

# Cultural Impact Assessment

## Private Plan Change Application

Dargaville Racecourse, SH14

Awakino Point, Dargaville

### Tripartite Group

**Report Prepared on  
Behalf of:**

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## Appendices

### **Appendix A: Draft Plan Change Documents**

### **Appendix B: Mitigation Measures**

### **Appendix C: Example Accidental Discovery Protocol Kaupapa**

### **Appendix D: Title Documents**

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**Intellectual property:**

The cultural information in this report is the intellectual property of Te Kuihi, Te Uri O Hau, Te Roroa and Te Parawhau Hapū, herein referred to as tāngata whenua. Information contained in this report is to be used only by the Tripartite Group, (the applicant) or their authorised representatives for the purposes of understanding cultural effects upon tāngata whenua arising from a private plan change application for the Dargaville Racecourse whenua at SH14, Awakino Point, Dargaville.

Use and replication of this report by any other party, in any other circumstance will be subject to the written approval of tāngata whenua.



## Executive Summary

The Tripartite Group, consisting of Ngāti Whatua Runanga, Dargaville Racing Club and The Dargaville Community Development Board, intend to apply to the Kaipara District Council (KDC) for a private plan change. The private plan change would see the subject site, the Dargaville Racecourse whenua, re-zoned to accommodate a mix of residential zones (including Papakāinga and retirement living), visitor accommodation, small-scale commercial activities, a Light Industrial Zone, a Neighbourhood Centre Zone and an Open Space Zone.

The plan change, if successful, will facilitate large scale subdivision and development of the 46.6729 ha piece of land.

Te Kuihi, Te Roroa and Te Uri o Hau, Te Parawhau are the tāngata whenua groups identified as retaining mana i te whenua, having the longest association and occupation of the lands and waterways in the area including the subject whenua.

Tāngata Whenua have shared their whakapapa within this CIA detailing their long history and association with the surrounding lands and waterways. Prominent Rangatira in the time since European settlement include Te Awha Parore of Te Kuihi and Tirarau Kukupa of Te Parawhau including Paikea Te Hekeua of Te Uri O Hau and Te Rore Taoho of Te Roroa.

Although records show the whenua changing ownership from two of Parore Te Awha's children to Francis Dargaville and others, Te Kuihi whanau and descendants of Parore Te Awha however, are of the view that the whenua was gifted by Parore for the purpose of a racecourse and was not sold. Furthermore, no bill of sale has been identified for these transactions. As such, it is requested that the whenua is returned to them.



As such, it is requested that the whenua is returned to them. Under the Resource Management Act, a CIA is not the mechanism for the return of land. Rather, this matter should be pursued as a separate process by Hapū descendants under The Waitangi Tribunal Treaty Claim process.

There is a wide body of legislation and statutory documents that provide for the recognition of tikanga Māori and cultural values. This legislation requires proper consideration as part of the decision-making process for any plan change under the Resource Management Act.

The plan change proposal, and the resultant potential future development is assessed against a framework of cultural values to determine the extent of effects upon these values, adverse, positive or benign. These effects inform a range of mitigation measures designed to appropriately address any negative or adverse effects.

A Kaumatua Roopu has been established comprising kaumatua from Te Uri O Hau, Te Kūihi, Te Parawhau and Te Roroa who have provided their support for the proposed plan change subject to recommended mitigation measures being adopted and integrated in the plan change provisions.

Mitigation measures are recommended to ensure positive outcomes for Tāngata Whenua, preserving mana and enhancing the mauri of the whenua and te ao tūroa.



## 1. Introduction

### 1.1 Scope and Limitations

The activity for which this report has been prepared relates to a private plan change application to the KDC. At the time of writing this Cultural Impact Assessment (CIA), the plan change application has not yet been prepared as such, the assessment of cultural effects outlined in this CIA is limited to the information obtained from Lands and Survey, the applicant's planning consultant, and supporting 'draft' specialist reports. A copy of these documents is attached as **Appendix A**. Accordingly, any change to the proposed plan change may require this CIA to be reviewed and amended, or a new CIA prepared.

*Note 1:* Tāngata whenua, Hapū, which includes Te Kuihi, Te Uri O Hau, Te Roroa, Te Parawhau are used interchangeably throughout this report and refers to the wider group who whakapapa to tupuna associated to the subject site and wider surrounding area.

*Note 2:* Kaumatua representing Tāngata Whenua (listed above) have granted the author approval to sign this CIA on their behalf.



## 2. Cultural Impact Assessment

### 2.1 Purpose

The primary objective of this CIA is to identify and assess the potential effects (both positive and adverse) of the proposal upon the uara ahurea (cultural values) of Tāngata Whenua, being those who retain mana i te whenua of the surrounding waterways, whenua, and the project area. The CIA seeks to provide a means by which any adverse effects on Tāngata Whenua's values can be avoided, remedied, or mitigated and their obligations upheld.

The purpose of the CIA can then be understood to:

1. Identify and document Tāngata Whenua cultural values associated with their ancestral lands and waterways, taonga tuku iho in, and around the project area.
2. Identify the potential effects (positive and negative) on Tāngata Whenua cultural values for current and future generations, arising from the proposal.
3. Provide an assessment of those matters outlined in Part II of the Resource Management Act (RMA) and other relevant legislation, to enable an evaluation of the degree of effects on Tāngata Whenua cultural values.
4. Determine appropriate measures to avoid, remedy or mitigate potential adverse effects on Tāngata Whenua cultural values. These measures will be included as conditions of consent and, or a side agreement with the Tripartite Group.

### 2.2 Methodology

The following methodology was undertaken in the preparation of this CIA:

- Two hui with kaumatua to establish a kaumatua roopu and discuss the proposal.
- Four whakaaro sharing hui with tāngata whenua to record their whakaaro.
- Several meetings with Venessa Anich, consultant planner from Lands and Survey and other consultants to update them on relevant whakaaro shared to guide the plan change application.
- Review of the Draft Outline Development Plan, supporting reports provided by Lands and Survey.
- A review of the relevant provisions of the RMA, National Policy Statements, National Environmental Standards, and other relevant legislation.



- Research of Treaty Claim reports prepared by Te Roroa, Te Uri O Hau and other reports to aid in the understanding of the whaikorero specific to the site and surrounding area.
- Distribution of a 'draft' CIA to the Kaumatua Roopu on behalf of tāngata whenua for review and approval.
- An online meeting with the Kaumatua Roopu to review and approve the CIA for release.

### **2.3 Engagement with Kaumatua and Hapū**

Consultation with kaumatua began in June 2021. Several hui with kaumatua and Hapū followed this initial meeting from July – November 2021.



It is surrounded by rural land holdings and small, rural lifestyle lots generally comprising of open pastoral land with rural buildings scattered across the landscape.

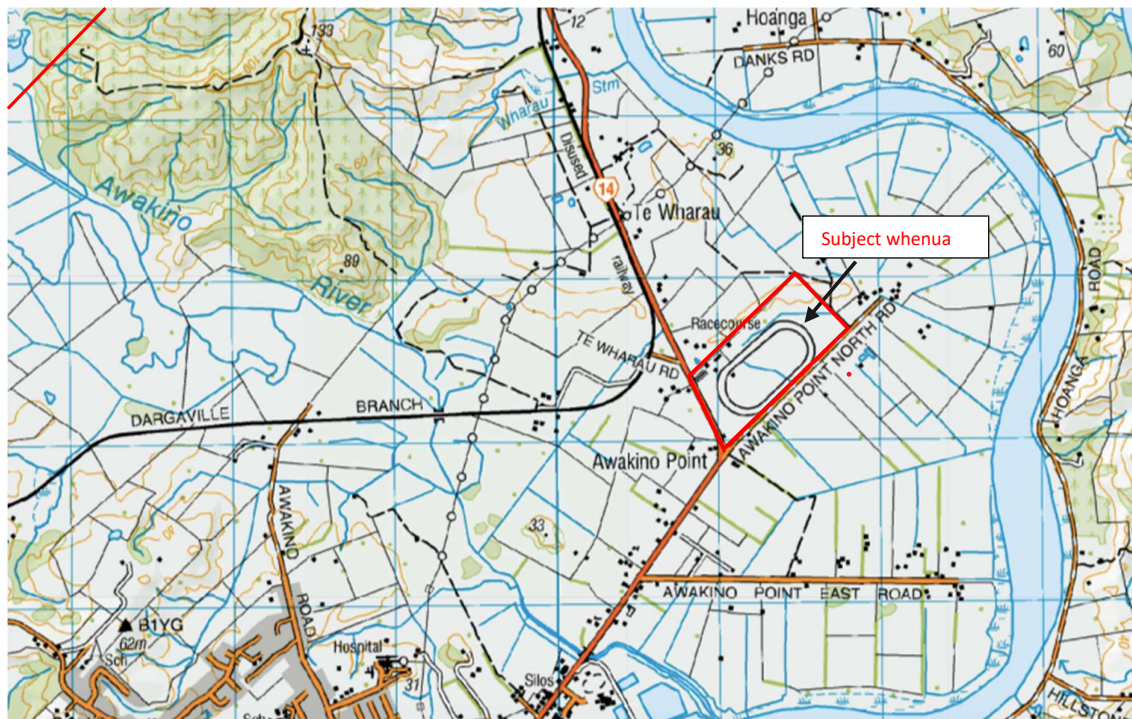
### 3.3 Watercourses

Overall, the whenua forms part of a water catchment area that feeds into the Wairoa River which in turn flows out to the Kaipara Harbour. Multiple irrigation drainage channels drain in an easterly and northerly direction to the Wairoa River across the whenua.

Several springs commence near the base of the hill in the northern part of the site and flow into the drainage channels. A historic and now overgrown dam is constructed at the base of the hill.

A currently used farm irrigation pond is present in an elevated position on the hill and an active water bore for stock use is located 500m northeast of the property boundary (LDE, Private Plan Change- Geotechnical Assessment Dargaville Racing Club, 2021).

#### Illustration 2: Aerial photo showing the subject whenua (red outline) within the surrounding landscape



Source: NZ Topo Maps, download date October 2021



### **3.4 Vegetation**

Aside from the northwest corner of the site which has become overgrown with a mix of gorse, pampas, pine and native shrubland species including manuka, the majority of the subject site is maintained under pasture and is used for the grazing of sheep.

### **3.5 Existing Development**

The site comprises a now decommissioned horse racing facility, owned and operated by the Dargaville Racing Club and is presently used for grazing. There are several access crossings from State Highway 14 and Awakino Point North Road with the main access from the State Highway. Buildings consist of a range of stables, outbuildings, and the main viewing pavilion (Lands and Survey, 2021).

### **3.6 Archaeological Assessment**

An archaeological report was commissioned by Horizon Archaeology. A summary of findings is below.

Desktop research recorded no archaeological sites were identified on the whenua and very few in the surrounding area.

- Historic survey plans suggest the area around the racecourse was wet and covered in manuka and fern scrub or Kahikatea Forest until at least 1912.
- The DRC (then the Northern Wairoa Racing Club) conducted race meets in several locations near Dargaville before settling on the current course, possibly in 1914.
- Buildings on the site have been significantly remodelled over the years and have no clear heritage value.
- The low-lying nature of the ground on which the racecourse is located may account for the absence of Māori archaeological sites.
- Where present, sites of this kind appear to be on raised ground such as is present in the northwest of the whenua.

An archaeological field inspection was carried out on Tuesday 6 April 2021 and found:

- No archaeological features visible on the surface of the property, including the north-eastern high ground.



- To test the presence of subterranean features/deposits a shovel test-pitting exercise was carried out across the property. All test pits found natural soil profiles with no evidence of archaeological deposits.

Based on the results of the archaeological field inspection and desktop research Horizon Archaeology are of the view that the risk of damage to intact archaeological deposits during any earthworks on the property is low and does not warrant the need for a prior archaeological authority from Heritage New Zealand. However, the presence of subterranean archaeological features or deposits (e.g., midden) cannot be ruled out entirely. An Archaeological Site Discovery Protocol should be used during all ground disturbances



## 4. The Proposal

The proposal relates to a private plan change to the KDC that would see the whenua, currently zoned rural, re-zoned to accommodate a mix of residential zones (including Papakāinga and retirement living), visitor accommodation, small-scale commercial activities, a Light Industrial Zone, a Neighbourhood Centre Zone and an Open Space Zone.

The Draft Outline Development Plan dated 5/8/21 envisages the following land use activities:

- Light Industrial – 72,000 m<sup>2</sup> consisting of approximately 115 allotments of average size of 500 m<sup>2</sup>,
- Medium Density Residential - 75,000 m<sup>2</sup> of 200 allotments of average size of 300 m<sup>2</sup>,
- General Residential - 120,000 m<sup>2</sup> consisting of 213 allotments of average size of 450 m<sup>2</sup>, Low Density Residential - 28,000 m<sup>2</sup> consisting of 22 allotments of average size of 1,000 m<sup>2</sup>, Passive reserve – 90,000 m<sup>2</sup>,
- Public open space / buffer areas – 81,729 m<sup>2</sup>,
- Possible small-scale commercial – Areas subject to confirmation (Lands and Survey, 2021).

**Table 1 – Draft Outline Development Plan – Land Use and Activities**

Land Use	Area sum (m <sup>2</sup> )	Number of lots
Commercial / Light Industry	155,268.00	25
Small	6,867.00	13
Medium	39,215.00	9
Anchor site	109,186.00	3
Residential	158,127.20	124
Low Density Residential	17,574.00	13
Medium Density Residential	13,710.00	32
General Residential	44,070.00	69
Large Lot Residential	29,803.20	7
Retirement / Marae	52,970.00	1
Neighbourhood Commercial	4,774.00	2
Open Space	93,015.00	7
Road reserve	77,897.00	n/a
<b>TOTAL</b>	<b>489,081.20</b>	

*Source: Lands and Survey, Civil Engineering Services Assessment, 2021*



## 5. Te Kuihi Hapū, Te Uri O Hau Hapū, Te Roroa, Te Parawhau (Tāngata Whenua)

### 5.1 History and Association with the Project Area

Māori descend from tupuna who migrated by waka from the central Pacific. Significant migratory patterns are evidenced by the arrival of tupuna waka landing in the many harbours and shores located throughout Te Tai Tokerau.

Over several centuries, the Ngai Tamatea and related tribes have migrated south from Muriwhenua in the north through the Hokianga, to Kaihu, and into the South Kaipara. *“The combined peoples of these migrations from the northern areas adopted the name Te Roroa (the Tall Ones), in the time of Manumanu I and his brother Rangitauwawaro, probably sometime in the 16th century”* (Te Roroa Claims Settlement Act 2008).

The present day confederation of Ngāti Whatua or Ngāti Whatua tuturu, include the tribes of Te Roroa and Te Uri o Hau. All are descended from the common tupuna Tuputupuwhenua or Tumutumuhenua and affiliated with the waka *Māhuhu-ki-te-rangi* which landed on the west coast between Kaipara Harbour and the Hokianga around the same time, some 600 years ago (Te Ara - the Encyclopedia of New Zealand, 2017).

Inter-tribal warfare in the 1820s led to Te Roroa being concentrated on lands around Waipoua and Waimamaku. Te Roroa hapū, Ngāti Whiu and Ngāti Kawa, who had ancestral lands on the Northern Wairoa River near Tunatahi (Dargaville), were living at Utakura, Hokianga, where they had moved to join their relatives Te Popoto and Ngahengahe after the battle of Te Ika-a-Ranganui in 1825. At this time Te Kuihi hapū, which included Parore Te Awha, were living at Kaihu and Northern Wairoa (Hooker, 2000).



### 5.1.1 Prominent Rangatira

Ngā tino rangatira e noho i te whenua o Kaipara, Kaihu, Tangiteroria ko Paikea Te Hekeua, Parore Te Awha, Te Rore Taoho me Tirarau tuatoru.

The following korero is a brief outline of those Rangatira who noho to the area. They are listed in alphabetical order and do not reflect any hierarchy.

#### Paikea Te Hekeua

Parents were Whakakahu and Te Kekeua. Paikea is a first cousin to both Parore Te Awha and Tirarau. He lived in the south Kaipara which included Otamatea.

#### Parore Te Awha

Parore Te Awha was born at Mangakahia about 1795. On his father's side he was descended from Te Ponaharakeke, of Ngāti Rua-Ngaio hapū ki Whangārei, a renowned Ngāpuhi chief. His mother, Pehirangi, was a granddaughter of Whakakaaria of the Ngai Tawake and Ngāti Tautahi hapū of Kaikohe and Ngāpuhi and was a second cousin of Hongi Hika. Because of family disputes, Parore's grandfather, Te Hei, moved to Mangakahia and gave rising to the hapū of Te Kuihi (Waitangi Tribunal, 1992). Parore Te Awha was rangatira of both Te Kuihi and Te Roroa.

Although Parore Te Awha participated in many battles, his primary business was as a trader. In Waipoua, 1832, a trader, J S Polack visited his pā, at Te Kauri, who observed Parore Te Awha to be of noble and dignified stature (Waitangi Tribunal, 1992). He was engaged in the flax trade at Kaihu and the spar trade in Hokianga and keenly desired to have Pakeha residing in his settlements for trading purposes. Although the people at Waipoua had acquired clothing and muskets and were growing introduced crops, which they desired to exchange for trade goods, Waipoua was too isolated to become a trading centre.

It is recalled that Parore Te Awha had moved to Kaihu in 1836. By 1864, when visited by the colonial secretary, he had established many acres of gardens, with several buildings, stock



yards, iron ploughs and horse drays. He was on Te Roroa's southern boundary, in the area also occupied by Te Rore Taoho (Waitangi Tribunal, 1992).

#### Te Rore Taoho

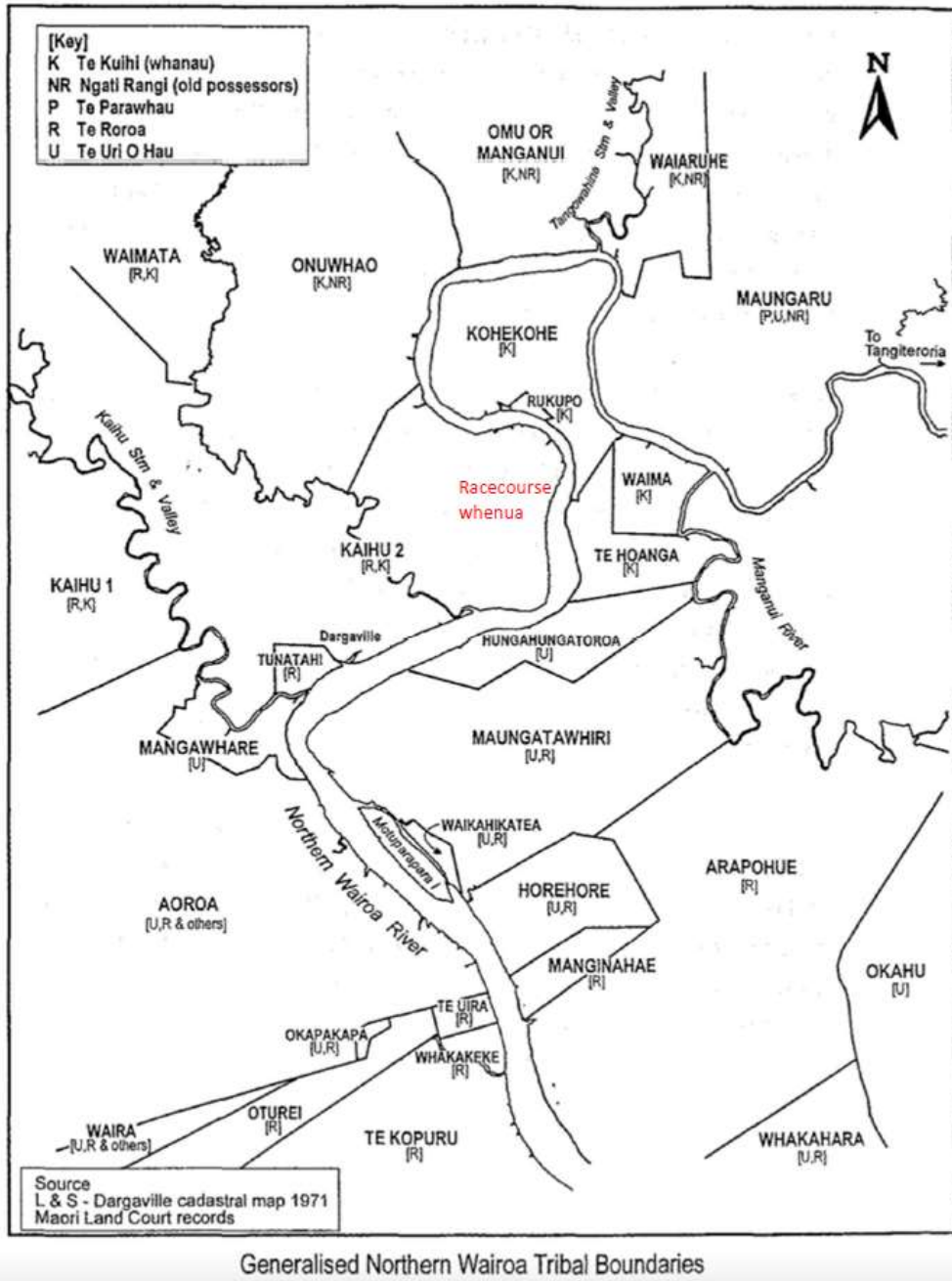
Te Rore Taoho, son of Taoho and his second wife, Koata, had his pā on the upper Kaihu stream, from which his mahinga were worked. He also lived for some years at Waimamaku and Waipoua and would return to Kaihu to protect his whenua when required. Eventually, he settled at Opanake which became his permanent base, and he became a Rangatira chief in the upper part of the Kaihu valley (Waitangi Tribunal, 1992).

#### Te Tirarau Kukupa

Te Tirarau Kukupa was the paramount chief of Te Parawhau, a hapū descended from Ngai Tahu. He was a brother in-law to Parore Te Awha and a prominent and influential figure in 19<sup>th</sup> century Kaipara, he resided at Te Aotahi at Tangiteroria. He played a key role in one of the most significant events of the colonial era, which included the 1842 muru (plunder) of Thomas Forsaith's Mangawhare store (Waitangi Tribunal, 1992).

The image at **Illustration 5** below shows the general Northern Wairoa tribal boundaries. Te Kuihi and Te Roroa are shown to be associated with the Kaihu 2B block.

**Illustration 3: Generalised Northern Wairoa Tribal Boundaries (Racecourse whenua location (approximate) is indicated in red font)**



Source: Excerpt from (Hooker, 2000)



### Significant history of the area over the past 200 years

Hapū in the area 200 years ago were Te Roroa, Te Kuihi, Te Parawhau and Te Uri O Hau. The area surrounding the subject whenua and waterways was highly contested over this time due to access to the awa, kai and other resources.

Adjacent to the Te Kuihi lands was the Te Roroa tribal heartland territory of the Kaihu valley, including Tunatahi (Dargaville) block, which, together with other contiguous Te Roroa heartland territory, provided a coastal corridor to South Hokianga Head. It was that heartland territory, in which Te Kuihi as Te Roroa descendants had some interest, which was referred to by the Te Roroa chief Te Rore Taoho before the Native Land Court.

The role of the native land court and increased knowledge of how to sell land by certain rangatira grew. This resulted in the loss of thousands of acres such as the subject whenua at Awakino Point. Under the pakeha ture, 'the sale of land', the full implications of this concept were foreign to rangatira. They believed their tino rangatiratanga still prevailed of the whenua. This loss of land resulted in the significant degradation of māori values across Aotearoa including the subject area.



## 5.2 The Whenua (Racecourse)

### 5.2.1 Kaihu 2B block

The whenua forms a part of an ancestral land block, identified as 'Kaihu 2B' at Awakino Point shown in **Illustration 6** below.

A settlement known to be located near the racecourse whenua is Te Wharau which is located approximately 4 km to the northwest. Tāngata Whenua still reside in the area today and occupy or remain in possession of their ancestral lands in and around Tunatahi, Te Wharau, Onuwahao and Waimata.

Te Houhanga Marae to the southwest of the present-day township of Tunatahi, is the tupuna (ancestral) marae for Te Kuihi whanau.

An ara, or traditional pathway, originally traversed the site, connecting the whenua to the Wairoa Awa and the Kaipara. The whenua has been highly modified and no evidence of this ara exists today.

Traditionally, the whenua was a swamp covered in wetland species where rongoā and kai, such as Tuna, Kewai, and other fauna and flora species were harvested. This vegetation has been completely cleared, and multiple drainage channels established to drain and convert the land to pastoral paddocks and a racecourse.

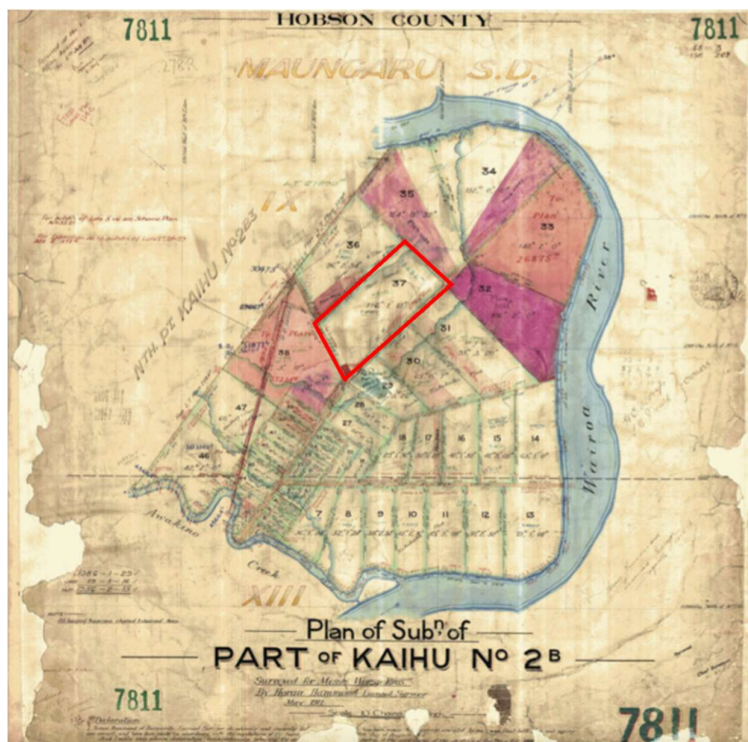
While there are no known wahi tapū or specific wahi taonga on the whenua, the whenua and watercourses that flow across the whenua are taonga. This taonga is highlighted by korero taonga tuku iho. In accordance with the korero, we relate tupuna korero of te ao tūroa to the story of Tane and how he created wetlands. This illustrates the adverse effects resulting from the sale of land and consequential land development and disturbance activities.

The story goes like this, Tumatauenga took human form and as such needed sustenance, 'kai moana and kai mo te wai māori'. In discovering Tumatauenga eating his children, Tangaroa became enraged and created a whawhai.

Tangaroa vowed "I will wash all the land away and drown you and your children too". The sediment resulting from Tangaroa flooding the land smothered the seabed and killed his own children. Tane saw this as a means to bring peace to his siblings and gifted Tangaroa the wetlands to stop the fighting and sediment from smothering his children. In return Tumatauenga, he tāngata agreed to fish sustainably. This agreement was sanctioned by all three Atua.

A breach of the agreement between Tumatauenga, Tane and Tangaroa can be seen in the clearance of all wetland vegetation, draining of the land and construction of roads across the whenua.

**Illustration 4: Kaihu No. 2B Block (Lot 37, subject whenua – red outline)**



Source: Māori Land Court – DP 7811, supplied by Tracy Walters, Ngāti Whatua Runanga



### 5.2.2 Land transactions

Historical land transfer documents point to the land being in Māori title in June 1891 in the joint ownership of Pouaka te Awha and Te Pouritanga te Awha, two of Parore Te Awha's children.

A chronology of land transfer events as provided by Ngāti Whatua Runanga is below;

- The owners leased the land to Richard Michelson, John Michelson and John Donnin all storekeepers on 6/7/1891 "at noon" by lease 1038.
- Francis Joseph Dargaville caveated the title the same day at 1pm, the caveat was removed ten days later on 11/9/1891 also at noon.
- Transfer 13080 saw part of the land from the above lease go from Michelson, Michelson & Donnin and be leased to Francis Joseph Dargaville from September 1 and until 11 September 1891.
- Transfer 13081 on the same day transferred that land from Pouaka te Awha and Te Pouritanga te Awha to Dargaville with NA61/88 created which references DP 924. This part of Kaihu 2B (misnamed and corrected on the plan) is NOT within the area of the racecourse.
- Transfer 15033 on 28/9/1893 transferred more land, this time to John Michelson shown on DP1146 and title NA68/3 issued in Michelson's name, this references Plan 7811 (**Illustration 4** shown above) is a subdivision plan of part of Kaihu 2B and includes Lot 37 which is the racecourse whenua.

The documents referred to above can be located at **Appendix D**.

### 5.2.3 Parore Te Awha and Gifting of Land

According to Te Kuihi whanau and descendants of Parore Te Awha, the whenua was gifted by Parore Te Awha for the purpose of a racecourse and was not sold. As such, it is requested that the land is returned to them. This is discussed briefly in **Section 6.2** below.



## 6. Legislative Framework

There is a wide body of legislation and statutory documents that provide for the recognition of tikanga Māori and uara ahurea (cultural values). This legislative framework is not only important to the context of this report, but also requires proper consideration as part of the decision-making process for any plan change under the RMA. The relevant legislative documents are discussed below:

### 6.1 Te Tiriti o Waitangi

The articles contained within Te Tiriti o Waitangi (Te Tiriti) and its principles are referenced in legislation, including the RMA.

Te Tiriti is the underlying foundation for the Crown (which includes local authorities as representatives of the Crown) and iwi/hapū relations regarding resource management. Protecting the values and interests of tāngata whenua and enabling Māori to exercise their resource management are obligations under Te Tiriti.

The principles of Te Tiriti include:

- (a) **Te Tino Rangatiratanga** – the duty to recognise Māori rights of independence, autonomy and self-determination. This principle empowers Māori to determine and manage matters of significance to them.
- (b) **Partnership** – the duty to interact in good faith and in the nature of a partnership. This includes a sense of shared enterprise and mutual benefits; where each partner must take into account the needs and interests of the other.
- (c) **Active protection** – the duty of the Crown to proactively protect the rights and interests of Māori, including the need to build Māori capacity and capability.
- (d) **Mutual benefit** – the need to recognise that benefits should accrue to both Māori and non- Māori, and that both must participate in the prosperity of Aotearoa.
- (e) **The right of development** – recognising that Te Tiriti rights are not confined to customary uses or the state of knowledge as at 1840, but include an active duty to assist Māori in the development of their properties and taonga.



**Comments:**

It is recognised that the Tripartite Group is not an agent of the Crown. However, it is important that the principles of Te Tiriti are recognised in the development of the plan change application. Importantly, the content of this CIA does provide guidance to the KDC as an agent of the Crown in their assessment of the proposed plan change and should be referred to in their decision-making process to ensure the proposal principles of Te Tiriti are met.

**Rangatiratanga** – empowers Māori to determine and manage matters of significance to them. As documented above, the subject site and surrounding areas are located within Tāngata Whenua’s ancestral lands and waterways.

Protection of the surrounding waterways, whenua and the restoration of whanaungatanga that has been lost through the successive alienation of land and the erosion of Māori history and tikanga is of paramount importance to Tāngata Whenua.

Tāngata Whenua has the power to exercise their rights and obligations in accordance with the principle of rangatiratanga under Te Tiriti to ensure that the proposed plan change inherently avoids any further degradation of their cultural values and taonga.

The recommendations at **Section 10** seek to empower Tāngata Whenua to exercise their right in accordance with the principle of rangatiratanga (Article I) under Te Tiriti.

**Partnership** – In keeping with the principle of partnership, the plan change provisions must provide the opportunity for early engagement with tāngata whenua. This engagement shall form the basis as matters of control or discretion for any relevant future subdivision or land use rules. An appropriate example of a possible matter of control or discretion is:

*“Engagement undertaken with tāngata whenua and the extent to which any tāngata whenua recommendations have been adopted”*



**Active protection** – in consideration of the proposed plan change, KDC has a duty to proactively protect the site as taonga, including nearby awa, in keeping with Tāngata Whenua’s rights and interests. Protecting tāngata whenua values and interests and enabling them to exercise kaitiakitanga are also obligations under Te Tiriti<sup>1</sup>. Examples of providing this active protection includes:

- Onsite water collection
- Safe and appropriate treatment of wastewater
- Effective erosion and sediment controls
- Maximum earthworks thresholds
- Pest plant and pest animal control
- Providing for Kaitiaki monitoring

**Mutual Benefit** – benefit arising from the proposal should accrue for both Tāngata Whenua and the wider community. The nature and details of such benefit should be agreed upon in consultation with Tāngata Whenua. The plan change should provide for ongoing opportunities for mutual benefit, beyond the initial plan change process and development plans. The inclusion of a ‘community hub’ as proposed by the applicant helps to provide mutual benefit to all (Māori and non-Māori).

**Right of development** – Māori interests in resources cannot be constrained to traditional or pre-Tiriti technology but includes the right to develop resources for economic benefit<sup>2</sup>. Whilst there are no specific requests for development rights or economic benefit opportunities, it has been noted that the means by which the whenua was acquired is disputed. The appropriate process for this dispute to be resolved is via a claim to the Waitangi Tribunal and therefore is not covered by this CIA.

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<sup>1</sup> Gooder, C. (2018). Cultural Values Assessments. Negotiating kāwanatanga and rangatiratanga through local government planning processes in Aotearoa, New Zealand: a review of the literature. Auckland Council technical report, TR2018/008.

<sup>2</sup> Janine Hayward, 'Principles of the Treaty of Waitangi – ngā mātāpono o te tiriti - Treaty principles developed by the Waitangi Tribunal', Te Ara - the Encyclopedia of New Zealand, <http://www.TeAra.govt.nz/en/principles-of-the-treaty-of-waitangi-nga-matapono-o-te-tiriti/page-4> (accessed 11 November 2020).



## 6.2 Waitangi Tribunal

Although the records listed in **Section 5.2.3** above shows the land changed ownership from two of Parore Te Awha's children to Francis Dargaville and others, Te Kuihi whanau and descendants of Parore Te Awha are of the view that the whenua was gifted by Parore for the purpose of a racecourse and was not sold. Furthermore, no bill of sale has been identified for these transactions. As such, it is requested that the whenua is returned to them.

It is advised by this CIA that this matter should be pursued as a separate process by Hapū descendants under The Waitangi Tribunal Treaty Claim process. As a CIA under the RMA is not the mechanism to pursue this matter.



### 6.3 RMA

Part II of the RMA requires those exercising functions and powers under the act to consider Māori values.

As outlined in section 5, *the purpose* of the RMA is to promote the sustainable management of natural and physical resources. This means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety.

#### 6.3.1 Section 6 Matters of National Importance

All persons exercising functions and powers under the RMA must, as a *matter of national importance*:

*Section 6(e), recognise and provide for the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga;*

**Comment:**

The site occupies ancestral land that is of cultural and historical significance to Tāngata Whenua. It is the land of their tupuna, its history recounted to successive generations through pūrakāu, waiata, korero and place names.

Protection must be provided for Tāngata Whenua cultural traditions in accordance with tikanga and Mātauranga Māori. This includes wāhi tapu and wāhi taonga that surround the site. The protection extended to Māori cultural values provided under the RMA is envisaged to be included in the provisions of the proposed plan change.

*Section 6(f), recognise and provide for the protection of historic heritage from inappropriate subdivision, use and development;*

**Comment:**

To ensure appropriate protection is afforded to historic heritage, it is expected that appropriate provisions will be included in the plan change. These provisions shall as a minimum require that Accidental Discovery Protocols (AD Protocols) are employed for any land disturbance activities. While Heritage NZ, Pouhere Taonga have their own AD



Protocols, provisions shall be made in the plan change to ensure an appropriate ADP, which incorporate tikanga māori, is carried out in the event of an 'accidental discovery'. An example of an appropriate Accidental Discovery Kaupapa is provided at **Appendix C**.

*Under section 6(g), recognise and provide for the protection of recognised customary activities, as a matter of national importance;*

**Comment:**

Traditionally the site, surrounding lands and waterways were used for customary activities such as mahinga kai, and access to resources to support kāinga within proximity of the whenua. As such, the proposed plan change should require any future land use or development to recognise customary activities by providing opportunities for mahinga kai to be restored, while enhancing the natural environment.

**6.3.2 Other Matters:**

All persons exercising functions and powers under the RMA shall have particular regard to:

*Section 7(a), kaitiakitanga; and*

*Section 7(aa) the ethic of stewardship.*

**Comment:**

As Kaitiaki, Tāngata Whenua are obligated to care for their taonga tuku iho and the mauri of te taiao (the environment) to ensure everyone benefits and wairuatanga is upheld. In performing the act of kaitiakitanga, it is behest upon Tāngata Whenua to actively protect the waterways and surrounding lands and their taonga from harm. The protection of waterways, which includes aquifers, underground water sources and taonga within the site, must be recognised in the drafting of the proposed plan change provisions. The plan change shall identify waterways and taonga to be protected. The protection shall be achieved by appropriate provisions such as setbacks, no build areas and Low Impact Urban Design principles.



### **6.3.3 Te Tiriti o Waitangi:**

Under section 8, all persons exercising functions and powers under the RMA shall take into account the principles of Te Tiriti o Waitangi.

#### **Comment:**

When drafting the plan change, the principles of Te Tiriti, as outlined in **Section 5.1** above, shall be taken into account.

## **6.4 Heritage NZ Pouhere Taonga Act 2014**

The Heritage New Zealand Pouhere Taonga Act 2014 promotes the identification, protection, preservation, and conservation of the historical and cultural heritage of New Zealand.

Ngā taonga tuku iho nō ngā tupuna (Māori heritage) comprises a wide range of different places and items from the physical and tangible, to the natural environment and the intangible.

This Act recognises Māori values in the following ways:

- Ensuring that Heritage NZ works collaboratively with Tāngata Whenua and with any scientific investigation of a site of interest to Māori that requires the consent of the appropriate iwi or hapū.
- For sites of interest to Māori, the archaeologist approved to undertake archaeological work under an Authority to Modify an Archaeological site must have skills and competencies relating to recognising and respecting Māori values and have access to appropriate cultural support.

This Act may be applicable with resultant future development arising from the proposal. As such, in the event of an archaeological find, or the discovery of koiwi, taonga tuku iho, the ADP in **Appendix C**, which includes tikanga māori, must be adhered to.



## 6.5 Planning Policy Framework

The following planning and policy documents are of relevance to Māori cultural values in relation to the proposal:

### 6.5.1 Regional Policy Documents

The Regional Policy Statement for Northland (RPS), and the Proposed Regional Plan for Northland (PRP) are relevant to the proposed plan change.

The relevant objectives and policies are provided in the following sections.

#### 6.5.1.1 RPS

The purpose of the RPS is to promote sustainable management of the region's natural and physical resources. Of importance to Māori and listed among the statement's guiding principles is;

***Partnership with tāngata whenua***

*"In recognition of the partnership principles in Te Tiriti o Waitangi, and the benefits of working in partnership, tāngata whenua have a key role in resource management".*

#### 6.5.1.2 PRP

Section D.1 Tāngata Whenua of the PRP provides a policy framework relating to effects on Tāngata Whenua which includes objectives and policies relating to water quality, contaminated land, sites of significance to tāngata whenua and tāngata whenua's role as kaitiaki.

#### **Comment:**

The RPS provides statutory recognition of Tāngata Whenua's role as kaitiaki. The principle of *Partnership with tāngata whenua* above recognises them as retaining mana i te whenua and ensures they are provided the opportunity to exercise resource management (kaitiakitanga) in accordance with the principles of Te Tiriti o Waitangi.

The site and surrounding area formed part of a wider network of traditional ancestral resources such as wai (waterways) ngahere, mahinga that supported surrounding kāinga. The PRP provides for the protection of these features (sites of significance). It is requested



that any regional resource consents required on the subject whenua include an assessment against and are undertaken in accordance with Section D.1 of the PRP.

### **6.5.2 Kaipara District Plan (KDP)**

The RMA informs much of the KDP policy framework in relation to Māori issues.

The KDP is structured into five parts (A, B, C, D and E). Part A includes the 'District Wide Strategy' chapters which will remain applicable to the proposed plan change whenua and are further discussed in this section. Part B relates to 'Land Use' and contains the KDP zoning provisions. The proposed plan change zoning discussed in **Section 4** will replace the current Rural Zone provisions applicable to the whenua.

Part C relates to specific 'Sites, Features and Areas'. No sites, features or areas are identified on KDC's Series 2 maps across the site and therefore an assessment of Part C of the KDP is not covered in this CIA.

In this section, a high-level assessment of only the most relevant District Wide Strategy Chapters, is provided.

#### **6.5.2.1 Chapter 3 – Land Use and Development Strategy**

Objectives 3.4.4, 3.4.6 and Policies 3.5.5 and 3.5.6 copied below are relevant to this proposal.

##### *"3.4 Objectives*

**3.4.4** *To ensure emissions, discharges and effects of residential and business development are managed so that adverse effects on the surrounding environment, including existing settlement areas, are comprehensively addressed.*

**3.4.6** *To provide clear direction on the information, planning and management requirements considered to be required to enable future changes in land use within the identified development areas".*

##### *"3.5 Policies*

**3.5.5** *By ensuring infrastructure and servicing (e.g. transport, stormwater and sewerage reticulation and treatment systems and networks) for new development areas are designed and provided for at the outset of development, so that any adverse effects on the environment or existing systems are adequately avoided, remedied or mitigated.*



**3.5.6** *By requiring new residential and business development to comprehensively consider (on a catchment wide basis) potential:*

- (a) *Adverse effects on the natural character of the coastal environment, lakes, rivers, wetlands or their margins;*
- (b) *Adverse effects on areas of significant indigenous vegetation or significant habitats of indigenous fauna;*
- (c) *Adverse effects on outstanding natural features, landscapes and heritage resources;*
- (d) *Adverse effects on the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga;*
- (e) *Conflicts with areas where natural hazards could adversely affect the physical resources of residential and business development or pose risks to people's health and safety;*
- (f) *Conflicts with finite resources which can reasonably be expected to be valuable for future generations (including highly productive and versatile soils and aggregate resources). (For example, where residential and business development could adversely affect the availability of finite resources); and*
- (g) *to identify mechanisms to avoid, remedy or mitigate such impacts".*

**Comment:**

A suite of mitigation measures is provided in this CIA to address adverse effects on Tāngata Whenua's relationship with their culture and traditions, their ancestral lands, waters, sites, wāhi tapu and taonga arising from the plan change. These measures include controls for wastewater, onsite water collection including no build areas within proximity of waterbodies on the whenua. The measures are requested to be included as a part of the proposed plan change and should ensure that any future land use activities generally align with the relevant objectives and policies.

**6.5.2.2 Chapter 5 – Tāngata Whenua Strategy**

The Objectives and Policies in this chapter seek to respond to Tāngata Whenua resource management issues throughout the district. The following objectives and policies are relevant to the proposed plan change and tāngata whenua values.

*"5.5 Tāngata Whenua Objectives*

*5.5.1 To involve Tāngata Whenua as partners in policy development and implementation and decision making under the District Plan.*



*5.5.2 To recognise the importance of providing for the relationship of Māori, including their culture and traditions, with their ancestral lands, water, sites, wāhi tapu and other taonga*

#### *5.6 Tāngata Whenua Policies*

##### *5.6.1 Recognising the partnership with Tāngata Whenua by:*

- 1. Consultation is undertaken with Te Uri o Hau and Te Roroa on those matters that may affect their taonga, or their use, development and protection of the natural and physical environment (recognising Kaitiaki); and*
- 2. Ensuring that active consideration is given to the impacts of development on taonga. This includes Tāngata Whenua involvement in consent processing / hearings.*

##### *5.6.3 Recognising Iwi Management Plans in consents and decision making*

*Iwi Management Plans are expressions of rangatiratanga, to help iwi and hapu exercise their Kaitiaki roles and responsibilities. - As Iwi Management Plans are developed by iwi in the Kaipara District and adopted by Council, these will form guiding documents that will be used to inform the decision making process and administration of activities located within areas of iwi and hapu influence”.*

#### **Comment:**

The introduction section in Chapter 5 recognises the historical connections tāngata whenua have with the Kaipara. The objectives and policies above recognise tāngata whenua’s relationship with their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga, as a matter of national importance as outlined in Section 6e of the RMA. Kaitiakitanga is further acknowledged by requiring consultation (engagement) with Tāngata Whenua is carried out.

Te Roroa and Te Uri O Hau have prepared Iwi Management Plans (briefly discussed below). These documents together with the suite of mitigation measures outlined in **Section 8** and **Appendix B** must be adopted to ensure Tāngata Whenua values are appropriately protected as a part of the plan change process.

#### **6.5.3 Iwi Environmental Management Plans**

Te Roroa and Te Uri O Hau have prepared Iwi Environmental Management Plans (IEMP). These documents provide an understanding of tāngata whenua values and interests and should be integrated throughout the plan change process.



## 7. Cultural Values

### 7.1 Kaitiaki, Kaitiakitanga and Manaakitanga

As kaitiaki, Tāngata Whenua have an obligation to all other hapū in the area which includes nurturing Mana Atua, Mana o Te Wai, Mana Whenua, Mana Ao Tūroa, Mana Tāngata.

Kaitiakitanga and manaakitanga, means more than just mere guardianship or hospitality and support to others. It is the intergenerational responsibility inherited at birth, which is passed down from generation to generation to care for the environment (te taiao) and to uphold their spiritual (wairuatanga) obligations and to safeguard these from harm.

Wairuatanga is seen as an essential requirement to health and therefore vital to Tāngata Whenua's wellbeing and identity.

Through whakapapa, Tāngata Whenua are also responsible for both mātauranga and tikanga Māori in relation to the management of their resources. Kaitiakitanga is not only about protecting the life supporting capacity of resources, but of fulfilling spiritual (wairuatanga) and inherited responsibilities to Te Taiao, maintaining mana over those resources, and ensuring the welfare of the people those resources support. This also means that as part of their obligations, Tāngata Whenua have a continuous and ongoing obligation to protect and use their natural resources and to interact and associate with their taonga and wāhi tapu. In this way, the legacy of kaitiakitanga and wairuatanga is passed from one generation to another.

### 7.2 Tāngata Whenua Cultural Values

The project site is located on whenua that forms a part of the historical Kaihu 2B block. The surrounding waterways were once an abundant source of kai moana and kai mo te wai māori. The waterways and adjacent whenua were an essential means of transport and resource for the people living there.



Tāngata Whenua have emphasised the deep and important relationship they have with the environment within and surrounding the whenua and the need to recognise this as a part of the decision-making process.

To Māori, all living and non-living things are intrinsically connected (physically and spiritually) to Ao Tūroa (the environment) through whakapapa, tātai and whanaungatanga. Spiritual values are as important as the physical.

As kaitiaki, Tāngata Whenua's responsibilities are not just focused on archaeological remnants but include their ancestral lands, customary activities, waters, wāhi tapu, the effect on their taonga, mana, tapu and the mauri of resources.

All things animate and inanimate have a life force (mauri). The entire site, and all surrounding lands have a mauri that binds the current generation through mana, tapu and whakapapa to the whenua and tātai ki te tāngata including Te Ao Tūroa (the environment).

The following key concepts are fundamental for environmental management based on Mātauranga Māori (Māori knowledge). They cover both the tangible and intangible, mai i te whenua ki te Rangi mai i te Rangi ki te whenua and govern the rules and regulations for the appropriate use and management of natural and physical resources.

These concepts form a cultural value framework and are expressed as:

- **Mana atua** – (the deity/spirit realm's mana) – effects (positive/negative) on the spiritual realm which includes tikanga, kawa (protocols/procedures).
- **Mana o te wai** – (the water's mana) – effects (positive/negative and benign) on the surrounding waterways and includes any physical change or discharge.
- **Mana whenua** (the land's/Papatūānuku's mana) – effects (positive/negative and benign) on the land arising from activities and includes earthworks/indigenous vegetation impacts/building coverage, contamination.
- **Mana ao tūroa** – (the space in between Ranginui and Papatūānuku, the environment's mana) – effects (positive/negative).
- **Mana tāngata** – (peoples' mana) – effects (positive/negative) on people which includes why is the project being carried out, social benefits/disbenefits.



## 8. Assessment of Effects on Tāngata Whenua Cultural Values and Mitigation Measures

This section considers Tāngata Whenua's cultural values and the potential effects (adverse and positive) upon these values (wairuatanga, kaitiaki/kaitiakitanga, manaakitanga, mana, taonga, tikanga, and mauri) arising from the various activities associated with the proposal.

There is broad support for the proposal and the potential opportunities it would deliver to the community, should the private plan change be successful.

The support is in principle and provided in good faith provided Tāngata Whenua cultural values are upheld. This can be achieved in the first instance by working side by side with tāngata whenua in a partnership role, now and into the future.

The proposal is for a private plan change, which won't in itself give rise to effects upon cultural values, rather it is potential future development arising from the plan change which is assessed below.

### 8.1 Mana Atua

Effects arising from the proposal can be more than tangible effects and include nontangible spiritual and wairua effects. Mana atua refers to the realm of the tupuna and deity (spirit realm). It is the relationship between ngā atua and tāngata. Protecting the role of ngā atua is paramount for wellbeing.

#### 8.1.1 Potential effects

To ensure mana atua is upheld, the relationship between ngā atua and tāngata must be one that is based on reciprocity and respect between each other and the spirit realm.

Potential adverse effects on wairuatanga, mana tupuna and Tāngata Whenua's kaitiaki responsibilities may arise from the proposal should the works not be undertaken correctly, and appropriate regard given to tikanga and mātauranga Māori.



Early and enduring engagement throughout the life of the project with Tāngata Whenua is necessary to avoid the potential for adverse effects on mana atua. The following mitigation measures are required to uphold these obligations.

### **8.1.2 Mitigation Measures**

- The plan change process should involve Tāngata Whenua members in a partnership capacity. They should be provided the opportunity to evaluate and inform how tāngata whenua values are addressed throughout the life of the project (plan change process and future development across the site). To achieve a meaningful partnership a co-governance arrangement is recommended. This would involve a Governance Roopu being established. The Roopu will comprise the applicant and members appointed by tāngata whenua. The Roopu will remain active through to the completion of the plan change process.
- Once the plan change is operative, the provisions shall clearly articulate the expectation of developers to work in partnership with tāngata whenua.
- The plan change provisions shall provide the opportunity for cultural induction wananga facilitated by Tāngata Whenua to avoid adverse cultural effects from large scale development.
- Karakia and other tikanga as directed by Tāngata Whenua representatives is to be carried out prior to any works commencing on the whenua and after the project is complete.
- Provisions shall be made in the plan change to ensure an appropriate ADP, which incorporate tikanga māori, is carried out in the event of an 'accidental discovery'. An example of an appropriate Accidental Discovery Kaupapa is provided at **Appendix C**.

## **8.2 Mana o Te Wai**

Considers the effects on the surrounding waterways that may be an anticipated or an unanticipated outcome from the proposal.

### **8.2.1 Potential effects**

These may be things such as potential physical change or discharge into waterways or activities that threaten the natural integrity and mauri of the waterways, all of which are taonga for Tāngata Whenua, providing physical and spiritual sustenance. The following



mitigation measures are therefore required to ensure Mana Tāngata values and obligations are upheld.

### **8.2.2 Mitigation Measures:**

- Appropriate erosion and sediment controls shall be established prior to any works commencing on site.
- All land disturbance activities, including the placement of material or structures near waterways, shall be managed by use of appropriate plan change provisions. Such provisions should allow for monitoring by kaitiaki monitors, as appointed by Tāngata Whenua at the time of works, to ensure they are carried out in accordance with tikanga Māori.
- The plan change provisions shall ensure existing waterways/watercourses within the whenua are safe guarded from adverse effects these provisions shall include no build areas and appropriate setbacks from the puna (spring) and waterways across the whenua.
- Kaitiaki Monitors shall be on site prior, during and post to any earthworks.
- The disposal of wastewater may be provided via on site disposal or Council's reticulated network.
- In accordance with tikanga māori, it is imperative that the discharge of wastewater is cleansed via Papatūānuku. While it is outside the scope of this CIA, it is expected that KDC shall provide the opportunity for tāngata whenua to work with Council to ensure the future management of the reticulated wastewater network and system are safe and in accordance with tikanga māori.
- The plan change provisions shall ensure where on-site disposal of wastewater is proposed that the system has been designed in accordance with tikanga māori and avoids existing waterways and accounts for the shallow ground water conditions.

## **8.3 Mana Whenua**

Mana whenua refers to the power or prestige held by the land or Papatūānuku.

Papatūānuku provides sustenance for he tāngata and hospitality for manuhiri (guests).

### **8.3.1 Potential effects**

Repo, or wetlands, are a taonga with great historical, cultural, economic, and spiritual significance. They are mahinga kai (food gathering sites) and provide significant habitats for



rongoā, kai species (flora and fauna). Wetlands are a source of Mātauranga (knowledge) that is intimately connected to whakapapa.

Without appropriate mitigation and in particular restoration of vegetation species, the proposed development significantly reduces the whenua's ability to slow stormwater and filter contaminants which includes sediment from entering the surrounding environment. The proposal will result in a significant increase in impervious surface. Any increase in built development, and resultant increase in impervious surface, as proposed with this application reduces Papatūānuku's mana and ability to sustain he tāngata.

Large volumes of earthworks are required to facilitate future development arising from the plan change. The proposed earthworks and other activities associated with this development has the potential to greatly diminish Papatūānuku's mana and ability to protect the surrounding waterways from harm. The following mitigation measures are required.

### **8.3.2 Mitigation Measures:**

- Appropriate and effective erosion and sediment controls shall be established prior to any earthworks commencing on the whenua. These controls shall be captured by provisions included in the plan change.
- No contaminated stormwater runoff from any earth worked areas shall discharge directly off site or to any watercourse. Stormwater from the works site shall be directed via a treatment device or over land prior to discharging off site to cool, treat and slow any stormwater runoff.
- The plan change shall incorporate Low Impact Urban Design Principles including passive stormwater treatment.
- Plan change provisions shall implement maximum earthworks thresholds to avoid adverse mana whenua effects.
- Plan change provisions shall implement maximum impervious surfaces thresholds to avoid adverse mana whenua effects.
- Kaitiaki Monitors shall be on site prior to, during and post any earthworks.
- Provisions shall be included in the plan change to ensure the future development of the whenua incorporates large trees and vegetation (landscaping) across the site



- (public and private spaces) to enhance the mauri and ecology of the whenua. The density of tree/plant species shall be agreed in collaboration with Tāngata Whenua.
- The plan change provisions shall require areas of open space to be set aside for recreation and wellbeing.
  - Single storey buildings are encouraged on the flat land to avoid the need for deep piles. Two storey buildings are appropriate on the elevated land within the northern part of the whenua. The plan change provisions shall provide for this configuration of development.

## **8.4 Mana Ao Tūroa**

Mana ao tūroa refers to the space between Papatūānuku and Ranginui (the environment). It is therefore the mana of the natural world, its ability to provide, nourish and replenish. Important to Mana ao Tūroa is the need to provide the breath of life to all things natural in this world which includes mana atua, mana o te wai, mana whenua, mana tāngata. This is achieved by ngā hau e wha, given by Tawhirimatea in his many forms. It is the obligation of Tāngata Whenua to ensure this is maintained. The following mitigation measures are required to uphold these obligations.

### **8.4.1 Mitigation Measures**

- Any works shall be carried out in accordance with mātauranga and tikanga Māori and as agreed between Tripartite Group and Tāngata Whenua.
- Appropriate erosion and sediment controls are established prior to any works commencing on site.
- Kaitiaki Monitors shall be on site prior, during and post any earthworks.
- Environmental controls shall be included in the plan change provisions covered in this CIA to ensure adverse effects on Ao Tūroa are avoided.
- Water is a precious resource and must be collected and used in a sustainable way. The plan change shall ensure all new allotments and future buildings must collect and store water on-site in tanks as a source of potable water, to comply with NZ Fire Safety requirements and to uphold Tāngata Whenua's obligations to mana ao tūroa.



## 8.5 Mana Tāngata

The peoples' mana is reliant upon their ability to undertake their inherited obligations and responsibilities, passed down from their tupuna. This is a crucial element of wellbeing.

Overtime, Tāngata Whenua and their tupuna have witnessed the steady desecration and loss of taonga as a result of colonisation. With this loss comes the erosion of their ability to exercise traditional practices (tikanga and mātauranga Māori) tino rangatiratanga over their traditional resources. As a consequence, their mana (prestige, power) has been stripped and the mauri of their taonga and wāhi tapu significantly degraded.

One such example within the context of this proposal is the replacement of indigenous names over time with European names. In Te ao Māori, when a place, area or event is given a name, that name cements the entity in history and becomes an essential part of pūrākau that is re-told by future generations. Names such as the Dargaville Racecourse and Dargaville have no positive meaning to tāngata whenua, indeed they simply serve as a reminder of that which has been lost.

Although these losses have occurred throughout our nation's history, it is recognised that the whenua has been used as a racecourse. Recognition of this use and the people associated with the racecourse is necessary to uphold their mana.

The following mitigation measures are required to address the potential adverse effects on Mana Tāngata, tino rangatiratanga, whanaungatanga, wairuatanga and mana tupuna.

### 8.5.1 Mitigation Measures

- Prior to the plan change being lodged with KDC, the applicant shall engage with Tāngata Whenua to demonstrate how the recommendations of this CIA have been provided for.
- Tāngata Whenua are given the opportunity to name the whenua including streets and other areas within the project area. It is foreseen that this will take place at the development stage of the proposal. This engagement process will be facilitated by the plan change provisions.
- Provisions within the plan change shall provide Tāngata Whenua with the opportunity to incorporate their whakaaro into the Development Plan and future land use of the whenua.



- With the Dargaville Racecourse’s approval, an area shall be set aside to showcase the old photos held by the Racecourse.
- Tāngata Whenua kaitiaki, Kaiārahi and any other cultural input (technical/kaumatua etc) required throughout the duration of project works shall be remunerated by the applicant (Tripartite Group). Such remuneration shall be agreed to prior to any works being carried out on site.
- Economic opportunities for local Tāngata Whenua should be provided as the development project moves into the planning stage. Dialogue and negotiations should be entered into as part of a formal process so these aspirations can be accommodated and integrated into the project at an appropriate time, as agreed by both parties.
- Communal vegetable gardens (mara kai) and orchards (oro) shall be incorporated across the site.
- Provisions shall be included in the plan change to ensure the future development of the whenua incorporates communal mara kai, oro in public areas across the site to enhance mana tāngata’s ability to grow kai and be self-sustaining.
- To ensure an appropriate level of privacy and open space is provided between each lot, the plan change provisions shall provide appropriate setbacks, lot size, building coverage, height, bulk, and form of development.
- A purpose-built community hub, incorporating a communal building and other facilities, shall be established as a part of the future development.



## 9. Conclusion

The project whenua is located within ancestral lands of Te Kuihi, Te Roroa and Te Uri O Hau, Te Parawhau. By virtue of their long association and occupation of these lands, the people affiliated with these groups retain mana i te whenua and are kaitiaki.

The Project area and surrounds have a mauri that binds the current generation through mana, tapu and whakapapa, to the whenua and the waterways which are of great cultural significance to them.

The cultural values innately imbedded in Te Ao Māori must be preserved by Tāngata Whenua as an inherited obligation for each successive generation.

Underpinning these cultural values is the responsibility afforded to Tāngata Whenua to protect and enhance their taonga, including wāhi tapu, cultural/spiritual sites, their people and the environment. This is the obligation bestowed upon them as kaitiaki and is necessary for wellbeing. The landscape and cultural sites act as a repository for the whakapapa, mana, tikanga and traditions for current and future generations.

The proposed plan change and potential future development offer a range of opportunities to the whanau of Tāngata Whenua and for the wider community. However, for Māori, this opportunity also comes with a range of obligations for themselves and for the applicant.

Tāngata Whenua have an opportunity to gain economically, socially, and culturally from the proposal, but in doing so comes the responsibility to ensure all pillars of cultural importance, as outlined in this report, are preserved and enriched along the way. Similarly, the applicant has a responsibility, which is upheld in legislation, to partner with and assist Tāngata Whenua in realising their aspirations for their people and for the wider community.



Mitigation measures as listed in this report are provided to protect and enhance Tāngata Whenua's mana. Their values must be integrated as part of the plan change process to guide any future development arising from this process.



## 10. Recommendations

The following recommendations are made and should inform the proposed plan change provisions, future conditions of consent and side agreements with the Tripartite Group:

1. Mitigation measures as discussed in this report be adopted as an appropriate response to the assessment of cultural effects.
2. All proposed mitigation measures shall be carried out in consultation with, and under the guidance of Tāngata Whenua and the Tripartite Group.



