COLD STORAGE FACILITY

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/181-2023

Dated: 29 April 2024

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drawing title:
TITLE SHEET

drawing no: SK-000 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
PARKHURST
LOT 7 SP234680

client:
KPG

REVISIONS

REV	DESCRIPTION	DATE
15	PRELIMINARY	05/03/2024

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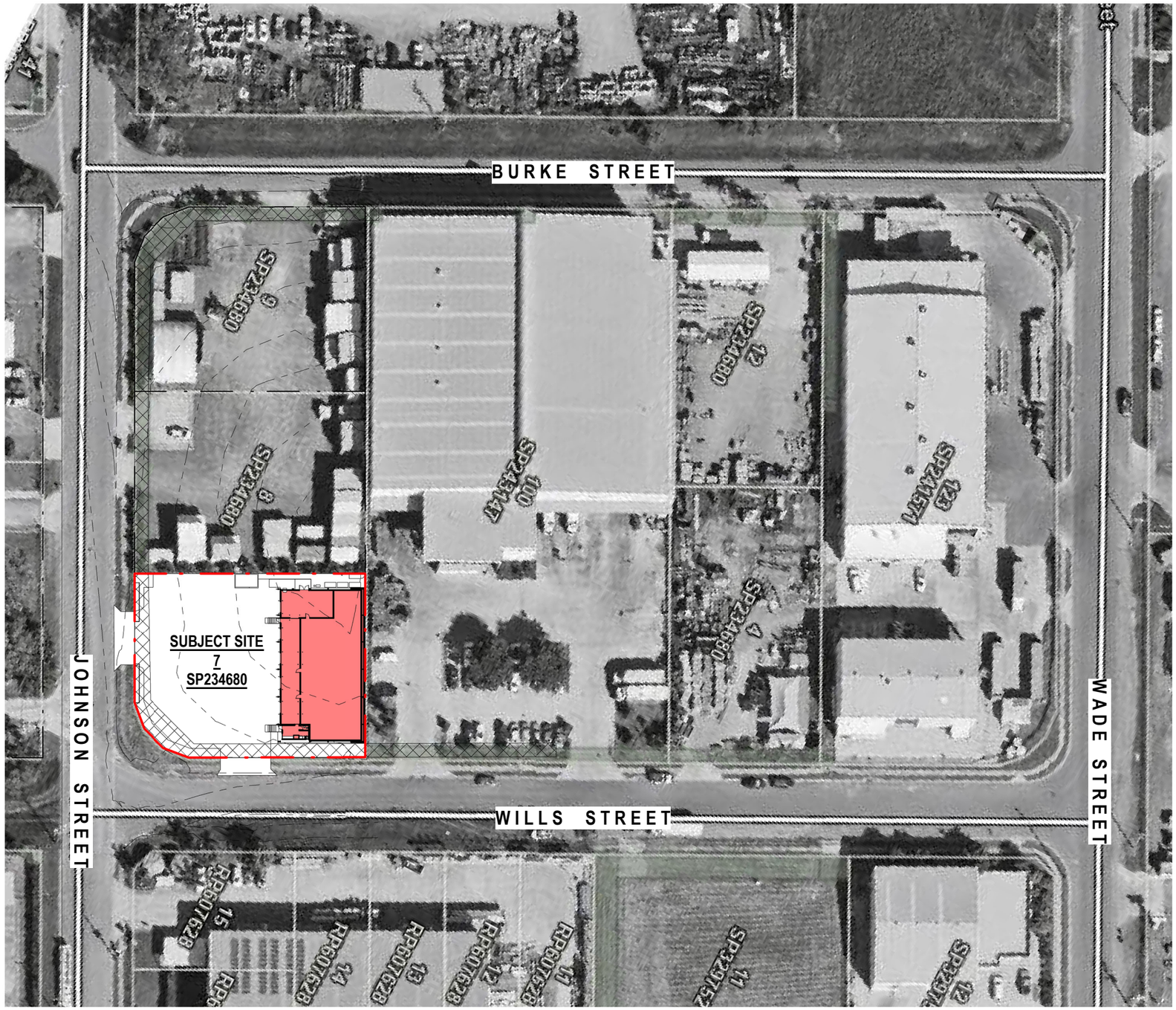

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GENERAL NOTE:

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- THESE DRAWINGS ARE APPROXIMATE AND CONCEPTUAL
- TRAFFIC/STORMWATER/OPERATIONAL WORKS: AS PER CIVIL ENGINEER DOCUMENTS AND DRAWINGS IF REQUIRED
- REFER TO TOWNPLANNING APPLICATION AND OPERATIONAL WORKS DOCUMENTATION WHEN VIEWING THESE PLANS
- THESE DRAWINGS ARE CONCEPTUAL AND DO NOT REFLECT BUILDING APPROVAL, PLUMBING APPROVAL, QFRS APPROVAL OR DISABILITY REQUIREMENTS. CLIENT TO CONFIRM AND GET APPROVAL FROM RELEVANT AUTHORITIES

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drawing title:
LOCATION PLAN

drawing no: SK-001 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
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client:
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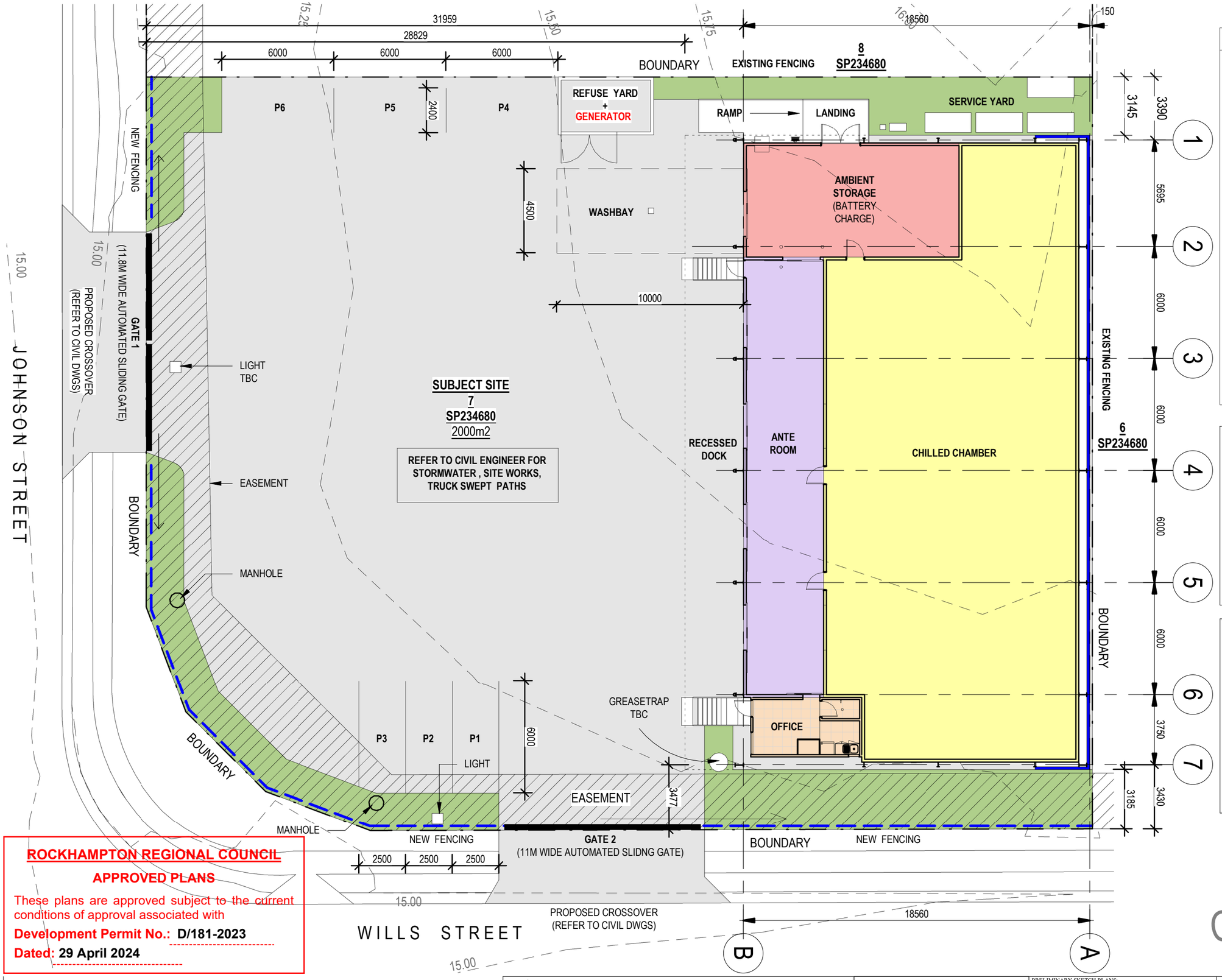

GENERAL LEGEND

TOTAL SITE AREA	**2000 SQM**
OVERALL BUILDING GFA	**591sqm**
CHILLED CHAMBER	(401sqm)
ANTE	(101sqm)
AMBIENT STORAGE	(70 sqm)
OFFICE	(19sqm)
TOTAL SITE COVERAGE	**29.5%**
LANDSCAPING	(200 sqm)

CONCRETE DRIVEWAY PARKING + DOCK

EXISTING EASEMENT

NEW FIRE RATED WALL

NEW FENCING - 2000 HIGH SPEAR METAL FENCING- POWDERCOAT FINISH

DISABILITY NOTE

WITH THE CURRENT PROPOSAL, NO DISABILITY ACCESS OR FACILITIES PROVIDED.

INITIAL DISCUSSION WITH THE CERTIFIER :
'NO DISABILITY REQUIREMENTS IF OWNER/OCCUPIER PROVIDE LETTER STATING ALL WORKS ARE REQUIRED TO BE PERFORMED BY PHYSICALLY ABLED STAFF + NO PUBLIC ACCESS TO SITE'

FIRE NOTE

FIRE FIGHTING REQUIREMENTS/ EQUIPMENT STILL TO BE DETERMINED

CURRENT PROPOSAL INCLUDE FIRE:
- RATED WALLS WITHIN 3M OF THE SIDE AND REAR BOUNDARY,
- EXIT DOORS,
- FIRE EXTINGUISHERS
- SPRINKLERS AS REQUESTED BY BEGA

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drawing title:
PROPOSED SITE PLAN

drawing no: SK-002 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
PARKHURST
LOT 7 SP234680

client:
KPG

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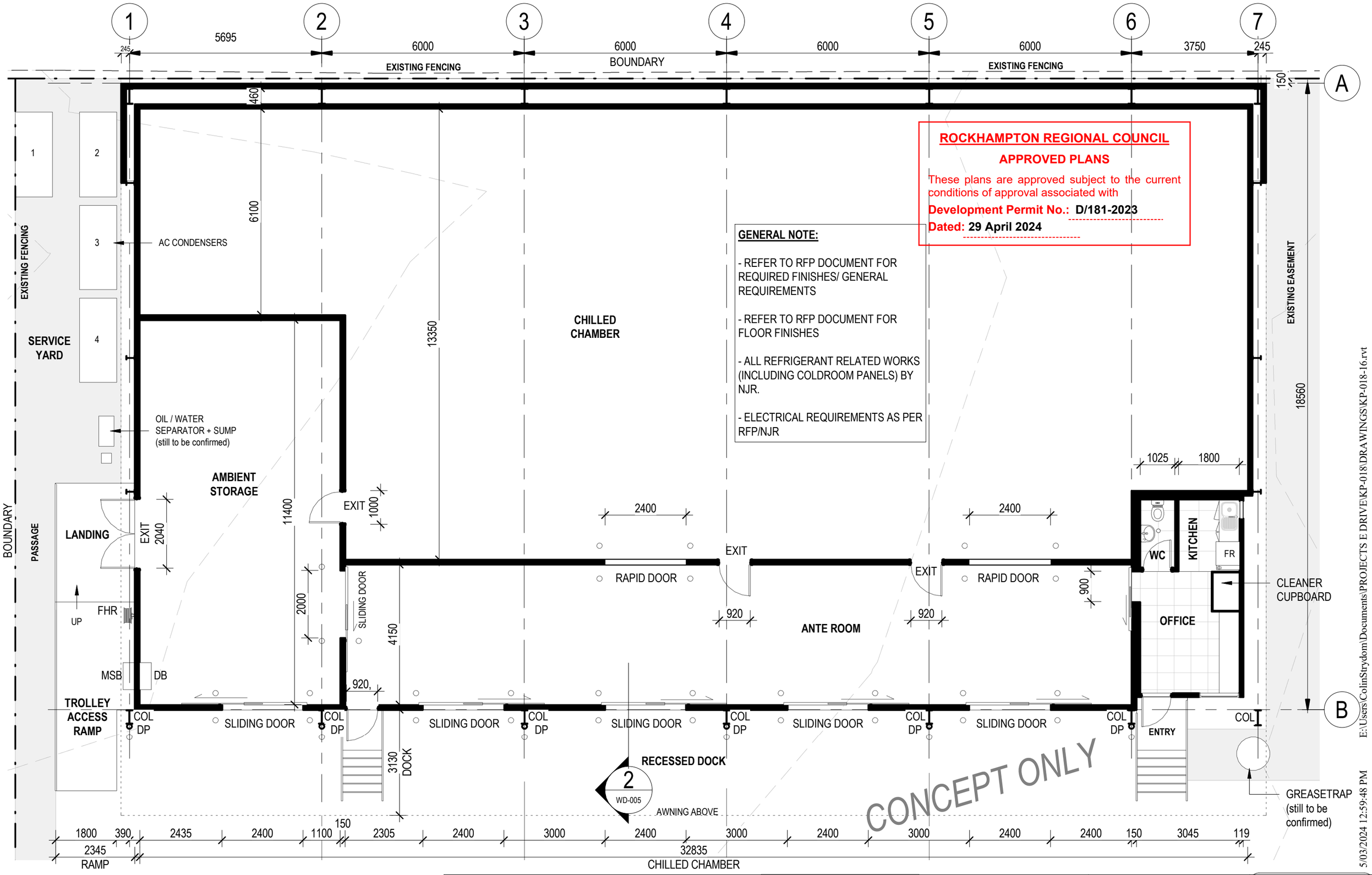

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GENERAL NOTE:

- REFER TO RFP DOCUMENT FOR REQUIRED FINISHES/ GENERAL REQUIREMENTS

- REFER TO RFP DOCUMENT FOR FLOOR FINISHES

- ALL REFRIGERANT RELATED WORKS (INCLUDING COLDROOM PANELS) BY NJR.

