 254
- Vegetation
- SHADING - Residential Area



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N

Dedicated to a better Brisbane

25 0 13 25

Metres

Scale: 1: 500

Projection: Web Mercator Auxiliary Sphere

Legend

- Local Government Areas
  - FLOW METER
  - FLOW METER - OFFLINE
  - Water Fitting
    - PIGGING POINT
    - JOINT
    - TAPPING
    - TEE
    - SCOUR OUTLET
  - Water Structures
    - PIPE BRIDGE
    - PIER
  - Water Hydrant
    - INGROUND HYDRANT
    - Service Valve, OPEN
    - SEQWATER
    - SEQ - NON POT
    - SEQ - OFFLINE
  - Water Pump Stations
    - SEQWATER
    - SEQWATER - OFFLINE
  - Water Pumps
    - LIFT PUMP
    - LIFT PUMP - OFFLINE
    - Water - Model Link
    - Trunk Main
    - SERVICE
- Property Holding
- Parcel - Outside Brisbane
- Road Network
  - Arterial Road
  - Arterial Road
- StreetPro Drainage Regions
- Local Government Area
  - Freeway
  - Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
  - High : 254
- Vegetation
- SHADING - Residential Area
- Road Network
  - Arterial Road
  - Arterial Road
- StreetPro Drainage Regions
- HillShade_25m
  - Low : 0
- Vegetation External
- Road Network
  - Arterial Road
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
  - High : 254
- HillShade_25m_exclude_BCC
  - Low : 0
- Vegetation External

- Water Device - All Other Assets
  - PRESSURE GAUGE
  - PRESSURE GAUGE - OFFLINE
  - <all other values>
  - END CAP
  - GIBAULT JOINT
  - REDUCER
  - RESERVOIR INLET
  - CHEMICAL INJECTION POINT
  - <all other values>
  - CONCRETE STOP
- Water Chamber
  - <all other values>
- Water Service Valve
- Water Network Structure - Reservoirs
  - PRIVATE
  - PRIVATE - NON POT
  - PRIV - OFFLINE
  - <all other values>
  - PRIVATE
  - PRIVATE - OFFLINE
  - BOOSTER PUMP
  - BOOSTER PUMP - OFFLINE
- Water Vertical Pressure Main
  - Raw Water Main
  - Scour Main
  - MODEL LINK
- Sealed Plan
- Brisbane City Label
  - Freeway
- Tunnel Only
- Waterbody
- HillShade_25m
  - Low : 0
- Locality Names
  - Highway
  - Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
- Parks
- Local Government Area
  - Freeway
- Tunnel Only
- Waterbody
- StreetPro Drainage Centrelines
  - High : 254
- Vegetation
- SHADING - Residential Area
  - Freeway
  - Connector Road
  - Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
  - High : 254
- Vegetation
- SHADING - Residential Area

- <all other values>
- LEVEL SENSOR
- LEVEL SENSOR - OFFLINE
- BEND
- CROSS
- TAPPING BAND
- WYE
- RESERVOIR OUTLET
- SAMPLING STATION
- ANCHOR BLOCK
- HEADWALL
- Water Network Structure Boundary
  - PILLAR HYDRANT
  - Service Valve, CLOSED
  - QUU
  - QUU - NON POT
  - QUU - OFFLINE
- Water Network Structure Boundary
  - QUU
  - QUU - OFFLINE
- Water Sampling Point
  - BORE PUMP
  - BORE PUMP - OFFLINE
- Water Pressure Main - by Type
  - Reticulation Main
- Water Service
  - COMMON SERVICE
- Parcel
- Local Government Area
  - Highway
  - Freeway
- Brisbane_River_Creek
  - High : 254
- Vegetation External
- Road Network
  - Arterial Road
  - Arterial Road
- StreetPro Drainage Regions
- HillShade_25m
  - Low : 0
- Vegetation External
- Locality Names
  - Highway
  - Freeway
- Brisbane_River_Creek
- MASK - Land Outside BCC
- Parks
- Local Government Area
  - Highway
- Railway Line
  - Arterial Road
- StreetPro Drainage Regions
- HillShade_1m
  - Low : 0
- Parks
- Local Government Area

Appendix C
Dial Before You Dig

APA Group
PO Box 6014 Halifax Street
South Australia 5000

24/03/2017

Company: Robert Bird Group
Mr Aaron Wilss
Level 5 333 Ann Street
Brisbane
QLD 4000

aaron.wilss@robertbird.com.au

Dear Mr Aaron Wilss

Sequence Number: 59912859
Worksite Address: St Pauls Tce
Fortitude Valley
QLD 4006

RE: REQUEST FOR APA GROUP (APA) UNDERGROUND DIAL BEFORE YOU DIG

Dear Sir/Madam

In response to the above enquiry we wish to confirm that APA **operates underground plant** (Mains and / or Services) at or in the vicinity of the above address.

Please check that the following map represents the area you requested - if the area is not correct please contact our Dial Before You Dig Officer - (08) 8115 4500. If works are proposed adjacent to any underground plant operated by APA please ensure compliance with the attached "DUTY OF CARE"

Please find enclosed the following information in support of the above: -

1. A location map of the **suburb** the service is in and an A4 location map showing the **status** of APA underground plant (Mains and / or Services) adjacent to the subject site

2. DUTY OF CARE statement which forms **an integral part** of any information supplied by APA

FOR GAS EMERGENCIES 24 HOURS - 1800 GAS LEAK (1800 427 532)

Please note that as work on APA underground plant is ongoing any information supplied on their status can only be considered current for **30 days from the date of this response**. Expired locations, i.e., over 30 days from the date of this response, require a new Dial Before You Dig request to validate location information.

Should you have any questions with **regards to the attached information** please contact our Dial Before You Dig officer - (08) 8115 4500.

For any excavation works, including vacuum excavations, an "Authority to Work" Permit may be required and a Site Watch may need to be scheduled.

A minimum of 5 business days notice is required to process permit applications. Permit applications can be made by: -

Post: Permit Applications QLD, PO Box 885 Hamilton Central QLD 4007 or

Email: permitsqld@apa.com.au or Phone: (07) 3215 6700 though an application will most likely be required

Charges may apply for Site Watch requests. Your sequence number may be requested when making your booking, please have this available when you request either a mains location or site watch.

For other enquiries please contact your gas retailer

To find out who your retailer is call 1800 657 567

Warning: if there are high or transmission pressure gas mains present in the vicinity of your area of interest, an APA employee must be in attendance during any excavation within 3 metres of high or transmission pressure mains, and an "Authority to Work" permit must be issued prior to work commencing.

Please contact us for a permit to work request if you believe your work is within this zone, by completing the "Authority to Work" request form attached and sending to APA. 5 days notice is required prior to the commencement of any excavation to assess and allocate resources. Contact phone numbers are shown at the end of the notice of location.

Please Note: For some DBYD enquiries, you might receive 2 responses from the APA Group. Please read both responses carefully as they will relate to different assets. It is your responsibility to action all requirements set out in APA Group responses.

Please take some time to review the entire response document and check the information supplied and please let us have any feedback by sending an email to *DBYDNetworksAPA@apa.com.au* or contacting us direct on (08) 8115 4500.

Yours faithfully

Dial Before You Dig Officer
APA Group

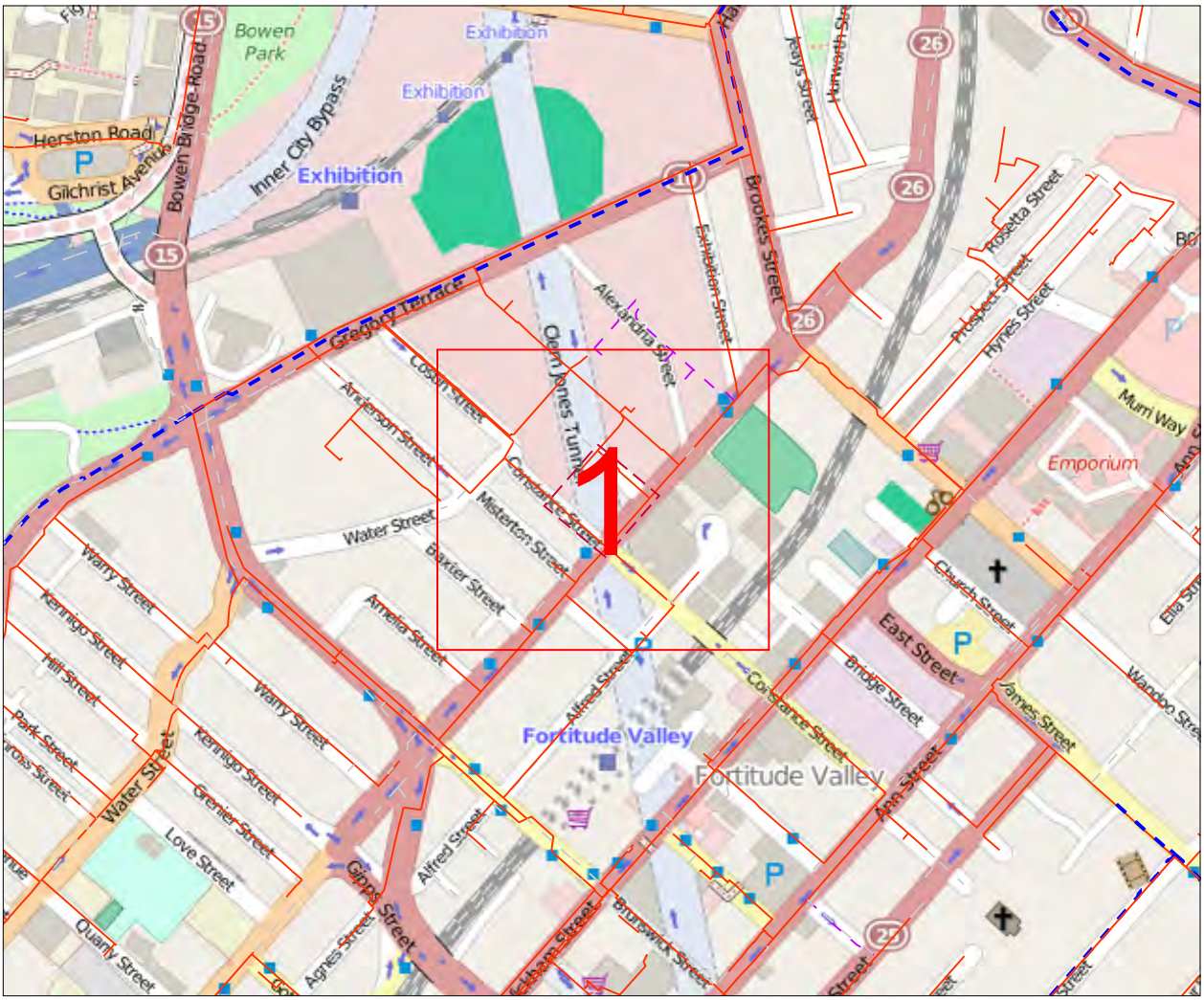
Email DBYDNetworksAPA@apa.com.au
Ph. (08) 8115 4500

DIAL BEFORE YOU DIG www.1100.com.au The Essential First Step

operated by apa

24/03/2017 **SCALE: DO NOT SCALE** **REF NO**: 59912859

As work on APA underground plant is ongoing any drawing with an issue date of more than one month previous can no longer be considered valid. All persons planning civil works on any site are advised to contact APA to confirm location. All underground gas pipelines are the property of APA & are not to be accessed by unauthorised persons. All care is taken with preparation of the drawings & no responsibility is accepted for errors or omissions.



59912859

Scale: 1: 6000

0 0.08km

NORTH

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by apa

This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500
- Medium Pressure PE/ Nylon (1)
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

- Gate Station
- Regulator Station
- Block/ Emergency Valve
- Isolation Valve
- Test Point
- Syphon
- Anode
- Pipeline Marker
- Trace Wire Point
- Reducer
- Pipe Connector/ Tee
- Pipe Connector
- End Cap

Pipe Materials

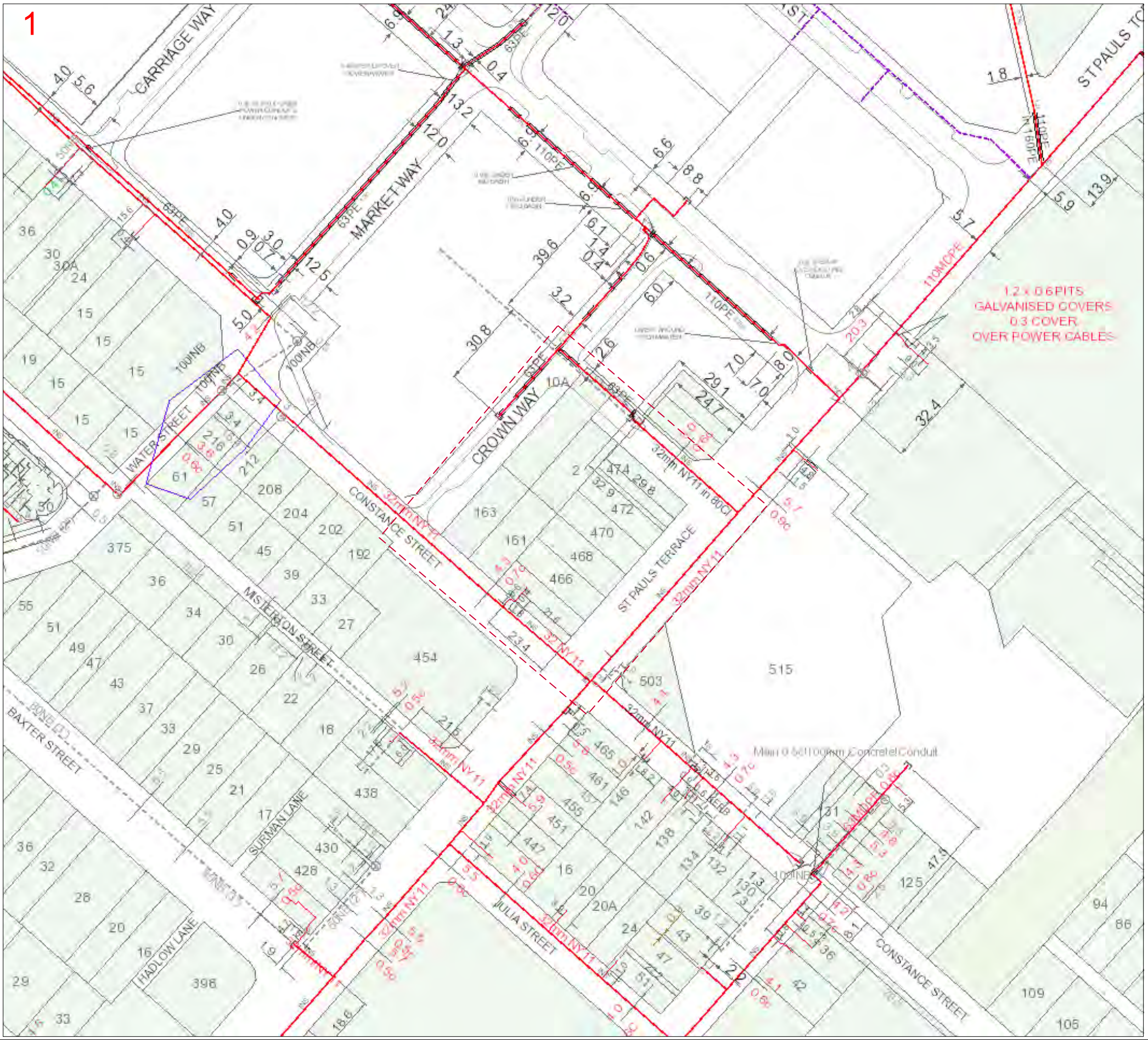
CI	Cast Iron
CU	Copper
GAL	Wrought Galvanised Iron
PGAL	Poly Coated Wrought Galvanised Iron
ST	Steel
NY/ NY11	Nylon
PE	Polyethylene
MDPE	Medium Density Polyethylene
HDPE	High Density Polyethylene
DN	Nominal Diameter
OD	Outside Diameter

Examples:
- 40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve
- 63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

APA Group does not guarantee the accuracy or completeness of the map and does not make any warranty about the data. APA Group is not under any liability to the user for any loss or damage (including consequential loss or damage) which the user may suffer resulting from the use of this map.

1



59912859 Map Sheet: 1

Scale: 1: 1000

0 0.01km

NORTH

Map Key:

1

This maps is created in colour and shall be printed in colour

Legend

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Line/ Polygon Request

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operated by apa

Working Around Gas Assets: Duty of Care and Responsibilities

It is illegal to interfere or tamper with gas infrastructure.
Offenders who interfere or tamper with gas infrastructure may be prosecuted under relevant legislation and there are very serious penalties for such offences

"Gas infrastructure" or "infrastructure" in this document refers to any infrastructure or property owned or operated by APA Group including, but not limited to natural gas mains, services and regulator/meter stations or regulator pits.

1. Planning Your Work

a. The constructor must:

i. Request plans of APA Group infrastructure for a particular location at a reasonable time before construction begins (at least 5 business days);
ii. Design for minimal impact and ensure protection of APA Group infrastructure, this includes networks managed by APA on behalf of Australian Gas Networks and Allgas; and
iii. Contact APA Group if their infrastructure is in any way affected by planned construction activities.

2. Before You Start Work

a. Please Note: **You will be responsible to pay for the repair of any damage by you to gas assets.**

b. You must obtain **Dial Before You Dig** (DBYD) documentation before any on-site construction or excavation commences. This document is to be read in conjunction with the Dial Before You Dig plans and other relevant documentation.
APA Group will provide free site plans if an APA Group infrastructure location request is made to Free call "1100" (Dial Before You Dig).

c. If DBYD documents indicate you will be working within 3m of a high pressure or transmission gas pipeline, you must complete and submit the **Authority to Work Request** provided with your DBYD documentation **five (5) business days** prior to commencing the work. Requests **under** five (5) business days will incur extra charges.

d. APA Group shall assess your Authority to Work Request and will inform you if a Site Watch is required. A Site Watch involves the presence of an APA representative at site to advise on locating and working around the asset. Where on-site location advice is provided, the constructor is responsible for all hand digging (potholing) to visually locate and expose APA Group infrastructure. Vacuum excavations may only be used if permission is granted by APA and if it is used on high pressure mains Site Watch will be required. **Site Watch services are charged at an hourly rate.**

e. The principal contractor for the site must provide APA Group with a written construction methodology for all works impacting or encroaching on APA infrastructure. All construction methodology documents will be reviewed by APA Group prior to the commencement of site works. Construction methodology documents must be submitted as part of an Authority to Work Request (send to permitsqld@apa.com.au).

f. Site Plans

i. Plans and/or details provided by APA Group through DBYD or otherwise are current for one (1) month from the date of dispatch and should be disposed of by shredding or any other secure disposal method after use.
ii. APA Group retains copyright in all plans and details provided in connection with any request.
iii. APA Group plans or other details are provided for the use of the applicant, its servants, employees, contractors and agents, and must not be used for any unauthorised purpose.
iv. APA Group plans are pipe indication diagrams only and indicate the presence of plant in the general vicinity of the geographical area shown. Exact ground cover and alignments cannot be given with any certainty as such levels can change over time.
v. APA Group, its servants, employees, or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and/or details so supplied to the applicant/constructor, its servants, employees, contractors and/or agents, and the applicant/constructor agrees to indemnify APA Group against any claim or demand for any such loss or damage.
vi. The constructor is responsible for all infrastructure damage occasioned to APA Group infrastructure.
vii. APA Group reserves all rights to recover compensation for loss or damage caused by interference or damage, including consequential loss and damages to its property and gas infrastructure.
viii. All care is taken in the preparation of location drawings and plans, but NO responsibility is accepted by APA Group for errors or omissions.

3. Working in the Vicinity of a Gas Pipeline

a. **Excavation** near Gas Mains and Services

PLEASE NOTE: Unless otherwise approved, mechanical excavation is not permitted above, or within 600mm of either side of APA Group infrastructure.

i. **Location of Gas Mains and Services:** Examining the DBYD documentation and other plans is not sufficient as reference points may change from the time of installation and recording on documentation. For all work to be done within 3.0 metres of APA Group infrastructure, the constructor is required to hand dig (pothole) and expose the plant, hence proving its exact location before work can commence. Vacuum excavation can cause failure of some types of gas mains and therefore APA Group must be contacted prior to any vacuum excavation. Please note that new APA Group gas mains generally have a plastic warning tape or lightweight plastic board buried above the pipe but this is not the case for older mains or when pipe is laid by means of boring or located in conduit.

ii. **IMPORTANT NOTE:** Not all gas services (i.e. pipe from gas main to a gas meter in an individual property) are captured on APA Plans. Gas services shown on plans are indicative only and do not pinpoint the exact location of APA's asset. A gas service may also cross a road to reach a property. To confirm the presence of a gas service, please contact the APA DBYD number below for further information.

iii. **Installation of Utilities Parallel to Gas Mains and Services**: If construction work is being undertaken parallel to APA Group gas mains, then hand digging (potholing) at least every 4 m is required to establish the location of all gas mains. Nominal locations must be confirmed before work can commence. A minimum clearance of 600mm must be maintained from gas mains unless otherwise approved by APA. If an excavation exceeds the depth of the gas mains and it is likely that the covers or bedding material around the pipes will move, approval must be sought from APA Group's Capital Works team.

iv. **Installation of Utilities Across Gas Mains and Services:** A minimum clearance of 300mm above and below and APA Group gas mains must be maintained unless otherwise approved by APA. If the width or depth of the excavation is such that the gas mains will be exposed or unsupported, then APA Group must be contacted to determine whether the gas mains should be taken out of service, or whether they need to be protected or supported. Protective cover strips when removed must be replaced under APA Group supervision.

v. **Exposed Gas mains and Services:** Exposure of APA infrastructure shall be limited to potholing for location purposes. Any other exposure of pipe is not permitted unless expressly approved by APA Group. Exposed gas pipes must be protected by the constructor against the effects of heat by shielding or covering with a suitable material. Heating of exposed plastic pipes is dangerous.

vi. **Heavy machinery Operation over Gas Mains and Services:** Where heavy "Crawler" or "Vibration" type machinery is operated over the top of gas mains, a minimum cover of 750mm to the gas mains must be maintained using load bearing protection whilst the machinery is in operation.

vii. **Directional Drilling Near Gas Mains and Services:** When drilling parallel to gas mains, trial holes must be carefully hand dug at least every 4m to prove the actual location of the conduits/pipes before using drilling machinery. Where it is required to drill across the line of gas mains, the actual location of the gas mains must first be proven by the constructor by hand digging. A trench must be excavated one metre from the side of the gas mains where the auger will approach to ensure a minimum clearance of 600mm for gas mains can be maintained unless otherwise approved by APA.

viii. **Explosives:** Clearances must be obtained from APA Group's Networks Engineering Manager for use of explosives in the vicinity of gas mains. Please contact the APA Group.

b. **Damage Reporting**: All damage to conduits and pipes and any other gas infrastructure and property must be reported to APA Group no matter how insignificant the damage appears to be. Even very minor damage to protective coverings can lead to eventual failure through corrosion. All work in the vicinity of damaged infrastructure should cease and the area should be vacated until a clearance to continue work has been obtained from an APA Group officer. Please contact the Emergency number below to report damage.

c. **Solutions and Assistance**: If it is determined that APA Group infrastructure is likely to be impacted or encroached upon by planned construction, APA Group must be contacted to arrange for possible engineering solutions. If APA Group relocation or protection works are part of the agreed solution, then payment to APA Group for the cost of this work will be the responsibility of the principal contractor. APA Group will provide an estimated quotation for work on receipt of the order number before work will proceed.

d. **Reinstatement**: APA assets affected by third party works as highlighted above are to be reinstated as per APA requirements, potentially including but not limited to; warning tape/marker board, soft bedding/backfill materials, trench dimensions, depth of cover, trace wire for PE mains, compaction requirements, concrete protection, and surface re-instatement.

4. Contacting APA

GAS EMERGENCIES 24 HRS	GAS PLANT RELOCATIONS	APA GROUP GAS ASSET LOCATIONS	DIAL BEFORE YOU DIG
1800 GAS LEAK (1800 427 532)	APA CAPITAL WORKS PH: 07 3215 6709 capitalworksqldnetworks@apa.com.au	TEAM (PERMITS OFFICE) PH: 07 3215 6700 permitsqld@apa.com.au	SUPPORT PH: (08) 8115 4500

HIGH PRESSURE GAS DISTRIBUTION MAINS "AUTHORITY TO WORK" REQUEST

N.B. THIS IS NOT A PERMIT TO WORK

SITE ADDRESS: ……

SUBURB: ……UBD MAP REF:……

DBYD Sequence Number:…… Date of DBYD Enquiry…..

(Note: Only valid enquiries will be accepted and the currency of DBYD requests will affect your permit period. APA Group's DBYD requests are valid for one month only. Enquiries may need to be renewed and a new application may be required)

COMMENTS:……

……

BROAD DESCRIPTION OF WORK (please provide any approvals from APA Group related to these works)

……

……

……

WORK TO BE CARRIED OUT:

Class 1.	Location	
	Works crossing a high pressure gas mains	☐
Class 2.	Location	
	Works within 3 metres of a high pressure gas mains	☐
Class 3.	Location	
	Works involving large excavations that would cause ground movement, vibrations or blasting beyond 3m of a high pressure gas mains	☐
Class 4.	Location	
	Works within 1m of gas service or connection to industrial gas meter	☐

DETAILS OF WORK INVOLVED (Tick Applicable)

Excavation	☐	Change to surface level	☐
Service crossing (Gas CONNECTION)	☐	Boring	☐
Proving (Dial Before You Dig)	☐	Blasting	☐
Earthworks	☐	Road Construction/Change?	☐
Vacuum Excavation	☐	Other (give details)	☐

……

Relevant drawings, Block Plans etc, attached Yes ☐ No ☐

PROPOSED DATES AND TIMES	**From:**	**To:**
Excavation	…… / …… / 20… ..... am/pm	…… / ……/ 20… ..... am/pm
Backfill	…… / …… / 20… ..... am/pm	…… / ……/ 20… ..... am/pm

Insurance Cover – Current Level None ☐ $5M ☐ $10M ☐ $20M ☐ Other☐ _

NOTES

1. This Authority to Work applies only to work in the vicinity of the Gas Mains. It does not authorise work near or on the Gas Mains itself
2. A minimum of 5 business days must be allowed between receipt by APA Group of this Request and a response. However, more time for notification may be necessary
3. For Class 1 and Class 2 classifications, this application must be accompanied by a detailed sequence of events, outlining all aspects of work involved and work is not permitted until an Authority to Work is issued
4. For class 1 and 2 Dial Before You Dig, APA Group will arrange for an inspector to be on site as necessary during the work. An inspector must be present at all times for works involving excavation within 1m of the Gas Mains. APA Group will advise the requirement for an inspector for other works within 3m of the Gas Mains
5. The applicant is responsible for any damage resulting from the work and all consequential damages and losses arising from such damage and therefore must insure against every liability of the contractor in respect of or arising out of any loss of life, loss of or damage to property of person (both real and personal), arising out of or in any way connected to this permit

Such insurance must be arranged for an indemnity of not less than $20 Million unless otherwise agreed.

Permit Requested By:(print name)…….Signature: ……..Date …./…./….

Company:…… Postal Address:..……..

Phone No:…… Fax number…….. Email……

Requestors PO Number…….. Site Contact Details: Name……

Site Contact Number……..……

Principal Contractors Details(if required)…….

Principal Contractors Contact details:…….

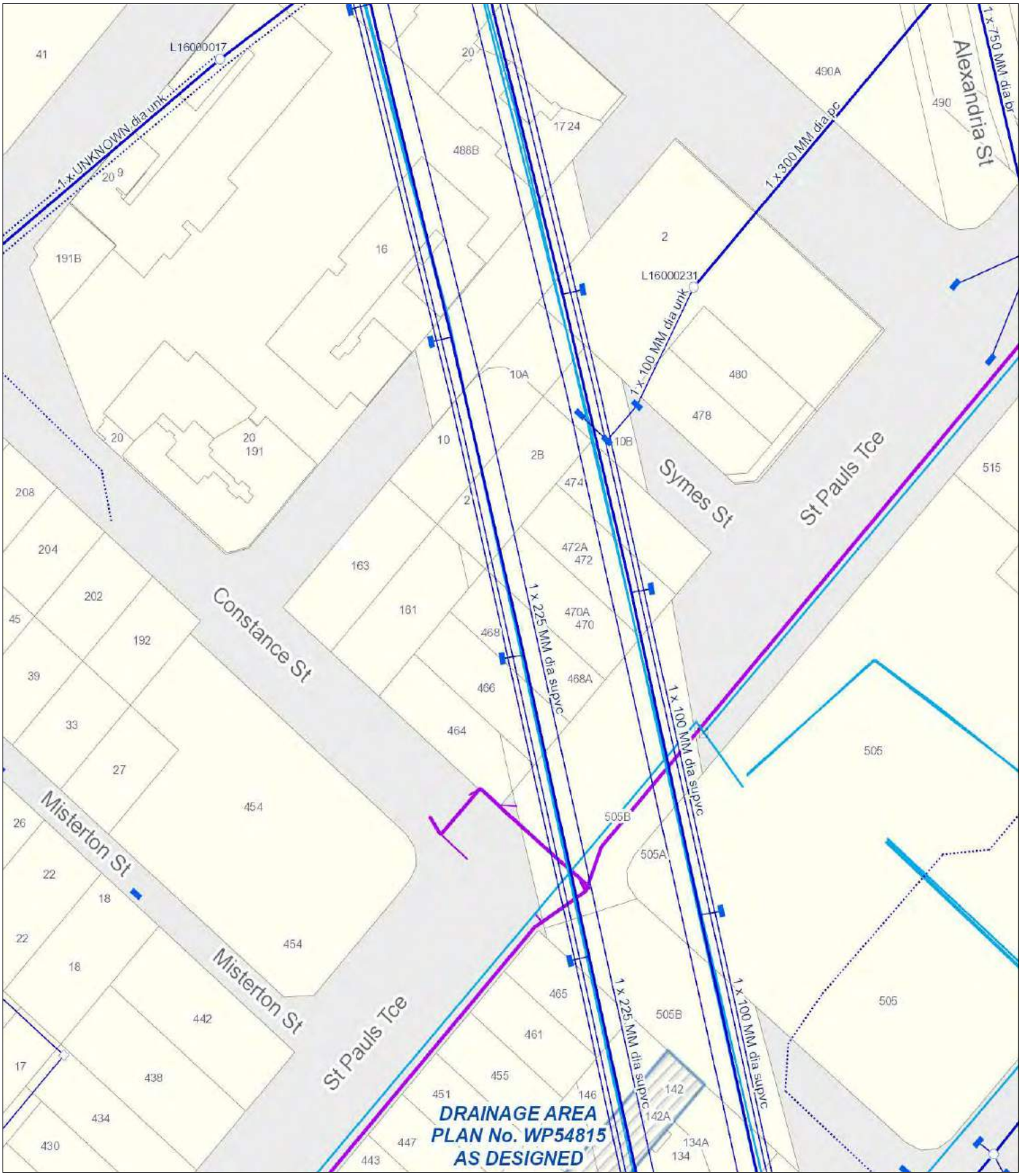
Please be advised;
Under the Work Health and Safety Act 2011, each work place has an obligation to comply to Workplace Health and Safety Regulations and Codes of Practice.

APA Group brings to your attention Work Health and Safety Regulations 2011, Chapter 4: Hazardous Work. Failure to comply to the above regulation may result in APA Group reporting the non-compliance to Workplace Health and Safety.

Office use only
Received: Date …/…./…. Site Watch required? **Yes/No** (please circle)

Pipeline Officer:
(print name)……...Signature: ……Date: …/…/….

Further information can be requested via:
Post: **Permit Applications QLD**
PO Box 885 Hamilton Central QLD 4007
Phone: (07) 3215 6700 though an application will most likely be required
Email: permitsqld@apa.com.au



BCC Stormwater and Cable Networks

Sequence Number: 59912855

Scale = 1:1000

Metres 20 40

Date: Mar 24, 2017

Location:

6963442

503232 N 503422

6963232

Disclaimer:

BRISBANE CITY

Legend

Stormwater Network


Stormwater Drain


Stormwater Gully / Roofwater Connection


Future Stormwater Drain

Stormwater Maintenance Hole

Stormwater Roofwater Pit

Stormwater Gully Pit

Stormwater Field Inlet

Stormwater Quality Improvement Device


Stormwater Culvert

BCC Cable Network


Traffic System Cable


Traffic Signal Ducting


Traffic Light Conduit

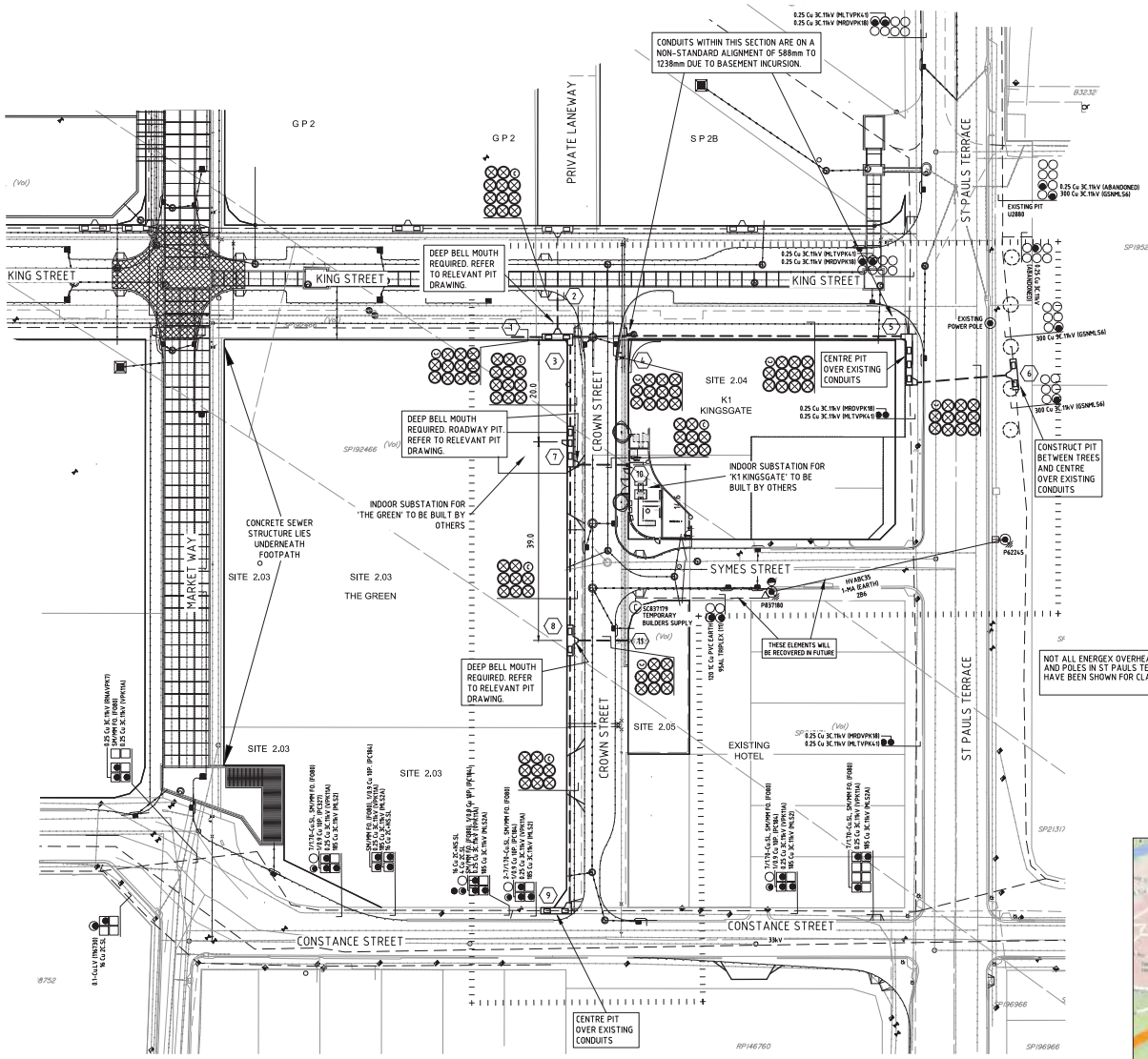

Fibre Optic Cable Location


Flood Telemetry Conduit


Parking Sensor Ducting

Fibre Optic Pit Location

Detail Works Plan
S0500310



Notice

This record provides details of ENERGEX proposed Underground works to be or being carried out in the area of your DBYD request. The cable voltages detailed may include, Low Voltage, 11KV, 33KV or 110KV Transmission and Pilot (Fibre Optic) underground Cables. The details of the underground works plan provided, is for information only as the works may not be constructed at this time.

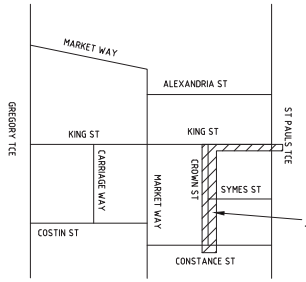
As the details shown on this works plan may differ from the final construction details, no responsibility is incurred by ENERGEX for the accuracy or completeness of the information provided.

MR PETER DUNCAN OF ENERGEX (0409 614 694) MUST BE CONTACTED FOR A SITE MEETING BEFORE ANY WORK IS TO COMMENCE. INSTALLED CONDUITS ARE NOT BE BACKFILLED UNTIL INSPECTED BY PETER.

