

**Residential Building at
10 Pacific Drive, Port
Macquarie
Structural Report**

Report No. **S20244401-RPT-1 [REV.7]**
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For Laurus Projects Pty Ltd

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Table of Contents

1 Executive Summary	3
2 Proposed Development	3
3 The Site	3
4. Structural Description	4
4.1 Basement	4
4.2 Superstructure	6
4.3 Stability	6
4.4 Foundation	6
5 Essential External Work Items	6
5.2 Driveway Crossing	7
5.3 Retaining Wall	7
5.4 Basement Structural Design – Landscape Review	9
6 Design Codes	9
7 Design Loads	9
7.1 Vertical Loads	9
7.2 Wind Loads	10
7.3 Earthquake Loads	10
8 Deflection Limits	10
8.1 Lateral Deflection	10
8.2 Vertical Deflection	10
9 Materials	10
9.1 Concrete	10
9.2 Reinforcement	10
9.3 Post-Tensioning Tendons	10
10 Fire Resistance Levels for Structural Elements	11

1 Executive Summary

This design brief is a summary of the structural concept, data assumptions, principles and proposed construction methods and materials to be used in the design of the Proposed Residential Flat Building on Lot 1, 2 of DP 538077, and A of DP 441800 in Pacific Drive, Port Macquarie.

This document aims to note down all project data and information, relevant design criteria and other materials associated with the structural design of this project. As new information or updates are available, the contents will be revised and changed accordingly.

This is to note that the building is still in an early design stage. The structural design may change with architectural changes, further client's requests or to comply with Council's requirements.

For the basement and the foundation design and construction of the proposed development, reference is made from the Geotechnical Investigation (GI) Report prepared by EI Australia (report no. E24947.G03 dated 21 January 2021).

2 Proposed Development

The proposed development is a residential building consisting of a Lower Ground, Ground Floor, and 6 levels located in Pacific Drive, Port Macquarie. The building entails the following:

- approximately 44 apartment units;
- 2 level basement car parking;
- the vehicle access into the Building from Pacific Drive on south-east corner of the building site.

3 The Site

The site is in a trapezoidal shape on plan, about average 78m in length and 45m in width. It consists of a predominate fall north-east to south-west direction from approximately 40 to 29m AHD. A 2 storey motel currently sitting on the northwest corner will be demolished.

The site is surrounded by following streets. North of the Site is Windmill Street. East is the Pacific Drive which is about 50m to the coastline. To the South is Home Street and Oxley Crescent is on the west side. The development site consists of the following lots in Pacific Drive which is about 50m from the coast are amalgamated to form the Building site.

Lot 1DP 538077
Lot 2 DP 538077
Lot A DP 441800



Fig 1 - Proposed Site and Building Lots

4. Structural Description

The proposed residential building has 6 levels of apartments on top of 2 levels car park. The car park is in Lower Ground and part of Ground Floor.

4.1 Basement

Based on the latest architectural basement plans (Fig 3), the basement outline is offset 5.6m from the northern and 1.5m to 9m from the western site boundaries, 1.3m to 6.8m for the eastern site boundary and minimum of 10m from the southern site boundary. The GI suggested that temporary batters with safe angle of 1 vertical to 1 horizontal can be adopted along the eastern and southern excavation perimeters (if required). The permanent basement perimeter wall will be in the form of in-situ reinforced concrete against the backfill and will be sitting on strip footing. Agg-line / drainage layer shall be provided along and behind the wall to collect and drain away seepage water hence preventing hydrostatic build up.

On the northern, eastern, and western excavation perimeters without sufficient boundary setback, a shoring wall system consisting anchored soldier piles with infill shotcrete panels shall be adopted. The soldier piles shall be closely spaced where neighbouring buildings / infrastructures present to reduce the lateral movements and the risk of potential damage.