- ELECTRICAL REQUIREMENTS AS PER RFP/NJR

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drawing title:
PROPOSED FLOOR PLAN

drawing no: SK-003 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
PARKHURST
LOT 7 SP234680

client:
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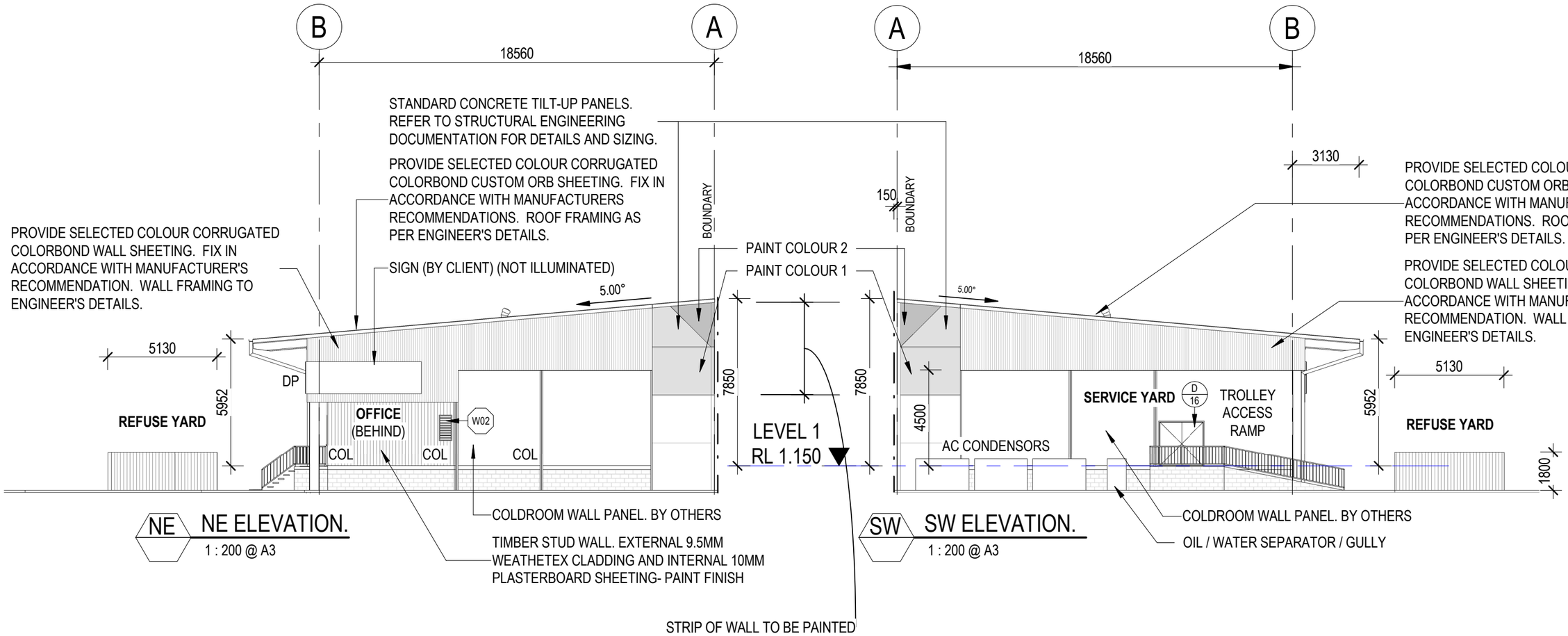

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drawing title:
PROPOSED ELEVATIONS

drawing no: SK-004 project no: KP-018

project:
COLD STORAGE FACILITY

A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS

location:
7 JOHNSON STREET,
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LOT 7 SP234680

client:
KPG

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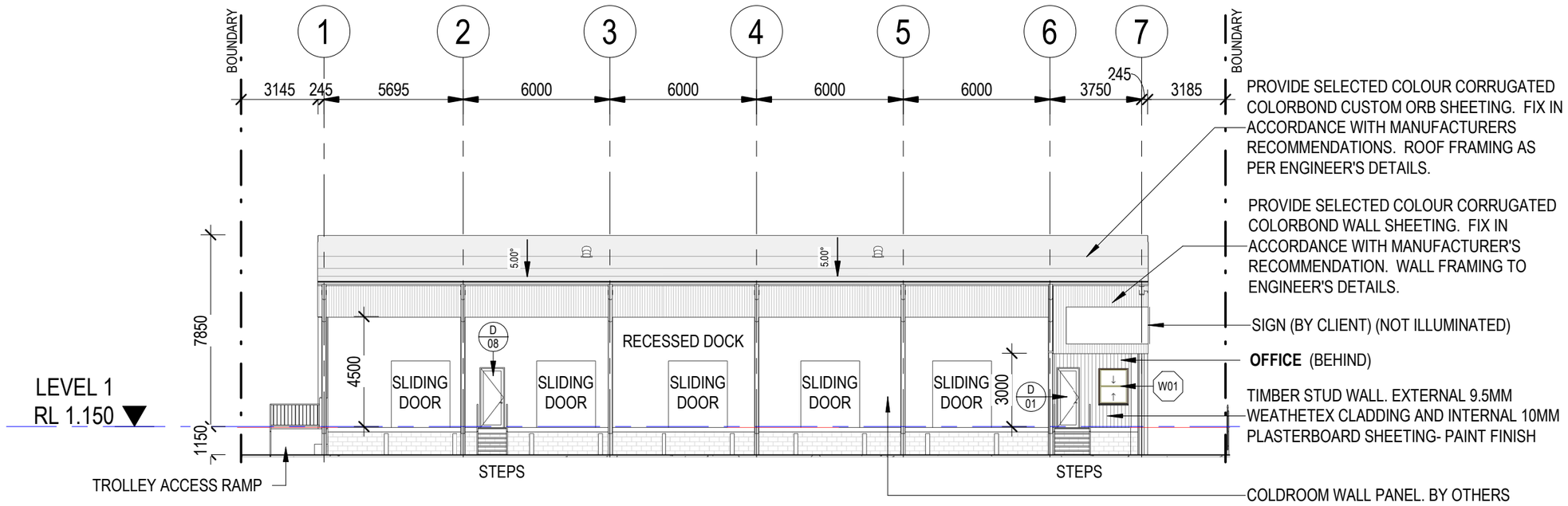

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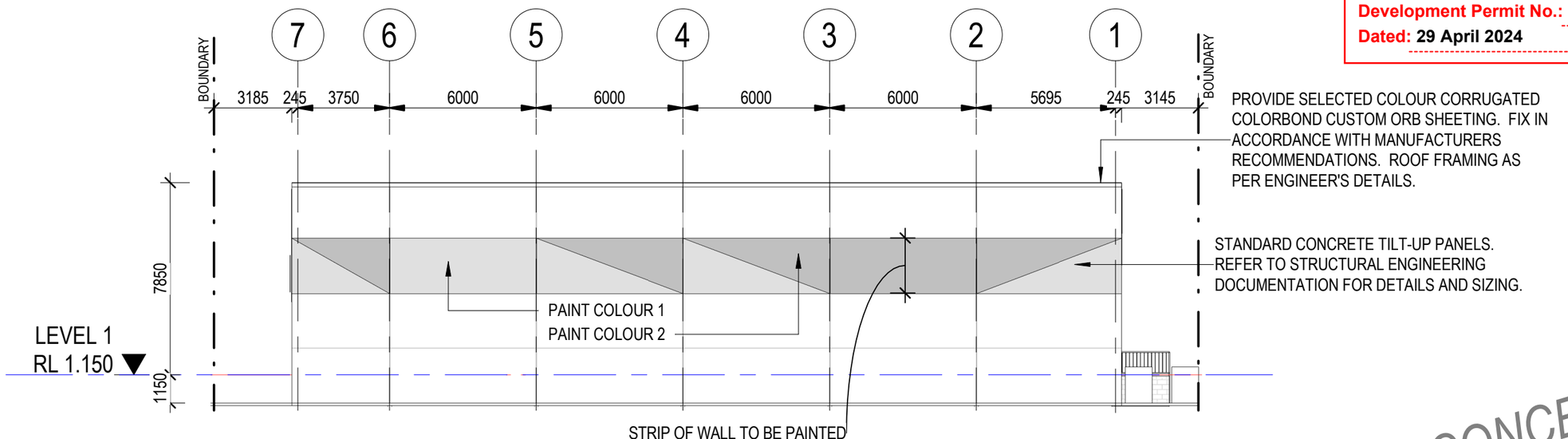

2 NW ELEVATION.
1 : 200 @ A3

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drawing title:
PROPOSED ELEVATIONS

drawing no: SK-005 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
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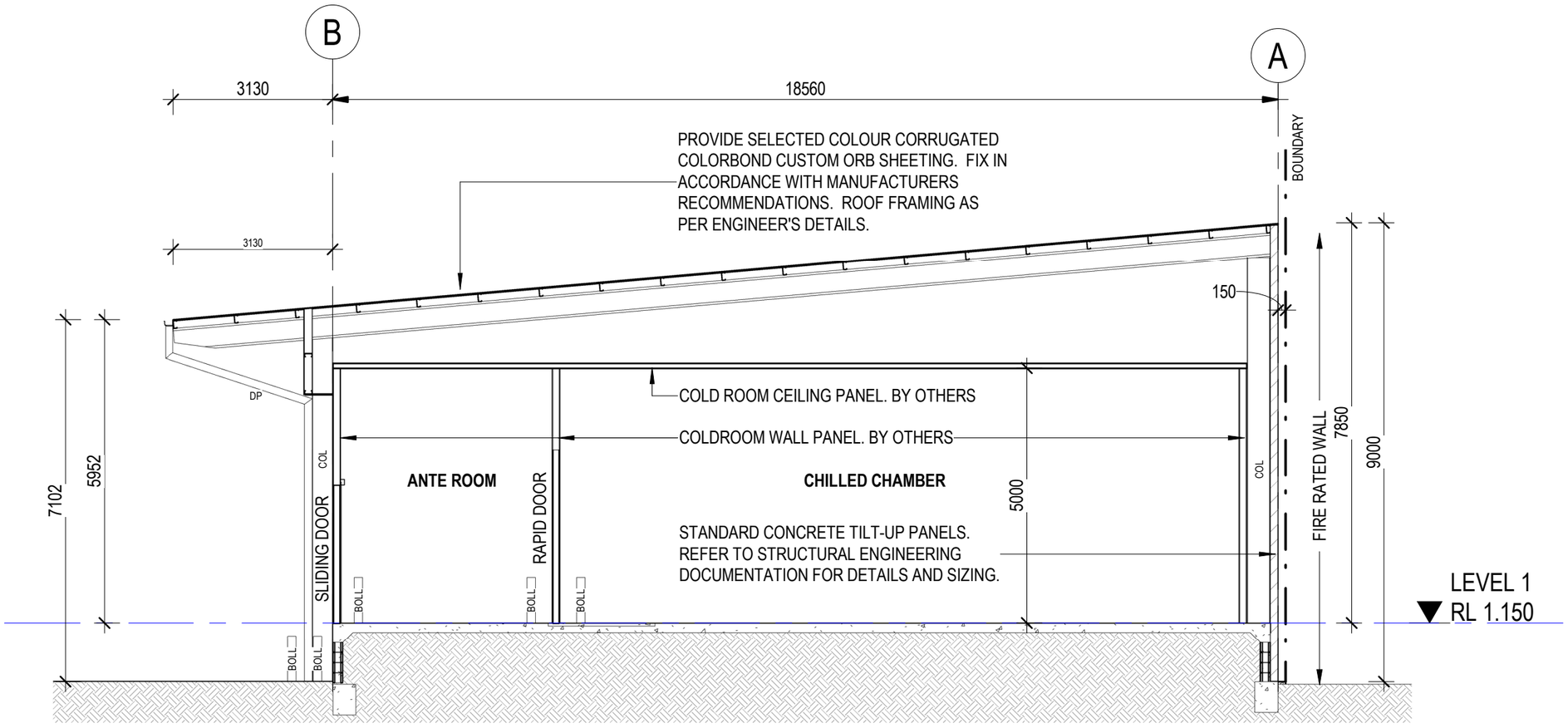

2 SECTION2.
1 : 100 @ A3

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drawing title:
PROPOSED SECTION

drawing no: SK-006 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
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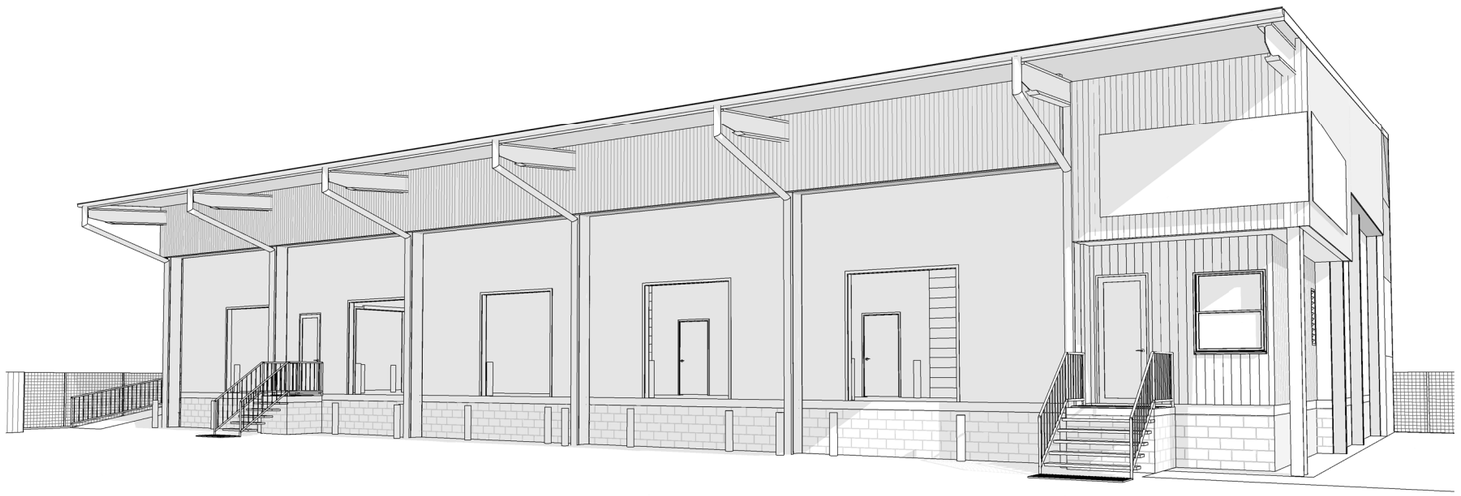

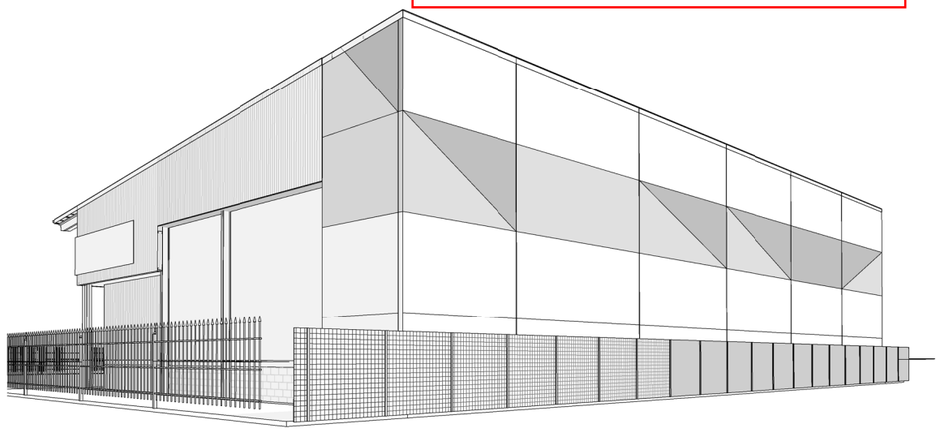

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drawing title:
PROPOSED 3D VIEWS

drawing no: SK-007 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
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PARKHURST
LOT 7 SP234680

client:
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MCE
McMurtrie Consulting Engineers

Engineering reimagined.

