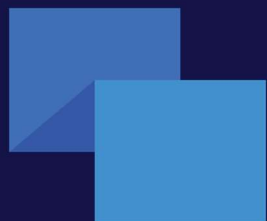


CIVIL ENGINEERING SERVICES REPORT

PROPOSED SELF-STORAGE DEVELOPMENT 174-176 TYGUM ROAD, WATERFORD WEST

PREPARED FOR BLACKOAK PROPERTY GROUP
C23080AR001



HURLEY
CONSULTING ENGINEERS

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Appendix A – Architectural Plans

Appendix B – Detail Survey

Appendix C – Concept Civil Services Plans

Appendix D – LCC Flood Report

Revision	Date	Author	Verifier	Approver
A	21/07/2024	RW	MB	CH

Approved for issue for and on behalf of Hurley Consulting Engineers Pty Ltd



Craig Hurley BE(Civil) MIEAust CPEng RPEQ 15957
Director & Principal Civil Engineer

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1 INTRODUCTION

Hurley Consulting Engineers has been commissioned by Blackoak Property Group to prepare a Civil Engineering Services Report for a proposed self-storage development at 174-176 Tygum Road, Waterford West. The development will involve a new multi-level self-storage facility as shown on the Proposal Architectural Plans prepared by Hayes Anderson Lynch Architects Pty Ltd and enclosed in **Appendix A**.

The intent of this report is to review existing infrastructure in the vicinity of the site and to demonstrate how the proposed development can be serviced in general accordance with the local planning scheme requirements.

2 SITE DESCRIPTION

The subject site is located at 174-176 Tygum Road, Waterford West, on land described as Lot 46 on RP106985. The site has a total area of approximately 2,572m² and is located within the Logan City Council (LCC) local government area.



Figure 2.1 – Locality Plan
Image Source: QLD Globe 2024

The site is surrounded by Tygum Road to the east, a shopping centre to the north, residential dwellings to the south and Tygum Lagoon to the west of the site. The site ranges in elevation from approximately RL 14.75m AHD in the north-eastern corner of the site to approximately RL 10.50m AHD in the south-western corner of the site.

The site contains one existing residential dwelling and ancillary structures on the eastern portion of the subject site, and the western portion of the site is largely comprised of grassland. Detailed survey has been provided by ONF Surveying and is enclosed in **Appendix B**.

3 FILLING & EXCAVATION

The proposed development involves the construction of a new self-storage building, which is defined as a Class 7(b) building under the National Construction Code (NCC). The LCC Flood Overlay Code requires that a Class 7(b) building must achieve a minimum building floor level at or above the defined flood level (DFL) to achieve flood immunity.

A LCC flood report was generated for the subject site and is enclosed in **Appendix D**. The report indicates that the critical flood source impacting the site is from the Logan River and sets the defined flood level (DFL) as RL 14.3m AHD. As such, the minimum pad level and floor level for this proposed development will be at or above RL 14.3m AHD, which will require bulk earthworks to achieve. It is proposed to perform compensatory earthworks to maintain the existing flood storage capacity within the site, and this is discussed further in **Section 5**.

Retaining walls are proposed to facilitate the above arrangement and tie in with the surrounding properties. The maximum retaining wall height visible from outside the development is expected to be approximately 2.0m (set back 3m from the property boundary and screened by landscaping) but will generally be less than 1.5m in height. All filling will be undertaken in accordance with Logan City Council planning scheme requirements and the requirements of AS3798 for Level 1 filling.

Construction phase stormwater quality can be managed by implementing appropriate erosion and sediment control techniques during the construction phase. Erosion and sediment control guidance is given in the International Erosion Control Association (IECA) Australasia Best Practice Erosion and Sediment Control (BPESC) document. The IECA BPESC documents are available for download from the IECA website.

The proposed extents of cutting and filling are shown on the Concept Bulk Earthworks Layout Plan enclosed in **Appendix C**. Final site levels will be subject to confirmation in a future operational works application to Council.

4 ROADWORKS & SITE ACCESS

The site currently has access to Tygum Road via two unformed crossovers. Tygum Road is a fully sealed road with two travel lanes and kerb and channel on both sides of the road.

It is proposed to restore the verge where the existing unformed crossovers are located and provide a new industrial crossover in accordance with IPWEA standard drawing RS-051. No further external roadwork is proposed because the road pavement at the site frontage has been constructed to an urban standard.

Refuse collection will be provided from Tygum Road via kerbside collection and mobile wheelie bins. Collection of abandoned bulky items will be arranged on site with a private waste removal contractor.

The proposed access arrangements are shown on the Concept Civil Services Plan enclosed in **Appendix C**.

5 STORMWATER MANAGEMENT

5.1 FLOODING

The site is impacted by flooding from the Logan River in major storms and falls under the LCC Temporary Local Planning Instrument (TLPI No. 1/2023). An extract from the current Flood Overlay mapping is shown in **Figure 5.1** and the Logan City Council Flood Portal identifies a 1% Annual Exceedance Probability (AEP) flood level of RL 14.3 metres AHD.

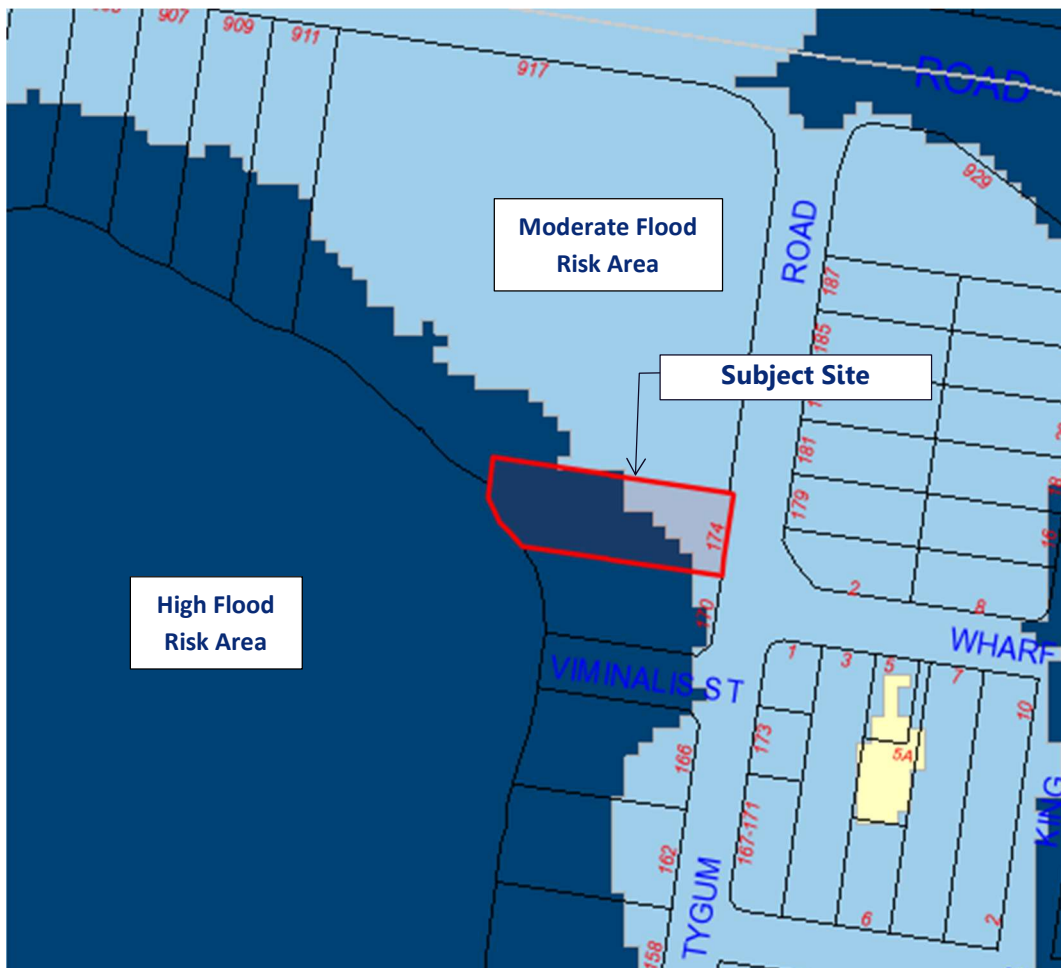


Figure 5.1 – LCC Flood Overlay Mapping

The development complies directly with Section 1 of the purpose of the Flood Hazard Overlay Code by maintaining pre-development flood storage and elevating the building above the 1% AEP flood level. Flooding is discussed further in the separate technical memorandum and Flood Emergency Management Plan prepared by SLR Consulting.

5.2 STORMWATER QUANTITY

The site currently falls away from Tygum Road and drains west as overland sheet flow, which eventually contributes runoff to Tygum Lagoon. A review of the LCC online asset infrastructure shows there is Council drainage infrastructure adjacent to Tygum Road that discharges captured runoff to grassed swales and ultimately Tygum Lagoon.

It is proposed to maintain the existing scenario of discharging towards Tygum Lagoon as overland flow. Roofwater from the proposed development will discharge via a headwall with scour protection at the rear of the development footprint. Discharged flows will drain towards the western boundary of the site and ultimately towards Tygum Lagoon as per the existing scenario.

The proposed internal drainage arrangement is shown on the Concept Civil Services Plan enclosed in **Appendix C**.

The development will increase peak runoff in local storm events due to an increase in the imperviousness of the site compared to the existing residential use. However given the site discharges directly to public land and into Tygum Lagoon (being a regional floodplain) the development will not cause or create an actionable drainage nuisance.

Peak flood levels in Tygum Lagoon and downstream are determined by Logan River flooding, which we understand has a critical storm duration of 48-72 hours. This is substantially longer than the critical storm duration for the local catchment, so the likelihood of peak local runoff coinciding with peak river flooding is negligible. Stormwater detention would increase the critical storm duration for the subject site (compared to an unmitigated developed case) so would provide no clear benefit in this case.

5.3 STORMWATER QUALITY

Formal stormwater quality treatment is not required because the the area disturbed is less than 2,500m² given the rear part of the site is to remain undisturbed. On that basis the development does not trigger the formal pollutant reduction targets under the State Planning Policy and Council planning scheme.

6 SEWERAGE RETICULATION

Detailed survey and Logan City Council GIS information identifies existing sewer infrastructure that passes through the site. It is proposed to upgrade the existing 100mm diameter sewer property connection to a new 150mm diameter sewer connection to service the proposed development. The final sizes and arrangements will be confirmed by a hydraulic engineer at detailed design phase.

The existing sewer main will be located within the proposed building footprint, however access to the sewer main for maintenance will be maintained in accordance with Queensland Development Code (QDC) MP1.4. The sewer main will maintain a 1.5m wide clear zone with a minimum unobstructed height of 2.4m along the length of the sewer line in accordance with QDC MP1.4 Clause A2.1(2) (a) and (b). An excerpt of the QDC MP1.4 requirements along the length of the pipe is shown in **Figure 6.1**.

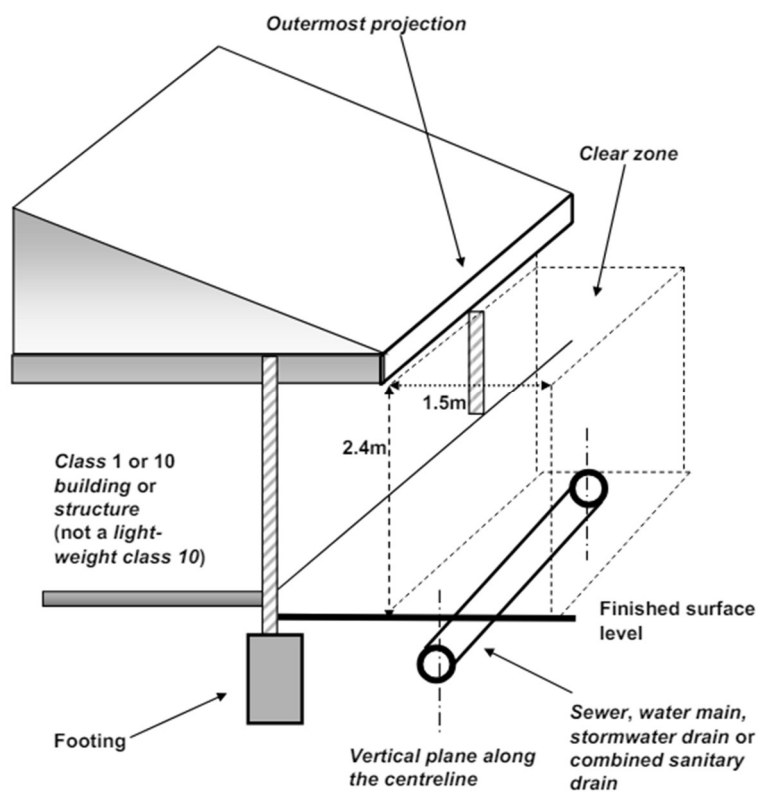


Figure 6.1 – QDC MP1.4 requirements for a clear zone over sewer mains

There is also an existing sewer maintenance structure located outside of the building footprint near the southern boundary of the site. No earthworks are proposed within the vicinity of this structure and a 1.5m radius "open to the sky" clear zone will be maintained over the existing maintenance structure in accordance with QDC MP1.4 Clause A2.1(2)(c) as shown on **Figure 6.2**.