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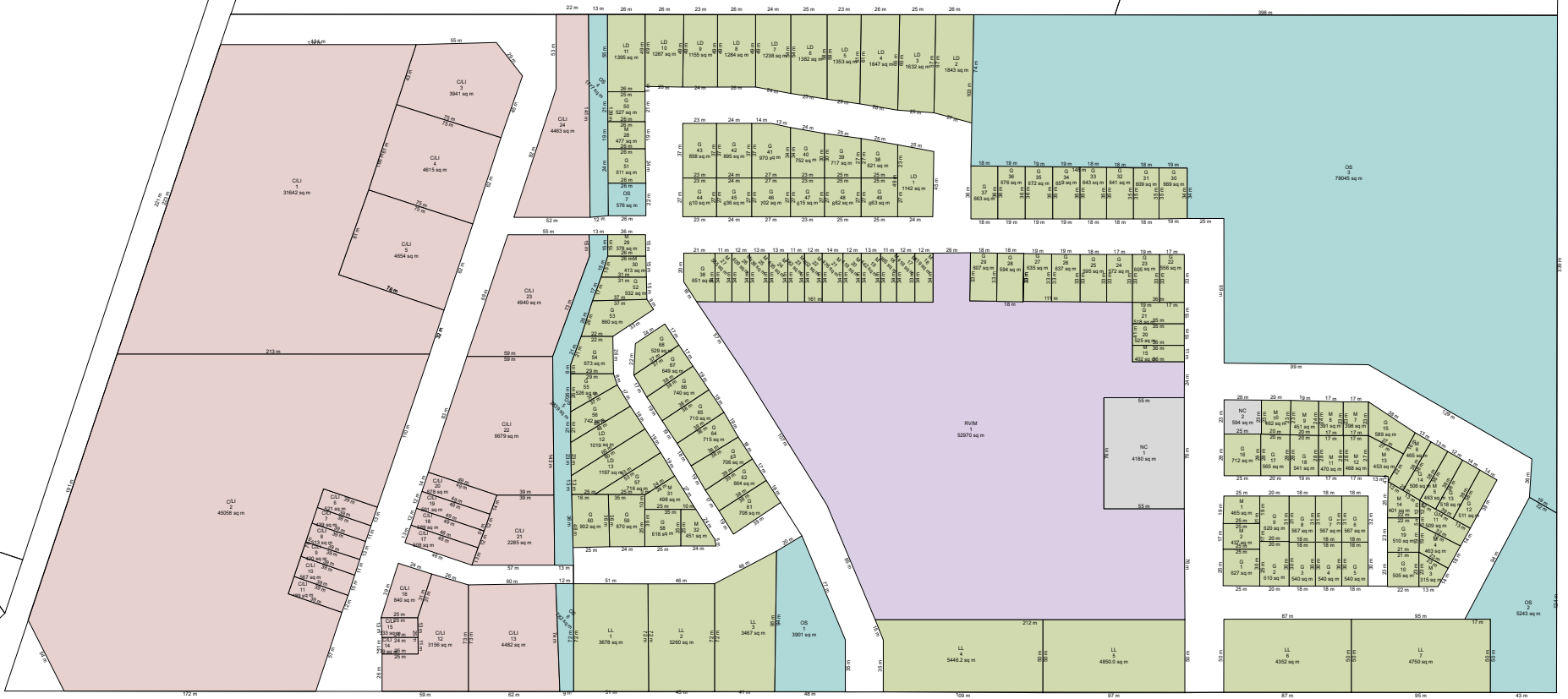
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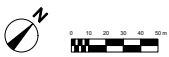
Appendix A:  
Draft Plan Change Documents

# DRAFT

	Light Industrial
	Residential
	Open Space
	Retirement Village Medium Density
	Neighbourhood Commercial



C/L1	1	32498 sq m	G	4	4540 sq m	G	33	32841 sq m	G	59	870 sq m	LL	6	64352 sq m	M	27	385 sq m
C/L1	1	131542 sq m	G	5	5450 sq m	G	33	32841 sq m	G	60	802 sq m	LL	7	74750 sq m	M	28	477 sq m
C/L1	2	245058 sq m	G	6	6567 sq m	G	34	34559 sq m	G	61	708 sq m	M	1	1465 sq m	M	29	378 sq m
C/L1	3	33941 sq m	G	7	7567 sq m	G	35	35727 sq m	G	62	664 sq m	M	2	2437 sq m	M	30	413 sq m
C/L1	4	48815 sq m	G	8	8567 sq m	G	36	3676 sq m	G	63	706 sq m	M	3	3315 sq m	M	31	498 sq m
C/L1	5	14654 sq m	G	9	9520 sq m	G	37	3653 sq m	G	64	715 sq m	M	4	4468 sq m	M	32	451 sq m
C/L1	6	6521 sq m	G	10	10505 sq m	G	38	3851 sq m	G	65	710 sq m	M	5	5463 sq m	NC	1	14180 sq m
C/L1	7	7439 sq m	G	11	11509 sq m	G	38	3821 sq m	G	66	740 sq m	M	6	6465 sq m	NC	2	2594 sq m
C/L1	8	8313 sq m	G	12	12511 sq m	G	39	39717 sq m	G	67	649 sq m	M	7	7398 sq m	OS	1	13901 sq m
C/L1	9	13420 sq m	G	13	13518 sq m	G	40	40752 sq m	G	68	629 sq m	M	8	8191 sq m	OS	2	25243 sq m
C/L1	10	10567 sq m	G	14	14508 sq m	G	41	41970 sq m	LD	1	1142 sq m	M	9	9451 sq m	OS	3	37789 sq m
C/L1	11	11489 sq m	G	15	15589 sq m	G	42	42895 sq m	LD	2	1843 sq m	M	10	10462 sq m	OS	4	41777 sq m
C/L1	12	13158 sq m	G	16	16712 sq m	G	43	43858 sq m	LD	3	1632 sq m	M	11	11470 sq m	OS	5	52839 sq m
C/L1	13	14482 sq m	G	17	17565 sq m	G	44	44810 sq m	LD	4	1547 sq m	M	12	12468 sq m	OS	6	6782 sq m
C/L1	14	14279 sq m	G	18	18541 sq m	G	45	45636 sq m	LD	5	15353 sq m	M	13	13453 sq m	OS	7	7578 sq m
C/L1	15	15333 sq m	G	19	19510 sq m	G	46	46702 sq m	LD	6	1382 sq m	M	14	14401 sq m	RV/M	1	152970 sq m
C/L1	16	16840 sq m	G	20	20525 sq m	G	47	47815 sq m	LD	7	1238 sq m	M	15	15402 sq m	Road Reserve	1	77897 sq m
C/L1	17	17805 sq m	G	21	21518 sq m	G	48	48865 sq m	LD	8	1284 sq m	M	16	16419 sq m			
C/L1	18	18589 sq m	G	22	22558 sq m	G	49	49663 sq m	LD	9	1155 sq m	M	17	17419 sq m			
C/L1	19	19591 sq m	G	23	23505 sq m	G	50	50527 sq m	LD	10	1287 sq m	M	18	18365 sq m			
C/L1	20	20878 sq m	G	24	24572 sq m	G	51	51511 sq m	LD	11	1395 sq m	M	19	19442 sq m			
C/L1	21	22295 sq m	G	25	25595 sq m	G	52	52535 sq m	LD	12	1519 sq m	M	20	20419 sq m			
C/L1	22	22679 sq m	G	26	26837 sq m	G	53	53860 sq m	LD	13	13197 sq m	M	21	21476 sq m			
C/L1	23	23494 sq m	G	27	27635 sq m	G	54	54573 sq m	LL	1	13678 sq m	M	22	22402 sq m			
C/L1	24	24463 sq m	G	28	28594 sq m	G	55	55526 sq m	LL	2	12320 sq m	M	23	23382 sq m			
G	25	26277 sq m	G	29	29507 sq m	G	56	56742 sq m	LL	3	13487 sq m	M	24	24435 sq m			
G	26	2610 sq m	G	30	30669 sq m	G	57	57716 sq m	LL	4	14442 sq m	M	25	25436 sq m			
G	27	3540 sq m	G	31	31609 sq m	G	58	58818 sq m	LL	5	14850 sq m	M	26	26409 sq m			



**THE URBAN ADVISORY**  
CONSULTANTS

**M** Matakote Architecture  
Urbanism

The Urban Advisory Ltd  
Level 1, 29 Bank St, Wellington 6100  
www.theurbanadvisory.com

DATE: 15/05/2024

PROJECT: Dargaville Racing Club Redevelopment

CLIENT: Tripartite Group

SCALE: 1:500

DRAWN: [Name]

CHECKED: [Name]

DATE: 15/05/2024

PROJECT: Dargaville Racing Club Redevelopment

CLIENT: Tripartite Group

SCALE: 1:500

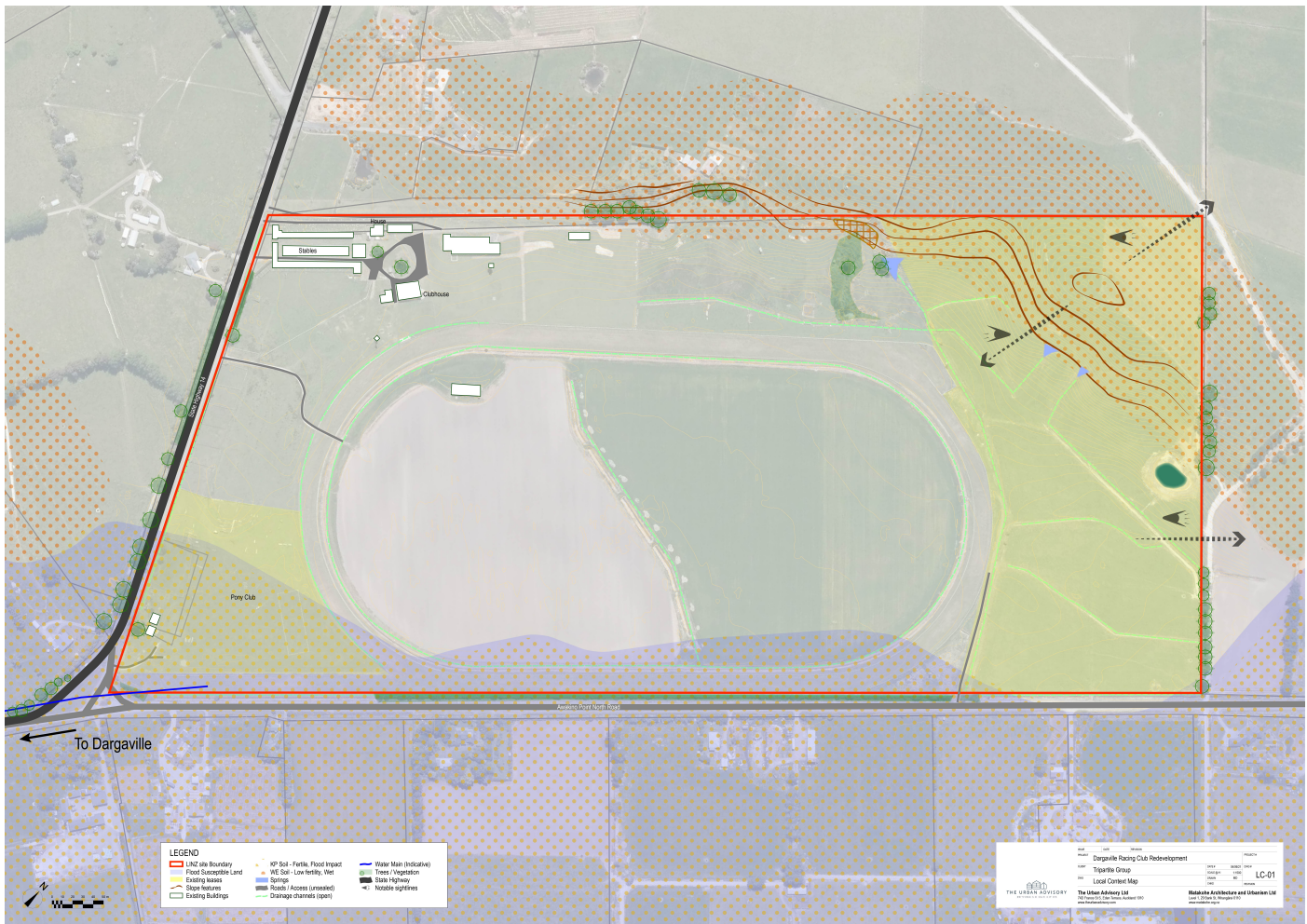
DRAWN: [Name]

CHECKED: [Name]

PREPARED BY: XXX

ODP

Matakote Architecture and Urbanism Ltd  
www.matakote.co.nz



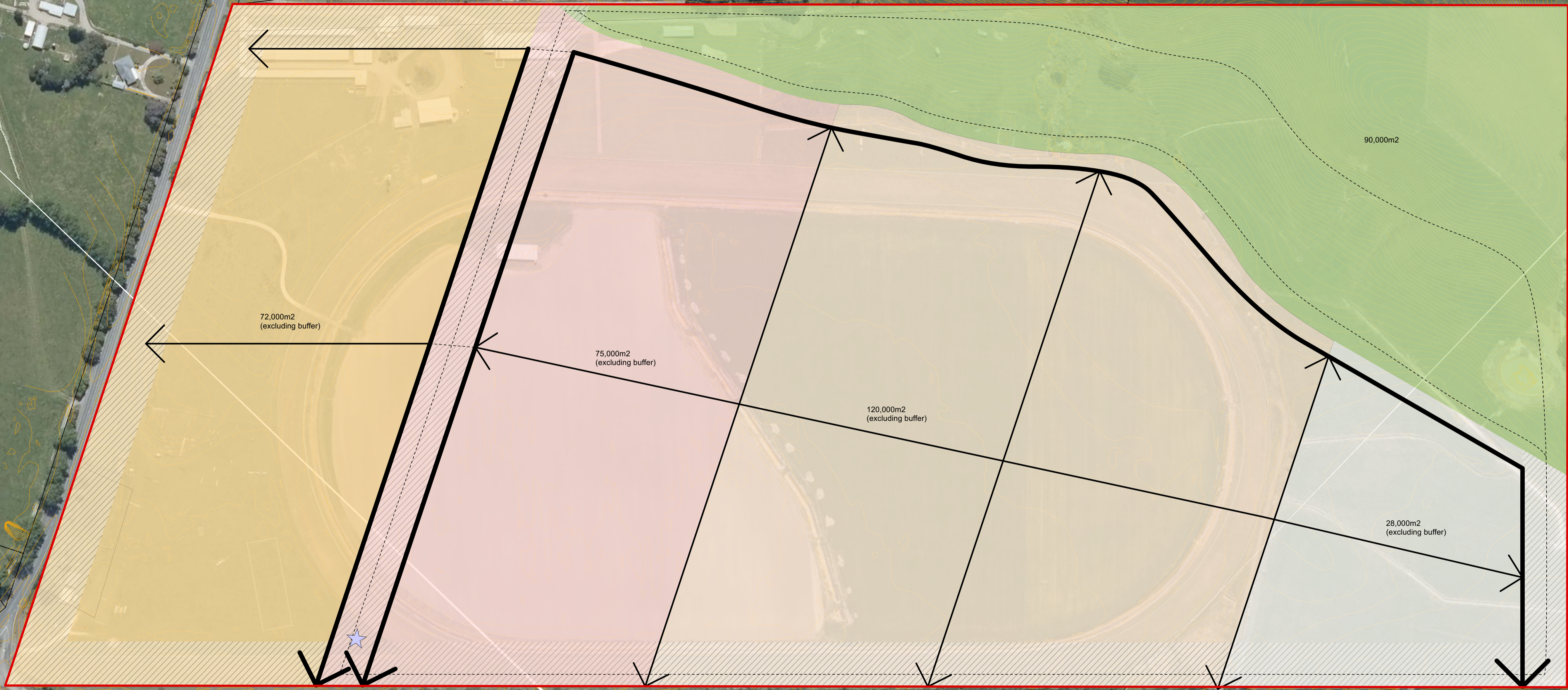
**LEGEND**

[Red line]	LINZ site Boundary	[Yellow area]	KP Soil - Fertile, Flood Impact	[Blue line]	Water Mark (Indicative)
[Yellow area]	Flood Susceptible Land	[Blue area]	WE Soil - Low fertility, Wet	[Green area]	Trees / Vegetation
[Green area]	Existing trees	[Blue area]	Storage	[Grey line]	State Highway
[Green line]	Slope features	[Grey line]	Roads / Access (Unsealed)	[Black arrow]	Notable sightlines
[White box]	Existing buildings	[Blue line]	Drainage channels (open)		

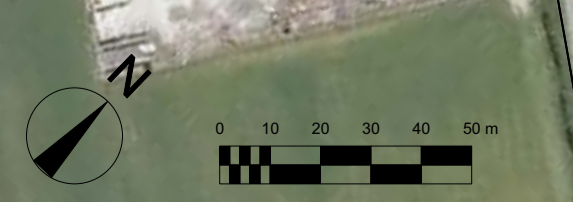
THE URBAN ADVISORY		Hobbs Architecture and Urbanism Ltd	
<b>Dargaville Racing Club Redevelopment</b>			
Tasman Group		LC-01	
Local Context Map			
<small>         The Urban Advisory Ltd          120-122 Victoria Street, Auckland, New Zealand          Phone: +64 9 300 9000          www.theurbanadvisory.co.nz       </small>			

DRAFT

- Light industrial
- Medium density residential (300m2 lots)
- General residential (400-500m2 lots)
- Low density residential (1,000m2 lots including retirement village)
- Passive reserve
- Landscape or open space buffer
- Potential small-scale commercial



THE URBAN ADVISORY RETHINKING OUR CITIES		DATE	REVISION	PROJECT #
Matakohē Architecture • Urbanism		DATE #	4/30/21	DWG #
The Urban Advisory Ltd 743 France St S, Eden Terrace, Auckland 1010 www.theurbanadvisory.com		SCALE @A1	1:1500	BM-01
		DRAWN		REVISION
		DWG		
		Matakohē Architecture and Urbanism Ltd Level 1, 23 Bank St, Whangarei 0110 www.matakohē.org.nz		





Reference: 19457

7 May 2021

Dargaville Racing Club Inc.  
C/O Griffiths and Associates Ltd  
127 Bank St & Mansfield Tce

**RE: PRIVATE PLAN CHANGE- GEOTECHNICAL ASSESSMENT DARGAVILLE RACING CLUB**

## **1 INTRODUCTION**

Land Development & Engineering Ltd (LDE) have been engaged by Dargaville Racing Club Inc to undertake a preliminary Geotechnical Assessment for the proposed plan change at Dargaville Racing Club, SH14, Awakino Point, Dargaville. The plan change encompasses the existing lot of 46.6729 ha and is planned to become multi-zoned, including retirement living, social housing, private housing, light industrial, recreational spaces and appropriate buffer zones.

No conceptual scheme plan of zoning had been created at the time of writing this report, so this report represents the factual results of the geotechnical investigation of the general site.

## **2 SITE SETTING**

The site is approximately 4km to the northeast of Dargaville township and adjacent to SH14 (Figure 1). The site lies within a broad meander of the Wairoa River named Awakino Point, that is mostly used for agricultural purposes.



Figure 1: Annotated location map showing the site. Source: google maps.

## 2.1 Site Description and Current Land Use

The site is situated approx. 4km northeast of Dargaville CBD and has previously been used as a racing club and is currently used for agricultural grazing of sheep. The neighbouring properties are a mix of rural production and smaller lifestyle blocks.

## 2.2 Geology

The GNS Science Geological Map 1:250,000<sup>1</sup> (Figure 2) indicates that the site and surrounding area is underlain by recent alluvial/colluvial deposits of Tauranga Group. The elevated hillslope deposits are generally older alluvial deposits, while the low-lying flat areas are more recently deposited.

At significant depth under the site is expected to lie bedrock of the Mangakahia Complex of the Northland Allochthon which is present on the opposite side of the Wairoa River.

<sup>1</sup> <https://data.gns.cri.nz/geology/>

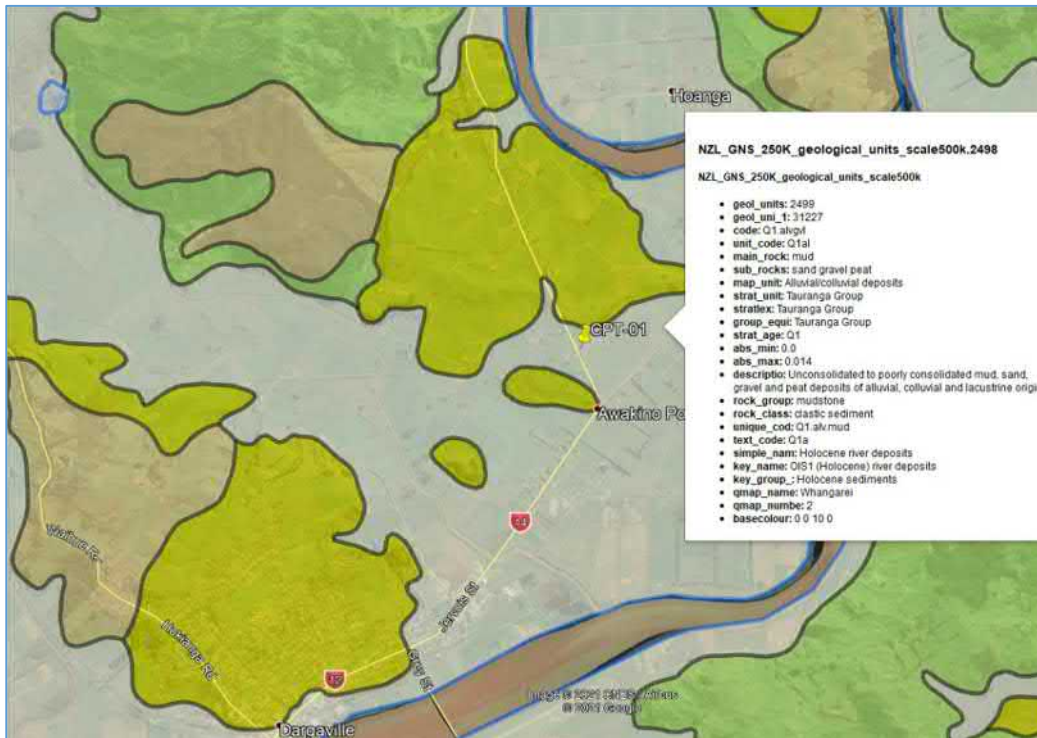


Figure 2: Excerpt from the GNS Science Geological Map.

Within the subject site itself, exists two geological units (Figure 3). Pleistocene aged alluvial deposits underlie the elevated northern portion of the site, with more recent Holocene aged alluvial deposits forming the flat remainder of the site.

#### Holocene aged Alluvial deposits (Q1a)

Unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins.

#### Early to Middle Pleistocene aged River & Hill Slope deposits (eQa)

Partly consolidated mud, sand, gravel and peat or lignite of alluvial, colluvial, lacustrine, swamp and estuarine origins.

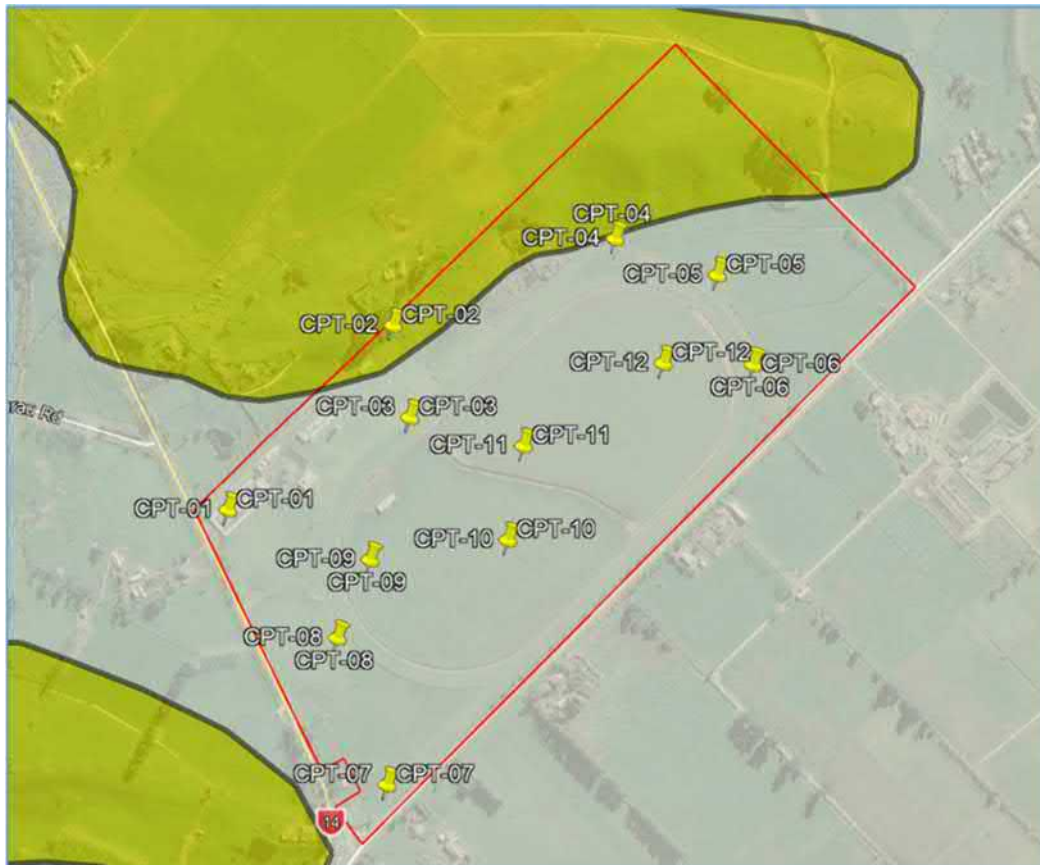


Figure 3. Ground investigation locations shown over geological map. Source: [data.gns.cri.nz/geology/](http://data.gns.cri.nz/geology/)

### 3 SITE INVESTIGATION

In addition to reviewing the available Geotechnical data from previous reports for the area and the NZGD database, LDE has undertaken a limited Geotechnical investigation which satisfies the, MBIE Guidelines, Module 2: Geotechnical testing for Earthquake Engineering<sup>2</sup> recommended minimum intensity of deep geotechnical investigations for plan change applications of 0.20 per hectare, for sites greater than 1Ha, and NZGS New Zealand Ground Investigation Specification 2017<sup>3</sup>.

The investigation comprised of the following:

1. A site walkover assessment by a Chartered Professional Engineer (Geotech & Civil) to inspect existing slopes, any evidence of historical slope failures and any exposures of the underlying geology.

<sup>2</sup>Wentz, R., Traylen, N., Fairclough, A. and Ashfield, D., 2016. *Earthquake Geotechnical Engineering Practice*. 1st ed. Ministry Business, Innovation & Employment, pp.<https://www.building.govt.nz/assets/Uploads/building-code-compliance/b-stability/b1-structure/geotechnical-guidelines/geotech-module-2.pdf>.

<sup>3</sup> 2017. *New Zealand Ground Investigation Specification*. 1st ed. [ebook] Auckland: New Zealand Geotechnical Society. Available at: <https://fi-nzgs-media.s3.amazonaws.com/uploads/2017/03/NZ-Ground-Investigation-Specification-Vol-1.pdf> [Accessed 16 February 2021].

2. 12 specialist Cone Penetration Tests (CPTs) to establish a deep soil profile and ascertain potential bedrock, zones of liquefaction and consolidation settlement analysis.
3. Several hand augured boreholes and Scala penetrometers to depths between 3m & 5m, adjacent to several CPTs to confirm soil behaviour type classifications. Undertake handheld shear vane measurements at 200mm intervals in cohesive soils to appropriately assess the ground strength profile.

The investigation was conducted on 28<sup>th</sup> and 29<sup>th</sup> April 2021. Locations of the CPTs are shown on the Ground Investigation Plan in Appendix A.

## 4 GROUND CONDITIONS

Typical ground conditions encountered were a denser surface crust above the groundwater table, consisting of 300mm of topsoil overlying 200mm of clayey silt. From 0.5m bgl to approximately 8m bgl, lies a very soft consistent clay layer with some potential organics. Below the soft clay layer, lies a denser silty clay to the maximum depth of investigation at 20m bgl. The lower silty clay layer showed a small improvement in shear strength. Bedrock was not encountered in any of the investigations, but several met refusal before the target depth on inferred denser Pleistocene aged alluvial deposits. This depth of refusal was shallower within the northern and western extents of the oval racetrack at locations closer to the base of the hills. A conceptualised geological cross section running west to east is shown in Appendix A.

The extent of deeper organics is believed to be exaggerated due to the high friction and pore pressures measured within these layers displaying an erroneous soil behaviour type. The presence and extent of organics should be proven with machine boreholes or push tubes at the next stage of investigation. Shear vanes within several hand augers returned unreliable results due to the presence of shallow gravels from made ground so the scale of the hand investigation was reduced and supplemented with additional CPTs. Scala penetrometers returned unreliable results below a depth of 1.5m bgl due to the high level of friction developing on the rods.

### 4.1 Geomorphology

A Chartered Professional Geotechnical Engineer undertook a site walkover over of the proposed development and the aerial images of the site have been studied.

Overall, the site forms a section of a water catchment area that feeds into the Wairoa River which in turn flows out to the Kaipara Harbour. The site sits along the upper extent of the catchment and will be bounded by the ridgeline of the hillform along the northern boundary of the site, and SH14 to the west of the site. The site and surrounding area have been extensively modified through the excavation of multiple irrigation drainage channels that drain in an easterly

and northerly direction to the Wairoa River. Most of the site comprises an alluvial plain which is essentially flat.

Specifically, the site consists of an oval racecourse with gently undulating hills to the north. The racecourse track consists of a compacted track surface with deep drainage channels on both the inside and outside of the oval. Several springs commence near the base of the hill and flow into the drainage channels. A historic and now overgrown dam exists at the base of the hill. Earthworks have excavated into the hill to form a track and likely borrow source for the dam embankment material. Instability was observed in the over steepened slope above the dam. A currently used farm irrigation pond is present in an elevated position on the hill within the north-eastern segment of the property. An active water bore for stock use is located 500m northeast of the property boundary. The water bore was drilled to a depth of 22.7m bgl and has a static water level of 4m bgl.

Anthropological processes often reduce the visibility of any features, in this case the area around the existing buildings with lawns and the racetrack have been smoothed out. Other than minor soil creep in the slopes near the northern and western site boundaries no other significant geomorphological features were observed on site.

A map of the onsite features can be found in Appendix A, Geomorphological mapping.

## **4.2 Ground Water**

Groundwater depth is fairly consistent across the study area. Within low-lying land, it was encountered near-surface from 1.5m to 3.5m below ground level, whilst beneath elevated areas it can be greater than 5m bgl. During winter, it is anticipated for ground water to be located nearer to the surface within the low-lying lands and may rise to within 0.5m below ground level.

The Northland Regional Council database indicates that the site falls outside of any major aquifers. A conservative groundwater level of 1.5mbgl for the CPTs located within the Holocene alluvium has been adopted for Geotechnical analysis purposes.

# **5 NATURAL HAZARDS AND GROUND DEFORMATION POTENTIAL**

## **5.1 General**

This section summarises our assessment of the natural hazards within the property as generally defined in Section 106 of the Resource Management Act (1991 and subsequent amendments)

and the Building Act (2004) and the potential risk that these present to the proposed development in terms of vertical and lateral ground deformation.

This section also includes our assessment of ground beneath the building site which is outside the definition of “Good Ground” as defined by the Compliance Document for the NZ Building Code, NZS3604 (2011) “Timber Framed Buildings”.

Considering recent Earthquake events, such as the Christchurch Earthquakes in 2010 & 2011, LDE has undertaken a preliminary Earthquake hazard assessment for the site to supplement the absence of information available in the surrounding area. In addition to this, soft compressible Holocene deposits containing clay, and silt were identified during the site investigations. We understand that at later stages of the plan change and subdivision, more in-depth analysis will be required.

## **5.2 Earthquake Hazards**

### **5.2.1 Seismicity**

Based on the investigation data and on-site conditions we consider that different areas of the site are either Class C (Shallow soil) or borderline D & E (Deep or soft & Very soft soil) as defined by NZS 1170.5 (2004) “Structural Design Actions: Part 5: Earthquake actions – New Zealand”.

The low-lying regions which contain low strength clays and silts are deemed to be Class D or E (Deep or Very soft soil) while the mid-slopes to upper slopes containing Pleistocene deposits exhibit Class C (Shallow soil) characteristics.

### **5.2.2 Earthquake Shaking**

The site is in a region of low seismicity. Accordingly, the potential deformations associated with earthquake shaking are expected to be low to negligible. No active faults are mapped in Northland with the nearest located south of Auckland. However due to the presence of low strength, silty materials containing varying degrees of organic content encountered during the CPT investigation we have undertaken a preliminary liquefaction assessment, especially for the low-lying regions of the site containing Holocene Alluvial deposits.

The Ministry of Business Innovation & Environment released a guideline for Earthquake Geotechnical Engineering Practice with a series of modules. In Module 3, titled “Identification assessment and mitigation of Liquefaction Hazards” (dated May 2016, Rev 0) has revised the methodologies of determining peak ground accelerations under Section 175 of the Building Act.

For this site, we have used “Method 1” which is a risk-based method using the earthquake hazard presented in the current edition of the NZTA *Bridge Manual* (SP/M/022; third edition, Amendment 2, May 2016).

As stated in Module 1, titled “Overview of the guidelines” (dated March 2016, Rev 0), the peak ground acceleration ( $\alpha_{max}$ ) can be determined by:

$$\alpha_{max} = C_{0,1000} \times \frac{R}{1.3} \times f \times g$$

Where:

$C_{0,1000}$  = unweighted peak ground acceleration coefficient corresponding to a 1000-year return period from Table 6A.1 from the NZTA *Bridge Manual*.

$R$  = return period factor provided by NZS 1170.5 (2004), Table 3.5.

$f$  = site response factor, as below:

Class A & B “Rock Sites”,  $f = 1.0$

Class C “Shallow Soil”,  $f = 1.33$ .

Class D & E “Soft / Deep Soil”,  $f = 1.0$

$g$  = acceleration from gravity

Based on the NZTA *Bridge Manual*, we have determined that for Dargaville area, an effective magnitude of 5.9 is expected for design return periods between 50 – 2500 years, and using the method above, we have calculated a peak ground acceleration of 0.13g for an Ultimate Limit State (ULS) 500-year event, and 0.03g for a Serviceability Limit State (SLS) 25-year event for an Importance Level 2 (IL2) Structure. We have used these parameters for the liquefaction assessment for the site.

### 5.2.3 Liquefaction Assessment

Based upon our desktop review and review of the ENGEO Geotechnical Assessment, Dargaville, Kaipara District, the site has been mapped as having high liquefaction potential.

Liquefaction is the term used to describe the severe strength loss which can occur when saturated loose to medium dense sands and low plasticity silts are subject to seismic shaking. In addition to strength loss, liquefaction may also result in the expulsion of sand, silt and water at the surface, post seismic settlement, and lateral movement towards areas of lower elevation such as rivers or streams, referred to as lateral spreading. Differences in the level underlying liquefaction due to variations in the ground can result in differential surface settlement. In addition, significant building settlement can occur due to the severe loss of strength and subsequent bearing capacity failure of the ground.

The low-lying regions of the site are underlain by Holocene Alluvial deposits which contain varying degrees of silts, clays, organics and sands of variable density and thickness below the water table which are likely to be prone to liquefaction. In addition, given the variation in the depth and strength of the layers across the site we also consider there are likely to be variations in the liquefaction-induced settlement that could potentially occur (i.e., differential settlement across the site). Furthermore, given the relatively high groundwater table, liquefaction within the zone of influence of any building foundations could result in building settlement.

We have assessed the liquefaction potential of soils on site using the “simplified procedure” as summarised by Idriss & Boulanger (2014) method. Liquefaction-induced free-field vertical volumetric strains were estimated for the SLS and ULS design seismic events using the method of Zhang et al. (2002). Default assessment values were utilised within CLiq during the liquefaction analyses. These include, but are not limited to, assuming the existing ground is level, utilising an  $I_c$  cut-off of 2.6, applying clean sand and overburden corrections, automatic calculations for soil unit weights and applying automatic corrections to the input data at soil transition layers.

### 5.2.4 Vertical Settlement from Liquefaction

Analysis shows that for a ULS event, expected free field vertical settlements are 0 to 24mm, which is below the acceptable tolerance of 25mm within the NZ Building Code. No free field settlement is expected to occur at SLS loadings (Figure 4). A 0mm calculation from CPT2 is associated with the elevated hillslope location, which is not anticipated to be subject to liquefaction, due to the lower ground water table and denser soils.

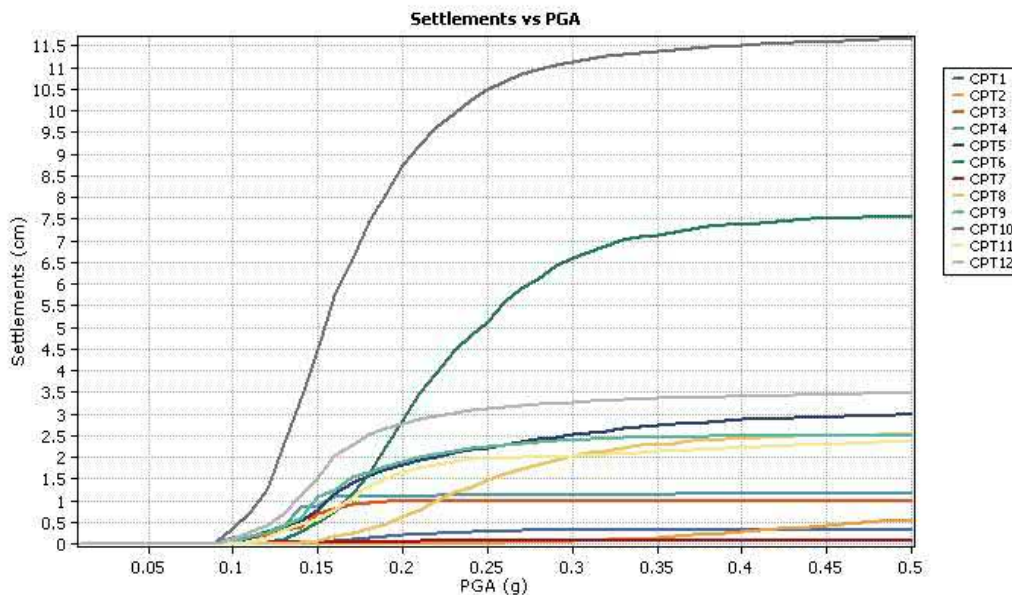


Figure 2: CLiq calculated "free field" vertical settlement results.

Under ULS loadings, isolated layers of saturated soils with high silt and sand components and relatively low densities, below 1.5mbgl (under earthquake groundwater levels) have low potential to liquefy. More specifically there tends to be a concentration of liquefiable layers between 6.0m bgl and 20m bgl, which are unlikely to propagate to the surface. Under ULS conditions only CPT12, returned results close to 25mm, which is the maximum allowable specified in the Compliance document for the NZ Building Code. The liquefaction assessment results are in Appendix B.

### 5.2.5 Liquefaction Severity Number (LSN)

The Liquefaction Severity Number<sup>4</sup> provides an indication of the likely future performance of the site due to underlying liquefaction. The determination of the number considers the thickness of the layers subject to liquefaction and their proximity to the surface. The magnitude of land damage that may be expected has been categorised into ranges (Table 1 below).

Table 1: LSN ranges and observed land effects.

LSN Range*	Predominant performance based on actual observations.
0-10	Little to no expression of liquefaction, minor effects
10-20	Minor expression of liquefaction, some sand boils
20-30	Moderate expression of liquefaction, with some sand boils and some structural damage
30-40	Moderate to severe expression of liquefaction, settlement can cause structural damage
40-50	Major expression of liquefaction, undulations, and damage to ground surface, severe total and differential settlement of structures
>50	Severe damage, extensive evidence of liquefaction at the surface, severe total and differential settlements affecting structures, damage to services.

\* LSN is an approximate indicator of liquefaction effects and do not always reflect the actual liquefaction from seismic events.

Analyses of the data from the CPTs put down within the site return LSN values between 0 to 3 under ULS conditions indicating that primarily there is little to no expression of liquefaction occurring on site.

<sup>4</sup> Tonkin and Taylor (2013) Liquefaction vulnerability study, Tonkin and Taylor Report 52020.0200/v1.0. February 2013. 52 pages and 14 appendices.

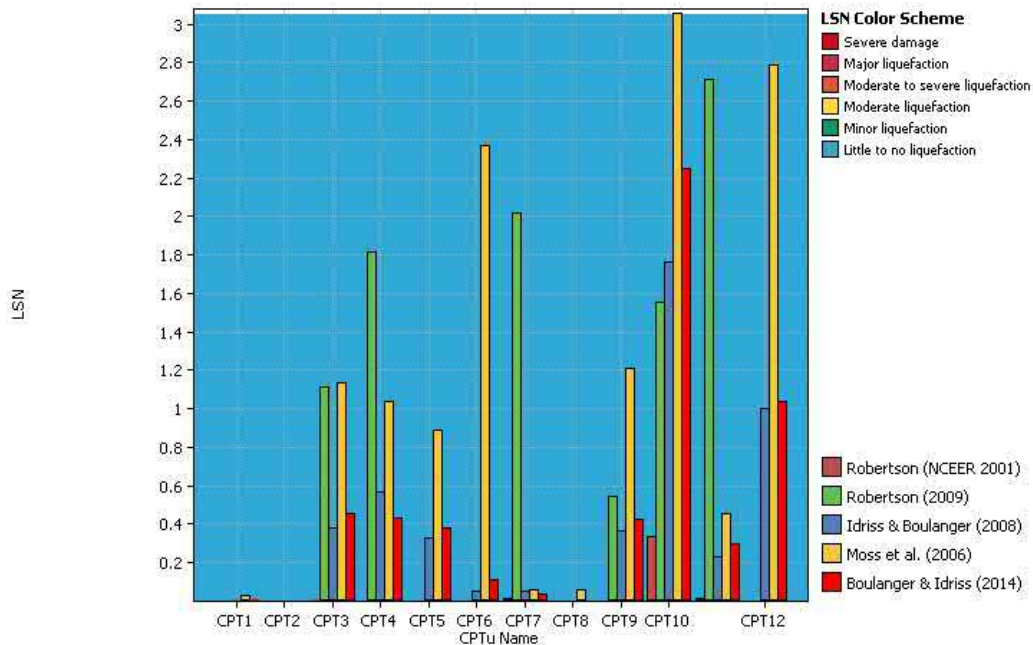


Figure 5: LSN calculated using different methodologies.

In summary, liquefaction has a low probability of occurring during a ULS event, the effects are expected to be nil to minor and within standard design tolerances for settlement.

### 5.3 Compressible Ground and Consolidation Settlement

CPT testing completed across the proposed plan change area identified some soft, potentially compressible soils within the low-lying alluvial deposits. Therefore, limited preliminary analysis was therefore undertaken for a scenario where light weight double storey housing were to be developed across the property. The analysis used the CPTu data recorded by the deep investigations that were varied out as part of this assessment. The software CPeT-IT Version 3 was used to determine the method of analysis which calculates the magnitude of two settlement components: primary (consolidation) and secondary (creep) settlements. The primary settlement determines the settlement which occurs through consolidation, while secondary settlement can be interpreted as an approximation of creep settlement. The calculated creep settlements show the amount of settlement expected over a 6-month period and over a 50-year period (600months) as per the New Zealand Building Code and NZS3604 (2011).

The software determines the relationship between soil stiffness and cone tip resistance ( $q_c$ ), which then calculates an estimate of static settlement per test location. The parameters used in the analysis were based upon double storey buildings being built with a footing width and length of 20m (L/B (Length and Breadth) ratio is 1), rectangular foundation system, apply a footing pressure of 20kPa (conservative estimate for double storey building), and a depth of

0.3m. Parameters are to be refined at a later stage in the development once structures are known. A rigid footing system assumes a stiffened waffle concrete slab (eg, Ribraft, Cupolex).

The settlement derived by ‘consolidation’ (primary settlement) is largely influenced by settlement derived by the magnitude of the static load applied to the soil meaning the greater the load, the more settlement through consolidation occurs. The time for the completion of the consolidation settlement to occur is dependent on the speed at which water can freely flow from the soil. It can be assumed that consolidation is generally complete when the overall predicted settlement has reached 90% completion. The settlement derived by ‘creep’ is settlement which occurs under the weight of the soil and is independent of static loading, therefore will continue to settle through the process of material decay and is hard to predict its performance beyond a 50-design life period. The total overall predicted settlement includes both the primary and secondary components.

### 5.3.1 CPeT-IT Analysis Results

Consolidation settlements (comprising of primary and secondary creep settlements) for a typical two-storey building, over a 50-year period under static loading were assessed using the software package CPeT-IT<sup>5</sup>. Predicted settlement calculations and results for a raft styled foundation system, are appended in Appendix C. A summary of the results is given in Table 2 below.

Table 1: Summary of CPeT-IT results and loading cases.

CPT ID	Foundation Type*	Loading applied (kPa)	Primary settlement (mm)	Creep settlement (mm)	Total Settlements (mm)
1	Raft Foundation (20m x 20m)	20	25	30	55
2			8	4	12
3			90	50	140
4			120	70	190
5			70	40	110
6			7	10	17
7			110	60	170
8			70	60	130
9			90	40	130
10			90	40	130
11			190	100	290
12			140	70	210

\*The foundations are embedded at a depth of 0.3m bgl for these calculations.

<sup>5</sup> Geogismiki Geotechnical Software, CPT&T-IT v12.0.1.55 – CPT Assessment Software

Calculated consolidation settlements are significant and well beyond the 25mm tolerance of the NZ Building Code. A detailed settlement and consolidation analysis will be required at resource consent or building consent and will need to incorporate the specific loadings of the structures proposed as part of the development. Several engineering techniques to mitigate this hazard are discussed in Section 6.

### 5.3.2 Fault Line Surface Rupture

The GNS NZ Geology webmap and Active Faults Database<sup>6</sup> do not show any faults passing beneath the site. There also does not appear to be any surface expressions which would indicate the presence of an active fault line beneath or within proximity to the site. We therefore consider the surface fault line rupture risk to be low.

## 5.4 Stability

The overall stability of the subject site and the immediate surrounding slopes has a geomorphology that is indicative of fundamental stability. In its existing state, the site ranges from generally flat to an approximate slope angle of 10° degrees with isolated slopes of significance of up to 18° degrees along the northern extent of the site. The gently sloping land across the site is smooth and lacking in visible evidence of significant slope instability or deformation, apart from the anthropogenically altered historic dam. Nevertheless, soil creep is still likely to occur in the sloping areas because of gravity and the plasticity of the underlying soils.

The slopes along the western and northern boundaries of the proposed plan change area slope toward the south. The slopes in this section of the site area range up to 25m in elevation difference and extending on average 120m horizontally from the crest to the base of the slope. Evidence of soil creep can be identified in the grassed slopes in areas of greater than approximately 15° degrees, this has formed the terracettes visible in the slope. We expect that this is due to the shrinkage and swelling of the highly plastic near surface soils and the effect of gravity over the long term. While this is evidence of shallow seated instability there are no features present which indicate that deep seated instability has occurred.

If the proposed development encroaches on the hill slope, stability increasing measures can be implemented to reduce the risk of loading the slope which may lead to slope failure. Examples of such measures may include, but not limited to, retaining walls, a shear key, palisade wall, tree planting, MSE wall and slope regrading. Soil creep can be mitigated against using retaining,

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<sup>6</sup> <http://data.gns.cri.nz/geology/>

slope regrading, the deepening of foundations within the vicinity of the soil creep and revegetation of the slope.

Overall slope instability is not considered to be a significant geotechnical risk for this development. However, it is recommended that specific investigation and slope stability analysis is undertaken during the development of that land adjacent to or on the slopes.

## 5.5 Ground Shrinkage and Swelling Potential

Plastic soils can be subject to shrinkage and swelling due to soil moisture content variations which can result in apparent heaving and settlement of buildings, particularly between seasons.

### Pleistocene & Holocene Alluvial Deposits

Alluvial deposits, were assessed to have near surface soils which are highly reactive i.e., susceptible to seasonal soil shrinkage and swelling (Class H in terms of B1/AS1:2019). Foundations within these areas will need be design for a site classification of Class H, in accordance with B1/AS1 of the NZ Building Code. A characteristic surface movement ( $\gamma_s$ ) of 78mm should be adopted for design in accordance with AS2870 (2011).

Soil types have been determined based upon visual characteristics observed during the drilling of the hand augers and based on our experience of similar soils within the region. Further laboratory testing to determine the site soil class in terms of AS2870:2011, should be undertaken to determine expansivity of the onsite soils.

## 5.6 Erosion

Although no tunnel gully features were observed within the site during the site walkover and investigation, the presence can often be hidden by vegetation and grass, and only become visible after collapse.

Although erodible (or dispersive) soils require additional engineering controls and measures to be undertaken to ensure that any building development is not adversely affected by tunnel gullies, the occurrence of erosion features, tunnels, and gullies are not considered to be detrimental to the development and generally will require simple remediations by removal of the affected material and replacement with engineered fill and drainage measures.

## 5.7 Bearing Capacity

Preliminary bearing capacity calculations have been undertaken using the CPet-IT software. Calculations have been undertaken for footing widths from 0.3m up to 4m. Results show that reduced bearing capacities are available with 'good ground' rarely achieved, due to the very soft shallow soils. An ultimate bearing capacity of 300kPa is required to achieve the definition

of 'good ground' according to NZS3604, so specific engineering design of foundations will be required. Bearing capacity results are shown in Appendix D.

## 6 ENGINEERING RECOMMENDATIONS

Consolidation settlement is the main geotechnical hazard at the site due to the very soft clay soils. This can be mitigated against using several engineering techniques.

- Piling through the soft layers to a competent bearing layer is feasible for larger structures located near the base of the hill.
- Shallow friction piles utilising the cohesion of the clay may be suitable for lightweight structures.
- Preloading future building areas with the temporary addition and then removal of fill, will induce settlement prior to the construction of buildings, roads or buried infrastructure. 1m to 2m of fill may be required and settlement may take several years. The rate of consolidation can be sped up by installing wick drains to depths of 10m bgl.
- The use of lightweight construction materials and low height structures will be essential to limit consolidation settlements.
- Multi-storey construction should be confined to the northern hill portion, or be piled.
- Excavation and removal of existing material and replacement with lightweight fill (eg. Expol Geofam polystyrene) will reduce loads to a tolerable level.

The spatial consistency of the CPT results has allowed for an average CPT to be generated for the purpose of a preliminary pile capacity calculation and to derive estimated parameters for structural use. These are presented in Appendix D.

## 7 SUMMARY

Specific consideration will be required for the points summarised within this document when developing the scheme plan. Consolidation and settlement analysis should be conducted in more detail and be site specific for the different stages of the scheme plan, with remediation methods considered to overcome potential consolidation settlement.

Based on our review of the data available and our site-specific investigations and preliminary assessment, it is considered that the proposed land within the scheme plan boundary is geotechnically suitable for residential subdivision, including light infrastructure and community centres (i.e., schools and parks). While earthworks, site contouring, retaining wall and specific analysis and development will be required, these are considered normal for developments of this nature.

## 8 LIMITATIONS

This report has been prepared exclusively for the Dargaville Racing Club Inc with respect to the brief given to us. Information, opinions, and recommendations contained in it cannot be used for any other purpose or by any other entity without our review and written consent. LDE Ltd accepts no liability or responsibility whatsoever for or in respect of any use or reliance upon this report by any third party.

This report was prepared in general accordance with current standards, codes, and practice at the time of this report. These may be subject to change.

Opinions given in this report are based on visual methods, and subsurface investigations at discrete locations. It must be appreciated that the nature and continuity of the subsurface materials between these locations are inferred and that actual conditions could vary from that described herein. We should be contacted immediately if the conditions are found to differ from that described in this report.

This report should be read in its entirety to understand the context of the opinions and recommendations given.

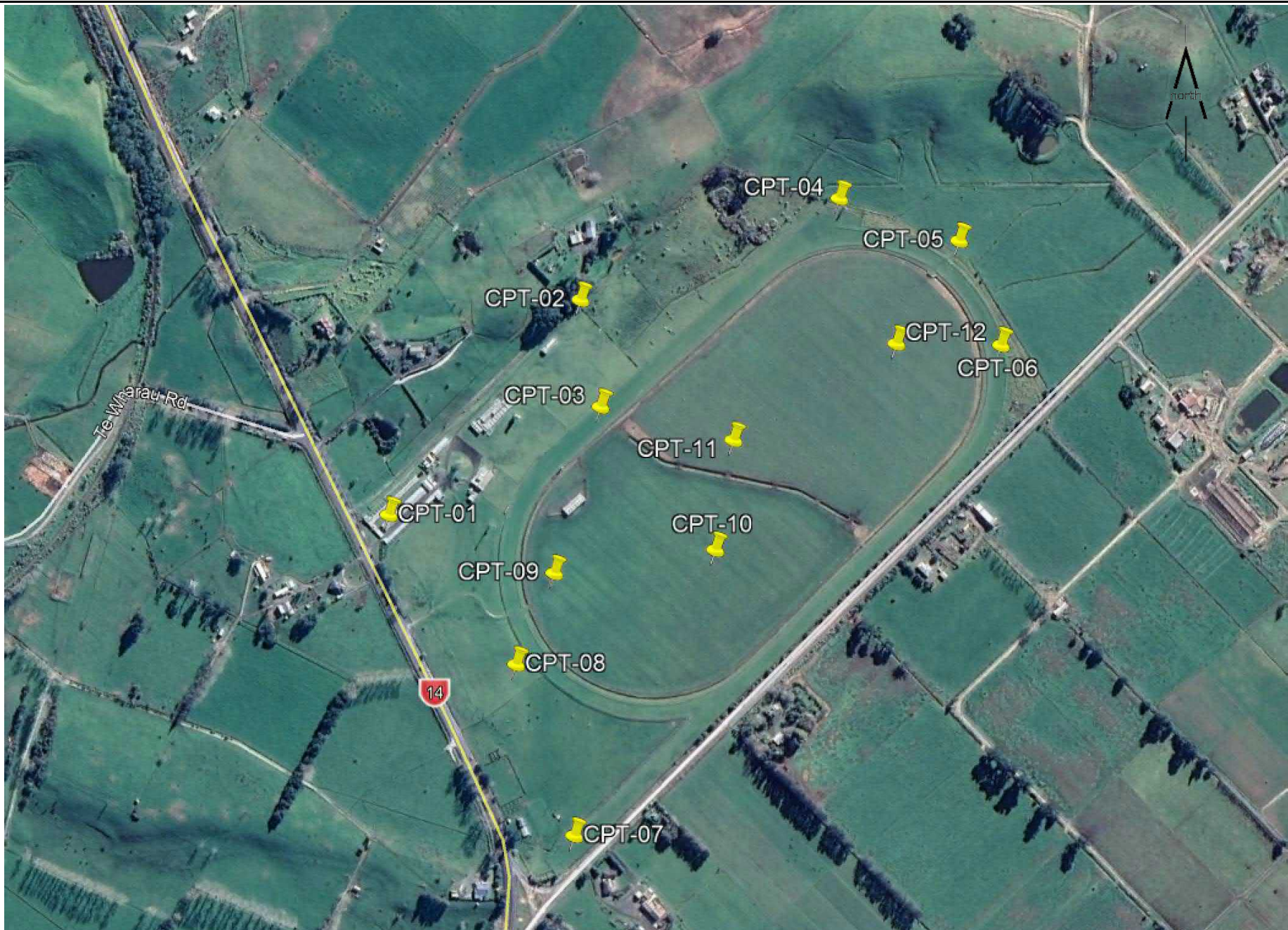
### **For and on behalf of LDE Ltd**

Report prepared by:



Gareth Harding  
*CPEng, IntPE(NZ), BE, BSc, CMEngNZ*  
*Chartered Professional Engineer (Geotech/Civil)*

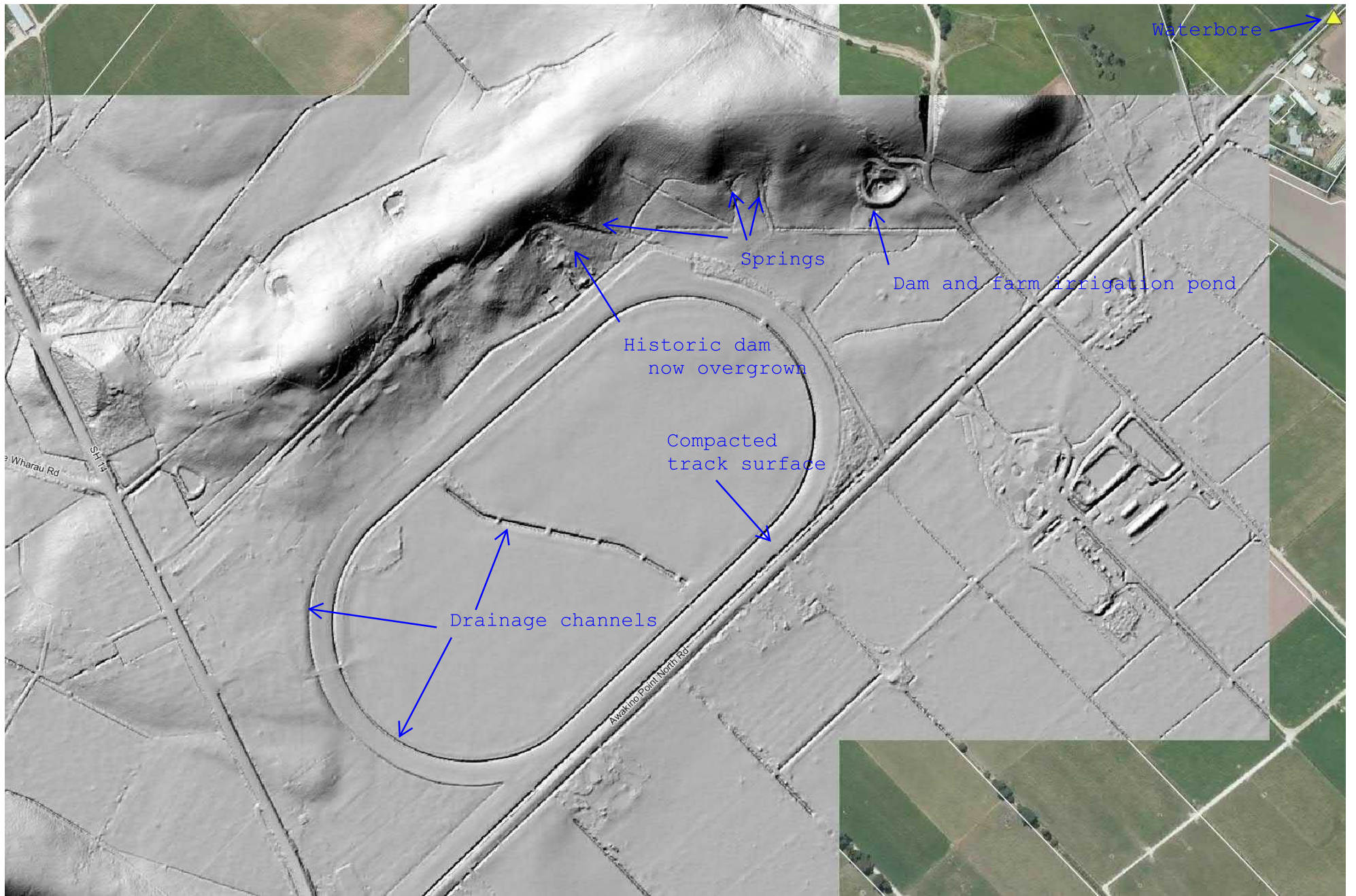
**APPENDIX A**  
**LDE DRAWINGS**



Ground Investigation Plan  
 Dargaville Racing Club



DRAWN	JC
CHECKED	GH
DATE	3/5/21
PROJECT	19457

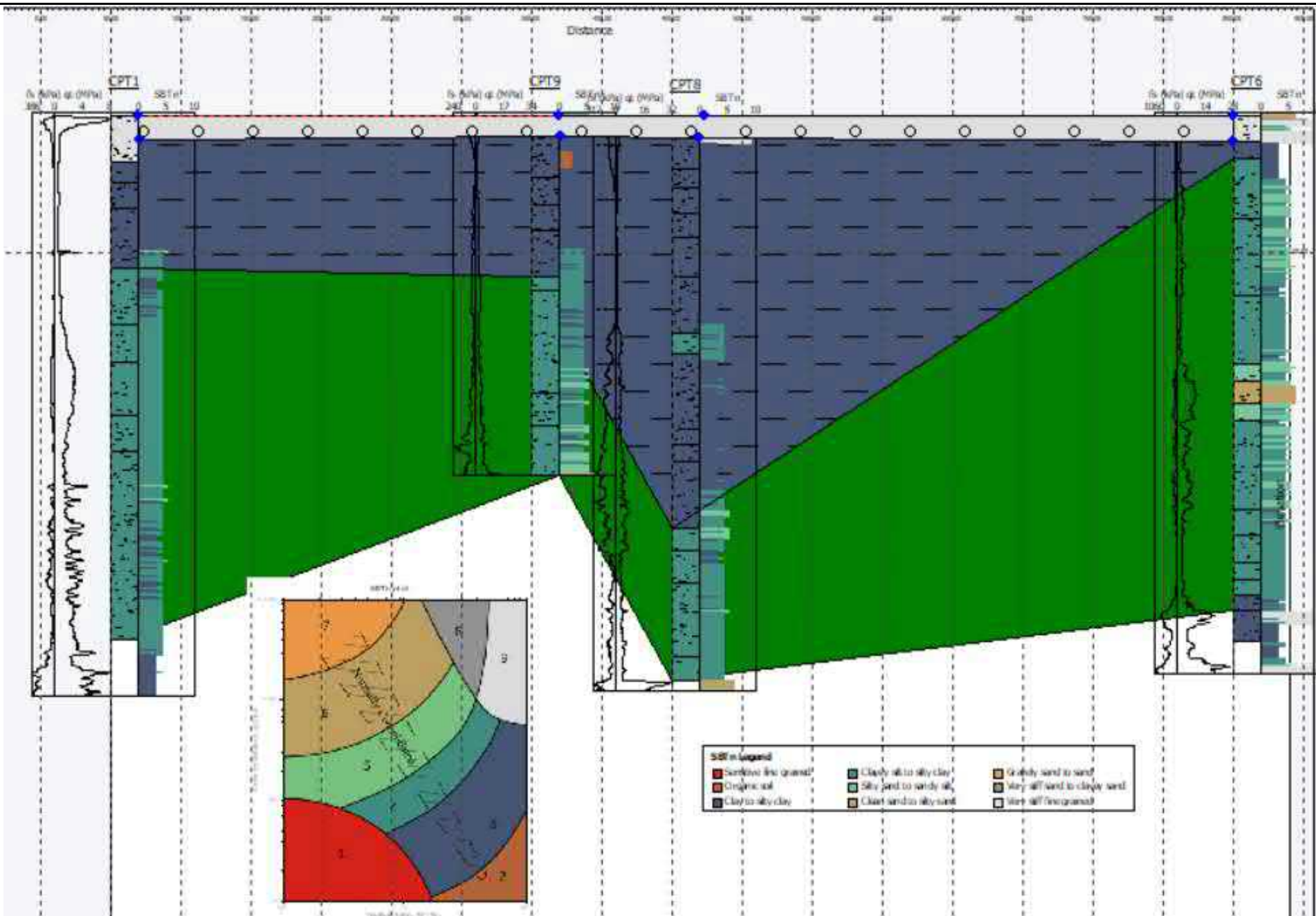


Geomorphological mapping

Dargaville Racing Club

DRAWN	GH
CHECKED	GH
DATE	3/5/21
PROJECT	19457





Geological x-section  
Dargaville Racing Club

DRAWN	JC
CHECKED	GH
DATE	3/5/21
PROJECT	19457

## **APPENDIX B**

### **INVESTIGATION DATA & LIQUEFACTION ANALYSIS**

**LIQUEFACTION ANALYSIS REPORT**

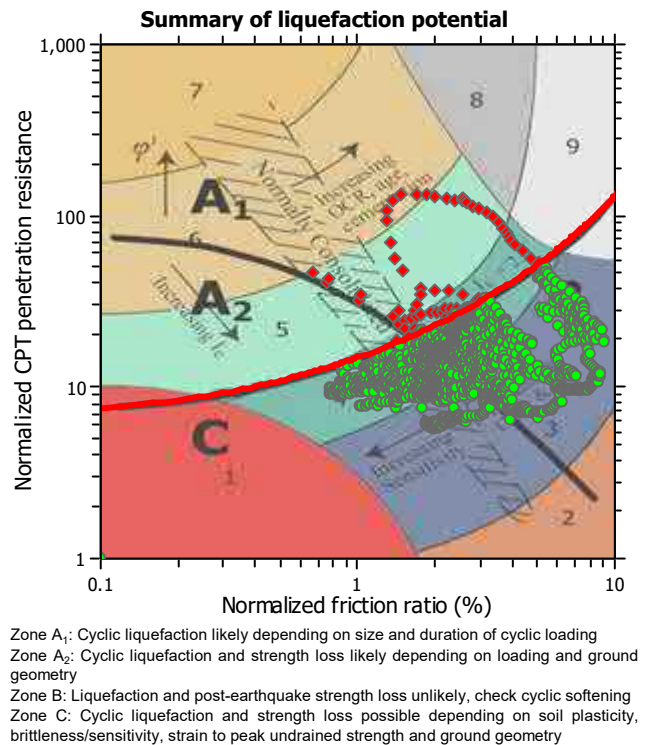
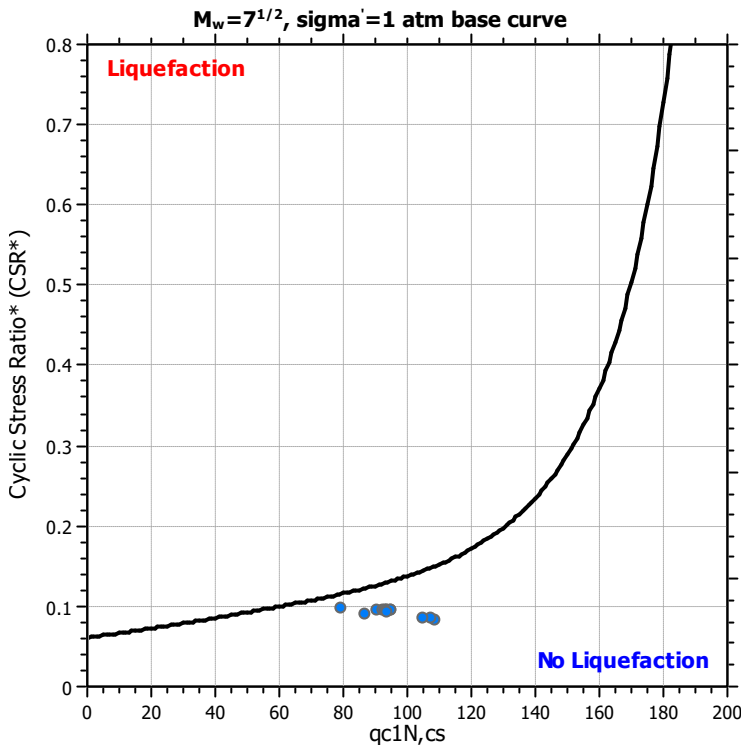
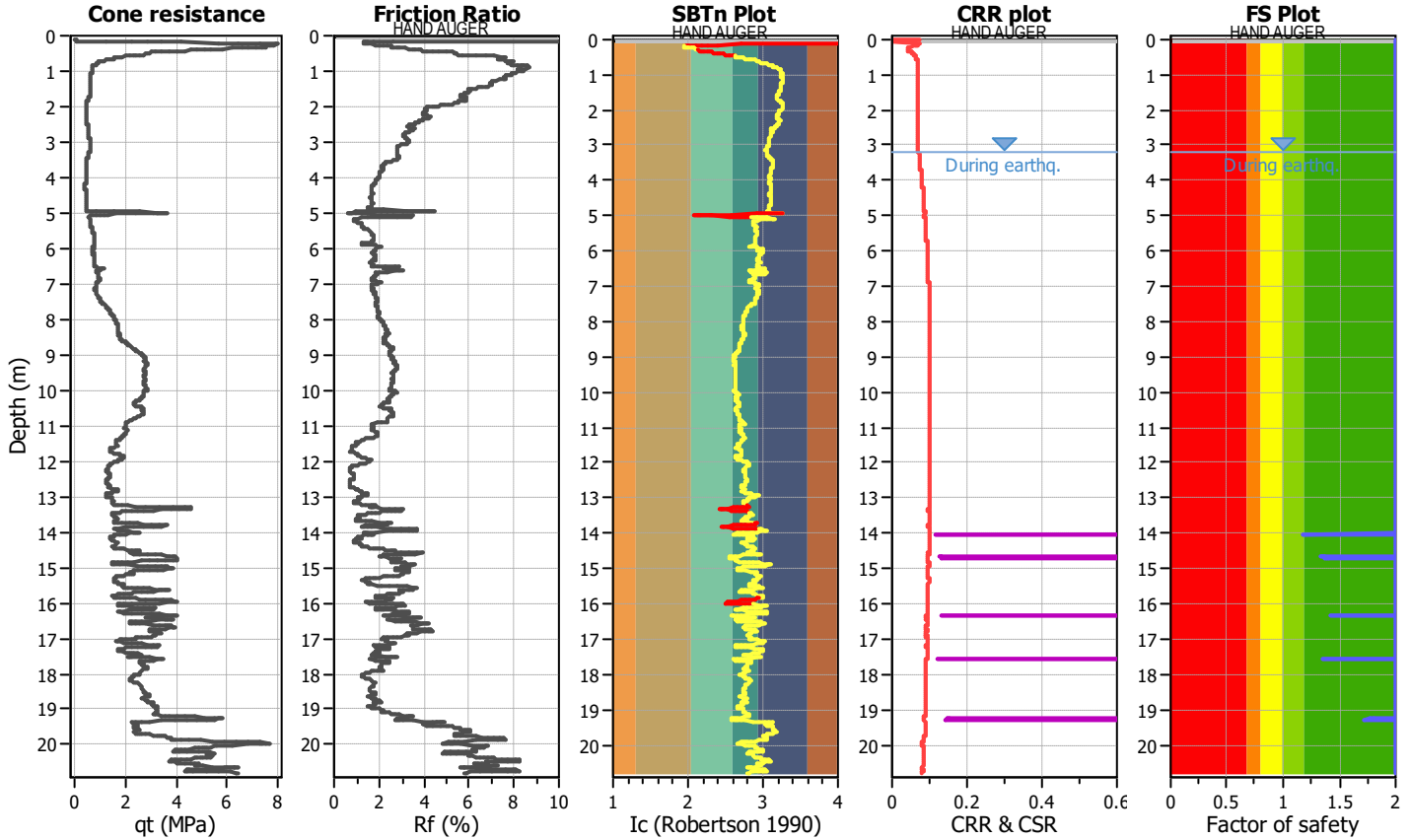
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

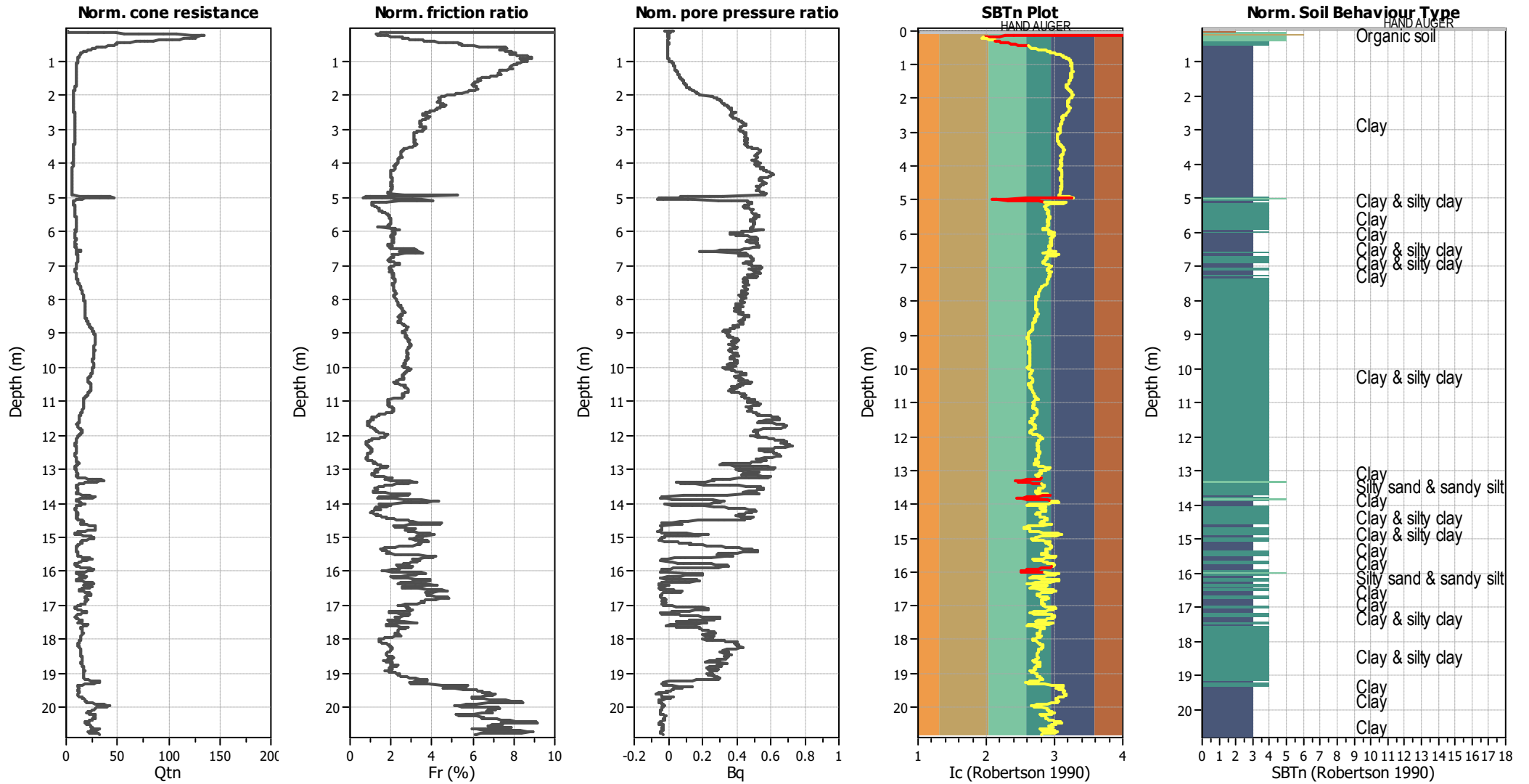
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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_g$ applied:	Yes		



