

**8 Stevensons Crescent, Albany Heights
Proposed Residential and Mixed Use
Development and Subdivision
Geotechnical Desktop Review and
Preliminary Assessment**

Prepared for:

Mansion Rear Ltd

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Document Control

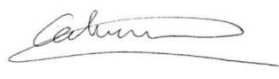
Document Information and Revision

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Author	Calvin Wu	Director	CPEng, CMEngNZ, IntPE		0

Document Applicability and Disclaimers

This report has been prepared by Subsurface Consultants Ltd solely for the benefit of Mansion Rear Ltd as our client with respect to the particular brief given to us. Comments, recommendations and opinions in this report are based on a geotechnical desktop assessment and initial walkover of the site which determined that there are no geotechnical impediments to the development of the site that cannot be addressed via conventional and well-proven civil engineering methodologies. A more detailed geotechnical investigation during the resource consent design stage will be required to confirm the comments and preliminary recommendations of this report.

Subsurface Consultants Ltd has agreed that the content of this report can be relied upon in the context of the application by our client to have this application considered via 'fast track' procedures under. Any advice given in undertaking this work cannot be relied on by any person or parties other than the client, or for any purpose other than the client's particular brief, without prior agreement from Subsurface Consultants Ltd. The reliance by other parties on the information is at such parties' sole risk.

1.0 Introduction

Subsurface Consultants Ltd (SCL) has been engaged to carry out a geotechnical desktop review and preliminary assessment of geotechnical issues relevant to the proposed residential and mixed use development and subdivision at 8 Stevensons Crescent, Albany Heights. The scope of this desktop review includes,

1. Initial site walkover observation by SCL staff.
2. Review of the publicly available information such as GNS Science geological maps, Auckland Council Geomaps for the site etc.
3. Provide general geotechnical comments and recommendations for the proposed concept plan prepared by OZAC Architects Ltd (OZAC).

This report provides a desktop review following an initial walkover of the site and our general geological knowledge of the area. The comments and recommendations provided in this report should be verified and confirmed following the detailed geotechnical investigation during the resource consent design stage.

2.0 Site Description and Features

The site at 8 Stevensons Crescent comprises two separate properties, namely:

1. PT Allot 27 Parish of Paremoremo, Pt Allot 299 Parish of Pukeatua
2. Pt Allot 27 Parish of Paremoremo

The total site area is 2.6848 hectares according to Auckland Council Geomaps. The site is irregular in shape and is located to the northwest of the rest of Stevensons Crescent. The aerial photo and existing contours from Auckland Council Geomaps are shown in Figure 1.

There are several existing building structures presented on site. These comprise:

1. A main dwelling with several surrounding ancillary buildings is located approximately in the centre of the site, adjacent to the western boundary.
2. A minor dwelling with a standalone garage is located on the southwestern corner of the site.

The site is generally situated on the toe of a ridge. The top of the ridge is on the neighbouring land located west of the site.

In general, the ground slope at this site varies from approximately 1V:10H to 1V:3H, sloping from southwest to north and east directions. The steepest slope is located on the northwestern part of the site. There is an elevated promontory located at this part of this site that could be related to a historical slope movement.

There are drainage ditches present along the northern and eastern boundaries of the site. As indicated on the Auckland Geomaps, there are four potential overland flow paths bypassing the site. They are shown in Figure 1.

3.0 Proposed Development

The preliminary concept plan is prepared by OZAC Architects Ltd (OZAC) and attached in Appendix A. It consists of 138 Units of residential developments. This includes 112 terrace houses and 26 apartments along with a smaller mixed use commercial component. The preliminary architectural masterplan is attached as Figure 2.

4.0 Geology and Ground Conditions

The GNS Science Geological Map of the Auckland Area Map 3, Scale 1:250,000 (Ref. 1) indicates that the site is located at the boundary of two geological units:

1. Puketoka Formation (Pup) of the Tauranga Group, which is commonly known as alluvium, is described as *"Pumiceous mud, sand and gravel with muddy peat and lignite; rhyolite pumice, including non-welded ignimbrite, tephra and alluvial pumice deposits; massive micaceous sand"*; and
2. East Coast Bays Formation (Mwe) of the Waitemata Group, is described as *"Alternating sandstone and mudstone with variable volcanic content and interbedded volcanoclastic grits."*

The alluvium is expected to be softer in strength and the East Coast Bays Formation is likely to have higher-strength residual soils overlying weathered rocks.