NOTE: SUBSTATIONS TO BE INSPECTED & HANDED TO ENERGEX 12 WEEKS PRIOR TO DATE SUPPLY REQUIRED

REFER DRAWING SET K2773–1 FOR MASTER CONDUIT PLAN OF CONDUIT LAYOUT FOR ALL STAGES

LOCALITY MAP
NTS



STAGING MAP
NTS

LEGEND OF SYMBOLS

- SERVICE PILLAR-PROPOSED
- SERVICE PILLAR-EXISTING
- LINK PILLAR
- EXISTING CONDUIT
- PROPOSED 40mm CONDUIT (EMPTY)
- PROPOSED 100mm CONDUIT (EMPTY)
- PROPOSED 125mm CONDUIT (EMPTY)
- PROPOSED CONDUIT & CABLE
- PROPOSED CABLE IN EXISTING CONDUIT
- EXISTING CABLE & CONDUIT
- UG CABLE-PROPOSED
- UG CABLE-EXISTING
- O/H MAINS-PROPOSED
- O/H MAINS-EXISTING
- JOINT
- PIT
- STATION NUMBER
- SWITCHBOARD
- FLOOD LIGHT-EXISTING
- STREETLIGHT-PROPOSED
- STREETLIGHT-EXISTING
- LV U/G TERMINATION
- HV U/G TERMINATION
- POLE - HV & LV
- POLE - LV
- POLE - HV
- EARTH
- CIRCUIT BREAKER OR RECLOSER
- RING MAIN UNIT
- GROUND STAY
- POLE STAY
- LV DISCONNECT LINKS
- LV CUTOUTS
- TREE

STAGE '1A' DETAILED DESIGN
CONSTRUCT CONCRETE PITS
TRENCH AND INSTALL CONDUITS

RNA SHOWGROUNDS REDEVELOPMENT
SOUTHERN SECTION
GREGORY TERRACE, BOWEN HILLS

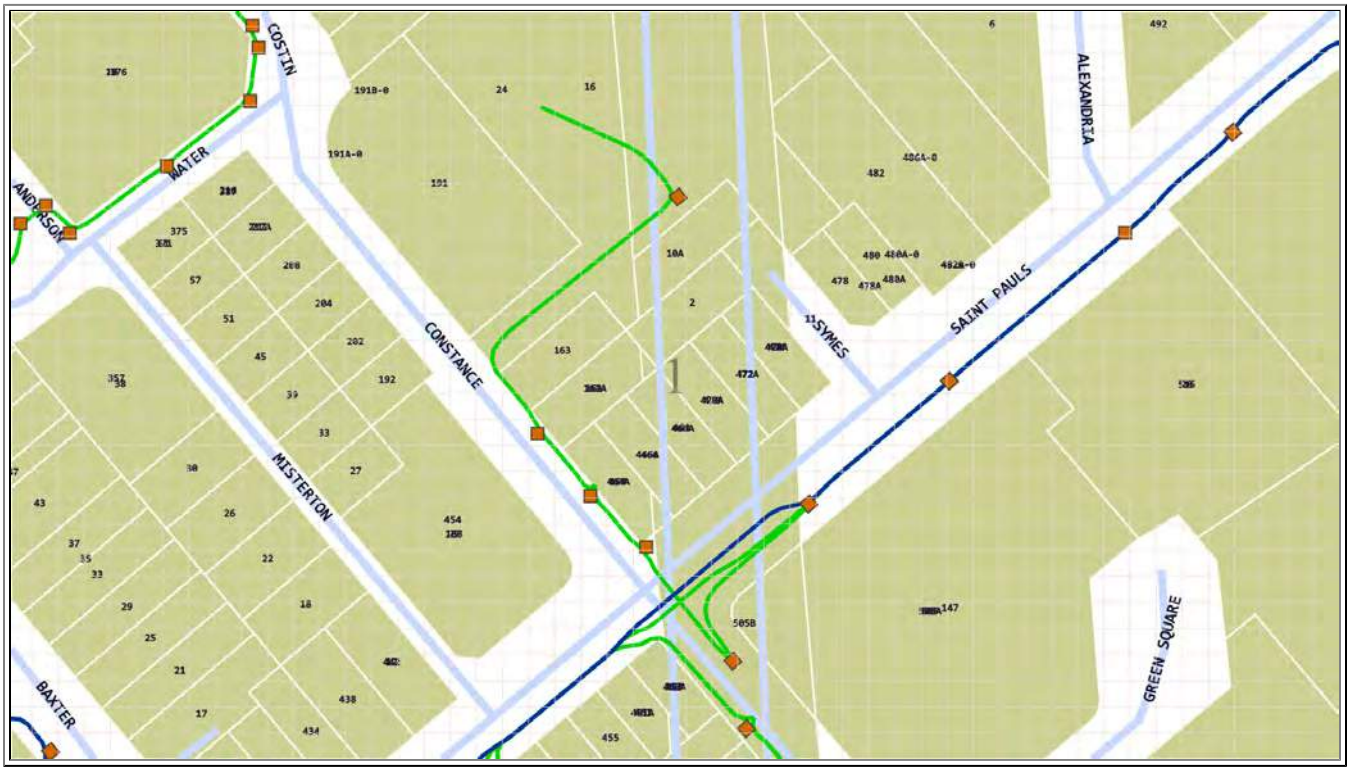
27/03/2017

Indicative Plans

Issue Date:	24/03/2017
Location:	St Pauls Tce,Fortitude Valley,QLD-4006

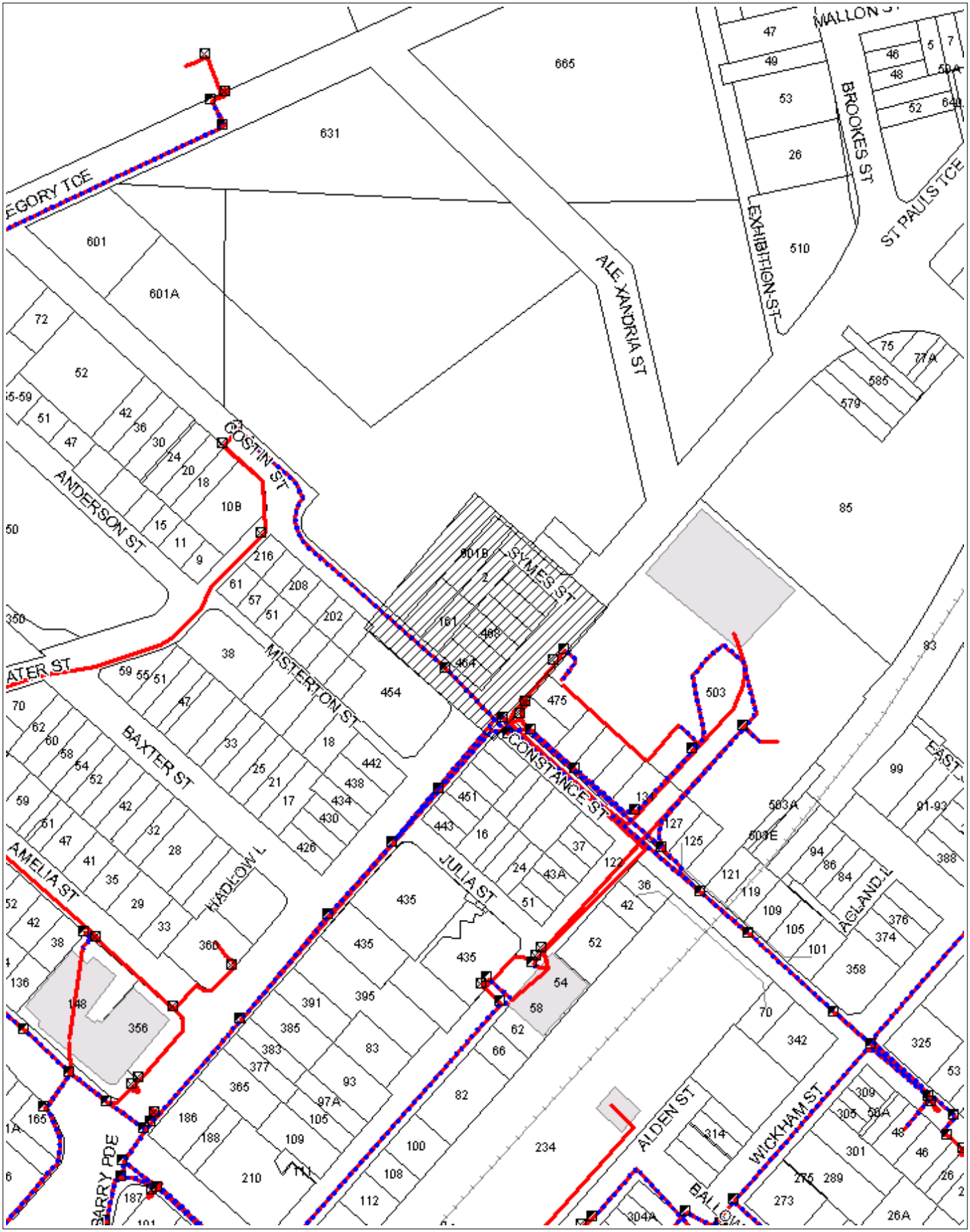
DIAL BEFORE YOU DIG www.1100.com.au

1



Emergency Contacts

You must immediately report any damage to **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

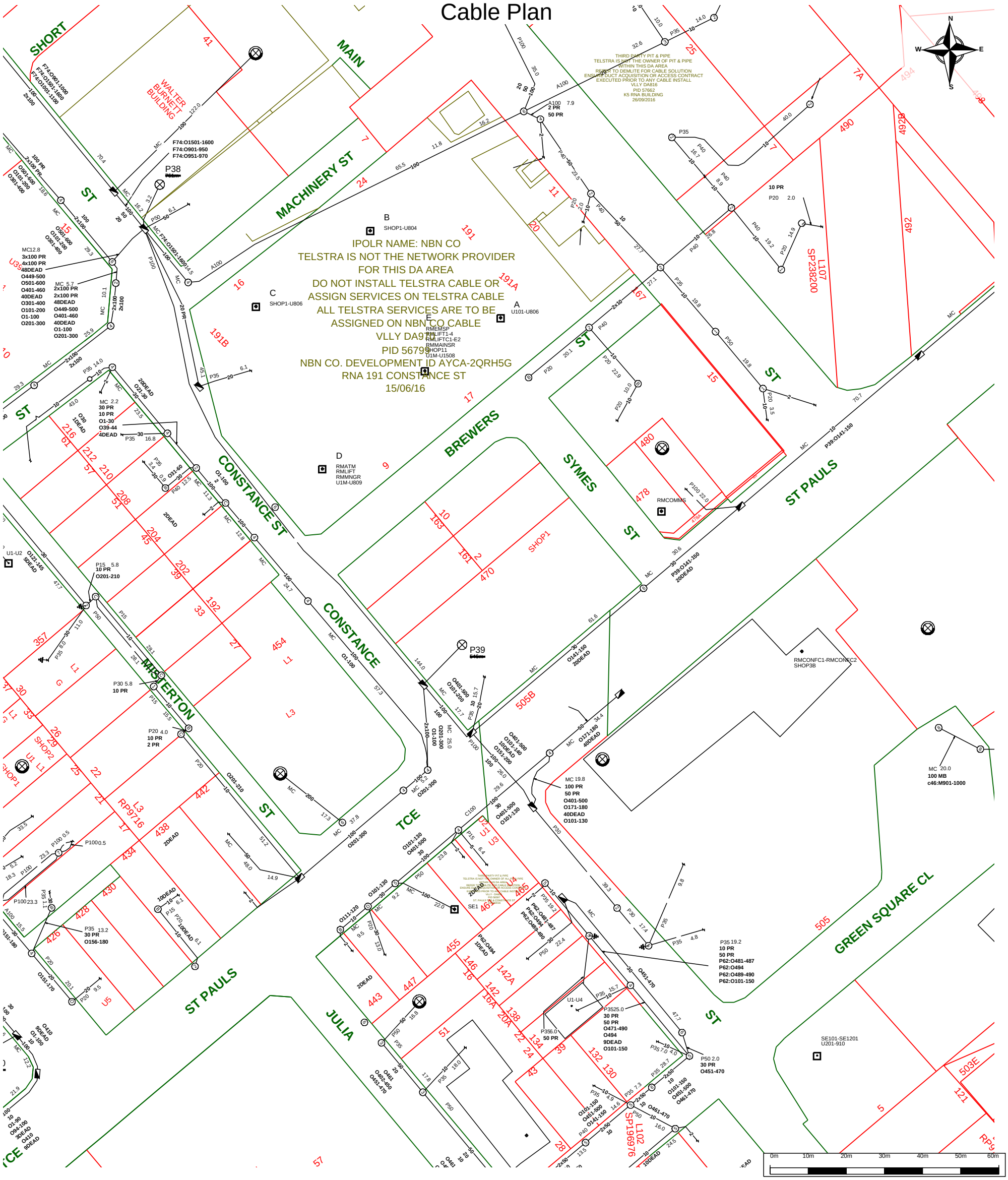


Sequence Number: 59912858

Date Generated: 24/03/2017

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

Cable Plan



For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com For urgent onsite contact only - ph 1800 653 935 (bus hrs)	Sequence Number: 59912857
TELSTRA CORPORATION LIMITED A.C.N. 051 775 556	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 27/03/2017 08:32:04	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

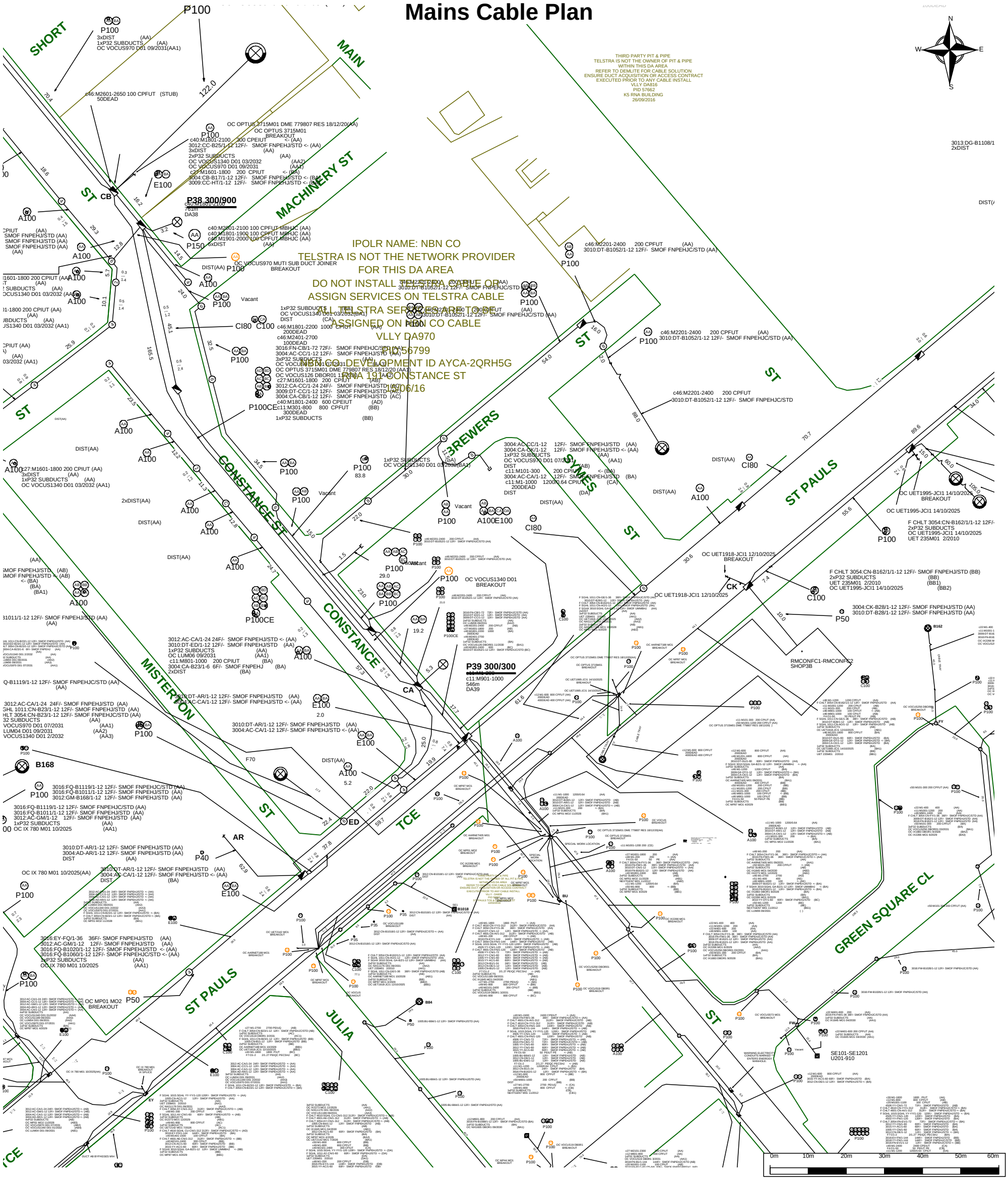
WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.

Mains Cable Plan



Telstra

For all Telstra DBYD plan enquiries -
email - Telstra.Plans@team.telstra.com
For urgent onsite contact only - ph 1800 653 935 (bus hrs)

TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

Generated On 27/03/2017 08:33:01

Sequence Number: 59912857

CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

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Appendix D
RNA Showground Development Drawings by Cardno

JOINS 161163-050-CD-C-301-2308

JOINS 161163-050-CD-C-301-2309

'K1' COMMERCIAL DEVELOPMENT
BASEMENT WALL TO BE CONSTRUCTED
PRIOR TO CIVIL CONSTRUCTION OF
PROPOSED SEWER.

'THE GREEN' RESIDENTIAL DEVELOPMENT
BASEMENT WALL TO BE CONSTRUCTED
PRIOR TO CIVIL CONSTRUCTION OF
PROPOSED SEWER.

INSTALL STORMWATER STUB TO CLEAR
PROPOSED 'THE GREEN' FOOTINGS.
REFER STRUCTURAL ENGINEERS
DRAWINGS FOR DETAILS OF FOOTINGS.
CIVIL CONTRACTOR TO FINISH PROPOSED
DRAINAGE PROPERTY CONNECTION AT
PROPERTY BOUNDARY.
CONSTRUCTION OF INTERNAL DRAINAGE
INCLUDING PENETRATION THROUGH
BASEMENT WALL BY LICENSED PLUMBER
IN 'THE GREEN' BUILDING WORKS.

SW1 SW2 SW3 SW4 SW5 SW6
LS1 LS2 LS3 LS4 LS5 LS6
SITE 2.05
SYMES STREET
LITTLE SUTTON STREET
CLEM7 TUNNEL UNDER
ST PAULS TERRACE
TERRACE
JUBILEE HOTEL
CONSTANCE STREET
CONSTANCE STREET
80.000
60.000
40.000
20.000
0.000
17.780
77.611
CT66.012
60.000
TC58.924
40.000
CT23.016
20.000
TC4.227
0.000

BIO-BASIN SETOUT

BASIN NAME	EASTING	NORTHING	BASIN MEDIA RL.	UNDER DRAIN CONNECTION AND NOTES	BASIN TYPE	W	L	F
LS1	503280.694	6963342.722	9.403	CONNECT TO MH. 2a-1	A	0.9	2.6	0
LS2	503301.820	6963354.452	9.010	SADDLE PIPE CONNECTION TO SWD PIPE	A	0.9	3.6	3.3
LS3	503301.658	6963366.523	8.589	SADDLE PIPE CONNECTION TO SWD PIPE	A	0.9	4.6	4.3
LS4	503316.325	6963370.920	7.942		A	0.9	4.6	4.3
LS5	503320.597	6963388.024	7.432	SECOND INLET 8.25m	A	0.9	9.79	4.95
LS6	503335.493	6963392.682	7.500		A	0.9	2.6	0

REFER DWG'S 161163-050-CD-C301-2350 TO 2352 FOR BIO-BASIN DETAILS

LEGEND

- PROPOSED CONTOURS — 30.0
- PROPOSED TYPE E KERB AND CHANNEL
- PROPOSED 230X230 EDGE RESTRAINT
- PROPOSED KERB RAMP
- PROPOSED SWALE DRAIN
- PROPOSED DRAINAGE STRUCTURE LABEL — M1 / 6
- PROPOSED UNDERGROUND ELECTRICITY — UG/E
- PROPOSED SEWERAGE — S
- PROPOSED SEWER RISING MAIN — SRM
- PROPOSED TELSTRA — C
- PROPOSED GAS — G
- PROPOSED WATER — W
- PROPOSED STORMWATER
- EXISTING KERB AND CHANNEL
- EXISITNG UNDERGROUND ELECTRICITY — U/G E
- EXISTING ELECTRICITY — S
- EXISITNG TELSTRA — T
- EXISTING GAS — G
- EXISTING WATER — W
- EXISTING STORMWATER — SWD
- EXISTING STORMWATER TO BE REMOVED — SWD

WARNING!
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0 5 10 15 20 25m
SCALE 1:250

STORMWATER
LAYOUT PLAN
Scale 1:250

Rev.	Date	Description	Des.	Verif.	Appd.
P4	09/082013	PRELIMINARY ISSUE			
P3	23/07/2013	PRELIMINARY ISSUE			
P2	19/07/2013	PRELIMINARY ISSUE			
P1	25/06/2013	PRELIMINARY ISSUE			

Verified Date
Approved Date
RPEQ No.

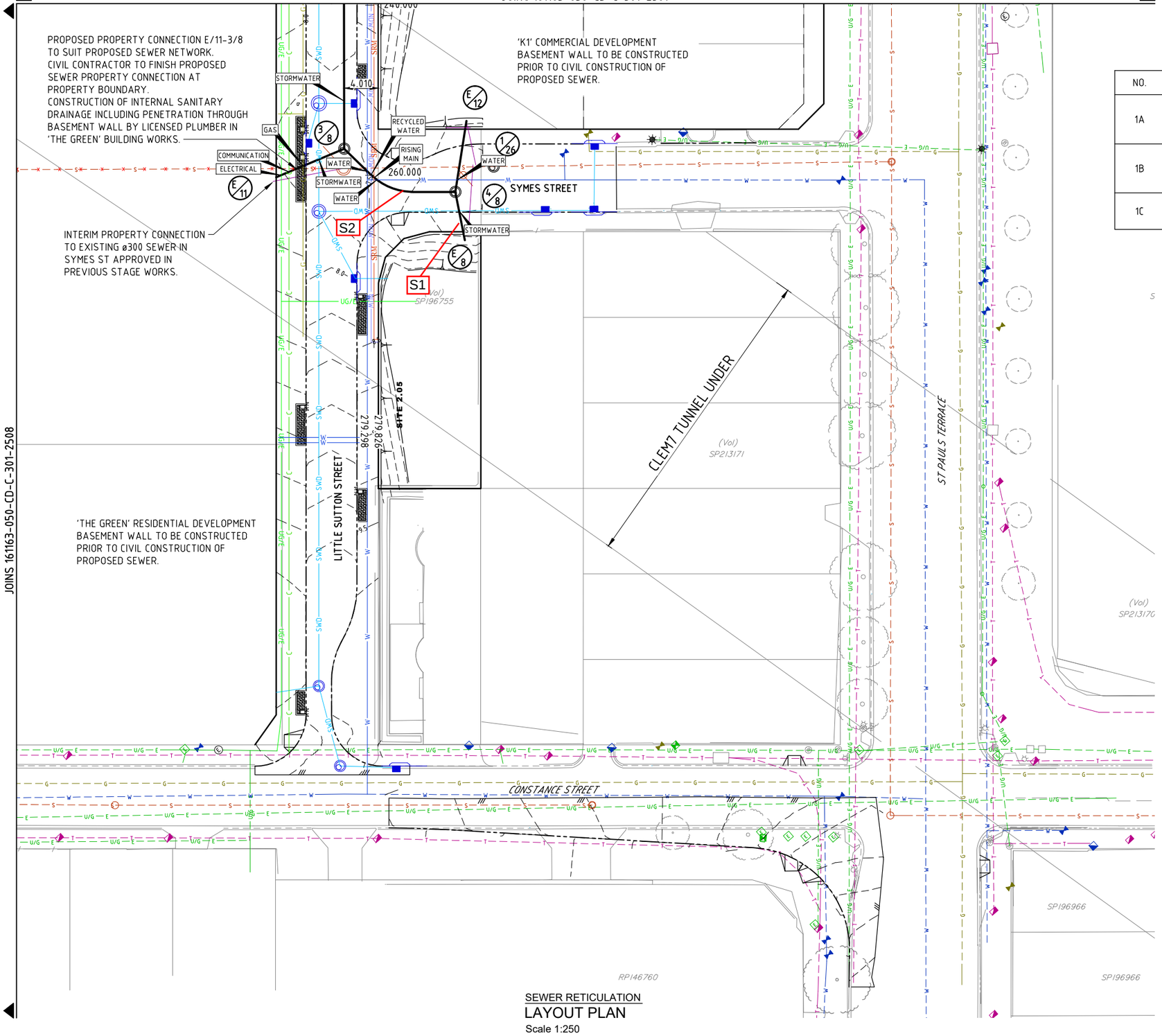
Cardno (Qld) Pty Ltd | ABN 57 051 074 992
Level 11, 515 St Paul's Terrace
Fortitude Valley, QLD 4006
Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722
Email: brisbane@cardno.com.au Web: www.cardno.com.au

Drawn Date
Checked Date
Designed Date
Cardno Ref. No. A10697-019

Client: RNA & LEND LEASE
RNA SHOWGROUND REDEVELOPMENT
STAGE 1 AND 2 - CONSTRUCTION
STORMWATER DRAINAGE
LAYOUT PLAN
SHEET 8 OF 8

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
Datum A.H.D. | Grid | Scale AS SHOWN | Size A1
Drawing Number 161163-050-CD-C-301-2310 | Revision P4

JOINS 161163-050-CD-C-301-2507



SEWER RETICULATION
LAYOUT PLAN
Scale 1:250

QUU AND CONTRACTOR LIVE SEWER WORKS

NO.	DESCRIPTION	SEWER DIA.	MH. NO.	MH. TYPE	COVER TYPE	FSL / ESL	IL	DEPTH
1A	QUU TO BREAK INTO EXISTING MAINTENANCE HOLE 1/1E AND CONSTRUCT 150mm STUB (TEMPORARILY PLUGGED) PRIOR TO START OF CONSTRUCTION.							
1B	CONTRACTOR TO LAY SHORT PIPE WITH AN I.O. THEN LAY LINE 1. AFTER CLEANSING, TESTING AND INSPECTION, I.O. PIPE TO BE SURROUNDED WITH 150mm OF CONCRETE							
1C	QUU TO REMOVE TEMPORARY PLUG IN MAINTENANCE HOLE 2/E AFTER SUCCESSFUL 'ON MAINTENANCE' INSPECTION							

LEGEND

- PROPOSED MANHOLE LABEL (E/16)
- PROPOSED SEWERAGE MANHOLE (S)
- PROPOSED CROSSING LABEL (ELECTRICAL)
- PROPOSED RECYCLED WATER (NDW)
- PROPOSED UNDERGROUND ELECTRICAL (UG/E)
- PROPOSED SEWERAGE (S)
- PROPOSED COMMUNINCATIONS (C)
- PROPOSED GAS (G)
- PROPOSED WATER (W)
- PROPOSED STORMWATER (SWD)
- PROPOSED SEWER CATCHMENT
- EXISITNG UNDERGROUND ELECTRICAL (U/G — E)
- EXISTING SEWER (S)
- EXISITNG TELSTRA (T)
- EXISTING GAS (G)
- EXISTING WATER (W)
- EXISTING STORMWATER (SWD)
- EXISTING SEWER TO BE REMOVED

A "PERMIT TO WORK" MUST BE OBTAINED FROM THE RELEVANT QUU CONTROL ROOM PRIOR TO COMMENCEMENT OF WORK ON SITE. A MINIMUM PERIOD OF TEN WORKING DAYS IS REQUIRED FOR THE ISSUING OF A PERMIT. CONTROL ROOM EAST (BRISBANE LG AREA)
PH. 3407 8391 EMAIL: PTWOE@URBANUTILITIES.COM.AU

DATE
QUEENSLAND URBAN UTILITIES DELEGATE
(VALID FOR 12 MONTHS FROM DATE SHOWN)

CLIENT:	CLIENT COMPANY NAME CLIENT COMPANY NAME
CONTACT:	NAME - PHONE NUMBER
Q.U.U. AUDITOR:	AUDIT & COMPLIANCE OFFICER QUEENSLAND URBAN UTILITIES
CONTACT:	0734078494

AS CONSTRUCTED DETAILS FOR AMEND. ?

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE TRUE AND ACCURATE RECORD OF THE WORKS

SIGNED DATE:
NAME of SIGNATORY
RPEQ No. or LICENCE
COMPANY NAME
START DATE FINISH DATE

QUEENSLAND UrbanUtilities

CONSTRUCTION INSPECTION:
NOTIFICATION OF INSPECTIONS MUST BE RECEIVED BY QUEENSLAND URBAN UTILITIES SERVICE DELIVERY EAST - PROJECT WIS AT LEAST TWO (2) WEEKS PRIOR TO COMMENCEMENT OF CONSTRUCTION
PLEASE CONTACT 0734078494

WARNING!
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES HAVE BEEN INTERPOLATED FROM GIS DATA OR KNOWN POSITIONS OF VALVES, MANHOLES ETC. OR INFORMATION SUPPLIED BY SERVICE AUTHORITIES. NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THE INTERPOLATED INFORMATION SUPPLIED. ENSURE ALL SERVICES ARE ACCURATELY LOCATED PRIOR TO COMMENCEMENT OF WORK.

0 5 10 15 20 25m
SCALE 1:250

Rev.	Date	Description	Des.	Verif.	Appd.
P3	09/082013	PRELIMINARY ISSUE			
P2	19/07/2013	PRELIMINARY ISSUE			
P1	25/06/2013	PRELIMINARY ISSUE			

Verified Date
Approved Date
RPEQ No.

RNA Lend Lease BAULDERSTONE

Cardno Shaping the Future
Cardno (Qld) Pty Ltd | ABN 57 051 074 992
Level 11, 515 St Paul's Terrace
Fortitude Valley, QLD 4006
Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722
Email: brisbane@cardno.com.au Web: www.cardno.com.au

Drawn Date
Checked Date
Designed Date
Cardno Ref. No.
A10697-019

Client
RNA & LEND LEASE

RNA SHOWGROUND REDEVELOPMENT
STAGE 1 AND 2 - CONSTRUCTION
SEWER RETICULATION

LAYOUT PLAN
SHEET 8 OF 8

Status
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Grid	Scale	Size
A.H.D.		AS SHOWN	A1

Drawing Number
161163-050-CD-C-301-2509
Revision
P3

JOINS 161163-050-CD-C-301-2607

JOINS 161163-050-CD-C-301-2608

'K1' COMMERCIAL DEVELOPMENT

LIVE CONNECTION
2 - Ø80 APPROVED CONNECTOR
2 - 1.5m MIN Ø80 DICL F-SP
Ø80 x Ø80 F-F-F TEE
Ø150 x Ø80 F-F REDUCER
Ø150 F & S VALVE

SYMES STREET

RISING MAIN
SEWER
RECYCLED WATER
STORMWATER
150 mPVC
1.275
5.964
W4
W3
W2
W1
ELECTRICAL
(Vol) SP196755

SE 2.05

150 DICL
PROPOSED ø150 DICL WATER SERVICE CONNECTIONS TO STOP 250mm FROM BOUNDARY.

'THE GREEN' RESIDENTIAL DEVELOPMENT

LITTLE SUTTON STREET

1.295

CLEM7 TUNNEL UNDER

ST PAULS TERRACE

JUBILEE HOTEL

100
(Vol) SP213171

101
(Vol) SP213176

LIVE CONNECTION
2 - Ø 100 APPROVED CONNECTOR
2 - 1.5m MIN Ø100 DICL P-SP
Ø100 x Ø100 SP-SP-F TEE
Ø100 x Ø150 F-F REDUCER
PIPE FROM REDUCER TO VALVE TO BE Ø150 DICL F-F

150 DICL
5.00
EXISTING 150 CICL
CONSTANCE STREET

SP196966
RP146760
23
19
18
17
6
5

CONNECTION TO EXISTING MAIN TO BE CARRIED OUT BY QUU APPROVED CONTRACTOR AT DEVELOPS EXPENSE UNLESS OTHERWISE AGREED. SUITABLE SAFETY MEASURES TO BE USED BY THE CONTRACTOR.

LEGEND

- PROPOSED FITTING LABEL
- PROPOSED SCOUR VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED ISOLATION VALVE
- PROPOSED TEST/ CHLORINATION POINT
- PROPOSED CROSSING LABEL
- PROPOSED RECYCLED WATER
- PROPOSED UNDERGROUND ELECTRICITY
- PROPOSED SEWERAGE
- PROPOSED COMMUNICATIONS
- PROPOSED GAS
- PROPOSED WATER
- PROPOSED STORMWATER
- PROPOSED KERB AND CHANNEL
- EXISITNG UNDERGROUND ELECTRICITY
- EXISTING SEWER
- EXISITNG TELSTRA
- EXISTING GAS
- EXISTING WATER
- EXISTING STORMWATER

A "PERMIT TO WORK" MUST BE OBTAINED FROM THE RELEVANT QUU CONTROL ROOM PRIOR TO COMMENCEMENT OF WORK ON SITE. A MINIMUM PERIOD OF TEN WORKING DAYS IS REQUIRED FOR THE ISSUING OF A PERMIT. CONTROL ROOM EAST (BRISBANE LG AREA)
PH. 3407 8391 EMAIL: PTWOE@URBANUTILITIES.COM.AU

TABLE OF FITTINGS

ITEM	DESCRIPTION
1	150 DIA GATE VALVE & MARKER
2	150 x 150 D.I. TEE & THRUST BLOCK (22.3kN)
3	150 x 80 DIA HYDRANT, TEE & MARKER
4	150 DIA x 11¼° D.I. BEND & THRUST BLOCK (4.4kN)
5	150 DIA x 22½° D.I. BEND & THRUST BLOCK (8.6kN)
6	150 DIA x 45° D.I. BEND & THRUST BLOCK (17.0Kn)
7	150 DIA x 90° D.I. BEND & THRUST BLOCK (31.5kN)
8	150 x 100 REDUCER
9	150x80 SCOUR TEE & THRUST BLOCK 80 F&S VALVE, 80 SCOUR ASSEMBLY
10	150 END CAP & THRUST BLOCK (22.3kN)
11	TEST POINT

WARNING!
BEWARE OF UNDERGROUND SERVICES
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0 5 10 15 20 25m
SCALE 1:250

DATE
QUEENSLAND URBAN UTILITIES DELEGATE
(VALID FOR 12 MONTHS FROM DATE SHOWN)

CLIENT:	CLIENT COMPANY NAME CLIENT COMPANY NAME
CONTACT:	NAME - PHONE NUMBER
Q.U.U. AUDITOR:	AUDIT & COMPLIANCE OFFICER QUEENSLAND URBAN UTILITIES
CONTACT:	0734078494

AS CONSTRUCTED DETAILS FOR AMEND. ?

I CERTIFY THAT THE "AS CONSTRUCTED" DETAILS SHOWN ON THIS PLAN ARE TRUE AND ACCURATE RECORD OF THE WORKS

SIGNED DATE:
NAME of SIGNATORY
RPEQ No. or LICENCE
COMPANY NAME
START DATE FINISH DATE

QUEENSLAND Urban Utilities

CONSTRUCTION INSPECTION:
NOTIFICATION OF INSPECTIONS MUST BE RECEIVED BY QUEENSLAND URBAN UTILITIES SERVICE DELIVERY EAST - PROJECT WIS AT LEAST TWO (2) WEEKS PRIOR TO COMMENCEMENT OF CONSTRUCTION
PLEASE CONTACT 0734078494

WATER RETICULATION
LAYOUT PLAN
Scale 1:250

Rev.	Date	Description	Des.	Verif.	Appd.
P2	09/082013	PRELIMINARY ISSUE			
P1	19/07/2013	PRELIMINARY ISSUE			

Verified Date
Approved Date
RPEQ No.

RNA
Lend Lease
BAULDERSTONE

Cardno® Shaping the Future
Cardno (Qld) Pty Ltd | ABN 57 051 074 992
Level 11, 515 St Paul's Terrace
Fortitude Valley, QLD 4006
Locked Bag 4006, Fortitude Valley QLD 4006
Tel: 07 3369 9822 Fax: 07 3369 9722
Email: brisbane@cardno.com.au Web: www.cardno.com.au

Drawn Date
Checked Date
Designed Date
Cardno Ref. No.
A10697-019

Client
RNA & LEND LEASE

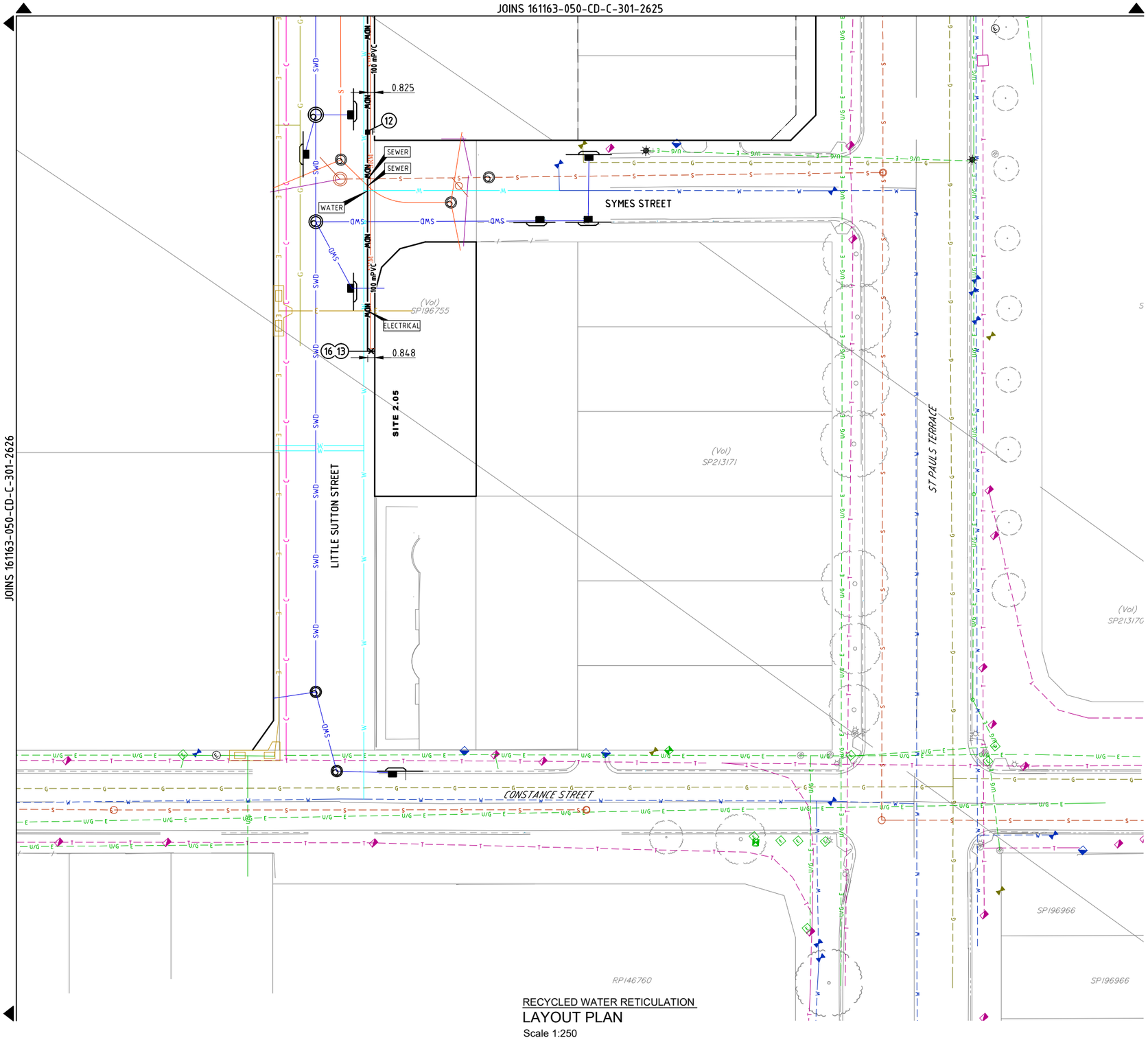
RNA SHOWGROUND REDEVELOPMENT
STAGE 1 AND 2 - CONSTRUCTION
WATER RETICUALTION

LAYOUT PLAN
SHEET 8 OF 8

Status
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Grid	Scale	Size
A.H.D.		AS SHOWN	A1

Drawing Number 161163-050-CD-C-301-2609 Revision P2



RECYCLED WATER RETICULATION
LAYOUT PLAN
Scale 1:250

NORTH

LEGEND

PROPOSED FITTING LABEL	3
PROPOSED FLUSHING POINT	F NDW
PROPOSED ISOLATION VALVE	NDW
PROPOSED CROSSING LABEL	ELECTRICAL
PROPOSED RECYCLED WATER	150 mPVC NDW
PROPOSED UNDERGROUND ELECTRICITY	UG/E
PROPOSED SEWERAGE	S
PROPOSED COMMMUNICATIONS	C
PROPOSED GAS	G
PROPOSED WATER	W
PROPOSED STORMWATER	SWD
PROPOSED KERB AND CHANNEL	
EXISITNG UNDERGROUND ELECTRICITY	U/G E
EXISTING SEWER	S
EXISITNG TELSTRA	T
EXISTING GAS	G
EXISTING WATER	W
EXISTING STORMWATER	SWD

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PH. 3407 8391 EMAIL: PTWOE@URBANUTILITIES.COM.AU

DATE

QUEENSLAND URBAN UTILITIES DELEGATE
(VALID FOR 12 MONTHS FROM DATE SHOWN)

TABLE OF FITTINGS

ITEM	DESCRIPTION
9	150 x 100 D.I. TEE & THRUST BLOCK (10.0kN)
10	150 x 100 REDUCER
11	150 x 150 D.I. TEE & THRUST BLOCK (22.3kN)
12	150 x 100 DIA TEE, FLUSHING POINT & MARKER
13	150 DIA GATE VALVE & MARKER
16	150 DIA × 90° D.I. BEND & THRUST BLOCK (31.5kN)

WARNING!
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0 5 10 15 20 25m
SCALE 1:250

CLIENT: CLIENT COMPANY NAME
CLIENT COMPANY NAME
CONTACT: NAME - PHONE NUMBER
Q.U.U. AUDITOR: AUDIT & COMPLIANCE OFFICER QUEENSLAND URBAN UTILITIES
CONTACT: 0734078494

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SIGNED DATE:
NAME of SIGNATORY
RPEQ No. or LICENCE
COMPANY NAME
START DATE FINISH DATE

QUEENSLAND Urban Utilities

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PLEASE CONTACT 0734078494

Rev.	Date	Description	Des.	Verif.	Appd.
P1	09/082013	PRELIMINARY ISSUE			

Verified Date
Approved Date
RPEQ No.

