

**Soil&Rock Consultants**  
*Your responsive & cost-effective engineers*

**30+** YEARS OF  
SOIL&ROCK  
since 1987



## Geotechnical Appraisal for Proposed Plan Change at **159 Awakino Road, Dargaville**

Rev A

5 May 2022 Job No. NL220026



**Auckland**  
(09) 835 1740

**Northland**  
(09) 982 8053

**Wellington**  
(04) 896 0675

**Christchurch**  
(03) 352 4519

[www.soilandrock.co.nz](http://www.soilandrock.co.nz)

---

## 1.0 Introduction

Soil & Rock Consultants (S&RC) were engaged by Moonlight Heights Ltd (the Client) to carry out a geotechnical assessment of the property at 159 Awakino Road, Dargaville ('the site'), for the purpose of assisting with a proposed plan change for residential subdivision of the property.

Our scope for this appraisal was to evaluate potential geotechnical hazards that may affect the existing property.

This involved:

- Reviews of:
  - Geological maps and the New Zealand Geotechnical Database
  - Existing geotechnical data held by Soil & Rock Consultants for nearby sites.
  - Relevant Kaipara District Council GIS information and historical aerial photos
  - Relevant Geotechnical Hazard documentation

No site walkover, internal inspection of existing buildings, sub-surface investigation, in-situ strength testing of the site soils, assessment of contamination or land damage associated with surface flooding or inundation was carried out and reliance has been placed on the bullet pointed items above and our general knowledge of the area. It follows that there is potential for actual soil conditions to vary from those inferred.

## 2.0 Site Description

The site covers 14 properties as summarised in Table 1 below and presented in Figure 1. The property is occupied by dwellings, sheds and ancillary farm buildings and infrastructure (eg: fences and troughs etc).

The site is predominantly covered with pasture, with Kanuka, pine and Towai located around the perimeter of the paddocks and sloping areas of the site. The site is irregular in shape and bound by rural-residential development to the north, west and east and Awakino Road and residential development to the west.

The site is located on an alluvial terrace, above the plain of the Awakino River to the east. Mapped contour lines indicate the site is generally near level to gently sloping with moderate to steep slopes at the edge(s) of the terrace in the southern and eastern portions of the site. Erosional gullies are located to the north and south of the site.

---

**Table 1:** Summary of legal descriptions

|    | Legal Description  |
|----|--------------------|
| 1  | Lot 1 DP 553122    |
| 2  | Lot 2 DP 553122    |
| 3  | Lot 2 DP 116318    |
| 4  | Lot 1 DP 55899     |
| 5  | Lot 2 DP 517950    |
| 6  | Lot 1 DP 380979    |
| 7  | Lot 2 DP 380979    |
| 8  | Lot 1 DP 355519    |
| 9  | Lot 1 DP 487184    |
| 10 | Lot 2 DP 487184    |
| 11 | Lot 2 DP 488951    |
| 12 | Pt Lot 12 DP 36083 |
| 13 | Lot 1 DP 169115    |
| 14 | Lot 1 DP 201626    |

**Figure 1:** Aerial photograph with contour lines (Source Kaipara District Council GIS Viewer)

### 3.0 Proposed Development

A concept drawing provided to S&RC indicates the proposed development is to comprise subdivision of the site residential lots ranging from 450m<sup>2</sup> to 2,475m<sup>2</sup> in area with associated roading and accessways. Open spaces and pedestrian trails are proposed within the steeper portions of the site.



#### 4.0 New Zealand Geotechnical Database (NZGD)

A review of the New Zealand Geotechnical Database reveals that no other investigations within a significant radius of the site have been submitted, and that no other pertinent information is available on the database.

#### 5.0 Geology

Reference to the GNS New Zealand Geological Web Map 1:250,000 Geology map, indicates the upper and sloping areas of the site comprise Early to Middle Pleistocene undifferentiated estuary, river and swamp deposits, and the lower areas of the site comprise Holocene river deposits.

The contact between the two deposits, as mapped by GNS, is at the toe of the terrace and indicated by the black line in Figure 2 below. Such contacts are mapped at large scales and should be considered approximate at best.

The Early to Middle Pleistocene deposits are described as *partly consolidated mud, sand, gravel and peat or lignite of alluvial, colluvial, lacustrine, swamp and estuarine origins.*

The river deposits are described as *Unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins.*



Figure 2: Geological Map with aerial photograph (GNS Science Web Map)

---

## **6.0 Nearby Investigations by S&RC**

S&RC have undertaken previous geotechnical investigations within the vicinity of the site within the Dargaville township and at 82 Awakino Road.

