Tunnel Impact Assessment Report

Trilogy Development - Corner Vulture Street and Main Street Woolloongabba

Job Number:	Revision:	Date of issue:
22552	P01	05 May 2026

Document Number:
22552-RBG-ZZ-XX-RP-ST-00003

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Report Amendment Register

Issue Ref	Amended Section(s)	Issue/Amendment Details	Author(s)	Reviewer	Date
P01	All	For Information	Rory McCracken	Willy Huang	05 May 2026

Author:

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Senior Associate

Reviewer:

Willy Huang
Structures Manager (QLD & NT)

Contents

Appendices

1. Introduction

This report covers an analysis of the impacts of the proposed Mark Lane mixed use development on the existing Clem 7 Tunnel. The development site is located on the corner of Vulture Street and Main Street in Woolloongabba. The proposed development will be constructed partially over the Clem 7 Tunnel. This report addresses the design criteria for projects above the Clem 7 Tunnel and the analysis undertaken by the project's geotechnical engineer to assess the induced impacts.

The Mark Lane Precinct 1 development comprises three towers over a mixed-use podium and basement carparking. The basement is two levels below Vulture Street and steps upward as you move towards Mark Lane at the northern edge of the site. The tunnel crown is understood to be generally at RL -6.3m for this site, based on information provided by EDG, and is therefore between 19m and 25m below the current site levels.

Structural design for this project commenced in 2022, and considerable design development has occurred, including coordination between all consultants, including architects, services engineers and the structure prior to producing this report. The structural design was advanced to allow derivation of the footing loads and founding levels that were subsequently used by EDG in undertaking a tunnel pressure assessment.

Architectural drawings for the proposed development are attached to this report in Appendix A.

This report includes in Appendix B, a technical memorandum summarising the analysis by EDG on the net pressure change at 1m above the Clem 7 Tunnel crown due to the introduction of the proposed development. The results from this analysis confirm that the proposed Mark Lane Precinct development will not exceed the 50 kPa limit of additional pressure at 1m above the Clem 7 Tunnel crown. The proposed excavation also does not extend within the nominated 7m tunnel exclusion zone.

2. Proposed Development

The proposed Mark Lane Precinct development is located in the Brisbane suburb of Woolloongabba on a prominent site bound by Vulture Street to the south, Mark Lane to the north, Main Street to the east, and the Aria-Cliff development to the west. The overall development is made up of three components: Precinct 1, Precinct 2 and Precinct 3.

This report focuses on Precinct 1 of the Mark Lane development, which is the eastern portion of the overall development between the existing St Nicholas Cathedral site and Main Street. Refer to Figure 1 below for context.

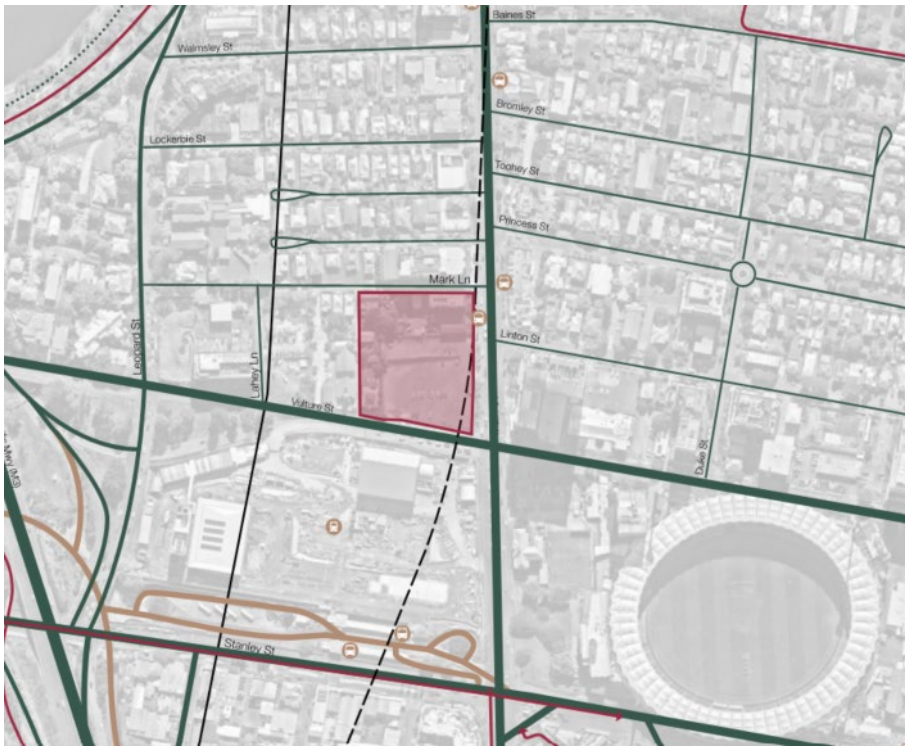

Figure 1: Development Site

The development application for Precinct 1 proposes a total of circa 117,000m^2 of GFA shared over the following components:

- Two levels of site-wide basement car parking
- Eight levels of site-wide mixed-use podium (inclusive of car parking, plaza, amenities, back of house and hotel usage)
- 52-story residential tower (**Tower 1**) positioned in the southwest corner of the Precinct 1 site
- 34-story residential tower (**Tower 2**) positioned in the northwest corner of the Precinct 1 site
- 11-story hotel tower (**Hotel/Tower 3**) positioned along Main Street in the northeastern corner of the Precinct 1 site

Figure 2 clarifies the proposed layout of the Precinct 1 development and provides context to the location of the Clem7 TBM tunnels, which underly the eastern edge of the Project site.

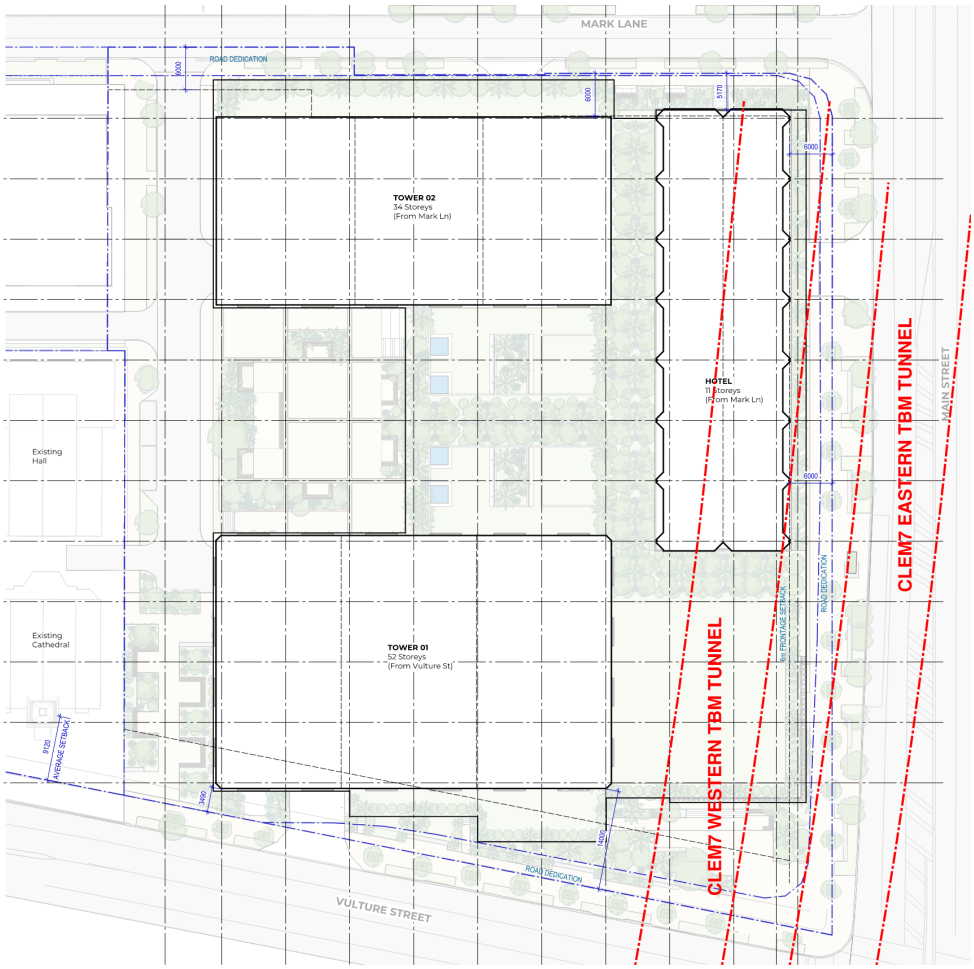

Figure 2: Precinct 1 Site Layout

Throughout the development of the design for Precinct 1, limiting the loading induced by the proposed buildings located above the underlying Clem 7 tunnels has driven the direction of the podium and hotel structural solution. This has led to a design concept which has achieved a balance between volume of excavation from the existing natural ground level and maximising the permanent built form introduced above. Figure 3 and Figure 4 below show indicative sections through the proposed podium and hotel structure proposed above the Clem 7 tunnel.

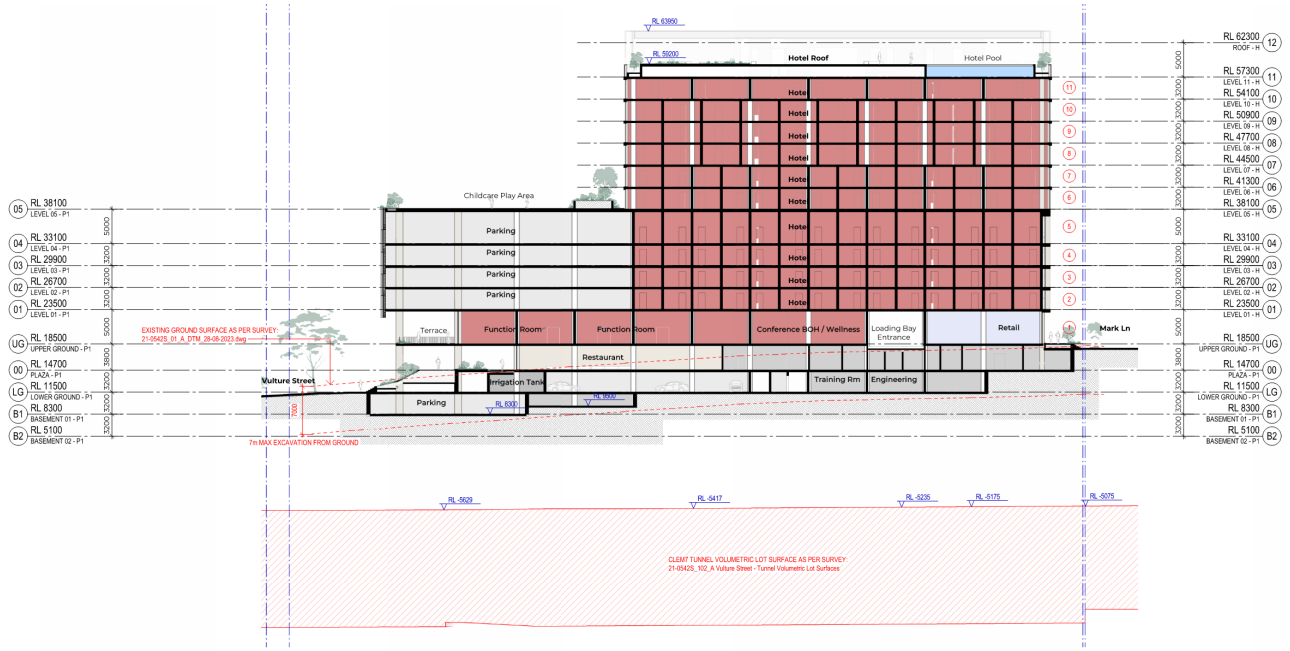

Figure 3: North-South Hotel/Podium Section (Looking West)

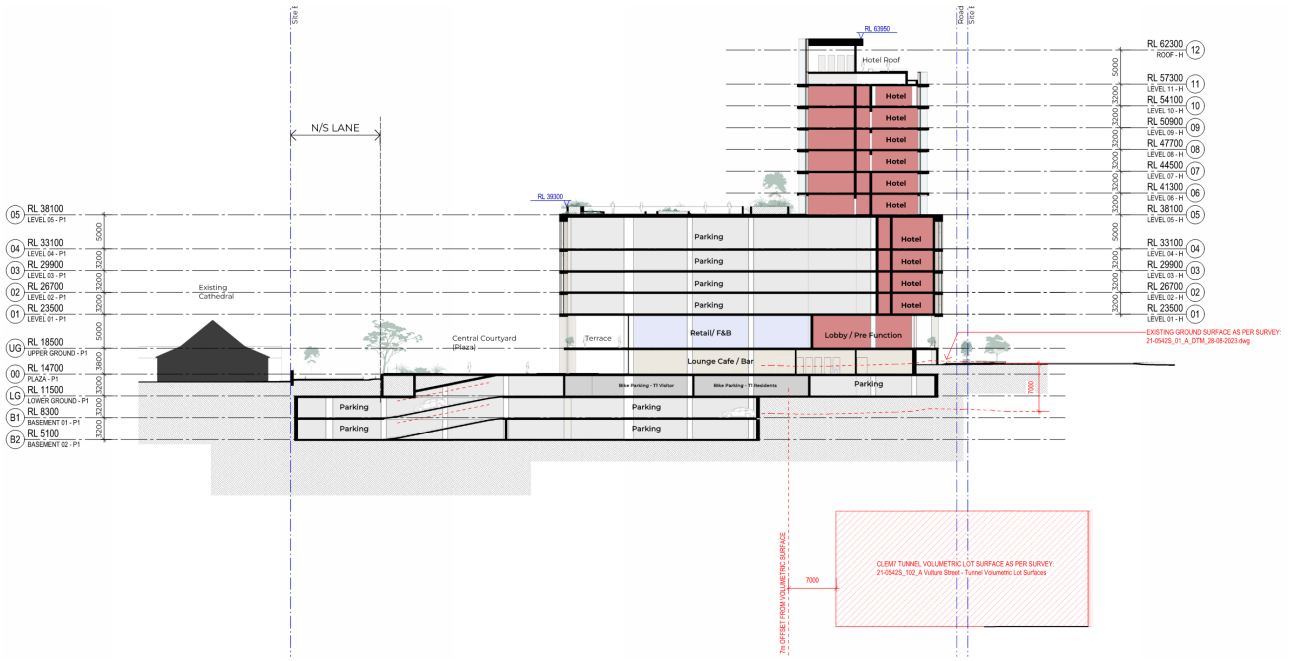

Figure 4: East-West Hotel/Podium Section (Looking North)

The structure for each of the three towers is generally founded on high level pad footings in rock immediately below the lowest corresponding basement level, with proposed founding levels provided to EDG for integration into their tunnel pressure assessment. To alleviate potential unacceptable stresses being imposed on the Clem7 tunnels, sleeved pile footings have been considered to support the walls and columns positioned on Gridline H. The purpose of the sleeved piles is to transfer structural loading deeper into the rock mass below the level of the tunnel crown.

The basement retention system is proposed to be a combination of soldier pile walls with shotcrete panel infills and reinforced concrete retaining walls (where batter slopes are achievable). The loads from the retention structure have been integrated into the EDG investigation.

Details of the column layout and column loads provided to EDG based on RBG's detailed load assessment can be found in Appendix C.

3. Tunnel Design Load Criteria

The North South Bypass Tunnel (**NSBT**) Performance Specification (Exhibit A, Annexure 2, Part 1, Clause 6.2.2) nominates the following limitations of future developments over the Clem 7 tunnel:

- **Criteria 1** - Additional vertical loading due to building loads must not exceed 50 kPa (working load) at a level of 1m above the tunnel crown.
- **Criteria 2 -** Additional filling at surface level is not to exceed 1m, equivalent to 20 kPa
- **Criteria 3 -** Building footings and excavations must not be located within 7m of the tunnel lining. Refer Figure 5 below for clarification of the excavation exclusion zone.
- **Criteria 4 -** Building excavations must not exceed 7m in depth within the width of the tunnel lining or the adjacent 7m wide pillars either side.

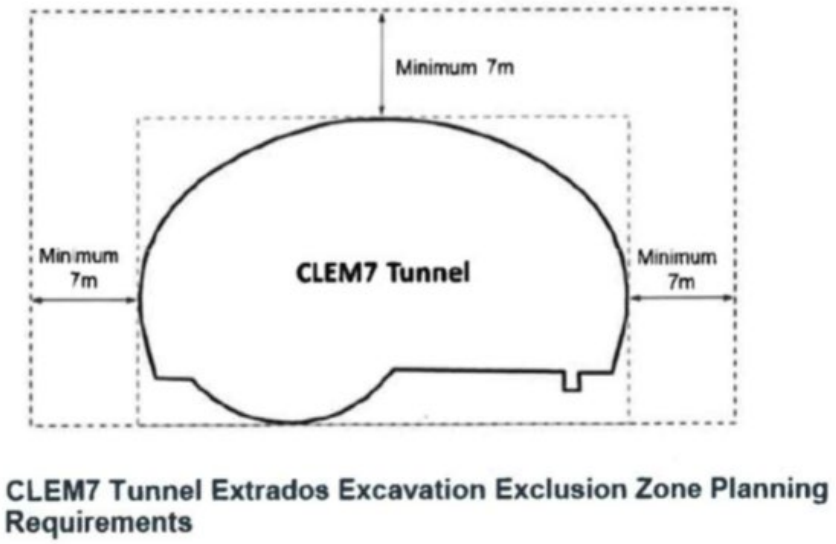

Figure 5: Clem7 Excavation Exclusion Zone

Criteria 2, 3 and 4 of the above are addressed through the planning of the development and are clearly satisfied as shown in Figure 3 and Figure 4 in Section 2 of this report.

Criteria 1 requires a more complex assessment requiring a detailed understanding of the proposed building, including excavation and founding depths and then a detailed assessment by a suitably qualified geotechnical engineer. This assessment is discussed in further detail within Section 4 of this report.

4. Analysis

EDG were engaged by the Project client to undertake geotechnical analysis of the net pressure increase at 1m above the tunnel crown based on the proposed building loads and founding levels provided by RBG, with the aim to satisfy Criteria 1.

EDG utilised a finite element analysis package, *Plaxis*, to analyse the impact of the building loads on the tunnel. EDG's technical memorandum (included in this report as Appendix B) outlines the analysis carried out and the results of their assessment.

EDG developed their finite element model incorporating the loading input, including founding levels and loadings, together with the existing survey and proposed basement extent, to calculate the extent of removal of existing material.

The foundation loads provided to EDG for their analysis are marginally conservative, allowing appropriate allowance for future possible minor design development changes and allowance for typical construction tolerance.

As design progresses in future stages of this Project, Robert Bird Group would undertake a review of calculated design loads prior to milestone drawing submissions to ensure that the loadings do not exceed those provided to EDG to inform this assessment. At the completion of design, the tunnel impact assessment will be repeated to ensure that compliance with the relevant design criteria is maintained.

5. Results

The analysis carried out by EDG (documented within Appendix B of this report) indicates that the increase in vertical stresses imposed by the proposed building at a level 1m above the tunnel crown meets the requirements of 50kPa or less within the tunnel footprint.

Figure 6 and Figure 7 below show output plots from EDG analysis extracted from the technical memo in Appendix B, which depict the predicted net pressure change on the Clem7 tunnels. It is worth noting that in some locations, the impact on pressure at 1m above the tunnel crown is negative, i.e. the tunnels have a net reduction in loading applied to them because of this proposed development. The primary driver for this is where basement excavation is proposed in zones where no significant load-bearing structure is being introduced.

As can be seen from the analysis, the Design Criteria 1, as noted in Section 2 above, has been satisfied for the proposed Mark Lane mixed-use development. Criteria 2, 3 and 4 are also satisfied as previously discussed.

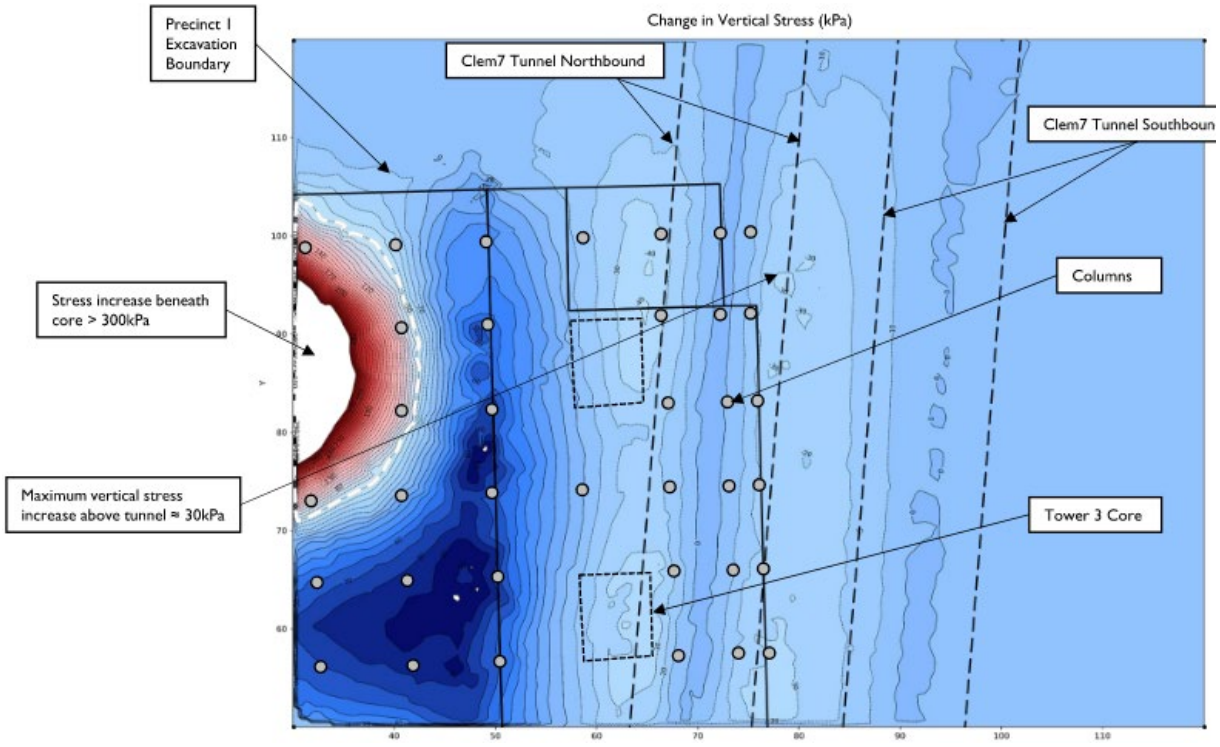

Figure 6: EDG Net Pressure Change Plot – North-East

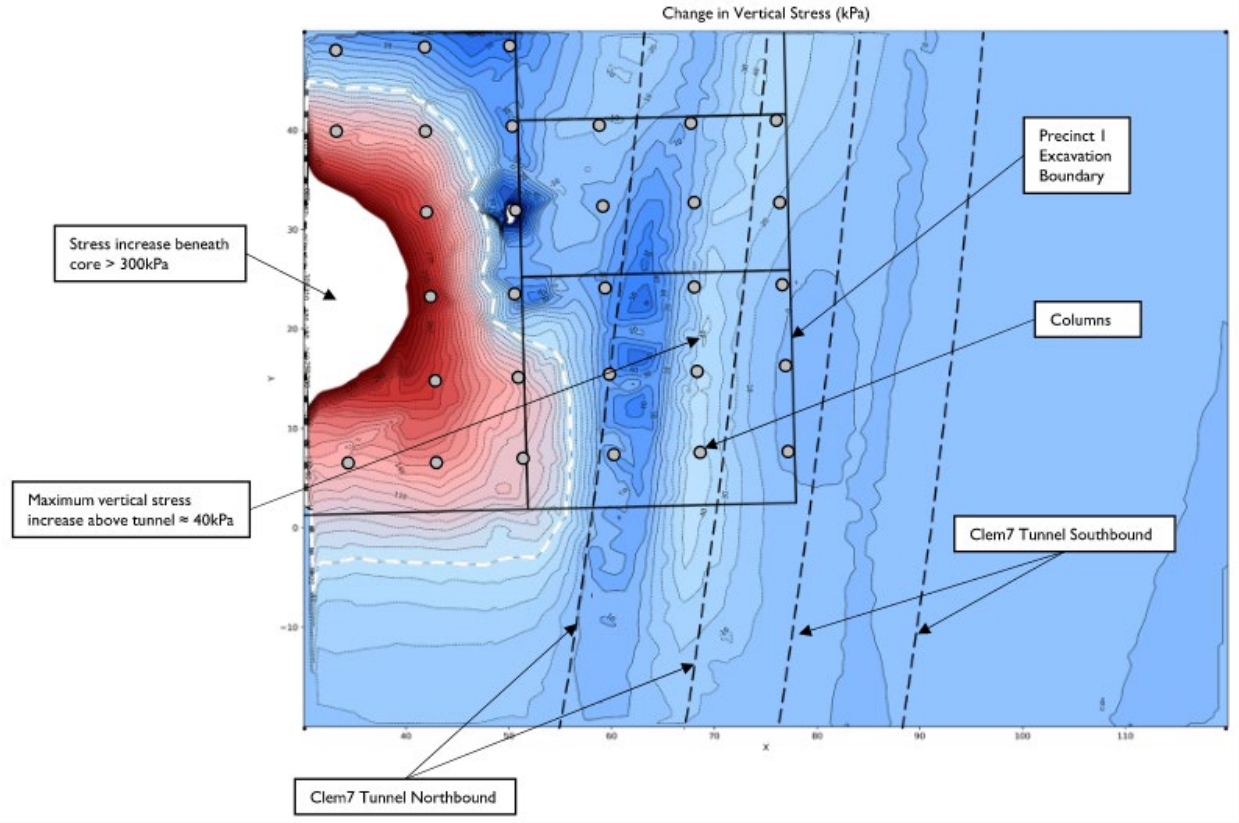

Figure 7: EDG Net Pressure Change Plot – South-East

Appendix A
Architectural Drawings

Document Number: 22552-RBG-ZZ-XX-RP-ST-00003
Revision: P01

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SK90003	Shadow Study : Equinox	B

Parking Schedule_Allocation

Allocation	Level	Count	Type
Childcare			
Childcare	LOWER GROUND - P1	21	
		21	
Hotel			
Hotel	PLAZA - P1	38	
Hotel	PLAZA - P1	5	Tandem Parking
		43	
Tower 1			
Tower 1	BASEMENT 02 - P1	136	
Tower 1	BASEMENT 01 - P1	55	
Tower 1	BASEMENT 01 - P1	13	Tandem Parking
Tower 1	LEVEL 01 - P1	2	
Tower 1	LEVEL 01 - P1	81	
Tower 1	LEVEL 02 - P1	81	
Tower 1	LEVEL 03 - P1	81	
Tower 1	LEVEL 04 - P1	2	
Tower 1	LEVEL 04 - P1	81	
		532	
Tower 2			
Tower 2	BASEMENT 02 - P1	40	
Tower 2	BASEMENT 02 - P1	11	Tandem Parking
Tower 2	BASEMENT 01 - P1	37	
Tower 2	BASEMENT 01 - P1	11	Tandem Parking
Tower 2	LOWER GROUND - P1	32	
Tower 2	LOWER GROUND - P1	11	Tandem Parking
Tower 2	LEVEL 01 - P1	34	
Tower 2	LEVEL 01 - P1	12	Tandem Parking
Tower 2	LEVEL 02 - P1	34	
Tower 2	LEVEL 02 - P1	12	Tandem Parking
Tower 2	LEVEL 03 - P1	34	
Tower 2	LEVEL 03 - P1	12	Tandem Parking
Tower 2	LEVEL 04 - P1	34	
Tower 2	LEVEL 04 - P1	12	Tandem Parking
		326	
Visitor T1			
Visitor T1	BASEMENT 01 - P1	103	
		103	
Visitor T2			
Visitor T2	LOWER GROUND - P1	41	
		41	
Grand total: 1066		1066	

Bike Schedule

Comments	Level	Bike Rack
Tower 1		
Tower 1	BASEMENT 02 - P1	104
Tower 1	BASEMENT 01 - P1	58
Tower 1	LOWER GROUND - P1	244
Tower 1	LEVEL 01 - P1	70
Tower 1	LEVEL 02 - P1	70
Tower 1	LEVEL 03 - P1	70
Tower 1	LEVEL 04 - P1	70
		686
Tower 2		
Tower 2	BASEMENT 02 - P1	114
Tower 2	BASEMENT 01 - P1	114
Tower 2	LOWER GROUND - P1	48
		276
Visitor T1		
Visitor T1	LOWER GROUND - P1	174
		174
Visitor T2		
Visitor T2	LOWER GROUND - P1	70
		70
Grand total		1206

Unit Mix - Hotel

Name	Count
Premium	
Premium	47
Premium: 47	
Standard	
Standard	120
Standard: 120	
Suite	
Suite	10
Suite: 10	
Grand total: 177	

Unit Mix - Tower 01

Name	Count
1 Bed - T1	
1 Bed	60
1 Bed + MPR	175
1 Bed - T1: 235	
2 Bed - T1	
2 Bed	315
2 Bed + MPR	108
2 Bed - T1: 423	
3 Bed - T1	
3 Bed + MPR	25
3 Bed - T1: 25	
Grand total: 683	

Unit Mix - Tower 02

Name	Count
1 Bed - T2	
1 Bed	54
1 Bed - T2: 54	
2 Bed - T2	
2 Bed	106
2 Bed - T2: 106	
3 Bed - T2	
3 Bed + MPR	55
3 Bed - T2: 55	
4 Bed - T2	
4 Bed + MPR	55
4 Bed - T2: 55	
Grand total: 270	

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
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Project number
150740

Size check
25mm

Checked
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Approved
DL

Sheet size
A1

Scale

Sheet title
Overall Arrangement
Drawing List

Sheet number
SK01000

Revision
B

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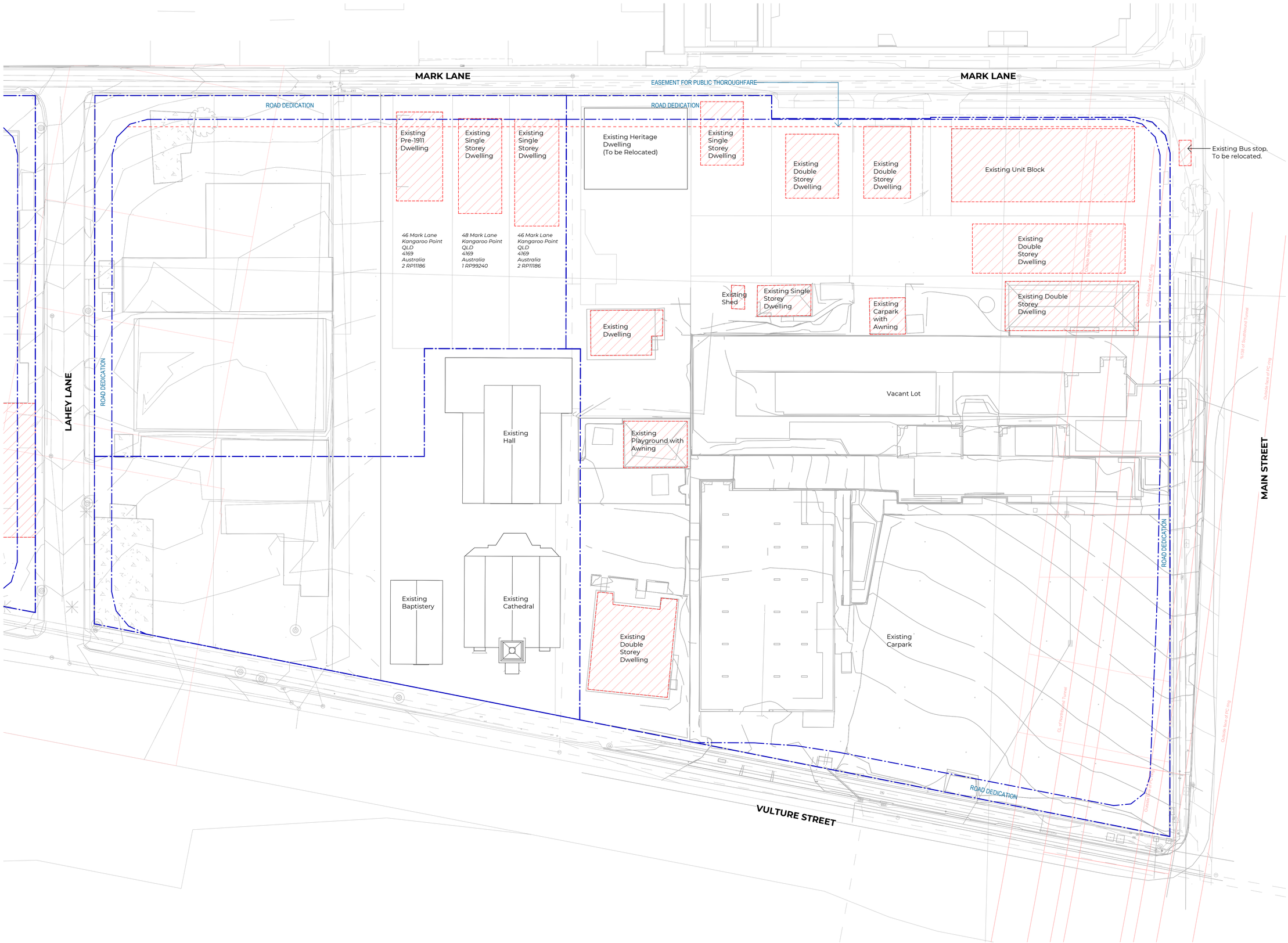

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Demolition Legend

For Demolition

Note:
To be read in conjunction with other specialist reports

Refer to landscape designer for existing tree removal and retention

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Sheet title
Overall Arrangement
Site Plan
Existing

Sheet number	Revision
SK11000	B

Status
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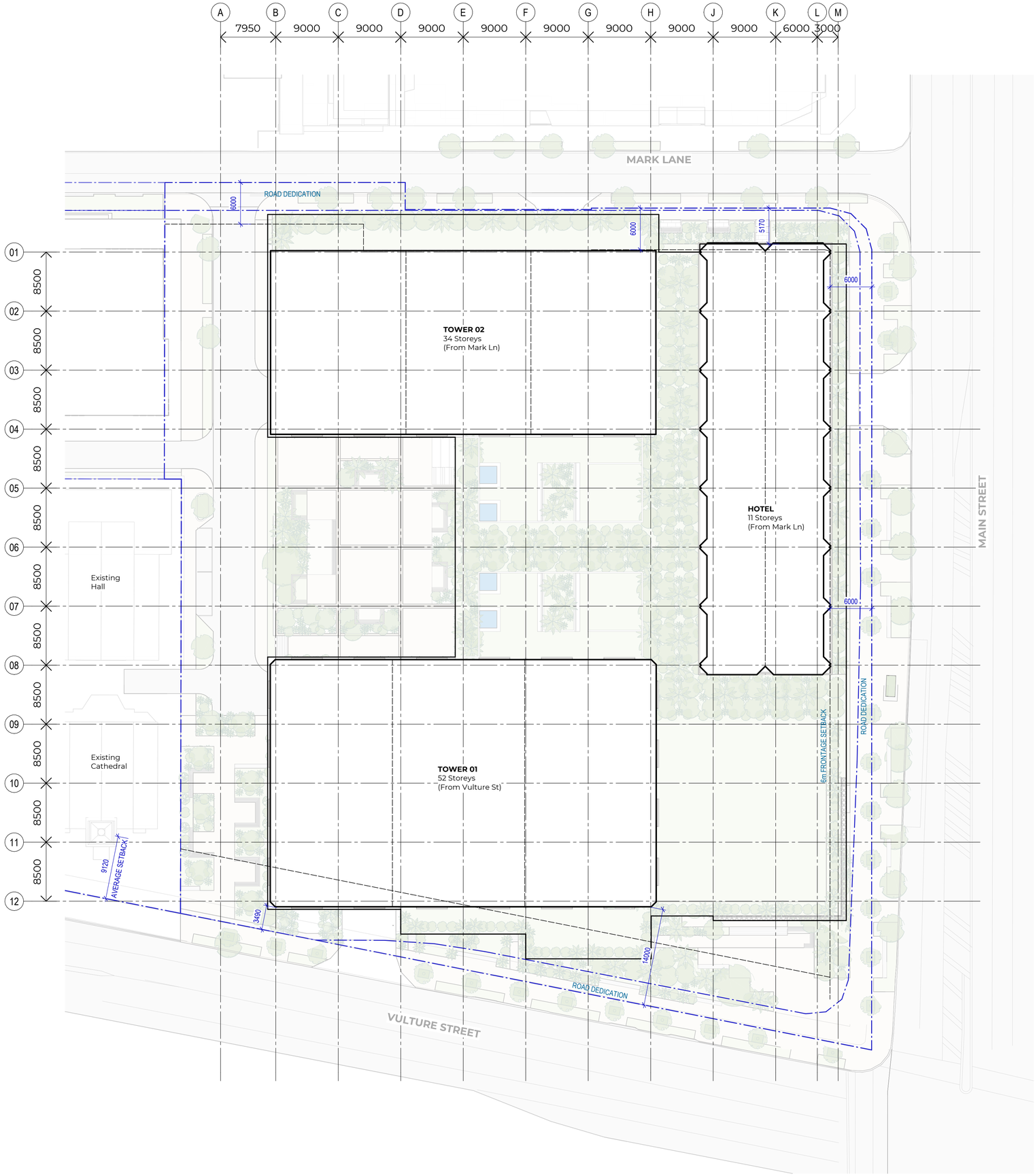

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Recent revision history

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Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

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Mark Lane Stage 1A and Precinct

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Philip Usher Constructions

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W–B
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Project number
150740

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Site Plan
Proposed

Sheet number
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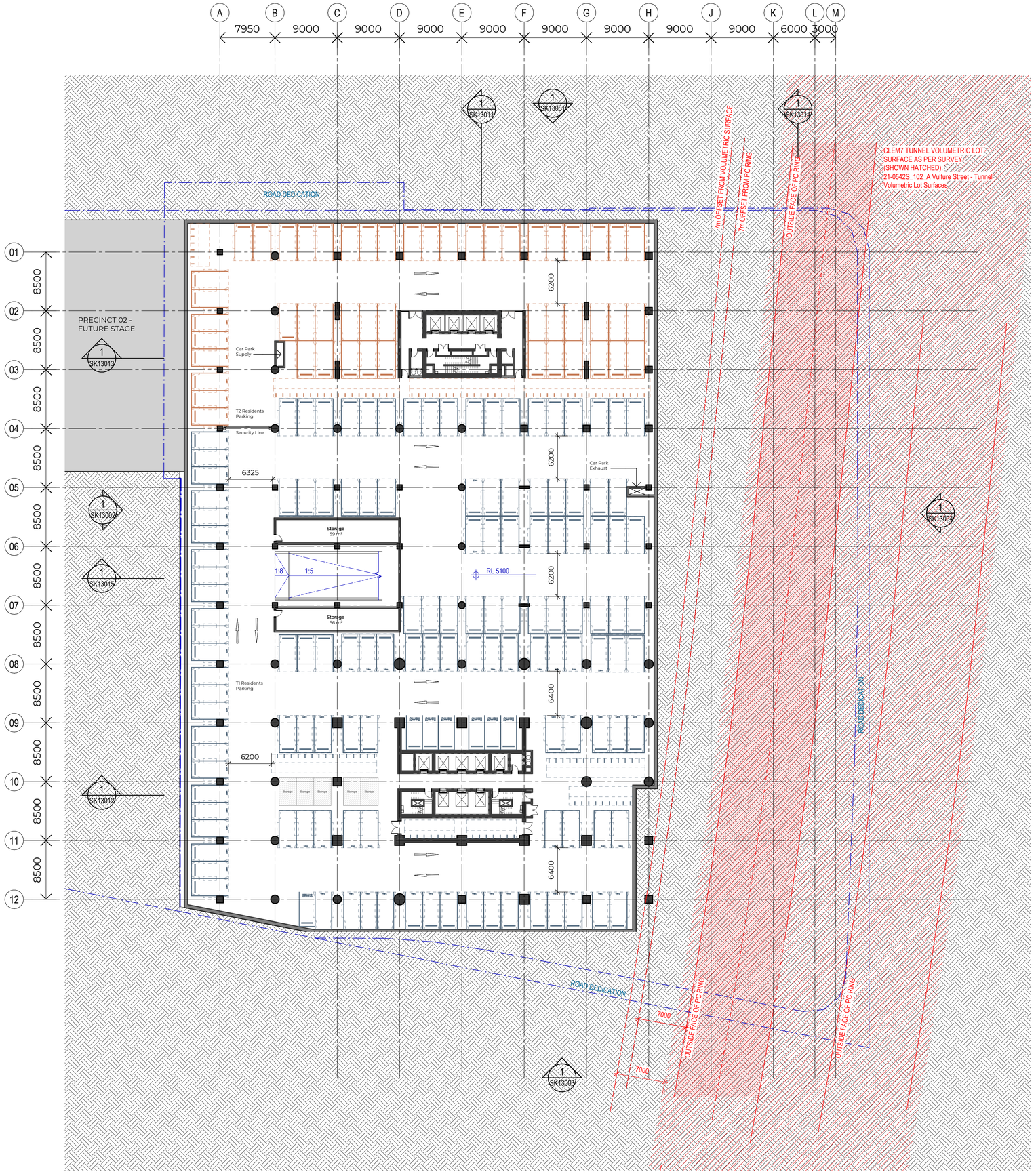

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Parking Allocation

- Hotel
- Other Uses
- Tower 1 - Visitor
- Tower 1 - Residents
- Tower 2 - Visitor
- Tower 2 - Residents

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
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Project number
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Basement 02

Sheet number
SK12000

Revision
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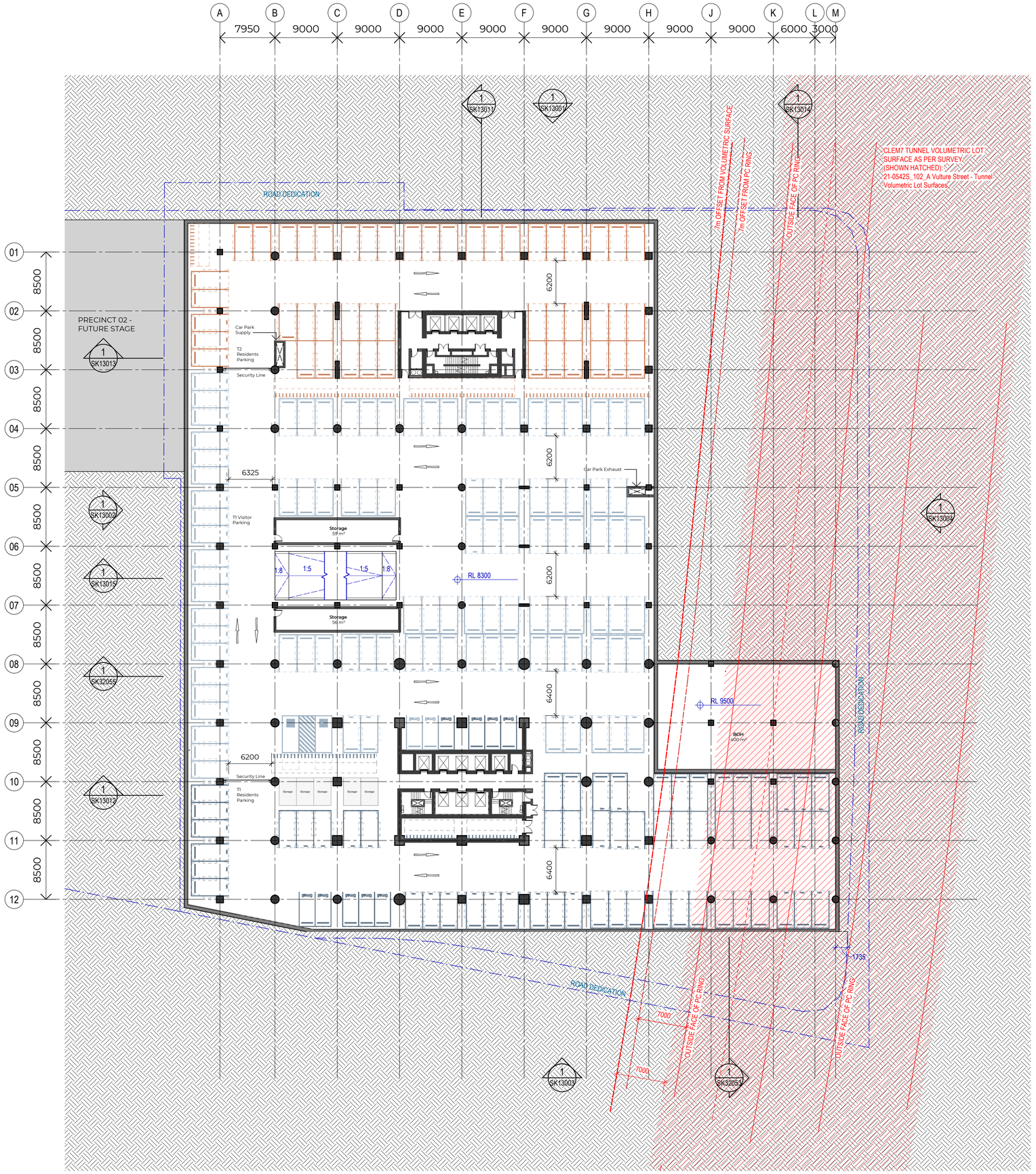

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Parking Allocation

- Hotel
- Other Uses
- Tower 1 - Visitor
- Tower 1 - Residents
- Tower 2 - Visitor
- Tower 2 - Residents

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

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Basement 01

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Revision
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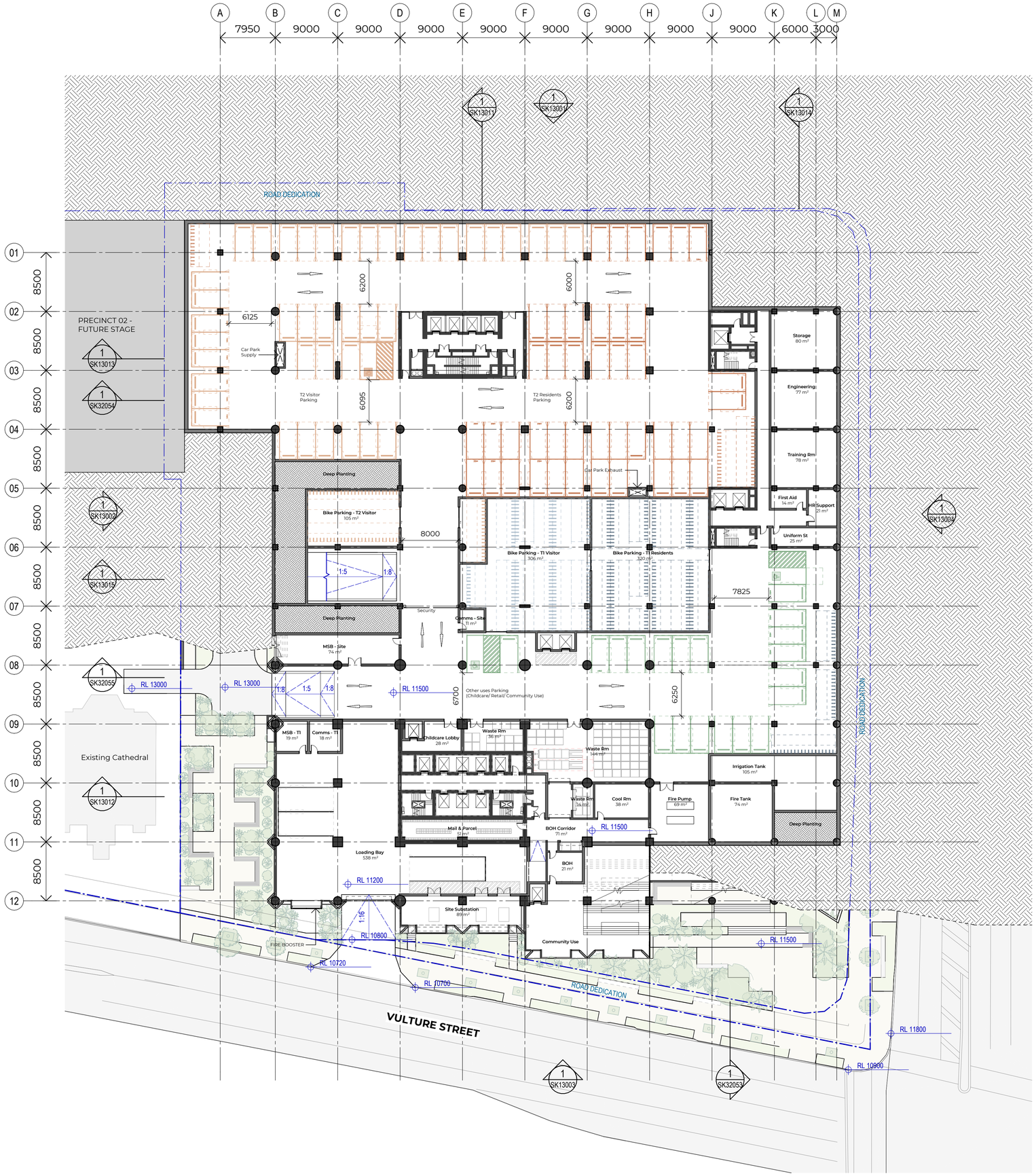

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Parking Allocation

- Hotel
- Other Uses
- Tower 1 - Visitor
- Tower 1 - Residents
- Tower 2 - Visitor
- Tower 2 - Residents

Project
Mark Lane Stage 1A and Precinct

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Plans
Lower Ground (Vulture St)

Sheet number
SK12002

Revision
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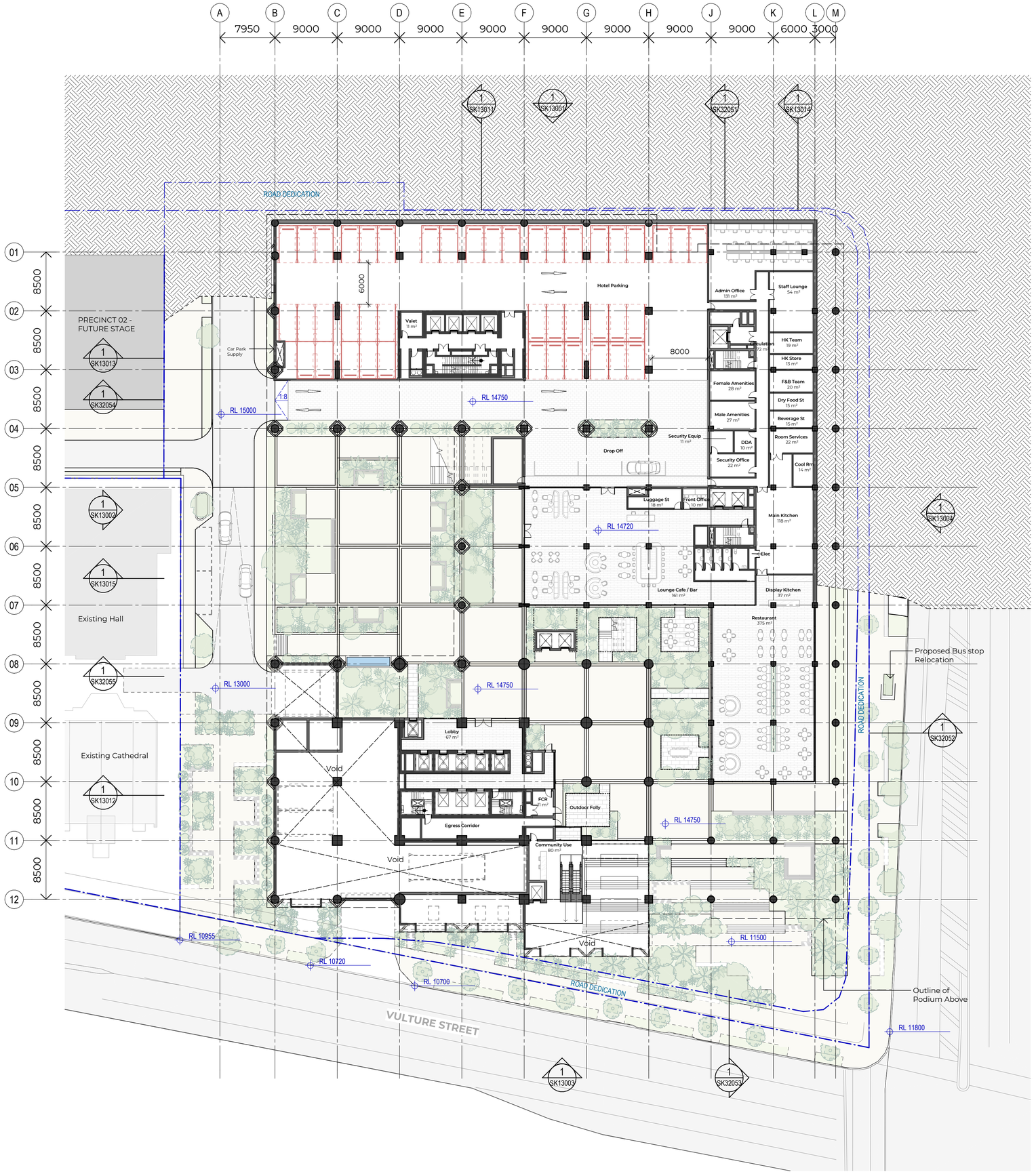

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Notes

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Do not scale drawings.