The geological map is generated on a regional scale. There could also be fill material that has been historically placed onsite which cannot be identified from the regional geological map. The actual ground condition should be confirmed by site-specific ground investigations during the resource consent design stage.

5.0 Discussion

It is generally expected that the elevated portions of the site would comprise residual soils derived from the Waitemata Group. The low-lying portions of the site could comprise alluvium (Tauranga Group). The depth of groundwater is expected to be deeper in the elevated portion of the site than in the low-lying areas. Both of these geological units are not uncommon for Auckland's residential subdivision sites.

The residual Waitemata Group soil is generally expected to have higher strength and consistency which should generally be suitable for developments without major earthworks. The steep portion of the elevated site may require slope stabilisation improvements to meet engineering standards for residential developments.

The alluvium is more likely to be weaker and could potentially contain organic-rich layers. The alluvium is considered to be more challenging for the proposed development. The material could be compressible and could be potentially susceptible to consolidation settlement with loading from bulk fill or buildings. It could also be subject to liquefaction-induced settlements and/or lateral spreading during the design earthquake events. These issues, should they be found to exist, can be addressed by appropriate and conventional ground improvement methods including but not limited to under-cutting, subsoil drainage, dynamic compaction, deep soil mixing, piling etc.

If a building is to be founded on residual Waitemata Group soil within the gently sloping ground, it is expected that it will be able to be founded with shallow foundations provided that the foundation extends below any topsoil, weak soil and uncertified fill. If a building is to be founded on fill or compressible

alluvium or steep sloping ground, the foundation is expected to be required to comprise deep piles and/or specific engineering design foundations.

Given the topography of the site, development in accordance with the OZAC Concept Plan:

1. Illustrates the retention of areas of wetlands and wetland soils located on the northern and north-western periphery of the site (adjoining the vehicle access that serves 10 Stevensons Crescent).
2. Will involve bulk earthworks and retaining to support the development of the road, lanes, infrastructure (including stormwater management) and building platforms. The site slopes from the south-west to the north-east and retaining structures should be required.

Retaining structures are common to developments with sloping ground. Groundwater diversion may be required if shallow groundwater is encountered behind the retaining structures.

Conventional engineering designs can ensure stability and detailed resource consent design would evaluate the effects of groundwater drawdown if required.

6.0 Preliminary Geotechnical Recommendations for the Development

1. It is recommended that fieldwork comprising hand and machine-drilled boreholes, together with machine-dug test pits, cone penetration tests, or similar, be carried out to investigate the ground conditions and to provide site-specific geotechnical recommendations for the proposed development during the resource consent design stage. Geotechnical laboratory tests should also be undertaken to confirm geotechnical design parameters.
2. The soils underlying the site are likely to be reactive and susceptible to seasonal soil shrinkage and swelling. All building foundations and services of the proposed developments should be designed in accordance with AS2870:2011 (Ref. 2). The class of the reactive soil should be identified by site-specific ground investigations during the resource consent design stage.
3. Due to the sloping nature of the ground, earthworks should predominantly comprise cutting, with minimal filling to minimise surcharge on the existing slopes. All cuts and fill must be retained by design retaining walls unless reviewed and approved by a Geotechnical Engineer. Spoil from the site excavation should be removed from the site. The proposed cut and fill earthworks plan should be reviewed and approved by a Geotechnical Engineer. Prior to placing any fill, all vegetation, topsoil and any weak soils should be removed from fill areas and sloping ground benched to key the fill into the slope and subgrade inspected by a Geotechnical Engineer. Any fill should be placed to suitable engineering standards, e.g., NZS 4431:2022 (Ref. 3).
4. A site-specific earthworks specification should be prepared prior to carry out any earthwork activities. The guidance and requirements in the Auckland Council Code of Practice for Land Development and Subdivision, Chapter 2: Earthworks and Geotechnical (Ref. 4) should be followed.
5. Slope stability assessments are required for any natural as well as cut/fill slopes equivalent of steeper than 1V:4H. For steep slopes, ground stabilising improvements may be required to provide adequate stability which meets engineering standards for residential subdivision developments.
6. The alluvial material on-site may include soft materials which require replacement with stabilising fill and/or ground improvements. This will need to be confirmed following the detailed geotechnical investigation during the resource consent design stage.

