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By email

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Lauren Saunders
Senior Planner, Regional Assessments
Department of Planning, Industry and Environment
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Dear Lauren

Review of Geotechnical Report - Proposed Residential Development, 89 John Whiteway Drive, Gosford, NSW

1. INTRODUCTION

At the request of the Department of Planning, Industry and Environment (DPIE), WSP Australia Pty Ltd (WSP) has provided geotechnical peer review services for the proposed Residential Development at 89 John Whiteway Drive, Gosford, NSW. We understand that the development is located in a former quarry and a key concern has to do with the stability of the excavated rock cuttings along the northern and western margins of the development.

The scope of work involved:

- Review of the latest geotechnical report (and other referenced geotechnical reports) in support of the development.
- Review of the latest architectural and structural engineering drawings prepared for the development.
- Prepare a letter report offering commentary on the adequacy and suitability of the geotechnical advice presented in the latest report.

2. BACKGROUND INFORMATION

The following relevant information is included in this review:

- Geotechnical Investigation Report prepared by JKGeotechnics dated 14 November 2019 (Ref: 31078S2rpt).
- Letter of Engineer advice for Construction of Rock Catch Fence from JKGeotechnics dated 17 July 2020 (Ref: 31078Plet5).

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- Following architecture drawings downloaded from the DPIE planning portal (<https://www.planningportal.nsw.gov.au/major-projects/project/11961>), prepared by ADG Architects dated 19 March 2021:
 - Architecture Plans – Block A.
 - Architecture Plans – Block B.
 - Architecture Plans – Block C.
 - Architecture Plans – Block D.
 - Architecture Plans – Part 1.
 - Architecture Plans – Part 2.
 - Architecture Plans – Part 3.

No structure design information was available at the time of this geotechnical review.

3. SITE DESCRIPTION

The site is located at 89 John Whiteway Drive, Gosford and is irregular in shape and has a combined area of approximately 22,300 m².

The proposed development will be to construct four residential flat buildings (ranging in height from 5 to 12 storeys) over a single basement level and one part-basement level car parking. Architectural drawing (DA001.7 Rev 3) indicates that the lower basement level will generally have a finished floor level at RL61.9 m AHD which will require excavation generally between 3 m to 6 m, with excavation (Block D) up to 7m to 11m deep and locally 13.5m where the ground rises on the eastern side. In JKGeotechnics report, it was identified that an excavation up to 9.5 m towards the northern and north-western end of the site where there is an existing 'headland' of sandstone outcropping. The basement excavation will generally be set back at least 9m from the site boundaries (at east side of Block C, at least 5 m set back).

4. GEOTECHNICAL REVIEW

The geotechnical report for this review was prepared by JKGeotechnics dated 14 November 2019 (Ref: 31078S2rpt and hereafter referred as The Report) which also included the historical site investigation information. In total there were 9 boreholes and 9 test pits across the site (Figure 4.1).