### CPT basic interpretation plots (normalized)



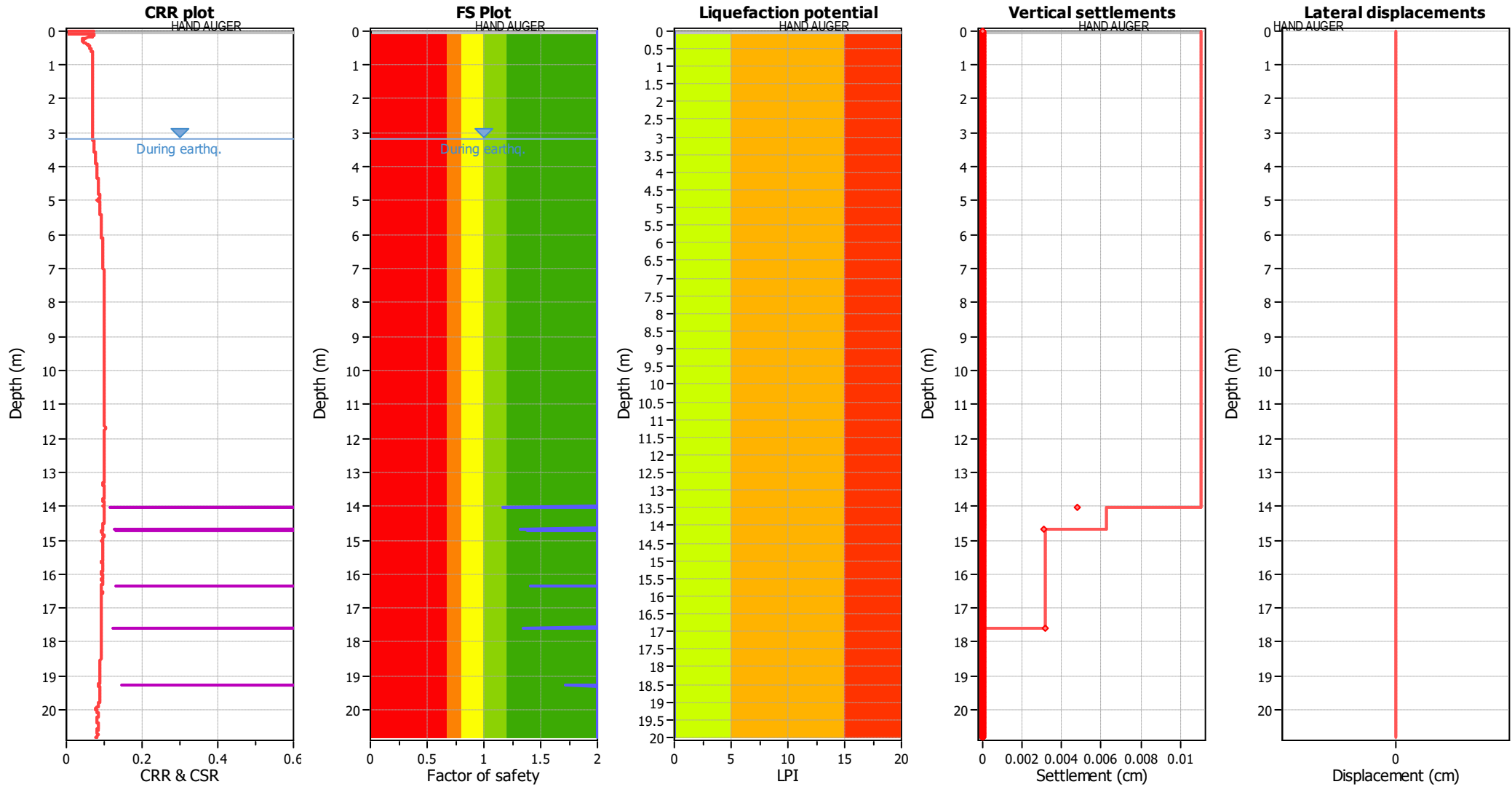
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Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.19 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	3.19 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_f$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.19 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

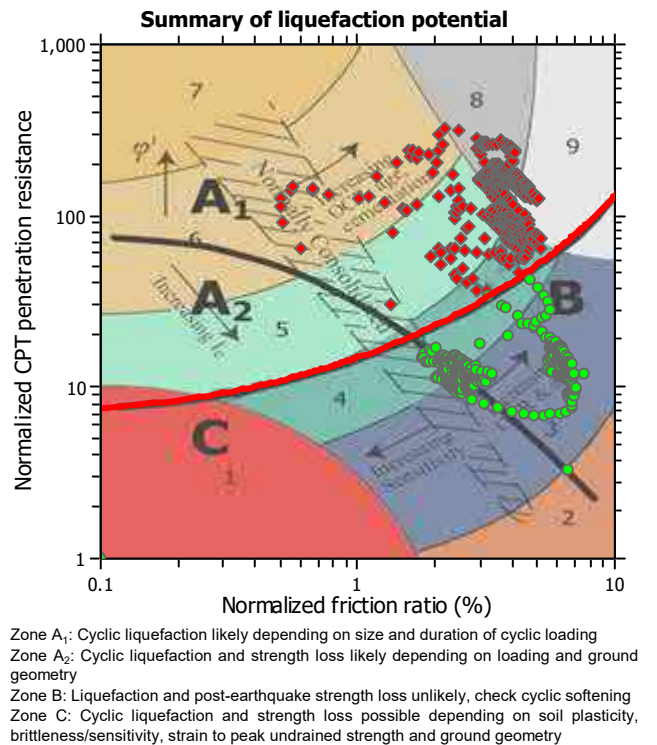
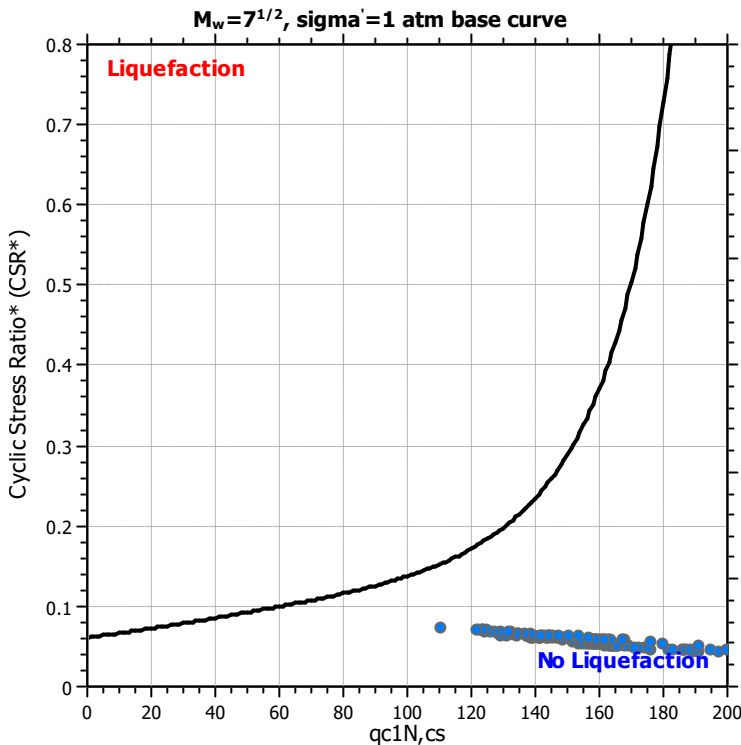
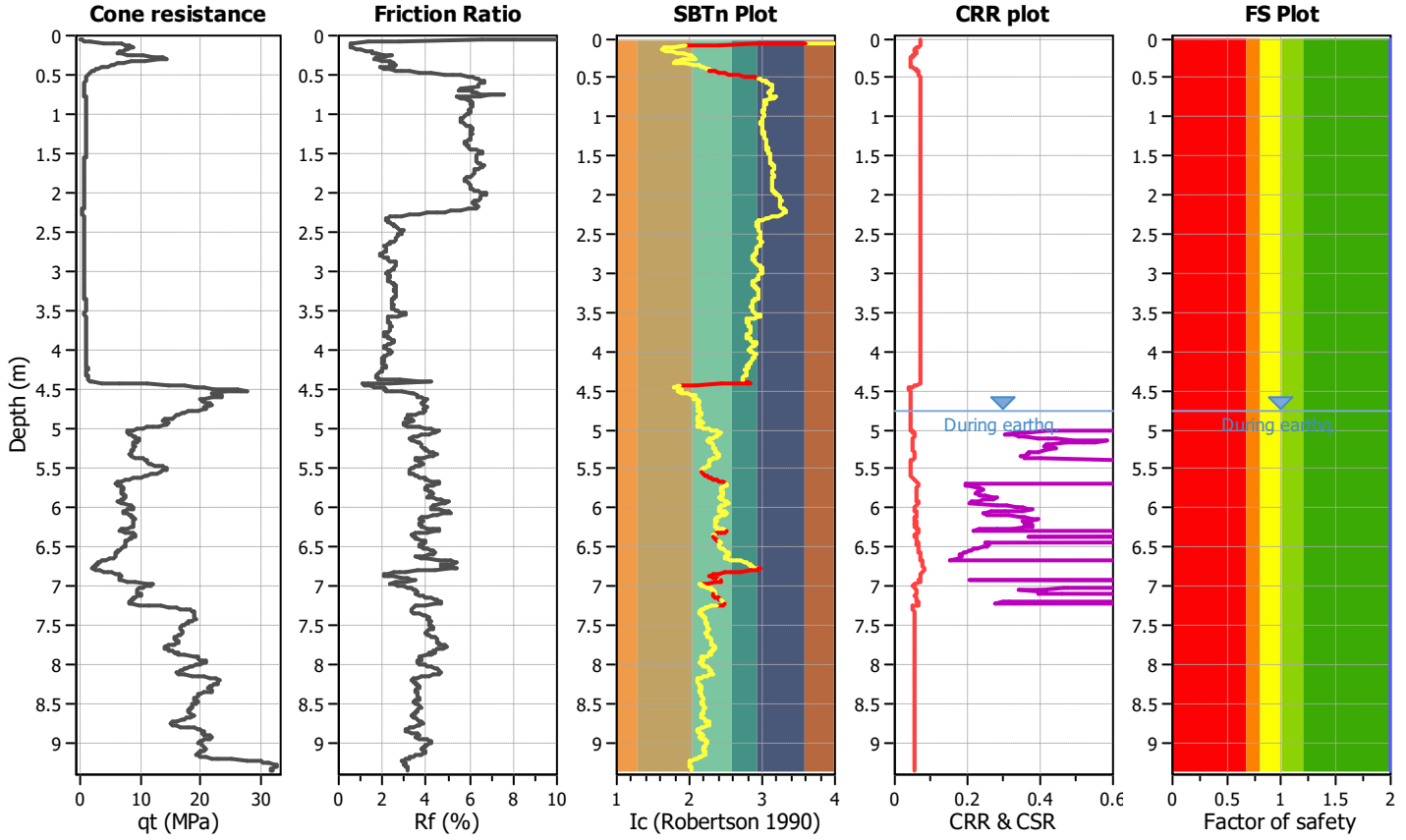
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

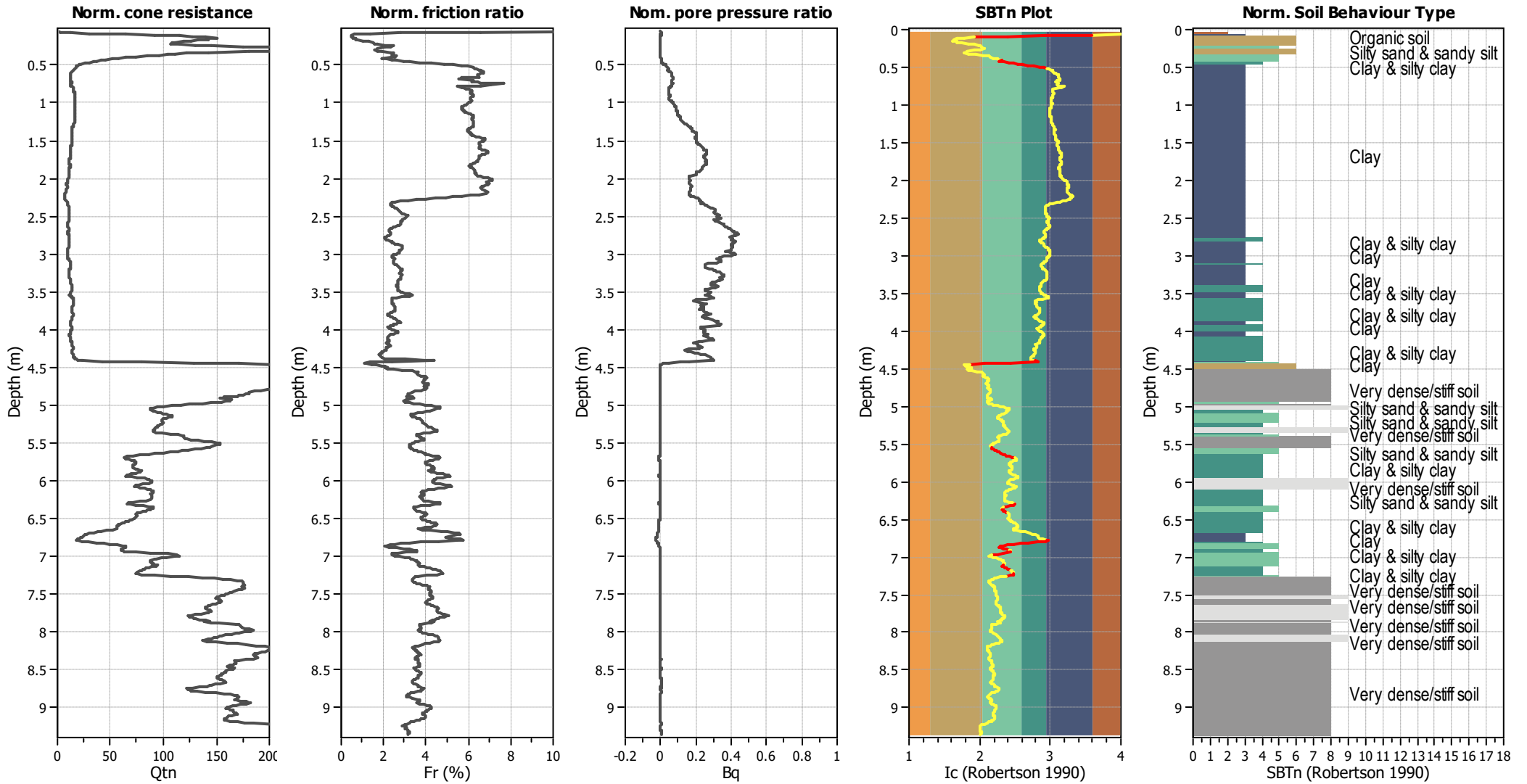
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### CPT basic interpretation plots (normalized)



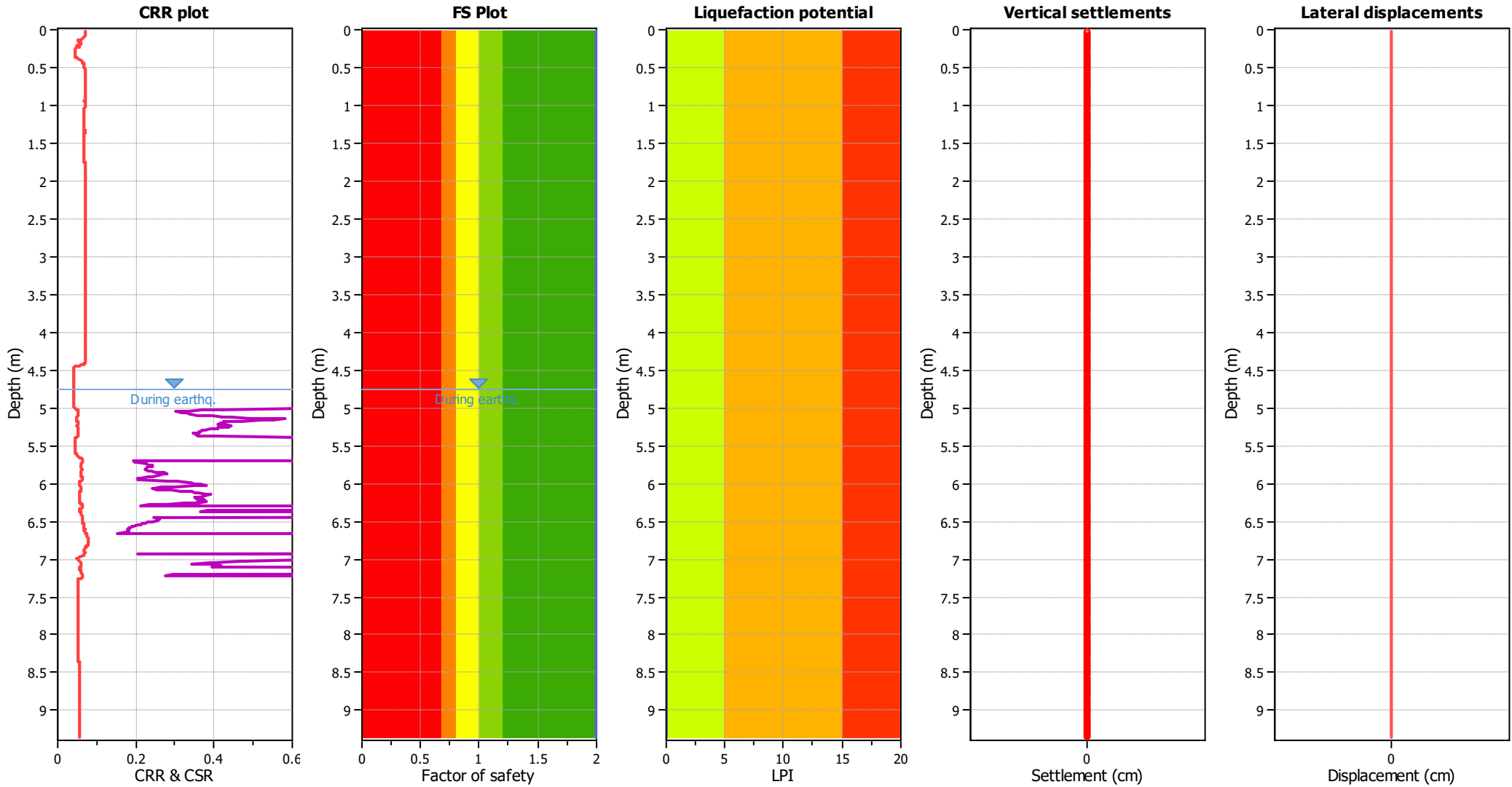
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Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>q</sub> applied:	Yes
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Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	4.76 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	4.76 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	4.76 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

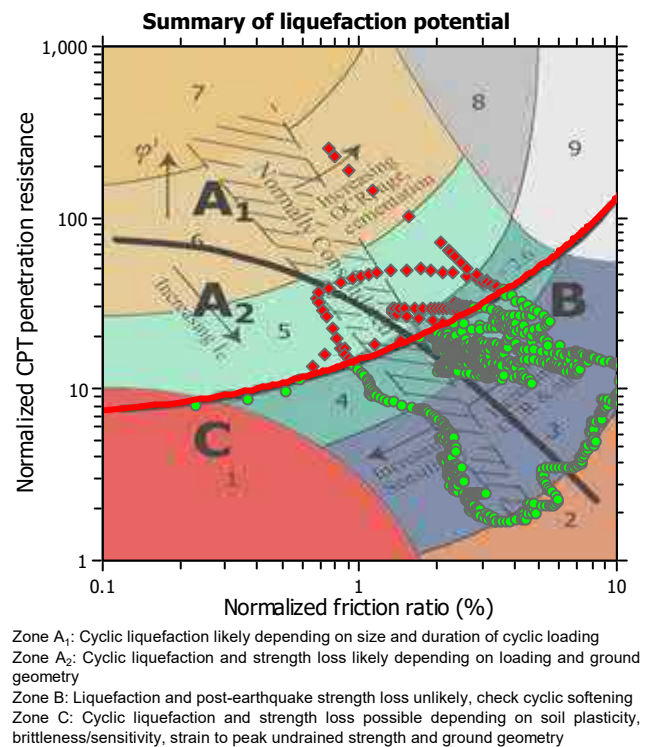
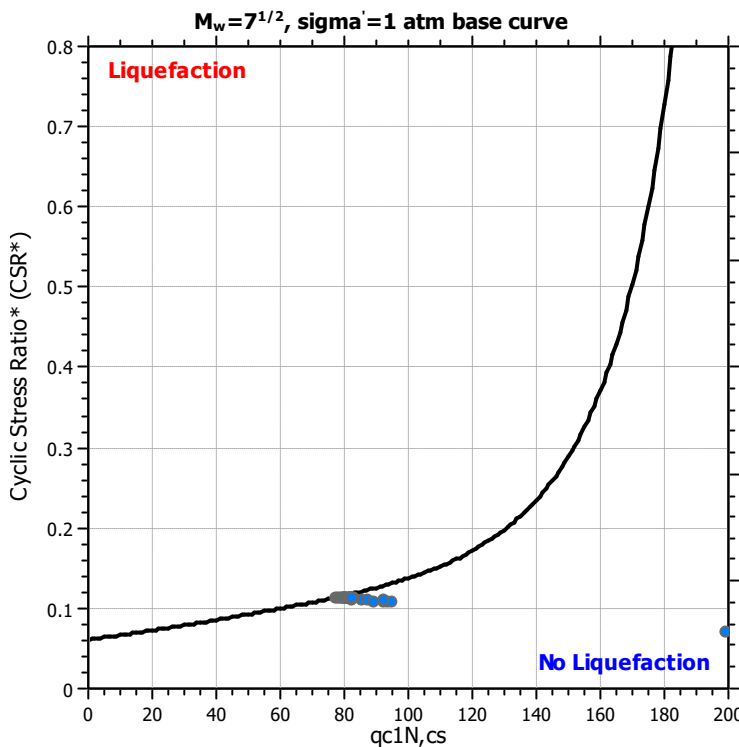
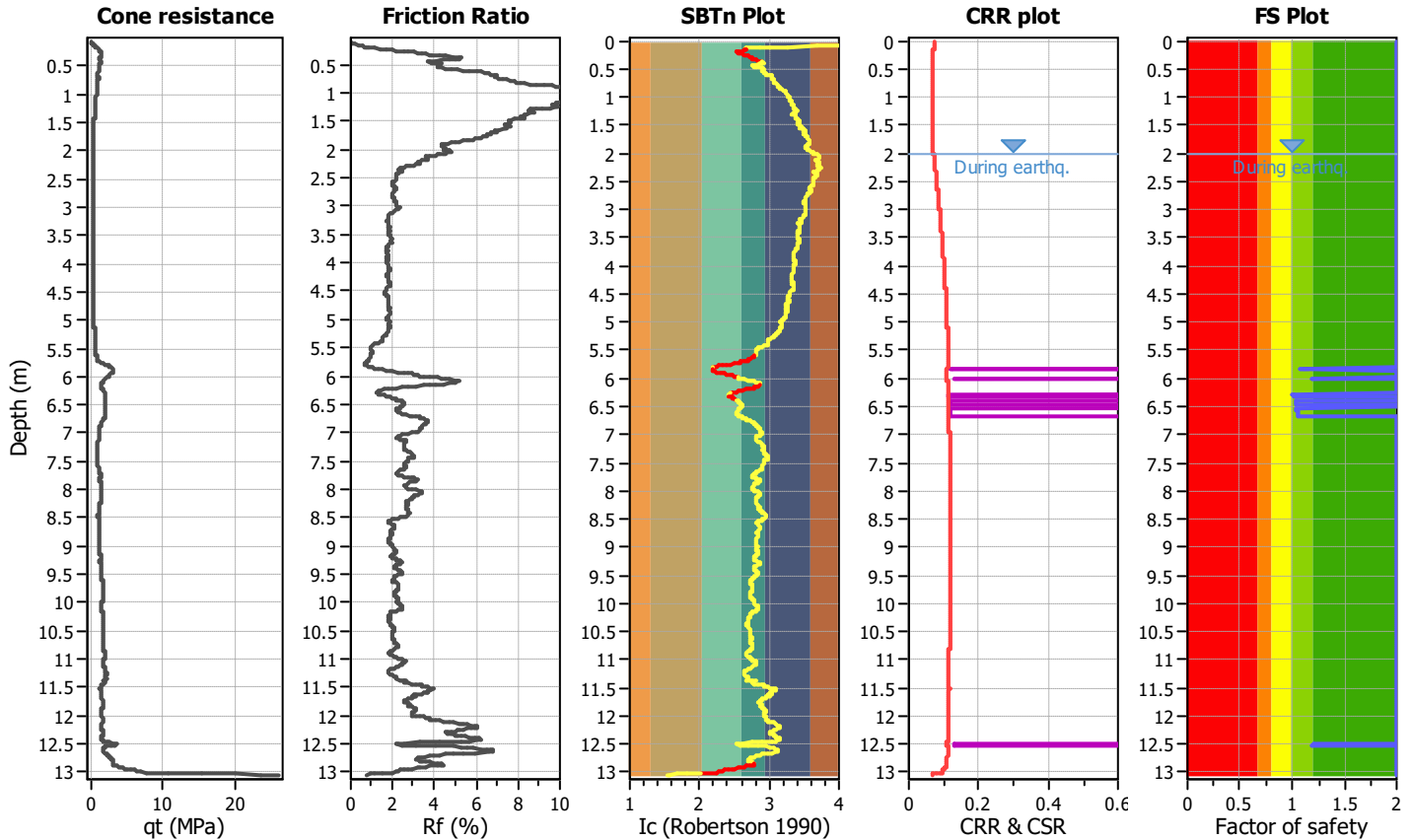
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

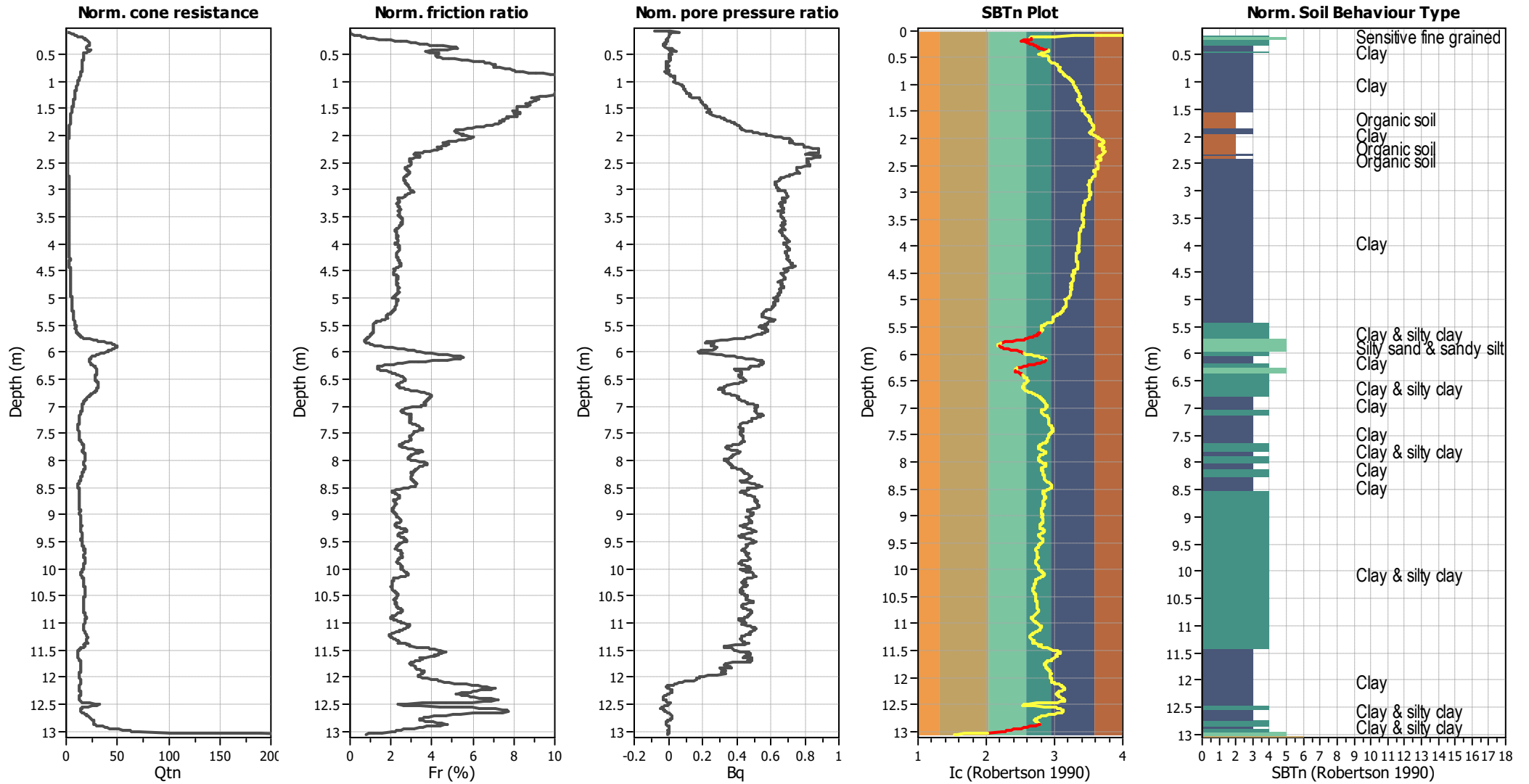
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### CPT basic interpretation plots (normalized)



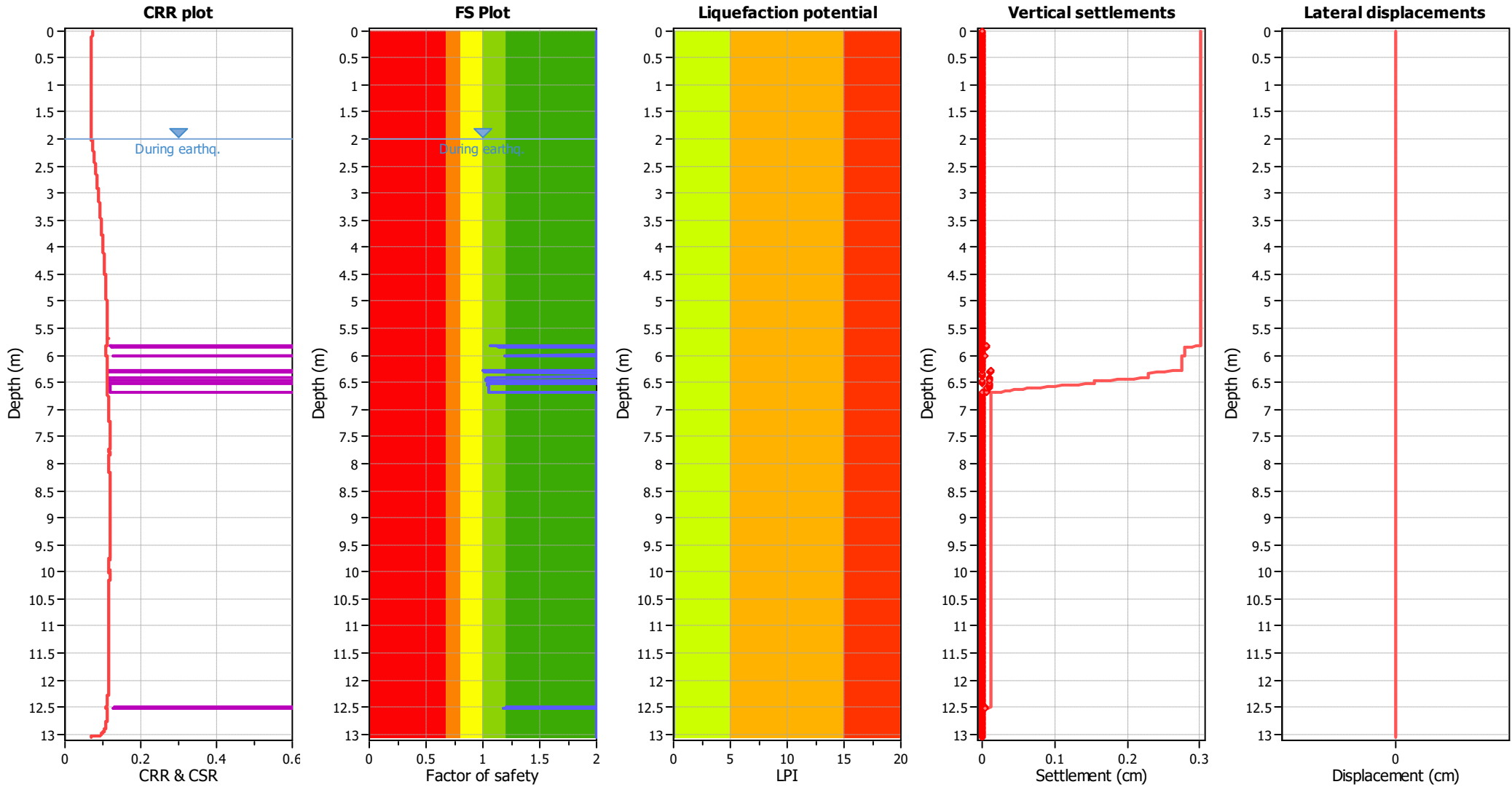
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Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GW (earthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

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- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

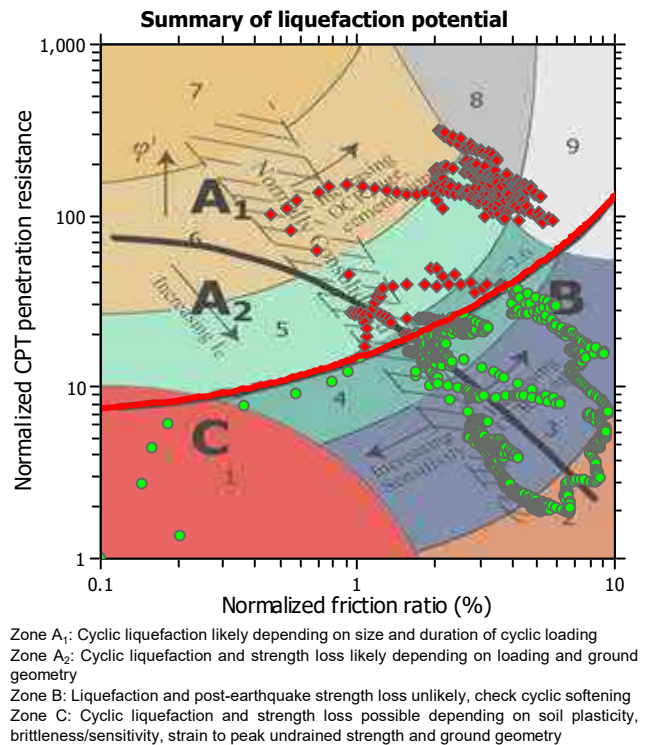
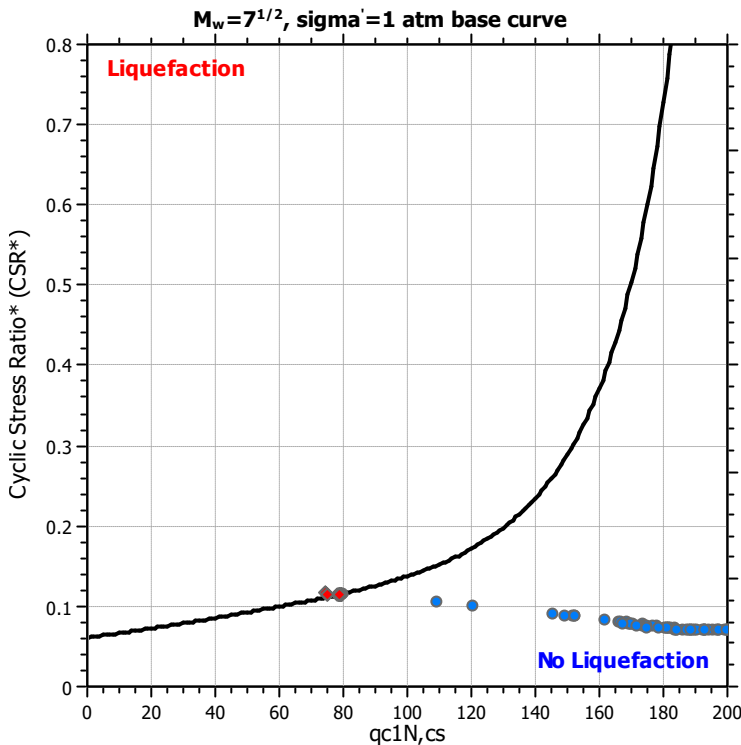
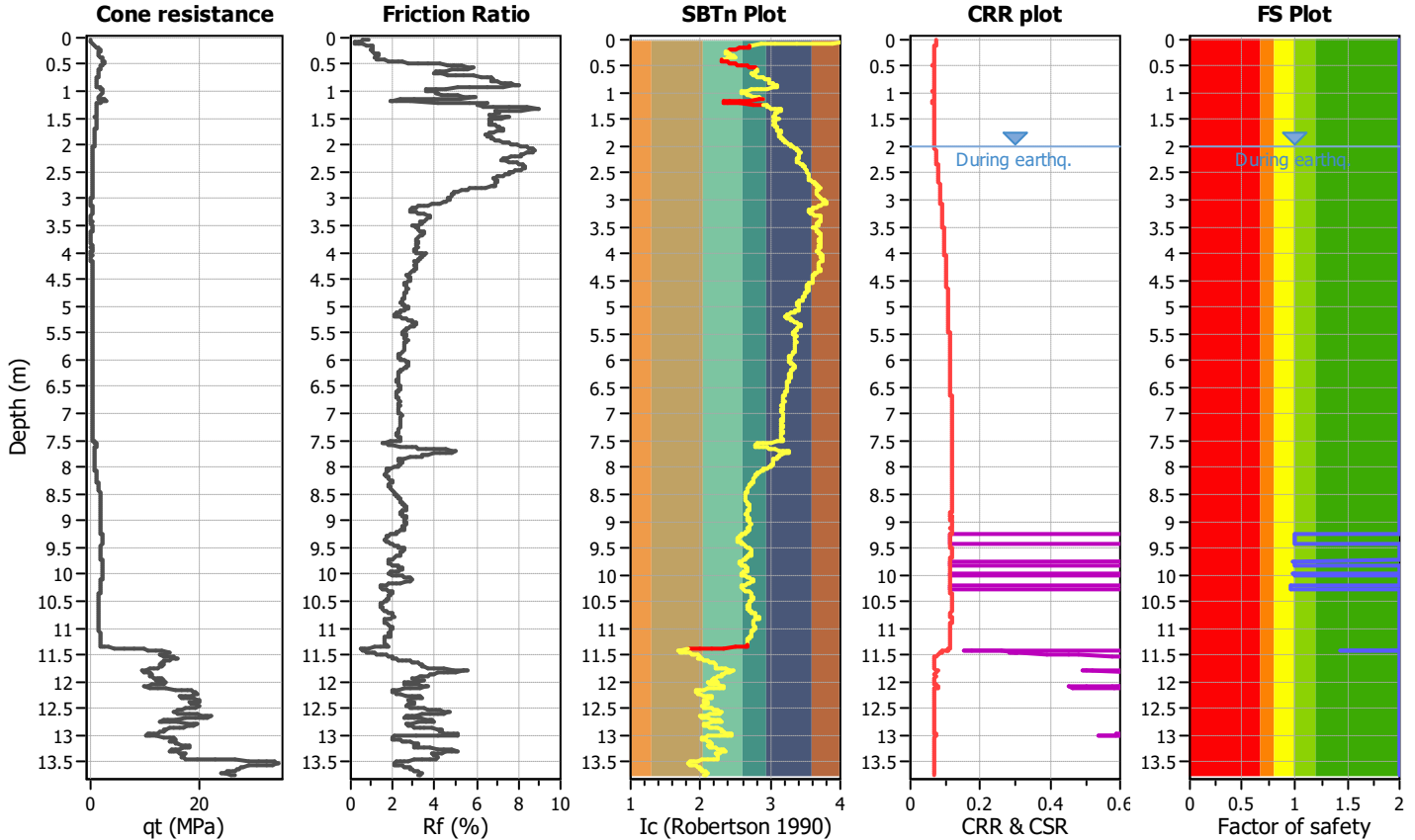
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

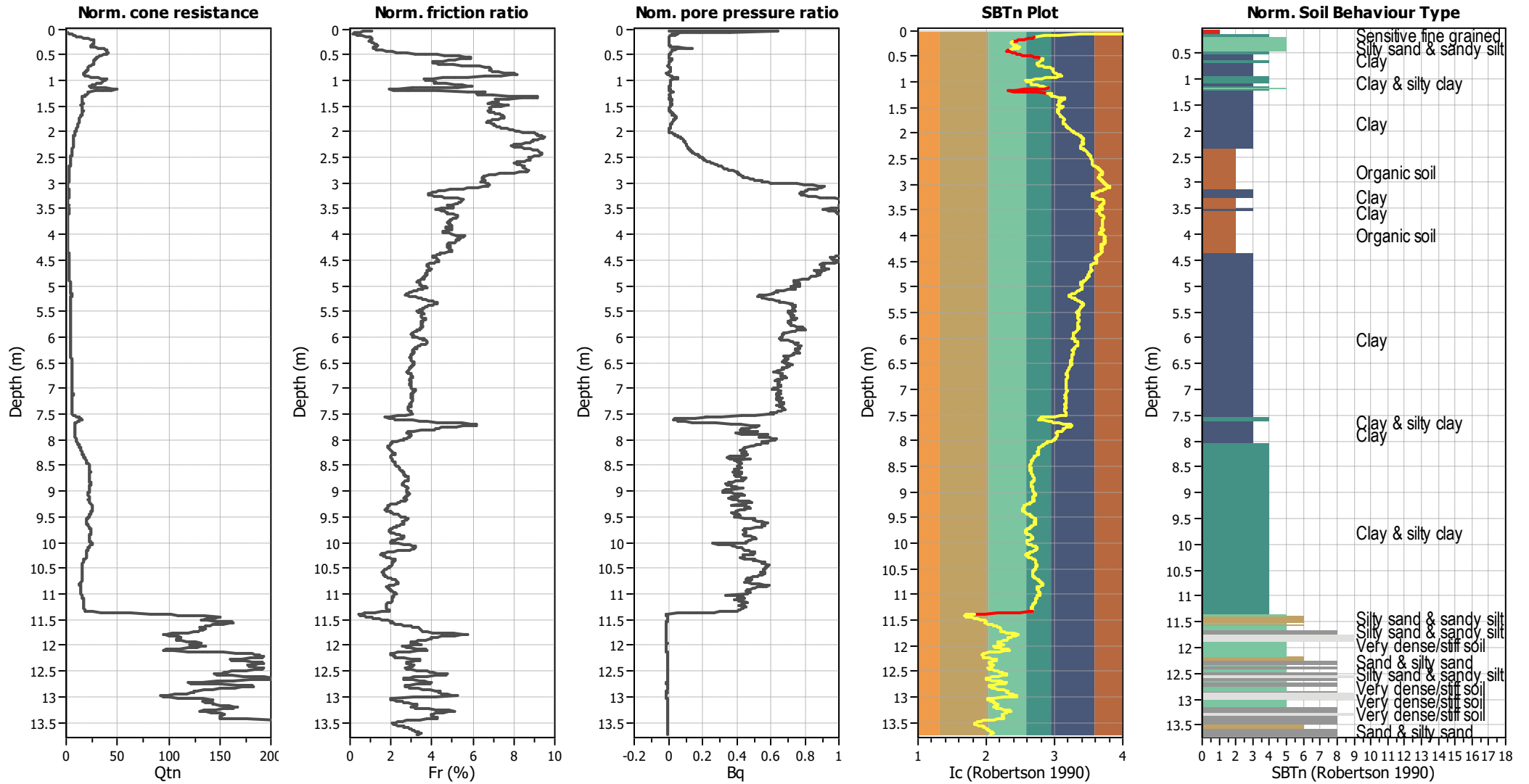
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Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
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Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_g$ applied:	Yes		



### CPT basic interpretation plots (normalized)



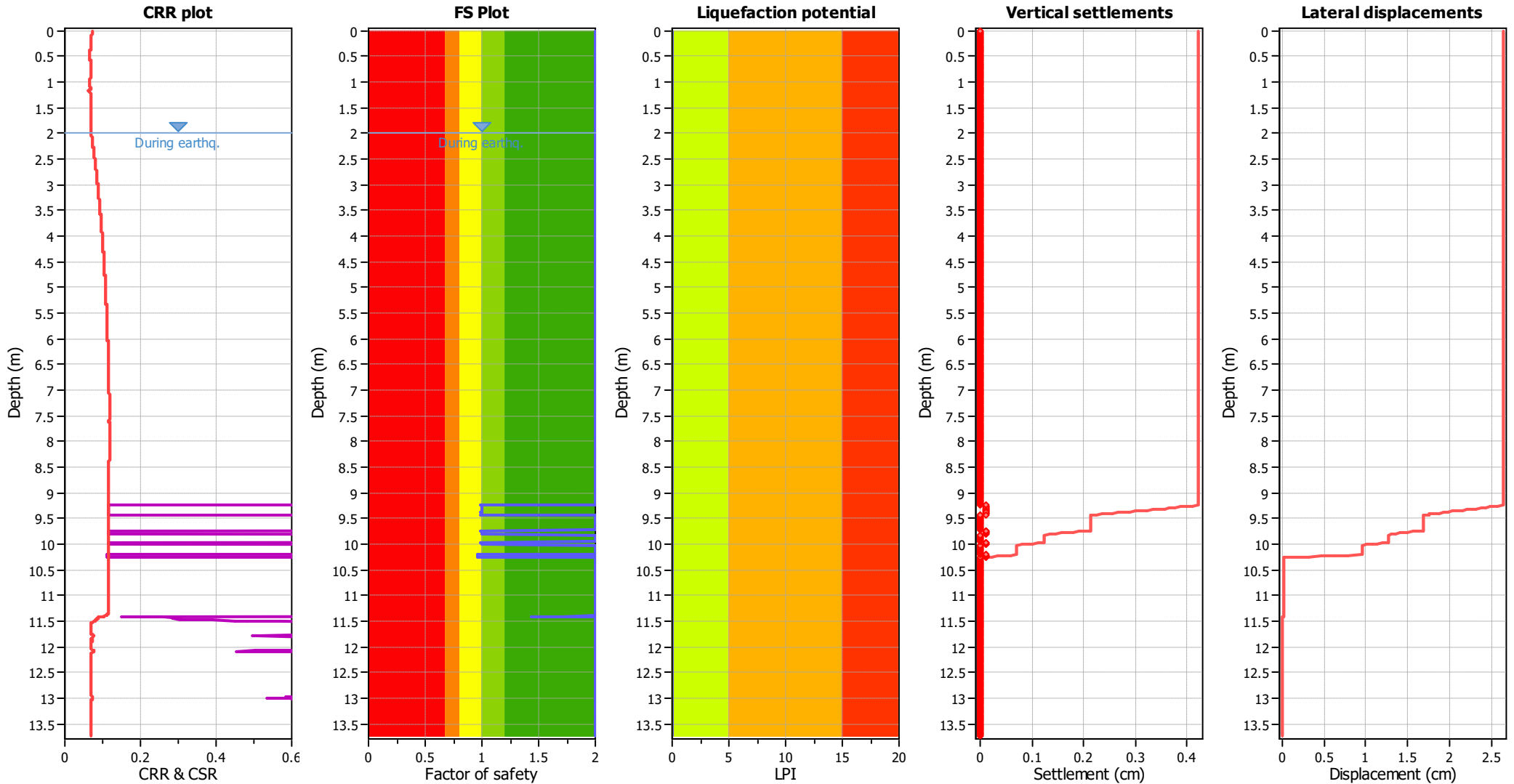
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Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

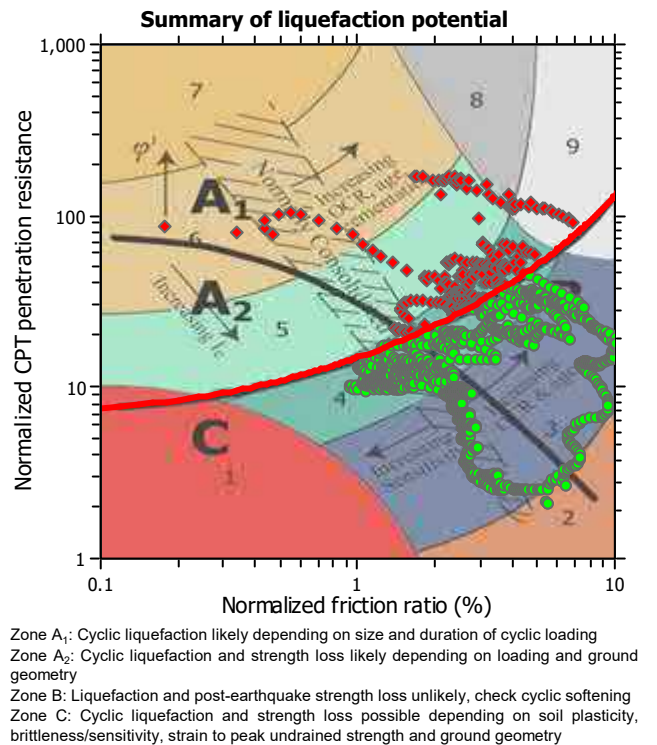
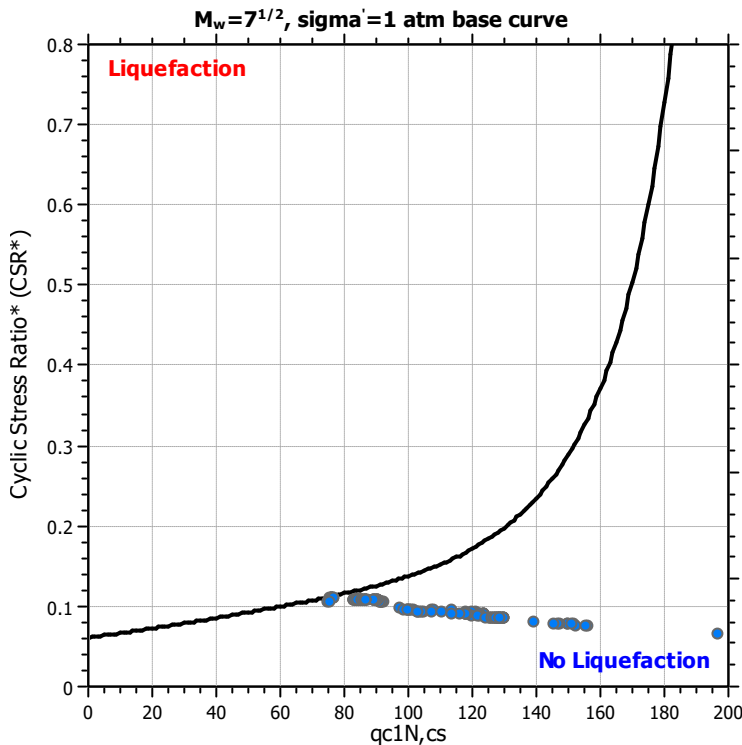
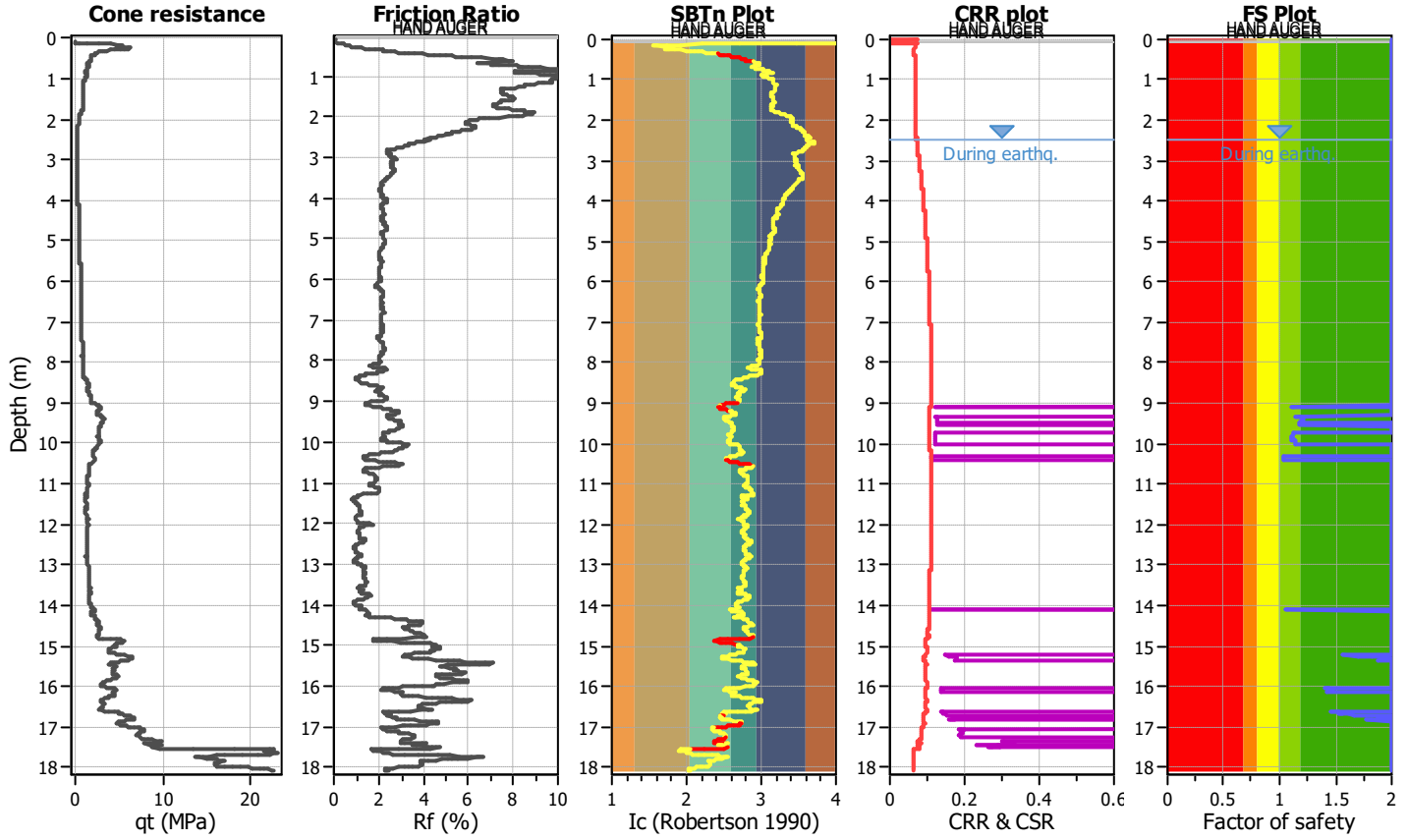
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

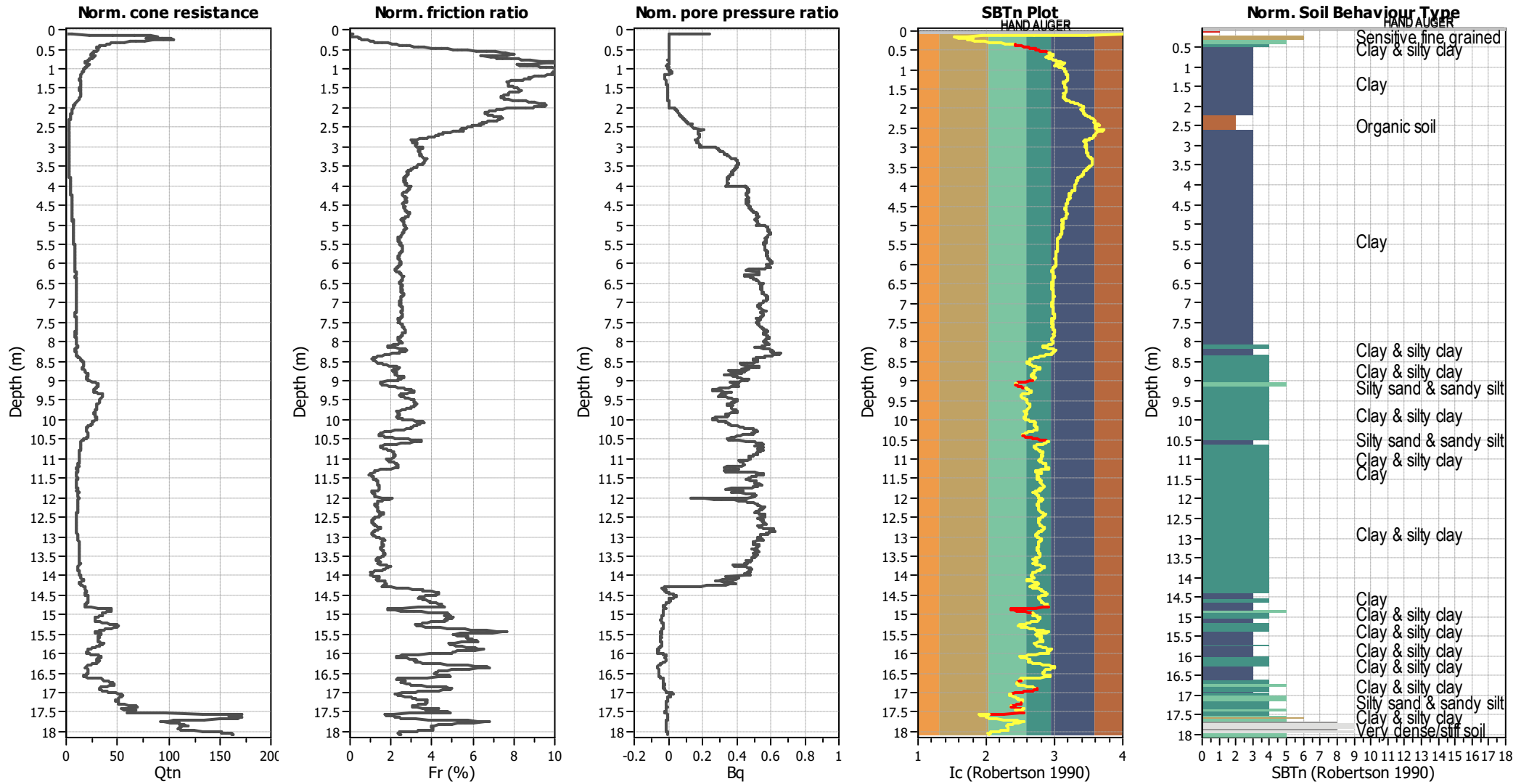
**CPT file : CPT5**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.50 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method



### CPT basic interpretation plots (normalized)



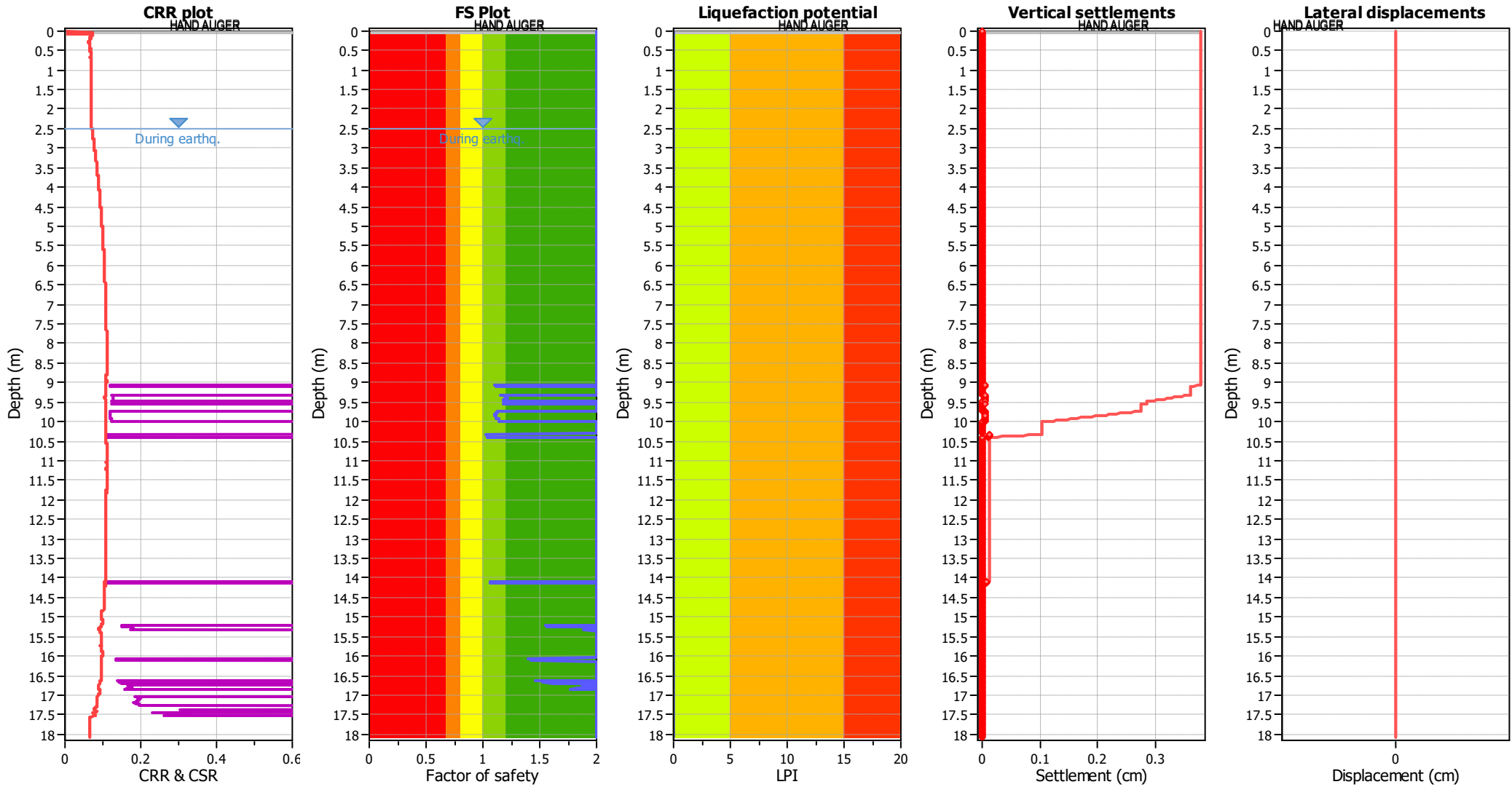
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.50 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.50 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.50 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.50 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

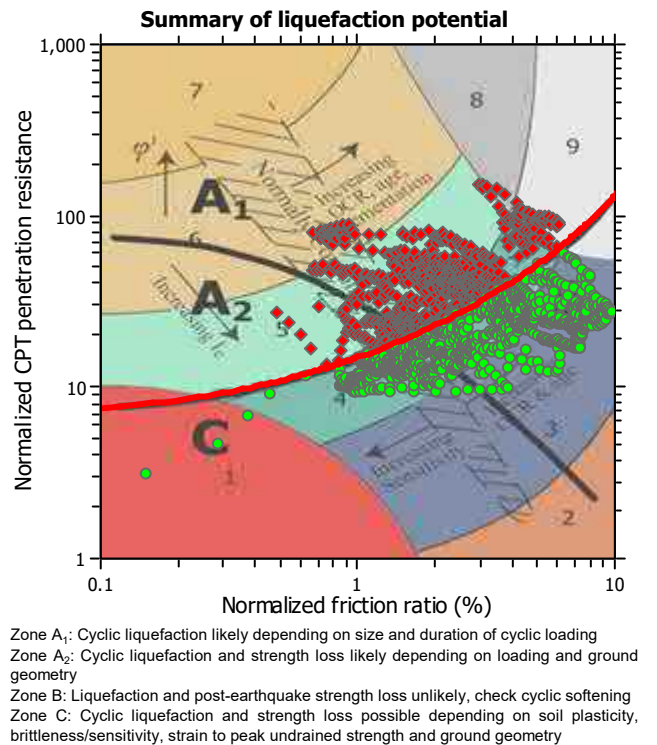
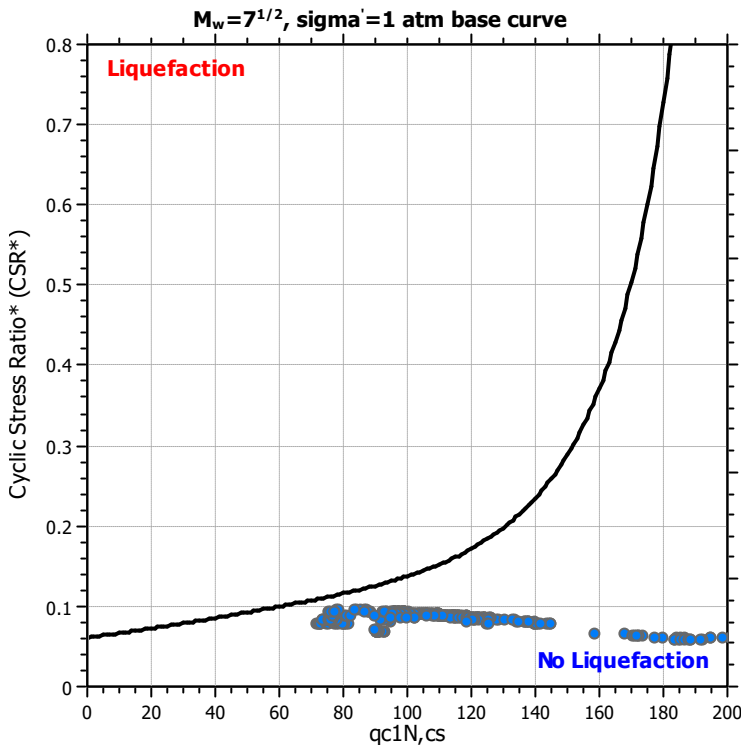
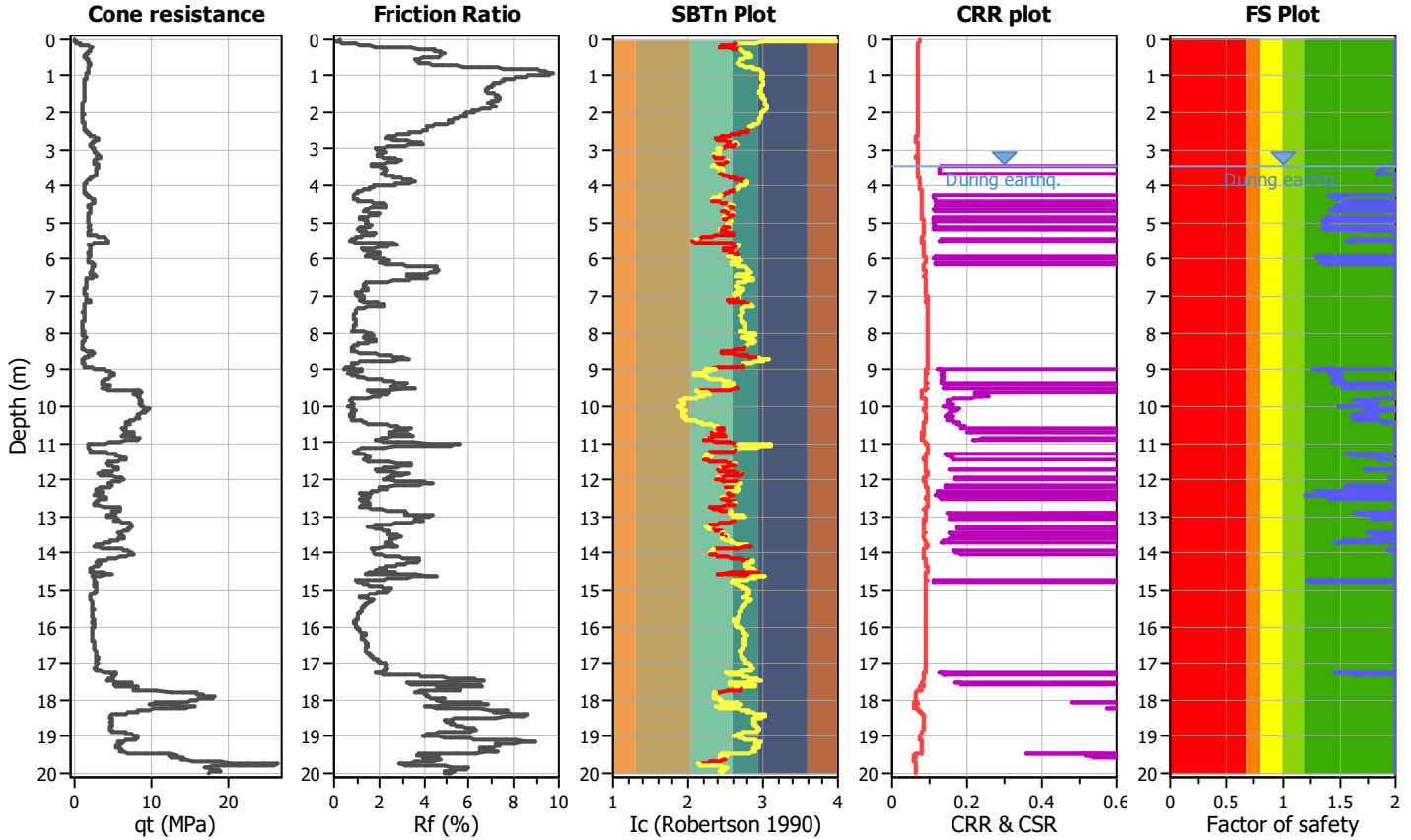
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