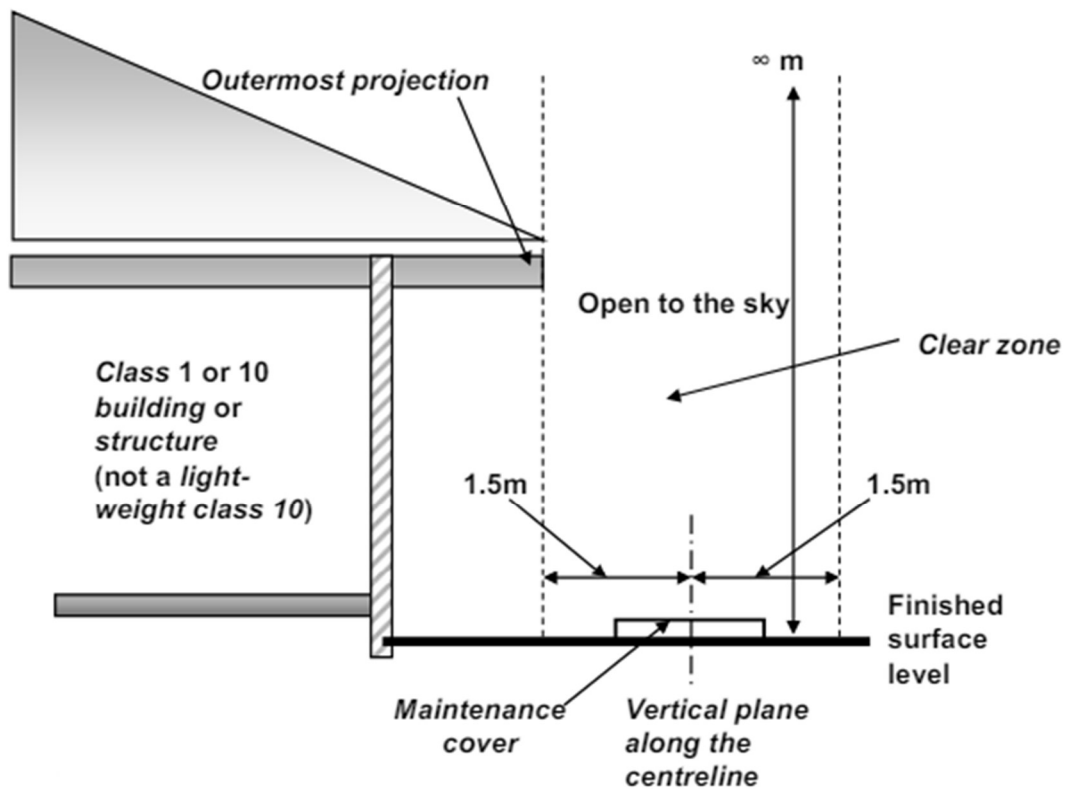


Figure 6.2 – QDC MP1.4 requirements for a clear zone over sewer maintenance holes

Compliance with QDC MP1.4 requirements will facilitate the on-going maintenance of the council sewer infrastructure by Logan City Council. The building and retaining wall footings will be designed by a structural engineer, in accordance with QDC MP1.4.

The existing sewer reticulation main and proposed sewer servicing arrangements is shown on the Concept Civil Services Plans enclosed in **Appendix C**.

7 WATER RETICULATION

Detailed survey and Logan City Council GIS information identifies a 100mm diameter existing water main that runs along the western road verge of Tygum Road. The site is currently serviced via an existing domestic water service and meter from that main.

It is proposed to remove the existing water meter and service located at the south-eastern corner of the site. A new fire service and commercial water meter is proposed to service the proposed development. The final sizes and arrangements will be confirmed by a hydraulic engineer at detailed design phase.

The existing water main and the proposed water servicing arrangements are shown on the Concept Civil Services Plans enclosed in **Appendix C**.

8 CONCLUSION

Hurley Consulting Engineers has been commissioned by Blackoak Property Group to prepare a Civil Engineering Services Report for a proposed industrial development at 174-176 Tygum Road, Waterford West. The development will involve a new multi-level self-storage facility as shown on the Proposal Architectural Plans prepared by Hayes Anderson Lynch Architects Pty Ltd and enclosed in **Appendix A**.

This report has reviewed existing infrastructure in the vicinity of the site and demonstrated how the proposed development can be serviced in general accordance with the local planning scheme requirements. Concept civil engineering plans are enclosed with **Appendix C** to illustrate the servicing arrangements discussed in this report.

No civil engineering constraints have been identified that, in our opinion, would preclude approval of the proposed development with reasonable and relevant conditions.

Appendix A - Architectural Plans

Town Planning Drawings

TYGUM ROAD STORAGE FACILITY

174-176 TYGUM ROAD, WATERFORD WEST, 4133, QLD



NOTE:
These drawings are for Town Planning purposes only

SITE STATISTICS

SITE AREA	2,571.59	
SITE COVER	1,436.78	55.87%
LANDSCAPING	1,044.97	40.63%
SELF STORAGE UNITS	290 INDICATIVE QUANTITY	
CAR SPACES	4	

DRAWING LIST

TP001	Coversheet	TP203	Level 2 Floor Plan
TP002	Locality Plan	TP204	Roof Plan
TP003	Renders	TP401	East & West Elevation
TP101	Site Plan - Demolition	TP402	South Elevation
TP102	Site Plan - Proposed	TP403	North Elevation
TP201	Ground Floor Plan	TP500	Sections
TP202	Level 1 Floor Plan		

TOWN PLANNING

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12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG
Date	Issue	Details	Checked



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Project
Storage Facility
174-176 Tygum Road, Waterford
West, QLD 4133

Drawing Title
Coversheet

Scale @ A3	Drawn:	Checked:
1:100	JK	BG
Project Number	Drawing Number	Issue
H4727TYG	TP001	C

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TYGUM LAGOON

WATERFORD PLAZA

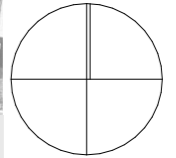
SUBJECT SITE

TYGUM ROAD

WHARF STREET

KING STREET

N



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02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG
Date	Issue	Details	Checked

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Project
Storage Facility
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Drawing Title
Locality Plan

Scale @ A3	Drawn: JK	Checked: BG
Project Number H4727TYG	Drawing Number TP002	Issue C

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Drawing Title
Renders

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
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LEGEND

- SS - EXISTING SEWER LINE
-  NO LOAD-BEARING STRUCTURE BELOW SLAB IN HATCHED ZONE 3000mm FROM 12.30m CONTOUR
-  PROPOSED VOLUMETRIC SEWER EASEMENT

RENOVATION LEGEND

-  To be demolished



1 Site Plan - Demolition 1:300

12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG
Date	Issue	Details	Checked

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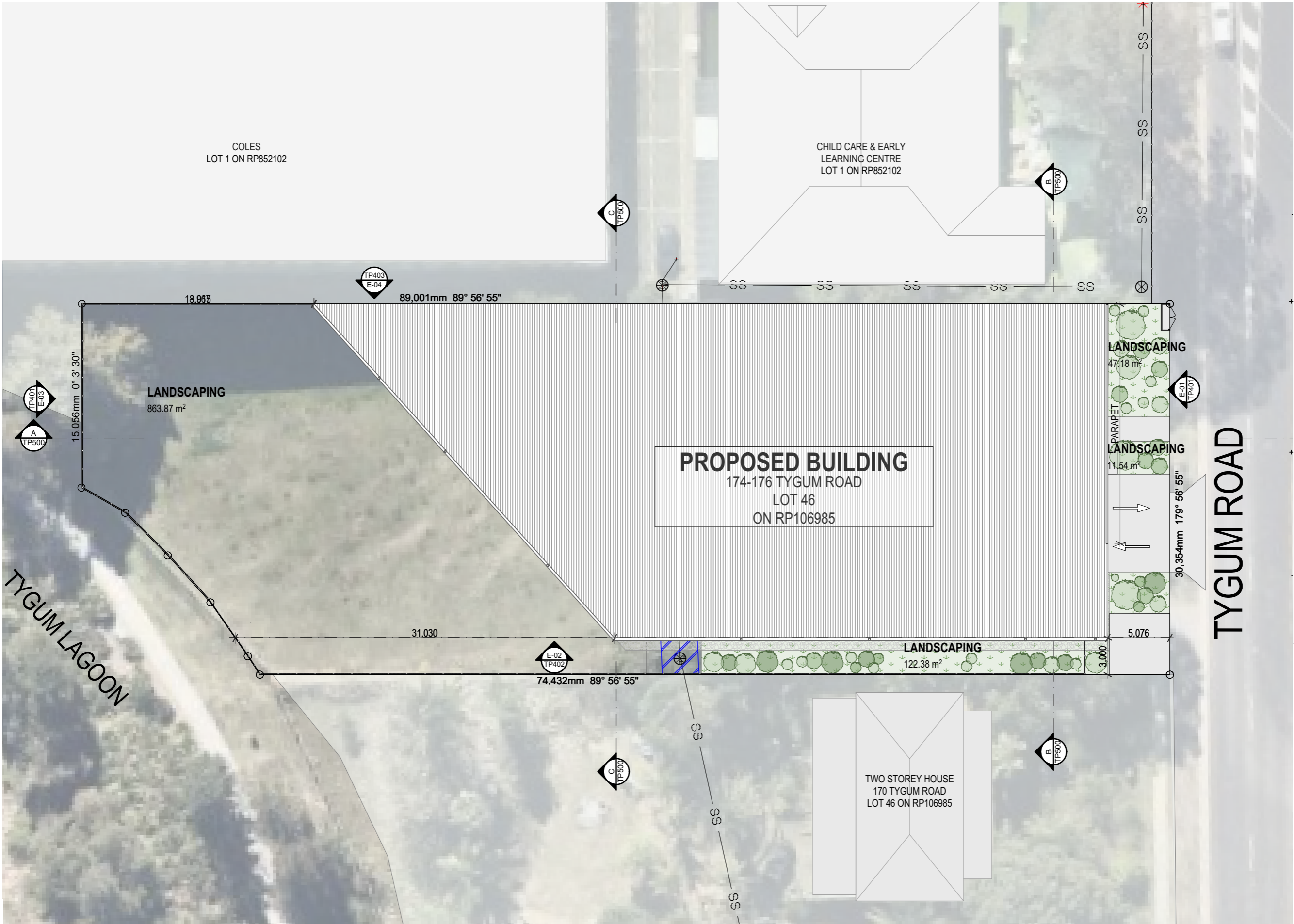
Project
Storage Facility
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Drawing Title
Site Plan - Demolition

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Project Number	Drawing Number	Issue
H4727TYG	TP101	C

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Date	Issue	Details	Checked
12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG



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Project
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West, QLD 4133

Drawing Title
Site Plan - Proposed

Scale @ A3	Drawn:	Checked:
1:300	JK	BG
Project Number	Drawing Number	Issue
H4727TYG	TP102	C

1 Site Plan - Proposed 1:300

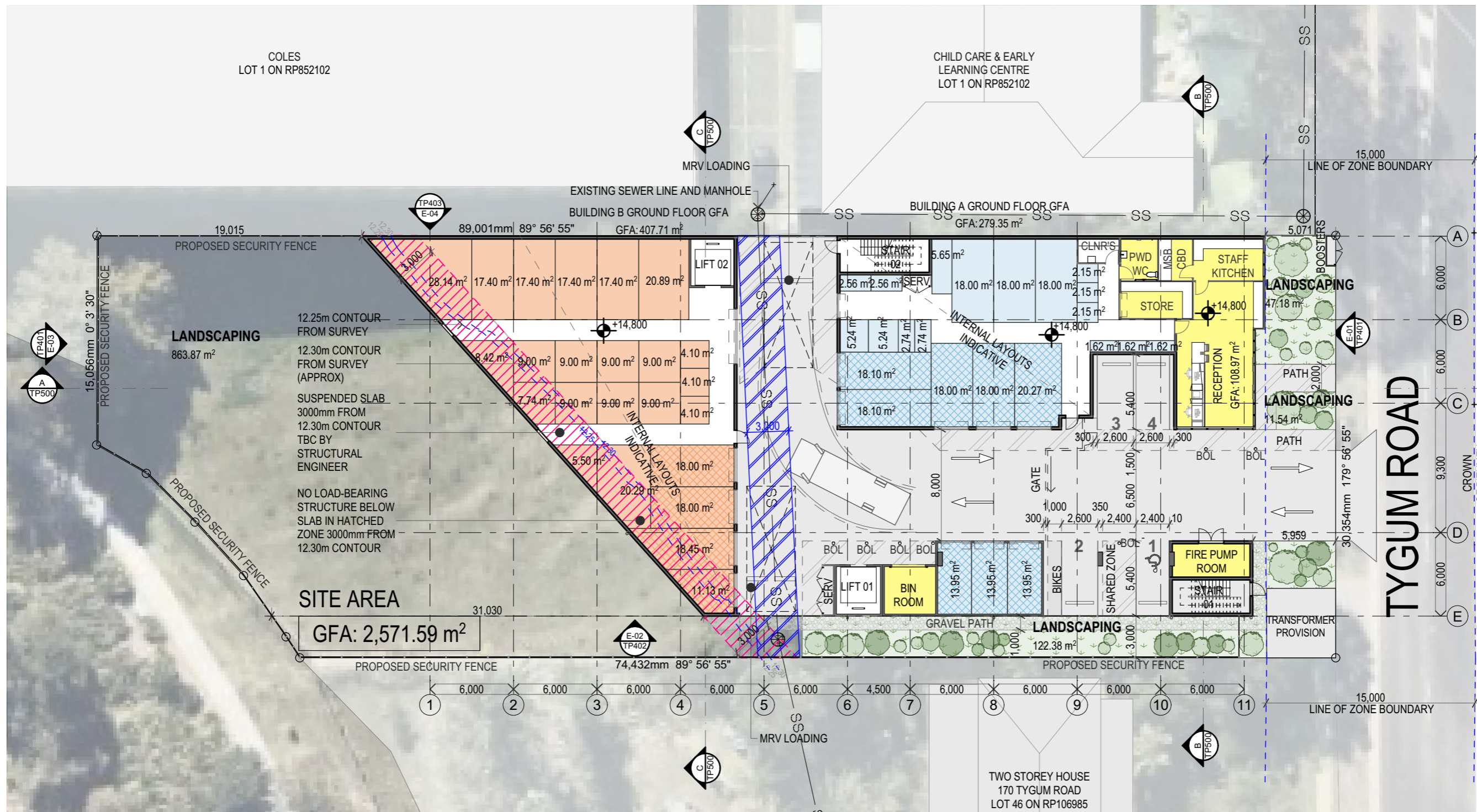
GFA SCHEDULE	
Storey	Area (m2)
Ground Floor	
BUILDING A GROUND FLOOR GFA	279.35
BUILDING B GROUND FLOOR GFA	407.71
RECEPTION	108.97
Level 01	
LEVEL 2 GFA	1,436.79
Level 02	
LEVEL 2 GFA	1,436.79
TOTAL	3,669.61 m²

