

12 December 2016
Project Reference: 2021746

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Attention: Mr. Greg Colbran

Dear Greg,

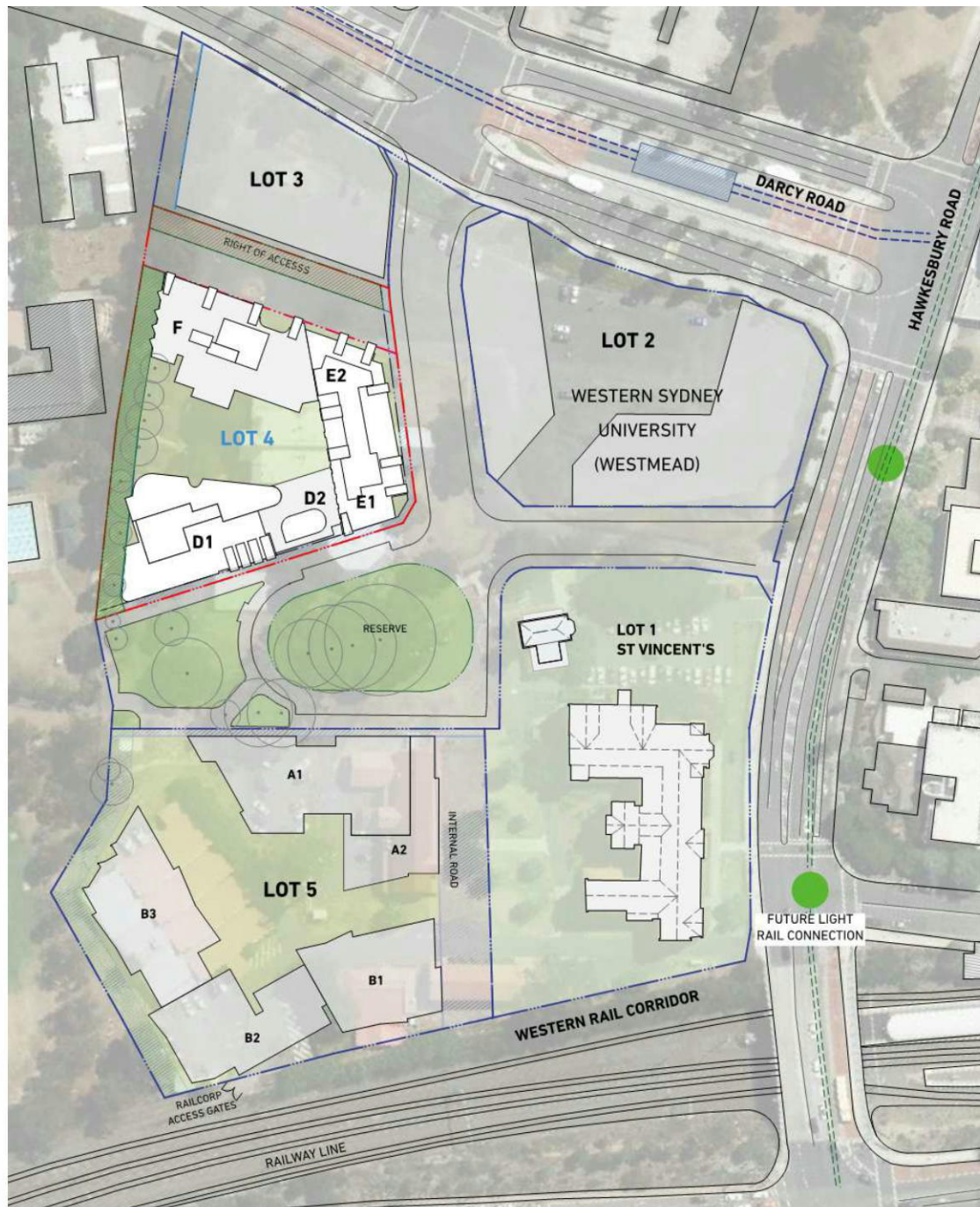
STRUCTURAL REPORT FOR WSU-LOT 4, DARCY RD, WESTMEAD NSW

Bonacci Group are the structural engineers for the proposed development at WSU-Lot 4 located on the corner of Darcy Road and Hawkesbury Road in Westmead. The site is currently un-developed with the existing buildings having been demolished prior to this project commencing. The site topography consists of a fall across the site from a high point on Hawkesbury Rd/Darcy Rd adjacent sloping down towards the South West corner of the site that is located adjacent to the Railway line.

The new development includes a twenty one storey residential building and eight and nine storey residential buildings with a large landscaped podium and up to four levels of basement carparking. The structure for the building is a post tensioned concrete slab supported by reinforced concrete columns and walls. The columns and walls generally bear on pad footing foundations located at the lowest level. There are a discrete number of piles that support portions of the tower levels located outside the basement extent. These piles are founded below the basement bulk excavation level.