RNA Lend Lease BAULDERSTONE

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Tel: 07 3369 9822 Fax: 07 3369 9722
Email: brisbane@cardno.com.au Web: www.cardno.com.au

Drawn Date
Checked Date
Designed Date
Cardno Ref. No.
A10697-019

Client
RNA & LEND LEASE

RNA SHOWGROUND REDEVELOPMENT
STAGE 1 AND 2 - CONSTRUCTION
WATER RETICUALTION

RECYCLED WATER LAYOUT PLAN
SHEET 8 OF 8

Status
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Datum	Grid	Scale	Size
A.H.D.		AS SHOWN	A1

Drawing Number
161163-050-CD-C-301-2627
Revision
P1

Appendix E
BCC Floodwise Information

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700040118
11/10/2017 15:34:00

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building.For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.30 RP.9713 *This is a report for this Lot only*

This property has no flood levels or flags for building or development purposes

Brisbane City Council has not assigned flood level information for this property for building or development purposes.

For professional advice or a detailed assessment of a property contact a Registered Professional Engineer of Queensland.

For general information about your flood risk and how to prepare your home or business for potential flooding visit www.brisbane.qld.gov.au/beprepared.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700040118

11/10/2017 15:34:00

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.30 RP.9713 *This is a report for this Lot only*

No Defined Flood Levels (DFL), Residential Flood Level (RFL) or Overland Flow flags for this property

There are no Defined Flood Levels, Residential Flood Level, Overland Flow or other flood related flags associated with this property.

FLOOD PLANNING DEVELOPMENT INFORMATION

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

FLOOD OVERLAY CODE

There are currently no River, Creek/Waterway, or Overland Flow Flood Planning Areas that apply to this property.

COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700040118

11/10/2017 15:34:00

Useful Definitions

Australian Height Datum (AHD) - The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Annual Exceedance Probability (AEP) – The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

Defined Flood Level (DFL) - The DFL for Brisbane River flooding is a level of 3.7m AHD at the Brisbane City Gauge based on a flow of 6,800 m^3/s.

Maximum and Minimum Ground Level – Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum Habitable Floor Level – The minimum level in metres AHD at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

Council's Planning Scheme - The City Plan (planning scheme) has been prepared in accordance with the Sustainable Planning Act as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Council's intention for future development in the planning scheme area, over the next 20 years.

Residential Flood Level (RFL) – Residential flood level (RFL) for Brisbane River flooding equates to the flood level applicable to the extent of January 2011 floods as depicted by mapping on the Queensland Reconstruction Authority website or the Council's defined flood level (DFL) for the Brisbane River, whichever is higher.

Rateable Address - A Lot or Property may have more than one street address. The address shown on this report is the address used by Council for the Lot or property selected.

Property - A property will contain 1 or more lots. The *Multiple Lot Warning* is shown if you have selected a property that contains multiple lots.

2017 Brisbane River Catchment Flood Study (BRCFS) – The BRCFS is a project led by the Queensland Government. The flood study was released in 2017. The 1% AEP flood levels from the flood study is yet to be adopted for application in planning schemes and is for information only. Other % AEPs will be updated with new information from the flood study as part of any relevant changes to City Plan 2014 as soon as is practicable.

Brisbane City Council's Online Flood Tools

Council provides a number of online flood tools:

- to guide planning and development
- to help residents and businesses understand their flood risk and prepare for flooding.

Planning and Development Online Flood Tools

Council's online flood tools for planning and development purposes include:

- FloodWise Property Report
- Flood Overlay Code

For more information on Council's planning scheme and online flood tools for planning and development:

- phone 07 3403 8888 to talk to a Development Assessment Customer Liaison Officer
- visit www.brisbane.qld.gov.au/planning-building
- visit a Regional Business Centre.

Helping residents and businesses be prepared for flooding

Council has a range of free tools and information to help residents and businesses understand potential flood risks and how to be prepared. This includes:

- Flood Awareness Maps
- Flooding in Brisbane – A Guide for Residents
- Flooding in Brisbane – A Guide for Business
- Early Warning Alert Service. Visit www.brisbane.qld.gov.au/earlywarning to register for email, home phone or SMS severe weather alert updates.

Note: The Flood Awareness Maps show four levels of flood likelihood from high likelihood (flooding is very likely to occur) through to very low likelihood (very rare and extreme flood events).

For more information on Council's online flood tools for residents and business:

- Visit www.brisbane.qld.gov.au/beprepared
- Phone (07) 3403 8888.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700040118

11/10/2017 15:34:00

Disclaimer

1. Defined Flood Levels and Residential Flood Levels, and the Minimum Habitable Floor Levels are determined from the best available information to Council at the date of issue. These flood levels, for a particular property, may change if more detailed information becomes available or changes are made in the method of calculating flood levels.
2. Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property report. Council disclaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.

Planning to build or renovate?

For information, guidelines, tools and resources to help you track, plan or apply for your development visit **www.brisbane.qld.gov.au/planning-building**

You can also find the Brisbane City Plan 2014 and Neighbourhood Plans as well as other information and training videos to help with your building and development plans.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700116589
11/10/2017 15:35:16

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building.For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.31 SP.196762 *This is a report for this Lot only*

This property has no flood levels or flags for building or development purposes

Brisbane City Council has not assigned flood level information for this property for building or development purposes.

For professional advice or a detailed assessment of a property contact a Registered Professional Engineer of Queensland.

For general information about your flood risk and how to prepare your home or business for potential flooding visit www.brisbane.qld.gov.au/beprepared.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700116589

11/10/2017 15:35:16

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.31 SP.196762 *This is a report for this Lot only*

No Defined Flood Levels (DFL), Residential Flood Level (RFL) or Overland Flow flags for this property

There are no Defined Flood Levels, Residential Flood Level, Overland Flow or other flood related flags associated with this property.

FLOOD PLANNING DEVELOPMENT INFORMATION

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

FLOOD OVERLAY CODE

There are currently no River, Creek/Waterway, or Overland Flow Flood Planning Areas that apply to this property.

COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700116589

11/10/2017 15:35:16

Useful Definitions

Australian Height Datum (AHD) - The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Annual Exceedance Probability (AEP) – The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

Defined Flood Level (DFL) - The DFL for Brisbane River flooding is a level of 3.7m AHD at the Brisbane City Gauge based on a flow of 6,800 m^3/s.

Maximum and Minimum Ground Level – Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum Habitable Floor Level – The minimum level in metres AHD at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

Council's Planning Scheme - The City Plan (planning scheme) has been prepared in accordance with the Sustainable Planning Act as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Council's intention for future development in the planning scheme area, over the next 20 years.

Residential Flood Level (RFL) – Residential flood level (RFL) for Brisbane River flooding equates to the flood level applicable to the extent of January 2011 floods as depicted by mapping on the Queensland Reconstruction Authority website or the Council's defined flood level (DFL) for the Brisbane River, whichever is higher.

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Brisbane City Council's Online Flood Tools

Council provides a number of online flood tools:

- to guide planning and development
- to help residents and businesses understand their flood risk and prepare for flooding.

Planning and Development Online Flood Tools

Council's online flood tools for planning and development purposes include:

- FloodWise Property Report
- Flood Overlay Code

For more information on Council's planning scheme and online flood tools for planning and development:

- phone 07 3403 8888 to talk to a Development Assessment Customer Liaison Officer
- visit www.brisbane.qld.gov.au/planning-building
- visit a Regional Business Centre.

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700116589

11/10/2017 15:35:16

Disclaimer

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700220172
11/10/2017 15:37:00

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building.For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.32 SP.196761 *This is a report for this Lot only*

This property has no flood levels or flags for building or development purposes

Brisbane City Council has not assigned flood level information for this property for building or development purposes.

For professional advice or a detailed assessment of a property contact a Registered Professional Engineer of Queensland.

For general information about your flood risk and how to prepare your home or business for potential flooding visit www.brisbane.qld.gov.au/beprepared.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700220172

11/10/2017 15:37:00

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.32 SP.196761 *This is a report for this Lot only*

No Defined Flood Levels (DFL), Residential Flood Level (RFL) or Overland Flow flags for this property

There are no Defined Flood Levels, Residential Flood Level, Overland Flow or other flood related flags associated with this property.

FLOOD PLANNING DEVELOPMENT INFORMATION

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

FLOOD OVERLAY CODE

There are currently no River, Creek/Waterway, or Overland Flow Flood Planning Areas that apply to this property.

COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700220172

11/10/2017 15:37:00

Useful Definitions

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700220172

11/10/2017 15:37:00

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700270216
11/10/2017 15:37:50

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

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THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.33 SP.196760 *This is a report for this Lot only*

This property has no flood levels or flags for building or development purposes

Brisbane City Council has not assigned flood level information for this property for building or development purposes.

For professional advice or a detailed assessment of a property contact a Registered Professional Engineer of Queensland.

For general information about your flood risk and how to prepare your home or business for potential flooding visit www.brisbane.qld.gov.au/beprepared.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700270216

11/10/2017 15:37:50

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.33 SP.196760 *This is a report for this Lot only*

No Defined Flood Levels (DFL), Residential Flood Level (RFL) or Overland Flow flags for this property

There are no Defined Flood Levels, Residential Flood Level, Overland Flow or other flood related flags associated with this property.

FLOOD PLANNING DEVELOPMENT INFORMATION

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

FLOOD OVERLAY CODE

There are currently no River, Creek/Waterway, or Overland Flow Flood Planning Areas that apply to this property.

COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700270216

11/10/2017 15:37:50

Useful Definitions

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Planning and Development Online Flood Tools

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- Flood Overlay Code

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700270216

11/10/2017 15:37:50

Disclaimer

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700326871
11/10/2017 15:38:46

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

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THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.34 SP.196759 *This is a report for this Lot only*

This property has no flood levels or flags for building or development purposes

Brisbane City Council has not assigned flood level information for this property for building or development purposes.

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For general information about your flood risk and how to prepare your home or business for potential flooding visit www.brisbane.qld.gov.au/beprepared.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700326871

11/10/2017 15:38:46

TECHNICAL SUMMARY

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Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.34 SP.196759 *This is a report for this Lot only*

No Defined Flood Levels (DFL), Residential Flood Level (RFL) or Overland Flow flags for this property

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FLOOD PLANNING DEVELOPMENT INFORMATION

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FLOOD OVERLAY CODE

There are currently no River, Creek/Waterway, or Overland Flow Flood Planning Areas that apply to this property.

COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700326871

11/10/2017 15:38:46

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700389749
11/10/2017 15:39:49

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THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.35 SP.196758 *This is a report for this Lot only*

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700389749

11/10/2017 15:39:49

TECHNICAL SUMMARY

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Lot Details: L.35 SP.196758 *This is a report for this Lot only*

No Defined Flood Levels (DFL), Residential Flood Level (RFL) or Overland Flow flags for this property

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COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700389749

11/10/2017 15:39:49

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- Flood Overlay Code

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700389749

11/10/2017 15:39:49

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Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700464377
11/10/2017 15:41:04

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

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THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.36 SP.196757 *This is a report for this Lot only*

This property has no flood levels or flags for building or development purposes

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Dedicated to a better Brisbane

Report Reference
1507700464377

11/10/2017 15:41:04

TECHNICAL SUMMARY

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Lot Details: L.36 SP.196757 *This is a report for this Lot only*

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There are no Defined Flood Levels, Residential Flood Level, Overland Flow or other flood related flags associated with this property.

FLOOD PLANNING DEVELOPMENT INFORMATION

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FLOOD OVERLAY CODE

There are currently no River, Creek/Waterway, or Overland Flow Flood Planning Areas that apply to this property.

COASTAL HAZARD OVERLAY CODE

There are currently no Coastal Hazard Overlays that apply to this property.

Brisbane City Council

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Dedicated to a better Brisbane

Report Reference
1507700464377

11/10/2017 15:41:04

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FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1507700493839
11/10/2017 15:41:33

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

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THIS IS A REPORT FOR:

Rateable Address: 470 ST PAULS TCE, FORTITUDE VALLEY QLD 4006

Lot Details: L.37 SP.196756 *This is a report for this Lot only*

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Report Reference
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11/10/2017 15:41:33

TECHNICAL SUMMARY

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11/10/2017 15:41:33

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FloodWise Property Report

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Report Reference
1507700559888
11/10/2017 15:42:39

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Lot Details: L.38 SP.192468 *This is a report for this Lot only*

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Report Reference
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11/10/2017 15:42:39

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Appendix F
Erosion Hazard Assessment

BRISBANE CITY COUNCIL ABN 72 002 765 795

Erosion Hazard Assessment - June 2014

Brisbane City Council (BCC), *Erosion Hazard Assessment* form must be read in conjunction with the *Erosion Hazard Assessment- Supporting Technical Notes* (June 2014 or later version) for explanatory terms and Certification information.

What is an Erosion Hazard Assessment?
Soil erosion and sediment from urban development, particularly during construction activities, is a significant source of sediment pollution in Brisbane's waterways. The Erosion Hazard Assessment determines whether the risk of soil erosion and sediment pollution to the environment is 'low' , 'medium' or 'high'.

When is the EHA required?
An *Erosion Hazard Assessment* form must be completed and lodged with BCC for any Development Application (ie MCU or ROL) that will result in soil disturbance OR Operational Works or Compliance Assessment Application for 'Filling' or Excavation.

Failure to submit this form during lodgement of an application may result in assessment delays or refusal of the application.

Privacy Statement
The personal information collected on this form will be used by Brisbane City Council for the purposes of fulfilling your request and undertaking associated Council functions and services. Your personal information will not be disclosed to any third party without your consent, unless this is required or permitted by law.

Assessment Details

1 Please turn over and complete the erosion hazard assessment.

2 Based on the erosion hazard assessment overleaf, is the site:

☐ ***A 'low' risk site***

Best practice erosion and sediment control (ESC) must be implemented but no erosion and sediment control plans need to be submitted with the development application. Factsheets outlining best practice ESC can be found at http://www.waterbydesign.com.au/factsheets

☑ ***A 'medium' risk site***

If the development is approved, the applicant will need to engage a Registered Professional Engineer (RPEQ) or Certified Professional in Erosion and Sediment Control (CPESC) to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy.

☐ ***A 'high' risk site***

If the development is approved, the applicant will need to engage a RPEQ and CPESC to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy. The plans and program will need to be certified by a CPESC.

3 Site Information and Certification

Application number (if known)

Site address

470 St Pauls Terrace,
Fortitude Valley
Postcode 4006

I certify that:

☐ I have made all relevant enquiries and am satisfied no matters of significance have been withheld from the assessment manager.

☐ I am a person with suitable qualifications and/or experience in erosion and sediment control.

☐ The Erosion Hazard Assessment was completed in accordance with the Erosion Hazard Assessment Supporting Technical Notes and the BCC Infrastructure Design Planning Scheme Policy.

☐ The Erosion Hazard Assessment accurately reflects the site's overall risk of soil erosion and sediment pollution to the environment.

☐ I acknowledge and accept that the BCC, as assessment manager, relies, in good faith, on this certification as part of its development assessment process and the provision of false or misleading information to the BCC constitutes an offence for which BCC may take punitive steps/ action against me/ enforcement action against me.

Certified by *Print name*

ROBERT ATHERTON

Certifier's signature

R Atherton

Date

12/10/2017

Assessment Table

Table 1: Low Risk Test

		Yes	*No*
1.1	is the area of land disturbance > 1000 m^2	☑	☐
1.2	does any land disturbance occur in a BCC mapped waterway corridor	☐	☑
1.3	is there any slope on site (longer than three metres in length) before, during or after construction that is steeper than 5%	☑	☐
1.4	does any land disturbance occur below 5 m AHD	☑	☐
1.5	does development involve endorsement of a staging plan	☐	☑
1.6	is there an upstream catchment passing through the site > 1 hectare	☐	☑

Have you answered 'yes' to any of the questions in Table 1?	*Yes*	*No*	**If '*No*' then site is low risk with respect to erosion and sediment control**
	☑	☐	

If '*Yes*' then proceed to Table 2

Table 2: Medium Risk Test

		Yes	*No*	**If '*No*' then site is medium risk with respect to erosion and sediment control**
2.1	is the area of land disturbance > 1 hectare	☐	☑	

If '*Yes*' then proceed to Table 3

Table 3: High Risk Test

3.1	is there an upstream catchment passing through the site > 1 hectare	☐	☐
3.2	does any land disturbance occurs in a BCC mapped waterway corridor	☐	☐
3.3	is there any slope on site (longer than three metres in length) before, during or after construction that is steeper than 15%	☐	☐

Have you answered 'yes' to any of the questions in Table 3?	*Yes*	*No*	**If '*No*' then site is medium risk with respect to erosion and sediment control**
	☐	☐	

Appendix G
BCC's Codes

FILLING AND EXCAVATING CODE
BRISBANE CITY COUNCIL 2014

Performance outcomes		Acceptable outcomes		Performance outcome
PO1	Development for filling or excavation minimises visual impacts from retaining walls and earthworks.	**AO1**	Development ensures that the total height of any cut and fill, whether or not retained, does not exceed: (a) 2.5m in a zone in the Industry zones category; (b) 1m in all other zones, or if adjoining a sensitive zone.	Acceptable solution provided: The proposed development will have more than 1m of cut. The excavation is to create a basement that will not have any visual impacts. The design of basement retaining walls will be lodged with the building application.
PO2	Development of a retaining wall proposed as a result of filling or excavation: (a) is designed and constructed to be fit for purpose; (b) does not impact adversely on significant vegetation; (c) is capable of easy maintenance. Editor's note—A retaining wall also needs to comply with the Building Regulation and embankment gradients will need to comply with the Building Regulation. Note—Guidance on the protection of native vegetation is included in the Biodiversity areas planning scheme policy.	**AO2.1**	Development of a retaining structure, including footings, surface drainage and subsoil drainage: (a) is wholly contained within the site; (b) if the total height to be retained is greater than 1m, then: (i) the retaining wall at the property boundary is no greater than 1m above the ground level; (ii) all further terracing from the 1m high boundary retaining wall is 1 vertical unit:1 horizontal unit; (iii) the distance between each successive retaining wall (back of lower wall to face of higher wall) is no less than 1m horizontally to incorporate planting areas.	Complies with AO2.1: Any retaining walls will be designed and constructed in accordance with Council requirements and the code. The design of basement retaining walls will be lodged with the building application.
		AO2.2	Development of a retaining wall over 1m in height protects significant vegetation on the site and on adjoining land and is designed and constructed in accordance with the structures standards in the Infrastructure design planning scheme policy and certified by a Registered Professional Engineer Queensland.	Complies with AO2.2: Retaining wall structures will be certified structural engineers.
		AO2.3	Development provides a retaining wall finish that presents	Complies with AO2.3: Refer

Performance outcomes		Acceptable outcomes		Performance outcome
			to adjoining land that is maintenance free if the setback is less than 750mm from the boundary.	AO2.1 The design of basement retaining walls will be lodged with the building application.
		AO2.4	Development for filling only uses clean fill that does not include any construction rubble or debris.	AO2.4 can be complied with.
PO3	Development ensures that a rock anchor is designed and constructed to be fit for purpose.	**AO3**	Development ensures that a rock anchor: (a) is constructed in accordance with the standards in the Infrastructure design planning scheme policy; (b) where it extends beyond the property boundary, is supported by a letter of consent from the adjoining land and building owners.	Complies with AO3: If any rock anchors are proposed, they will be designed and constructed in accordance with Council requirements and the code. The design of any rock anchors will be lodged with the operational works application.
PO4	Development protects all services and public utilities.	**AO4**	Development protects services and public utilities and ensures that any alteration or relocation of services or public utilities meets the standard design specifications of the responsible service authorities.	Complies with AO4: Should any relocation works associated with proposed services and/or public utilities be required, the works will be done in accordance with the relevant BCC standard specifications and the requirements of the responsible service authorities.
PO5	Development provides surface and sub-surface drainage to prevent water seepage, concentration of run-off or ponding of stormwater on adjacent land.	**AO5**	Development ensures all flows and subsoil drainage are directed to a lawful point of discharge of a surface water diversion drain, including to the top or toe of a retaining wall in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy	Complies with AO5: Refer to Site Services Report and SBSMP. The proposed development will have building extended to the site boundary, therefore the drainage will be designed by hydraulic

Performance outcomes		Acceptable outcomes		Performance outcome
				consultants and further details will be lodged with the building approval application.
PO6	Development ensures that the design and construction of all open drainage works is undertaken in accordance with natural channel design principles, being the development of a stormwater conveyance system for major flows, by using a vegetated open channel or drain that approximates the features and functions of a natural waterway to enhance or improve riparian values of those stormwater conveyance systems. Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines.	**AO6**	No acceptable outcome is prescribed.	Complies with AO6: Not applicable to this project.
PO7	Development for filling or excavation: (a) does not degrade water quality or adversely affect environmental values in receiving waters; (b) ensures site sediment and erosion control standards are best practice.	**AO7.1**	Development for filling or excavation provides water quality treatment that complies with the stormwater drainage section of the Infrastructure design planning scheme policy.	Complies with AO7.1: An erosion and sediment control program and sketch have been prepared as part of the Site Services Report and SBSMP, which comply with the Infrastructure design planning scheme policy. Further details will be lodged with the operational works submission.

Performance outcomes		Acceptable outcomes		Performance outcome
		AO7.2	Development provides erosion and sediment control standards that are in accordance with the stormwater drainage section of the Infrastructure design planning scheme policy.	Complies with AO7.2: Refer AO7.1. Further details will be lodged with the operational works submission.
PO8	Development for filling or excavation is conducted such that adverse impacts at a sensitive use due to noise and dust are prevented or minimised. Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome.	**AO8.1**	Development ensures that no dust emissions extend beyond the boundary of the site, including dust from construction vehicles entering and leaving the site.	Complies with AO8.1: A noise and dust impact management plan will be prepared as part of the construction management plan to be lodged by contractor prior to the commencement of works.
		AO8.2	Development for filling or excavation activity only occurs between the hours of 6:30am and 6:30pm Monday to Saturday, excluding public holidays.	Complies with AO8.2.
PO9	Development ensures that vibration generated by the filling or excavation operation does not exceed the vibration criteria in Table 9.4.3.3.D, Table 9.4.3.3.E, Table 9.4.3.3.F and Table 9.4.3.3.G. Note—A noise management report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	**AO9**	Development involving filling or excavation does not cause a ground-borne vibration beyond the boundary of the site.	AO9 can be complied: A noise and vibration management report will be provided as part of the construction management plan to be lodged by the contractor prior to the commencement of works.
PO10	Development ensures that heavy trucks hauling material to and from the site do not affect the amenity of established areas and limits environmental nuisance impact on adjacent land.	**AO10**	Development ensures that heavy trucks hauling material to and from the site: (a) occur for a maximum of 3 weeks; (b) use a major road to access the site; (c) only use a minor road for the shortest-most-direct route that has the least amount of environmental nuisance if there is no major road alternative.	Acceptable solution provided: Excavation works are likely to take more than 3 weeks to complete. A construction management plan will be developed and lodged by the contractor prior to the

Performance outcomes		Acceptable outcomes		Performance outcome
				commencement of works.
PO11	Development for filling or excavation protects the environment and community health and wellbeing from exposure to contaminated land and contaminated material.	**AO11**	Development does not involve: (a) excavation on land previously occupied by a notifiable activity or on land listed on the Environmental Management Register or the Contaminated Land Register; (b) filling with material containing a contaminant.	Complies with AO11: The site is not included in the Contaminated Land Registers. If fill is to be used, it will be specified and will be in accordance with BCC development guidelines.
PO12	Development provides for: (a) landscaping for water conservation purposes; (b) water sensitive urban design measures which are employed within the landscape design to maximise stormwater use and to reduce any adverse impacts on the landscape; (c) stormwater harvesting to be maximised and any adverse impacts of stormwater minimised.	**AO12.1**	Development provides landscaping which is designed using the standards in the Landscape design guidelines for water conservation planning scheme policy.	Acceptable solution provided: Landscaping is to be designed in accordance with the landscape design guidelines for water conservation planning scheme policy where applicable. Refer to landscape architect's documentation for details.
		AO12.2	Development ensures that the design and requirements for irrigation are in compliance with the standards in the Landscape design guidelines for water conservation planning scheme policy.	Acceptable solution provided: Design and requirements for irrigation will be done in accordance with the landscape design guidelines for water conservation planning scheme policy. Refer to landscape architect's documentation for details.
		AO12.3	Development provides areas of pavement, turf and mulched garden beds which are drained. Note—This may be achieved through the provision and/or treatment of swales, spoon drains, field gullies, sub-surface drainage and stormwater connections.	Complies with AO12.3: Further details will be lodged with the building works submission by relevant consultants.

INFRASTRUCTURE CODE
BRISBANE CITY COUNCIL 2014

Performance outcomes		Acceptable outcomes		Performance outcome
PO1	Development provides roads, pavement, edging and landscaping which: (a) are designed and constructed in accordance with the road hierarchy; (b) provide for safe travel for pedestrians, cyclists and vehicles; (c) provide access to properties for all modes; (d) provide utilities; (e) provide high levels of aesthetics and amenity, improved liveability and future growth; (f) provide for the amelioration of noise and other pollution; (g) provide a high-quality streetscape; (h) provide a low-maintenance asset with a minimal whole-of-life cost. Note—This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.	**AO1**	Development provides roads and associated pavement, edging and landscaping which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy.	Complies with AO1: Development will provide pedestrian walking areas that comply with the infrastructure design planning scheme policy. Should any existing infrastructure require replacement, these details will be lodged with the operational works submission.
PO2	Development provides road pavement surfaces which: (a) are well designed and constructed; (b) durable enough to carry the wheel loads of the intended types and numbers of travelling and parked vehicles; (c) ensures the safe passage of vehicles, pedestrians and cyclists, the discharge of stormwater run-off and the preservation of all-weather access; (d) allows for reasonable travel comfort.	**AO2**	Development provides road pavement surfaces which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy.	Complies with AO2: The proposed development fronts existing St Pauls Terrace, Constance Street, Brewers Street and Symes Street. Vehicle access to the site will be via the proposed driveways off Symes St. Should any existing infrastructure require replacement, these details will be

Performance outcomes		Acceptable outcomes		Performance outcome
				lodged with the operational works submission.
PO3	Development provides a pavement edge which is designed and constructed to: (a) control vehicle movements by delineating the carriageway for all users; (b) provide for people with disabilities by allowing safe passage of wheelchairs and other mobility aids.	**AO3**	Development provides pavement edges which are designed and constructed in compliance with the road corridor design standards in the Infrastructure design planning scheme policy.	Complies with AO3: The proposed development is adjacent to existing St Pauls Terrace, Constance Street, Brewers Street and Symes Street. Should any existing infrastructure require replacement, these details will be lodged with the operational works submission.
PO4	Development provides verges which are designed and constructed to: (a) provide safe access for pedestrians clear of obstructions and access areas for vehicles onto properties; (b) provide a sufficient area for public utility services; (c) be maintainable by the Council.	**AO4**	Development provides verges which are designed and constructed in compliance with the road corridor design and streetscape locality advice standards in the Infrastructure design planning scheme policy.	Complies with AO4: The proposed development is adjacent to existing verges on St Pauls Terrace, Constance Street, Brewers Street and Symes Street. The existing verges will be assessed for conformance with the Infrastructure design planning scheme policy. Should any existing infrastructure require replacement, these details will be lodged with the operational works submission.
PO5	Development provides a lane or laneway identified in a neighbourhood plan which: (a) allows equitable access for all modes; (b) is safe and secure;	**AO5**	Development provides a lane or laneway identified in a neighbourhood plan which is embellished in compliance with the streetscape locality advice standards in the Infrastructure design planning scheme policy.	Complies with AO5: Not applicable to this development.

Performance outcomes		Acceptable outcomes		Performance outcome
	(c) has 24-hour access; (d) is a low-speed shared zone environment; (e) has a high-quality streetscape.			
PO6	Development of an existing premises provides at the frontage to the site, if not already provided, the following infrastructure to an appropriate urban standard: (a) an effective, high-quality paved roadway; (b) an effective, high-quality roadway kerb and channel; (c) safe, high-quality vehicle crossings over channels and verges; (d) safe, accessible, high-quality verges compatible and integrated with the surrounding environment; (e) safe vehicle access to the site that enables ingress and egress in a forward gear; (f) provision of and required alterations to public utilities; (g) effective drainage; (h) appropriate conduits to facilitate the provision of required street-lighting systems and traffic signals.	**AO6**	Development of an existing premises provides at the frontage of the site, if not already existing, the following infrastructure to the standard that would have applied if the development involved new premises as stated in the road corridor design standards in the Infrastructure design planning scheme policy: (a) concrete kerb and channel; (b) forming and grading to verges; (c) crossings over channels and verges; (d) a constructed bikeway; (e) a constructed verge or reconstruction of any damaged verge; (f) construction of the carriageway; (g) payment of costs for required alterations to public utility mains, services or installations; (h) construction of and required alterations to public utility mains, services or installations; (i) drainage works; (j) installation of electrical conduits.	Complies with AO6: The existing site fronts St Pauls Terrace, Constance Street, Brewers Street and Symes Street, which has existing footpath, concrete kerb and channel. Vehicle access to the site will be obtained via the proposed driveways from Symes Street. Temporary access to the site during the construction period will be detailed in the construction management plan, to be submitted by the contractor prior to commencement of works. Should any existing infrastructure require replacement, these details will be lodged with the operational works submission. Any infrastructure damaged as a result of the proposed development will be reinstated at no cost to Council.

Performance outcomes		Acceptable outcomes		Performance outcome
PO7	Development provides both cycle and walking routes which: (a) are located, designed and constructed to their network classification (where applicable); (b) provide safe and attractive travel routes for pedestrians and cyclists for commuter and recreational purposes; (c) provide safe and comfortable access to properties for pedestrians and cyclists; (d) incorporate water sensitive urban design into stormwater drainage; (e) provide for utilities; (f) provide for a high level of aesthetics and amenity, improved liveability and future growth; (g) are a low-maintenance asset with a minimal whole-of-life cost; (h) minimise the clearing of significant native vegetation. Note—This can be demonstrated in an engineering report prepared and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.	**AO7**	Development provides cycle and walking routes which are located, designed and constructed in compliance with the road corridor design and off-road pathway design standards in the Infrastructure design planning scheme policy.	Complies with AO7. Walking and cycle routes are provided along existing St Pauls Terrace, Constance Street, Brewers Street and Symes Street.
PO8	Development provides refuse and recycling collection, separation and storage facilities that are located and managed so that adverse impacts on building occupants, neighbouring properties and the public realm are minimised.	**AO8.1**	Development provides refuse and recycling collection and storage facilities in accordance with the Refuse planning scheme policy.	Refer to the Traffic and Transport Report.
		AO8.2	Development ensures that refuse and recycling collection and storage location and design do not have any adverse impact including odour, noise or visual impacts on the amenity of land uses within or adjoining the development.	Refer to the Traffic and Transport Report.

Performance outcomes		Acceptable outcomes		Performance outcome
			Note—Refer to the Refuse planning scheme policy for further guidance.	
PO9	Development ensures that: (a) land used for an urban purpose is serviced adequately with regard to water supply and waste disposal; (b) the water supply meets the stated standard of service for the intended use and fire-fighting purposes.	**AO9.1**	Development ensures that the reticulated water and sewerage distribution system for all services is in place before the first use is commenced.	Complies with AO9.1: The site is serviced by existing water and sewer network.
		AO9.2	Development provides the lot with reticulated water supply and sewerage to a standard acceptable to the distributor–retailer.	Complies with AO9.2: The capacity of the existing sewer and water reticulation is to be assessed by QUU.
PO10	Development provides public utilities and street lighting which are the best current or alternative technology and facilitate accessibility, easy maintenance, minimal whole-of-life costs, and minimal adverse environmental impacts.	**AO10.1**	Development provides public utilities and street lighting which are located and aligned to: (a) avoid significant native vegetation and areas identified within the Biodiversity areas overlay map; (b) minimise earthworks; (c) avoid crossing waterways, waterway corridors and wetlands or if a crossing is unavoidable, tunnel-boring techniques are used to minimise disturbance, and a disturbed area is reinstated and restored on completion of the work. Note—Guidance on the restoration of habitat is included in the Biodiversity areas planning scheme policy.	Refer to RBG Site Services Report dated 13/10/2017.
		AO10.2	Development provides compatible public utility services and street-lighting services which are co-located in common trenching for underground services.	Refer to RBG Site Services Report dated 13/10/17.

Performance outcomes		Acceptable outcomes		Performance outcome
		AO10.3	Development provides public utilities and street lighting which are designed and constructed in compliance with the public utilities standards in the Infrastructure design planning scheme policy.	Refer to RBG Site Services Report dated 13/10/17.
PO11	Development ensures that land used for urban purposes is serviced adequately with telecommunications and energy supply.	**AO11**	Development provides land with the following services to the standards of the approved supplier: (a) electricity; (b) telecommunications services; (c) gas service where practicable.	Services to the site will be provided by the relevant services authorities.
PO12	Development ensures that major public projects promote the provision of affordable, high-bandwidth telecommunications services throughout the city.	**AO12**	Development provides conduits which are provided in all major Council and government works projects to enable the future provision of fibre optic cabling, if: (a) the additional expense is unlikely to be prohibitive; or (b) further major work is unlikely or disruption would be a major concern, such as where there is a limited capacity road; or (c) there is a clear gap in the telecommunications network; or (d) there is a clear gap in the bandwidth available to the area. Editor's note—An accurate, digital 'as built' three-dimensional location plan is to be supplied for all infrastructure provided in a road.	Refer to the relevant services providers and/or authorities.
PO13	Development provides public art identified in a neighbourhood plan or park concept plan which: (a) is provided commensurate with the status and scale of the proposed development;	**AO13**	Development provides public art identified in a neighbourhood plan or park concept plan which is sited and designed in compliance with the public art standards in the Infrastructure design planning scheme policy.	Complies with AO13: Not applicable to this development.

Performance outcomes		Acceptable outcomes		Performance outcome
	(b) is sited and designed: (i) as an integrated part of the project design; (ii) as conceptually relevant to the context of the location; (iii) to reflect and respond to the cultural values of the community; (iv) to promote local character in a planned and informed manner.			
PO14	Development provides signage of buildings and spaces which promote legibility to help users find their way.	**AO14**	Development provides public signage: (a) at public transport interchanges and stops, key destinations, public spaces, pedestrian linkages and at entries to centre developments; (b) which details the location of the key destinations, public spaces and pedestrian linkages in the vicinity, the services available within the development and where they are located. Editor's note—Signage is to be in accordance with Local Law Number 1 (Control of Advertisements Local Law).	Complies with AO15: Not applicable to this development.
PO15	Development that provides community facilities which form part of the development is functional, safe, low maintenance, and fit for purpose.	**AO15**	Development that provides community facilities which form part of the development is designed in compliance with the community facilities standards in the Infrastructure design planning scheme policy.	Complies with AO15: Not applicable to this development.
PO16	Development provides public toilets which: (a) are required as part of a community facility or park; (b) are located, designed and constructed to be: (i) safe;	**AO16**	Development that provides public toilets is designed and constructed in compliance with the public toilets standards in the Infrastructure design planning scheme policy.	Complies with AO16: Not applicable to this development.

Performance outcomes		Acceptable outcomes		Performance outcome
	(ii) durable; (iii) resistant to vandalism; (iv) able to service expected demand; (v) fit for purpose.			
PO17	Development provides bridges, tunnels, elevated structures and water access structures that are designed and constructed using proven methods, materials and technology to provide for: (a) safe movement of intended users; (b) an attractive appearance appropriate to the general surroundings and any adjacent structures; (c) functionality and easy maintenance; (d) minimal whole-of-life cost; (e) longevity; (f) current and future services. Note—All bridges and elevated and associated elements must be designed and certified by a Registered Professional Engineer Queensland in accordance with the Infrastructure design planning scheme policy.	**AO17**	Development that provides bridges, tunnels, elevated structures and water access structures is designed and constructed in compliance with the standards in the Infrastructure design planning scheme policy.	Complies with AO17: Not applicable to this development.
PO18	Development provides culverts which are designed and constructed using proven methods, materials and technology to provide for: (a) safety; (b) an attractive appearance appropriate to the general surroundings; (c) functionality and easy maintenance;	**AO18**	Development that provides culverts is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy.	Complies with AO18: Not applicable to this development.

Performance outcomes		Acceptable outcomes		Performance outcome
	(d) minimal whole-of-life cost; (e) longevity; (f) future widening; (g) current and future services; (h) minimal adverse impacts, such as increase in water levels or flow velocities, and significant change of flood patterns. Note—All culverts and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards.			
PO19	Development provides batters, retaining walls, and seawalls and river walls which are designed and constructed using proven methods, materials and technology to provide for: (a) safety; (b) an attractive appearance appropriate to the surrounding area; (c) easy maintenance; (d) minimal whole-of-life cost; (e) longevity; (f) minimal water seepage. Note—All retaining walls and associated elements are to be designed and certified by a Registered Professional Engineer Queensland in accordance with the applicable design standards.	**AO19**	Development that provides batters, retaining walls, seawalls and river walls is designed and constructed in compliance with the structures standards in the Infrastructure design planning scheme policy.	Complies with AO19: The design of basement and retaining walls will be lodged with the building application.
If for development with a gross floor area greater than 1,000m^2				

Performance outcomes		Acceptable outcomes		Performance outcome
PO20	Development ensures that construction is managed so that use of public spaces and movement on pedestrian, cyclist and other traffic routes is not unreasonably disrupted and existing landscaping is adequately protected from short- and long-term impacts. Note—The preparation of a construction management plan can assist in demonstrating achievement of this performance outcome. Note—The Transport, access, parking and servicing planning scheme policy provides advice on the management of vehicle parking and deliveries during construction.	**AO20**	Development ensures that during construction: (a) the ongoing use of adjoining and surrounding parks and public spaces, such as malls and outdoor dining, is not compromised; (b) adjoining and surrounding landscaping is protected from damage; (c) safe, legible, efficient and sufficient pedestrian, cyclist and vehicular accessibility and connectivity to the wider network are maintained.	Complies with AO20: Details will be provided in the construction management plan to be submitted by contractor, prior to commencement of works.
PO21	Development ensures that construction and demolition activities are guided by measures that prevent or minimise adverse impacts including sleep disturbance at a sensitive use, due to noise and dust, including dust from construction vehicles entering and leaving the site. Note—A noise and dust impact management plan prepared in accordance with the Management plans planning scheme policy can assist in demonstrating achievement of this performance outcome.	**AO21.1**	Development ensures that demolition and construction: (a) only occur between 6:30am and 6:30pm Monday to Saturday, excluding public holidays; (b) do not occur over periods greater than 6 months.	AO21.1 can be complied. A construction management plan will be developed and submitted by the contractor, prior to commencement of works.
		AO21.2	Development including construction and demolition does not release dust emissions beyond the boundary of the site.	Complies with AO21.2: A soil erosion and sedimentation control plan will be developed and lodged with the Operational Works submission. Additional dust suppression measures will be detailed in the

Performance outcomes		Acceptable outcomes		Performance outcome
				construction management plan, to be submitted by the contractor prior to commencement of works.
		AO21.3	Development construction and demolition does not involve asbestos-containing materials.	Complies with AO21.3: If asbestos is found during demolition, the removal of asbestos will be carried out by licensed and trained personnel.
PO22	Development ensures that: (a) construction and demolition do not result in damage to surrounding property as a result of vibration; (b) vibration levels achieve the vibration criteria in Table 9.4.4.3.B, Table 9.4.4.3.C, Table 9.4.4.3.D and Table 9.4.4.3.E. Note—A vibration impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome.	**AO22**	Development ensures that the nature and scale of construction and demolition do not generate noticeable levels of vibration.	AO22 can be complied: A noise and vibration management report will be provided as part of the construction management plan.