Parking Allocation

- Hotel
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- Tower 2 - Visitor
- Tower 2 - Residents

Project
Mark Lane Stage 1A and Precinct

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Overall Arrangement Plans
Plaza

Sheet number	Revision
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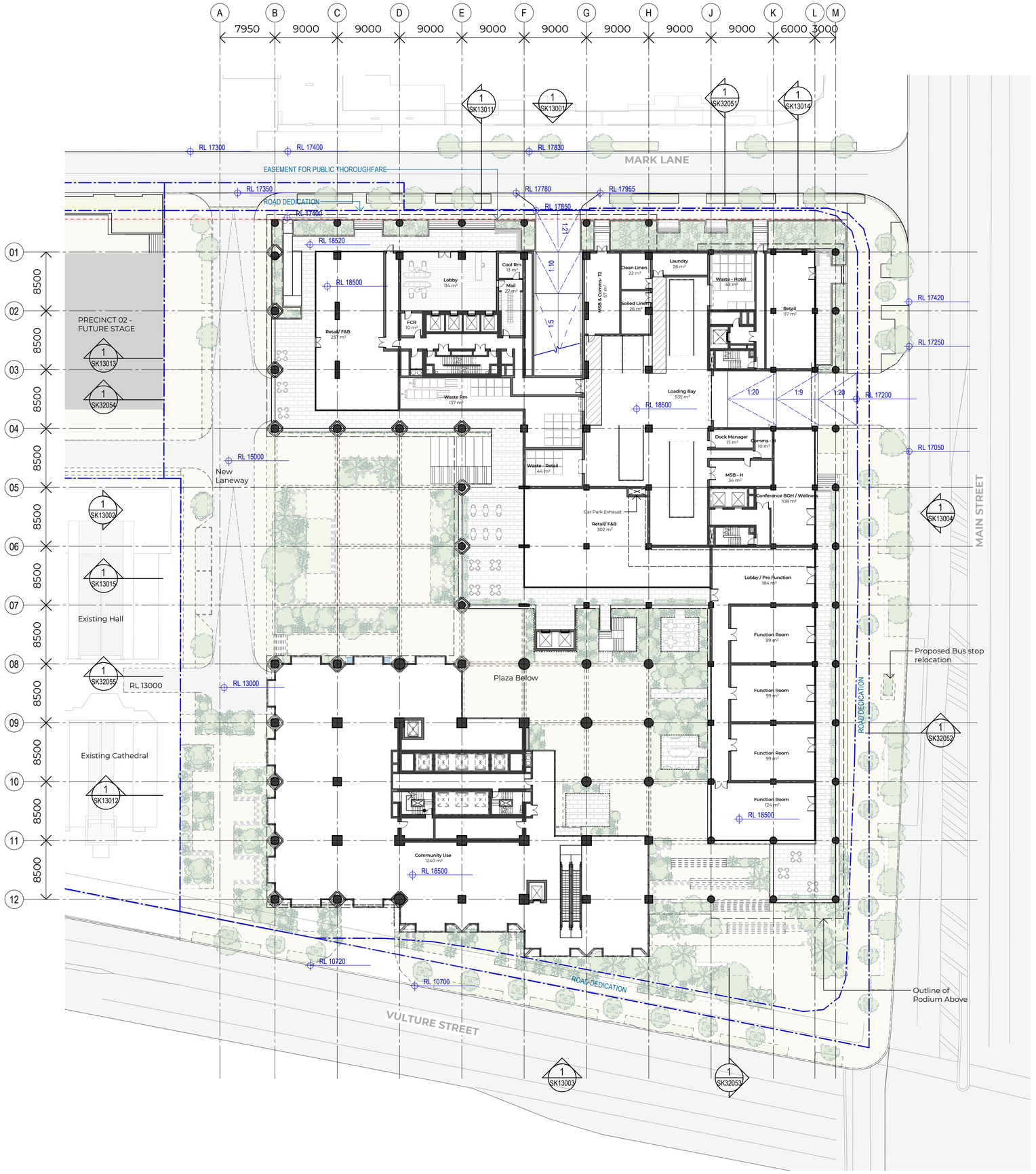

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Project
Mark Lane Stage 1A and Precinct

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Philip Usher Constructions

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Project number	Size check		
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Overall Arrangement Plans
Upper Ground (Mark Ln)

Sheet number	Revision
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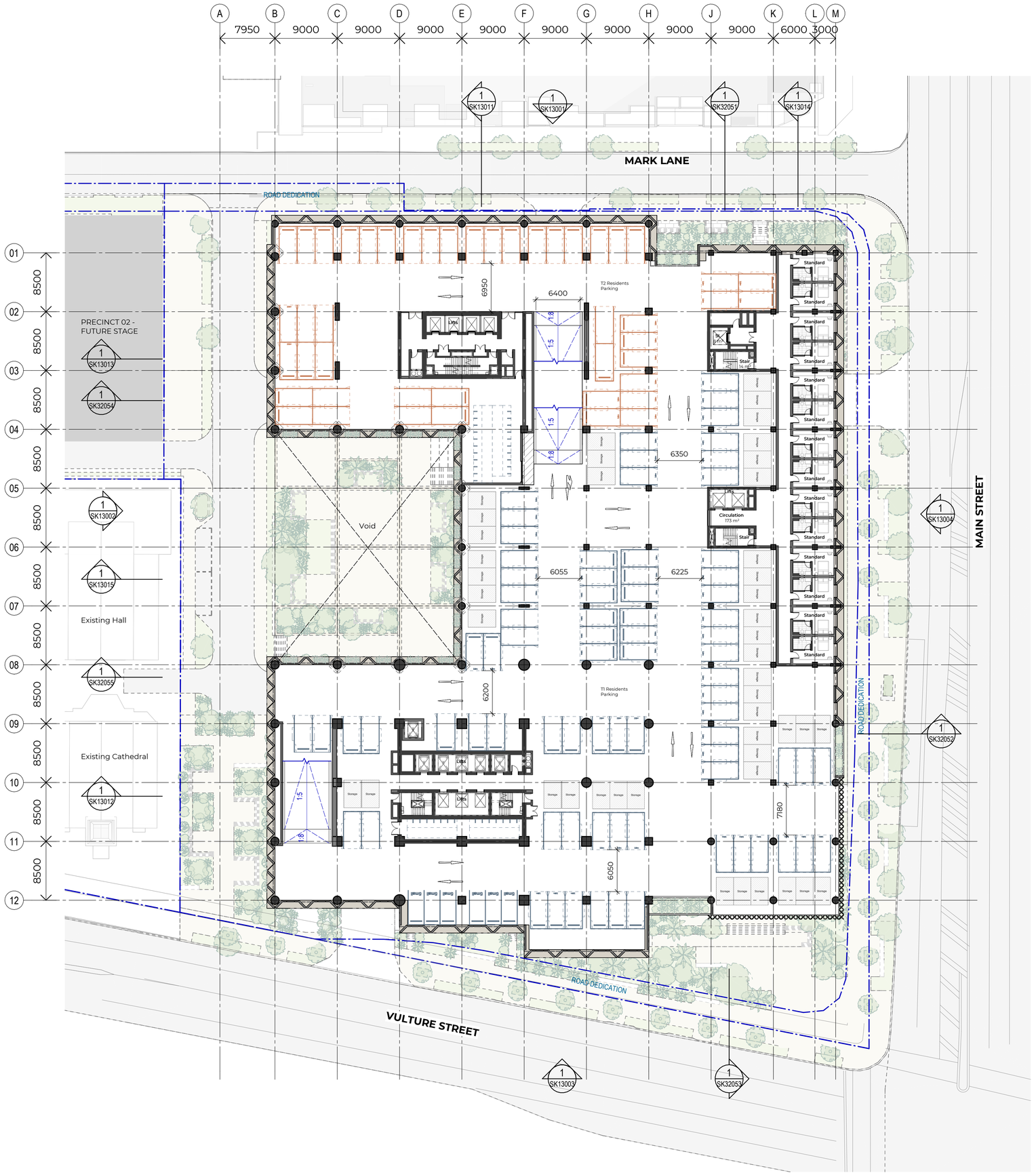

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Mark Lane Stage 1A and Precinct

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Overall Arrangement Plans
Level 01 - Podium

Sheet number	Revision
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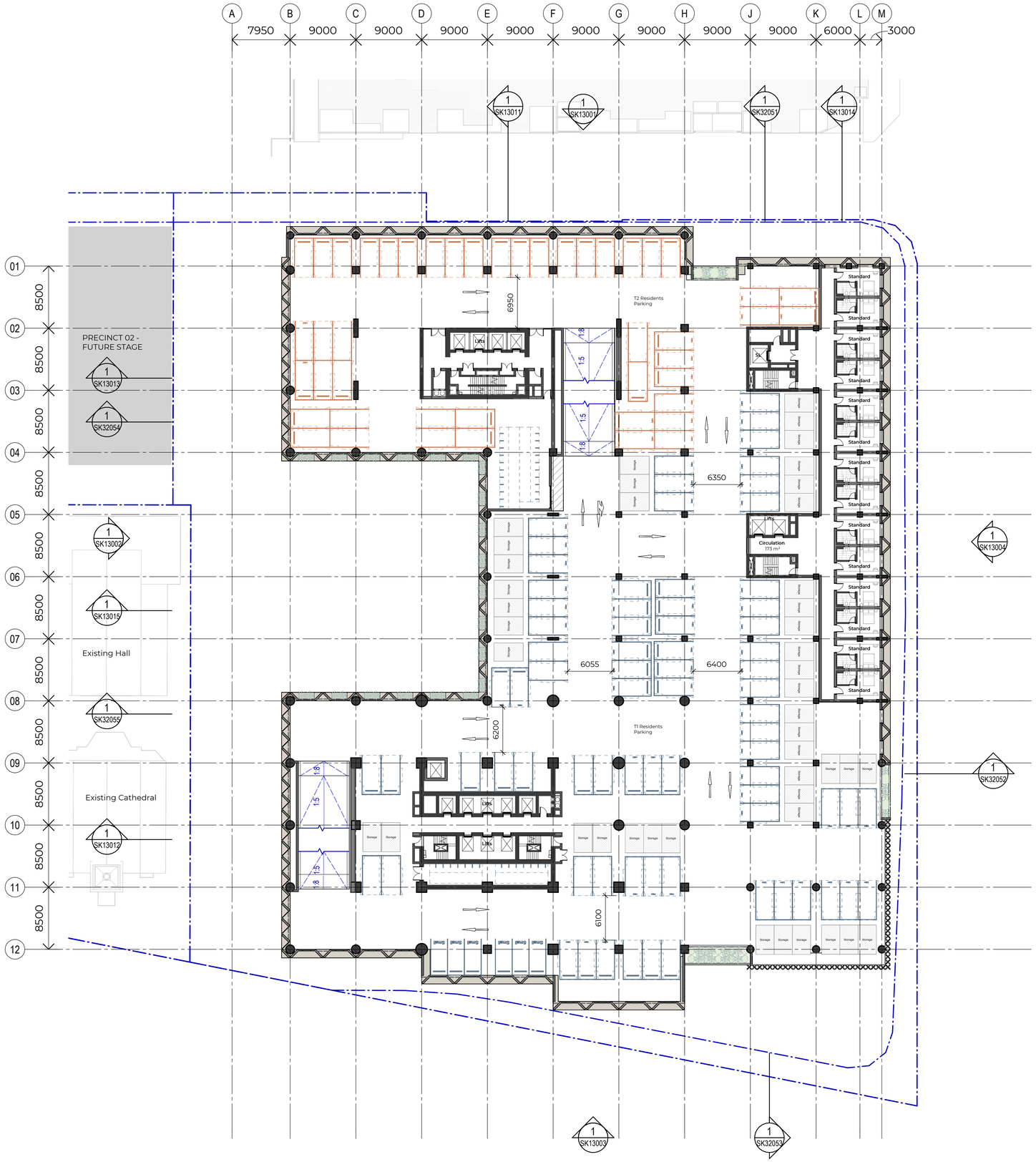

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

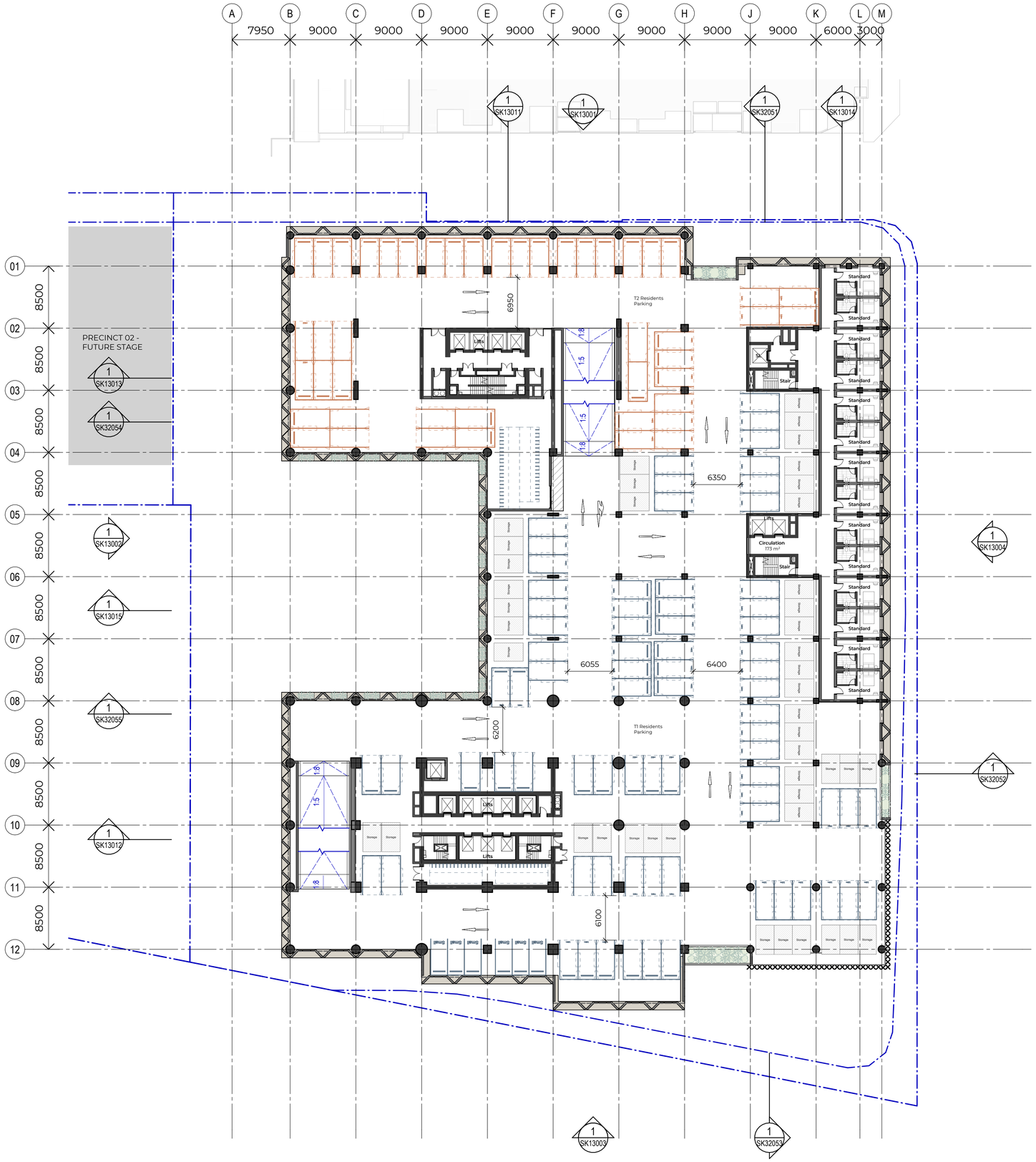
Project number	Size check		
150740	25mm		
Checked	**Approved**	**Sheet size**	**Scale**
PL	DL	A1	1 : 300

Sheet title
Overall Arrangement Plans
Level 02 - Podium

Sheet number	Revision
SK12006	B

Status
For Information

Date generated 30/04/2026 5:28:59 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Parking Allocation

- Hotel
- Other Uses
- Tower 1 - Visitor
- Tower 1 - Residents
- Tower 2 - Visitor
- Tower 2 - Residents

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

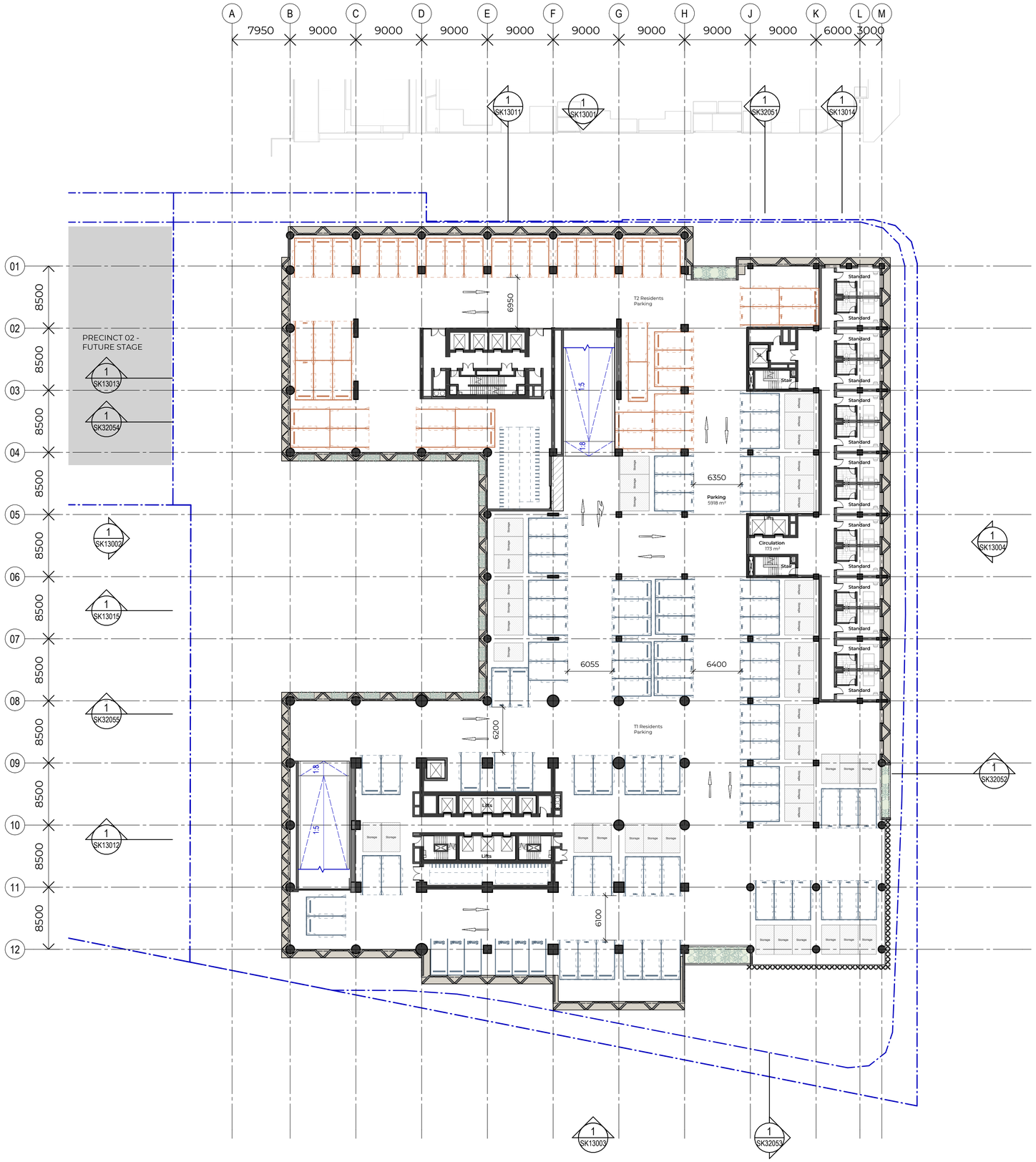
Project number	Size check		
150740	25mm		
Checked	**Approved**	**Sheet size**	**Scale**
PL	DL	A1	1 : 300

Sheet title
Overall Arrangement Plans
Level 03 - Podium

Sheet number	Revision
SK12007	B

Status
For Information

Date generated 30/04/2026 5:29:09 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Parking Allocation

- Hotel
- Other Uses
- Tower 1 - Visitor
- Tower 1 - Residents
- Tower 2 - Visitor
- Tower 2 - Residents

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 300

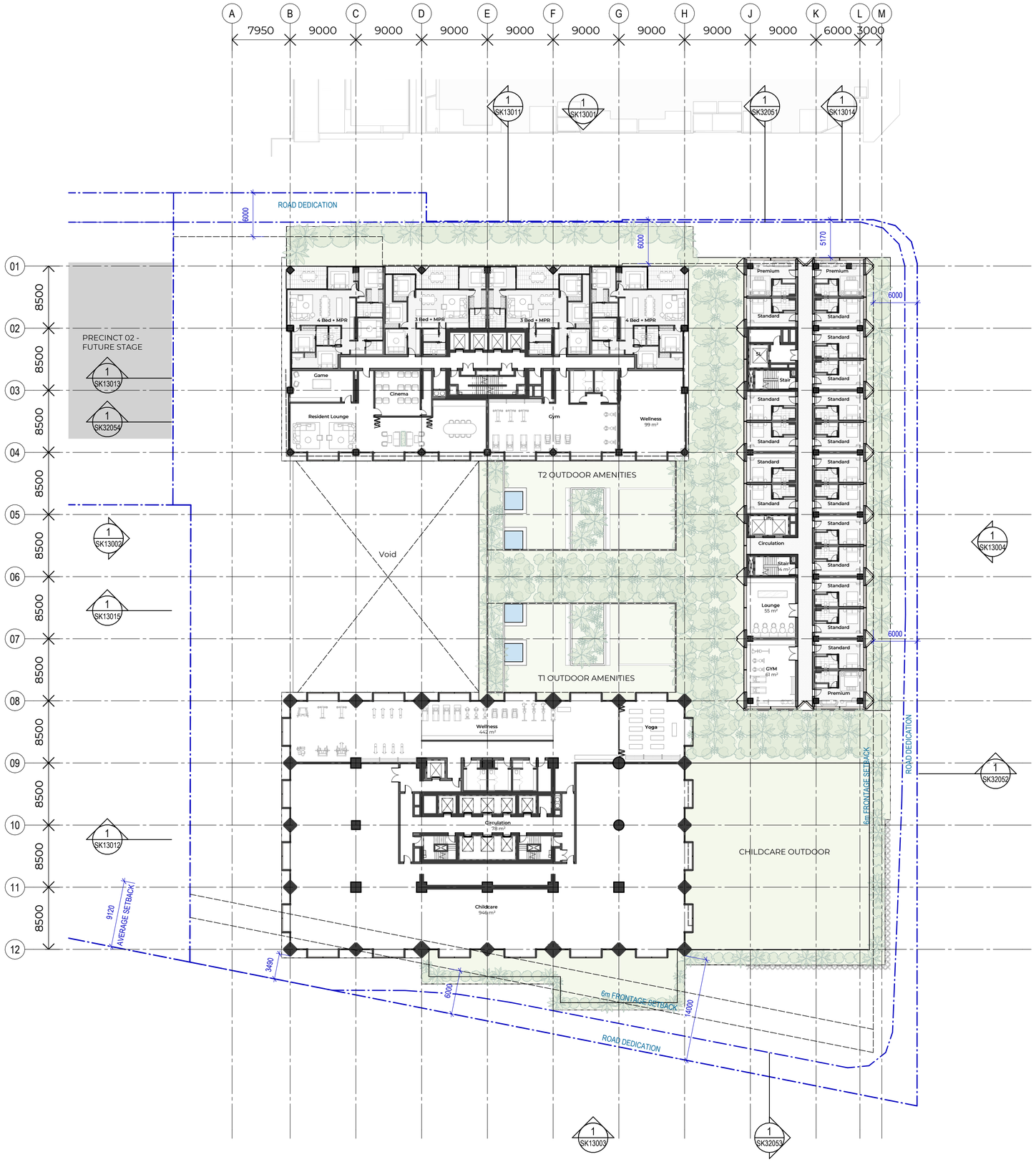
Sheet title
Overall Arrangement Plans
Level 04 - Podium

Sheet number
SK12008

Revision
B

Status
For Information

Date generated 30/04/2026 5:29:21 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 300

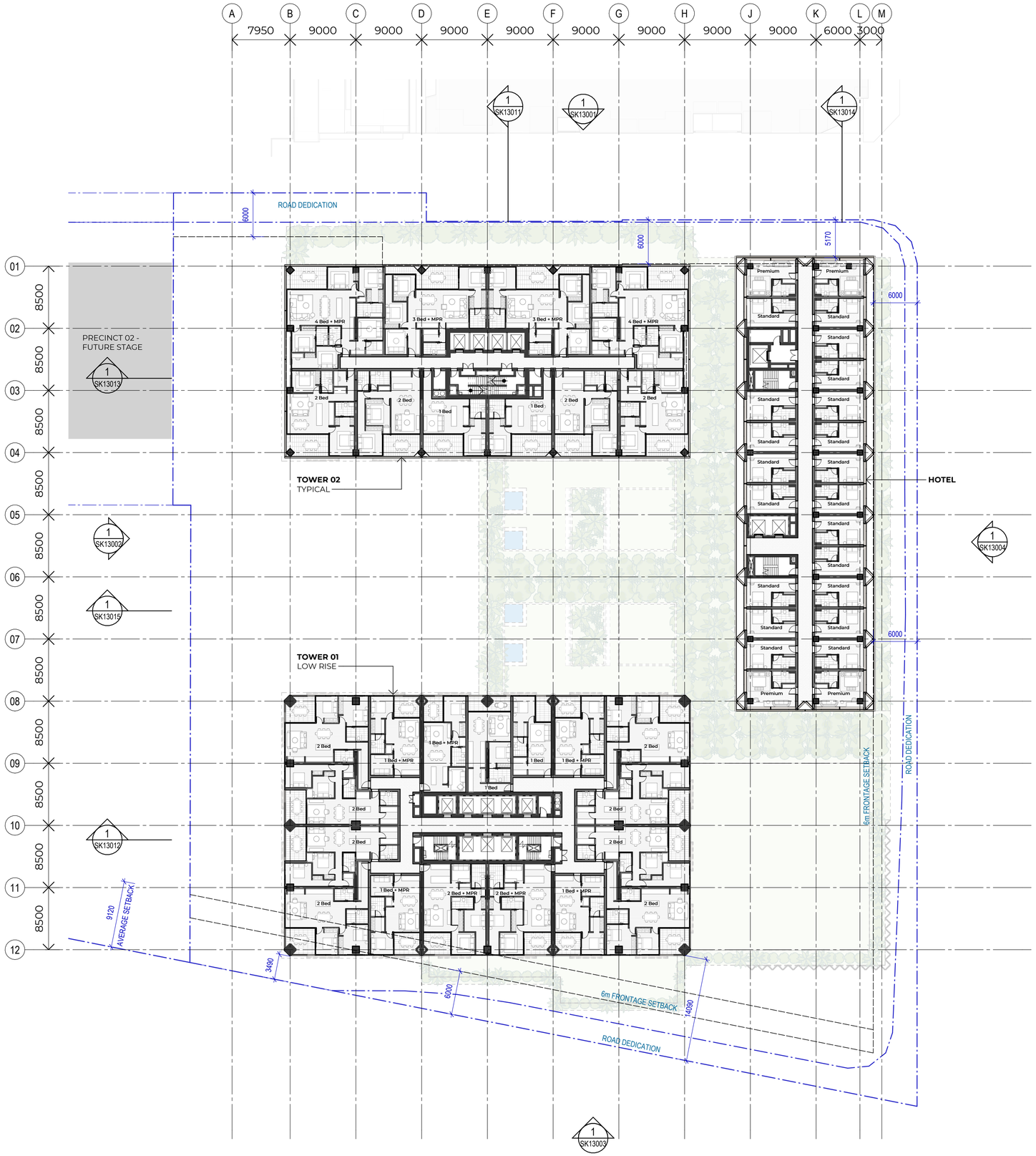
Sheet title
Overall Arrangement Plans
Level 05 - Podium Roof

Sheet number
SK12009

Revision
B

Status
For Information

Date generated 30/04/2026 5:29:49 PM



Date generated 30/04/2026 5:30:22 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W–B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

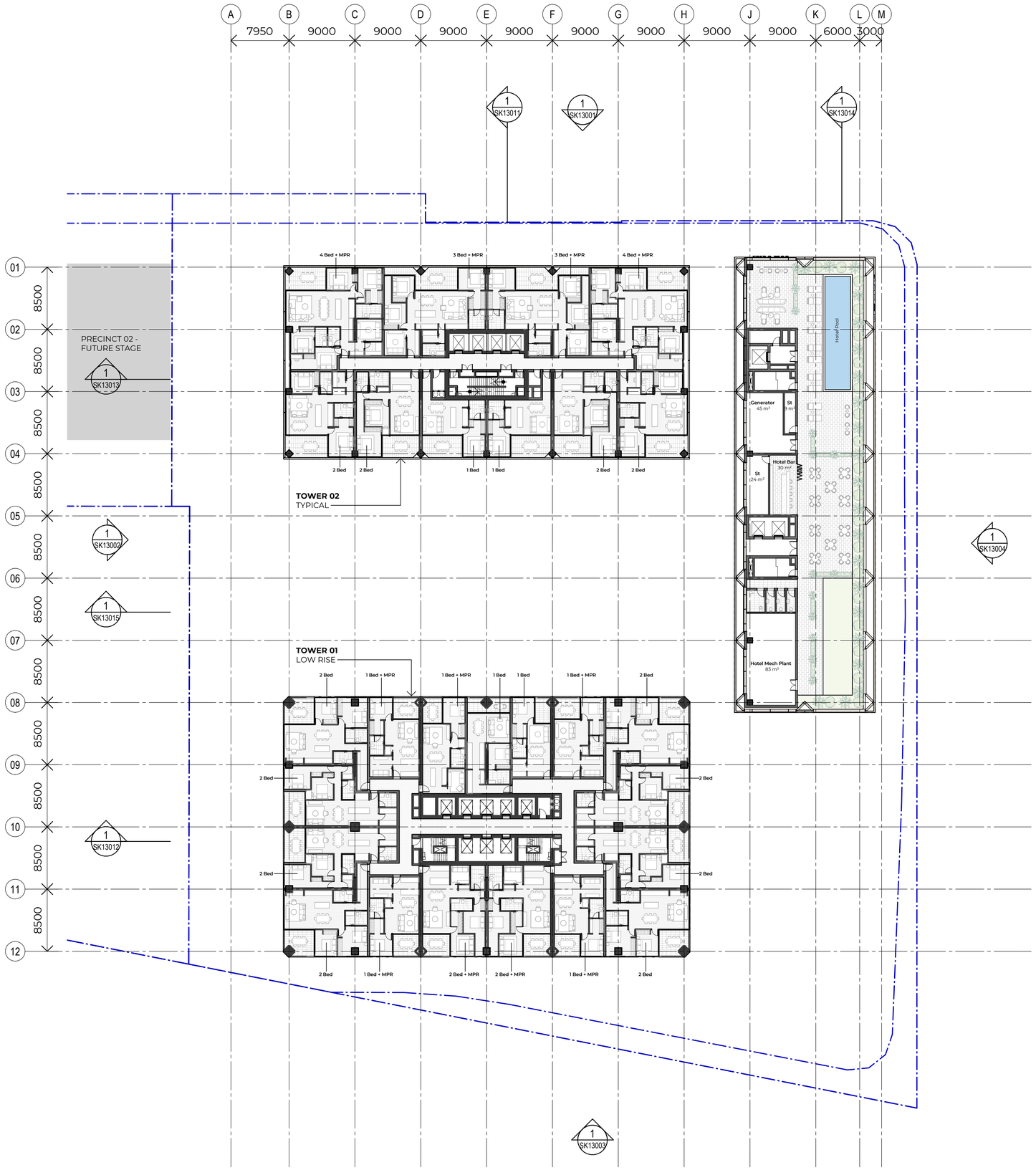
Scale
1 : 300

Sheet title
Overall Arrangement Plans
Level 06 - Typical

Sheet number
SK12010

Revision
B

Status
For Information



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

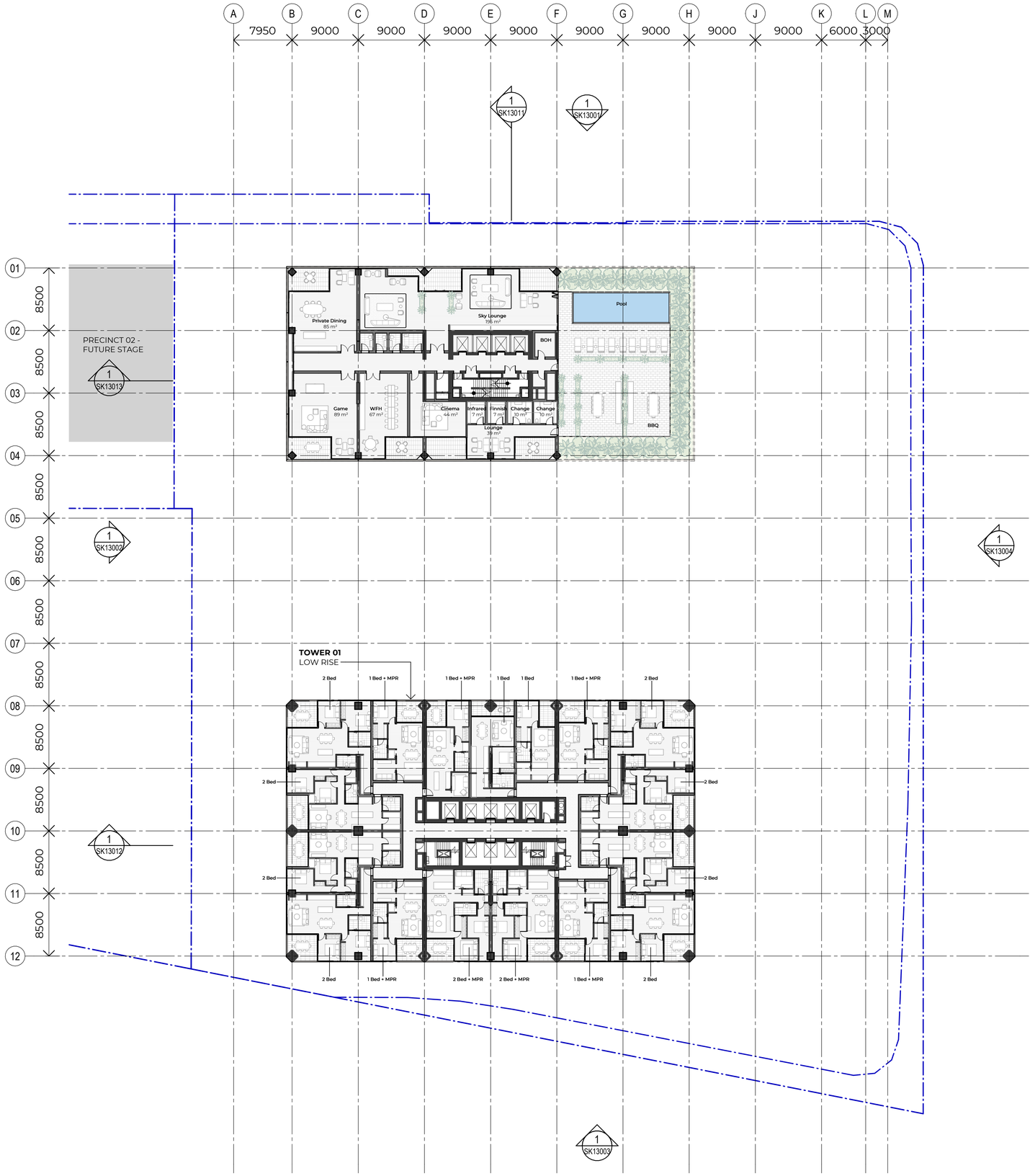
Sheet title
Overall Arrangement Plans
Level 11 - Hotel Roof

Sheet number
SK12011

Revision
B

Status
For Information

Date generated 30/04/2026 5:30:39 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

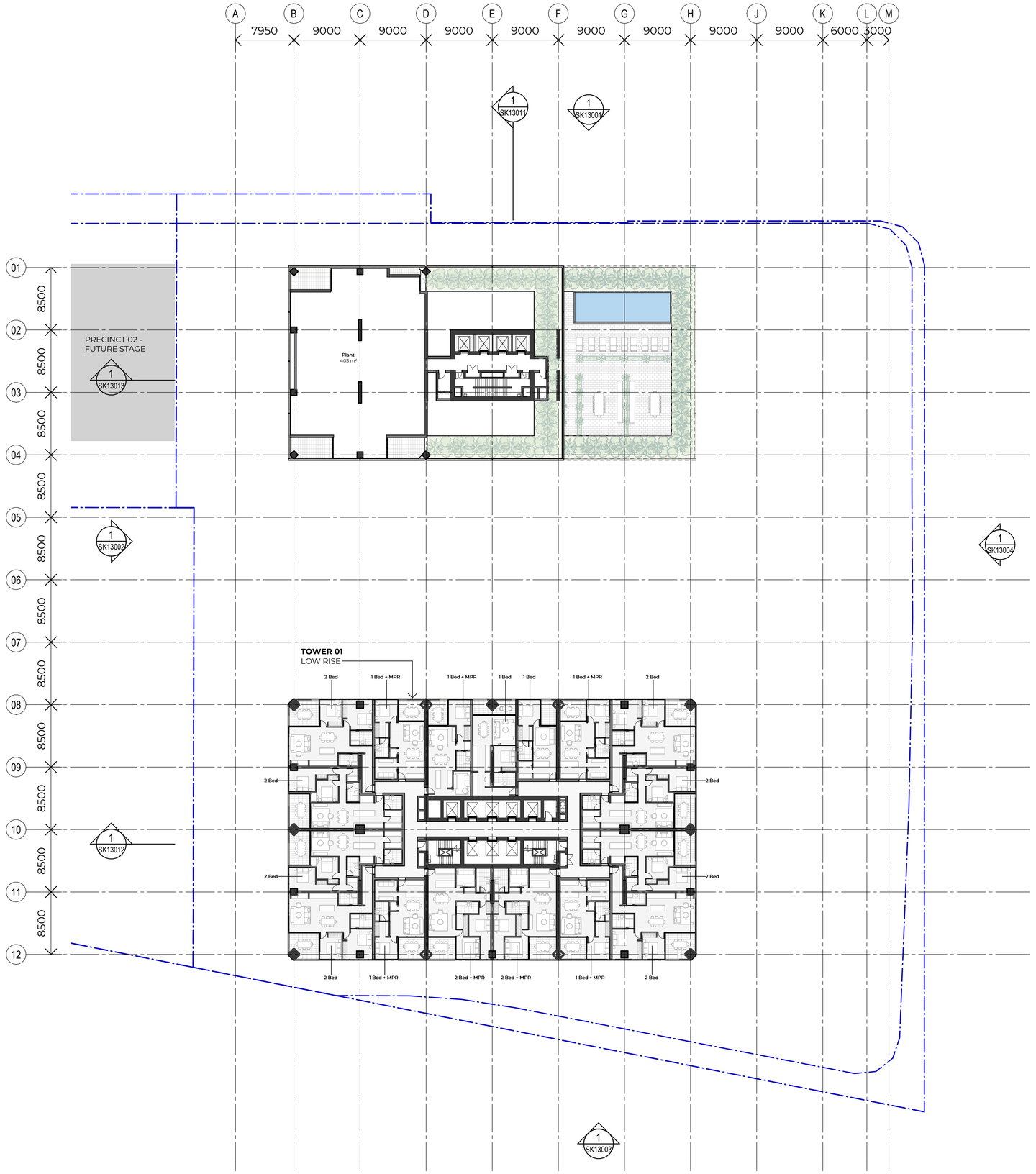
Sheet title
Overall Arrangement Plans
Level 33 - T2 Amenities

Sheet number
SK12033

Revision
B

Status
For Information

Date generated 30/04/2026 5:30:52 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 300

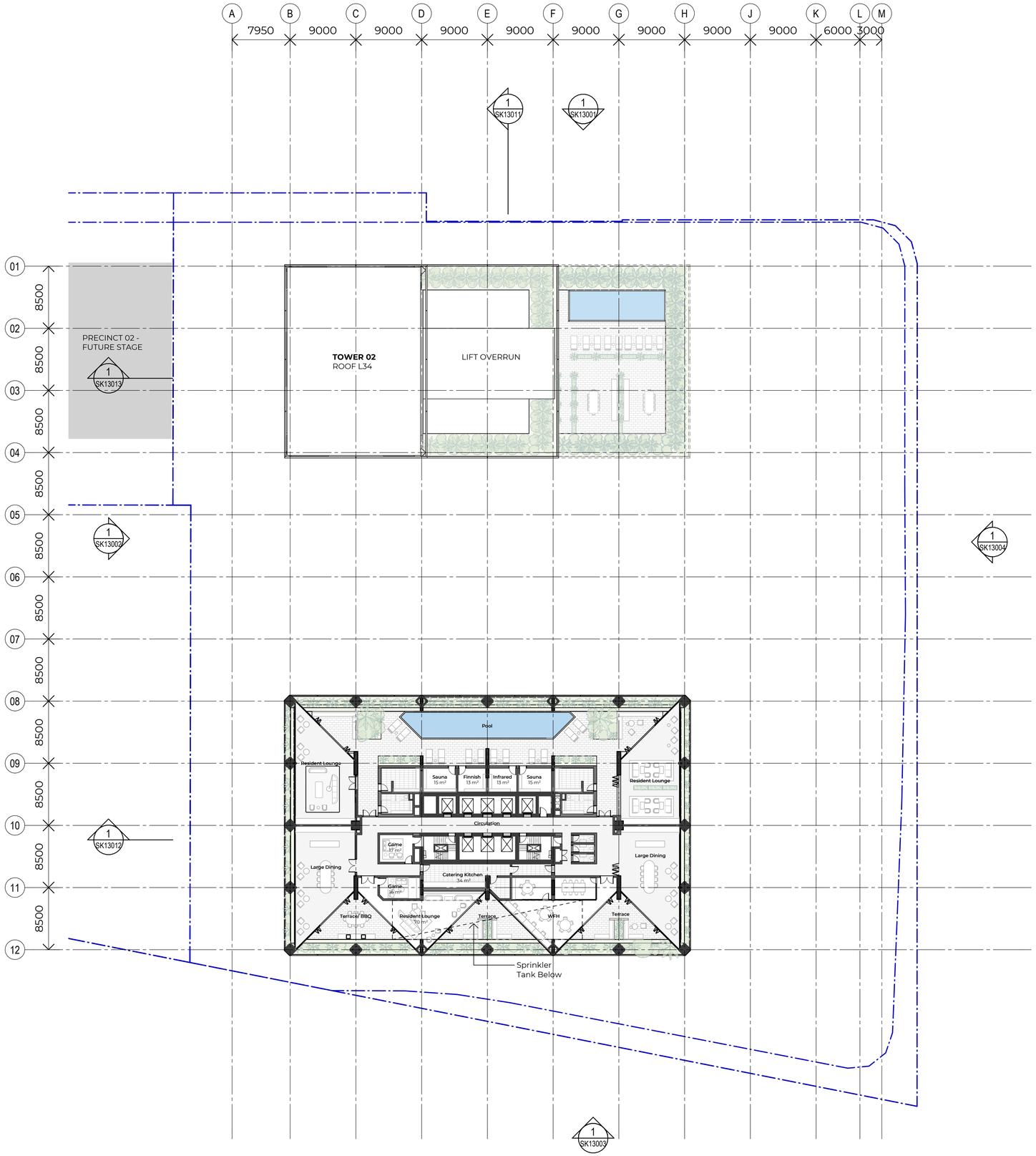
Sheet title
Overall Arrangement Plans
Level 34 - T2 Roof Plant

Sheet number
SK12034

Revision
B

Status
For Information

Date generated 30/04/2026 5:31:10 PM



Date generated 30/04/2026 5:31:34 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

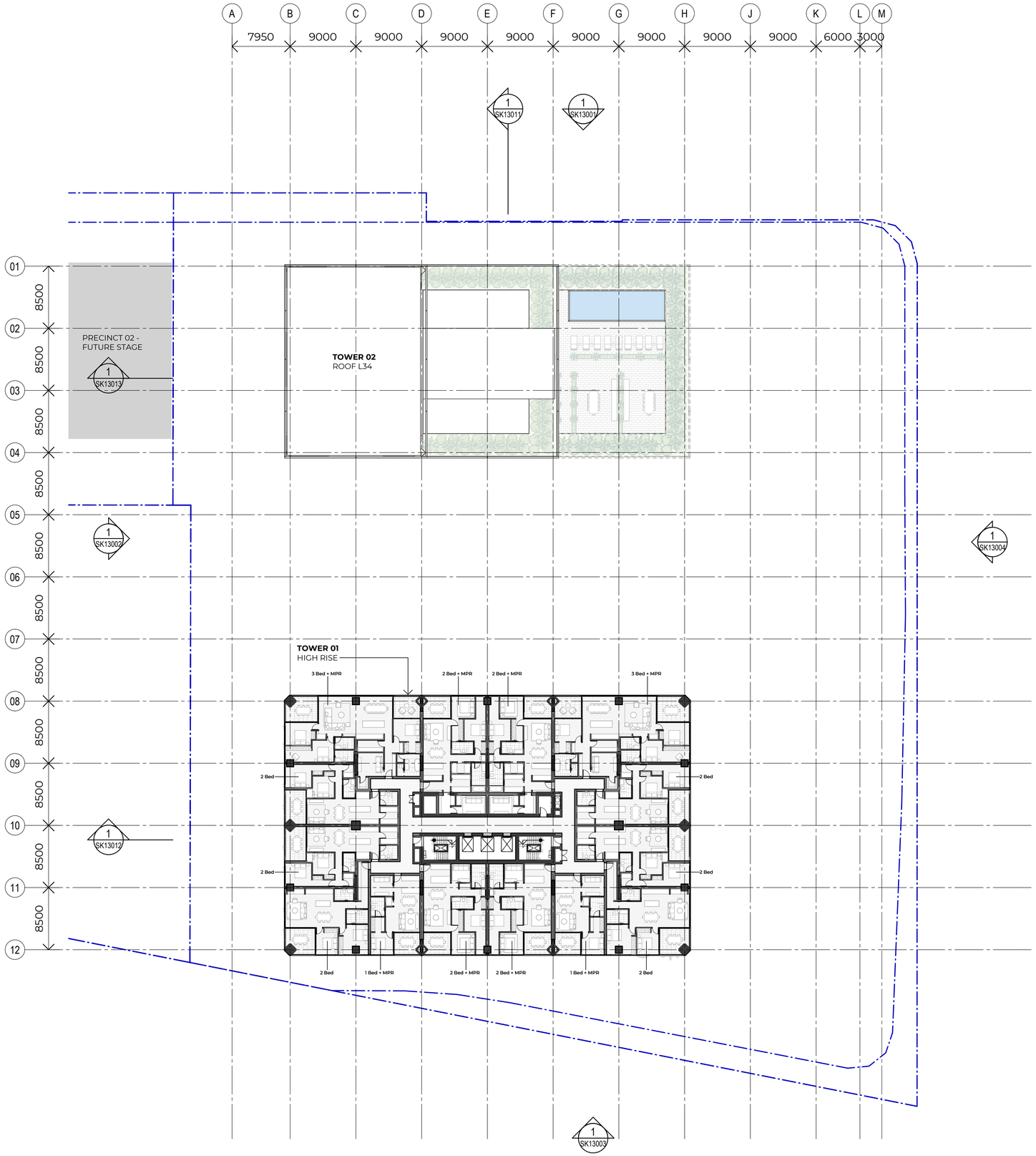
Scale
1 : 300

Sheet title
Overall Arrangement Plans
Level 36 - T1 Amenities

Sheet number
SK12036

Revision
B

Status
For Information



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 300

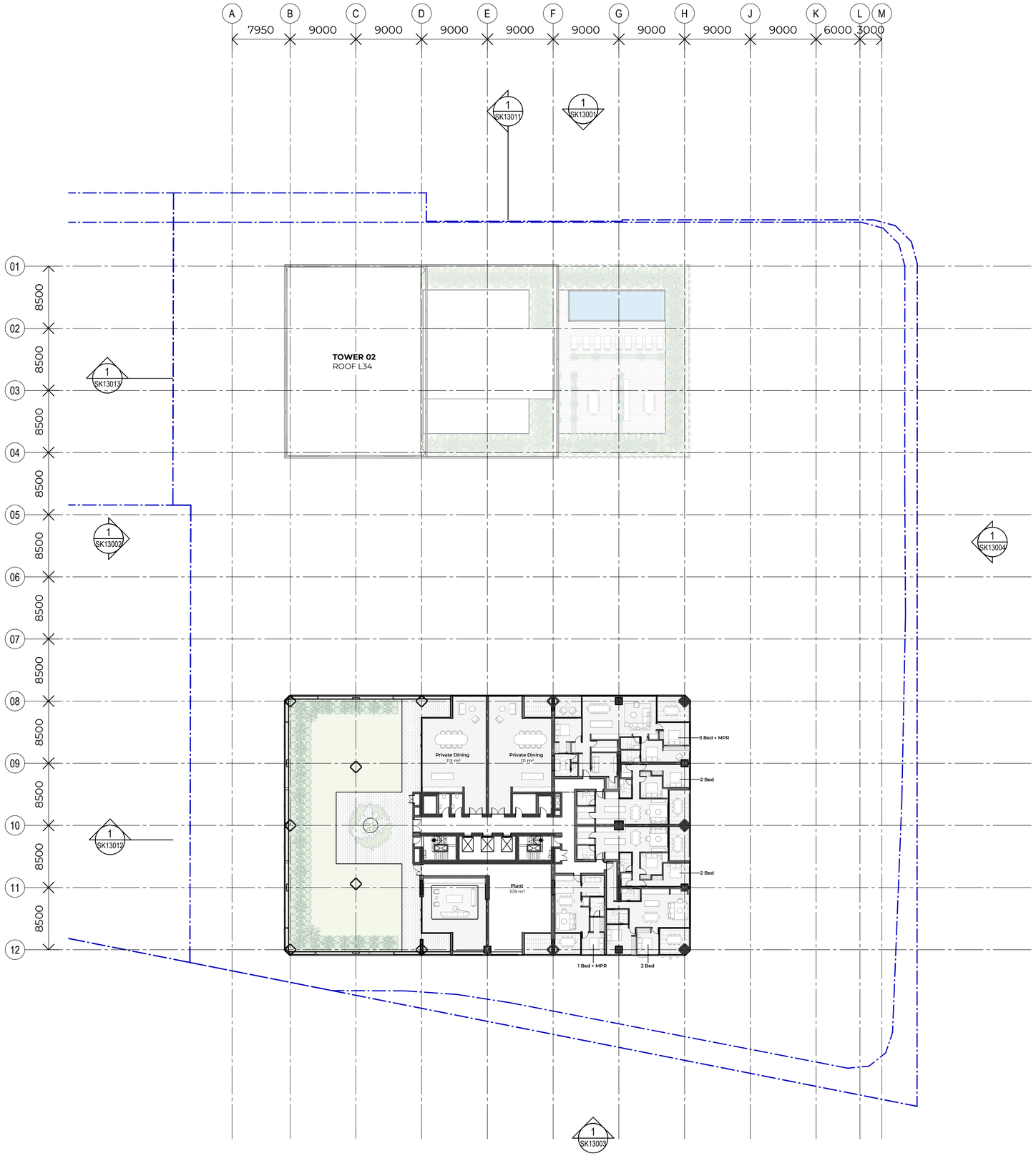
Sheet title
Overall Arrangement Plans
Level 37 - T1 High Rise

Sheet number
SK12037

Revision
B

Status
For Information

Date generated 30/04/2026 5:31:53 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

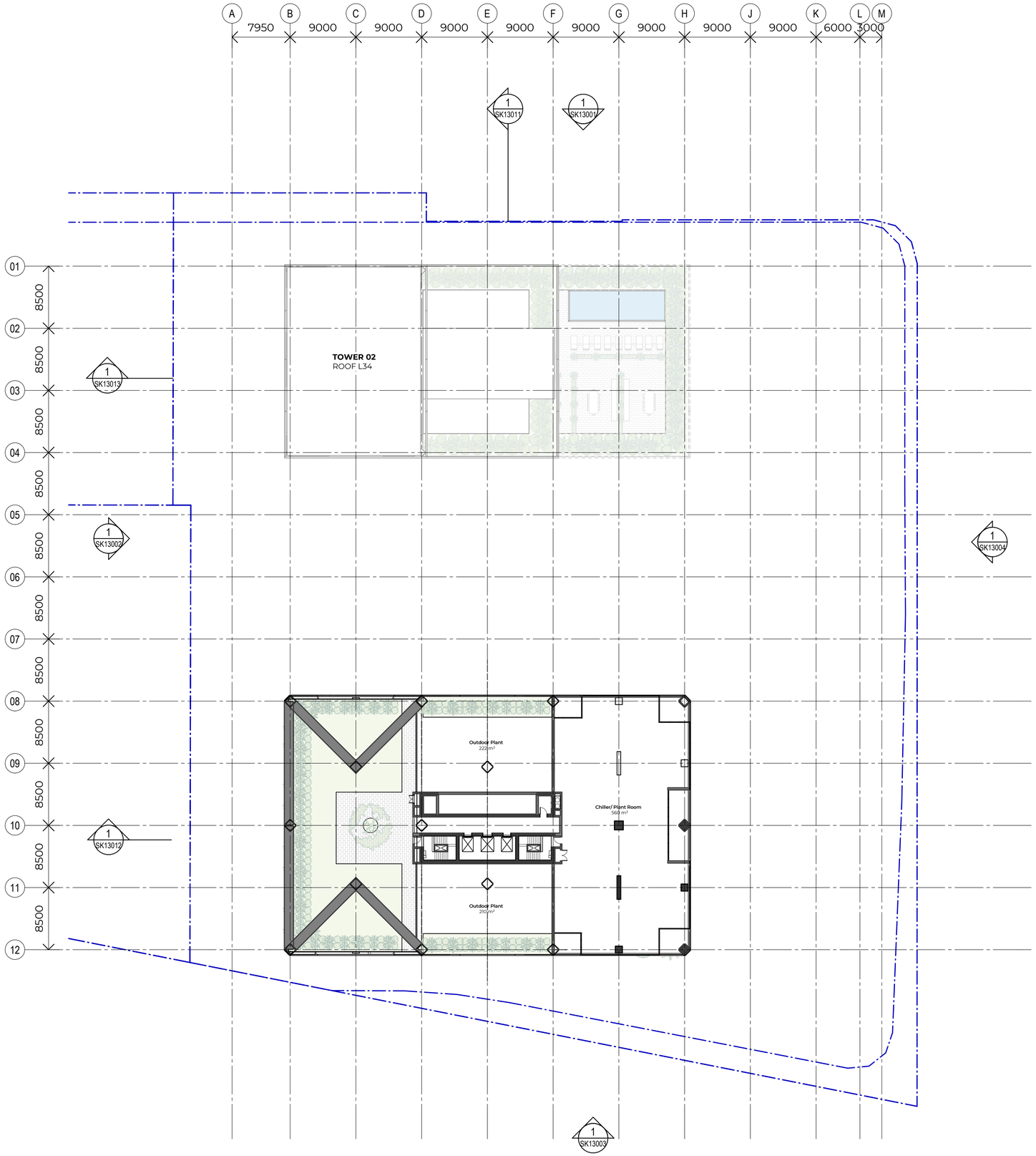
Sheet title
Overall Arrangement Plans
Level 49 - T1 Amenities

Sheet number
SK12049

Revision
B

Status
For Information

Date generated 30/04/2026 5:32:21 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 300