The soils encountered within our nearby investigations comprised fill and alluvial deposits including peat and soft organics.

## **7.0 Historic Aerial Photography**

Aerial photographs from the RetroLens website coupled with recent satellite imagery have been examined. Photographs are available from 1957, 1966, 1979, and 1984, and satellite imagery is available from 2006 until present.

The 1957 photography shows the site was used as an airstrip with dwellings constructed along Awakino Road. The airstrip comprises three runways as follows: a single runway in the east-west direction and two runways that cross at the midpoint in the north-west to south-east and north-east to south-west directions. The site is otherwise predominantly covered with grass, scrub and trees. The area to the east of the airfield and the sloping section to the east of the property is covered with trees.

Earthworks appear to be underway at the head of the gully to the north of the site.

The 1966 aerial photography indicates the trees and shrubs on the eastern area have generally been removed and covered with pasture. The eastern slope remains vegetated with trees. The area of earthworks appears to have been partially covered by the airfield. Further dwellings have been constructed along Awakino Road and structures have been constructed (possibly aircraft hangars) near the northern property boundary.

The 1979 aerial photography indicates that vegetation has started to cover the area of earthworks. Pathways have been constructed around the airfield and farming operations have begun on the grassed areas. Patchy scrub has returned around the airfield, and the trees on the eastern slopes have been removed.

The 1984 aerial photography indicates the site is being used for farming and a fence has been constructed through the two crossing runways indicating they are no longer in use. The aircraft hangars near the northern boundary appear to still be in use and aircraft are parked nearby. Vegetation has completely covered the earthworks area.

---

---

Excluding the earthworks near the northern boundary, aerial photography did not show any significant geological features or significant changes to the landform within the site or surrounding area.

Parallel drainage ditches appear in the more recent aerial photography that are not present in the previous photographs. The drainage ditch locations are consistent with the previous airfield runway(s).

## **8.0 Geotechnical Hazard Risks**

### **8.1 River Deposits**

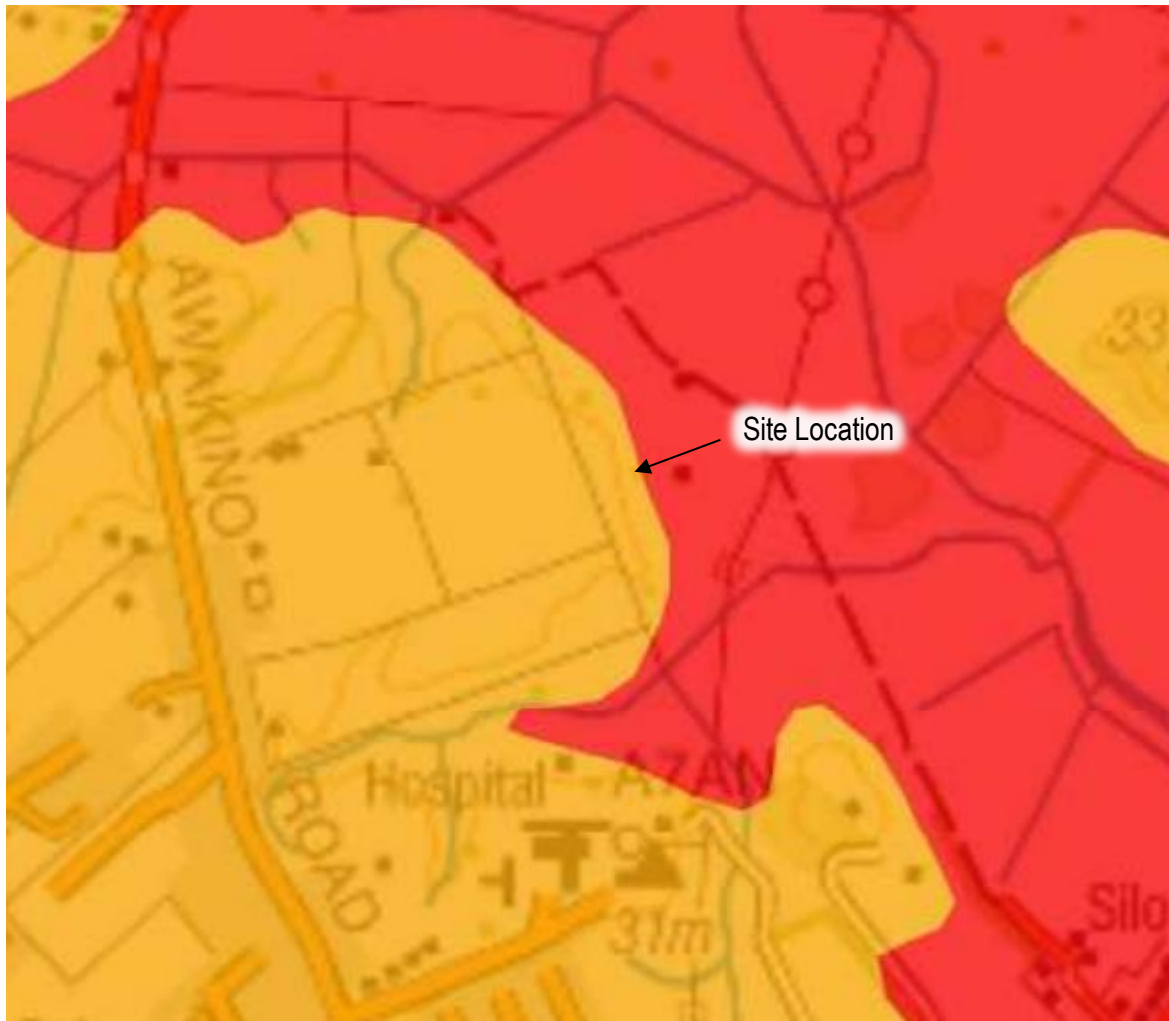
The geotechnical risk with river deposits is that the soils can be weak or sensitive to disturbance, which means that soils that test well in-situ can perform poorly when disturbed by earthworking or passage by construction plant with excessive vibration.