POTENTIAL AND ACTUAL ACID SULPHATE SOILS OVERLAY CODE
BRISBANE CITY COUNCIL 2014

Performance outcomes		Acceptable outcomes		Performance outcome
PO1	Development protects the environmental values and ecological health of receiving waters and does not subject assets to accelerated corrosion.	**AO1**	Development ensures that: (a) no potential or actual acid sulphate soils are disturbed; or Note—This can be demonstrated through the submission of an acid sulphate soil investigation report with reference to the Potential and actual acid sulphate soils planning scheme policy. (b) the disturbance impacts in an area that hosts potential acid sulphate soils are appropriately managed, if less than 500m^3 of soil is disturbed and the watertable is not affected; or Note—This can be demonstrated through the submission of an acid sulphate soil investigation report and a preliminary acid sulphate soil management plan, with reference to the Potential and actual acid sulphate soils planning scheme policy. (c) impacts are appropriately managed if 500m^3 or more of soil is disturbed or the watertable in an area that hosts potential or actual acid sulphate soils is affected. Note—This can be demonstrated through the submission of an acid sulphate soil investigation report and a full acid sulphate soil management plan, with reference to the Potential and actual acid sulphate soils planning scheme policy. Using levels of testing commensurate with the level of risk. If the investigation demonstrates that an acid sulphate soil management plan is not required, only an investigation report is required.	An acid sulphate soil investigation report will be prepared by a suitably qualified Geotechnical Engineer in accordance with the Potential and actual acid sulphate soils planning scheme policy. An acid sulphate management plan will also be prepared by a suitably qualified Geotechnical Engineer if required as a result of the outcome of the acid sulphate soil investigation report. These reports will be lodged with the Operational Works Submission.

STORMWATER CODE
BRISBANE CITY COUNCIL 2014

Performance outcomes		Acceptable outcomes		Performance outcome
Section A—If for a material change of use, reconfiguring a lot, operational work or building work Note—Compliance with the performance outcomes and acceptable outcomes in this section should be demonstrated by the submission of a site-based stormwater management plan for high risk development only.				
PO1	Development provides a stormwater management system which achieves the integrated management of stormwater to: (a) minimise flooding; (b) protect environmental values of receiving waters; (c) maximise the use of water sensitive urban design; (d) minimise safety risk to all persons; (e) maximise the use of natural waterway corridors and natural channel design principles. Editor's note—The stormwater management system to be developed to address PO1 is not intended to require management of stormwater quality.	**AO1**	Development provides a stormwater management system designed in compliance with the Infrastructure design planning scheme policy	Complies with AO1: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17. The detailed design of the stormwater drainage will be lodged with the operational works submission in compliance with the Infrastructure design planning scheme policy.
PO2	Development ensures that the stormwater management system and site work does not adversely impact flooding or drainage characteristics of premises which are up slope, down slope or adjacent to the site.	**AO2.1**	Development does not result in an increase in flood level or flood hazard on up slope, down slope or adjacent premises.	Complies with AO2.1: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
		AO2.2	Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy.	Complies with AO2.2: Refer AO1.
PO3	Development ensures that the stormwater management system does not direct stormwater run-off through existing or proposed lots and property where it is likely to adversely affect the safety of, or cause nuisance to properties.	**AO3.1**	Development ensures that the location of the stormwater drainage system is contained within a road reserve, drainage reserve, public pathway, park or waterway corridor.	Complies with AO3.1: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
		AO3.2	Development provides a stormwater management system which is designed in compliance with the standards in the	Complies with AO3.2: Refer AO1.

STORMWATER CODE
BRISBANE CITY COUNCIL 2014

Performance outcomes		Acceptable outcomes		Performance outcome
			Infrastructure design planning scheme policy.	
		AO3.3	Development obtains a lawful point of discharge in compliance with the standards in the Infrastructure design planning scheme policy	Complies with AO3.3: Refer AO1.
		AO3.4	Where on private land, all underground stormwater infrastructure is secured by a drainage easement.	Complies with AO3.4: Not applicable to this development.
PO4	Development provides a stormwater management system which has sufficient capacity to safely convey run-off taking into account increased run-off from impervious surfaces and flooding in local catchments.	**AO4.1**	Development provides a stormwater conveyance system which is designed to safely convey flows in compliance with the standards in the Infrastructure design planning scheme policy.	Complies with AO4.1: Refer AO1.
		AO4.2	Development provides sufficient area to convey run-off which will comply with the standards in the Infrastructure design planning scheme policy.	Complies with AO4.2: Refer to SBSMP.
PO5	Development designs stormwater channels, creek modification works, bridges, culverts and major drains to protect and enhance the value of the waterway corridor or drainage path for fauna movement.	**AO5**	Development ensures the design of stormwater channels, creek modifications or other infrastructure, permits terrestrial and aquatic fauna movement.	Complies with AO5: Not applicable to this development.
PO6	Development ensures that location and design of stormwater detention and water quality treatment: (a) minimises risk to people and property; (b) provides for safe access and maintenance; (c) minimises ecological impacts to creeks and waterways.	**AO6.1**	Development locates stormwater detention and water quality treatment: (a) outside of a waterway corridor; (b) offline to any catchment not contained within the development.	Complies with AO6.1: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
		AO6.2	Development providing for stormwater detention and water quality treatment devices are designed in compliance with the standards in the Infrastructure design planning scheme policy	Complies with AO6.2: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
PO7	Development is designed, including any car parking areas and channel works to: (a) reduce property damage;	**AO7.1**	Development (including any ancillary structures and car parking areas) is located above minimum flood immunity levels in Table 9.4.9.3.B, Table 9.4.9.3.C, Table 9.4.9.3.D,	Complies with AO7.1.

Performance outcomes		Acceptable outcomes		Performance outcome
	(b) provide safe access to the site during the defined flood event.		Table 9.4.9.3.E and Table 9.4.9.3.F. Note—Compliance with this acceptable outcome can be demonstrated by the submission of a hydraulic and hydrology report identifying flood levels and development design levels (as part of a site-based stormwater management plan).	
		AO7.2	Development including the road network provides a stormwater management system that provides safe pedestrian and vehicle access in accordance with the standards in the Infrastructure design planning scheme policy.	Complies with AO7.2: Not applicable to this development.
PO8	Development designs stormwater channels, creek modification works and the drainage network to protect and enhance the environmental values of the waterway corridor or drainage path.	**AO8.1**	Development ensures natural waterway corridors and drainage paths are retained.	Complies with AO8.1: Not applicable to this development.
		AO8.2	Development provides the required hydraulic conveyance of the drainage channel and floodway, while maximising its potential to maximise environmental benefits and minimise scour. Editor's note—Guidance on natural channel design principles can be found in the Council's publication Natural channel design guidelines	Complies with AO8.2: Not applicable to this development.
		AO8.3	Development provides stormwater outlets into waterways, creeks, wetlands and overland flow paths with energy dissipation to minimise scour in compliance with the standards in the Infrastructure design planning scheme policy	Complies with AO8.3: Not applicable to this development.
		AO8.4	Development ensures that the design of modifications to the existing design of new stormwater channels, creeks and major drains is in compliance with the standards in the Infrastructure design planning scheme policy	Complies with AO8.4: Not applicable to this development.
PO9	Development is designed to manage run-off and peak flows by minimising large areas of impervious material and maximising opportunities for capture and re-use.	**AO9**	No acceptable outcome is prescribed.	Complies with AO9: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.

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Performance outcomes		Acceptable outcomes		Performance outcome
PO10	Development ensures that there is sufficient site area to accommodate an effective stormwater management system. Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only.	**AO10**	No acceptable outcome is prescribed.	Complies with AO10: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
PO11	Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the: (a) existing capacity of stormwater infrastructure within and external to the site, and any planned stormwater infrastructure upgrades; (b) safe management of stormwater discharge from existing and future up-slope development; (c) implication for adjacent and down-slope development.	**AO11.1**	Development with up-slope external catchment areas provides a drainage connection sized for ultimate catchment conditions that is directed to a lawful point of discharge.	Complies with AO11.1: Not applicable to this development.
		AO11.2	Development ensures that existing stormwater infrastructure that is undersized is upgraded in compliance with the Priority infrastructure plan and the standards in the Infrastructure design planning scheme policy	Complies with AO11.2: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
PO12	Development provides stormwater infrastructure which: (a) remains fit for purpose for the life of the development and maintains full functionality in the design flood event; (b) can be safely accessed and maintained cost effectively; (c) ensures no structural damage to existing stormwater infrastructure.	**AO12.1**	The stormwater management system is designed in compliance with the Infrastructure design planning scheme policy	Complies with AO12.1: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
		AO12.2	Development provides a clear area with a minimum of 2m radius from the centre of an existing manhole cover and with a minimum height clearance of 2.5m.	Complies with AO12.2: Not applicable to this development.
PO13	Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development site from construction activities, including vegetation	**AO13**	No acceptable outcome is prescribed.	Complies with AO13: The Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17 provides details of the ESC strategy.

Performance outcomes		Acceptable outcomes		Performance outcome
	clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect: (a) the environmental values and water quality objectives of waters; (b) waterway hydrology; (c) the maintenance and serviceability of stormwater infrastructure. Note—The Infrastructure design planning scheme policy outlines the appropriate measures to be taken into account to achieve the performance outcome.			
PO14	Development ensures that: (a) unnecessary disturbance to soil, waterways or drainage channels is avoided; (b) all soil surfaces remain effectively stabilised against erosion in the short and long term.	**AO14**	No acceptable outcome is prescribed.	Complies with AO14: Refer AO13.
PO15	Development does not increase: (a) the concentration of total suspended solids or other contaminants in stormwater flows during site construction; (b) run-off which causes erosion either on site or off site.	**AO15**	No acceptable outcome is prescribed.	Complies with AO15: Refer AO13.

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Section B—Additional criteria which apply to high-risk development, being one or more of the following: (a) a material change of use for an urban purpose which involves greater than 2,500m^2 of land that: (i) will result in an impervious area greater than 25% of the net developable area; or (ii) will result in 6 or more dwellings. (b) reconfiguring a lot for an urban purpose that involves greater than 2,500m^2 of land and will result in 6 or more lots; (c) operational work for an urban purpose which involves disturbing greater than 2,500m^2 of land.				
PO16	Development ensures that the entry and transport of contaminants into stormwater is avoided or minimised to protect receiving water environmental values. Note—Prescribed water contaminants are defined in the *Environmental Protection Act 1994*. Note—Compliance with the performance outcome should be demonstrated by the submission of a site-based stormwater management plan for high-risk development only.	**AO16**	Development provides a stormwater management system which is designed in compliance with the standards in the Infrastructure design planning scheme policy.	Complies with AO16: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.
PO17	Development ensures that: (a) the discharge of wastewater to a waterway or external to the site is avoided; or (b) if the discharge cannot practicably be avoided, the development minimises wastewater discharge through re-use, recycling, recovery and treatment. Note—The preparation of a wastewater management plan can assist in demonstrating achievement of this performance outcome. Editor's note—This code does not deal with sewerage which is the subject of the Wastewater code.	**AO17**	No acceptable outcome is prescribed.	Complies with AO17: Refer to the Site Services Report and SBSMP prepared by Robert Bird Group, dated 13/10/17.

Appendix H
SPP Codes

State Planning Policy July 2014
SPP Code: Water Quality

Performance Outcomes and Acceptable Solutions

Plan to avoid/ minimise new impacts

Performance Outcomes		Acceptable Outcomes		Proposal Compliance Response
PO1	The development is planned and designed considering the land use constraints of the site for achieving stormwater design objectives.	**AO1.1**	A site stormwater quality management plan (SQMP) is prepared, and: *a)* is consistent with any local area stormwater management planning, and b) provides for achievable stormwater quality treatment measures meeting design objectives listed below in Table A (construction phase) and Table B (post construction phase), or current best practice environmental managements, reflecting land use constraints, such as: • erosive, dispersive, sodic and/or saline soil types • landscape features (including landform) • acid sulfate soil and management of nutrients of concern • rainfall erosivity. *Editor's note: Local area stormwater management planning may include Urban Stormwater Quality Management Plans, or Catchment or waterway management plans, Healthy Waters Management Plans, Water Quality Improvement Plans, Natural Resource Management Plans.*	**Complies with AO1.1**: The area of the proposed site is greater than 2,500m^2 and Best management practices (BMP's) have been proposed for the proposed development. A SQMP has been prepared by RBG as part of the Site Services Report prepared in accordance with BCC guidelines to support the development application.
PO2	Development does not discharge wastewater to a waterway or off site unless demonstrated to be best practice environmental management for that site.	**AO2.1**	A wastewater management plan (WWMP) is prepared by a suitably qualified person and addresses: a) wastewater type, and b) climatic conditions, and c) water quality objectives (WQOs), and d) best-practice environmental management, and	**Complies with AO2.1**: Not applicable to this development. No waste water other than stormwater and sewer is expected from the proposed development.
		AO2.2	The WWMP provides that wastewater is managed in accordance with a waste management hierarchy that:	**Complies with AO2.2**: Not applicable to this development.

Performance Outcomes		Acceptable Outcomes		Proposal Compliance Response
			a) avoids wastewater discharges to waterways, or b) if wastewater discharge to waterways cannot practicably be avoided, minimises wastewater discharge to waterways by re-use, recycling, recovery and treatment for disposal to sewer, surface water and groundwater.	
PO3	Any non-tidal artificial waterway is located in a way that is compatible with the land use constraints of the site for protecting water environmental values in existing natural waterways.	**AO3.1**	If the proposed development involves a non-tidal artificial waterway: a) environmental values in downstream waterways are protected, and b) any groundwater recharge areas are not affected, and c) the location of the waterway incorporates low lying areas of a catchment connected to an existing waterway, and d) existing areas of ponded water are included, and	**Complies with AO3.1**: Not applicable to this development.
		AO3.2	Non-tidal artificial waterways are located: a) outside natural wetlands and any associated buffer areas, and b) to minimise disturbing soils or sediments, and c) to avoid altering the natural hydrologic regime in acid sulphate soil and nutrient hazardous areas.	**Complies with AO3.2**: Refer AO3.1.
PO4	Any non-tidal artificial waterway is located in a way that is compatible with existing tidal waterways.	**AO4.1**	Where a non-tidal artificial waterway is located adjacent to, or is connected to, a tidal waterway by means of a weir, lock, pumping system or similar: a) there is sufficient flushing or a tidal range of >0.3m, or b) any tidal flow alteration does not adversely impact on the tidal waterway, or c) there is no introduction of salt water into freshwater environments.	**Complies with AO4.1**: Not applicable to this development.

Design to avoid / minimise new impacts

Performance Outcome		Acceptable Outcome		Proposal Compliance Response
PO5	Stormwater does not discharge directly to a non-tidal artificial waterway without treatment to manage stormwater quality management.	**AO5.1**	Any non-tidal artificial waterway is designed and managed for any of the following end-use purposes: a) amenity including aesthetics, landscaping and recreation, or b) flood management, or c) stormwater harvesting as part of an integrated water cycle management plan, or d) aquatic habitat, and	**Complies with AO5.1**: Not applicable to this development.
		AO5.2	The end-use purpose of any non-tidal artificial waterway is designed and operated in a way that protects water environmental values.	

Construct to avoid / minimise new impacts

Performance Outcome		Acceptable Outcome		Proposal Compliance Response
PO6	Construction activities for the development avoid or minimise adverse impacts on stormwater quality.	**AO6.1**	An erosion and sediment control plan (ESCP) demonstrates that release of sediment-laden stormwater is avoided for the nominated design storm, and minimised when the nominated design storm is exceeded, by addressing design objectives listed below in Table A (construction phase) or local equivalent, for: a) drainage control, and b) erosion control, and c) sediment control, and d) water quality outcomes, and	**Complies with AO6.1**: An ESC program and sketch have been prepared as part of the Site Services Report. Further details will be lodged with the Operational Works Submission.
		AO6.2	Erosion and sediment control practices (including any proprietary erosion and sediment control products) are designed, installed, constructed, operated, monitored and maintained, and any other erosion and sediment control practices are carried out in accordance with local conditions and appropriate recommendations from a suitably qualified person, or	**Complies with AO6.2**: Refer AO6.1.

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
	AO6.2 The ESCP demonstrates how stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to Acceptable Outcome AO6.1.	**Complies with AO6.2**: Refer AO6.1.

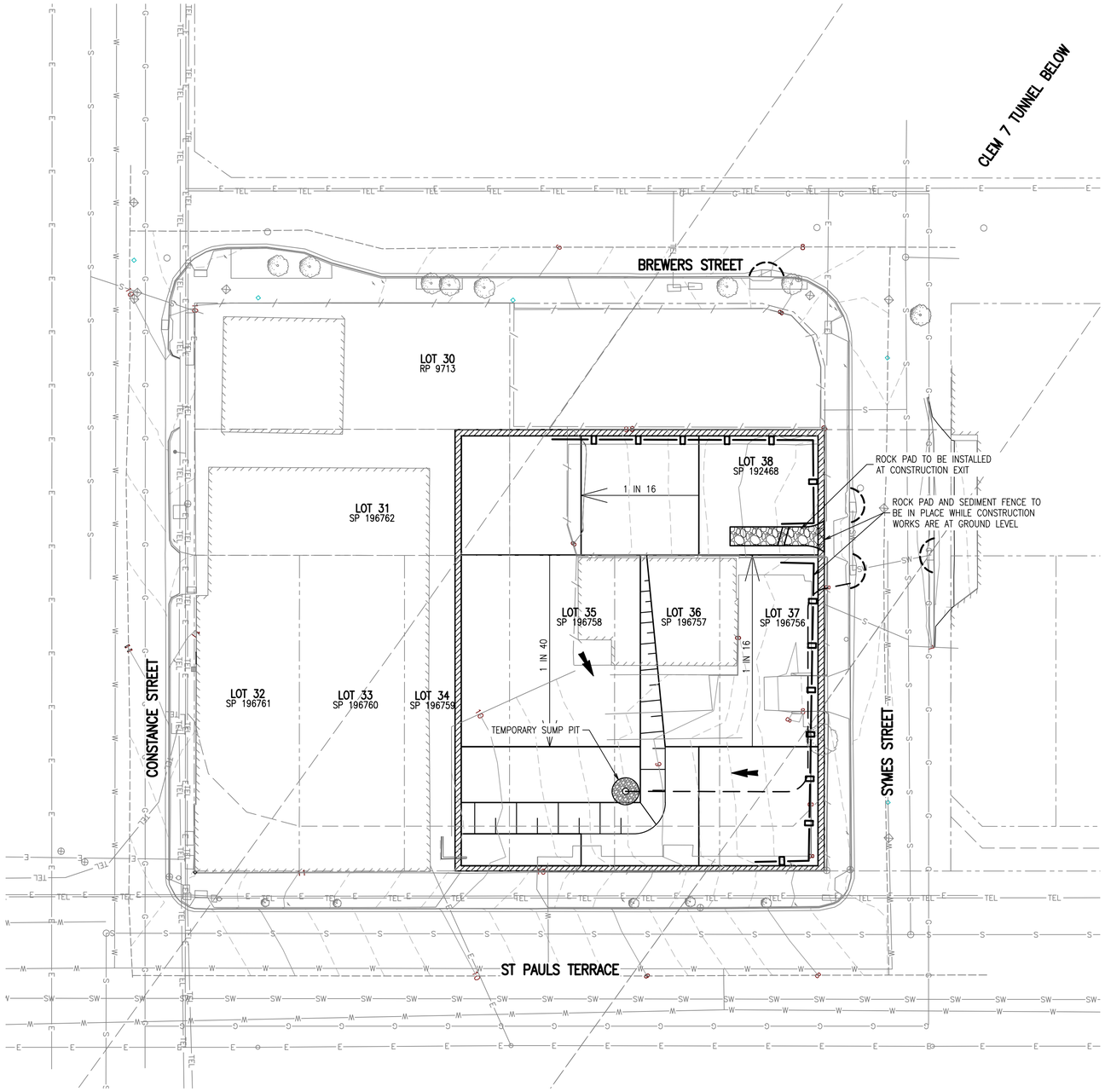
Operate to avoid / minimise new impacts

Performance Outcome		Acceptable Outcome		Proposal Compliance Response
PO7	Operational activities for the development avoid or minimises changes to waterway hydrology from adverse impacts of altered stormwater quality and flow.	**AO7.1**	Development incorporate stormwater flow control measure to achieve the design objectives set out below in and Table B (post construction phase). The operational phases for the development comply with design objectives in Table B (post construction phase), or current best practice environmental management, including management of frequent flows, and peak flows.	**Complies with AO7.1**: Refer AO1.1. Stormwater detention is not required for this development.
PO8	Any treatment and disposal of waste water to a waterway accounts for: • the applicable water quality objectives for the receiving waters, and • adverse impact on ecosystem health or receiving waters, and • in waters mapped as being of high ecological value, the adverse impacts of such releases and their offset.	**AO8.1**	Implement the WWMP prepared in accordance with AO2.1.	**Complies with AO8.1**: Refer AO2.1.
PO9	Wastewater discharge to a waterway is managed in a way that maintains ecological processes, riparian vegetation, waterway integrity, and downstream ecosystem health.	**AO9.1**	Wastewater discharge waterways is managed to avoid or minimize the release of nutrients of concern so as to minimize the occurrence, frequency and intensity of coastal algal blooms, and	**Complies with AO9.1 and AO9.2:** Not applicable to this development.
		AO9.2	Development in coastal catchments avoids or minimises and appropriately manages soil disturbance or altering natural hydrology, and	

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
	AO9.3 Development in coastal catchments: a) avoids lowering groundwater levels where potential or actual acid sulphate soils are present, and b) manages wastewaters so that: (i) the pH of any wastewater discharged is maintained between 6.5 and 8.5 to avoid mobilisation of acid, iron, aluminium, and metals, and (ii) holding times of neutralised wastewaters ensures the flocculation and removal of any dissolved iron prior to release, and (iii) visible iron floc is not present in any discharge, and (iv) precipitated iron floc is contained and disposed of, and (v) wastewater and precipitates that cannot be contained and treated for discharge on site are removed and disposed of through trade waste or another lawful method.	**Complies with AO9.3**: Not applicable to this development.
PO10 Any non-tidal artificial waterway is managed and operated by suitably qualified persons to achieve water quality objectives in natural waterways.	**AO10.1** Any non-tidal artificial waterway is designed, constructed and managed under the responsibility of a suitably qualified registered professional engineer, Queensland (RPEQ) with specific experience in establishing and managing artificial waterways, and **AO10.2** Monitoring and maintenance programs adaptively manage water quality in any non-tidal artificial waterway to achieve relevant water-quality objectives downstream of the waterway, and **AO10.3** Aquatic weeds are managed in any non-tidal artificial waterway to achieve a low percentage of coverage of the water surface area (less than 10%). Pests and vectors (such as mosquitoes) are managed through avoiding stagnant water areas, providing for native fish predators, and any other best practices for monitoring and treating pests, and **AO10.4** Any non-tidal artificial waterway is managed and	**Complies with AO10.1, AO10.2, AO10.3, AO10.4**: Not applicable to this development.

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
	operated by a responsible entity under agreement for the life of the waterway. The responsible entity is to implement a deed of agreement for the management and operation of the waterway that: a) identifies the waterway, and b) states a period of responsibility for the entity, and c) states a process for any transfer of responsibility for the waterway, and d) states required actions under the agreement for monitoring the water quality of the waterway and receiving waters, and e) states required actions under the agreement for maintaining the waterway to achieve the outcomes of this code and any relevant conditions of a development approval, and f) identifies funding sources for the above, including bonds, infrastructure charges or levies.	

Appendix J
Concept Erosion and Sediment Control Plan



LEGEND

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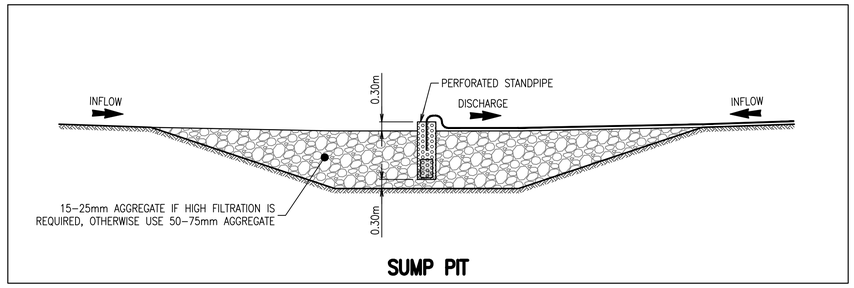
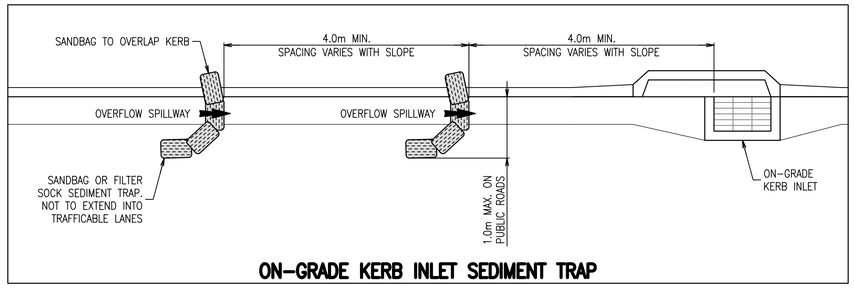
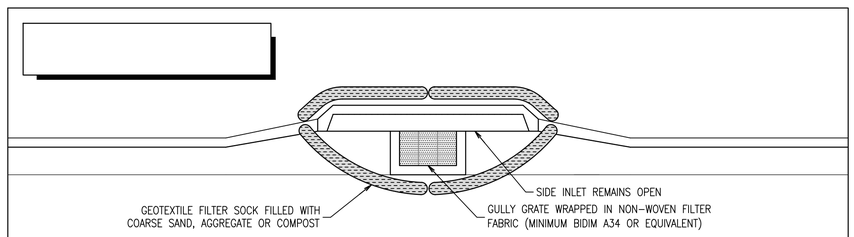
- EXISTING EASEMENT
- EXISTING BUILDING
- EXISTING CONTOURS MAJOR (3.00)
- EXISTING CONTOURS MINOR (3.50)
- EXISTING FENCE
- EXISTING GAS MAIN
- EXISTING TELSTRA CABLE
- EXISTING ELECTRICITY LINE
- EXISTING STORMWATER PIPE
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- PROPOSED SITE BOUNDARY
- PROPOSED SEDIMENT FENCE
- PROPOSED CATCH DRAIN
- PROPOSED PUMP LINE
- PROPOSED BULK EARTHWORKS BATTER
- PROPOSED BULK EARTHWORKS PAD LEVEL (BE 0.100)
- PROPOSED INLET PROTECTION ON GRADE
- PROPOSED INLET PROTECTION SAG
- DIRECTION OF FALL FROM LOTS
- PROPOSED SUMP PIT
- PROPOSED ROCK PAD CONSTRUCTION EXIT



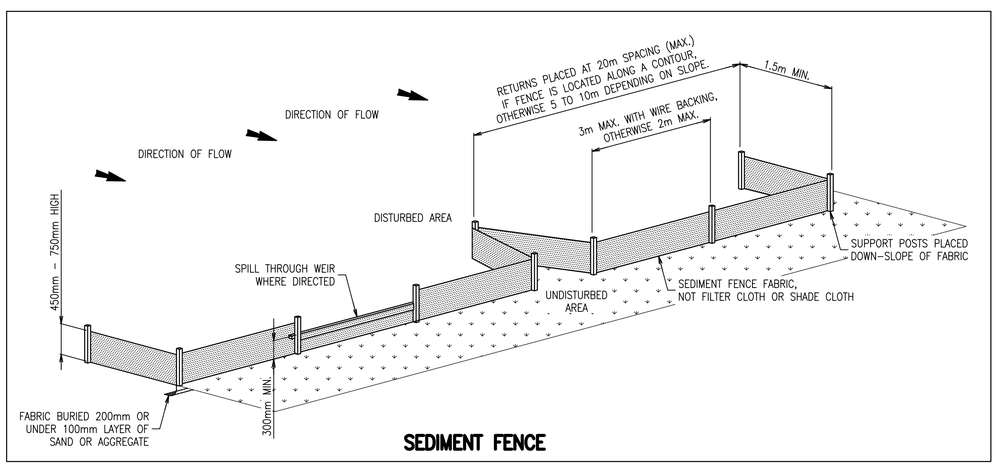
SUMP PIT



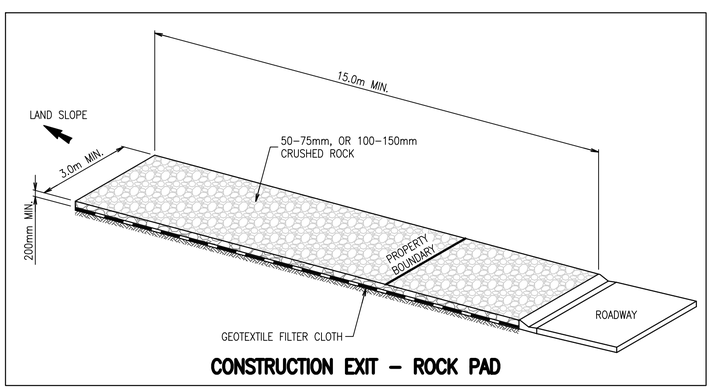
ON–GRADE KERB INLET SEDIMENT TRAP



SAG KERB INLET SEDIMENT TRAP – FILTER SOCK



SEDIMENT FENCE



CONSTRUCTION EXIT – ROCK PAD

SCALE 1:250

5 0 5 10m

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_____ RPEQ _____

NOTE
TREATED STORMWATER TO BE PUMPED TO THE EXISTING STORMWATER. CONNECTION TO BE DETERMINED BY THE CONTRACTOR ON SITE.

Rev	Revision Description	By	App	Date
P2	ISSUE FOR DEVELOPMENT APPROVAL	NR	IM	15.11.17
P1	ISSUE FOR INFORMATION	NR	–	13.10.17

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

Structural, Civil & Construction Engineering Consultant

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ACN 010 580 248

Client
BLIGHT RAYNER

Project
JUBILEE HOTEL REDEVELOPMENT

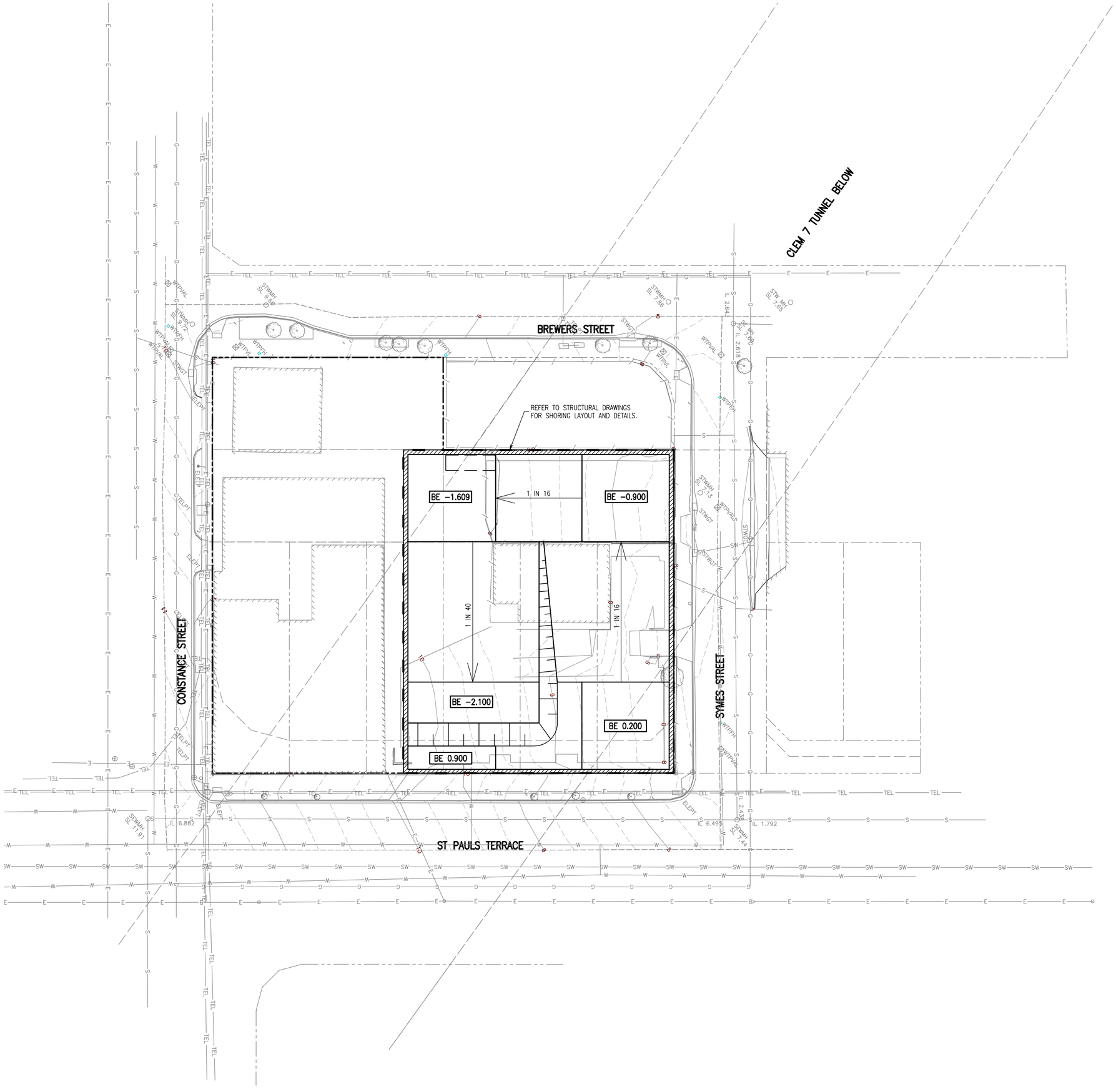
Title
CONCEPT EROSION AND SEDIMENT CONTROL PLAN

Date	Drawn
OCTOBER 2017	N.ROBINSON
Scale at A1	Designer
1:250	A.WILSS
	Design Checker
	A.PEARSON
Job Number	Approved
17206C	–

NOT FOR CONSTRUCTION

Drawing Number	Revision
C01–01	P2

Appendix K
Concept Bulk Earthworks Plan



LEGEND

- EXISTING SITE BOUNDARY
- EXISTING EASEMENT
- EXISTING BUILDING
- EXISTING CONTOURS MAJOR
- EXISTING CONTOURS MINOR
- EXISTING FENCE
- EXISTING GAS MAIN
- EXISTING TELSTRA CABLE
- EXISTING ELECTRICITY LINE
- EXISTING STORMWATER PIPE
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- PROPOSED SITE BOUNDARY
- PROPOSED BULK EARTHWORKS BATTER
- PROPOSED BULK EARTHWORKS CONTOUR – MAJOR
- PROPOSED BULK EARTHWORKS CONTOUR – MINOR
- PROPOSED BULK EARTHWORKS LEVEL (BE123.56)
- PROPOSED BULK EARTHWORKS PAD OUTLINE
- PROPOSED BULK EARTHWORKS DETENTION BASIN
- GENERAL FILL ZONE
- GENERAL CUT ZONE
- PROPOSED BULK EARTHWORKS PAD LEVEL (BE 0.100)

SCALE 1:250

5 0 5 10m

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_____ RPEQ _____

Rev	Revision Description	By	App	Date
P2	ISSUE FOR DEVELOPMENT APPROVAL	NR	IM	15.11.17
P1	ISSUE FOR INFORMATION	NR	–	13.10.17

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Engineering Consultant

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Client
BLIGHT RAYNER

Project
JUBILEE HOTEL REDEVELOPMENT

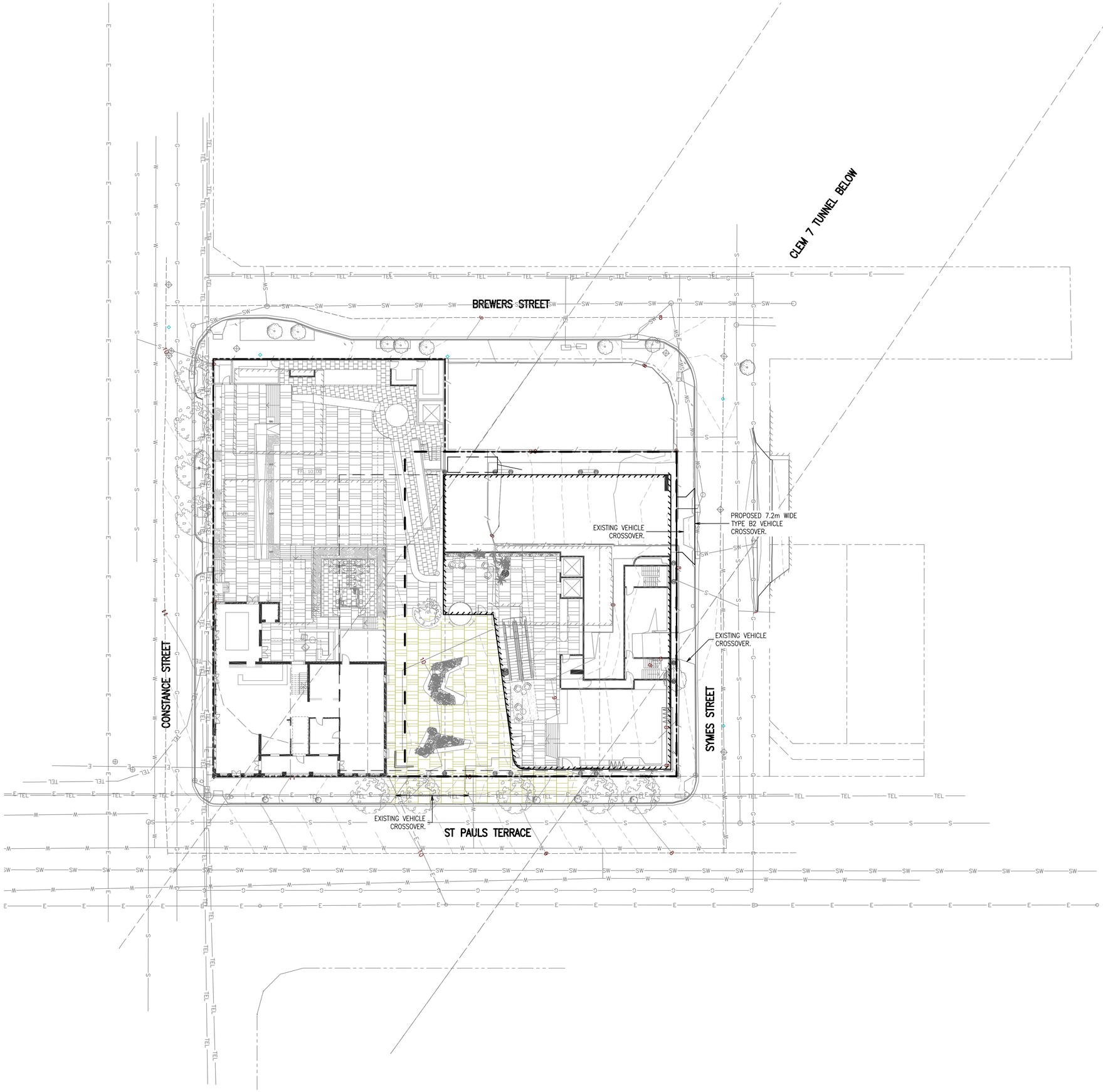
Title
CONCEPT BULK EARTHWORKS PLAN

Date: OCTOBER 2017	Drawn: N.ROBINSON
Scale at A1: 1:200	Designer: A.WILSS
	Design Checker: A.PEARSON
Job Number: 17206C	Approved: –

NOT FOR CONSTRUCTION

Drawing Number: C02–01
Revision: P2

Appendix L
Concept Roadworks Layout Plan



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- EXISTING BUILDING
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- EXISTING FENCE
- EXISTING GAS MAIN
- EXISTING TELSTRA CABLE
- EXISTING ELECTRICITY LINE
- EXISTING STORMWATER PIPE
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- EXISTING ROAD SIGN
- KO (EX) EXISTING KERB ONLY
- K&C (EX) EXISTING KERB AND CHANNEL
- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED BASEMENT OUTLINE
- PROPOSED ROOF OUTLINE
- PROPOSED ROAD SIGN
- KO PROPOSED KERB ONLY
- K&C PROPOSED KERB AND CHANNEL
- 01 KERB SETOUT POINT

SCALE 1:250

5 0 5 10m

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_____ RPEQ _____

Rev	Revision Description	By	App	Date
P2	ISSUE FOR DEVELOPMENT APPROVAL	NR	IM	15.11.17
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ACN 010 580 248