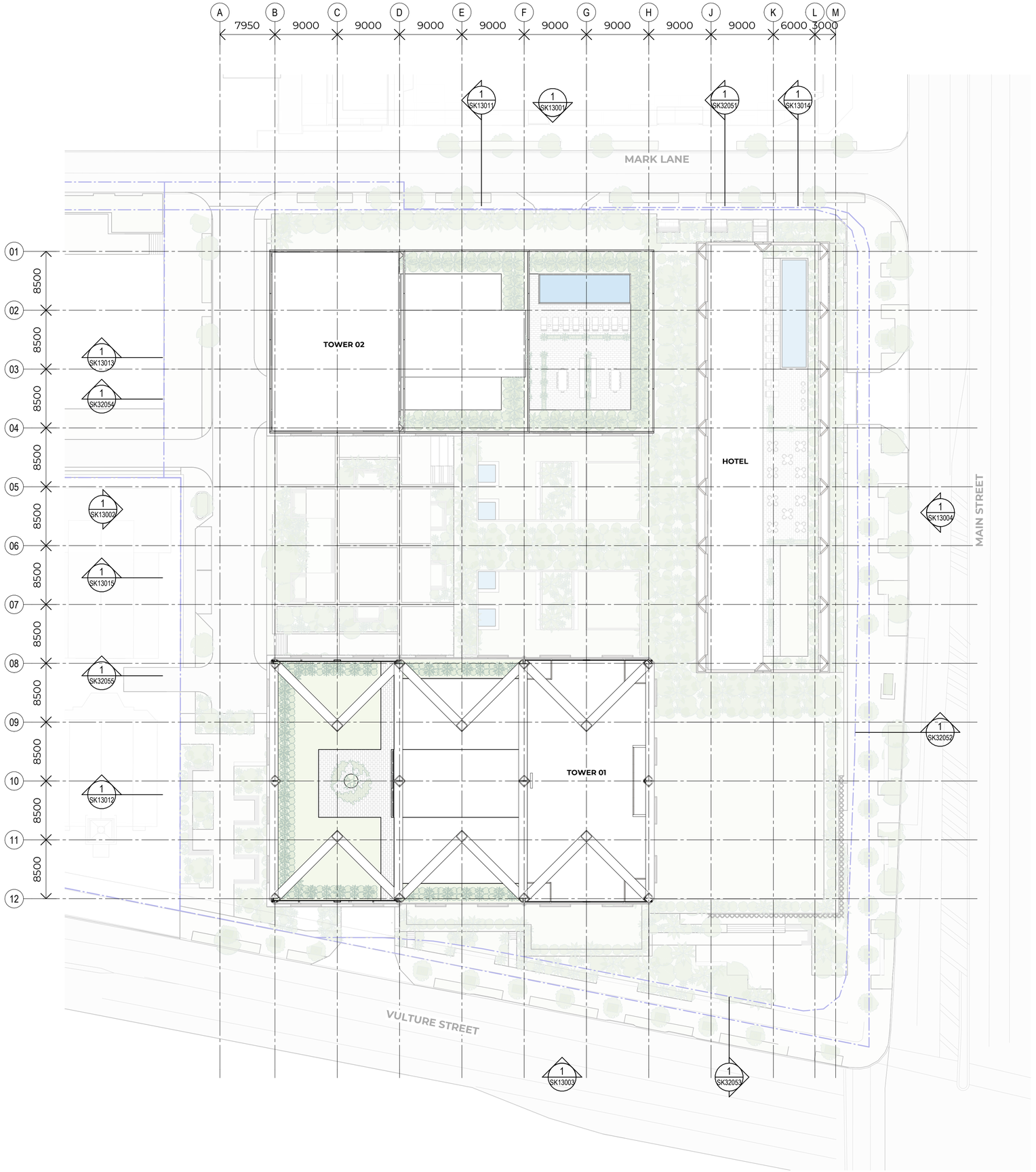
Sheet title
Overall Arrangement Plans
Level 50 - T1 Roof Plant

Sheet number
SK12050

Revision
B

Status
For Information

Date generated 30/04/2026 5:32:52 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 300

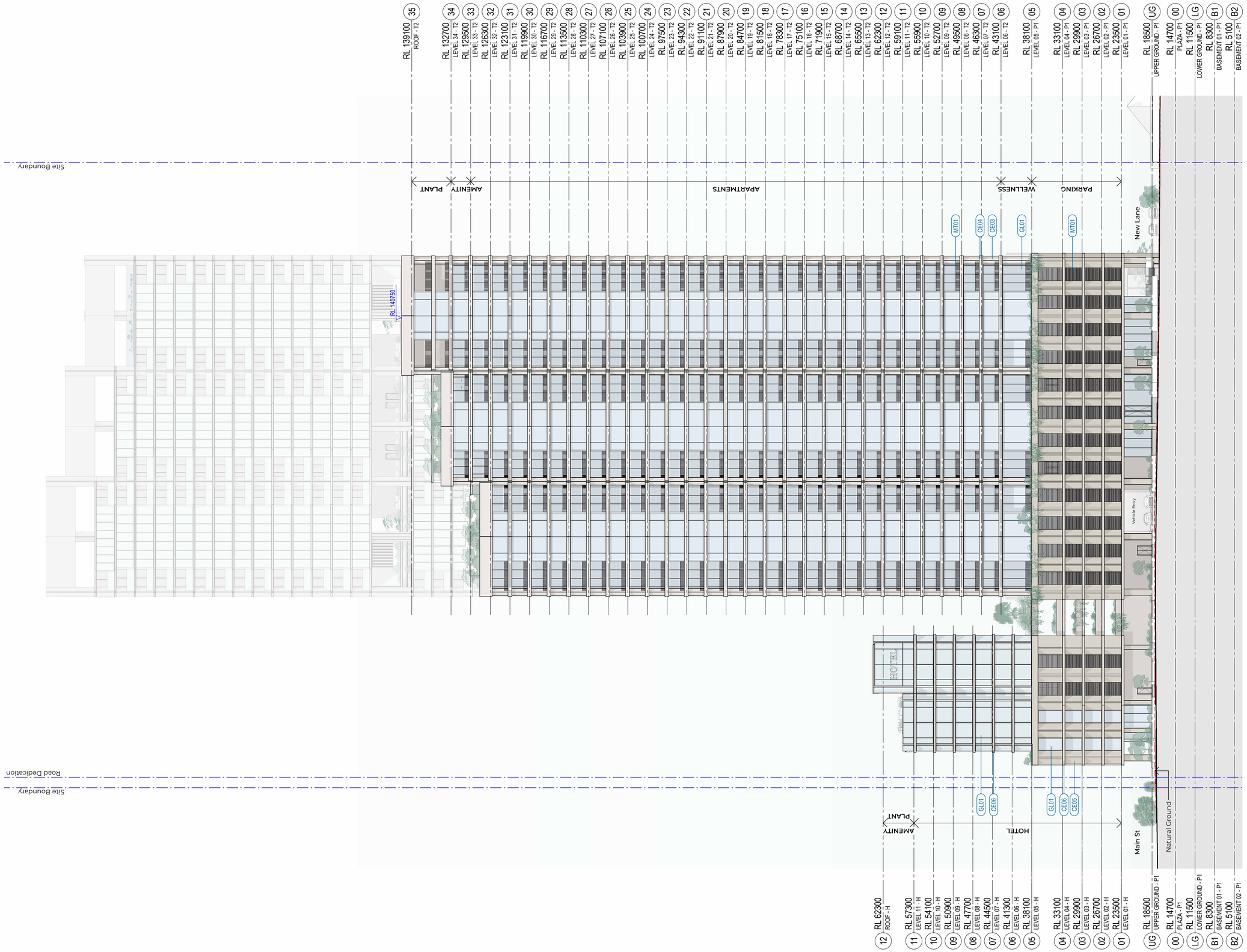
Sheet title
Overall Arrangement Plans
Roof Plan

Sheet number
SK12051

Revision
B

Status
For Information

Date generated 30/04/2026 5:34:32 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Materials Legend

CE01	Textured Concrete - Tower 01
CE02	Smooth Concrete - Tower 01
CE03	Textured Concrete - Tower 02
CE04	Smooth Concrete - Tower 02
CE05	Textured Concrete - Podium&Hotel
CE06	Smooth Concrete - Podium&Hotel
MT01	Metal Finish
MT02	Screen
GL01	Glass

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	As indicated

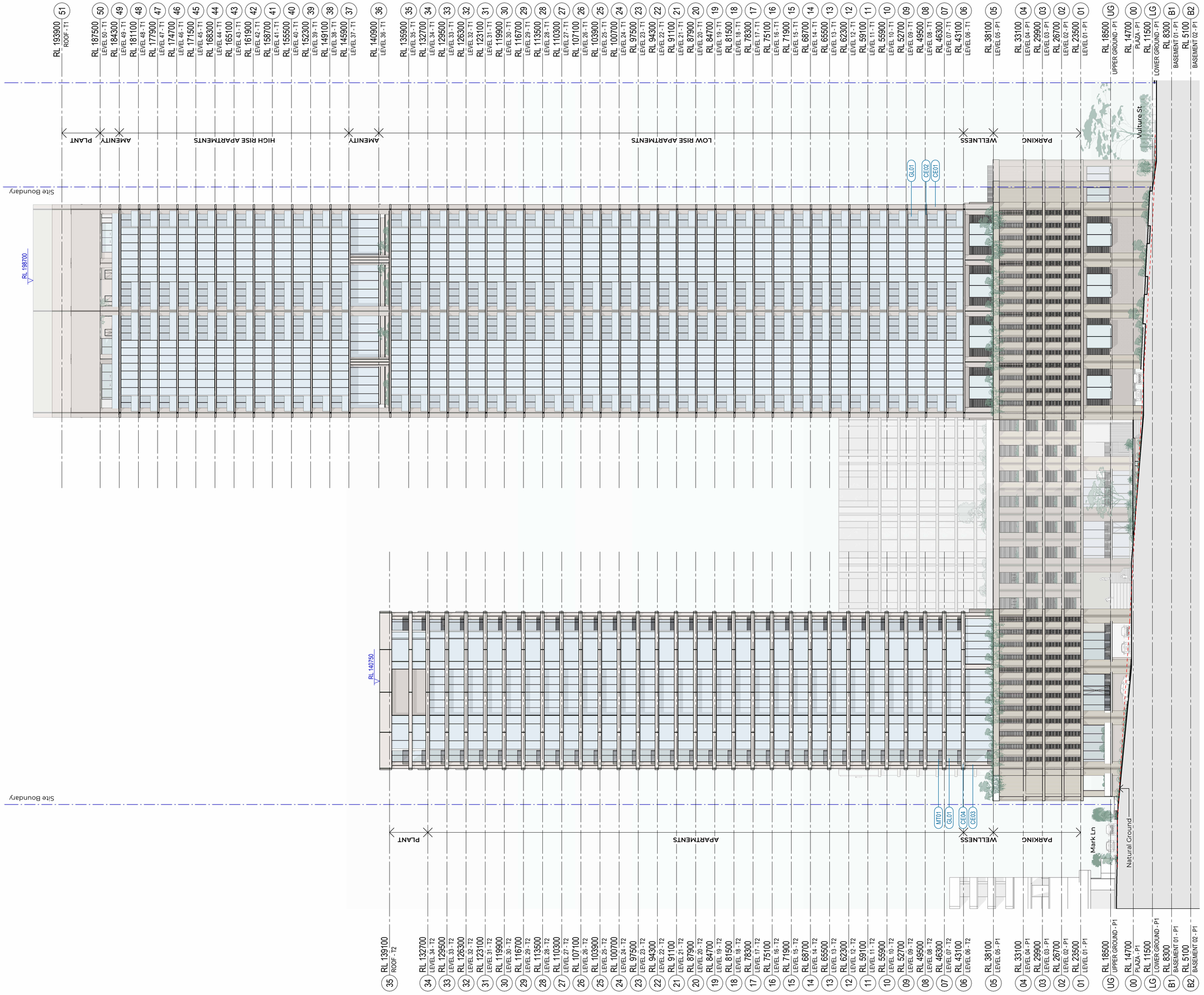
Sheet title
Overall Arrangement Elevations
North (Mark Ln)

Sheet number
SK13001

Revision
B

Status
For Information

Date generated 30/04/2026 4:53:19 PM



Date generated 30/04/2026 4:55:10 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Materials Legend

CE01	Textured Concrete - Tower 01
CE02	Smooth Concrete - Tower 01
CE03	Textured Concrete - Tower 02
CE04	Smooth Concrete - Tower 02
CE05	Textured Concrete - Podium&Hotel
CE06	Smooth Concrete - Podium&Hotel
MT01	Metal Finish
MT02	Screen
GL01	Glass

Project
Mark Lane Stage 1A and Precinct

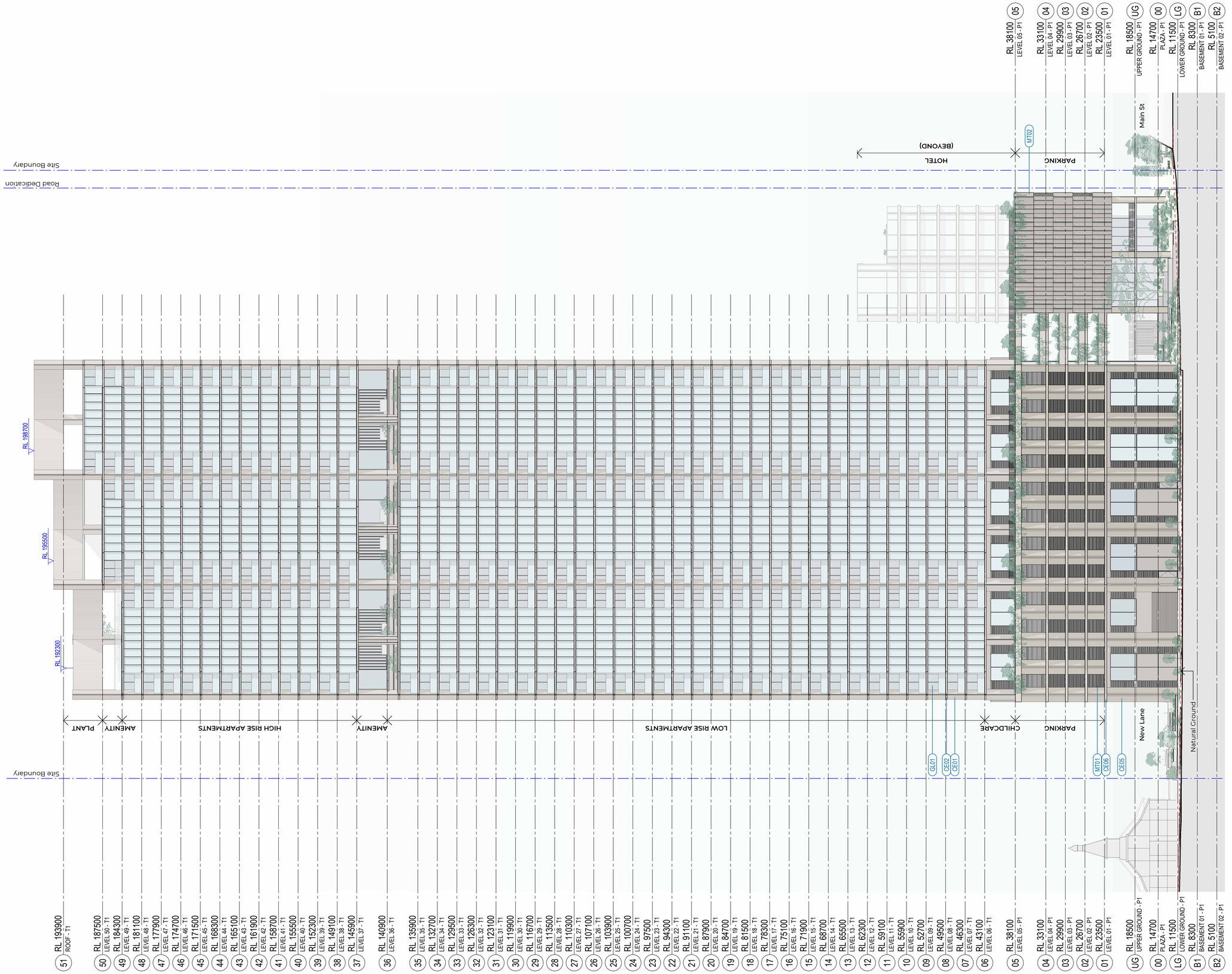
Client
Philip Usher Constructions

Issuer
WOODS BAGOT

Project number 150740
Size check 25mm
Checked PL
Approved DL
Sheet size A1
Scale As indicated

Sheet title
Overall Arrangement Elevations
West (New Lane)

Sheet number **SK13002**
Revision B
Status For Information



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Materials Legend

CE01	Textured Concrete - Tower 01
CE02	Smooth Concrete - Tower 01
CE03	Textured Concrete - Tower 02
CE04	Smooth Concrete - Tower 02
CE05	Textured Concrete - Podium&Hotel
CE06	Smooth Concrete - Podium&Hotel
MT01	Metal Finish
MT02	Screen
GL01	Glass

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	As indicated

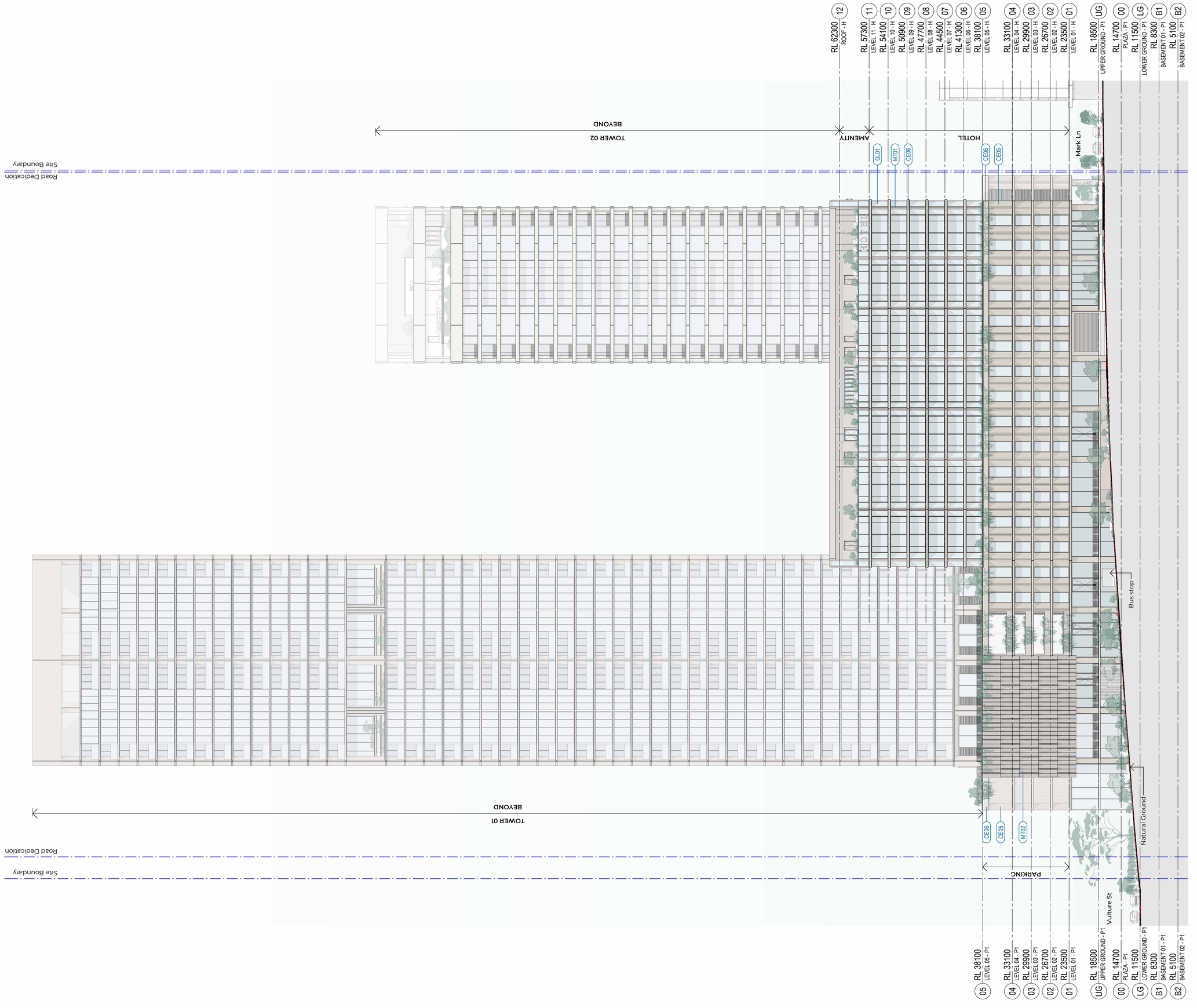
Sheet title
Overall Arrangement Elevations
South (Vulture St)

Sheet number
SK13003

Revision
B

Status
For Information

Date generated 30/04/2026 4:56:26 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Materials Legend

CE01	Textured Concrete - Tower 01
CE02	Smooth Concrete - Tower 01
CE03	Textured Concrete - Tower 02
CE04	Smooth Concrete - Tower 02
CE05	Textured Concrete - Podium&Hotel
CE06	Smooth Concrete - Podium&Hotel
MT01	Metal Finish
MT02	Screen
GL01	Glass

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

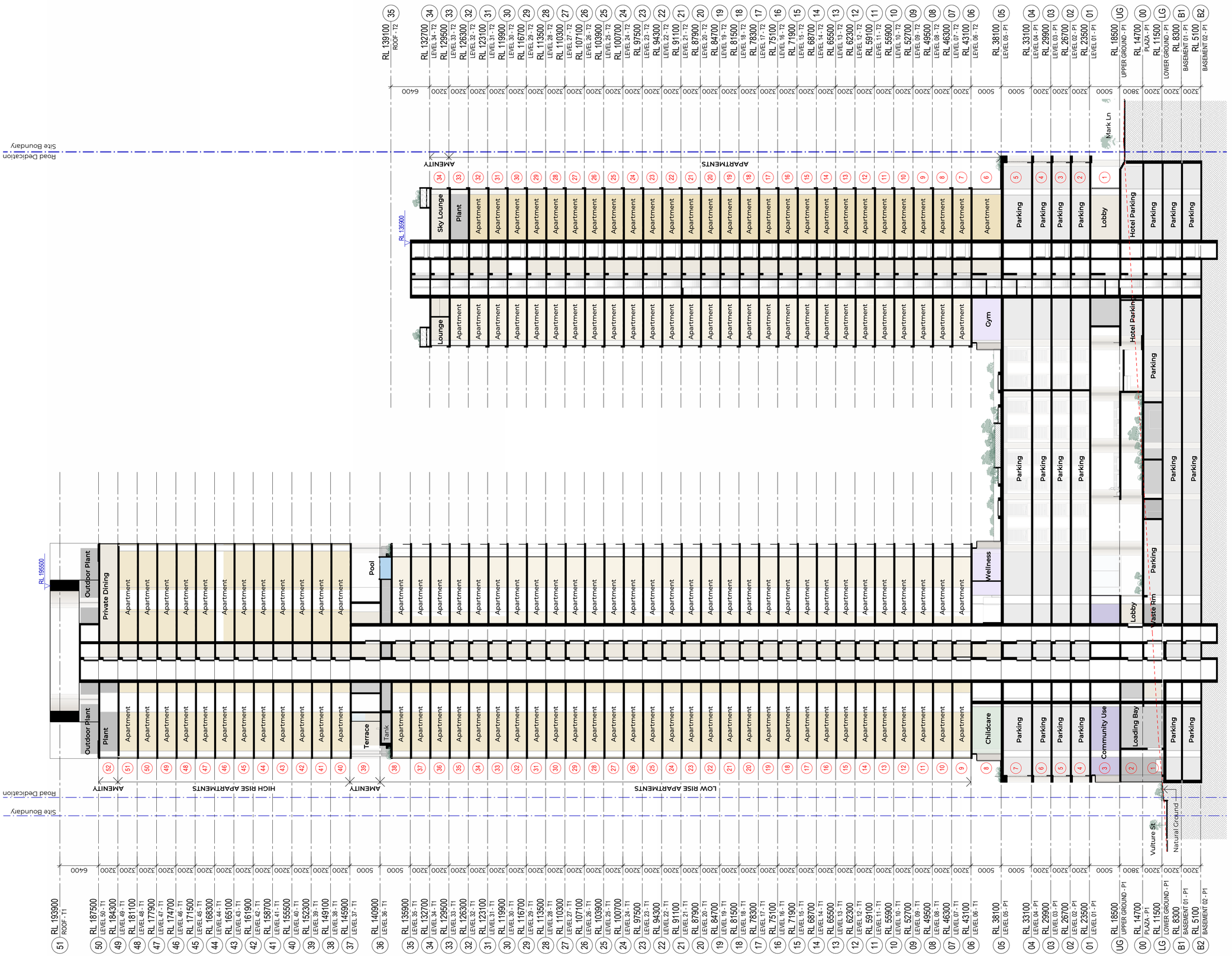
Issuer
WOODS BAGOT

Project number 150740
Size check 25mm
Checked PL
Approved DL
Sheet size A1
Scale As indicated

Sheet title
Overall Arrangement Elevations
East (Main St)

Sheet number **SK13004**
Revision B
Status
For Information

Date generated 30/04/2026 4:57:39 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W–B
WOODS BAGOT

Project number	Size check
150740	25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

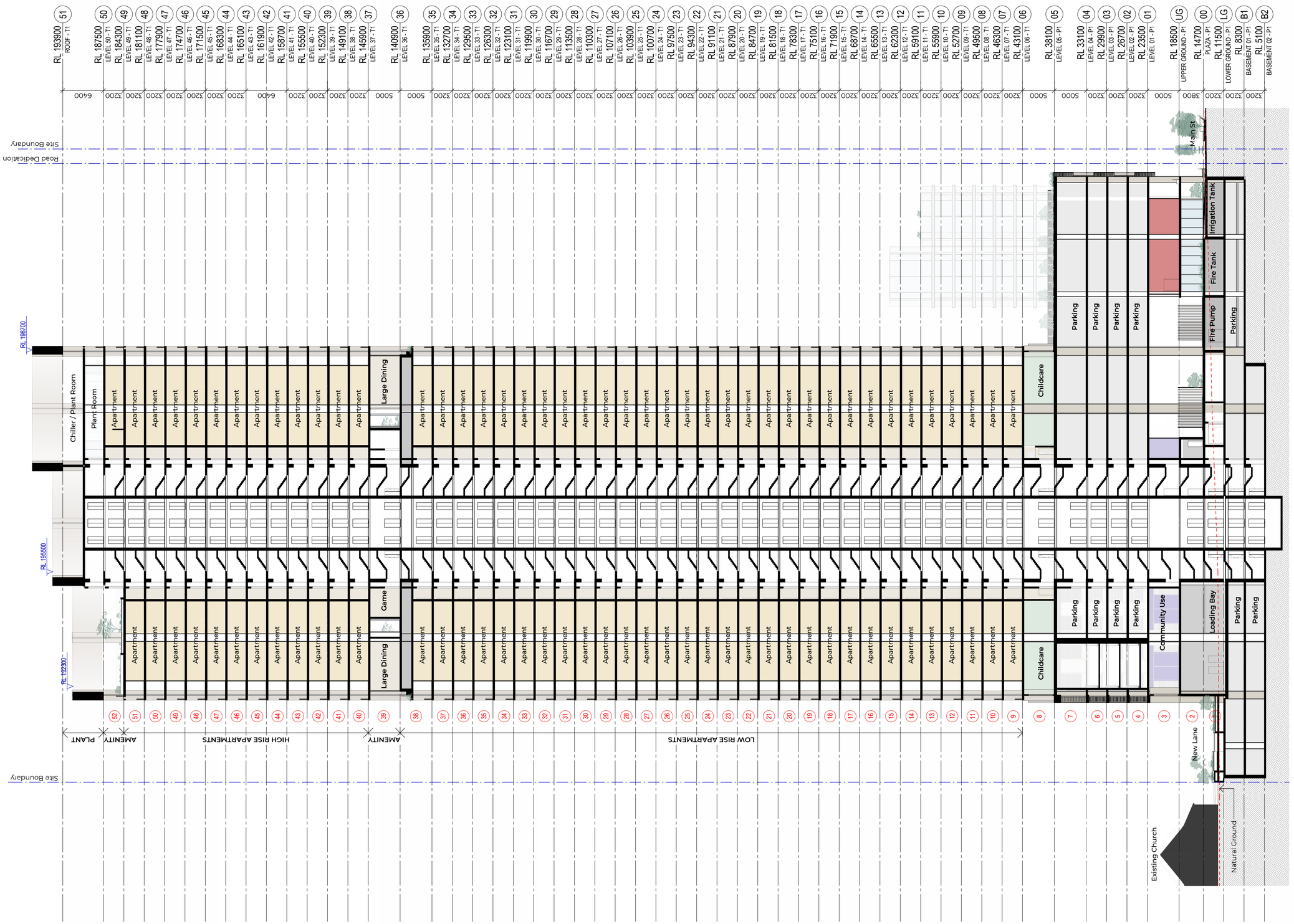
Sheet title
Overall Arrangement Sections
Sheet 01

Sheet number
SK13011

Revision
B

Status

Date generated 30/04/2026 9:35:03 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W–B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

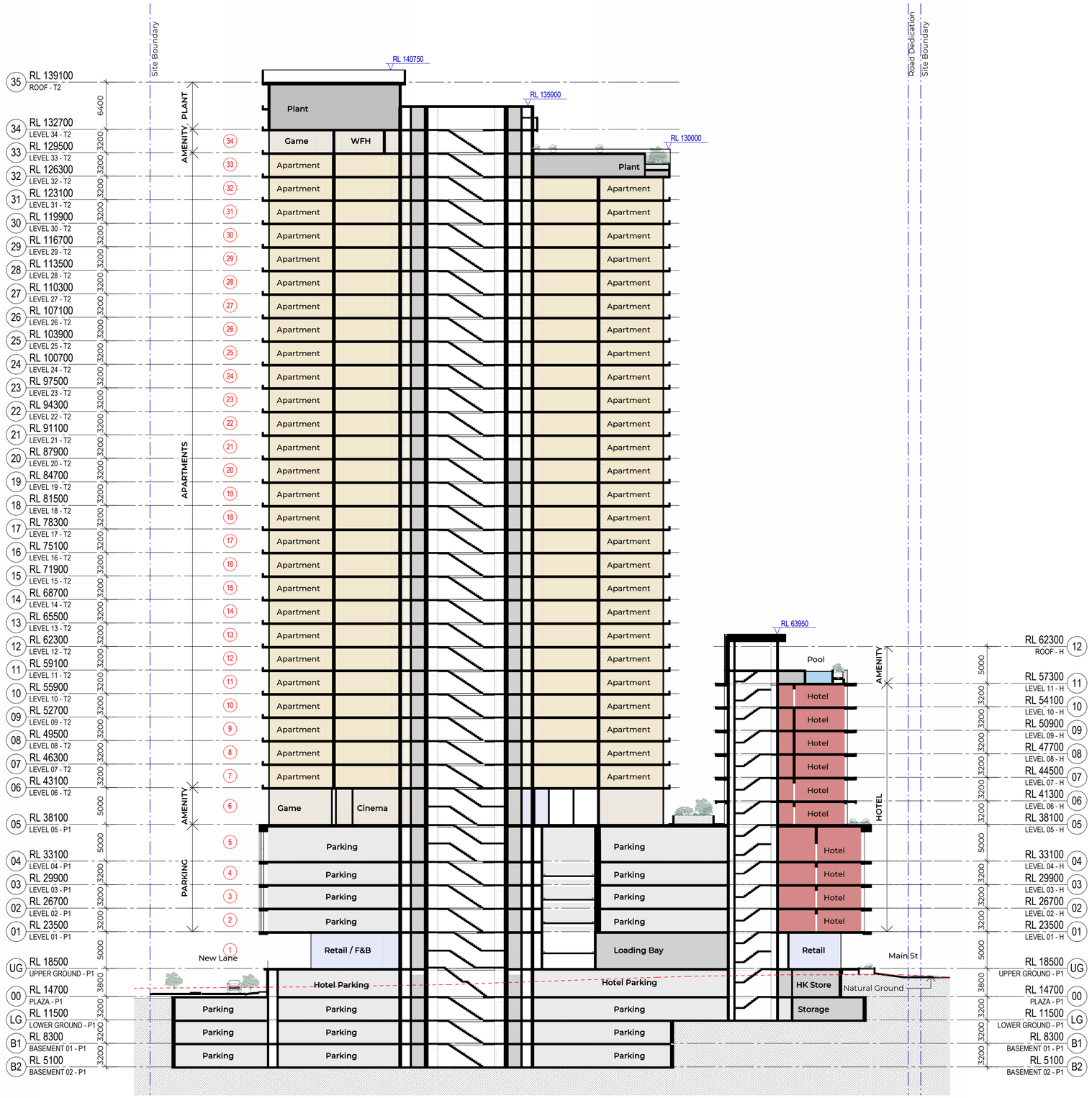
Sheet title
Overall Arrangement
Sections
Sheet 02

Sheet number
SK13012

Revision
B

Status

Date generated 30/04/2026 9:37:12 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number	Size check
150740	25mm

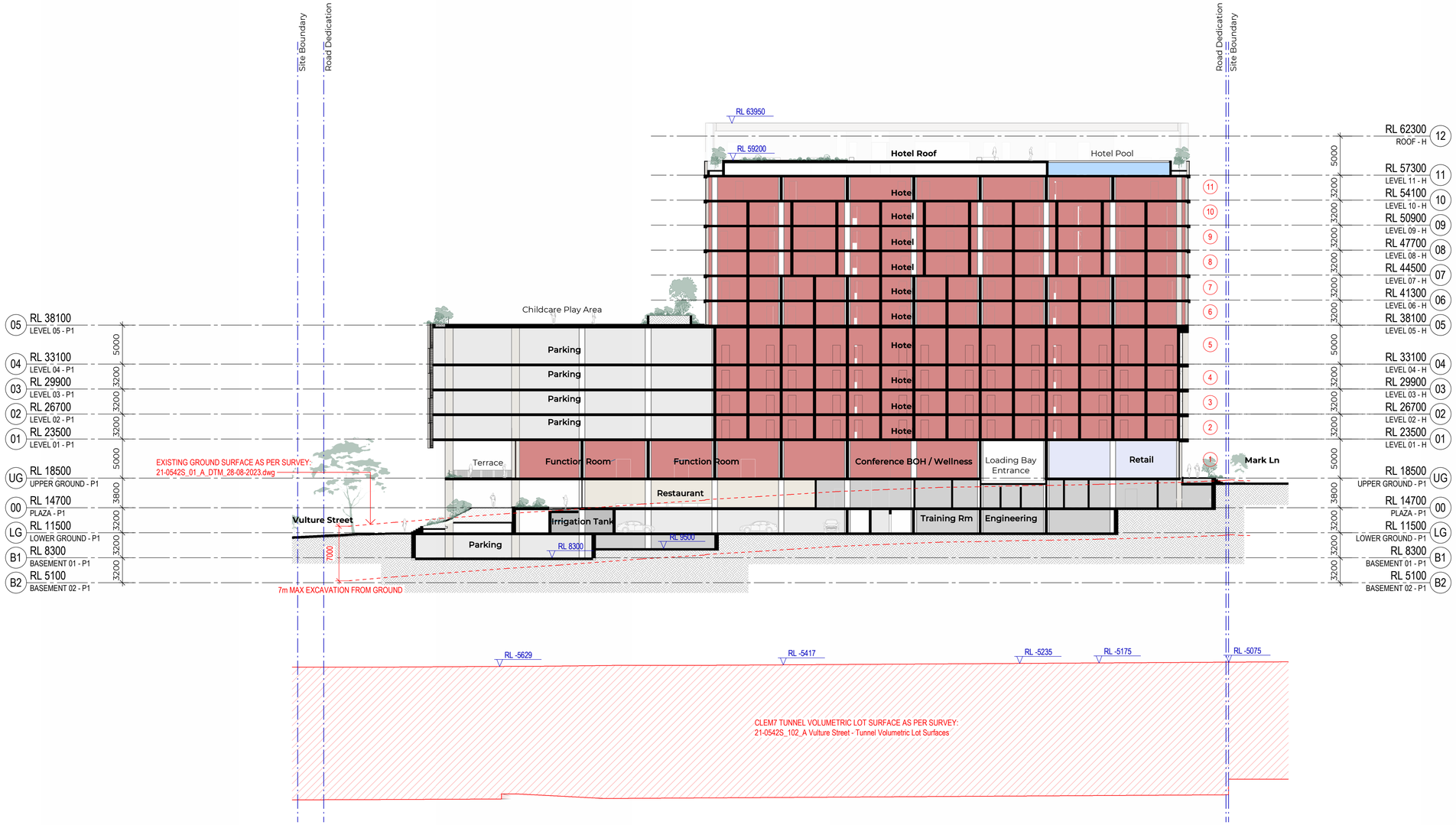
Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

Sheet title
Overall Arrangement Sections Sheet 03

Sheet number	Revision
SK13013	B

Status

Date generated 30/04/2026 9:40:23 PM



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

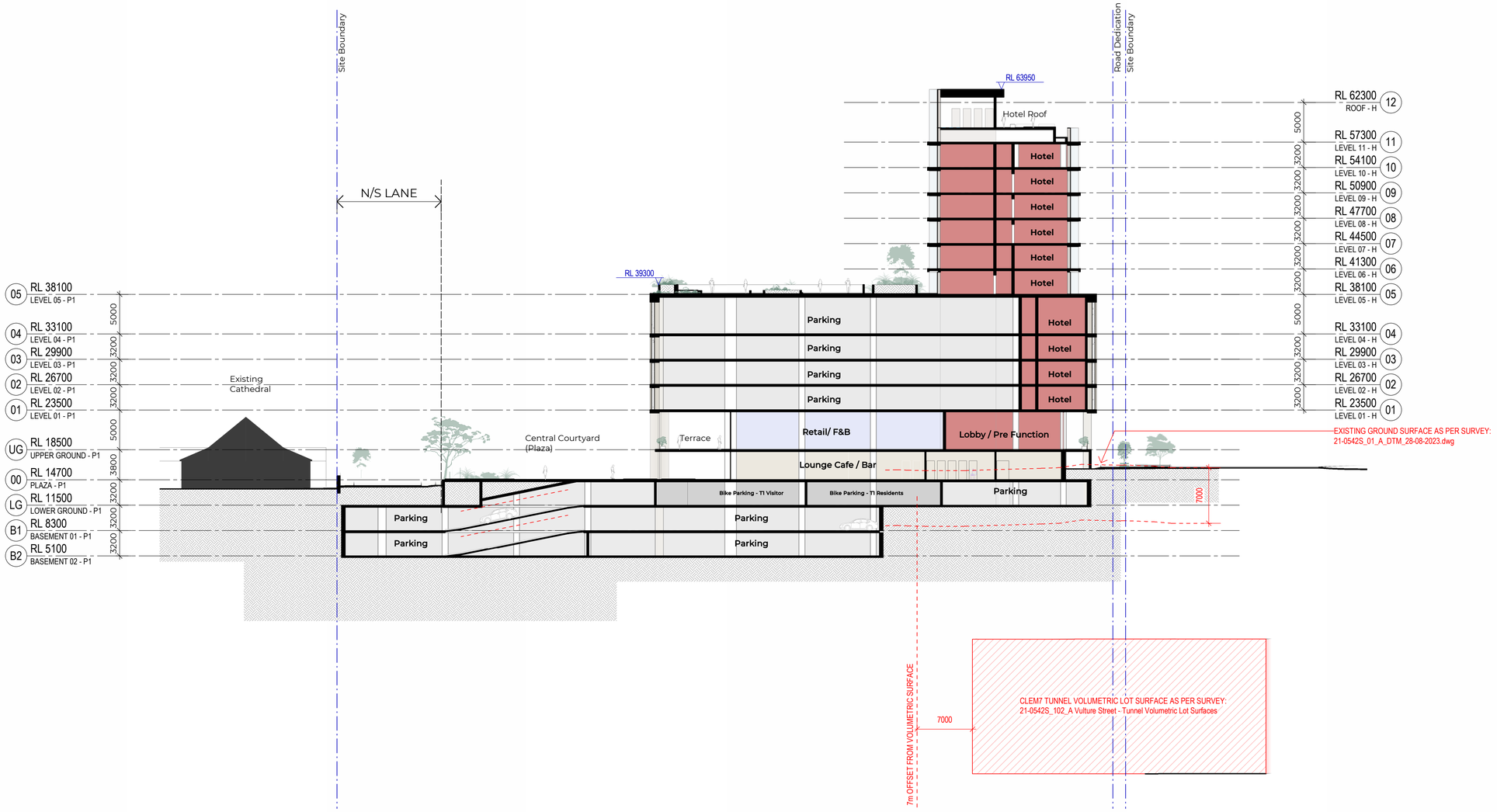
Sheet title
Overall Arrangement
Sections
Sheet 04

Sheet number
SK13014

Revision
B

Status

Date generated 30/04/2026 9:42:00 PM



Date generated 30/04/2026 9:45:02 PM

Recent revision history

#	Status	Description	Date
A		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

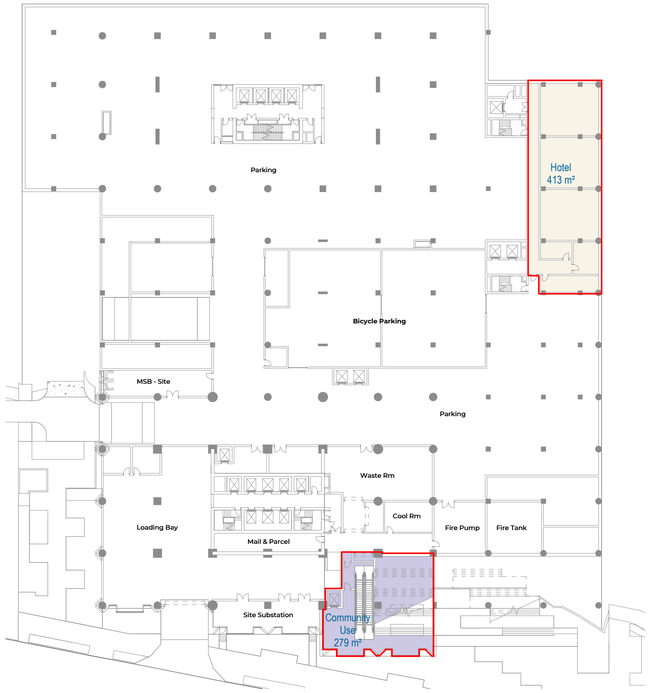
Project number	Size check
150740	25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 300

Sheet title
Overall Arrangement
Sections
Sheet 05

Sheet number	Revision
SK13015	A

Status



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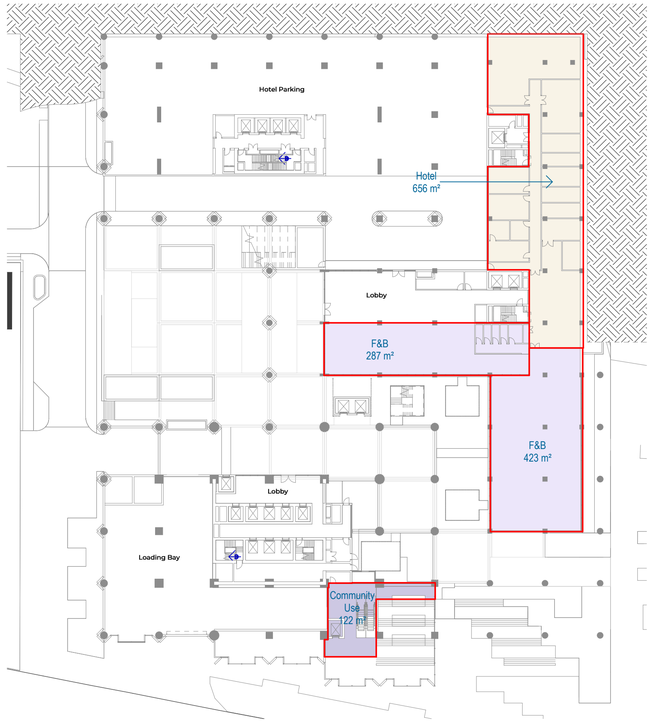
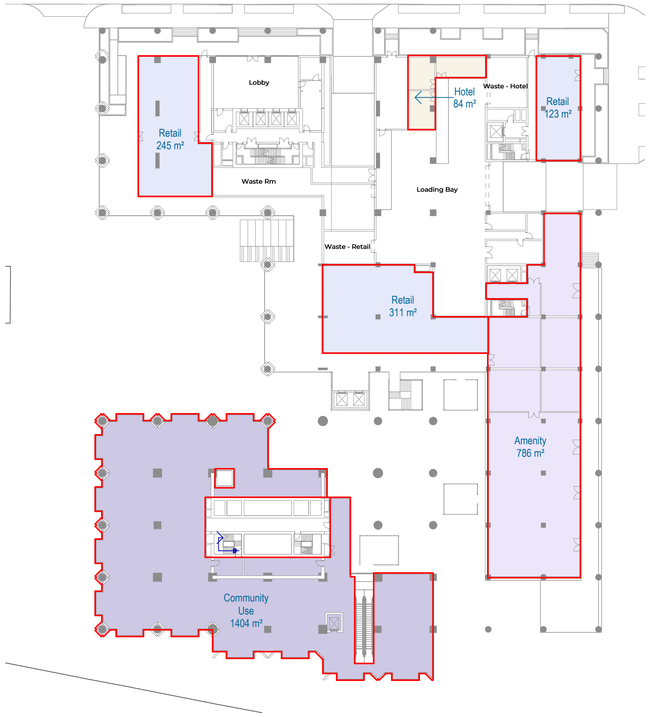
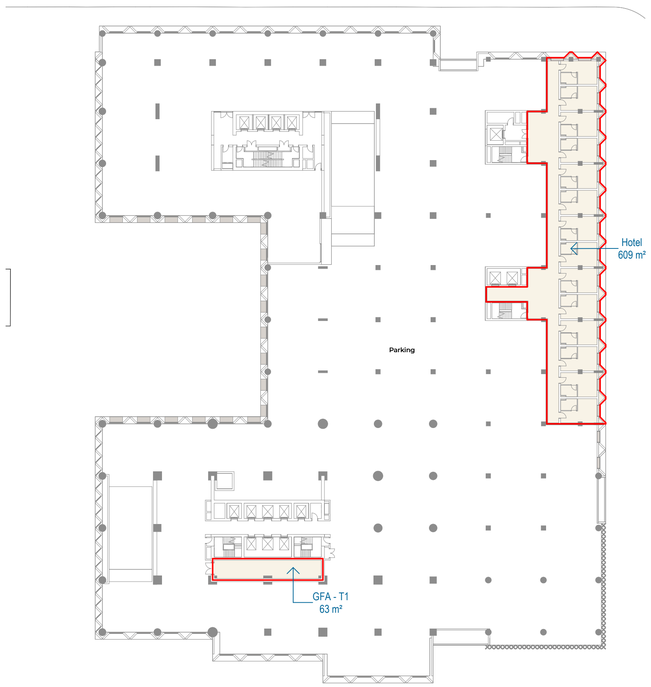
SCALE 1 : 500



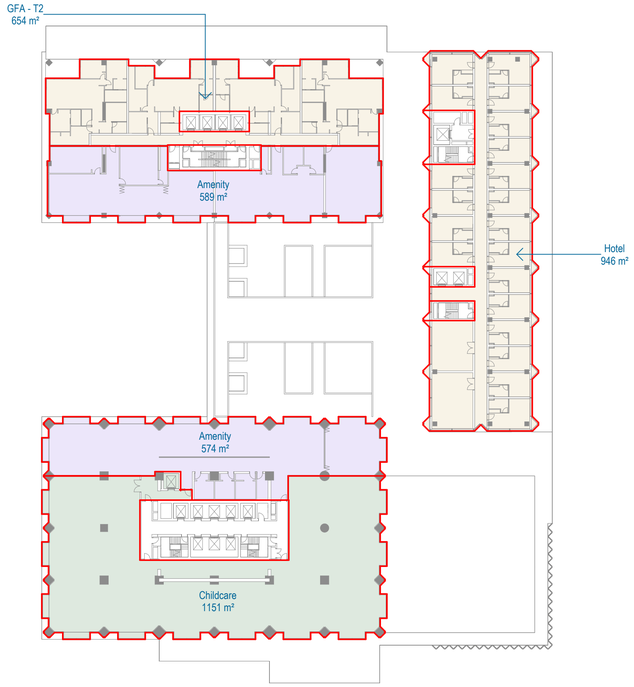
2 PLAZA - GFA
SCALE 1 : 500



3 UPPER GROUND - GFA
SCALE 1 : 500



4 LEVEL 01 to 04 - GFA
SCALE 1 : 500



5 LEVEL 05 - GFA
SCALE 1 : 500

Date generated 30/04/2026 5:00:53 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W–B
WOODS BAGOT

Project number
150740

Size check
25mm

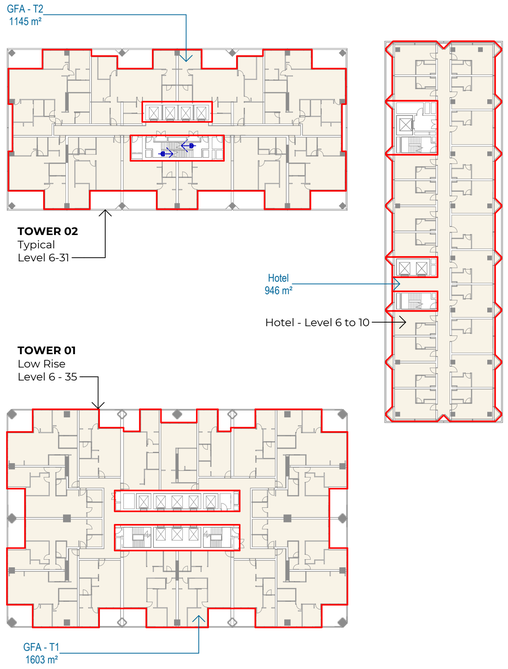
Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 500

Sheet title
Overall Arrangement
Area Plans
GFA - Sheet 01

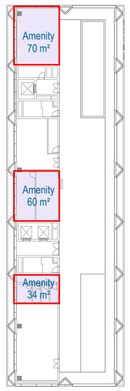
Sheet number
SK18101

Revision
B

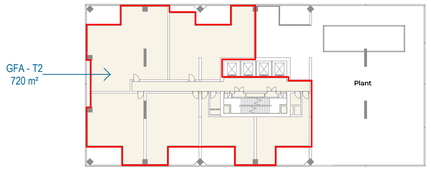
Status
For Information



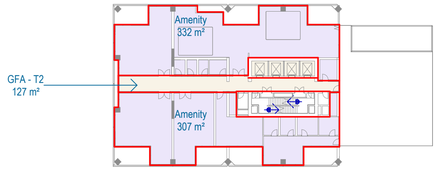
1 TOWER TYPICAL FLOOR - GFA
SCALE 1 : 500



2 LEVEL 11 - HOTEL GFA
SCALE 1 : 500



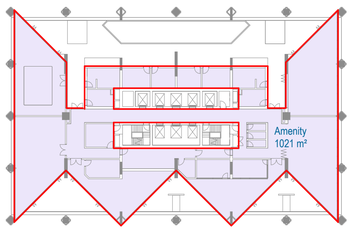
3 LEVEL 32 - T2 GFA
SCALE 1 : 500



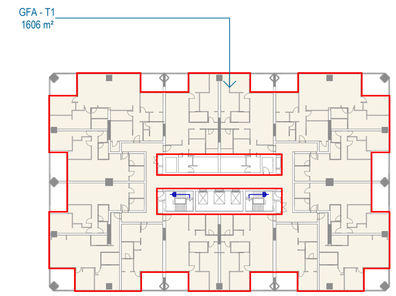
4 LEVEL 33 - T2 AMENITY GFA
SCALE 1 : 500

GFA

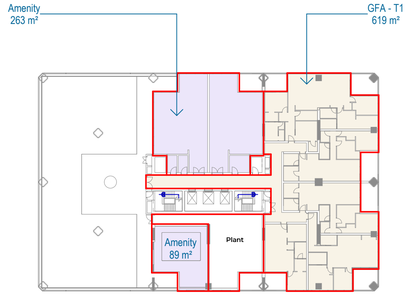
Level	Name	Area	Floor Plate	Total
Amenity				
UPPER GROUND - P1	Amenity	786 m²	1	786 m²
LEVEL 05 - P1	Amenity	574 m²	1	574 m²
LEVEL 05 - P1	Amenity	589 m²	1	589 m²
LEVEL 11 - H	Amenity	34 m²	1	34 m²
LEVEL 11 - H	Amenity	60 m²	1	60 m²
LEVEL 11 - H	Amenity	70 m²	1	70 m²
LEVEL 33 - T2	Amenity	307 m²	1	307 m²
LEVEL 33 - T2	Amenity	332 m²	1	332 m²
LEVEL 36 - T1	Amenity	1021 m²	1	1021 m²
LEVEL 49 - T1	Amenity	89 m²	1	89 m²
LEVEL 49 - T1	Amenity	263 m²	1	263 m²
		4127 m²		4127 m²
Childcare				
LEVEL 05 - P1	Childcare	1151 m²	1	1151 m²
		1151 m²		1151 m²
Community Use				
LOWER GROUND - P1	Community Use	279 m²	1	279 m²
PLAZA - P1	Community Use	122 m²	1	122 m²
UPPER GROUND - P1	Community Use	1404 m²	1	1404 m²
		1805 m²		1805 m²
F&B				
PLAZA - P1	F&B	287 m²	1	287 m²
PLAZA - P1	F&B	423 m²	1	423 m²
		711 m²		711 m²
GFA - T1				
LEVEL 01 - P1	GFA - T1	63 m²	1	63 m²
LEVEL 06 - T1	GFA - T1	1603 m²	30	48100 m²
LEVEL 37 - T1	GFA - T1	1606 m²	12	19273 m²
LEVEL 49 - T1	GFA - T1	619 m²	1	619 m²
		3892 m²		68056 m²
GFA - T2				
LEVEL 05 - P1	GFA - T2	654 m²	1	654 m²
LEVEL 06 - T1	GFA - T2	1145 m²	26	29777 m²
LEVEL 32 - T2	GFA - T2	720 m²	1	720 m²
LEVEL 33 - T2	GFA - T2	127 m²	1	127 m²
		2646 m²		31278 m²
Hotel				
LOWER GROUND - P1	Hotel	413 m²	1	413 m²
PLAZA - P1	Hotel	656 m²	1	656 m²
UPPER GROUND - P1	Hotel	84 m²	1	84 m²
LEVEL 01 - P1	Hotel	609 m²	4	2437 m²
LEVEL 05 - P1	Hotel	946 m²	1	946 m²
LEVEL 06 - T1	Hotel	946 m²	5	4730 m²
		3654 m²		9266 m²
Retail				
UPPER GROUND - P1	Retail	123 m²	1	123 m²
UPPER GROUND - P1	Retail	245 m²	1	245 m²
UPPER GROUND - P1	Retail	311 m²	1	311 m²
		679 m²		679 m²
Grand total		18664 m²		117072 m²



5 T1 - LEVEL 36 - GFA
SCALE 1 : 500



6 T1 - LEVEL 37 to 48 - GFA
SCALE 1 : 500



7 T1 - LEVEL 49 - GFA
SCALE 1 : 500

Date generated 30/04/2026 5:01:02 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 500

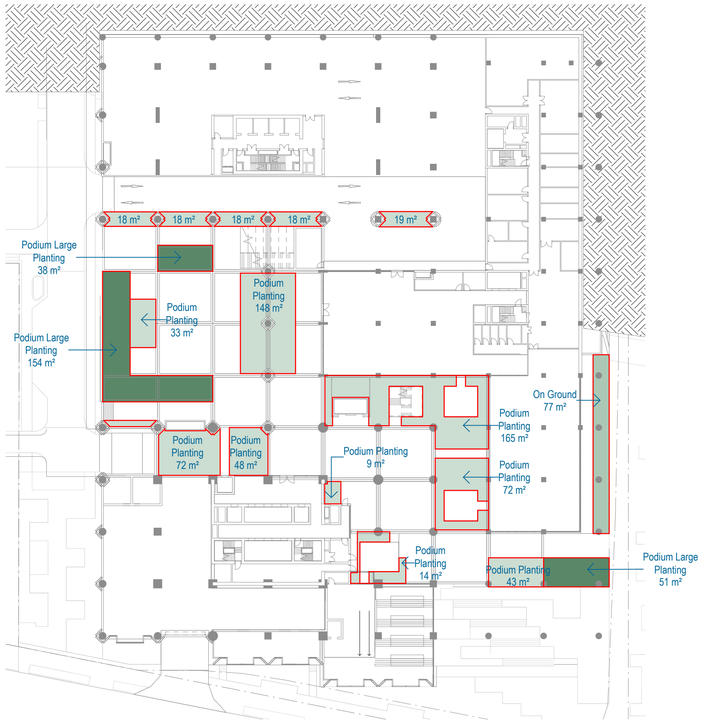
Sheet title
Overall Arrangement
Area Plans
GFA - Sheet 02

Sheet number
SK18102

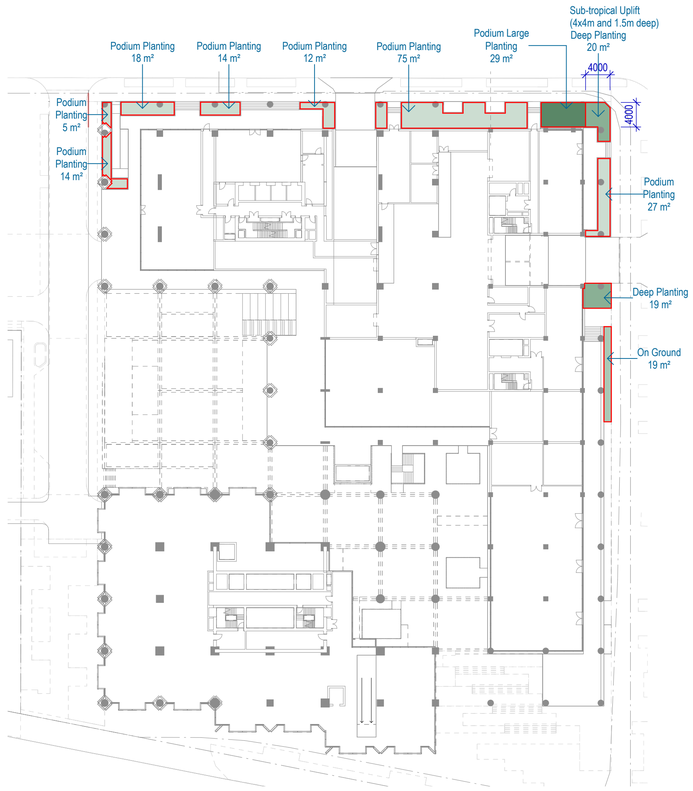
Revision
B

Status
For Information

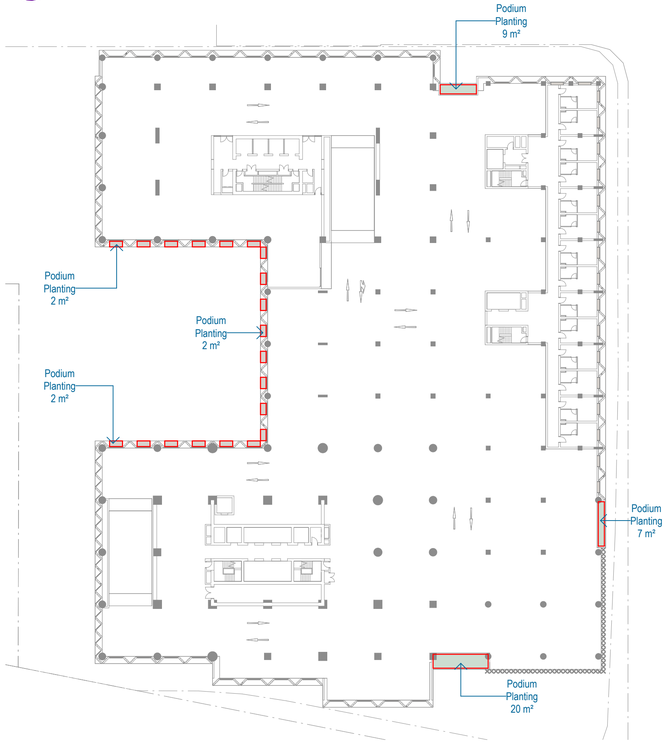
1 LOWER GROUND - LANDSCAPE
SCALE 1 : 500



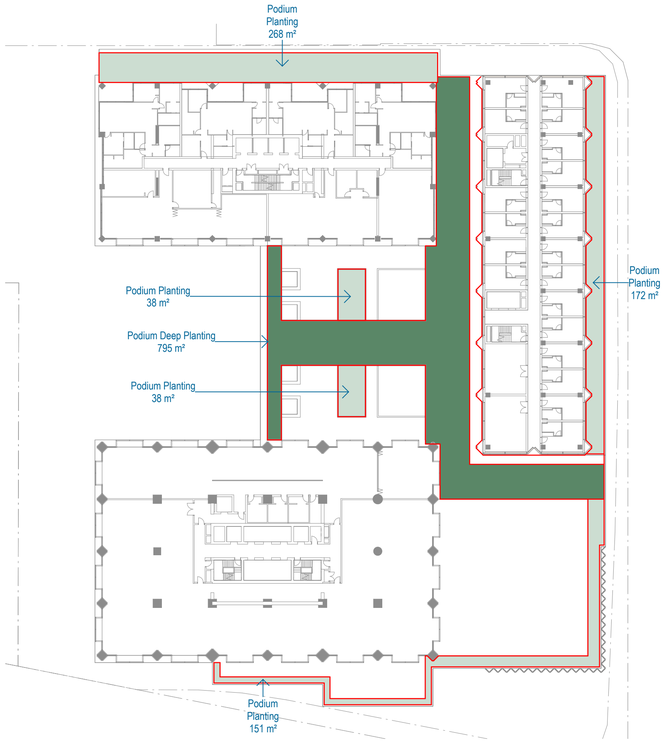
2 PLAZA - LANDSCAPE
SCALE 1 : 500



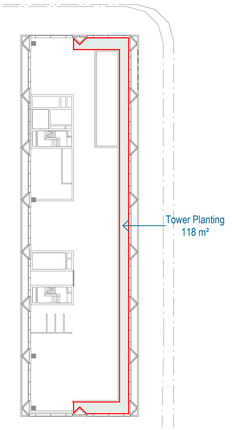
3 UPPER GROUND - LANDSCAPE
SCALE 1 : 500



4 LEVEL 01 to 04 - LANDSCAPE
SCALE 1 : 500



5 LEVEL 05 - LANDSCAPE
SCALE 1 : 500



6 LEVEL 11 - HOTEL ROOF
SCALE 1 : 500

Date generated 30/04/2026 5:01:12 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

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Do not scale drawings.

