

25th July 2018

Faraneh Jabalameli
Kennedy Associates
Level 3/ 1 Booth Street
Annandale NSW 2038



Att: Faraneh Jabalameli

Dear Madame

**RE: EXCAVATION CONSTRUCTION METHODOLOGY REPORT for
KIAMA SHORES, BLACKTOWN, NSW**

1.0 INTRODUCTION

This report presents a structural engineering assessment of the proposed development at 23 Meares Place and 33 Collins Street Kiama, which has been the subject of design modification and refinement following initial pre-lodgement engagement with and assessment by Council. This reports relates to the revised design and also responds to the requirements of Item 13 of the Engineering Comments (page 4) “The development application shall detail construction methodology” outlined in Kiama Municipal Council’s Development Assessment Unit Minutes, dated 15/06/2016, regarding the proposed development and also the presence of “Bombo Tuff” within the site.

The proposed development involves the construction of a multistorey medium density seniors living complex. There are four above ground levels (comprising ~58 units) over two below ground levels of basement carpark.

Generally, the buildings are constructed over the basement footprint, however, some parts of the building will be founded outside of the footprint of the excavation and will need to be piered/designed accordingly. This is not covered in this report and will be developed further upon approval of the DA and subsequent engagement of the design team.

In our experience, the general construction methodology associated with the proposed development, and provided herein, appears to be typical of similarly sized developments along the South Coast and in the Sydney region, however, some additional consideration does need to be taken regarding the treatment of exposed rock faces etc. and this advice is provided below as part of our recommendations.

2.0 EXCAVATION

Geotechnical investigations (refer report No. 38145.01.R.001 by Douglas Partners (DP), dated June 2016) reveal the site is underlain by Kiama sandstone (Budgong Sandstone or “Bombo Tuff”), the depth to which varies from roughly 1.4-5.0m for low-medium strength rock and 2.0-6.0m for the higher strength material. Fills and natural clays overlay the rock, with the clay becoming stiff to very stiff at less than 1 metre below the existing ground levels. A temporary batter of 1:1 is possible in the clays (where space permits).

Based on the above soil/rock profiles, the proposed finished floor level of the basement and the proposed setback from the boundaries, the following general methodology would need to be employed during construction to avoid impacting any of the neighbouring properties and to also ensure that the excavation is adequately supported during construction (See Appendix A-Extent of Excavation for further detail on the extent of the various options):

- Where possible within the site boundary, the upper layer of top soils and clays are to be battered back at 1V:1H using a standard excavator. If the levels are to be raised again at completion of construction, then a cantilever block retaining wall could be installed prior to backfill. This methodology is feasible for most of the excavated perimeter except for a small area along the north eastern edge of the basement ramp; along the south western edge of the basement ramp; and the northern corner of the site where the first/second floor is terraced.
- For the remainder of the building footprint, where the depth to rock is less than the distance to the boundary i.e. greater than 1V:1H, a suitably designed retention system is to be installed prior to excavation. This may involve the installation of an anchored contiguous pile wall down to rock or soldier piles at discrete centres with shotcrete infill panels. The anchors could be released upon completion of construction i.e. once the excavation is braced by the building. The adopted methodology would depend on the proximity to neighbouring properties and/or our understanding of their footing systems.
- Once we are into rock a vertical cut can be installed with a rock-saw to limit vibrations and a rock-breaker or ripper utilised (where possible) to excavate through the rock. Guidance on the buffer distances for typical excavation machinery is contained in the report by DP.
- In order to prevent the degradation of the exposed “Bombo Tuff” sandstone layers due to moisture exposure, and to reduce the likelihood of wedge type joint failures in the rock, it has been suggested that the excavation face be supported/sealed over the full depth of the excavation with a layer of structural shotcrete (150mm thick) and a series of rock bolts. Preliminary advice by DP suggests that rock bolts at 1.5m centres (vertical and horizontal) is suitable for preliminary design/costing purposes. This is generally consistent with our experience in similar basement excavations and would be supported in our design recommendations.
- Further to the above, and in conjunction with the advice provide by DP, once the final excavation levels are achieved it is also suggested that the base of the excavation be adequately sealed with a blinding layer of concrete to prevent the degradation of the sandstones due to moisture exposure etc.

3.0 VIBRATION

Induced ground vibrations are expected to be minimal whilst excavating out the upper layers of weak rock and/or soils, however, where the basement is excavated deep into the underlying sandstone bedrock, it will be necessary to control and monitor vibration levels so as not to affect the neighbouring properties. The issue of controlling and monitoring ground vibrations is well addressed in the geotechnical report (refer Section 8.3, Table 4 & Appendix D) and we concur with the recommendations outlined therein.