SITE STATISTICS		
	Area (m2)	Percentage of Site
SITE AREA	2,571.59	
SITE COVER	1,436.78	55.87%
LANDSCAPING	1,044.97	40.63%

NOTE:
Boundary, contours, levels, and site services information are sourced from a survey by ONE Surveyors on 07.12.23

TOWN PLANNING
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LEGEND
 - SS - EXISTING SEWER LINE
 [Hatched Area] NO LOAD-BEARING STRUCTURE BELOW SLAB IN HATCHED ZONE 3000mm FROM 12.30m CONTOUR
 [Blue Hatched Area] PROPOSED VOLUMETRIC SEWER EASEMENT



Date	Issue	Details	Checked
12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG

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Project
Storage Facility
174-176 Tygum Road, Waterford West, QLD 4133
Drawing Title
Ground Floor Plan
Scale @ A3 Drawn: JK Checked: BG
Project Number Drawing Number Issue
H4727TYG TP201 C

1 Ground Floor
1:300

GFA SCHEDULE	
Storey	Area (m2)
Ground Floor	
BUILDING A GROUND FLOOR GFA	279.35
BUILDING B GROUND FLOOR GFA	407.71
RECEPTION	108.97
Level 01	
LEVEL 2 GFA	1,436.79
Level 02	
LEVEL 2 GFA	1,436.79
TOTAL	3,669.61 m²

SITE STATISTICS		
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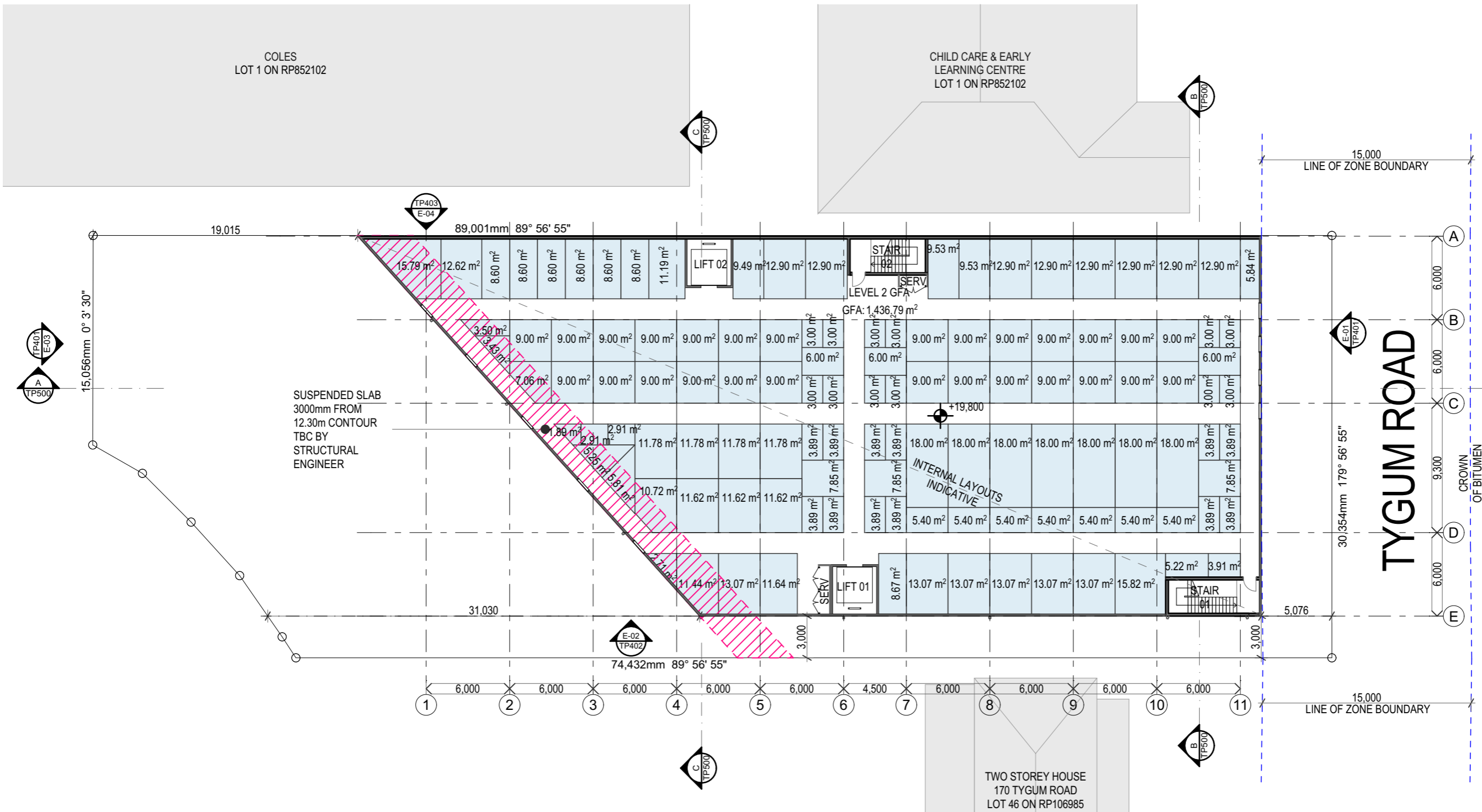
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LEGEND

 - SS - EXISTING SEWER LINE

 NO LOAD-BEARING STRUCTURE BELOW SLAB IN HATCHED ZONE 3000mm FROM 12.30m CONTOUR

 PROPOSED VOLUMETRIC SEWER EASEMENT



Date	Issue	Details	Checked
12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG

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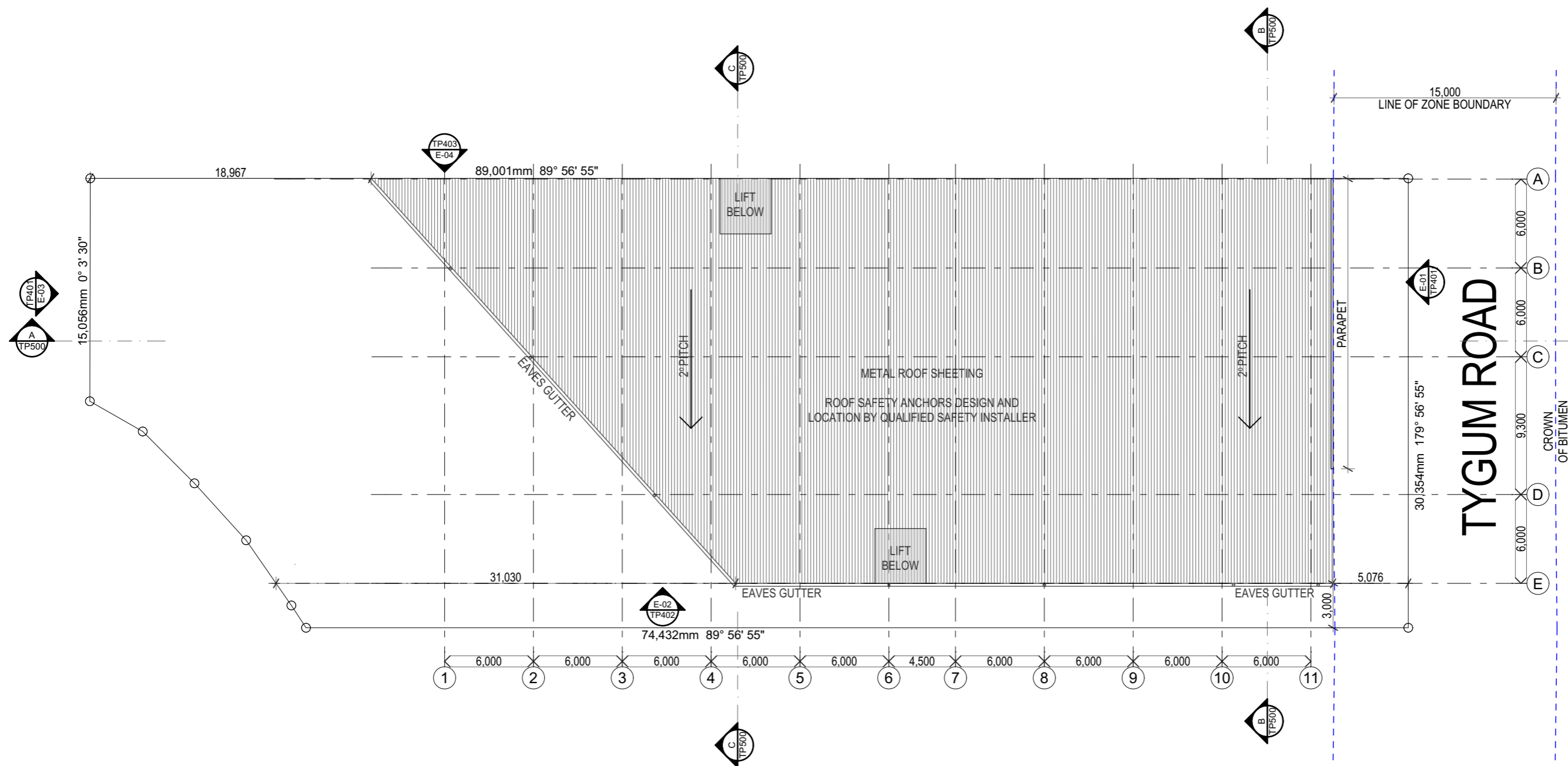
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Storage Facility
174-176 Tygum Road, Waterford West, QLD 4133
Drawing Title
Level 1 Floor Plan
Scale @ A3 Drawn: Checked:
1:300 JK BG
Project Number Drawing Number Issue
H472TYG TP202 C

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-  NO LOAD-BEARING STRUCTURE BELOW SLAB IN HATCHED ZONE 3000mm FROM 12.30m CONTOUR
-  PROPOSED VOLUMETRIC SEWER EASEMENT



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Date	Issue	Details	Checked



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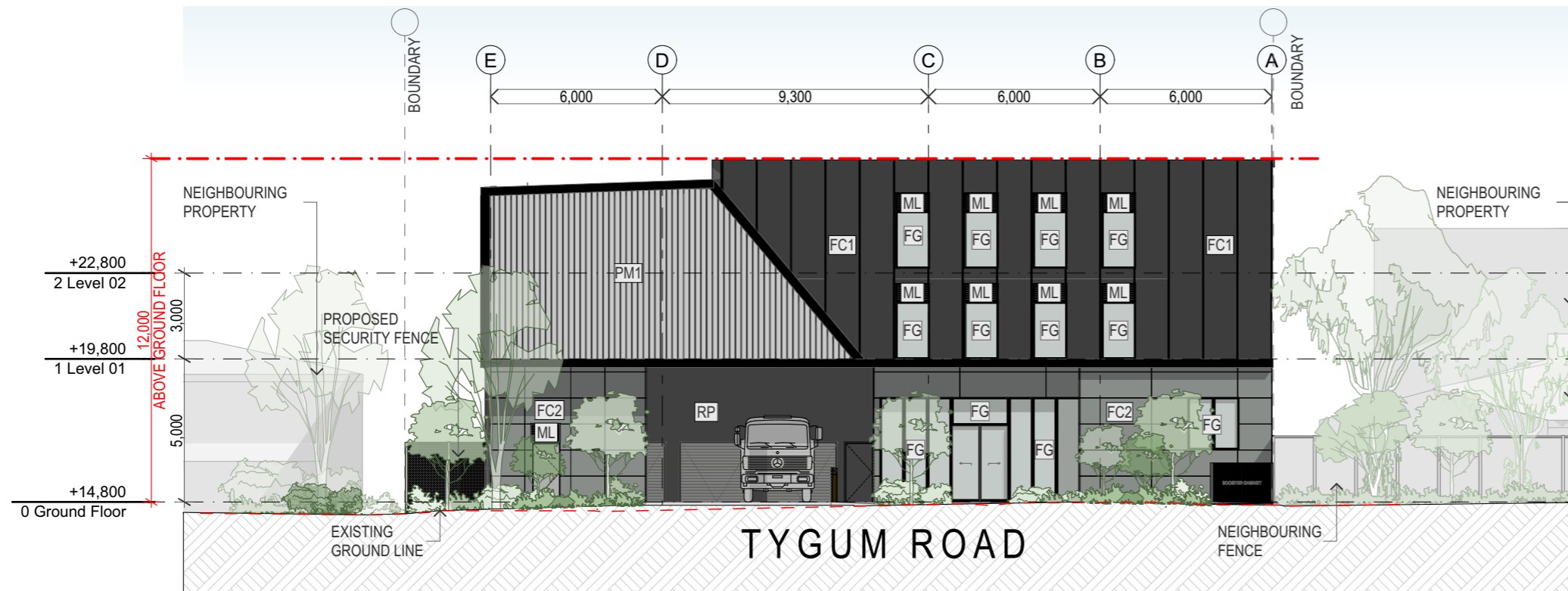