Landscape Legend

- Deep Planting
  1500mm min. soil depth
- *Podium Large Planting*
  1200mm depth (container planting)
- Podium / Tower Planting
  450mm soil depth (container planting)
- On Ground
  1000mm max. soil depth (above slab)

Note:
To be read in conjunction with Landscape Design report

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

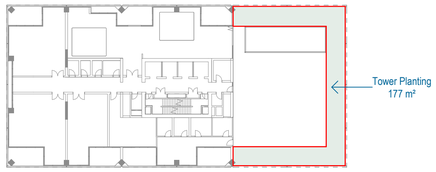
Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 500

Sheet title
Overall Arrangement
Area Plans
Landscape - Sheet 01

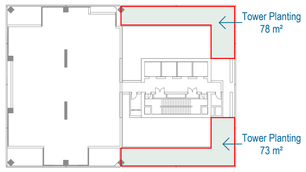
Sheet number
SK18111

Revision
B

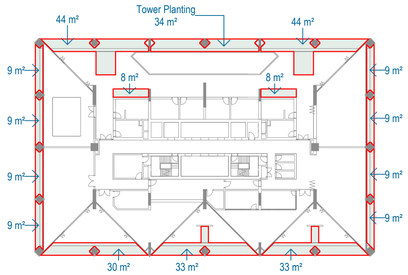
Status
For Information



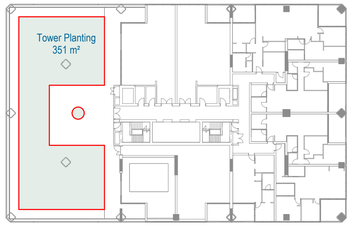
1 LEVEL 33 - T2 AMENITY
SCALE 1 : 500



2 LEVEL 34 - T2 ROOF PLANT
SCALE 1 : 500



3 LEVEL 36 - T1 AMENITY LANDSCAPE
SCALE 1 : 500



4 T1 - LEVEL 49 - LANDSCAPE
SCALE 1 : 500

Landscape Coverage

	On Ground Planing (m2)	Deep Planting (m2)	Podium Planting (m2)	Podium Large Planting (m2)	Tower Planting (m2)	**Total**
Level 49 - Tower 1 Roof Amenity					351	351
Level 36 - Tower 1 Amenity					306	306
Level 34 - Tower 2 Rooftop Plant					151	151
Level 33 - Tower 2 Amenity					177	177
Level 11 - Hotel Amenity (Roof)					118	118
Level 05 - Podium Top			667	795		1462
Level 04 - Podium			76			76
Level 03 - Podium			76			76
Level 02 - Podium			76			76
Level 01 - Podium			76			76
Upper Ground (Mark Lane)	19	39	145	29		232
Plaza	77		681	243		1001
Lower Ground (Vulture Street)	264	204		106		574
Total	**360**	**243**	**1797**	**1173**	**1103**	**4676**
Site Area (Pre-Dedication)						11,293
Percentage of Site (%)						**41.41%**

Date generated 30/04/2026 5:01:17 PM

Recent revision history

#	Status	Description	Date
A		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Landscape Legend

- Deep Planting
  1500mm min. soil depth
- *Podium Large Planting*
  1200mm depth (container planting)
- Podium / Tower Planting
  450mm soil depth (container planting)
- On Ground
  1000mm max. soil depth (above slab)

Note:
To be read in conjunction with Landscape Design report

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W–B
WOODS BAGOT

Project number
150740

Size check
25mm

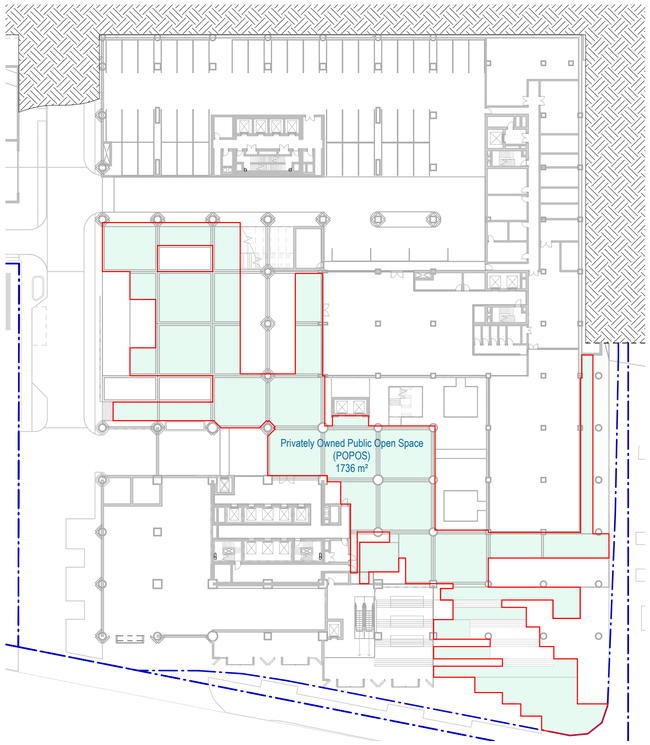
Checked	Approved	Sheet size	Scale
PL	DL	A1	As indicated

Sheet title
Overall Arrangement
Area Plans
Landscape - Sheet 02

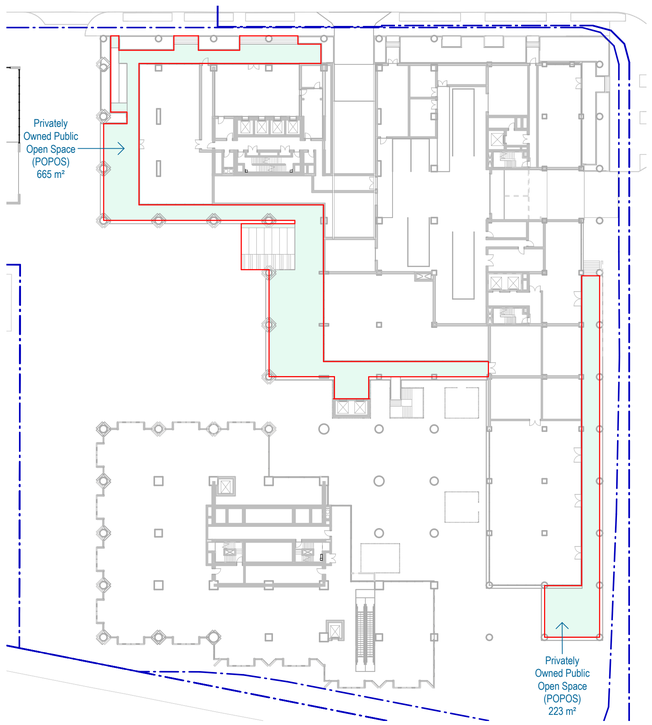
Sheet number
SK18112

Revision
A

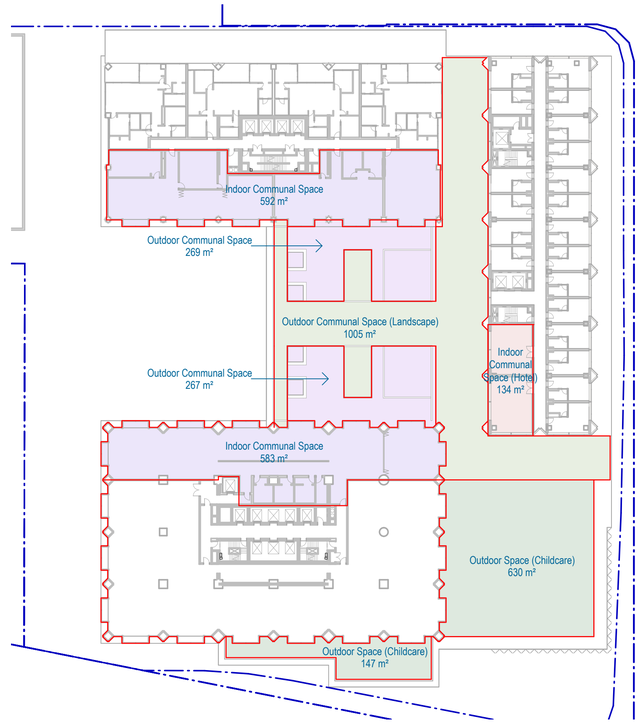
Status
For Information



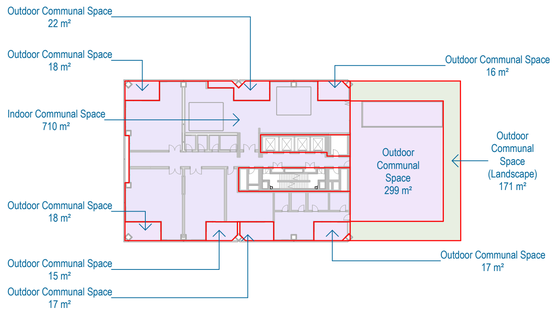
1 PLAZA - COMMUNAL SPACE
SCALE 1 : 500



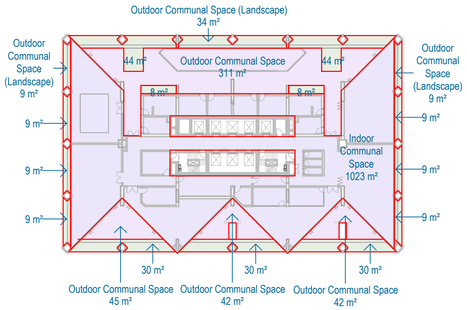
2 UPPER GROUND - COMMUNAL SPACE
SCALE 1 : 500



3 LEVEL 05 - COMMUNAL SPACE
SCALE 1 : 500



4 LEVEL 33 - T2 COMMUNAL SPACE
SCALE 1 : 500



5 LEVEL 36 - T1 COMMUNAL SPACE
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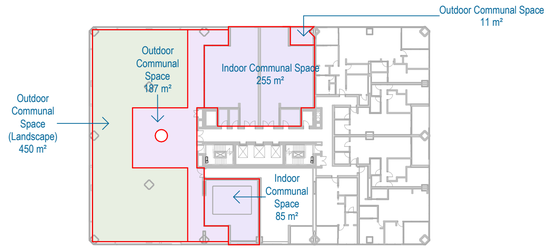
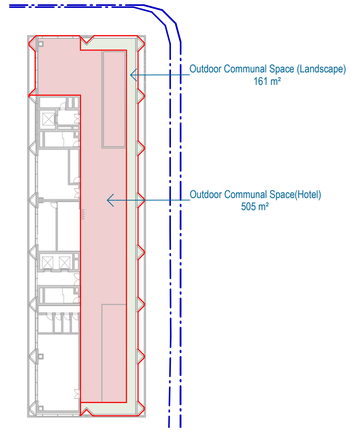


6 LEVEL 49 - T1 COMMUNAL SPACE
SCALE 1 : 500



7 LEVEL 11 - HOTEL COMMUNAL SPACE
SCALE 1 : 500

Communal Open Space

	Privately Owned Public Open Space (POPOS)	Indoor Communal Space (m2)	Outdoor Communal Space (m2)	Outdoor Communal Space Landscape (m2)	*Hotel Communal Space - Private (m2)*	*Hotel Outdoor Communal Space - Private Landscape (m2)*	*Childcare Outdoor Space - Private*	**Total (m2)** ***Not including private use***
Level 49 - Tower 1 Amenity		340	198	450				988
Level 36 - Tower 1 Amenity		1023	401	300				1724
Level 33 - Tower 2 Amenity		710	422	171				1303
Level 11 - Hotel Amenity (Roof)					*505*	*161*		
Level 05 - Podium Top		1175	536	1005	*134*		*777*	2716
Upper Ground (Mark Lane)	888							
Plaza	1736							
Total	**2624**	**3248**	**1557**	**1926**	*639*	*161*	*777*	**9355**
Site Area (Pre-Dedication)								11,293
Communal Area Percentage of Site (%)								**82.84%**

Date generated 30/04/2026 5:01:29 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

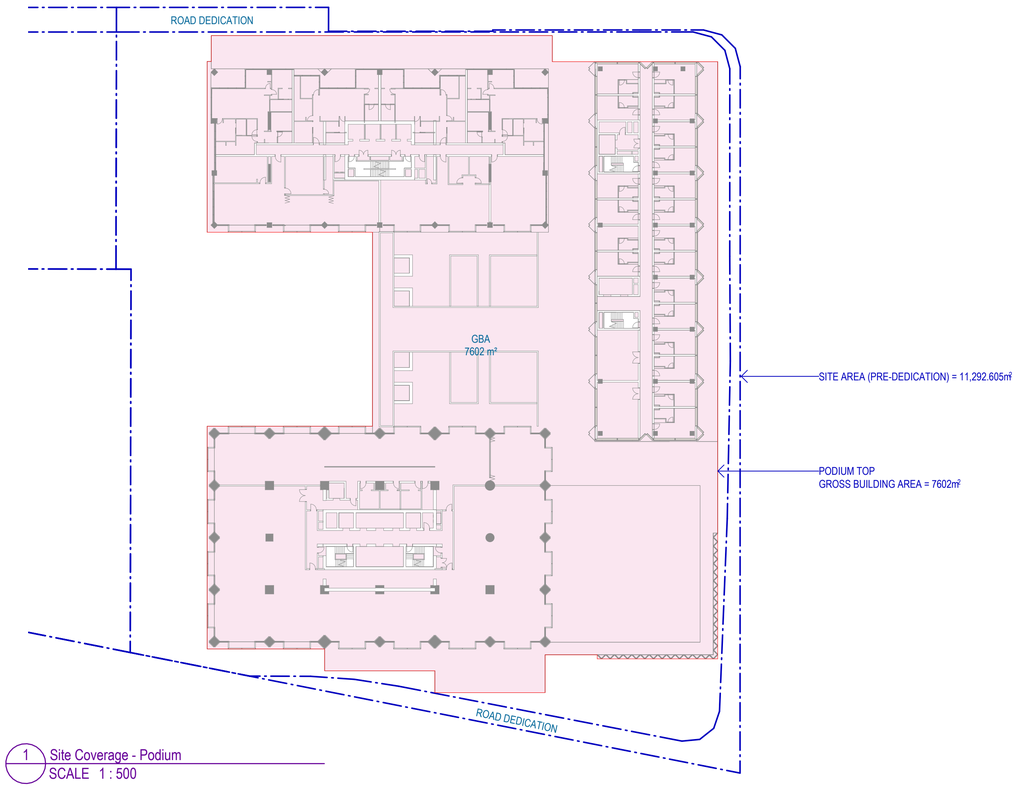
Client
Philip Usher Constructions

Issuer
WOODS BAGOT

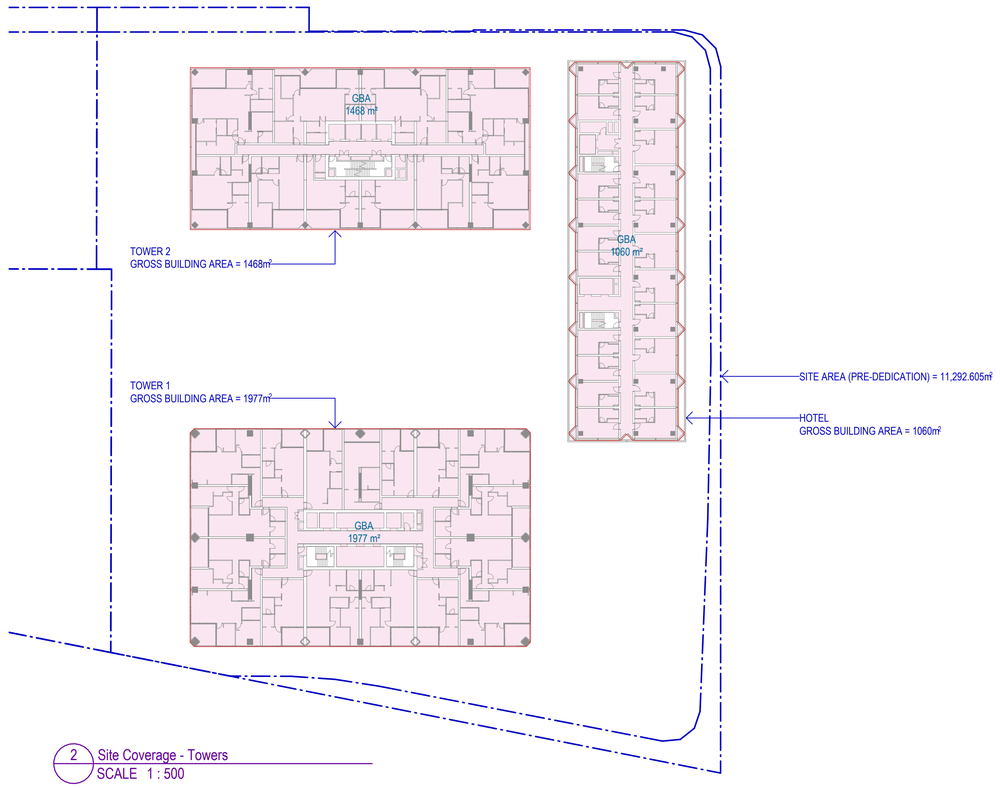
Project number 150740
Size check 25mm
Checked PL
Approved DL
Sheet size A1
Scale As indicated

Sheet title
Overall Arrangement
Area Plans
Communal Space

Sheet number **SK18500**
Revision B
Status
For Information



1 Site Coverage - Podium
SCALE 1 : 500



2 Site Coverage - Towers
SCALE 1 : 500

Site Coverage Typical Floor			
	Area (m2)	Percentage of Site (%)	Percentage of Podium Area (%)
Podium	7,602	67.32%	
Tower 1	1,977	17.51%	26.01%
Tower 2	1,468	13.00%	19.31%
Hotel	1,060	9.39%	13.94%
Site Area (Pre-Dedication)	***11,293***		

Note:
Areas measured to pre-dedication site area (11,293m²)

Site Area:
Pre-Dedication 11,293m2
Post-Dedication 10,651m2

BCC Site Coverage Definition:
the portion of the site that will be covered by a building or structure, measured to its outermost projection, after the development is carried out, other than a building or structure, or part of a building or structure, that is:
- in a landscaped or open space area, including, for example, a gazebo or shade structure; or
- a basement that is completely below ground level and used for car parking; or
- the eaves of a building; or
- a sun shade

Areas Measured to:
- Measured to outside of external walls
- Centreline of shared partition & corridor walls
- Outer face of glass or aluminium balustrades

Date generated 30/04/2026 5:01:34 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

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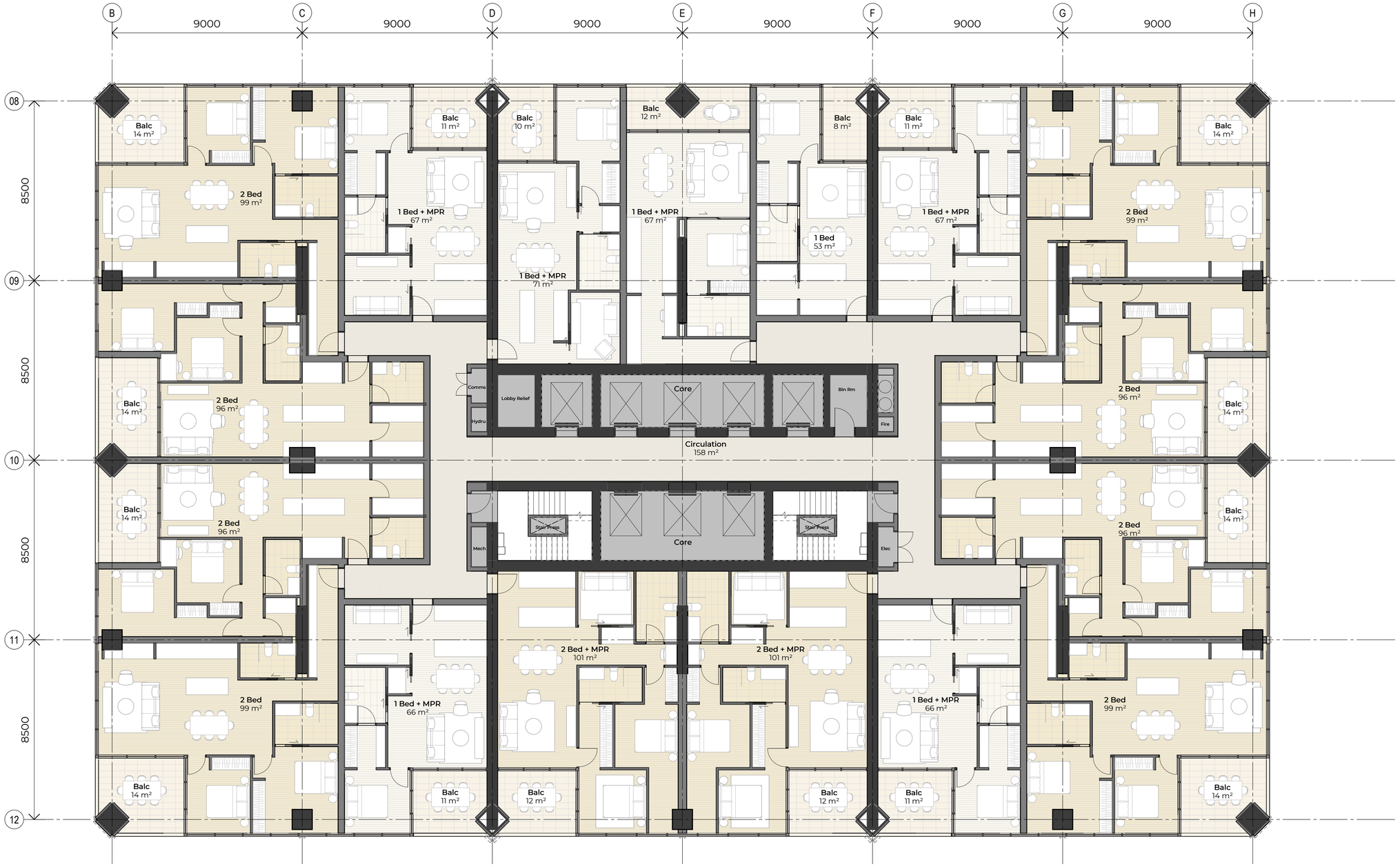
PL	DL	A1	As indicated

Sheet title
Overall Arrangement
Area Plans
Site Coverage

Sheet number
SK18600

Revision
B

Status
For Information



Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

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Do not scale drawings.

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked
PL

Approved
DL

Sheet size
A1

Scale
1 : 100

Sheet title
General Arrangement
Floor Plan
T1 - Typical Low Rise

Sheet number
SK22101

Revision
B

Status
For Information

Date generated 30/04/2026 5:02:59 PM

Date generated 30/04/2026 5:03:04 PM

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

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Do not scale drawings.

Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 100

Sheet title
General Arrangement
Floor Plan
T1 - Typical High Rise

Sheet number
SK22102

Revision
B

Status
For Information

Recent revision history

#	Status	Description	Date
A		DA WIP - BACKGROUND UPDATE	17/04/26
B		DEVELOPMENT APPLICATION	01/05/26

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

Issuer
W—B
WOODS BAGOT

Project number
150740

Size check
25mm

Checked	Approved	Sheet size	Scale
PL	DL	A1	1 : 100

Sheet title
General Arrangement
Floor Plan
T2 - Typical Floor

Sheet number
SK22201

Revision
B

Status
For Information

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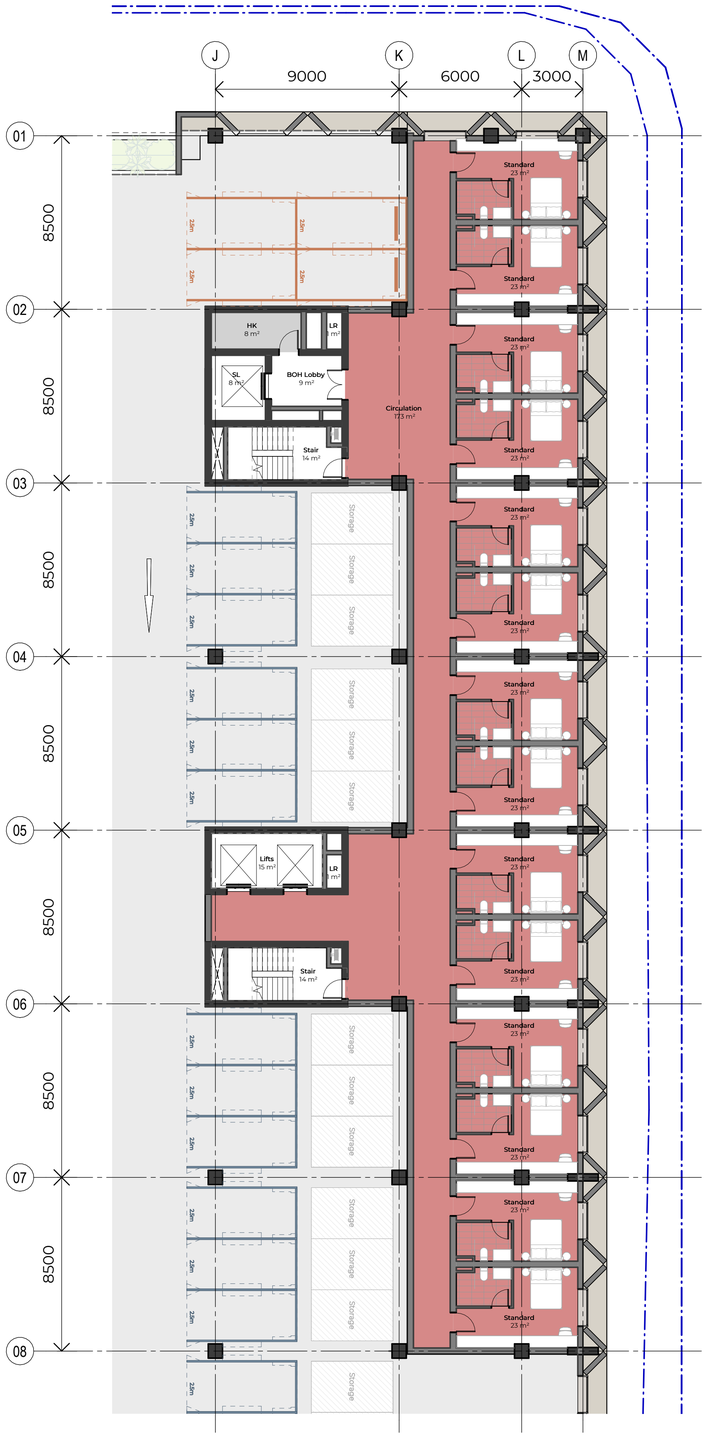
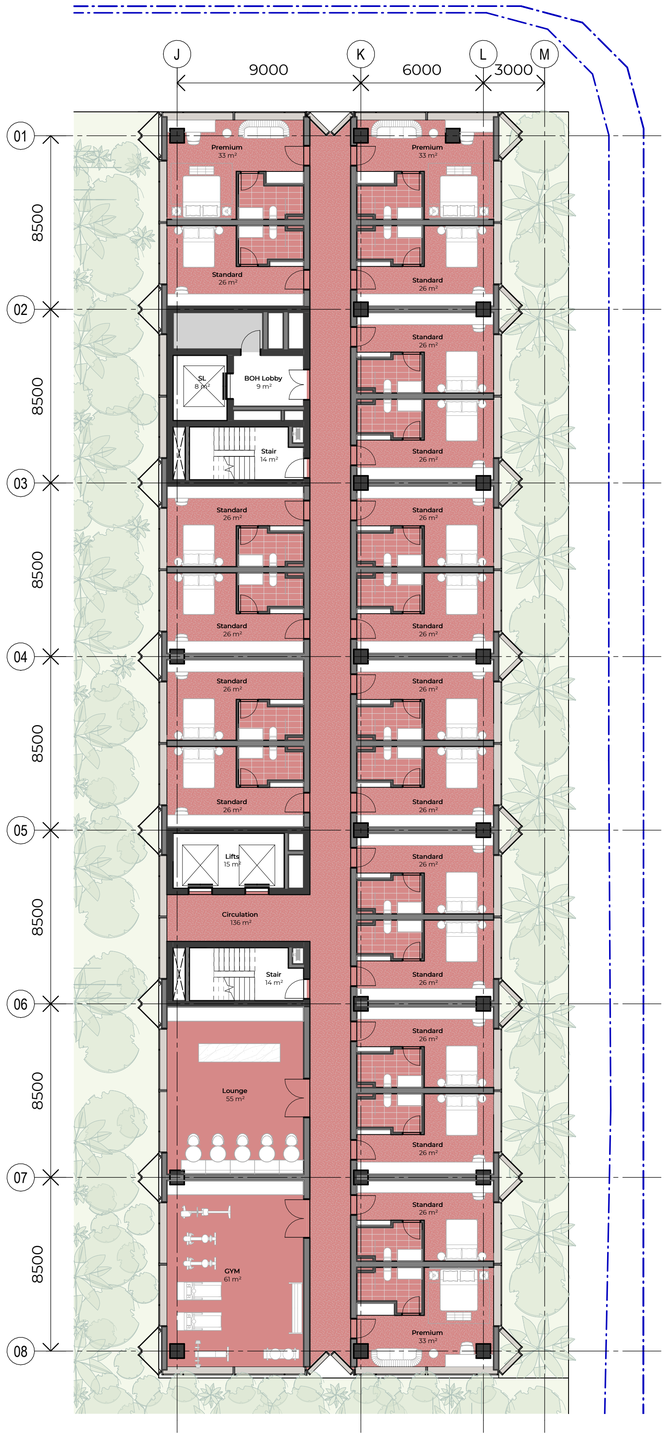


1 LEVEL 01 - 04 Standard
SCALE 1 : 150



2 LEVEL 05_Standard
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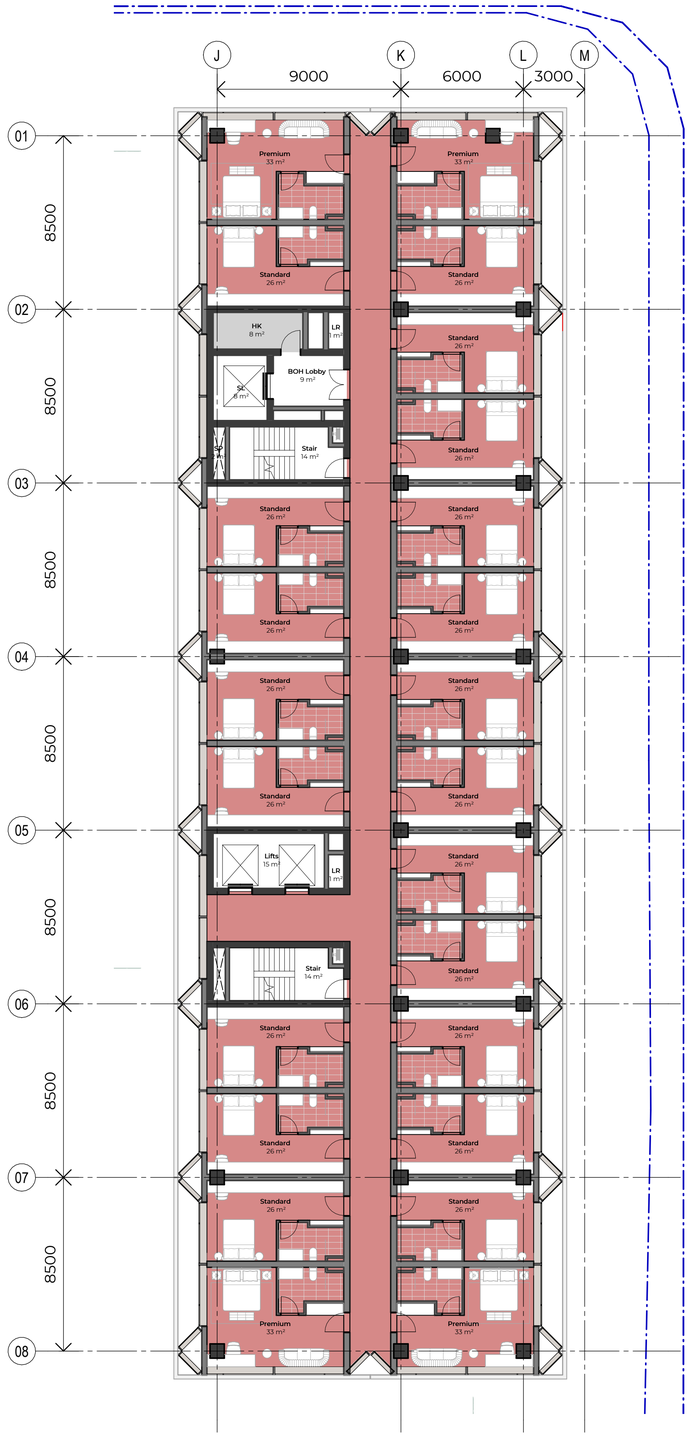

3 LEVEL 06 _Standard
SCALE 1 : 150

Recent revision history

#	Status	Description	Date
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B		DEVELOPMENT APPLICATION	01/05/26

Notes

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Do not scale drawings.

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

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Project number
150740

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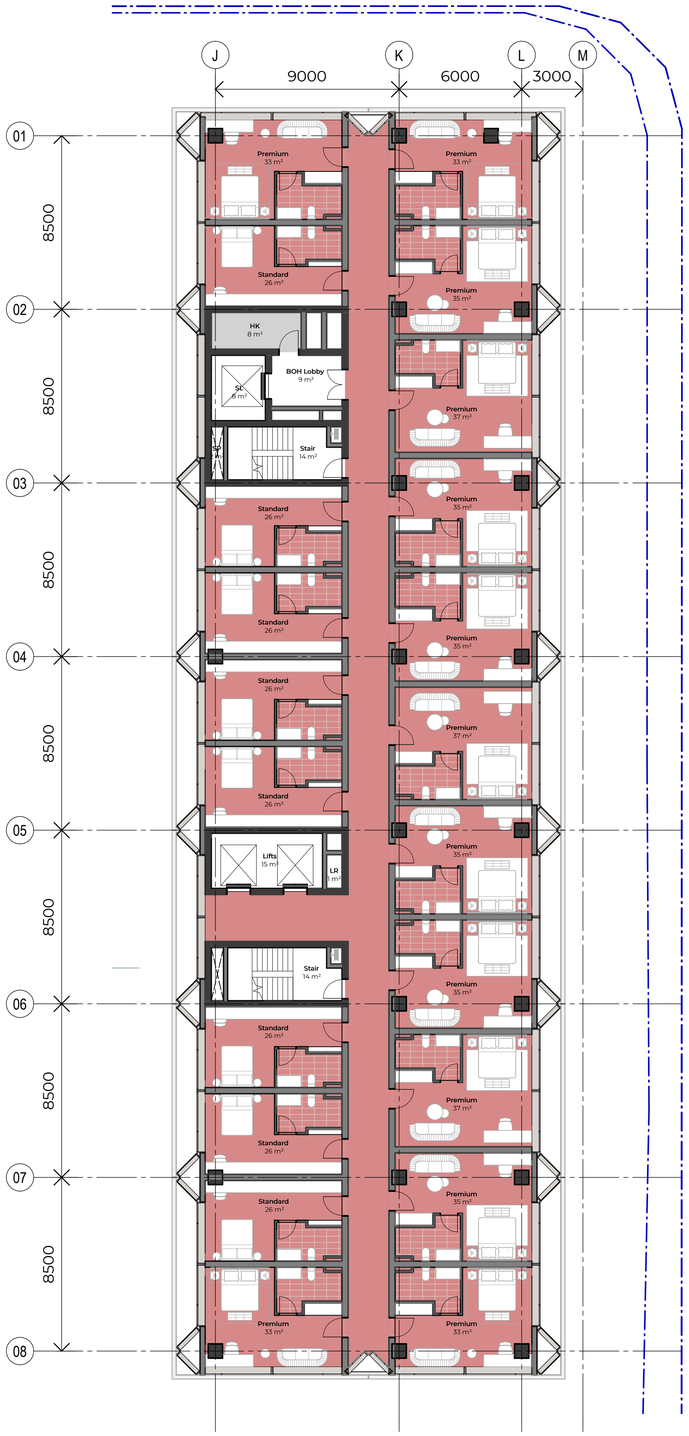
Sheet title
General Arrangement
Floor Plan
Hotel Typical

Sheet number
SK22301

Revision
B

Status
For Information



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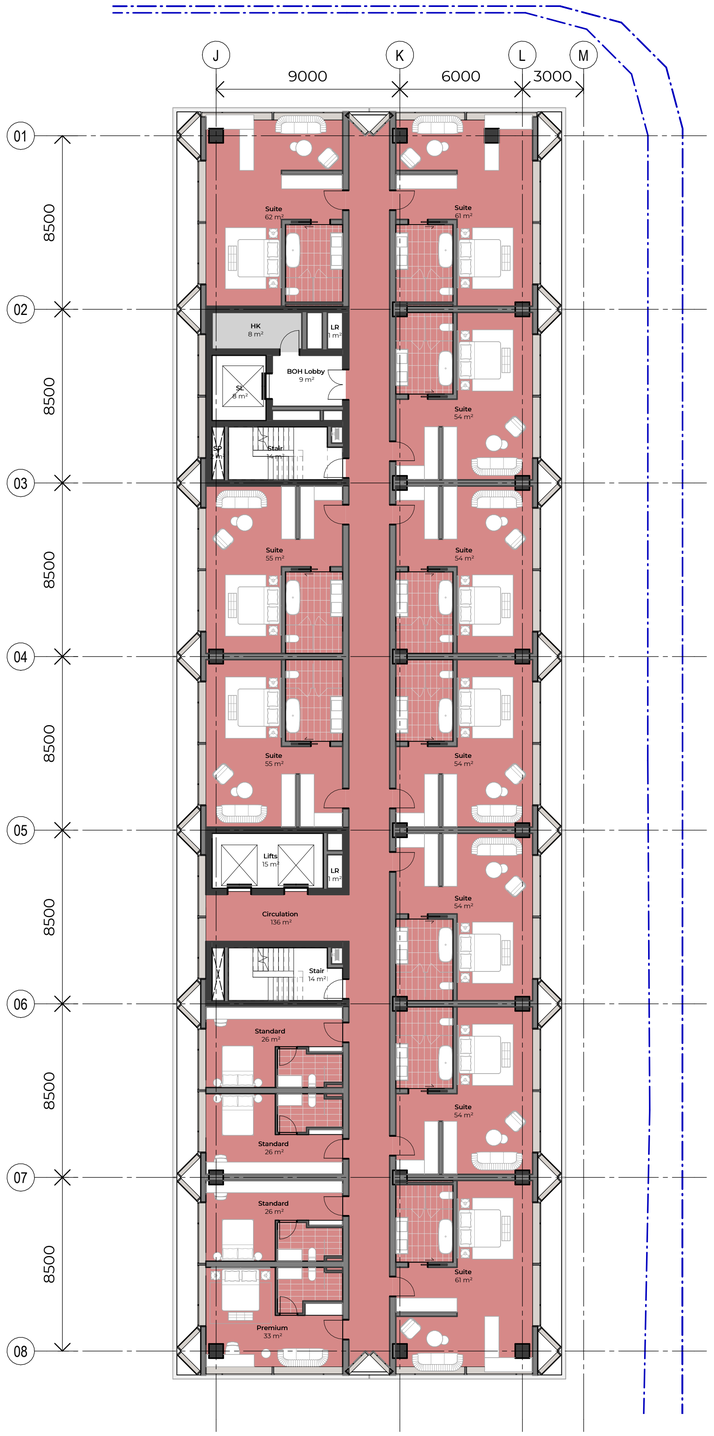

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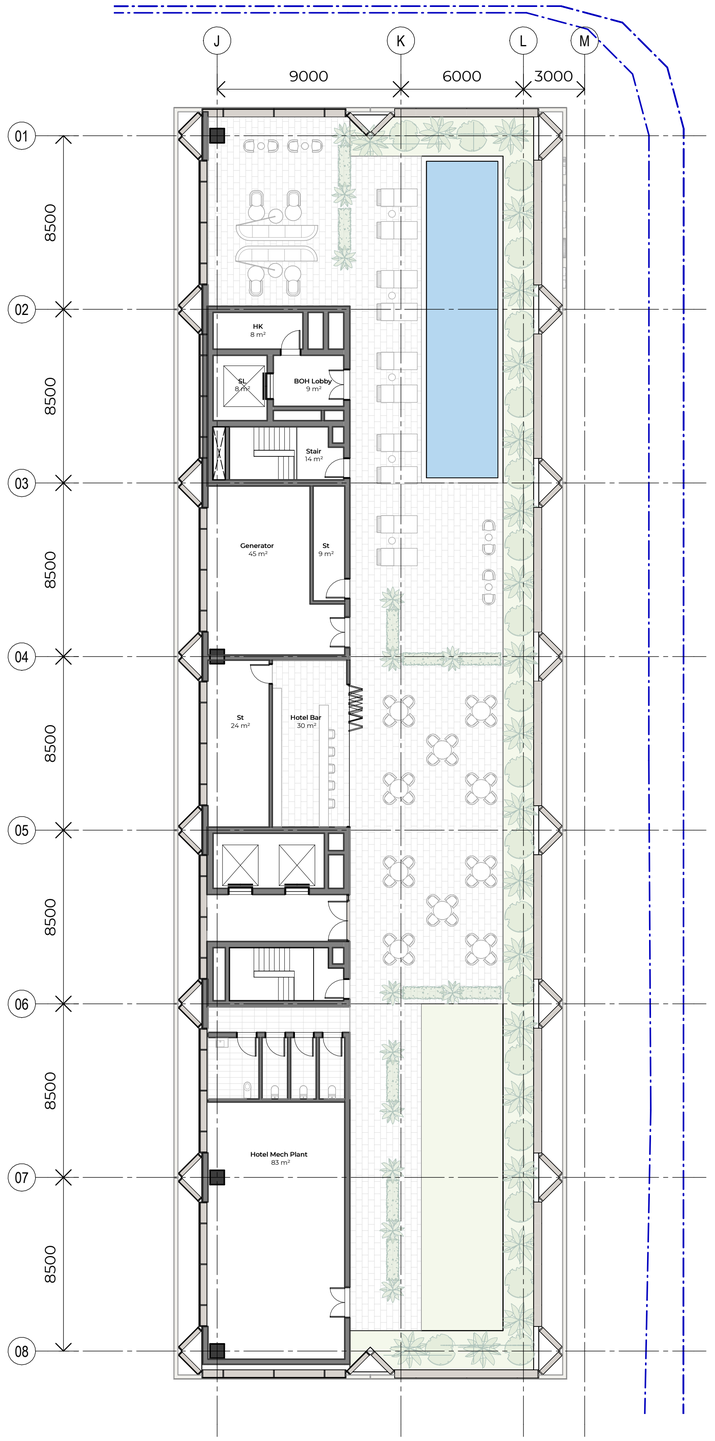

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Project
Mark Lane Stage 1A and Precinct

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Philip Usher Constructions

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Floor Plan
Hotel Typical

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

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Sections
Street Interface - Sheet 01

Sheet number	Revision
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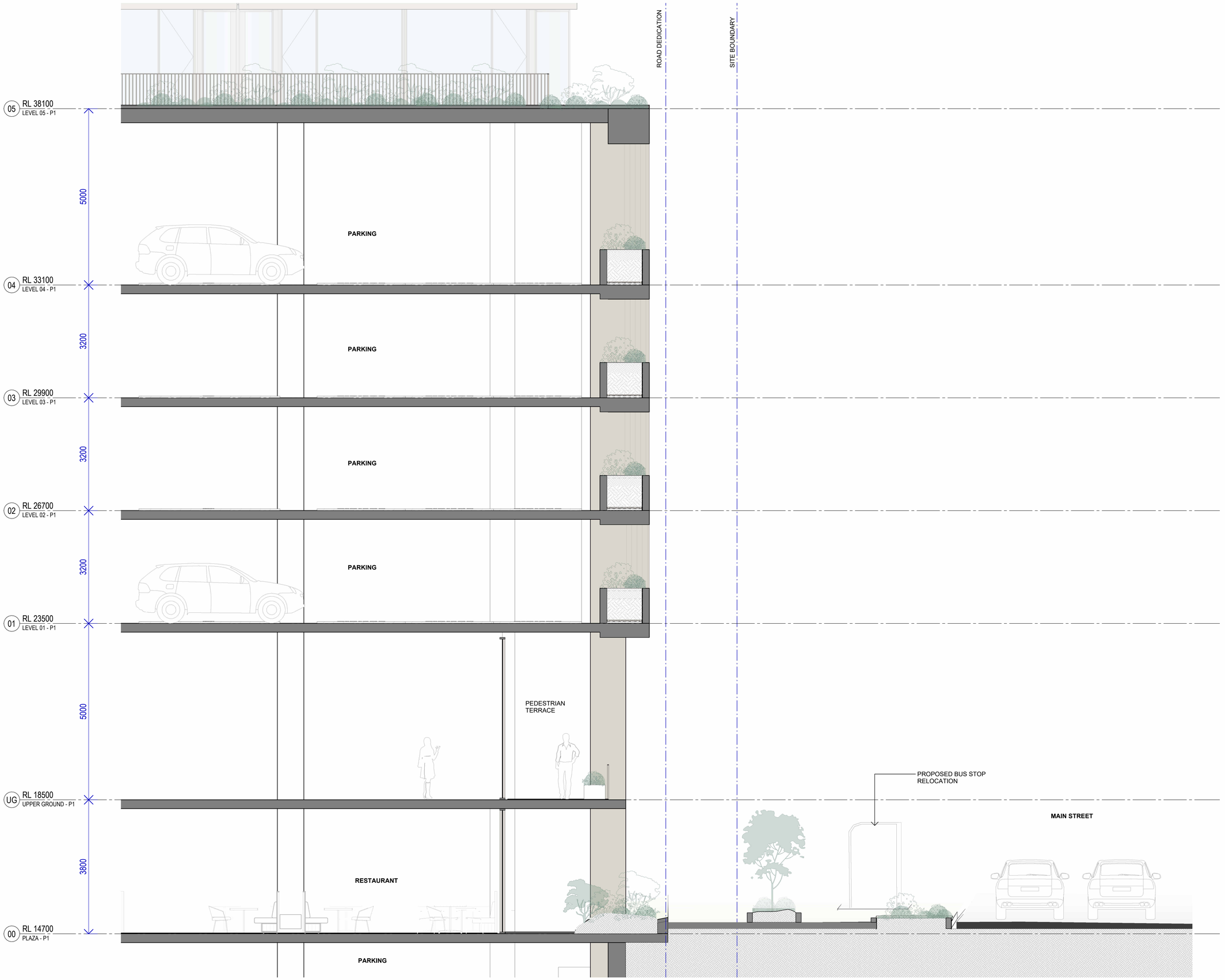

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

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Street Interface - Sheet 02

Sheet number	Revision
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Recent revision history

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Mark Lane Stage 1A and Precinct

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Philip Usher Constructions

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Recent revision history

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Mark Lane Stage 1A and Precinct

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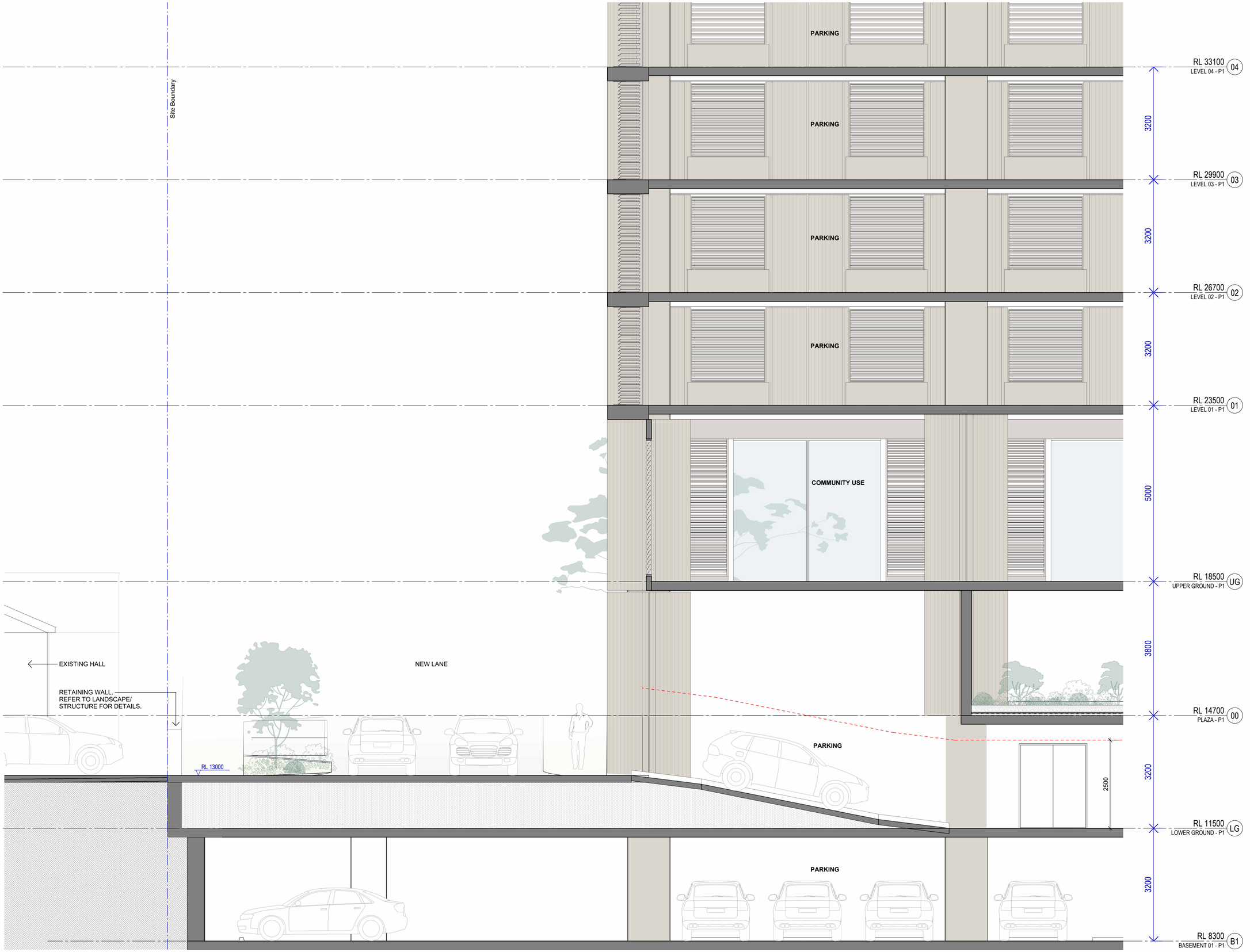