Cold Storage Facility at 39 Johnson St, Parkhurst 4702 (Lot 7 on SP234680)

Traffic Impact Assessment

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/181-2023

Dated: 29 April 2024

DATE
29 March 2024

REF
R060-22-23

CLIENT
Kele Property Group

COMMERCIAL IN CONFIDENCE

Engineering reimagined.

Contact Information

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ABN 25 634 181 294

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North Rockhampton, QLD 4701

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(07) 4921 1780
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Document Information

Prepared for	Kele Property Group
Document Name	Traffic Impact Assessment
Job Reference	R060-22-23
Revision	B

Document History

Revision	Date	Description of Revision	Prepared by	Approved by		
				Name	Signature	RPEQ No
A	8/01/2024	Original Issue	R. Crouch	R. Bywater		23569
B	29/02/2024	General Revisions	R. Crouch	R. Bywater		23569

Engineering reimagined.

Contents

Appendices

1 Introduction

1.1 Project Background

Kele Property Group are proposing to establish a Cold Storage Facility at 39 Johnson St, Parkhurst 4702, on land described as Lot 7 on SP234680. The Cold Storage Facility is expected to cater for South-Westbound and North-Eastbound passing traffic on the adjacent section of Johnson St, and the South-Eastbound passing traffic on Willis St and provide parking facilities for light vehicles and trucks.

1.2 Scope and Study Area

McMurtrie Consulting Engineers (MCE) have been commissioned by Kele Property Group to undertake a Traffic Impact Assessment (TIA) for the proposed Cold Storage Facility.

This Traffic Impact Assessment (TIA) was carried out to determine the level of potential impacts of the Project on the operation of the surrounding road network. The outcomes of the TIA will be used in support of the Development Application which will be assessed by Rockhampton Regional Council (RRC)

The assessment methodology adopted for this TIA is summarised in the key tasks listed below.

- Broadly identify the existing transport infrastructure which is of relevance to the Project.
- Estimate traffic generation associated with the Project and the distribution of this development traffic on the identified road network.
- Assess the potential impact of the Project on the surrounding transport infrastructure.
- Identify potential mitigation and management strategies to be implemented to offset the impact of the proposed Project (if required).

The process allows for the assessment of the traffic impacts of the Project in terms of road safety, access requirements, road link capacity and other transport infrastructure. Following this, if required, potential mitigation and/or management measures would be formulated to address the potential traffic impacts caused by the proposed Project.

1.2.1 Study Area

As previously identified, the proposed Cold Storage Facility is proposed to be located at 39 Johnson St, Parkhurst 4702, on land described as Lot 7 on SP234680. The site is located on the corner of Johnson and Willis St within the Parkhurst Industrial Estate in Rockhampton.

2 Existing Conditions

2.1 Surrounding Road Network Links

Johnson St

Johnson Street links McLaughlin Street and Alexandra Street within the Parkhurst Industrial Estate in Rockhampton. Johnson Street is typically a two-way, one lane road with a posted speed of 60km/h, with direct access to properties fronting the route. The South-Westbound and North-Eastbound lanes along Johnson Street are unseparated, allowing vehicles to pass and turn into the opposite lanes.

Adjacent to the proposed development site, the speed limit is 60km/h, and the road is classified as an Industrial Collector.

Access to Johnson Street for the proposed development will be from the South-Westbound and North-Eastbound lanes as indicated in Figure 1 below and will be left & right in/out given the undivided nature of Johnson Street.

Willis St

Willis Street is also typically a two-way, one lane road with an unposted speed of 50km/h, with direct access to properties fronting the route. The North-Westbound and South-Eastbound lanes along Willis Street are unseparated, allowing vehicles to pass and turn into the opposite lanes. Adjacent to the proposed development site the road is classified as an Industrial Assess. Access to the proposed Cold Storage Facility from Willis Street will also be right in only (entry only) given its road classification.

Figure 1 - Study area – 39 Johnson St, Parkhurst QLD

2.2 Traffic Volumes

2.2.1 Road Link Volumes

The background traffic volumes for the relevant section of road network are currently unavailable, therefore have been established using the Capricorn Municipal Development Guidelines (CMDG) in conjunction with the road network's

classifications. As previously stated, Johnson and Willis Streets are classified as an Industrial Collector and Industrial Access, therefore from the CMDG, Johnson and Willis St are expected to generate 3000 and 750 AADT respectively.

2.3 Road Safety Issues

2.3.1 Existing Site Conditions

A desktop review of the existing traffic conditions on the relevant road network was undertaken by Chris Hewitt (RPEQ/Road Safety Auditor) on Monday 08 January 2024. No obvious safety issues were able to be identified.

2.4 Site Access

As previously identified, access to the site will be via left & right in/out for Johnson Street and right in for Willis Street, due to the undivided nature of both streets. The access intersection will need to cater for light vehicles, trucks, and semi-trailers for stock delivery.

3 Proposed Development Details

3.1 Operational Details

The proposed development is a Cold Storage Facility, which will occupy the entire lot as shown in the site plan included as Appendix A. The proposed development represents the final form of the site, and no further development is expected.

The development will provide a Cold Storage Facility along with six (6) spaces for onsite parking (light vehicles). Vehicular access is proposed via a left and right in/out with Johnson St and right in for Willis St. While the largest design vehicle anticipated to require access to the site is a Semi truck for delivery of stock.

The proposed Cold Storage Facility has an area of 591m² GFA, with parking bays provided for cars and trucks parking near the building.

The traffic elements of the proposed development are discussed further in the following sections.

3.2 Proposed Access and Parking

3.2.1 Site Access

As previously identified, vehicular access to the Cold Storage Facility development is proposed to be provided via a left and right in/out access intersection with Johnson Street and a right in access intersection with Willis St catering for vehicles in the adjacent road networks.

3.2.2 Internal Site Facilities

To assess the adequacy of the internal traffic facilities, reference has been made to the Transport and Parking Code within the Rockhampton Regional Council Planning Scheme, as well as the relevant Australian Standards.

Compliance with the requirements of these documents is discussed in the following sections.

3.2.2.1Car Parking

Table 9.3.1.3.2: Parking requirements of RRC's Planning Scheme stipulates that for Warehouses a car parking requirement of at least one (1) space per 100 square metres or part thereof of gross floor area. Given the Cold Storage Facility has approximately 591 m^2 GFA, the recommended parking provisions for the proposed development is therefore 5 parking spaces minimum. As shown on the site plan (included in Appendix A), a total of 6 parking spaces are proposed on site (light vehicle).

All parking spaces proposed for light vehicles (cars) are generally 5.5m long and 2.5m wide and are accessed by a parking aisle exceeding 6.6m width, which meets the requirements stipulated in AS2890.1 for short term, high turnover parking. Usually, a general PWD bay provision rate of between 1-2% of the overall parking bays on site is provided. However, due to the nature of this development there is an exemption in place, which allows for the exclusion of this PWD bay. Therefore, this provision hasn't been included within this development.

3.2.2.2 Vehicle Access and Loading

RRC's Planning Scheme doesn't specify a design vehicle for Warehouses. However, based on the approximate size and nature of the proposed development it's going to service a Heavy Rigid Vehicle, Semi-Trailer or smaller. Additionally, vehicle swept paths have also been undertaken which confirm the ability of a HRV or Semi-Trailer to travel into the site for delivery purposes with the capacity to reverse park into the stock loading bays, with a copy of the relevant swept paths for the proposal included for reference in Appendix A. As per the Capricorn Municipal Development Guidelines (CMDG), all access crossovers will be designed in accordance with the Standard Drawing CMDG-R-042 (Type A – Two Way Access Commercial Driveway Slab)

4 Development Traffic

4.1 Traffic Generation

To determine the traffic generation of the proposed Cold Storage Facility development, reference has been made to the *Guide to Traffic Generating Developments* published by the Road and Traffic Authority NSW.

This guide reveals that warehouses have a daily vehicle trip generation rate of 4 vehicles per 100 m^2 of GFA. Applying this rate to the identified Cold Storage Facility in Parkhurst this would equate to a daily trip generation for the proposed development site of 24 trips (entry and exit). Also, to allow for a conservative approach it is assumed that the proposed Cold Storage Facility would have 3 staff members on site during the day. Therefore, it is assumed that 6 additional trips will be generated by the staff as they arrive in the morning and leave in the afternoon.

As such the adoption of the calculated rate from the Guide to Traffic Generating Development combined with the additional staff trips, establishing 30 daily trips is considered acceptable for the proposed Cold Storage Facility.

4.2 Traffic Distribution

Given the proposed development is a Cold Storage Facility, it is anticipated that most trips generated by the proposed development (if not all) will be diverted "New" trips undertaken by vehicles travelling to the facility, mainly along on Johnson St with a small percentage using Willis St due to its road classification as an Industrial access.

The summary of the expected distribution of traffic from the development provided in Table 1 below.

Table 1 - Proposed development traffic distribution

Daily Trips
– 50% traffic inbound to development; and – 50% traffic outbound from development.
Inbound – 45% from Johnson Street (South-West) – 45% from Johnson Street (North-East) – 10% from Willis Street (South-East) **Outbound** – 50% to Johnson Street (South-West) – 50% to Johnson Street (North-East)

4.3 Development Traffic Volumes on the Network

Based on the information outlined above and the conservative assumptions applied, an estimate of the additional development traffic volumes at the key site access intersection of Johnson and Willis Street were established, with a summary of the resultant development traffic volumes provided in Figure 2 and 3 below.

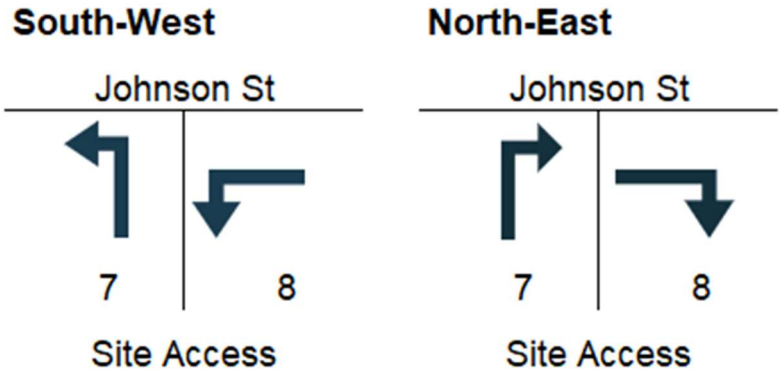

Figure 2 – 'New Trip' Development Volumes along Johnson Street

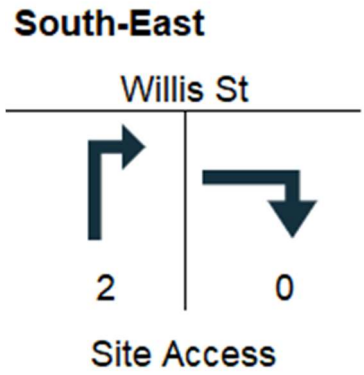

Figure 3 – 'New Trip' Development Volumes along Willis Street

5 Impact Assessment and Mitigation

Based on the information provided above, it was determined that the critical elements of the surrounding road network in terms of the potential impact of the proposed Cold Storage Facility development was the Johnson St and Willis St access intersections.

Further details of the assessment of the impact of the development on road network is provided in the following sections.

5.1 With and Without Development Traffic Volumes

5.1.1 Road Link Volumes

As previously discussed, given the proposed development is a Cold Storage Facility it is anticipated that most, if not all, trips generated by the proposed development will be new trips. With the development being predicted to generate in the order of 30 vehicle trips (entry and exit) throughout the day during operational hours. From CMDG, it was revealed that Johnson and Willis St would generate 3000 and 750 AADT, comparing these acquired values to the distributed daily trips (shown in Figures 2 & 3) the development traffic is <5% the acquired AADT. Accordingly, the impact of the proposed development upon existing road link volumes and the need for turn warrants assessment is anticipated to be negligible.

5.2 Pavement Impact Assessment and Mitigation

Given that the proposed development is a Warehouse on an Industrial Connector Road and that the proposed development construction period will be completed in a few months, it is expected to generate an increased number of new heavy vehicle movements under typical operation. However, due to the site's location in an industrial estate the additional heavy vehicle impact will be negligible as the surrounding road infrastructure is designed to withstand the traffic impacts established by this development. Thus, no pavement mitigation works are deemed warranted or required because of the proposal.

6 Conclusions and Recommendations

6.1 Summary of Impacts and Mitigation Measures Proposed

6.1.1 Internal Facilities

The traffic elements of the proposed plan of development have been designed generally in accordance with the requirements of AS2890 and Table 9.3.1.3.2: Parking requirements of RRC's Planning Scheme.

The proposed on-site parking provision a total of 6 parking spaces, is considered adequate to cater for the parking demand expected to be generated by the development. Also, as per the Capricorn Municipal Development Guidelines (CMDG), all access crossovers will be designed in accordance with the Standard Drawing CMDG-R-042 (Type A – Two Way Access Commercial Driveway Slab). The design of the car parking area is in accordance with the requirements outlined in the relevant standards and guidelines and is supportive of a traffic engineering perspective.

In addition, the swept paths for vehicles using the Warehouse and of the largest vehicle entering the site for stock delivery are shown to comfortably be able to enter the site.

6.1.2 Traffic Impacts

Due to the development traffic displaying <5% of the AADT for both sections of Johnson and Willis Street no turn warrants assessment was required due to the minimal impact of the surrounding road network. Also, given the nature of the development and its location with an already established industrial estate, all the road infrastructure design will accommodate the requirements of the Cold Storage Facility. As such no treatments are proposed.

6.1.3 Recommendations

Considering the information provided above, it is concluded that the proposed development will have a negligible impact on the adjacent road network and can therefore be recommended to be approved from a traffic engineering perspective.

6.2 Certification Statement and Authorisation

A copy of the RPEQ certification and authorisation statement covering this assessment of the proposed Cold Storage Facility development located at 39 Johnson St on land described as Lot 7 on SP234680 is included as reference in Appendix B.