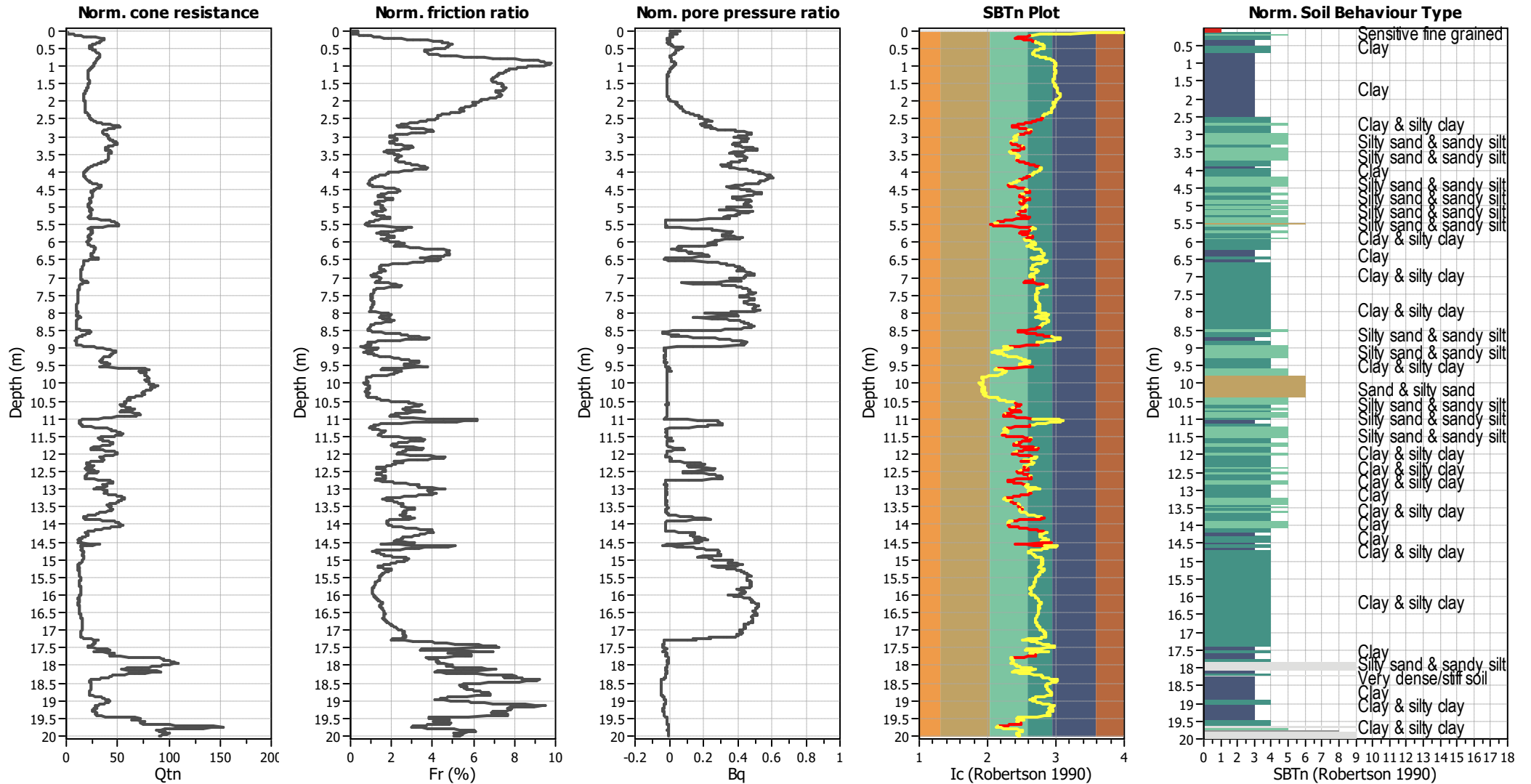
**CPT file : CPT6**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.45 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.45 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_g$ applied:	Yes		



### CPT basic interpretation plots (normalized)



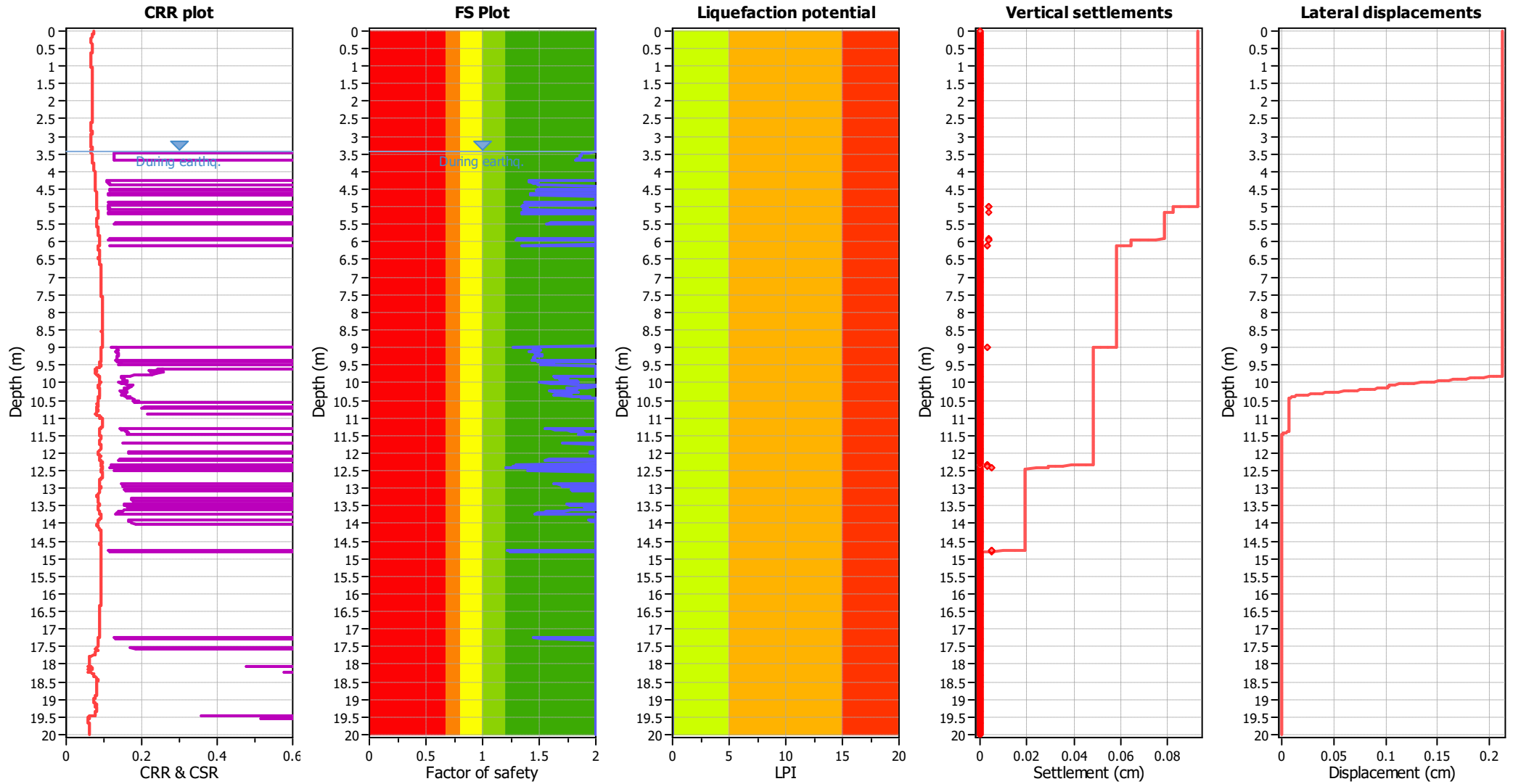
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.45 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.45 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.45 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.45 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

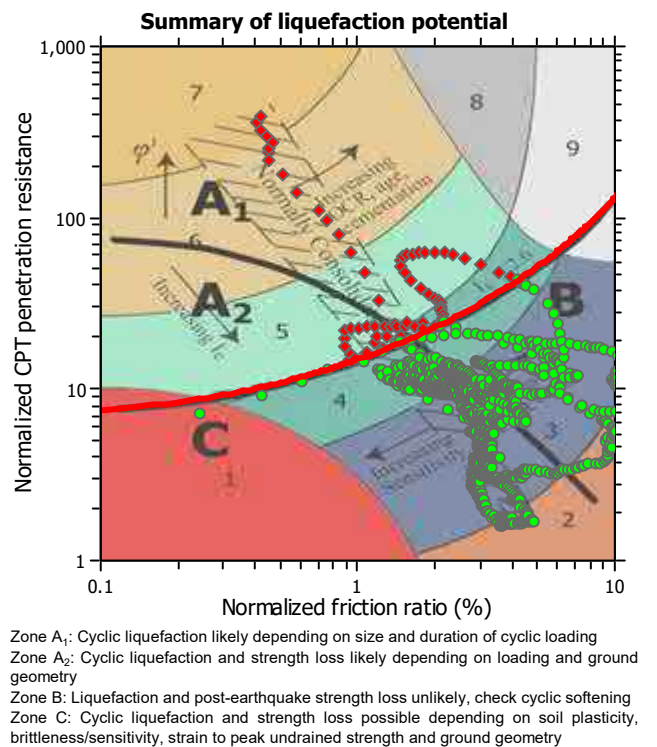
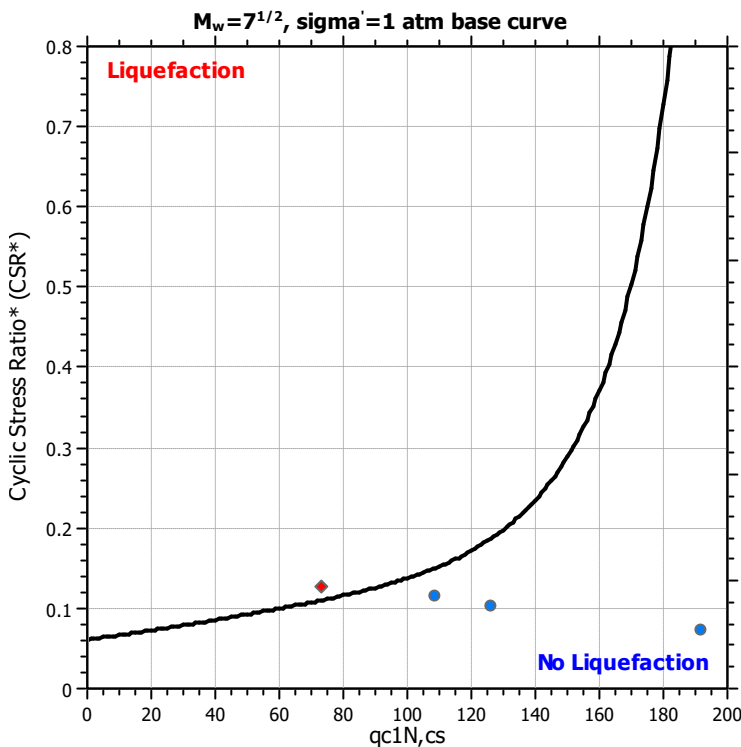
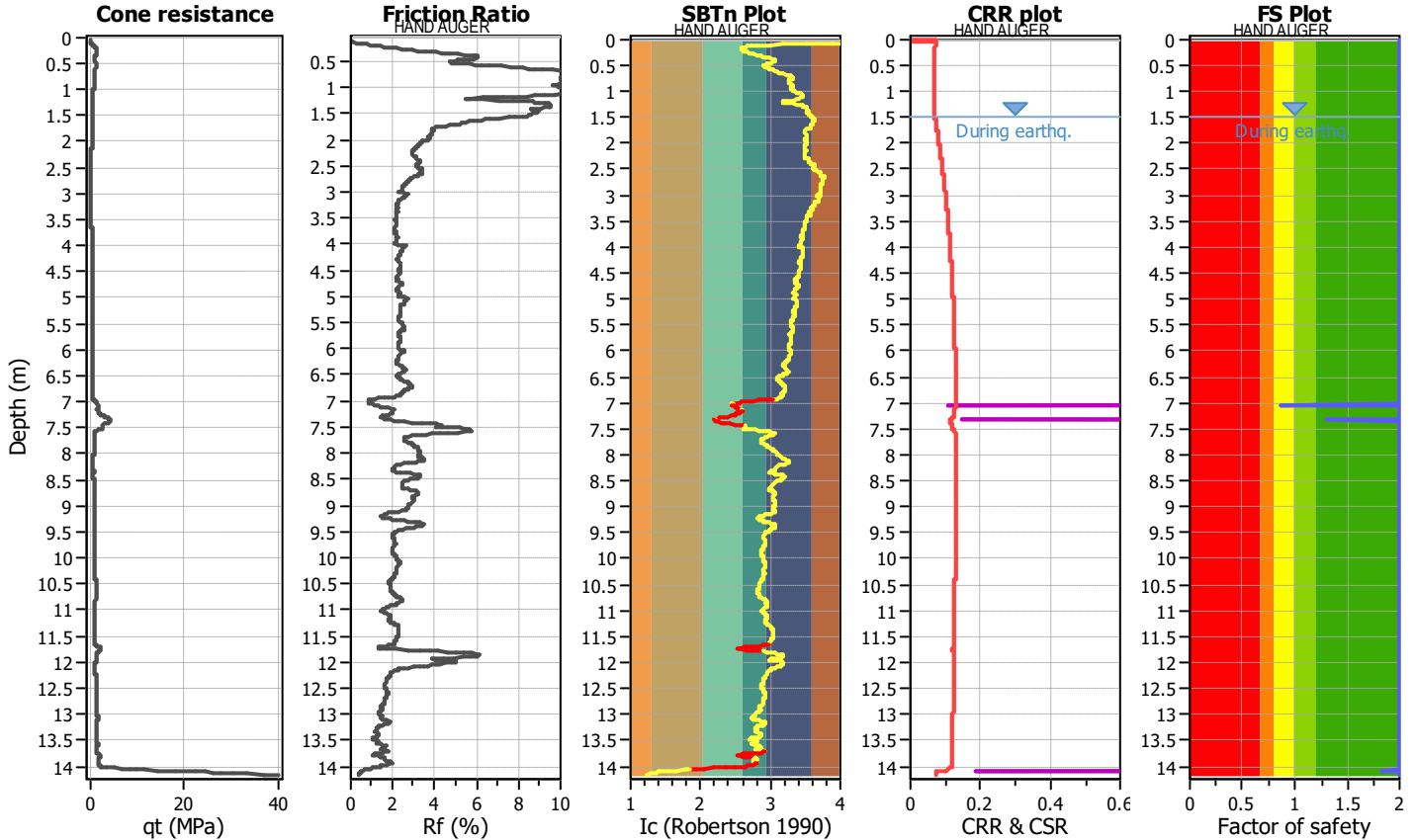
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

**CPT file : CPT7**

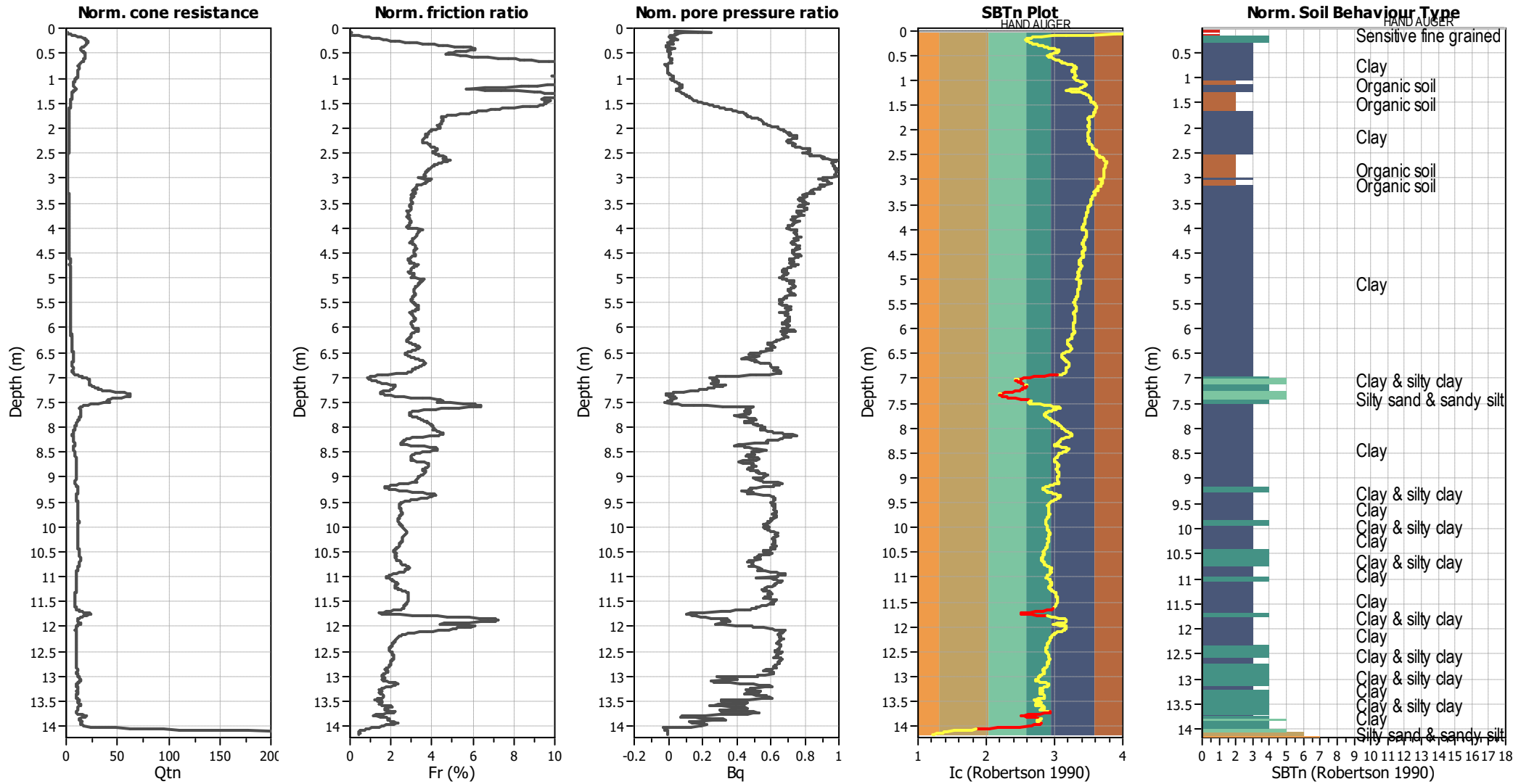
**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.50 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method



Zone A<sub>1</sub>: Cyclic liquefaction likely depending on size and duration of cyclic loading  
 Zone A<sub>2</sub>: Cyclic liquefaction and strength loss likely depending on loading and ground geometry  
 Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening  
 Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

### CPT basic interpretation plots (normalized)



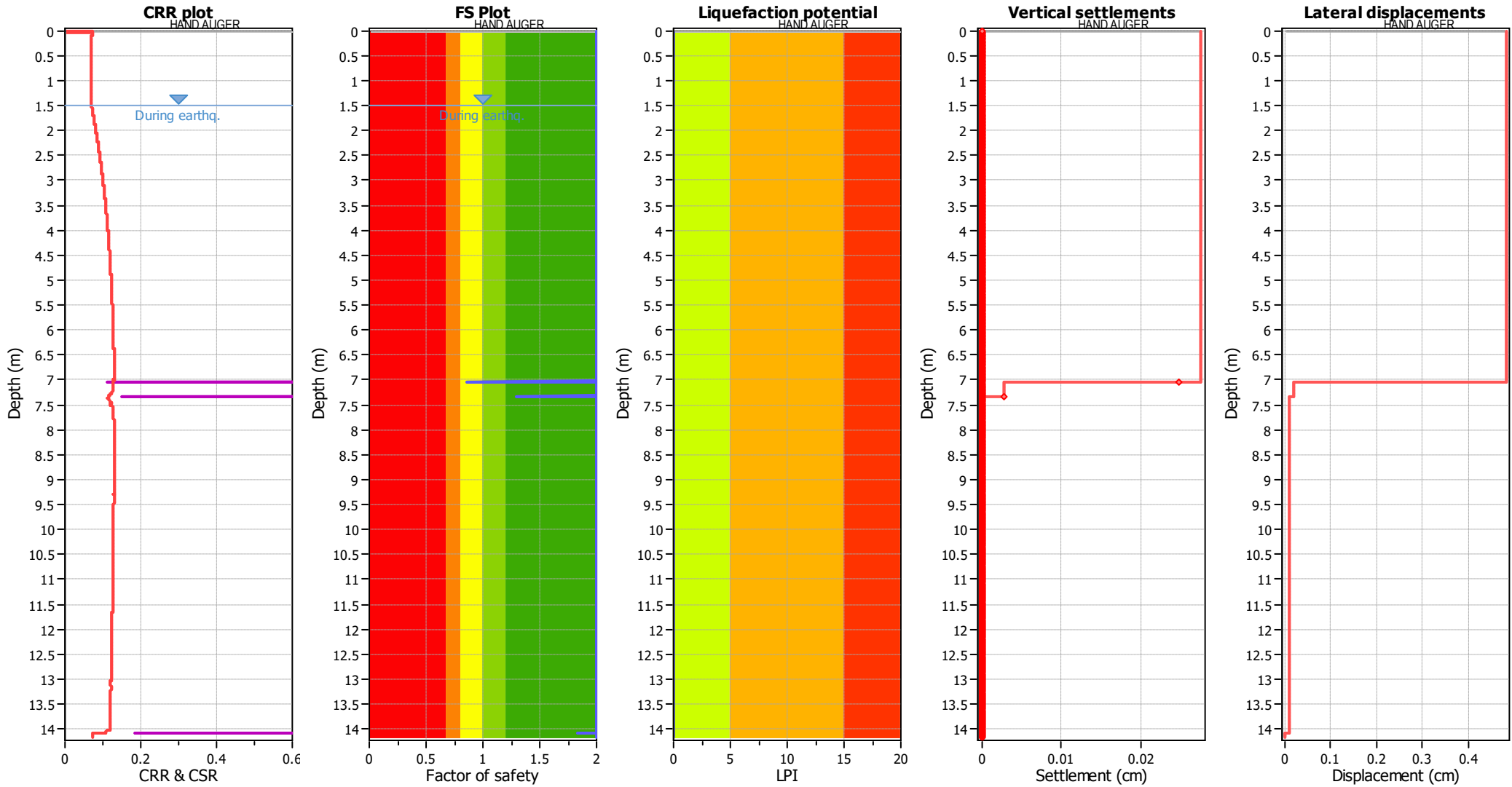
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.50 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.50 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	1.50 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.50 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

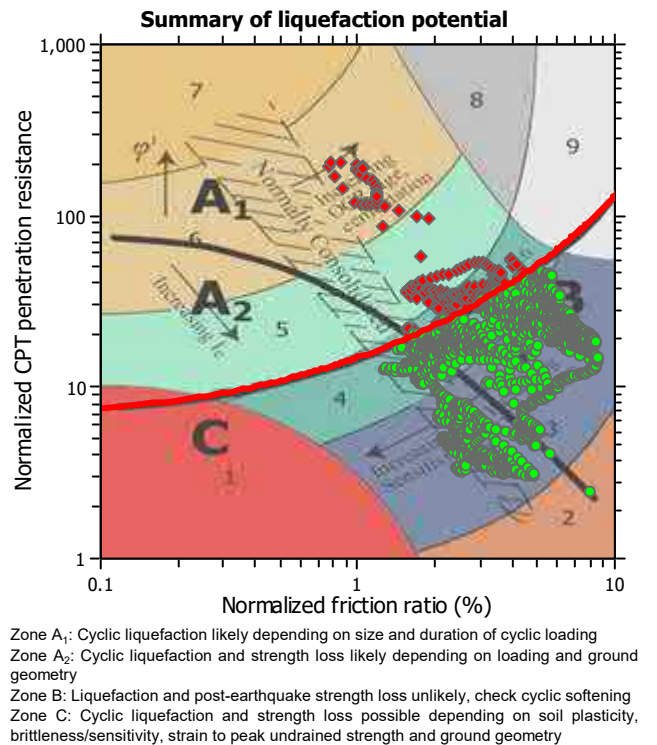
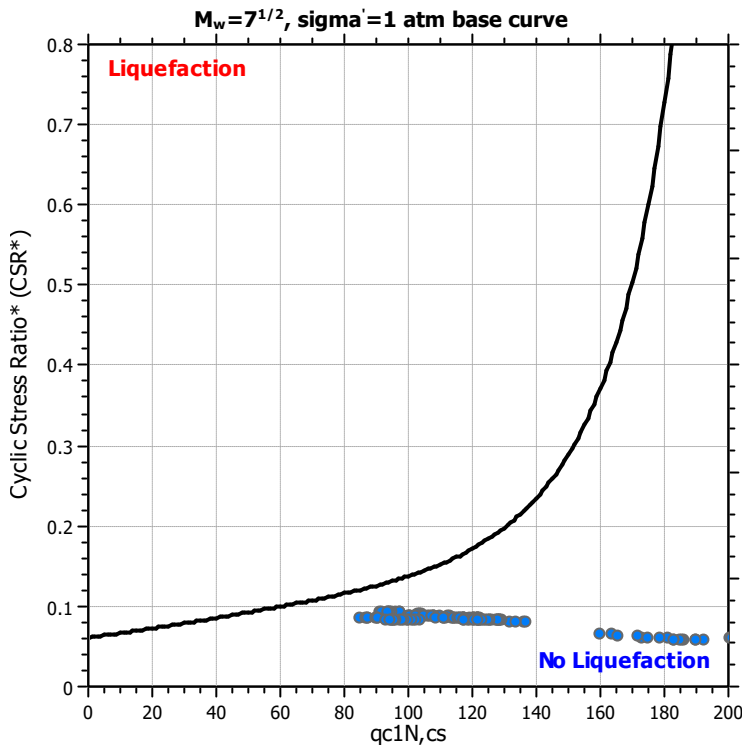
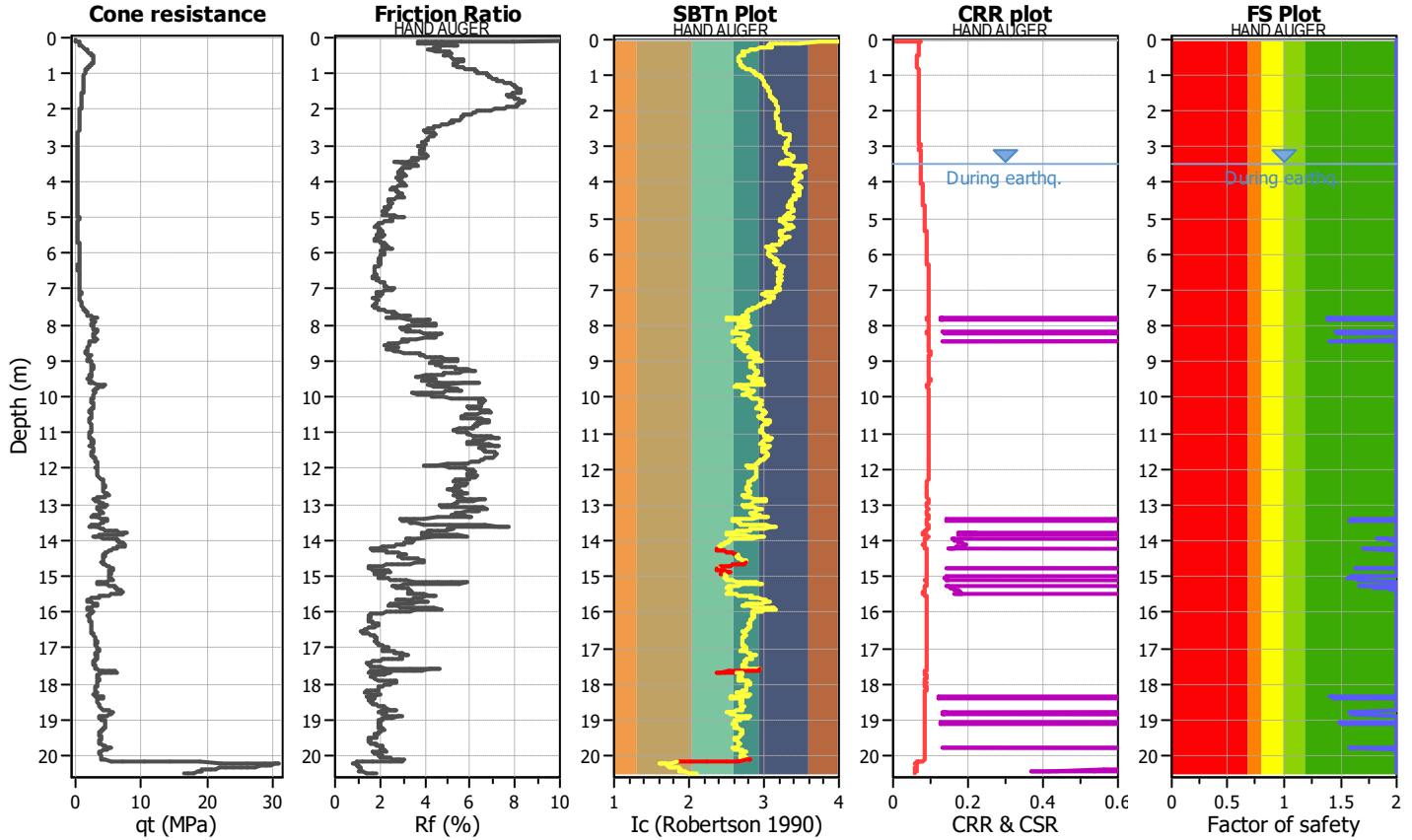
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

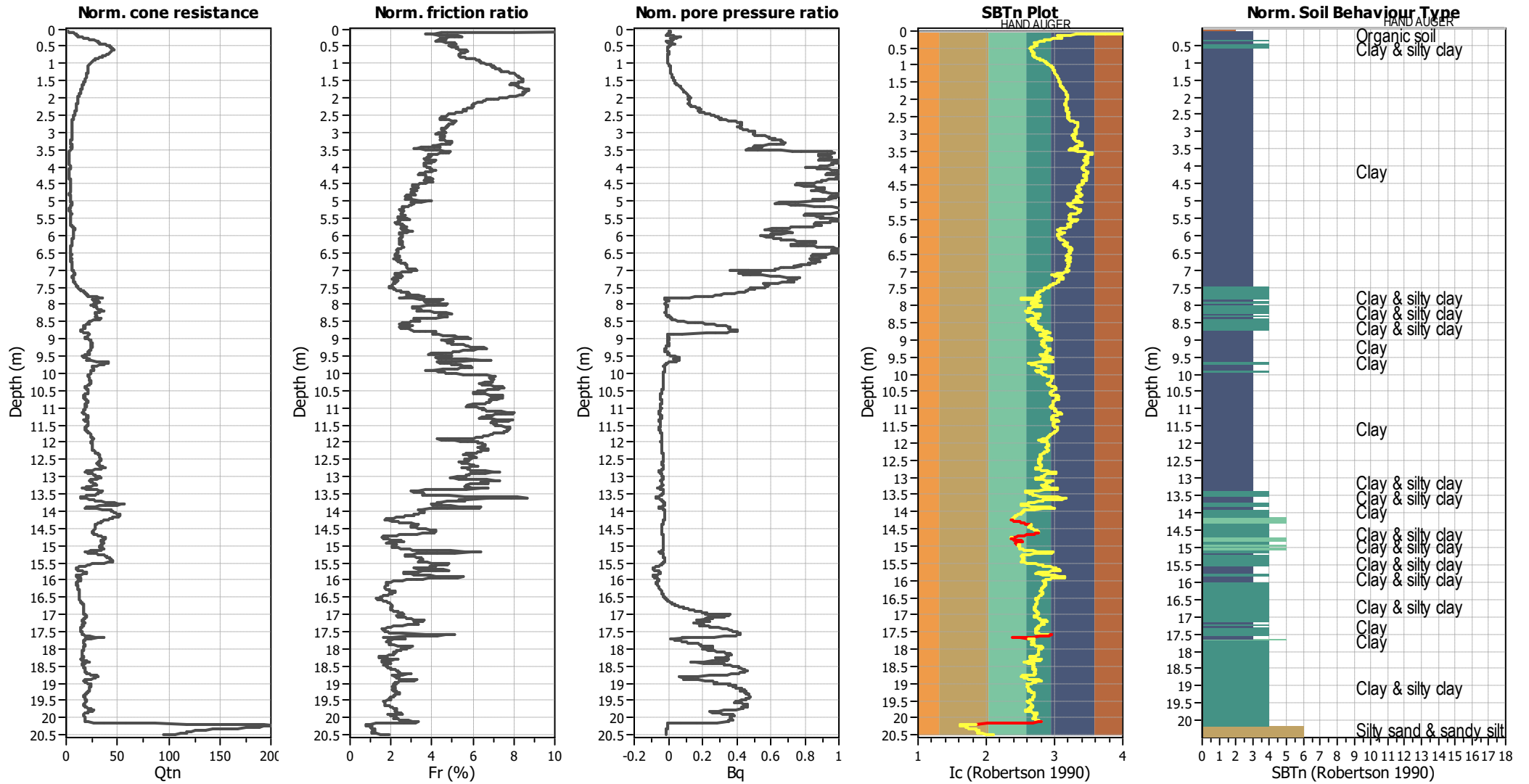
**CPT file : CPT8**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	3.50 m	Use fill:	No	Clay like behavior	
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	3.50 m	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes	MSF method:	Method



### CPT basic interpretation plots (normalized)



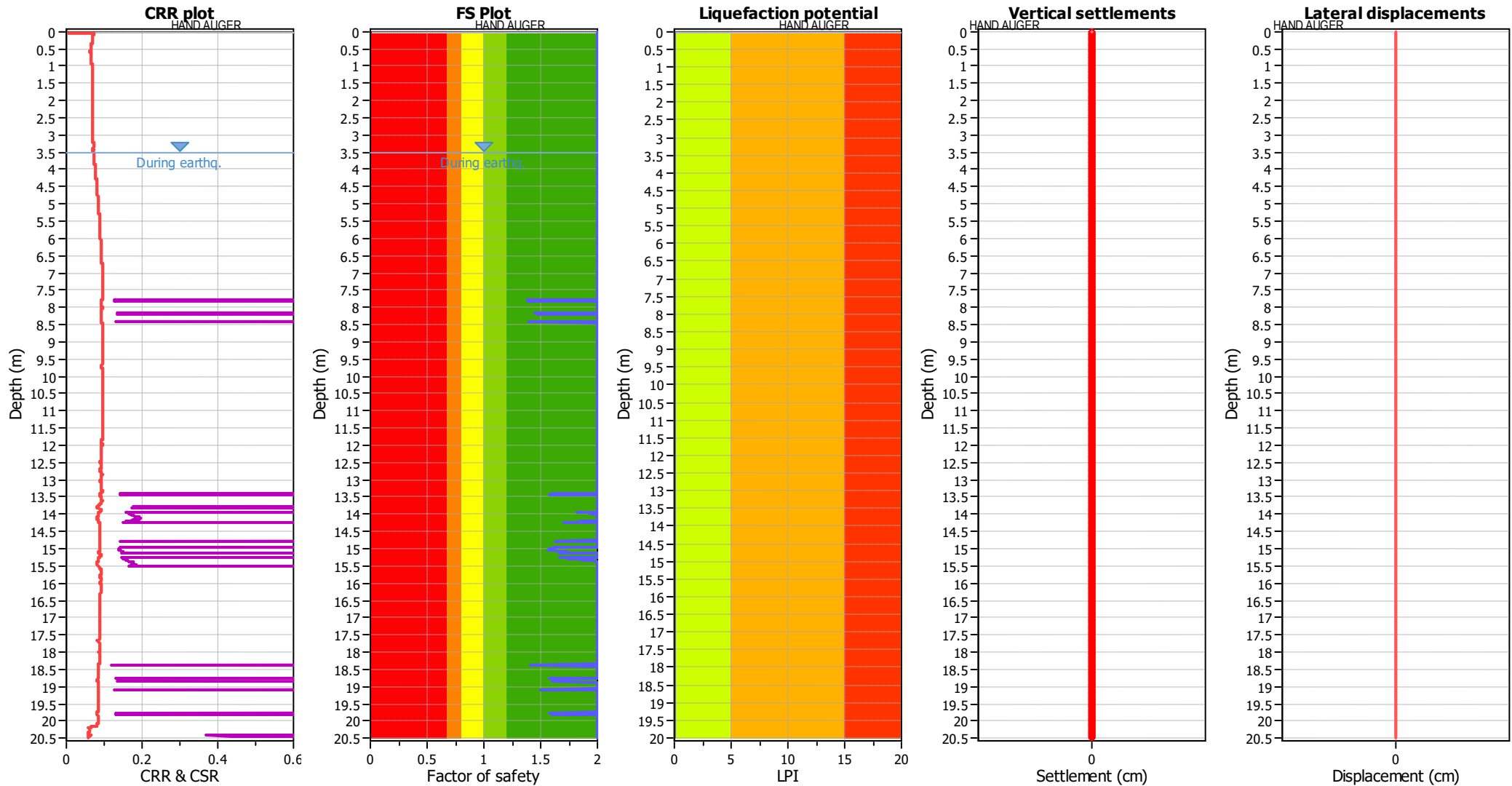
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	3.50 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.50 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	3.50 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_f$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	3.50 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

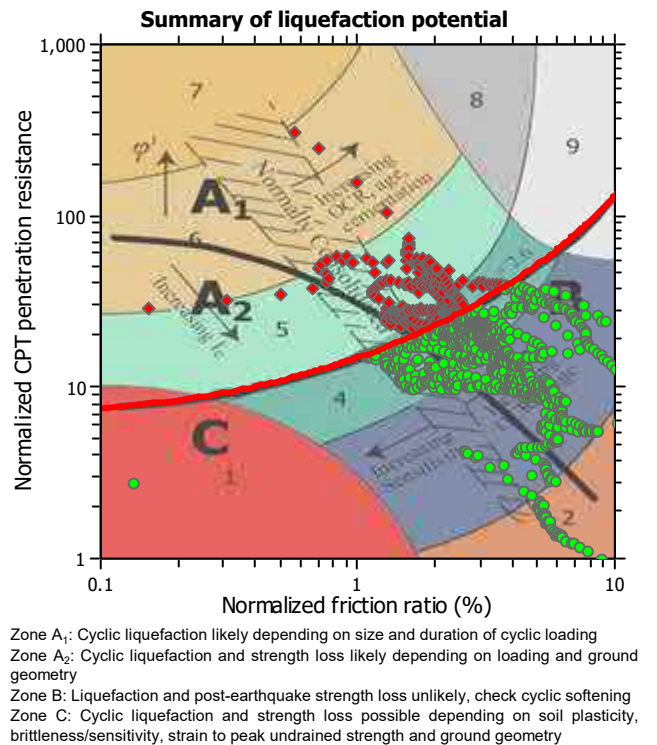
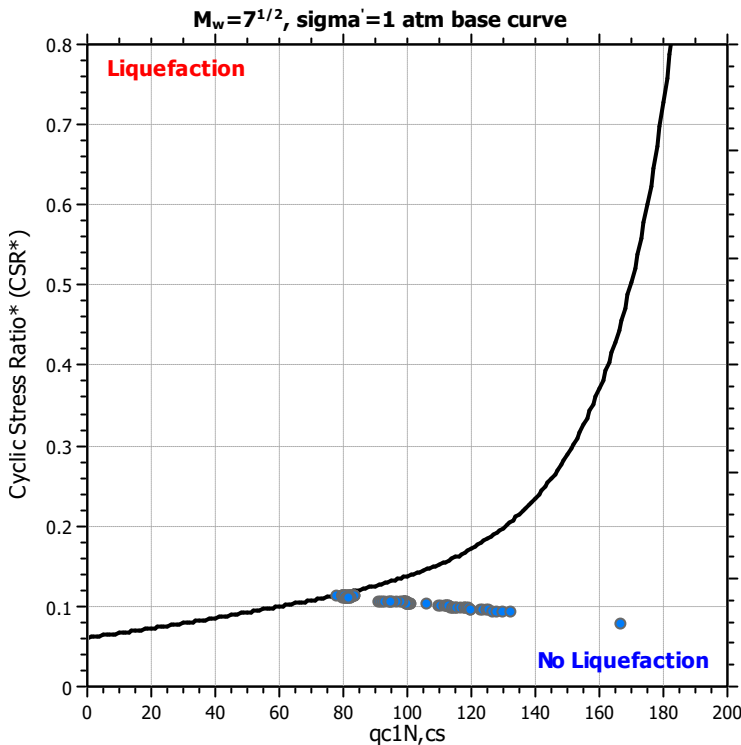
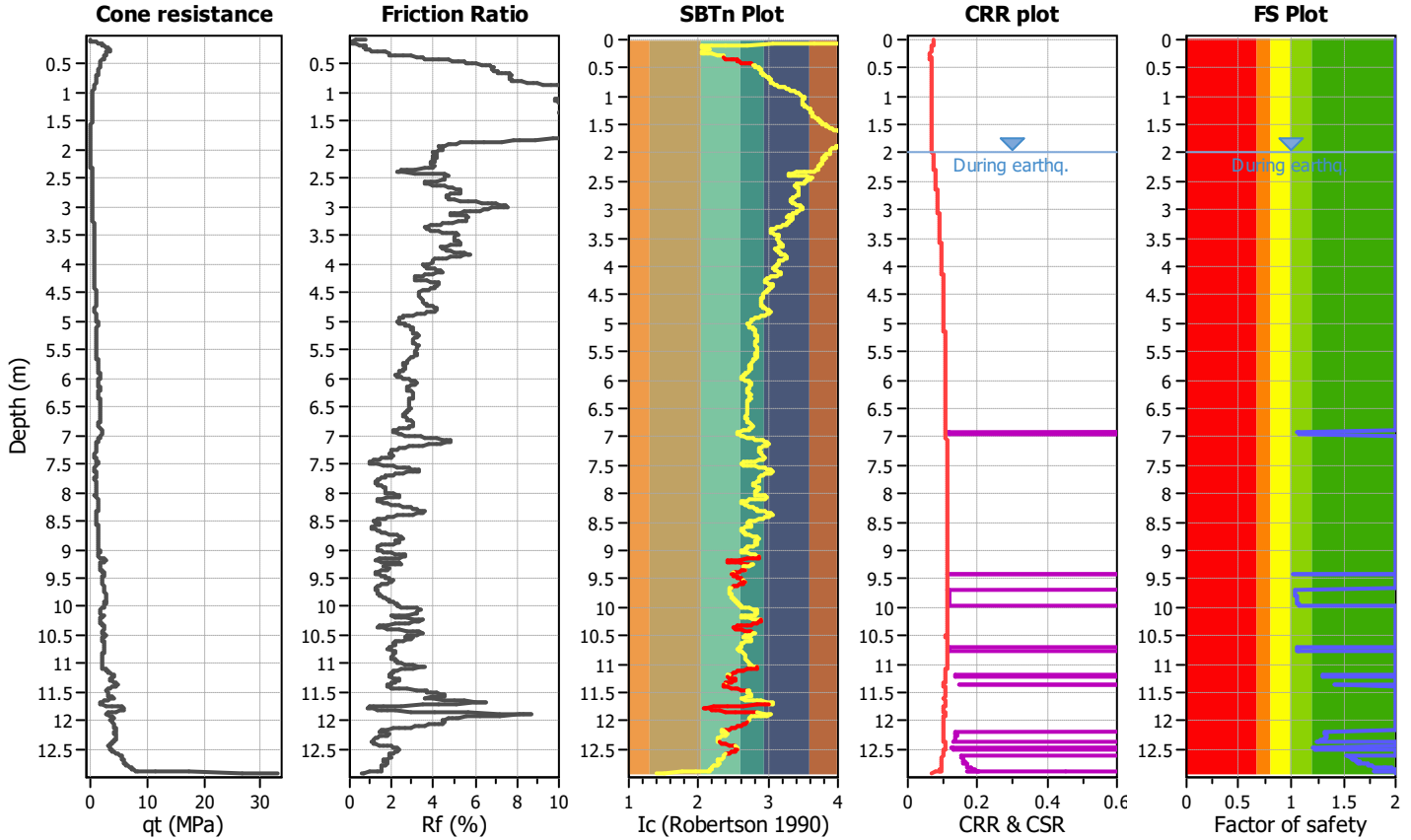
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

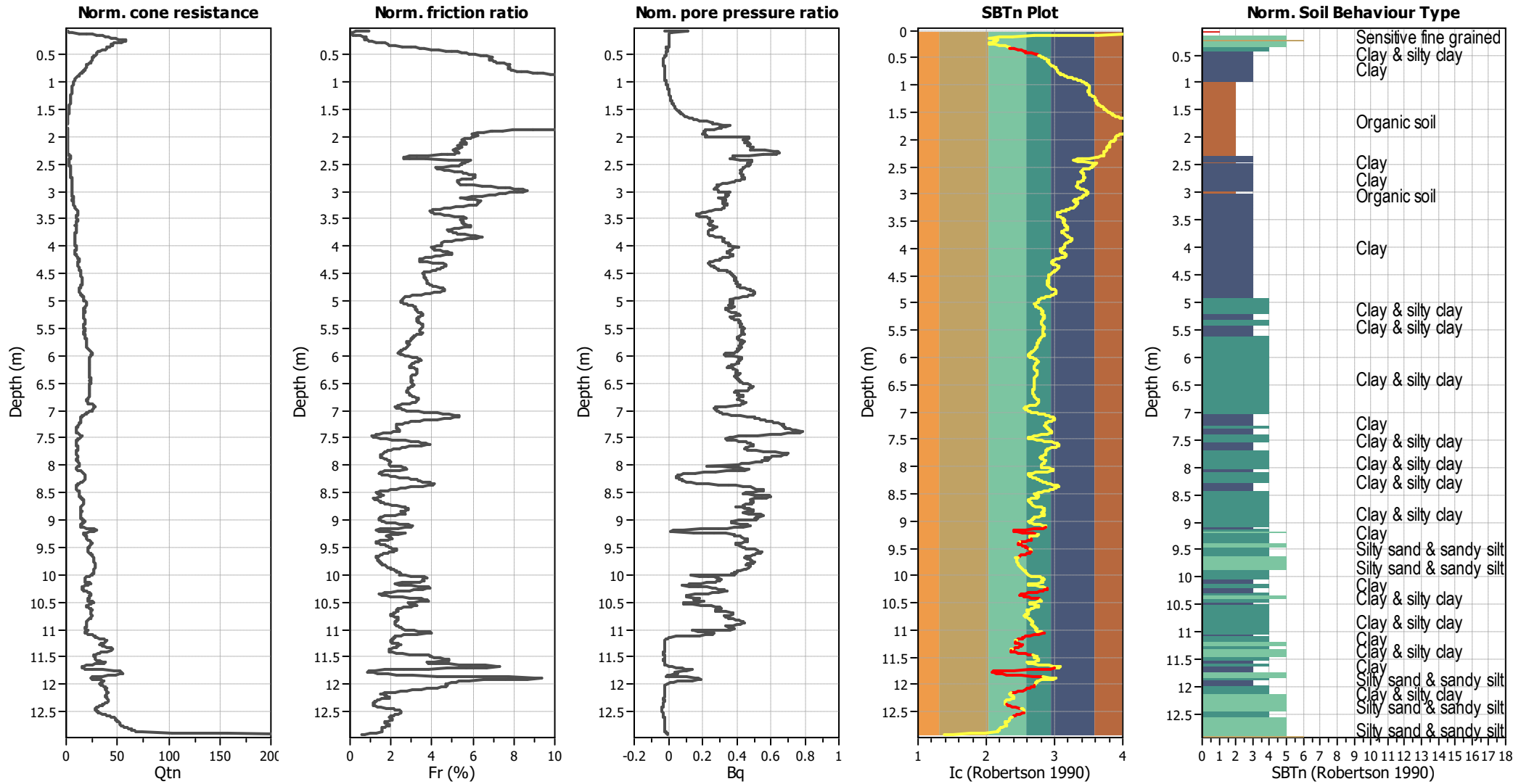
**CPT file : CPT9**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes		



### CPT basic interpretation plots (normalized)



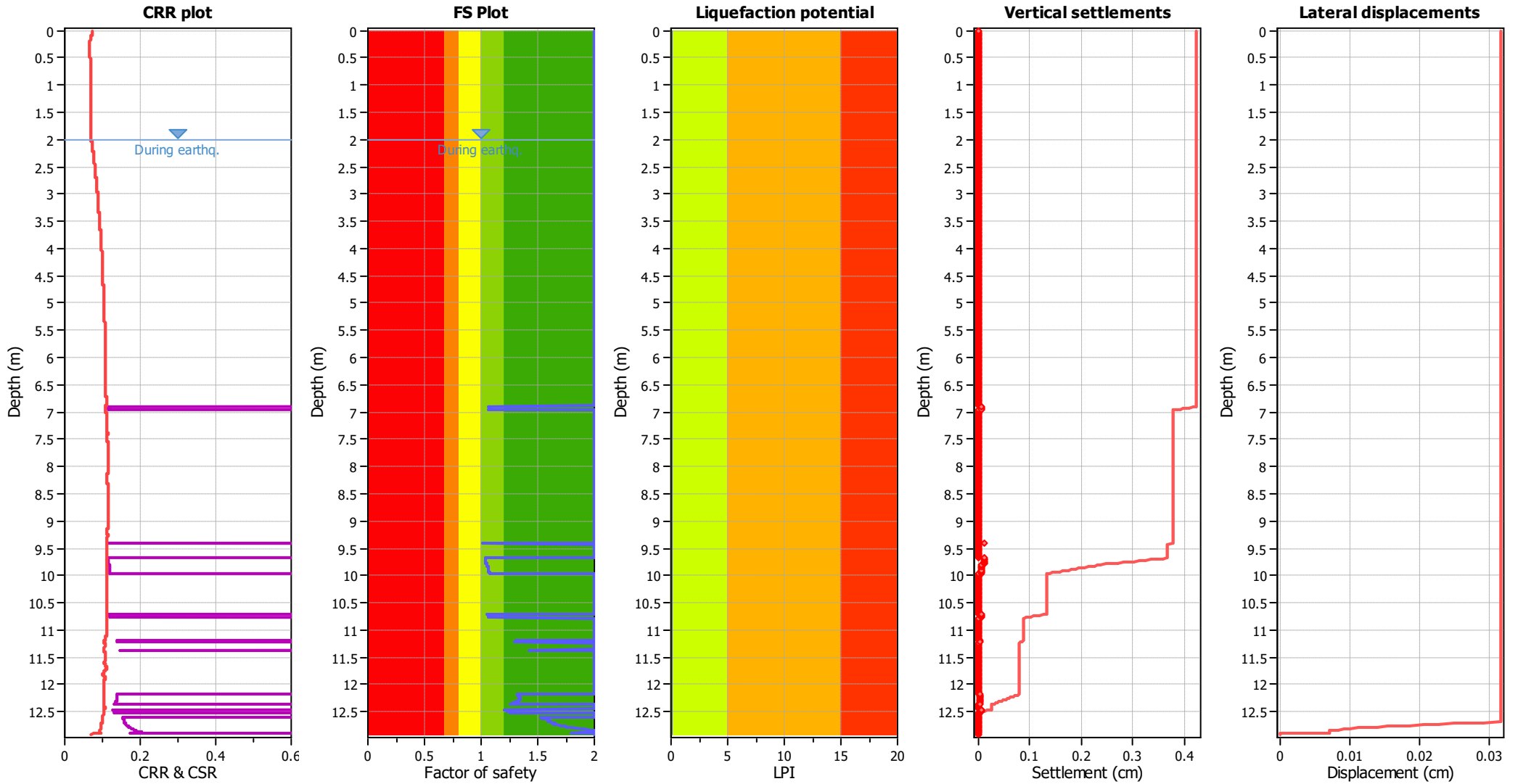
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

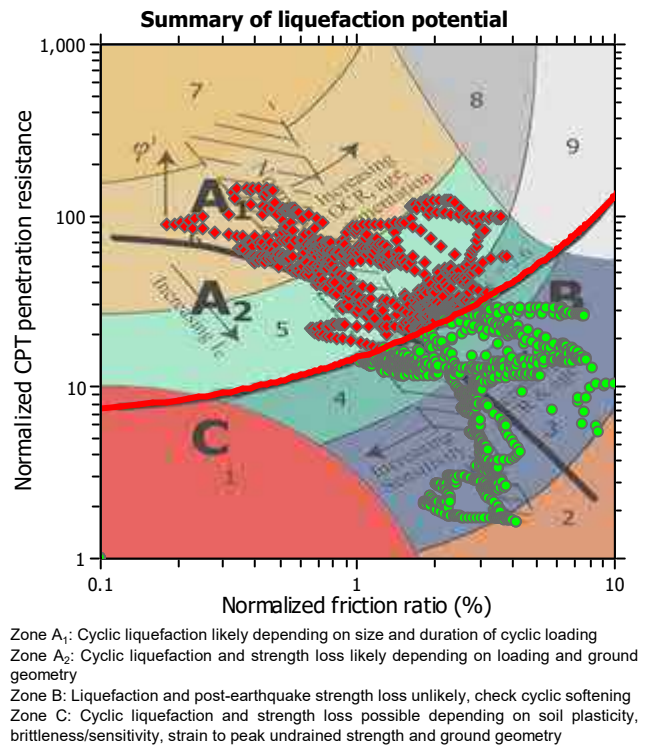
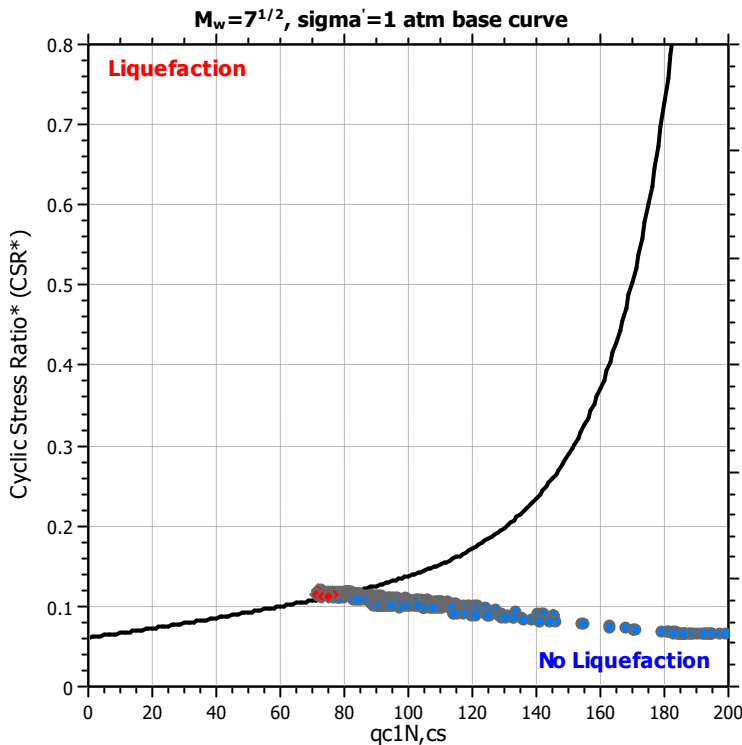
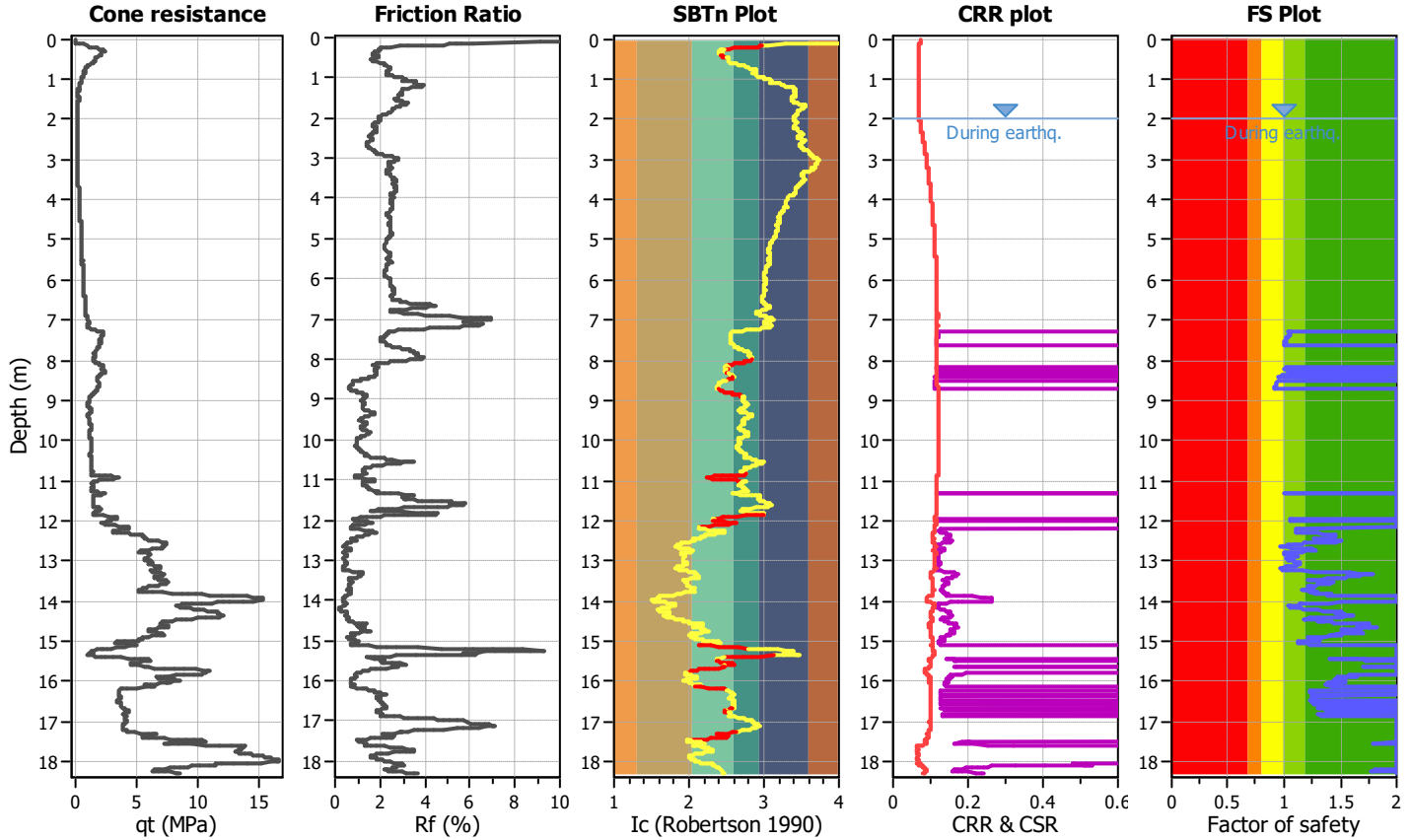
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

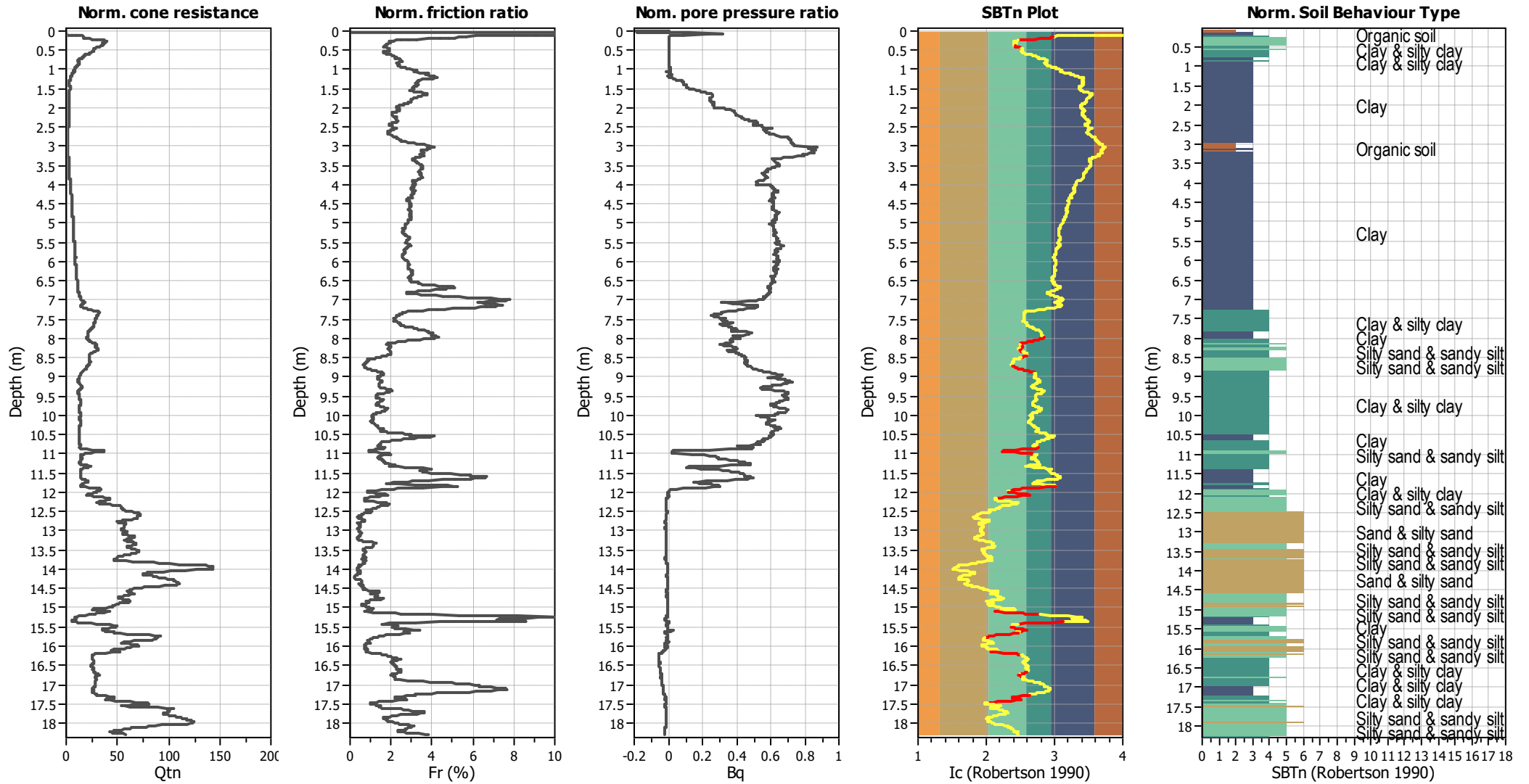
**CPT file : CPT10**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.00 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.00 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes		



### CPT basic interpretation plots (normalized)



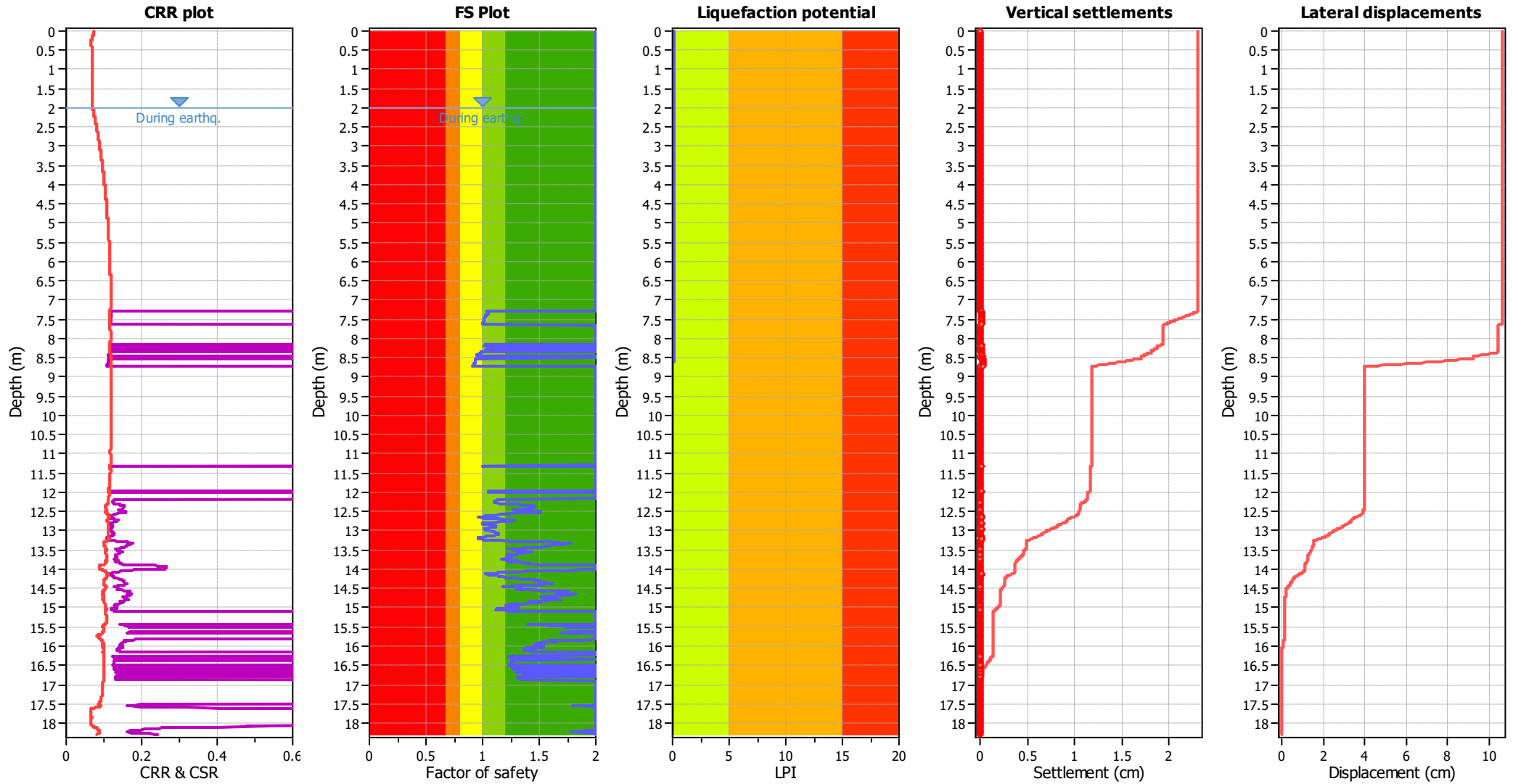
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.00 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.00 m	Fill height:	N/A	Limit depth:	N/A