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Project
Mark Lane Stage 1A and Precinct

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Street Interface - Sheet 05

Sheet number	Revision
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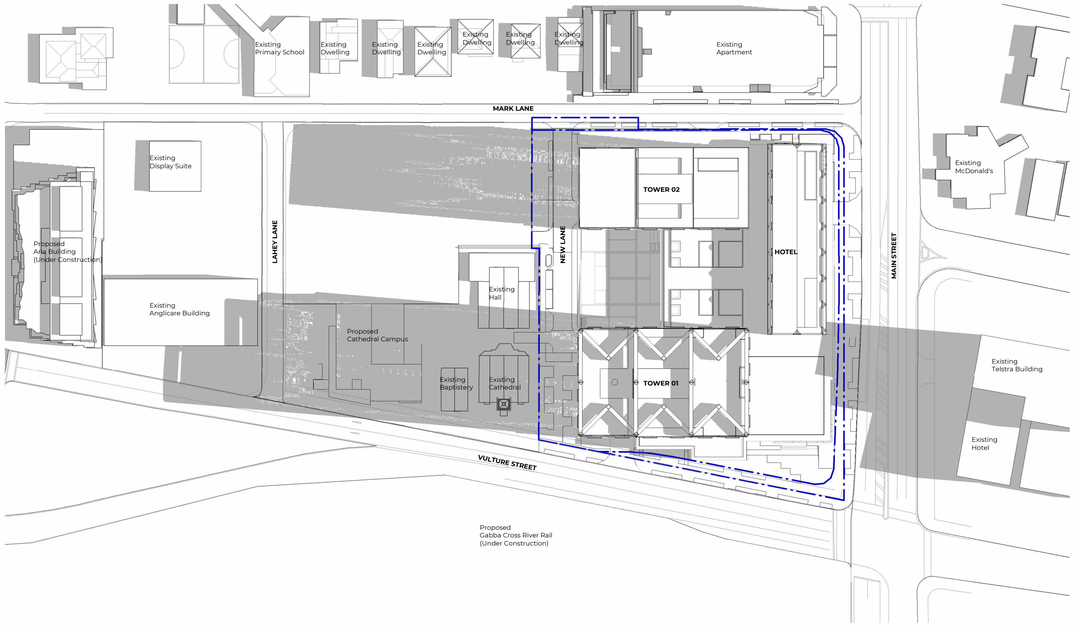

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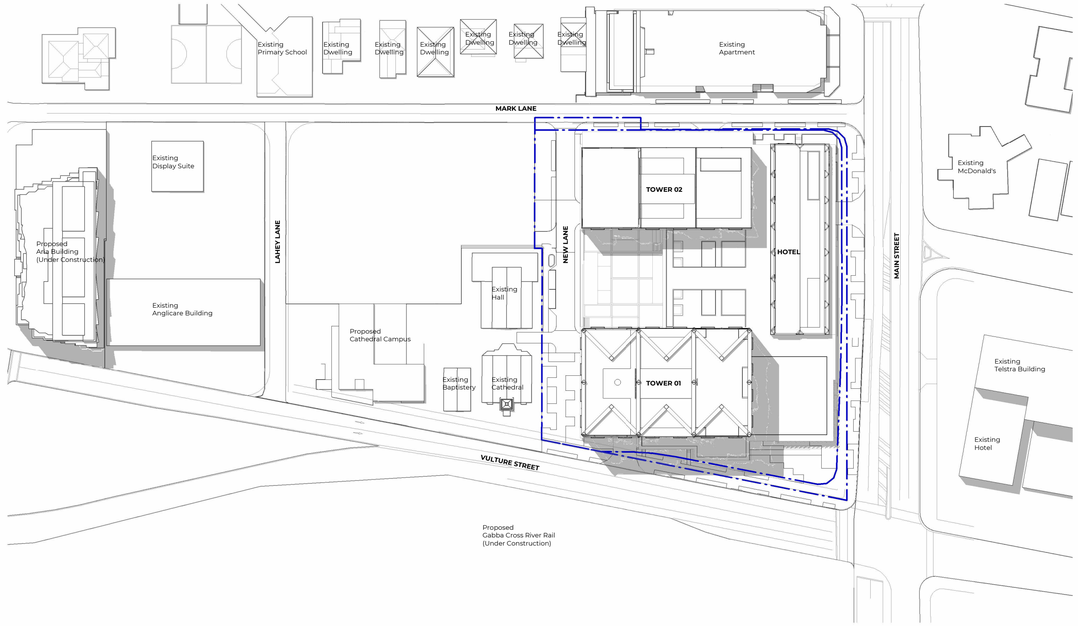

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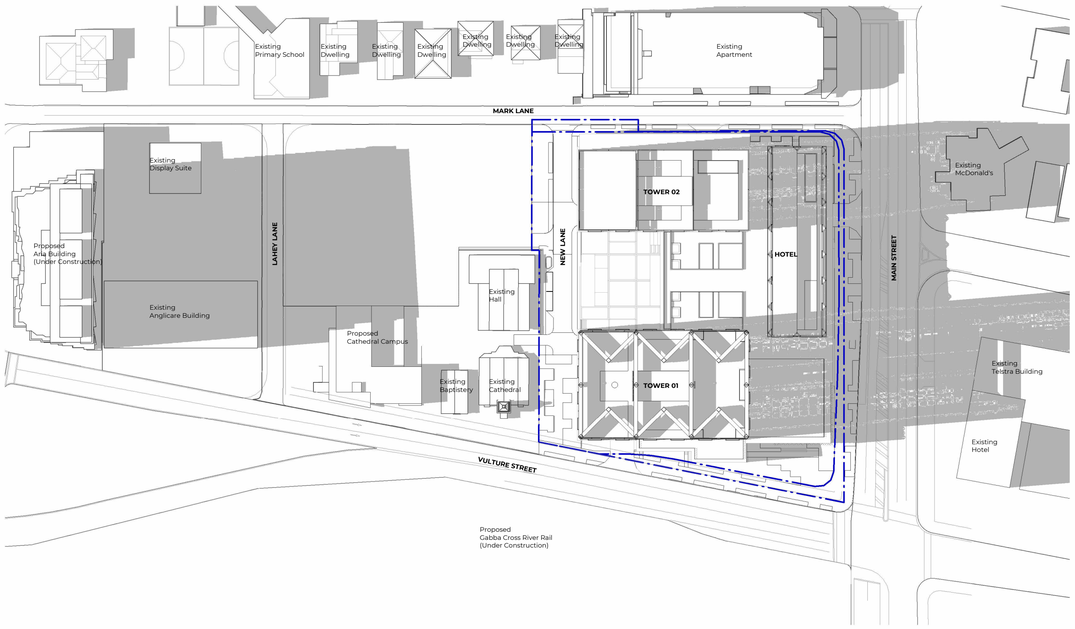

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

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Project number
150740

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Sheet title
Overall Arrangement
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Summer

Sheet number
SK90001

Revision
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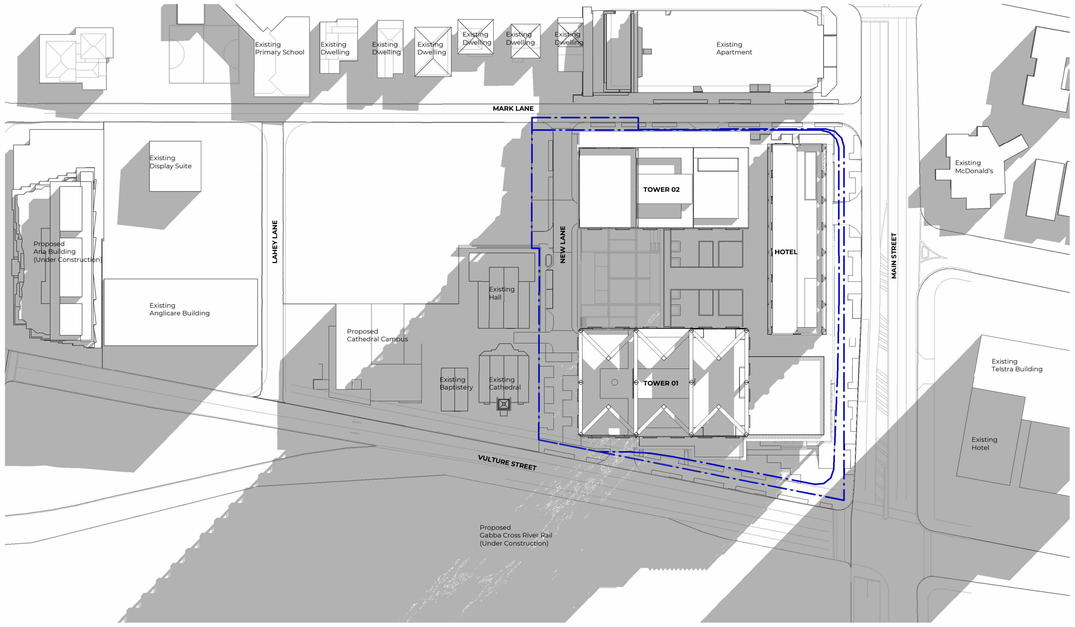

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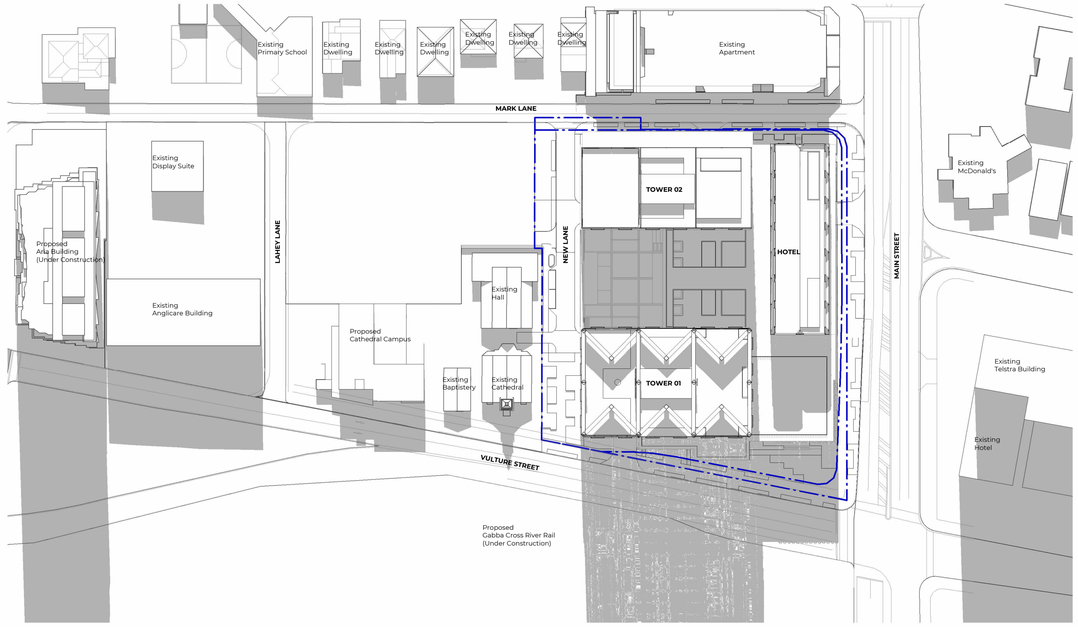

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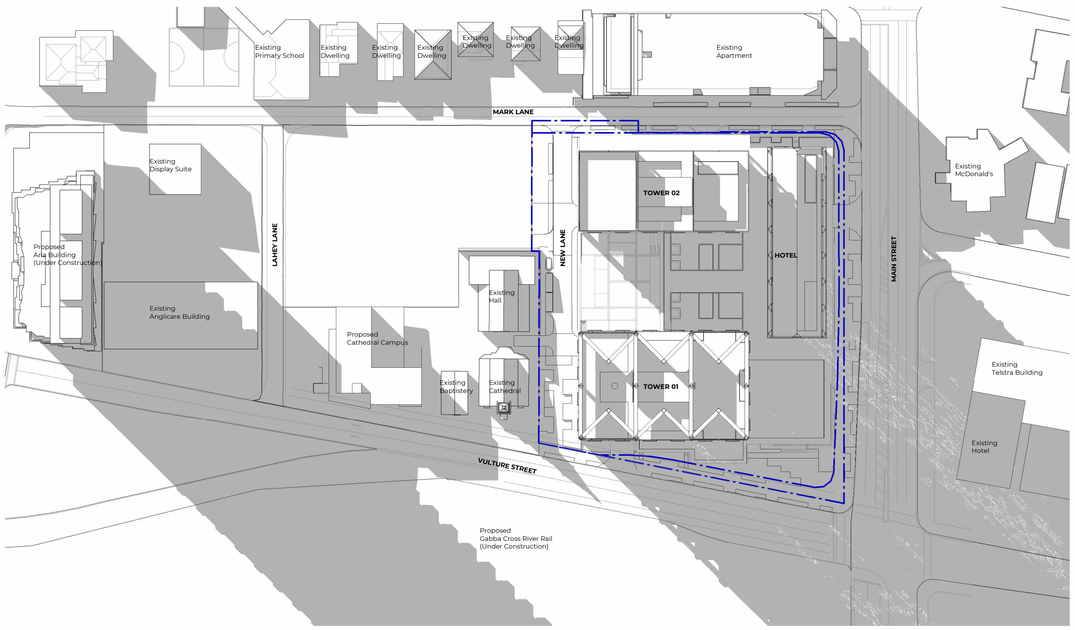

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B		DEVELOPMENT APPLICATION	01/05/26

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Project
Mark Lane Stage 1A and Precinct

Client
Philip Usher Constructions

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Project number
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Sheet number
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Revision
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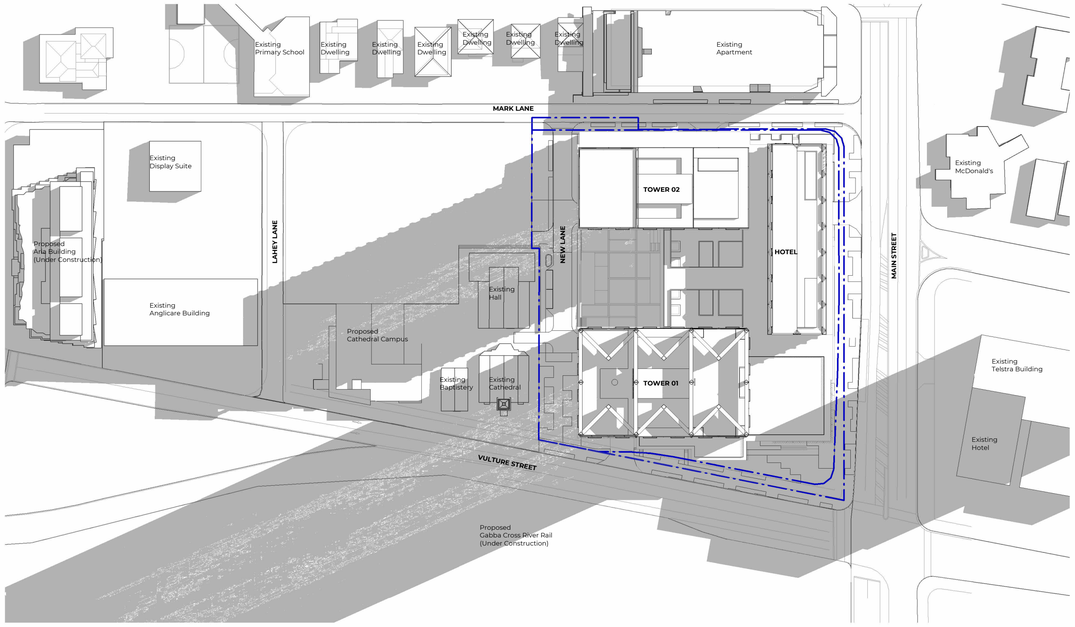

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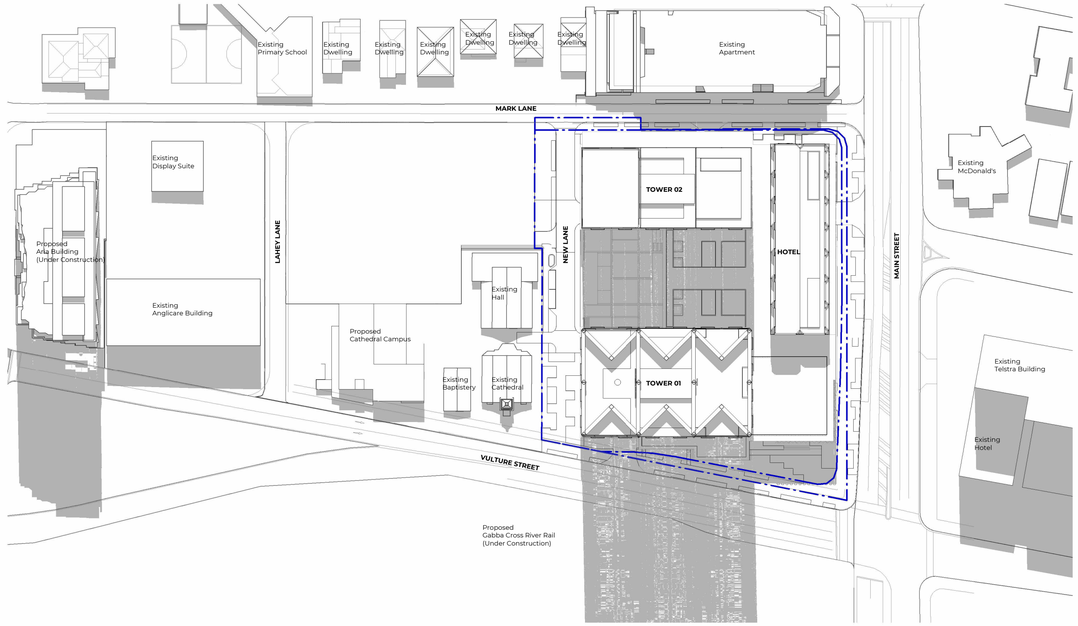

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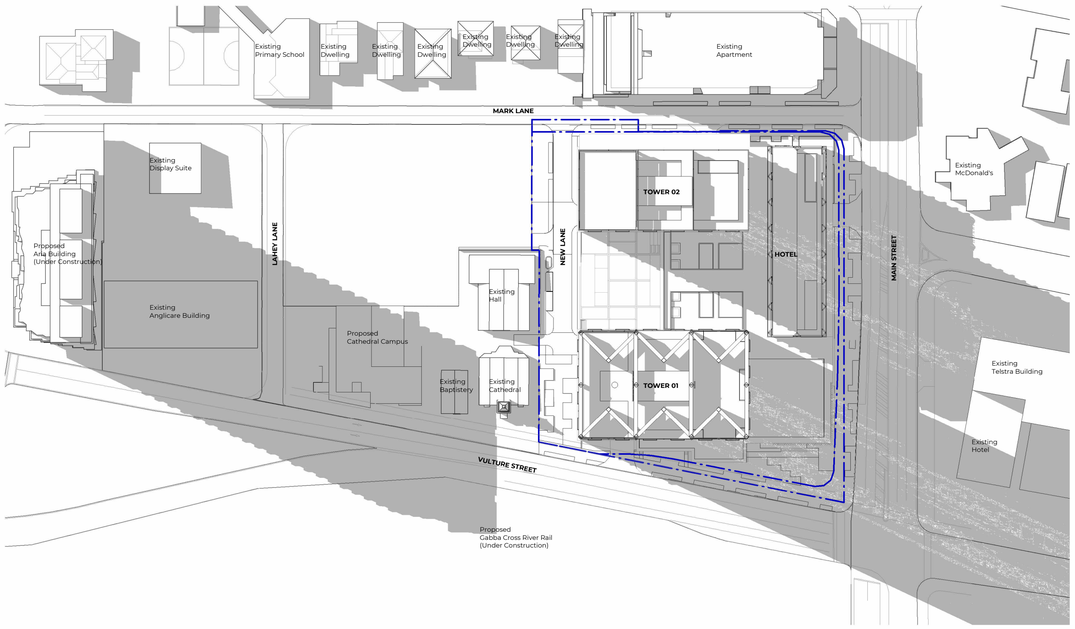

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Project
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Sheet title
Overall Arrangement
Shadow Study
Equinox

Sheet number
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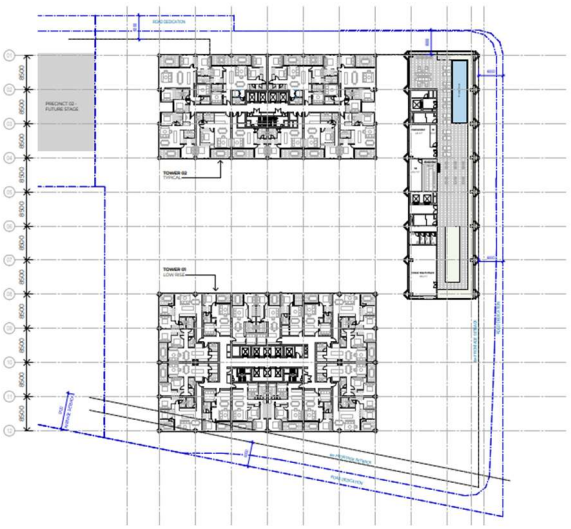
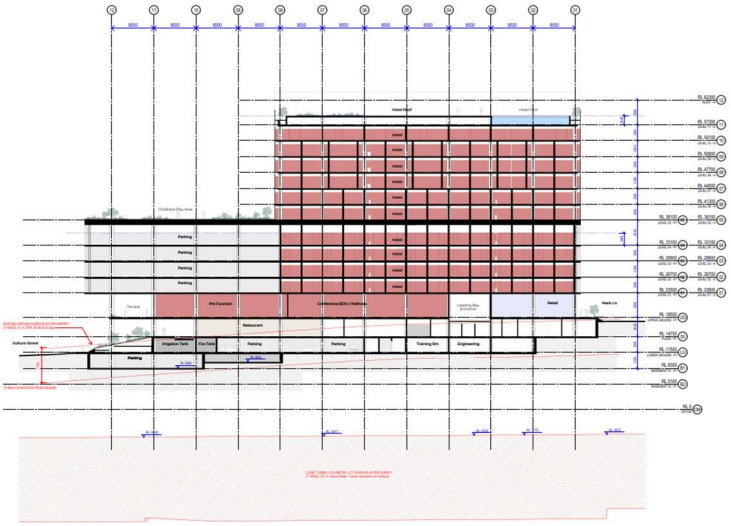
Appendix B
EDG Technical Memorandum

Document Number: 22552-RBG-ZZ-XX-RP-ST-00003
Revision: P01

Mark Lane Development Geotechnical Report - Precinct 1 Brisbane, QLD





Prepared for:
Phillip Usher Constructions

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Mark Lane Development Geotechnical Report - Precinct 1 Brisbane, QLD

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Table of Contents

1 Project Background

EDG Consulting (EDG) has been engaged by Philip Usher Constructions (PUC) to prepare this geotechnical report to support a Development Application (DA) for Material Change of Use (MCU) for the proposed Multiple Dwelling, Short-term Accommodation, Food and Drink Outlet, Shop, Function Facility, Indoor Sport and Recreation, Office, Community Use, and Childcare Centre and Building Works (BW) involving Demolition of a Pre-1911 Building, buildings or structures within 10 metres of a heritage place and relocation of a Local heritage place. The DA is made over 18, 26, 26A, 32, 32A, 38, 44, 46, 48 and 52 Mark Lane, 803, 807, and 811 Main Street, and 352 Vulture Street, Kangaroo Point.

Precinct 1 of the proposed development will comprise of a hotel (Tower 3), two high-rise residential towers (Tower 1 and Tower 2), and surrounding podium structures. The eastern end of the Precinct 1 development is located above the Clem7 Tunnel Boring Machine (TBM) tunnels which were completed in 2010. Development of the proposed sites will therefore be required to satisfy the requirements of the Clem7 infrastructure, to ensure the proposed works do not exceed prescribed limits / criteria.

PUC has engaged EDG to provide geotechnical analysis and advice relating to the proposed works as part of the DA. The outcomes of our geotechnical assessment for the Precinct 1 development, located above the Clem7 tunnels, are documented herein.

2 Site Location and Description

The proposed Precinct 1 development is shown in Figure 1 and 2 and is bounded by Mark Lane to the north, Vulture Street to the south and Main Street towards the east. Saint Nicholas Cathedral is located west of the site, adjacent to Tower 1.

The site ground surface elevation ranges between approximately RL 18m AHD and RL 12m AHD, generally falling towards the south of the site.

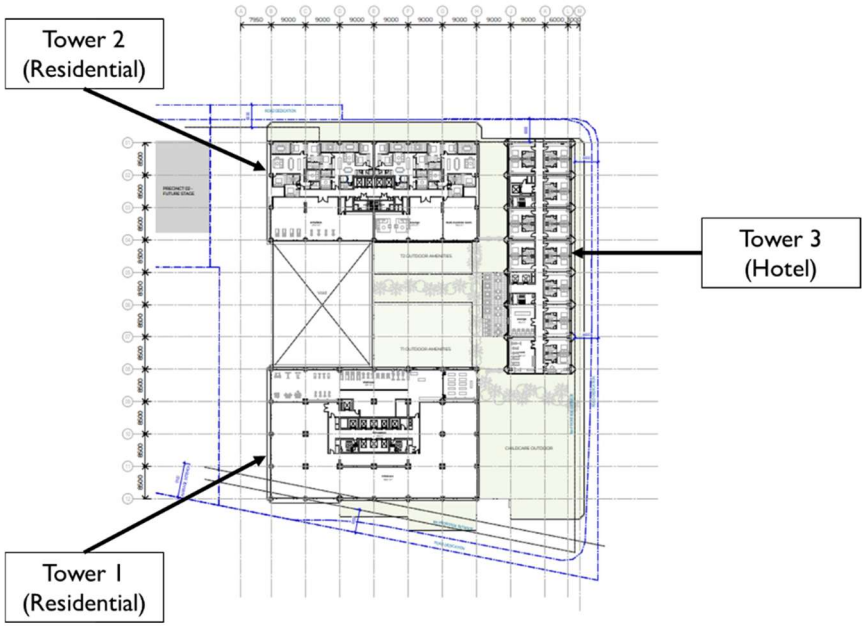

Figure 1 – Precinct 1 Site Plan

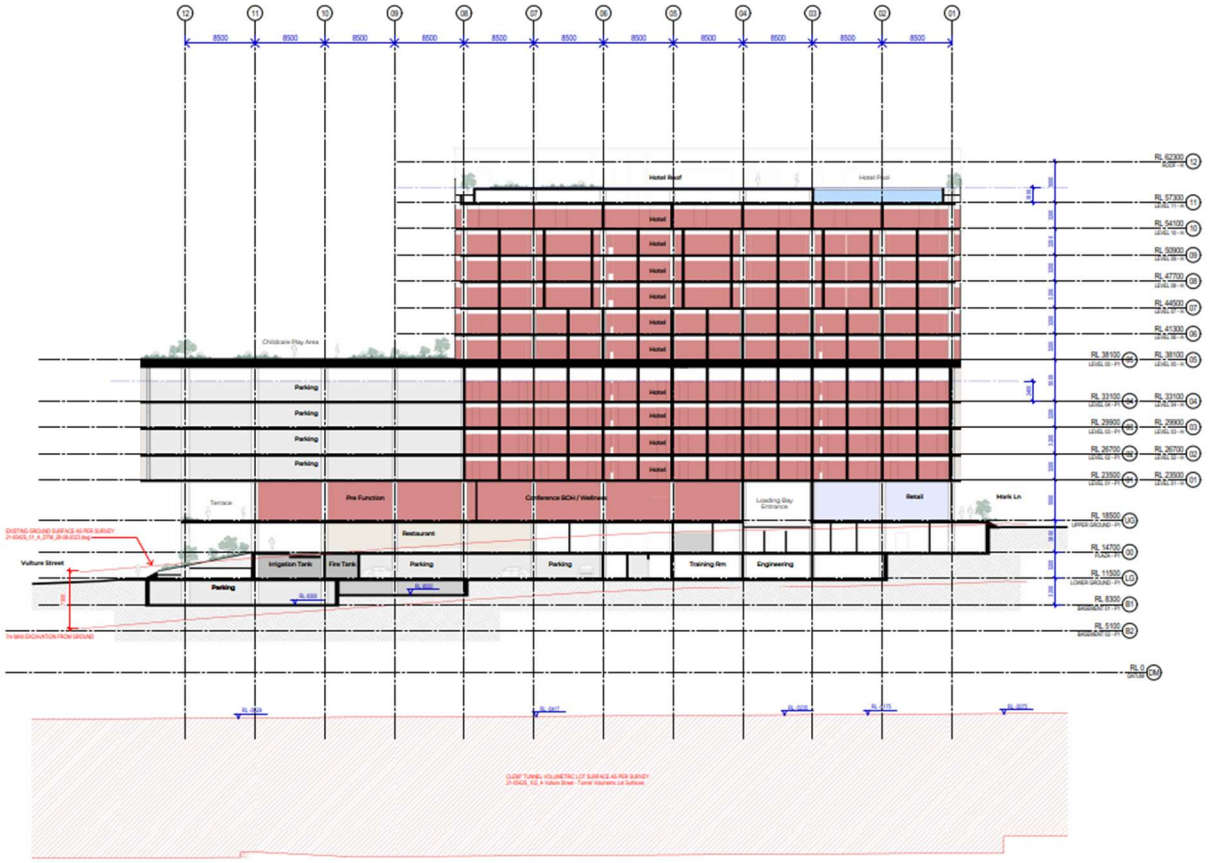

Figure 2 – Precinct 1 Elevation (looking from East towards West)

3 Ground Conditions

3.1 Available Geological Information

Based on a review of the 1:100,000 series Brisbane geological map (2015), the site is expected to be underlain by Triassic age Brisbane Tuff, underlain by weathered rock of the Triassic age Aspley Formation, which in turn is underlain by Devonian age, Neranleigh Fernvale Beds. The published geological information is shown as Figure 3.

The following geotechnical investigation information has been supplied to EDG by PUC and has been considered in our interpretation of the site conditions:

- Cross River Rail Project: Tunnel, Stations and Development Package (TSD) – Geotechnical Interpretive Report (GIR) by PSM (Report Ref. CRRTSD-000-0351-RPT-PSMQ-1120-030021) and associated borehole logs.
- Cross River Rail Project: Tunnel, Stations and Development – Factual Report on Geotechnical Investigation by Douglas Partners (Report Ref. 97335.00.R.001.Rev0)
- 58-64 Leopard Street, Kangaroo Point – Report on Additional Geotechnical Investigation by Douglas Partners (Report Ref. 210250.06.R.001.Rev0)
- Proposed Development at Corner of Main Street and Vulture Street, Woolloongabba – Geotechnical Investigation Report by Coffey (Report Ref. GEOTNEWS20843AB-AC)
- 364 Vulture Street, Kangaroo Point – Report on Geotechnical Investigation by Douglas Partners (Report Ref. 97013.01.R.001.Rev0)

- North South Bypass Tunnel – Geotechnical Interpretive Report – Driven Tunnels by Golder Associates (Report Ref. NSBT-0802-GT-RP-055005[05])

A summary of the available geotechnical investigations considered in this assessment is included as Appendix A.

Typically, fill due to previous development activities is present at surface level, which overlies Residual Soil derived from weathered Brisbane Tuff. Beneath the Residual Soil, rock units derived from variably weathered Brisbane Tuff are present. The Brisbane Tuff is underlain by interbedded siltstone and conglomerate of the Aspley formation, which overlies the Neranleigh Fernvale Group. Towards the eastern end of the site, an unconformity zone exists between the underlying Neranleigh Fernvale Group and the overlying Tuff.

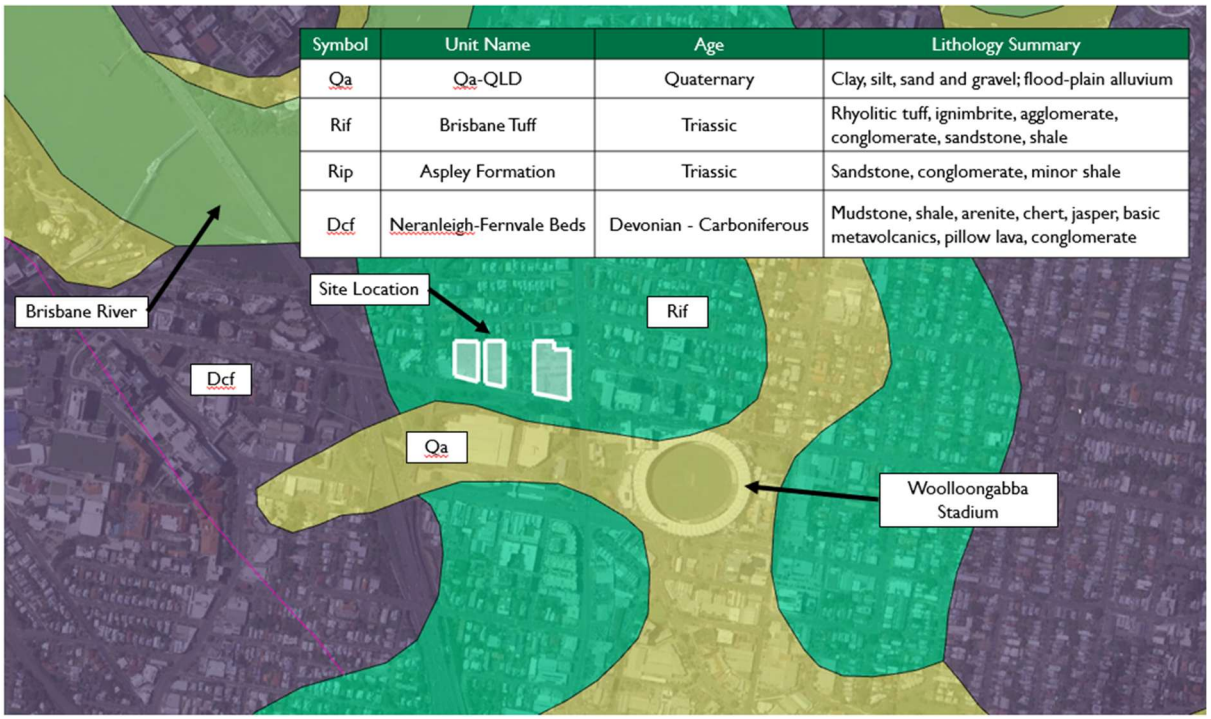

Figure 3 – Published Geological Information

3.2 Material Units

Several material units have been identified based on our interpretation of the available geological information, along with our previous experience with similar projects in the areas surrounding the site. To maintain compatibility between this assessment and the Clem7 tunnel design, we have adopted similar terminologies for the geological units previously identified in the Clem7 Geotechnical Interpretive Report by Golder Associates[1]. The project material units are summarised below and are discussed in further detail in the following sections.

- Fill (F)
- Residual Soil (RS)

[1] North South Bypass Tunnel – Geotechnical Interpretive Report – Driven Tunnels by Golder Associates (Report Ref. NSBT-0802-GT-RP-055005[05])

- Very Low to Medium Strength Tuff (Tuff VL-M)
- Medium to High Strength Tuff (Tuff M-H)
- High to Very High Strength Tuff (Tuff H-VH)
- Medium Strength Conglomerate dominant Aspley Formation (CD M)
- Medium Strength Siltstone dominant Aspley Formation (SD M)
- Unconformity Zone (UC)
- Medium to High Strength Phyllite of the Neranleigh Fernvale Group (NFG M-H)

3.3 Soil Units

3.3.1 Fill (F)

Fill associated with previous site use is present throughout the area. The fill thickness typically varies between 1m and 2m and generally comprises firm to stiff clay and/or loose to medium dense sand and gravel.

3.3.2 Residual Soil (RS)

Residual Soil derived from weathered rock from the Brisbane Tuff rock units underlies the fill material. The Residual Soil generally ranges in thickness between approximately 1m and 5m. The material is typically fine grained comprising a high plasticity clay of stiff to hard consistency, with occasional rock fragments.

3.4 Rock Units

3.4.1 Very Low to Medium Strength Tuff (Tuff VL-M)

Very low to medium strength tuff was typically encountered beneath the residual soil across the site. The material is generally very low to medium strength, is highly to moderately weathered, with defects typically spaced at an approximate frequency of 20mm to 200mm.

3.4.2 Medium to High Strength Tuff (Tuff M-H)

Medium to high strength tuff was typically encountered beneath the very low to medium strength tuff across the site. The material unit is generally medium to high strength and is moderately to slightly weathered, with defects typically spaced between 60mm to 600mm.

3.4.3 High to Very High Strength Tuff (Tuff H-VH)

High to very high strength tuff was typically encountered beneath the medium to high strength tuff across the site. The material unit is generally high to very high strength and is slightly weathered to fresh, with defects typically spaced between 200mm to 1m.

3.4.4 Medium Strength Conglomerate dominant Aspley Formation (CD M)

Medium strength conglomerate dominant Aspley formation is typically encountered underneath Tuff H-VH. The material is generally medium in strength and is slightly weathered, with defects typically spaced between 200mm and 2m.

3.4.5 Medium Strength Siltstone dominant Aspley Formation (SD M)

Medium strength siltstone dominant Aspley formation is typically encountered underneath Tuff H-VH. The material is generally medium in strength and is slightly weathered, with defects typically spaced between 60mm and 600m.

3.4.6 Unconformity (UC)

An unconformity zone exists between the underlying Neranleigh Fernvale Group and the overlying Tuff. Limited information is available associated with the unconformity rock units, with only the Clem 7 Geotechnical Interpretive report by Golder making reference to the UC unit. In addition, the two closest geotechnical investigation (NST01 and NST02) which encountered and recorded this rock unit are located approximately 300m away from the site. Based on the limited available geotechnical data, we have interpreted the Unconformity Zone unit to typically comprise medium to high strength rock units comprising of breccia, conglomerate and sandstone.

3.4.7 Medium to High Strength Phyllite of the Neranleigh Fernvale Group (NFG M-H)

Medium to high strength phyllite of the Neranleigh Fernvale Group is typically encountered underneath the Aspley Formation. The material is generally medium in strength and is slightly weathered, with defects typically spaced between 500mm and 1m.

3.5 Stratigraphy

Our interpretation of the ground stratigraphy is presented on the interpreted geological cross sections presented in Drawings B01554-1AB_001 to B01554-1AB_005.

4 Geotechnical Lab Testing and Parameters

Geotechnical parameters have been developed adopting a 'moderately conservative' basis for the material units present at the site based on the results of field and laboratory testing, supplemented with published data, correlations and previous experience. The basis of parameter selection is presented in Table 1.

Table 1 – Basis of Geotechnical Parameter Interpretation

Parameter	Basis of Interpretation
Unit weight of soil	Previous experience with similar soils and rock, along with engineering judgement.
At rest earth pressure coefficient (K0)	Previous experience with similar soils and rock, along with engineering judgement.
Undrained shear strength parameters (Su)	Interpretation of results of in-situ testing including hand shear vane and pocket penetrometer testing.
Drained shear strength parameters (c´, ϕ')	Results of available triaxial shear strength testing along with previous experience with similar soils and rock, and engineering judgement. Assessment using RocLab based on rock mass characterisation to assess equivalent Mohr-Coulomb parameters.
Unconfined Compressive Strength of Rock Units	Interpretation of available point load and UCS test data.
Soil and Rock Elastic Modulus	Previous experience with similar soils and rock, along with engineering judgement.
Rock Mass Elastic Modulus	Assessment of the rock mass GSI and use of the Generalised Hoek and Diederichs equation (2006).
Poisson's Ratio	Previous experience with similar soils and rock, along with engineering judgement.

Histograms showing the distribution of available Point Load Strength Index (Is50) tests and Unconfined Compressive Strength (UCS) tests for each of the rock units have been included on Figure 4 and summarised in Table 2. We have adopted a factor of 20 to assess the UCS from Point Load Strength Index, which we consider to be appropriate based on our experience in Brisbane CBD.

Figure 4 – Distribution of UCS and Point Load Strength Index

Table 2 – UCS and Point Load Strength Index Summary

Unit	Typical UCS Range (MPa)
Tuff VL-M	0.6 to 7
Tuff M-H	6 to 24
Tuff H-VH	20 to 80
SD M	8 to 13
CD M	6 to 12
NFG M-H	2 to 25

The recommended material parameters for the nominated soil and rock material units are summarised in Table 3 and Table 4.

Table 3 – Geotechnical properties for soil units

Unit	Materials	Unit Weight	Soil strength materials							
			Undrained Shear Strength	Drained Cohesion	Drained Friction Angle	Undrained Young's Modulus	Drained Young's Modulus	Drained Poisson's Ratio	Over Consolidation Ratio	At Rest Earth Pressure Coefficient
		(kN/m^3)	su (kPa)	c' (kPa)	ϕ' (Degrees)	E_u (MPa)	E' (MPa)	v' (-)	OCR (-)	K_0 (-)
Fill	Firm to stiff clay / loose to medium dense sand and gravel	18	40	0	28	15	10	0.3	N/A	0.5
Residual Soil	Mainly clay (stiff to hard)	19	100	5	28	20	15	0.3	5.0	1.0

Table 4 – Geotechnical properties for rock units

Geological Age	Unit	Sub Unit	Materials	Unit Weight	Rock strength materials													
					Drained Cohesion	Drained Friction Angle	Intact Rock Strength	Intact Rock Stiff.	Geo. strength index	Rock Mass Stiff.	Poisson's ratio	Hoek-Brown param.			Tensile Strength	Insitu Stress Ratio K_h / K_v	
												m_b	s	a		Min	Max
				(kN/m^3)	c' (kPa)	ϕ' (Degrees)	σ_{ci} (MPa)	E_i (GPa)	GSI (-)	E (GPa)	v' (-)	(-)	(-)	(-)	σ_t (kPa)	(-)	(-)
Triassic	Brisbane Tuff	Tuff VL-M	Rhyolitic tuff, ignimbrite, agglomerate, conglomerate, sandstone, shale	24	30	35	4	3	20-35	0.2	0.3	0.535	0.0003	0.526	30	1	1
		Tuff M-H		24	260	50	20	8	45-60	3	0.2	1.403	0.0067	0.504	95	1	2
		Tuff H-VH		24	700	60	40	15	55-75	9	0.2	3.725	0.0205	0.502	220	2	3
	Aspley (conglomerate dominant)	CD M	Conglomerate, sandstone, shale, minor coal	25	200	45	8	5	50-65	2	0.2	2.799	0.0084	0.504	25	1	1
	Aspley (siltstone dominant)	SD M		24	170	45	10	6	40-55	1	0.2	1.994	0.0029	0.507	15	1	1
	Unconformity	UC [Note 1]	Breccia, conglomerate and sandstone	22	400	55	30	10	50-60	8	0.2	3.608	0.0067	0.504	60	1	2
Devonian - Carboniferous	Neranleigh-Fernvale Beds	Phyllite M-H	Mudstone, shale, chert, jasper, basic metavolcanics, conglomerate	27	400	50	20	12	45-65	5	0.2	3.007	0.0067	0.504	45	1	2

Note: [1] Very limited geotechnical investigation available for UC material unit. In lieu of future investigation data, we have based material parameters for the UC unit on the parameters as documented in the Geotechnical Interpretative Report by Golder Associates (Report Ref. NSBT-0802-GT-RP-055005[05]).

5 Groundwater

We have undertaken a review of the Clem7 Geotechnical Interpretative Report[2] and the Woolloongabba Permanent Lining Design Report[3].

As part of the Clem7 project, groundwater levels across the tunnel corridor had been monitored at selected locations over a time frame from mid-2004 until late 2005. Based on the monitoring and interpretation undertaken during the Clem7 project, the groundwater level is expected to vary between 8m to 15m below existing ground level across the site as shown on the available Clem7 drawings[4]. The report described that groundwater levels will be largely unaffected in the TBM sections except for short periods during construction of the cross passages and substations. Any groundwater level drawdown is expected to only occur for limited periods prior to construction of the tunnel permanent lining.

In the Woolloongabba Permanent Lining Design Report, it was described that the measured groundwater head in the vicinity of Woolloongabba Station is about RL6.0, which is located approximately 5m to 6m below ground surface. The Woolloongabba Station cavern is designed to be a drained structure, and groundwater collection for the drained cavern and adits are achieved using slotted pipes running around the cavern lining and sheet drainage below the full extent of the invert slabs.

The site groundwater conditions are expected to have been affected by construction of the adjacent Woolloongabba Station Cavern. As the Woolloongabba Station has been designed as a drained structure, drainage measures have been installed to prevent build-up of groundwater pressure adjacent to the cavern lining. We have therefore interpreted that the site groundwater levels are locally drawn down within proximity of the Woolloongabba Station Cavern. This local drawdown is expected to be limited to the western side of the development (i.e. the western tower and the central tower), while the eastern side that is in proximity of the Clem7 tunnels remains largely unaffected.

It will be required to confirm the local groundwater conditions and the extent of the groundwater drawdown during subsequent design stages. Definition of site groundwater levels would be a requirement of future geotechnical investigations associated with subsequent design phases.

6 Shallow Foundations

The exact foundation arrangement has yet to be confirmed, however, it is possible that shallow footings could be used to support loads from selected tower and podium columns. The elevation of the base of the footings is not confirmed at this stage, however is expected to be approximately at the basement excavation level of RL 14.7m, 11.5m, 9.5m, 8.3m and 5.1m AHD. The material at the proposed foundation level is expected to be either medium to high strength Tuff (Tuff M-H) or high to very high strength Tuff (Tuff H-VH).

We have carried out a preliminary assessment of allowable bearing capacity considering a shallow footing foundation founding in Tuff M-H and founding in Tuff H-VH. The assessment is based on the method presented by Wyllie[5], which represents the strength of the rock mass based on the generalised

[2] Golder Associates. August 2009. *North South Bypass Tunnel. Design Lot. 0802. Zone 0 Across All Zones. Geotechnical Interpretative Report – Driven Tunnels*. Report No. NSBT-0802-GT-RP-055005[05].
[3] PSM. January 2022. *Permanent Works Design Report. Cross River Rail Project – Tunnel, Stations and Development Package (TSD). Permanent Lining (Tunnel – Woolloongabba)*. Report No. CRRTSD-300-0320-RPT-PSMQ-1330-160087.
[4] Golder Associates. 2009. *North South Bypass Tunnel Geotechnical Plan and Section.* Drawing Ref. NSBT-0802-GT-DG-055001[02] and NSBT-0802-GT-DG-055002[02].
[5] Wyllie, D.C., 1999. Foundations on Rock, 401pp. Spon: New York.

Hoek Brown failure criterion. The outcomes of our assessment are summarised in Table 5. Note that the allowable bearing capacity has been calculated using a Factor of Safety of 3.0 applied to the ultimate bearing capacity.

Preliminary estimates of settlement and the associated vertical Modulus of Subgrade Reaction have been carried out using the software FLEA (Finite Layer Elastic Analysis) based on the Finite Layer Method. This software accounts for the size and shape of the foundation and layering of the rock profile. The estimates of allowable bearing pressure and associated settlements are shown in Table 5 and have considered footing dimensions of 3m x 3m for individual column foundations.

Table 5 – Summary of Shallow Footing Assessment

Material Unit	Foundation Dimensions	Ultimate Bearing Capacity (MPa)	Allowable Bearing Capacity (MPa)	Estimated Vertical Settlement at Allowable Bearing Pressure (mm)	Modulus of Subgrade Reaction[1] (MPa/m)
Tuff M-H	3m x 3m	9	3	2	1500
Tuff H-VH	3m x 3m	30	10	2.5	4000

Notes: [1] The structural designer should consider the nominated values of modulus of subgrade reaction together with a sensitivity range of 50% to 200%, (i.e. reduce the modulus of subgrade reaction for all foundations to 50% and increase the modulus of subgrade reaction for all foundations to 200%).

7 Piled Foundations

7.1 Geotechnical Reduction Factor

A geotechnical strength reduction factor of $\varnothing_g = 0.52$ is recommended at this stage in accordance with the process in AS2159:2009 Piling, based on the quality and quantity of information available.

The geotechnical reduction factor considers that no pile load testing will be carried out during construction, however, it would be possible to increase the geotechnical strength reduction factor should pile load testing be carried out during construction.

7.2 Pile Design Parameters

Design values of ultimate skin friction and ultimate end bearing have been assessed for all soil and rock units. Ultimate skin friction and end bearing have been calculated based on the method proposed by Zhang and Einstein (1998)[6]. Recommended values of ultimate skin friction and ultimate end bearing are summarised in Table 6.

Table 6 – Ultimate Pile Design Parameters

Material	Fs, Ultimate Skin Friction (kPa)	Fbu, Ultimate End Bearing (MPa)
RS	50	N/A
Tuff VL-M	500	8

[6] Zhang, L. and Einstein, H. (1998). "End bearing capacity of drilled shafts in rock." ASCE Jnl. Geot. Eng., Vol. 124 (7), 574-584)

Material	Fs, Ultimate Skin Friction (kPa)	Fbu, Ultimate End Bearing (MPa)
Tuff M-H	1000	20
Tuff H-VH	1500	30

8 Retention System

8.1 Concept Arrangement

At this stage, the arrangement of the proposed retention system is not confirmed, however, it would likely comprise a soldier pile retaining wall or possibly be supported by a combination of soil nails and rock bolts. If the soldier pile arrangement is adopted, it is likely that piled retention system will be supported by several rows of horizontal bracing either from ground anchors, or internal props.

8.2 Preliminary Design Advice

To allow a preliminary sizing and spacing of the pre-stressed anchors and/or props for the south and west faces, an approximation of the lateral earth pressure (unfactored) can be based on the following rectangular lateral earth pressure distribution:

$p = 5H + 0.5q$, where:

p = lateral earth pressure (kPa)

H = depth of retained ground (m)

q = surcharge behind the wall (kPa)

This earth pressure distribution relates to the failure mechanism as illustrated in Figure 5 and assumes that adequate drainage is provided behind the wall such that no hydrostatic pressure build-up occurs.

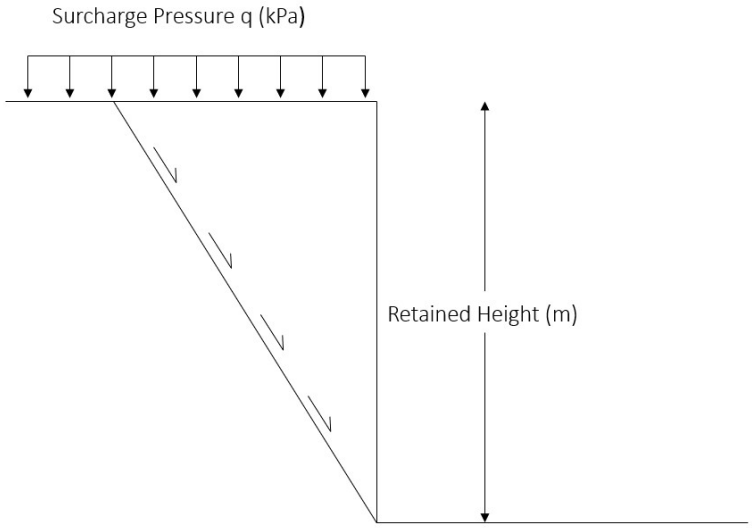

Figure 5 – Failure Mechanism

Earth pressure distributions of this type have been shown to give a reasonable estimate of required anchor pre-stress values or prop forces in propped flexible retaining wall systems. However, estimates

of ground movement and structural actions require rigorous soil-structure interaction modelling using finite element methods such as RS2, FLAC or PLAXIS, which would be required during the Detailed Design stage.

Design of anchors may consider the values of ultimate bond stress presented in Table 7. Estimates of ultimate bond stress for fill and residual soil have not been provided as we do not recommend anchoring within those materials. Appropriate reduction factors, given the nature of the loading must be applied to the ultimate bond stress in the anchor design. The designer must give careful attention to bond zone lengths, hole diameters and the spacing of the anchors to avoid interaction issues.

We recommend that at this stage (in advance of detailed soil-structure interaction modelling of the retention system) a minimum free length extending beyond a 45° plane extending up from the excavation should be adopted for the retention anchors.

Table 7 – Anchor Bond Stress

Material Unit	Ultimate Bond Stress (MPa)
Tuff VL-M	0.4
Tuff M-H	1.5
Tuff H-VH	2.5

Drainage must be provided behind the retention system to permanently relieve any water pressures, and therefore pressure from ground water is expected to be zero under normal service condition. However, to account for potential failure or partial failure of the drainage system (temporary blockage etc.), a water head on the retaining wall equivalent to 1/3 of the retained height should be considered.

8.3 Excavation Staging

Excavation of the proposed basement should be carried out in stages to help control retaining wall deflections and settlement of material behind the retention system.

For propped soldier pile walls, excavation would only proceed following completion of the construction of the retaining wall including its capping beam. Excavation would then proceed but would likely be limited to a maximum of approximately two to three metres followed by installation of the first (upper) row of excavation support and waler beam. Following installation of the upper row of support, excavation would then likely proceed to the approximate level of the subsequent rows of excavation support and waler beam. Excavation would then continue following a sequence of excavation and installation of support, until the maximum bulk excavation level was reached.

9 Temporary Batter Slope Angles

During excavation of the basement, temporary batter slopes may need to be excavated within fill, residual soil, very low to medium strength tuff and medium to high strength tuff material. The recommended maximum temporary batter slope angles for these materials are summarised in Table 8.

Once the contractor confirms the proposed excavation geometry, slope stability assessments should be carried out by the geotechnical temporary works engineer. Rock face mapping can be undertaken in the tuff material during construction and can be used to provide additional recommendations on slope angles. If required, these slope angles may be further steepened with the support of soil nails or rock bolts.

Table 8 – Recommended Excavation Angles

Material	Time Period	Height (m)		
		≤1.5	1.5 < H ≤ 3.5	>3.5
Fill	Less than 4 weeks	1.5H:1V	1.5H:1V	Not expected due to limited thickness of material
	More than 4 weeks	2H:1V	2H:1V	
RS	Less than 4 weeks	1H:1V	1.25H:1V	Same slope angle as per 1.5m < H ≤ 3.5m. However, all excavations greater than 3.5m in vertical height must have a minimum 1.5m wide bench.
	More than 4 weeks	1.5H:1V	2H:1V	
Tuff (VL-M)	n/a	1H:2V	1H:1.5V	
Tuff (M-H)	n/a	1H:3V	1H:2V	

10 Excavability

The materials present within the proposed basement excavation are expected to comprise surface fill, residual soils and variably weathered Tuff (Tuff VL-M, Tuff M-H and Tuff H-VH).

We have carried out an assessment of material excavatability based on the method proposed by Pettifer and Fookes[7] along with the experience of EDG staff gained on similar projects. The methods consider the material rock strength and defect characteristics. The outcomes of the assessment are summarised in Table 9 and shown on Figure 6.