Project
Storage Facility
 174-176 Tygum Road, Waterford West, QLD 4133

Drawing Title
Roof Plan

Scale @ A3	Drawn:	Checked:
1:300	JK	BG
Project Number	Drawing Number	Issue
H4727TYG	TP204	C

1 Roof 1:300



E-01 East Elevation (Tygum Road)
1:200



E-03 West Elevation
1:200

FINISHES LEGEND	
	PM1 Profiled Vertical Metal Sheetting
	PM2 Profiled Vertical Metal Sheetting
	FC1 Painted FC Sheetting Expressed Joints
	FC2 Painted FC Sheetting Expressed Joints
	RP Rendered Paint
	PF Paint Finish
	ML Powdercoated Metal Louvres
	FG Feature Glazing
	Colorbond Metal Sheetting Colorbond Surfist
	All Weather Coloured Concrete Sealer or Similar

TOWN PLANNING

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Date	Issue	Details	Checked
12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG



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KANGAROO POINT QLD 4169

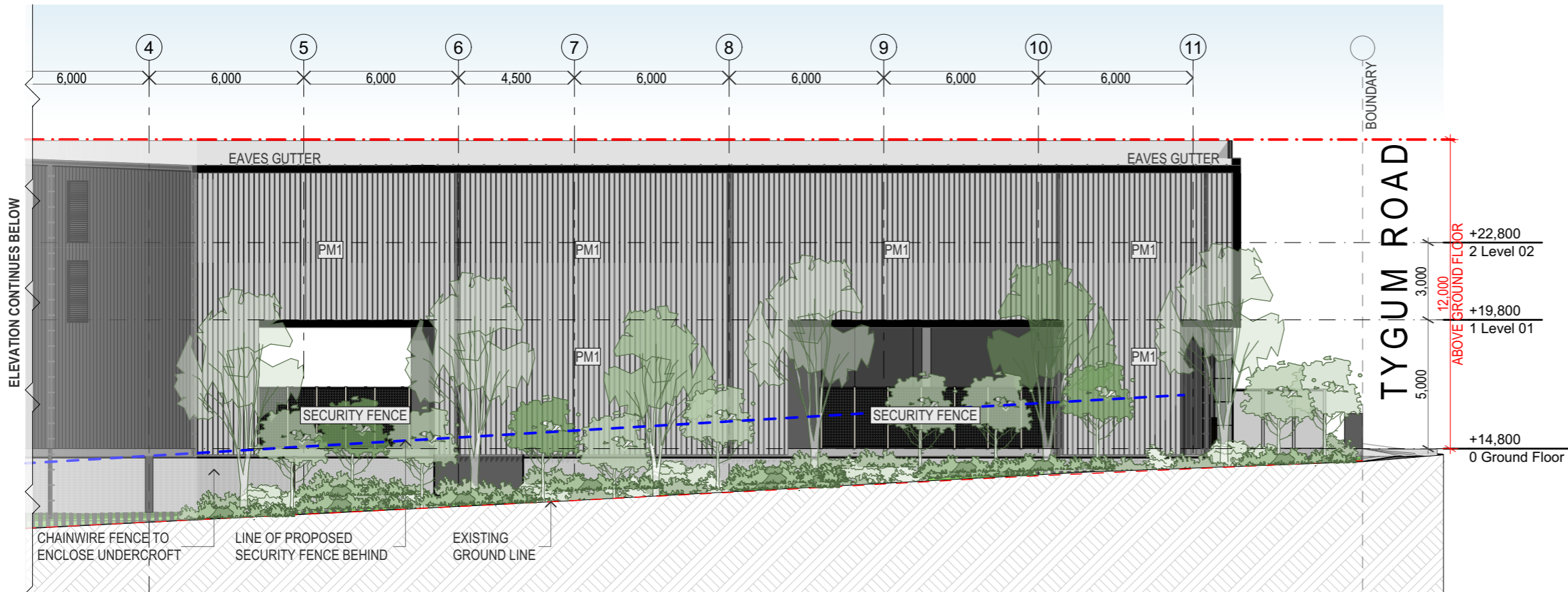
P + 61 7 3 8 5 2 3 1 9 0
E reception@halarchitects.com.au
W www.halarchitects.com.au



Project
Storage Facility
174-176 Tygum Road, Waterford
West, QLD 4133

Drawing Title
East & West Elevation

Scale @ A3	Drawn:	Checked:
1:200	JK	BG
Project Number	Drawing Number	Issue
H4727TYG	TP401	C



E-02 South Elevation
1:200

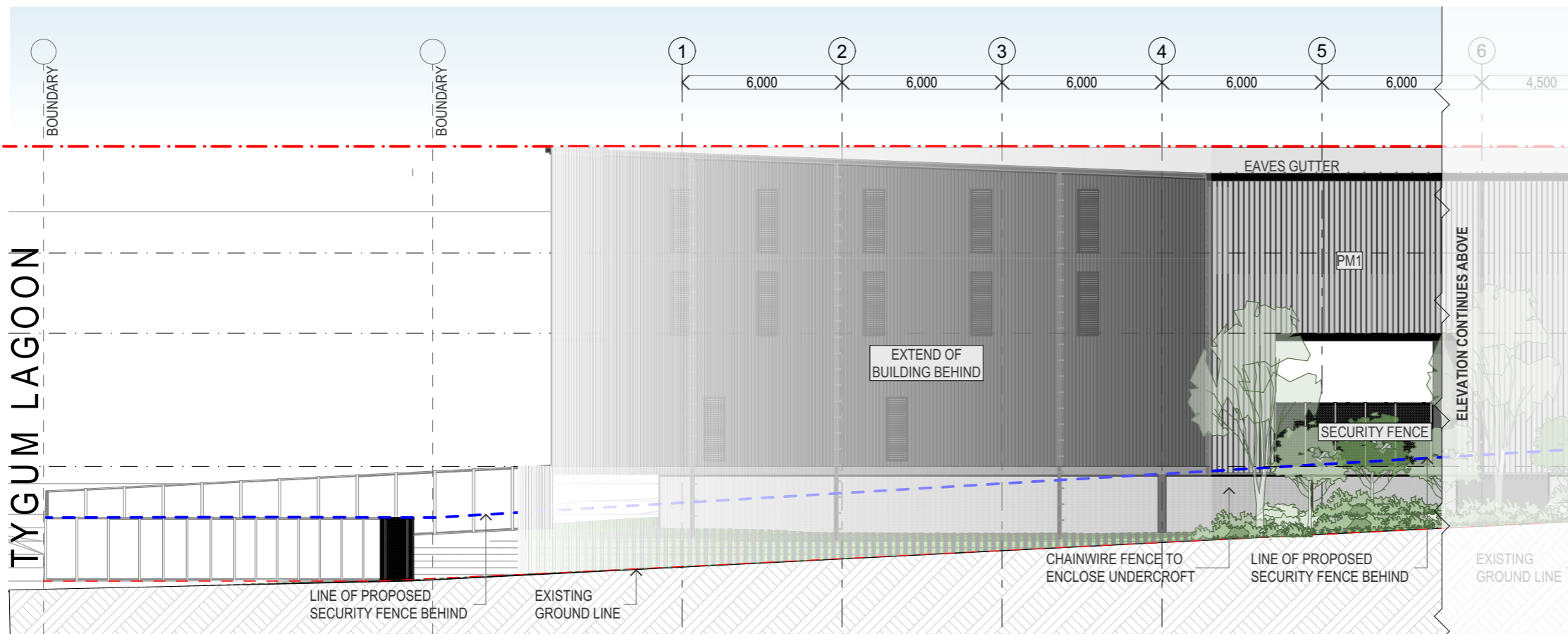
FINISHES LEGEND

	PM1	Profiled Vertical Metal Sheeting
	PM2	Profiled Vertical Metal Sheeting
	FC1	Painted FC Sheeting Exposed Joints
	FC2	Painted FC Sheeting Exposed Joints
	RP	Rendered Paint
	PF	Paint Finish
	ML	Powdercoated Metal Louvres
	FG	Feature Glazing
		Colorbond Metal Sheeting Colorbond Surfmist
		All Weather Coloured Concrete Sealer or Similar

TOWN PLANNING

General Notes

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E-02 South Elevation Continued
1:200

12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG
Date	Issue	Details	Checked

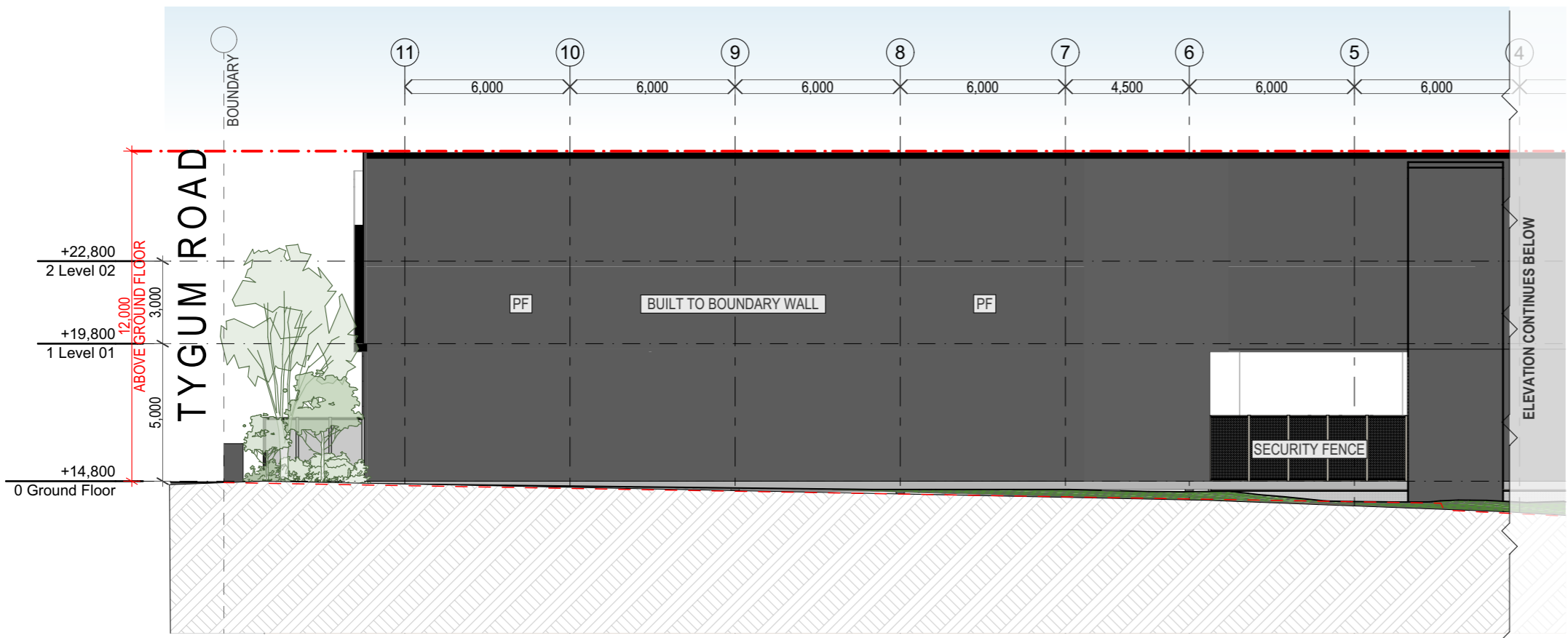
HAYES ANDERSON LYNCH
ARCHITECTS PTY LTD
ARCHITECTS
TOWN PLANNERS
INTERIOR DESIGNERS
3 / 709 MAIN STREET
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West, QLD 4133

Drawing Title
South Elevation

Scale @ A3 1:200	Drawn: JK	Checked: BG
Project Number H4727TYG	Drawing Number TP402	Issue C



E-04 North Elevation
1:200

FINISHES LEGEND

	PM1	Profiled Vertical Metal Sheeting
	PM2	Profiled Vertical Metal Sheeting
	FC1	Painted FC Sheeting Exposed Joints
	FC2	Painted FC Sheeting Exposed Joints
	RP	Rendered Paint
	PF	Paint Finish
	ML	Powdercoated Metal Louvres
	FG	Feature Glazing
		Colorbond Metal Sheeting Colorbond Surfmist
		All Weather Coloured Concrete Sealer or Similar