Client
BLIGHT RAYNER

Project
JUBILEE HOTEL REDEVELOPMENT

Title
CONCEPT ROADWORKS LAYOUT PLAN

Date
OCTOBER 2017

Scale at A1
1:250

Job Number
17206C

Drawn
N.ROBINSON

Designer
A.WILSS

Design Checker
A.PEARSON

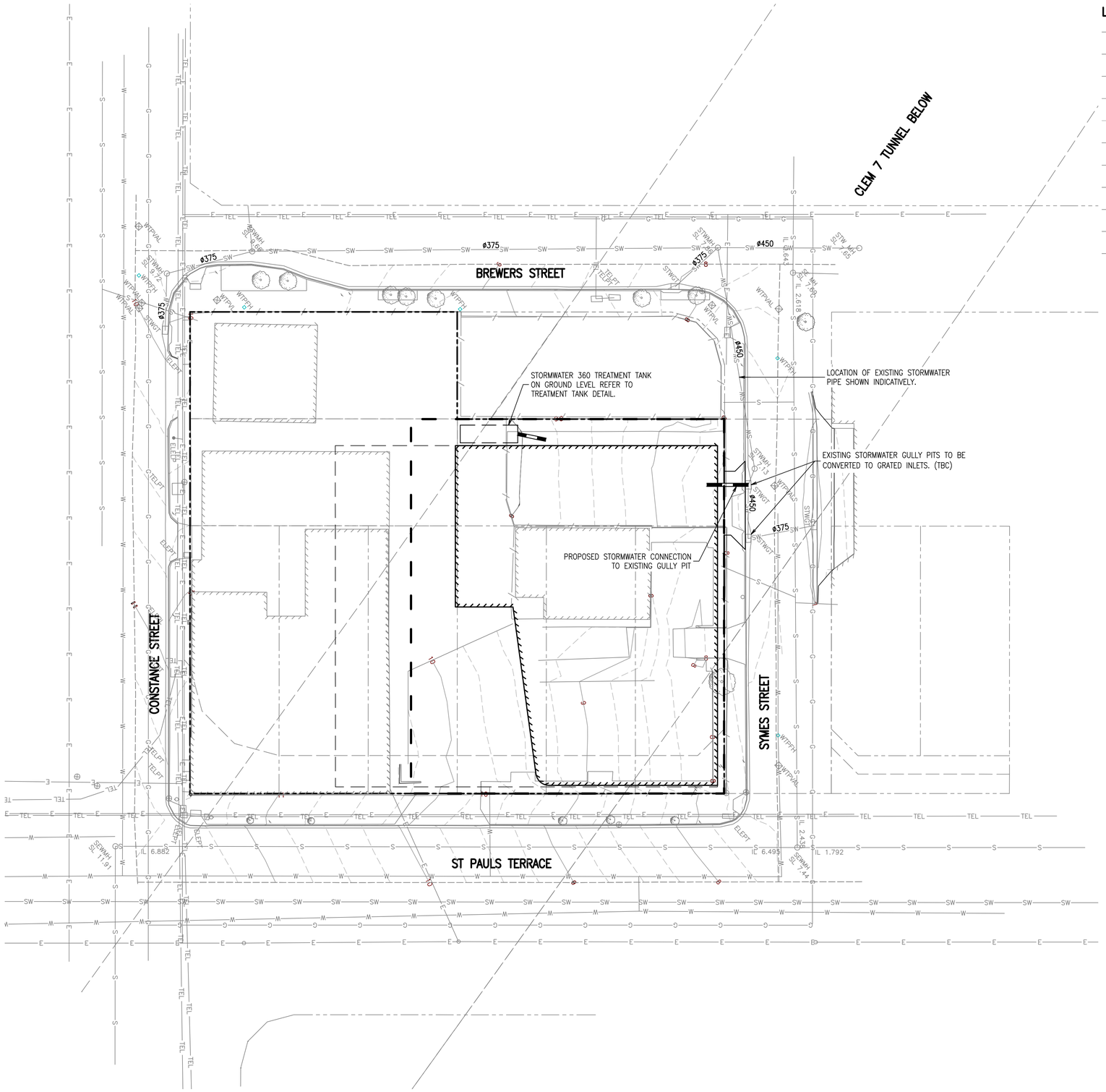
Approved
–

NOT FOR CONSTRUCTION

Drawing Number
C03–01

Revision
P2

Appendix M
Concept Stormwater Management Plan



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- EXISTING CONTOURS MINOR (3.50)
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- EXISTING GAS MAIN
- EXISTING TELSTRA CABLE
- EXISTING ELECTRICITY LINE
- EXISTING STORMWATER PIPE
- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- EXISTING STORMWATER MAINTENANCE HOLE
- PROPOSED BUILDING
- PROPOSED BASEMENT OUTLINE
- PROPOSED ROOF OUTLINE
- PROPOSED ROOFWATER PIPE
- PROPOSED STORMWATER PIPE
- PROPOSED SWALE
- PROPOSED STORMWATER MAINTENANCE HOLE
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- PROPOSED STORMWATER FIELD INLET PIT
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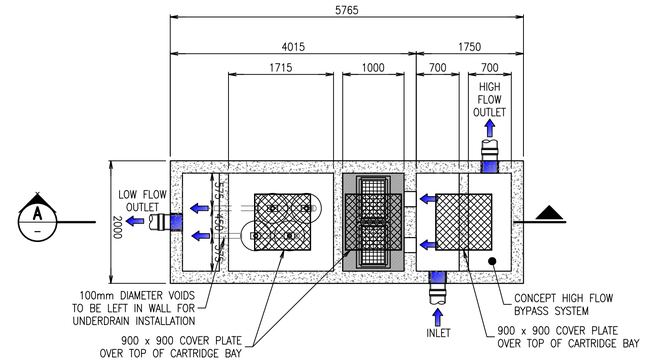
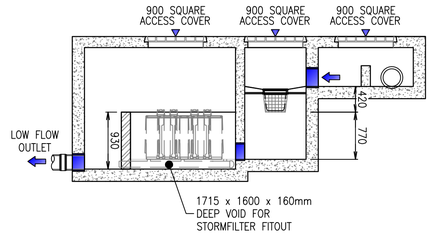


STORMWATER TREATMENT TANK
SCALE 1:50



SECTION A–A
SCALE 1:50

NOTE
MAXIMUM TOTAL STORMWATER INLET FLOW TO THE TANK = 100L/S. TOTAL FLOW HIGHER THAN 100L/S IS TO BE DIVERTED PRIOR TO ENTERING INTO THE TANK.

SCALE 1:50
1 0 1 2m

SCALE 1:250
5 0 5 10m

SIGNED FOR AND ON BEHALF OF ROBERT BIRD GROUP PTY LTD

_____ RPEQ _____

Rev	Revision Description	By	App	Date
P2	ISSUE FOR DEVELOPMENT APPROVAL	NR	IM	15.11.17
P1	ISSUE FOR INFORMATION	NR	–	13.10.17

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

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Client
BLIGHT RAYNER

Project
JUBILEE HOTEL REDEVELOPMENT

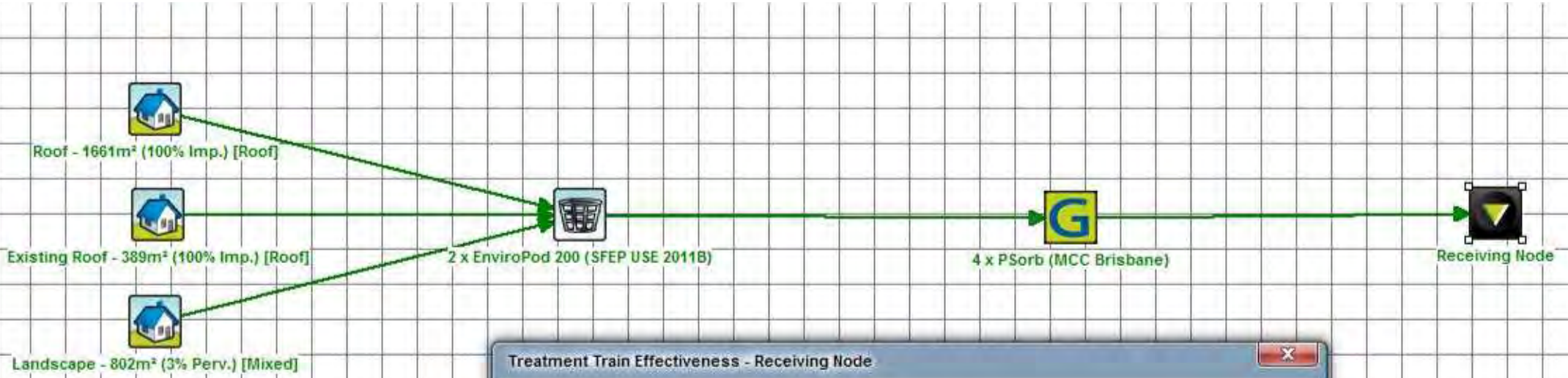
Title
CONCEPT STORMWATER DRAINAGE PLAN

Date: OCTOBER 2017
Scale at A1: 1:250
Job Number: 17206C
Drawn: N.ROBINSON
Designer: A.WILSS
Design Checker: A.PEARSON
Approved: –

NOT FOR CONSTRUCTION

Drawing Number: **C06–01**
Revision: **P2**

Appendix N
MUSIC Modelling Output



Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.04	3.04	0
Total Suspended Solids (kg/yr)	234	38.6	83.5
Total Phosphorus (kg/yr)	0.683	0.251	63.2
Total Nitrogen (kg/yr)	7.26	3.97	45.4
Gross Pollutants (kg/yr)	71	0.629	99.1

Appendix P
Stormwater 360

Operations and maintenance

StormFilter® EnviroPod Treatment Train

Stormwater360
AUSTRALIA

Device details			
Location of Device			
GPS Coord	N:	E:	D P Number:
Relevant Council			
Company			
Contact		Email	Ph
Engineer			
Contact		Email	Ph

SFEP Treatment
1
2

Frequency of Inspection/Maintenance	Inspections (time/year)	Major Maintenance
StormFilter		
EnviroPod		

Maintenance Estimated Annual Cost
StormFilter
EnviroPod
TOTAL

Contents

Maintaining the EnviroPod® Stormwater Gully Pit Insert

Maintenance is as integral to every stormwater management system as it is to any other item of machinery or equipment.

The primary purpose of the EnviroPod® Stormwater Gully Pit insert is to filter out and remove pollutants from entering our waterways. To ensure that the EnviroPod® continues to function effectively, it is important that the pollutants it captures are periodically removed, and the filtration components properly cleaned.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site, as well as the occurrence of events such as chemical spills or excessive sediment loading due to site erosion or extreme storms. Similarly, the system should be inspected after all major storm events.

Treatment Train Specifications

Performance Specification

The stormwater filtration treatment train shall consist of x 200 micron gully pit basket/s and x 460/690mm passive, siphon-actuated, radial flow, self cleaning media filtration cartridge system/s operating at a specific flow rate of not more than 1.5L/s/m^2.

The gully pit basket system shall consist of the following components;

- Removable 200 micron Nylon monofilament Precision woven Filtration Bag
- Fixed Galvanised Mesh Cage (no greater than 80mm x 80mm) around the Filtration Bag
- Recycled modified ABS plastic to seal the unit into the pit
- By-pass mechanism above the Filter with no moving parts
- System rigidly fixed to the walls of the pit.

The media filtration system shall be located within the following structure.

- Manhole
- DownPipe
- Linear
- Vault
- Large Box
- Detention.

Regardless of the system type, the media filtration system shall consist of the following components;

- Inlet energy dissipation
- Cartridge section
- Outlet section to bypass storm flows and convey treated stormwater
- Access Lids in roof slab for access to Cartridges
- Siphon actuated cartridges filled with proprietary ZPG™ filter media
- Specific flow rate of each individual cartridge limited not to exceed 1.5L/s/m^2
- Air Lock Cap complete with one way Air Valve Flap
- Outer Hood complete with Scrubbing Regulators
- Automated high-energy turbulence on the screen face (only) at the end of storm flows to flush pollutants from the cartridge
- Centre Drainage Tube complete with Buoyancy Float
- Individual Cartridge Flow Restrictor Disc
- ¼ Turn Bayonet Fittings
- Under drain manifold to convey treated stormwater to the receiving environment.

Components of any proposes treatment train or technology

The components of any proposed the treatment train or technology, including a gully pit basket upstream of a radial flow cartridge filtration system, must be evaluated for a range of pollutants and these performance expectations must comply with current best practice guidelines, i.e. Water by Design "MUSIC Modeling Guidelines version 1.0 2010" for South East Queensland.

In short, the performance evaluation of any system must show:

1. Any reduction efficiencies are justified by rigorous scientific testing as determined by an independent peer reviewer and the results further peer reviewed and published in a credible scientific journal. Any potential or perceived conflicts of interest should be disclosed within the published article.
2. Published article providing insight into the pollutant composition (e.g. soluble vs particulate for nitrogen) and the mean concentration of inflow and outflow to compare to local and or regional conditions.
3. Performance evaluation undertaken in dry weather conditions or a method to take into account any potential leaching of nutrients that may occur in the system(s).
4. Evaluation is conducted using full-scale systems with details of treatable flow rates sampled and how they correlate to discrete removal efficiencies and comparisons to the designed treatable flow rates of the device. A comparison should also be made to the climatic conditions especially where un-restricted filters are used.

Maintenance Overview

The primary purpose of the Stormwater Treatment Train is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the system to its full efficiency and effectiveness.

* Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance must be performed in accordance with the Treatment Trains Operation and Maintenance Guidelines.

Introduction

This manual has been designed to assist you with cleaning and maintaining the EnviroPod Stormwater Gully Pit Insert, using the methods recommended by the manufacturer.

The cleaning process and methods described cover all aspects of the system, including:

- Removing the grate
- Cleaning the filter bag
- Inspecting the unit
- Rejuvenating the filter bag
- Re-installing the filter bags.

The manual should be used in conjunction with your site's traffic management and safety plans, as well as other appropriate Stormwater360 (IES) documents such as the IES Employee Health and Safety Manual. We also recommend that maintenance and cleaning contractors, or device owners, develop their own site-specific health and safety activity plans to ensure a safe work environment.

Please note: This manual consists primarily of the processes and tasks associated with the hand maintenance and inductor maintenance procedures. It does not include details of the site's traffic management or occupational health and safety requirements. Contractors or IES staff should utilise their own Employee Health and Safety Manual, which details the policies and procedures for safe work.

Why cleaning and maintenance are so vitally important

Adhering to the inspection and maintenance schedule of each stormwater treatment device is essential to ensuring that it works properly throughout its estimated design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It's also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner. To ensure consistency, we recommend that one person be responsible for overseeing the management of the maintenance and cleaning process.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up).

Health and safety

The EnviroPod has been designed to trap and retain pollutants in stormwater runoff, helping to maintain the quality of water entering our aquatic ecosystems. Depending on the nature of your site, pollutants can range from organic material such as leaves and sticks through to debris such as broken glass, syringes or other potentially harmful materials.

Access to gully pits containing EnviroPods may require removing heavy protective grates, while cleaning such pits may entail working in confined spaces. For these reasons, all aspects of maintaining and cleaning your EnviroPod require careful adherence to Occupational Health and Safety (OH&S) guidelines. Doing so will ensure that all maintenance personnel are adequately protected and have been properly trained before taking part in any specialist activities. The same level of care needs to be taken to protect non-work personnel in and around the site, while appropriate traffic control measures must be put in place where collection pits are situated in, or adjacent to, roadways or car parks.

* The procedures indicated in the Operations section of this manual are recommended as the safest and most efficient manner of conducting the maintenance of EnviroPod units (Section 2), however contractors and cleaning staff may vary the procedure in response to the site conditions; varying work practices; or general preferences in the cleaning techniques. Please note that procedures outlined in this manual are not exhaustive, and that any changes made should always comply with general safe work practices.

Cleaning of EnviroPod filters and StormFilters is a specialist activity. The material collected by the devices can be harmful, and needs to be handled correctly. For example, sediments may contain heavy metals and carcinogenic substances as well as harmful objects such as broken glass and syringes. It is essential that Occupational Safety and Health guidelines are followed at all times, and that the following steps are carried out to ensure safe and successful maintenance operations.

In addition to the dangers associated with the cleaning and handling of material in the filter bags, precaution needs to be taken with activities such as removing the grate as well as with managing the traffic, pedestrians and other non-worker personnel at the site. The general workplace hazards associated with working outdoors also need to be taken into account.

2.1 Personnel health and safety

All contractors and staff must comply with all current workplace health and safety legislation and take all practicable steps to:

- Comply with all applicable laws, regulations and standards
- Ensure that all employees, contractors and visitors are informed of and understand their obligations in respect of current workplace health and safety legislation
- Ensure that employees understand and accept their responsibility to practice and promote a safe and healthy work environment.

* Take proper care. Pollutants can range from organic materials such as leaves and sticks through to debris such as broken glass, syringes or other potentially harmful materials.

While cleaning and maintaining filters, all relevant precautions must be taken to prevent contact with sediment and litter. This includes wearing the following personal protective and safety equipment:

- Puncture resistant gloves
- Steel capped safety boots
- Fluorescent safety vest
- Overalls or similar skin protection
- Safety apron (if necessary)*
- Eye protection (if necessary)*.

* Higher personal safety conditions may be required when maintaining units that may contain more hazardous material, for example pits where syringes have been observed or pits located in areas associated with such activities.

2.2 Traffic control

Stormwater collection pits are typically situated either in or on roads and car parks, or adjacent to roads in a footpath or swale. Traffic control requirements across all such locations differ with most of the state and local road authorities requiring the same controls to be implemented whether the work is to be conducted on the road or on the road reserve.

As traffic requirements differ depending on road usage and the specific road configuration, separate traffic control plans should be prepared for each site. Given that maintenance is typically a quick process, the contractor should liaise with the relevant road authority to determine the specific road safety requirements for each location to ensure that on site workers can conduct the cleaning operations safely and efficiently, while complying with all laws and regulations.

State government publications such as the NSW RMS *Traffic Control at Work Sites* safety manual outline the signage requirements, placement of barricades or witches hats and the positioning of traffic control personnel that's required when working on public roads. For increased safety, IES recommends that the maintenance vehicle be used to shield the work area from oncoming traffic.

Photo 1 shows the maintenance vehicle with cones placed around and positioned to shield the work area. **Photo 2** shows the head-on view, note the vehicle is positioned to allow access to the drive, whilst still blocking the pit from on-coming traffic. The vehicle has a flashing light on the roof and the hazard lights switched on.

2.3 Confined spaces

Confined space entry procedures are not included as part of this manual. For IES employees these procedures are included as part of the IES Safety Manual. It is recommended that all contractors evaluate their own needs for confined space entry and compliance with Occupational Health and Safety regulations.

When repairs or maintenance activities cannot be conducted from the surface, and there is a need to enter and work in a confined space, only staff with current confined space training are permitted to operate in a confined space. Appropriate measures and controls must be put in place to meet confined space entry requirements. At all times the necessary safety equipment must be worn, and where gas or oxygen hazards occur, only staff trained in its use will use breathing apparatus gear. **Non-trained staff must not go into confined spaces.**

* Confined spaces pose a serious safety hazard for all personnel; however during the normal maintenance procedures there should be no reason to enter a confined space and all maintenance procedures are able to be conducted from the surface.

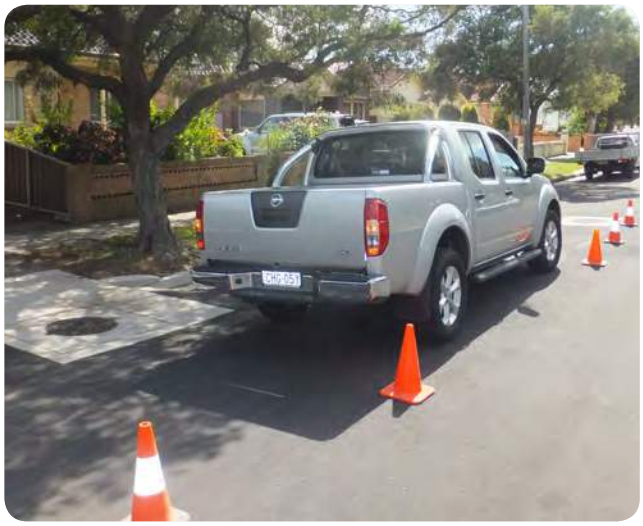


Photo 1 Vehicle positioned near pit, preventing traffic from passing close to the pit.

Photo 2 Head-on view, indicating the placement of the vehicle near the pit.

Operations

EnviroPod units need to be regularly inspected to determine whether they require maintenance or cleaning. This process involves several steps, and may require two or more maintenance personnel working together, as well the use of specialised equipment such as a hydraulic lifting arm or an inductor truck with a vacuum hose.

As gully pit grates are usually quite heavy, it is important that correct lifting procedures are adopted, and that the area surrounding the opened pit is shielded from access to non-work personnel.

If inspection reveals that the filter bag needs to be emptied and rejuvenated, the entire unit should also be examined to ensure that all connections and joints are sound. Any material that has accumulated in the overflow diversion channels or outlet pipes also needs to be removed, with those areas then being flushed. Where required, filter bags may need to be cleaned or repaired, and all waste material must be disposed of according to local guidelines at either an approved disposal site or transfer station.

This section outlines the procedures for cleaning the EnviroPod units. It has been written so that someone who has never previously encountered a stormwater pit or an EnviroPod unit can carry out such maintenance by simply following the outlined steps.

3.1 Maintenance and monitoring of EnviroPod filters

To ensure that each EnviroPod unit achieves optimal performance, the material collected by the filter bag should be emptied when the level of material is no more than approximately **half to two thirds** of the total bag depth or when there is evidence of material overflow. While the bag has a greater storage capacity, it is recommended that it is not left to fill completely prior to emptying, for the following reasons:

- the bags are capable of retaining a heavy mass of material (in excess of 50kg), which will make them more difficult to lift and empty
- material near the top of the bag can be re-suspended during high to extreme rainfall events
- blockage of the overflow sections can occur, when material is allowed to build up above the filter bag.

It is also recommended that additional monitoring is conducted following moderate to extreme rainfall events, especially when preceding months have had little or no rainfall. This increased frequency of monitoring is necessary as there is a greater accumulation of surface contamination during low rainfall periods, which will then enter the unit with the higher volumes of runoff generated during a major rainfall event. It is also important to ensure that the units have not been damaged due to high pipe velocities.

3.2 Stormwater pit cover removal

3.2.1 Hinged pit grates

These are the steps for opening a hinged pit grate:

1. Insert the lifting hooks beneath the grate. (Position indicated in **Photo 3**)
2. Check hinge point is not damaged and debris is not caught in the hinge area.
3. Fully open pit grate, ensuring that the grate will stay in the open position without any external forces applied. Grates that do not remain open without being held should be removed or secured during cleaning or maintenance activities. **Photo 4** indicates the grate being opened and grate resting freely in the open position, respectively.

Please note: Many cast iron hinges are not hinged securely (to enable the removal of the grate). This may result in the pit grate not being able to sit in an open position. Additionally the hinge pins may also be damaged or corroded, which may allow the grate to fall into the pit. Such pit grates can be removed using the method indicated below for non-hinged grates.

Photo 3 Lifting the grate

Photo 4 Fully open grate

Photo 5 Lowering grate

3.2.2 Non-hinged pit grates

To remove a non-hinged pit grate:

1. Place lifting hooks beneath grate, where possible in the four corners of the grate (see **Photo 6**). Concrete lids may have Gatic lifting points, a key arrangement or holes in the lid, which may require special equipment such as Gatic lifters
2. Position each person either side of the grate (see **Photo 7**)
3. Lift the grate, ensuring that good heavy lifting posture is used at all times
4. Place the grate on an angle on the gutter, to allow for the lifting hooks to be removed (see **Photo 8**)
5. For extremely heavy one-piece grates and concrete Gatic covers, insert the lifters in place and slide the lids back. Note some lids may still require two people

Photo 6 Insert hook near edge of grate

Photo 7 Position each lifter either side of the grate

Photo 8 Lift grate and move grate to one side

Photo 9 Lift grate above the support frame

Photo 10 Reinstated non hinged grate

3.3 Cleaning methods

One of the following maintenance methods should be used for servicing EnviroPod Filters:

3.3.1 Cleaning using an inductor truck

Follow these steps to safely and efficiently clean the EnviroPod using an inductor truck:

1. Open gully pit (See Section 3.2)
2. Place the inductor hose over the material collected in the filter bag and switch on the inductor
3. Using the inductor hose, suck out all of the sediment, organic leaf material, litter etc. collected in the filter bag
4. Allow the filter bag to be sucked up into the inductor hose for a few seconds to allow for the filter mesh pores to be cleaned. Care is to be taken that there are no sharp edges on the inductor hose that can damage the filter bag
5. If material has built up around the overflows, use the inductor hose to clear the accumulated material
6. Remove filter bag from the pit
7. Sediment retained in the gully pit grate is to be removed
8. Back-opening channels are to be cleared of any debris to ensure flow is not hindered. This debris can also be collected using the inductor truck
9. All gully pit waste is to be removed from the pit
10. Check the EnviroPod unit (Section 3.4)
11. Check filter bag (Section 3.4)
12. Reinstate filter bag and gully pit lids

Photo 11 Cleaning an EnviroPod using the inductor method

3.3.2 Hand maintenance

To clean the EnviroPod manually by hand, follow these steps:

1. Open gully pit (See Section 1)
2. Place the lifting hooks in the lifting loops of the filter bag (See **Photo 12**)
3. For extremely heavy and overfilled bags either use a hydraulic lifting arm to lift the bag, or remove excess material using a shovel or similar piece of equipment. IES prefers the use of a post hole shovel, due to the reduced strain on the back when digging and the ability of the shovel to grab material vertically
4. Lift the bag vertically off the supporting frame, ensuring that no undue pressure is placed on the filter bag. (See **Photo 13**)
5. Lift the bag clear of the stormwater pit (See **Photo 14**)
6. Position the bag over the truck or other collection vehicle, taking hold of the loops at the base of the bag (See **Photo 15** and **Photo 16**)
7. Lift and empty the filter bag by holding the bottom lifting loops only (See **Photo 17**)
8. Completely empty the filter bag (See **Photo 18**)
9. Brush the filter bag with a stiff brush to remove bound sediment from the filter pores
10. Check the EnviroPod unit (Section 3.4)
11. Check the filter bag (Section 3.5)
12. Reinstate filter bag, ensuring bag is installed the correct way (See **Photo 19** and **Photo 20**)
13. Reinstate gully pit lids (See **Photo 21** and **Photo 22**)

Photo 12 Place the lifting hooks through the bag loops

Photo 13 Lift the bag from the cage and support frame

Photo 14 Lift the bag from the stormwater pit

Photo 15 Lift the bag onto the collection vehicle

Photo 16 Grab the bottom lifting loops

Photo 17 Lifting the bottom bag loops empty the filter bag

Photo 18 Completely empty the contents of the filter bag

Photo 19 Reinstall filter bag

Photo 20 Ensure that the unit is positioned correctly, with the lifting loops on the inside

Photo 21 Correctly installed filter bag

Photo 22 Installed filter bag and sealed pit

Please note: Under no circumstances are gully pit sediments to be backwashed into the gully pit.

Photo 23 Check seals are pushed against the pit walls

Photo 24 Check joining rivets (two piece unit shown above)

3.4 Unit inspection

After the EnviroPod filter bag has been removed, emptied and cleaned, the following should be checked to ensure that the unit has not been damaged:

- All connections and joints should be checked and broken rivets replaced (See **Photo 23**)
- The plastic pit seals should be inspected for unit movement or damage (See **Photo 24**)
- The cage should be inspected for damage or movement.

The overflow diversion channels, and the area between the EnviroPod cage and pit wall should also be inspected for any accumulated debris. Any observed debris should be removed and disposed of off-site. Accumulated material within the outlet pipe may also need to be flushed.

If spare parts are required, Stormwater360 is able to provide these at a cost to the owner of the EnviroPod unit, although these parts may also be obtained from other suppliers.

Please note: If the units are not cleaned regularly, the mobilisation of material collected in the EnviroPod unit may occur. As such, cleaning of the units in accordance with this management plan is required. As this plan is based on observations and data collected during the monitoring period, ongoing adjustment of the cleaning frequency is generally required to improve the overall efficiency in the removal of collected material and prevent material overflow.

3.5 Filter bag inspection and rejuvenation

After the filter bags have been emptied and cleaned, they should be inspected to evaluate their condition. Given the nature of stormwater, the filter bag may become considerably clogged with fine sediment or damaged by various objects in stormwater as well as fauna. Sharp material such as sticks, combined with high velocity water and a large mass in the filter bag, can cause small tears in the filter material. Animals such as rats have also been known to chew through fine mesh filter bags located in gully pits near takeaway food outlets.

3.5.1 Clogged filters

Clogged filter bags can be cleaned using several different methods. If the techniques described in the general maintenance sections above do not adequately clean the filter bags, the following options should be considered:

- Using a stiff brush and a bucket of soapy water, scrub the filter bag surface.
- Remove filter bags from the pit and wash the bags using a high pressure water spray, taking care not to transfer the contamination elsewhere. Wastewater from the process should be collected and disposed of correctly.
- Remove the filter bags from the pits and the support rings and wash the bags in an industrial washing machine.

This final option typically results in the bags appearing like new, with no visible stain or pore clogging within the filter mesh.

Photo 25 Slightly clogged filter bag, indicated by the brown stain on in the centre of the bag

Photo 26 A clean used filter bag

3.5.2 Damaged filters

Damaged filter bags can often be repaired, provided the damage is small. Small tears in the fabric may occur due to several reasons, however the overall strength and structure of the nylon fabric typically prevents small tears becoming much larger. Although the bag is unlikely to tear further, care must be used when cleaning torn bags so as not to spill the collected material into the pit.

Small tears may be repaired by either sewing the tear back together with additional fabric to increase the strength of the stitching, or by sewing a patch of the filter material onto the filter bag. If large tears are present, the filter bag may need to be replaced as it is no longer able to function as intended.

3.6 Disposal of material

All gully pit wastes are to be taken off site and disposed of at a transfer station or similar approved disposal site. Stormwater sediments can contain lead, copper, zinc, mercury, hydrocarbons and PCBs, which are harmful to both humans and the receiving environment. Appropriate sampling and laboratory analysis may be required to classify the material as suitable for reuse, or disposal under appropriate local guidelines.

Emergency procedures

Spills and blockages can have an immediate impact on the performance of a stormwater management system, and can potentially result in serious damage to built infrastructure as well as the surrounding waterways and wetlands.

In these types of emergencies, it is important to act quickly to remediate the problem by removing affected sediment or clearing the cause of the blockage, so that the system can resume normal and effective functioning as soon as possible.

4.1 Spill procedures

In the event of a spill discharging into any gully pit, all sediment is to be extracted and the filter bags are to be removed and replaced with rejuvenated filter bags. Normal operation procedures apply to additional cleaning as a result of spills.

4.2 Blockages

In the unlikely event of surface flooding around a gully pit fitted with an EnviroPod the following steps should be carried out:

1. Check EnviroPod overflow bypass. The EnviroPod filter has been designed with an overflow mechanism built into the filter box. If surface flooding still exists, check the overflow slots underneath the rubber seal. If debris is lodged in the overflow slots it can be easily cleared by hand or a steel rod.
2. If overflow is clear and surface flooding still exists remove EnviroPod and check outlet pipe for blockages.
3. Removal of the EnviroPod may be difficult if the filter is clogged and the EnviroPod is holding water. If the filter is clogged, brush the sidewalls of the filter with a yard broom or similar. This will dislodge particles trapped at the interface allowing contained water to flow through the filter.
4. If the outlet pipe is blocked, it is likely that a gully sucker truck will be required to unblock it. Debris should be removed from the EnviroPod with the gully sucker truck before removal of the EnviroPod filter. If a gully sucker truck is not available and the EnviroPod needs to be removed by hand, follow the steps below:

a. Remove excess debris by hand or brush the side of the filter.
b. Lift and place filter ring through the filter box and into cage.
c. Remove Filter box.
d. Lift cage containing filter bag and ring out of the pit.
e. Unblock outlet pipe.

The Stormwater Management StormFilter®

For almost two decades the Stormwater Management StormFilter® has helped meet the most stringent stormwater quality requirements.

The system has been continually tested and refined, to ensure it achieves maximum reliability and performance.

As a best management practice (BMP) system, it removes the most challenging target pollutants – including fine solids, soluble heavy metals, oils and total nutrients (including soluble) – by using a variety of media to achieve site-specific pollutant removal objectives.

StormFilter® overview

1.1 Description

StormFilter is a passive, flow-through stormwater filtration system consisting of vaults that house rechargeable cartridges filled with a variety of filter media, and is installed in-line with storm drains. The StormFilter works by passing stormwater through media-filled cartridges, which trap particulates and adsorb materials such as dissolved metals and hydrocarbons. After being filtered through the media, the treated stormwater flows into a collection pipe or discharges into an open channel drainage way. StormFilter is offered in three different configurations: cast-in-place, precast and linear. The precast and linear models utilise pre-manufactured vaults. The cast-in-place units are customised for larger flows and may be either covered or uncovered underground units.

1.2 Operation

1.2.1 Purpose

The StormFilter is a passive stormwater filtration system designed to improve the quality of stormwater runoff from the urban environment before it enters receiving waterways.

Through independent third party studies, it has been demonstrated that the StormFilter is highly effective for treatment of first flush flows, and fast-paced flows, during the latter part of a storm. In general, StormFilter's efficiency is highest when pollutant concentrations are highest. The primary target pollutants for removal are: sediments (TSS), soluble metals, soluble phosphorus, nitrates, and oil and grease.

1.2.2 Sizing

The StormFilter is typically sized to meet design water quality objectives, which are subject to legislation regulated by local government authorities and other relevant environmental bodies. MUSIC modelling software is used to determine pollutant loads from a site, influenced by a number of factors such as site area, imperviousness and land use. Pollutant load reduction capabilities, based on third party testing, allows the number of StormFilter cartridges required to achieve the relevant objectives to be established. Cartridges are designed to treat a peak flow between 0.7 and 1.6 litres/second, depending on the cartridge size used. For example, 10 standard sized cartridges (460mm) are able to treat 11 L/s, as each filter can treat 1.1 L/s.

Because of the highly porous nature of the granular filter media, the flow through a newly installed cartridge is restricted to 1 L/s (average 460mm), using a restrictor disc, to ensure adequate pollutant-media contact time.

Photo 27 Filter cartridge

1.2.3 Basic function

The StormFilter is designed to siphon stormwater runoff through a filter cartridge containing media. The variety of media available can be designed to act as a mechanical filter to remove sediments, as an ion exchanger to remove dissolved heavy metals, and as an absorber to remove oils and greases.

1.2.4 Priming system function

The treated stormwater collects in the centre tube of the cartridge, which is equipped with a self-priming siphon system. (Figure 1 illustrates this system.) The key component of the system is the plastic float, consisting of a ball located at the base leading up to a larger portion, which provides increased buoyancy. Initially the ball rests in a seat, effectively closing off the port to the drainage manifold.

As a result, the filter fills the centre drainage tube until the water level has risen high enough to purge the air from the filter cartridges and displaces the float. At a water depth of 22 inches the float pulls loose and allows the filtered water to drain out through the manifold. This effectively “primes” a siphon within the drainage tube and greatly increases the potential across the filter. The priming system increases StormFilter’s ability to be loaded with sediment. A related feature is the cartridge “hood”. This hood maintains the siphon effect by preventing air from being drawn into the cartridge until the external water level drops below the bottom of the hood.

Cartridges are connected to the manifold with a plastic connector. These can be either quarter turn connectors or in the older systems, threaded connectors.

StormFilter is also equipped with flow spreaders that trap floating debris and surface films, even during overflow conditions. Depending on individual site characteristics, some systems are equipped with high and/or low flow bypasses. High flow bypasses are installed when the calculated peak storm event generates a flow that overcomes the overflow capacity of the system. This is especially important for precast systems. Low flow bypasses are sometimes installed to bypass continuous inflows caused by ground water seepage, which usually do not require treatment. All StormFilter units are designed with an overflow. The overflow operates when the inflow rate is greater than the infiltration capacity of the filter media.

1.2.5 Maintenance overview

The primary purpose of the StormFilter is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, these pollutants must be removed periodically to restore the StormFilter to its full efficiency and effectiveness. Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. To assist the owner with maintenance issues, Stormwater360 provides detailed Operation and Maintenance Guidelines with each unit.

Stormwater360 can provide maintenance services completely, or in part. Available services include tracking of installed systems, advising the system’s owner of maintenance needs, and notification of the regulatory agency once the system has been maintained.

Maintenance is usually performed in the dryer periods to rejuvenate the filter media and prepare the system for the next rainy period. Maintenance activities can also be required in the event of a chemical spill or excessive sediment loading due to site erosion or extreme storms. It is good practice to inspect the system after severe storm events.

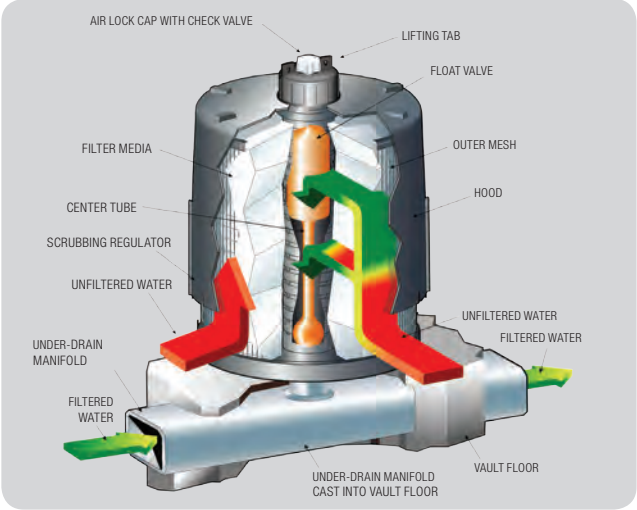


Figure 1 Filter cartridge

StormFilter® maintenance and performance expectations

To ensure the optimal and ongoing performance of the StormFilter, the system requires systematic inspection, cleaning and maintenance. This maintenance regime falls into two categories – ongoing minor inspection and maintenance, and major cleaning and maintenance. The maintenance frequency is largely determined by the conditions of each site, and the amount of sedimentation in the stormwater runoff that flows through the system. Unexpected events such as chemical spills, erosion or extreme storm activity require immediate inspection of the system, together with removal of debris or contaminated sediment, and where appropriate, replacement of the media cartridges.

While some maintenance activities can be completed by hand, others require specialised equipment such as an inductor truck with a vacuum hose. In all cases, it is important that maintenance staff are properly trained in the functioning of the StormFilter system and have a good knowledge of the correct procedures for disposing contaminated sediment as well as the methods for removing and installing StormFilter media cartridges.

At all times, appropriate safety equipment must be used, and Occupational Health And Safety (OH&S) guidelines adhered to.

2.1 Types of maintenance

Presently, procedures have been developed for two levels of maintenance:

- Inspection and/or minor maintenance
- Major maintenance.

Inspection/minor maintenance activities are combined since the minor maintenance does not require special equipment and typically little or no materials are in need of disposal.

Inspection/minor maintenance typically involves opening the flow restricting valves (to pre-set levels) and cleaning up vegetation and debris. Major maintenance typically includes cartridge recharging. Major maintenance may involve disposal of materials that require consideration of regulatory guidelines. Depending on the particular unit configuration and equipment used, major maintenance may require an understanding of OSHA rules. **Table 1** summarises the primary activities associated with StormFilter maintenance.

Table 1: StormFilter

Facility component requiring maintenance	Maintenance activity	When maintenance activity is required	Expected facility performance after maintaining
StormFilter cartridges and containment structure	Litter and debris removal	Floatable objects or other litter is present in the filter. Remove to avoid hindrance of filtration and eliminate unsightly debris and litter.	Permanent removal from storm system.
StormFilter cartridges and containment structure	Cartridge replacement and sediment removal	Media has been contaminated by high levels of pollutants, such as after a spill.	New media is able to effectively treat stormwater.
Drainage system piping	Flushing with water	Drainage system is obstructed by debris or sediment.	Outflow is not restricted.

2.2 Maintenance activities

2.2.1 Maintenance activity timing

Two scheduled inspections/maintenance activities should take place during the year. During the minor maintenance activities (routine inspection, debris removal), the type of major maintenance required is determined and, if required for disposal, samples of the sediments and media are obtained.