Table 9 – Excavaeability Summary

Material Unit(s)	Estimated Excavatability Conditions
Fill Residual Soil	Soil materials within cuts are expected to be readily excavated using excavators.
Tuff VL-M Tuff M-H	Rock excavation is expected to be achievable by hard digging and/or ripping, which may be hard ripping. Rock hammer may be required in areas of higher strength.
Tuff H-VH	Hard or very hard ripping may be required to excavate rock. Rock hammer is expected to be required in higher strength areas and within local excavations such as lift overrun pits and for shallow foundations.

Although not confirmed at this stage, it is likely that lift core overrun pits and local excavations would be included in the building design, that may extend approximately 2m to 3m below the lowest basement slab. Such excavations are expected to be within the high to very high strength rock (Tuff H-VH) and would likely require excavation using rock hammers. Specialist advice relating to the vibrations associated with the use of rock hammers and its impact on the Clem7 tunnels and nearby infrastructure may be required.

[7] Pettifer, G.S. and Fookes, P.G., 1994. A revision of the graphical method for assessing the excavatability of rock. Quarterly Journal of Engineering Geology and Hydrogeology, 27(2), pp.145-164.

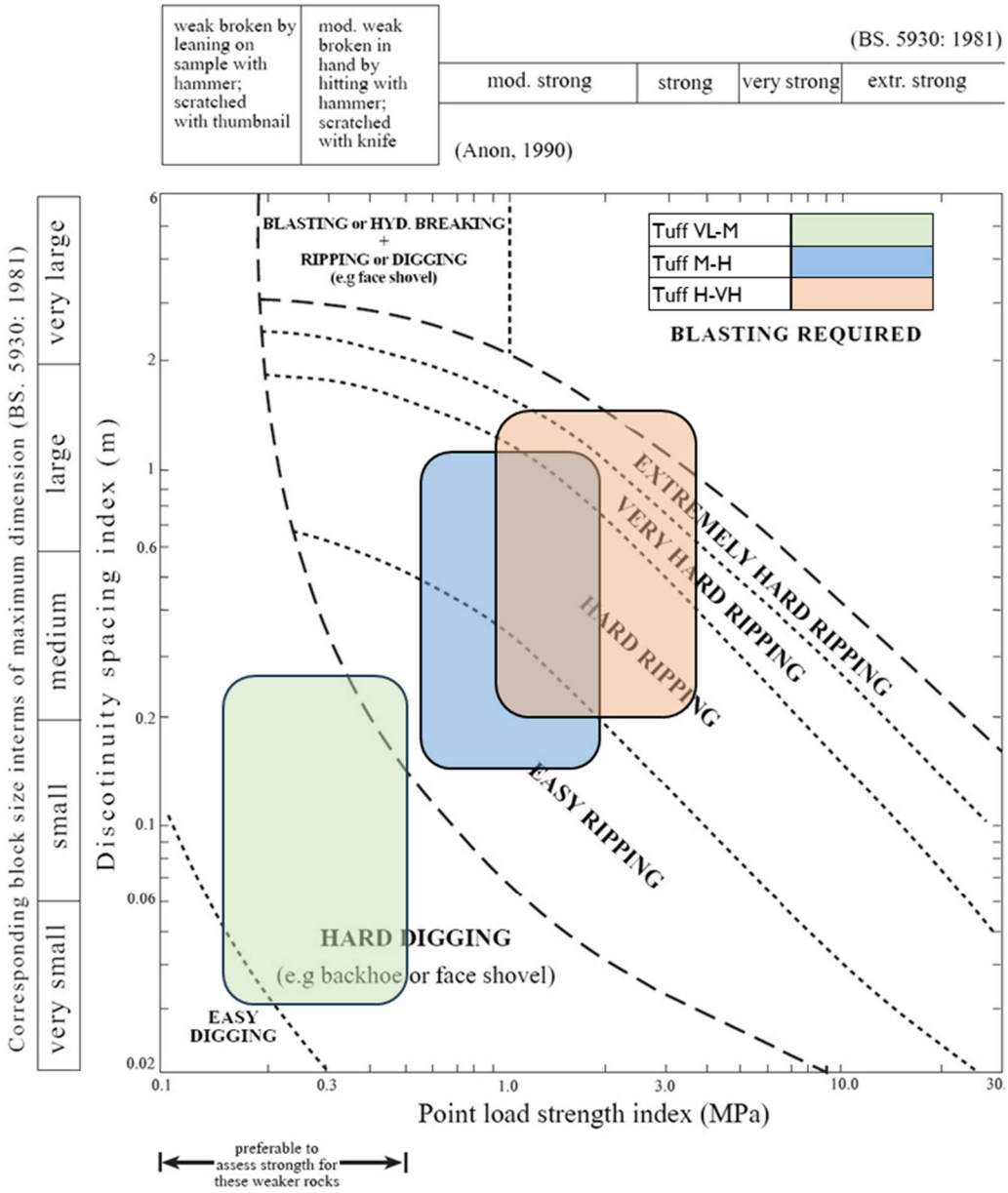

Figure 6 – Excavatability Assessment

11 Slabs on Ground

11.1 Slabs at Ground Level

The subgrade material present at or close to existing ground level is expected to comprise Fill (F) and/or Residual Soil (RS). Should slabs be required at existing surface level, additional in-situ testing comprising test pits, Dynamic Cone Penetrometer (DCP) and laboratory testing would be required to assess the site California Bearing Ratio (CBR) at the locations of the proposed slabs.

For the purposes of preliminary design, in advance of additional testing, we would recommend that at least 250mm of a pavement quality coarse grained fill (such as an MRTS05 compliant Type 2.3 fill) be placed and compacted beneath the proposed slab, to achieve a subgrade design CBR value of ≥ 3%.

11.2 Basement Slabs

The subgrade beneath the proposed basement excavations is expected to comprise variably weathered Tuff, varying from medium to high strength (Tuff M-H), to high to very high strength (Tuff H-VH).

Weathered Tuff (Tuff M-H or better) is considered a suitable subgrade for the basement floor slabs, although there is the potential for extremely weathered materials to deteriorate after wetting and/or trafficking. Preparation procedures to be adopted include excavation to design level, the removal of any loose debris or water softened materials followed by a visual assessment to confirm the suitability of the exposed subgrade prior to placement of the drainage layer / blinding concrete.

12 Earthquake Subsoil Class

Based on our interpretation of the ground conditions, the site sub-soil class is classified as Class B_e – Rock in accordance with Section 4 of AS 1170.4-2007, when considering the materials below the proposed foundation level (approx. RL 8m AHD) and below.

The materials above foundation level, i.e. the materials in contact with the retention system are firm to stiff soils and are therefore consistent with Class C_e – Shallow soil site. The structural designer should therefore consider additional damping/amplification effects associated with the soils in the retention system design.

13 Acid Sulphate Soil

We have undertaken a review of acid sulphate soil using the 1:100,000 acid sulphate overlay available online via Queensland Globe. Based on our review the site is not within the acid sulphate soil overlay boundaries and therefore we interpret that acid sulphate soil is unlikely to be present within the site.

During the geotechnical investigation, soil samples will be collected specifically for acid sulphate testing to further assess the presence of acid sulphate soil across the site.

14 Clem7 TLDM Requirements

The detailed design of the permanent lining of the Clem7 tunnel is outlined in the Tunnel Lining Design Manual[8] (TLDM). The nominated design constraints associated with future building loads and excavation within vicinity of the Clem7 infrastructure are summarised in Figure 7.

[8] LBBJV. February 2007. *North South Bypass Tunnel. Design Lot No. 0115 – Stage 2 – Detailed Design. Zone 0: Across All Zones. Design Manual Tunnel Lining*. Report No. NSBT-0115-TU-RP-004184[00].

Table 1: Loading and excavation design constraints

Additional Vertical and Lateral Loading	Excavations
Building vertical loading: (i) up to net 50 kPa (working load) acting on the ground at a level of 1m above the tunnel crown and in uniform and patterned (including symmetric and unsymmetrical) arrangements which give the most unfavourable loading condition on the tunnel; and (ii) allow for buildup of surface level with a minimum of one metre of fill equivalent to 20 kPa.	**Continuous excavations:** (i) up to 14m below natural surface for developable properties or developable land between Baildon St, Kangaroo Point and St Pauls Terrace, Fortitude Valley; and (ii) up to 7m below natural surface for developable properties or developable land at locations other than those listed in item (i) above; and (iii) with a minimum of 7m residual ground cover above the extrados of the tunnel crown; and (iv) with a minimum 7m pillar width between the extrados of the side wall of the tunnel and any adjacent building basement excavation.

Figure 7 – Clem7 Loading and Excavation Design Constraints

As per the TLDM, in addition to the existing rock, earth and groundwater loads, the tunnel lining has been designed to accommodate additional loads resulting from future building developments. The allowance considered by the tunnel lining engineer is an additional load of 50kN/m^2 acting at a reference level of 1m above the tunnel crown.

Allowance for excavations permits up to 7m provided at least 7m (height) of residual ground cover exists above the tunnel extrados (as defined in Figure 8) and at least 7m (width) of rock pillar exists between the extrados of the side wall of the tunnel and any future building basement excavation.

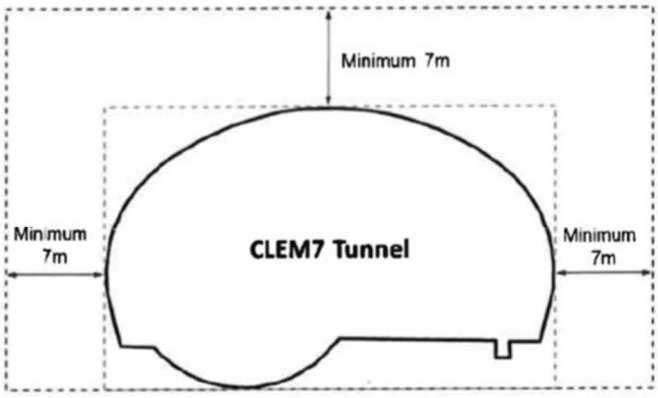

Figure 2 – CLEM7 Tunnel Extrados Excavation Exclusion Zone Planning Requirements

Figure 8 – Clem7 Tunnel Exclusion Zone

15 Preliminary Finite Element Assessment

15.1 Analysis Methodology

To provide a comparison between the TLDM design criteria and the effects of the proposed building loads, we have developed a preliminary 3D finite element model to assess the ground stresses associated with the proposed building loads at a reference level of 1m above the tunnel crown.

The finite element model is considered as simplified as this stage as the ground model is interpreted from limited geotechnical investigation data and the structural loads have been generated from an preliminary structural model. In the detailed design stage, the ground conditions would be based on additional geotechnical investigations and the model would incorporate loads from a more developed structural model, which would include wind loads assessed from wind tunnel testing.

The assessment adopts the process shown in Figure 9.

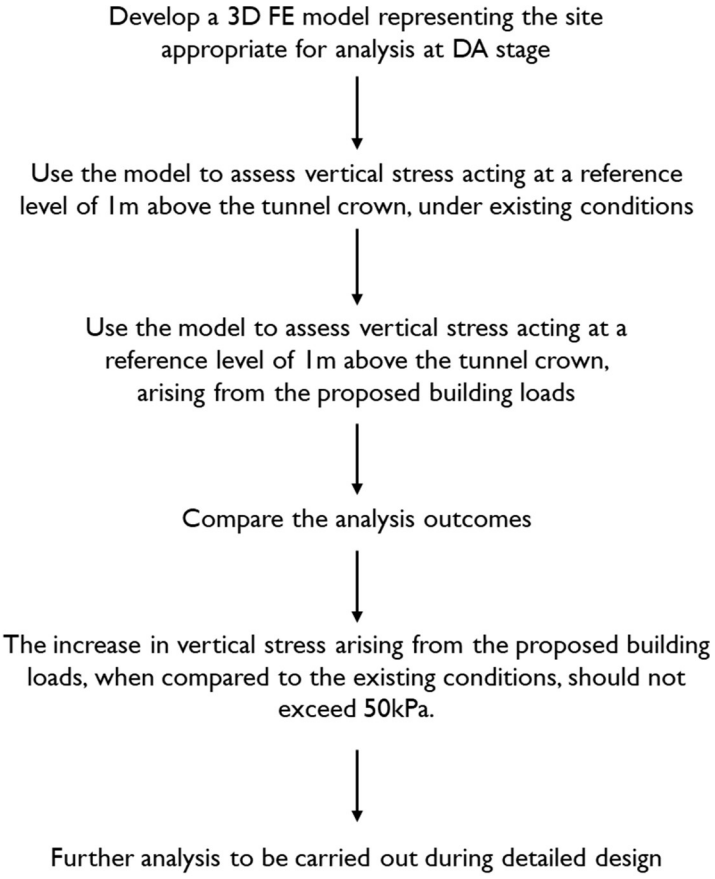

Figure 9 – Analysis Process

15.2 Model Calibration

We have carried out the following comparisons to gain confidence that the modelling and geotechnical analysis carried out as part of the Clem7 design and the modelling as part of this assessment are similar:

- The ground stratigraphy adopted for this assessment was compared with the ground stratigraphy adopted for the Clem7 project (as shown in the Clem7 Geotechnical Interpretative Report[9]), and both were assessed to be similar at the tunnel location.
- The soil and rock material parameters adopted in our assessment were all similar to those adopted for the Clem7 project, as presented in the Clem7 Geotechnical Interpretative Report.

15.3 Finite Element Model Inputs

The preliminary model adopted soil and rock profiles that are consistent with the ground stratigraphy presented on the interpreted geological cross sections presented in Drawings B01554-1AF_001 to B01554-1AF_005.

Soil and rock behaviour was represented by a linear-elastic perfectly plastic continuum constitutive model for all materials. Plasticity was controlled by a stress-dependent Mohr-Coulomb failure criterion for all soil types, based on the material parameters presented in Table 3 and Table 4. Drained shear strength parameters were used for all materials in all stages.

Structural loads were defined by RBG and presented in a loading plan showing both the magnitude and location of the applied loads. A working load combination comprising 1.0G (dead load) and 0.7Q (live load), together with a 10% contingency factor, was adopted for the finite element assessment, resulting in an overall load combination of 1.1(G+0.7Q).

In the finite element model, the structural loads were modelled as follows:

- Columns loads were modelled as individual point loads.
- Wall loads were modelled as line loads along the length of each wall.
- Core loads were modelled as a uniformly distributed load (UDL) over the core footprint area.

15.4 Groundwater Inputs

We have adopted a groundwater level of 8m below existing surface level (see Section 5 of this report for additional information and basis).

15.5 Structural Elements

Details of the structural elements used in the analysis are presented in Table 10.

Table 10 – Finite Element Model Structural Elements

Component	Plaxis Element Type	Details
Shallow Foundation Footing – Columns	Plate	Shallow foundation footings for the podium columns are modelled as 3m (length) x 3m (width) x 1.0m (thick) plate elements. An elastic modulus value of 32.8GPa has been assigned to all plates.

[9] Golder Associates. August 2009. North South Bypass Tunnel. Design Lot. 0802. Zone 0 Across All Zones. Geotechnical Interpretative Report – Driven Tunnels. Report No. NSBT-0802-GT-RP-055005[05].

Component	Plaxis Element Type	Details
Core Slab	Plate	Core slabs for the tower cores are modelled as 1.5m (thick) plate elements. The length and width for each core varies but are generally consistent with the footprint dimensions shown on the loading plan (see Appendix B). An elastic modulus value of 32.8GPa has been assigned to all plates.
Piles	Embedded Beam	All piles are modelled as 1.0m diameter embedded beams. An elastic modulus value of 32.8GPa has been assigned to all beams. Skin friction values as per Section 7 of this report are adopted for the material units. A reduced skin friction value of 50kPa has been allowed for piles within the steel sleeved zones.

The finite element model is shown indicatively in Figure 10 and Figure 11.

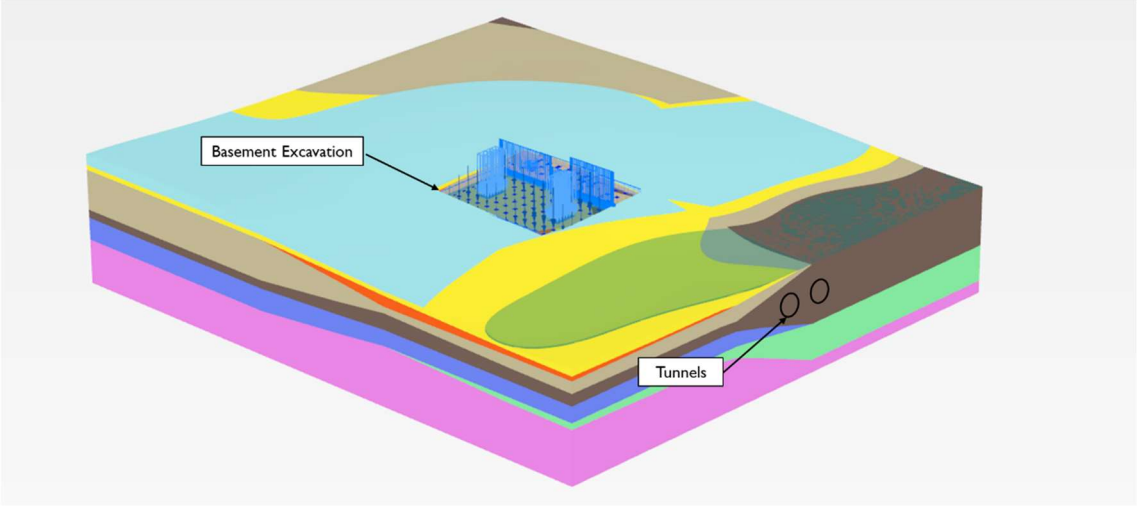

Figure 10 – Finite Element Model (Overall)

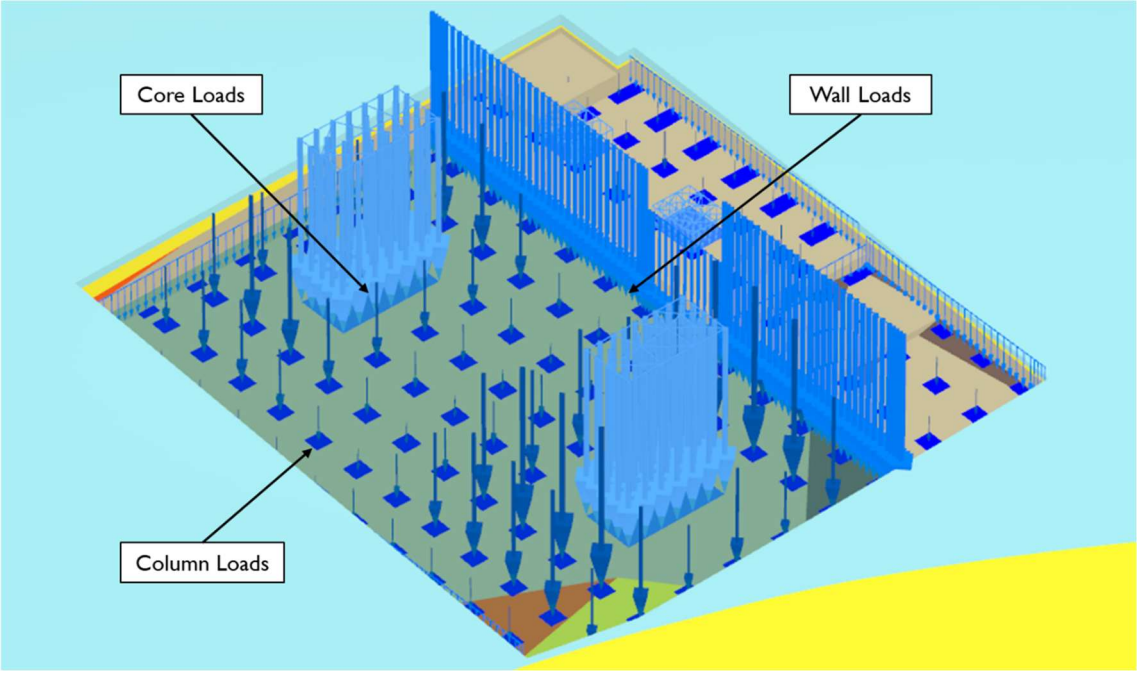

Figure 11 – Finite Element Model (Building Foundations)

15.6 Construction Stages

The analysis adopted the construction stages as presented in Table 11.

Table 11 – Construction Stages

Analysis Stage	Description	Details
1	Initial Stage	Initial stresses are defined in the model using the K_0 procedure.
2	Tunnel Excavation	The tunnels are excavated across the model. Stress relaxation of the tunnel is represented using the ΣM_{Stage} factor.
3	Basement Excavation	The basement excavation for the proposed building is excavated.
4	Shallow footings, core slabs and piles (subject to analysis case) installation	Shallow footings, core slabs and piles (subject to analysis case) are installed in a single stage. The shallow footings and core slabs are modelled as plate elements. The individual piles are modelled as embedded beam rows.
5	Apply loading	Individual point loads, line loads and uniformly distributed loads for the columns, walls and cores, as provided by RBG, are applied.

15.7 Tunnel Construction

We have made allowance for the progressive installation of segmental lining by assessing the stress relaxation prior to support installation following the method by Hoek (2008). This method assesses the proportion of convergence experienced at a point of interest back from the tunnel face. Using this method, we are able to estimate the relative proportion of convergence due to tunnelling that would have occurred prior to installation of the segmental lining. The proportion of total convergence at each analysis stage is considered in the Finite Element (FE) analysis via the Plaxis "M_{Stage}" factor input.

For TBM tunnels, the advance length is typically large compared to the tunnel diameter. As such, significant convergence is expected to occur prior to installation of the segmental lining. Therefore, we have adopted a M_{Stage} factor of one in our finite element assessment, which therefore allows all tunnel convergence to occur prior to installation of the TBM lining.

15.8 Sleeved Piles

All walls and columns along architectural grid "Guideline H" are founded on sleeved piled foundations. The purpose of the sleeved piles is to limit the transfer of structural loads to the rock mass within the sleeved section, and therefore transfer structural loads deeper into the rock mass and further away from the Clem 7 tunnels.

Within the sleeved section of the piles, a reduced skin friction has been adopted, with a value of 50kPa applied within these zones. The steel sleeves extend 15m below the bulk excavation level, which extends past the crown of the tunnel.

The tower columns which are founded on sleeved piled foundations in Case 2 are highlighted in Figure 12.

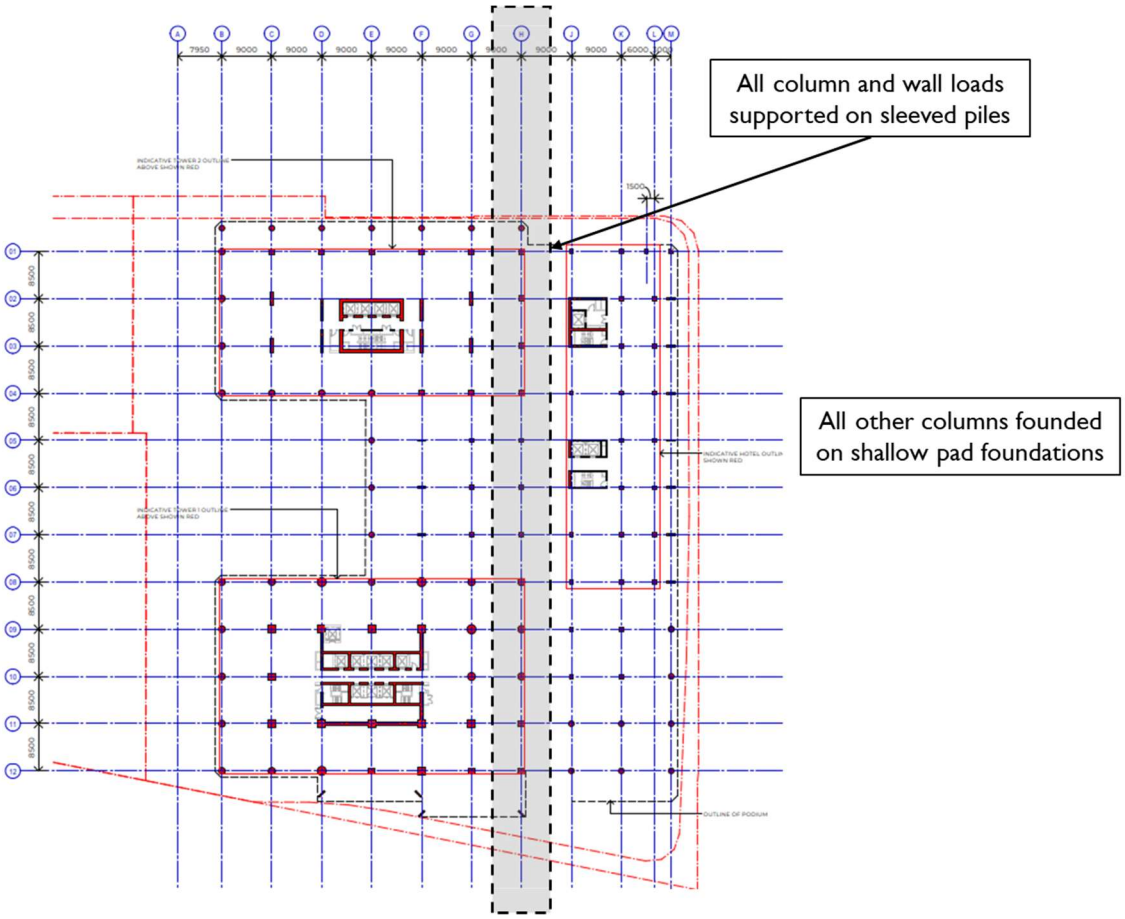

Figure 12 – Building Plan Showing Location of Sleeved Piled Foundations

15.9 Analysis Results

In accordance with the TLDM requirements, we have extracted the vertical stress at a reference level of 1m above the tunnel crown. The results of our assessment are presented graphically as contour plots on Figure B2 to B4 in Appendix B and are discussed below.

Values of vertical stress are presented in terms of relative change (or delta). The delta values are the change in vertical stress following excavation of the tunnels (i.e. they reflect the additional vertical stress from the basement excavation and building loads).

Figure B2 presents an overall view of the increase in vertical stress across the entire site. Figure B3 and B4 provide zoomed-in views along the southern side and northern side of the site, respectively, above the Clem7 tunnels.

Our assessment indicates that the increase in vertical stress 1m above the tunnel crown remains within the TLDM nominated limit of 50kPa.

The exact arrangement of the sleeved pile foundations will be further developed and confirmed during the detailed design stage. It will likely comprise of a bored pile with the upper section lined with a permanent steel liner.

16 Construction Comments

The geotechnical aspects of the works are expected to encounter several challenges during construction. A commentary on construction issues / requirements identified at this stage is provided in the following sections.

16.1 Piling

At this stage the retention system walls may comprise soldier piles. Excavation associated with construction of the retention system is expected to extend through fill, residual soil and variable weathered rock units, increasing in strength from very low to high. Verification of pile socket material as well as socket sidewall and base cleanliness would be required during construction by an experienced geotechnical engineer.

16.2 Shallow Footings

Several shallow footings may be constructed to support the permanent building loads. Following excavation of the footings, geotechnical assessment must be carried out by an experienced geotechnical professional to verify that the design requirements have been achieved. Assessments would be carried out using visual and tactile methods.

16.3 Anchors

Construction of ground anchors should be carried out in accordance with an appropriate specification such as TfNSW B114.

Anchors should be proof loaded and tested during construction to ensure that design loads are being achieved. At least three sacrificial proof tests should be carried out in each unit that the anchors are bonded into (Tuff VL-M, Tuff M-H and Tuff H-VH). Every anchor should be subject to acceptance test and/or suitability test depending on the specification adopted for the works.

17 Geotechnical Investigations

The advice presented in this document has considered the available geotechnical investigation data predominantly undertaken as part of the CRR and Clem7 project. Additional geotechnical investigations will therefore be required to verify the geotechnical conditions considered in the building design, and will be carried out during subsequent design stages.

The actual scope of the additional geotechnical investigation will be confirmed during the geotechnical investigation phase, however is expected to comprise approximately 12 rotary cored boreholes and in situ and laboratory testing to provide information on soil and rock strength, stiffness parameters. To assess groundwater levels, standpipe piezometers will be installed in several of the rotary cored boreholes. The approximate locations of the 12 additional proposed investigations are shown in Appendix D in blue. Existing boreholes are shown in white.

18 Risks and Limitations

There are several key geotechnical risks that are identified at this stage and will be investigated further in the detailed design stage. A commentary on key geotechnical risks and limitations associated with this stage of geotechnical assessment is provided in Table 12.

Table 12 – Risk and Limitations

Issue	Discussion
Interpretation of ground conditions	To help reduce uncertainty and risk associated with the interpretation of ground conditions, additional geotechnical investigation is recommended and is expected to be carried out during subsequent design stages. In particular, limited information is available for the unconformity material unit (UC) between the underlying Neranleigh Fernvale Group and the overlying Tuff. Further investigation targeting this material unit will be required.
Groundwater levels	It is expected that the site groundwater conditions have been affected by construction of the adjacent Woolloongabba Station Cavern. The extent of groundwater drawdown due to the construction of the drained cavern is unclear. It will be required to confirm the local groundwater conditions during subsequent design stages. Definition of site groundwater levels would be a requirement of the additional geotechnical investigation.
Surface settlements behind retention system	Note that no detailed soil-structure interaction analyses for the retention system have been carried out at this stage and therefore ground surface settlements will be assessed during subsequent design stages for assessment of the performance of any sensitive buried infrastructure.
Ground-borne vibrations affecting tunnels	The proposed construction works may cause ground-borne vibrations that have the potential to affect the tunnel linings. We would recommend that specialist advice is sought on ground-borne vibrations relating to the specific site details and proposed construction equipment be sought during the detailed design stage. Construction stage work may include monitoring of vibrations on-site associated with bored piling and rock excavation activities and re-calibrating the vibration levels for the observed measurements.

For and on behalf of EDG Consulting Pty Ltd

David Cunliffe
Senior Principal

Ground conditions and the natural environment often present the highest potential risks to project construction and operation. Helping our clients manage their geotechnical risk is fundamental to the role of EDG. We have prepared these notes to assist our clients to understand the information we provide and to help them to manage their risk. Where there is uncertainty about the site, project or geotechnical conditions, contact EDG for assistance.

Scope of Services

The information provided in this document is based on the scope of services defined in the client's agreement with EDG Consulting Pty Ltd (EDG). In undertaking the work, EDG has relied on information provided by the client and other individuals and organisations. Unless stated in the document, EDG has not verified the accuracy of that information and does not accept responsibility for the conclusions, recommendations or designs developed based on that information should it be incorrect, misrepresented or withheld.

Unless specifically stated to the contrary, this document does not cover geo-environmental issues, which require significantly different equipment, techniques and personnel. A geo-environmental specialist should be engaged to provide such advice.

The document is based on specific project details

The information provided in this document is relevant to the subject site and project only. The document has been prepared based on the specific details and requirements of your project and may not be relevant if any changes to the project occur. Should changes occur, must review the report to identify if and how such changes will affect the conclusions, recommendations or designs provided. EDG accepts no responsibility if the client elects not to consult in the event of changes to the project.

The document is prepared for a specific purpose

The information in the document has been prepared for specific purposes in relation to the project. The document must not be used for any purpose other than that for which it was prepared unless additional specific advice is sought from EDG. Information contained in the document must not be separated from the document, reproduced or redrawn in any way.

The document is for our client only

The document has been prepared for the benefit of EDG's client only. EDG assumes no responsibility and will not be liable to any other party in relation to the content of the document for any loss or damage suffered. Other parties must not rely upon the document in any way and should make their own enquiries and/or obtain independent advice.

Should you choose to engage an alternative party for advice based on the information in the document, it must be understood that the alternative party will be less familiar with the site conditions and basis of information provided, and there is a potential for misinterpretation. EDG will not be held liable in any way from such misinterpretation.

EDG will not be liable to update or revise the document to take into account information any events or circumstances or facts occurring or becoming apparent after the date of the report.

All site conditions cannot be identified

The scope of work undertaken represents a professional assessment of the information cited to develop a basic geotechnical model of the site based on EDG's understanding of the client's risk profile. In some cases, increasing the frequency of investigations and/or sampling, or considering alternative investigation techniques may improve the interpretation, but may not identify all relevant subsurface conditions at the site.

The document presents an interpretation

Geotechnical information is an interpretation of conditions evident based on a limited number of facts established during a site investigation. Engineering logs are an interpretation of observations of samples and test results at discrete locations in the subsurface profile. A geotechnical model is an interpretation of site conditions, developed using information from discrete locations on the site and an understanding of geological processes. Interpreted conditions at and between investigation locations may be different to those inferred on the engineering logs and geotechnical model. The client must consider how variations in conditions could affect the project and seek advice to reduce risk if it is unacceptable to the client.

Conditions can change

The geotechnical information provided is based on the conditions observed at the time of the investigation. Such conditions may be time dependent and subject to external influences. Many things could influence the site conditions, including geological processes, variation in groundwater or surface water levels, other natural cycles and influence from human activities (on this site or nearby sites). Specific advice should be sought if conditions on site change from those observed at the time the report was prepared.

How to deal with different site conditions

The sub-surface conditions on the site may not be as inferred in this report. Geotechnical uncertainties can be managed throughout the project life cycle, but particularly during construction.

Knowledge of site conditions must be further developed as the ground is exposed during construction and/or operation. It is essential that the client implements the nominated design and construction requirements, including observation, interpretation and assessment of the exposed conditions during construction and operation using skilled staff familiar with the design assumptions and assumed geotechnical conditions, or engaging EDG to undertake this role on your behalf. EDG will not be held liable in any way from such misinterpretation.

Drawings

B01554-1AF_001 – Site Plan

B01554-1AF_002 – Cross Section A

B01554-1AF_003 – Cross Section B

B01554-1AF_004 – Cross Section C

B01554-1AF_005 – Cross Section D

A	INITIAL ISSUE	DL	28/04/2026	DJC
	Revisions/Descriptions	Drawn	Date	Approved

Dwg_Filename.dwg

SURVEY DATA

Coordinate System

Height Datum

Base Plan

1:1000 0 12.5 25m

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE

Drawn	DL
Checked	DJC
Designed	DL
Verified	DJC

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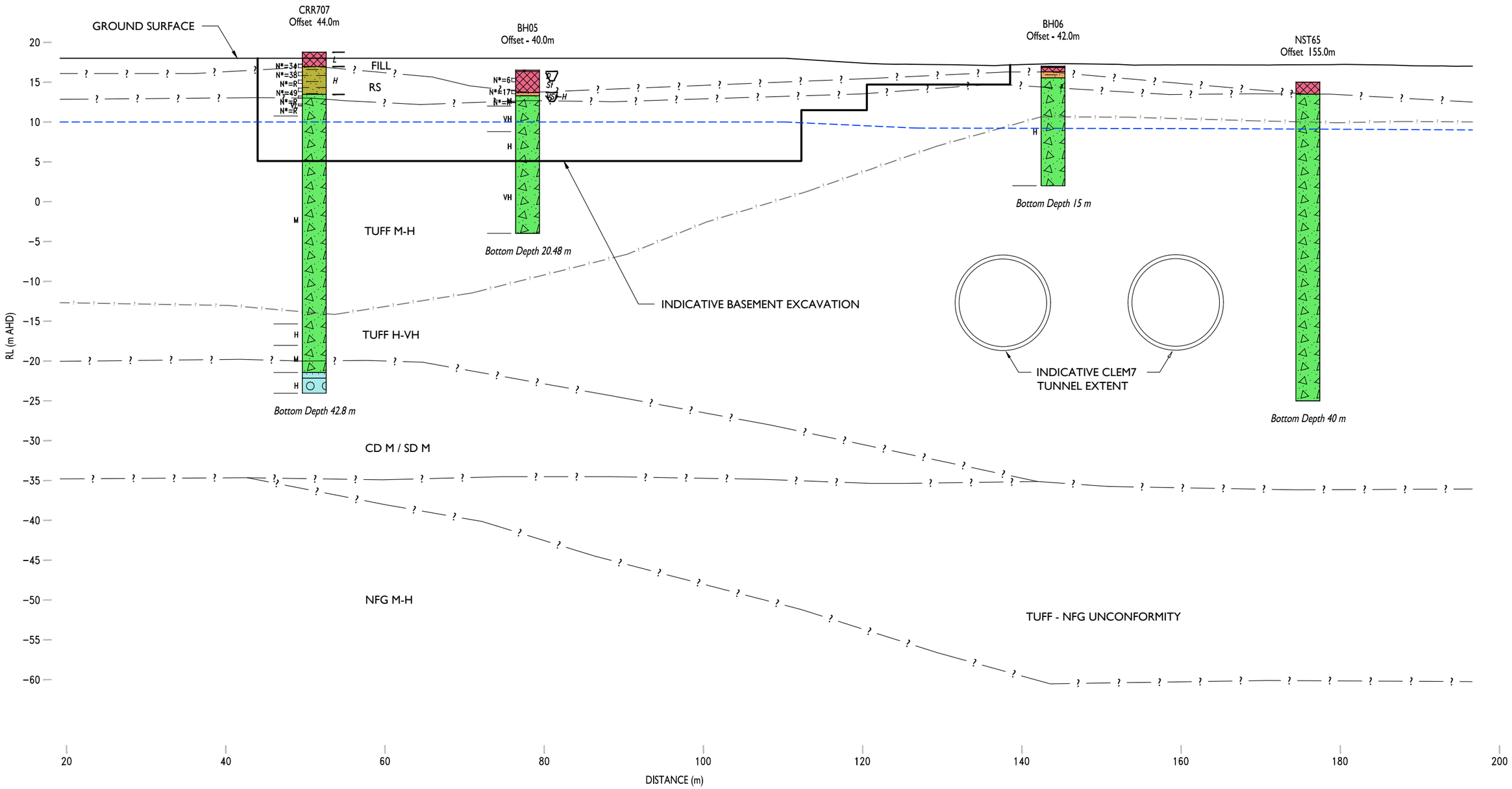
PHILIP USHER CONSTRUCTION
MARK LANE DEVELOPMENT
KANGAROO POINT, BRISBANE
SITE PLAN
PRECINCT 1

Job No.	B01554-1	
DRG No.	B01554-1AF_001	A
Client Ref.	Client Ref.	

File Location:
F:/Projects/B01017-1.....



LEGEND

▽	Water Level
N*=17	Standard Penetration Test Results
pp=40kPa	Undrained Shear Strength from Pocket Penetrometer
VL	Rock Strength (see explanation sheets)
VS/MD	Consistency / Density

FILL
- FILL
- CONCRETE

SOIL
- SAND
- SILT
- CLAY
- SILTY CLAY
- SANDY CLAY

ROCK
- TUFF
- SANDSTONE, MEDIUM, MEDIUM – COARSE GRAINED
- SILTSTONE
- CONGLOMERATE
- ARGILLITE
- PHYLLITE
- CORE LOSS

- INTERPRETED MAJOR UNIT BOUNDARY
- INTERPRETED SUB UNIT BOUNDARY
- INTERPRETED GROUNDWATER LEVEL

- FILL
- RS
- TUFF
- CD M/SD M
- NFG M–H

A	INITIAL ISSUE	DL	28/04/2026	DJC
	Revisions/Descriptions	Drawn	Date	Approved

Dwg_Filename.dwg

SURVEY DATA

Coordinate System

Height Datum

Base Plan

1:500 0 6.25 12.5m

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE

Drawn	DL
Checked	DJC
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MARK LANE DEVELOPMENT
KANGAROO POINT, BRISBANE
CROSS SECTION A
PRECINCT 1

Job No.	B01554-1	
DRG No.	B01554-1AF_002	A
Client Ref.	Client Ref.	

File Location:
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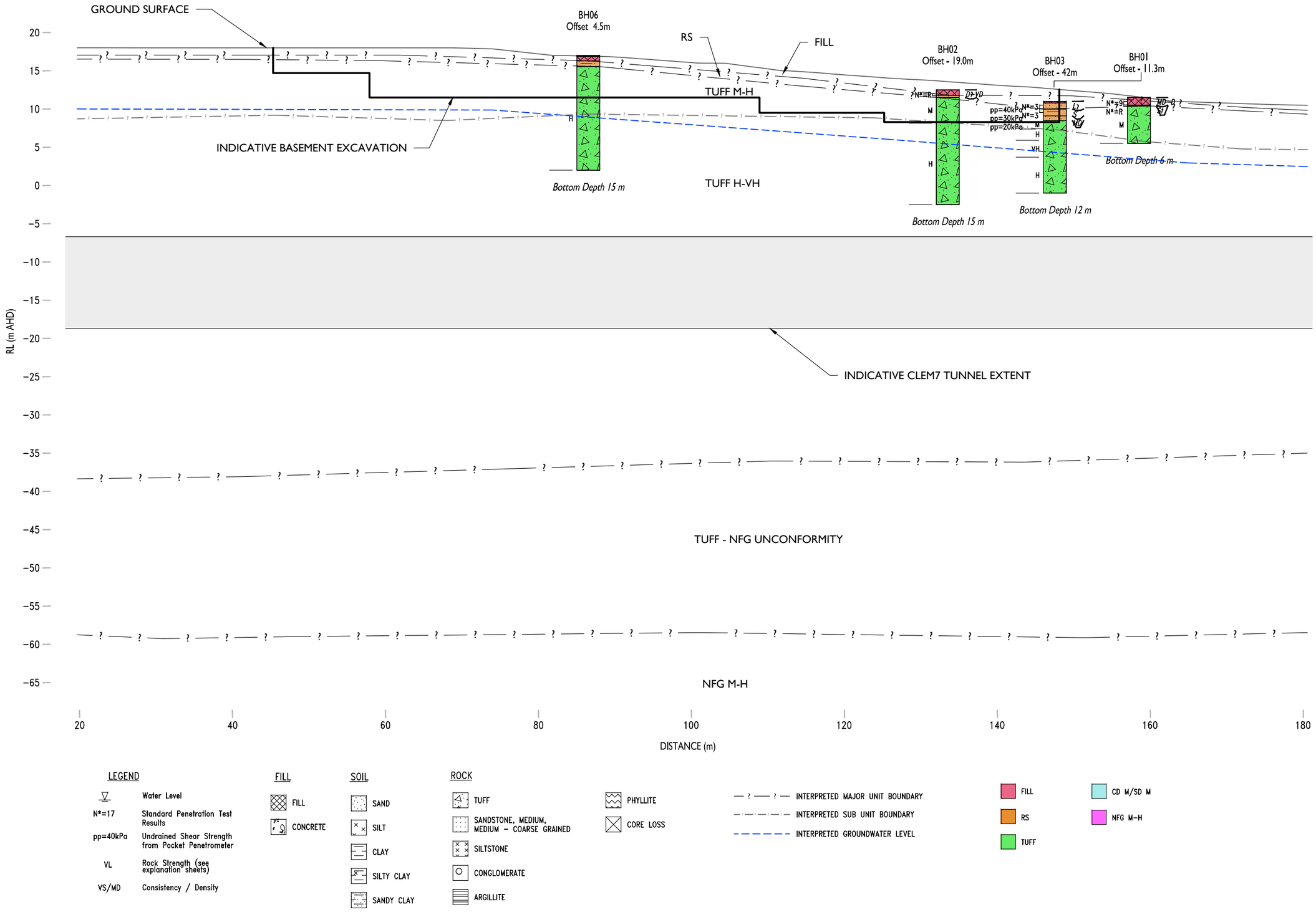

LEGEND

▽	Water Level
N*=17	Standard Penetration Test Results
pp=40kPa	Undrained Shear Strength from Pocket Penetrometer
VL	Rock Strength (see explanation sheets)
VS/MD	Consistency / Density

FILL
- FILL
- CONCRETE

SOIL
- SAND
- SILT
- CLAY
- SILTY CLAY
- SANDY CLAY

ROCK
- TUFF
- SANDSTONE, MEDIUM, MEDIUM – COARSE GRAINED
- SILTSTONE
- CONGLOMERATE
- ARGILLITE
- PHYLLITE
- CORE LOSS

- INTERPRETED MAJOR UNIT BOUNDARY
- INTERPRETED SUB UNIT BOUNDARY
- INTERPRETED GROUNDWATER LEVEL

- FILL
- RS
- TUFF
- CD M/SD M
- NFG M-H

A	INITIAL ISSUE	DL	28/04/2026	DJC
	Revisions/Descriptions	Drawn	Date	Approved

Dwg_Filename.dwg

SURVEY DATA

Coordinate System

Height Datum

Base Plan

1:500 0 6.25 12.5m

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE

Drawn	DL
Checked	DJC
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MARK LANE DEVELOPMENT
KANGAROO POINT, BRISBANE
CROSS SECTION B
PRECINCT 1

Job No.	B01554-1	
DRG No.	B01554-1AF_003	A
Client Ref.	Client Ref.	

File Location:
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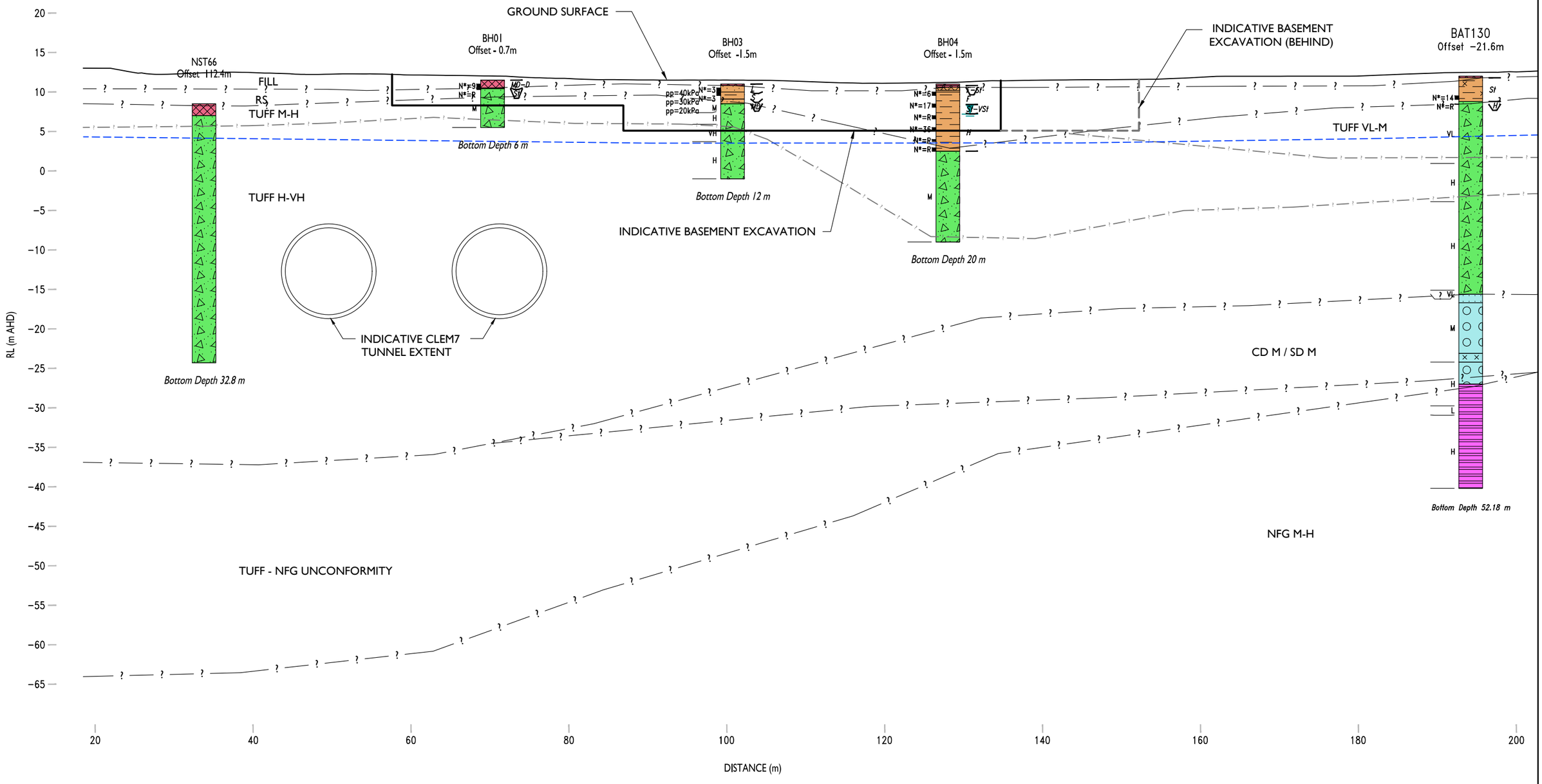

LEGEND

▼	Water Level
N*=17	Standard Penetration Test Results
pp=40kPa	Undrained Shear Strength from Pocket Penetrometer
VL	Rock Strength (see explanation sheets)
VS/MD	Consistency / Density

FILL: FILL; CONCRETE

SOIL: SAND; SILT; CLAY; SILTY CLAY; SANDY CLAY

ROCK: TUFF; SANDSTONE, MEDIUM, MEDIUM – COARSE GRAINED; SILTSTONE; CONGLOMERATE; ARGILLITE; PHYLLITE; CORE LOSS

INTERPRETED MAJOR UNIT BOUNDARY

INTERPRETED SUB UNIT BOUNDARY

INTERPRETED GROUNDWATER LEVEL

FILL; RS; TUFF; CD M/SD M; NFG M-H

A	INITIAL ISSUE	DL	28/04/2026	DJC
	Revisions/Descriptions	Drawn	Date	Approved

Dwg_Filename.dwg

SURVEY DATA

Coordinate System

Height Datum

Base Plan

1:500 0 6.25 12.5m

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE

Drawn	DL
Checked	DJC
Designed	DL
Verified	DJC

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MARK LANE DEVELOPMENT
KANGAROO POINT, BRISBANE
CROSS SECTION C
PRECINCT 1

Job No.	B01554-1	
DRG No.	B01554-1AF_004	A
Client Ref.	Client Ref.	

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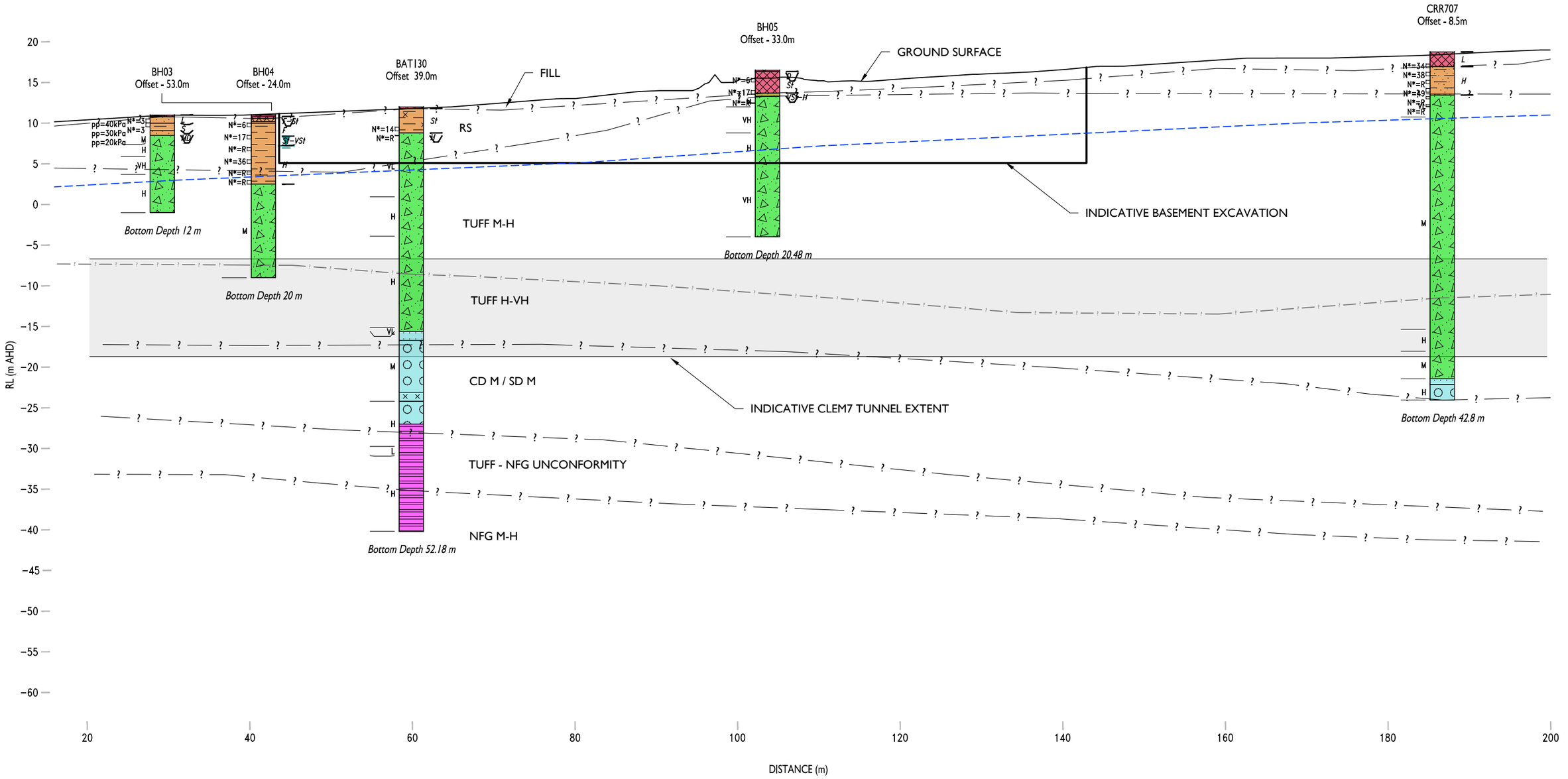

LEGEND

▽	Water Level
N*=17	Standard Penetration Test Results
pp=40kPa	Undrained Shear Strength from Pocket Penetrometer
VL	Rock Strength (see explanation sheets)
VS/MD	Consistency / Density

FILL
- FILL
- CONCRETE

SOIL
- SAND
- SILT
- CLAY
- SILTY CLAY
- SANDY CLAY

ROCK
- TUFF
- SANDSTONE, MEDIUM, MEDIUM – COARSE GRAINED
- SILTSTONE
- CONGLOMERATE
- ARGILLITE
- PHYLLITE
- CORE LOSS

- INTERPRETED MAJOR UNIT BOUNDARY
- INTERPRETED SUB UNIT BOUNDARY
- INTERPRETED GROUNDWATER LEVEL

- FILL
- RS
- TUFF
- CD M/SD M
- NFG M-H

A	INITIAL ISSUE	DL	28/04/2026	DJC
	Revisions/Descriptions	Drawn	Date	Approved

Dwg_Filename.dwg

SURVEY DATA

Coordinate System

Height Datum

Base Plan

1:500 0 6.25 12.5m

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE

Drawn	DL
Checked	DJC
Designed	DL
Verified	DJC

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MARK LANE DEVELOPMENT
KANGAROO POINT, BRISBANE
CROSS SECTION D
PRECINCT 1

Job No.	B01554-1	
DRG No.	B01554-1AF_005	A
Client Ref.	Client Ref.	