As the GI suggested that groundwater is not likely to be encountered and seepages volume would be low, it is envisaged that the basement slab will be in a form of slab on ground underlaid by sub soil drain and pump out system, subject to further confirmation from the Geotechnical Engineer.

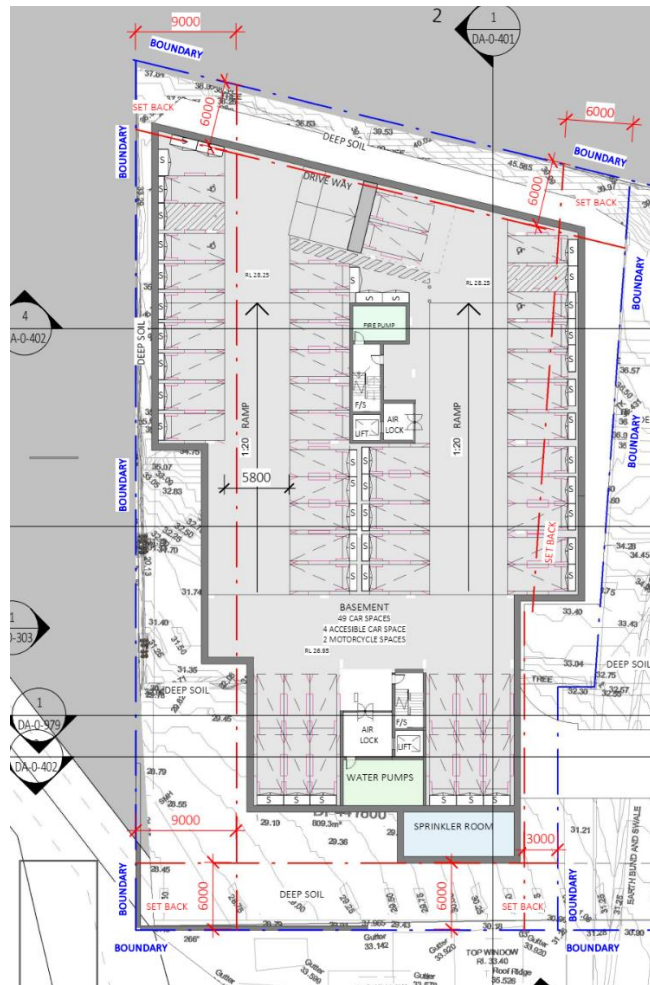


Fig 3 - Basement Plan Showing Minimum 6m Setback

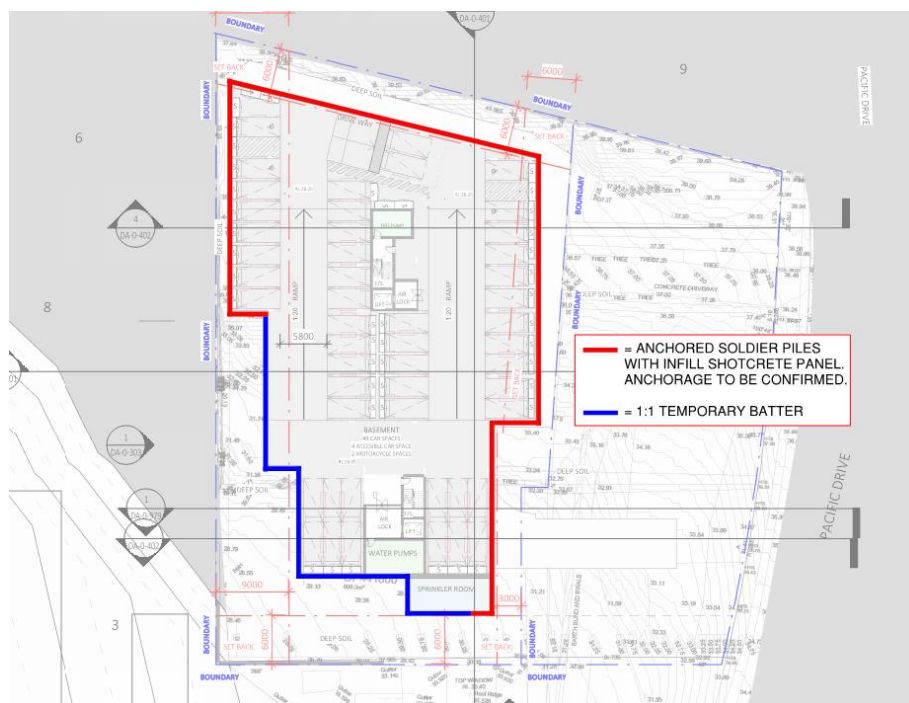


Fig 4 – Temporary Batter Excavation

4.2 Superstructure

It is anticipated that a split-level post-tensioned transfer flat plate will be adopted and supported on concrete columns at carpark levels. All columns over shall stack up and proceed to roof. The non-transfer floors will be either post-tensioned or reinforced flat plate.

All exposed slab shall be waterproofed with an applied waterproof membrane in accordance with architectural specifications.