Appendix A: Site Layout Plan and Swept Paths

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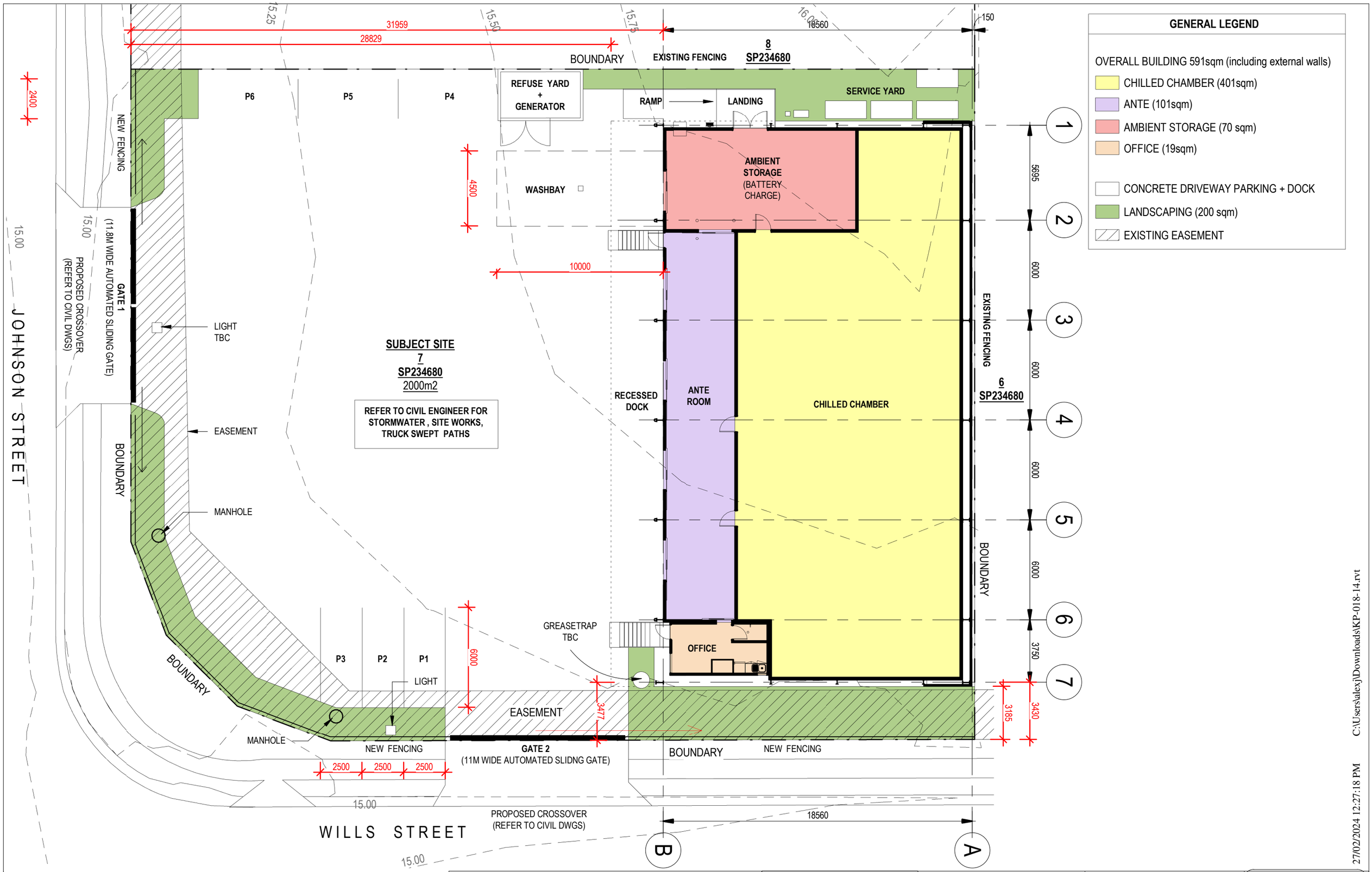

drawing title:
PROPOSED SITE PLAN

drawing no: SK-001 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
PARKHURST
LOT 7 SP234680

client:
KPG

REVISIONS

REV	DESCRIPTION	DATE
10	PRELIMINARY	05/01/2024
11	PRELIM	14/02/2024
12	PRELIM	20/02/2024
14	PRELIMINARY	27/02/2024

design + architecture
abn: 80167978832 Pty.Ltd.
044 968 2924 design@designaa.com.au
www.designaa.com.au reg no:4610

ISSUED FOR
PRELIMINARY

scale As indicated
date FEB 24
drawn Author
rev 14

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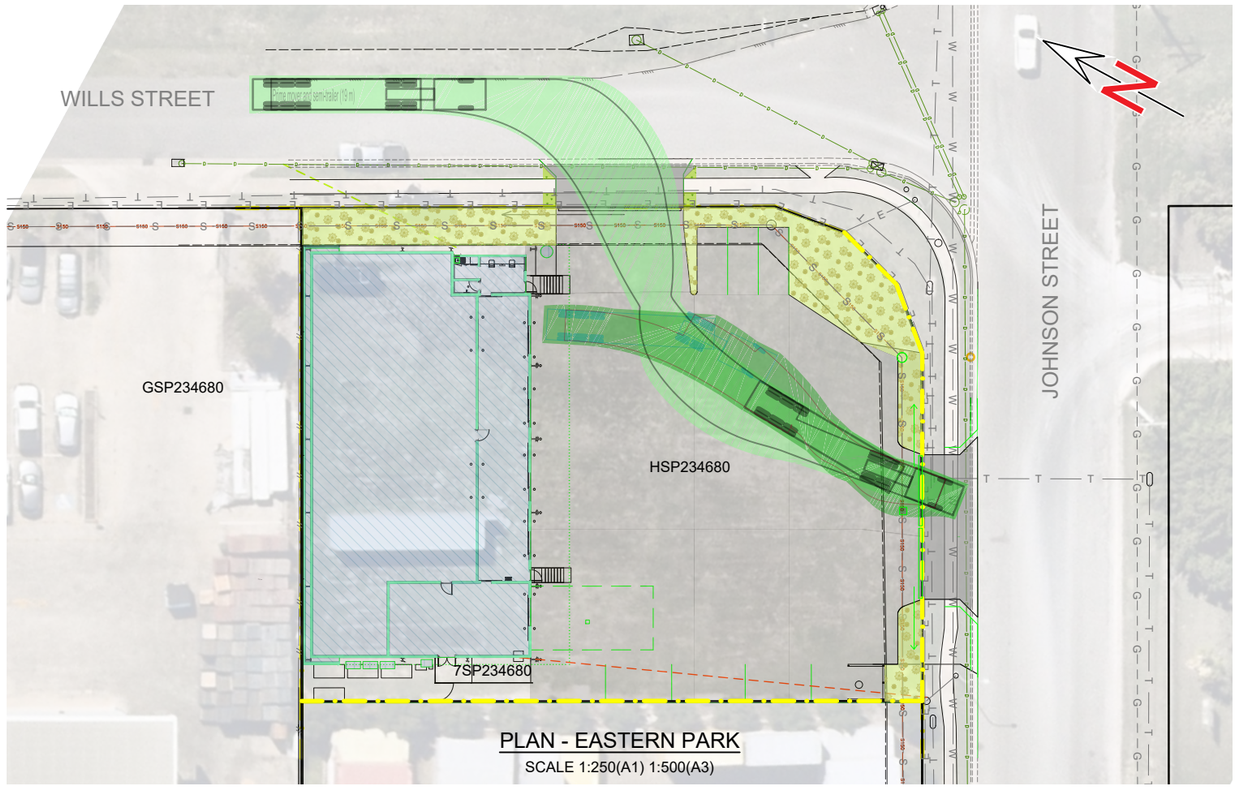
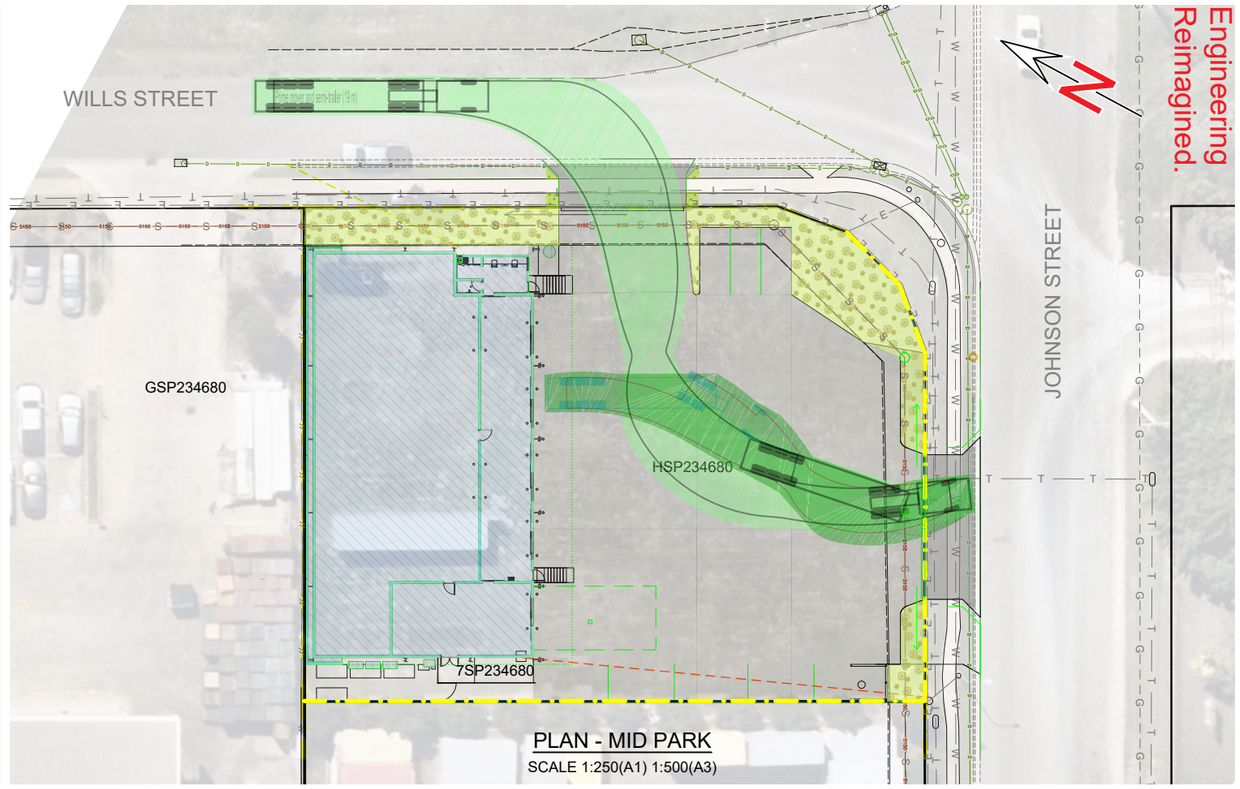
27/02/2024 12:27:18 PM

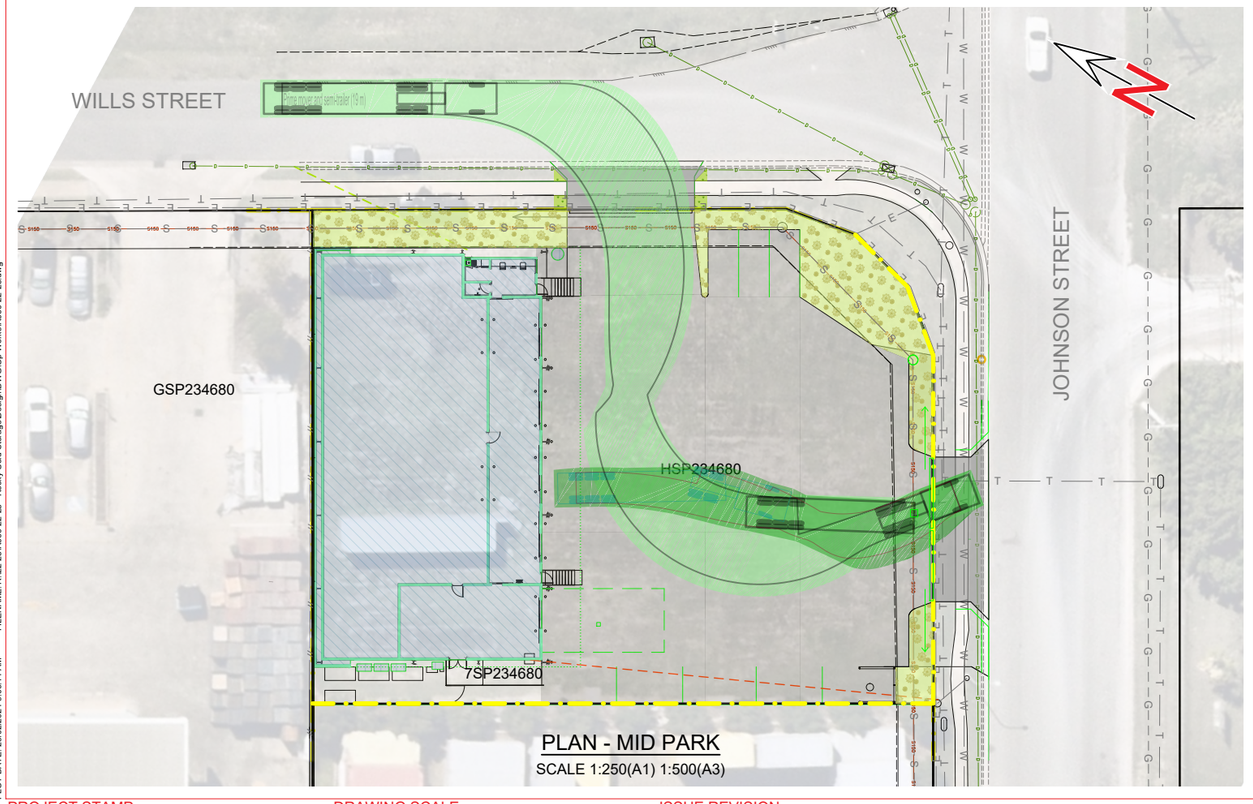
ISO_A1_594mm x 841mm



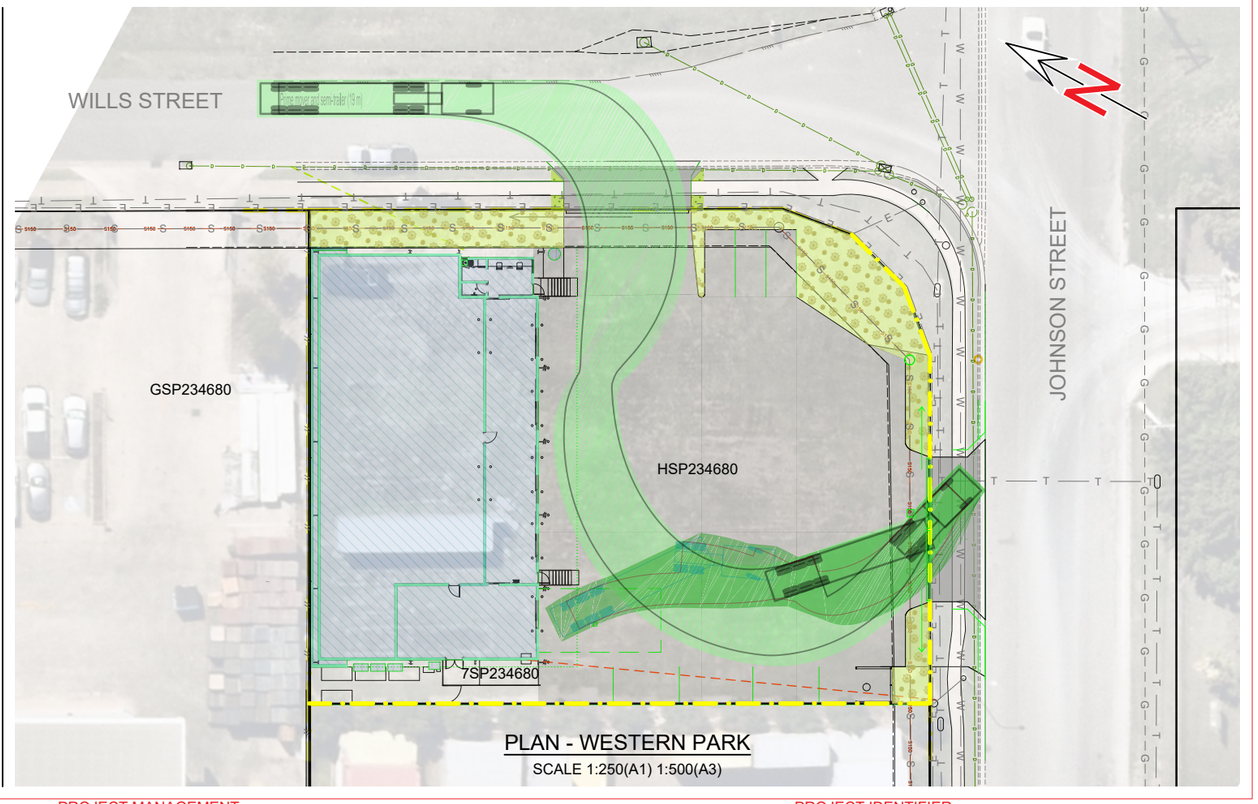
PLAN - EASTERN PARK
SCALE 1:250(A1) 1:500(A3)



PLAN - MID PARK
SCALE 1:250(A1) 1:500(A3)



PLAN - MID PARK
SCALE 1:250(A1) 1:500(A3)



PLAN - WESTERN PARK
SCALE 1:250(A1) 1:500(A3)

Engineering Reimagined.