#### F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

#### LPI color scheme

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

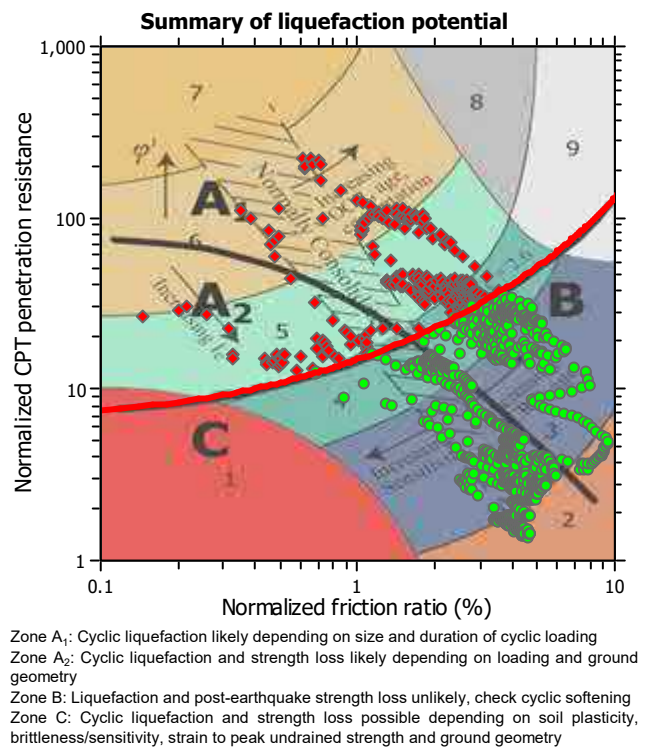
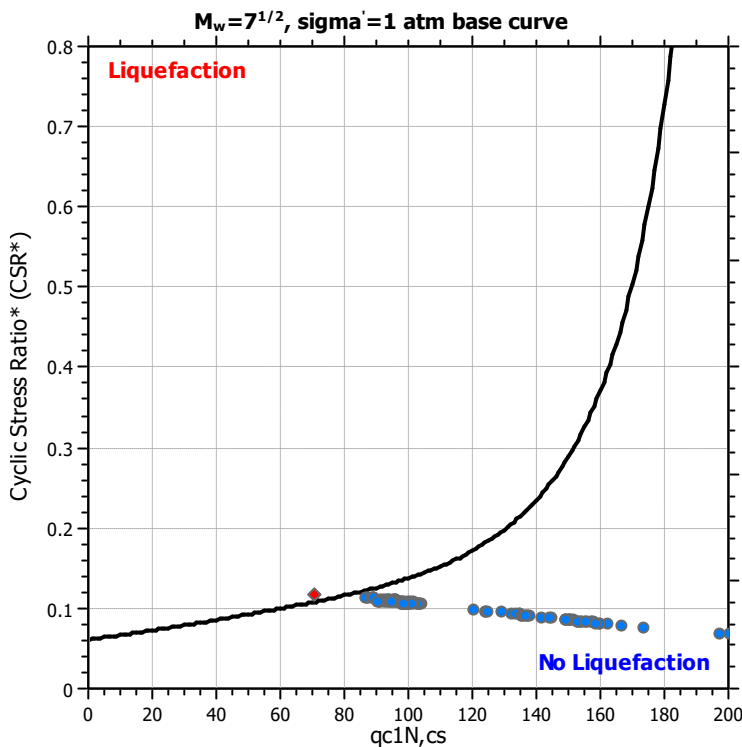
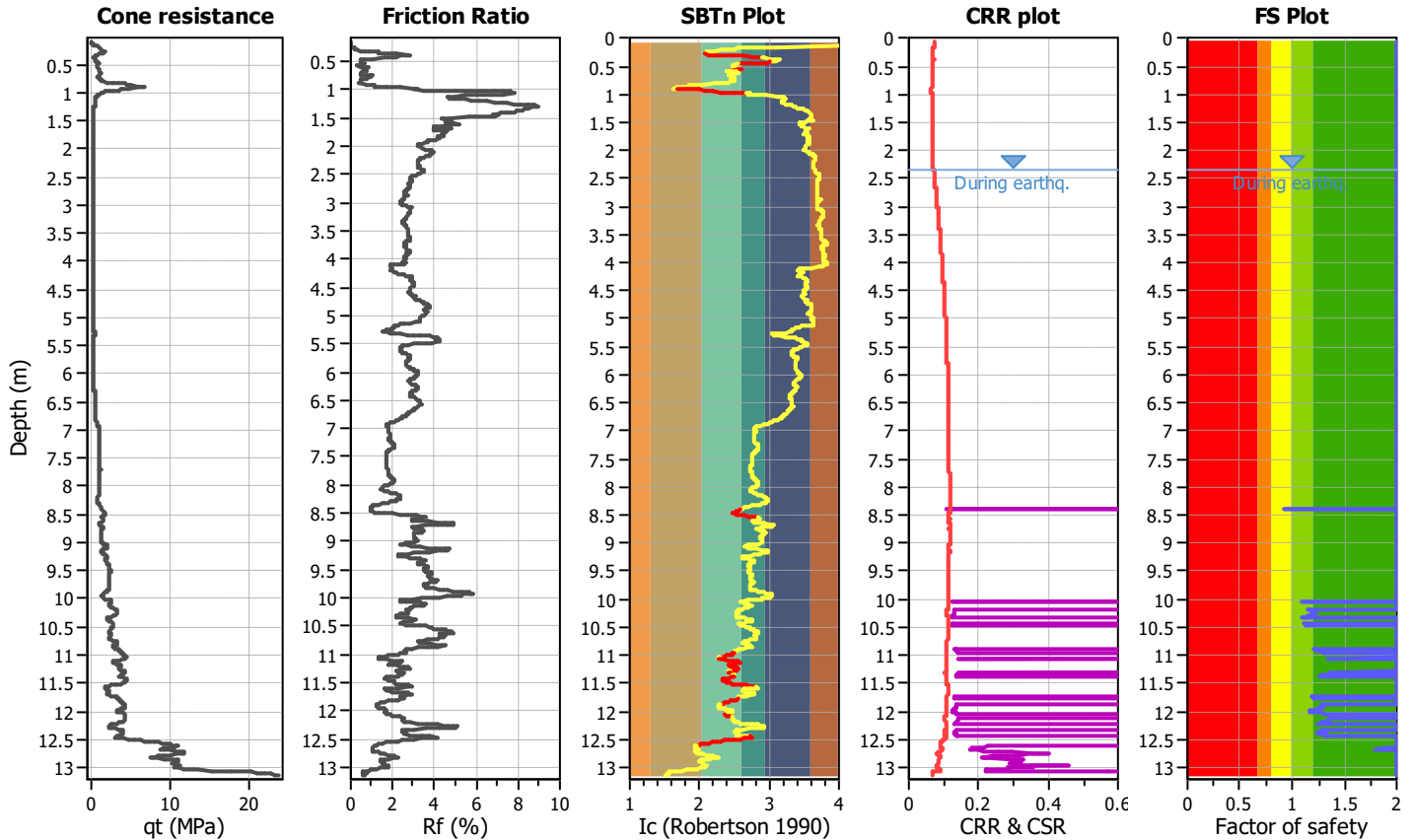
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

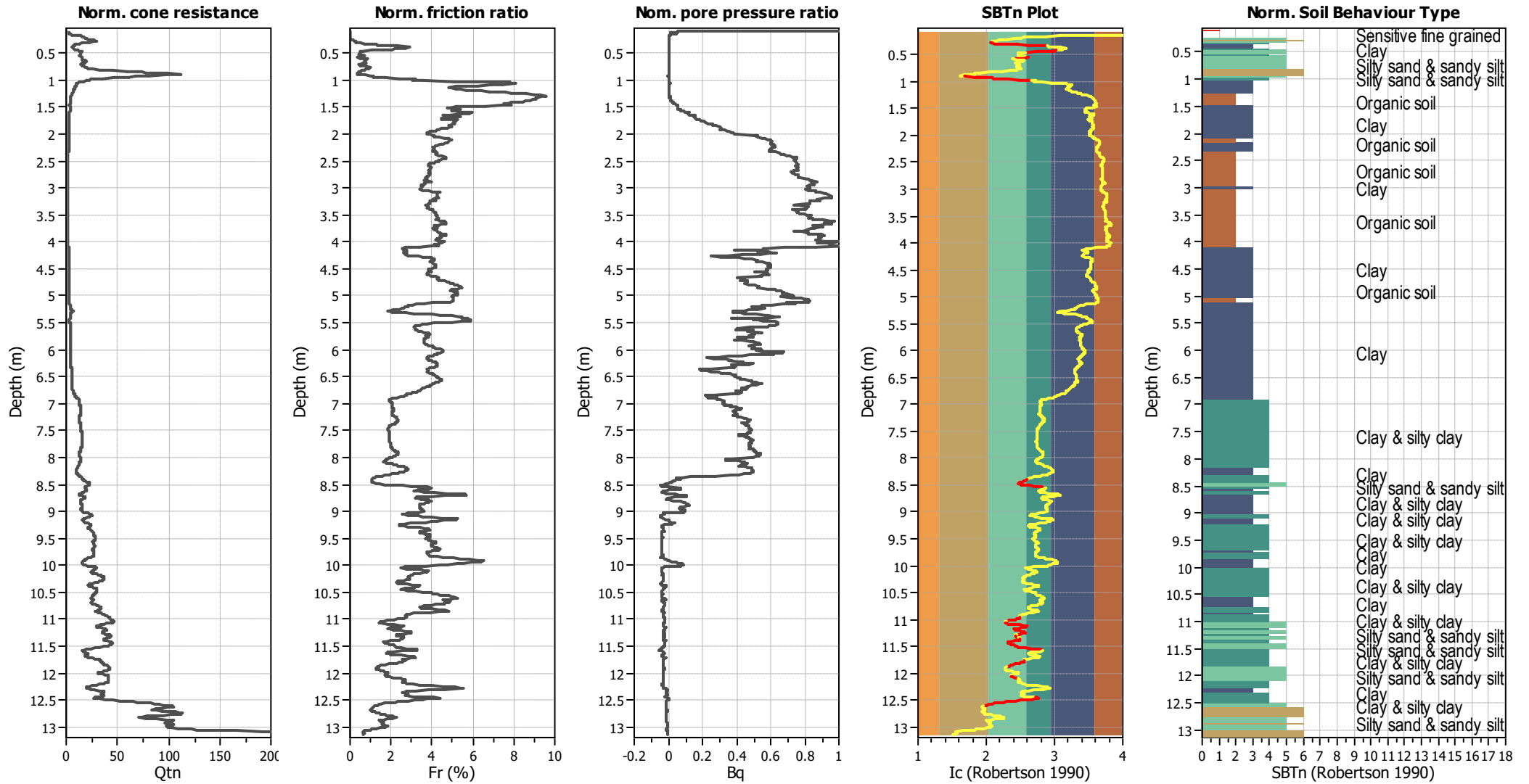
**CPT file : CPT11**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	2.33 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	2.33 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes		



### CPT basic interpretation plots (normalized)



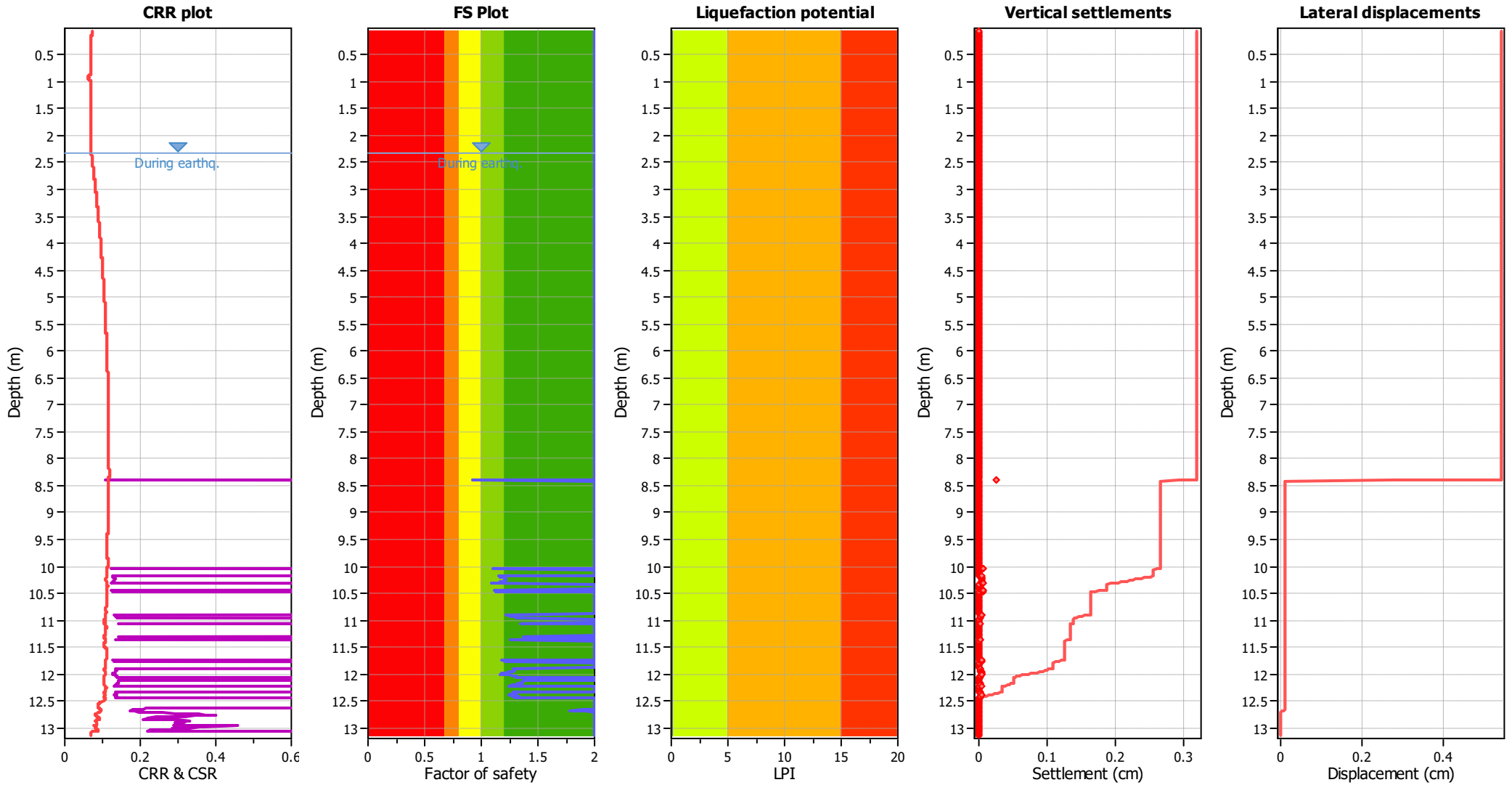
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	2.33 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.33 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	2.33 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	2.33 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

- Very high risk
- High risk
- Low risk

**LIQUEFACTION ANALYSIS REPORT**

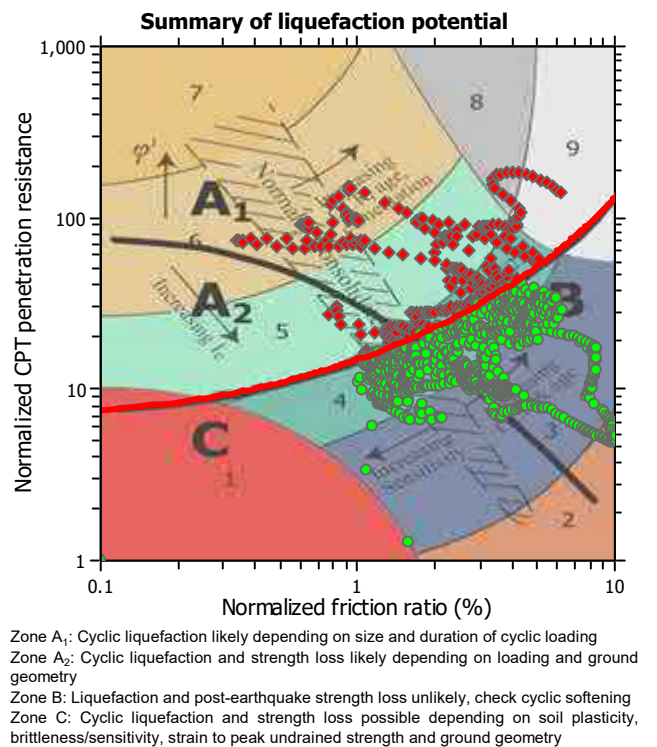
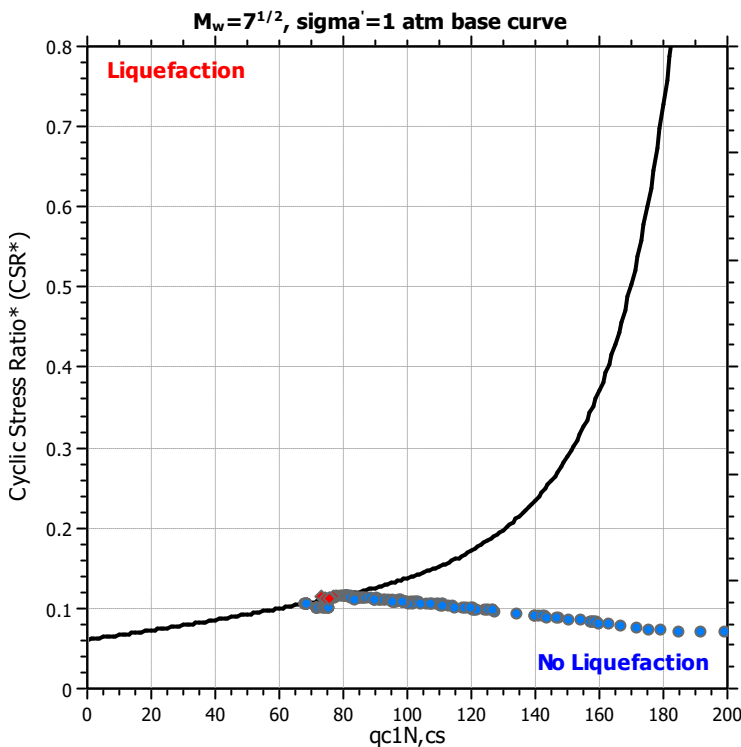
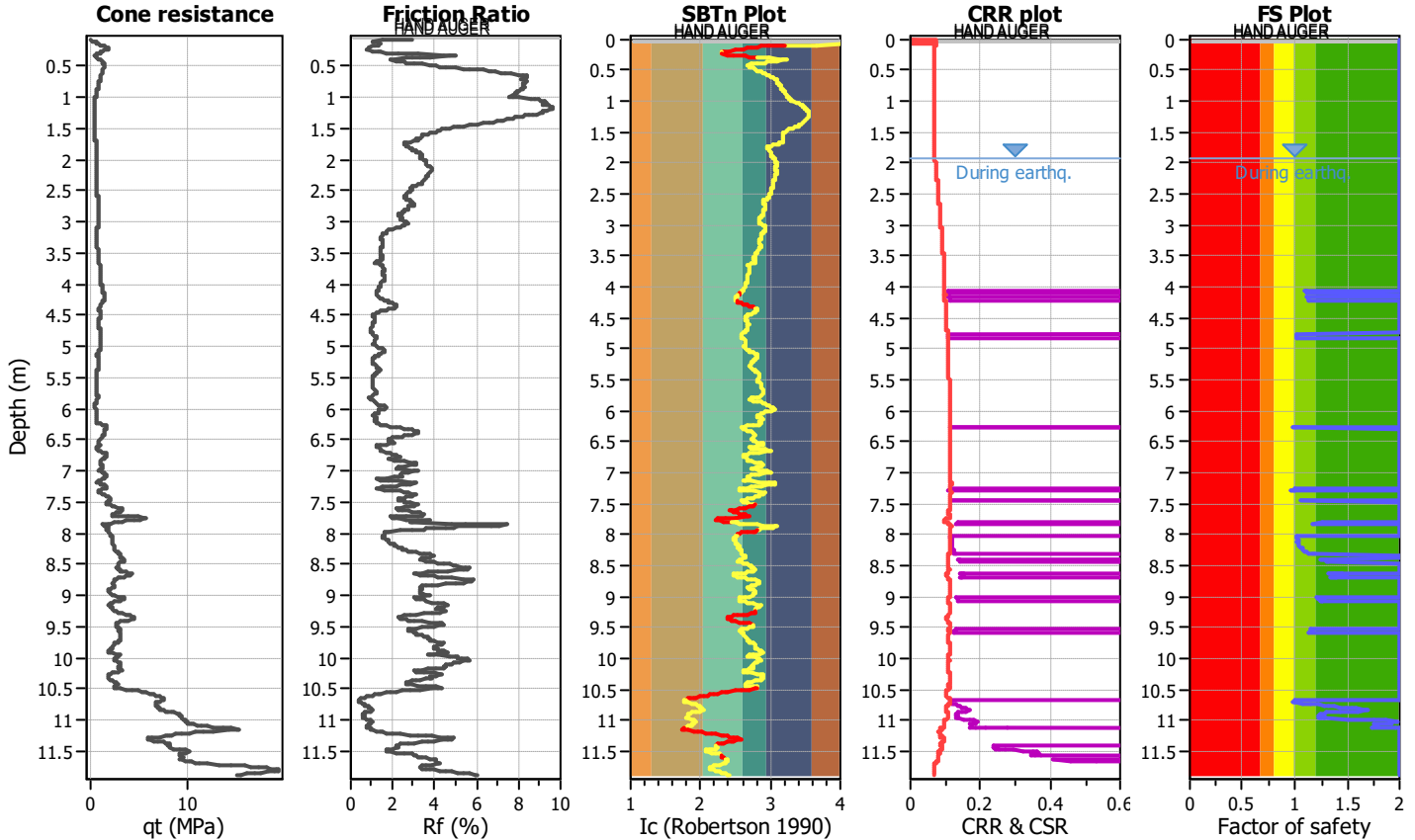
**Project title : 19457 - Dargaville Racing Club**

**Location : SH14, Awakino Point, Dargaville**

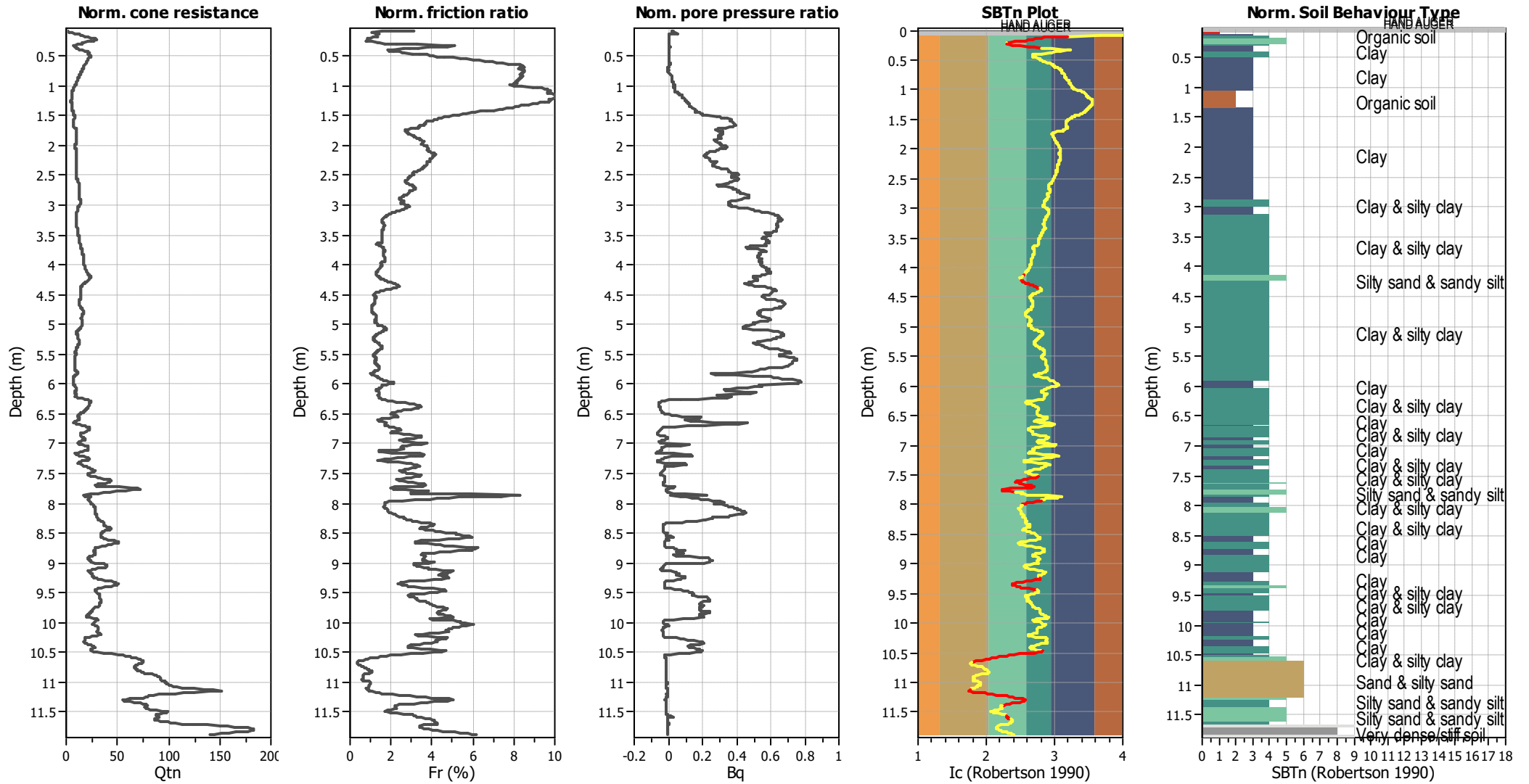
**CPT file : CPT12**

**Input parameters and analysis data**

Analysis method:	B&I (2014)	G.W.T. (in-situ):	1.91 m	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	B&I (2014)	G.W.T. (earthq.):	1.91 m	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude $M_w$ :	5.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.13	Unit weight calculation:	Based on SBT	$K_\sigma$ applied:	Yes		



### CPT basic interpretation plots (normalized)



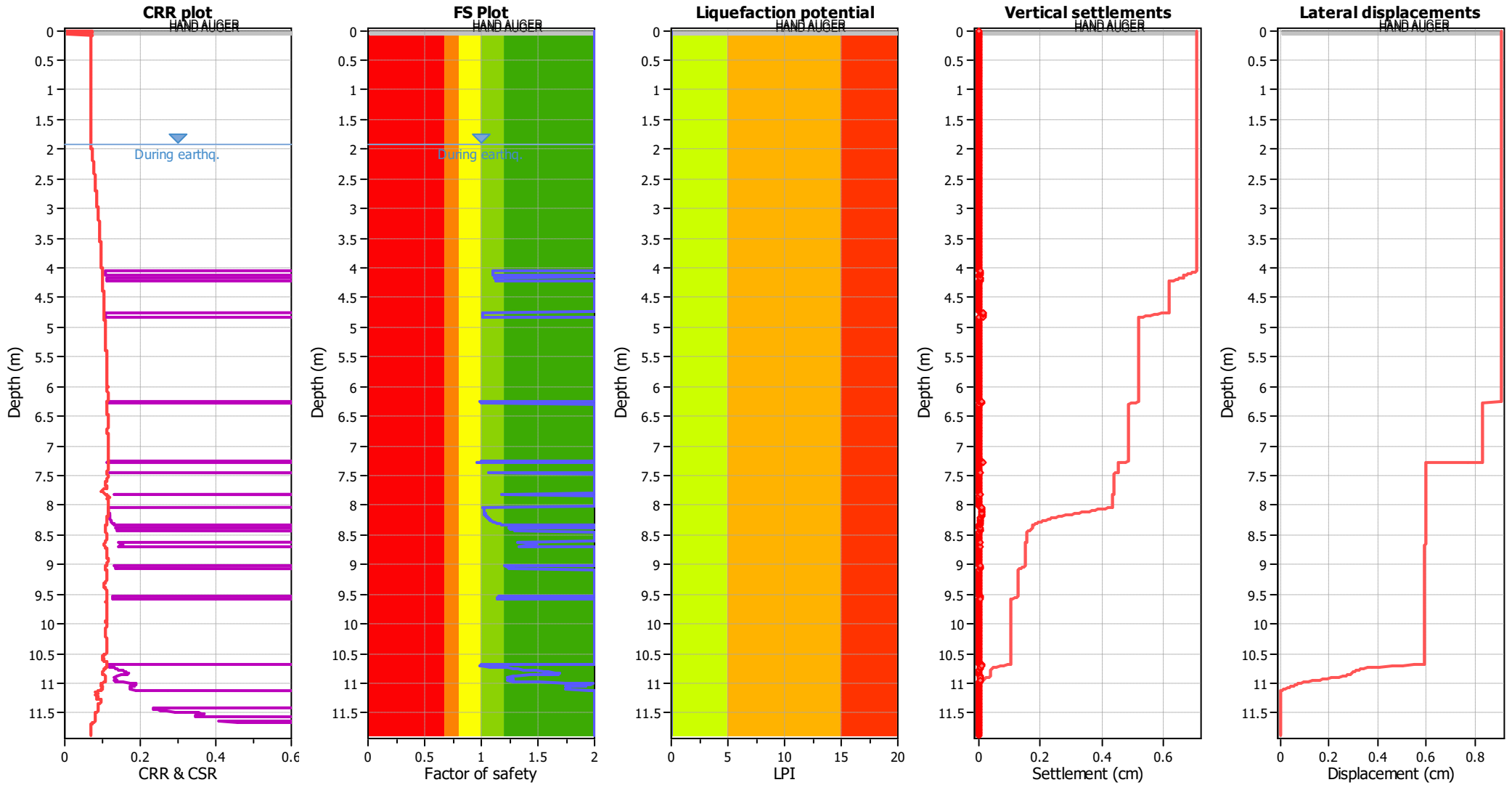
#### Input parameters and analysis data

Analysis method:	B&I (2014)	Depth to GWT (erthq.):	1.91 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K <sub>σ</sub> applied:	Yes
Earthquake magnitude M <sub>w</sub> :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.91 m	Fill height:	N/A	Limit depth:	N/A

#### SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

### Liquefaction analysis overall plots



**Input parameters and analysis data**

Analysis method:	B&I (2014)	Depth to GWT (earthq.):	1.91 m	Fill weight:	N/A
Fines correction method:	B&I (2014)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	$K_{\sigma}$ applied:	Yes
Earthquake magnitude $M_w$ :	5.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.13	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	1.91 m	Fill height:	N/A	Limit depth:	N/A

**F.S. color scheme**

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

**LPI color scheme**

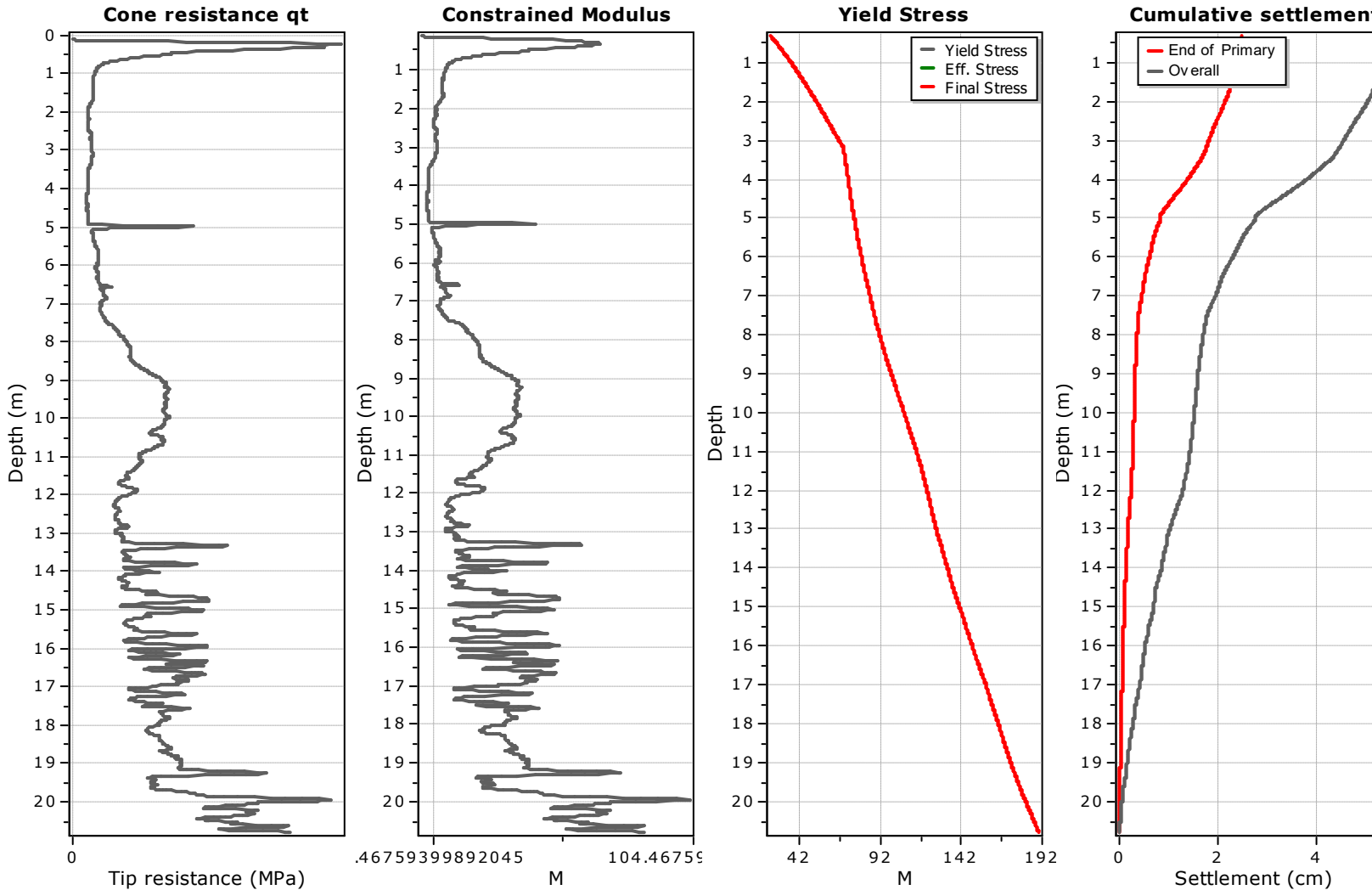
- Very high risk
- High risk
- Low risk

## **APPENDIX C**

### **CONSOLIDATION SETTLEMENT CALCULATIONS**



**Settlements calculation according to theory of elasticity\***



**Calculation properties**

- Footing type: Rectangular
- Footing width: 20.00 (m)
- L/B: 1.0
- Footing pressure: 20.00 (kPa)
- Embedment depth: 0.30 (m)
- Footing is rigid: Yes
- Remove excavation load: No
- Apply 20% rule: No
- Calculate secondary settlements: Yes
- Time period for primary consolidation: 6 months
- Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

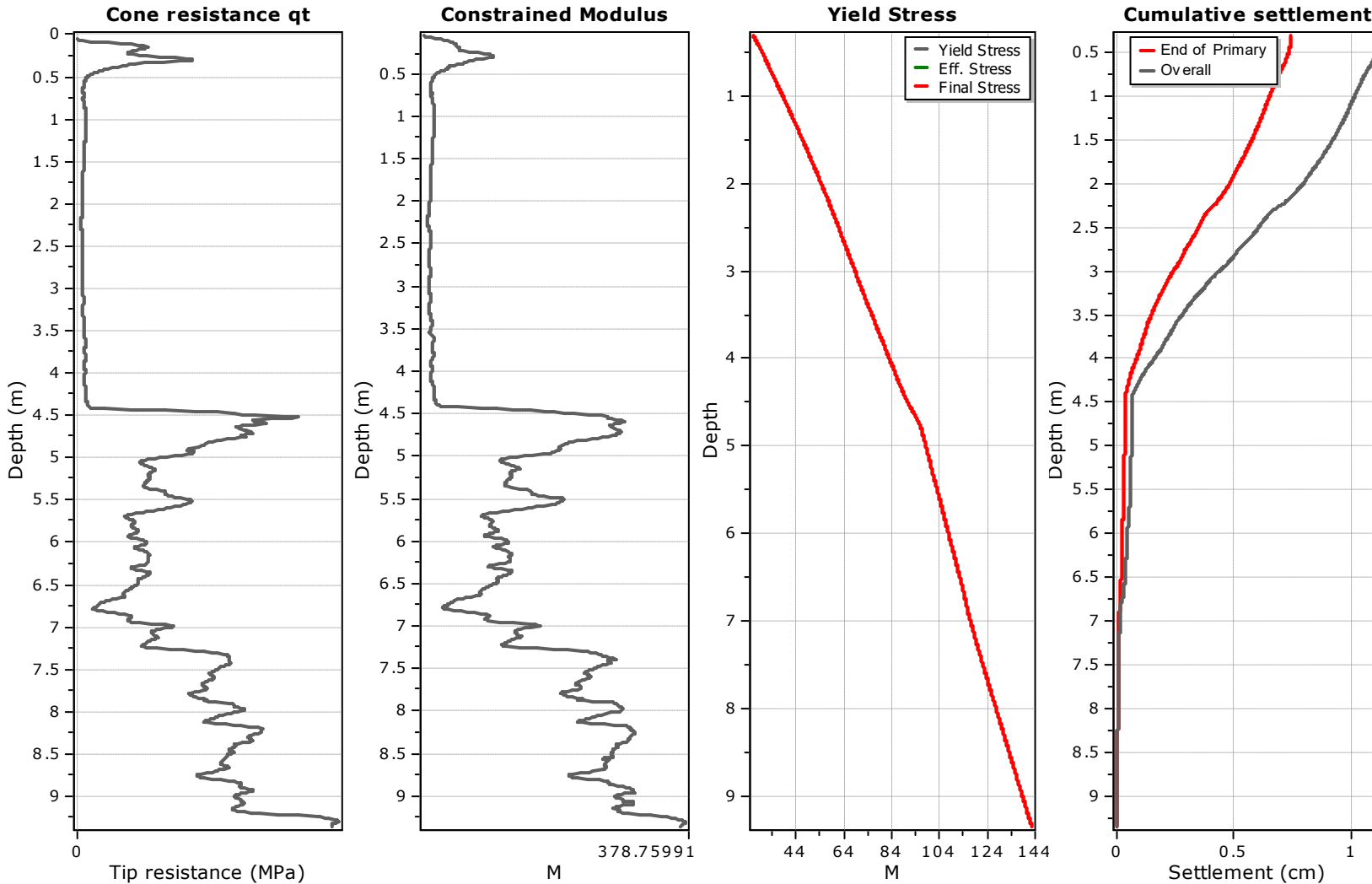
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

Footing type: Rectangular  
Footing width: 20.00 (m)  
L/B: 1.0  
Footing pressure: 20.00 (kPa)  
Embedment depth: 0.30 (m)  
Footing is rigid: Yes  
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Apply 20% rule: No  
Calculate secondary settlements: Yes  
Time period for primary consolidation: 6 months  
Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

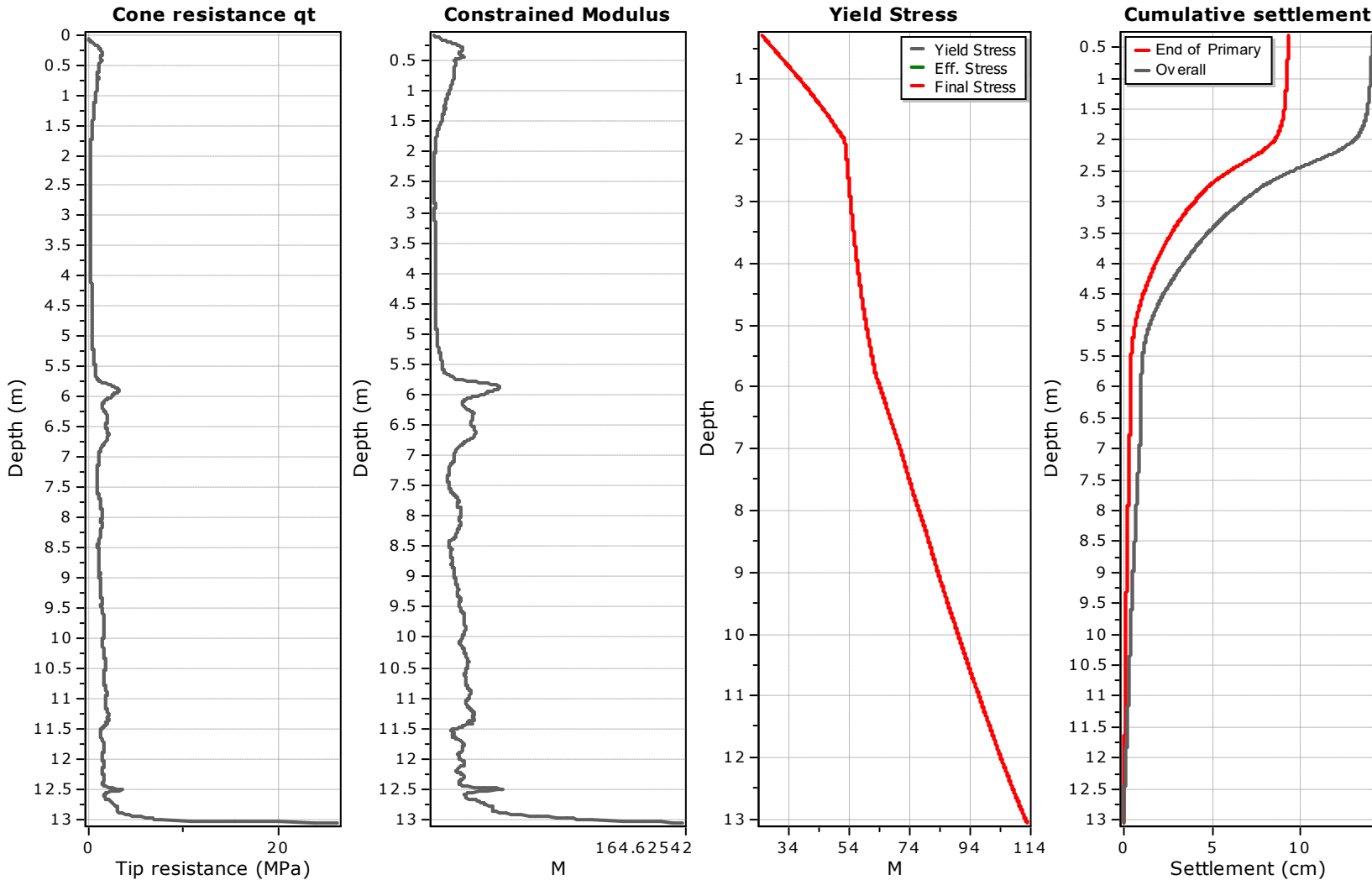
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

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 Calculate secondary settlements: Yes  
 Time period for primary consolidation: 6 months  
 Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

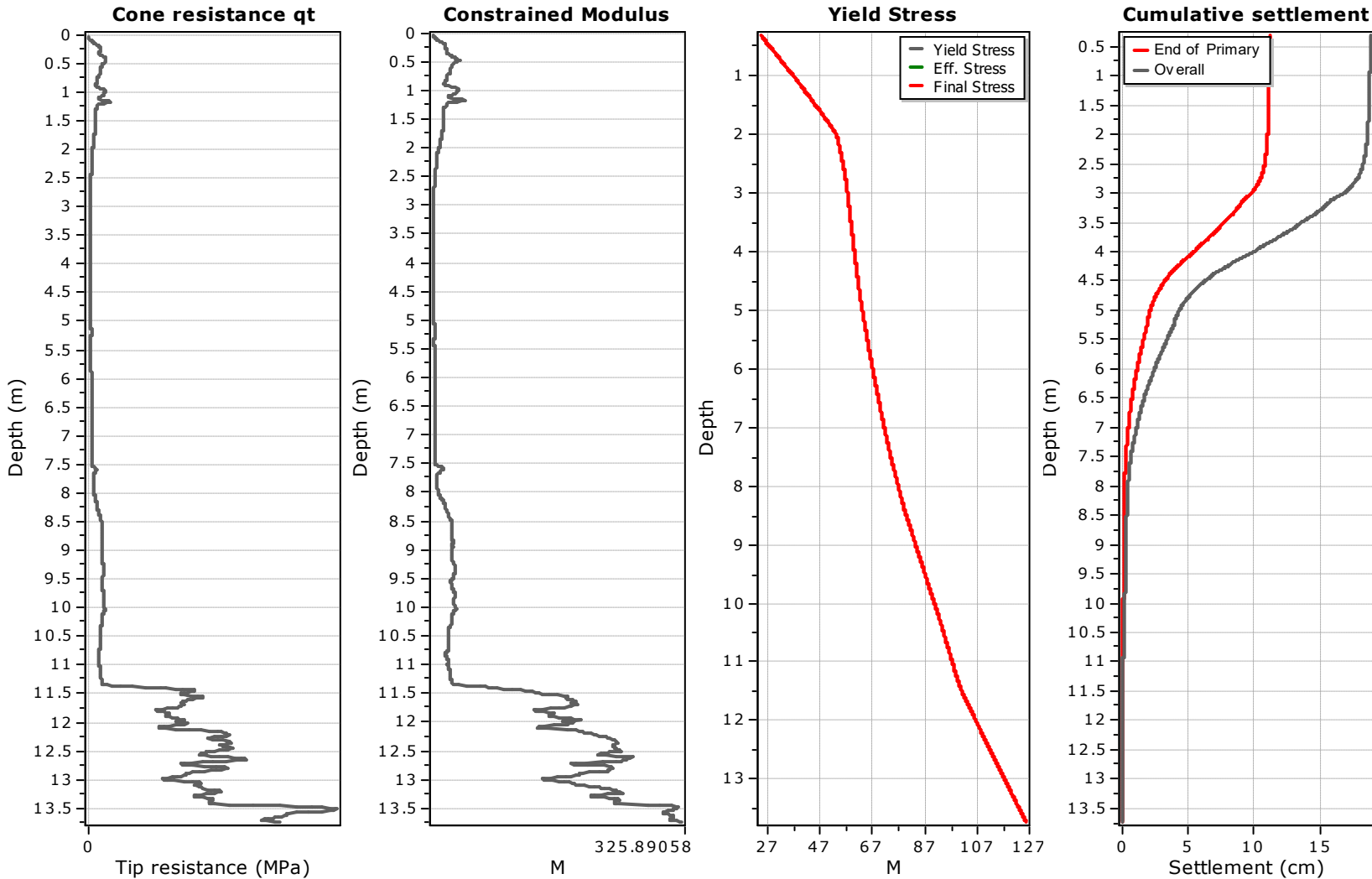
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

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**Settlements calculation according to theory of elasticity\***



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Footing pressure: 20.00 (kPa)  
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Time period for primary consolidation: 6 months  
Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

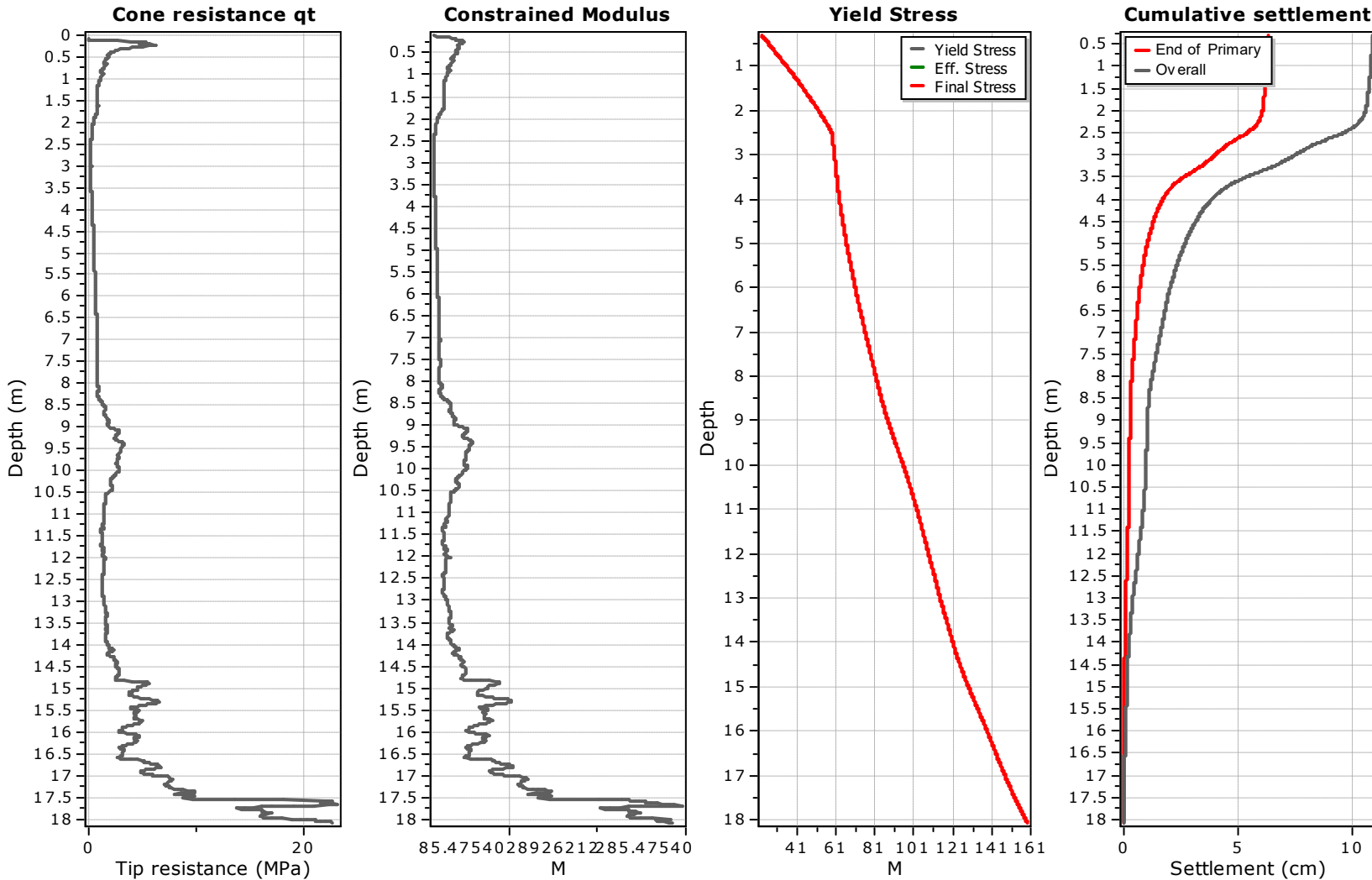
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

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**Settlements calculation according to theory of elasticity\***



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Footing type: Rectangular  
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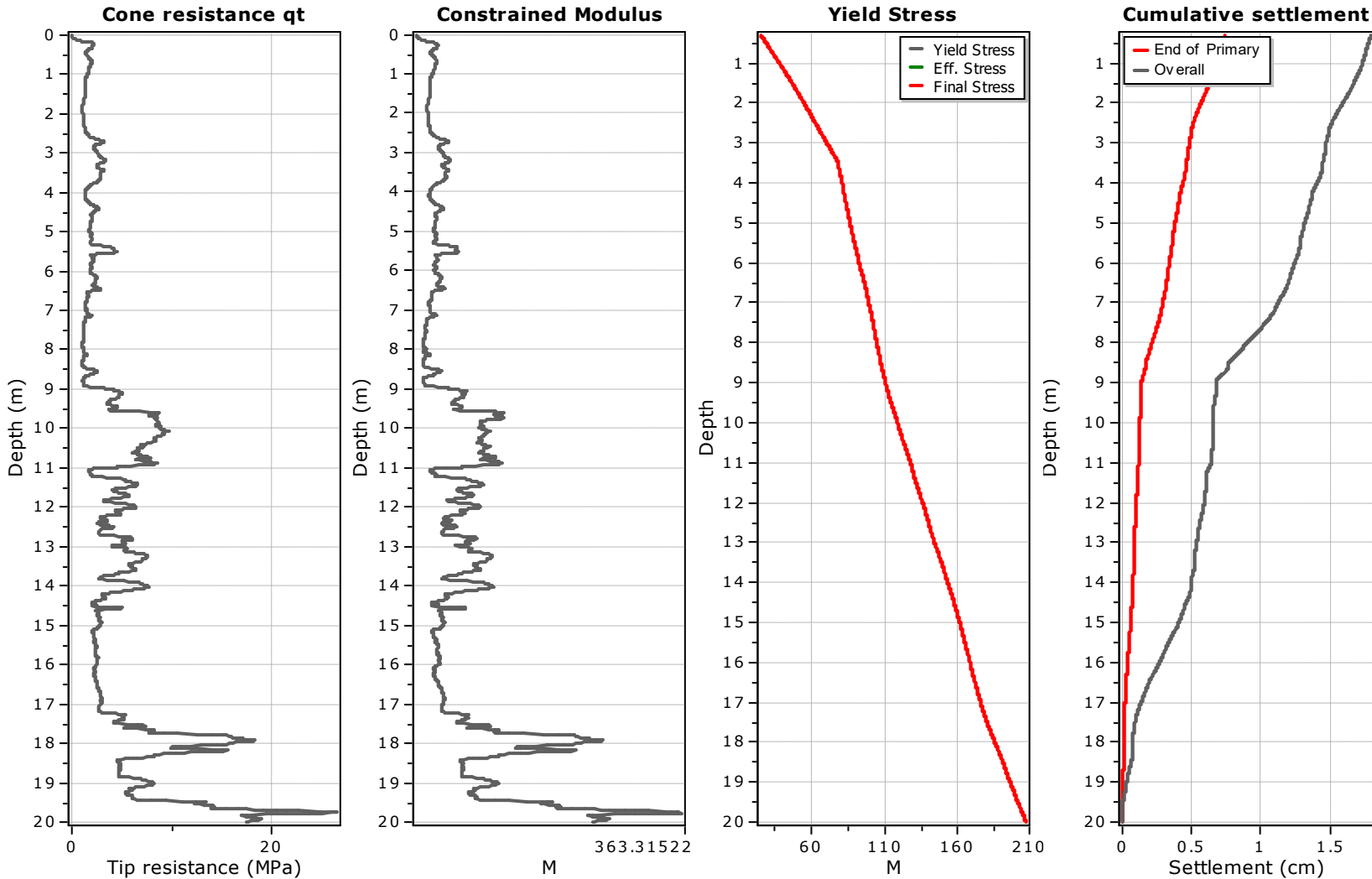
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

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**Settlements calculation according to theory of elasticity\***



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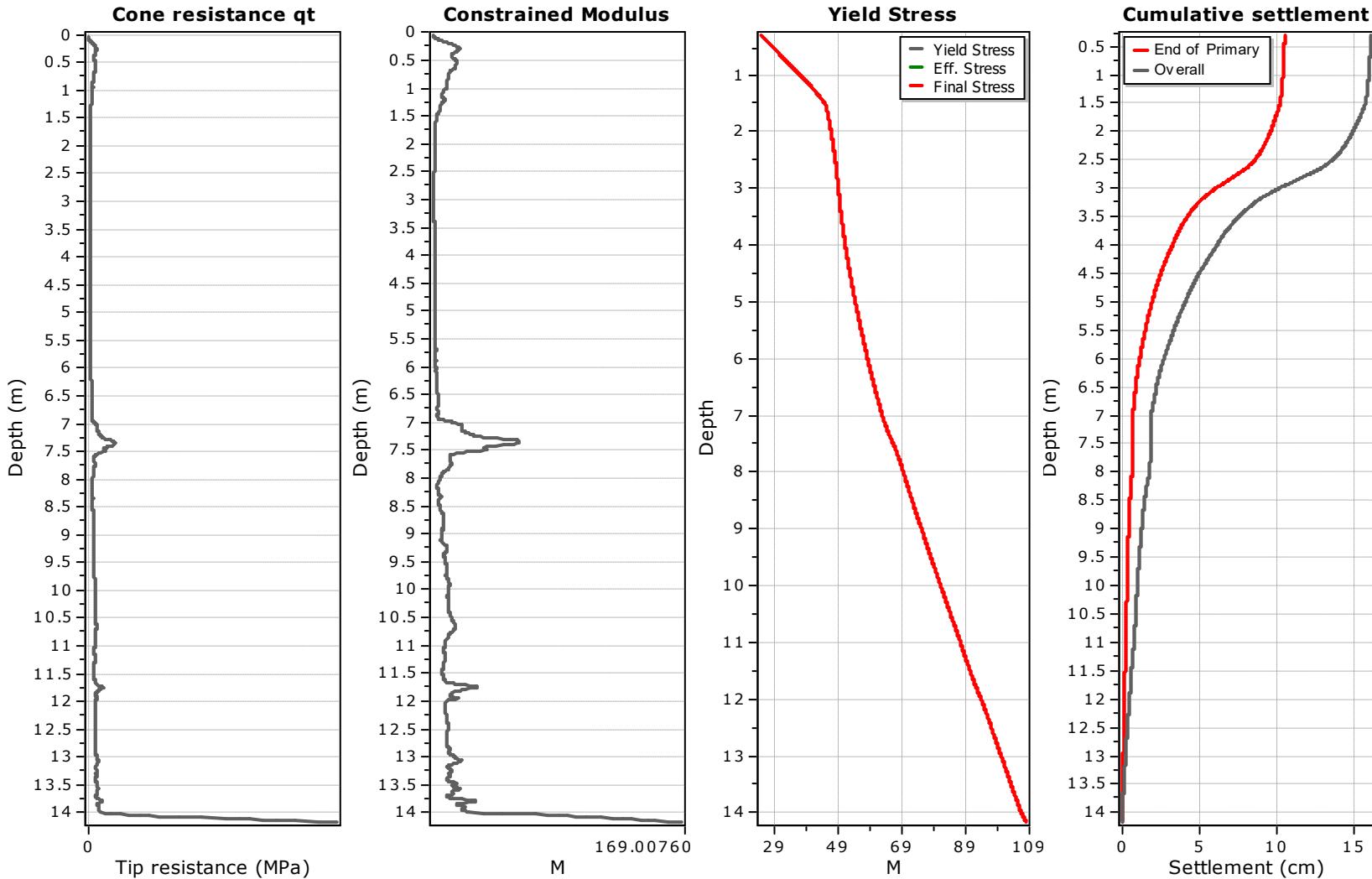
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**Settlements calculation according to theory of elasticity\***



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- Footing type: Rectangular
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- Apply 20% rule: No
- Calculate secondary settlements: Yes
- Time period for primary consolidation: 6 months
- Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

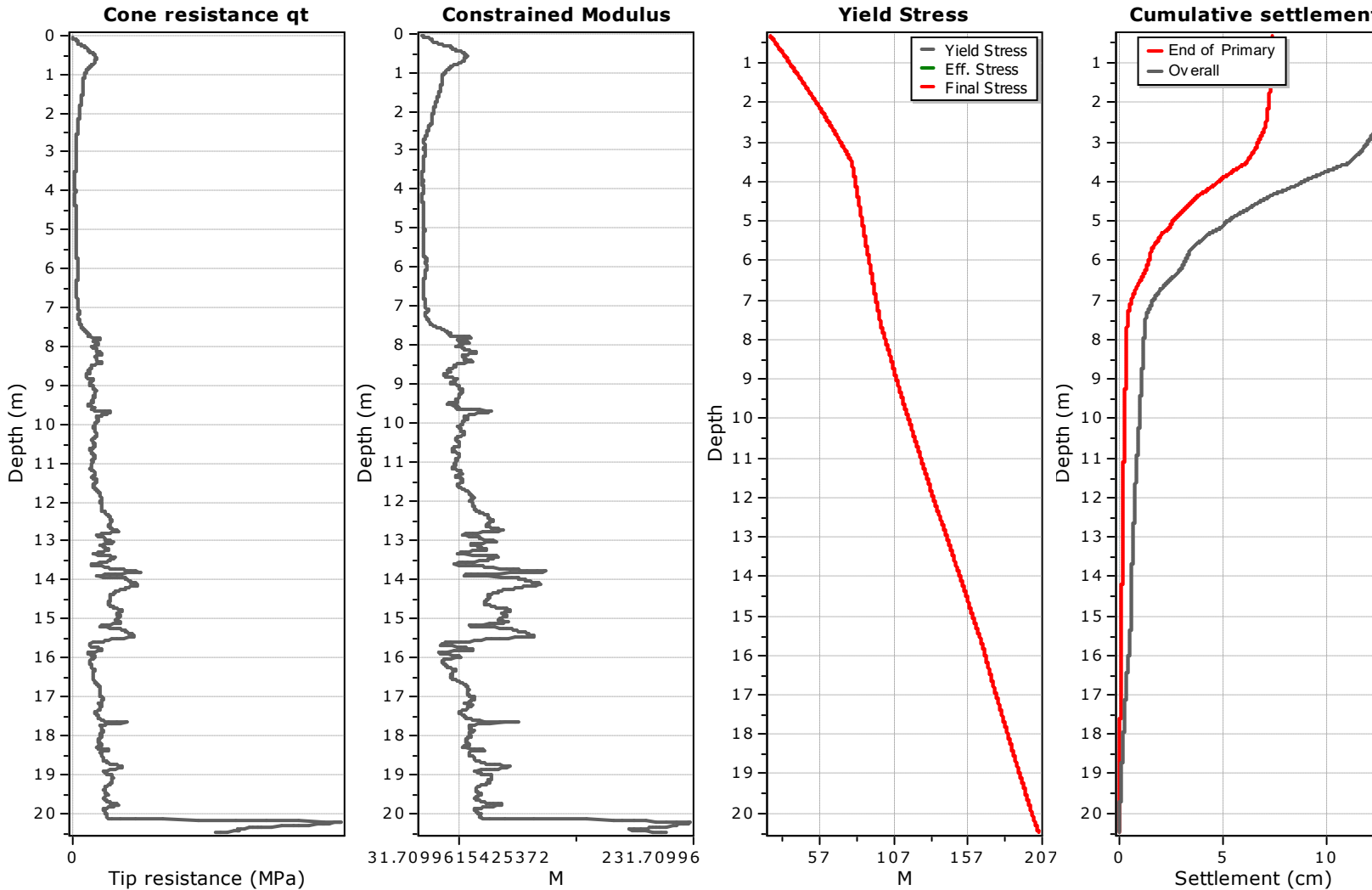
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



Calculation properties	
Footing type:	Rectangular
Footing width:	20.00 (m)
L/B:	1.0
Footing pressure:	20.00 (kPa)
Embedment depth:	0.30 (m)
Footing is rigid:	No
Remove excavation load:	No
Apply 20% rule:	No
Calculate secondary settlements:	Yes
Time period for primary consolidation:	6 months
Time period for second. settlements:	600 months

\* Primary settlement calculation is performed according to the following formula:

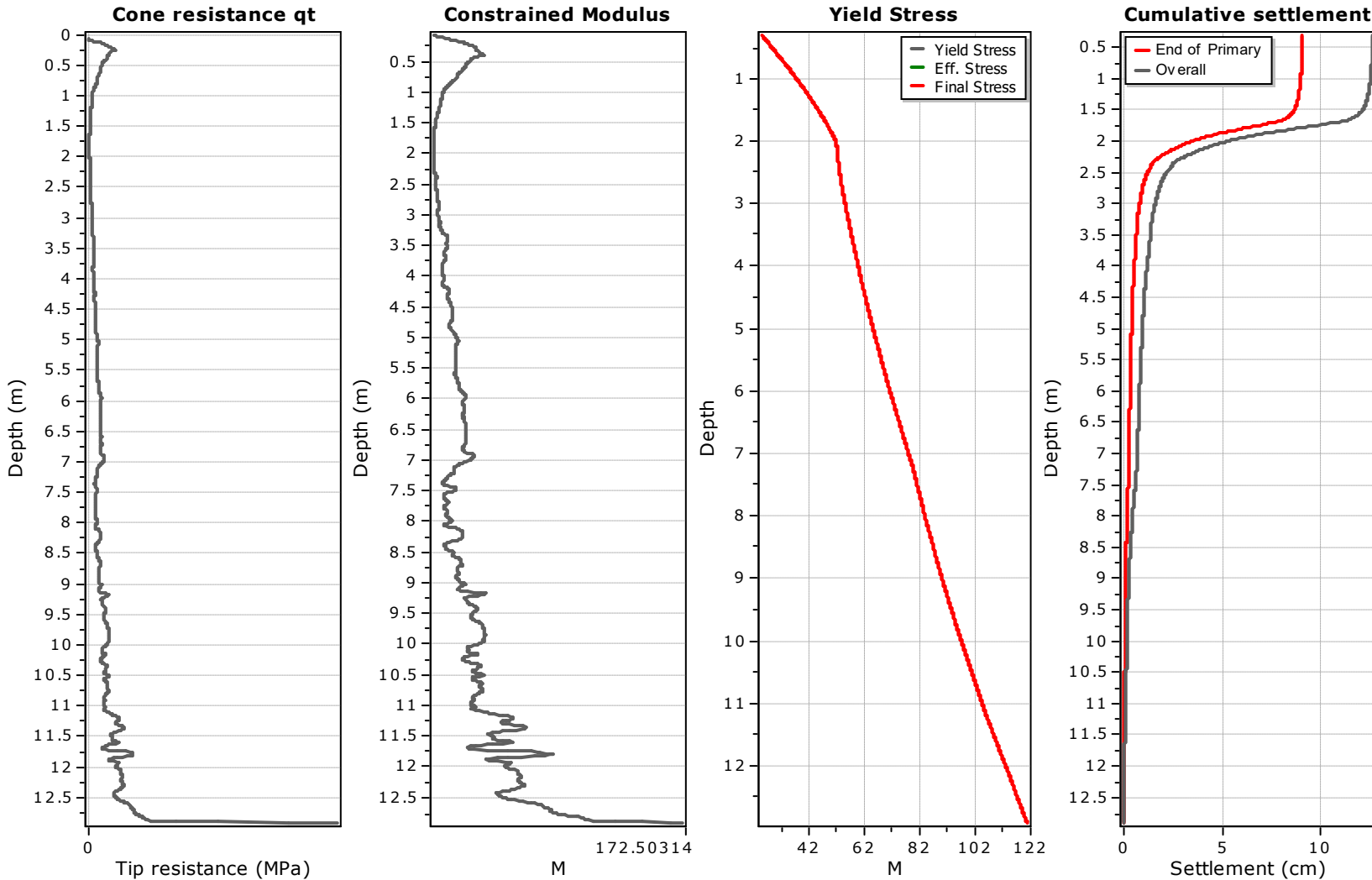
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

Footing type: Rectangular  
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 L/B: 1.0  
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 Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