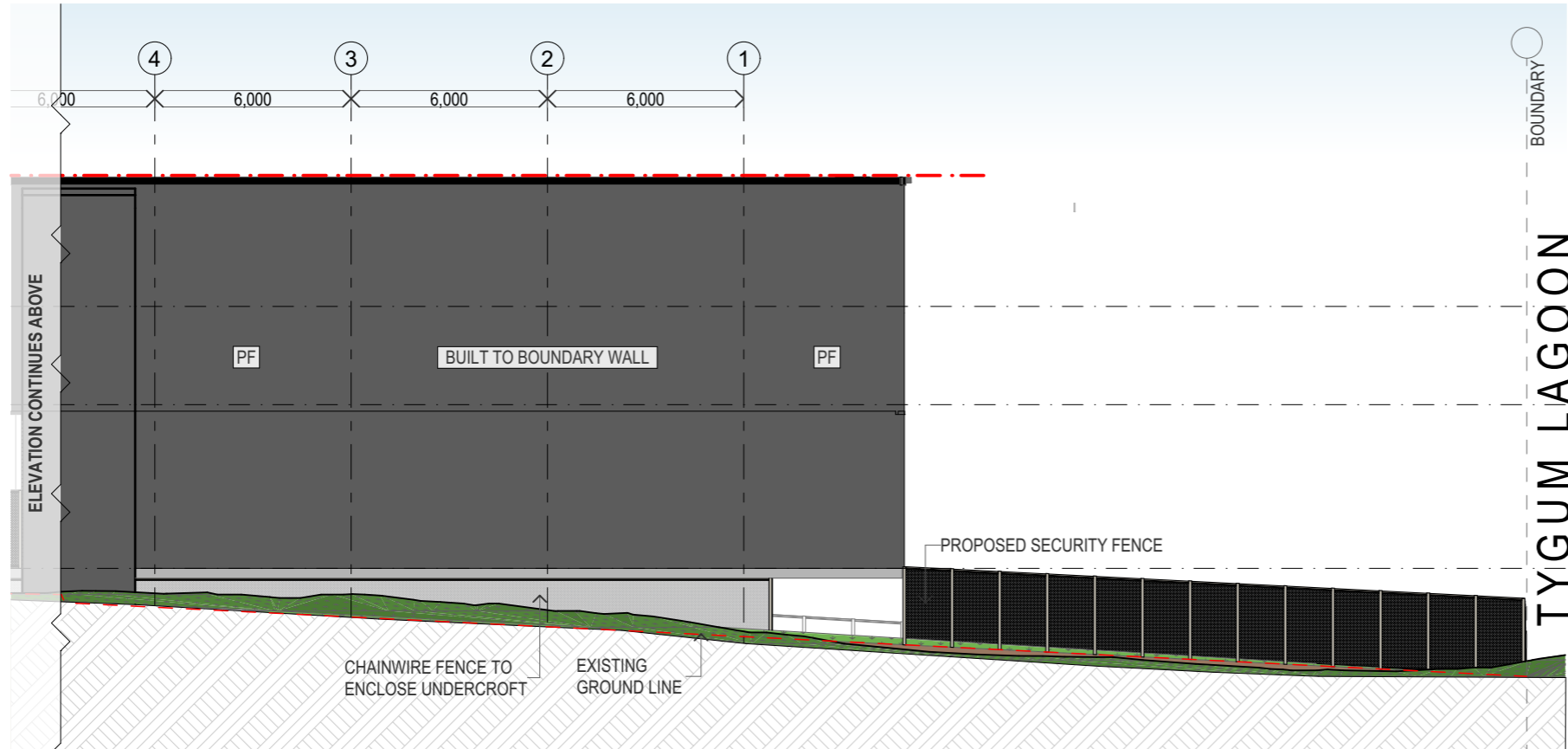
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LEGEND

	SS	EXISTING SEWER LINE
		NO LOAD-BEARING STRUCTURE BELOW SLAB IN HATCHED ZONE 3000mm FROM 12.30m CONTOUR
		PROPOSED VOLUMETRIC SEWER EASEMENT



E-04 North Elevation
1:200

12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG
Date	Issue	Details	Checked



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Project
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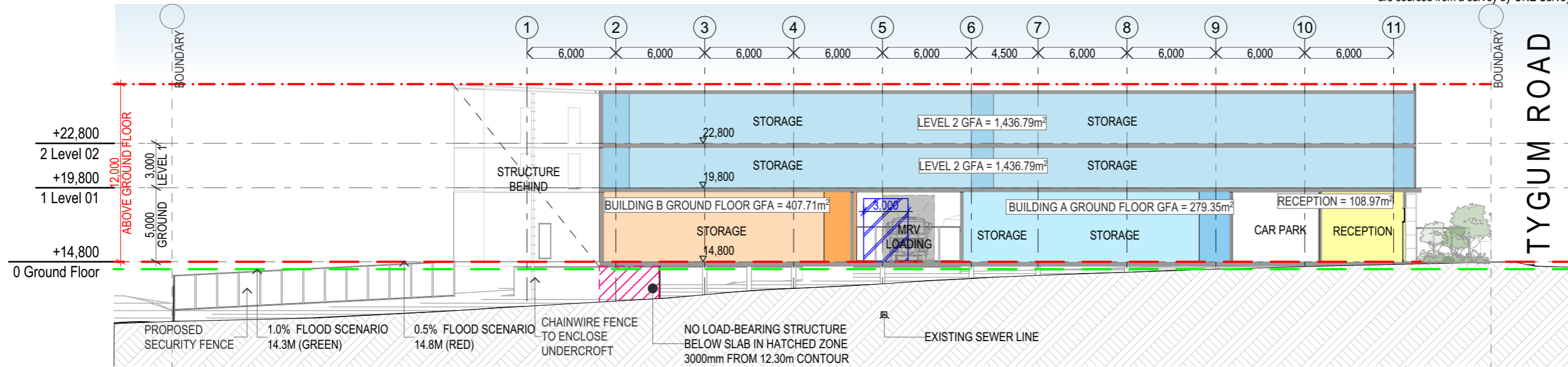
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North Elevation

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Project Number	Drawing Number	Issue
H4727TYG	TP403	C

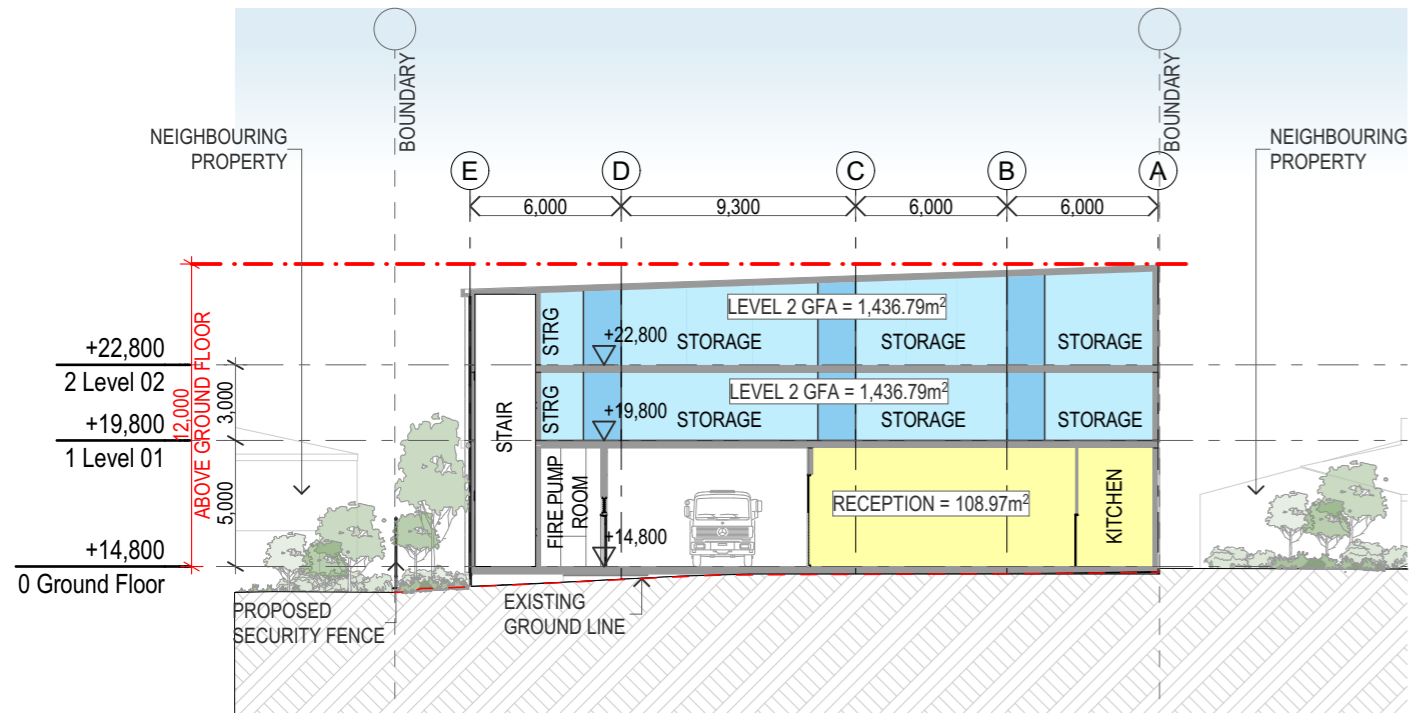
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- LEGEND**
- SS - EXISTING SEWER LINE
 - [Hatched] - NO LOAD-BEARING STRUCTURE BELOW SLAB IN HATCHED ZONE 3000mm FROM 12.30m CONTOUR
 - [Blue Hatched] - PROPOSED VOLUMETRIC SEWER EASEMENT

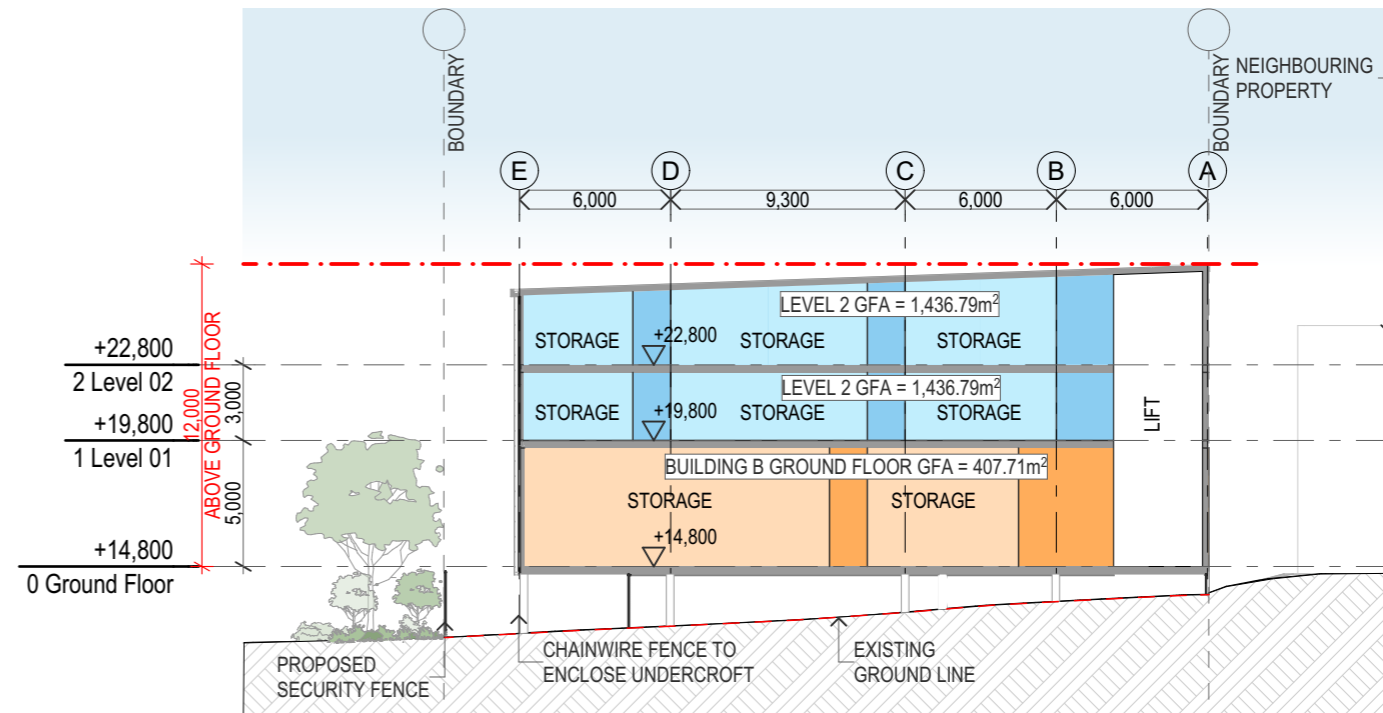
NOTE:
Boundary, contours, levels, and site services information are sourced from a survey by ONE Surveyors on 07.12.23



Section A
1:300



Section B
1:300



Section C
1:300

Date	Issue	Details	Checked
12/07/24	C	Client Issue	BG
02/07/24	B	Client Issue	BG
22/04/24	A	Client Issue	BG