FILENAME: R:\22-23\R060-22-23 - Rocky Cold Storage\Design\DWG\Op Works\R060-22-23.dwg
PLOT DATE: 29/02/2024 9:06:14 AM

PROJECT STAMP

PRELIMINARY

NOTE: THIS DRAWING IS SOLELY THE PROPERTY OF McMURTRIE CONSULTING ENGINEERS PTY LTD. THE INFORMATION CONTAINED IS NOT TO BE DISCLOSED, REPRODUCED OR COPIED IN WHOLE OR PART WITHOUT WRITTEN APPROVAL FROM McMURTRIE CONSULTING ENGINEERS PTY LTD.

DRAWING SCALE

0 5 10 15 20m
SCALE 1:250 @ A1 1:500 @ A3

ISSUE.REVISION

ISSUE	REV	DATE	DES	DESCRIPTION
INFO	A	8/02/2024	TH	PRELIMINARY FOR REVIEW

PROJECT MANAGEMENT

THIS DOCUMENT IS UNCONTROLLED AND IS NOT TO BE USED

RPEQ CERTIFICATION		
TH	RB	
DESIGNER	CHECKED	APPROVED
INTERNAL PROJECT NO.	R060-22-23	
DATUM	AHD	SURVEY MGA 2020 Z56

MCE
McMurtrie Consulting Engineers
ROCKHAMPTON | BUNDABERG
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PROJECT IDENTIFIER

CLIENT KELE PROPERTY GROUP
PROJECT ROCKHAMPTON COLD STORAGE FACILITY
TITLE
VEHICLE SWEPT PATHS
SINGLE GATE

DRAWING NUMBER R0602223-0401
REVISION A

Appendix B: RPEQ Certification

Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for

Project Title:	Rocky Cold Storage

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

i. I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and

ii. where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment, and that

iii. the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that

iv. I believe the strategies recommended for mitigating impacts by this traffic impact assessment,

v. embrace contemporary practice initiatives and will deliver the desired outcomes.

Name:	Richard Bywater	RPEQ No:	23569
RPEQ Competencies:	Civil		
Signature:		Dated:	29/02/2024
Postal Address:	63 Charles Street, North Rockhampton, QLD 4701		
Email:	richardb@mcmengineers.com		

Traffic impact assessment components to which this certification applies	✓
1. Introduction	
Background	✓
Scope and study area	✓
Pre-lodgement meeting notes	✓
2. Existing Conditions	
Land use and zoning	N/A
Adjacent land uses / approvals	N/A
Surrounding road network details	✓
Traffic volumes	✓
Intersection and network performance	N/A
Road safety issues	✓
Site access	✓
Public transport (if applicable)	N/A
Active transport (if applicable)	N/A
Parking (if applicable)	N/A
Pavement (if applicable)	N/A
Transport infrastructure (if applicable)	N/A
3. Proposed Development Details	
Development site plan	✓
Operational details (including year of opening of each stage and any relevant catchment / market analysis)	✓
Proposed access and parking	✓
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	✓
Trip distribution	✓
Development traffic volumes on the network	✓
5. Impact Assessment and Mitigation	
With and without development traffic volumes	✓
Construction traffic impact assessment and mitigation (if applicable)	N/A
Road safety impact assessment and mitigation	✓
Access and frontage impact assessment and mitigation	✓
Intersection delay impact assessment and mitigation	N/A
Road link capacity assessment and mitigation	N/A
Pavement impact assessment and mitigation	✓
Transport infrastructure impact assessment and mitigation	N/A
Other impacts assessment relevant to the specific development type / location (if applicable)	N/A
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	✓
Certification statement and authorisation	✓

MCE
McMurtrie Consulting Engineers

Engineering reimagined.

Cold Storage Facility at 39 Johnson Street, Parkhurst 4702 (Lot 7 on SP234680)

Stormwater Management Plan

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/181-2023

Dated: 29 April 2024

DATE
29 February 2024

REF
R060-22-23

CLIENT
Kele Property Group

COMMERCIAL IN CONFIDENCE

Engineering reimagined.

Contact Information

McMurtrie Consulting Engineers Pty Ltd
ABN 25 634 181 294

Rockhampton Office
63 Charles Street
North Rockhampton, QLD 4701

www.mcmengineers.com
(07) 4921 1780
mail@mcmengineers.com

Document Information

Prepared for	Kele Property Group
Document Name	Stormwater Management Plan
Job Reference	R060-22-23
Revision	B

Document History

Revision	Date	Description of Revision	Prepared by	Approved by		
				Name	Signature	RPEQ No
A	7/02/2024	Original Issue	T. Lisle	R. Bywater		23569
B	29/02/2024	Issued for Approval	T. Lisle	R. Bywater		23569

Contents

Appendices

1 Introduction

1.1 Project Overview

McMurtrie Consulting Engineers have been commissioned by Kele Property Group (the Client) to undertake a site-based Stormwater Management Plan to support a Development Application for a Material Change of Use, for a Cold Storage Facility. The site is located at 39 Johnson Street, Parkhurst 4702, on land described as Lot 7 on SP234680.

The aim of this SMP is to demonstrate that the proposed development will comply with Council planning scheme requirements, QUDM (IPWEAQ, 2016), Australian Rainfall and Runoff (Ball, et al., Australian Rainfall and Runoff: A Guide to Flood Estimation, 2019) and the State Planning Policy (DILGP, 2017).

1.2 Methodology

The assessment methodology adopted for this SMP is summarised below.

- Broadly identify the contributing catchments to the project.
- Identify Lawful Point of Discharge (LPOD) for the site stormwater runoff.
- Estimate peak discharge runoff for pre-development and post-development scenarios.
- Identify potential mitigation and management strategies to ensure no worsening to downstream catchments and infrastructure.

1.3 Data Sources

- ARR'16 data hub
- Elvis - Elevation and Depth – Foundation Spatial Data hub
  - 2015 Rockhampton 1m DEM

2 Site Characteristics

2.1 Pre-Development

The site is a vacant industrial lot that was built as part of a previously completed industrial subdivision. The site is 0.2ha in area, with a typical slope of 1.7% from the north-western corner to the south-eastern corner.

Figure 1 - Pre-Development Layout Plan

The existing Lawful Point of Discharge (LPOD) is to the kerb and kerb inlet at the south-eastern corner of the lot.

2.2 Post-Development

The proposed development is an industrial shed and associated concrete hardstand areas. Appendix A shows the proposed layout. The development has a fraction impervious of 0.9.

The post-development scenario will maintain the same LPOD as compared to the pre-development scenario, connecting the onsite drainage to the kerb inlet chamber on the corner of Wills Street and Johnson Street.

3 Stormwater Management Plan

3.1 Existing Industrial Development

The site is part of a relatively recently constructed industrial development. In order to determine the feasibility of connecting the site to the existing drainage network constructed as part of said development, the original design plans were reviewed to determine the capacity of the network.

Drawings R1128-01-01-028 and R1128-01-01-029 of Appendix C show that the network was designed for a Cy value of 0.83, which corresponds to design fraction impervious of 0.9, which is consistent with the proposed development intent.

3.2 Development Stormwater Management Strategy

As the proposed development sits within G2/6 and G0/6 of the original development layout, it can be reasonably assumed that by connecting the proposed development's internal drainage network to the road drainage network, sufficient capacity has been allocated to the site for up to and including a fraction impervious of 0.9.

Therefore, the following is recommended to adequately manage stormwater runoff from the site:

1. Provide an onsite drainage network connected to the kerb inlet chamber on the corner of Wills Street and Johnson Street.
2. Provide onsite grading that allows for site runoff in events greater than the 0.5EY event to safely overtop at least one of the 10m (min) wide driveway crossovers.

Figure 2 presents the proposed development layout plan.

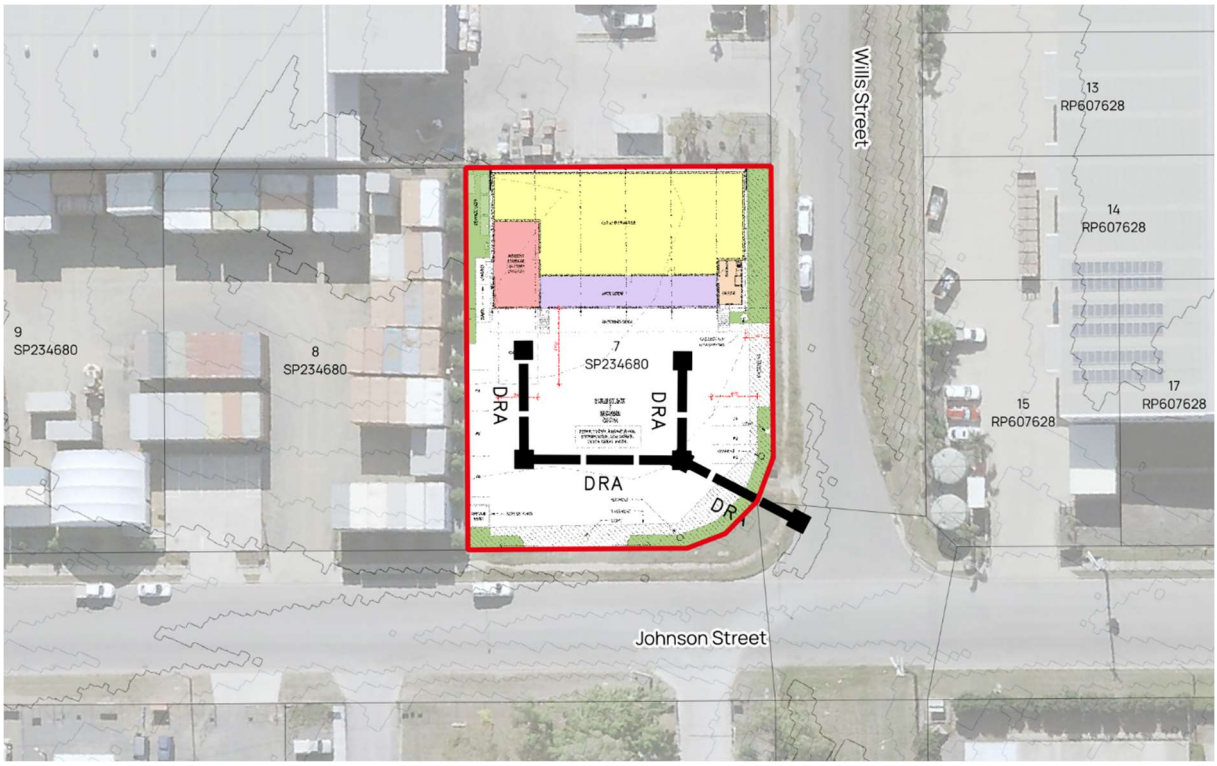


Figure 2 - Development layout plan

3.2.1 Driveway Crossover Discharge

As it can be assumed that, by referring to the 0.5EY runoff shown in Appendix B, the quantity of water overtopping the driveway will be the difference between the 0.5EY event and the design event (e.g. the 1% AEP event in the major event scenario), the performance of a 10m (min) wide driveway crossover as a weir can be represented as shown in Table 1.

Table 1 - Driveway Crossover Discharge Performance

Design Event	Discharge Over Driveway (m^3/s)	Depth Over Driveway (mm)	d.v. Check
0.2 EY	0.0219	11.4	0.00219
10% AEP	0.0393	16.83	0.00393
5% AEP	0.0597	22.24	0.00597
2% AEP	0.0917	29.61	0.00917
1% AEP	0.1095	33.32	0.01095

As shown, in all design events the driveway can act as a safe discharge point for the major event runoff.

4 Stormwater Quality

The proposed development is for an urban purpose of less than 2,500 m2 and therefore does not trigger the water quality assessment benchmarks set out in the SPP (DILGP, 2017) for MCU or ROL works.

The development of the land has the potential to increase the pollutant loads of stormwater runoff and downstream watercourses. During the construction phase of the development, disturbances to the ground have the potential to significantly increase sediment loads entering downstream drainage systems and watercourses. The operational phase of the development will potentially increase the amount of sediment and nutrient runoff from the site.

4.1 Construction Phase

4.1.1 Key Pollutants

During the construction phase, a number of key pollutants have been identified for this development. Table 2 below illustrates the key pollutants that have been identified.

Table 2 - Key pollutants - construction phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, material offcuts.
Sediment	Exposed soils and stockpiles during earthworks and building works.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.

4.1.2 Erosion and Sediment Controls

Erosion and Sediment Control (ESC) devices employed on the site shall be designed and constructed in accordance with Council's guidelines.

Pre-Construction

- Stabilised site access/exit locations.
- Sediment fences are to be located along the contour lines downstream of disturbed areas.
- Diversion drains to divert clean runoff around the construction site.
- Educate site personnel on the requirements of the Sediment and Erosion Control Plan.

