NORTHROP

STRUCTURAL

1020 Melia Court, Castle Hill, Rogans Hill Park

Report prepared for
Castle Hill Glen Pty Ltd

Contents

1.0 Report overview

This structural report has been prepared to accompany the preliminary planning proposal for 1020 Melia Court in Castle Hill. This report is intended to assist Council with their assessment of the safety of the build as well as understanding the structural systems proposed for use.

2.0 Site Description and Development Summary

The site is to be developed for a mix of low and medium density residential buildings including a new public park, series of open spaces and public domain upgrades.

The project includes:

- A Publicly Accessible Park “Rogans Hill Park” that is designed to provide a natural play area and outdoor fitness opportunities.
- Six (6) residential flat buildings, with heights ranging from three to six storeys, containing 147 apartment units.
- 38 terraces, each spanning between two and three stories.
- A series of connected biodiversity corridors connecting the existing Blue Gum High Forest and WSUD infrastructure that provide new opportunities for habitat for local flora and fauna.
- A central loop road to enhance accessibility and circulation to each public and communal space.

The architectural concept design has been prepared by DKO architects (Drawings dated 12.07.23) including PP101 Scheme 12, PP200 Scheme 12, PP201 Scheme 12, PP202 Scheme 12, PP203 Scheme 12, PP204 Scheme 12, PP205 Scheme 12, PP206 Scheme 12 & PP207 Scheme 12.

3.0 Demolition of Existing Buildings

The existing site is a greenfield site with no structure and a few services passing through the lot. Some services may be required to be re-located as a part of the proposed development – refer services drawings/reports for these items.

4.0 Proposed Structural System

The structure is anticipated to be a concrete frame consisting of reinforced concrete load bearing columns, walls & slab systems.

Key structural elements of the building include:

- Ground floor and level 1 transfer slabs – these will be used to transfer apartment column layout to the underlying column grid within the basement.
- Northern shoring wall – at the northern edge of the site will be a permanent anchored shoring wall independent of the building structure to retain the uphill side of the site as well as acting as a cutoff drain to minimise water entering the site from uphill

The buildings are expected to be founded on rock through the use of bored pier/CFA piling and designed in accordance with the BCA and relevant Australian Standards. All building loads will extend down to rock and on this basis no vertical building loads will be transferred to any of the surrounding properties external to all boundaries.

Structural material to be used will include a combination of reinforced concrete and steel appropriately sized to suit the applied loads and BCA requirements.

Construction movement joints will be incorporated into the structural design where necessary.

A preliminary structural sketch showing a typical cross section through the site is contained within appendix A.

5.0 Geotechnical Conditions

Several geotechnical investigations have been undertaken on the site with the aim of addressing land slip concerns for the proposed development site:

Douglas Partners

- Project 36055 – Geotechnical assessment (dated February 2004)
- Project 36055 – Hydrogeological and Geotechnical Monitoring and maintenance plan (dated March 2005)
- Project 36055 – Amendment of slope stabilization design (dated June 2010)

TGE geotechnical Engineering Pty Ltd

- TGE21632-2 Report on Geotechnical Assessment & Earthworks Methodology for Landslide Remediation (dated January 2017)
- TGE21632-7 Report on Geotechnical Summary Review and Design (dated June 2017)

Morrow Geotechnics

- P1197_03 Plaxis Analysis (dated April 2017)

Tetra Tech Coffey

- SYDGE321033-AC (dated November 2023)

The above reports note that the land slip issues arise when excess groundwater enters the soil underlying the development after prolonged periods of rainfall. There are two methods that have been recommended in the reports to address this issue:

1. Provide a series of drainage channels within the soil layer above the slip plane to capture and discard of the excess water
2. Provide a perimeter shoring wall around the development and excavate down to the slip plane. The slip plane depth varies across the site to an approximate maximum depth of 11m. Following removal of the unstable material, a drainage layer would be installed on bedrock material and the site levels built back up as required

The proposed approach for this site is combination of the above two methods and is proposed to involve:

- Installing a permanent anchored shoring wall at the northern edge of the site which will act to retain the hillside above the development and also act as a cutoff drain to reduce the amount of water entering the development from uphill
- In areas that have basements which are close to the slip plane, over-excavating down to the slip plane, installing a drainage layer and building back up to the soffit of the basement level with site won engineered fill
- In areas that don't have basements or where the basement level is well above the slip plane, installing a series of drainage channels in the soil to remove excess water from the soil. This scenario under building extents may also involve the use of additional piles to stiffen/reinforce the slide material that is remaining under the buildings.
- All proposed structures will be designed as suspended structures supported on bored piers/ CFA piles (or equivalent) as to limit surcharge loading on the ground material

Ongoing groundwater monitoring will need to be conducted in order to identify the long-term groundwater levels for basement design.

Please refer to appendix B for diagrammatic illustration of the above methodologies.

6.0 Retention System and Excavation

The proposed development requires excavation to install a single basement level, as well as any further excavation as recommended by the geotechnical engineer for slope stability works. A permanent anchored soldier pile shoring wall is proposed for the northern edge of the site to allow for excavation to the northern basement. Shoring piles will extend to into good quality shale material and drainage strips will be placed behind the shotcrete panels to relieve any groundwater seepage from uphill. Please refer to appendix B for diagram of the proposed alignment of the northern shoring wall.

Elsewhere it is proposed to batter the site whilst excavating the basements, and the site geometry appears to allow for this. The basements will have reinforced concrete walls independent of the northern shoring wall. Following the installation of the basement walls and slabs, the site levels will be built back up with site won engineered fill.

The excavation for the proposed development is anticipated to be largely in clay and weathered shales. The shale is likely to be continuous across adjoining properties however the closest dwelling appears to be approximately 40m away from the proposed northern shoring wall. Excavation of the fill, residual clay and weathered shale will be achievable using conventional earthmoving equipment, such as the buckets on hydraulic excavators.

Excavation of good quality shale may require assistance with rock breaking/ripping equipment. The existing buildings on the adjacent property boundaries are sensitive to vibrations above certain threshold levels. Close controls by the excavation contractor over the rock excavation are therefore necessary, so that excessive vibration effect is not generated which could cause damage. Vibration monitoring should be undertaken to assess the magnitude of vibrations generated during excavation of the rock, regardless of what excavation plant is employed.

7.0 Metro Reserve and Tunnels

The Sydney Metro tunnels and the North-west Rail Link run under Castle Hill Road to the north of the site. At its closest point to our development it is over 100m away so no structure is close to Sydney Metro reserves.

8.0 Conclusion

Structurally we support the proposed development and confirm it can be designed to allow for the particular constraints of the site, BCA and relevant Australian Standards.