The next scheduled date is to perform major maintenance activities (replacement of the filter cartridges and associated sediment removal). In addition to the scheduled activities, it is important to check the condition of the filter after major storms to check for damage caused by high flows and to check for high sediment accumulation, which may be caused by localised erosion in the drainage area. It may be necessary to adjust maintenance activity scheduling depending on the actual operating conditions encountered by the system.

2.2.2 Maintenance activity frequency

The primary factor controlling timing of maintenance for the StormFilter is sedimentation. A properly functioning system will remove solids from water by trapping these particulates within the porous structure of the media. The flow through the system will naturally decrease as more and more solids are trapped. Eventually the flow through a system will be low enough to require replacement of the cartridges. Sediment should be removed from upstream trapping devices on an as-needed basis to prevent material from being re-suspended and discharged to the system.

Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction should be inspected and maintained more often than those in fully established areas. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after large storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual filter.

2.3 Maintenance crew requirements

Table 2 lists the anticipated crew requirements for maintenance operations. Removal of water and sediments during major maintenance activities can be accomplished using either a pump and water truck or a vacuum truck. All applicable occupational health and safety (OH&S) and disposal regulations should be followed. A general description of the maintenance activities follows.

Table 2 Anticipated Crew Requirements

	Inspection/Minor Maintenance	Major Maintenance: Sediment Removal	Major Maintenance: Cartridge Replacement
Labourer	1		1
Skilled Worker	1	1	1
Vacuum/Water Truck Operator		1	0/1
Total	**2***	**2***	**2/3***
Special Requirements	Knowledge of Proper StormFilter Function	Knowledge of Disposal Requirements	Knowledge of Cartridge Removal and Installation Procedures

* May require OH&S trained person if/when vault entry occurs.

2.4 Maintenance methods

2.4.1 Minor maintenance/inspection (twice a year)

Minor maintenance typically will involve the steps below, however if it appears that a spill of some type has occurred, the local hazard control agency and Stormwater360 should be notified immediately.

Steps for Minor Maintenance/Inspection

1. Maintenance to be performed by a skilled worker familiar with StormFilter units.
2. If applicable, set up safety equipment to protect pedestrians from fall hazards presented by open access covers. Also set up appropriate safety equipment for work near roadways.
3. Inspect the external condition of the unit and take notes concerning defects/problems.
4. Open the access covers to the vault and allow the system to air out for 5-10 minutes.
5. **Without entering the vault,** inspect the inside of the unit, including components.
6. Take notes about the external and internal condition. This includes inspecting pit penetrations, walls, lids, ladders and grates etc.
7. Give particular attention to recording the level of sediment build-up on the floor of the vault and on top of the internal components. If flow is occurring, note the level of water and estimate the flow rate per drainage pipe. Record all observations.
8. Remove large loose debris and litter using a pole with a grapple or net on the end.
9. Close and fasten the access cover, and remove safety equipment.
10. Finally, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loadings of other materials to the system.

* In the case of a spill, workers should abort maintenance activities until the proper guidance has been obtained.

2.4.2 Major maintenance inspection (once a year)

The primary goal of the major maintenance inspection is to assess the condition of the cartridges relative to the level of sediment loading. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, large amounts of sediments should be present and very little flow will be discharging from the drainage pipes. It is likely that the cartridges need to be replaced. Major maintenance inspection will typically involve the steps below. However, if it appears that a spill of some type has occurred, the local hazard control agency and Stormwater360 should be notified immediately. **In the case of a spill, the worker should abort maintenance activities until the proper guidance has been obtained.**

Steps for Pre-Major Maintenance Inspection

1. Maintenance to be performed by a skilled worker familiar with StormFilter units.
2. If applicable, set up safety equipment to protect pedestrians from fall hazards presented by open doors. Also, set up appropriate safety equipment for work near roadways.
3. Inspect the external condition of the unit and take notes concerning defects/problems.
4. Open the access covers to the vault and allow the vault to air out for 5-10 minutes.
5. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
6. Take notes about the external and internal condition.
7. Give particular attention to recording the level of sediment build-up on the floor of the vault, and on top of the internal components.
8. Remove large loose debris and litter using a pole with a grapple or net on the end.
9. If the visit is during a storm, make the flow observations discussed above.
10. Close and fasten the access cover, and remove safety equipment.
11. Make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
12. Review the condition reports from the previous minor and major maintenance visits and schedule for cartridge replacement if needed.

2.4.3 Major maintenance: sediment removal and cartridge replacement (and emergency)

Major maintenance/filter cartridge replacement typically involves the steps below. However, if it appears that a spill of some type has occurred, the local hazard control agency and Stormwater360 should be notified immediately. **In the case of a spill, the worker should abort maintenance activities until the proper guidance has been obtained.**

Depending on the configuration of the particular system, a worker may be required to enter the vault to perform some tasks. If vault entry is required, OH&S rules for general confined space entry must be strictly adhered to. Filter cartridge replacement should occur during dry weather and it may be necessary to plug the filter inlet pipe if base flows exist. Standing water present in the vault should be regarded as polluted and contained during this operation by temporarily capping the manifold connectors.

Please note: Confined space entry may be required on StormFilter systems. In this case, please ensure that appropriate Confined Space entry training and subsequent certification has been undertaken and is valid, and work procedures are strictly adhered to. If you are unsure, do not enter the vault and contact Stormwater360 immediately.

Steps For Cartridge Replacement Maintenance

1. Depending on the particular unit, one or two utility workers and a hauling truck operator will deliver the replacement cartridges to the site. Information concerning how to obtain the replacement cartridges is available from Stormwater360.
2. If applicable, set up safety equipment to protect pedestrians from fall hazards presented by open doors. Also, set up appropriate safety equipment for work near roadways.
3. Inspect the external condition of the unit and take notes concerning defects/problems.
4. Open the doors to the vault and allow the system to air out for 5-10 minutes.
5. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
6. Make notes about the external and internal condition.
7. Give particular attention to recording the level of sediment build-up on the floor of the vault and on top of the internal components.
8. Ensuring safe working procedures are met, off load the replacement cartridges (16-39kgs each) and set aside.
9. Remove the top cap (threaded), upper seal and float from the cartridge. Repeat procedure for every cartridge within StormFilter vault. Place items in a large plastic container to be lifted form the vault.
10. Using a cordless drill and 8mm hex head, remove the three screws located around the top perimeter of the cartridge hood. Place screws in the large plastic container and, once full or completed, remove plastic container from vault.
11. Move the vacuum truck near the StormFilter vault on the down-wind side. Be sure that the truck is not too close to the vault so that fumes will not enter the vault. Make sure that the last 500mm of the nozzle is approximately 100-125mm in outside diameter.
12. Feed vacuum nozzle into cartridge bay and start vacuum truck. Remove cartridge hood and place nozzle directly onto filter media. Completely remove media from each cartridge and repeat process for every cartridge in vault.
13. Once completed disconnect cartridges from vault floor and place hood back on cartridges
14. Using the appropriate lifting cap, attach the cable and remove the cartridge (up to 10kgs. each) from the vault. It is strictly prohibited to have personnel standing under suspended cartridges. Care must also be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner unless Stormwater360 is performing maintenance activities and damage is not related to discharges to the system.
15. Set the used cartridge aside or load onto the hauling truck.
16. Repeat steps 14 to 15 until all cartridges have been removed.
17. Remove deposited sediment from the floor of the vault. This can be accomplished by using the vacuum truck
18. Once the sediments are removed, it is necessary to assess the condition of the vault, particularly the manifold and the connectors. These are short sections of 2-inch schedule 50 PVC, or threaded schedule 80 PVC that should protrude above the floor of the vault. If required, apply a light coating of FDA approved silicon grease to the outside of the exposed portion of the connectors. This ensures a watertight connection between the cartridge and the drainage pipe. Replace any damaged connectors.
19. Using the boom, crane, or tripod, lower and install the new cartridges (typically 30kg for standard 460 cartridges). Once again, take care not to damage connectors.
20. Close and fasten the access cover, and remove safety equipment.
21. Make notes about the local drainage area relative to ongoing construction, erosion problems, or high loadings of other materials to the system.
22. Finally, dispose of the residual materials in accordance with applicable regulations. Make arrangements to return the used cartridges to Stormwater360.

2.4.4 Related maintenance activities (performed on an as-needed basis)

StormFilter units are often just one of many components in a more comprehensive stormwater drainage and treatment system. The entire system may include catch basins, detention vaults, sedimentation vaults and manholes, detention/retention ponds, swales, artificial wetlands, and other miscellaneous components. In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities. In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil and grease loading, and discharges of inappropriate materials.

2.5 Typical equipment required for maintenance activities

Typical equipment required for conducting maintenance is shown in Table 3. Some of the materials listed are suggestions rather than requirements. It should be noted that there is more than one way to accomplish some tasks. Owners with available labour and equipment resources may desire to use alternative methods. However, it is advisable that guidance from Stormwater360 be obtained prior to using alternative techniques.

Table 3 Maintenance Equipment Requirements

Maintenance equipment required		
Minor maintenance	**Pre-major maintenance inspection**	**Major maintenance cartridge replacement**
• Safety equipment*: First aid, cones, barricades, flagging, flares, tape, vests, hard hats • Work clothes: Rubber boots, overalls, and gloves • Door bolt, wrench, proprietary lifters (e.g. Gatic) and miscellaneous Tools • Tape measure • Flashlight • Grapple or net pole • Record keeping forms • Litter/debris container	• Safety equipment*: First aid, cones, barricades, flagging, flares, tape, vests, hard hats • Work clothes: Rubber boots, overalls, and gloves • Door bolt, wrench, proprietary lifters (e.g. Gatic) and miscellaneous Tools • Tape measure • Flashlight • Grapple or net pole • Record keeping forms • Litter/debris container	• Safety equipment*: First aid, cones, barricades, flagging, flares, tape, vests, hard hats • Work clothes: Rubber boots, overalls, and gloves • Door bolt, wrench, Pentasocket and miscellaneous Tools • Tape measure • Flashlight • Grapple or net pole • Record keeping forms • Vacuum truck • Replacement cartridges • Cartridge hauling truck • Crane, tripod and hoist, or other lifting device (150kg minimum capacity) • Shovels • Extra 50mm PVC cartridge connectors • Spare flow restrictor discs • Litter/debris container • Vault inlet pipe plug • Dolly • PVC Pipe cutter • Ladder • Cartridge installation and removal sling

*Confined space equipment may be required for vault entry. This equipment must be used by personnel with the appropriate OH&S training. This equipment typically includes: Atmospheric testing devices, atmospheric purging and ventilating devices, and entry, exit, and rescue assisting devices.

2.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in a manner that will not allow the material to affect surface or ground water. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily travelled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations.

It is not appropriate to discharge these materials back to the stormwater drainage system. Part of arranging for maintenance to occur should include coordination of disposal of solids (landfill coordination) and liquids (municipal vacuum truck decant facility, local wastewater treatment plant, on-site treatment and discharge). Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals. Stormwater360 will determine disposal methods or reuse of the media contained in the cartridges. If the material has been contaminated with any unusual substance, the cost of special handling and disposal will be the responsibility of the owner.

SFEP StormFilter & Enviropod Maintenance Data Sheet

Stormwater360 AUSTRALIA

Date:	Location:	GPS COORD:
System size:	Type: ◯ Cast-in-place ◯ Precast ◯ Linear	
Number of Cartridges:	Type of Cartridge: ◉ 460mm ◯ 690mm ◯ 310mm	
Filter Media: ◯ ZPG ◯ Perlite		
Type of EnviroPods:		Number of EnviroPods:
Personnel:		

STORMFILTER SYSTEM OBSERVATIONS

Last service:
Sediment Depth on Vault Floor:
Structural Damage:
Cartridges submerged: ◯ Yes ◯ No How deep:
Comments:

ENVIROPOD SYSTEM OBSERVATIONS

Last service:
Amount of Sediment in Basket:
Structural Damage:
Comments:

DRAINAGE AREA REPORT

Excessive Oil and Grease Loading	◯ Yes	◯ No	Source:
Sediment Accumulation on Pavement	◯ Yes	◯ No	Source:
Erosion of Landscaped Areas	◯ Yes	◯ No	Source:
Comments:			

STORMFILTER CARTRIDGE MAINTENANCE ACTIVITIES

Remove Litter and Debris	◯ Yes	◯ No	Details:
Sediment Removed from Vault Floor	◯ Yes	◯ No	Details:
Quantity of Sediment Removed (estimate?):			
Replace Cartridges	◯ Yes	◯ No	Details:
Minor Structural Repairs	◯ Yes	◯ No	Details:
Residuals (debris, sediment) Disposal Methods:			
Notes/Problems:			

ENVIROPOD MAINTENANCE ACTIVITIES

Number of Bags Replaced:	Clogged EnviroPods/Bags: ◯ Yes ◯ No
Comments:	

SFEP Treatment Train Inspection Data Sheet

Stormwater360 AUSTRALIA

It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, large amounts of sediments should be present, very little flow will be discharging from the drainage pipes, and it is likely that the cartridges need to be replaced during major maintenance.

Date:	Location:	GPS COORD:
System size:	Type: ◯ Cast-in-place ◯ Precast ◯ Linear	
Number of Cartridges:	Type of Cartridge: ◯ 460mm ◯ 690mm ◯ 310mm	
Filter Media: ◯ ZPG ◯ Perlite		
Type of EnviroPods:		Number of EnviroPods:
Personnel Attending Inspection:		

STORMFILTER SYSTEM OBSERVATIONS

Last service:			
Sediment Depth on Vault Floor:			
Structural Damage:			
Cartridges submerged:	◯ Yes	◯ No	How deep:
Comments:			

ENVIROPOD SYSTEM OBSERVATIONS

Last service:			
Amount of Sediment in Basket:			
Structural Damage:			
Comments:			

DRAINAGE AREA REPORT

Excessive Oil and Grease Loading	◯ Yes	◯ No	Source:
Sediment Accumulation on Pavement	◯ Yes	◯ No	Source:
Erosion of Landscaped Areas	◯ Yes	◯ No	Source:
Comments:			

Next steps

Learn more

For more detailed technical information about Stormwater360 products and solutions, visit **www.stormwater360.com.au**

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With more than 12 years experience in developing, installing and maintaining innovative and efficient site-specific stormwater management solutions, Stormwater360's highly qualified engineers and consultants can assist you with every aspect of your stormwater project.

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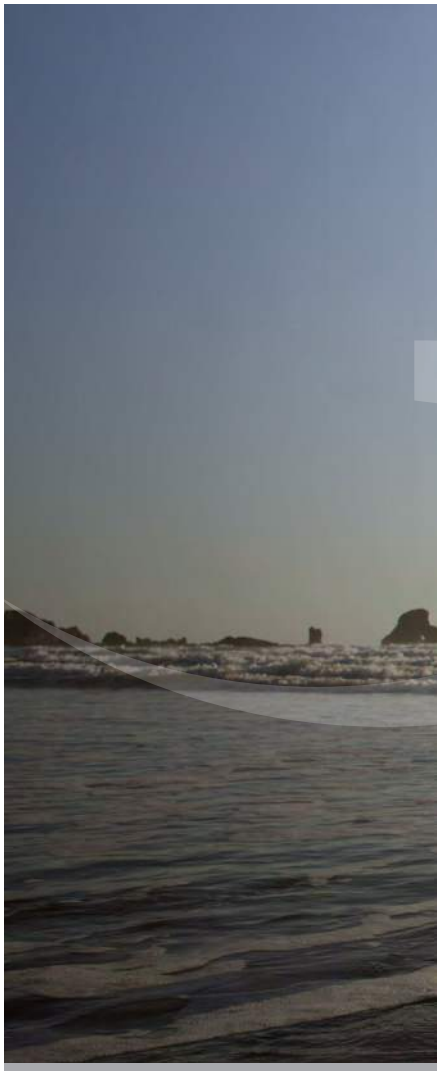
Stormwater360 supplies and maintains a complete range of filtration, hydrodynamic separation, screening and oil/water separation technologies.

Call 1300 354 722



www.stormwater360.com.au

Appendix Q
Clem 7 Tunnel Preliminary Load Assessment

TECHNICAL MEMORANDUM

DATE 13 November 2017 **REFERENCE No.** 1776804-004-TM-Rev0

TO Damon Kambouris
Robert Bird Group

CC Grant Weir (Robert Bird Group)

FROM Cai Min / Robert Haynes **EMAIL** cmin@golder.com.au

PROPOSED JUBILEE HOTEL AT 470 ST PAULS TERRACE, FORTITUDE VALLEY
REVISED TUNNEL PRESSURE ASSESSMENT

Introduction

Golder Associates Pty Ltd (Golder) has been engaged by Robert Bird Group on behalf of Bennett & Associates Pty Ltd to provide an assessment of the foundation loading effects within the CLEM7 volumetric easement for the proposed 11-storey Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley.

North South Bypass Tunnel Performance Specification Exhibit A, Annexure 2, Part 1, Clause 6.2.2 imposes the following requirements with regard to future building pressures above the CLEM7 tunnel:

- Additional vertical loading due to building loads must not exceed 50 kPa (working load) at a level of 1 m above the tunnel crown.
- Building footings and excavations must not be located within 7 m of the tunnel crown.
- Additional filling at surface level is not to exceed 1 m equivalent to 20 kPa.

This Technical Memorandum presents our engineering assessment of impacts on the CLEM7 tunnel arising from the above development.

Provided Information

This assessment has been based on the following information:

- Location Plan prepared by BlightRayner dated 3 April 2017.
- Footing Loads at Basement 2 Extension
- Footing Loads at Basement 2
- Building Section
- Drawing No. S-6441-080-A Rev B – Overall Survey Sheet 1 of 31 prepared by JensenBowers dated 5 February 2013.
- Drawing No. S.6441-080-A Rev B – Overall Survey Sheet 4 of 31 prepared by JensenBowers dated 5 February 2013.
- Drawing No. 051614/8 – "CLEM7 Tunnel Infrastructure Zone of Influence Extents" prepared by City Design dated 17 May 2010.
- As-built Drawing No. NSBT-1030-RP-DG-006224 Rev B: Layout Plan – Sheet 24.
- As-built Drawing No. NSBT-1030-RL-DG-006405 Rev C: Control Line M0A1 – Sheet 6.
- As-built Drawing No. NSBT-1030-RL-DG-006412 Rev C: Control Line M0B1 – Sheet 6.
- As-built Drawing No. NSBT-1250-TU-DG-060130 Rev B: TBM Tunnel Cross Section.
- As-built Drawing No. NSBT-1260-TU-DG-060300 Rev B: Ring Configuration – Cross Section.

The above information is presented in Attachment A.

Subsurface Conditions

Based on existing borehole information, the expected soil cover should be about 1 to 3 m above Brisbane Tuff. Rock strength should range from very low to high.

Conditions and Assumptions for Analysis

The existing ground surface level is taken as RL 11.1 m AHD on the Constance Street side and RL 7.1 m AHD at Symes Street, varying linearly between the two streets. This will need to be confirmed on site.

The level of the proposed basement is taken as RL 1.1 m AHD for Basement 2 and RL -1.9 m AHD for Basement 2 Extension respectively.

All the column loads are assumed to act at the bottom of footings.

The tunnel crown level is taken to be at RL -14.4 m AHD.

The location at 1 m above tunnel crown is approximately 20.5 m below the existing lower ground level (taken as RL 7.1 m AHD).

The average density of materials to be excavated is assumed to be 24 kN/m^3. This will need to be confirmed by a detailed investigation at the site.

Results of Analysis

The additional vertical stresses have been analysed using the commercially available software Settle3D. Settle3D is a program that performs the analysis of the 1-dimensional vertical settlement of soil/rock under 3-dimensional stress distribution conditions. The software was used to estimate pressures applied at 1 m above the tunnel crown due to the proposed building footing loads. Load relaxation due to proposed site excavation has also been taken into account in the model. The stress distribution was calculated by the Boussinesq method for rigid footings.

Two cases regarding footing sizes have been analysed as follows:

- Case 1: The footing sizes are the same as those provided.
- Case 2: The footings for Columns C5 and C6 are combined to a 3.5 m x 18.3 m footing.

The pressure change contours in Plan View at 1 m above the tunnel crown are illustrated in Figures 1 and 2 for Case 1 and Case 2 respectively.

The pressure change contours in 3D View at 1 m above the tunnel crown are illustrated in Figures 3 and 4 for Case 1 and Case 2 respectively.

The pressure changes along cross section A-A are illustrated in Figures 5 and 6 for Case 1 and Case 2 respectively.

The pressure changes along cross section B-B are illustrated in Figures 7 and 8 for Case 1 and Case 2 respectively.

The pressure changes along cross section C-C are illustrated in Figures 9 and 10 for Case 1 and Case 2 respectively.

Note that all the stresses are under working load conditions (serviceability limit state).

Engineering Comment

Based on the current information and assumptions, the maximum additional vertical stresses as a result of the proposed development at 1 m above the tunnel crown are:

- 68 kPa - exceeds the NSBT specification limit of 50 kPa for Case 1, and
- 44 kPa - within the NSBT specification limit of 50 kPa for Case 1.

We recommend the following:

- A combined footing of approximately 3.5 m x 18.3 m in size should be adopted to support Columns C5 and C6. This reduces the pressure increase from 68 to 37 kPa, and
- The existing ground level in the proposed development footprint must be checked by survey as this affects the additional vertical stresses on the CLEM7 tunnel.

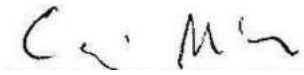
This Technical Memorandum should be revisited and updated as the building layout, founding levels, footing sizes and loadings are modified.

Important Information

Your attention is drawn to the document - “Important Information”, which is included as an Attachment B. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimise the risks associated with the services provided for this project. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

Should you have any queries, or require further clarification, please contact either of the undersigned.

GOLDER ASSOCIATES PTY LTD



Cai Min
Senior Geotechnical Engineer

Robert Haynes
Associate

CM/RJH/cm

Attachments: Figure Nos. 1 to 10
Attachment A: Provided Information
Attachment B: Important Information

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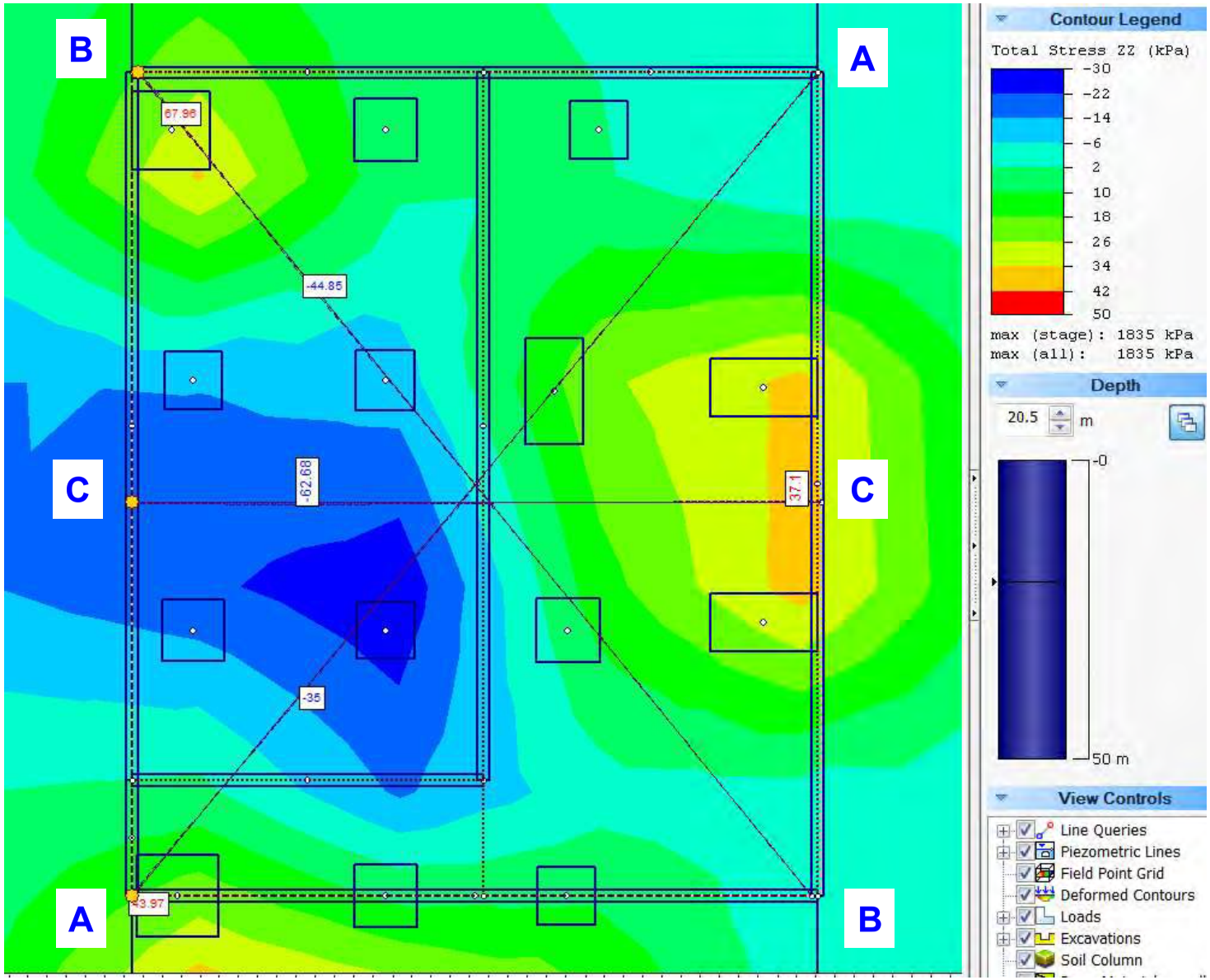
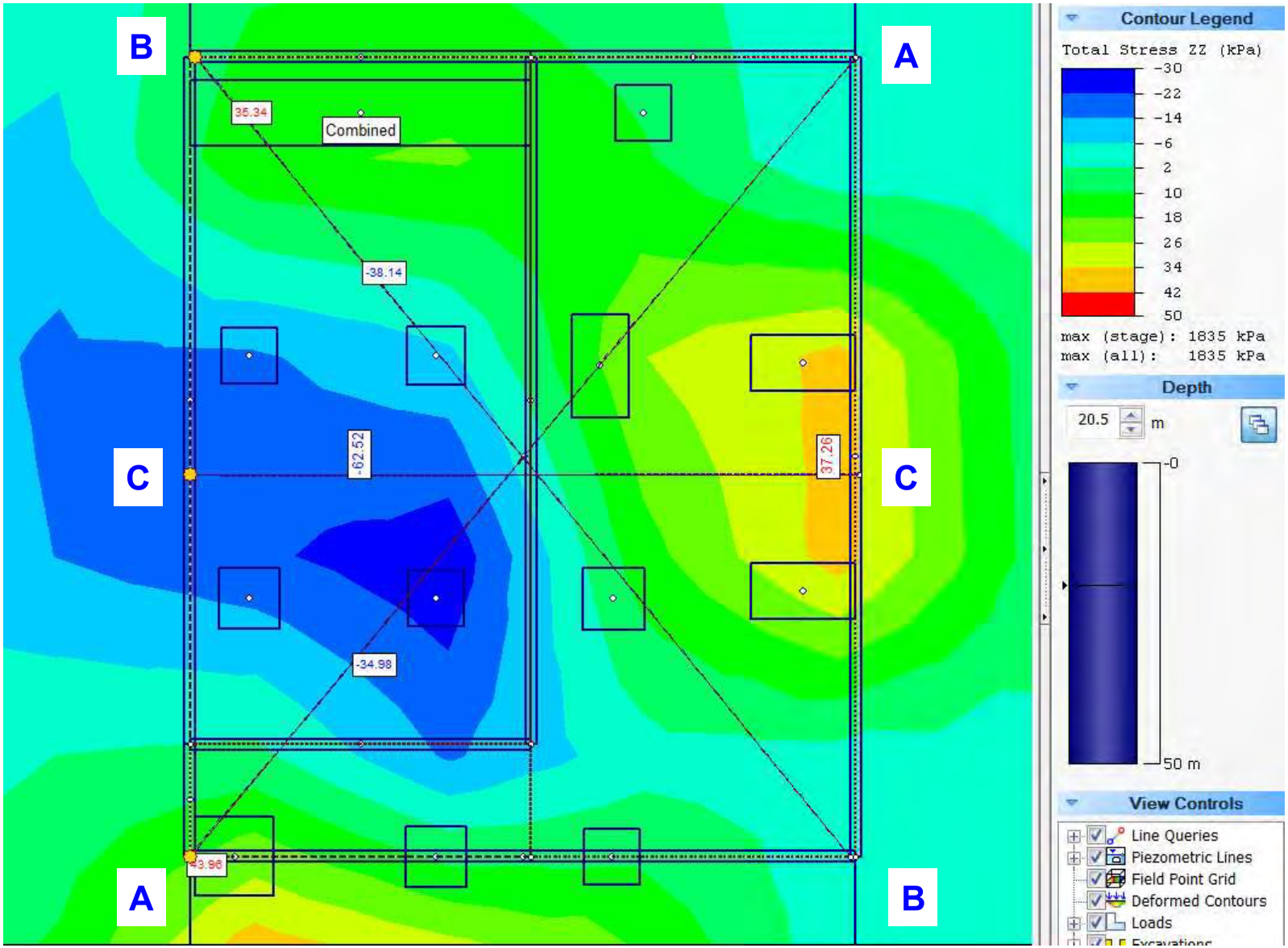
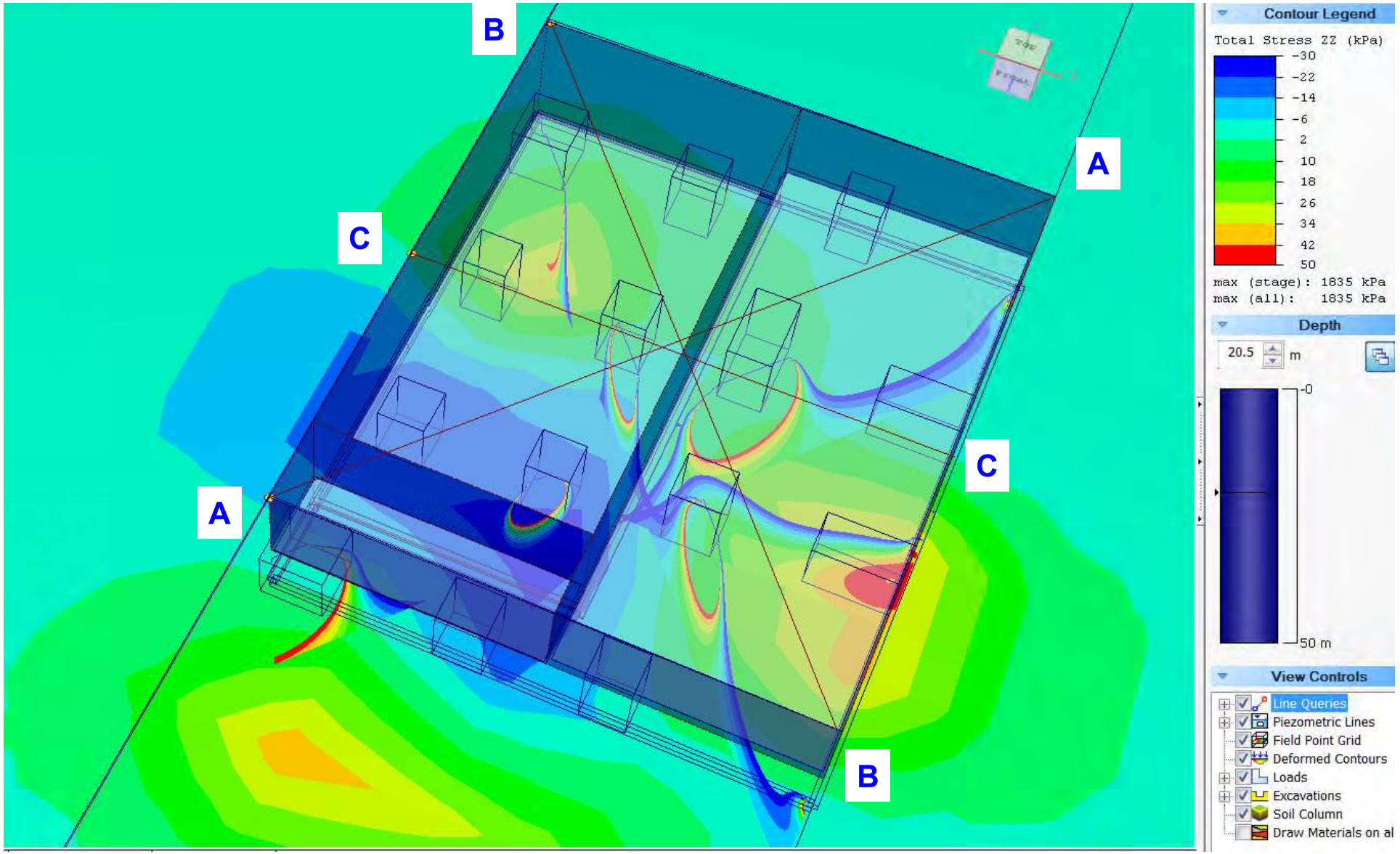
Figures



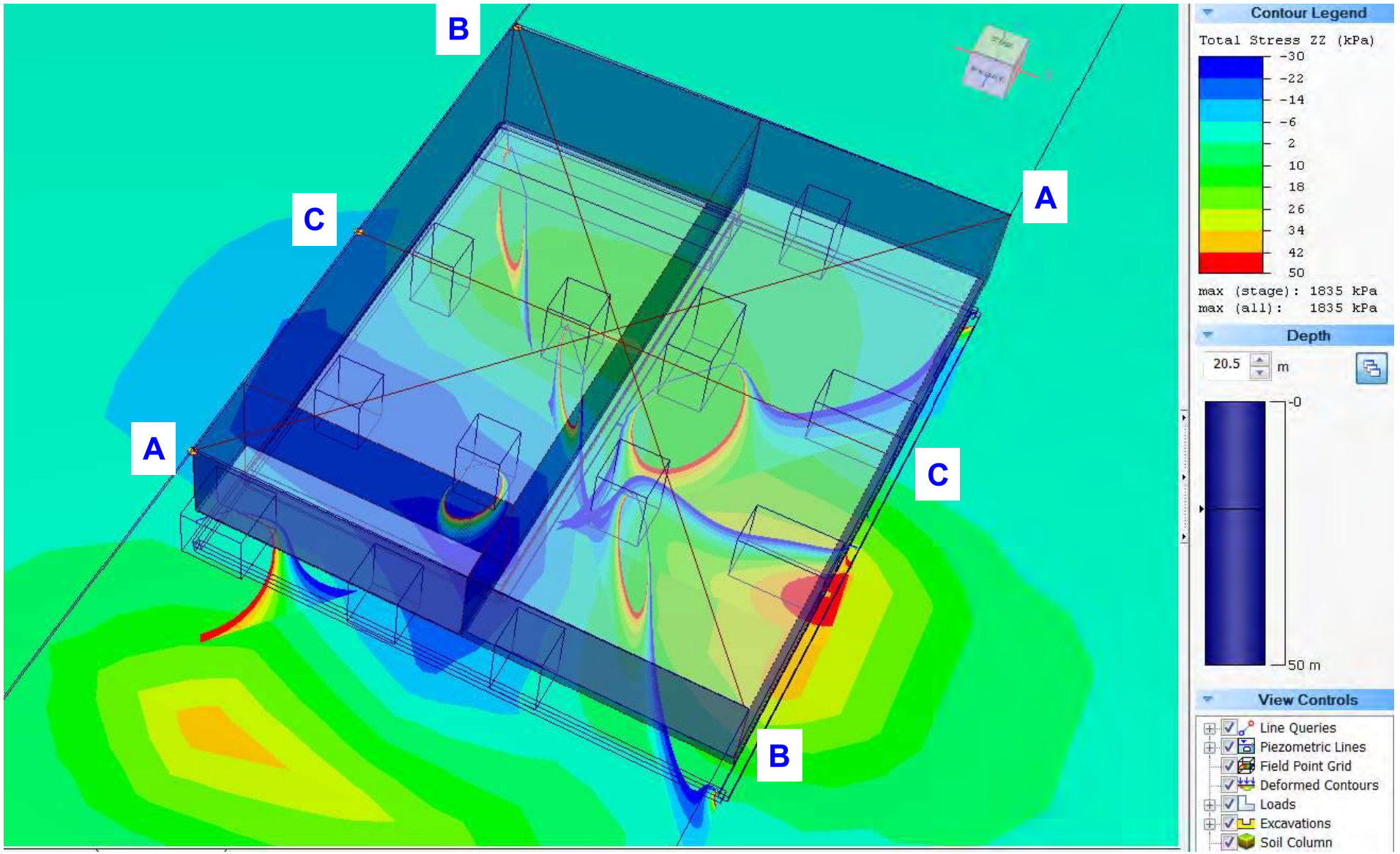
CLIENT	Robert Bird Group	PROJECT	Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
DRAWN CM	DATE 13/11/2017	TITLE	Settle3D Output Plan View: Change in Vertical Stress Contours at 1 m above tunnel crown: Case 1
CHECKED RJH	DATE 13/11/2017		
SCALE Not to scale		PROJECT No 1776804-004	FIGURE No 1 / REV No 0 / A4



Golder Associates	CLIENT: Robert Bird Group		PROJECT: Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
	DRAWN: CM	DATE: 13/11/2017	TITLE: Settle3D Output Plan View: Change in Vertical Stress Contours at 1 m above tunnel crown: Case 2
	CHECKED: RJH	DATE: 13/11/2017	
	SCALE: Not to scale	PROJECT No: 1776804-004	FIGURE No: 2 / REV No: 0 / A4



Golder Associates	CLIENT: Robert Bird Group		PROJECT: Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
	DRAWN: CM	DATE: 13/11/2017	TITLE: Settle3D Output 3D View: Change in Vertical Stress Contours at 1 m above tunnel crown: Case 1
	CHECKED: RJH	DATE: 13/11/2017	
	SCALE: Not to scale	PROJECT No: 1776804-004	FIGURE No: 3 / REV No: 0 / A4