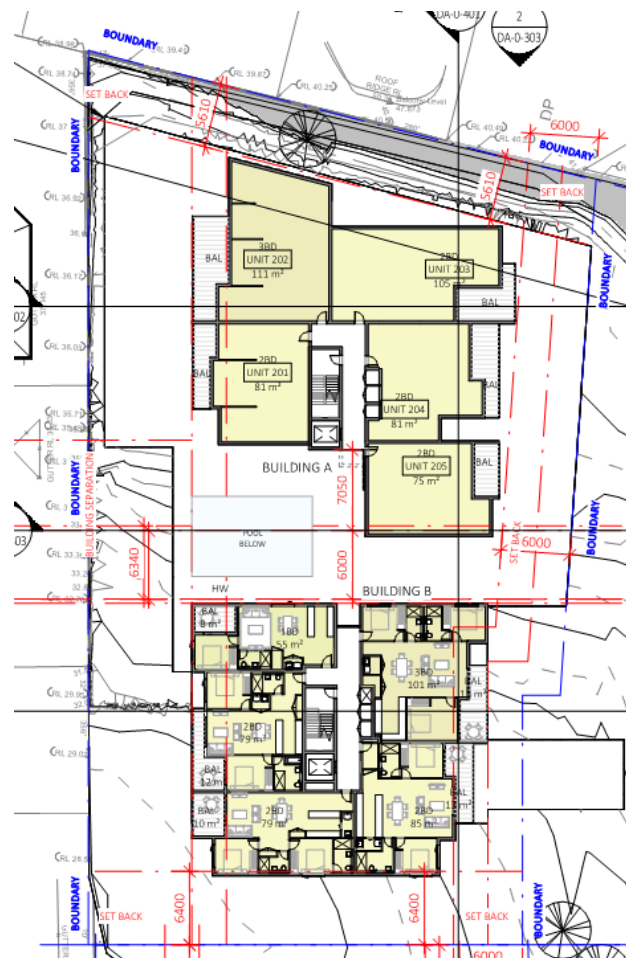


Fig 5 – Typical Floor Plan

4.3 Stability

The lift core and stair core walls will resist the lateral loads on the buildings due to wind, earthquake, and unbalanced soil retention. The walls will be in-situ reinforced concrete and will be supported by the coupling force given by the lateral soil pressure acting on core bases or piles where applicable.

4.4 Foundation

Refer to the GI, cast in situ concrete piles (such as CFA piles) founded into hard clays shall be a suitable foundation system to support the building columns and walls. The piles founded within hard clays can be designed for a maximum allowable bearing pressure of 400kPa.

5 Essential External Work Items

5.2 Driveway Crossing

The driveway crossing within the road reserve for the carpark entrance shall conform to Port Macquarie Hastings Council Heavy Duty Standard Drawing ASD202.