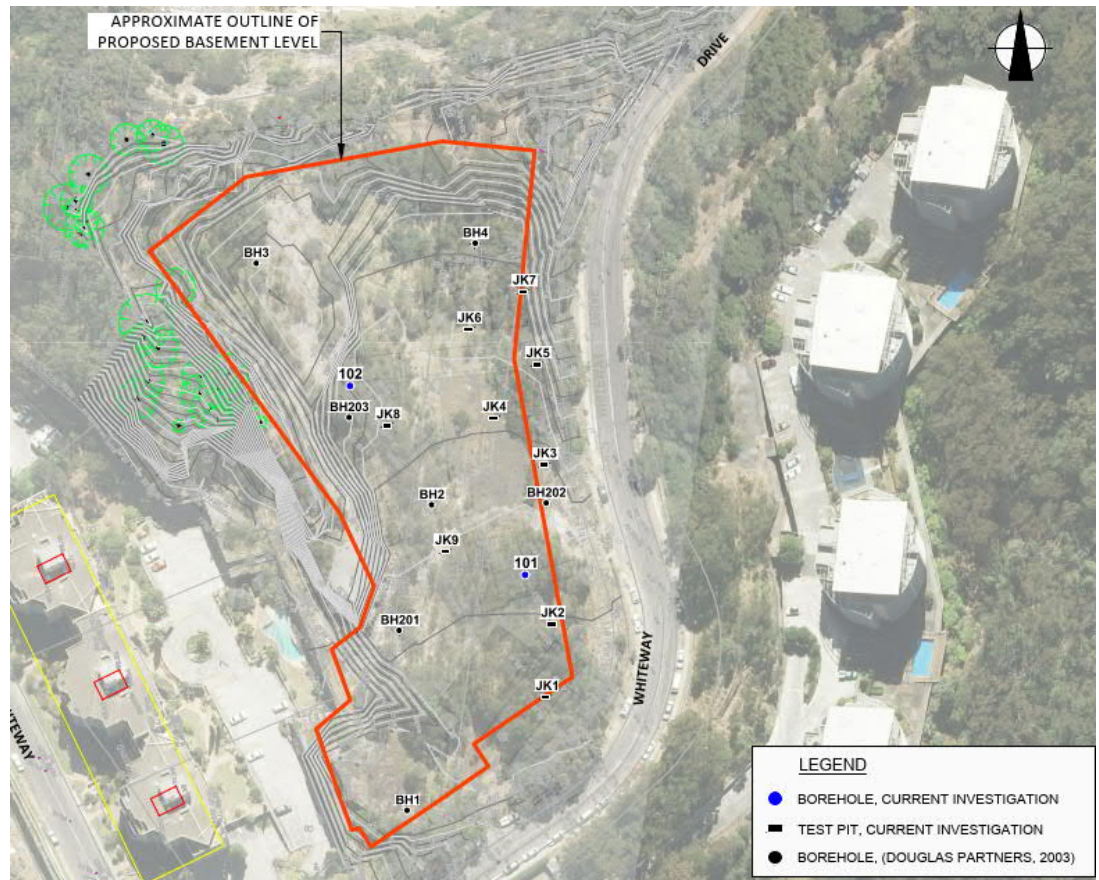


Figure 4.1 Locations of boreholes and test pits (extracted from JKGeotechnics' report)

Review of “Geotechnical Investigation Report”, comments below:

Scale of site investigation: All of boreholes and test pit logs show consistent subsurface profiles across the site: fill comprised of gravelly silty sand or silty sand up to depths from 0.25 m to 1.3 m over medium to high strength sandstone bedrock. Historical boreholes and additional site investigation presented in the report indicate that there are no significant variations of the subsurface conditions identified across the site, therefore, it is considered that the scale of site-specific geological investigation is appropriate for the project stage of development application.

The report also provided geotechnical advice and recommendations on excavation (including advice regarding noise/vibration, battered slopes and shoring system requirements to stabilise the rock faces), groundwater seepage, earth pressures for the retaining wall design, allowable bearing pressures for foundation design (footing). These advice and recommendations are considered suitable for the proposed development.

The Report also highlights excavation conditions on Headland and Western Quarry Face. It is proposed to remove the thin triangular shaped portion of the headland at southern end due to stability concern in the longterm and for the remain part of headland with a horizontal width large than 10m, a 1H:1V slope with benches formed plus some stabilisation measures (rock bolts and shotcrete) if required. These are considered as appropriate for a high level assessment at this design stage. However, compliance with the non-buildable exclusion zone and other development conditions has not been assessed.

It is noted that JKGeotechnics is not able to give advice on the stability of the western face of the headland as access for inspection was not readily available.

5. ISSUES TO BE ADDRESSED NEXT STAGE

The Report also highlights further geotechnical inputs required next stage including interactions with structure design, geotechnical site inspections during construction stage and detailed assessment of the lower quarry face.

Apart from these further inputs stated in The Report, following issues should be addressed at the next stage of design/construction.

It is noted that slightly deeper excavation is proposed at Block A for vehicle/truck access ramp to the basement from John Whiteway Drive with less than 6 m to the boundary and cliff (Figure 5.1). It is recommended that following actions to be taken to ensure the stability of the cliff at this location

- The design of foundations, if any, should have loads be transferred down to the zone of influence.
- Geotechnical engineer to inspect the exposed rock face to identify any potential rock wedges and advised protection measures.

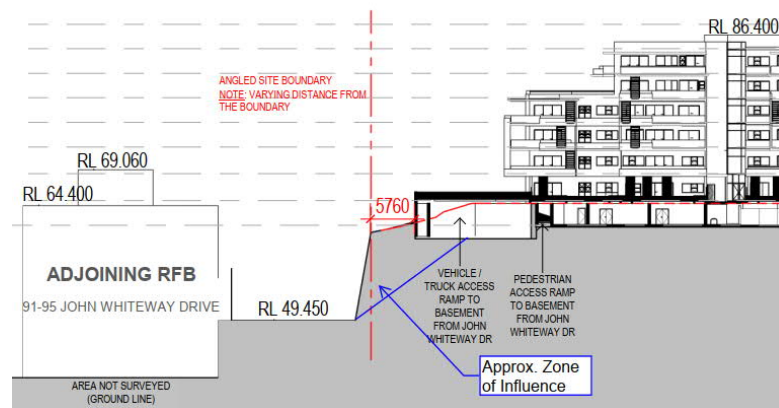


Figure 5.1 Vehicle access ramp to be constructed close to cliff

As indicated in The Report, the rock exposed in the headland is mainly sandstone but with bands/lenses of fragmented shale and the eastern face of the headland has been benched as it would not form stable vertical faces. No site mapping has been done for the headland outcrops (Figure 5.2). It is noted that over 10 m cut would be required as shown in Figure 5.3 below. Saw cut or hammering could induce unstable outcrop if there are defects to form rock wedges.