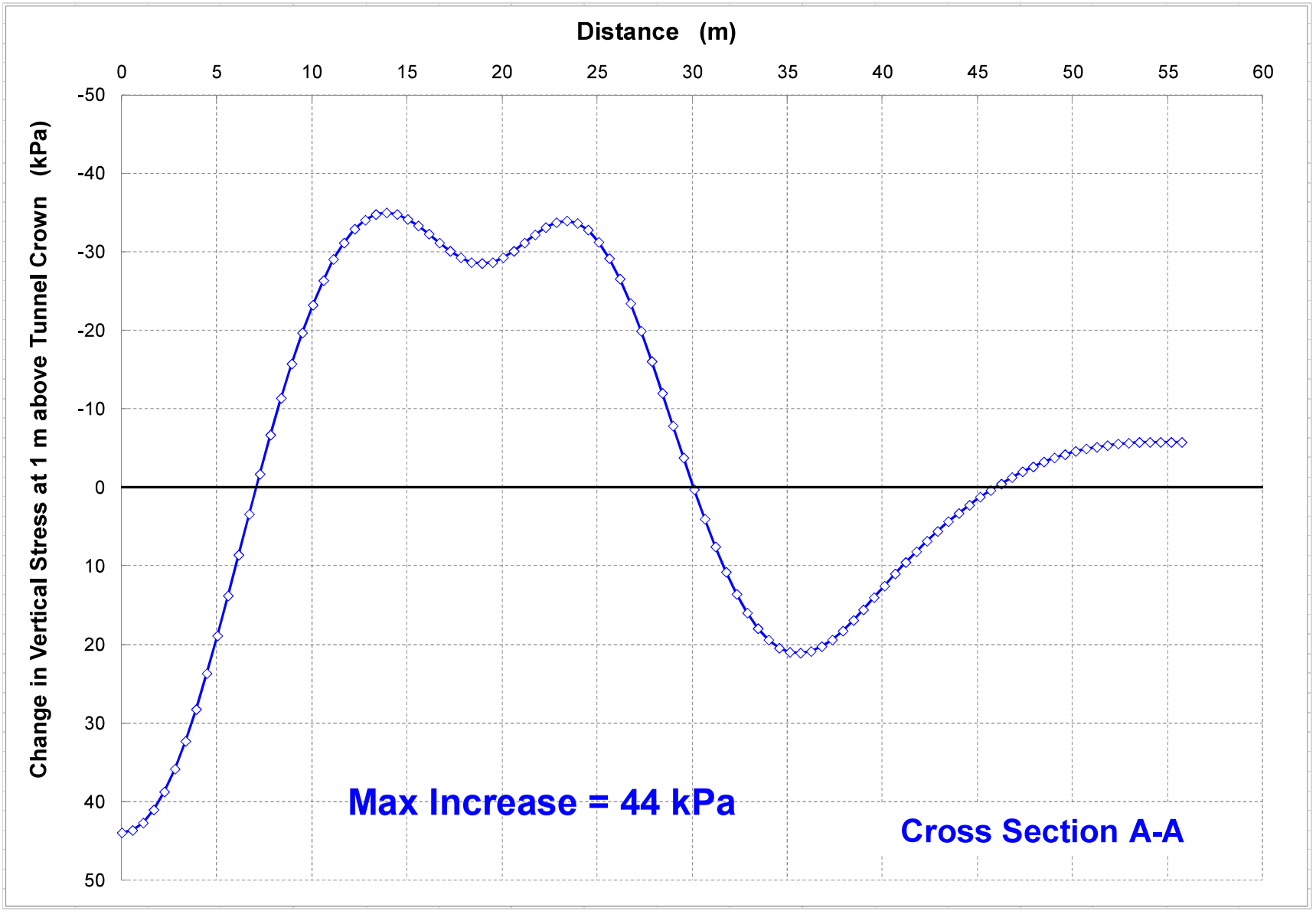


Golder Associates	CLIENT: Robert Bird Group		PROJECT: Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
	DRAWN: CM	DATE: 13/11/2017	TITLE: Settle3D Output 3D View: Change in Vertical Stress Contours at 1 m above tunnel crown: Case 2
	CHECKED: RJH	DATE: 13/11/2017	
	SCALE: Not to scale	PROJECT No: 1776804-004	FIGURE No: 4 / REV No: 0 / A4

Golder Associates

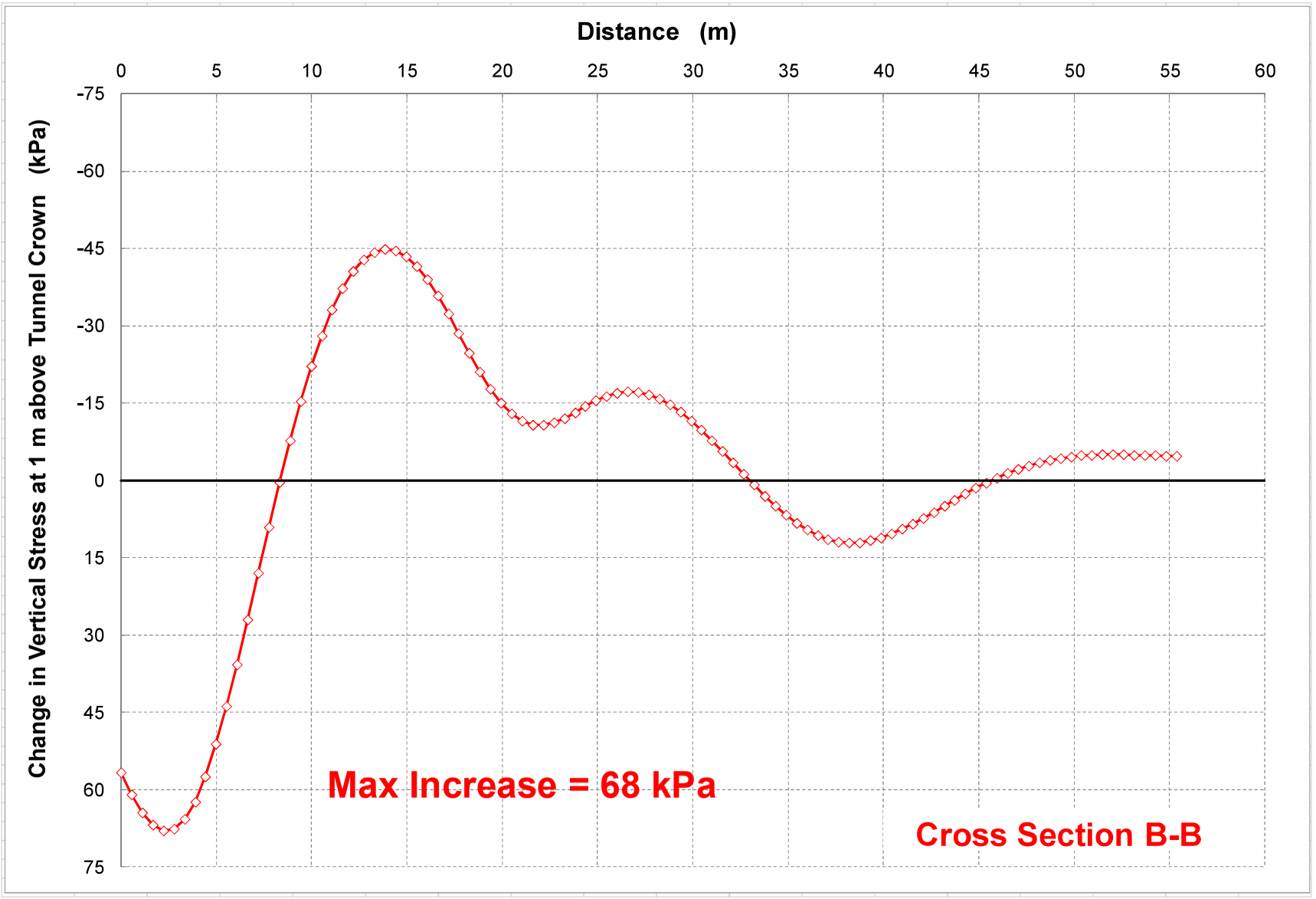
CLIENT	Robert Bird Group	PROJECT	Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
DRAWN CM	DATE 13/11/2017	TITLE	Change in Vertical Stress along Section A-A at 1 m above Tunnel: Case 1
CHECKED RJH	DATE 13/11/2017		
SCALE	Not to scale	PROJECT No 1776804-004	FIGURE No 5 / REV No 0 / A4

T:\Templates\Figure Templates\Powerpoint\GAP A4L.pot



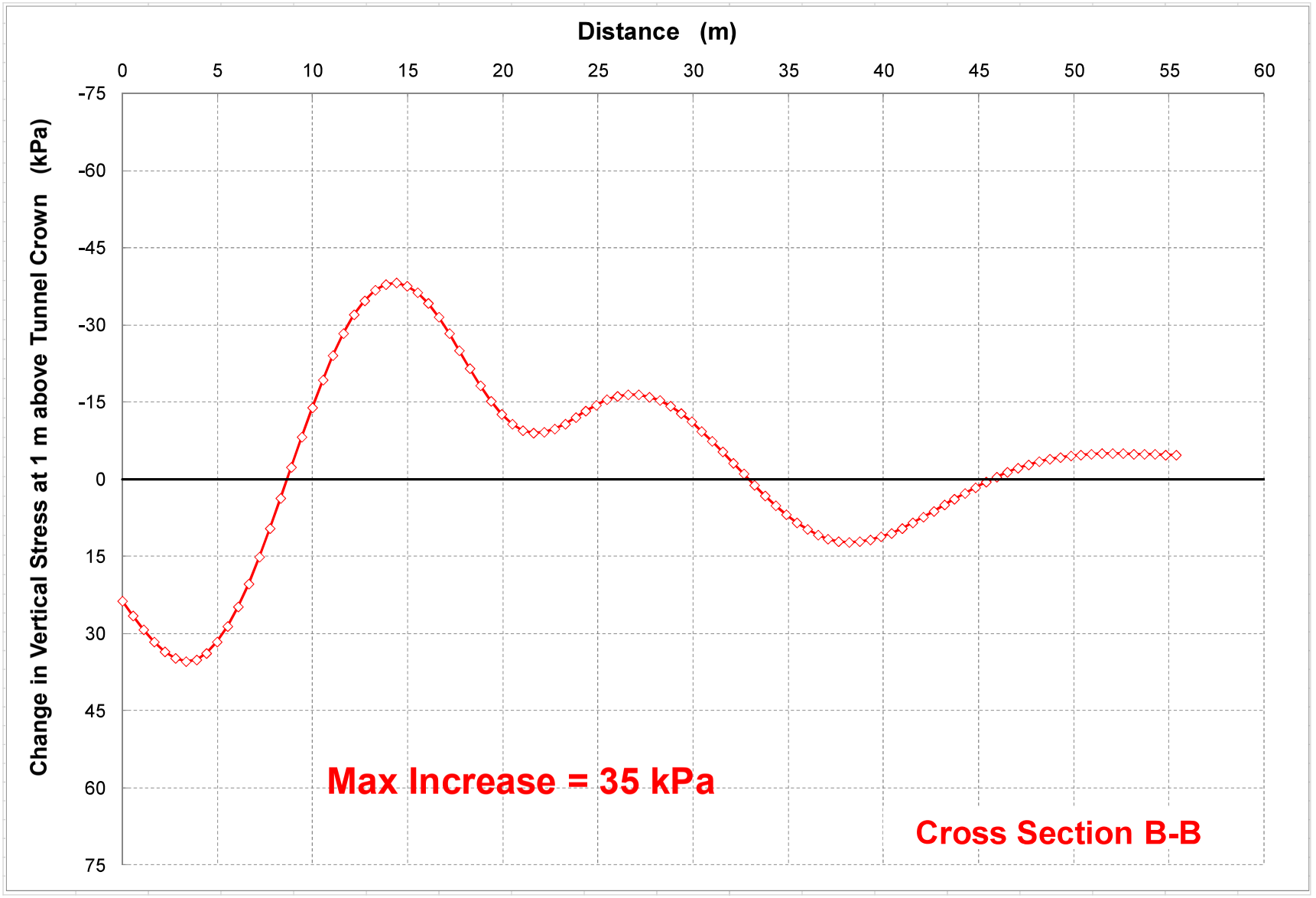
Golder Associates

CLIENT	Robert Bird Group	PROJECT	Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
DRAWN CM	DATE 13/11/2017	TITLE	Change in Vertical Stress along Section A-A at 1 m above Tunnel: Case 2
CHECKED RJH	DATE 13/11/2017		
SCALE	Not to scale	PROJECT No 1776804-004	FIGURE No 6 / REV No 0 / A4



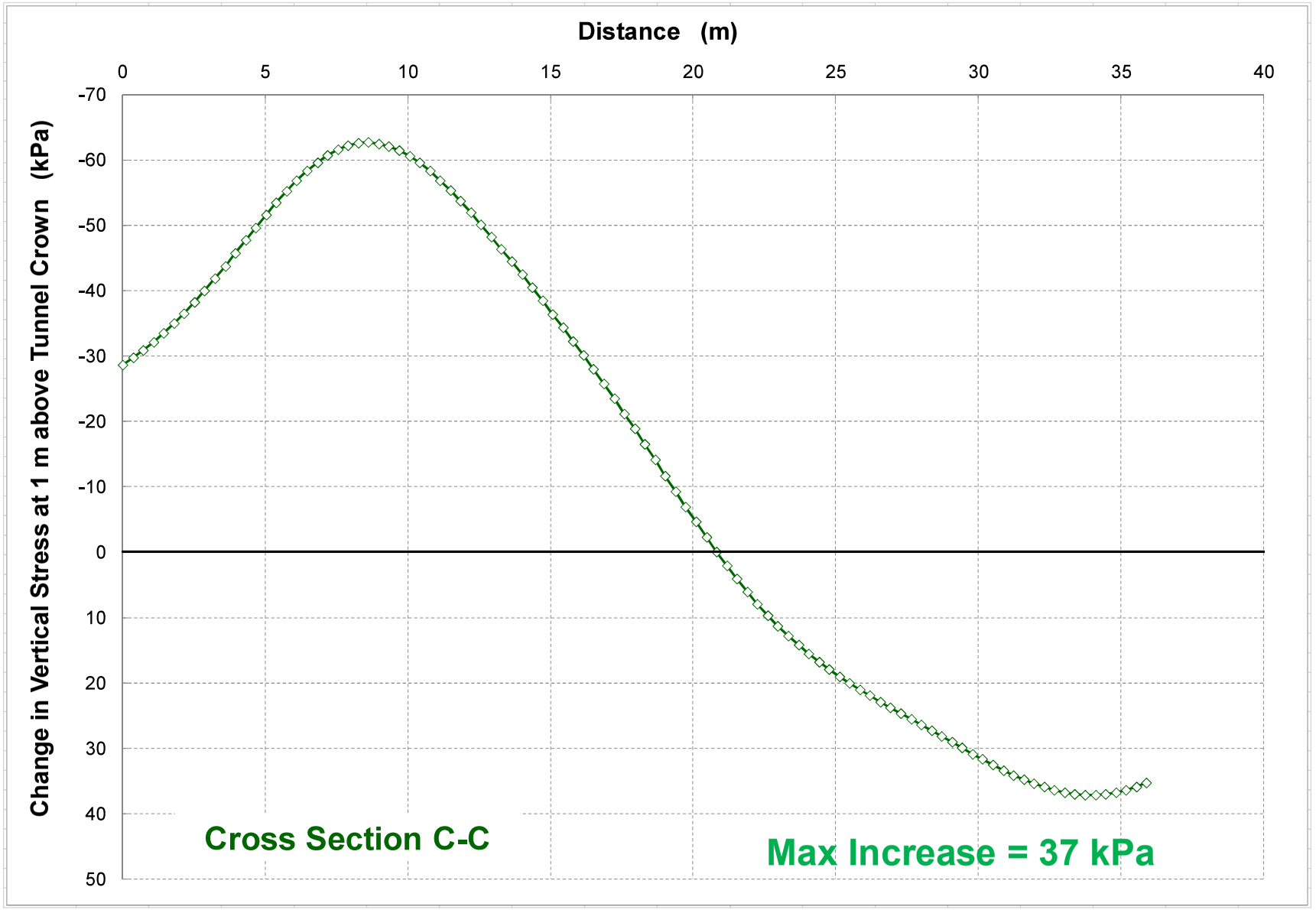
CLIENT: Robert Bird Group		PROJECT: Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley	
DRAWN: CM	DATE: 13/11/2017	TITLE: Change in Vertical Stress along Section B-B at 1 m above Tunnel: Case 1	
CHECKED: RJH	DATE: 13/11/2017		
SCALE: Not to scale		PROJECT No: 1776804-004	FIGURE No: 7 / REV No: 0 / A4

T:\Templates\Figure Templates\Powerpoint\GAP A4L.pot

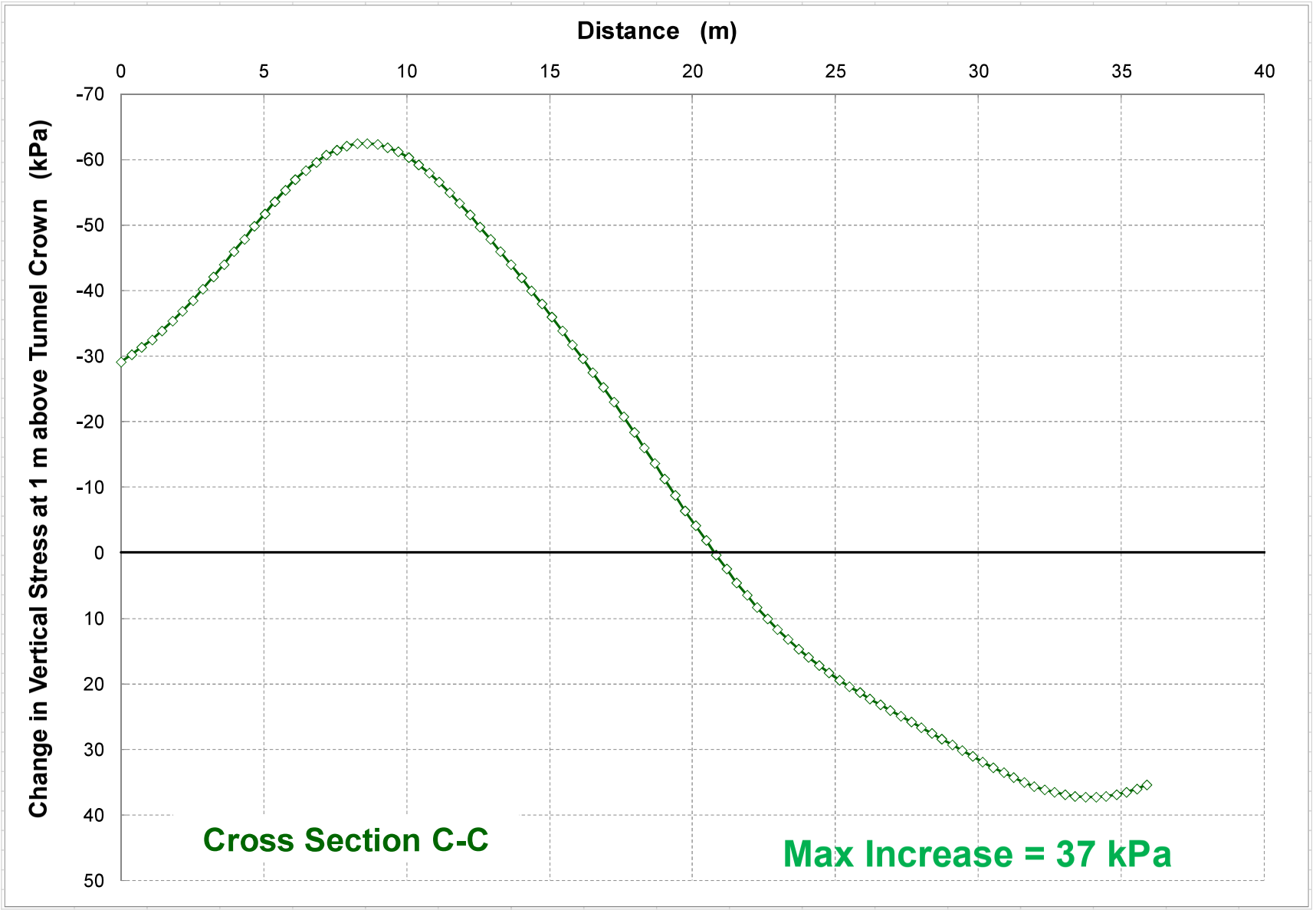


Golder Associates

CLIENT	Robert Bird Group	PROJECT	Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
DRAWN CM	DATE 13/11/2017	TITLE	Change in Vertical Stress along Section B-B at 1 m above Tunnel: Case 2
CHECKED RJH	DATE 13/11/2017		
SCALE	Not to scale	PROJECT No 1776804-004	FIGURE No 8 / REV No 0 / A4



CLIENT: Robert Bird Group		PROJECT: Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley	
DRAWN: CM	DATE: 13/11/2017	TITLE: Change in Vertical Stress along Section C-C at 1 m above Tunnel: Case 1	
CHECKED: RJH	DATE: 13/11/2017		
SCALE: Not to scale		PROJECT No: 1776804-004	FIGURE No: 9 / REV No: 0 / A4



Golder Associates

CLIENT	Robert Bird Group	PROJECT	Tunnel Pressure Assessment Jubilee Hotel at 470 St Pauls Terrace, Fortitude Valley
DRAWN CM	DATE 13/11/2017	TITLE	Change in Vertical Stress along Section C-C at 1 m above Tunnel: Case 2
CHECKED RJH	DATE 13/11/2017		
SCALE	Not to scale	PROJECT No 1776804-004	FIGURE No 10 / REV No 0 / A4

Attachment A – Provided Information

LOCATION PLAN

RNA SHOWGROUNDS

GREGORY TERRACE

MACHINERY STREET

MISTERTON STREET

THE GREEN

KING STREET

BREWERS STREET

PROPOSED DEVELOPMENT

K1

JAMES STREET

ST PAULS TERRACE

CONSTANCE STREET

GREEN SQUARE

BROOKES STREET

ALFRED STREET

FORTITUDE VALLEY TRAIN STATION

VALLEY POOL

WICKHAM STREET

CHINATOWN

JUBILEE HOTEL 470 ST PAULS TERRACE

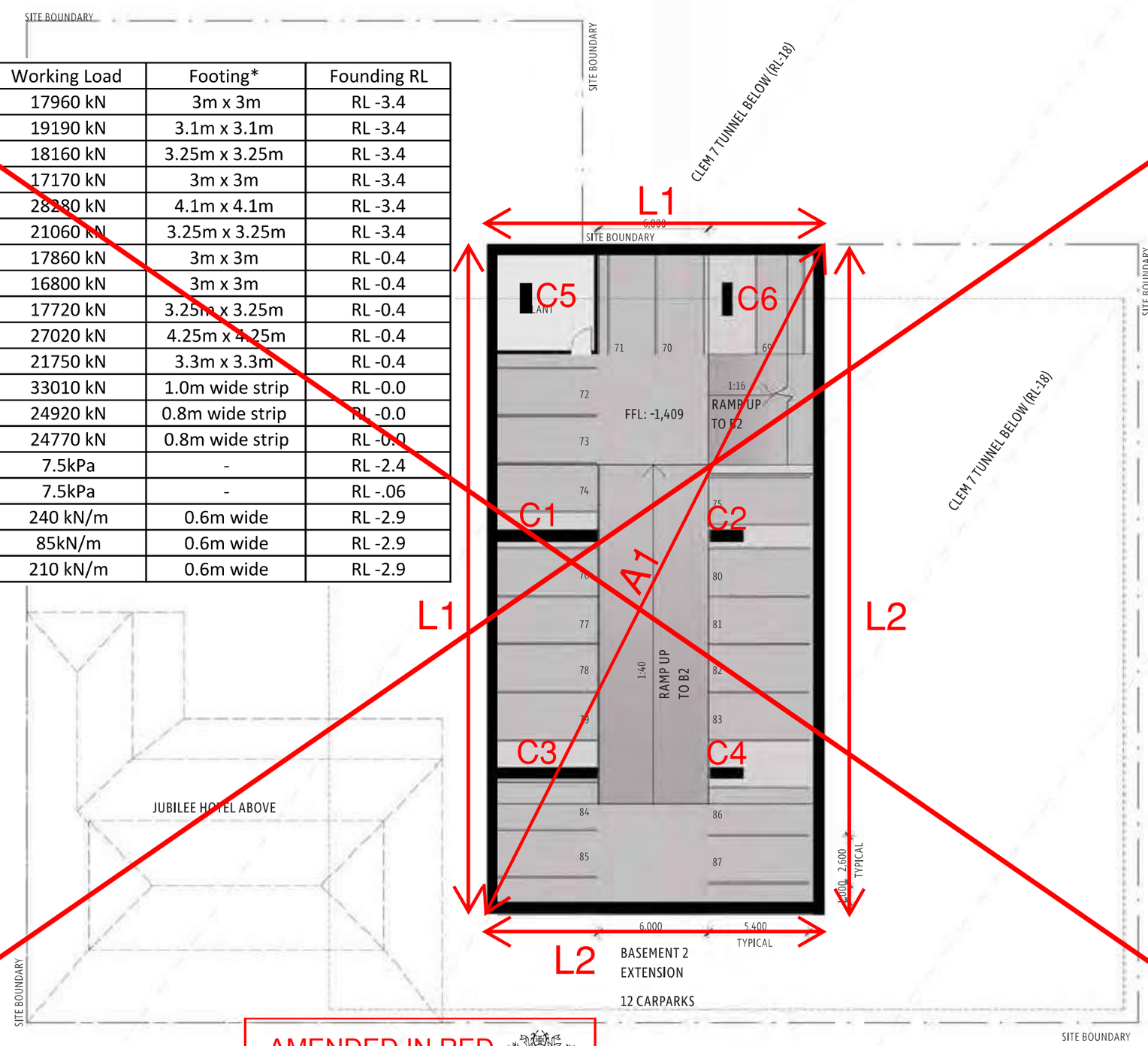
03.04.2017

BlightRayner

DA.05 BASEMENT 2 EXTENSION

1:250@A3 0 2 4 6

Column ID	Working Load	Footing*	Founding RL
C1	17960 kN	3m x 3m	RL -3.4
C2	19190 kN	3.1m x 3.1m	RL -3.4
C3	18160 kN	3.25m x 3.25m	RL -3.4
C4	17170 kN	3m x 3m	RL -3.4
C5	28280 kN	4.1m x 4.1m	RL -3.4
C6	21060 kN	3.25m x 3.25m	RL -3.4
C7	17860 kN	3m x 3m	RL -0.4
C10	16800 kN	3m x 3m	RL -0.4
C11	17720 kN	3.25m x 3.25m	RL -0.4
C12	27020 kN	4.25m x 4.25m	RL -0.4
C13	21750 kN	3.3m x 3.3m	RL -0.4
Core 1	33010 kN	1.0m wide strip	RL -0.0
Core 2	24920 kN	0.8m wide strip	RL -0.0
Core 3	24770 kN	0.8m wide strip	RL -0.0
A1	7.5kPa	-	RL -2.4
A2	7.5kPa	-	RL -.06
L1	240 kN/m	0.6m wide	RL -2.9
L2	85kN/m	0.6m wide	RL -2.9
L3	210 kN/m	0.6m wide	RL -2.9



AMENDED IN RED

By: Tom Barker

Date: 12 February 2018

Queensland Government

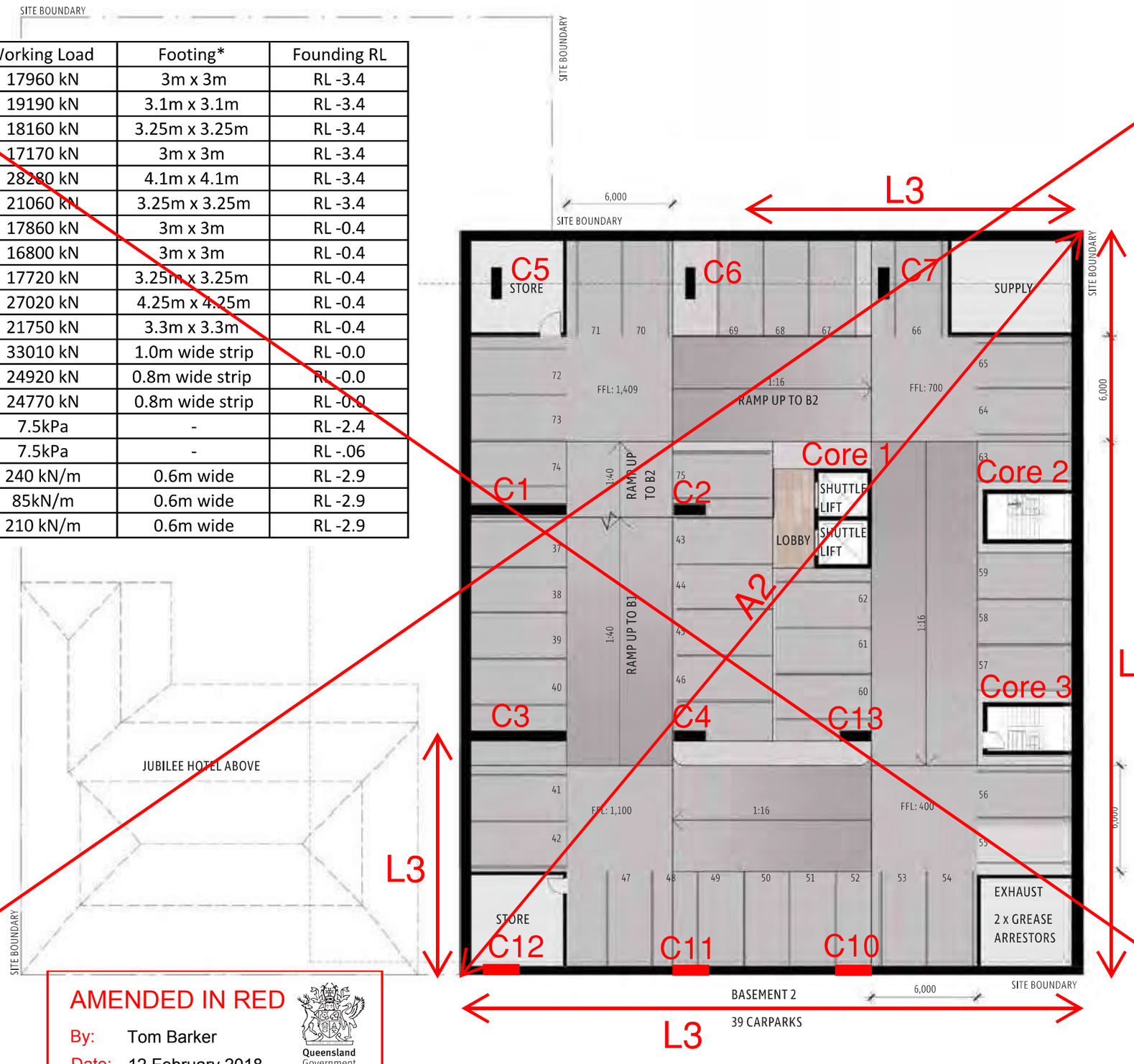
FOOTING LOADS
RBG 06/10/2017
17206S 1/2

SUPERSEDED - REFER TO APPROVED PLANS/DOCUMENTS

DA.04 BASEMENT 2

1:250@A3 0 2 4 6

Column ID	Working Load	Footing*	Founding RL
C1	17960 kN	3m x 3m	RL -3.4
C2	19190 kN	3.1m x 3.1m	RL -3.4
C3	18160 kN	3.25m x 3.25m	RL -3.4
C4	17170 kN	3m x 3m	RL -3.4
C5	28280 kN	4.1m x 4.1m	RL -3.4
C6	21060 kN	3.25m x 3.25m	RL -3.4
C7	17860 kN	3m x 3m	RL -0.4
C10	16800 kN	3m x 3m	RL -0.4
C11	17720 kN	3.25m x 3.25m	RL -0.4
C12	27020 kN	4.25m x 4.25m	RL -0.4
C13	21750 kN	3.3m x 3.3m	RL -0.4
Core 1	33010 kN	1.0m wide strip	RL -0.0
Core 2	24920 kN	0.8m wide strip	RL -0.0
Core 3	24770 kN	0.8m wide strip	RL -0.0
A1	7.5kPa	-	RL -2.4
A2	7.5kPa	-	RL -.06
L1	240 kN/m	0.6m wide	RL -2.9
L2	85kN/m	0.6m wide	RL -2.9
L3	210 kN/m	0.6m wide	RL -2.9



AMENDED IN RED

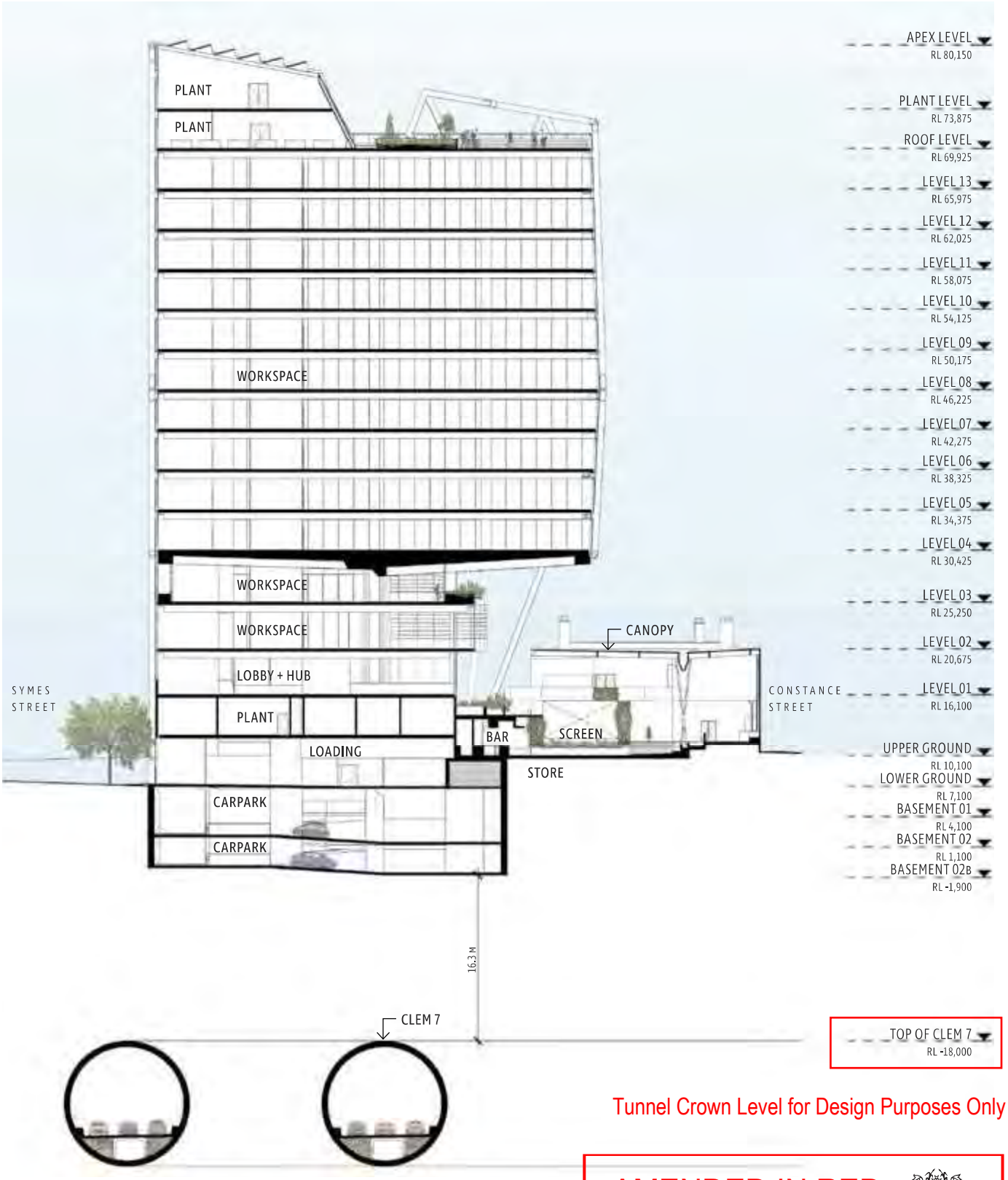
By: Tom Barker

Date: 12 February 2018

Queensland Government

FOOTING LOADS
RBG 06/10/2017
17206S 2/2

SUPERSEDED - REFER TO APPROVED PLANS/DOCUMENTS



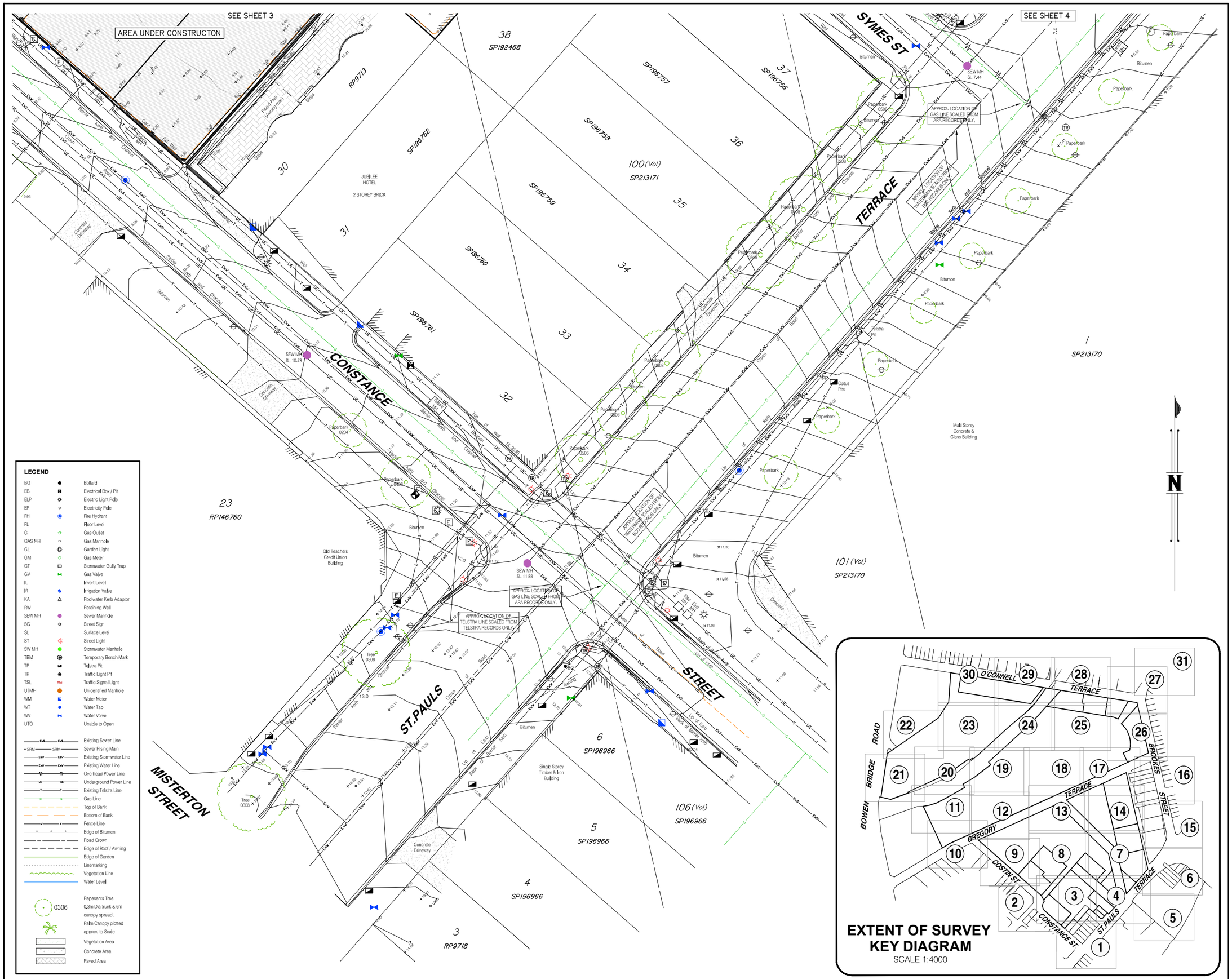
Tunnel Crown Level for Design Purposes Only

AMENDED IN RED

By: Tom Barker

Date: 12 February 2018

Queensland Government



LEGEND

BO	Bollard
EB	Electrical Box / Pit
ELP	Electric Light Pole
EP	Electricity Pole
FH	Fire Hydrant
FL	Floor Level
G	Gas Outlet
GAS MH	Gas Manhole
GL	Garden Light
GM	Gas Meter
GT	Stormwater Gully Trap
GV	Gas Valve
IL	Invert Level
IR	Irrigation Valve
KA	Roofwater Kerb Adaptor
RW	Retaining Wall
SEW MH	Sewer Manhole
SG	Street Sign
SL	Surface Level
ST	Street Light
SW MH	Stormwater Manhole
TBM	Temporary Bench Mark
TP	Telstra Pit
TR	Traffic Light Pit
TSL	Traffic Signal Light
UI MH	Unidentified Manhole
WM	Water Meter
WT	Water Tap
WV	Water Valve
UTO	Unable to Open

Existing Sewer Line
Sewer Rising Main
Existing Stormwater Line
Existing Water Line
Overhead Power Line
Underground Power Line
Existing Telstra Line
Gas Line
Top of Bank
Bottom of Bank
Fence Line
Edge of Bitumen
Road Crown
Edge of Roof / Awning
Edge of Garden
Linemarking
Vegetation Line
Water Level

0306 Represents Tree 0.3m Dia trunk & 6m canopy spread, Palm Canopy plotted approx. to Scale

Vegetation Area
Concrete Area
Paved Area

EXTENT OF SURVEY KEY DIAGRAM
SCALE 1:4000

JENSEN BOWERS
SURVEYORS
PLANNERS
DEVELOPMENT ADVISORS
jensenbowers.com.au

72 Costin Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818

T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
ABN. 52 010 872 607

Associated Consultants

Local Authority:	Brisbane City Council
File Ref. No:	6441
RP Description:	Lots 101-107 & 701 on SP219236, Lots 108-111 & 702 on SP219237, Lots 112-115 & 703 on SP238193 & Lots 116 & 704 on SP219239.
Original Portion:	-
Parish/County:	North Brisbane / Stanley
Date of Survey:	Oct 2012
Level Datum:	AHD (der)
Origin:	OPM131345 - (RL 14.765m)
Level Bk / Fld Bk:	
Horizontal Datum:	GDA94
Contour Interval:	0.25m

Scale

0 4 8 12m
1 : 200@A1
1 : 400@A3 (Before Reduction)

Notes

The services shown hereon have been located where possible by field survey. Whilst due care and attention have been exercised, T.H. Jensen and Bowers Pty. Ltd. does not warrant that the services have been located in their entirety.