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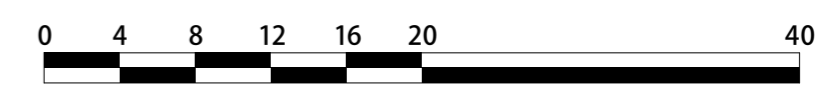
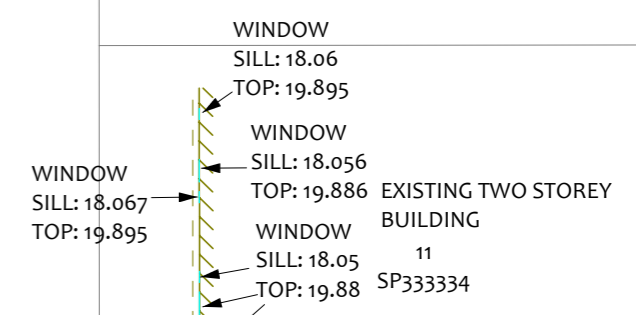
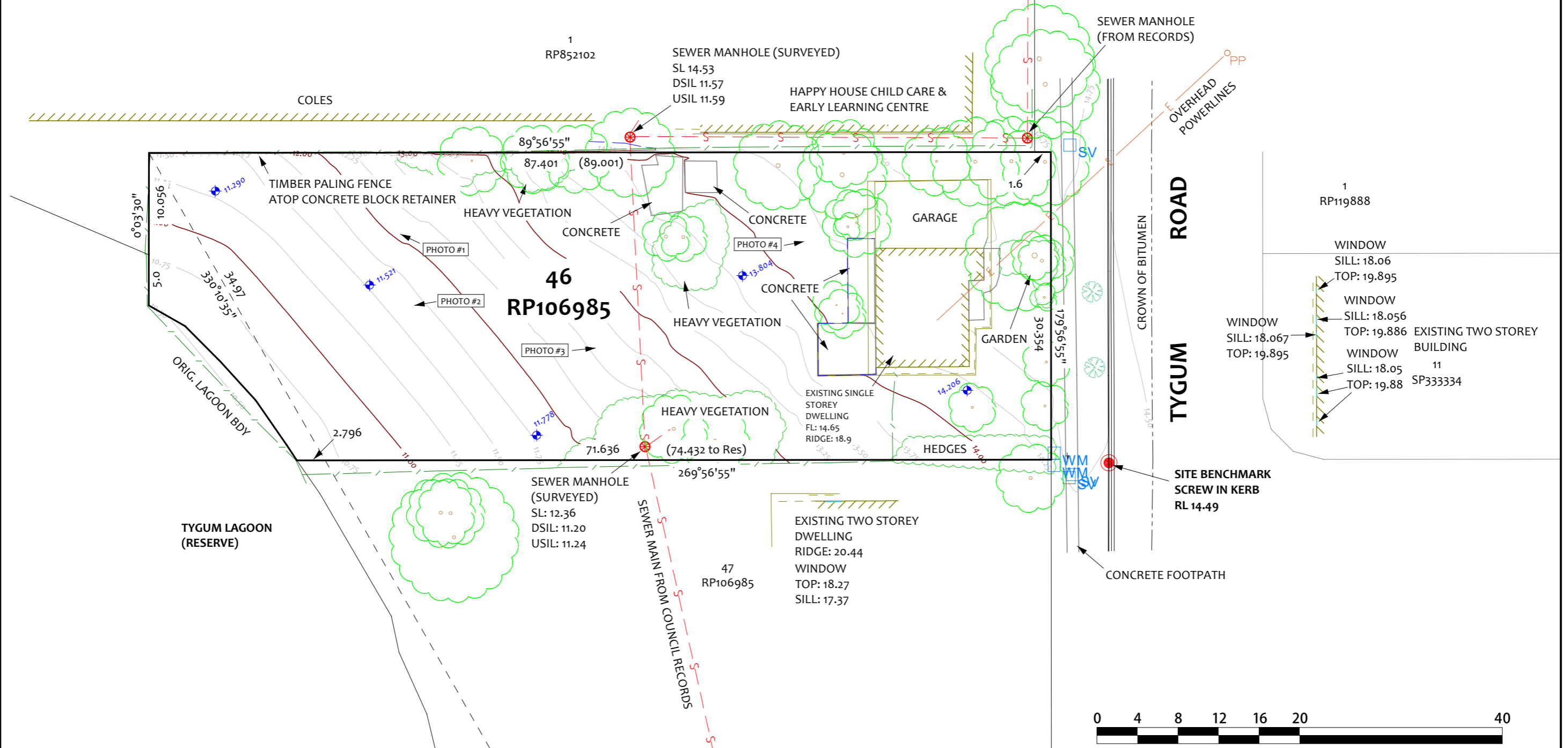
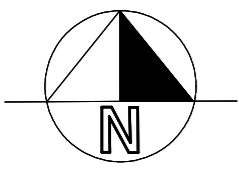


Project
Storage Facility
174-176 Tygum Road, Waterford
West, QLD 4133

Drawing Title
Sections

Scale @ A3	Drawn:	Checked:
1:300	JK	BG
Project Number	Drawing Number	Issue
H4727TYG	TP500	C

Appendix B - Detail Survey



NOTE :-
THE TITLE BOUNDARIES AS SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY AND NOT BY FIELD SURVEY.

Horizontal Co-Ord Datum		Contour Interval 0.25m	Level Datum AHD-D
Horizontal Co-Ord Origin		Level Origin PM 15426	Value 16.711
Easting	Northing	Surveyed K.T.	Date 27/11/2023
Azimuth IS213441	Field Book TSC5	Drawn K.T.	Date 07/12/2023



Client BLACK OAK PROPERTY GROUP		Project Contour and Detail Survey Over Lot 46 on RP106985 - 174-176 Tygum Road -			
Computer File M:\...LOGAN....\...11823...	Scale (A3) 1:400	Job No. 11823	Locality WATERFORD WEST	Drawing Number 11823_D1	Rev Sheet - 1 OF 1

Appendix C - Concept Civil Services Plans



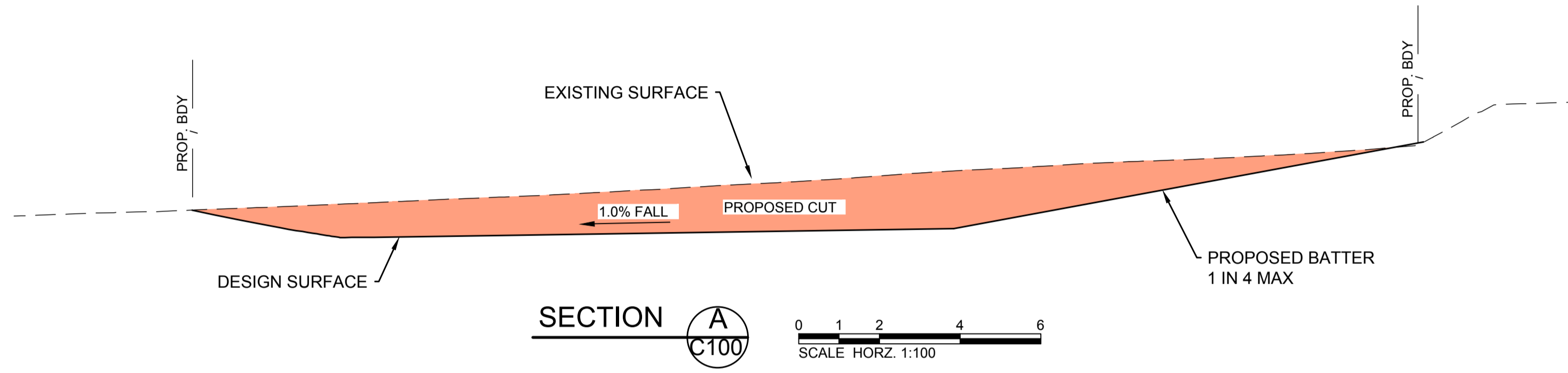
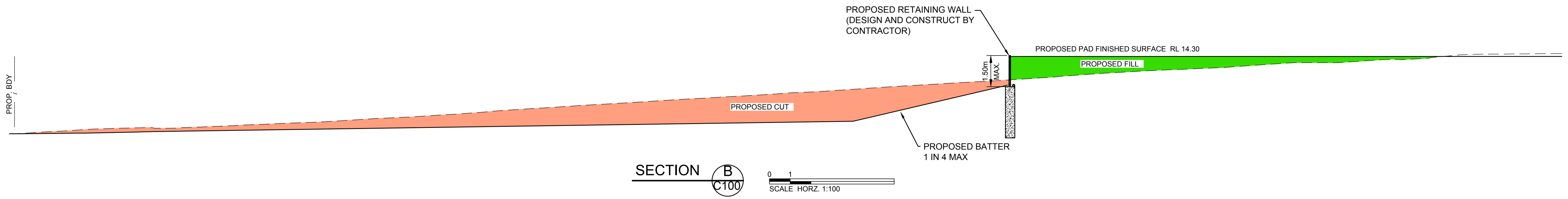
PROPOSED LEGEND	
	EARTHWORKS CUT
	EARTHWORKS FILL
	PROPOSED RETAINING WALL
	PROPOSED RETAINING WALL HEIGHT
	FINISHED SURFACE (FSL) PAD
	PROPOSED DESIGN CONTOUR

EXISTING LEGEND	
	EXISTING STORMWATER
	EXISTING SEWER
	EXISTING TELSTRA
	EXISTING WATER MIAN
	EXIST. SURFACE CONTOUR

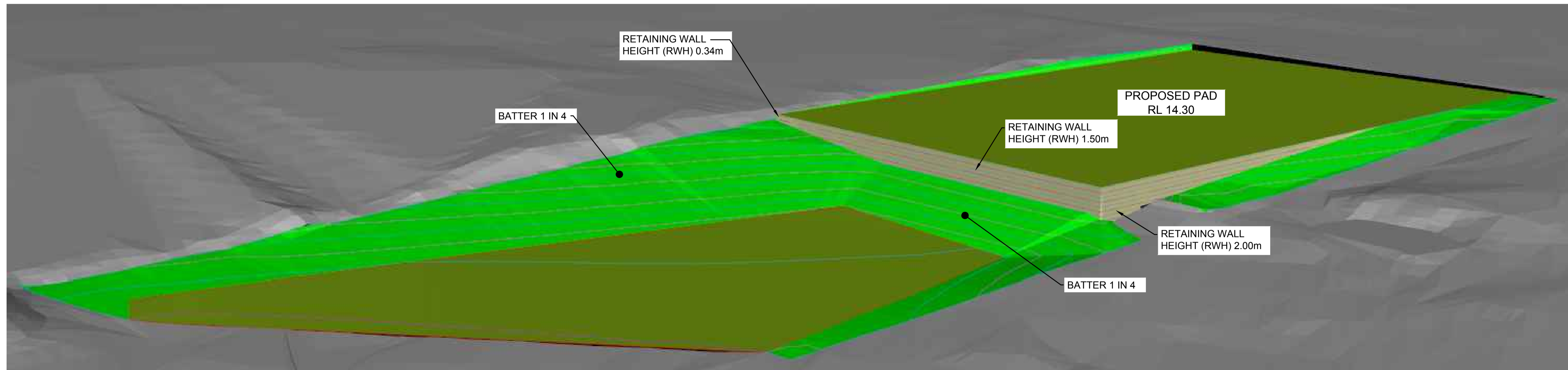
CUT/FILL EARTHWORK REPORT	
EXISTING LIDAR TO FINISHED DESIGN VOL. REPORT.	
TOTAL CUT	-520.85m³
TOTAL FILL	430.45m³
TOTAL BALANCE	-90.40m³
THEREFORE ADDITIONAL FLOOD STORAGE 90.40m³	

CONCEPT BULK EARTHWORKS LAYOUT PLAN

REV	DESCRIPTION	DATE	DRAWN	DESIGN	CHECK	LOT DESCRIPTION: LOT 46 ON RP106985 LEVEL DATUM: DATUM: RL14.49m AHD (SCREW IN KERB) APPROVED FOR AND ON BEHALF OF HURLEY CONSULTING ENGINEERS PTY LTD: NAME: CRAIG HURLEY RPEQ NO: 15957	ORIENTATION & SCALES: Full Size 1:200 ; Half Size 1:400 Scale (m) DO NOT SCALE FROM DRAWING	NOTES: THESE DRAWINGS REMAIN THE PROPERTY OF HURLEY CONSULTING ENGINEERS PTY LTD AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION. THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY HURLEY CONSULTING ENGINEERS. EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.	 HURLEY CONSULTING ENGINEERS PO BOX 417 CARINA QLD 4152 TELEPHONE: 0432 418 815 EMAIL: mail@hurleyce.com	PROJECT: COMMERCIAL DEVELOPMENT 174-176 TYGUM RD, WATERFORD WEST CLIENT: BLACKOAK PROPERTY GROUP	DRAWING TITLE: CONCEPT BULK EARTHWORKS TYPICAL SECTIONS & 3D MODEL LOCAL GOVERNMENT AUTHORITY AND DEVELOPMENT APPLICATION NO: LOGAN CITY COUNCIL ORIGINAL SIZE: A1 DRAWING No.: C23080A-SK-C101
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B	ISSUED FOR APPROVAL	09.07.24	RW	RW	CH						