These soils are also commonly underlain at shallow to moderate depth by Peat and/or saturated soils which are both prone to consolidation settlement under loads. This may dictate that house foundations require specific design, and raft-type foundations or piling are a common approach. These compressible soils may or may not be present - the actual characteristics cannot be known without in-ground investigation.

### **8.2 Liquefaction**

Liquefaction mapping prepared for Kaipara District Council by Engeo Ltd indicates that the site is located within areas of medium and high liquefaction risk, as shown in Figure 3 below. The Holocene deposits underlying the eastern (lower) portion of the site are mapped as having high liquefaction risk, whereas the elevated portion of the site is mapped as medium liquefaction risk.

---

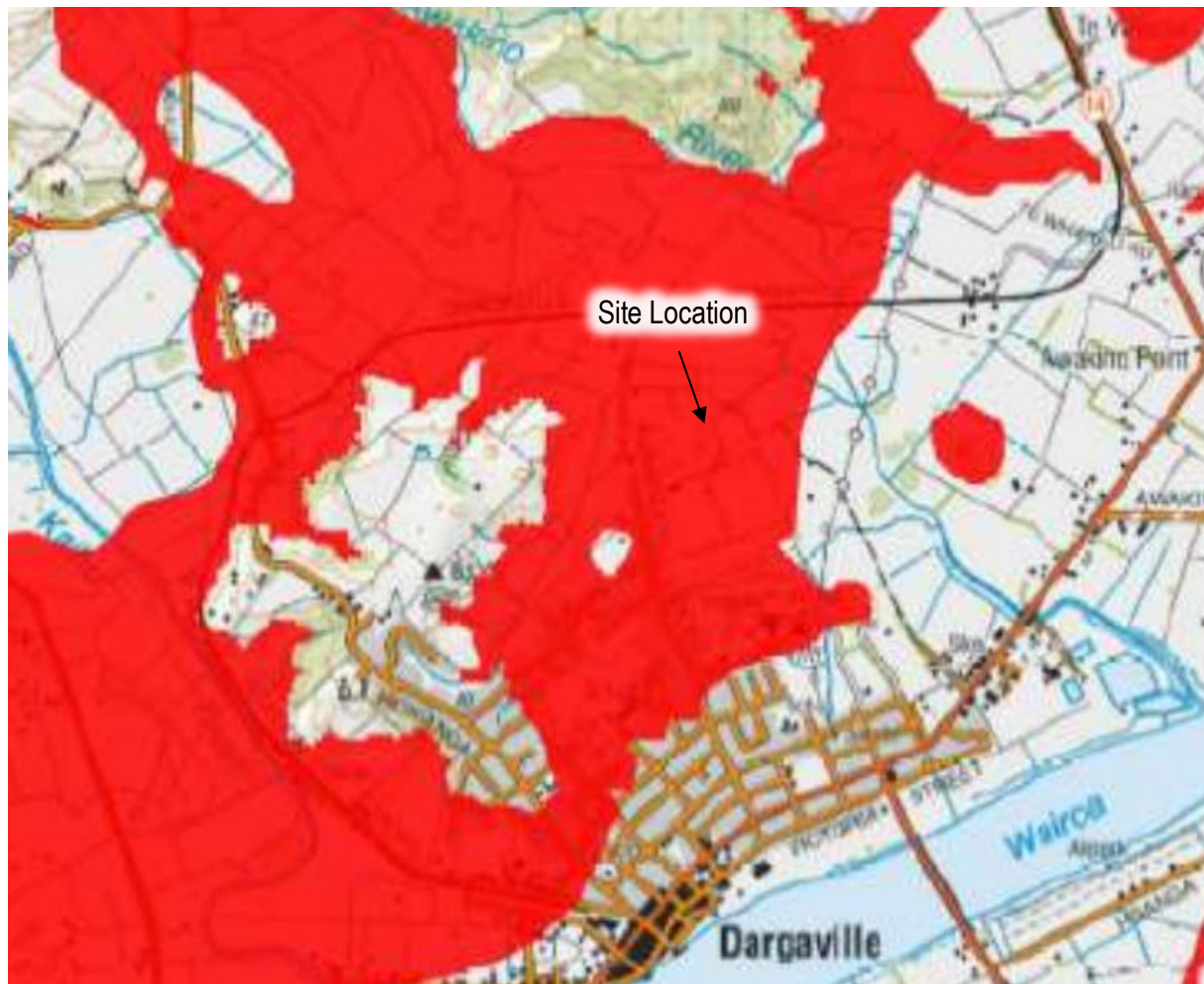


**Figure 3: Liquefaction Risk Map** (Source: Geotechnical Assessment: Dargaville by ENGEO Limited)

### 8.3 Acid Sulphate Soils

The Acid Sulphate Soil Planning Policy Guide (21 July 2015) identifies soils below 5m OTPD (One Tree Point Datum) as at risk of possessing acid sulphate soils. These are considered a potential risk to buried structures, particularly steel or concrete, because freshly disturbed soils may result in an increase in acidity of groundwater.

A draft map prepared by WSP-Opus (2017) indicates the subject site within the Acid Sulphate soil risk area (see Figure 4).



**Figure 4: Acid Sulphate Soil Risk Map** (Source: Geotechnical Assessment: Dargaville by WSP-Opus Limited)

## 9.0 Conclusions

Based on our desktop assessment, we consider that the site is geotechnically suited to residential subdivision. The following is noted of geotechnical concern at the site:

- Site slopes on the eastern portion of the site will need to be assessed for stability and remedial options design (if required)