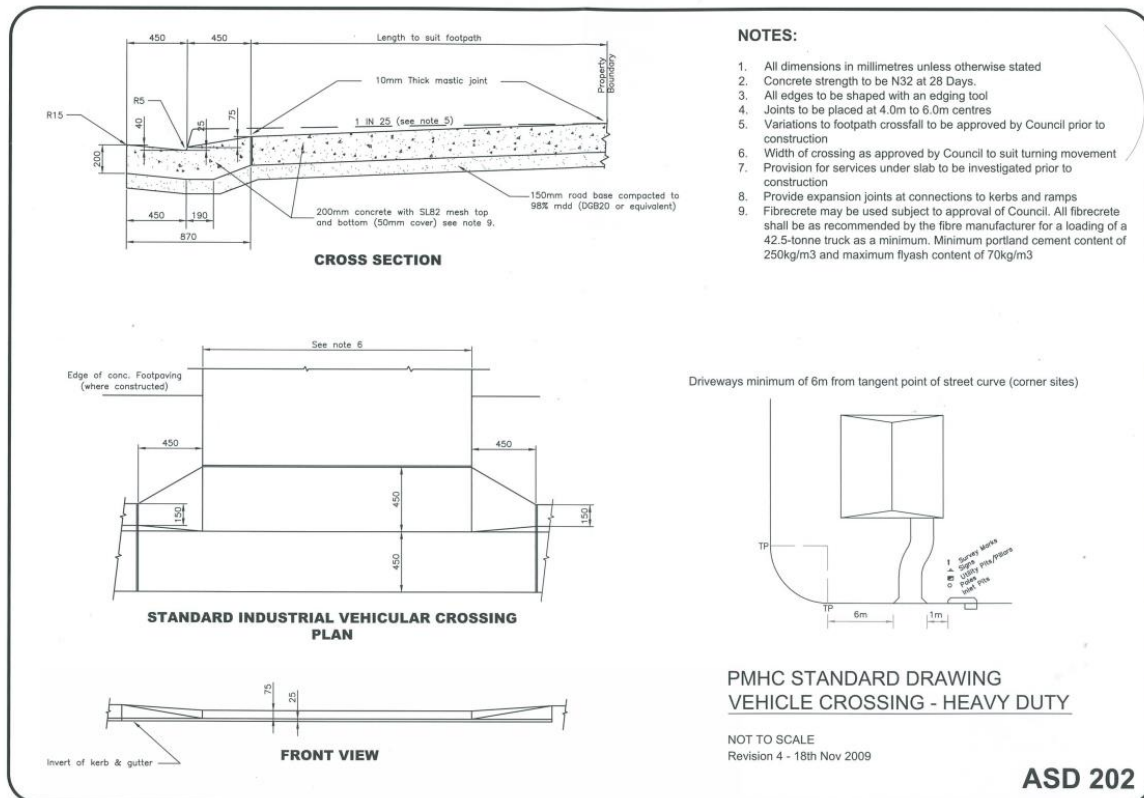


Fig 8 - Driveway Slab to Proposed Residential Flat crossing Pacific Drive Road Reserve

5.3 Retaining Wall

The retaining wall for the northern boundary is to have no more than a 1:4 slope to the top terrace area. The location of the retaining wall is shown in Figure 9. Once the shoring walls have been constructed, the construction sequence is shown in Figure 10. The sequence is to first build a 1:1 batter, install piled foundation (450 diameter at no larger than 2500mm centres), capping beam (500mm x 500mm), construct the retaining wall, then fill to a maximum slope of 1:4. See Fig 9, 10 and 11 for more information.

