

Our Ref: PSM3688-012L

21 December 2018

Great River NSW Pty Ltd
Suite 5, Level 5
66 Hunter Street
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Attention: The Directors

Dear: Sirs

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RE: SUMMARY OF GEOTECHNICAL ASSESSMENTS IN RELATION TO INDUSTRIAL DEVELOPMENT OF SOUTHERN WETLANDS SITE, PENRITH LAKES

1. Introduction

This letter summarises the geotechnical assessments undertaken by PSM in relation to the proposed industrial development of the Southern Wetlands site, Penrith Lakes. It has been prepared to support a development application by Great River NSW Pty Ltd relating to the design and construction of civil infrastructure and buildings. The letter concludes that from a geotechnical perspective, the site can be developed to provide for typical industrial use including buildings and infrastructure, using industry standard approaches for the type of ground conditions encountered.

2. Geotechnical conditions

The Southern Wetlands site is a river gravel quarry that has been backfilled with tailings from the quarrying operation. PSM has undertaken three phases of investigation to characterise the ground conditions for use in preparing concept designs. These are:

- Desktop study and review of pre-existing information including aerial photographs, reported in PSM2541-151R DRAFT (21 December 2016)
- Intrusive site investigation and in situ testing, reported in PSM2541-207R (22 August 2017)
- Additional intrusive site investigation and in situ testing, reported in PSM3688-010L (18 August 2018).

The geotechnical conditions within the backfilled quarry comprise tailings (clays, silts, and sands), overlain in parts by a capping layer.

3. Ground treatment

We understand that the proposed development includes earthworks to achieve a final landform, preparation of lots for industrial development (warehouses, offices, etc.), and construction of associated infrastructure (roads, drainage, other services). Depths of additional fill are typically 2 m to 3 m. Surface settlements are expected upon placement of this additional fill, due to consolidation of the underlying tailings.

Some form of ground treatment is therefore expected to be required to provide adequate performance of the infrastructure. Such ground treatment could for example include the use of surcharge fill placed to preload the ground and minimise post-construction settlements to acceptable levels, combined with wick drains where required to increase the rate of consolidation of tailings to achieve a program that is acceptable to the developer. Other forms of ground improvement could also be applicable. PSM has undertaken concept design of ground treatments, which demonstrates that it is feasible to develop the site using industry standard approaches for this type of ground condition. These concept designs are documented in:

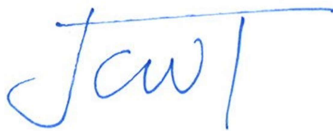
- Assessment of different ground treatment strategies, reported in PSM2541-151R DRAFT (21 December 2016)
- Further advice regarding ground treatment strategies, reported in PSM2541-207R (22 August 2017)
- Further details on ground treatment strategies, reported in PSM2541-236L (24 May 2018).

Regarding the industrial lots, similar ground treatment could be undertaken, and for structures there are other alternatives to ground treatment options. The depth to shale bedrock is approximately 15m below the surface level. Future buildings can simply be piled to bedrock with no ground treatment required at all.

4. Conclusion

PSM has undertaken sufficient investigation at this site to understand the geotechnical conditions and constraints relating to its development. We conclude that from a geotechnical perspective, the site can be developed to provide for typical industrial use including buildings and infrastructure, using industry standard approaches for the type of ground conditions encountered.

For and on behalf of
PELLS SULLIVAN MEYNINK

A handwritten signature in blue ink, appearing to read 'Jawt'.

JEREMY TOH
PRINCIPAL