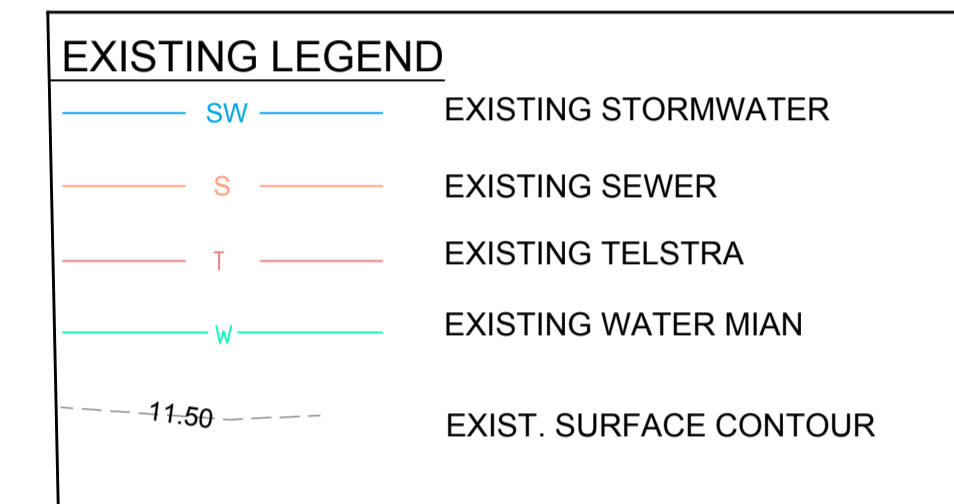
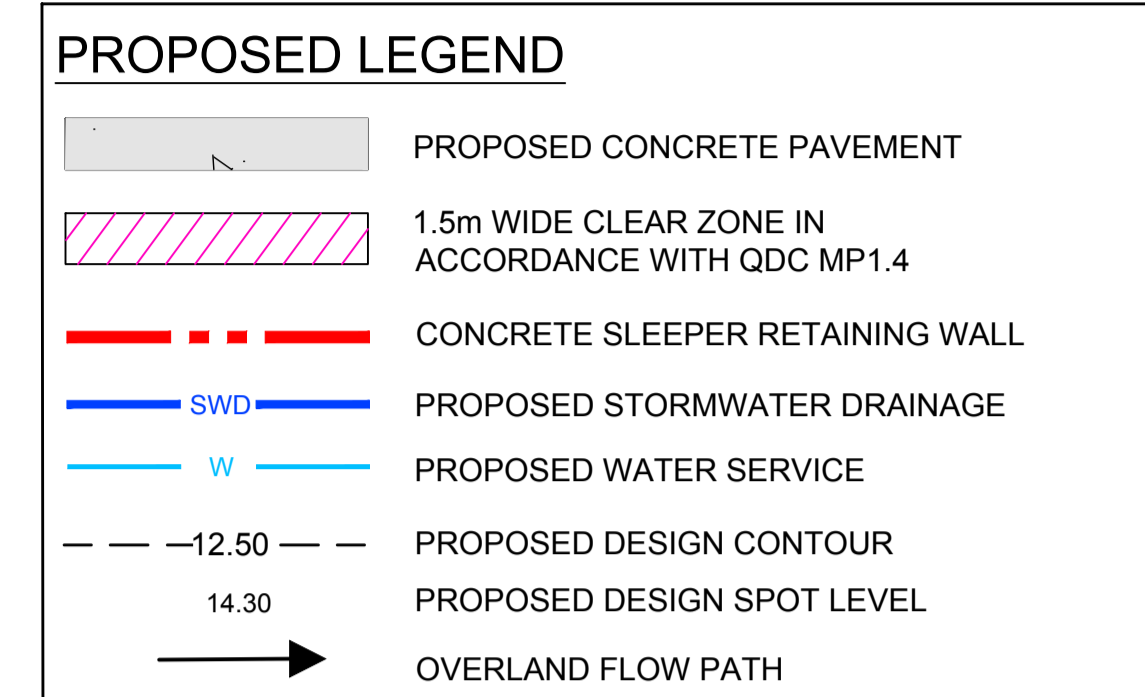
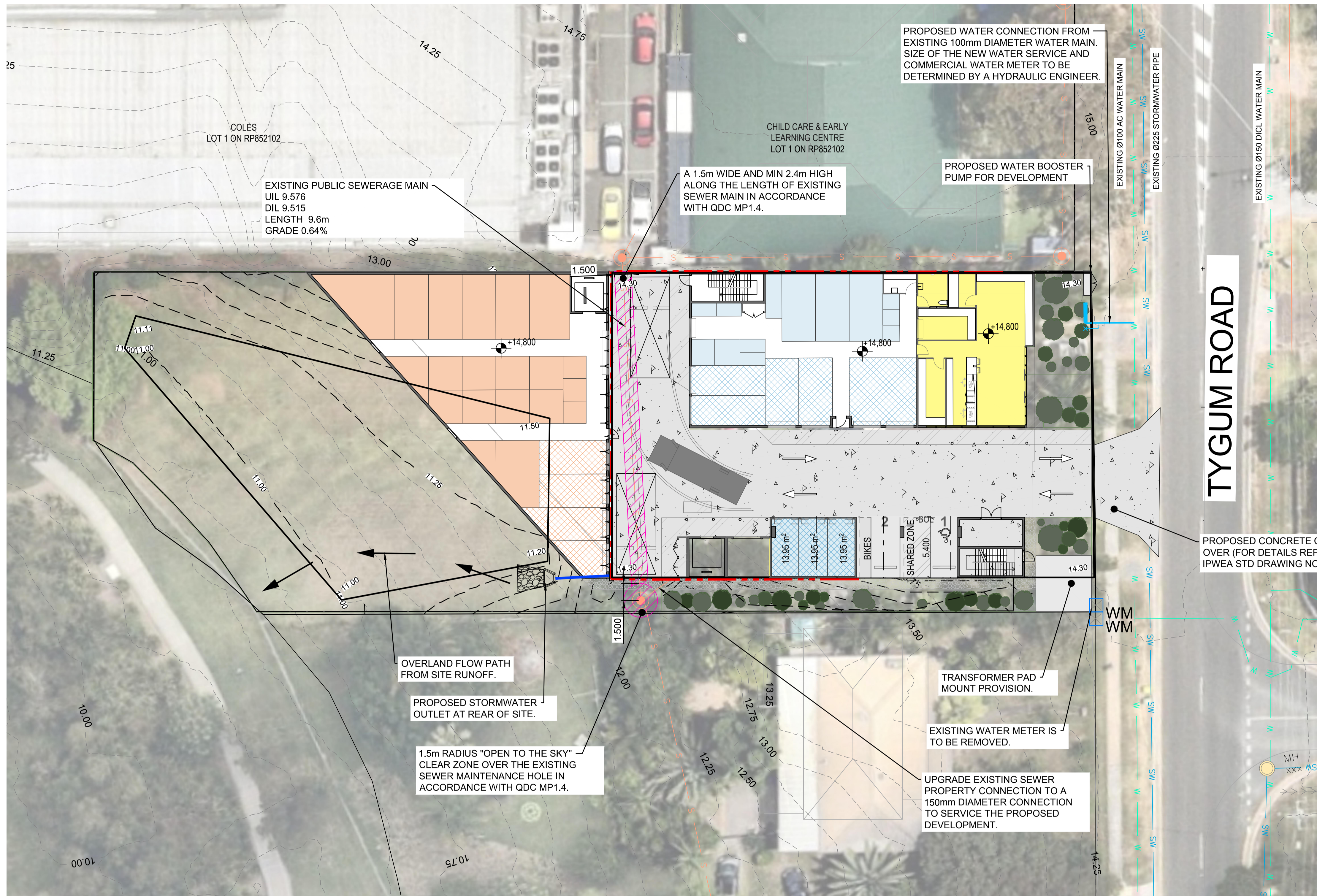


BULK EARTHWORKS SECTIONS (TYP.)



BULK EARTHWORKS - 3D MODEL

REV	DESCRIPTION	DATE	DRAWN	DESIGN	CHECK	LOT DESCRIPTION: LOT 46 ON RP106985 LEVEL DATUM: DATUM: RL14.49m AHD (SCREW IN KERB)	ORIENTATION & SCALES:	NOTES:	PROJECT:	DRAWING TITLE:	
A	FOR CO-ORDINATION	07.06.24	RW	RW	CH	APPROVED FOR AND ON BEHALF OF HURLEY CONSULTING ENGINEERS PTY LTD:	DO NOT SCALE FROM DRAWING	<small>THESE DRAWINGS REMAIN THE PROPERTY OF HURLEY CONSULTING ENGINEERS PTY LTD AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION.</small> <small>THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY HURLEY CONSULTING ENGINEERS.</small> <small>EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.</small>	HURLEY CONSULTING ENGINEERS PO BOX 417 CARINA QLD 4152 TELEPHONE: 0432 418 815 EMAIL: mail@hurleyce.com	COMMERCIAL DEVELOPMENT 174-176 TYGUM RD, WATERFORD WEST CLIENT: BLACKOAK PROPERTY GROUP	CONCEPT BULK EARTHWORKS TYPICAL SECTIONS & 3D MODEL LOCAL GOVERNMENT AUTHORITY AND DEVELOPMENT APPLICATION NO: LOGAN CITY COUNCIL
B	ISSUED FOR APPROVAL	09.07.24	RW	RW	CH					ORIGINAL SIZE: A1 DRAWING No.: C23080A-SK-C101	



CONCEPT SERVICES LAYOUT PLAN

REV	DESCRIPTION	DATE	DRAWN	DESIGN	CHECK	LOT DESCRIPTION: LOT 46 ON RP106985 LEVEL DATUM: DATUM: RL14.49m AHD (SCREW IN KERB)	ORIENTATION & SCALES: Full Size 1:200 ; Half Size 1:400 Scale (m) DO NOT SCALE FROM DRAWING	NOTES: THESE DRAWINGS REMAIN THE PROPERTY OF HURLEY CONSULTING ENGINEERS PTY LTD AND MUST NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION. THESE DRAWINGS HAVE BEEN PREPARED FOR EXCLUSIVE USE BY OUR CLIENT. NO RESPONSIBILITY IS TAKEN FOR ANY THIRD PARTY THAT RELIES UPON OR USES THIS INFORMATION. THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS NOTED OR INSTRUCTED OTHERWISE BY HURLEY CONSULTING ENGINEERS. EXISTING SERVICES ARE SHOWN FOR INFORMATION ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OF THIS INFORMATION. ALL EXISTING SERVICES IN THE VICINITY OF THE SITE SHALL BE LOCATED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.	PROJECT: COMMERCIAL DEVELOPMENT 174-176 TYGUM RD, WATERFORD WEST CLIENT: BLACKOAK PROPERTY GROUP	DRAWING TITLE: CONCEPT BULK EARTHWORKS TYPICAL SECTIONS & 3D MODEL LOCAL GOVERNMENT AUTHORITY AND DEVELOPMENT APPLICATION NO: LOGAN CITY COUNCIL
A	FOR CO-ORDINATION	07.06.24	RW	RW	CH	APPROVED FOR AND ON BEHALF OF HURLEY CONSULTING ENGINEERS PTY LTD: NAME: CRAIG HURLEY RPEQ NO: 15957				DRAWING No.: C23080A-SK-C101
B	ISSUED FOR APPROVAL	09.07.24	RW	RW	CH					

Appendix D - LCC Flood Report

PROPERTY FLOOD REPORT

Property Details

Address: 174-176 Tygum Road WATERFORD WEST QLD 4133

Lot/Plan: Lot 46 RP 106985

Size/Area: 2,613 m²






Property Key: 205330

Latest Flood Risk

The extract below comes from the flood risk map based on the latest (most recent) flood studies accepted by Council applicable for this property.



LEGEND

	High	Floodwaters may be deep or fast flowing, or have a relatively high chance of occurrence (e.g. 80% chance in 30 years). Conditions may pose a risk to life and cause damage to buildings, possibly severe.
	Moderate	Less frequently affected by flooding or if more frequent, with shallow or slower moving floodwater. Conditions may pose an unacceptable risk to people or property if not mitigated.
	Low	Extremely unlikely chance of flooding (1% chance or less over a 30 year period) and/or relatively shallow or benign flooding conditions.
	Very Low	Identifies the full floodplain under the largest flood that could conceivably occur.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.



The flood studies this map is based on consider the impacts of climate change, as required by Queensland's planning legislation and policies. The map considers the whole floodplain for Logan and reflects a risk-based approach that takes into account:

- How likely a flood of a given size is in any given year, and
- What the impact or level of danger of that flood is.

Summary Flood Assessment

The table below presents the flood risks applicable to the selected property. There may be multiple studies and flood scenarios affecting the property, particularly for larger sites.

Assessment	Details
Risk area(s)	High, Moderate
Investigation area	Not applicable
River flooding	10% chance of a flood this size or larger happening in any given year
Creek flooding	Not applicable
Overland flow	Not applicable

Flood Levels

The table below displays flood levels from the most recently accepted flood studies affecting this property. To view the flood study documents please see the [Flood page](#) on Council's website.

The levels are measured in Australian Height Datum (AHD), where sea level is approximately zero (0) metres. The level displayed in the table below is the maximum flood level on the property for that event (likelihood). For some properties, particularly large properties or those on a significant slope, flood levels can vary significantly.

The most likely flood scenarios is shown at the top of the table, with the Probable Maximum Flood (PMF) at the bottom, being the least likely but most serious flood scenario.

Some properties may be impacted by only river flooding or only creek flooding, and some may be impacted by both. There may also be other sources of inundation that may impact the property and affect flood levels, based on overland flow or local creeks where studies have not yet been completed.