Figure 5.2 Headland rocky outcrop

Therefore, it is recommended that:

- Site mapping on the faces of headland (based on accessibility) to be carried out prior to construction to identify any potential rock wedges.
- Reassess the Baker Ryan Stewart detailed rock catcher fence (Figure 5.4); if rock wedges are identified, then additional measures may be required.
- Geotechnical engineer on site during construction to inspect the exposed rock faces and provide support/reinforcement advice if necessary.

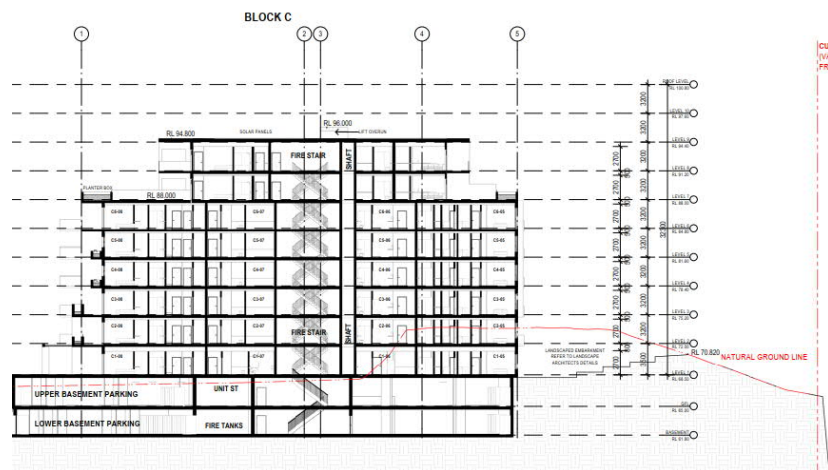


Figure 5.3 Deep cut in rock up to 10 m on headland rocks

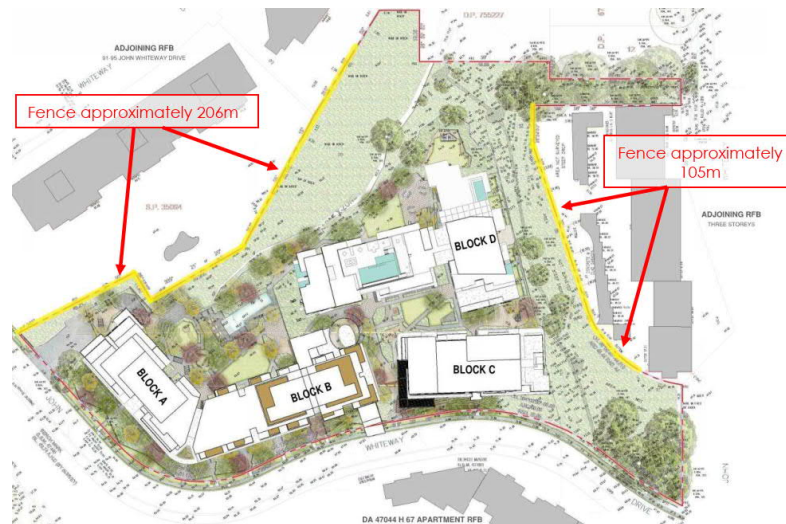


Figure 5.4 Extent of rock catcher fence proposed (extracted from "Preliminary Construction Management Plan" Rev 5, prepared by Baker Ryan Stewart Pty Ltd)

6. SUMMARY

The site-specific geotechnical investigation up to date has provided suitable information for this stage of design in consideration of the coverage of boreholes/test pits across the site and consistent subsurface conditions identified from the geological data.

The recommendations provided in The Report with regards to excavation, groundwater seepage, excavation support, earth pressure for retaining wall design and footing foundations are considered appropriate for SSD DA.



The stability of headland outcrop during excavation and the long-term stability of cliff at the western side will require further investigation and assessment at the next stage design.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Pan Jiping'.

Jiping Pan
Technical Executive

A handwritten signature in black ink, appearing to read 'Robert Kingsland'.

Robert Kingsland
Technical Executive, Geotechnics