Construction

- Maintain construction access/exit, sediment fencing, catch drains and all other existing controls as required.
- Progressively surface and revegetate finished areas as appropriate.
- During construction, all areas of exposed soils allowing dust generation are to be suitably treated. Treatments will include mulching the soil and watering.
- Road access is to be regularly cleaned to prevent the transmission of soil on vehicle wheels and eliminate any build-up of typical road dirt and tyre dust from delivery vehicles.
- Adequate waste disposal facilities are to be provided and maintained on the site to cater for all waste materials such as litter hydrocarbons, toxic materials, acids or alkaline substances.

5 Summary

5.1 Conclusion

The runoff from the proposed development can be adequately managed by providing an onsite drainage network connected to the existing road drainage network, and by providing a 10m driveway crossover graded to act as a weir in the major design event. By providing this, there will be no impact on the capacity of the existing network or the safety of road users.

Given the site is less than 2500m^2, the provisions of the SPP for MCU works do not apply. Erosion and sediment control measures should be provided at the Operational Works stage.

5.2 Qualifications

This stormwater management plan has been prepared by MCE to support a Development Application for Material Change of Use, for a proposed cold storage facility. The site is located at 39 Johnson Street, Parkhurst 4702, on land described as Lot 7 on SP234680

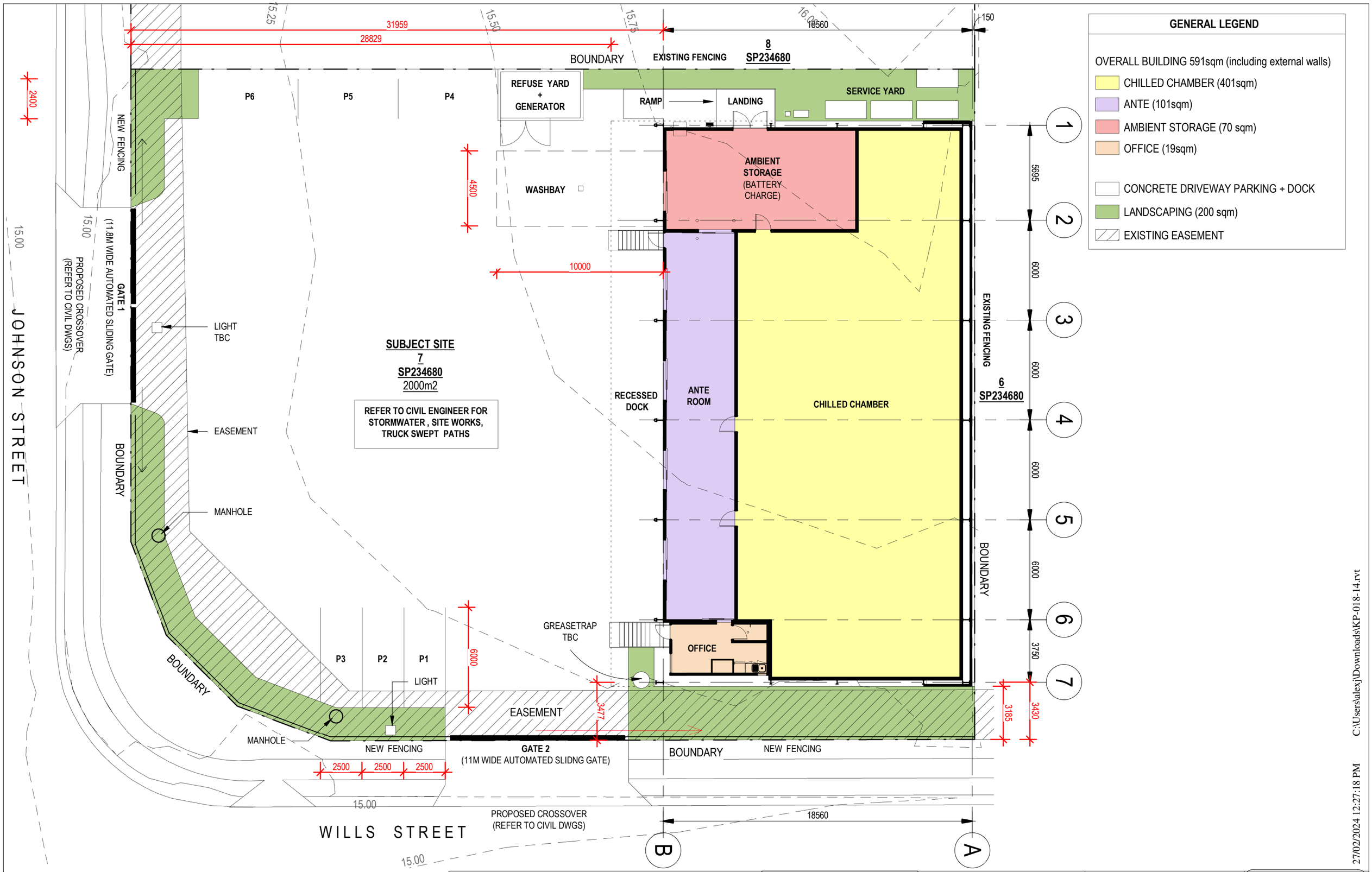
The analysis and overall approach were specifically catered to the requirement of this project and may not be applicable beyond this scope. For this reason, any other third parties are not authorised to utilise this report without further input and advice from MCE.

Whilst this report accurately assesses the catchment hydrology performance using industry-standard theoretical techniques and engineering practices, actual future observed catchment flows may vary from those predicted herein.

It is acknowledged that, due to the general course of coordination of a development application, some discrepancies may arise between the architectural layout shown within this document and the finalised architectural plans submitted by the Applicant. Generally, this does not constitute a material impact to the proposed development from an engineering perspective. Conservative engineering principles have been applied with consideration to earthworks, stormwater and servicing. As such, any concern should be suitable for conditioning as part of the detailed design process (i.e. to be finalised at the Operational Works stage).

Appendix A: Development Layout Plan

REFER TO ATTACHMENT



drawing title:
PROPOSED SITE PLAN

drawing no: SK-001 project no: KP-018

project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
COLD STORAGE FACILITY

location:
7 JOHNSON STREET,
PARKHURST
LOT 7 SP234680

client:
KPG

REVISIONS

REV	DESCRIPTION	DATE
10	PRELIMINARY	05/01/2024
11	PRELIM	14/02/2024
12	PRELIM	20/02/2024
14	PRELIMINARY	27/02/2024

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www.designaa.com.au reg no:4610

ISSUED FOR
PRELIMINARY

scale As indicated
date FEB 24
drawn Author
rev 14

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Appendix B: Rational Method Calculations

Time of Concentration			
t_c	5	mins	*Time of concentration*
Standard Inlet Time			
t	5	min	*Standard inlet time*

Catchment Info			
Area	0.2	ha	*Catchment area*
f_i	0.9	decimal	*Fraction impervious*
$^1I_{10}$	66	mm/hr	*10% AEP 1hr rainfall intensity*
C_{10}	0.88	unitless	*Discharge coefficient*
Climate Change Factor		N/A	
Urbanisation		Urban	

Rational Method								
Event	63.21%	0.5EY	0.2EY	10%	5%	2%	1%	1% + CC	
F_y	0.80	0.85	0.95	1.00	1.05	1.15	1.20	1.20	factor
^tI_y	116	143	175	202	232	272	304	304	mm/hr
C_y	0.704	0.748	0.836	0.88	0.924	1	1	1	factor
Q_y	0.0454	0.0594	0.0813	0.0988	0.1191	0.1511	0.1689		m^3/s

Time of Concentration			
t_c	5	mins	*Time of concentration*
Standard Inlet Time			
t	5	min	*Standard inlet time*

Catchment Info			
Area	0.2	ha	*Catchment area*
f_i	0.9	decimal	*Fraction impervious*
$^1I_{10}$	66	mm/hr	*10% AEP 1hr rainfall intensity*
C_{10}	0.88	unitless	*Discharge coefficient*
Climate Change Factor		N/A	
Urbanisation		Urban	

Rational Method									
Event	63.21%	0.5EY	0.2EY	10%	5%	2%	1%	1% + CC	
F_y	0.80	0.85	0.95	1.00	1.05	1.15	1.20	1.20	factor
^tI_y	116	143	175	202	232	272	304	304	mm/hr
C_y	0.704	0.748	0.836	0.88	0.924	1	1	1	factor
Q_y	0.0454	0.0594	0.0813	0.0988	0.1191	0.1511	0.1689		m^3/s

Figure 3 - Rational Method Calculations

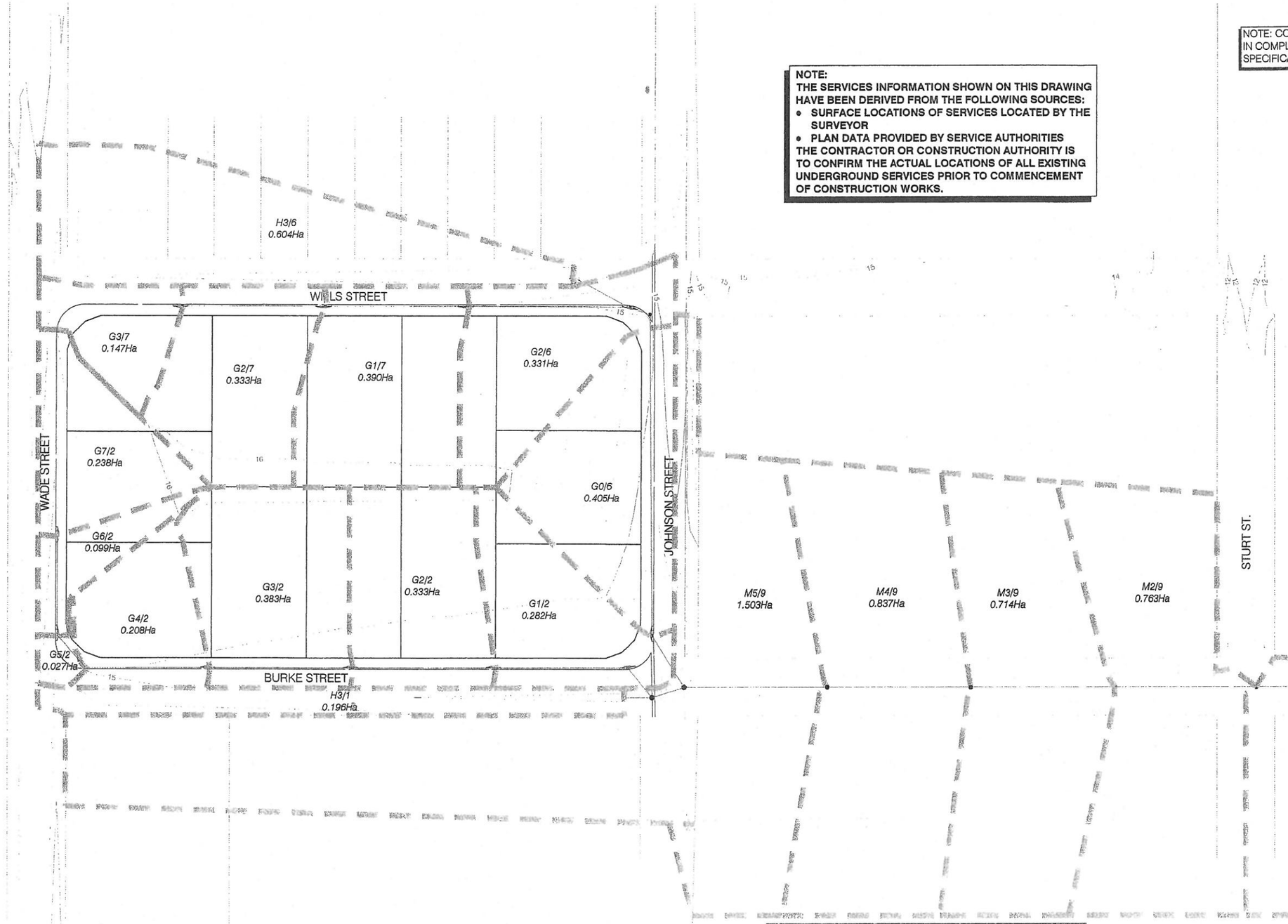
Appendix C: Existing Development Plans

REFER TO ATTACHMENT

NOTE: CONSTRUCTION OF SUBDIVISION TO BE IN COMPLIANCE WITH THE CMDG STANDARD SPECIFICATIONS AND DRAWING STANDARDS.

NOTE:
THE SERVICES INFORMATION SHOWN ON THIS DRAWING HAVE BEEN DERIVED FROM THE FOLLOWING SOURCES:
- **SURFACE LOCATIONS OF SERVICES LOCATED BY THE SURVEYOR**
- **PLAN DATA PROVIDED BY SERVICE AUTHORITIES**

THE CONTRACTOR OR CONSTRUCTION AUTHORITY IS TO CONFIRM THE ACTUAL LOCATIONS OF ALL EXISTING UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS.



LEGEND

25 DESIGN CONTOURS

PROPOSED CATCHMENT BOUNDARY

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D/2008-1382
Dated 22/7/2009

10 5 0 10 20 30 40 50
1 : 750 (A1), 1 : 1500 (A3)

FOR APPROVAL

Rv.	DATE	REVISIONS	REC.	APPR.
4	10.07.09	FURTHER STORMWATER AMENDMENTS	A.Sk	CWS
3	14.05.09	STORMWATER SYSTEM AMENDED	A.Sk	CWS
2	03.03.09	STORMWATER DETENTION ADDED	A.Sk	CWS
1	03.12.08	FOR APPROVAL	PTM	CWS
0	12.08.08	OPERATIONAL WORKS SUBMISSION	CWS	CGF
A	10.01.08	FIRST ISSUE	SH	CS

DRAWN: E. BEATTIE
DESIGNED: P. MOORE
CHECKED: C SHIELDS
A1 DATUM:
R1128-01-01-025 STORMWATER CATCHMENT PLAN.dwg

RECOMMENDED: PROJECT MANAGER C. SHIELDS
APPROVED: PROJECT DIRECTOR STUART DOAK RPEQ 3222

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Sydney	(02) 9416 8233	(02) 9416 8529
Sunshine Coast	(07) 5443 2555	(07) 5443 5842
Townsville	(07) 4772 1186	(07) 4721 2508
Hervey Bay	(07) 4124 5455	(07) 4124 5155
Rockhampton	(07) 4924 7500	(07) 4926 4375
Central Coast	(02) 4323 2558	(02) 4324 3251
Port Moresby	(0011675) 325 2322	(0011675) 325 0851
Philippines	(0011632) 910 5146	(0011632) 910 5146

KELE BROS. PTY LTD
INDUSTRIAL SUBDIVISION
JOHNSON STREET, PARKHURST

STORMWATER CATCHMENT PLAN

DATE: 10/01/08
DRAWING No: R1128-01-01-025

3 2 1 0 A 4 Rv.