7. All stormwater from the roofs, driveways and any overland flow shall be disposed of and/or diverted as per Auckland Council's requirements.
8. Groundwater monitoring shall be carried out for groundwater drawdown assessments if required during the resource consent design stage.
9. Specific geotechnical recommendations for the proposed site work will be confirmed by the detailed geotechnical investigation during the resource consent design stage.

7.0 Conclusions

In general, we consider that development undertaken in accordance with the Ozac Concept Plan is feasible from a geotechnical perspective.

This report has been prepared to provide a preliminary assessment of the site for the proposed developments. Detailed geotechnical investigation and assessments are required during the resource consent design stage to confirm geotechnical recommendations including but not limited to:

1. Geological and geotechnical constraints.
2. Site stability and potential ground stabilisation improvements.
3. Foundation design recommendations for the building structures, and ground improvements that may be required for the alluvial materials onsite.

References

1. Edbrooke, S.W. (compiler) (2001) "*Geology of the Auckland Area, Institute of Geological & Nuclear Sciences 1:250:000 Geological Map 3*" 1 sheet and 74 p. Lower Hutt, New Zealand. Institute of Geological & Nuclear Sciences Ltd.
2. Standards Australia (2011) '*Australian Standard, Residential Slabs and Footings, AS 2870:2011*' ISBN 978 0 7337 9756 9.
3. Standards New Zealand (2022) '*NZS4431:2022 Engineered Fill Construction for Lightweight Structures*' ISBN (PDF) 978-1-77691-167-7.
4. Auckland Council (2022) '*Auckland Code of Practice for Land Development and Subdivision, Chapter 2: Earthworks and Geotechnical*' July 2022, Version 2.0



Figure 1

8 and 12 Stevensons Crescent, Albany Heights
Proposed Residential Developments
Existing Site Plan



STREAM WITH 10M OFFSET FROM STREAM BANKS

Lot 3
DP 430542

ACTIVATED STREET FRONTAGE

All units with street frontage to have direct access from the front yards

FUTURE LINK ROAD TO THE WEST

12.0m wide road with 2-way vehicle access & footpaths

16m wide PUBLIC ROAD

16.0m wide road with 2-way vehicle access, footpaths, street parking with quality amount of street trees/landscaping on both sides

ACTIVATED STREET FRONTAGE

All units with street frontage to have direct access from the front yards

Private driveway to neighboring property

PRESERVED WETLANDS WITH 5m SETBACK

[NO EARTHWORKS OR PROPOSED STRUCTURES]

used as discharge points for stormwater. Mitigation and quality treatment devices provided prior to discharge

PUBLIC PEDESTRIAN WALKWAY AT WETLAND RESERVE

Connecting the wetlands and rear units with no street frontage to the public realm

REAR LANES / INTERNAL DRIVEWAYS

Min 7m wide for residential parking, service access (waste collection and household deliveries)

REAR LANES / INTERNAL DRIVEWAYS

[NO PUBLIC PEDESTRIAN ACCESS]

For residential parking, service access (waste collection and household deliveries)

FUTURE LINK ROAD TO THE EAST

12.0m wide road with 2-way vehicle access & footpaths

REAR LANES / INTERNAL DRIVEWAYS

[NO PUBLIC PEDESTRIAN ACCESS]

For residential parking, service access (waste collection and household deliveries)

STREAM WITH 10M OFFSET FROM STREAM BANKS

acting as a stormwater management detention basin

RIGHT OF WAY

INTERNAL DRIVEWAY TO APARTMENT

Min 7m wide formed driveway containing parking lots and service area for Commercial Units and Apartment units

MAIN SITE ACCESS TO AND FROM STEVENSON CRES

16.0m wide road with 2-way vehicle access, footpaths, street parking with quality amount of street trees/landscaping on both sides

REAR LANES - NO PUBLIC PEDESTRIAN ACCESS

(For blocks with opportunity for direct street access)
Prevents unnecessary public access and offers better privacy for residents

BRIDGE / CULVERT OVER STREAM CROSSING

To be designed to comply to NES-F standards

**APARTMENT BUILDINGS WITH COMMERCIAL UNITS
AT GROUND FLOOR**

Proposed Zoning: Mixed Housing Urban Zone
Site Area: 25112 m²
Total number of proposed units : 138
Terrace: 112
Apartment: 26
Commercial Area : 550sqm

- Site Boundary
- Main entrances to Site and Blocks
- Stream with required 10m offset
- Wetland extents with required 5m offset
- Private Outdoor living space (approx 20sqm)
- Public greenery, communal areas

Figure 2