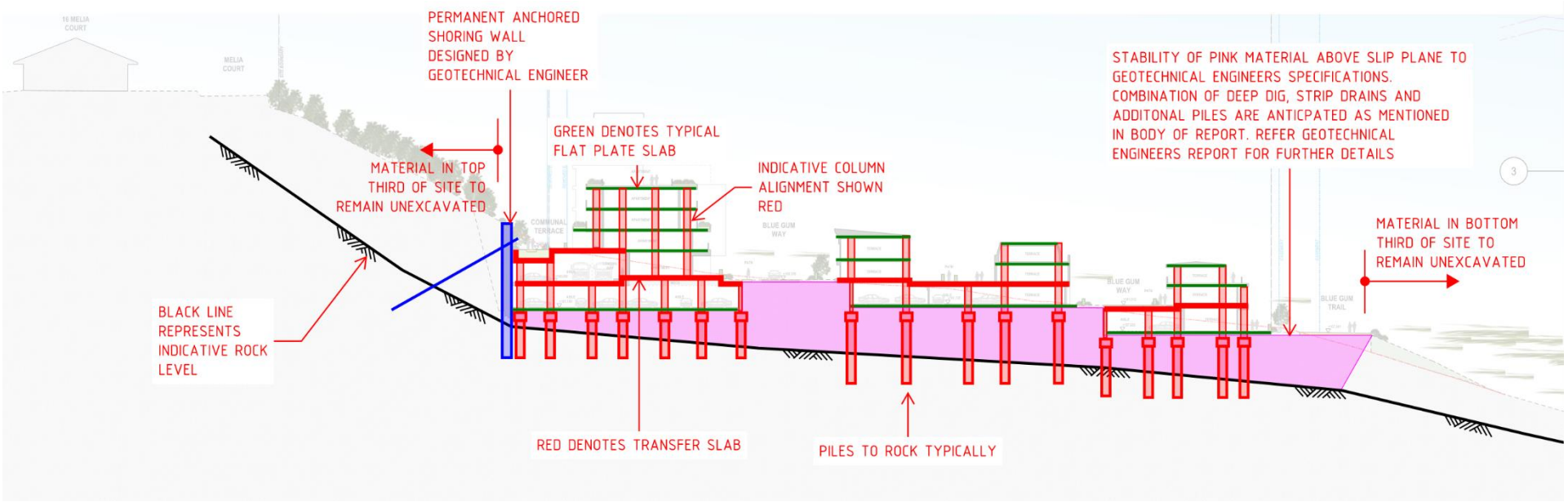
Yours sincerely,

Sam Chapple
Structural Engineer
BEng (Hons1) MIEAust CPEng NER

On behalf of Northrop Consulting Engineers Pty Ltd

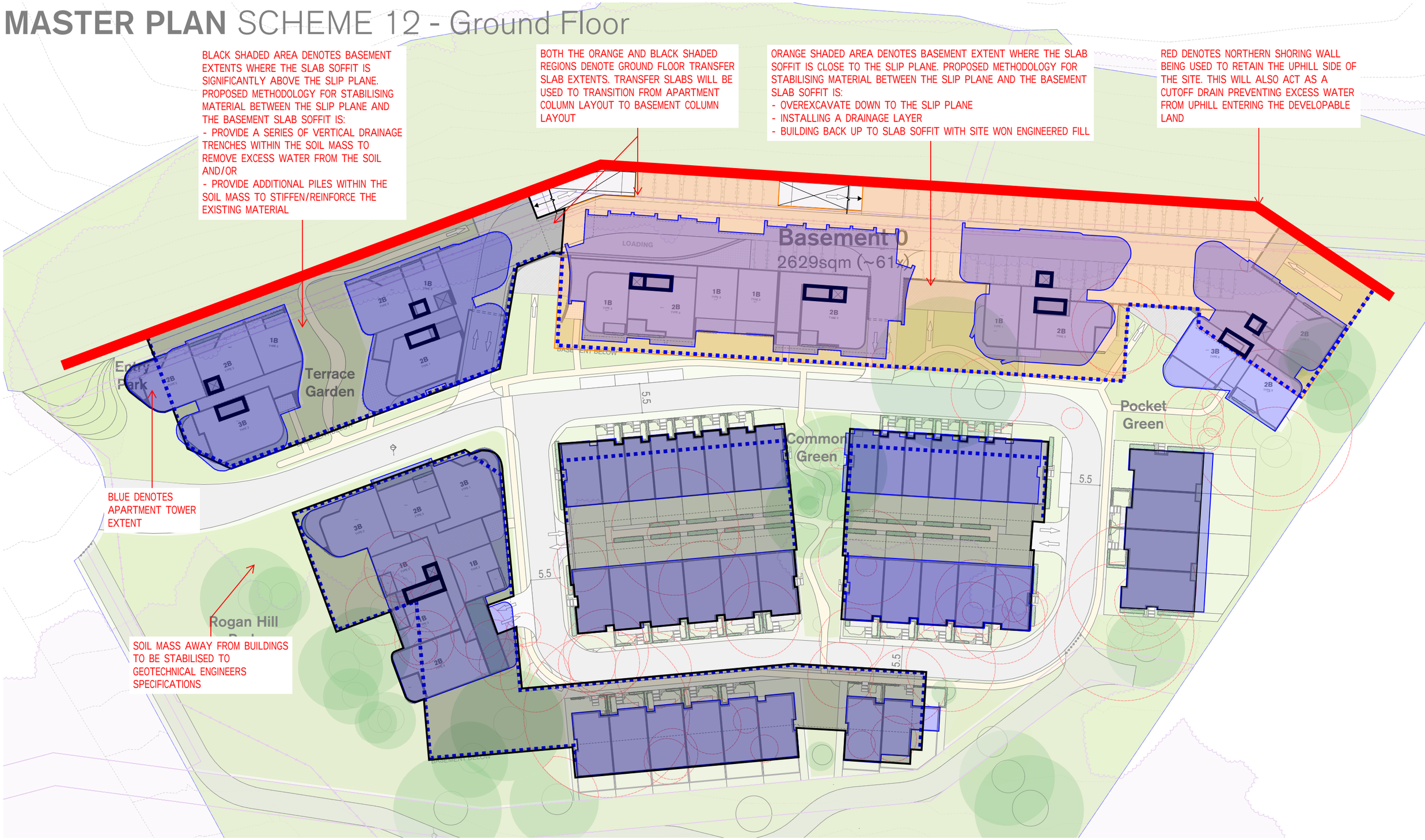
Lilian Lee
Principal / Structural Engineer
BE MEngSc MIEAust CPEng NER