Reference Documents:

- Turner Architectural Drawings Dated December 2016
- Geotechnical Report by EI Australia Pty Ltd - Reference "Geotechnical Investigation Report - Lot 4, Darcy Road & Hawkesbury Road, UWS Westmead" - Report No: E23033 GA dated 1 July 2016.
- Geotechnical Report by Coffey Pty Ltd - Reference "Geotechnical Investigation UWS Redevelopment, Westmead" - Report No: GEOTLCOV23424AA-AG dated 8th Feb 2007.
- Survey Plans by Daw & Walton Pty Ltd - Reference "Rail Survey @ UWS Campus, Darcy Rd, Westmead, NSW 2145" - Dwg No: 3020-16 dated 12th May 2016.
- Stray current Electrolysis Risk Report by Cathodic Protection Services Pty Ltd
- Bonacci Group structural sketches and markups issued electronically.



Location Plan Courtesy Turner Architects

Geotechnical Conditions:

The geotechnical investigation report that has been completed by EI Australia describes the ground conditions, the geotechnical issues associated with excavation and the groundwater issues. Refer to EI's report for a more detailed description of the geotechnical conditions across the site.

Railcorp Corridor:

The Westmead Railway line is located beyond the Southern boundary of the development site. The closest railway line is approximately 140m away from the Lot 4 site boundary. Further confirmation can also be found detailed on surveyor's drawings noted in the reference documents above.

Building Foundations:

The new building's footings consist of a combination of pad and strip footings founded in the high strength shale at approximately RL 16.00.

For further information regarding the site geotechnical conditions please refer to the EI Geotechnical Report for this project.

Site Excavation:

The temporary shoring system supporting the three to four levels of basement and consists of an anchored concrete soldier pile wall. The piles are generally 600-750mm in diameter spaced at 2.5m centres and extend below the level of the bulk excavation with a minimum embedment of 2m. The shotcrete wall between the soldier piles will be 180-200mm thick.

These systems are in accordance with the recommendations of the project geotechnical engineer and is a common site retention system in Sydney.

The proposed excavation sequence along the boundary would be:

- Construct temporary batters to geotechnical engineer's details.
- Drill and install piles to setouts and depths shown on plans, elevations and sections. All sockets are to be dewatered if necessary and specific holes/sockets will require an inspection from the geotechnical engineer to verify that the foundation conditions comply with the design assumptions.
- Place reinforcement in bored holes and place concrete in holes up to the underside of the capping beam.
- Construct capping beam and ensure min 25 MPa concrete strength achieved prior to further excavation occurring.
- Excavate to a maximum of 500mm below the top level of anchors and install anchors. Repeat for each level of anchors.
- Geotechnical engineer to inspect exposed rock face every 3m of excavation depth.

Shoring Wall Movements:

Issues associated with deep excavations of proposed developments and the interaction between existing infrastructure include stress redistribution and ground movement.

The shoring wall system for the boundary comprises concrete soldier piles that are spaced at approximately 2.5m centres with a shotcrete wall installed between the piles. The shoring wall is braced via ground anchors in the temporary case and by the basement floor slabs in the permanent case. Currently the shoring wall

movements have been predicted using Wallap based on the soil parameters specified by the project geotechnical engineers and using the construction sequence nominated.

Current modelling indicates that the shoring wall will have a predicted horizontal movement of 10-15mm maximum at the top of the wall.

All survey monitoring of shoring wall movements to be undertaken in accordance with the monitoring brief prepared by the project geotechnical engineers.

Stray Current Electrolysis:

A stray current electrolysis risk report has been undertaken for this specific site and the recommendations of this report have been adopted into the design documentation. Please refer to the specific report for more details.

Building Lateral Loads:

As part of the permanent design of the building, lateral loads have been applied to the new building from either Wind or Earthquake. These horizontal shear forces will be transferred at the foundation level into the underlying rock.

Tower Structural Design:

Bonacci Group have provided advice to the architect during the pre-DA phase via sketches/PDF schemes and meeting advice in order for the project architects to incorporate the requirements for the structure required to support these buildings.

We have undertaken a final review of the DA plans and confirm that the building has an adequate allowance for structure support and site retention within the proposed building envelopes. Based upon our review of the architectural drawings, we confirm that the DA scheme by Turners provides adequate structural allowance for a structurally feasible detailed design to be developed in the future stages of the project

For further information regarding the impacts of the excavation and future development on the existing infrastructure, please refer to the report undertaken by the project geotechnical engineers EI.

Yours faithfully,

BONACCI GROUP (NSW) PTY LTD

A handwritten signature in black ink, appearing to read 'Ryan Campbell', is positioned above the printed name and title.

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Director