LOCATION					TIME			SUB-CATCHMENT RUNOFF						INLET DESIGN							DRAIN DESIGN															HEADLOSSES										PART FULL		DESIGN LEVELS							
						tc	I	C10	C	A	C*A	+CA	Q					Qg	Qb		tc	I	+CA	Qt	Qm	Qs	Qp	L	S		V	T				V2/2g	Ku	hu	Kl	hl	Kw	hw	Sf	hf		Vp							
DESIGN ARI	STRUCTURE No.	DRAIN SECTION	SUB-CATCHMENTS CONTRIBUTING	LAND USE	SLOPE OF CATCHMENT	SUB-CATCHMENT TIME OF CONC.	RAINFALL INTENSITY	10yr RUNOFF CO-EFFICIENT	CO-EFFICIENT OF RUNOFF	SUB-CATCHMENT AREA	EQUIVALENT AREA	SUM OF (C * A)	SUB-CATCHMENT DISCHARGE	FLOW IN K&C (INC. BYPASS)	ROAD GRADE AT INLET	MINOR FLOW ROAD CAPACITY	INLET TYPE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE No.	CRITICAL TIME OF CONC.	RAINFALL INTENSITY	TOTAL (C * A)	MAJOR TOTAL FLOW	MAJOR SURFACE FLOW CAPACITY	MAJOR SURFACE FLOW	PIPE FLOW	REACH LENGTH	PIPE GRADE	PIPE / BOX DIMENSIONS (CLASS)	FLOW VELOCITY FULL (PIPE GRADE VELOCITY)	TIME OF FLOW IN REACH	STRUCTURE CHART No.	STRUCTURE RATIOS FOR 'K' VALUE CALCULATIONS	VELOCITY HEAD	U/S HEADLOSS COEFFICIENT	U/S PIPE STRUCT. HEADLOSS	LAT. HEADLOSS CO-EFFICIENT	LAT. PIPE STRUCT. HEADLOSS	W.S.E CO-EFFICIENT	CHANGE IN W.S.E	PIPE FRICTION SLOPE	PIPE FRICTION HEADLOSS (L * SI)	DEPTH	VELOCITY	OBVERT LEVELS	DRAIN SECTION H.G.L	UPSTREAM H.G.L	LAT. H.G.L	W.S.E.	SURFACE OR K&C INVERT LEVEL	STRUCTURE No.
yrs					%	min	mm/h			ha	ha	ha	l/s	l/s	%	l/s		l/s	l/s		min	mm/h	ha	l/s	l/s	l/s	l/s	m	%	mm	m/s	min			m		m		m		m		m		m/s	m	m	m	m	m	m	
5 100	G7/2	G7/2 to G6/2	G7/2			5.00 5.00	179 322		0.83 1.00	0.238 0.238	0.198 0.238	0.198 0.238	98 213	96	0.30	106	7	69	29	G6/2	5.00 5.00	179 322	0.198 0.238	213			69 (Pipe flow= Grate flow)	34.727	0.50	375(2)	0.82 (1.12)	0.58		Qg 0.069 Qo 0.069 Do 375 CHRT 32: Vo2/2gDo 0.05 H/Do Kg side flow 6.73 end flow 5.03	0.020	6.73	0.132			6.73	0.132	0.16	0.054			14.848 14.672	15.105 15.051	15.237		15.237	15.781	G7/2
5 100	G6/2	G6/2 to G5/2	G7/2;G6/2			5.00 5.00	179 322		0.83 1.00	0.099 0.099	0.082 0.099	0.082 0.099	41 89	70	0.32	110	7	55	15	G5/2	5.58 5.58	171 309	0.280 0.337	289			118 (Pipe flow= Sum upstr atten flows)	15.325	5.00	375(2)	1.07 (3.55)	0.24		Qg 0.053 Qo 0.118 Do 375 CHART 37 Angle 41 Case 2 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.44 K 1.55 S/Do 2.06 cor 0.16 Ku 1.71 Kw 1.71	0.056	1.71	0.100			1.71	0.100	0.46	0.070			14.652 13.886	14.951 14.881	15.051		15.051	15.670	G6/2
5 100	G5/2	G5/2 to G4/2	G7/2;G6/2;G5/2			5.00 5.00	179 322		0.83 1.00	0.027 0.027	0.022 0.027	0.022 0.027	11 24	26	1.33	224	7F.5	16	10	G4/2	5.82 5.82	168 304	0.302 0.364	307			131 (Pipe flow= Sum upstr atten flows)	43.416	0.50	375(2)	1.19 (1.12)	0.61		Qg 0.015 Qo 0.131 Do 375 Angle 49 Chart 39 S/Do 2.5 chart Du/Do 1.00 K0 1.80 K0.5 1.91 Qu/Qo 0.89 Cg 0.29 K 1.83 S/Do 4.0 K0 1.42 K0.5 1.54 K 1.45 S/Do 3.0 K0 1.53 K0.5 1.73 K 1.65	0.072	1.46	0.106	Interp val for S/Do 3.72 Kw 1.51 CHART 38 S/Do 4.0 K0 1.40 K0.5 1.49 K 1.42 S/Do 3.0 K0 1.57 K0.5 1.69 K 1.57 Interp val for S/Do 3.72 Ku 1.46		1.51 (3.72 Kw 1.51	0.109	0.56	0.244			13.866 13.649	14.775 14.531	14.881		14.884	15.104	G5/2
5 100	G4/2	G4/2 to G3/2	G7/2;G6/2;G5/2;G4/2			5.00 5.00	179 322		0.83 1.00	0.206 0.206	0.172 0.206	0.172 0.206	86 166	96	0.50	137	7	68	28	G3/2	6.43 6.43	162 293	0.474 0.572	466			188 (Pipe flow= Sum upstr atten flows)	50.001	0.50	450(2)	1.18 (1.27)	0.71		Qg 0.062 Qo 0.188 Do 450 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.83 Qg/Qo 0.33 K 0.66 S/Do 2.84 cor -0.07 Ku 0.79 Kw 0.79	0.071	0.79	0.056			0.79	0.056	0.44	0.218			13.704 13.454	14.475 14.257	14.531		14.531	14.741	G4/2
5 100	G3/2	G3/2 to G2/2	G7/2;G6/2;G5/2;G4/2 ;G3/2			5.00 5.00	179 322		0.83 1.00	0.383 0.383	0.318 0.383	0.318 0.383	158 343	186	0.50	137	7	106	80	G2/2	7.14 7.14	155 282	0.792 0.955	748			272 (Pipe flow= Sum upstr atten flows)	50.000	0.50	525(2)	1.21 (1.42)	0.69		Qg 0.092 Qo 0.272 Do 525 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.86 Qg/Qo 0.34 K 0.96 S/Do 2.38 cor 0.03 Ku 1.01 Kw 1.01	0.075	1.01	0.075			1.01	0.075	0.37	0.183			13.518 13.268	14.182 13.999	14.257		14.257	14.491	G3/2
5 100	G2/2	G2/2 to G1/2	G7/2;G6/2;G5/2;G4/2 ;G3/2;G2/2			5.00 5.00	179 322		0.83 1.00	0.333 0.333	0.277 0.333	0.277 0.333	138 298	218	0.50	137	7	113	105	G1/2	7.83 7.83	150 272	1.069 1.289	974			358 (Pipe flow= Sum upstr atten flows)	46.373	0.50	600(2)	1.22 (1.55)	0.83		Qg 0.095 Qo 0.358 Do 600 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.88 Qg/Qo 0.26 K 0.80 S/Do 2.15 cor 0.08 Ku 0.86 Kw 0.88	0.076	0.88	0.087			0.88	0.087	0.31	0.144			13.298 13.068	13.932 13.788	13.999		13.999	14.242	G2/2
5 100	G1/2	G1/2 to M2/1	G7/2;G6/2;G5/2;G4/2 ;G3/2;G2/2;G1/2			5.00 5.00	179 322		0.83 1.00	0.282 0.282	0.234 0.282	0.234 0.282	116 252	291	0.00	224	17S.1	224	67		8.46 8.46	146 264	1.303 1.571	1152	632	621 (Pipe flow= Sum upstr atten flows)	531	13.706	0.00	1050(2)	0.59 (0.00)	0.23		Qg 0.163 Qo 0.531 Do 1050 Angle 52 Chart 39 S/Do 2.5 chart Du/Do 0.57 K0 2.61 K0.5 1.64 Qu/Qo 0.86 Cg 0.76 K 1.83 S/Do 2.0 K0 2.93 K0.5 1.75 K 2.04 S/Do 1.5 K0 3.45 K0.5 2.05 K 2.39	0.018	2.19	0.038	Interp val for S/Do 1.36 Kw 2.50 CHART 38 S/Do 2.0 K0 2.28 K0.5 1.69 K 1.83 S/Do 1.5 K0 2.71 K0.5 1.81 K 2.11 Interp val for S/Do 1.36 Ku 2.16		2.50 (0.00)	0.044	0.03	0.005			13.411 13.411	13.750 13.745	13.788		13.794	14.145	G1/2
5 100	H3/1	H3/1 to M2/1	H3/1	UNLOCK INLET CAPACITY - to reduce overland flow at M4/9 Major ARI gutter flow: Crit Inlet 322mm/h @ H3/1 30% of atten. major ARI catchment runoff from H3/1 = 53 (Catchment flow 175 x 322/322 x 30%) 30% of atten. major ARI catchment runoff from H3/1 = 26 (Catchment flow 175 x 322/322 x 30%) Total major ARI gutter flow 79			5.00 5.00	179 322		0.83 1.00	0.196 0.196	0.163 0.196	0.163 0.196	61 175	61 Maj 79	0.50	917		81 (UNLOCKED	0 53)		5.00 5.00	179 322	0.163 0.196	175	1545	122 (Pipe flow=	53 Unlocked	9.472 grate flow)	0.50	1050(2)	0.09 (2.25)	0.16			0.000	1.50	0.000			1.50	0.000	0.00	0.000			13.458 13.411	13.745 13.745	13.745		13.745	13.384	H3/1
5 100	M2/1	M2/1 to M1/1	G7/2 to G1/2;H3/1														24				8.69 8.69	144 261	1.466 1.767	1291			584 (Pipe flow= Sum upstream flows)	11.880	0.50	1050(2)	0.65 (2.25)	0.20		Qo 0.584 Do 1050 Routine 2.24 Join Pipes: G1/2 and H3/1 Vel1 0.613 Vel2 0.061	0.022	1.57	0.034	Eq Dia 1149 Angle 245 Flow 0.584 CHART 6D Du/Do1.09 alpha 65 Kw 0.28 Vu 0.56 WSE 0.04 Ku 1.57 Kw 1.78		1.78 (Eq Dia 1149 Angle 245 Flow 0.584	0.038	0.04	0.005			13.391 13.331	13.711 13.706	13.745		13.749	14.132	M2/1
5 100	G3/7	G3/7 to G2/7	G3/7			5.00 5.00	179 322		0.83 1.00	0.147 0.147	0.122 0.147	0.122 0.147	61 131	61 FLOW WIDTH/DEPTH 2.167m DOWNSTREAM 0.877m	0.40	123	7	49	12	G2/7	5.00 5.00	179 322	0.122 0.147	131			49 (Pipe flow= Grate flow)	50.000	0.41	375(2)	0.44 (1.02)	0.83		Qg 0.049 Qo 0.049 Do 375 CHRT 32: Vo2/2gDo 0.03 H/Do Kg side flow 5.31 end flow 4.02	0.010	5.31	0.053			5.31	0.053	0.08	0.039			14.506 14.301	14.973 14.934	15.026		15.026	15.443	G3/7
5 100	G2/7	G2/7 to G1/7	G3/7;G2/7			5.00 5.00	179 322		0.83 1.00	0.333 0.333	0.277 0.333	0.277 0.333	138 298	150 FLOW WIDTH/DEPTH 3.290m DOWNSTREAM 2.132m	0.40	123	7	91	59	G1/7	5.83 5.83	168 304	0.399 0.461	406			131 (Pipe flow= Sum upstr atten flows)	50.000	0.40	450(2)	0.83 (1.13)	0.83		Qg 0.065 Qo 0.131 Do 450 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.83 Qg/Qo 0.65 K 1.76 S/Do 2.41 cor 0.05 Ku 1.83 Kw 1.83	0.035	1.83	0.065			1.83	0.065	0.21	0.106			14.301 14.101	14.669 14.763	14.934		14.934	15.243	G2/7
5 100	G1/7	G1/7 to G2/6	G3/7;G2/7;G1/7			5.00 5.00	179 322		0.83 1.00	0.390 0.390	0.324 0.390	0.324 0.390	161 349	220 FLOW WIDTH/DEPTH 3.877m DOWNSTREAM 2.808m	0.40	123	7	114	106	G2/6	6.66 6.66	159 290	0.723 0.871	702			226 (Pipe flow= Sum upstr atten flows)	56.634	0.37	525(2)	1.01 (1.22)	0.94		Qg 0.101 Qo 0.226 Do 525 CHART 33 Angle 0 S/Do 2.5 Du/Do 0.86 Qg/Qo 0.45 K 1.26 S/Do 2.24 cor 0.10 Ku 1.38 Kw 1.38	0.052	1.38	0.072			1.38	0.072	0.25	0.143			14.101 13.891	14.691 14.548	14.763		14.763	15.049	G1/7
5 100	H3/6	H3/6 to G2/6	H3/6	UNLOCK INLET CAPACITY - to reduce overland flow at G2/6 Major ARI gutter flow: Crit Inlet 322mm/h @ H3/6 60% of atten. major ARI catchment runoff from H3/6 = 324 (Catchment flow 540 x 322/322 x 60%) Total major ARI gutter flow 324			5.00 5.00	179 322		0.83 1.00	0.604 0.604	0.501 0.604	0.501 0.604	249 540	249 Maj 324 FLOW WIDTH/DEPTH 0.839m	0.40	821	101	249 (UNLOCKED	0 298)		5.00 5.00	179 322	0.501 0.604	540	1654	243 (Pipe flow=	298 Unlocked	22.637 grate flow)	0.50	750(2)	0.65 (1.80)	0.38			0.022	1.50	0.032			1.50	0.032	0.07	0.015			14.024 13.911	14.563 14.548	14.595		14.595	14.402	H3/6
5 100	G2/6	G2/6 to M1/6	G3/7;G2/7;G1/7;H3/6; G2/6			5.00 5.00	179 322		0.83 1.00	0.331 0.331	0.274 0.331	0.274 0.331	136 296	242 FLOW WIDTH/DEPTH 3.568m	0.04	224	17S.1	224	18		7.60 7.60	152 275	1.498 1.806	1380	632	632 (Pipe flow=	747 Sum upst	7.263 ream flows)	0.50	750(2)	1.64 (1.80)	0.07		Qg 0.224 Qo 0.747 Do 750 Routine 2.15 Join Pipes: G1/7 and H3/6 Vel1 1.042 Vel2 0.673 Eq Dia 894 Angle 179 Flow 0.523	0.137	1.26	0.173	CHART 33 Angle 1 S/Do 2.5 Du/Do 1.19 Qg/Qo 0.30 K 1.08 S/Do 1.86 cor 0.18 Ku 1.26 Kw 1.26		1.26 (1.26 Kw 1.26	0.173	0.41	0.030			13.891 13.655	14.375 14.345	14.548		14.548	14.951	G2/6
5 100	M1/6	M1/6 to G0/6	G3/7;G2/7;G1/7;H3/6; G2/6														24				7.67 7.67	151 274	1.498 1.931	1470			837 Additional flow: 0.095 cumecs (Pipe flow= Sum upstr atten flows)	113.385	0.50	825(2)	1.52 (1.92)	1.24		Qo 0.837 Do 825 CHART 50 Du/Do0.91 alpha 73 Kw 0.29 Vu 1.68 WSE 0.23 Ku 1.62 Kw 1.97	0.118	1.82	0.191			1.97	0.232	0.31	0.355			13.655 13.288	14.154 13.799	14.345		14.366	14.901	M1/6
5 100	G0/6	G0/6 to M1/1	G3/7;G2/7;G1/7;H3/6; G2/6;G0/6			5.00 5.00	179 322		0.83 1.00	0.405 0.405	0.337 0.405	0.337 0.405	168 362	168 FLOW WIDTH/DEPTH 2.768m DOWNSTREAM 1.799m	1.12	206	7	98	70	G1/2	8.91 8.91	143 259	1.835 2.337	1681	1578	810 (Pipe flow=	871 Sum upst	21.453 ream flows)	0.50	900(2)	1.32 (2.03)	0.27		Qg 0.078 Qo 0.871 Do 900 CHART 34 Angle 32 Case 3 S/Do 2.5 Du/Do 0.82 Qg/Qo 0.09 K 0.45 S/Do 1.56 cor 0.09 Ku 0.54 Kw 0.54	0.089	0.54	0.047			0.54	0.047	0.21	0.046			13.288 13.180	13.752 13.706	13.799		13.799	14.453	G0/6
5 100	M1/1	M1/1 to M5/9	G7/2 to G1/2;H3/1;G3 /7;G2/7;G1/7;H3/6;G2 /6;G0/6														24				9.18 9.18	142 256	3.301 4.104	2918			1455 (Pipe flow= Sum upstream flows)	49.970	0.80	1200(2)	1.25 (3.11)	0.67		Qo 1.455 Do 1200 Routine 2.19 Combined pipes in line case Join Pipes: G0/6 and M2/1 Vel1 0.574 Vel2 1.389	0.080	1.25	0.100	Eq Dia 1303 Angle 207 Flow 1.455 CHART 6D Du/Do1.09 alpha 0 Kw 0.05 Vu 1.09 WSE 0.05 Ku 0.59 Kw 0.63 Interpolated Ku= 1.25 Kw= 1.25		1.25 (Eq Dia 1303 Angle 207 Flow 1.455	0.100	0.13	0.064			13.464 13.065	13.606 13.542	13.706		13.706	14.288	M1/1