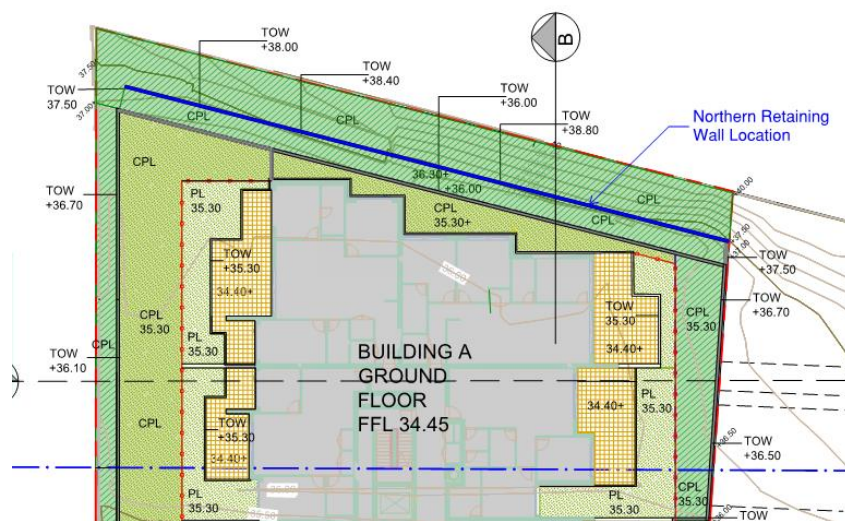


Fig 9 – Location of Northern Retaining Wall

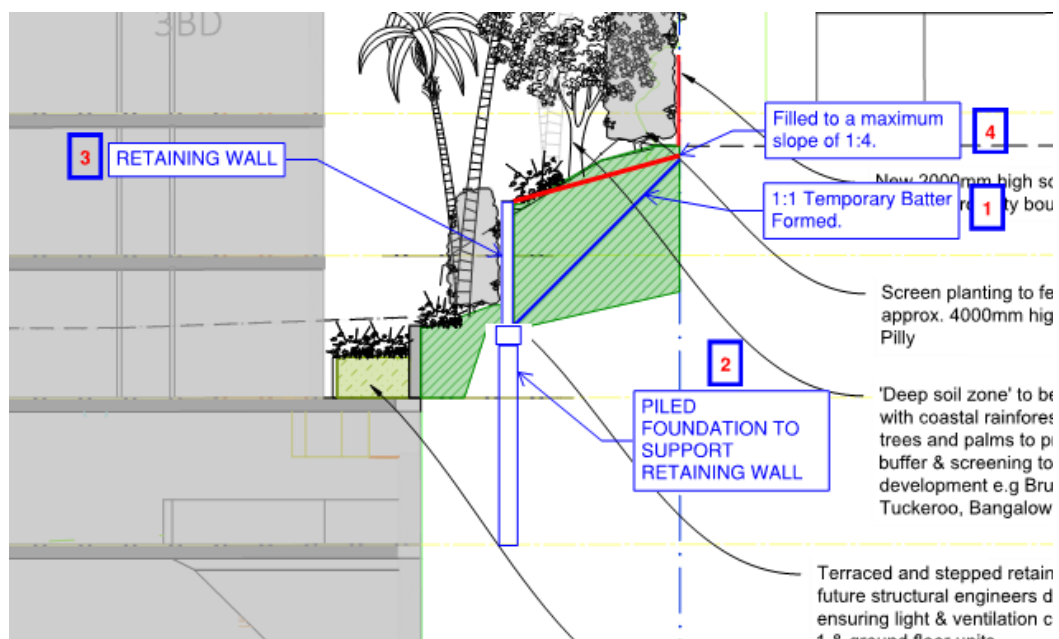


Fig 10 – Construction Sequence of Northern Retaining Wall

RETAINING WALL SCHEDULE TYPE B S5*						
TOTAL HEIGHT 'H' (mm)	HEIGHT OF BLOCK TYPE			'B' (mm)	'V' & 'X' BARS	'K' BARS
	150 SERIES	200 SERIES	300 SERIES			
800	800	-	-	800	N12 AT400	-
1000	1000	-	-	900	N12 AT400	-
1200	1200	-	-	1000	N12 AT400	-
1400	-	1400	-	1100	N16 AT400	-
1600	-	1600	-	1200	N16 AT400	-
1800	-	1800	-	1400	N16 AT400	-
2000	-	1400	600	1600	N20 AT400	-
2200	-	1400	800	1800	N16 AT400	N16 AT400
2400	-	1600	800	2000	N16 AT400	N16 AT400
2600	-	1600	1000	2100	N20 AT400	N20 AT400
2800	-	1800	1000	2200	N16 AT200	N16 AT200
3000	-	2000	1000	2400	N16 AT200	N16 AT200
3200	-	2000	1200	2600	N20 AT200	N16 AT200
3400	-	2000	1400	2800	N20 AT200	N16 AT200

Fig 11 – Retaining Wall Schedule per Total Height

5.4 Basement Structural Design – Landscape Review

The basement design will be configured structurally to accommodate the depth of the podium planters and landscaping, without amending the layout of the basement or depth of the landscaping.

6 Design Codes

The following codes and standards will form the basis for the structural design:

BCA	Building Code of Australia
AS/NZS 1170 Pt 0	General Principles
AS/NZS 1170 Pt 1	Permanent, imposed and other actions
AS/NZS 1170 Pt 2	Wind actions
AS/NZS 1170 Pt 4	Earthquake
AS 2159	Piling Code
AS 3600	Concrete Structures Code
AS 3700	Masonry Code
AS 4100	Steel Structures Code

7 Design Loads

7.1 Vertical Loads

	Superimposed Dead Load (kPa)	Live Load (kPa)
Residential unit	1.5	1.5
	+1.5kN/m intertenancy wall	
Balcony	2.0	2.0
Typical floor common area	2.0	4.0
Non accessible roof	2.0	1.5
Carpark / Ramp	0.5	2.5
Plant Room	0.5	5.0