File Location:
F:/Projects/B01017-1.___

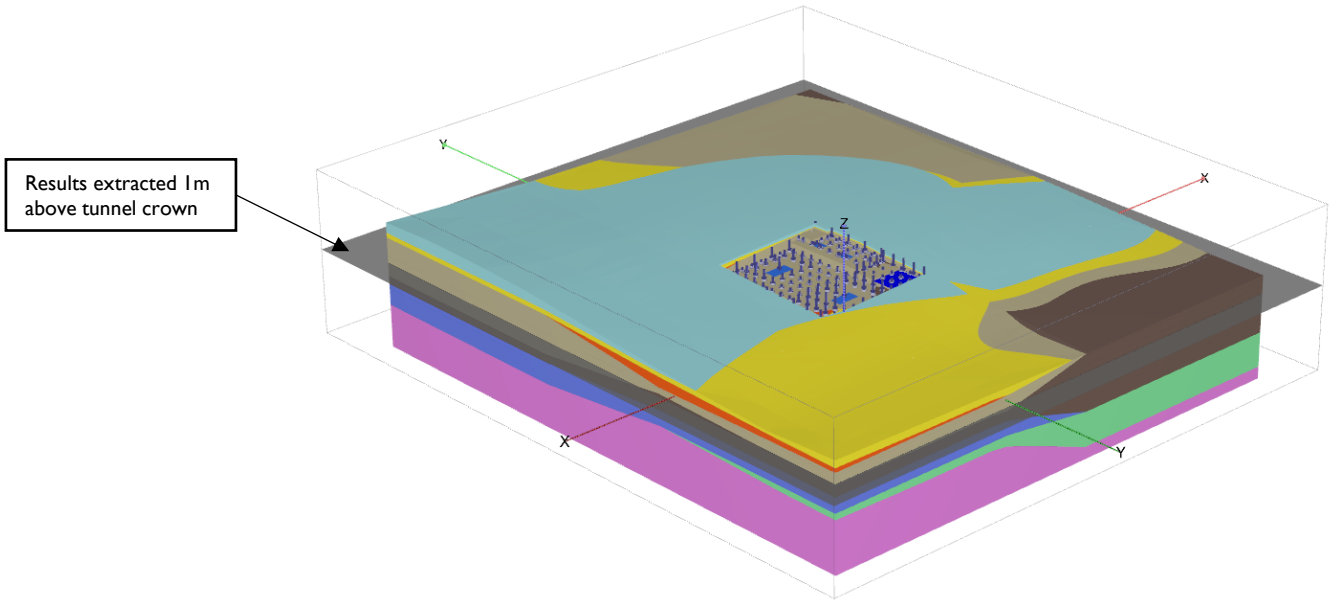
Appendix A

Available Geotechnical Investigations

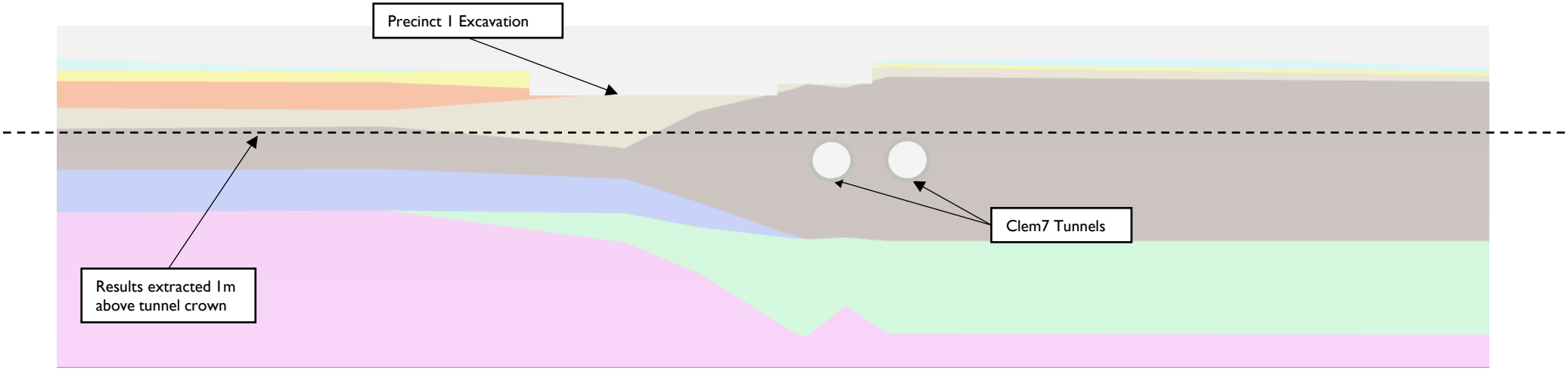
Test Location ID	Easting (GDA94)	Northing (GDA94)	Termination Depth (m)	Surface RL (m)
BAT130	503391.1	6959941.2	52.18	12
BH01	503514	6959924	6	11.5
BH02	503506	6959938	15	12.5
BH03	503483	6959924	12	11
BH04	503455	6959923	20	11
BH05	503462	6959985	20.48	16.5
BH06	503528	6959985	15	17
CRR1017	503359.88	6960024.38	40.55	17.398
CRR1067	503346.714	6959958.328	42	13.953
CRR208	503296.44	6959926.28	42.7	14.15
CRR218	503285	6959923	44.33	14.31
CRR707	503435.2	6960068	42.8	18.76
DP01	503268.6	6959984.9	15.05	19
DP02	503284.2	6959996.1	15	19.1
DP03	503257.4	6959969.5	15.11	18.6
DP04	503281.1	6959967.8	37	15.2
DP05	503268.6	6959955.6	37.25	18.1
NST65	503560	6960182	40	15
NST66	503529	6959812	32.8	8.5
Pit07	503490	6959949	0.65	13.2
Pit08	503473	6959970	2.5	16

Appendix B

Finite Element Assessment Outputs

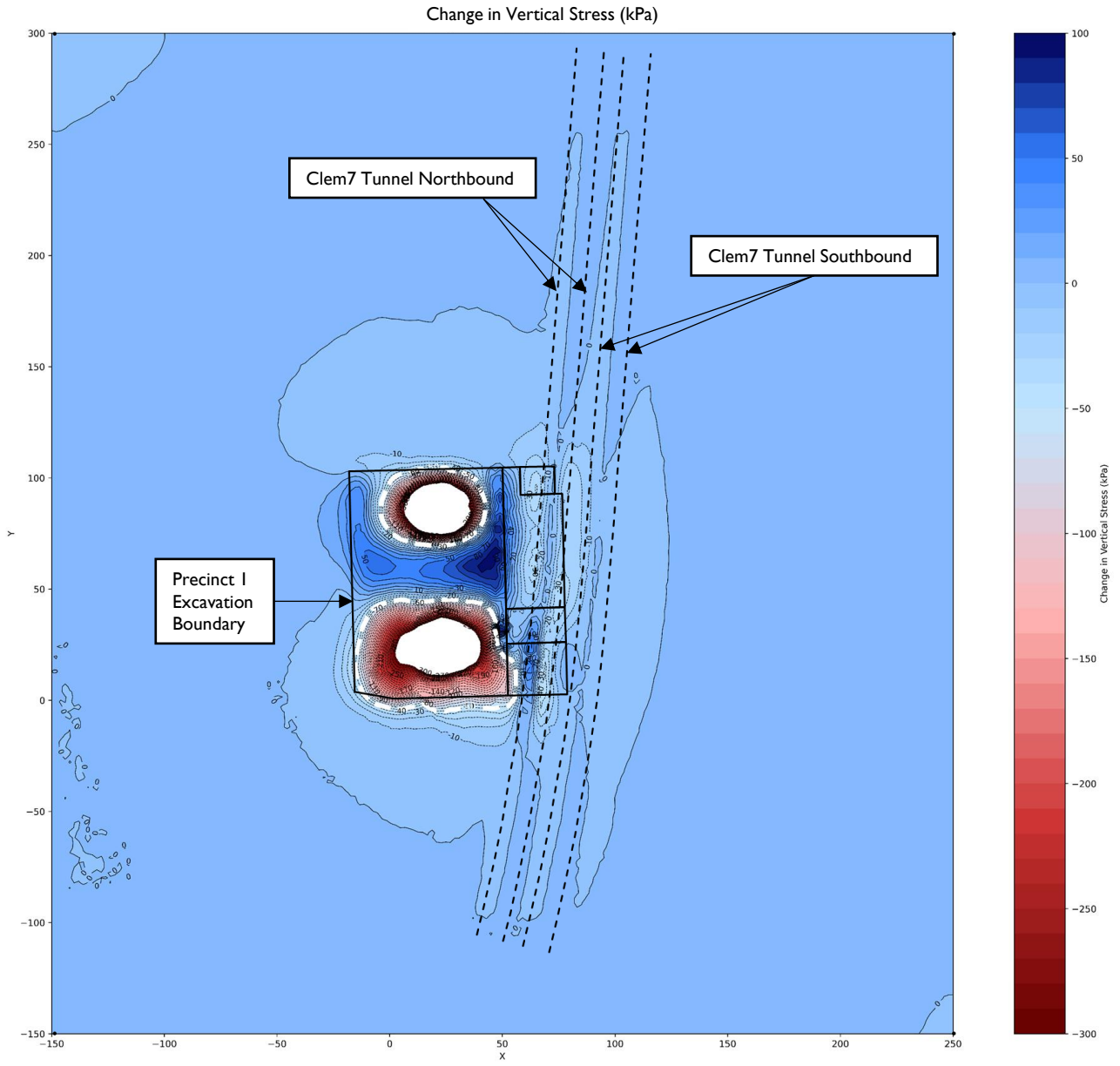


Isometric View



Elevation View

by:	DL	*client:*	Phillip Usher Constructions	EDG consulting engineering | design | geosciences TYPSA Group
date:	30/4/2026	*project:*	Mark Lane Precinct	
approved:	DJC	*location:*	Brisbane, QLD	
scale:	As per axis	*title:*	*Results Extracted 1m above Tunnel Crown*	*figure:* B1
		job no:	B01554-1	



Notes:

- Values shown are the change in vertical stress following excavation of the tunnels (i.e. they reflect the change in vertical stress following basement excavation and application of building loads).
- Negative values represent an increase in vertical compressive stress (i.e. downwards).
- Positive values represent a decrease in vertical compressive stress (i.e. upwards).
- TLDM nominated limit of 50kPa stress increase highlighted in white dash line

by:	DL	*client:*	Phillip Usher Constructions
date:	30/4/2026	*project:*	Mark Lane Precinct
approved:	DJC	*location:*	Brisbane, QLD
scale:	As per axis	*title:*	*Plan - Overall*
		job no:	B01554-1

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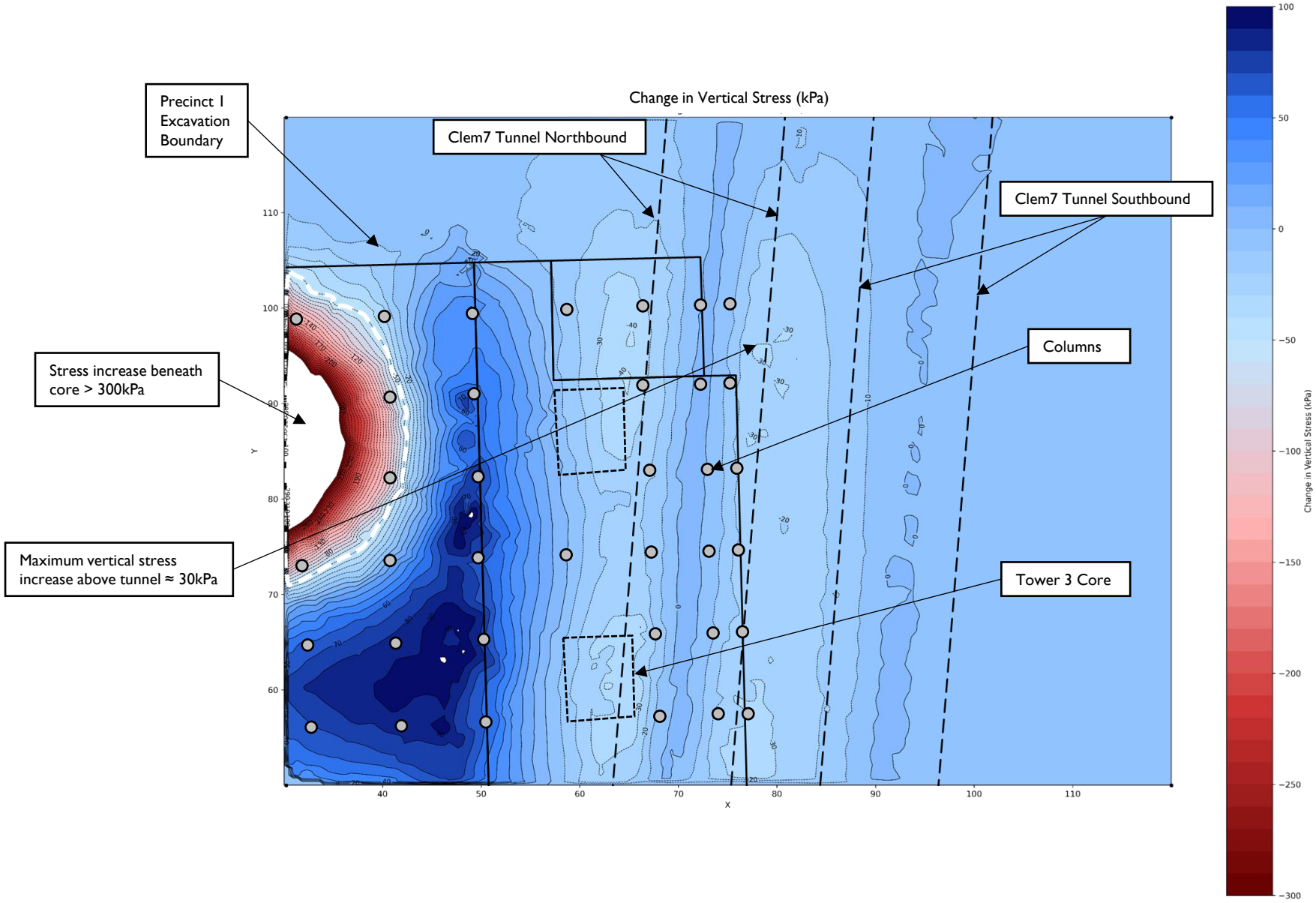
TYPSA Group

figure: B2



Notes:

- Values shown are the change in vertical stress following excavation of the tunnels (i.e. they reflect the change in vertical stress following basement excavation and application of building loads).
- Negative values represent an increase in vertical compressive stress (i.e. downwards).
- Positive values represent a decrease in vertical compressive stress (i.e. upwards).
- TLDM nominated limit of 50kPa stress increase highlighted in white dash line

by:	DL	*client:*	Phillip Usher Constructions
date:	30/4/2026	*project:*	Mark Lane Precinct
approved:	DJC	*location:*	Brisbane, QLD
scale:	As per axis	*title:*	*Plan - North*
		job no:	B01554-1

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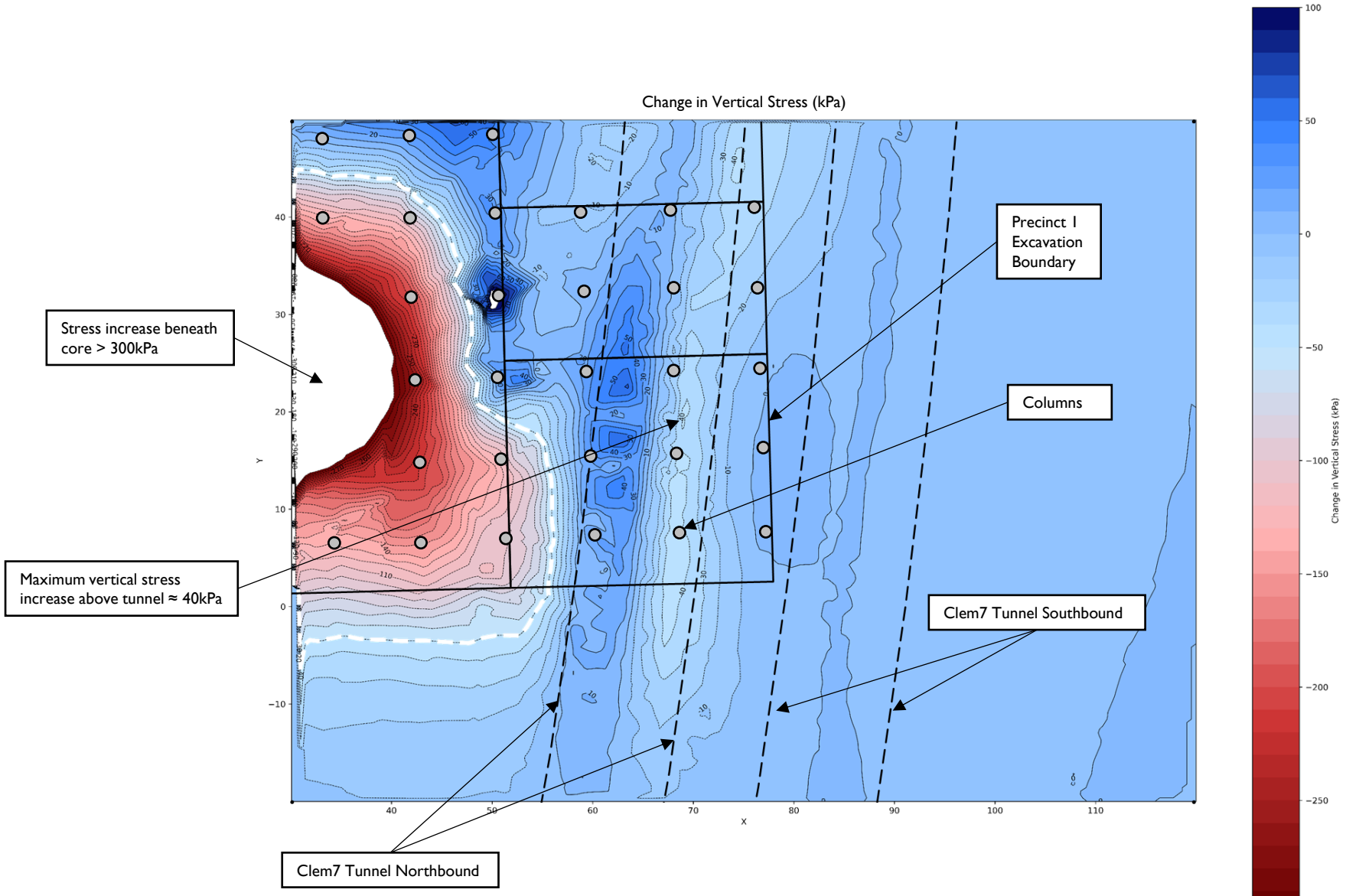
TYPSA Group

figure: B3



Notes:

- Values shown are the change in vertical stress following excavation of the tunnels (i.e. they reflect the change in vertical stress following basement excavation and application of building loads).
- Negative values represent an increase in vertical compressive stress (i.e. downwards).
- Positive values represent a decrease in vertical compressive stress (i.e. upwards).
- TLDM nominated limit of 50kPa stress increase highlighted in white dash line

by:	DL	*client:*	Phillip Usher Constructions
date:	30/4/2026	*project:*	Mark Lane Precinct
approved:	DJC	*location:*	Brisbane, QLD
scale:	As per axis	*title:*	*Plan - South*
		job no:	B01554-1

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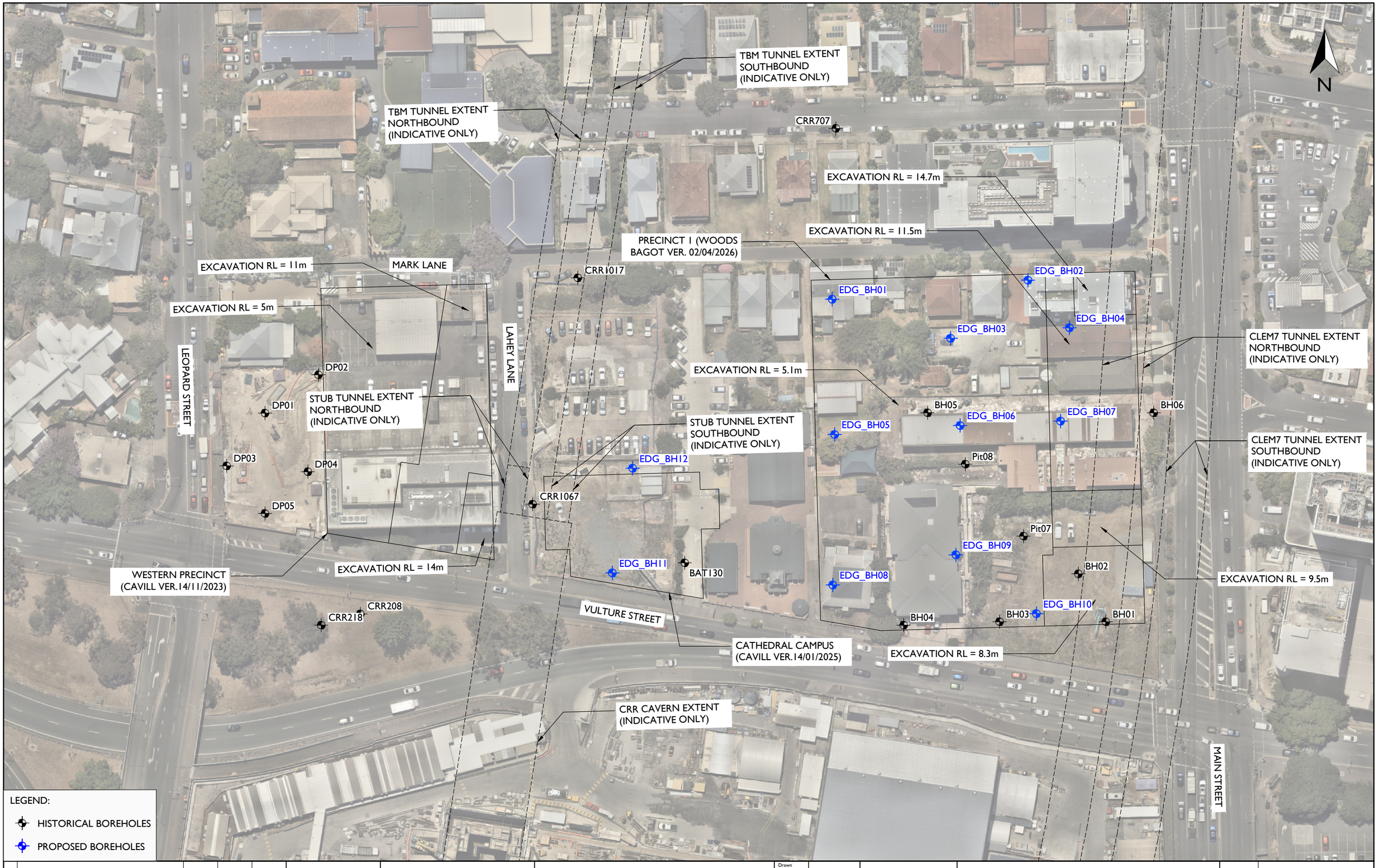
TYPSA Group

figure: B4

Appendix C

Additional Proposed Ground Investigations



A	INITIAL ISSUE	DL	07/04/2026	DJC
	Revisions/Descriptions	Drawn	Date	Approved

Dwg_Filename.dwg

SURVEY DATA

Coordinate System:

Height Datum:

Base Plan:

1:1000 0 12.5 25m

Dimensions shown in metres except where shown otherwise

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	NO.	DATE

Drawn	DL
Checked	DJC
Designed	DL
Verified	DJC

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PHILIP USHER CONSTRUCTION
KANGAROO POINT PRECINCT
KANGAROO POINT, BRISBANE
PROPOSED INVESTIGATIONS PLAN

Job No.	B01554-1	
DRG No.	B01554-1XX_XXX	A
Client Ref.	Client Ref.	

File Location:
F:/Projects/B01017-1.....

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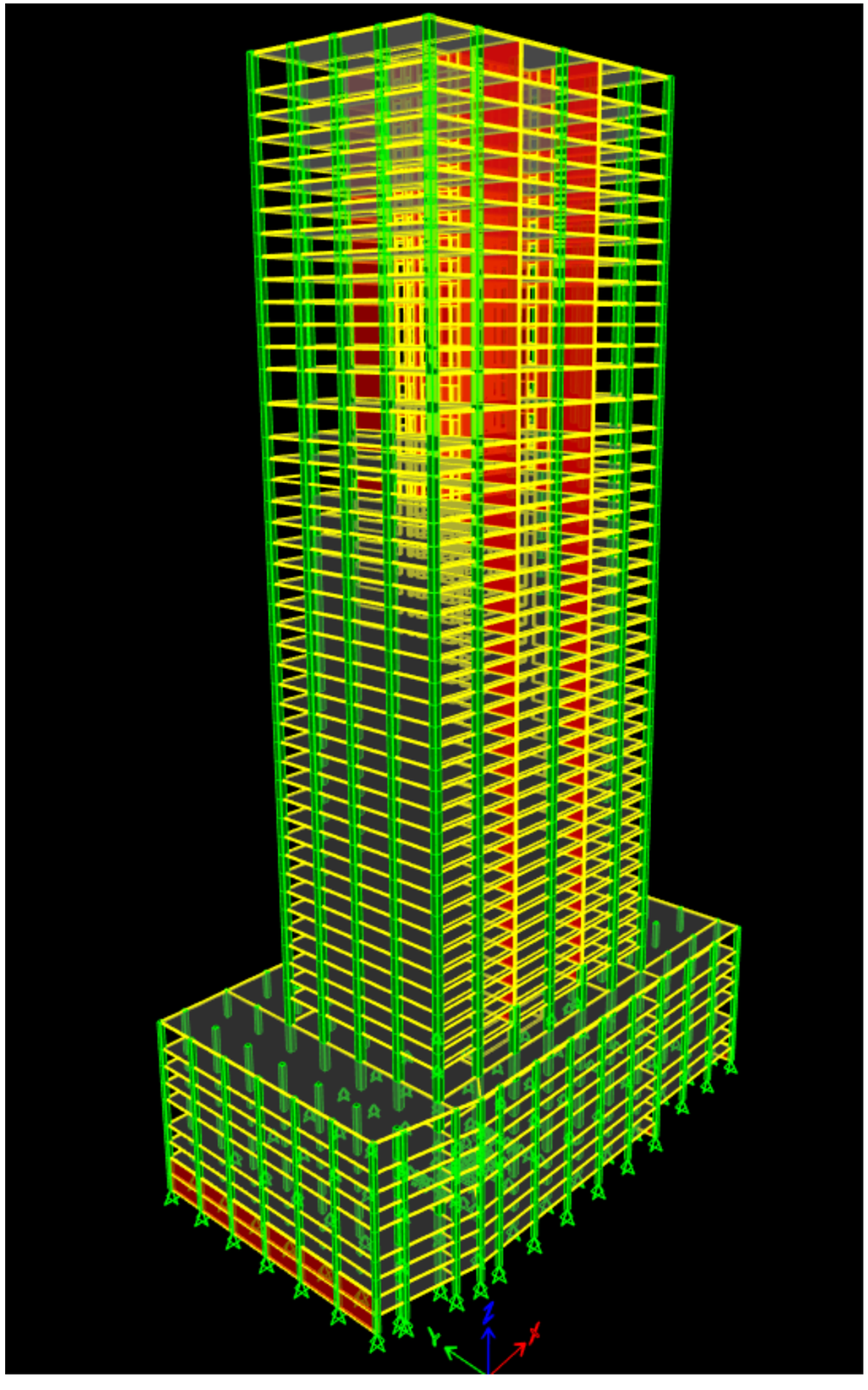
consulting

Appendix C
RBG Footing Loads

Document Number: 22552-RBG-ZZ-XX-RP-ST-00003
Revision: P01

TOWER 1 - Model

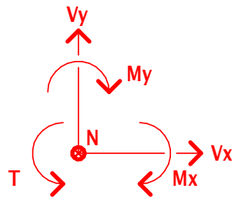


Uniform Load Set:

	SDL/ kPa	LL/kPa
Car Parking	0.5	2.5
Residential	1.5	1.5
Hotel	1.5	2.0
Mixed use	2.5	5
Plant	2.5	7.5
Lobby	1.5	4

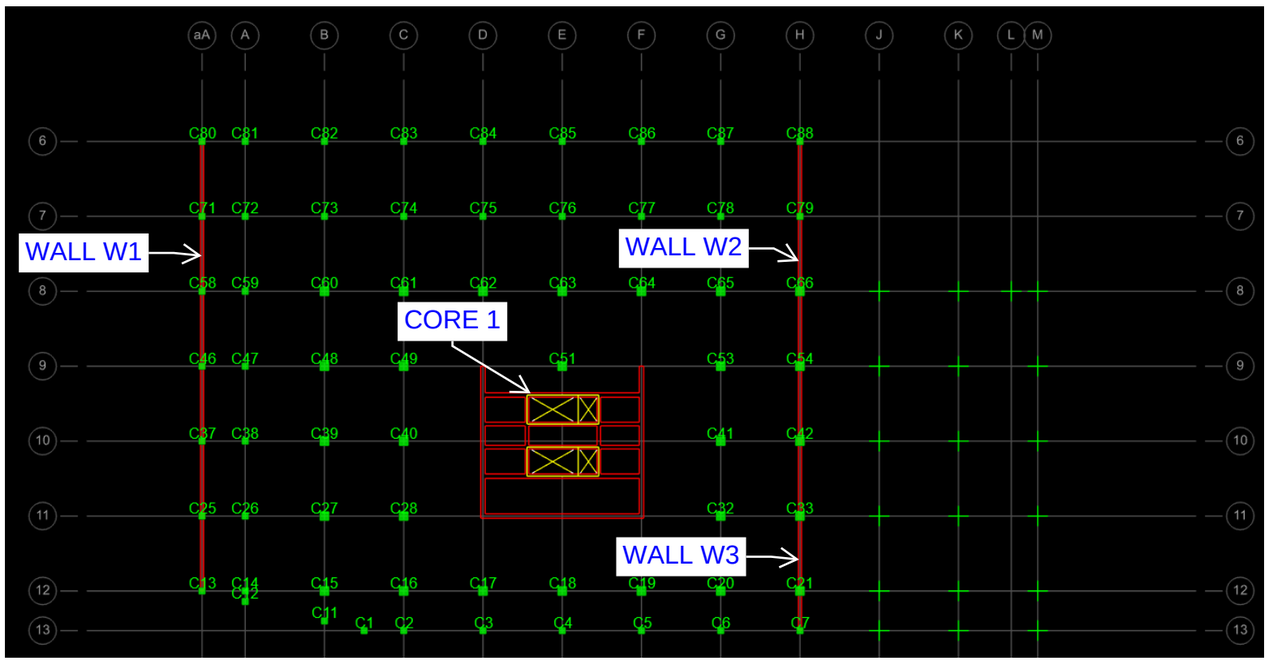
TOWER 1 - Wall and Column labels

Pier Forces Directions

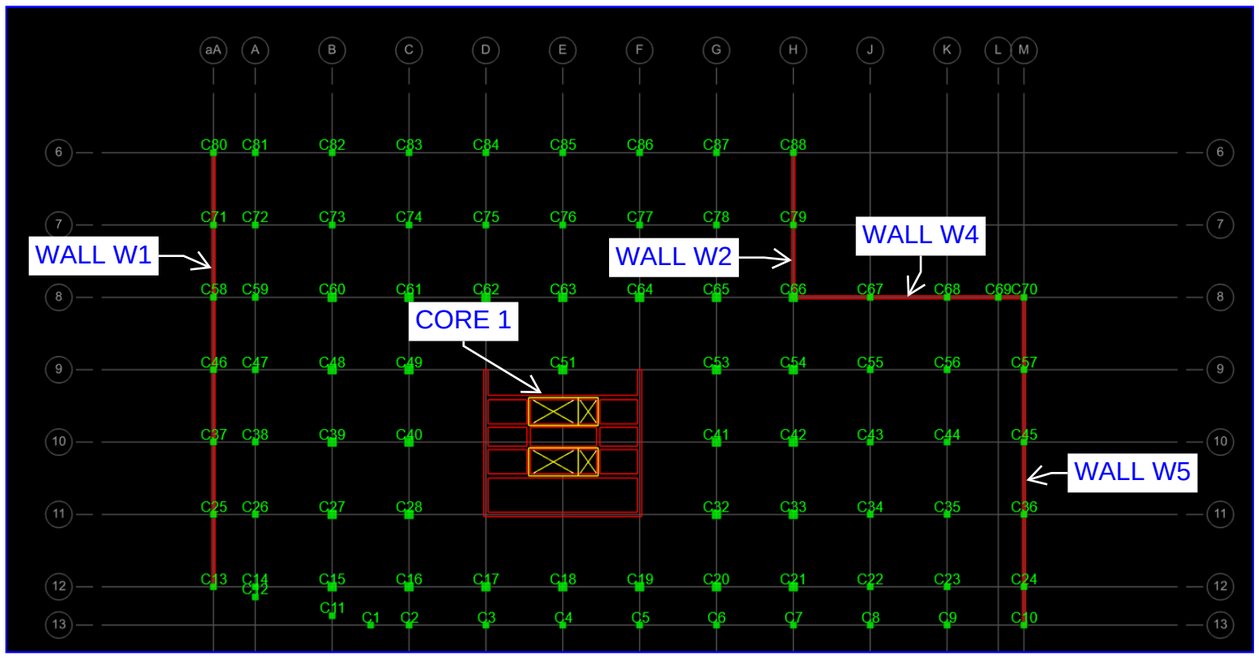


N DENOTES AXIAL LOAD IN VERTICAL DIRECTION
Vx DENOTES LOAD APPLIED IN X DIRECTION
Vy DENOTES LOAD APPLIED IN Y DIRECTION
Mx DENOTES MOMENTS ABOUT X-AXIS
My DENOTES MOMENTS ABOUT Y-AXIS
T DENOTES TORSION ABOUT CENTROID

1. ALL LOADS ARE PROVIDED FOR FOUNDATION PRICING PURPOSES ONLY AND ARE SUBJECT TO CHANGE AS THE CURRENT DESIGN IS AT DA STAGE.
2. SEISMIC LOADS ARE BASED ON A DUCTILITY OF 1 AND STRUCTURAL PERFORMANCE FACTOR OF 1.
3. REFER TO THE APPENDIX FOR THE COLUMNS AND PIERS LOADING SCHEDULE.
4. LOADS PROVIDED FOR ALL COLUMNS AND CORE WALLS ARE BASE REACTIONS TAKEN AT BASEMENT LEVEL +11.500. SELF WEIGHT OF FOUNDATION ELEMENTS (PILES, PILE CAPS, RAFT) IS EXCLUDED FROM THE LOAD SCHEDULE.



BASEMENT B2



BASEMENT B1

TOWER 1 - Walls/Piers forces

Pier	Output Case	Case Type	Step Type	Location	N	Vx	Vy	T	Mx	My
					kN	kN	kN	kN-m	kN-m	kN-m
Core 1	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Top	1586	16270	2651	45873	267990	1340213
Core 1	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Bottom	1586	16270	2651	38669	275337	1392411
Core 1	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Top	1577	16157	2482	-13558	267020	1335911
Core 1	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Bottom	1577	16157	2482	-20714	274825	1387757
Core 1	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Top	8359	2142	14760	60355	1346962	266355
Core 1	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Bottom	8359	2142	14760	59498	1390740	273170
Core 1	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Top	8343	1962	14725	-48482	1344517	258546
Core 1	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Bottom	8343	1962	14725	-49260	1388388	264803
Core 1	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Top	165	34218	542	96558	15724	843352
Core 1	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Bottom	165	34218	542	84241	16762	943499
Core 1	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Top	-165	-34218	-542	-96558	-15724	-843352
Core 1	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Bottom	-165	-34218	-542	-84241	-16762	-943499
Core 1	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Top	2784	1815	21473	63040	663656	24612
Core 1	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Bottom	2784	1815	21473	62826	727222	29223
Core 1	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Top	-2784	-1815	-21473	-63040	-663656	-24612
Core 1	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Bottom	-2784	-1815	-21473	-62826	-727222	-29223
Core 1	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Top	114	11975	384	22852	2144	1511873
Core 1	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Bottom	114	11975	384	17535	3285	1550330
Core 1	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Top	-114	-11975	-384	-22852	-2144	-1511873
Core 1	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Bottom	-114	-11975	-384	-17535	-3285	-1550330
Core 1	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Top	6423	701	6431	17099	924977	4912
Core 1	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Bottom	6423	701	6431	16747	942820	7195
Core 1	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Top	-6423	-701	-6431	-17099	-924977	-4912
Core 1	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Bottom	-6423	-701	-6431	-16747	-942820	-7195
Core 1	Unfactored Dead Load	Combination		Top	-508715	-1434	-2291	-4250	-14280	-8378
Core 1	Unfactored Dead Load	Combination		Bottom	-512835	-1434	-2291	-3629	204648	-9782
Core 1	Unfactored Live Load	Combination		Top	-97147	-527	-481	-1463	6487	-1427
Core 1	Unfactored Live Load	Combination		Bottom	-97147	-527	-481	-1232	48067	-2507
W1	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Top	295	-26	3464	43	-5664	-26
W1	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Bottom	306	-18	3456	-27	-12496	1
W1	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Top	241	-15	162	-100	-866	-56
W1	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Bottom	268	-8	162	-51	-1348	0
W1	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Top	59	-8	9384	-101	-15592	38
W1	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Bottom	23	-6	9371	-161	-34086	0
W1	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Top	-37	13	3493	-274	-6704	-19
W1	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Bottom	-35	13	3500	-272	-13626	0
W1	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Top	207	-15	3608	323	-5543	47
W1	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Bottom	207	-19	3606	182	-12540	1
W1	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Top	-207	15	-3608	-323	5543	-47
W1	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Bottom	-207	19	-3606	-182	12540	-1
W1	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Top	90	-12	10194	454	-16211	42
W1	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Bottom	97	-16	10192	382	-36181	0
W1	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Top	-90	12	-10194	-454	16211	-42
W1	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Bottom	-97	16	-10192	-382	36181	0
W1	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Top	308	-22	582	16	-1138	60
W1	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Bottom	323	-21	578	11	-2371	1
W1	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Top	-308	22	-582	-16	1138	-60
W1	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Bottom	-323	21	-578	-11	2371	-1
W1	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Top	35	-6	4231	124	-7372	15
W1	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Bottom	40	-5	4222	136	-15854	0
W1	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Top	-35	6	-4231	-124	7372	-15
W1	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Bottom	-40	5	-4222	-136	15854	0
W1	Unfactored Dead Load	Combination		Top	-9747	-163	854	-3	-1920	-356
W1	Unfactored Dead Load	Combination		Bottom	-11360	-83	852	-26	-3462	2
W1	Unfactored Live Load	Combination		Top	-3342	-94	189	19	-227	-203
W1	Unfactored Live Load	Combination		Bottom	-3425	-46	188	4	-463	1
W2	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Top	149	-9	780	10	-983	0
W2	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Bottom	155	-5	726	26	-2344	0
W2	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Top	-109	-2	-171	-8	-742	-16
W2	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Bottom	-103	0	-154	23	-442	0
W2	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Top	-554	-10	4770	62	-2097	8
W2	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Bottom	-621	-8	4460	43	-9817	0
W2	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Top	-1030	4	3031	28	-1652	-23
W2	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Bottom	-1088	1	2846	39	-6359	0
W2	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Top	408	-6	1258	98	-979	17
W2	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Bottom	429	-6	1173	49	-2237	0
W2	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Top	-408	6	-1258	-98	979	-17
W2	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Bottom	-429	6	-1173	-49	2237	0
W2	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Top	1026	-5	5063	153	-2436	18
W2	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Bottom	1101	-8	4742	72	-10600	0
W2	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Top	-1026	5	-5063	-153	2436	-18
W2	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Bottom	-1101	8	-4742	-72	10600	0
W2	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Top	182	-7	496	10	-522	11
W2	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Bottom	199	-3	463	17	-287	0
W2	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Top	-182	7	-496	-10	522	-11
W2	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Bottom	-199	3	-463	-17	287	0
W2	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Top	495	-4	2261	29	-884	10
W2	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Bottom	535	-4	2111	22	-4527	0
W2	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Top	-495	4	-2261	-29	884	-10
W2	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Bottom	-535	4	-2111	-22	4527	0
W2	Unfactored Dead Load	Combination		Top	-8614	103	1720	2	25014	233
W2	Unfactored Dead Load	Combination		Bottom	-9818	60	1646	-58	24776	-4
W2	Unfactored Live Load	Combination		Top	-2569	61	323	9	3637	139
W2	Unfactored Live Load	Combination		Bottom	-2729	36	317	-25	3554	-3
W3	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Top	-50	7	590	-15	-26	15
W3	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Bottom	-39	-3	459	-69	-209	0
W3	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Top	-110	9	18	-79	975	12
W3	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Bottom	-221	-2	63	-86	1399	0
W3	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Top	254	2	4074	10	3656	9
W3	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Bottom	845	2	3212	-66	3981	0
W3	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Top	147	6	3036	-103	5496	4
W3	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Bottom	517	4	2504	-99	6925	0
W3	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Top	146	-15	841	291	-1214	24
W3	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Bottom	333	-2	634	147	-1986	1
W3	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Top	-146	15	-841	-291	1214	-24
W3	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Bottom	-333	2	-634	-147	1986	-1
W3	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Top	273	-9	4656	335	-6236	8
W3	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Bottom	899	-4	3776	172	-7537	1
W3	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Top	-273	9	-4656	-335	6236	-8
W3	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Bottom	-899	4	-3776	-172	7537	-1
W3	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Top	170	-7	434	37	-591	10
W3	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Bottom	366	-5	325	68	-762	0
W3	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Top	-170	7	-434	-37	591	-10
W3	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Bottom	-366	5	-325	-68	762	0
W3	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Top	140	-2	1910	40	-2515	2
W3	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Bottom	439	-2	1509	37	-3222	0
W3	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Top	-140	2	-1910	-40	2515	-2
W3	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Bottom	-439	2	-1509	-37	3222	0
W3	Unfactored Dead Load	Combination		Top	-18929	713	-781	-398	-1194	1326
W3	Unfactored Dead Load	Combination		Bottom	-37314	229	-437	-287	-595	-4
W3	Unfactored Live Load	Combination		Top	-4499	400	-133	-289	843	745
W3	Unfactored Live Load	Combination		Bottom	-8161	130	-87	-181	1951	-2

Pier	Output Case	Case Type	Step Type	Location	N	Vx	Vy	T	Mx	My
					kN	kN	kN	kN-m	kN-m	kN-m
W4	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Top	-74	4060	12	37	65	-1742
W4	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Bottom	-90	2828	22	104	3	3311
W4	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Top	-95	3464	-14	-12	-52	-3657
W4	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Bottom	-96	2659	-27	-79	-3	2129
W4	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Top	-50	2578	8	-127	231	1976
W4	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Bottom	-10	1798	-11	1	0	4938
W4	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Top	-93	1490	-39	-212	15	-1581
W4	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Bottom	-27	1506	-103	-340	-9	2698
W4	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Top	89	4069	32	83	136	3983
W4	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Bottom	101	2857	57	224	6	3305
W4	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Top	-89	-4069	-32	-83	-136	-3983
W4	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Bottom	-101	-2857	-57	-224	-6	-3305
W4	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Top	35	1986	41	242	235	2761
W4	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Bottom	48	1354	102	362	9	4669
W4	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Top	-35	-1986	-41	-242	-235	-2761
W4	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Bottom	-48	-1354	-102	-362	-9	-4669
W4	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Top	78	3522	5	51	23	2974
W4	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Bottom	94	2499	11	53	1	2282
W4	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Top	-78	-3522	-5	-51	-23	-2974
W4	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Bottom	-94	-2499	-11	-53	-1	-2282
W4	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Top	46	915	13	99	86	587
W4	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Bottom	11	668	39	119	3	1926
W4	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Top	-46	-915	-13	-99	-86	-587
W4	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Bottom	-11	-668	-39	-119	-3	-1926
W4	Unfactored Dead Load	Combination		Top	-4124	1013	360	-584	-621	-10850
W4	Unfactored Dead Load	Combination		Bottom	-3644	349	84	-159	10	-6883
W4	Unfactored Live Load	Combination		Top	-1127	111	215	-357	-377	-1979
W4	Unfactored Live Load	Combination		Bottom	-804	9	53	-76	8	-1366
W5	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Top	-46	-3	2946	347	-2366	-6
W5	0: Code Wind Envelope Wx+0.2Wy	Combination	Max	Bottom	-71	-10	2385	104	-4584	0
W5	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Top	-76	-1	-526	69	1964	-24
W5	0: Code Wind Envelope Wx+0.2Wy	Combination	Min	Bottom	-131	-2	45	-194	-2608	-1
W5	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Top	48	-22	7987	52	208	-50
W5	0: Code Wind Envelope Wy+0.2Wx	Combination	Max	Bottom	104	-29	5747	-86	-7021	1
W5	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Top	-13	-17	1463	-464	8366	-82
W5	0: Code Wind Envelope Wy+0.2Wx	Combination	Min	Bottom	-23	-13	1322	-643	-3466	0
W5	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Top	61	-4	4030	358	-5022	21
W5	0: EQSpecX_m=1,Sp=1.00	Combination	Max	Bottom	108	-12	2877	378	-4289	1
W5	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Top	-61	4	-4030	-358	5022	-21
W5	0: EQSpecX_m=1,Sp=1.00	Combination	Min	Bottom	-108	12	-2877	-378	4289	-1
W5	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Top	50	-21	7887	357	-8506	82
W5	0: EQSpecY_m=1,Sp=1.00	Combination	Max	Bottom	100	-31	5614	730	-6619	1
W5	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Top	-50	21	-7887	-357	8506	-82
W5	0: EQSpecY_m=1,Sp=1.00	Combination	Min	Bottom	-100	31	-5614	-730	6619	-1
W5	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Top	75	-1	1139	269	-1280	11
W5	0: EQStaticX_m=1,Sp=1.00	Combination	Max	Bottom	129	-6	1111	49	-3202	1
W5	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Top	-75	1	-1139	-269	1280	-11
W5	0: EQStaticX_m=1,Sp=1.00	Combination	Min	Bottom	-129	6	-1111	-49	3202	-1
W5	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Top	18	-11	2873	167	-2932	38
W5	0: EQStaticY_m=1,Sp=1.00	Combination	Max	Bottom	35	-12	2053	232	-2764	0
W5	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Top	-18	11	-2873	-167	2932	-38
W5	0: EQStaticY_m=1,Sp=1.00	Combination	Min	Bottom	-35	12	-2053	-232	2764	0
W5	Unfactored Dead Load	Combination		Top	-4581	573	328	349	7946	1188
W5	Unfactored Dead Load	Combination		Bottom	-8012	257	251	77	11748	-6
W5	Unfactored Live Load	Combination		Top	-1529	337	16	156	3475	700
W5	Unfactored Live Load	Combination		Bottom	-2100	152	9	41	5468	-3

TOWER 1 - Column coordinates at foundation

Column	X m	Y m	Z m
C1	4.5	5.5	5.1
C2	9.0	5.5	5.1
C3	18.0	5.5	5.1
C4	27.0	5.5	5.1
C5	36.0	5.5	5.1
C6	45.0	5.5	5.1
C7	54.0	5.5	5.1
C8	63.0	5.5	8.3
C9	72.0	5.5	8.3
C10	81.0	5.5	8.3
C11	0.0	6.6	5.1
C12	-8.0	8.8	5.1
C13	-12.9	10.0	5.1
C14	-8.0	10.0	5.1
C15	0.0	10.0	5.1
C16	9.0	10.0	5.1
C17	18.0	10.0	5.1
C18	27.0	10.0	5.1
C19	36.0	10.0	5.1
C20	45.0	10.0	5.1
C21	54.0	10.0	5.1
C22	63.0	10.0	8.3
C23	72.0	10.0	8.3
C24	81.0	10.0	8.3
C25	-12.9	18.5	5.1
C26	-8.0	18.5	5.1
C27	0.0	18.5	5.1
C28	9.0	18.5	5.1
C32	45.0	18.5	5.1
C33	54.0	18.5	5.1
C34	63.0	18.5	8.3
C35	72.0	18.5	8.3
C36	81.0	18.5	8.3
C37	-12.9	27.0	5.1
C38	-8.0	27.0	5.1
C39	0.0	27.0	5.1
C40	9.0	27.0	5.1
C41	45.0	27.0	5.1
C42	54.0	27.0	5.1
C43	63.0	27.0	8.3
C44	72.0	27.0	8.3
C45	81.0	27.0	8.3
C46	-12.9	35.5	5.1
C47	-8.0	35.5	5.1
C48	0.0	35.5	5.1
C49	9.0	35.5	5.1
C51	27.0	35.5	5.1

Column	X m	Y m	Z m
C53	45.0	35.5	5.1
C54	54.0	35.5	5.1
C55	63.0	35.5	8.3
C56	72.0	35.5	8.3
C57	81.0	35.5	8.3
C58	-12.9	44.0	5.1
C59	-8.0	44.0	5.1
C60	0.0	44.0	5.1
C61	9.0	44.0	5.1
C62	18.0	44.0	5.1
C63	27.0	44.0	5.1
C64	36.0	44.0	5.1
C65	45.0	44.0	5.1
C66	54.0	44.0	5.1
C67	63.0	44.0	8.3
C68	72.0	44.0	8.3
C69	78.0	44.0	8.3
C70	81.0	44.0	8.3
C71	-12.9	52.5	5.1
C72	-8.0	52.5	5.1
C73	0.0	52.5	5.1
C74	9.0	52.5	5.1
C75	18.0	52.5	5.1
C76	27.0	52.5	5.1
C77	36.0	52.5	5.1
C78	45.0	52.5	5.1
C79	54.0	52.5	5.1
C80	-12.9	61.0	5.1
C81	-8.0	61.0	5.1
C82	0.0	61.0	5.1
C83	9.0	61.0	5.1
C84	18.0	61.0	5.1
C85	27.0	61.0	5.1
C86	36.0	61.0	5.1
C87	45.0	61.0	5.1
C88	54.0	61.0	5.1

TOWER 1 - Column reactions

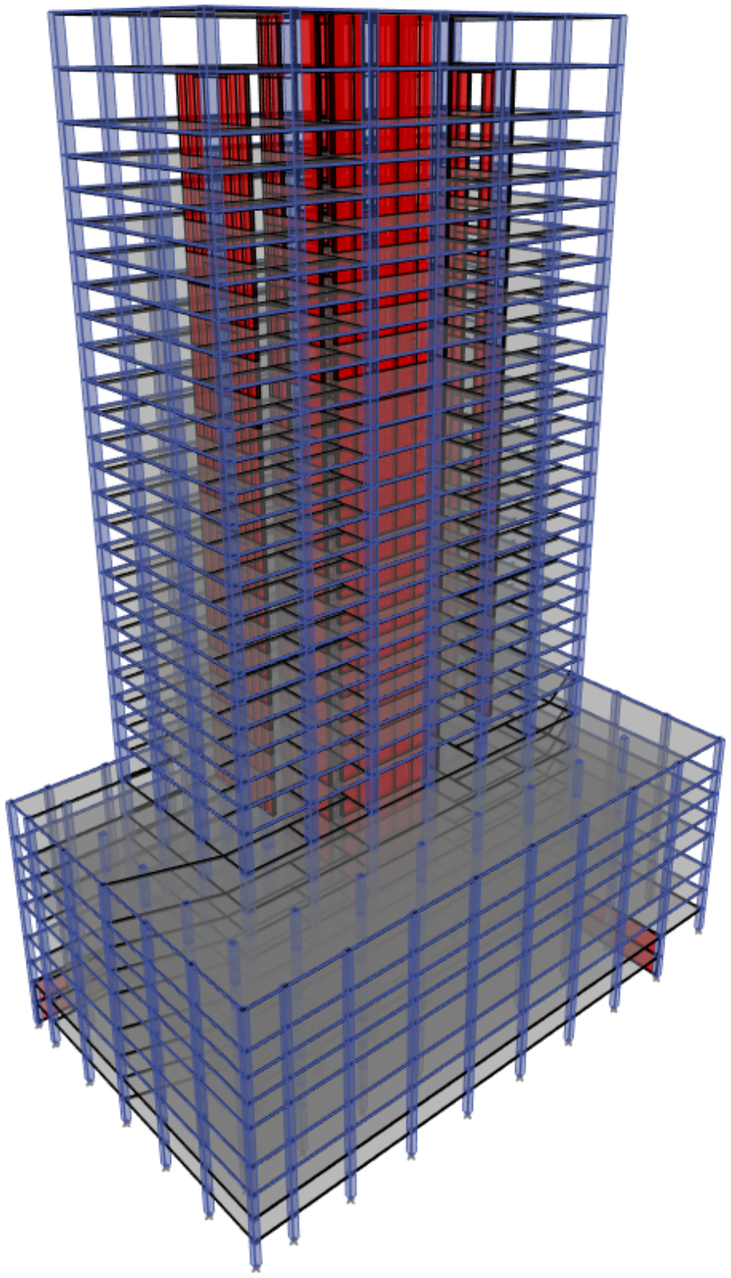
Column	Output Case	N kN
C1	Unfactored Dead Load	-1524
C1	Unfactored Live Load	-496
C2	Unfactored Dead Load	-1770
C2	Unfactored Live Load	-559
C3	Unfactored Dead Load	-1916
C3	Unfactored Live Load	-714
C4	Unfactored Dead Load	-2285
C4	Unfactored Live Load	-791
C5	Unfactored Dead Load	-1895
C5	Unfactored Live Load	-705
C6	Unfactored Dead Load	-2281
C6	Unfactored Live Load	-787
C7	Unfactored Dead Load	-1488
C7	Unfactored Live Load	-524
C11	Unfactored Dead Load	-1227
C11	Unfactored Live Load	-248
C12	Unfactored Dead Load	-1022
C12	Unfactored Live Load	-354
C13	Unfactored Dead Load	-534
C13	Unfactored Live Load	-137
C14	Unfactored Dead Load	-2898
C14	Unfactored Live Load	-1330
C15	Unfactored Dead Load	-14581
C15	Unfactored Live Load	-3307
C16	Unfactored Dead Load	-21146
C16	Unfactored Live Load	-4724
C17	Unfactored Dead Load	-12534
C17	Unfactored Live Load	-2922
C18	Unfactored Dead Load	-18168
C18	Unfactored Live Load	-4064
C19	Unfactored Dead Load	-12499
C19	Unfactored Live Load	-2922
C20	Unfactored Dead Load	-21187
C20	Unfactored Live Load	-4768
C21	Unfactored Dead Load	-11051
C21	Unfactored Live Load	-2294
C25	Unfactored Dead Load	-535
C25	Unfactored Live Load	-185
C26	Unfactored Dead Load	-5172
C26	Unfactored Live Load	-2665
C27	Unfactored Dead Load	-23268
C27	Unfactored Live Load	-5513
C28	Unfactored Dead Load	-29799
C28	Unfactored Live Load	-7109
C32	Unfactored Dead Load	-29713
C32	Unfactored Live Load	-7232
C33	Unfactored Dead Load	-16370
C33	Unfactored Live Load	-3449
C37	Unfactored Dead Load	-519
C37	Unfactored Live Load	-175
C38	Unfactored Dead Load	-5046
C38	Unfactored Live Load	-2622
C39	Unfactored Dead Load	-22951
C39	Unfactored Live Load	-5579
C40	Unfactored Dead Load	-29584
C40	Unfactored Live Load	-8262
C41	Unfactored Dead Load	-29177
C41	Unfactored Live Load	-8581