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D/2008-1282
Dated 22/7/2009

CALCULATIONS TABLE

FOR APPROVAL

Rv.	DATE	REVISIONS	REC.	APPR.
4	10.07.09	FURTHER STORMWATER AMENDMENTS	A.Sk	CWS
3	14.05.09	STORMWATER SYSTEM AMENDED	A.Sk	CWS
2	03.03.09	STORMWATER DETENTION ADDED	A.Sk	CWS
1	03.12.08	FOR APPROVAL	PTM	CWS
0	12.08.08	OPERATIONAL WORKS SUBMISSION	CWS	CGF
A	10.01.08	FIRST ISSUE	SH	CS

DRAWN: E. BEATTIE
DESIGNED: P. MOORE
CHECKED: C. SHIELDS
A1 DATUM:
R1128-01-01-028 STORMWATER CALCULATION TABLE.dwg

RECOMMENDED: PROJECT MANAGER C. SHIELDS
APPROVED: PROJECT DIRECTOR STUART DOAK RPEQ 3222

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Sunshine Coast	(07) 5443 2555	(07) 5443 5642
Townsville	(07) 4772 1166	(07) 4721 2508
Hervey Bay	(07) 4124 5455	(07) 4124 5155
Rockhampton	(07) 4924 7500	(07) 4926 4375
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Philippines	(00116632) 910 5146	(00116632) 910 5146

KELE BROS. PTY LTD
INDUSTRIAL SUBDIVISION
JOHNSON STREET, PARKHURST
STORMWATER CALCULATION TABLE
SHEET 1 OF 2

DATE: 10/01/08
DRAWING No: R1128-01-01-028
Rv: A | 4

LOCATION					TIME			SUB-CATCHMENT RUNOFF						INLET DESIGN							DRAIN DESIGN																HEADLOSSES								PART FULL		DESIGN LEVELS							
						tc	I	C10	C	A	C*A	+CA	Q					Qg	Qb		tc	I	+CA	Qt	Qm	Qs	Qp	L	S		V	T			V2/2g	Ku	hu	Kl	hl	Kw	hw	Sf	hf		Vp							
DESIGN ARI	STRUCTURE No.	DRAIN SECTION	SUB-CATCHMENTS CONTRIBUTING	LAND USE	SLOPE OF CATCHMENT	SUB-CATCHMENT TIME OF CONC.	RAINFALL INTENSITY	10yr RUNOFF CO-EFFICIENT	CO-EFFICIENT OF RUNOFF	SUB-CATCHMENT AREA	EQUIVALENT AREA	SUM OF (C * A)	SUB-CATCHMENT DISCHARGE	FLOW IN K&C (INC. BYPASS)	ROAD GRADE AT INLET	MINOR FLOW ROAD CAPACITY	INLET TYPE	FLOW INTO INLET	BYPASS FLOW	BYPASS STRUCTURE No.	CRITICAL TIME OF CONC.	RAINFALL INTENSITY	TOTAL (C * A)	MAJOR TOTAL FLOW	MAJOR SURFACE FLOW CAPACITY	MAJOR SURFACE FLOW	PIPE FLOW	REACH LENGTH	PIPE GRADE	PIPE / BOX DIMENSIONS (CLASS)	FLOW VELOCITY FULL (PIPE GRADE VELOCITY)	TIME OF FLOW IN REACH	STRUCTURE CHART No.	STRUCTURE RATIOS FOR K' VALUE CALCULATIONS	VELOCITY HEAD	U/S HEADLOSS COEFFICIENT	U/S PIPE STRUCT. HEADLOSS	LAT. HEADLOSS CO-EFFICIENT	LAT. PIPE STRUCT. HEADLOSS	W.S.E CO-EFFICIENT	CHANGE IN W.S.E	PIPE FRICTION SLOPE	PIPE FRICTION HEADLOSS (L * Sf)	DEPTH	VELOCITY	OBVERT LEVELS	DRAIN SECTION H.G.L	UPSTREAM H.G.L	LAT. H.G.L	W.S.E.	SURFACE OR K&C INVERT LEVEL	STRUCTURE No.
yrs					%	min	mm/h			ha	ha	l/s		l/s	%	l/s		l/s	l/s		min	mm/h	ha	l/s	l/s	l/s	m	%	mm	m/s	min			m		m		m		m	%	m	m	m/s	m	m	m	m	m	m	
5 100	M5/9	M5/9 to M4/9	G7/2 to G1/2;H3/1;G3/7;G2/7;G1/7;H3/6;G2/6;G0/6;M5/9			15.00 15.00	116 207		0.83 1.00	1.503 1.503	1.247 1.503	1.247 1.503	402 864	402 Maj 605 FLOW WIDTH/DEPTH 4.777m	0.50	137	101	402 (UNLOCKED	0 605)		15.00 15.00	116 207	4.548 5.607	3224	2693	1164 (Pipe flow=	2060 Sum upstream flows)	50.000	1.00	1200(2	1.77 (3.46)	0.47		Qg 0.605 Qo 2.000 Do 1200 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.29 K 1.07 S/Do 1.41 cor 0.36 Ku 1.43 Kw 1.43	0.160	1.43	0.229			1.43	0.229	0.26	0.128			13.045 12.545	13.313 13.185	13.542		13.542	14.391	M5/9
				UNLOCK INLET CAPACITY - to reduce overland flow at M4/9 Major ARI gutter flow: Crit Inten 207mm/h @ M5/9 70% of atten. major ARI catchment runoff from M5/9 = 605 (Catchment flow 864 x 207/207 x 70%) Total major ARI gutter flow 605																																																
5 100	M4/9	M4/9 to M3/9	G7/2 to G1/2;H3/1;G3/7;G2/7;G1/7;H3/6;G2/6;G0/6;M5/9;M4/9			15.00 15.00	116 207		0.83 1.00	0.837 0.837	0.695 0.837	0.695 0.837	224 481	224 Maj 810 FLOW WIDTH/DEPTH 3.723m	0.50	137	101	224 (UNLOCKED	0 810)		15.47 15.47	114 204	5.243 6.444	3651	1055	781 (Pipe flow=	2870 Sum upstream flows)	50.000	0.50	1200(2	2.46 (2.46)	0.34		Qg 0.810 Qo 2.870 Do 1200 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.28 K 1.04 S/Do 1.54 cor 0.29 Ku 1.33 Kw 1.33	0.308	1.33	0.411			1.33	0.411	0.50	0.249			12.525 12.275	12.774 12.525	13.165		13.165	14.119	M4/9
				UNLOCK INLET CAPACITY - to reduce overland flow at M2/9 Major ARI gutter flow: Crit Inten 204mm/h @ M4/9 50% of atten. major ARI catchment runoff from M4/9 = 237 (Catchment flow 481 x 204/207 x 50%) 50% of total atten. overland flow for M5/9 = 573 (Overland flow 1154 x 204/207 x 50%) Total major ARI gutter flow 810																																															
5 100	M3/9	M3/9 to M2/9	G7/2 to G1/2;H3/1;G3/7;G2/7;G1/7;H3/6;G2/6;G0/6;M5/9;M4/9;M3/9			15.00 15.00	116 207		0.83 1.00	0.714 0.714	0.593 0.714	0.593 0.714	191 411	191 Maj 587 FLOW WIDTH/DEPTH 3.473m	0.50	137	101	191 (UNLOCKED	0 271)		15.81 15.81	113 202	5.636 7.168	4016	1055	675 (Pipe flow=	3141 Sum upstream flows)	50.001	0.50	1200(2	2.69 (2.46)	0.31		Qg 0.271 Qo 3.141 Do 1200 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.09 K 0.47 S/Do 1.22 cor 0.13 Ku 0.60 Kw 0.60	0.369	0.60	0.222			0.60	0.222	0.60	0.299			12.255 12.005	12.303 12.005	12.525		12.525	13.993	M3/9
				UNLOCK INLET CAPACITY - to reduce overland flow at M2/9 Major ARI gutter flow: Crit Inten 202mm/h @ M3/9 50% of atten. major ARI catchment runoff from M3/9 = 200 (Catchment flow 411 x 202/207 x 50%) 50% of total atten. overland flow for M4/9 = 387 (Overland flow 781 x 202/204 x 50%) Total major ARI gutter flow 587																																															
5 100	M2/9	M2/9 to M1/9	G7/2 to G1/2;H3/1;G3/7;G2/7;G1/7;H3/6;G2/6;G0/6;M5/9;M4/9;M3/9;M2/9			15.00 15.00	116 207		0.83 1.00	0.763 0.763	0.633 0.763	0.633 0.763	204 439	204 FLOW WIDTH/DEPTH 3.574m	0.50	137	101	204	0		16.12 16.12	112 200	6.469 7.921	4400	1055	1055 (Pipe flow= | 3345 Sum upstream flows)	49.999	0.50	1200(2	2.87 (2.46)	0.29		Qg 0.204 Qo 3.345 Do 1200 Flow M3/9 made eqv grate flow CHRT 32: Vo2/2gDo 0.34 H/Do Kg elde flow 4.06 end flow 3.54 K vals above for stepped pipes as grate flow grate flow decreased by 3.141 from M3/9	0.420	0.46	0.193		CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.06 K 0.36 S/Do 1.52 cor 0.07 Ku 0.46 Kw 0.46 K vals step pipes as pipe flow Ku 0.46 Kw 0.46	0.46	0.193	0.66	0.339			10.899 10.646	11.340 11.001	11.533		11.533	13.903	M2/9
5 100	M1/9	M1/9 to GPT/9	G7/2 to G1/2;H3/1;G3/7;G2/7;G1/7;H3/6;G2/6;G0/6;M5/9;M4/9;M3/9;M2/9;M1/9			15.00 15.00	116 207		0.83 1.00	0.420 0.420	0.349 0.420	0.349 0.420	112 241	112 FLOW WIDTH/DEPTH 1.892m	3.64	371	101	112	0		16.41 16.41	111 196	6.818 8.341	4567		(Pipe flow= | 3423 Sum upstream flows)	48.120	0.50	1200(2	2.93 (2.46)	0.27		Qg 0.107 Qo 3.423 Do 1200 CHART 33 Angle 0 S/Do 2.5 Du/Do 1.00 Qg/Qo 0.03 K 0.30 S/Do 1.31 cor 0.04 Ku 0.34 Kw 0.34	0.438	0.34	0.149			0.34	0.149	0.71	0.341			10.626 10.385	10.852 10.511	11.001		11.001	13.979	M1/9
5 100	GPT/9	GPT/9 to O/9	G7/2 to G1/2;H3/1;G3/7;G2/7;G1/7;H3/6;G2/6;G0/6;M5/9;M4/9;M3/9;M2/9;M1/9														24				16.68 16.68	110 197	6.818 8.341	4564		(Pipe flow= | 3423 Sum upstream flows)	4.880	0.50	1200(2	2.93 (2.46)	0.03		Qo 3.423 Do 1200 CHART 50 Du/Do1.00 alpha 0 Kw 0.05 Vu 3.03 WSE 0.16 Ku 0.31 Kw 0.36	0.438	0.31	0.135			0.36	0.159	0.71	0.035			10.365 10.341	10.376 10.341	10.511		10.535	11.227	GPT/9

CALCULATIONS TABLE

ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D/2008-1282
Dated 22/7/2009

FOR APPROVAL

Rv.	DATE	REVISIONS	REC.	APPR.
4	10.07.09	FURTHER STORMWATER AMENDMENTS	A.Sk	CWS
3	14.05.09	STORMWATER SYSTEM AMENDED	A.Sk	CWS
2	03.03.09	STORMWATER DETENTION ADDED	A.Sk	CWS
1	03.12.08	FOR APPROVAL	PTM	CWS
0	12.08.08	OPERATIONAL WORKS SUBMISSION	CWS	CGF
A	10.01.08	FIRST ISSUE	SH	CS

DRAWN: E. BEATTIE
DESIGNED: P. MOORE
CHECKED: C SHIELDS
A1 DATUM:
R1128-01-01-029 STORMWATER CALCULATION TABLE.dwg

RECOMMENDED: PROJECT MANAGER C. SHIELDS
APPROVED: PROJECT DIRECTOR STUART DOAK RPEQ 3222

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INDUSTRIAL SUBDIVISION
JOHNSON STREET, PARKHURST
STORMWATER CALCULATION TABLE
SHEET 2 OF 2

DATE: 10/01/08
DRAWING No: R1128-01-01-029
Rv. 4