Appendix A


PERMANENT ANCHORED SHORING WALL DESIGNED BY GEOTECHNICAL ENGINEER
GREEN DENOTES TYPICAL FLAT PLATE SLAB
MATERIAL IN TOP THIRD OF SITE TO REMAIN UNEXCAVATED
INDICATIVE COLUMN ALIGNMENT SHOWN RED
STABILITY OF PINK MATERIAL ABOVE SLIP PLANE TO GEOTECHNICAL ENGINEERS SPECIFICATIONS. COMBINATION OF DEEP DIG, STRIP DRAINS AND ADDITONAL PILES ARE ANTICPATED AS MENTIONED IN BODY OF REPORT. REFER GEOTECHNICAL ENGINEERS REPORT FOR FURTHER DETAILS
MATERIAL IN BOTTOM THIRD OF SITE TO REMAIN UNEXCAVATED
BLACK LINE REPRESENTS INDICATIVE ROCK LEVEL
RED DENOTES TRANSFER SLAB
PILES TO ROCK TYPICALLY

Appendix B

MASTER PLAN SCHEME 12 - Ground Floor



NORTHROP

Contact Us

BOWRAL
02 4861 2042
bowral@northrop.com.au
Shop 9a, 310-312 Bong Bong Street
Bowral NSW 2576

BRISBANE
07 3365 0400
brisbane@northrop.com.au
Level 25, 12 Creek Street
Brisbane QLD 4000

CANBERRA
02 6285 1822
canberra@northrop.com.au
Level 6, 224 Bunda Street
Canberra ACT 2608

CENTRAL COAST
02 4365 1668
centralcoast@northrop.com.au
Level 1, Suite 4 257-259 Central Coast Highway
Erina NSW 2250

COFFS HARBOUR
02 5603 3053
coffsharbour@northrop.com.au
Suite 6, 27 Orlando Street
Coffs Harbour NSW 2450

MELBOURNE
03 9600 2645
melbourne@northrop.com.au
Level 3, 520 Collins Street
Melbourne VIC 3000

NEWCASTLE
02 4943 1777
newcastle@northrop.com.au
Level 1, 215 Pacific Highway
Charlestown NSW 2290

PARRAMATTA
02 9241 4188
sydney@northrop.com.au
Lvl 15, 6 Hassall Street
Parramatta NSW 2150

SYDNEY
02 9241 4188
sydney@northrop.com.au
Level 11, 345 George Street
Sydney NSW 2000

WOLLONGONG
02 4226 3333
southcoast@northrop.com.au
Level 1, 57 Kembla Street
Wollongong NSW 2500