Study: Logan and Albert Rivers Flood Study 2023

Likelihood (each year)	River flooding
20% chance	Not applicable
10% chance	10.7 metres AHD
5% chance	12.5 metres AHD
2% chance	13.5 metres AHD
1% chance	14.3 metres AHD
0.5% chance	14.8 metres AHD
0.2% chance	15.5 metres AHD
0.05% chance	15.9 metres AHD
PMF	19.8 metres AHD

Ground Levels

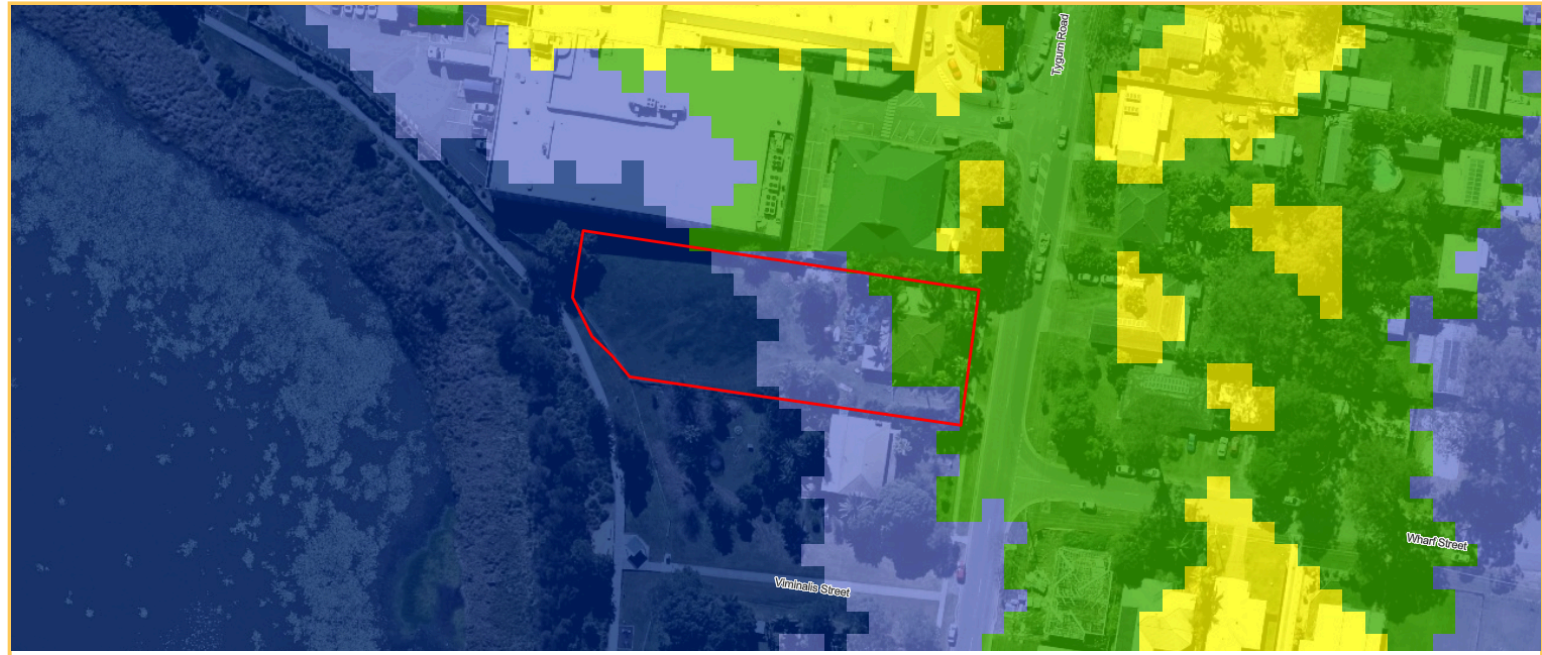
Ground levels are based on an aerial LiDAR (Light Detection and Ranging) survey, which uses millions of laser point measurements to build a model of the ground surface. The source of the data is displayed in the table below so that you know when the survey was conducted.

Ground level	Details
Minimum ground level	10.4 metres AHD
Maximum ground level	14.9 metres AHD







Source: 2021 Digital elevation model (1 metre grid)

Flood Scenarios Map

This extract comes from the map showing the projected extent of flooding (affected areas) for multiple flood scenarios for all relevant flood studies, **including the projected impacts of climate change**. This map corresponds with the flood levels provided in the table above for the 5%, 1%, 0.5%, 0.05% and Probable Maximum Flood (PMF) scenarios.

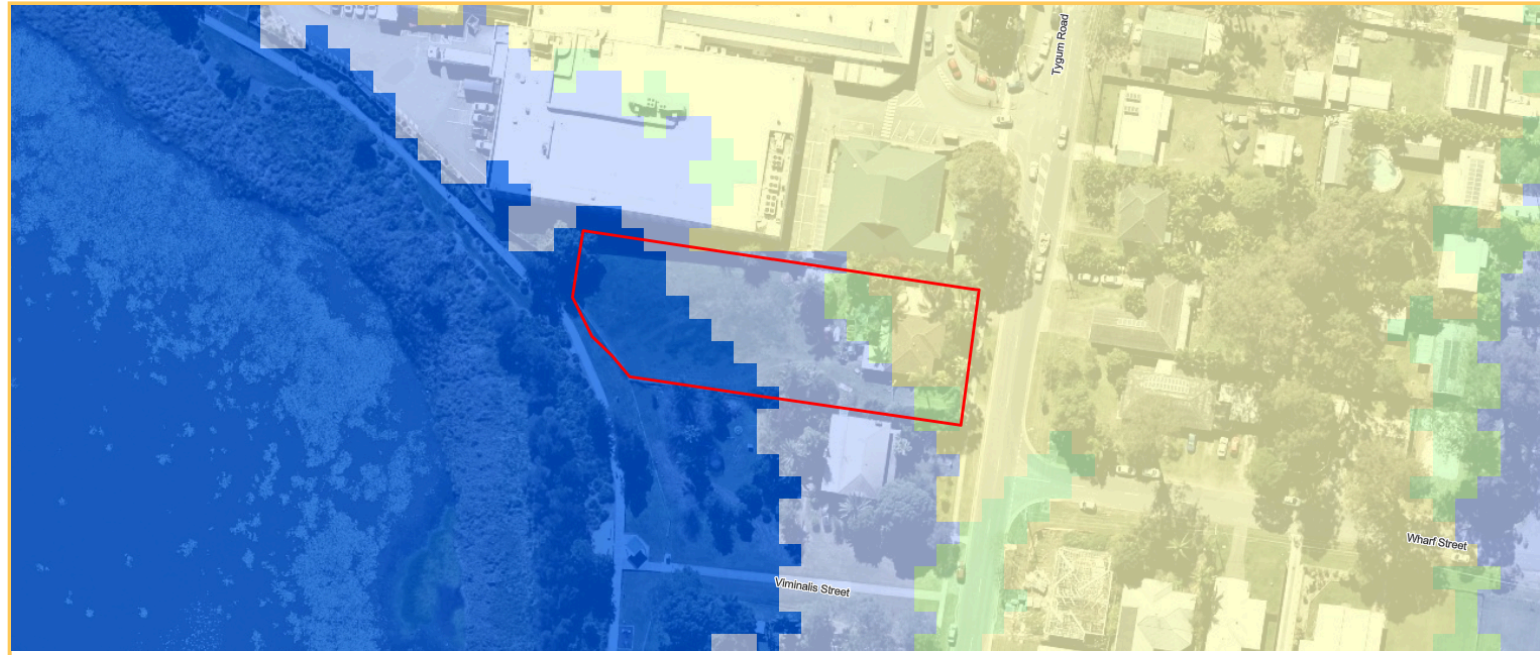


LEGEND







	5% chance	The areas modelled to be impacted by a flood that has a 5% (or 1 in 20) chance of happening in any given year, or 80% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	1% chance	The areas modelled to be impacted by a flood that has a 1% (or 1 in 100) chance of happening in any given year, or 25% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	0.5% chance	The areas modelled to be impacted by a flood that has a 0.5% (or 1 in 200) chance of happening in any given year, or 15% chance over a 30 year period, which is the common term of a mortgage. This modelling includes the impacts of climate change and represents our understanding of future risk.
	0.05% chance	The areas modelled to be impacted by a flood that has a 0.05% (or 1 in 2000) chance of happening in any given year. This is an extremely unlikely flood event with a 1% chance of happening over a 30 year period, not including the impacts of climate change.
	PMF	The PMF or probable maximum flood scenario represents the full extent of the floodplain, or the most serious flood that could be expected to occur. This is usually estimated based on the probable maximum rainfall, not including the impacts of climate change.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

Present Day (Insurance) Scenarios Map

This extract comes from the map showing flood affected areas **without** considering the impacts of climate change. This map represents modelled flooding under current conditions, and can be used for insurance purposes.



LEGEND

	5% chance	The areas modelled to be impacted by a flood that has a 5% (or 1 in 20) chance of happening in any given year, or 80% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	1% chance	The areas modelled to be impacted by a flood that has a 1% (or 1 in 100) chance of happening in any given year, or 25% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	0.5% chance	The areas modelled to be impacted by a flood that has a 0.5% (or 1 in 200) chance of happening in any given year, or 15% chance over a 30 year period, which is the common term of a mortgage. This modelling is based on current (present day) conditions and does not take into account the impacts of climate change.
	0.05% chance	The areas modelled to be impacted by a flood that has a 0.05% (or 1 in 2000) chance of happening in any given year. This is an extremely unlikely flood event with a 1% chance of happening over a 30 year period, not including the impacts of climate change.
	PMF	The PMF or probable maximum flood scenario represents the full extent of the floodplain, or the most serious flood that could be expected to occur. This is usually estimated based on the probable maximum rainfall, not including the impacts of climate change
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

Historic Flood Events

Based on the best information available to Council, the table below indicates whether or not the selected property may have been impacted by significant historic flood events. It is possible that other creek flooding or overland flow, which is not included in Council's mapping of these events, may have impacted the property.

Flood event	Property impacted
1974	Yes
2017 (after ex Tropical Cyclone Debbie)	Yes
2022 (late February / early March)	Yes

Planning Scheme Maps

The selected property is shown below on an extract of the Flood Overlay Maps from the Logan Planning Scheme 2015 V9 with TLPI No. 1/2023. Various provisions of the planning scheme which refer to properties affected by the Flood Overlay Maps will apply to the flood affected areas for the purposes of planning and development. This may include, for example, raised building floor levels and achieving safe vehicle access to the road network.

OM-05.01 Flood risk areas








OM-05.02 High flow area







OM-05.03 Isolated islands



MAP LEGEND

	High	Floodwaters may be deep or fast flowing, or have a relatively high chance of occurrence (e.g. 80% chance in 30 years). Conditions may pose a risk to life and cause damage to buildings, possibly severe.
	Moderate	Less frequently affected by flooding or if more frequent, with shallow or slower moving floodwater. Conditions may pose an unacceptable risk to people or property if not mitigated.
	Low	Extremely unlikely chance of flooding (1% chance or less over a 30 year period) and/or relatively shallow or benign flooding conditions.
	Very Low	Identifies the full floodplain under the largest flood that could conceivably occur.
	Investigation area	Locations where a current flood study has not been delivered and information to determine flood risk is not available. The approximation of the floodplain in these areas is based on a citywide overland flow study. Further investigation is needed.

MAP LEGEND

	High flow area	High hazard areas of flooding where significant (deeper, faster) flow of water occurs and in which a building is vulnerable to structural damage or failure from floodwater. Classified as H5 or H6 in the Australian Institute of Disaster Resilience (AIDR) Guideline 7-3 'Flood Hazard'.
	High flood island	Areas which are isolated from flood-free land (surrounded by floodwater) but retain a portion of the area as flood free in a probable maximum flood (PMF).
	Low flood island	Areas which are surrounded by floodwater and at first isolated from flood-free land, then completely inundated by floodwater (submerged) as the flood continues to rise.
	Meadowbrook flood assessment area	Area where the function of important community infrastructure needs to be maintained. Flood mitigation measures and comprehensive emergency management planning is required to adequately manage the risk for flood events.



If more recent flood studies have been completed and accepted by Council, the Latest Flood Risk Map shown at the top of this report may be different from the planning scheme map. The latest flood information should be used to inform development decisions and will be incorporated into the planning scheme in a future amendment.

Further Information

1. Floods are highly unpredictable and variable, and properties may be affected by other sources of potential flooding. Each flood and its impact is different. Areas that were not flooded previously may be affected by future events. Areas that have been previously flooded may be impacted in different ways. This online report cannot take all of this into account.
2. The flood mapping and levels in this report are based on data from flood studies undertaken at a particular time and are subject to change. For example, if the method for calculating flood levels is updated, industry guidelines are updated or more recent information becomes available, this may result in changes to the information in this report. In areas where development is ongoing, the flood mapping and levels may not reflect developed conditions.
3. Flood studies do not create risk. They help us to understand the risk, based on relevant legislation and Queensland Government policies and guidelines. Flood studies also consider a range of other factors such as rainfall and river level information from recent events, climate change and trends, the impacts of development, changes to catchment conditions, new technologies and industry best practice (which help to improve accuracy).
4. Flood studies and models are developed from the best information available at the time. They do not tell you how the flood waters might behave, how quickly they may rise, or how dangerous the flooding will be. The models also cannot represent changes that have occurred since they were developed which may impact flood behaviour, such as earthworks, new developments or road infrastructure.
5. This report is not a substitute for independent professional advice. You should engage the services of a Registered Professional Engineer of Queensland (RPEQ) to get site specific information regarding the flood risk to your property, and how that might affect any proposed building or development work.
6. While Logan City Council takes reasonable care in producing this report, it does not guarantee that the information is accurate, complete or current. Logan City Council does not accept any responsibility for any loss or damage (however it was caused) in connection with the use of or reliance on the information in this report.

Contact Information

Where to go for further information depends on the type of information you need. Please refer to the [Flood Risk Fact Sheet](#) or contact Council using the details below.

Topic	Contact Details
Flood studies and modelling information, and the flood risk on your property	Contact Council on 07 3412 3412 or email council@logan.qld.gov.au . Further information about flooding and flood studies is available on the Flood page on Council's website.
Planning and development enquiries or proposals	Contact Council on 07 3412 3412 or email development@logan.qld.gov.au . Before lodging a development application, pre-lodgement advice is recommended.
Building information	Contact Council on 07 3412 3412 or email council@logan.qld.gov.au . You can also contact a private building certifier .
Properties in Priority Development Areas	Contact Economic Development Queensland . Council is not the planning authority for these properties.
Independent advice about flooding on your property	Contact a registered engineer through the Board of Professional Engineers of Queensland: Phone: 07 3210 3100 Email: admin@bpeg.qld.gov.au Web: Home - Board of Professional Engineers Queensland (bpeg.qld.gov.au)