Appropriate façade loads refer to arch elevation drawings

7.2 Wind Loads

The wind Loads will be assessed in accordance with AS 1170.2.

Importance Level	II
Annual Probability of Exceedance	1:500 (ULS). 1:25 (SLS)
Region	A2
Regional Wind Speed	45 m/s (ULS), 37 m/s (SLS)
Terrain Category	1.5
Topographic Multiplier	1.0
Shielding Multiplier	1.0

7.3 Earthquake Loads

The earthquake loads will be assessed in accordance with AS 1170.4.

Importance Level	II
Annual Probability of Exceedance	1:500
Probability Factor, k_p	1.0
Hazard Factor Z	0.08
Soil Classification	to be confirmed by Geotechnical Engineer
Earthquake Design Category	II

8 Deflection Limits

8.1 Lateral Deflection

Interstorey drift due to serviceability wind – Floor Height/500
 Interstorey drift due to earthquake – 1.5% Floor Height

8.2 Vertical Deflection

	Total Long Term	Incremental
Slab	span/250 or 25mm	span/500 for brittle finishes
Cantilever	span/125 or 25mm	span/250 for brittle finishes
Transfer	span/500 or 15mm	
Slab edge	15mm	

9 Materials

9.1 Concrete

Various strength grade of concrete will be adopted. Concrete properties shall refer to AS3600 Section 3.1.

9.2 Reinforcement

Modulus of Elasticity	200,000 MPa
Yield Strength	500MPa (Class N), 250MPa (Class R)

9.3 Post-Tensioning Tendons

Strand Type	12.7mm
Modulus of Elasticity	200,000 MPa

Minimum Breaking Load 184 kN

[10 Fire Resistance Levels for Structural Elements](#)

The fire resistance levels for structural elements shall be in accordance with the Building Code of Australia unless advised in the Fire Engineering Report for this project.

Concrete covers are to be in accordance with AS 3600 Section 5. The fire resistance levels of blockwork shall refer to Architect's specifications.

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