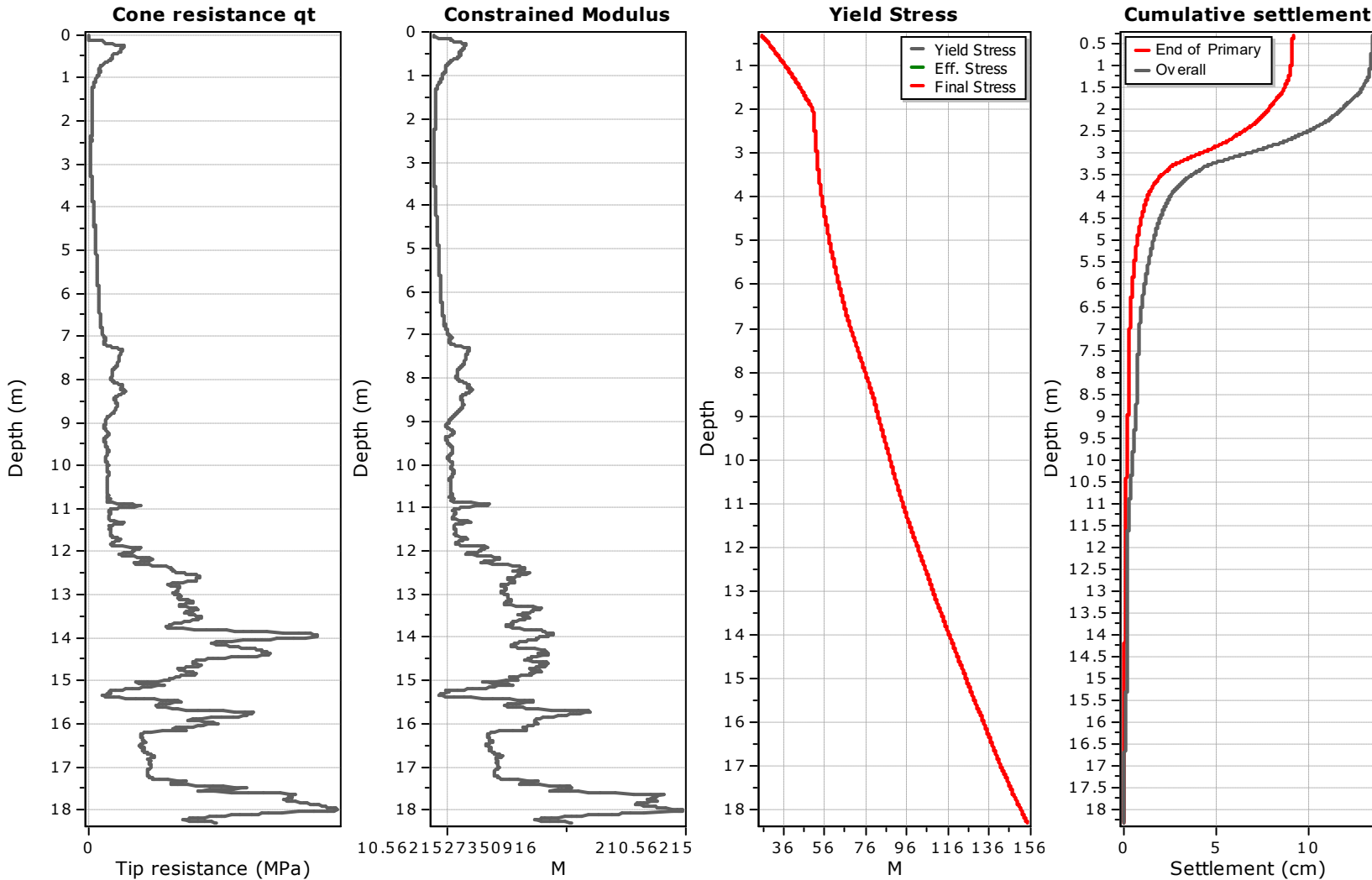
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

- Footing type: Rectangular
- Footing width: 20.00 (m)
- L/B: 1.0
- Footing pressure: 20.00 (kPa)
- Embedment depth: 0.30 (m)
- Footing is rigid: Yes
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- Apply 20% rule: No
- Calculate secondary settlements: Yes
- Time period for primary consolidation: 6 months
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\* Primary settlement calculation is performed according to the following formula:

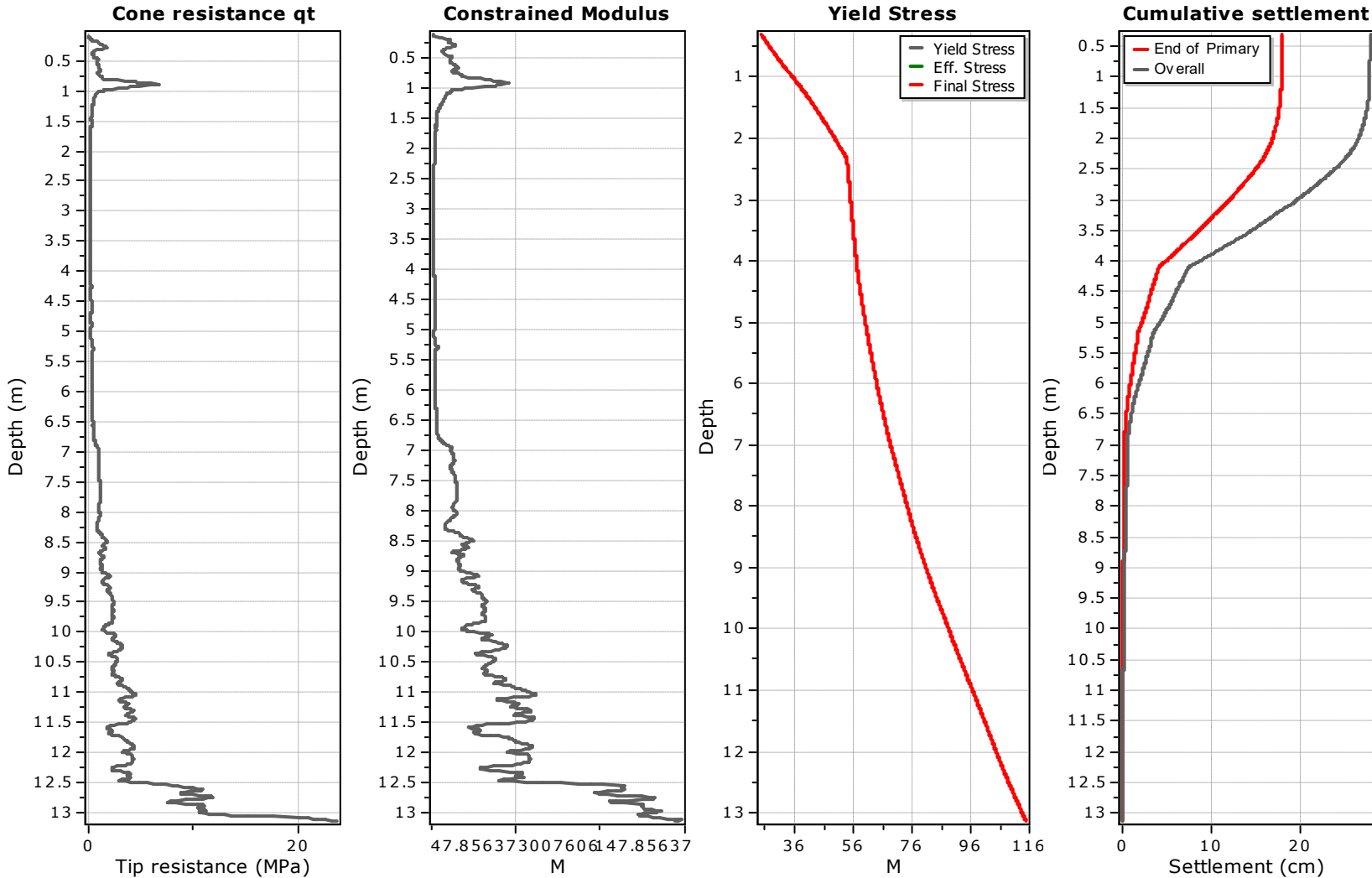
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

- Footing type: Rectangular
- Footing width: 20.00 (m)
- L/B: 1.0
- Footing pressure: 20.00 (kPa)
- Embedment depth: 0.30 (m)
- Footing is rigid: Yes
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- Calculate secondary settlements: Yes
- Time period for primary consolidation: 6 months
- Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

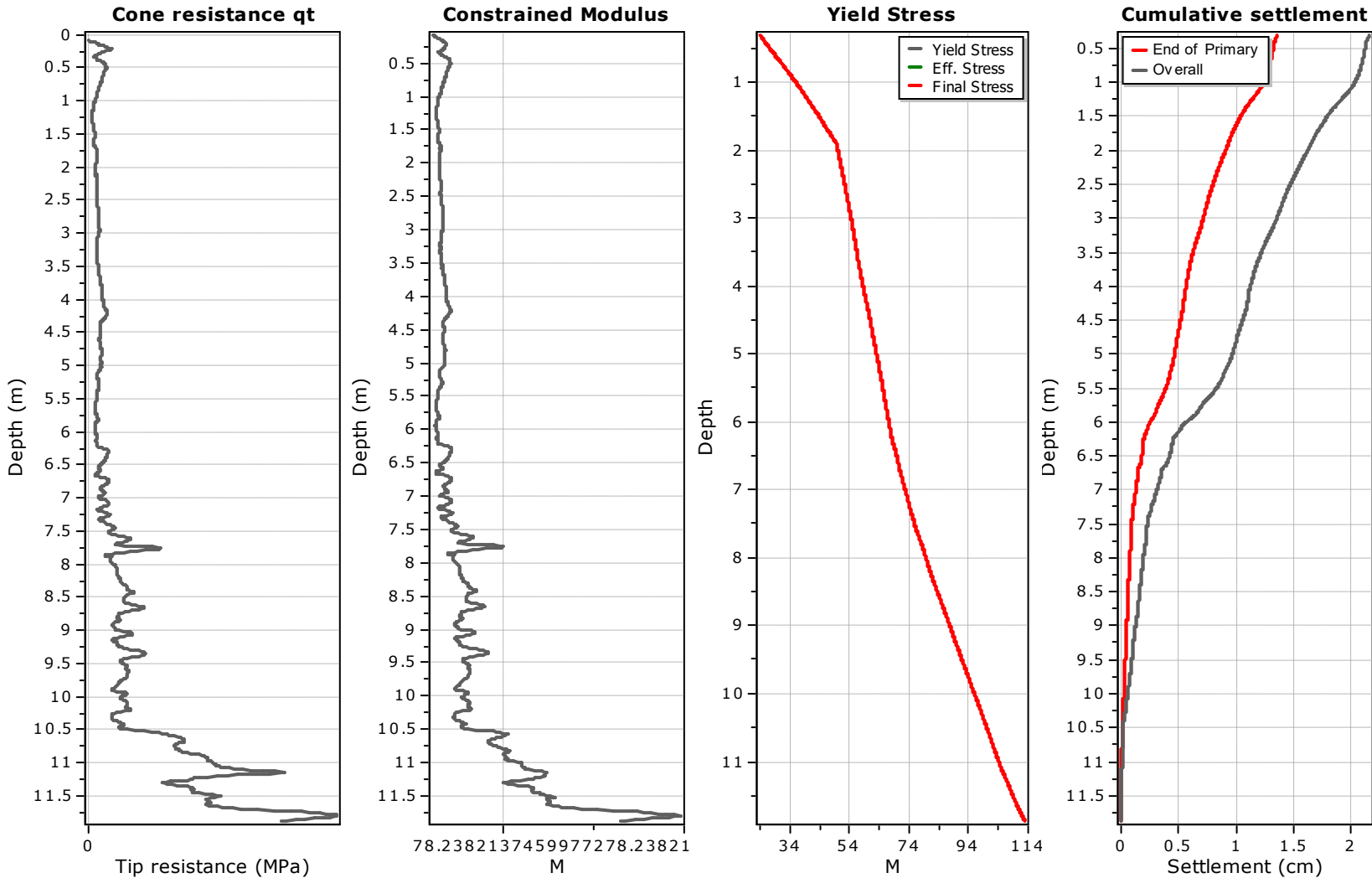
$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**Settlements calculation according to theory of elasticity\***



**Calculation properties**

- Footing type: Rectangular
- Footing width: 20.00 (m)
- L/B: 1.0
- Footing pressure: 20.00 (kPa)
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- Footing is rigid: Yes
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- Apply 20% rule: No
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- Time period for primary consolidation: 6 months
- Time period for second. settlements: 600 months

\* Primary settlement calculation is performed according to the following formula:

$$S = \sum \frac{\Delta\sigma_v}{M_{CPT}} \Delta z$$

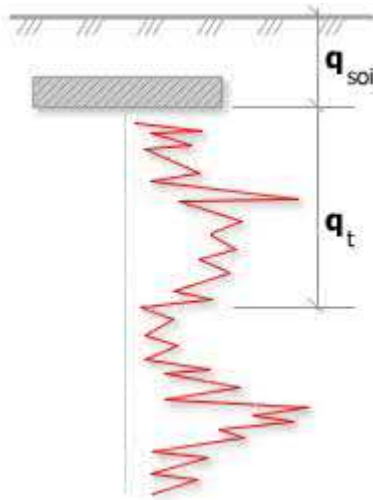
\* Secondary (creep) settlement calculation is performed according to the following formula:

$$S = C_\alpha \cdot \Delta z \cdot \log(t/t_p)$$

where  $t_p$  is the duration of primary consolidation

**APPENDIX D**  
**BEARING CAPACITY, PILE ANALYSIS & ESTIMATED PARAMETERS**

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

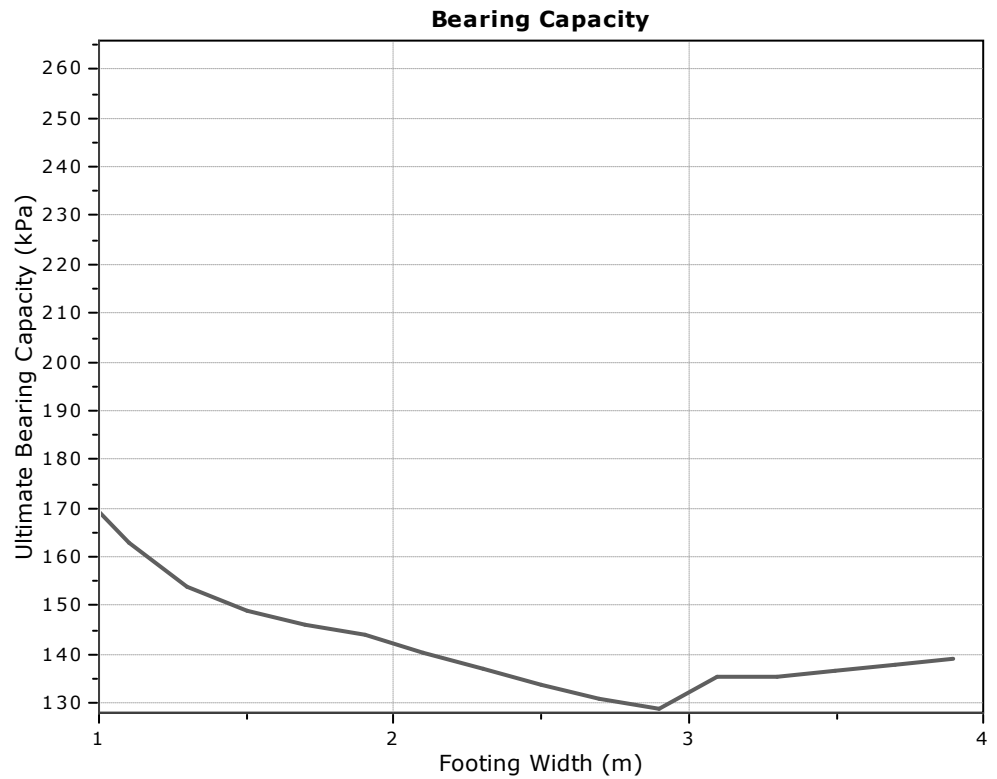


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

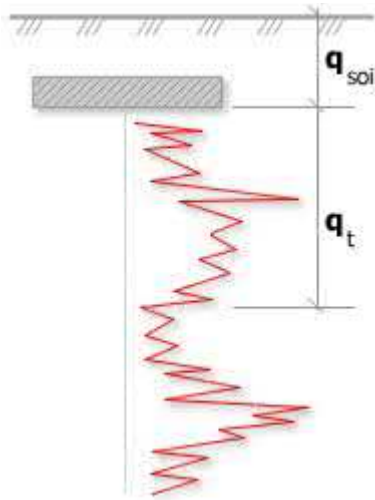
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	1.28	0.20	9.50	265.08
2	0.50	0.50	1.25	1.02	0.20	9.50	213.65
3	0.70	0.50	1.55	0.90	0.20	9.50	190.28
4	0.90	0.50	1.85	0.83	0.20	9.50	175.74
5	1.10	0.50	2.15	0.77	0.20	9.50	162.70
6	1.30	0.50	2.45	0.72	0.20	9.50	153.82
7	1.50	0.50	2.75	0.70	0.20	9.50	148.78
8	1.70	0.50	3.05	0.68	0.20	9.50	145.89
9	1.90	0.50	3.35	0.67	0.20	9.50	143.84
10	2.10	0.50	3.65	0.65	0.20	9.50	140.20
11	2.30	0.50	3.95	0.64	0.20	9.50	136.92
12	2.50	0.50	4.25	0.62	0.20	9.50	133.69
13	2.70	0.50	4.55	0.61	0.20	9.50	130.93
14	2.90	0.50	4.85	0.60	0.20	9.50	128.84
15	3.10	0.50	5.15	0.63	0.20	9.50	135.32
16	3.30	0.50	5.45	0.63	0.20	9.50	135.33
17	3.50	0.50	5.75	0.64	0.20	9.50	136.64
18	3.70	0.50	6.05	0.64	0.20	9.50	138.00
19	3.90	0.50	6.35	0.65	0.20	9.50	138.98

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

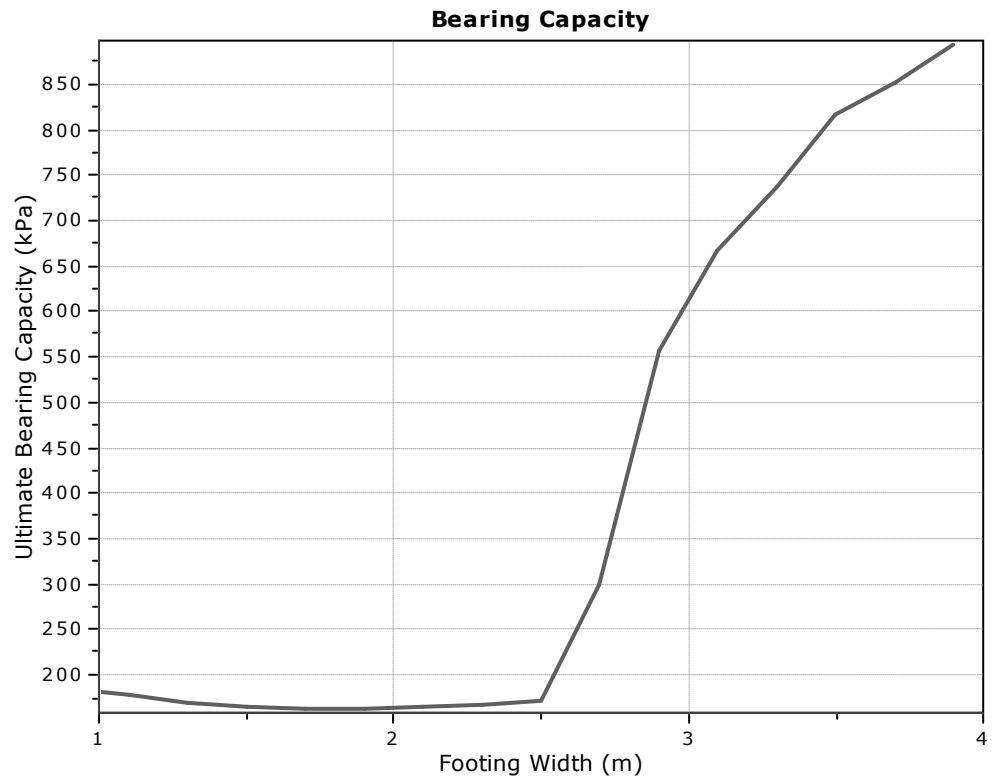


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

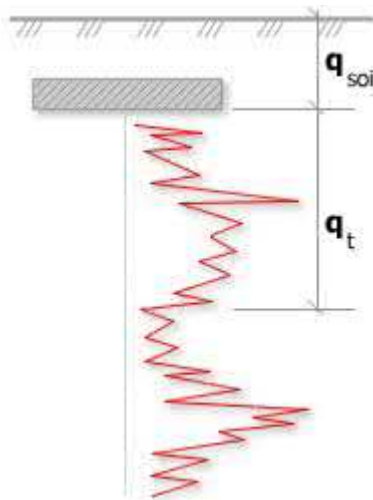
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	0.89	0.20	9.50	186.50
2	0.50	0.50	1.25	0.94	0.20	9.50	196.84
3	0.70	0.50	1.55	0.92	0.20	9.50	193.24
4	0.90	0.50	1.85	0.88	0.20	9.50	185.22
5	1.10	0.50	2.15	0.84	0.20	9.50	176.69
6	1.30	0.50	2.45	0.80	0.20	9.50	168.70
7	1.50	0.50	2.75	0.78	0.20	9.50	165.23
8	1.70	0.50	3.05	0.77	0.20	9.50	162.76
9	1.90	0.50	3.35	0.76	0.20	9.50	162.27
10	2.10	0.50	3.65	0.78	0.20	9.50	164.54
11	2.30	0.50	3.95	0.79	0.20	9.50	167.66
12	2.50	0.50	4.25	0.81	0.20	9.50	170.91
13	2.70	0.50	4.55	1.44	0.20	9.50	298.31
14	2.90	0.50	4.85	2.73	0.20	9.50	556.28
15	3.10	0.50	5.15	3.28	0.20	9.50	666.49
16	3.30	0.50	5.45	3.64	0.20	9.50	737.20
17	3.50	0.50	5.75	4.03	0.20	9.50	816.38
18	3.70	0.50	6.05	4.22	0.20	9.50	852.93
19	3.90	0.50	6.35	4.42	0.20	9.50	894.35

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

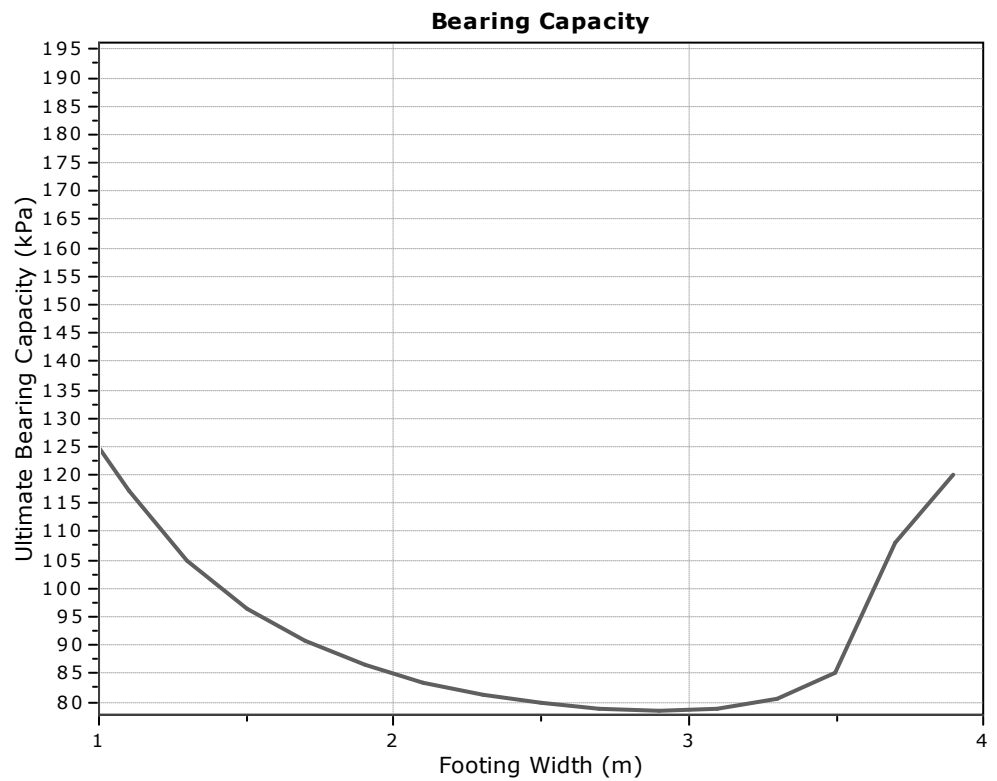


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

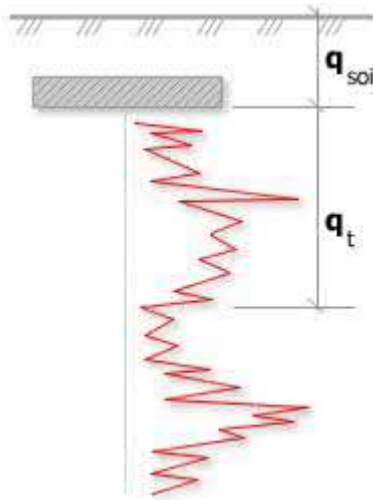
- $R_k$ : Bearing capacity factor
- $q_t$ : Average corrected cone resistance over calculation depth
- $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	0.93	0.20	9.50	195.48
2	0.50	0.50	1.25	0.81	0.20	9.50	172.16
3	0.70	0.50	1.55	0.71	0.20	9.50	152.06
4	0.90	0.50	1.85	0.61	0.20	9.50	132.48
5	1.10	0.50	2.15	0.54	0.20	9.50	117.06
6	1.30	0.50	2.45	0.48	0.20	9.50	104.98
7	1.50	0.50	2.75	0.43	0.20	9.50	96.46
8	1.70	0.50	3.05	0.41	0.20	9.50	90.65
9	1.90	0.50	3.35	0.38	0.20	9.50	86.42
10	2.10	0.50	3.65	0.37	0.20	9.50	83.40
11	2.30	0.50	3.95	0.36	0.20	9.50	81.32
12	2.50	0.50	4.25	0.35	0.20	9.50	79.77
13	2.70	0.50	4.55	0.35	0.20	9.50	78.76
14	2.90	0.50	4.85	0.34	0.20	9.50	78.43
15	3.10	0.50	5.15	0.35	0.20	9.50	78.82
16	3.30	0.50	5.45	0.36	0.20	9.50	80.56
17	3.50	0.50	5.75	0.38	0.20	9.50	85.15
18	3.70	0.50	6.05	0.49	0.20	9.50	108.22
19	3.90	0.50	6.35	0.55	0.20	9.50	120.06

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

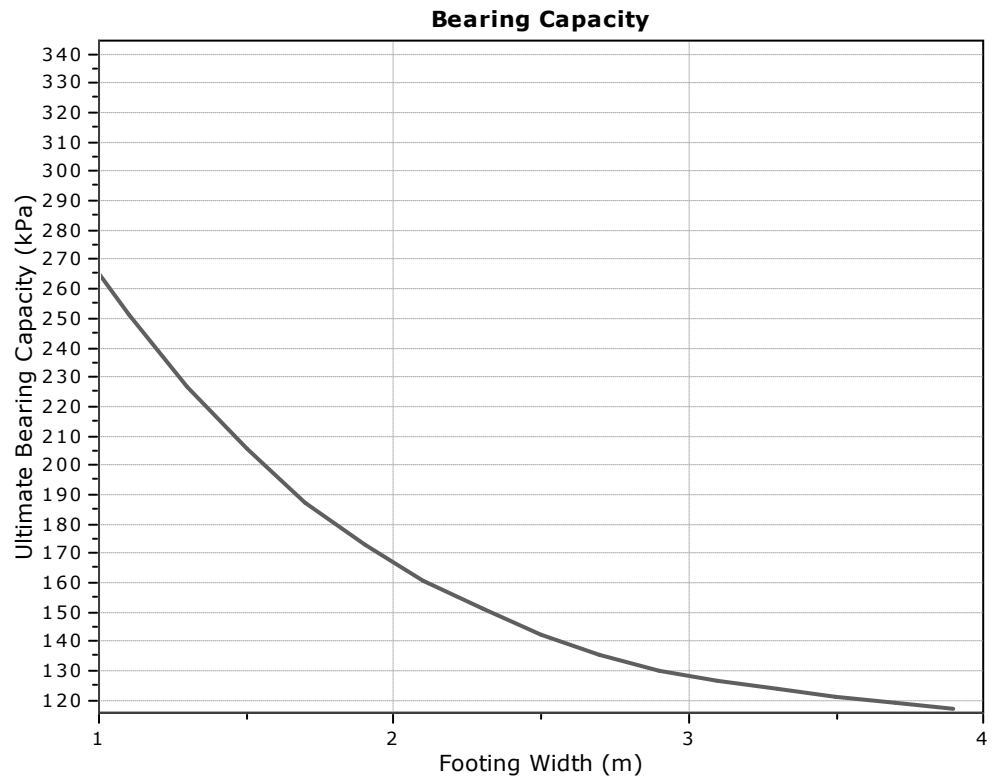


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

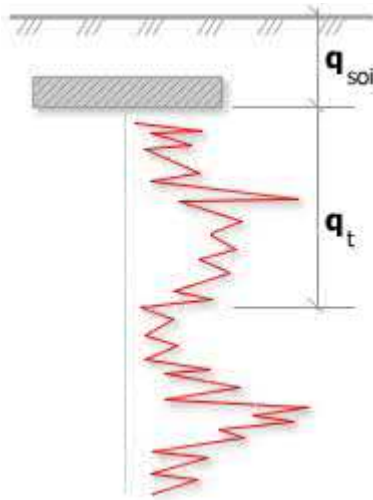
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	1.47	0.20	9.50	304.14
2	0.50	0.50	1.25	1.67	0.20	9.50	343.21
3	0.70	0.50	1.55	1.49	0.20	9.50	306.66
4	0.90	0.50	1.85	1.35	0.20	9.50	279.34
5	1.10	0.50	2.15	1.21	0.20	9.50	251.19
6	1.30	0.50	2.45	1.09	0.20	9.50	226.90
7	1.50	0.50	2.75	0.98	0.20	9.50	205.70
8	1.70	0.50	3.05	0.89	0.20	9.50	187.35
9	1.90	0.50	3.35	0.82	0.20	9.50	172.65
10	2.10	0.50	3.65	0.76	0.20	9.50	160.65
11	2.30	0.50	3.95	0.71	0.20	9.50	150.99
12	2.50	0.50	4.25	0.66	0.20	9.50	142.36
13	2.70	0.50	4.55	0.63	0.20	9.50	135.56
14	2.90	0.50	4.85	0.60	0.20	9.50	130.24
15	3.10	0.50	5.15	0.58	0.20	9.50	126.45
16	3.30	0.50	5.45	0.57	0.20	9.50	123.64
17	3.50	0.50	5.75	0.56	0.20	9.50	120.90
18	3.70	0.50	6.05	0.55	0.20	9.50	118.82
19	3.90	0.50	6.35	0.54	0.20	9.50	117.09

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

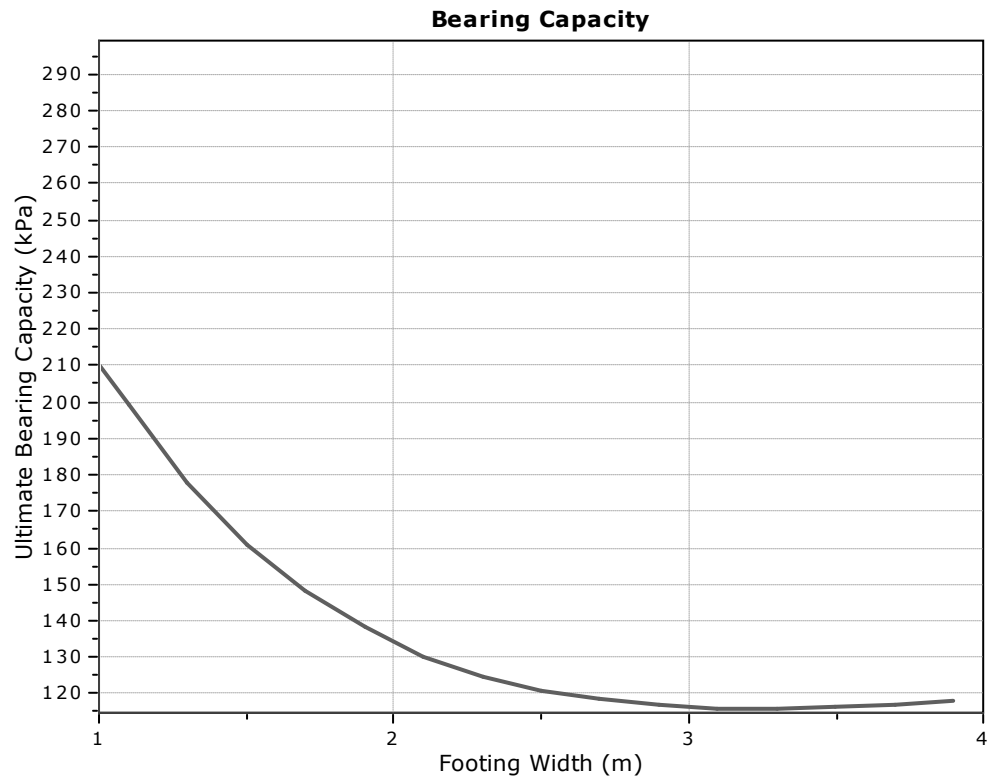


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

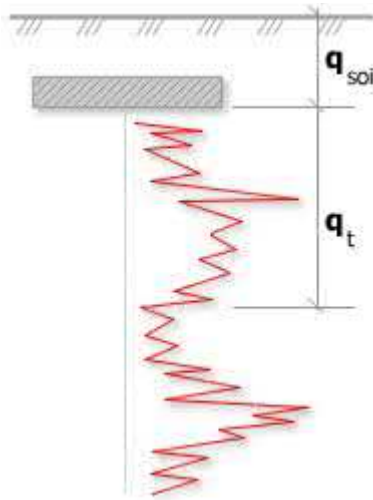
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	1.44	0.20	9.50	298.00
2	0.50	0.50	1.25	1.25	0.20	9.50	259.25
3	0.70	0.50	1.55	1.14	0.20	9.50	236.60
4	0.90	0.50	1.85	1.06	0.20	9.50	221.45
5	1.10	0.50	2.15	0.95	0.20	9.50	198.99
6	1.30	0.50	2.45	0.84	0.20	9.50	177.93
7	1.50	0.50	2.75	0.76	0.20	9.50	160.81
8	1.70	0.50	3.05	0.69	0.20	9.50	148.37
9	1.90	0.50	3.35	0.64	0.20	9.50	138.39
10	2.10	0.50	3.65	0.60	0.20	9.50	130.28
11	2.30	0.50	3.95	0.58	0.20	9.50	124.73
12	2.50	0.50	4.25	0.56	0.20	9.50	120.77
13	2.70	0.50	4.55	0.54	0.20	9.50	118.42
14	2.90	0.50	4.85	0.54	0.20	9.50	116.84
15	3.10	0.50	5.15	0.53	0.20	9.50	116.08
16	3.30	0.50	5.45	0.53	0.20	9.50	115.88
17	3.50	0.50	5.75	0.53	0.20	9.50	116.27
18	3.70	0.50	6.05	0.54	0.20	9.50	116.92
19	3.90	0.50	6.35	0.54	0.20	9.50	118.26

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

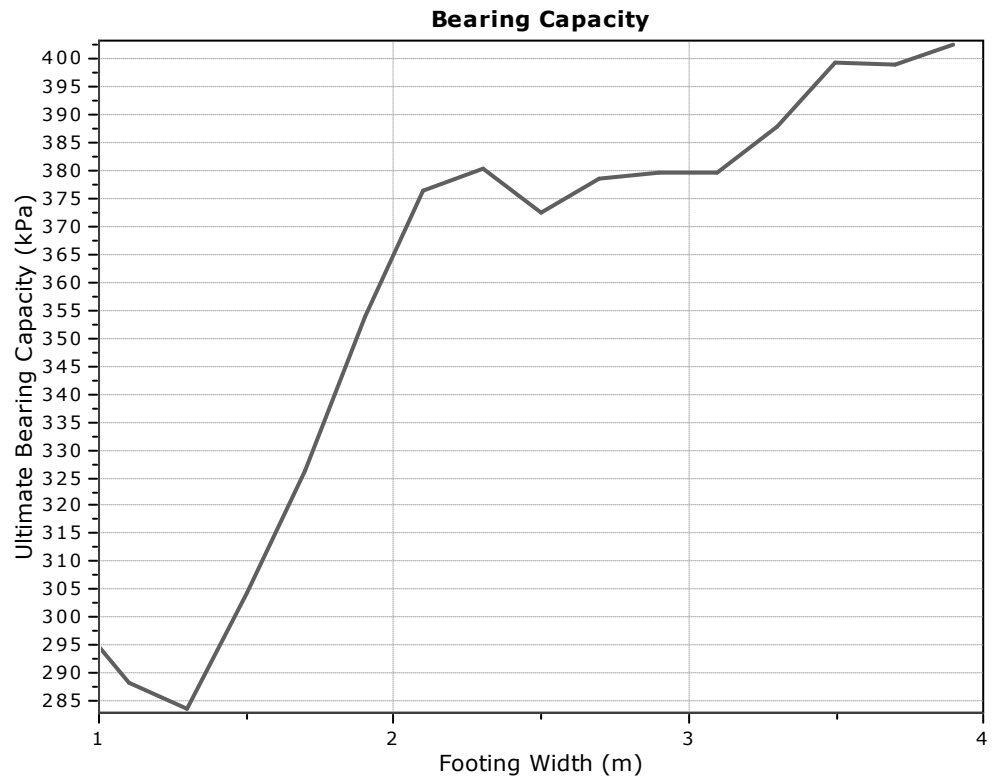


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

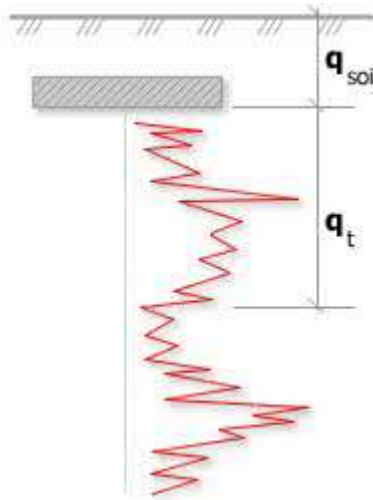
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	1.77	0.20	9.50	363.65
2	0.50	0.50	1.25	1.63	0.20	9.50	335.06
3	0.70	0.50	1.55	1.54	0.20	9.50	318.14
4	0.90	0.50	1.85	1.46	0.20	9.50	301.06
5	1.10	0.50	2.15	1.39	0.20	9.50	288.35
6	1.30	0.50	2.45	1.37	0.20	9.50	283.56
7	1.50	0.50	2.75	1.47	0.20	9.50	304.27
8	1.70	0.50	3.05	1.58	0.20	9.50	326.21
9	1.90	0.50	3.35	1.72	0.20	9.50	353.85
10	2.10	0.50	3.65	1.83	0.20	9.50	376.46
11	2.30	0.50	3.95	1.86	0.20	9.50	380.55
12	2.50	0.50	4.25	1.82	0.20	9.50	372.57
13	2.70	0.50	4.55	1.85	0.20	9.50	378.53
14	2.90	0.50	4.85	1.85	0.20	9.50	379.70
15	3.10	0.50	5.15	1.85	0.20	9.50	379.73
16	3.30	0.50	5.45	1.89	0.20	9.50	387.96
17	3.50	0.50	5.75	1.95	0.20	9.50	399.56
18	3.70	0.50	6.05	1.95	0.20	9.50	399.07
19	3.90	0.50	6.35	1.97	0.20	9.50	402.68

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

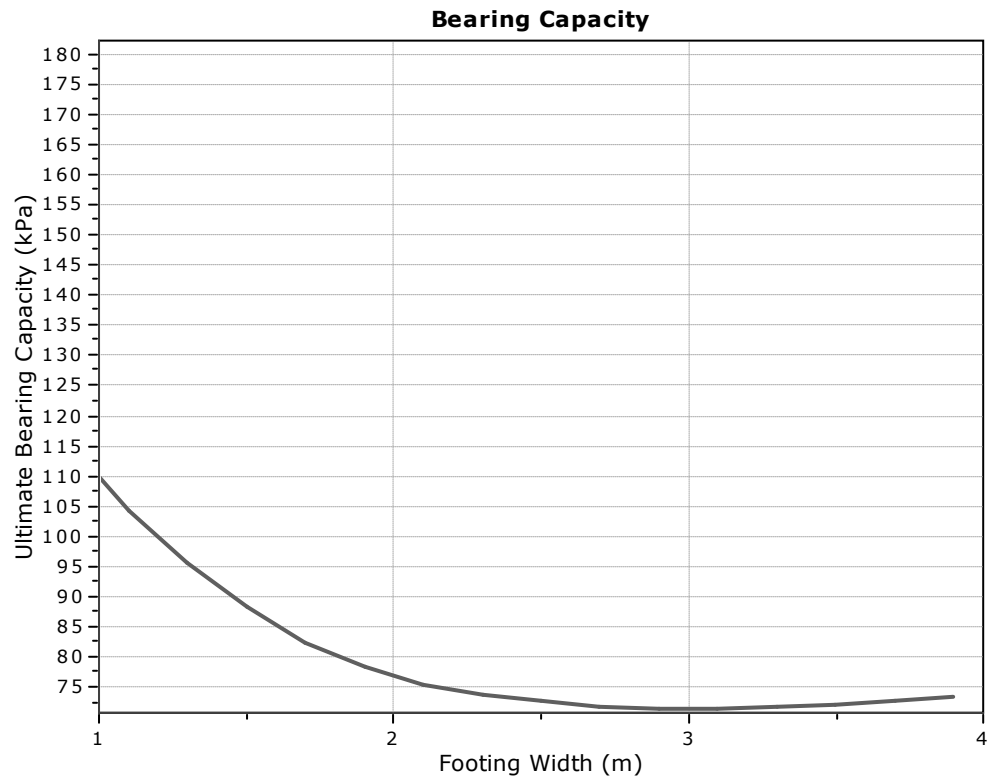


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

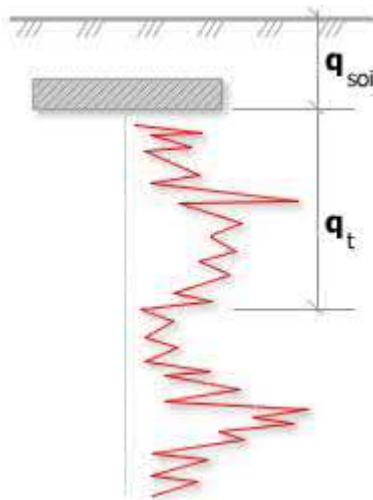
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	0.86	0.20	9.50	181.60
2	0.50	0.50	1.25	0.73	0.20	9.50	155.21
3	0.70	0.50	1.55	0.62	0.20	9.50	133.15
4	0.90	0.50	1.85	0.53	0.20	9.50	115.38
5	1.10	0.50	2.15	0.47	0.20	9.50	104.10
6	1.30	0.50	2.45	0.43	0.20	9.50	95.61
7	1.50	0.50	2.75	0.39	0.20	9.50	88.24
8	1.70	0.50	3.05	0.36	0.20	9.50	82.39
9	1.90	0.50	3.35	0.34	0.20	9.50	78.23
10	2.10	0.50	3.65	0.33	0.20	9.50	75.51
11	2.30	0.50	3.95	0.32	0.20	9.50	73.80
12	2.50	0.50	4.25	0.32	0.20	9.50	72.55
13	2.70	0.50	4.55	0.31	0.20	9.50	71.72
14	2.90	0.50	4.85	0.31	0.20	9.50	71.37
15	3.10	0.50	5.15	0.31	0.20	9.50	71.36
16	3.30	0.50	5.45	0.31	0.20	9.50	71.54
17	3.50	0.50	5.75	0.31	0.20	9.50	72.04
18	3.70	0.50	6.05	0.32	0.20	9.50	72.59
19	3.90	0.50	6.35	0.32	0.20	9.50	73.52

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

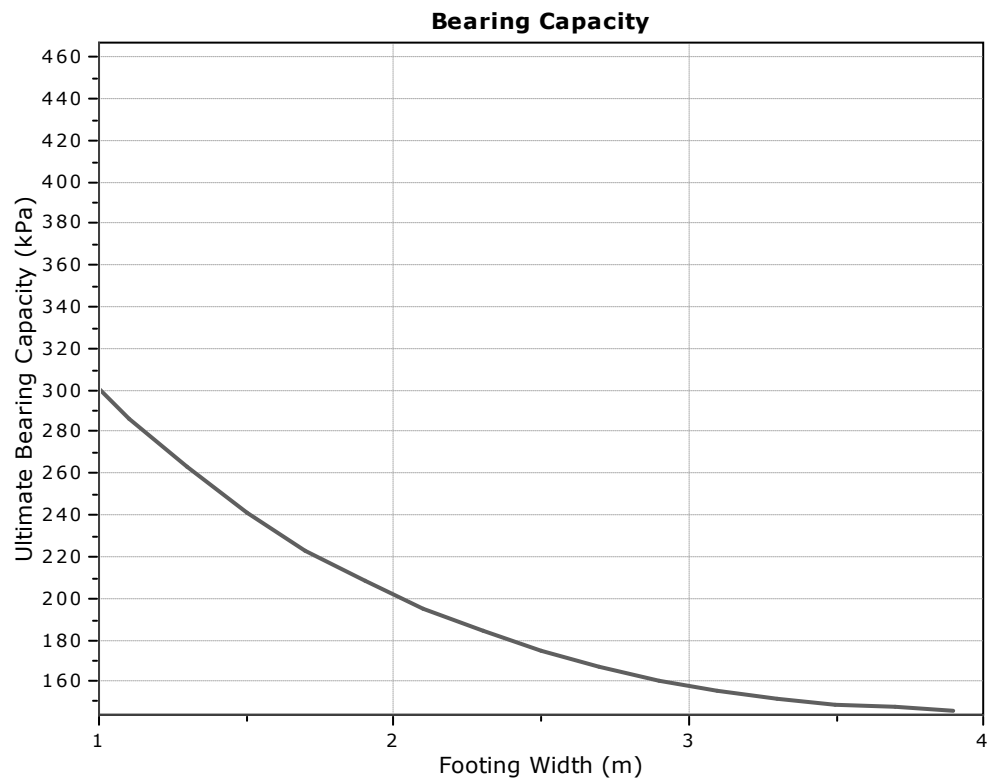


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

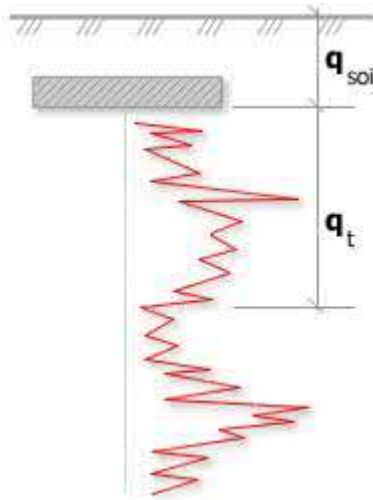
- $R_k$ : Bearing capacity factor
- $q_t$ : Average corrected cone resistance over calculation depth
- $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	2.28	0.20	9.50	464.84
2	0.50	0.50	1.25	1.90	0.20	9.50	389.02
3	0.70	0.50	1.55	1.70	0.20	9.50	348.80
4	0.90	0.50	1.85	1.53	0.20	9.50	314.77
5	1.10	0.50	2.15	1.39	0.20	9.50	286.55
6	1.30	0.50	2.45	1.27	0.20	9.50	262.76
7	1.50	0.50	2.75	1.16	0.20	9.50	241.04
8	1.70	0.50	3.05	1.07	0.20	9.50	222.91
9	1.90	0.50	3.35	0.99	0.20	9.50	208.31
10	2.10	0.50	3.65	0.93	0.20	9.50	195.45
11	2.30	0.50	3.95	0.87	0.20	9.50	184.34
12	2.50	0.50	4.25	0.83	0.20	9.50	174.66
13	2.70	0.50	4.55	0.79	0.20	9.50	167.00
14	2.90	0.50	4.85	0.76	0.20	9.50	160.70
15	3.10	0.50	5.15	0.73	0.20	9.50	156.06
16	3.30	0.50	5.45	0.71	0.20	9.50	151.80
17	3.50	0.50	5.75	0.69	0.20	9.50	148.41
18	3.70	0.50	6.05	0.69	0.20	9.50	147.74
19	3.90	0.50	6.35	0.68	0.20	9.50	146.00

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

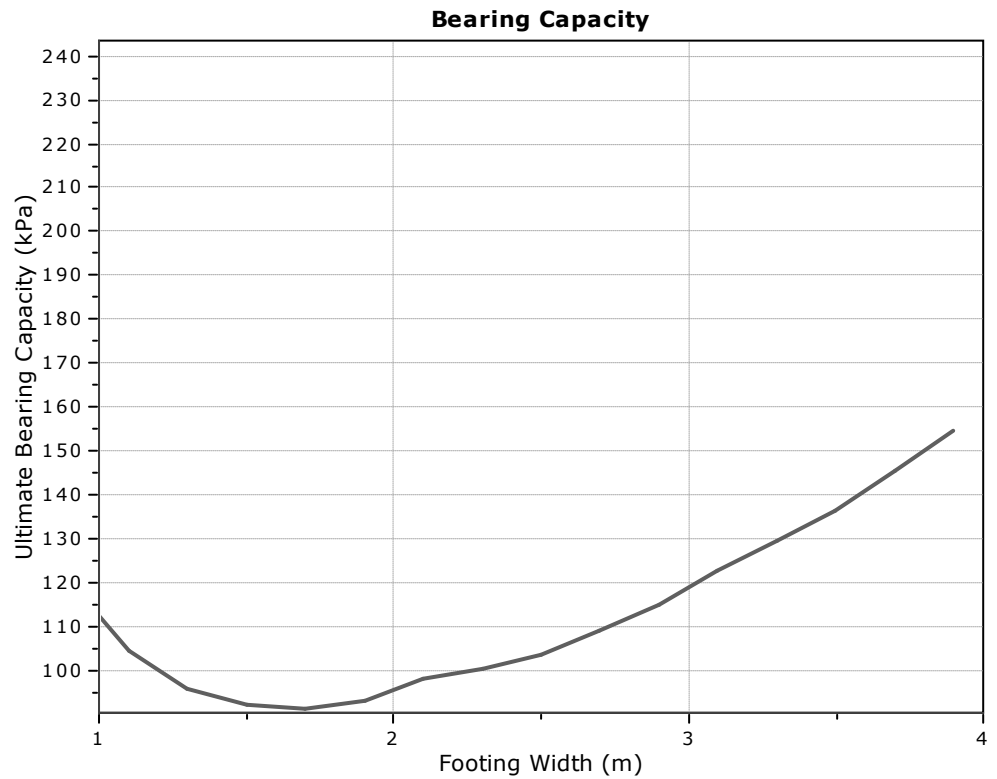


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

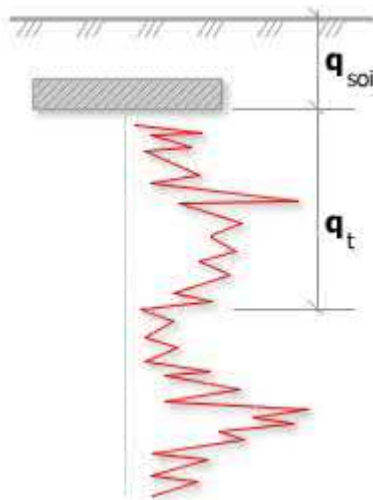
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	1.17	0.20	9.50	242.54
2	0.50	0.50	1.25	0.86	0.20	9.50	181.65
3	0.70	0.50	1.55	0.69	0.20	9.50	147.55
4	0.90	0.50	1.85	0.56	0.20	9.50	120.58
5	1.10	0.50	2.15	0.48	0.20	9.50	104.76
6	1.30	0.50	2.45	0.43	0.20	9.50	95.99
7	1.50	0.50	2.75	0.41	0.20	9.50	92.20
8	1.70	0.50	3.05	0.41	0.20	9.50	91.43
9	1.90	0.50	3.35	0.42	0.20	9.50	93.28
10	2.10	0.50	3.65	0.44	0.20	9.50	98.05
11	2.30	0.50	3.95	0.46	0.20	9.50	100.66
12	2.50	0.50	4.25	0.47	0.20	9.50	103.83
13	2.70	0.50	4.55	0.50	0.20	9.50	109.33
14	2.90	0.50	4.85	0.53	0.20	9.50	115.24
15	3.10	0.50	5.15	0.57	0.20	9.50	123.03
16	3.30	0.50	5.45	0.60	0.20	9.50	129.79
17	3.50	0.50	5.75	0.64	0.20	9.50	136.59
18	3.70	0.50	6.05	0.68	0.20	9.50	145.75
19	3.90	0.50	6.35	0.73	0.20	9.50	154.56

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

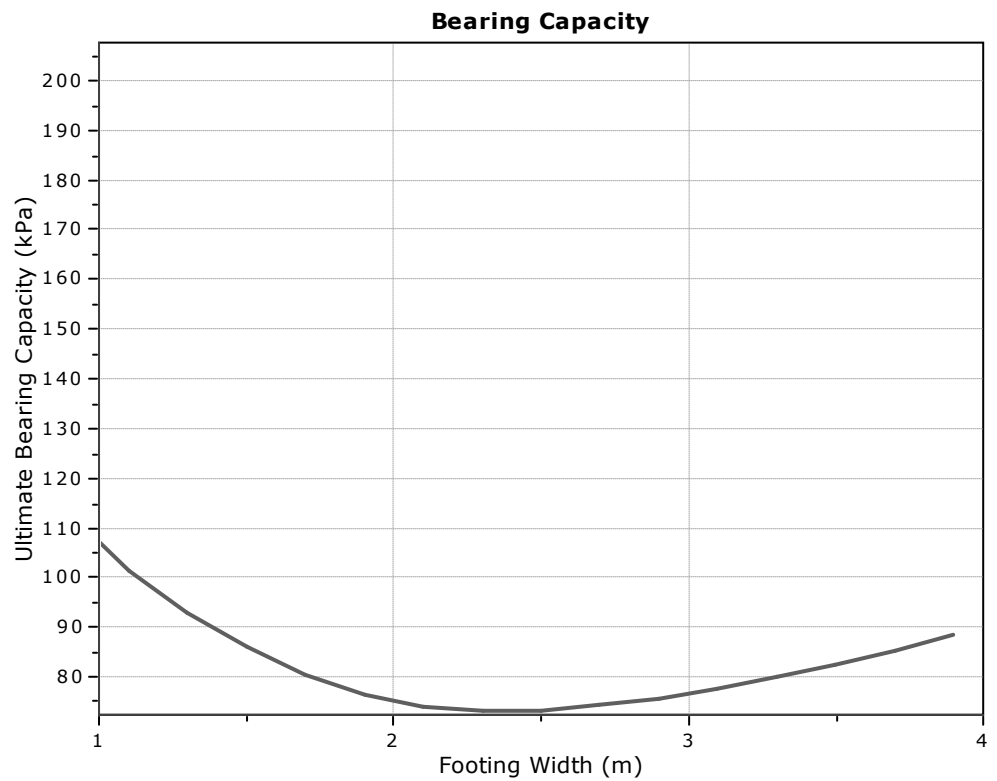


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

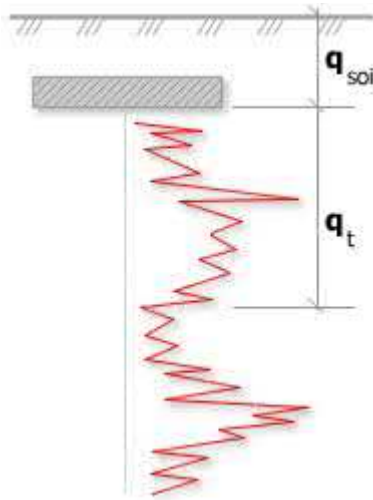
- $R_k$ : Bearing capacity factor
- $q_t$ : Average corrected cone resistance over calculation depth
- $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	0.99	0.20	9.50	206.78
2	0.50	0.50	1.25	0.76	0.20	9.50	160.77
3	0.70	0.50	1.55	0.61	0.20	9.50	131.84
4	0.90	0.50	1.85	0.52	0.20	9.50	112.86
5	1.10	0.50	2.15	0.46	0.20	9.50	101.46
6	1.30	0.50	2.45	0.42	0.20	9.50	92.83
7	1.50	0.50	2.75	0.38	0.20	9.50	86.07
8	1.70	0.50	3.05	0.36	0.20	9.50	80.53
9	1.90	0.50	3.35	0.34	0.20	9.50	76.50
10	2.10	0.50	3.65	0.32	0.20	9.50	74.16
11	2.30	0.50	3.95	0.32	0.20	9.50	73.18
12	2.50	0.50	4.25	0.32	0.20	9.50	73.37
13	2.70	0.50	4.55	0.32	0.20	9.50	74.32
14	2.90	0.50	4.85	0.33	0.20	9.50	75.76
15	3.10	0.50	5.15	0.34	0.20	9.50	77.73
16	3.30	0.50	5.45	0.35	0.20	9.50	79.95
17	3.50	0.50	5.75	0.37	0.20	9.50	82.52
18	3.70	0.50	6.05	0.38	0.20	9.50	85.34
19	3.90	0.50	6.35	0.39	0.20	9.50	88.28

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

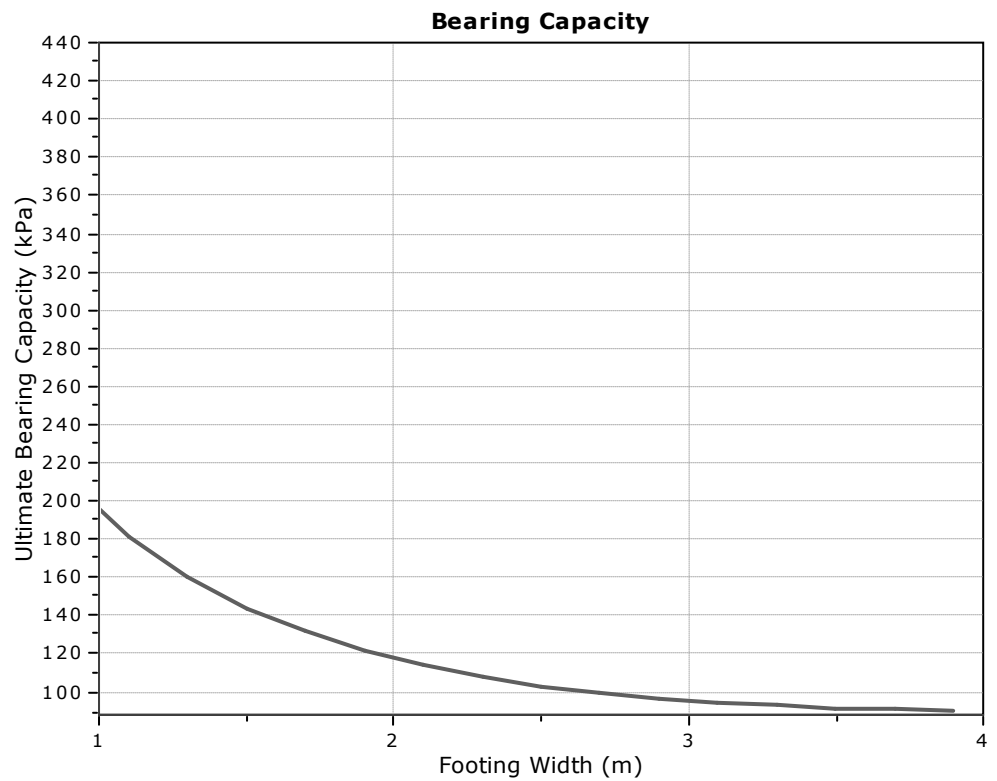


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

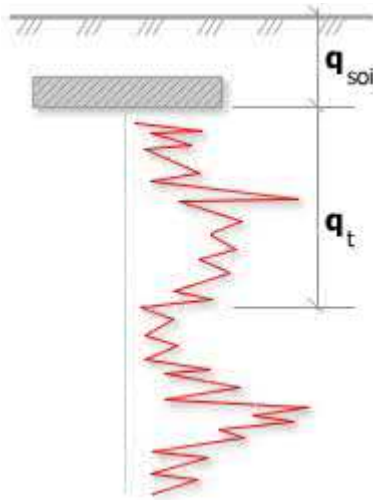
$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	2.14	0.20	9.50	438.00
2	0.50	0.50	1.25	1.61	0.20	9.50	332.08
3	0.70	0.50	1.55	1.24	0.20	9.50	257.73
4	0.90	0.50	1.85	1.01	0.20	9.50	211.10
5	1.10	0.50	2.15	0.86	0.20	9.50	181.51
6	1.30	0.50	2.45	0.75	0.20	9.50	160.08
7	1.50	0.50	2.75	0.67	0.20	9.50	143.98
8	1.70	0.50	3.05	0.61	0.20	9.50	131.64
9	1.90	0.50	3.35	0.56	0.20	9.50	121.84
10	2.10	0.50	3.65	0.52	0.20	9.50	113.95
11	2.30	0.50	3.95	0.49	0.20	9.50	107.63
12	2.50	0.50	4.25	0.47	0.20	9.50	102.70
13	2.70	0.50	4.55	0.45	0.20	9.50	99.26
14	2.90	0.50	4.85	0.43	0.20	9.50	96.40
15	3.10	0.50	5.15	0.42	0.20	9.50	93.81
16	3.30	0.50	5.45	0.42	0.20	9.50	92.83
17	3.50	0.50	5.75	0.41	0.20	9.50	91.63
18	3.70	0.50	6.05	0.41	0.20	9.50	90.66
19	3.90	0.50	6.35	0.40	0.20	9.50	90.13

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

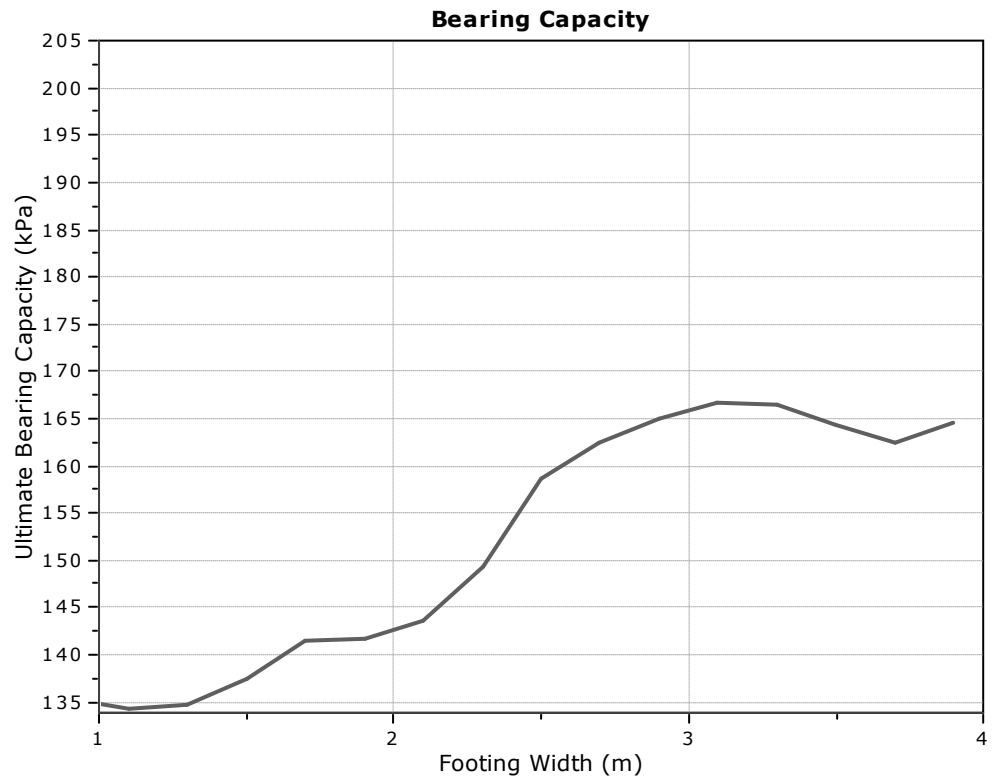


Bearing Capacity calculation is performed based on the formula:

$$Q_{ult} = R_k \times q_t + q_{soil}$$

where:

$R_k$ : Bearing capacity factor  
 $q_t$ : Average corrected cone resistance over calculation depth  
 $q_{soil}$ : Pressure applied by soil above footing



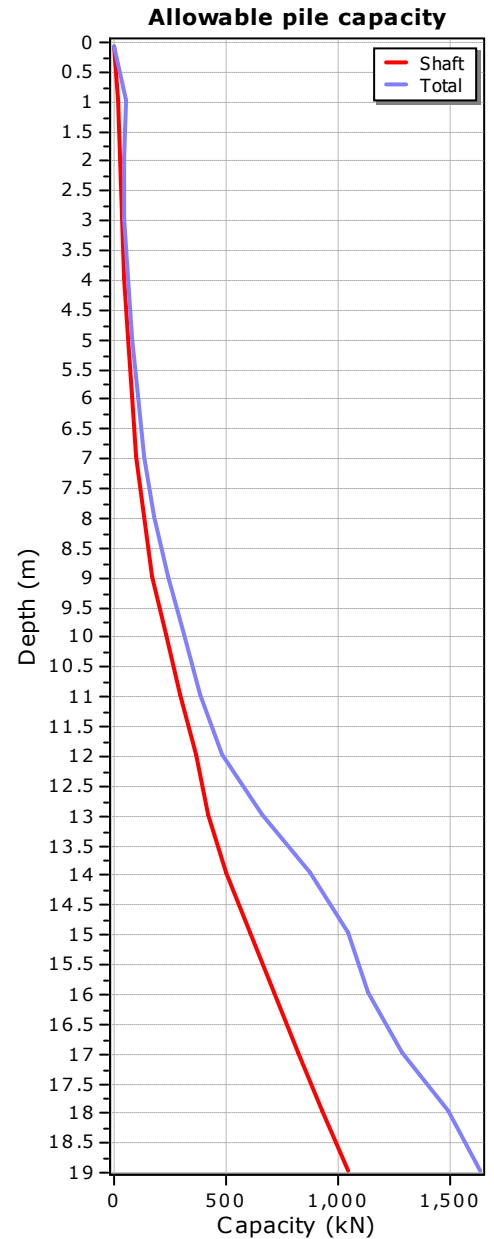
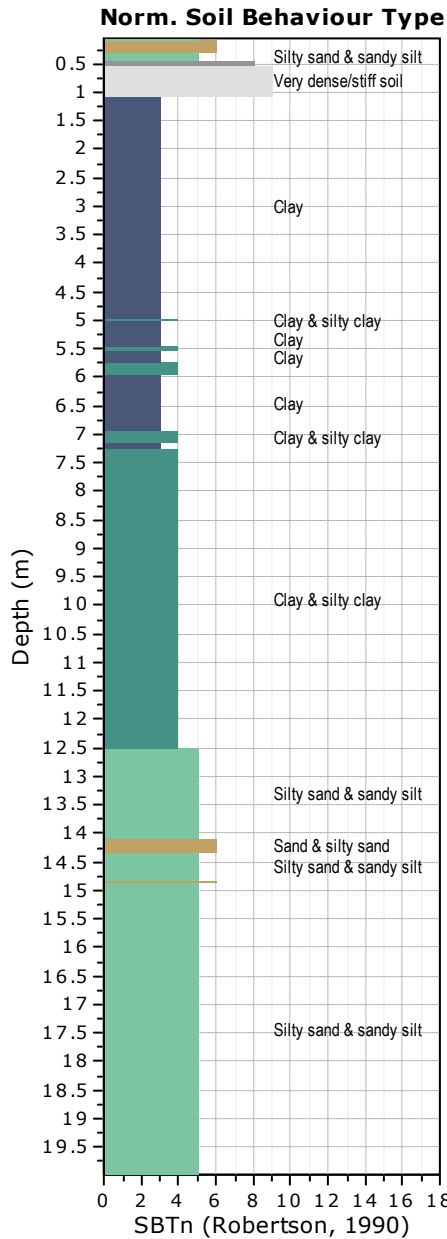
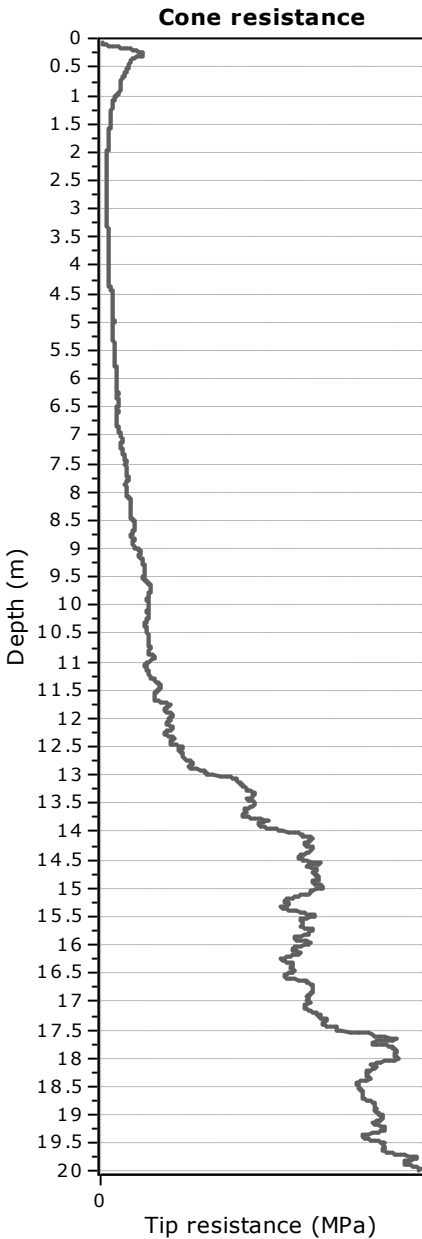
**:: Tabular results ::**