4.0 GROUNDWATER

Based on the advice provided in the geotechnical report some excavation may be below ground water level. It is indicated in the report that the standing groundwater table is within the rock profile (RL13.0 to RL16.0), the lower basement (RL 11.56) is 1.5m to 4.5m below this. It is considered that any inflows will be controllable by the use of sumps and pumps. This is standard practice and manageable as part of both the abovementioned construction methodology and in the final design. Further detail as to the method of collection and/or discharge of collected water will obviously be made available as part of the detailed design phase.

5.0 CONCLUSION

It is our opinion that the works proposed can be safely excavated when undertaken in accordance with standard practice, a good workmanlike manner, structural engineering guidance and supervision, and the recommendations provided in the geotechnical report by Douglas Partners.

As is commonly adopted in the industry, a structural engineer has not been appointed at this time to undertake the full analysis, design, and documentation of the works, as this usually does not proceed until after the DA is approved. We thus conclude by advising that, upon DA approval, all structural works associated with the excavation and any permanent retention be designed and documented by a qualified structural engineer.

I trust this meets your current requirements. Should you have any further queries please feel free to contact the undersigned.

Yours faithfully,

Partridge Structural Pty Ltd

Prepared by:

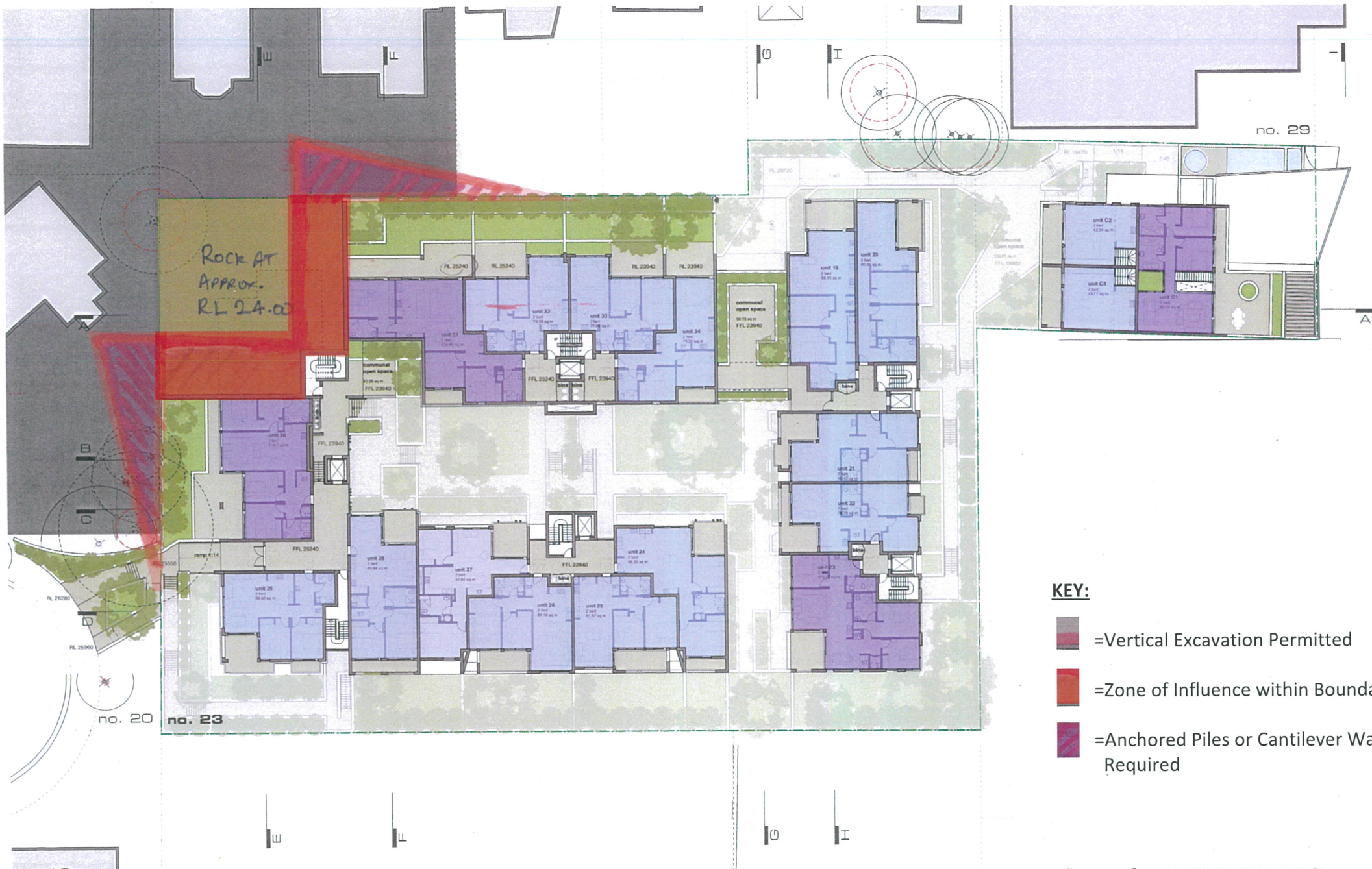


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APPENDIX A EXTENT OF EXCAVATION