- The lower portion of the site (eastern area) is mapped as high liquefaction risk
- Previous earthworks have been carried out along the northern boundary of the site. No information is known about the fill, and we infer the fill has not been placed to engineering standards.
- The existing drainage channels will need to be maintained or assessed.

The Client should consider potential issues related to Acid-Sulphate soils. This should not preclude residential development but may represent higher cost of house foundation and subdivision infrastructure construction.



---

A detailed geotechnical investigation should be undertaken at subdivision design stage to confirm our desk study inferences and provide design recommendations.

## **10.0 Limitations**

The conclusions and recommendations contained within this report are based on a desktop assessment of the site only and no walkover or investigative drilling has been carried out by Soil & Rock Consultants. It must be appreciated that the subsurface conditions may vary from those inferred.

This report deals with geotechnical aspects of the site and limited environmental commentary (acid sulphate soil) only, and assessment of items such as stormwater and wastewater disposal, flooding and other environmental issues were not part of our scope. If input on any of these items are required, please contact the undersigned at your convenience.

We trust the above is satisfactory. Please do not hesitate to contact the undersigned should you have any queries.

Yours faithfully

SOIL & ROCK CONSULTANTS

Prepared by: Dave Ouwejan  
Principal Geotechnical Engineer  
CMEngNZ

Reviewed by: Chris Windross  
Senior Engineering Geologist  
MEngNZ

End of Report Text – Attachments Follow

Attachments: Historic Aerial Imagery (four Images)

---

1957 Aerial Photograph



---

1966 Aerial Photograph



---

1979 Aerial Photograph





1984 Aerial Photograph