Column	Output Case	N kN
C46	Unfactored Dead Load	-524
C46	Unfactored Live Load	-177
C47	Unfactored Dead Load	-5060
C47	Unfactored Live Load	-2615
C48	Unfactored Dead Load	-22916
C48	Unfactored Live Load	-5415
C49	Unfactored Dead Load	-29818
C49	Unfactored Live Load	-7255
C51	Unfactored Dead Load	-18091
C51	Unfactored Live Load	-3916
C53	Unfactored Dead Load	-29607
C53	Unfactored Live Load	-7404
C54	Unfactored Dead Load	-16128
C54	Unfactored Live Load	-3414
C58	Unfactored Dead Load	-532
C58	Unfactored Live Load	-180
C59	Unfactored Dead Load	-4959
C59	Unfactored Live Load	-2572
C60	Unfactored Dead Load	-17318
C60	Unfactored Live Load	-4333
C61	Unfactored Dead Load	-23565
C61	Unfactored Live Load	-5564
C62	Unfactored Dead Load	-19198
C62	Unfactored Live Load	-4604
C63	Unfactored Dead Load	-21737
C63	Unfactored Live Load	-5187
C64	Unfactored Dead Load	-19176
C64	Unfactored Live Load	-4605
C65	Unfactored Dead Load	-23634
C65	Unfactored Live Load	-5663
C66	Unfactored Dead Load	-8912
C66	Unfactored Live Load	-1670
C71	Unfactored Dead Load	-555
C71	Unfactored Live Load	-191
C72	Unfactored Dead Load	-5110
C72	Unfactored Live Load	-2707
C73	Unfactored Dead Load	-6651
C73	Unfactored Live Load	-3522
C74	Unfactored Dead Load	-6605
C74	Unfactored Live Load	-3478
C75	Unfactored Dead Load	-6553
C75	Unfactored Live Load	-3491
C76	Unfactored Dead Load	-6611
C76	Unfactored Live Load	-3501
C77	Unfactored Dead Load	-6537
C77	Unfactored Live Load	-3480
C78	Unfactored Dead Load	-6777
C78	Unfactored Live Load	-3563
C79	Unfactored Dead Load	-930
C79	Unfactored Live Load	-408
C80	Unfactored Dead Load	-547
C80	Unfactored Live Load	-119
C81	Unfactored Dead Load	-2693
C81	Unfactored Live Load	-1184
C82	Unfactored Dead Load	-3287
C82	Unfactored Live Load	-1485
C83	Unfactored Dead Load	-3202
C83	Unfactored Live Load	-1442

Column	Output Case	N kN
C84	Unfactored Dead Load	-3207
C84	Unfactored Live Load	-1446
C85	Unfactored Dead Load	-3207
C85	Unfactored Live Load	-1445
C86	Unfactored Dead Load	-3195
C86	Unfactored Live Load	-1440
C87	Unfactored Dead Load	-3343
C87	Unfactored Live Load	-1518
C88	Unfactored Dead Load	-824
C88	Unfactored Live Load	-276

Column	Output Case	N kN
C8	Unfactored Dead Load	-1603
C8	Unfactored Live Load	-659
C9	Unfactored Dead Load	-1732
C9	Unfactored Live Load	-698
C10	Unfactored Dead Load	-720
C10	Unfactored Live Load	-220
C22	Unfactored Dead Load	-4194
C22	Unfactored Live Load	-1616
C23	Unfactored Dead Load	-4286
C23	Unfactored Live Load	-1677
C24	Unfactored Dead Load	-1330
C24	Unfactored Live Load	-417
C34	Unfactored Dead Load	-4910
C34	Unfactored Live Load	-1537
C35	Unfactored Dead Load	-5003
C35	Unfactored Live Load	-1586
C36	Unfactored Dead Load	-1490
C36	Unfactored Live Load	-350
C43	Unfactored Dead Load	-4761
C43	Unfactored Live Load	-1493
C44	Unfactored Dead Load	-4885
C44	Unfactored Live Load	-1541
C45	Unfactored Dead Load	-1459
C45	Unfactored Live Load	-344
C55	Unfactored Dead Load	-4964
C55	Unfactored Live Load	-1541
C56	Unfactored Dead Load	-4967
C56	Unfactored Live Load	-1562
C57	Unfactored Dead Load	-1457
C57	Unfactored Live Load	-344
C67	Unfactored Dead Load	-1733
C67	Unfactored Live Load	-394
C68	Unfactored Dead Load	-1459
C68	Unfactored Live Load	-334
C69	Unfactored Dead Load	-1138
C69	Unfactored Live Load	-256
C70	Unfactored Dead Load	-389
C70	Unfactored Live Load	-20

TOWER 2 - Model

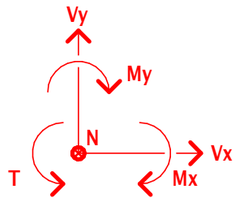


Uniform Load Set:

	SDL/ kPa	LL/kPa
Car Parking	0.5	2.5
Residential	1.5	1.5
Hotel	1.5	2.0
Mixed use	2.5	5
Plant	2.5	7.5
Lobby	1.5	4

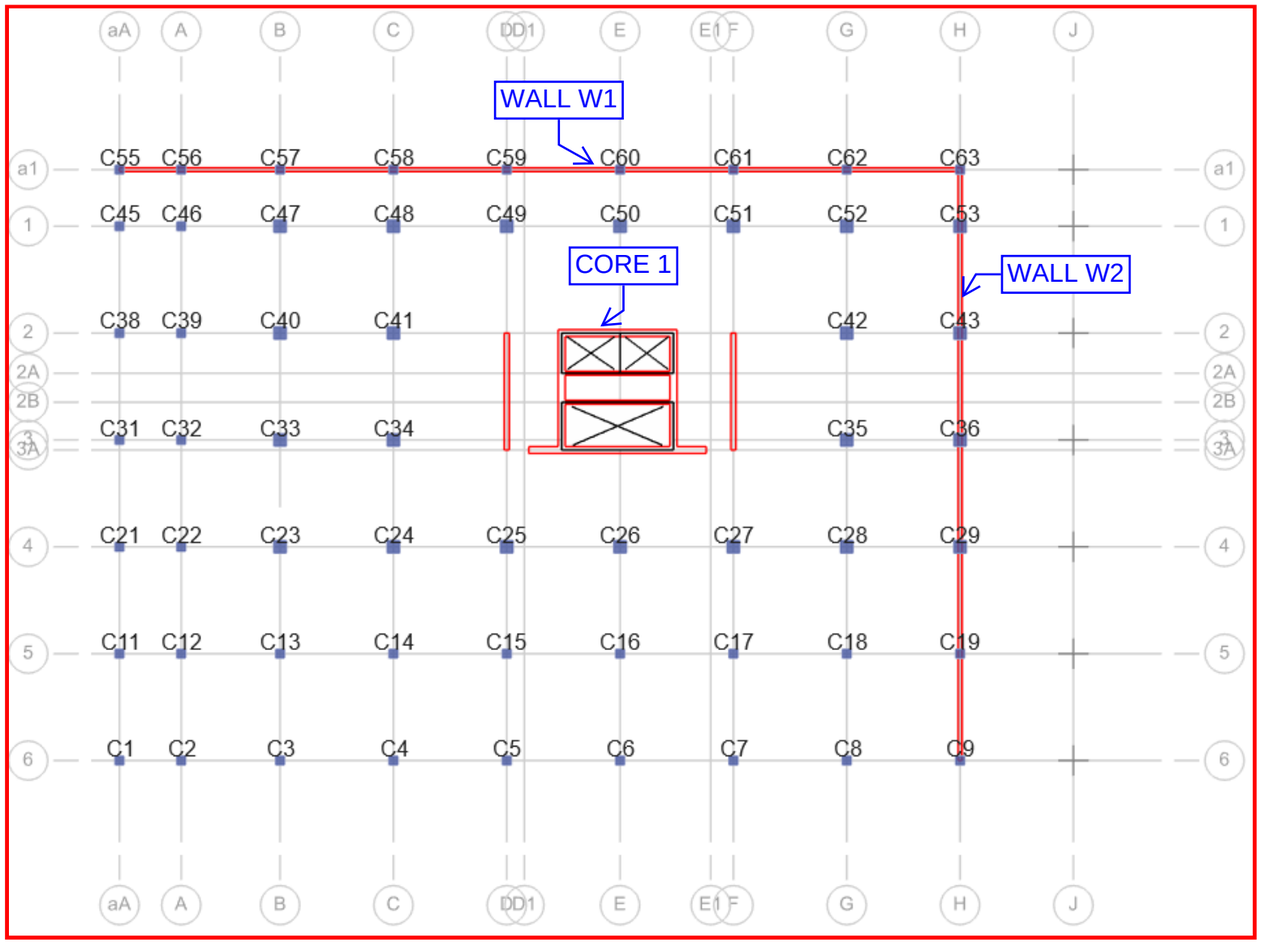
TOWER 2 - Wall and Column labels

Pier Forces Directions

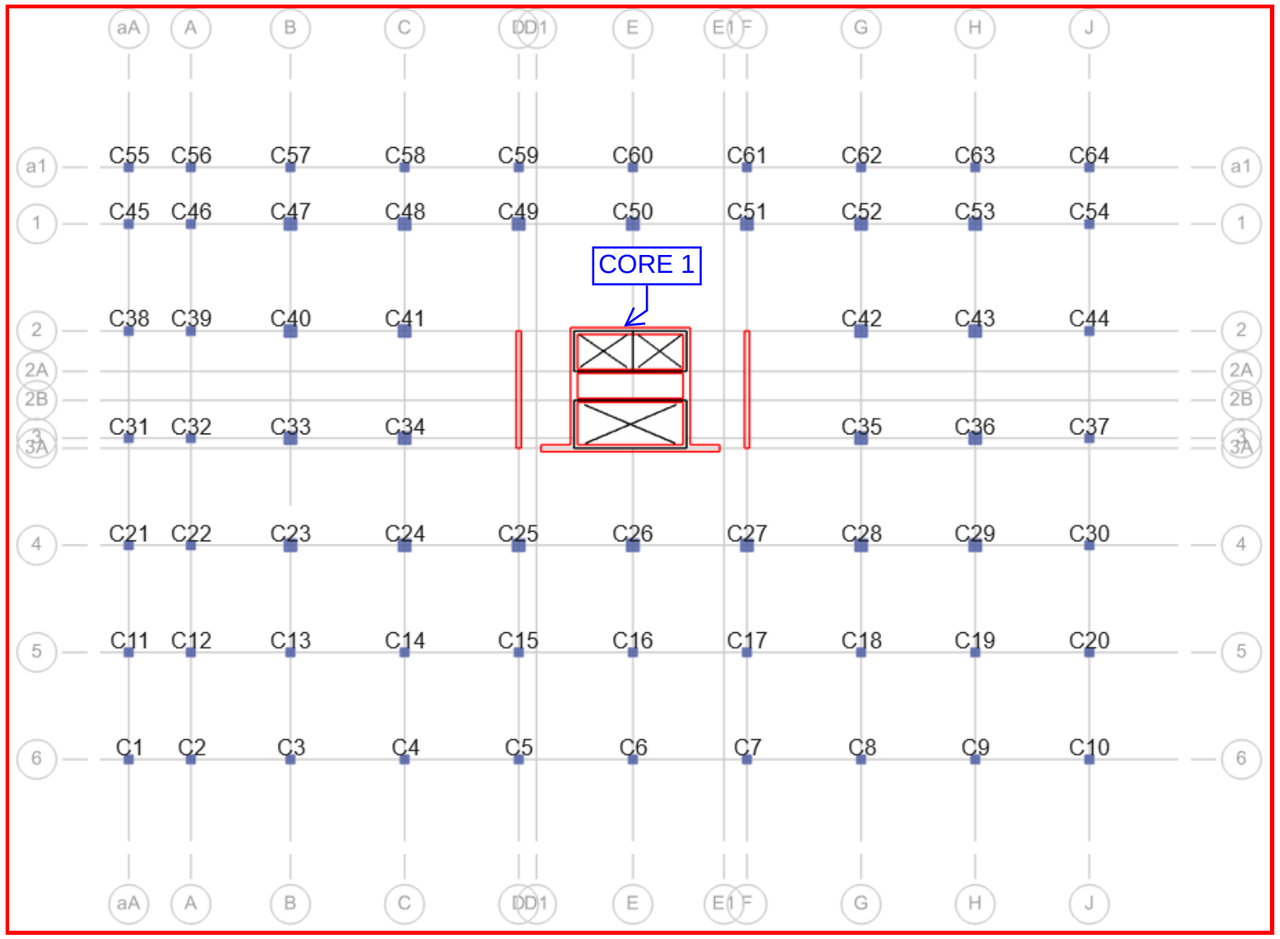


N DENOTES AXIAL LOAD IN VERTICAL DIRECTION
Vx DENOTES LOAD APPLIED IN X DIRECTION
Vy DENOTES LOAD APPLIED IN Y DIRECTION
Mx DENOTES MOMENTS ABOUT X-AXIS
My DENOTES MOMENTS ABOUT Y-AXIS
T DENOTES TORSION ABOUT CENTROID

1. ALL LOADS ARE PROVIDED FOR FOUNDATION PRICING PURPOSES ONLY AND ARE SUBJECT TO CHANGE AS THE CURRENT DESIGN IS AT DA STAGE.
2. SEISMIC LOADS ARE BASED ON A DUCTILITY OF 1 AND STRUCTURAL PERFORMANCE FACTOR OF 1.
3. REFER TO THE APPENDIX FOR THE COLUMNS AND PIERS LOADING SCHEDULE.
4. LOADS PROVIDED FOR ALL COLUMNS AND CORE WALLS ARE BASE REACTIONS TAKEN AT BASEMENT LEVEL +11.500. SELF WEIGHT OF FOUNDATION ELEMENTS (PILES, PILE CAPS, RAFT) IS EXCLUDED FROM THE LOAD SCHEDULE.



BASEMENT B2 (AND B1)



LOWER GROUND

TOWER 2 - Walls/Piers forces

Pier	Output Case	Step Type	Location	N kN	Vx kN	Vy kN	T kN-m	Mx kN-m	My kN-m
Core 1	0: Code Wind Envelope Wx+0.2Wy	Max	Top	20	228	2174	8735	140282	412911
Core 1	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	20	228	2174	8723	147268	413681
Core 1	0: Code Wind Envelope Wx+0.2Wy	Min	Top	15	-1708	-622	-3869	131506	407111
Core 1	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	15	-1708	-622	-3774	129527	401678
Core 1	0: Code Wind Envelope Wy+0.2Wx	Max	Top	425	-1205	13260	-24326	706789	80948
Core 1	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	425	-1205	13260	-24272	749366	77092
Core 1	0: Code Wind Envelope Wy+0.2Wx	Min	Top	412	-5279	7097	-51022	687467	68670
Core 1	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	412	-5279	7097	-50744	710280	51764
Core 1	0: EQSpecX_m=1,Sp=1.00	Max	Top	47	9655	4467	30046	17288	313030
Core 1	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	47	9655	4467	29536	27380	335464
Core 1	0: EQSpecX_m=1,Sp=1.00	Min	Top	-47	-9655	-4467	-30046	-17288	-313030
Core 1	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-47	-9655	-4467	-29536	-27380	-335464
Core 1	0: EQSpecY_m=1,Sp=1.00	Max	Top	163	4821	17906	46848	309465	17464
Core 1	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	163	4821	17906	46609	361111	30202
Core 1	0: EQSpecY_m=1,Sp=1.00	Min	Top	-163	-4821	-17906	-46848	-309465	-17464
Core 1	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-163	-4821	-17906	-46609	-361111	-30202
Core 1	0: EQStaticX_m=1,Sp=1.00	Max	Top	191	4972	2763	19032	7880	969747
Core 1	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	191	4972	2763	19270	16729	957104
Core 1	0: EQStaticX_m=1,Sp=1.00	Min	Top	-191	-4972	-2763	-19032	-7880	-969747
Core 1	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-191	-4972	-2763	-19270	-16729	-957104
Core 1	0: EQStaticY_m=1,Sp=1.00	Max	Top	599	3962	8743	42580	795480	9796
Core 1	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	599	3962	8743	42369	823572	22491
Core 1	0: EQStaticY_m=1,Sp=1.00	Min	Top	-599	-3962	-8743	-42580	-795480	-9796
Core 1	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-599	-3962	-8743	-42369	-823572	-22491
Core 1	Unfactored Dead Load		Top	-188354	-370	-116	-1253	24527	14815
Core 1	Unfactored Dead Load		Bottom	-190665	-370	-116	-1231	35192	13213
Core 1	Unfactored Live Load		Top	-38835	-139	-4	-40	-5780	5580
Core 1	Unfactored Live Load		Bottom	-38835	-139	-4	-32	-3530	5048
W1	0: Code Wind Envelope Wx+0.2Wy	Max	Top	-42	6951	-2	115	45	9209
W1	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	-49	6766	-1	135	0	21201
W1	0: Code Wind Envelope Wx+0.2Wy	Min	Top	-177	3640	-17	-210	6	8572
W1	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	-237	3540	-16	-212	-1	16284
W1	0: Code Wind Envelope Wy+0.2Wx	Max	Top	-580	11108	-29	395	163	12239
W1	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	-609	10821	-29	531	-1	32105
W1	0: Code Wind Envelope Wy+0.2Wx	Min	Top	-863	4141	-62	-331	77	10560
W1	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	-978	4040	-64	-233	-3	21629
W1	0: EQSpecX_m=1,Sp=1.00	Max	Top	131	8068	15	248	39	9237
W1	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	163	7856	16	385	1	23615
W1	0: EQSpecX_m=1,Sp=1.00	Min	Top	-131	-8068	-15	-248	-39	-9237
W1	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-163	-7856	-16	-385	-1	-23615
W1	0: EQSpecY_m=1,Sp=1.00	Max	Top	431	8922	38	443	101	9025
W1	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	501	8697	42	498	2	25480
W1	0: EQSpecY_m=1,Sp=1.00	Min	Top	-431	-8922	-38	-443	-101	-9025
W1	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-501	-8697	-42	-498	-2	-25480
W1	0: EQStaticX_m=1,Sp=1.00	Max	Top	107	8931	6	205	17	14708
W1	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	84	8677	5	221	0	30069
W1	0: EQStaticX_m=1,Sp=1.00	Min	Top	-107	-8931	-6	-205	-17	-14708
W1	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-84	-8677	-5	-221	0	-30069
W1	0: EQStaticY_m=1,Sp=1.00	Max	Top	892	8036	59	274	157	10436
W1	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	980	7828	60	390	3	24673
W1	0: EQStaticY_m=1,Sp=1.00	Min	Top	-892	-8036	-59	-274	-157	-10436
W1	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-980	-7828	-60	-390	-3	-24673
W1	Unfactored Dead Load		Top	-10586	-304	140	342	-337	7283
W1	Unfactored Dead Load		Bottom	-12517	-304	86	294	4	12111
W1	Unfactored Live Load		Top	-3456	-201	86	207	-205	4520
W1	Unfactored Live Load		Bottom	-3562	-196	51	131	2	5963
W2	0: Code Wind Envelope Wx+0.2Wy	Max	Top	-205	25	2361	0	-8896	27
W2	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	-199	2	2320	66	-14190	-1
W2	0: Code Wind Envelope Wx+0.2Wy	Min	Top	-322	26	1364	-270	-5279	18
W2	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	-354	4	1356	-31	-8951	-1
W2	0: Code Wind Envelope Wy+0.2Wx	Max	Top	152	-14	7673	-35	-21302	-30
W2	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	179	-14	7541	-57	-35994	1
W2	0: Code Wind Envelope Wy+0.2Wx	Min	Top	-101	-13	5479	-621	-13366	-49
W2	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	-157	-9	5417	-261	-24474	1
W2	0: EQSpecX_m=1,Sp=1.00	Max	Top	260	-49	1886	337	-5491	69
W2	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	312	-15	1858	173	-9585	2
W2	0: EQSpecX_m=1,Sp=1.00	Min	Top	-260	49	-1886	-337	5491	-69
W2	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-312	15	-1858	-173	9585	-2
W2	0: EQSpecY_m=1,Sp=1.00	Max	Top	196	-20	6324	584	-13063	53
W2	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	238	-15	6220	262	-24484	1
W2	0: EQSpecY_m=1,Sp=1.00	Min	Top	-196	20	-6324	-584	13063	-53
W2	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-238	15	-6220	-262	24484	-1
W2	0: EQStaticX_m=1,Sp=1.00	Max	Top	806	-54	1112	301	-9448	50
W2	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	864	-7	1095	84	-13442	2
W2	0: EQStaticX_m=1,Sp=1.00	Min	Top	-806	54	-1112	-301	9448	-50
W2	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-864	7	-1095	-84	13442	-2
W2	0: EQStaticY_m=1,Sp=1.00	Max	Top	175	-18	6711	415	-20428	44
W2	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	188	-12	6591	191	-33369	1
W2	0: EQStaticY_m=1,Sp=1.00	Min	Top	-175	18	-6711	-415	20428	-44
W2	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-188	12	-6591	-191	33369	-1
W2	Unfactored Dead Load		Top	-32828	371	117	368	-73496	731
W2	Unfactored Dead Load		Bottom	-35967	166	84	377	-76463	-16
W2	Unfactored Live Load		Top	-11171	232	-14	240	-3797	457
W2	Unfactored Live Load		Bottom	-11742	103	-22	250	-3603	-10

TOWER 2 - Column coordinates at foundation

Column	X m	Y m	Z m
C1	-12.8	-19.0	5.1
C2	-7.9	-19.0	5.1
C3	0.0	-19.0	5.1
C4	9.0	-19.0	5.1
C5	18.0	-19.0	5.1
C6	27.0	-19.0	5.1
C7	36.0	-19.0	5.1
C8	45.0	-19.0	5.1
C9	54.0	-19.0	5.1
C10	63.0	-19.0	11.5
C11	-12.8	-10.5	5.1
C12	-7.9	-10.5	5.1
C13	0.0	-10.5	5.1
C14	9.0	-10.5	5.1
C15	18.0	-10.5	5.1
C16	27.0	-10.5	5.1
C17	36.0	-10.5	5.1
C18	45.0	-10.5	5.1
C19	54.0	-10.5	5.1
C20	63.0	-10.5	11.5
C21	-12.8	-2.0	5.1
C22	-7.9	-2.0	5.1
C23	0.0	-2.0	5.1
C24	9.0	-2.0	5.1
C25	18.0	-2.0	5.1
C26	27.0	-2.0	5.1
C27	36.0	-2.0	5.1
C28	45.0	-2.0	5.1
C29	54.0	-2.0	5.1
C30	63.0	-2.0	11.5
C31	-12.8	6.5	5.1
C32	-7.9	6.5	5.1
C33	0.0	6.5	5.1
C34	9.0	6.5	5.1
C35	45.0	6.5	5.1
C36	54.0	6.5	5.1
C37	63.0	6.5	11.5
C38	-12.8	15.0	5.1
C39	-7.9	15.0	5.1
C40	0.0	15.0	5.1
C41	9.0	15.0	5.1
C42	45.0	15.0	5.1
C43	54.0	15.0	5.1
C44	63.0	15.0	11.5
C45	-12.8	23.5	5.1
C46	-7.9	23.5	5.1
C47	0.0	23.5	5.1
C48	9.0	23.5	5.1
C49	18.0	23.5	5.1
C50	27.0	23.5	5.1
C51	36.0	23.5	5.1
C52	45.0	23.5	5.1
C53	54.0	23.5	5.1
C54	63.0	23.5	11.5
C55	-12.8	28.0	5.1
C56	-7.9	28.0	5.1
C57	0.0	28.0	5.1
C58	9.0	28.0	5.1
C59	18.0	28.0	5.1
C60	27.0	28.0	5.1
C61	36.0	28.0	5.1
C62	45.0	28.0	5.1
C63	54.0	28.0	5.1
C64	63.0	28.0	11.5

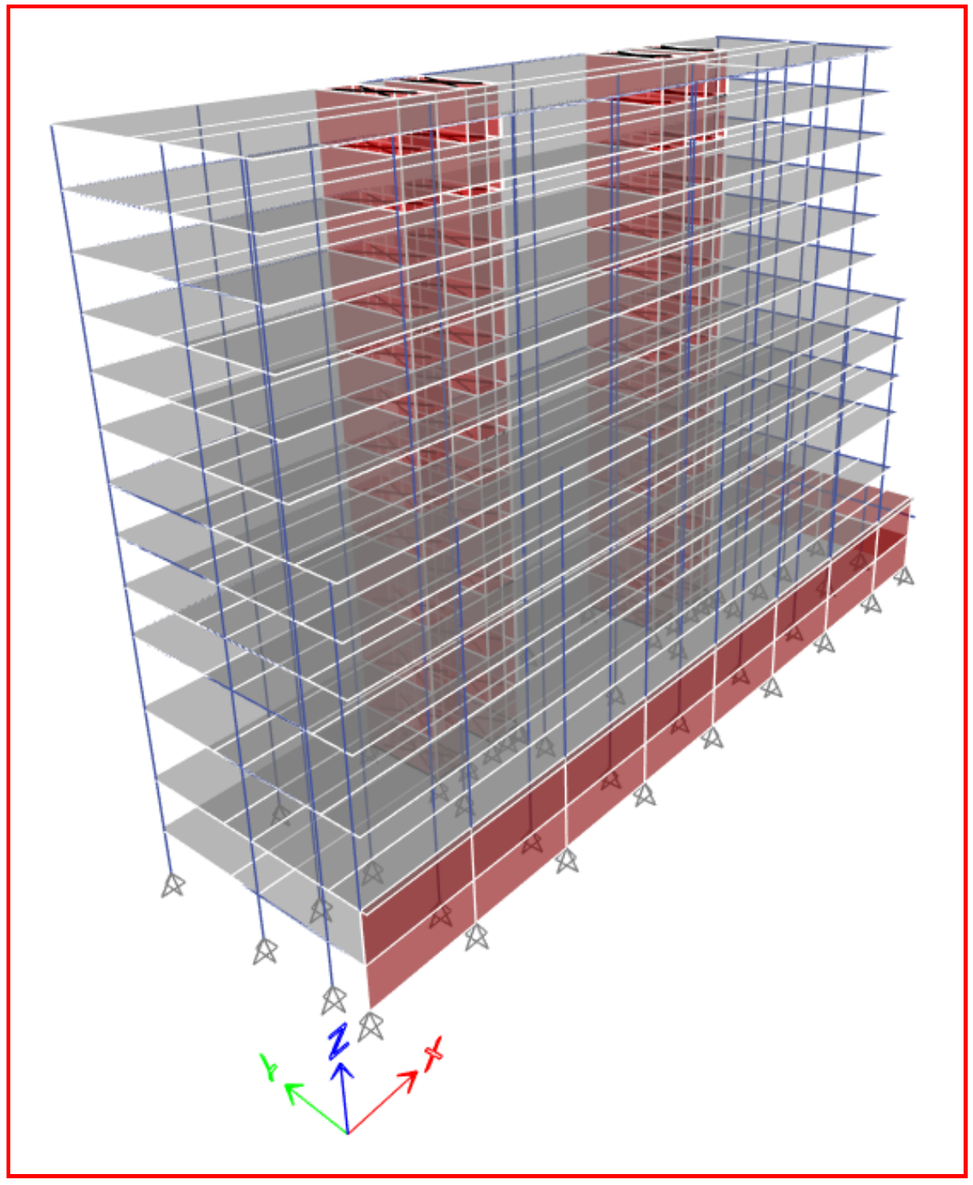
TOWER 2 - Column reactions

Column	Output Case	N kN
C1	Unfactored Dead Load	-997
C1	Unfactored Live Load	-264
C2	Unfactored Dead Load	-2119
C2	Unfactored Live Load	-882
C3	Unfactored Dead Load	-2621
C3	Unfactored Live Load	-1136
C4	Unfactored Dead Load	-2738
C4	Unfactored Live Load	-1194
C5	Unfactored Dead Load	-2717
C5	Unfactored Live Load	-1182
C6	Unfactored Dead Load	-2718
C6	Unfactored Live Load	-1183
C7	Unfactored Dead Load	-2726
C7	Unfactored Live Load	-1187
C8	Unfactored Dead Load	-2703
C8	Unfactored Live Load	-1175
C9	Unfactored Dead Load	-1287
C9	Unfactored Live Load	-527
C11	Unfactored Dead Load	-1727
C11	Unfactored Live Load	-640
C12	Unfactored Dead Load	-4133
C12	Unfactored Live Load	-2074
C13	Unfactored Dead Load	-5291
C13	Unfactored Live Load	-2707
C14	Unfactored Dead Load	-5615
C14	Unfactored Live Load	-2887
C15	Unfactored Dead Load	-5595
C15	Unfactored Live Load	-2878
C16	Unfactored Dead Load	-5610
C16	Unfactored Live Load	-2886
C17	Unfactored Dead Load	-5611
C17	Unfactored Live Load	-2886
C18	Unfactored Dead Load	-5493
C18	Unfactored Live Load	-2818
C19	Unfactored Dead Load	-1480
C19	Unfactored Live Load	-696
C21	Unfactored Dead Load	-1636
C21	Unfactored Live Load	-594
C22	Unfactored Dead Load	-3917
C22	Unfactored Live Load	-1941
C23	Unfactored Dead Load	-10684
C23	Unfactored Live Load	-3608
C24	Unfactored Dead Load	-14687
C24	Unfactored Live Load	-5227
C25	Unfactored Dead Load	-12968
C25	Unfactored Live Load	-4577
C26	Unfactored Dead Load	-12177
C26	Unfactored Live Load	-4346
C27	Unfactored Dead Load	-13080
C27	Unfactored Live Load	-4623
C28	Unfactored Dead Load	-14631
C28	Unfactored Live Load	-5188
C29	Unfactored Dead Load	-4840
C29	Unfactored Live Load	-1565
C31	Unfactored Dead Load	-1650
C31	Unfactored Live Load	-604
C32	Unfactored Dead Load	-3958
C32	Unfactored Live Load	-1957

Column	Output Case	N kN
C33	Unfactored Dead Load	-14555
C33	Unfactored Live Load	-4363
C34	Unfactored Dead Load	-23134
C34	Unfactored Live Load	-6165
C35	Unfactored Dead Load	-23051
C35	Unfactored Live Load	-6124
C36	Unfactored Dead Load	-6489
C36	Unfactored Live Load	-1872
C38	Unfactored Dead Load	-1665
C38	Unfactored Live Load	-612
C39	Unfactored Dead Load	-4038
C39	Unfactored Live Load	-1999
C40	Unfactored Dead Load	-14584
C40	Unfactored Live Load	-4231
C41	Unfactored Dead Load	-24077
C41	Unfactored Live Load	-5982
C42	Unfactored Dead Load	-23978
C42	Unfactored Live Load	-5933
C43	Unfactored Dead Load	-6580
C43	Unfactored Live Load	-1827
C45	Unfactored Dead Load	-1436
C45	Unfactored Live Load	-508
C46	Unfactored Dead Load	-3219
C46	Unfactored Live Load	-1544
C47	Unfactored Dead Load	-10256
C47	Unfactored Live Load	-3041
C48	Unfactored Dead Load	-14809
C48	Unfactored Live Load	-4609
C49	Unfactored Dead Load	-14061
C49	Unfactored Live Load	-4272
C50	Unfactored Dead Load	-13103
C50	Unfactored Live Load	-3948
C51	Unfactored Dead Load	-14150
C51	Unfactored Live Load	-4304
C52	Unfactored Dead Load	-14719
C52	Unfactored Live Load	-4565
C53	Unfactored Dead Load	-4730
C53	Unfactored Live Load	-1354
C55	Unfactored Dead Load	-463
C55	Unfactored Live Load	-77
C56	Unfactored Dead Load	-446
C56	Unfactored Live Load	-117
C57	Unfactored Dead Load	-495
C57	Unfactored Live Load	-132
C58	Unfactored Dead Load	-515
C58	Unfactored Live Load	-143
C59	Unfactored Dead Load	-507
C59	Unfactored Live Load	-141
C60	Unfactored Dead Load	-515
C60	Unfactored Live Load	-145
C61	Unfactored Dead Load	-506
C61	Unfactored Live Load	-141
C62	Unfactored Dead Load	-513
C62	Unfactored Live Load	-143
C63	Unfactored Dead Load	-946
C63	Unfactored Live Load	-253

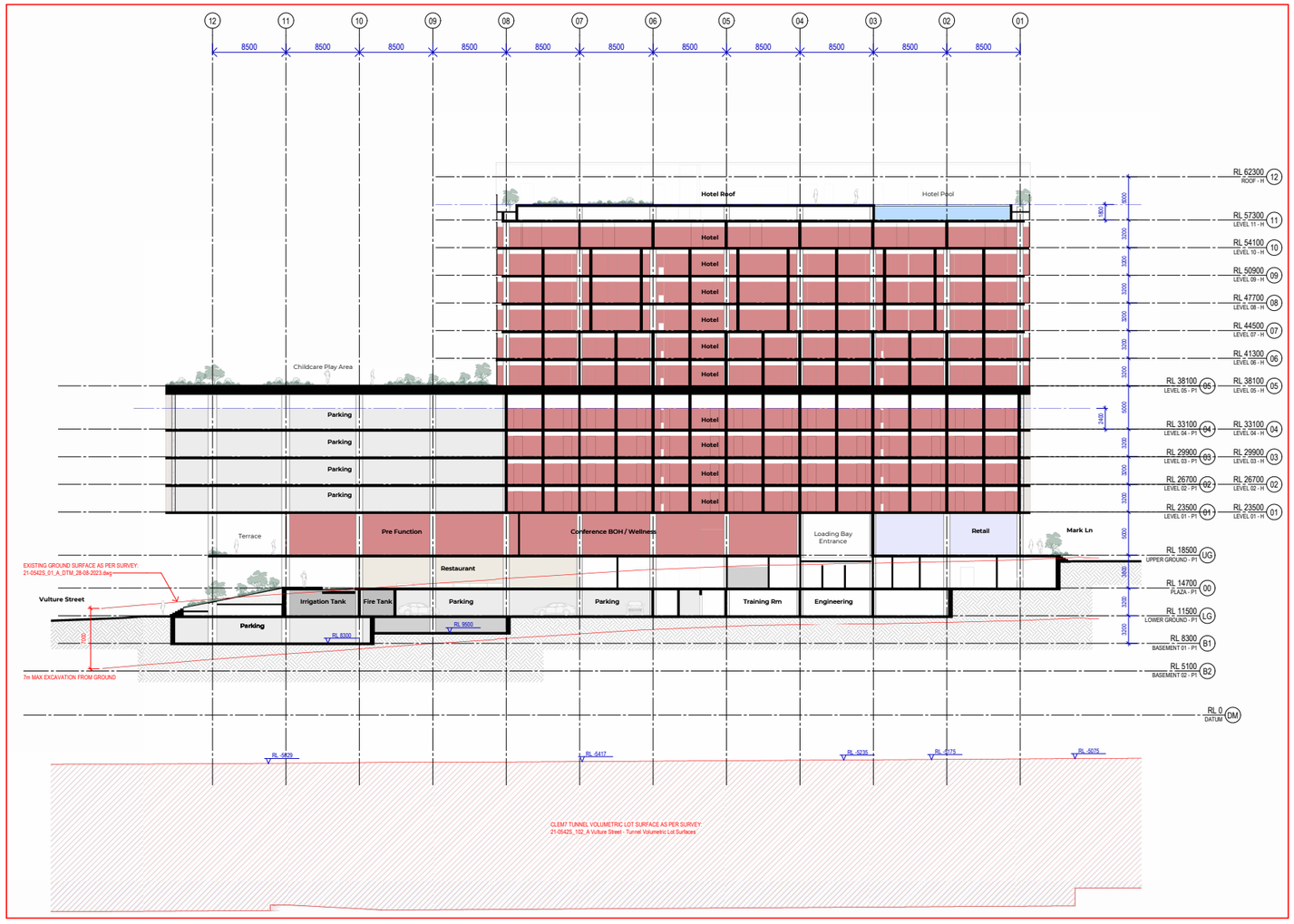
Column	Output Case	N kN
C10	Unfactored Dead Load	-1204
C10	Unfactored Live Load	-376
C20	Unfactored Dead Load	-2206
C20	Unfactored Live Load	-902
C30	Unfactored Dead Load	-2083
C30	Unfactored Live Load	-833
C37	Unfactored Dead Load	-2139
C37	Unfactored Live Load	-861
C44	Unfactored Dead Load	-2183
C44	Unfactored Live Load	-883
C54	Unfactored Dead Load	-1787
C54	Unfactored Live Load	-693
C64	Unfactored Dead Load	-748
C64	Unfactored Live Load	-168

TOWER 3 - Model



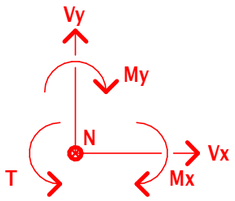
Uniform Load Set:

	SDL/ kPa	LL/kPa
Car Parking	0.5	2.5
Residential	1.5	1.5
Hotel	1.5	2.0
Mixed use	2.5	5
Plant	2.5	7.5
Lobby	1.5	4



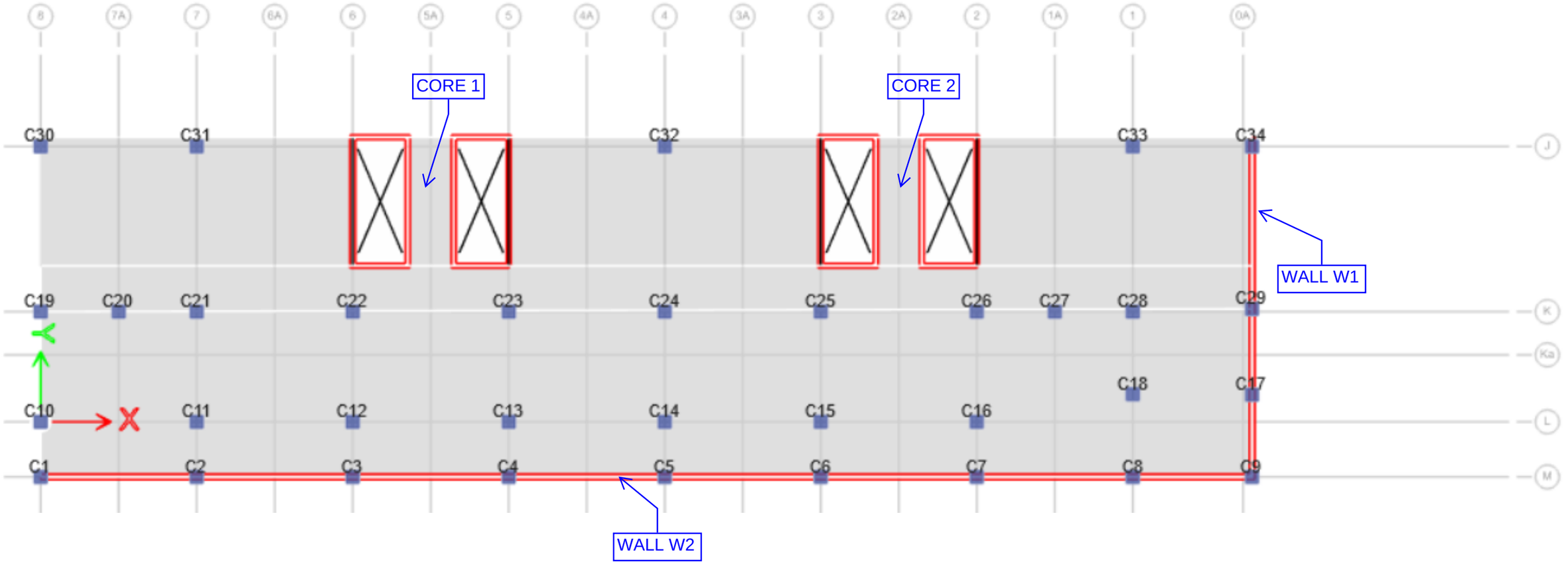
TOWER 3 - Wall and Column labels

Pier Forces Directions



N DENOTES AXIAL LOAD IN VERTICAL DIRECTION
Vx DENOTES LOAD APPLIED IN X DIRECTION
Vy DENOTES LOAD APPLIED IN Y DIRECTION
Mx DENOTES MOMENTS ABOUT X-AXIS
My DENOTES MOMENTS ABOUT Y-AXIS
T DENOTES TORSION ABOUT CENTROID

1. ALL LOADS ARE PROVIDED FOR FOUNDATION PRICING PURPOSES ONLY AND ARE SUBJECT TO CHANGE AS THE CURRENT DESIGN IS AT DA STAGE.
2. SEISMIC LOADS ARE BASED ON A DUCTILITY OF 1 AND STRUCTURAL PERFORMANCE FACTOR OF 1.
3. REFER TO THE APPENDIX FOR THE COLUMNS AND PIERS LOADING SCHEDULE.
4. LOADS PROVIDED FOR ALL COLUMNS AND CORE WALLS ARE BASE REACTIONS TAKEN AT BASEMENT LEVEL +11.500. SELF WEIGHT OF FOUNDATION ELEMENTS (PILES, PILE CAPS, RAFT) IS EXCLUDED FROM THE LOAD SCHEDULE.



TOWER 3 - Walls/Piers forces

Pier	Output Case	Step Type	Location	N	Vx	Vy	T	Mx	My
				kN	kN	kN	kN-m	kN-m	kN-m
Core 1	0: Code Wind Envelope Wx+0.2Wy	Max	Top	-148	1	1484	154	-17523	-644
Core 1	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	-148	1	1484	175	-22252	-653
Core 1	0: Code Wind Envelope Wx+0.2Wy	Min	Top	-323	318	447	-2052	-6197	-11165
Core 1	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	-323	318	447	-1961	-7617	-12202
Core 1	0: Code Wind Envelope Wy+0.2Wx	Max	Top	-753	-210	4609	1167	-81075	3
Core 1	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	-753	-210	4609	1248	-95726	639
Core 1	0: Code Wind Envelope Wy+0.2Wx	Min	Top	-1624	1191	2070	-5457	-32034	-6028
Core 1	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	-1624	1191	2070	-5163	-38614	-9921
Core 1	0: EQSpecX_m=1,Sp=1.00	Max	Top	748	-1106	2698	3775	-33604	44184
Core 1	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	748	-1106	2698	3625	-37048	42676
Core 1	0: EQSpecX_m=1,Sp=1.00	Min	Top	-748	1106	-2698	-3775	33604	-44184
Core 1	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-748	1106	-2698	-3625	37048	-42676
Core 1	0: EQSpecY_m=1,Sp=1.00	Max	Top	2426	-1537	5158	7649	-108644	15058
Core 1	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	2426	-1537	5158	7342	-123965	19597
Core 1	0: EQSpecY_m=1,Sp=1.00	Min	Top	-2426	1537	-5158	-7649	108644	-15058
Core 1	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-2426	1537	-5158	-7342	123965	-19597
Core 1	0: EQStaticX_m=1,Sp=1.00	Max	Top	526	-1162	4004	4438	-12064	87828
Core 1	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	526	-1162	4004	4309	-15537	85215
Core 1	0: EQStaticX_m=1,Sp=1.00	Min	Top	-526	1162	-4004	-4438	12064	-87828
Core 1	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-526	1162	-4004	-4309	15537	-85215
Core 1	0: EQStaticY_m=1,Sp=1.00	Max	Top	4242	-1645	7405	6912	-183091	6824
Core 1	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	4242	-1645	7405	6458	-206522	12291
Core 1	0: EQStaticY_m=1,Sp=1.00	Min	Top	-4242	1645	-7405	-6912	183091	-6824
Core 1	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-4242	1645	-7405	-6458	206522	-12291
Core 1	Unfactored Dead Load		Top	-20438	-61	28	385	8450	429
Core 1	Unfactored Dead Load		Bottom	-21172	-61	28	383	9771	-332
Core 1	Unfactored Live Load		Top	-5471	-20	10	270	5837	104
Core 1	Unfactored Live Load		Bottom	-5471	-20	10	269	6180	-84
Core 2	0: Code Wind Envelope Wx+0.2Wy	Max	Top	-69	-90	371	-325	-12667	-812
Core 2	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	-69	-90	371	-322	-13836	-1079
Core 2	0: Code Wind Envelope Wx+0.2Wy	Min	Top	-289	182	113	-650	-3865	-11494
Core 2	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	-289	182	113	-624	-4224	-11540
Core 2	0: Code Wind Envelope Wy+0.2Wx	Max	Top	-459	293	1865	-2016	-61815	-762
Core 2	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	-459	293	1865	-1911	-67693	-1875
Core 2	0: Code Wind Envelope Wy+0.2Wx	Min	Top	-1429	842	1402	-3176	-18907	-5590
Core 2	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	-1429	842	1402	-3052	-23366	-8201
Core 2	0: EQSpecX_m=1,Sp=1.00	Max	Top	550	-1153	752	1439	-24946	46962
Core 2	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	550	-1153	752	1351	-24144	43896
Core 2	0: EQSpecX_m=1,Sp=1.00	Min	Top	-550	1153	-752	-1439	24946	-46962
Core 2	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-550	1153	-752	-1351	24144	-43896
Core 2	0: EQSpecY_m=1,Sp=1.00	Max	Top	2374	-934	1587	3872	-90177	14315
Core 2	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	2374	-934	1587	3741	-94261	16330
Core 2	0: EQSpecY_m=1,Sp=1.00	Min	Top	-2374	934	-1587	-3872	90177	-14315
Core 2	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-2374	934	-1587	-3741	94261	-16330
Core 2	0: EQStaticX_m=1,Sp=1.00	Max	Top	300	-1955	1229	1385	-21152	93188
Core 2	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	300	-1955	1229	1195	-17198	87365
Core 2	0: EQStaticX_m=1,Sp=1.00	Min	Top	-300	1955	-1229	-1385	21152	-93188
Core 2	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-300	1955	-1229	-1195	17198	-87365
Core 2	0: EQStaticY_m=1,Sp=1.00	Max	Top	3870	-1656	3068	6813	-147287	6603
Core 2	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	3870	-1656	3068	6558	-156215	12019
Core 2	0: EQStaticY_m=1,Sp=1.00	Min	Top	-3870	1656	-3068	-6813	147287	-6603
Core 2	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-3870	1656	-3068	-6558	156215	-12019
Core 2	Unfactored Dead Load		Top	-20197	-57	250	562	9025	1584
Core 2	Unfactored Dead Load		Bottom	-20931	-57	250	570	9623	823
Core 2	Unfactored Live Load		Top	-5199	-22	117	343	5764	765
Core 2	Unfactored Live Load		Bottom	-5199	-22	117	347	5744	595
W1	0: Code Wind Envelope Wx+0.2Wy	Max	Top	0	-2	279	7	-470	-1
W1	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	1	-2	276	8	-1002	0
W1	0: Code Wind Envelope Wx+0.2Wy	Min	Top	-17	0	-428	0	897	-5
W1	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	-31	0	-422	1	1831	0
W1	0: Code Wind Envelope Wy+0.2Wx	Max	Top	13	-2	1536	1	-2697	-2
W1	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	26	-2	1523	10	-5712	0
W1	0: Code Wind Envelope Wy+0.2Wx	Min	Top	-16	0	-363	-3	477	-6
W1	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	-36	-1	-360	1	1132	0
W1	0: EQSpecX_m=1,Sp=1.00	Max	Top	70	-7	1338	29	-3059	21
W1	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	124	-7	1320	29	-6090	0
W1	0: EQSpecX_m=1,Sp=1.00	Min	Top	-70	7	-1338	-29	3059	-21
W1	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-124	7	-1320	-29	6090	0
W1	0: EQSpecY_m=1,Sp=1.00	Max	Top	20	-4	2271	8	-4233	9
W1	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	27	-3	2242	14	-8845	0
W1	0: EQSpecY_m=1,Sp=1.00	Min	Top	-20	4	-2271	-8	4233	-9
W1	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-27	3	-2242	-14	8845	0
W1	0: EQStaticX_m=1,Sp=1.00	Max	Top	111	-12	2511	53	-5870	37
W1	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	201	-13	2475	49	-11583	0
W1	0: EQStaticX_m=1,Sp=1.00	Min	Top	-111	12	-2511	-53	5870	-37
W1	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-201	13	-2475	-49	11583	0
W1	0: EQStaticY_m=1,Sp=1.00	Max	Top	18	-6	2555	2	-5006	14
W1	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	42	-5	2519	23	-10271	1
W1	0: EQStaticY_m=1,Sp=1.00	Min	Top	-18	6	-2555	-2	5006	-14
W1	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-42	5	-2519	-23	10271	-1
W1	Unfactored Dead Load		Top	-1240	87	-159	-115	-1048	154
W1	Unfactored Dead Load		Bottom	-1612	29	-158	-47	-592	-1
W1	Unfactored Live Load		Top	-434	51	-72	-69	-609	91
W1	Unfactored Live Load		Bottom	-417	17	-72	-31	-398	-1
W2	0: Code Wind Envelope Wx+0.2Wy	Max	Top	101	1586	0	-5	8	4942
W2	0: Code Wind Envelope Wx+0.2Wy	Max	Bottom	136	1583	-3	95	0	8155
W2	0: Code Wind Envelope Wx+0.2Wy	Min	Top	36	-2	-2	-39	7	583
W2	0: Code Wind Envelope Wx+0.2Wy	Min	Bottom	27	0	-6	2	0	598
W2	0: Code Wind Envelope Wy+0.2Wx	Max	Top	396	219	-8	-6	42	1468
W2	0: Code Wind Envelope Wy+0.2Wx	Max	Bottom	452	216	-15	216	-1	1706
W2	0: Code Wind Envelope Wy+0.2Wx	Min	Top	212	-1826	-12	-124	38	-5
W2	0: Code Wind Envelope Wy+0.2Wx	Min	Bottom	190	-1831	-22	5	-1	-2575
W2	0: EQSpecX_m=1,Sp=1.00	Max	Top	134	7333	6	84	15	20126
W2	0: EQSpecX_m=1,Sp=1.00	Max	Bottom	190	7322	8	206	0	35015
W2	0: EQSpecX_m=1,Sp=1.00	Min	Top	-134	-7333	-6	-84	-15	-20126
W2	0: EQSpecX_m=1,Sp=1.00	Min	Bottom	-190	-7322	-8	-206	0	-35015
W2	0: EQSpecY_m=1,Sp=1.00	Max	Top	536	1455	12	151	73	5622
W2	0: EQSpecY_m=1,Sp=1.00	Max	Bottom	578	1458	36	410	1	5982
W2	0: EQSpecY_m=1,Sp=1.00	Min	Top	-536	-1455	-12	-151	-73	-5622
W2	0: EQSpecY_m=1,Sp=1.00	Min	Bottom	-578	-1458	-36	-410	-1	-5982
W2	0: EQStaticX_m=1,Sp=1.00	Max	Top	121	11797	8	15	4	34963
W2	0: EQStaticX_m=1,Sp=1.00	Max	Bottom	281	11770	10	411	0	58833
W2	0: EQStaticX_m=1,Sp=1.00	Min	Top	-121	-11797	-8	-15	-4	-34963
W2	0: EQStaticX_m=1,Sp=1.00	Min	Bottom	-281	-11770	-10	-411	0	-58833
W2	0: EQStaticY_m=1,Sp=1.00	Max	Top	932	3108	21	135	131	1614
W2	0: EQStaticY_m=1,Sp=1.00	Max	Bottom	953	3114	63	477	2	3814
W2	0: EQStaticY_m=1,Sp=1.00	Min	Top	-932	-3108	-21	-135	-131	-1614
W2	0: EQStaticY_m=1,Sp=1.00	Min	Bottom	-953	-3114	-63	-477	-2	-3814
W2	Unfactored Dead Load		Top	-8936	50	-216	49	427	-7620
W2	Unfactored Dead Load		Bottom	-10463	62	-80	150	-1	-8673
W2	Unfactored Live Load		Top	-2250	4	-115	14	232	-1505
W2	Unfactored Live Load		Bottom	-2214	10	-43	86	0	-1644

TOWER 3 - Column coordinates at foundation

Column	X m	Y m	Z m
C1	0.0	-3.0	11.5
C2	8.5	-3.0	11.5
C3	17.0	-3.0	11.5
C4	25.5	-3.0	11.5
C5	34.0	-3.0	11.5
C6	42.5	-3.0	11.5
C7	51.0	-3.0	11.5
C8	59.5	-3.0	11.5
C9	66.0	-3.0	11.5
C10	0.0	0.0	11.5
C11	8.5	0.0	11.5
C12	17.0	0.0	11.5
C13	25.5	0.0	11.5
C14	34.0	0.0	11.5
C15	42.5	0.0	11.5
C16	51.0	0.0	11.5
C17	66.0	1.5	11.5
C18	59.5	1.5	11.5
C19	0.0	6.0	11.5
C20	4.3	6.0	11.5
C21	8.5	6.0	11.5
C22	17.0	6.0	11.5
C23	25.5	6.0	11.5
C24	34.0	6.0	11.5
C25	42.5	6.0	11.5
C26	51.0	6.0	11.5
C27	55.3	6.0	11.5
C28	59.5	6.0	11.5
C29	66.0	6.2	11.5
C30	0.0	15.0	11.5
C31	8.5	15.0	11.5
C32	34.0	15.0	11.5
C33	59.5	15.0	11.5
C34	66.0	15.0	11.5

TOWER 3 - Column reactions

Column	Output Case	N kN
C1	Unfactored Dead Load	-364
C1	Unfactored Live Load	-51
C2	Unfactored Dead Load	-363
C2	Unfactored Live Load	-75
C3	Unfactored Dead Load	-348
C3	Unfactored Live Load	-68
C4	Unfactored Dead Load	-347
C4	Unfactored Live Load	-68
C5	Unfactored Dead Load	-346
C5	Unfactored Live Load	-68
C6	Unfactored Dead Load	-353
C6	Unfactored Live Load	-67
C7	Unfactored Dead Load	-375
C7	Unfactored Live Load	-73
C8	Unfactored Dead Load	-328
C8	Unfactored Live Load	-69
C9	Unfactored Dead Load	-109
C9	Unfactored Live Load	-27
C10	Unfactored Dead Load	-1844
C10	Unfactored Live Load	-451
C11	Unfactored Dead Load	-3383
C11	Unfactored Live Load	-1143
C12	Unfactored Dead Load	-3555
C12	Unfactored Live Load	-1226
C13	Unfactored Dead Load	-3528
C13	Unfactored Live Load	-1213
C14	Unfactored Dead Load	-3566
C14	Unfactored Live Load	-1234
C15	Unfactored Dead Load	-3828
C15	Unfactored Live Load	-1190
C16	Unfactored Dead Load	-3978
C16	Unfactored Live Load	-1100
C17	Unfactored Dead Load	-97
C17	Unfactored Live Load	-21
C18	Unfactored Dead Load	-2878
C18	Unfactored Live Load	-746
C19	Unfactored Dead Load	-2067
C19	Unfactored Live Load	-665
C20	Unfactored Dead Load	-4153
C20	Unfactored Live Load	-1753
C21	Unfactored Dead Load	-4725
C21	Unfactored Live Load	-2123
C22	Unfactored Dead Load	-3326
C22	Unfactored Live Load	-1345
C23	Unfactored Dead Load	-3364
C23	Unfactored Live Load	-1365
C24	Unfactored Dead Load	-6017
C24	Unfactored Live Load	-2755
C25	Unfactored Dead Load	-3515
C25	Unfactored Live Load	-1322
C26	Unfactored Dead Load	-2773
C26	Unfactored Live Load	-904
C27	Unfactored Dead Load	-3769
C27	Unfactored Live Load	-1390
C28	Unfactored Dead Load	-2619
C28	Unfactored Live Load	-957
C29	Unfactored Dead Load	-151
C29	Unfactored Live Load	-53
C30	Unfactored Dead Load	-2368
C30	Unfactored Live Load	-717
C31	Unfactored Dead Load	-4230
C31	Unfactored Live Load	-1618
C32	Unfactored Dead Load	-4041
C32	Unfactored Live Load	-1537
C33	Unfactored Dead Load	-2800
C33	Unfactored Live Load	-954
C34	Unfactored Dead Load	-107
C34	Unfactored Live Load	-27

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