No	B (m)	Start Depth (m)	End Depth (m)	Ave. $q_t$ (MPa)	$R_k$	Soil Press. (kPa)	Ult. bearing cap. (kPa)
1	0.30	0.50	0.95	0.98	0.20	9.50	204.58
2	0.50	0.50	1.25	0.75	0.20	9.50	159.62
3	0.70	0.50	1.55	0.65	0.20	9.50	140.45
4	0.90	0.50	1.85	0.63	0.20	9.50	135.32
5	1.10	0.50	2.15	0.62	0.20	9.50	134.31
6	1.30	0.50	2.45	0.63	0.20	9.50	134.82
7	1.50	0.50	2.75	0.64	0.20	9.50	137.41
8	1.70	0.50	3.05	0.66	0.20	9.50	141.55
9	1.90	0.50	3.35	0.66	0.20	9.50	141.71
10	2.10	0.50	3.65	0.67	0.20	9.50	143.60
11	2.30	0.50	3.95	0.70	0.20	9.50	149.36
12	2.50	0.50	4.25	0.75	0.20	9.50	158.61
13	2.70	0.50	4.55	0.76	0.20	9.50	162.49
14	2.90	0.50	4.85	0.78	0.20	9.50	165.03
15	3.10	0.50	5.15	0.79	0.20	9.50	166.78
16	3.30	0.50	5.45	0.78	0.20	9.50	166.48
17	3.50	0.50	5.75	0.77	0.20	9.50	164.30
18	3.70	0.50	6.05	0.76	0.20	9.50	162.37
19	3.90	0.50	6.35	0.78	0.20	9.50	164.56

**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**

**Pile properties**

Shaft diameter:	0.60 m	Pile shaft Group:	Group IA
Tip diameter:	0.60 m	Pile tip Group:	Group I
Unit friction area:	1.885 m <sup>2</sup>	Pile shaft FOS:	2.00
Tip area:	0.283 m <sup>2</sup>	Pile tip FOS:	3.00



**Pile group for bearing capacity factor  $k_c$**

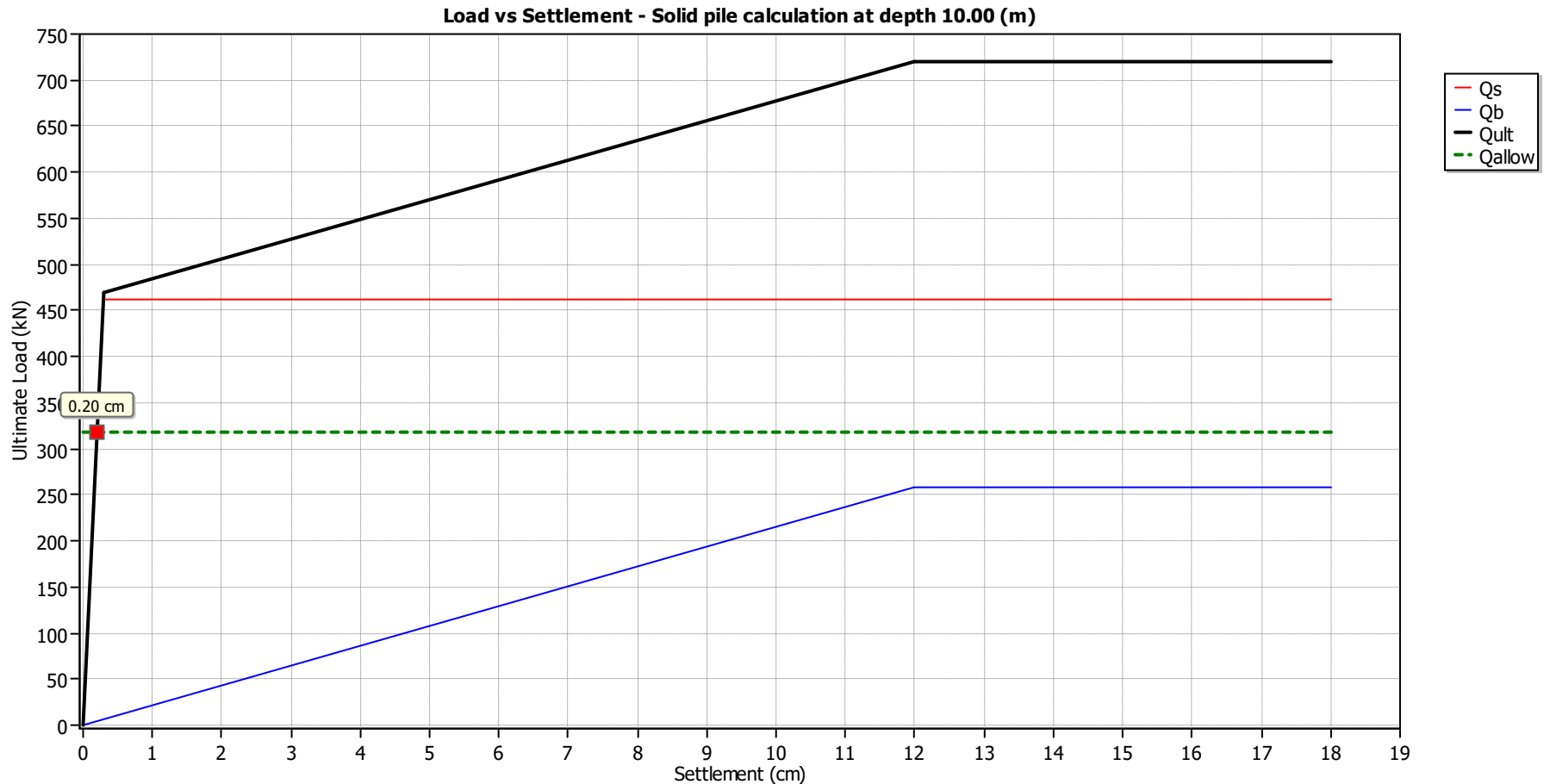
- Group I: plain bored piles; mud bored piles; micro piles (grouted under low pressure); cased bored piles; hollow bored piles; piers; barrettes
- Group II: cast screwed piles; driven precast piles; prestressed tubular piles; driven cast piles; jacked metal piles; micropiles (small diameter piles grouted under high pressure with diameter < 250 mm); driven grouted piles (low pressure grouting); driven metal piles; driven rammed piles; jacket concrete piles; high pressure grouted piles of large diameter

**Pile group for friction coefficient alpha**

- Group IA: plain bored piles; mud bored piles; hollow auger bored piles; micro piles (grouted under low pressure); cast screwed piles; piers; barrettes
- Group IB: cased bored piles; driven cast piles
- Group IIA: driven precast piles; prestresses tubular piles; jacket concrete piles



Project: 19457 - Dargaville Racing Club  
Location: SH14, Awakino Point, Dargaville

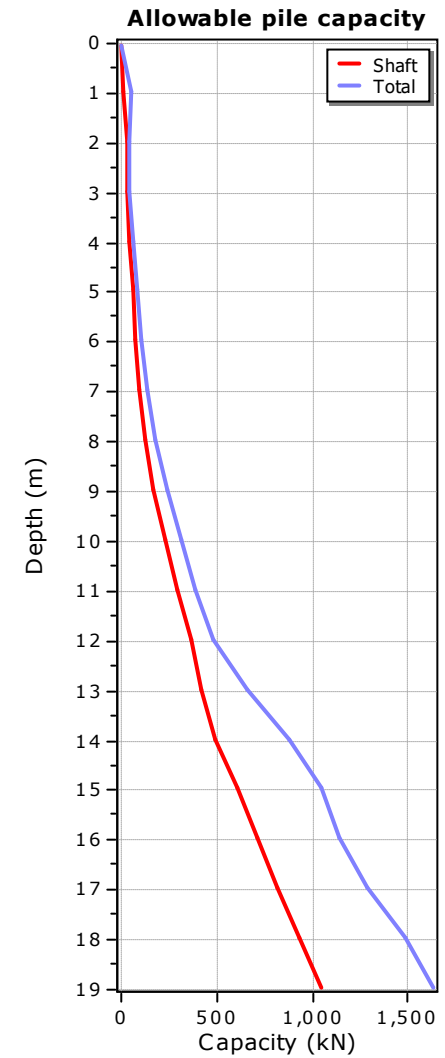
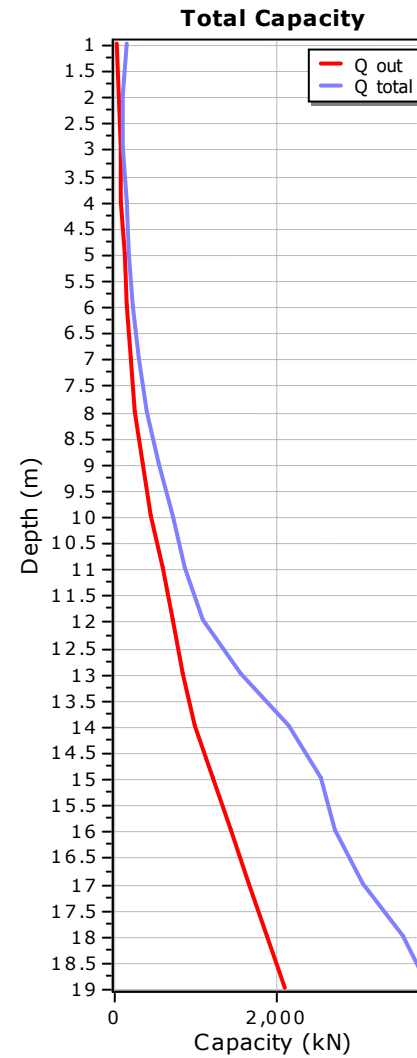
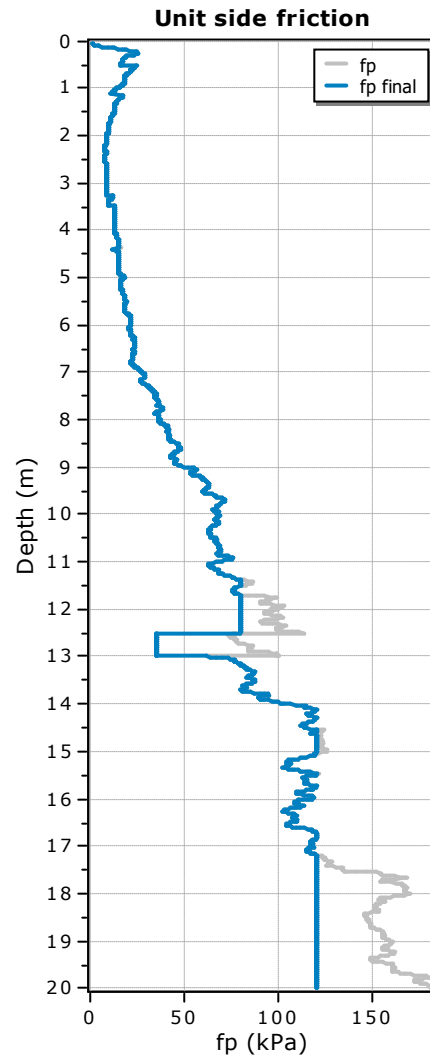
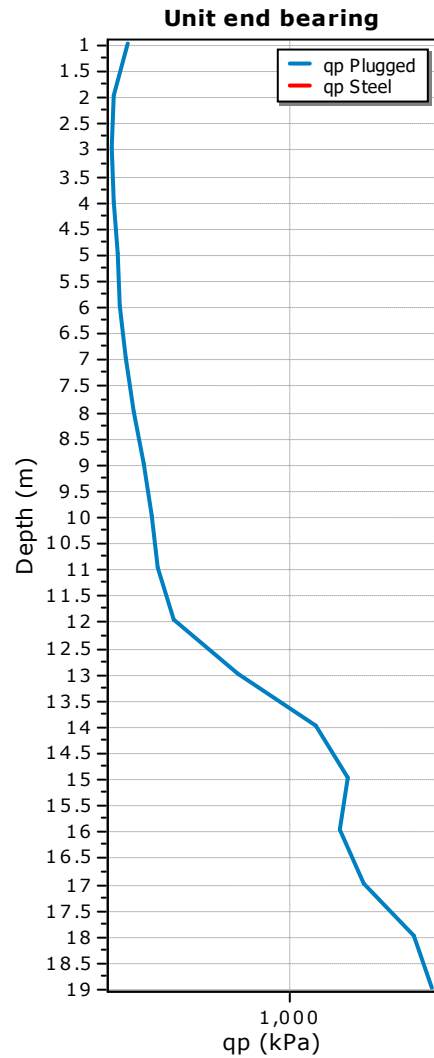


**Pile properties**

Shaft diameter:	0.60 m	Pile shaft Group:	Group IA	Shaft displacement:	0.005 x Ds (where Ds = shaft diameter)
Tip diameter:	0.60 m	Pile tip Group:	Group I	Tip displacement:	0.200 x Db (where Db = base/tip diameter)
Unit friction area:	1.885 m <sup>2</sup>	Pile shaft FOS:	2.00		
Tip area:	0.283 m <sup>2</sup>	Pile tip FOS:	3.00		

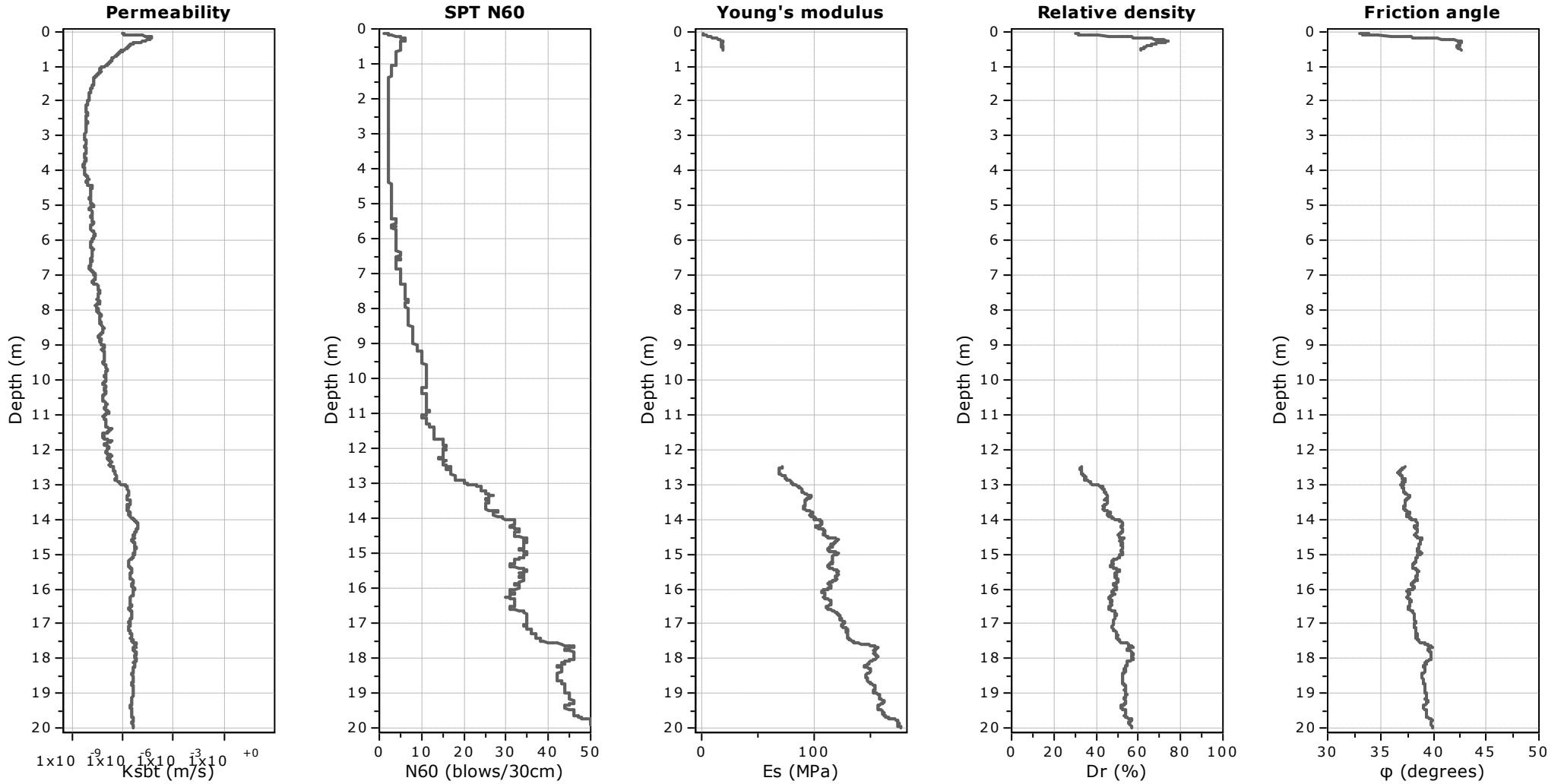


Project: 19457 - Dargaville Racing Club  
Location: SH14, Awakino Point, Dargaville





**Project: 19457 - Dargaville Racing Club**  
**Location: SH14, Awakino Point, Dargaville**



**Calculation parameters**

Permeability: Based on  $SBT_n$

SPT  $N_{60}$ : Based on  $I_c$  and  $q_t$

Young's modulus: Based on variable alpha using  $I_c$  (Robertson, 2009)

Relative density constant,  $C_{Dr}$ : 350.0

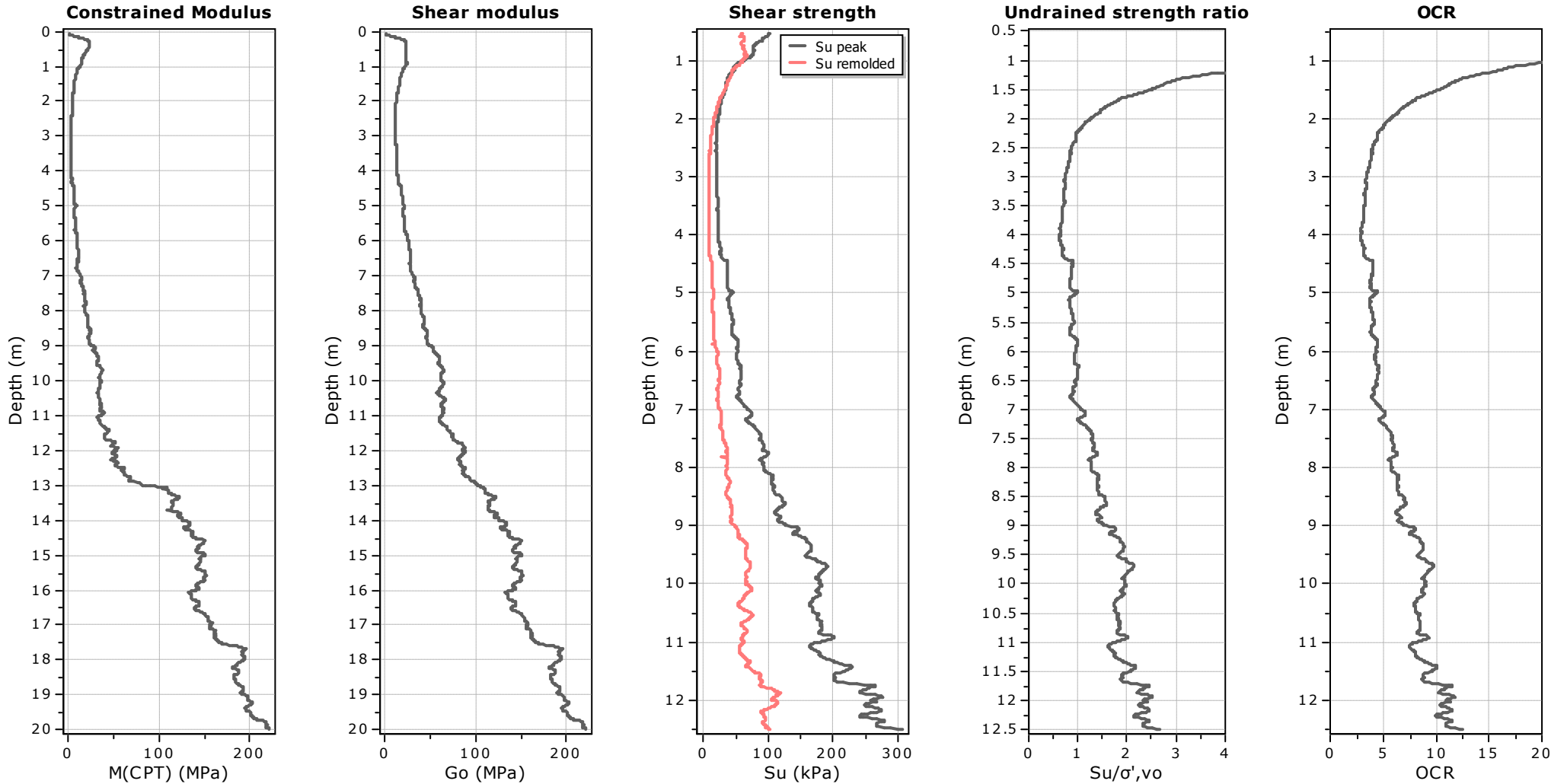
Phi: Based on Kulhawy & Mayne (1990)

● — User defined estimation data



**Project: 19457 - Dargaville Racing Club**

**Location: SH14, Awakino Point, Dargaville**



**Calculation parameters**

Constrained modulus: Based on variable *alpha* using  $I_c$  and  $Q_{tn}$  (Robertson, 2009)

Go: Based on variable *alpha* using  $I_c$  (Robertson, 2009)

Undrained shear strength cone factor for clays,  $N_{kt}$ : 14

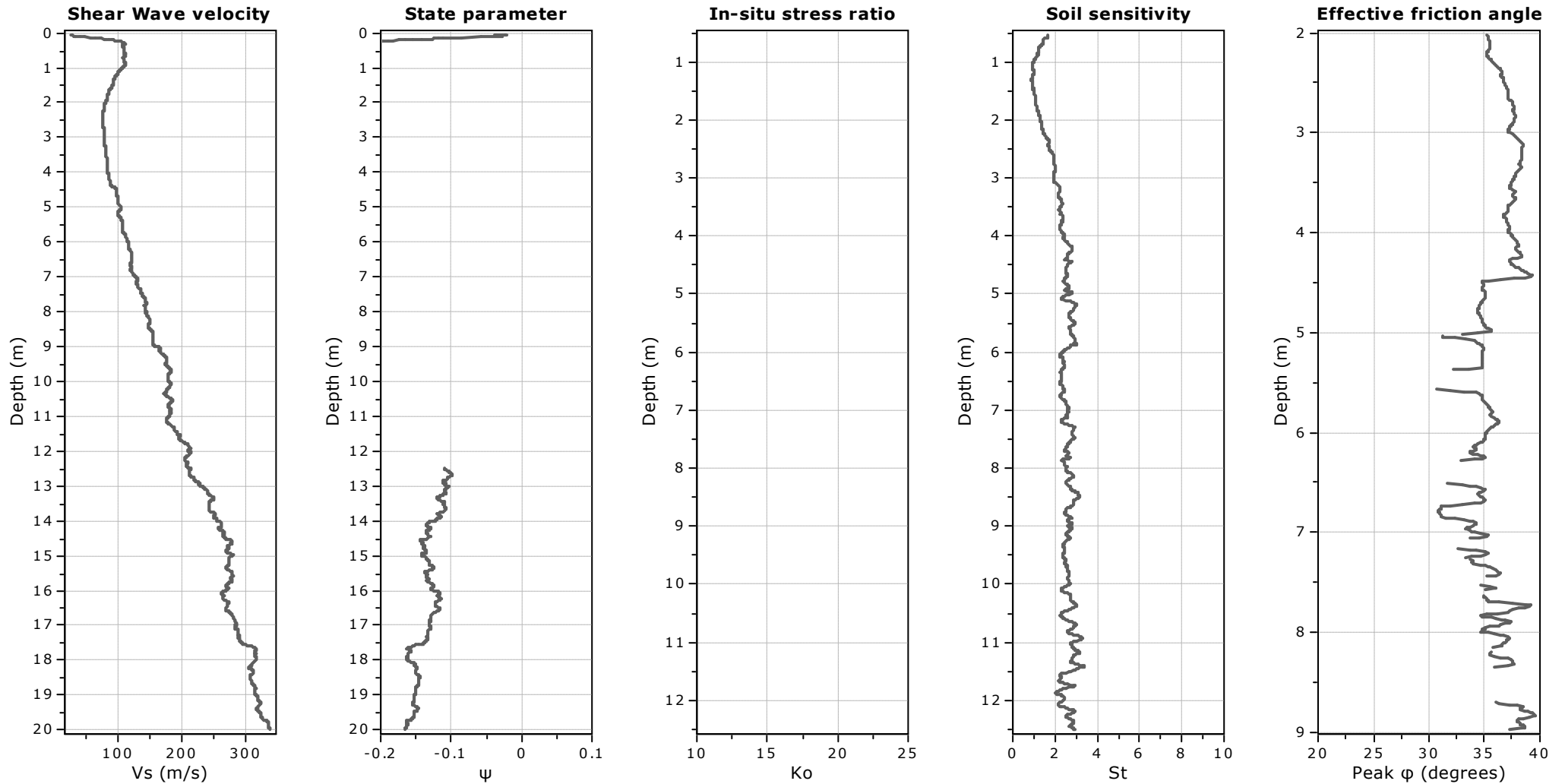
OCR factor for clays,  $N_{kt}$ : 0.33

● User defined estimation data

● Flat Dilatometer Test data



Project: 19457 - Dargaville Racing Club  
Location: SH14, Awakino Point, Dargaville



**Calculation parameters**

Soil Sensitivity factor,  $N_s$ : 7.00

—●— User defined estimation data



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# TRIPARTITE GROUP

## Dargaville Racecourse Redevelopment Private Plan Change

### Assessment of landscape effects

14 July 2021  
21092\_01  
DRAFT

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# 1.0 INTRODUCTION

Simon Cocker Landscape Architecture has been engaged by Tripartite Group to undertake a landscape assessment for a Private Plan Change application for land on Awakino Point North Road, Dargaville, being the former site of Dargaville Racing Club (Pt Lot 37 DP 7811 and Pt Lot 37 DP 27168). The location of the site is shown in Figure 1 in Appendix 1.

The property is located within the Rural Zone, under the Operative Kaipara District Plan.

This document will focus upon a description of the site, the characteristics of the proposal and an analysis and evaluation of the existing environment, identification of any affected parties or individuals, an assessment of the landscape effects of the activity.

# 2.0 ASSESSMENT METHODOLOGY

The assessment has been prepared by a Registered Landscape Architect with reference to the Quality Planning Landscape Guidance Note 1 and its signposts to examples of best practice, which include:

- Best Practice Note 10.1, Landscape Assessment and Sustainable Management, New Zealand Institute of Landscape Architects (2010).
- Guidelines for Landscape and Visual Impact Assessment 3rd Edition, Landscape Institute (UK) and IEMA (2013).

In addition, this report has been prepared in accordance with the NZILA (New Zealand Institute of Landscape Architects) Code of Conduct<sup>1</sup>.

## Effects Ratings and Definitions

The methodology employed is detailed in Appendix 2, which also contains an outline of the effects ratings and definitions used in this assessment is provided in Appendix 1. In summary, the significance of effects identified in this assessment are based on a seven-point scale which includes negligible, very low; low; moderate-low; moderate, high, and very high.

## Desktop study and site visit

Prior to conducting the assessment, a desktop study was completed which included a review of the relevant information relating to the landscape and visual aspects of the project. This information included:

- The Operative Kaipara District Plan;
- Xxx
- Xxxx
- xxxx), and
- Aerial photography, Google Earth and Streetview;

Following the desktop study, a site visit was undertaken on 25 June 2021.

---

1

Contained in Appendix 1 of: [http://www.nzila.co.nz/media/50906/registered\\_membership\\_guide\\_final.pdf](http://www.nzila.co.nz/media/50906/registered_membership_guide_final.pdf)

## 3.0 THE PROPOSAL

XXXXXXXXXX.

## 4.0 EXISTING ENVIRONMENT

### 4.1 Location of the site

The subject Site is situated some 2.0km to the north east of Dargaville and is bounded on its south eastern side by Awakino Point North Road, and on its south western side by State Highway 14. It has an area of approximately xxxx ha.

### 4.2 Topography, geology, soils and hydrology

As is illustrated by photo 1, the subject Site is located within a flat and low-lying landscape that reflects its riverine formative processes. Underlain by Holocene River Deposits (unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins)<sup>2</sup>, the Site is located within a wide meander of the Wairoa River, and within the flood plain of the Wairoa and Awakino Rivers. The Wairoa River drains an extensive catchment which extends to the east and north east as far as the Hikurangi Swamp, and outfalls to the Kaipara Harbour, approximately 30km to the south of the Site.

The headwaters of the Awakino River are in the Tutamoe Range, some 15 – 20km to the north, and the River converges with the Wairoa River 2km to the south of the Site.

The low-lying flood plain landscape has been historically drained to facilitate the establishment of pasture, and – as is evident in Figures 1, 3 and 4 – the patterning of drains has imposed an artificial linear and rectilinear structure on the landscape. This patterning is emphasised where property boundaries, field boundaries and shelterbelt plantings reflect the patterning established by the drainage system.

To the north, and south west of the Site, slight variations in the terrain reflect differences in the underlying geology where Early Pleistocene – Middle Pleistocene estuary, river and swamp deposits are manifest in low rounded hills of up to 30m in height. This landform is visible in photo 2 and it provides containment for the Site on its northern side, as well as precluding views of the Site from locations to the north and north west.

This landform also affords elevated views across the Site, as is illustrated in photos 3, 4 and 5.

Due to the prevailing low-lying character of the landscape, subtle changes in landform, or groups of individual trees have the potential to influence the spatial character of the landscape. This is demonstrated in photo 6, where a low hill encroaches on, and forces a slight deviation in the alignment of the western edge of the State Highway close to the south western corner of the Site. In conjunction with the trees on the western and eastern sides of the road corridor, views to the Site along the State Highway corridor are constrained and ‘focused’, thereby creating the impression of a gateway when approaching from the south west.

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<sup>2</sup> Information derived from GNS NZ Geology web map - <https://data.gns.cri.nz/geology/>

Whilst the low-lying flood plain landscape dominates the landscape character of the environs of the Site, more elevated terrain is evident within the wider landscape and tends to draw the eye to these distant backdrop features. Across the Wairoa River to the north east, east, south east and south, dissected hills, underlain by mudstone (Undifferentiated Mangakahia Complex in Northland Allothton), rise to a height of some 120m (refer to photos 3, and 4). The distant shadow of the Tutamoe Range is a feature of views to the north (refer to photo 1 and 2).

The main soil type within the Site is described as Kara Sandy Loam (KRa)<sup>3</sup>.

### 4.3 Vegetation

The landscape displays an open and exposed character, in part derived from the flatness of the terrain, but also an outcome of the paucity of vegetation of any scale. Where larger trees occur, they tend to be exotic specimens, or shelterbelt trees. Often these are planted along property, or field boundaries and the resulting pattern accentuates the linear structuring of the landscape (refer to photo 6).

In places, pockets of mixed native and exotic trees have become established. These are usually associated with settlement and were presumably planted to provide shelter, and / or for amenity purposes. Examples can be seen on the northern boundary of the Site (refer to photo 2) and on the slightly elevated land to the west (refer to photos 7 and 8).

The Awakino Point North Road boundary of the Site is vegetated with a fragmented strip of vegetation comprising a mix of native species (principally karo – *Pittosporum crassifolium*), and exotic species (predominantly small leaf privet – *Ligustrum chinense*). The karo appears to have been planted to create a hedge screen where the racecourse straight is aligned close to the road corridor, whilst the privet is more likely to have seeded naturally.

The majority of the subject Site is maintained under pasture, and is used for the grazing of sheep. Visible in Figures 3 and 4, and in photos 2 and 5 has been allowed to become overgrown with a mix of gorse, pampas, pine and native shrubland species including manuka. It appears that this area was used in the past for cross country eventing, and a number of the jumps and obstacles remain. In addition, the area is poorly drained, with a number of seeps, intercepted by a drain at the foot of the slope.

There are few examples of remnant native vegetation within the immediate environs of the Site. Isolated pockets are situated immediately to the south of Awakino Point East Road, and approximately 1.5km to the south west. To the east, native shrubland is widespread on the low hills, with pockets of plantation forestry. The Kaipara PNAP report identifies two sites on the eastern edge of the Wairoa River, these being Hoanga Alluvial Forest Fragment (P07/162), and Hoanga Road Forest (P07/165).

### 4.4 Land use

As noted previously, the predominant land use in the area is pastoral grazing. The Northland Showground site is located approximately 500m to the south on Awakino Point East Road. This property is visually separated from the subject Site by vegetation, although glimpse views of the Site are possible from the road to the east of the showgrounds property (refer to photo 8).

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<sup>3</sup> Information derived from the NZLRI Soil website - <https://iris.scinfo.org.nz/layer/48066-nzlr-soil/>

Figure 3 illustrates the cadastral pattern within the vicinity of the Site. A number of rural residential properties occupy the elevated land on the north western boundary of the Site, identified as Pt Lot 36 DP 11719, Lot 2 DP 388838 and Lot 1 DP 388838, these lots, along with Lot 1 DP 365819 immediately to the north, form a small cluster of settlement which range in area between xx and xxm<sup>2</sup>.

Awakino Point North Road defines the south eastern boundary of the Site. A number of rural residential properties are accessed from this road and range in area between xx and xxha. Dwellings within Lot 1 DP 65922, Lot 1 DP 37054, Pt Lot 30 DP 11537, Pt Lot 30 DP 15269, and Lot 1 DP 70219 offer relatively proximate views across the road to the Site.

At the north eastern end of Awakino Point North Road dwellings within a number of small lots – being, Lot 1 DP 158696, Lot 3 DP 396182, Lot 1 DP 396182, Lot 1 DP 61368, and Lot 1 DP 377245 are clustered close to the road. Between these dwellings, and also close to the road frontage, a number of dwellings are located on more expansive holdings. These are identified as Pt Lot 32S DP 11125 Pt Lot 35 DP 11124. A dwelling within Pt Lot 34 DP 7811 is located to the east of the Site, is located on a large land holding and is accessed from the end of Awakino Point North Road via a long driveway.

The south western, and mid sections of Awakino Point North Road reflect the open and exposed character of the flood plain landscape. Unsealed, and with only occasional dwellings located close to the road, the corridor displays a strongly rural character. The character of the north eastern end of the road is influenced by the presence of a cluster of dwellings, including a number within smaller properties. A number of these have established gardens and this lends the road corridor a rural residential character.

A similar pattern of sporadic small residential lots are accessed from Awakino Point East Road.

To the west of the Site, and on the western side of State Highway 14 a dwelling is located close to the road, and some 50m from the north western corner of the Site within a large lot identified as Pt Lot 3 DP 27234.

Similarly, some 50m to the west of the south western corner of the Site, a dwelling within a large lot identified as Pt Lot 1 DP 11126 is elevated slightly above the Site. The dwelling is located at the eastern end of a subtle ridge which is aligned west – east.

Within the wider landscape, land holding tend to be more extensive, but to the south west along the State Highway corridor, a ribbon of lots ranging in size between xx and xxha extend to the south west to link with the eastern end of the Dargaville conurbation.

### 4.3 Visual catchment

The visual catchment of the Site is influenced by the low-lying character of the surrounding landscape, and containment provided by the low ridge immediately to the north of the Site. The latter feature precludes views from the north, north east and north west, although a dwelling within Pt Lot 36 DP 11719 offers the potential to gain glimpse views through vegetation to the Site. Principally, this dwelling is oriented to benefit from views to the north and north east.

Dwellings within adjoining properties (Lot 1 DP 388838 and Lot 1 DP 365819), are some 90 and 180m from the north western corner of the Site respectively. The former dwelling offers views across the majority of the Site, whilst the latter limits views across its western edge.

Views from the west are largely screened by vegetation growing along the western edge of the State Highway and shelterbelts within paddocks to the west of the State Highway. A dwelling within Pt Lot 3 DP 27234 (50m from the north western corner of the Site, and a dwelling within Pt Lot 1 DP 11126 (elevated slightly above, and some 50m from the

south western corner, offer views into the subject Site. Users of State Highway 14 have the potential to gain views into the Site from the road corridor, albeit fragmented by vegetation (refer to photos 9, 10 and 11).

Glimpse views are possible from the wider landscape to the south as far as Awakino Point East Road (as is evidenced by photo 8). Users of the Awakino Point North Road gain direct views into the western end of the Site (refer to photo 12), but further to the east, the road boundary of the Site is vegetated with a mix of native and exotic species which partially block views into the Site. Photos 6 and 13 evidence how views of the Site from the eastern end of Awakino Point North Road are possible, but are partially screened by vegetation.

Dwellings located along the southern edge of Awakino Point North Road offer the potential for direct and proximate views to the subject Site. The type and character of view is described below in Table 1

Address	Legal desc.	Dist.	Elevation	Comment
6 Awakino Point North Rd	Lot 28 DP 7811	100m	As Site	Set back from road. Views constrained by vegetation. Potential for oblique views to north through vegetation and over #16 to Site? Property also serves as a depot for rural contracting business?
16 Awakino Point North Rd	Lot 1 DP 65922	35m	As Site	Dwelling on large lot set close to road frontage. Views to north and north east screened by dense evergreen hedge. Views to west and north west include south west corner of Site and SH14 / Awakino Point North Road junction.
26 Awakino Point North Rd	Lot 1 DP 37054	30m	As Site	Dwelling in small lot with established vegetation to south west south and south east. Front boundary delineated by picket fence and direct views possible over road into Site.
44 Awakino Point North Rd	Pt Lot 30 DP 11537	35m	As Site	Two storey dwelling with north west facing dormer windows set close to road frontage and set within established vegetated garden. Vegetation on road boundary buffers views from ground floor windows. Views over vegetation from dormer windows to west, north west and north, into Site.
70 Awakino Point North Rd	Lot 6 DP 122426	40m	As Site	Dwelling forms part of cluster of farm buildings, located close to the road. Screened from road by vegetation on boundaries, and by vegetation along Site road boundary..
	Lot 1 DP 70219	70m	As Site	Dwelling in cluster of farm buildings which are also contained within lot below. Direct views to Site across road to west, north west and north
102 Awakino Point North Rd	Lot 1 DP 208926	-	As Site	Cluster of farm buildings with dwelling contained in lot above.
118 Awakino Point North Rd	Lot 325 DP 11125	50m	As Site	Large productive lot with dwelling located close to road. Direct views to west and south west into Site.
130 Awakino Point North Rd	Lot 1 DP 377245	160m	As Site	Views to Site buffered by vegetation, within front yard and substation.
131 Awakino Point North Rd	Pt Lot 35 DP 11124	160m	As Site	Dwelling on large productive lot at south western end of cluster of dwellings. Views to south west

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				part screened by shelterbelts. Views available to elevated land in north east corner of Site.
133 Awakino Point North Rd	Lot 1 DP 158696	200m	As Site	Two storey dwelling on small lot within cluster. Views to south west and west from ground floor partially screened by buildings and vegetation. Possible views from dormer window in upper floor towards Site
141 Awakino Point North Rd	Pt Lot 35 DP 7811	270m	As Site	Dwelling located within cluster of settlement on large lot which extends to the north. Spacious setting but views to the west and north west screened by vegetation and buildings.
143 Awakino Point North Rd	Lot 3 DP 396182	300m	As Site	Dwelling located within cluster of settlement on small triangular lot. Spacious setting but views to the west and north west screened by vegetation and buildings
	Lot 4 DP 396182			Contains cluster of farm buildings.
144 Awakino Point North Rd	Lot 1 DP 61368	310m	As Site	Small narrow lot to south of road in cluster of 3. Views to west and south west part obscured by vegetation
145 Awakino Point North Rd	Lot 1 DP 396182	345m	As Site	Small lot off end of road in cluster of 3. Oriented to north. Views to Site blocked by vegetation and buildings.
145B Awakino Point North Rd	Lot 2 DP 396182	350m	As Site	Large productive lot off end of road in cluster of 3. Oriented to north. Views to Site blocked by vegetation and buildings.

*Table 1: Potentially affected individuals located on Awakino Point North Road.*

Users of Awakino Point North Road have the potential to experience immediate and direct transitory views into the Site at the south western and north eastern ends of the road. Views from the mid-section tend to be largely screened by a mix of native and exotic vegetation growing on the northern edge of the road corridor.

The elevated land to the east, south east and south, on the eastern side of the Wairoa River offers long views to the Site at separation distances of between 2.5 – 4.0km. Few potential receptors reside on these hills, although some scattered dwellings offer views from Hillstone and Rowland Roads (refer to photo 1). Views from the River, and from Hoanga Road, which traces the eastern bank of the River are screened by intervening landform and vegetation.

## 4.4 Statutory context

### 4.4.1 The Resource Management Act (1991)

Part 2 of the Resource Management Act 1991 (RMA) sets its purpose and principles. Part 2, Section 5 states that the purpose of the RMA is to promote the sustainable management of natural and physical resources. Section 6 sets out the matters of importance that must be recognised and provided for in achieving the purpose of the RMA. Section 7 contains other matters that must be given particular regard to, and section 8 states that the principles of the Treaty of Waitangi must be taken into account in achieving the purpose of the RMA.

The protection of outstanding natural features (ONF) and landscapes (ONL) from inappropriate subdivision, use and development is identified as a matter of national importance in section 6(b). There are no ONL or ONF identified on or within close proximity of the site (refer to Figure 3).

Section 7 identifies a range of matters that shall be given particular regard to in achieving the purpose of the RMA. Of relevance to this proposal is section 7(c) the maintenance and enhancement of amenity values. This is considered in this report in relation to potential effects on landscape elements and character, and visual amenity.

#### **4.4.2 The Northland Regional Policy Statement**

The Northland Regional Policy Statement (NRPS) contains relevant objectives and policies in relation to the protection of natural features and landscapes. These have been translated into the Kaipara District Plan. The site does not however fall within the Outstanding Natural Landscape classification under the NRPS.

The above matters, together with the Regional Policy Statement (RPS, under the Northland Regional Council ('NRC')) and District Plan (under the jurisdiction of the Kaipara District Council) provide background to inform the assessment of landscape and visual effects.

The site does not fall within an Outstanding Landscape under the District Plan.

#### **4.4.3 The Kaipara District Plan (Operative November 2013)**

##### Objectives and Policies

The objectives and policies of Chapters 12 (Rural) place particular emphasis on the need to ensure that subdivision and development occurs in a manner that is sympathetic to the amenity and character of the receiving environment, the need protect features that contribute to the amenity of the surrounding environment.

Rural Issues are set out in section 12.4. Of particular relevance to the scope of this assessment is 12.4.2 which states:

*The impact of uncontrolled subdivision and land use has the potential to adversely affect rural character and amenity of the District.*

The explanation notes that rural areas are "...characterised by farming, open spaces and natural landforms with remnants of indigenous bush, woodlots and a low intensity of development and built form. It is these characteristics which contribute to rural amenity. The form or density of subdivision and land use activities can adversely affect rural character and amenity."

Also of relevance is 12.4.4:

*There are potential adverse effects on amenity and the natural environment from rural activities including land disturbance and vegetation clearance.*

This focuses on the land development which may alter the shape and appearance of natural landforms and has the potential to adversely affect the natural character and visual amenity values of the area where they are undertaken.

12.4.9 recognises for potential for built form to affect amenity values by resulting in a scale and pattern of built form which is not compatible with the landscape and visual characteristics of ridgelines

*The bulk and location of buildings (particularly in sensitive locations) has the potential to adversely affect rural amenity.*

These themes are reflected in the objectives and policies.

Objectives and policies of relevance from Chapter 12 are outlined in italic below:

*12.5.2 To maintain the rural character and amenity including:*

- *Sense of openness*
  - *Low dominance of built form*
  - *Pasture and Commercial Forest Areas*
  - *Areas of indigenous vegetation and significant fauna and*
  - *Unmodified natural landforms.*
- 
- *12.6.4 By requiring all subdivision to contribute to the retention of rural character and amenity.*
  - *12.6.5 By avoiding, remedying or mitigating the adverse effects of subdivision and development (including ribbon development) on the natural environment values of the rural area.*
  - *12.6.7 By avoiding, remedying or mitigating the adverse effects of activities which pose the greatest threat to remaining areas of significant indigenous vegetation and significant habitats of indigenous fauna), and rural amenity (e.g. vegetation clearance, excavation and fill, the bulk and location of buildings and structures).*

*12.5.4 To ensure that the servicing of new subdivision and development does not adversely affect the environment, in particular sensitive receiving environments.*

*12.5.8 To provide for development of land with a range of allotment sizes that is appropriate to the character of the surrounding rural environment.*

*12.5.9 To maintain sites and buildings during development to avoid adverse visual amenity effects.*

*12.6.15 By requiring site and building development to demonstrate how adverse visual amenity effects will be addressed over the duration of the development.*

## **5.0 IDENTIFIED LANDSCAPE VALUES**

Landscape character is the distinct and recognisable pattern of elements that occur consistently in a particular landscape. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement.

In order to understand the effects of the change anticipated by the proposal, it is necessary to consider the sensitivity of this landscape to change and how this relates to the wider landscape character.

The Kaipara PNAP report does not identify any sites within the immediate vicinity of the Site, the nearest being located to the north east and east, on the eastern side of the Wairoa River.

The Northland Regional Policy Statement does not identify any Outstanding Natural Areas or Outstanding Natural Features close to the Site.

The New Zealand Geopreservation Inventory<sup>4</sup> identifies a feature which is associated with the Wairoa River (Tangowahine tidal bore), some 2.0km to the north east of the Site.

To evaluate the values of the wider landscape, the site and its environs have been assessed against the attributes set out in Appendix 3. This assessment has determined that the landscape quality is between 'Ordinary' and 'Poor', on the basis that it displays a weak landscape structure, characteristic patterns of landform and land cover often masked by landuse, with mixed land use evident, some evidence of lack of management and intervention which has resulted in examples of detracting features.

## 6.0 ASSESSMENT OF LANDSCAPE EFFECTS

### 6.1 Background

For the assessment of effects, the landscape and visual effects in terms of three interrelated categories are considered: biophysical and landscape quality, visual amenity, and landscape character. (Refer to the table in section 3 that shows the relationship between the relevant RMA provisions the assessment categories.)

These categories combine to create the relationship between a development and its landscape context or setting, which is directly responsible for the impacts of the development. In this regard, there are three main sets of values that can generally be attributed to the setting. These are:

1. the degree of builtness or naturalness of the surrounding landscape, i.e. the degree of modification in terms of development and buildings
2. the landscape vulnerability or fragility of the environment to absorb development or change, and
3. the nature of the development itself.

The first two define the "fitness" of the landscape to accept the new development, and allow decisions to be made regarding the impact of a development on the receiving environment, while the third defines how well equipped the design of the development is to "fit" the landscape, taking account of physical and cultural values as well as from an aesthetic point of view. The landscape character and nature of the landform and vegetation also determine the available views of the development, depending on the exact location and disposition of elements.

### 6.2 Assessment of Effects

The effects covered in this assessment, include those that can occur in relation to physical features, viewing audiences and visual amenity and/or on the site's contribution to the existing landscape character and amenity values.

A landscape effect is a consequence of change on landscape values. Change is not an effect: Landscapes constantly change. The relevant question is whether such changes have a positive or adverse effect on landscape values

- Landscape character and amenity effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced. This may in turn affect the perceived value ascribed to the landscape.

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<sup>4</sup> <https://services.main.net.nz/geopreservation/>

- Visual effects are a subset of landscape effects. They are consequences of change on landscape values as experienced in views.

Landscape values arise from the combination of physical, associative, and perceptual dimensions. Effects on landscape values not only include the physical environment, but also its associated meanings, and how it is perceived through all the senses.

The nature of landscape effects generated by any particular proposal can, therefore, be:

- Positive (beneficial), contributing to the visual character and quality of the environment.
- Negative (adverse), detracting from existing character and quality of environment; or
- Neutral (benign), with essentially no effect on existing character or quality of environment.

Landscape, and Amenity effects can be rated on a seven-point scale from Very High, through to Very Low.

Change in a landscape does not, of itself, necessarily constitute an adverse landscape effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways, these changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use. The aim is to provide a high amenity environment through appropriate design outcomes, including planting that can provide an adequate substitution for the currently experienced amenity.

### 6.2.1 Landscape effects

### 6.2.2 Biophysical – abiotic attributes

The key abiotic attributes of the site include its landform, geology, and the movement of water. xxxxxxxx.

### 6.2.3 Biophysical – biotic attributes

The biotic attributes of the site are the living organisms which shape an ecosystem. xxxxxxxx.

### 6.2.4 Experiential attributes

Experiential attributes comprise the interpretation of human experience of the rural environment. This includes visible changes in the character of the rural landscape – its naturalness as well as its sense of wildness and remoteness including effects on natural darkness of the night sky.

The character of the rural landscape of the area is influenced by the presence of built development within adjoining lots, particularly those within elevated properties to the north. The presence of these dwellings and other buildings has the effect of diminishing the sensitivity of the wider landscape to change. Notwithstanding this, the Site and its landscape context displays a rural character and a sense of pastoral spaciousness.

The proposal seeks to focus built development within the low-lying portion of the Site, whilst retaining the ridge flanks on its north western edge, and in its north eastern corner as unaffected by built development. Conversely, these more visible edges will be enhanced and retained as open space.

The proposed mitigation planting within the landscape buffers on the boundaries of the Site will, within 5 years, buffer the Site from views from proximate views and from the visual catchment where it is associated with the flood plain landscape. Views into the development will be afforded from a limited number of elevated private viewpoints close to the north western corner, and the south western corner of the Site, and from more distant elevated locations. Although receptors who experience views from the proximate elevated viewpoints will have the potential to experience views of the Site, those within the wider catchment in elevated locations are sufficiently distant from the Site such that its prominence will be small

Generally, the change in the character of the landscape resulting from the proposal will be internalised by virtue of the mitigation planting, and by the ridge landform on the north western boundary, and in the north eastern corner of the Site.

As such, the perceived changes to the experiential attributes of the Site will be limited to a small number of proximate receptors. The majority of potential proximate, and more distant receptors will not be aware of any change in the character of the Site, or will notice an enhancement of the edges of the Site as a result of the proposed mitigation planting.

## 6.2.5 Landscape effects: Social, cultural and associative attributes

To be completed on receipt of the archaeological report and CIA.

## 6.2.6 Summary of landscape effects.

xxxxxxxxxx

## 6.3 Visual amenity effects.

Visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.

Landscape and visual assessments are separate, although linked, procedures.

For the assessment of visual amenity effects, a number of representative viewpoints within the visual catchment were selected to evaluate the effects for the different viewing audience types. These represent places that capture and fairly represent the range of public views towards the proposed development, together with interpolated private views.

Selected views are included below with all views provided at a larger scale in the attachment to this report. Images are equivalent to the view obtained with a naked eye<sup>5</sup> with some images combined to form a panorama.

Views are divided into different audiences and areas as follows:

- Occupants of dwellings to north and north west;
- Occupants of dwellings to west and south west;
- Users of State Highway 14;

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<sup>5</sup> Photographs were taken in fair weather, with a Canon EOS Kiss X5 camera, with the digital equivalent of a 50mm focal length

- Receptors within the wider environment to the south;
- Occupants of dwellings on Awakino Point North Road;
- Users of Awakino Point North Road, and;
- Receptors within the wider environment to the east and south east.

An evaluation of the level of potential adverse visual amenity effect is contained in Table 2 in Appendix 4.

#### **Occupants of dwellings to north and north west**

Visible in photo 2 this viewer group includes a very small number of individuals with a high sensitivity to change who gain a variety of views from elevated locations across the subject Site. Occupants of the dwelling within Pt Lot 36 DP 11719 are only offered limited views of the Site, with their main outlook from the dwelling focused to the north. Glimpse views to the south are afforded through intervening vegetation. Development within the Site will be set back some 200m from the dwelling and although occupants will be aware of the change as a result of the proposal, the change is within a part of their outlook which does not contribute in any great measure to the amenity of these individuals. Over time, the mitigation planting on the northern boundary of the Site will develop to buffer views.

Occupants of the dwelling within Lot 1 DP 388838 benefit from an outlook which includes unimpeded views to the north and north east, but also to the south east and south, and therefore across much of the subject Site. The anticipated change within the subject Site will be set back from the dwelling by some 120m, and occupants will gain direct views of the development. Over time the proposed mitigation will create a vegetated buffer between the built form within the Site and this neighbouring dwelling.

The dwelling within Lot 1 DP 365819 is also slightly elevated above the Site, but offers very limited views to the Site. Occupants may be aware of a change, but the change will result in little impact on their amenity.

A dwelling within Pt Lot 3 DP 27234 is situated close to the State Highway, and is on a similar level to that of the Site. Although this dwelling offers direct views to the Site, the outlook is across the State Highway, and existing buildings (refer to photo 14), which previously served the Racing club form a component of the outlook. The future development within the Site will be visible from this dwelling, but will be set back beyond the proposed 25m buffer which extends along the State Highway frontage of the Site. Occupants will gain views of construction activities, but as the proposed mitigation planting develops, views of built form within the Site will be progressively reduced, and the level of effect will diminish.

#### **Occupants of dwellings to west and south west**

Visible in photo 2 and represented by photo 15, this viewer group includes a very small number of individuals (a single dwelling) with a high sensitivity to change.

The dwelling within Pt Lot 1 DP 11126 is elevated slightly above State Highway and Site and is oriented to north and east. Views to the east are buffered by existing mature vegetation which is growing within the road reserve, although glimpse views are possible to the Site. More direct views through vegetation are possible to the north east and north to the north west portion of Site.

The change facilitated by the Plan Change will be perceptible to this receptor with the character of the midground outlook to the east and north east being modified. As the mitigation planting within the State Highway frontage buffer becomes established, the views into the Site will become filtered by vegetation, but due to the elevation of this dwelling, mitigation will be gradual over some 5 – 8 years. \

### **Users of the State Highway**

This viewer group is represented by photos 7, 14, 15 and 16. The viewer group comprises a high number of individuals with a low sensitivity to change.

Long views are experienced along the State Highway when approaching the south west corner of the Site from the south west (refer to photo 7).

Views when approaching Site from the north west are blocked by landform until the receptor is within 100m of the north west corner (refer to photo 16).

Generally unrestricted transitory views into the Site are afforded the receptor when on the State Highway adjacent to Site although existing built form within the north western corner of the Site lends it a more built character.

Future development facilitated by the proposal will be apparent when passing the Site, although the proposed mounding and planting within the 25m roadside buffer will block views within 3 – 4 years following implementation.

### **Receptors within the wider environment to the south**

Comprising a variety of residential viewers, and users of Awakino Point East Road, this viewer group comprises a low number of individuals with a high (for the former) and low (for the latter) level of sensitivity. Views are represented by photo 8.

Receptors have the potential to gain fragmented and restricted views across the flat landscape toward the Site. Views are interrupted by shelterbelts and other vegetation, but existing built structures within the Site are currently visible from some locations.

Development facilitated by the plan change will be apparent as a background element and will be unlikely to form a prominent and diverting element within the view.

Within 3 – 5 years, the proposed mitigation planting along the Awakino Point North Road will predominantly screen views from these locations.

### **Occupants of dwellings on Awakino Point North Road**

Represented by photos 2, 6, 12 and 13, this viewer group comprises a low number of individuals with a high sensitivity to change and a divergent range of views from their dwellings.

The detail of these views is set out in Table 2, as is the anticipated level of effect that will be experienced by these receptors. Generally speaking, where existing views of the Site are available from dwellings along the road, occupants will have the potential to gain views of the future construction activity, and will experience views of development within the Site until the proposed vegetation screen along the Site's roadside boundary has become established. This is likely to occur with 5 years.

### **Comment on traffic required on receipt of traffic report**

#### **Users of Awakino Point North Road**

This neighbouring viewer is illustrated in photos 16 and 17. The viewer group comprises a low number of individuals with a low to moderate sensitivity to change.

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Direct views into the Site are afforded from the south western end of the road, and from the north eastern end, whilst the central section is screened by existing vegetation. As with the previous viewer group, receptors will have the potential to gain views of the future construction activity, and will experience views of development within the Site until the proposed vegetation screen along the Site’s roadside boundary has become established.

**Receptors within the wider environment to the east and south east**

This neighbouring viewer is illustrated in photo 1. The viewer group comprises a low to moderate number of individuals with a high sensitivity to change.

The group includes a variety of receptors, including occupants of dwellings located on the elevated terrain to the east, south east and south of the Site. Since these individuals are separated from the Site by a distance in excess of 2.5km, they experience views of the Site within an expansive panorama, and within that outlook, the Site forms a relatively insignificant component.

The change resulting from the plan change will be perceptible, but will not form a dominant element within the view. Over time, the vegetation within the proposed green links will develop to fragment the clusters of built form and soften the appearance of the development.

## 7.0 EFFECT ON STATUTORY INSTRUMENTS

XXXXXXXXXXXXXXXXXX.

## 8.0 CONCLUSION

XXXXXXXXXX

**Simon Cocker**

14 July 2021



# Appendix 1: Figures

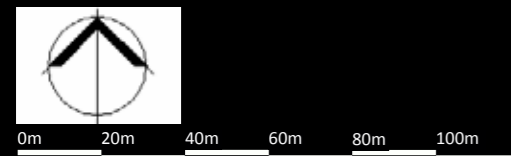


Photo location

**DARGAVILLE RACING CLUB REDEVELOPMENT**  
Landscape Assessment

FIGURE 1: Location of the Site

DRAFT

- Light industrial
- Medium density residential (300m2 lots)
- General residential (400-500m2 lots)
- Low density residential (1,000m2 lots including retirement village)
- Passive reserve
- Landscape or open space buffer
- Potential small-scale commercial

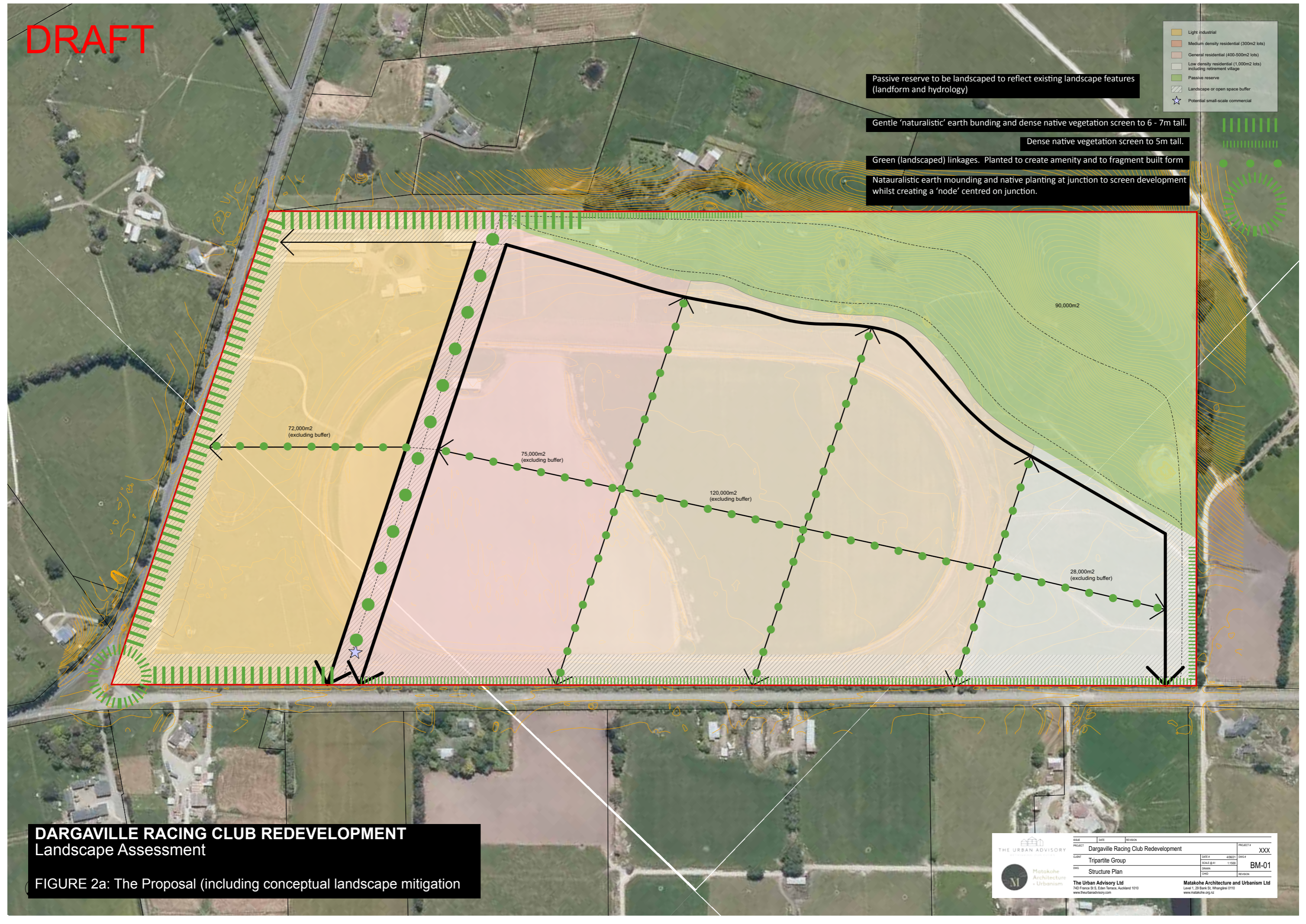
Passive reserve to be landscaped to reflect existing landscape features (landform and hydrology)

Gentle 'naturalistic' earth bunding and dense native vegetation screen to 6 - 7m tall.

Dense native vegetation screen to 5m tall.

Green (landscaped) linkages. Planted to create amenity and to fragment built form

Naturalistic earth mounding and native planting at junction to screen development whilst creating a 'node' centred on junction.



72,000m2 (excluding buffer)

75,000m2 (excluding buffer)

120,000m2 (excluding buffer)

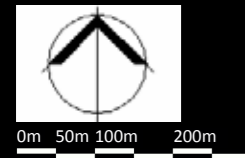
90,000m2

28,000m2 (excluding buffer)

### DARGAVILLE RACING CLUB REDEVELOPMENT Landscape Assessment

FIGURE 2a: The Proposal (including conceptual landscape mitigation)

THE URBAN ADVISORY	DATE	REVISION	PROJECT #
			Dargaville Racing Club Redevelopment XXX
CLIENT	DATE #	DWG #	
Tripartite Group	408021	0101	
DWG	SCALE @ A1	1:1500	BM-01
DRG	DRAWN		
	CHECK		
	REVISION		
The Urban Advisory Ltd 740 France St, Eden Terrace, Auckland 1010 www.theurbanadvisory.com		Matakohe Architecture and Urbanism Ltd Level 1, 20 Bank St, Whangarei 0110 www.matakohe.org.nz	



**DARGAVILLE RACING CLUB REDEVELOPMENT**  
Landscape Assessment

FIGURE 2b: The proposal in context



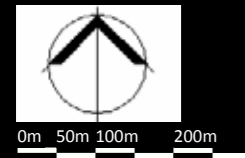
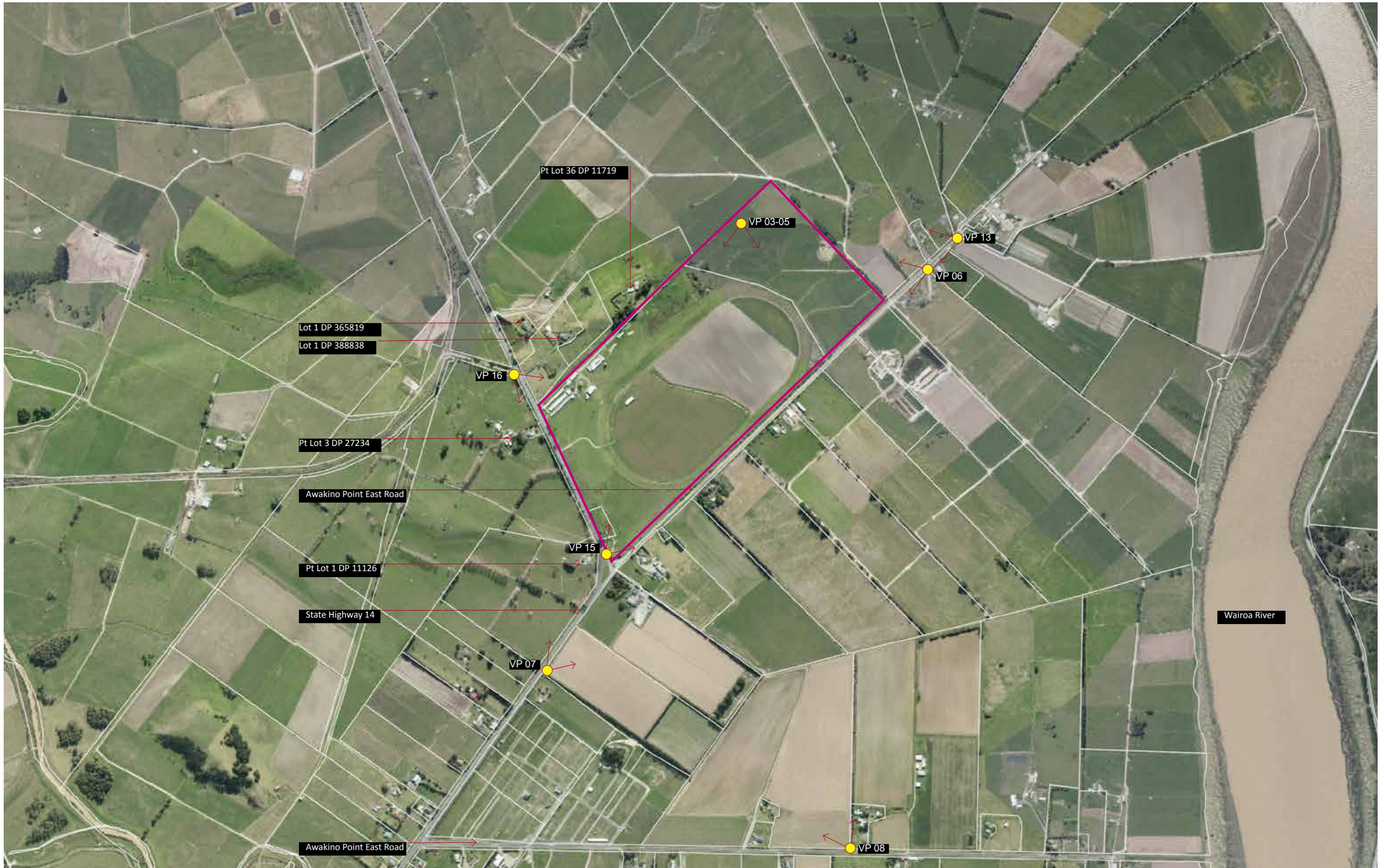
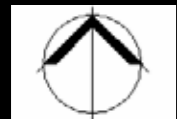


Photo location

**DARGAVILLE RACING CLUB REDEVELOPMENT**  
Landscape Assessment

FIGURE 3: Immediate context of the Site





0m 50m 100m 150m 200m 300m

● Photo location  
↗ ↘

### DARGAVILLE RACING CLUB REDEVELOPMENT Landscape Assessment



FIGURE 4: The Site



Photo 1: View to Site from Hillstone Road

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Lot 1 DP 365819

Lot 1 DP 388838

Pt Lot 36 DP 11719

Photo 2: View north across the Site from Awakino Point North Road

Photo date - 25 June 2021

**DARGAVILLE RACING CLUB REDEVELOPMENT**

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 3: View to south east across Site from elevated land in north east corner (panorama 1 of 3)

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 4: View to south across Site from elevated land in north east corner (panorana 2 of 3)

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Pt Lot 1 DP 11126

Pt Lot 3 DP 27234

Pt Lot 36 DP 11719

Photo 5: View to south west across Site from elevated land in north east corner (panorama 3 of 3)

Photo date - 25 June 2021

**DARGAVILLE RACING CLUB REDEVELOPMENT**

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 6: View to south west along Awakino Point North Road from close to the north east corner of the Site

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)



Pt Lot 1 DP 11126



Photo 7: View north to Site along State Highway

Photo date - 25 June 2021

**DARGAVILLE RACING CLUB REDEVELOPMENT**

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 8: View to the Site from Awakino Point East Road

Photo date - 25 June 2021

**DARGAVILLE RACING CLUB REDEVELOPMENT**

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 9: View to Site junction of Awakino Point North Road and State Highway 14 (panorama 1 of 2)

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 10: View to Site junction of Awakino Point North Road and State Highway 14 (panorama 2 of 2)

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Lot 1 DP 365819

Lot 1 DP 388838

Photo 11: View to north from State Highway at north western corner of the Site

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos  
(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





LOT 20 DP 555309 (Western dwelling)

Photo 12: View to west from western end of Awakino Point North Road.