The boundaries shown hereon are for plotting purposes only and are subject to final survey.

The location of underground service lines are approximate only and have been plotted from field survey observations and/or service searches. Should their accurate location be critical to detail design we recommend further investigation.

Disclaimer

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Drawn:	SS	Date:	12-12-12
Surveyed:	SK,JF,CK,KN	Date:	OCT 12
Checked:	SJM	Date:	12-12-12
Approved:			

Issue	Description	Date	Appd.
A	Original Issue	12-12-12	SJM
B	Additional Serviced Added	5-2-13	SJM

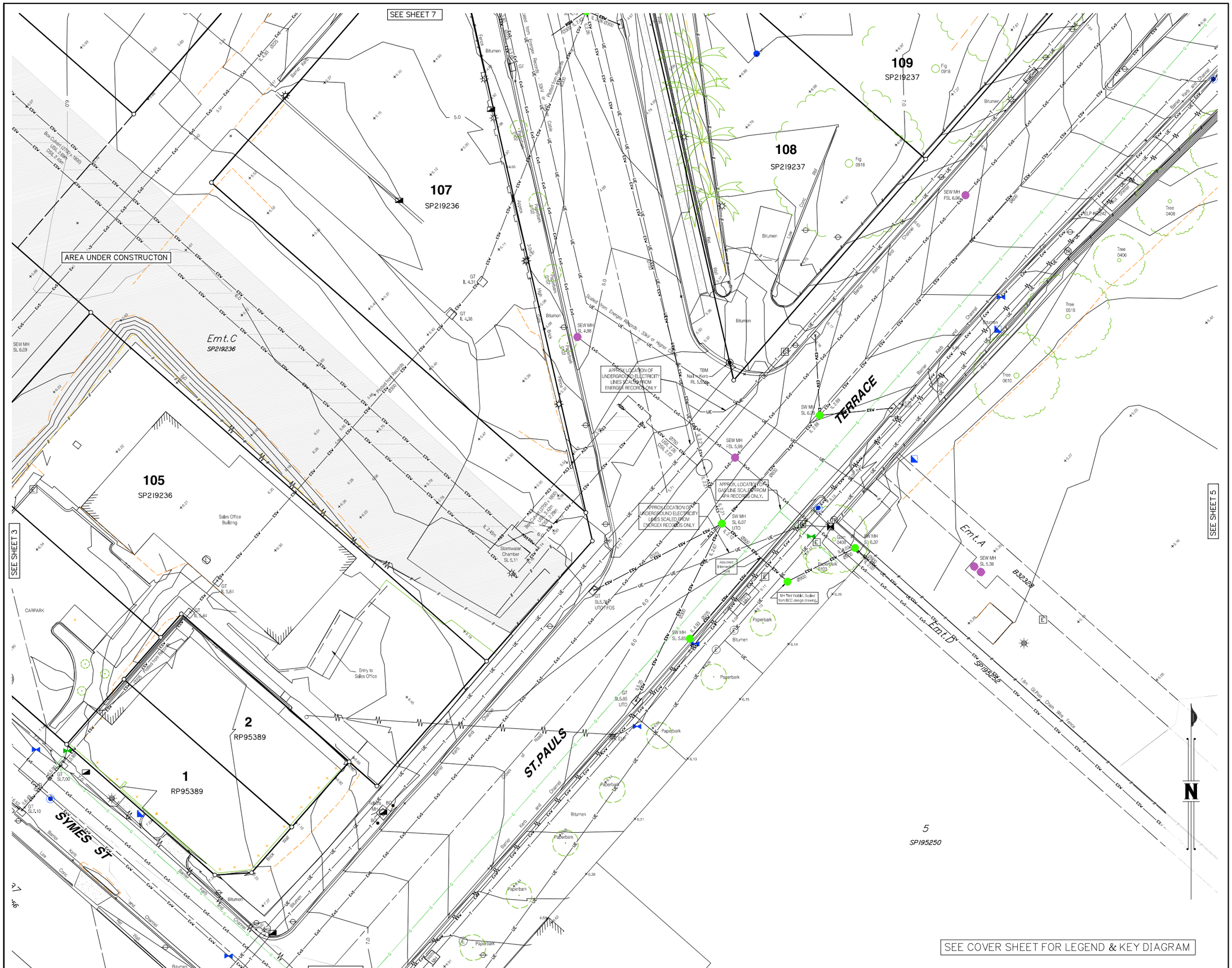
Client

LEND LEASE DEVELOPMENT P/L

RNA SHOWGROUNDS
600 Gregory Terrace, Bowen Hills

DETAIL SURVEY
Sheet 1 of 31

Drawing No.	Original Size
S-6441-080-A	A1



JENSEN BOWERS

SURVEYORS
PLANNERS
DEVELOPMENT ADVISORS

jensenbowers.com.au

72 Costin Street, Fortitude Valley, Qld. 4006
PO Box 799, Spring Hill, Qld. 4004
T (07) 3852 1771 **F** (07) 3252 9818

T.H. Jensen & Bowers Pty. Ltd. (Consulting Surveyors)
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Associated Consultants

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Origin:	OPM131345 - (RL 14.765m)
Level Bk / Fld Bk:	
Horizontal Datum:	GDA94
Contour Interval:	0.25m

Scale

0 4 8 12m
1 : 200@A1
1 : 400@A3 (Before Reduction)

Notes

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Drawn:	SS	Date:	12-12-12
Surveyed:	SK,JF,CK,KN	Date:	OCT 12
Checked:	SJM	Date:	12-12-12
Approved:			

Issue	Description	Date	Appd.
A	Original Issue	12-12-12	SJM
B	Additional Serviced Added	5-2-13	SJM

Client

LEND LEASE DEVELOPMENT P/L

RNA SHOWGROUNDS
600 Gregory Terrace, Bowen Hills

DETAIL SURVEY
Sheet 4 of 31

Drawing No.	Original Size
S-6441-080-A	A1

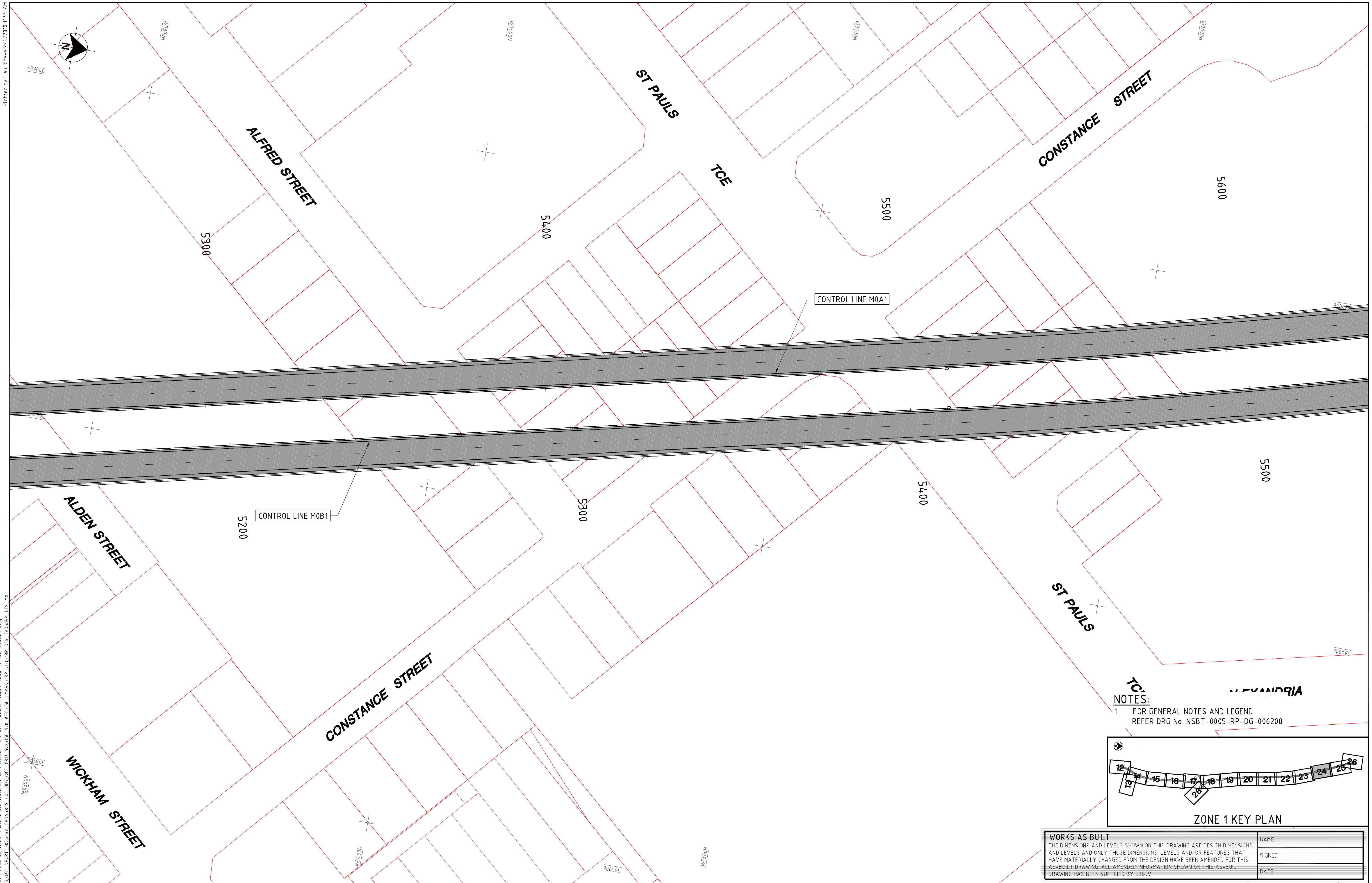
CLEM7 Tunnel

Infrustructure Zone of Influence Extents

PREPARED BY CITY DESIGN

17 May 2010

Horizontal Datum: BCSG02
Vertical Datum: AHD
Field Book:
Contour Interval:
Survey Information
Survey/Design
Drawn: JHH 10/05/2010
Checked
Authorised for Issue
Horizontal Scale: (Before Reduction)
Reference No
Scale: SCALE 1:1000
Drawing Number / Sheet: 051614 / 8
Issue



NOTES:

1. FOR GENERAL NOTES AND LEGEND REFER DRG No. NSBT-0005-RP-DG-006200

ZONE 1 KEY PLAN

WORKS AS BUILT
THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.

NAME	
SIGNED	
DATE	

This drawing is confidential and shall only be used for the purposes of this project.

REVISIONS

REV	DATE	DESCRIPTION	APPD
B	03.02.10	AS BUILT - SITE CONFIRMATION RECEIVED	PPK
A	05.02.07	ISSUED FOR CONSTRUCTION	PPK

SCALE BARS

SCALE B 0 10 20 25m
1 : 1000 (A3) 1 : 500 (A1)

ORIGINAL FOR CONSTRUCTION DRAWING SIGNED BY P.P. KOUPARITSAS

WORKS AS BUILT
THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.

NAME:	A.A. PECK
SIGNED:	[signature]
DATE:	18-06-2010

RIVERCITY MOTORWAY

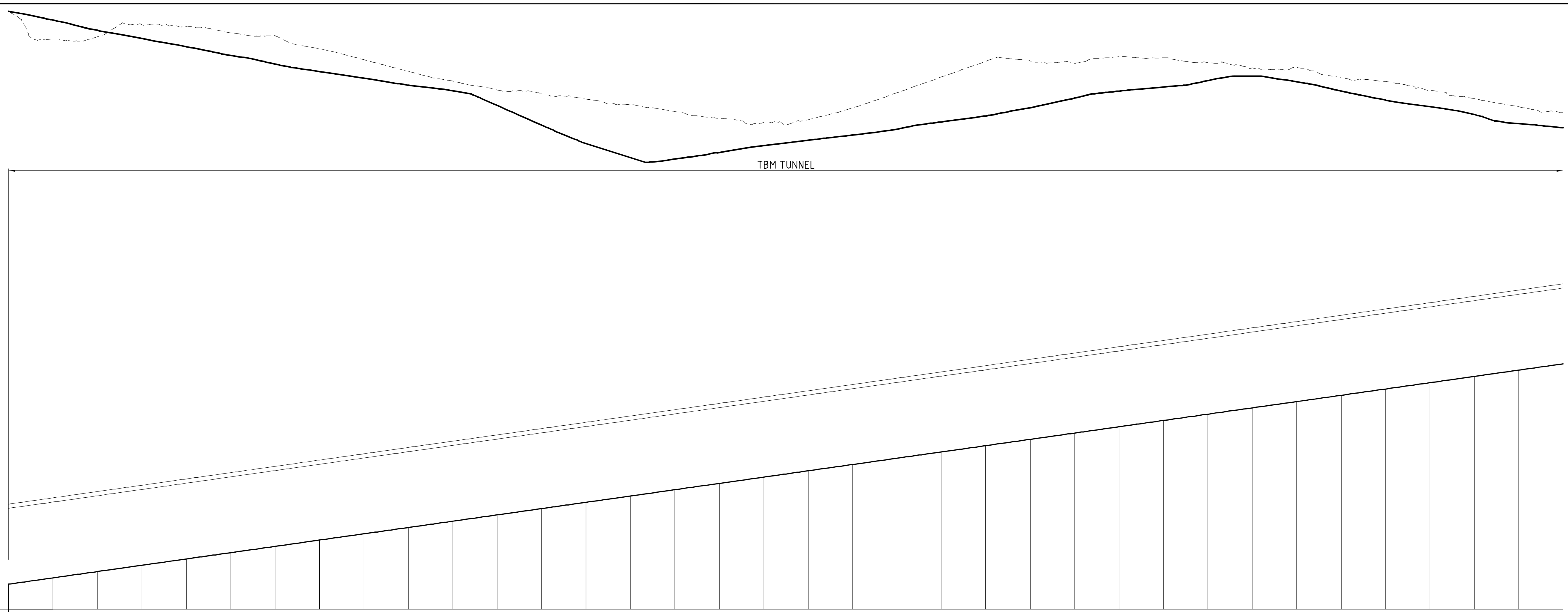
LBB JV

MPB NORTH SOUTH BYPASS TUNNEL
Maunsell Parsons Brinckerhoff DJV

NORTH-SOUTH BYPASS TUNNEL

ZONE 1 - DRIVEN TUNNELS
CIVIL - ALIGNMENTS - TUNNEL MAIN ALIGNMENTS
LAYOUT PLAN - SHEET 24

Phase	Drg No.	Rev.
AS BUILT	NSBT-1030-RP-DG-006224	B



DATUM -49.000

VERTICAL GEOMETRY: G=3.541%

HORIZONTAL SETOUT DETAILS

- HORIZ GEOM.: R=-2000.000 | 5111.082 | D=406.785 | 5517.867 | R=-3000.000
- XFALL: LHS=2.00% | 6.200.00
- CO-ORDS: N160147.611 E53429.103 | N160544.067 E53338.020

CHAINAGE	4900	4920	4940	4960	4980	5000	5020	5040	5060	5080	5100	5120	5140	5160	5180	5200	5220	5240
DESIGN LEVEL M0A1	-46.165	-45.457	-44.748	-44.040	-43.332	-42.624	-41.915	-41.207	-40.499	-39.790	-39.082	-38.374	-37.666	-36.957	-36.249	-35.541	-34.832	-34.124
EXISTING LEVEL	18.381	15.065	15.448	16.789	16.608	15.875	15.550	14.078	12.852	11.539	10.443	9.457	9.108	8.439	7.815	7.030	6.241	5.800

CHAINAGE	5260	5280	5300	5320	5340	5360	5380	5400	5420	5440	5460	5480	5500	5520	5540	5560	5580	5600
DESIGN LEVEL M0A1	-33.416	-32.708	-31.999	-31.291	-30.583	-29.874	-29.166	-28.458	-27.750	-27.041	-26.333	-25.625	-24.916	-24.208	-23.500	-22.792	-22.083	-21.375
EXISTING LEVEL	6.097	7.434	9.137	10.907	12.677	12.718	12.450	13.186	13.067	12.530	11.931	11.964	10.910	10.391	9.380	8.471	7.561	6.908

AS BUILT NOTE:

AT COMPLETION OF TUNNEL DRIVE, CABLE TUNNEL INSTALLATION AND SMOKE DUCT CONSTRUCTION THE VERTICAL ALIGNMENT OF THE PAVEMENT WAS MODIFIED TO ENSURE THAT THE TRAFFIC CLEARANCE HEIGHT WAS MAINTAINED. AT ALL LOCATIONS. THIS DRAWING PROVIDES THE FINAL DESIGN ALIGNMENT USED AS REFERENCE FOR AS CONSTRUCTED INFORMATION OF TUNNEL PERMANENT LINING, CROSS PASSAGE LINING AND SMOKE DUCT CONSTRUCTION, FOR MODIFIED VERTICAL ALIGNMENT OF PAVEMENT, REFER TO DWG NSBT-1030-RL-DG-013111.

LONG SECTION ALONG M0A1 / DESIGN 1000
MAIN NORTH BOUND TUNNEL

LEGEND

- - - - - - EXISTING SURFACE LEVEL
- ——— INFERRED ROCK LEVEL
- ═══ TUNNEL CROWN EXCAVATION LINE

WORKS AS BUILT	
THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.	NAME SIGNED DATE

REVISIONS

REV	DATE	DESCRIPTION	APPD
C	03.02.10	AS BUILT - SITE CONFIRMATION RECEIVED	PPK
B	27.11.09	ISSUED FOR CONSTRUCTION - RFI 5457 INCORPORATED	PPK
A	05.02.07	ISSUED FOR CONSTRUCTION	PPK

SCALE BARS

SCALE C: 0 5 10 12.5m — 1 : 500 (A3) 1 : 250 (A1)

SCALE A: 0 10 20 30 40 50m — 1 : 2000 (A3) 1 : 1000 (A1)

ORIGINAL FOR CONSTRUCTION DRAWING SIGNED BY P.P. KOUPARITSAS

WORKS AS BUILT	
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RIVERCITY MOTORWAY

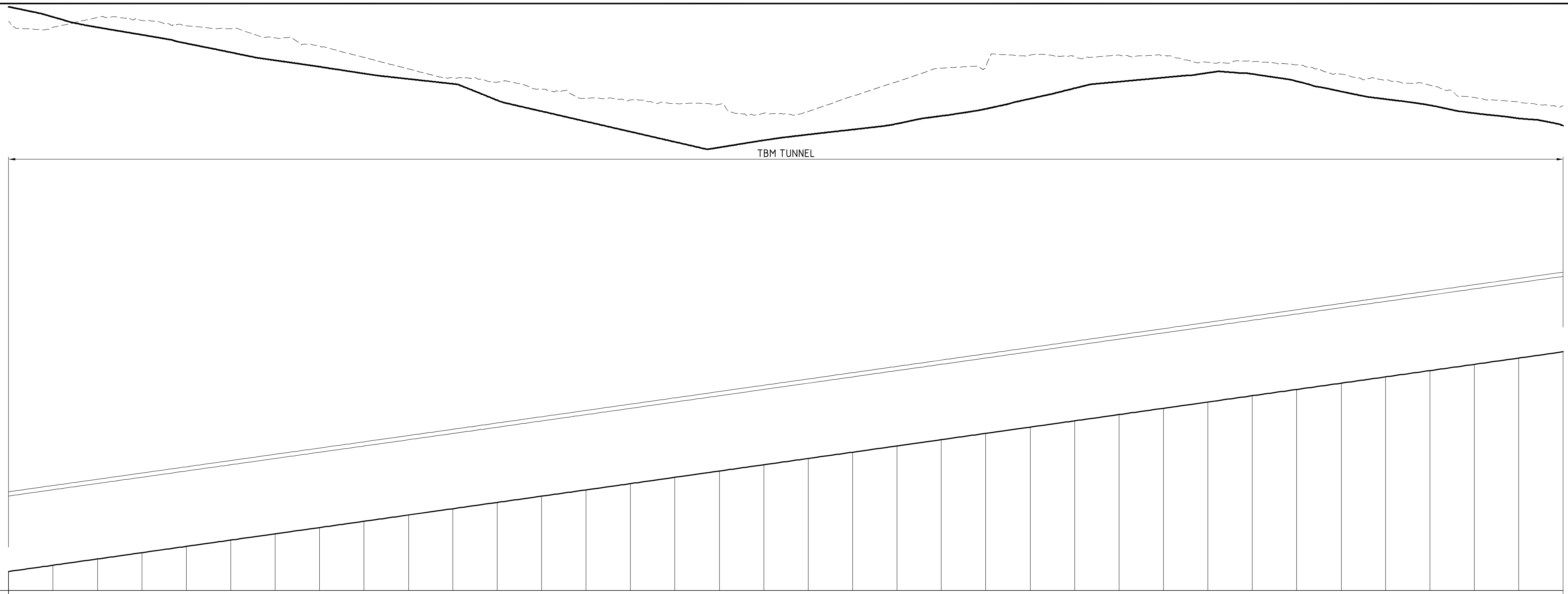
LBB JV

MPB NORTH SOUTH BYPASS TUNNEL
Maunsell Parsons Brinckerhoff DJV

NORTH-SOUTH BYPASS TUNNEL

ZONE 1 - DRIVEN TUNNELS
CIVIL - ALIGNMENTS - TUNNEL MAIN ALIGNMENTS
ROAD LONGITUDINAL SECTION - CONTROL LINE M0A1 - SHEET 6

Phase: AS BUILT | Drg No. NSBT-1030-RL-DG-006405 | Rev. C



VERTICAL GEOMETRY: G=3.534%

HORIZONTAL SETOUT DETAILS

HORIZ GEOM.: R=-2013.700 | 5004.558 | D=406.785 | 5411.342 | R=-3013.700

XFALL: LHS=2.00%

CO-ORDS: N160150.678 E53442.455 | N160547.135 E53351.372

CHAINAGE	4800	4820	4840	4860	4880	4900	4920	4940	4960	4980	5000	5020	5040	5060	5080	5100	5120	5140
DESIGN LEVEL M0B1	-45.855	-45.148	-44.442	-43.735	-43.028	-42.321	-41.615	-40.908	-40.201	-39.495	-38.788	-38.081	-37.374	-36.668	-35.961	-35.254	-34.548	-33.841
EXISTING LEVEL	16.079	15.419	16.536	16.189	15.605	15.265	14.233	13.290	12.033	10.740	9.724	9.255	8.467	7.433	7.243	6.849	6.743	5.755

CHAINAGE	5160	5180	5200	5220	5240	5260	5280	5300	5320	5340	5360	5380	5400	5420	5440	5460	5480	5500
DESIGN LEVEL M0B1	-33.134	-32.427	-31.721	-31.014	-30.307	-29.600	-28.894	-28.187	-27.480	-26.774	-26.067	-25.360	-24.653	-23.947	-23.240	-22.533	-21.827	-21.120
EXISTING LEVEL	5.953	7.671	9.308	10.825	10.976	12.307	12.141	12.302	12.214	11.478	11.531	11.219	10.150	9.545	8.910	7.516	7.001	6.646

AS BUILT NOTE:

AT COMPLETION OF TUNNEL DRIVE, CABLE TUNNEL INSTALLATION AND SMOKE DUCT CONSTRUCTION THE VERTICAL ALIGNMENT OF THE PAVEMENT WAS MODIFIED TO ENSURE THAT THE TRAFFIC CLEARANCE HEIGHT WAS MAINTAINED. AT ALL LOCATIONS. THIS DRAWING PROVIDES THE FINAL DESIGN ALIGNMENT USED AS REFERENCE FOR AS CONSTRUCTED INFORMATION OF TUNNEL PERMANENT LINING, CROSS PASSAGE LINING AND SMOKE DUCT CONSTRUCTION, FOR MODIFIED VERTICAL ALIGNMENT OF PAVEMENT, REFER TO DWG NSBT-1030-RL-DG-013112.

LONG SECTION ALONG M0B1 / DESIGN 1000
MAIN SOUTH BOUND TUNNEL

LEGEND

- EXISTING SURFACE LEVEL (dashed line)
- INFERRED ROCK LEVEL (solid line)
- TUNNEL CROWN EXCAVATION LINE (double line)

WORKS AS BUILT
THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.
NAME:
SIGNED:
DATE:

REV	DATE	DESCRIPTION	APPD
C	03.02.10	AS BUILT - SITE CONFIRMATION RECEIVED	PPK
B	27.11.09	ISSUED FOR CONSTRUCTION - RFI 5457 INCORPORATED	PPK
A	05.02.07	ISSUED FOR CONSTRUCTION	PPK

REVISIONS

SCALE BARS
SCALE C: 0 5 10 12.5m — 1 : 500 (A3) 1 : 250 (A1)
SCALE A: 0 10 20 30 40 50m — 1 : 2000 (A3) 1 : 1000 (A1)

ORIGINAL FOR CONSTRUCTION DRAWING SIGNED BY P.P. KOUPARITSAS

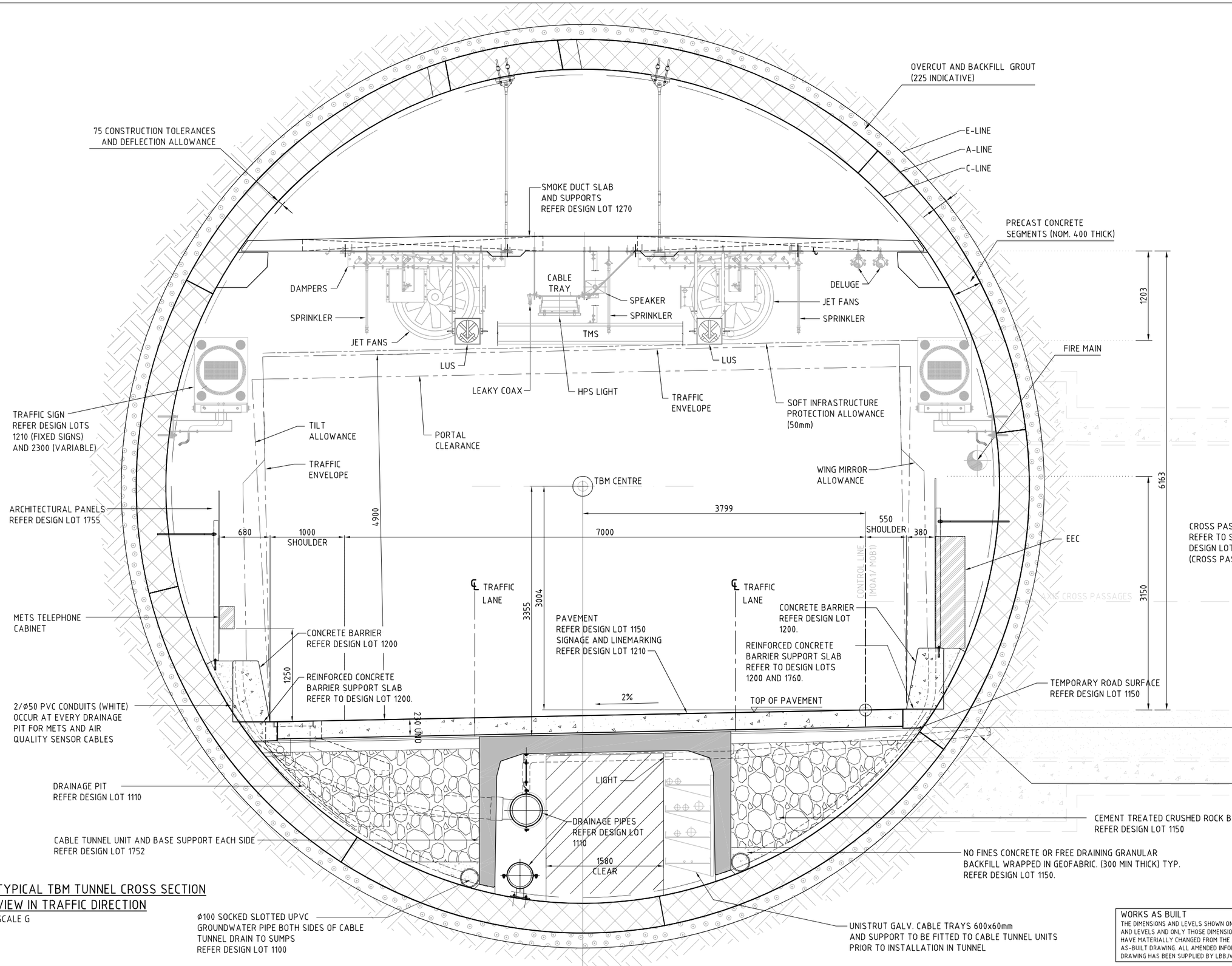
WORKS AS BUILT
THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.
NAME: A.A. PECK
SIGNED:
DATE: 18-06-2010

RIVERCITY MOTORWAY
LBB JV
MPB NORTH SOUTH BYPASS TUNNEL
Maunsell Parsons Brinckerhoff DJV

NORTH-SOUTH BYPASS TUNNEL

ZONE 1 - DRIVEN TUNNELS
CIVIL - ALIGNMENTS - TUNNEL MAIN ALIGNMENTS
ROAD LONGITUDINAL SECTION - CONTROL LINE M0B1 - SHEET 6

Phase: AS BUILT
Drg No. NSBT-1030-RL-DG-006412
Rev. C



TYPICAL TBM TUNNEL CROSS SECTION
VIEW IN TRAFFIC DIRECTION
SCALE G

LEGEND

- PRECAST CONCRETE ELEMENTS
- CAST IN SITU CONCRETE (REINF. OR. UNREINF.)
- BACKFILL MATERIAL

NOTES :

1. REFER TO MECHANICAL AND ELECTRICAL ENGINEERS DRAWINGS FOR SERVICES LOCATIONS AND DETAILS.
2. ALL INTERNAL STRUCTURES INDICATIVE, REFER TO RELEVANT DESIGN LOT DRAWINGS AND GENERAL NOTES REFERENCES.
3. FOR SMOKE DUCT, REFER TO DESIGN LOT 1270 DRAWINGS.

WORKS AS BUILT THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.	NAME E. NEUN
	SIGNED
	DATE 15.01.2010

REV	DATE	DESCRIPTION	APPD
B	15.01.10	AS BUILT	
A	20.12.07	ISSUED FOR CONSTRUCTION	

REVISIONS

SCALE BARS

SCALE G 0 500 1000 1250mm
1 : 50 (A3) 1 : 25 (A1)

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE BB-TB DESIGN VERIFICATION PLAN

DESIGNED	G. BEHNEN	CHECKED	E. NEUN
DRAWN	J. HENNING	CHECKED	G. BEHNEN
APPROVED		DATE	11.01.2007

RIVERCITY MOTORWAY
LBB JV
BILFINGER BERGER Civil
Structural Design Munich

NORTH - SOUTH BYPASS TUNNEL

TBM TUNNEL GENERAL
GENERAL LAYOUT STANDARD TBM TUNNEL
TBM TUNNEL CROSS SECTION

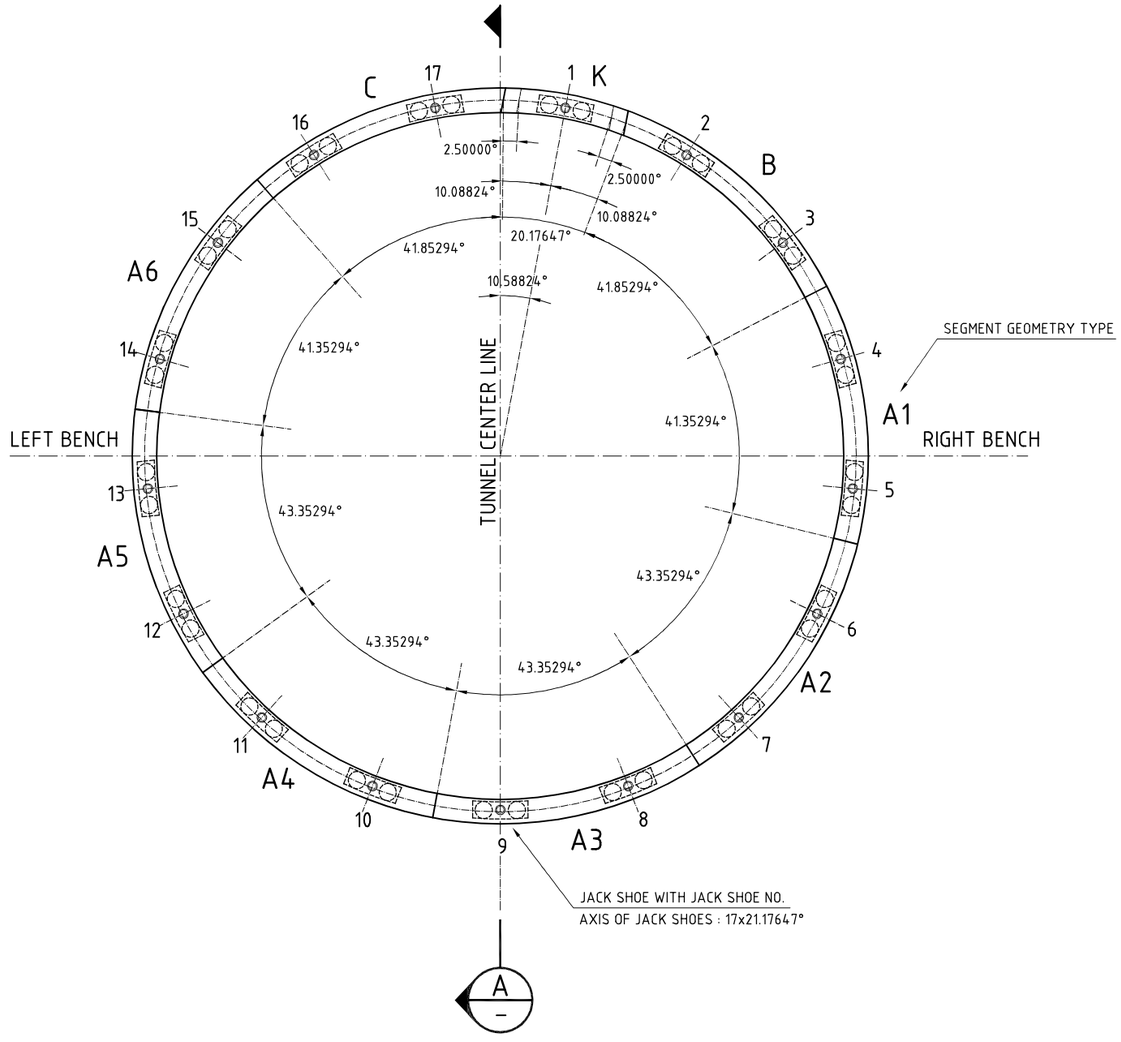
Status: AS BUILT
Drg No.: NSBT-1250-TU-DG-060130 B

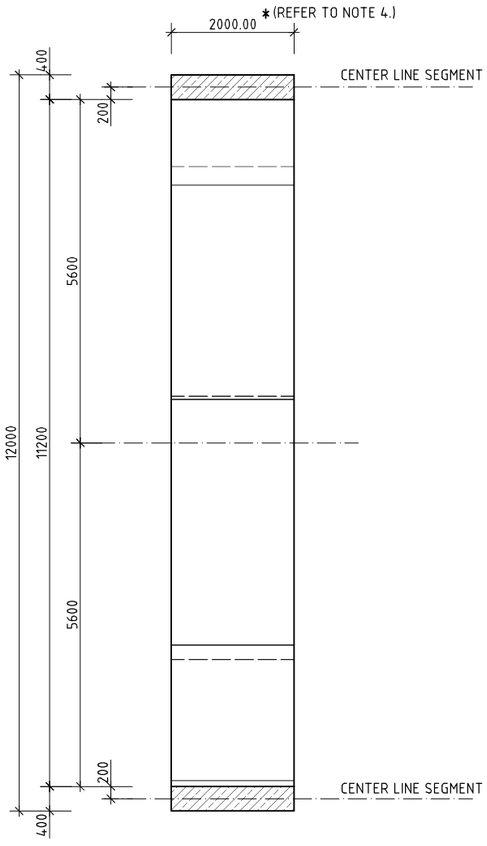
NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHER WISE.
2. ALL JOINT DIMENSIONS ARE REFERENCED TO THE "THEORETICAL AXIS OF THE JOINT", UNLESS NOTED OTHER WISE.
3. ALL ANGLE DIMENSIONS REFER TO THE "CENTER LINE SEGMENTS". K-STONE ANGLES REFER TO THE THEORETICAL RING WIDTH OF 2000 mm (WITHOUT CONSIDERING THE TAPER).
4. **TAPER ±20 mm NOT SHOWN HERE.**
5. ALL DIMENSIONS ARE ROUNDED TO 1/100 MILIMETRE, RESPECTIVE 1/10000 DEGREE. DUE TO THIS PROCEDURE THE SUMMED UP DIMENSIONS MAY DEVIATE FROM THE CORRECT TOTAL VALUE BY LESS THEN 0.1 mm RESPECTIVE 0.0001 DEGREE. DECIMAL PLACES ARE NOT SHOWN WHEN "00" (ZERO).

STANDARD RING CONFIGURATION - CROSS SECTION (VIEW IN DRIVING DIRECTION)

SCALE F





SECTION A
SCALE F

WORKS AS BUILT
THE DIMENSIONS AND LEVELS SHOWN ON THIS DRAWING ARE DESIGN DIMENSIONS AND LEVELS AND ONLY THOSE DIMENSIONS, LEVELS AND/OR FEATURES THAT HAVE MATERIALLY CHANGED FROM THE DESIGN HAVE BEEN AMENDED FOR THIS AS-BUILT DRAWING. ALL AMENDED INFORMATION SHOWN ON THIS AS-BUILT DRAWING HAS BEEN SUPPLIED BY LBBJV.

NAME E. NEUN
SIGNED
DATE 21.12.2009

REVISIONS

REV	DATE	DESCRIPTION	APPD
B	21.12.09	AS BUILT	
A	26.04.07	ISSUED FOR CONSTRUCTION	

SCALE BARS

SCALE F 0 1,0 2,0 2,5m
1:100 (A3) 1:50 (A1)

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE MPB DJV DESIGN VERIFICATION PLAN

DESIGNED	G. BEHNEN	CHECKED	
DRAWN	J. HENNING	CHECKED	G. BEHNEN
APPROVED		DATE	18.09.2006

RIVERCITY MOTORWAY
LBB JV
BILFINGER BERGER Civil
Structural Design Munich

NORTH - SOUTH BYPASS TUNNEL

TBM SEGMENTAL LINING - DETAILED DESIGN
OVERVIEW
RING CONFIGURATION - CROSS SECTION

Status: AS BUILT
Drg No.: NSBT-1260-TU-DG-060300 B

Attachment B – Important Information

IMPORTANT INFORMATION RELATING TO THIS REPORT

The document ("Report") to which this page is attached and which this page forms a part of, has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

This Report constitutes or is part of services ("Services") provided by Golder to its client ("Client") under and subject to a contract between Golder and its Client ("Contract"). The contents of this page are not intended to and do not alter Golder's obligations (including any limits on those obligations) to its Client under the Contract.

This Report is provided for use solely by Golder's Client and persons acting on the Client's behalf, such as its professional advisers. Golder is responsible only to its Client for this Report. Golder has no responsibility to any other person who relies or makes decisions based upon this Report or who makes any other use of this Report. Golder accepts no responsibility for any loss or damage suffered by any person other than its Client as a result of any reliance upon any part of this Report, decisions made based upon this Report or any other use of it.

This Report has been prepared in the context of the circumstances and purposes referred to in, or derived from, the Contract and Golder accepts no responsibility for use of the Report, in whole or in part, in any other context or circumstance or for any other purpose.

The scope of Golder's Services and the period of time they relate to are determined by the Contract and are subject to restrictions and limitations set out in the Contract. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by Golder in regards to it.

At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification.

Brisbane Office

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