KEY:

-  =Vertical Excavation Permitted
-  =Zone of Influence within Boundary
-  =Anchored Piles or Cantilever Walls Required

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Rev.	Issue / Amendment	App.	Date
P1	PRELIMINARY		25/07/18



Client
**EXCAVATION CONSTRUCTION METHODOLOGY for
 KIAMA SHORES, NSW**
ZONE OF INFLUENCE

Electronic Code	Signature	Date
Design MW	Drawn MW	
Scale at A3 NTS	Date	July 2018
Job No. 2016S0070	Drg. Rev. SK02	



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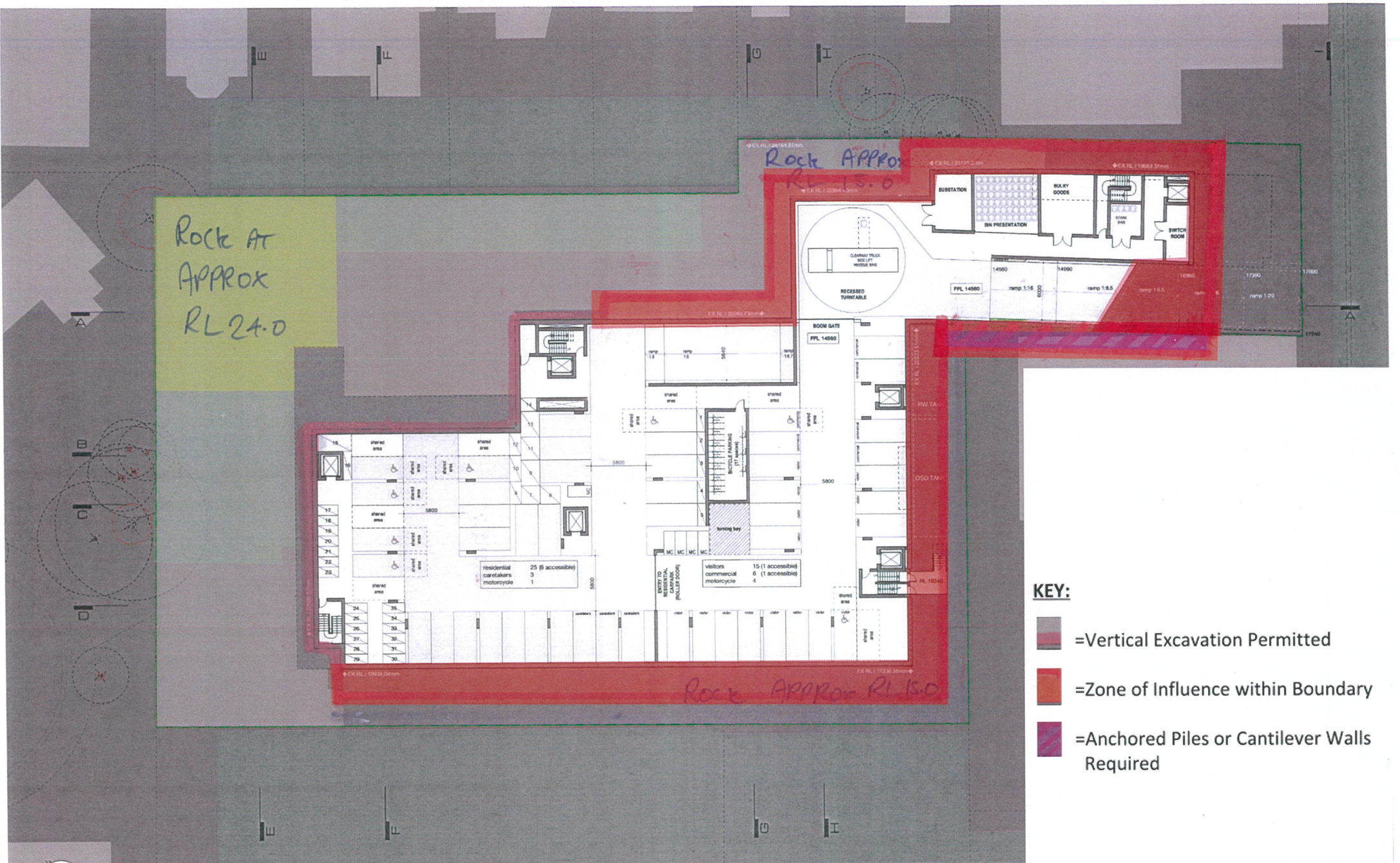
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