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)



Photo 13: View toward Site from eastern end of Awakino Point North Road

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 14: View to Site from entrance to Pt Lot 3 DP 27234

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 15: View to Site from south western corner

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)





Photo 16: View to north western corner of Site from State Highway to north west

Photo date - 25 June 2021

## DARGAVILLE RACING CLUB REDEVELOPMENT

Photos

(Photographs taken with digital equivalent of 50mm focal length unless otherwise specified)



# Appendix 2: Assessment Methodology

# Landscape and Visual Effects Assessment Methodology

## Introduction

The landscape and visual effects assessment process provides a framework for assessing and identifying the nature and level of likely effects that may result from a proposed development. Such effects can occur in relation to changes to physical elements, the existing character of the landscape and the experience of it. In addition, the landscape assessment method may include an iterative design development processes which includes stakeholder involvement. The outcome of any assessment approach should seek to avoid, remedy or mitigate adverse effects. A separate assessment is required to assess changes in natural character in coastal areas and other waterbodies.

When undertaking landscape and visual effects assessments, it is important that a structured and consistent approach is used to ensure that findings are clear and objective. Judgement should always be based on skills and experience, and be supported by explicit evidence and reasoned argument.

While landscape and visual effects assessments are closely related, they form separate procedures. The assessment of the potential effect on the landscape forms the first step in this process and is carried out as an effect on an environmental resource (i.e. landscape elements, features and character). The assessment of visual effects considers how changes to the physical landscape affect the viewing audience. The types of effects can be summarised as follows:

**Landscape effects:**

*Change in the physical landscape, which may change its characteristics or qualities.*

**Visual effects:**

*Change to views which may change the visual amenity experienced by people.*

The policy context, existing landscape resource and locations from which a development or change is visible all inform the 'baseline' for landscape and visual effects assessments. To assess effects, the landscape must first be described, including an understanding of the key landscape characteristics and qualities. This process, known as landscape characterisation, is the basic tool for understanding landscape character and may involve subdividing the landscape into character areas or types. The condition of the landscape (i.e. the state of an individual area of landscape or landscape feature) should also be described alongside a judgement made on the value or importance of the potentially affected landscape.

This outline of the landscape and visual effects assessment methodology has been undertaken with reference to the Quality Planning Landscape Guidance Note<sup>1</sup> and its signposts to examples of best practice which include the UK guidelines for landscape and visual impact assessment<sup>2</sup> and the New Zealand Landscape Institute Guidelines for Landscape Assessment<sup>3</sup>.

Assessing landscape effects requires an understanding of the nature of the landscape resource and the magnitude of change which results from a proposed development to determine the overall level of landscape effects.

## Nature of the landscape resource

Assessing the nature of the landscape resource considers both the susceptibility of an area of landscape to change and the value of the landscape. This will vary upon the following factors:

- Physical elements such as topography / hydrology / soils / vegetation;
- Existing land use;
- The pattern and scale of the landscape;

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<sup>1</sup> <http://www.qualityplanning.org.nz/index.php/planning-tools/land/landscape>

<sup>2</sup> Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)

<sup>3</sup> Best Practice Note Landscape Assessment and Sustainable Management 10.1, NZILA

- Visual enclosure / openness of views and distribution of the viewing audience;
- The zoning of the land and its associated anticipated level of development;
- The value or importance placed on the landscape, particularly those confirmed in statutory documents; and
- The scope for mitigation, appropriate to the existing landscape.

The susceptibility to change takes account of both the attributes of the receiving environment and the characteristics of the proposed development. It considers the ability of a specific type of change occurring without generating adverse effects and/or achievement of landscape planning policies and strategies.

Landscape value derives from the importance that people and communities, including tangata whenua, attach to particular landscapes and landscape attributes. This may include the classification of

Outstanding Natural Landscape (RMA s.6(b)) based on important biophysical, sensory/ aesthetic and associative landscape attributes, which have potential to be affected by a proposed development.

### Magnitude of Landscape Change

The magnitude of landscape change judges the amount of change that is likely to occur to existing areas of landscape, landscape features, or key landscape attributes. In undertaking this assessment, it is important that the size or scale of the change is considered within the geographical extent of the area influenced and the duration of change, including whether the change is reversible. In some situations, the loss /change or enhancement to existing landscape elements such as vegetation or earthworks should also be quantified.

When assessing the level of landscape effects, it is important to be clear about what factors have been considered when making professional judgements. This can include consideration of any benefits which result from a proposed development. Table 1 below helps to explain this process. The tabulating of effects is only intended to inform overall judgements.

Contributing factors		Higher	Lower
Nature of Landscape Resource	Susceptibility to change	The landscape context has limited existing landscape detractors which make it highly vulnerable to the type of change which would result from the proposed development.	The landscape context has many detractors and can easily accommodate the proposed development without undue consequences to landscape character.
	The value of the landscape	The landscape includes important biophysical, sensory and associative attributes. The landscape requires protection as a matter of national importance (ONF/L).	The landscape lacks any important biophysical, sensory or associative attributes. The landscape is of low or local importance.
Magnitude of Change	Size or scale	Total loss or addition of key features or elements. Major changes in the key characteristics of the landscape, including significant aesthetic or perceptual elements.	The majority of key features or elements are retained. Key characteristics of the landscape remain intact with limited aesthetic or perceptual change apparent.
	Geographical extent	Wider landscape scale.	Site scale, immediate setting.
	Duration and reversibility	Permanent. Long term (over 10 years).	Reversible. Short Term (0-5 years).

Table 1: Determining the level of landscape effects

### Visual Effects

To assess the visual effects of a proposed development on a landscape, a visual baseline must first be defined. The visual 'baseline' forms a technical exercise which identifies the area where the development may be visible, the potential viewing audience, and the key representative public viewpoints from which visual effects are assessed.

The viewing audience comprises the individuals or groups of people occupying or using the properties, roads, footpaths and public open spaces that lie within the visual envelope or ‘zone of visual influence’ of the site and proposal. Where possible, computer modelling can assist to determine the theoretical extent of visibility together with field work undertaken to confirm this. Where appropriate, key representative viewpoints should be agreed with the relevant local authority.

### Nature of the viewing audience

The nature of the viewing audience is assessed in terms of the susceptibility of the viewing audience to change and the value attached to views. The susceptibility of the viewing audience is determined by assessing the occupation or activity of people experiencing the view at particular locations and the extent to which their interest or activity may be focused on views of the surrounding landscape. This relies on a landscape architect’s judgement in respect of visual amenity and reaction of people who may be affected by a proposal. This should also recognise that people more susceptible to change generally include: residents at home, people engaged in outdoor recreation whose attention or interest is likely to be focused on the landscape and on particular views; visitors to heritage assets or other important visitor attractions; and communities where views contribute to the landscape setting.

The value or importance attached to particular views may be determined with respect to its popularity or numbers of people affected or reference to planning instruments such as viewshafts or view corridors.

Important viewpoints are also likely to appear in guide books or tourist maps and may include facilities provided for its enjoyment. There may also be references to this in literature or art, which also acknowledge a level of recognition and importance.

### Magnitude of Visual Change

The assessment of visual effects also considers the potential magnitude of change which will result from views of a proposed development. This takes account of the size or scale of the effect, the geographical extent of views and the duration of visual change which may distinguish between temporary (often associated with construction) and permanent effects where relevant. Preparation of any simulations of visual change to assist this process should be guided by best practice as identified by the NZILA<sup>4</sup>.

When determining the overall level of visual effect, the nature of the viewing audience is considered together with the magnitude of change resulting from the proposed development. Table 2 has been prepared to help guide this process:

Contributing factors		Higher	Lower
Nature of Landscape Resource	Susceptibility to change	Views from dwellings and recreation areas where attention is typically focussed on the landscape..	Views from places of employment and other places where the focus is typically incidental to its landscape context. Views from transport corridors.
	The value of the landscape	Viewpoint is recognised by the community such as an important view shaft, identification on tourist maps or in art and literature. High visitor numbers.	Viewpoint is not typically recognised or valued by the community. Infrequent visitor numbers..
Magnitude of Change	Size or scale	Loss or addition of key features in the view. High degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Full view of the proposed development	Most key features of view retained. Low degree of contrast with existing landscape elements (i.e. in terms of form scale, mass, line, height, colour and texture). Glimpse / no view of the proposed development.
	Geographical extent	Front on views. Near distance views; Change visible across a wide area.	Oblique views. Long distance views. Small portion of change visible.
	Duration and reversibility	Permanent. Long term (over 15 years).	Transient / temporary. Short Term (0-5 years).

<sup>4</sup> Best Practice Guide: Visual Simulations BPG 10.2, NZILA

## Nature of Effects

In combination with assessing the level of effects, the landscape and visual effects assessment also considers the nature of effects in terms of whether this will be positive (beneficial) or negative (adverse) in the context within which it occurs. Neutral effects can also occur where landscape or visual change is benign.

It should also be noted that a change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic transformational ways, these changes are both natural and human induced. What is important in managing landscape change is that adverse effects are avoided or sufficiently mitigated to ameliorate the effects of the change in land use. The aim is to provide a high amenity environment through appropriate design outcomes.

This assessment of the nature effects can be further guided by Table 3 set out below:

Nature of effect	Use and definition
<b>Adverse (negative):</b>	The proposed development would be out of scale with the landscape or at odds with the local pattern and landform which results in a reduction in landscape and / or visual amenity values
<b>Neutral (benign):</b>	The proposed development would complement (or blend in with) the scale, landform and pattern of the landscape maintaining existing landscape and / or visual amenity values
<b>Beneficial (positive):</b>	The proposed development would enhance the landscape and / or visual amenity through removal of restoration of existing degraded landscapes uses and / or addition of positive elements or features

Table 3: Determining the Nature of Effects

## Cumulative Effects

During the scoping of an assessment, where appropriate, agreement should be reached with the relevant local authority as to the nature of cumulative effects to be assessed. This can include effects of the same type of development (e.g. wind farms) or the combined effect of all past, present and approved future development<sup>5</sup> of varying types, taking account of both the permitted baseline and receiving environment. Cumulative effects can also be positive, negative or benign.

### Cumulative Landscape Effects

Cumulative landscape effects can include additional or combined changes in components of the landscape and changes in the overall landscape character. The extent within which cumulative landscape effects are assessed can cover the entire landscape character area within which the proposal is located, or alternatively, the zone of visual influence from which the proposal can be observed.

### Cumulative Visual Effects

Cumulative visual effects can occur in combination (seen together in the same view), in succession (where the observer needs to turn their head) or sequentially (with a time lapse between instances where proposals are visible when moving through a landscape). Further visualisations may be required to indicate the change in view compared with the appearance of the project on its own.

Determining the nature and level of cumulative landscape and visual effects should adopt the same approach as the project assessment in describing both the nature of the viewing audience and magnitude of change leading to a final judgement. Mitigation may require broader consideration which may extend beyond the geographical extent of the project being assessed.

## Determining the Overall Level of Effects

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<sup>5</sup> The life of the statutory planning document or unimplemented resource consents

The landscape and visual effects assessment concludes with an overall assessment of the likely level of landscape and visual effects. This step also takes account of the nature of effects and the effectiveness of any proposed mitigation.

This step informs an overall judgement identifying what level of effects are likely to be generated as indicated in Table 4 below. This table which can be used to guide the level of landscape and visual effects uses an adapted seven-point scale derived from NZILA’s Best Practice Note.

	Effect rating	Use and definition
More than minor	Very high	Total loss of key elements / features / characteristics, i.e. amounts to a complete change of landscape character
	High	Major modification or loss of most key elements / features / characteristics, i.e. little of the pre-development landscape character remains. Concise Oxford English Dictionary Definition High: adjective- Great in amount, value, size, or intensity
	Moderate to high	Modifications of several key elements / features / characteristics of the baseline, i.e. the pre-development landscape character remains evident but materially changed.
Minor	Moderate	Partial loss of or modification to key elements / features / characteristics of the baseline, i.e. new elements may be prominent but not necessarily uncharacteristic within the receiving landscape. Concise Oxford English Dictionary Definition Moderate: adjective- average in amount, intensity, quality or degree
	Moderate to low	Minor loss of or modification to one or more key elements / features / characteristics, i.e. new elements are not prominent or uncharacteristic within the receiving landscape.
	Low	No material loss of or modification to key elements / features / characteristics. i.e. modification or change is not uncharacteristic and absorbed within the receiving landscape. Concise Oxford English Dictionary Definition Low: adjective- 1. Below average in amount, extent, or intensity
Less than minor	Very low	Little or no loss of or modification to key elements/ features/ characteristics of the baseline, i.e. approximating a ‘no change’ situation.

Table 4: Determining the overall level of landscape and visual effects

## Determination of “minor”

Decision makers determining whether a resource consent application should be notified must also assess whether the effect on a person is less than minor<sup>6</sup> or an adverse effect on the environment is no more than minor<sup>7</sup>. Likewise, when assessing a non-complying activity, consent can only be granted if the s104D ‘gateway test’ is satisfied. This test requires the decision maker to be assured that the adverse effects of the activity on the environment will be ‘minor’ or not be contrary to the objectives and policies of the relevant planning documents.

These assessments will generally involve a broader consideration of the effects of the activity, beyond the landscape and visual effects. Through this broader consideration, guidance may be sought on whether the likely effects on the landscape resource or effects on a person are considered in relation to ‘minor’. It must also be stressed that more than minor effects on individual elements or viewpoints does not necessarily equate to more than minor effects on the wider landscape resource. In relation to this assessment, moderate-low level effects would generally equate to ‘minor’.

<sup>6</sup> RMA, Section 95E

<sup>7</sup> RMA Section 95D

## Appendix 3: Landscape Value

<b>Determination of landscape quality</b>		
<b>Category</b>	<b>Criteria</b>	<b>Typical Example</b>
<b>High - Exceptional</b>	Strong landscape structure, characteristics, patterns, balanced combination of landform and land cover	International or nationally recognised site – national park.
	Appropriate management for land use and land cover	
	Distinct features worthy of conservation	
	Sense of place	
	No detracting features	
<b>High</b>	Strong landscape structure, characteristics, patterns, balanced combination of landform and land cover	Nationally or regionally recognised site – national park
	Appropriate management for land use and land cover but potential scope for improvement.	
	Distinct features worthy of conservation	
	Sense of place	
	Occasional detracting features	
<b>Good</b>	Recognisable landscape structure, characteristics, patterns, balanced combination of landform and land cover still evident	Nationally, regionally recognised site all or great majority of area of local landscape importance
	Scope to improve management for land use and land cover	
	Some features worthy of conservation	
	Sense of place	
	Some detracting features	
<b>Ordinary</b>	Distinguishable landscape structure, characteristic patterns of landform and land cover often masked by landuse	
	Some features worthy of conservation	
	Some detracting features	
<b>Poor</b>	Weak landscape structure, characteristic patterns of landform and land cover often masked by landuse	
	Mixed land use evident	
	Lack of management and intervention has resulted in degradation	
	Frequent detracting features	
<b>Very poor</b>	Degraded landscape structure, characteristic patterns of landform and land cover are masked by landuse	
	Mixed land use dominates	
	Lack of management and intervention has resulted in degradation	
	Extensive detracting features	
<b>Damaged landscape</b>	Damaged landscape structure	
	Single land use	
	Disturbed or derelict land requires treatment	
	Detracting features dominate.	

**Table 2** has been adapted for NZ conditions from an example of threshold criteria used by practitioners in the United Kingdom. The original document was prepared by Jeff Stevenson Associates and published in Guidelines for Landscape and Visual Assessment (“GLVIA”) 3<sup>rd</sup> Edition. Landscape Institute (UK) and IEMA 2013

DARGAVILLE RACING CLUB REDEVELOPMENT

Private Plan Change  
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# Appendix 4: Summary of Visual Amenity Effects

DARGAVILLE RACING CLUB REDEVELOPMENT

Private Plan Change  
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Address	Legal desc.	Dist.	Elev.	Comment	Constr. effect	Short term	Med. to long term
<b>Occupants of dwellings to north and north west</b>							
5329 SH14	Pt Lot 36 DP 11719	60m		Dwelling oriented to the north on ridge crest, and elevated above level of Site. Dense and mature vegetation growing on the ridge flank to south of building, but glimpse views through gaps in vegetation, and from driveway. Lawn areas within lower (southern) portion of property adjoin Site.	Low	Low	Very low
5321 SH14	Lot 1 DP 388838	90m		Dwelling located on ridge flank above Site and oriented to north. Direct views possible from southern façade of dwelling across the majority of Site.	High	High	Low to moderate
5311 SH14	Lot 1 DP 365819	180m		Dwelling located on lower ridge flank above Site. Outlook appears to be to south west and garage / shed situated on the southern side of the dwelling. In addition, trees within property buffer views south to Site.	Very low	Low	Very low
5344 SH14	Pt Lot 3 DP 27234	50m	As Site	Dwelling located close to State Highway, oriented to north east and toward north western corner of Site across State Highway. Vegetation within property buffers / fragments views to Site	Low	Low to moderate	Low
<b>Occupants of dwellings to west and south west</b>							
	Pt Lot 1 DP 11126	50m		Dwelling elevated slightly above State Highway and Site. Oriented to north and east. Road (east) boundary vegetated with dense vegetation, although fragmented views possible through to Site. More direct views through vegetation possible to north east and north to north west portion of Site.	Moderate to high	Moderate to high	Low to moderate
<b>Users of State Highway 14</b>							
-	-	20m	As Site	Long views along State Highway when approaching south west corner of Site from south west. Views when approaching Site from north west blocked by landform until within 100m of north west corner.  Generally unrestricted transitory views into Site when on State Highway adjacent to Site	Low to moderate	Low	Very low

**Viewers within the wider environment to the south**

Dwellings located on, and users of Awakino Point East Rd	-	900m – 1.5km	As Site	Fragmented and restricted views across flat landscape to Site. Views fragmented by shelterbelts and other vegetation	Very low	Very low	Nil
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**Occupants of dwellings on Awakino Point North Road**

6 Awakino Point North Rd	Lot 28 DP 7811	100m	As Site	Set back from road. Views constrained by vegetation. Potential for oblique views to north through vegetation and over #16 to Site? Property also serves as a depot for rural contracting business?	Low	Low	Very low
16 Awakino Point North Rd	Lot 1 DP 65922	35m	As Site	Dwelling on large lot set close to road frontage. Views to north and north east screened by dense evergreen hedge. Views to west and north west include south west corner of Site and SH14 / Awakino Point North Road junction.	Low to moderate	Low to moderate	Very low
26 Awakino Point North Rd	Lot 1 DP 37054	30m	As Site	Dwelling in small lot with established vegetation to south west south and south east. Front boundary delineated by picket fence and direct views possible over road into Site.	Moderate to high	Moderate	Low
44 Awakino Point North Rd	Pt Lot 30 DP 11537	35m	As Site	Two storey dwelling with north west facing dormer windows set close to road frontage and set within established vegetated garden. Vegetation on road boundary buffers views from ground floor windows. Views over vegetation from dormer windows to west, north west and north, into Site.	Moderate	Low to moderate	Low to moderate
70 Awakino Point North Rd	Lot 6 DP 122426	40m	As Site	Dwelling forms part of cluster of farm buildings, located close to the road. Screened from road by vegetation on boundaries, and by vegetation along Site road boundary..	Very low	Very low	Nil
	Lot 1 DP 70219	70m	As Site	Dwelling in cluster of farm buildings which are also contained within lot below. Direct views to Site across road to west, north west and north	Moderate to high	Moderate to high	Low
102 Awakino Point North Rd	Lot 1 DP 208926	-	As Site	Cluster of farm buildings with dwelling contained in lot above.	-	-	-
118 Awakino Point North Rd	Lot 325 DP 11125	50m	As Site	Large productive lot with dwelling located close to road. Direct views to west and south west into Site.	Moderate to high	Moderate to high	Low

130 Awakino Point North Rd	Lot 1 DP 377245	160m	As Site	Dwelling located close to road with views to road and Site partially screened by vegetation on north western and south western boundaries, and shelterbelts to west.	Low to moderate	Low to moderate	Very low
131 Awakino Point North Rd	Pt Lot 35 DP 11124	160m	As Site	Dwelling on large productive lot at south western end of cluster of dwellings. Views to south west part screened by shelterbelts. Views available to elevated land in north east corner of Site.	Low to moderate	Low to moderate	Low
133 Awakino Point North Rd	Lot 1 DP 158696	200m	As Site	Two storey dwelling on small lot within cluster. Views to south west and west from ground floor partially screened by buildings and vegetation. Possible views from dormer window in upper floor towards Site	Very low	Very low	Nil
141 Awakino Point North Rd	Pt Lot 35 DP 7811	270m	As Site	Dwelling located within cluster of settlement on large lot which extends to the north. Spacious setting but views to the west and north west screened by vegetation and buildings.	Very low	Very low	Nil
143 Awakino Point North Rd	Lot 3 DP 396182	300m	As Site	Dwelling located within cluster of settlement on small triangular lot. Spacious setting but views to the west and north west screened by vegetation and buildings	Very low	Very low	Nil
	Lot 4 DP 396182			Contains cluster of farm buildings.	-	-	-
144 Awakino Point North Rd	Lot 1 DP 61368	310m	As Site	Small narrow lot to south of road in cluster of 3. Views to west and south west part obscured by vegetation	Very low	Very low	Very low
145 Awakino Point North Rd	Lot 1 DP 396182	345m	As Site	Small lot off end of road in cluster of 3. Oriented to north. Views to Site blocked by vegetation and buildings.	Nil	Nil	Nil
145B Awakino Point North Rd	Lot 2 DP 396182	350m	As Site	Large productive lot off end of road in cluster of 3. Oriented to north. Views to Site blocked by vegetation and buildings.	Nil	Nil	Nil

#### Views from the Awakino Point North Road

	-	20m	As Site	Immediate and direct transitory views into the Site are possible at the south western and north eastern ends of the road. Views from the mid-section tend to be largely screened by a mix of native and exotic vegetation growing on the northern edge of the road corridor	Low to moderate	Low	Very low
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#### Views from the wider environment to the east and south east

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Receptors located on elevated land to east of Wairoa River	-	2.5 – 4km		Where views available to north or north west, the Site is visible as part of a broad panorama.	Very low	Very low	Very low
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*Table 2: Visual amenity effects summary*



# Initial Engagement for the Dargaville Racing Club Site

## Summary Report

**04 June 2021**

Prepared by The Urban Advisory



# Initial Engagement Summary

Dargaville Racing Club

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This document summarises the initial community and stakeholder engagement for the Dargaville Racing Club Site

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# Community Engagement Summary

## The purpose of this document is to:

- Capture previous engagement that has informed planning and/or development in Dargaville.
- Document the start of the engagement process with key stakeholders, including neighbours and DRC members about the development of the Racing Club site.
- Support the development of a Concept Plan for the Racing Club site by researching:
  - demand for housing, commercial and industrial activities and community amenities in Dargaville.
  - community needs, concerns and aspirations for the site.
- Support the evidence needed for a Private Plan Change submission for the Racing Club site.

## Initial community stakeholder and community engagement has included the following:

- Engaging with tripartite members (Dargaville Racing Club, Te Rūnanga o Ngāti Whātua, Dargaville Community Development Board) about their aspirations for the site
- 3 community meetings; one with neighbours (20 attendees approximately), one with Dargaville Racing Club members (8-10 attendees), one with the wider community (50-60 attendees approximately). Further engagement and consultation is planned through June/July/August including a housing survey, targeted engagement for potential retirement village residents, and consultation on the development plan.
- Specific engagement with Te Rūnanga o Ngāti Whātua is also underway and not recorded in this document; it will be captured in the Cultural Impact Assessment being undertaken for the Plan Change and the Cultural Narrative work being undertaken by Matakoho Architecture and Urbanism for this project. This will be synthesised into this project as it develops.

## The data in this report is coded as follows:

**Blue = Previous engagement\* undertaken in Dargaville**

**Purple = The views of neighbours, shared on 27 May 2021**

**Green = The views of Dargaville Race Club members, shared on 27 May 2021**

**Orange = The views of community members, shared on 27 May 2021**

### *\*The previous engagement documents summarised in this report include:*

*Kaipara Spatial Planning | Consultation Document: Let's Talk About Options For Dargaville, Maungatūroto & Kaiwaka. November 2019*

*Engagement 1 - Issues, Vision and Principles: Kaipara spatial planning project for Dargaville, Maungaturoto and Kaiwaka. July/ August 2019*

*Let's talk about options – Survey Analysis December 2019*

*Dargaville Meeting District Plan Feedback themes (DCDB)*

*Kaipara Spatial Plan (Parts A-E)*

## Key Themes

- 1. This project has the potential to help ease the severe housing shortage in Dargaville.** A number of attendees commented on the lack of supply and choice available in Dargaville currently and raised concerns about younger residents being priced out of the local market to an increasing extent. Another concern was having enough options for existing locals as well as the influx of Auckland residents who had been able to cash in on high house sale prices and move to Dargaville for the lifestyle/larger home and land package.
- 2. A mix of housing options (types and tenures) is critical.** The demand for rental properties was perceived to be very high; rent-to-buy schemes were also strongly suggested as a favoured solution by a number of attendees. At the moment, any rental listings will attract 30+ viewers, lots of competition and little choice in the market. Needing to cater to the existing community that was missing out on suitable housing options was a strong opinion held by many attendees. There were mixed views as to whether standalone large lot homes only or more variety i.e. terraced units or low-rise apartments were needed to suit more diverse needs. Some older residents have downsized to smaller units in old age, but still demand for retirement living option (not aged / hospital care). However, there were also mixed views about the appropriateness of a retirement village out of town, unless it was well-connected with a shuttle and if there were some additional facilities, such as a medical facility and a local produce/everyday item store
- 3. The community benefit intent of the project is of paramount importance.** There were concerns raised about how the project would navigate being sold to developers, and how the community benefit could be delivered to the town as a whole rather than favouring specific groups. The story of the land and how it came to be in the possession of the DRC was also an important theme, and it was important to many attendees to honour the long history of the site.
- 4. There is a nervousness about change and development of the site.** These concerns revealed the need for transparency. People need to be taken on the journey. There needs to be opportunities for people to engage and be part of the process to ensure ownership over whatever outcomes develop.
- 5. The timing is right for new development in Dargaville.** A strong view came through that there was appetite for change and the acknowledgement that Dargaville was ready for both residential and commercial growth. The correlation was drawn between housing and opportunities for employment; one attendee commented that "housing sustains schools, local clubs, employment". One caution, however, was the number of unused light-industrial sites that were observed in the centre of town and the perceived difficulties faced when trying to develop these.
- 6. Mana whenua have an important role to play.** Many attendees were interested in the potential for Te Rūnanga o Ngāti Whātua's involvement in developing the site.
- 7. The relationship between housing and light industrial needs to be carefully managed.** Concerns were raised by attendees about how housing and light industrial might coexist, what the transition or buffer between them might be.
- 8. It is important to provide potential future residents with good access to amenities, but the town centre also needs to be looked after.** Connectivity to the town centre was raised as a concern for making development at the site favourable to locals. A wide range of amenities were raised by attendees as being potential options for the site, including medical facilities, café or restaurant, green space (i.e. park/reserve/garden/off-leash area for dogs/picnic area), community hall or facilities, accommodation, and/or leisure facilities (i.e. 9-hole golf course). The future of the Pony Club and how it could be incorporated in a development plan was a concern of many attendees.
- 9. Mitigating the potential environmental impacts of the development is important.** Preserving and enhancing the natural ecology of the site was discussed by attendees, as was the importance of social

sustainability and using local suppliers to develop the site where possible. It's also important to acknowledge that many community members agree with the vision for Kaipara to be the 'food bowl of NZ'.

## Engagement Data by Topic

### Topic 1: Vision for Dargaville

- “In 2050, Dargaville is the epicentre of Kaipara food production & technology, a visitor hub for our natural and cultural tourism attractions and a place where our history and the community are celebrated.”
- Thriving town centre
- Intensified residential areas close to town
- Shared pedestrian/cycle link connecting industrial, residential, and recreational areas
- Medium density papakāinga and a retirement village close to the hospital with good transport routes to town



**Aspirations for Dargaville.** Source: Resilio Studio. Kaipara Spatial Planning Constraints and Opportunities: Discussion Paper. Rev 8. 5 September 2019. (p53)

### Topic 2: Community Aspirations

People were given the opportunity to discuss their community aspirations and asked to think about why people move to Dargaville and what helps them stay. People were also asked to think about if Covid and the lockdowns impacted Dargaville?

- Value people: Great friendships and community spirit, Diversity, Strong Community Groups and volunteers
- Enjoy the relaxed pace of living
- Have all the services at your doorstep
- An improved town centre (promoting character, graffiti removal)
- A destination rather than a gateway
- The food bowl of New Zealand
- Build on our successful industries
- Struggle for youth to get training and employment in Dargaville.
- Other workers travel to Dargaville from Mangawhai or Whangārei, as there isn't housing in Dargaville for them to move.
- Dargaville High School Construction Academy is successful in providing training and pathway into formal apprenticeships.
- Ngāti Whātua aspiration to provide employment for local people through Retirement Village and construction of new development on Racecourse Site.

- Some mentioned 'retirement at 65' isn't a thing in this community']
- Council upgrades needed
- Need someone promoting the town
- Wake the town up – help
- Tidy the town up – restore pride
- Challenge to get building owners to tidy your buildings
- We're a 2-star accommodation place
- Plaque in remembrance of a tīpuna – telling the story of land (Paratene Te Awha)
- Empty industrial in town, we need more houses
- How do you propose to attract more residents to Dargaville; upgrade the town, lights on the NW bridge

#### Concerns about community aspirations

- Local business owners mentioned challenges of consenting retrofit properties for their businesses (4+ years for one farm motorcycle company) and even new builds, considered easier, are taking years to get consented in Dargaville. Both of these are challenges because the quality of industrial and commercial buildings in Dargaville is low - demand for new high-quality buildings suitable for local business.
- Sportsville development was a massive community-led effort to get funded and constructed for the benefit of Dargaville. Budget limitations / uncertainty meant lower spec development (without bells & whistles) resulted.

#### Mana whenua engagement themes for Dargaville

(Further themes are woven throughout the document and will also be captured in a larger Cultural Impact Assessment process)

- Developing and fostering relationships
- Bringing our people home
- Papakāinga, warm and dry homes, kaumatua housing, increase housing choice, supporting ahi kā
- Pathways to papakāinga are considered arduous (complicated planning rules, funding and infrastructure challenges) - consider in District Plan review
- Warm healthy affordable housing
- Marae restoration, appropriate zoning and infrastructure
- Education
- Industry and workforce opportunities
- Aspiration for self-sufficiency on the land
- Protect the Northern Wairoa River edge and adjacent fertile land from the effects of climate change i.e. increased potential of extreme flooding.
- Culturally and environmentally sensitive land use and development required
- Mana whenua don't want to be regarded as a testing ground for experimental development or failed infrastructure projects
- Be the food basket of the north: e.g. Market garden industries, fishing and kai moana, Waipoua forest and cultivation.
- Tinopai: local resource management plan, to advise development in the area

#### Youth engagement themes for Dargaville

- Demand for places to go and eat, places to gather and be active including more recreation activities, entertaining activities and public events
- Walking and cycling
- Disconnect between training provided at NorthTec and skills required by large manufacturing firms in Kaipara

#### Future Residents in Dargaville

- Need to attract younger people to stay or come here
- New residents of all ages
- People with skills to help the district
- Cheap housing for young families to own/rent-to-buy
- Trend for Dargaville people going to Whangarei not what we want

## Community Design Principles



## Topic 3: Environmental Aspirations

- Recognise the beauty of the riverfront (tree planting, cleaning up reserves)
- Restoration – return to more trees that are native
- Cherish the heritage of Kaipara’s natural geological assets
- Retain rural land
- Horticulture over Agriculture – Aquaculture
- Ability to grow and gather kai moana
- More edibles planted in the town (an urban orchard for community sustainability)
- Limits to industrial land uses
- Many community members agree with the vision for Kaipara to be the ‘food bowl of NZ’. The land in Kaipara is high quality and maintaining the production economy is important.
- Trend of land use change in rural areas, less dairy farming activities (especially around Racecourse site) as farms transition to beef, chickens and seasonal cropping. Only one dairy farm off Awakino North Road now.
- Ngāti Whātua have a strong aspiration to purchase land and operate horticultural or crop activities, and process botanicals (for example) in the Kaipara area.
- Retirement village wrong use of the land; soils are good for agriculture (asp. flat land area)
- Whole thing owned by a trust to support horticulture activity (short term cropping)
- Water supply/sewage/stormwater need to be considered
- Many community members agree with the vision for Kaipara to be the ‘food bowl of NZ’. The land in Kaipara is high quality and maintaining the production economy is important.
- Trend of land use change in rural areas, less dairy farming activities (especially around Racecourse site) as farms transition to beef, chickens and seasonal cropping. Only one dairy farm off Awakino North Road now.
- Ngāti Whātua have a strong aspiration to purchase land and operate horticultural or crop activities, and process botanicals (for example) in the Kaipara area.

## Topic 4: Transport Aspirations

- Improve walking and cycle connections
- Connect the town centre and wider community with the Northern Wairoa River
- Ability to get to work in 2 minutes
- Mana Whenua: Marae - restoration, appropriate zoning and infrastructure
- Link to town

- Link to rail/water
- Walking tracks

## Topic 5: Housing Aspirations

People were asked to think about how easy or difficult it is to find a good quality rental property in Dargaville, how easy or difficult it is to own a home in Dargaville, and if there are any groups that are not served by current housing options (e.g. young families, families with teenagers, single workers, older residents who want to downsize?).

- Denser development in the town centre
- Residential close enough to industry to walk and cycle
- Would like to see Council build more pensioner units
- Need more sections
- Want to keep sections big – small town feel
- A variety of section sizes to suit different living styles
- Land for a retirement village – Central to town, not out in the wops
- Mana Whenua: papakāinga and warm and dry homes
- Rentals
- Don't want rentals
- Rent-to-buy
- Retirement village idea good
- Retirement village wrong use of the land; soils are good for agriculture (asp. flat land area)
- If Port of Auckland likely to be in Whangarei-housing critical?
- One community member mentioned buying a house for \$250,000 4 years ago which has doubled in value since then.
- Demand for retirement village clear from 2017 Ansell report and discussion with local community members
- Ngāti Whātua have aspirations to develop and operate a retirement living facility, to provide income and employment for local people.

Live - High-Density



Work - Mixed-Use



Work - Main Street



Live - Medium-Density



Work - Industry



Learn - Schools

Live - Low-Density



Play - Recreational



**Aspirations for Dargaville.** Source: Resilio Studio. Kaipara Spatial Plan - Key Urban Areas. May 2020 (p28)

## Topic 6: Services and Facilities Needed in Dargaville

- Local business owners mentioned challenges of consenting retrofit properties for their businesses (4+ years for one farm motorcycle company) and even new builds, considered easier, are taking years to get consented in Dargaville. Both of these are challenges because the quality of industrial and commercial buildings in Dargaville is low - demand for new high-quality buildings suitable for local business.
- Sportsville development was a massive community-led effort to get funded and constructed for the benefit of Dargaville. Budget limitations / uncertainty meant lower spec development (without bells & whistles) resulted.
- Demand for retirement village clear from 2017 Ansell report and discussion with local community members
- Ngāti Whātua have aspirations to develop and operate a retirement living facility, to provide income and employment for local people.
- Variety of food shops
- Places to gather and be active both indoors and outdoors
- Parks and Playgrounds – Free BBQ's
- Free Parking and no traffic lights
- Youth facilities
- Age care facilities. Retirement village.
- Shops near factories so workers can buy lunch
- Bigger library – mobile bus
- Community hub like Kaitaia Te Ahu business space (Hot desking)
- Medical centre (more services dentists and doctors) – must not lose the hospital – mobile service throughout the district – Lack of maternity services
- Childcare
- Public transport – passenger train to Auckland, tourist trains
- Tertiary institution - more choices
- Airport
- Visitor centre
- Swimming Pool 365 days of the year
- Mana Whenua: Education opportunities
- Mana Whenua: Industry and workplace opportunities
- Competition for Countdown
- Don't need an information centre
- Don't need accommodation (i.e. motel)
- We need commercial, not industrial
- We need industry in Dargaville. Oamaru District Council had a great concept and would be worth getting in touch with them. They secured land on the outskirts of Oamaru and opened an industrial part. They put in a sealed road and about 10 sections and to kick it offered 2/4 years to pay for the 1st section and also a rates concession this got a company come in and set up a factory and one by one all sections sold. Manufacturing can be done here as good as Auckland. (Vernon Suckling happy to provide contacts)
- Already have a golf course
- Mangaware, Masonic & Council
- Don't want industrial...but it does create work
- Supermarket competition
- Need housing quality & industrial/commercial
- Kumarani Productions Trust
- Dargaville town needs to upgrade some of its services i.e. banking, health care, parking

## Topic 7: Racecourse Site Aspirations

People were asked to consider what type of housing they want to see at the site, what other services and facilities could be important at the site, and generally what they would like to see done with the site. People were also asked to share their concerns with the potential development.

**What would you like to see at the site?**

Community	<ul style="list-style-type: none"> <li>● Story of the land: Parore Te Āwha / Pouaka Parore and Pouritanga Parore</li> <li>● Opportunity for Dargaville – Innovation, Entrepreneurship, Do something</li> <li>● We must move forward. Protect our community – working together.</li> <li>● No more racing – but we have an asset, so let’s use it.</li> <li>● Mixed community – concern about anti-social behaviour</li> <li>● “Let’s look after our community first”</li> <li>● Giving back to the community is critical</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>● Urban and industrial development to the north east on rural land and SH14 will avoid sensitive ecology and productive soils</li> <li>● Development self-sufficient (solar, septic, water etc...)</li> <li>● If two different areas are close (industrial &amp; housing) potential for noise and conflict</li> <li>● Water supply from town?</li> <li>● Solar powered</li> <li>● Water/septic self sufficient</li> <li>● Wind turbines (small)</li> <li>● All engineered timber</li> <li>● Building with solid mass for solar efficiency</li> <li>● All dwellings and associated commerce north facing industrial and services south side adjacent to Awakino Point North Road</li> <li>● Enhance the natural features; pond/wetland area</li> <li>● “We already have our own parks – they’re farms.”</li> <li>● Need buffers</li> <li>● Buffer zones – avoid reverse sensitivity.</li> <li>● Want it to be sustainable legacy for the grandchildren</li> </ul>
Transport	<ul style="list-style-type: none"> <li>● Bus service in to Dargaville (shuttle)</li> <li>● Need a bus service to get people in to town</li> <li>● Shuttle service</li> <li>● Bus service/shuttle</li> <li>● Connect to town; walkway/cycleway, continuous loop, electric bus (10 seater) town to racecourse</li> <li>● Sealed road around the whole area</li> <li>● Green space/ bridle way around the whole site for others to use-walkers, runners and cyclists</li> <li>● Electric vehicles only</li> </ul>
Housing	<ul style="list-style-type: none"> <li>● Quality housing</li> <li>● Mixed financial range of houses</li> <li>● Bring it on! Residential and Industrial</li> <li>● Combination of different \$\$ houses (i.e. variety of price points)</li> <li>● Support housing and light industry</li> <li>● Gating and security for safety in retirement</li> <li>● Residential</li> <li>● Housing affordable place for whānau of local hapū</li> <li>● Agree on providing rental accommodation, open spaces, retirement facilities, parks</li> <li>● Offer 2 to 4 years to pay for a section along with a rates concession</li> <li>● Minimum of ¼ acre sections for residential</li> <li>● Create income stream from rentals for future growth</li> <li>● If housing is objective, then industrial area should not be in tandem</li> <li>● Reserves and pony club area a buffer zone for houses</li> <li>● Private homes and rent-to-buy</li> <li>● Retirement Village</li> </ul>

	<ul style="list-style-type: none"> <li>● Retirement Village; self contained to include a small shopping centre including - foursquare type shop, medical room for doctor weekly consultations, community hall</li> <li>● Private homes</li> <li>● No rentals unless rent-to-buy</li> <li>● Intergenerational living</li> <li>● Tiny home sections/affordable</li> <li>● Live/work units, Commercial integration</li> <li>● Retirement Village (not a rest home)</li> <li>● Covenant pets (conflict) with lambs</li> <li>● Don't want houses on the boundary edge</li> <li>● More affordable housing-futureproofing for our community</li> <li>● Balance of work + houses + retirement village</li> <li>● Give them the opportunity to buy</li> <li>● Affordable houses/sustainable growth</li> </ul>
<p><b>Services and Facilities</b></p>	<ul style="list-style-type: none"> <li>● A business hub</li> <li>● A great industrial park</li> <li>● Medical facilities</li> <li>● Cafes</li> <li>● Restaurants</li> <li>● Restaurant</li> <li>● Decent Kai</li> <li>● Playground accessible</li> <li>● Zip line on raised part</li> <li>● Banking facilities</li> <li>● Gates, security</li> <li>● Lighting</li> <li>● Reserves/picnic areas (could incorporate Pony Club area)</li> <li>● Communal gardens – veges etc...</li> <li>● Happy for housing.... Really want large green space as reserve for Pony Club and benefit of all community (accessible) e.g. small bridal path space for equestrian</li> <li>● Medical consultation in small community hall perhaps in the Retirement Village</li> <li>● BBQs in open parks, playgrounds</li> <li>● MANA WHENUA MARAE</li> <li>● Marae and community gardens</li> <li>● Community hall and park area</li> <li>● We need industry in Dargaville</li> <li>● A nice functional centre with a restaurant for dining and functions</li> <li>● Community Hall</li> <li>● Set up a factory and sell sections around the factory</li> <li>● Interdenominational worship space (Jewish, Muslim, Christian)</li> <li>● Use flat areas for sports fields &amp; parks for walking</li> <li>● Create green areas for walking, setting out parks, and planting many trees</li> <li>● Designate green space as a reserve (Papatōetoe)??</li> <li>● Pony Club would like to stay in current position - 10 acres minimum</li> <li>● An area for Pony Club maybe upgraded Arenas (Parking all weather) (dressage, green area for show jumping)</li> <li>● Pony Club to be included in the development while space allows (temporarily!)</li> <li>● Dedicated dog park (off leach area)</li> <li>● Golf Course; I appreciate that the golf course concept is not for everyone and potentially if it's a 9-hole course it requires approx 13 hectares and developer investment.</li> </ul>

	<p><b>Option 1:</b> Included in the land mass for utilisation by everyone, retirees, new housing residents, visitors and community. Memberships desired to pay for costs and maintenance.</p> <p><b>Option 2:</b> Included in the Retirement Village facilities - refer One Tree Point subdivision with 9-hole golf course. This could be an alternative with a multi-use facility with visitors and community membership offered to generate income. Par 3 and 4 holes only would require less land.</p> <ul style="list-style-type: none"> <li>● Hotel/motel accommodation 4 stars plus</li> <li>● Accommodation Food and Beverage; A 40 - 45 Bed Lodge. The concept of providing accommodation is much needed for Dargaville and could be utilised by new housing and retirement residents, friends and family. Sufficient accommodation for a bus load of visitors would be a great asset. We also experience a real shortage of accommodation when there are large events such as the Field Days. A facility like this would encourage visitors to stay in Dargaville with a quality property offering food and beverage. Multiuse to provide a private event facility for celebrations and weddings.</li> <li>● Boutique Winery with Food/Beverage/Venue; A bordering property belonging to the McLeods, which sits on the north-eastern side of the hill at the back of the site, may provide potential private enterprise investment. Their son Lachland McLeod had a vision to build a venue that would complement his grape growing initiative, also on their property and provide an event venue for weddings etc. that would also double as a food and beverage facility as part of his winery. NB Mrs Mcleod spent quite a lot of time talking with you or Greer around the table at the DRC meeting. It looked like she had roading concerns but perhaps she was concerned about their potential development, hope so!</li> <li>● Mini golf – old and young people (open space)</li> <li>● Keep pony club (\$1 per year lease). Move the pony club – as buffer between dairy farm and residential</li> <li>● Accommodation 4-5 Star; café &amp; bar; doubles as Function Venue</li> <li>● Commercial investment</li> <li>● Food growing industries</li> <li>● Leisure – 9-hole golf course</li> <li>● Nice public space</li> <li>● Green space</li> <li>● Gardens – feed the kids</li> <li>● Housing sustains schools, local clubs, employment</li> <li>● Keep an area as equine e.g reserve buffer e.g pony club(3-4 acres/ha Need housing quality &amp; industrial/commercial)</li> <li>● Dressage 60x40</li> <li>● Growing demand for equine facilities-dressage</li> <li>● (Barge Park-Whangarei)</li> <li>● Northland doesn't have a need for large facilities</li> <li>● Keep track loop in physical farm</li> <li>● 10ha OK for equine reserve</li> <li>● Maungaturoto Resthome-create employment</li> <li>● 10ha ok for equine reserve (precedent Hakani near Mangawhai)</li> <li>● Contact Ministry of Ed re: Northern Wairoa report on demand for Riding for Disabled</li> <li>● Shared community space for horse</li> <li>● Riding for disabled</li> <li>● An area that stays equine-eg Pony Club + growth of pony clubs</li> <li>● Preserve or relocate the Pony Club</li> </ul>
Other	<ul style="list-style-type: none"> <li>● Dollars per person of economic growth?</li> <li>● Secure land on the outskirts and open up an industrial part</li> <li>● Build on hill areas</li> <li>● Dargaville builders should be used</li> </ul>

	<ul style="list-style-type: none"> <li>● Develop from the racecourse then towards town to connect up the infrastructure</li> <li>● Something attractive</li> <li>● Idea – no complaints covenant</li> <li>● Respect for the legacy of the Club</li> <li>● Purpose of Club reflected in the plan</li> <li>● Respect the legacy of the RC</li> <li>● Respect the predecessors of the Club</li> <li>● Financially sustainable, affordable, needed to support employment</li> </ul>
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**What are your concerns?**

<b>Community</b>	<ul style="list-style-type: none"> <li>● No jobs</li> <li>● Not another town</li> <li>● Grow Dargaville instead</li> <li>● Need to start in town before you start at DRC</li> <li>● Pride in home</li> <li>● Don't want to lose lifestyle – Be mindful of the people who are here already</li> <li>● Safety. Feeling safe in home – with neighbours.</li> <li>● Do we have the population to support this development?</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>● Natural features e.g. wetlands get drained (not enhanced)</li> <li>● Retaining horticultural land – 6-7% for growing</li> <li>● Herbicide spraying – notifying neighbours is challenging</li> <li>● Services? Wastewater treatment close water here</li> <li>● Dogs &amp; kids disturbing the animals. Also, the smell</li> <li>● Dairy farm as neighbours. Herbicide spraying only 300 metres away</li> <li>● Size of lot. Storm water. Sewerage water supply</li> <li>● Noise in the early morning. Housing nearby</li> </ul>
<b>Transport</b>	<ul style="list-style-type: none"> <li>● No cards inside the development please</li> <li>● Access for elderly people</li> <li>● Limited access highway</li> <li>● Intersection</li> <li>● Traffic – speed, volume</li> </ul>
<b>Housing</b>	<ul style="list-style-type: none"> <li>● Having rentals unless rent-to-buy</li> <li>● Too far out of town for a retirement village</li> <li>● Keep them well-separated</li> <li>● A few apartment buildings for those who can't afford to buy a house OK</li> <li>● No Flatbush mark 2 or Stonefields</li> <li>● Housing – don't want slum – noise.</li> <li>● People would need to know WHY you would need new houses</li> </ul>
<b>Services and Facilities</b>	<ul style="list-style-type: none"> <li>● No heavy commercial or chook farm</li> <li>● No big box retailer!!!</li> <li>● No fast food chains!</li> <li>● Strongly oppose industrial</li> <li>● No industrial if homes are built</li> <li>● No industrial</li> <li>● Losing Pony Club</li> <li>● Would not want it to be turned in to an industrial area</li> <li>● Commercial and retail? Not light industry or heavy</li> </ul>
<b>Other</b>	<ul style="list-style-type: none"> <li>● Don't want a developer to 'rape' us, needs to be local/iwi-led project</li> <li>● Developers don't make it too expensive (for locals)</li> </ul>

- How do we prevent government pinching our \$
- NZTR taking the \$
- Let it be farmed
- The NZTR needs to let DRC do what they have to. Not take something that isn't theirs.
- Do the committee and community know the history prior to the Dargaville Racing Club?
- Will the CIA incorporate the wahi tapu areas of significance/Māori owned land?
- Asbestos in buildings a concern
- If Ngāti Whātua wants a steak in the pie; shouldn't they be putting money into it now before the Shane Jones money runs out
- How much control do we have when the land is sold to developers?
- What are the terms of the Northern Wairoa Fund? How will mana whenua benefit?
- Too many people make complaints. People not used to rural life = complaints
- Elderly people on mobility scooters on the road
- Who will be moving in? Who will be the developer?
- Why have housing next door to industrial?
- Council (consenting) process too hard
- No concept plan. Hard to visualise
- Do we sell property, or do we want an active role in the future?
- Original purpose was to support the Racing Club-KEEP IT
- Acknowledge the change in racing and what this means to the community
- 25 ha lease to Philips-gives good return
- Williamsons free digger + limestone (goodwill)



# Market Analysis for the Dargaville Racing Club Site

## Summary Report

04 June 2021

Prepared by The Urban Advisory



# Market Analysis – LIVE DOCUMENT

## Dargaville Racing Club

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This document outlines key market analysis insights to inform future planning of development on the Dargaville Racing Club Site.

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## EXECUTIVE SUMMARY

- **Purpose:** This market demand analysis builds understanding of what households need and want, to inform the work commissioned to develop a concept development plan for the Dargaville Racing Club Site. This will help to form the background to the proposed plan change process for future development, and guide future development so that it provides appropriate solutions for the Dargaville population now, and in the future.
  
- **Key insights:** [this will be further informed by the Housing Demand Survey results]
  - This is a severe housing shortage in Dargaville.
  - The influx of migrants from Auckland is increasing housing pressure locally, so there is a need for consideration of tools to address this, possibly by way of limiting who can occupy any dwellings built on the site.
  - The expected decrease in average household size will drive the need for more houses to accommodate the same population. This combined with general anticipated population growth means that there is a high need for more houses in Dargaville.
  - The ageing population in Dargaville presents the need for more options for elderly.
  - A mix of housing options (types and tenures) is critical. New development should consider a variety of tenure options [not within the scope of this analysis], including rental options because there is a great shortage of available rental properties.
  - From community engagement, there was clear demand for a retirement village.
  - Ngāti Whātua have aspirations to develop and operate a retirement living facility.
  - New development should consider the supply of transitional and/or public housing, because this is urgently required in Dargaville.
  - New development should consider a range of options for first home buyers, because they continue to struggle in the market.
  - Beyond housing, amenities should consider health and education facilities, because there is a lack of these in Dargaville and the need for them will continue to grow, alongside demographic changes.
  - Many community members agree with the vision for Kaipara to be the 'food bowl of NZ'
  - Ngāti Whātua have a strong aspiration to purchase land and operate horticultural or crop activities
  - Dargaville has a comparatively high unemployment rate, so new development could present the opportunity to provide jobs.
  - Ngāti Whātua aspiration to provide employment for local people
  - The roading and rail projects should increase connectivity to Dargaville, increasing the number of visitors and possibly residents locally. This presents a possible case for visitor accommodation on site, in conjunction with housing.

# INTRODUCTION

## Purpose

Market demand analysis builds understanding of what households need and want, what they can afford, and what tenures (both rental and ownership) and typologies may be appropriate to meet the needs of current and future residents. The purpose of this document is to analyse the demand for housing in Dargaville (and the wider Kaipara District), to inform the work commissioned to develop a concept development plan for the Dargaville Racing Club Site. This will help to form the background to the proposed plan change process for future development, and guide future development.

## Scope of analysis

The market demand analysis has considered key datasets for Kaipara, Dargaville, and Northland, and other relevant resources, including previous reports on the population and housing market of these areas. The inputs included:

- Statistics New Zealand Data
- REINZ Data
- Tenancy NZ Data
- Reports, as cited in the bibliography

The retrospective data analysed in this document only takes into account the very early stages of the COVID-19 pandemic (if at all), so we have not taken into account any impacts of COVID-19 in projections, because this is beyond the scope of this work. Where possible we have used pre-pandemic statistics as a baseline instead.

To build a complete picture of housing demand, comparative analysis is required between the data provided below and all the outputs of the community engagement, in order to understand the full range of trade-offs and priorities that current and future residents would make when considering their housing choices. This will be completed when developing Version 2 of this document, when results of our Housing Demand Survey are finalised.

## Context

For demographic analysis, we look at the immediate locality of Dargaville; the wider Kaipara District, and the target catchment of the whole of the Northland region. This forms the target catchment area for development of the Racing Club Site. In most cases we have used Statistics New Zealand's Area Units, specifically Statistical Area 2 (SA2) for Dargaville. In our wider analysis, we consider the Kaipara District within its Territorial Authority boundaries, and Northland as defined by Electorate boundaries. This is all in line with Statistics New Zealand data areas.

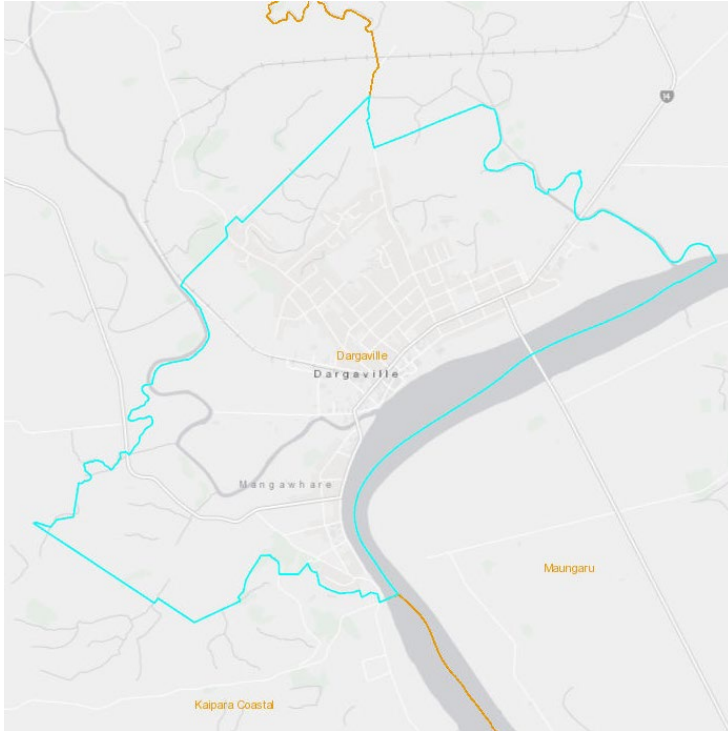


Figure 1 Dargaville SA2 Boundary<sup>1</sup>

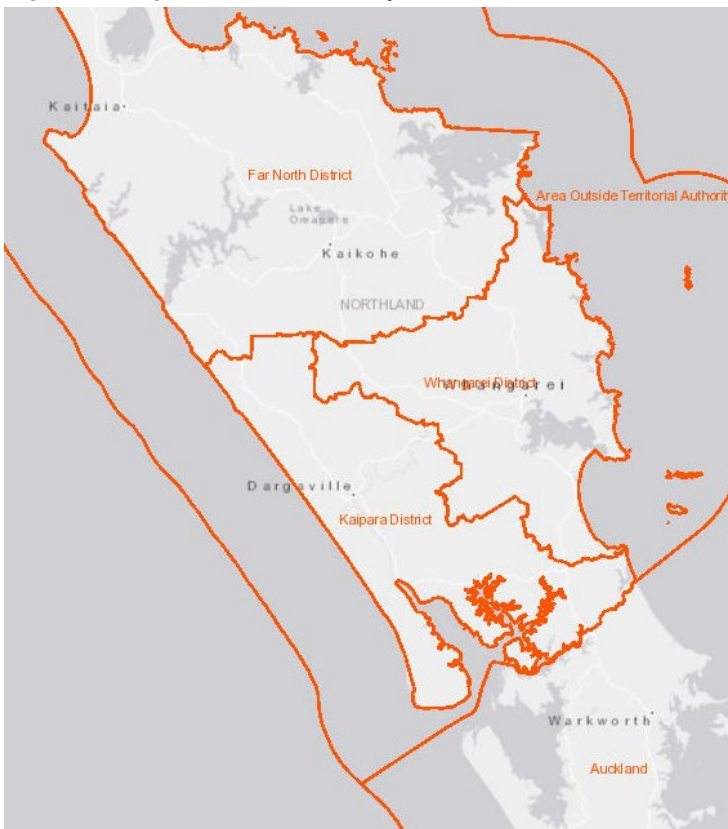


Figure 2 Kaipara District Territorial Authority Boundary<sup>2</sup>

<sup>1</sup> Statistics New Zealand (2021) <https://statsnz.maps.arcgis.com>

<sup>2</sup> Ibid.



Figure 3 Northland 2020 General Electorate Boundary<sup>3</sup>

***\*potential disclaimer section?***

<sup>3</sup> Ibid.

# 1. DEMOGRAPHIC ANALYSIS

This section outlines key demographic insights, to create a snapshot of the Dargaville population. Understanding age, household arrangement, ethnicity, mana whenua representation, and migration, helps to build an overview of what is needed in Dargaville to meet the needs of the people living here.

## Dargaville Quick Stats: (Source: stats.govt.nz)

★ Number of people	4,794
★ Median age	44.1 years
★ Males	2,325
★ Females	2,469
★ Number of Māori	1,710
★ Māori median age	26.7 years
★ European ethnic group	70.7%
★ Māori ethnic group	35.7%
★ Māori descent	38.9%

## 1.1 Age

- 30-64 year olds makes up the largest proportion of the population in Dargaville
- People aged 65 years and over make up more than a quarter of the population
- Māori population is considerably younger, with those aged 65 years and over only making up around 10% of the population

## 1.2 Household Arrangement

- “Couple-only” and “Couple with child(ren)” households make up the largest proportion of households in Dargaville.
- Older groups (“30-64” and “65 years and over”) are the most likely to live in one-person or couple-only households.
- Of households living with extended family, those with three or more generations are more common (61%) than two-generation (36%) or single-generation (3%). This is in line with the trend in the wider Northland region, where three or more generations make up 62% of extended family households, while two-generation and single-generation make up 33% and 4.5% respectively
- In the 2018 census, 99 households were recorded as living as extended families.

## 1.3 Ethnicity

- Māori make up a larger proportion of the population in Dargaville (36%) than the wider Kaipara District (25%).
- Similarly, Pacific peoples make up a larger proportion of the population in Dargaville (7%) than Kaipara (4%).

- “Māori comprise 35% of the Te Tai Tokerau population and it is essential that whānau, hapū and iwi are enabled to share in and contribute to social, cultural and economic prosperity.”<sup>4</sup>

## 1.4 Mana Whenua

**Table 1** Ngāti Whātua 2013 Census of Population and Dwellings *by Districts*

Area of usual residence (2018)	19 Years and under	20 Years and over	Total	%age
Far North District	348	501	846	5%
Whangarei District	681	921	1,599	10%
Kaipara District	504	717	1,221	7%
Auckland	3,675	4,257	7,932	49%
Thames-Coromandel District	36	45	81	0%
Hauraki District	18	30	48	0%
Waikato District	105	126	231	1%
Matamata-Piako District	36	42	78	0%
Hamilton City	183	234	420	3%
Waipa District	66	54	117	1%
Otorohanga District	9	15	24	0%
South Waikato District	69	63	132	1%
Waitomo District	21	27	45	0%
Taupo District	33	66	96	1%
Other	1,545	1,905	3,447	21%
<b>Total</b>	<b>7,329</b>	<b>9,003</b>	<b>16,317</b>	<b>100%</b>

## 1.5 Migration

- Migrants to Kaipara are typically those nearing retirement age. Young families are increasingly represented as well, as described below<sup>5</sup>
- The three regions closest to Auckland; Northland, Waikato and Bay of Plenty, attracted two thirds (68%) of Auckland’s regional population exodus, reinforcing the emergence of the Upper North Island as New Zealand’s main population and economic centre<sup>6</sup>

<sup>4</sup> Tai Tokerau Northland Economic Action Plan Advisory Group. 2019. p9

<sup>5</sup> Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020

<sup>6</sup> Ibid

- Looking at Auckland’s contribution to migration into Northland, it has been identified that net regional migration out of Auckland is primarily outflows of people in their late twenties and through their thirties with children. This suggests the unaffordability of housing in Auckland is a key driver pushing these young families out of Auckland and into the wider upper North Island region<sup>7</sup>.
- Net regional migration outflow is also accelerated as people reach retirement. This suggests people are selling their Auckland family homes to release capital and seek better lifestyle opportunities<sup>8</sup>. This puts added pressure on the local housing market in regions such as Dargaville, because it increases competition for houses and limits the buying power of locals.

### 1.6 Social Deprivation Index

Refer to the map below, highlighting the high deprivation status of Dargaville and the Northland region (dark red = most deprived)

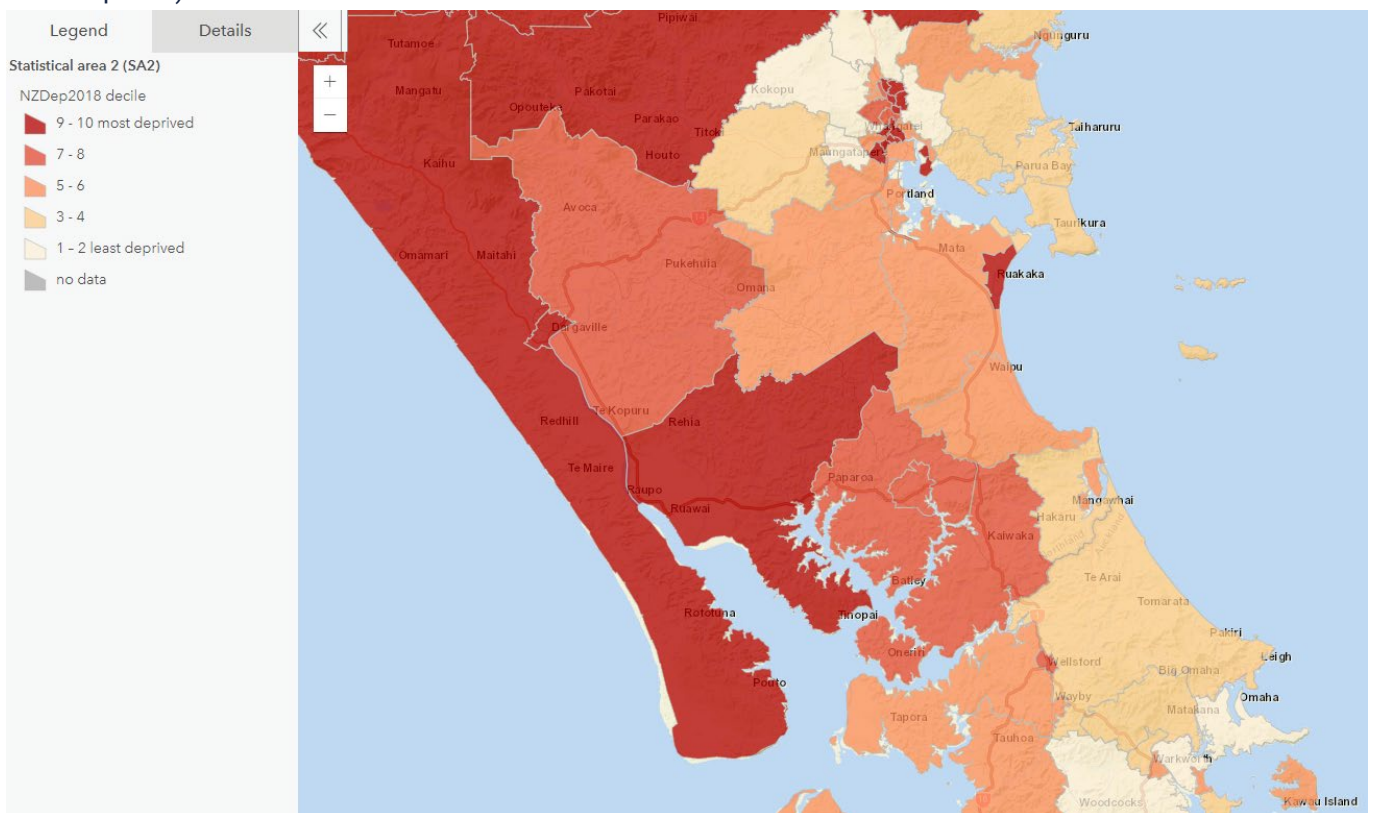


Figure 4. NZDep2018, by statistical area 1 (SA1) and statistical area 2 (SA2), 2018<sup>9</sup>

<sup>7</sup> Ibid

<sup>8</sup> Ibid

<sup>9</sup> <https://www.ehinz.ac.nz/indicators/population-vulnerability/socioeconomic-deprivation-profile/#nzdep-for-2018-nzdep2018>

## 1.7 What Does This Mean For The Development Of The Racecourse Site?

- There should be a range of housing and amenities to suit the population, particularly those who are of “working age” and those 65+.
- Any new development on the racing club site should consider models of housing for extended families, designed in response to engagement with people who need them.
- New development should address the specific need for a range of housing and amenities to suit the Māori and Pacific population.
- The influx of migrants from Auckland is increasing housing pressure locally, so there is a need for consideration of tools to address this, possibly by way of limiting who can occupy any dwellings built on the site.

## 2. POPULATION GROWTH PROJECTIONS

### Existing and projected future population growth:

These population and household projections are a useful high-level indicator of likely dwelling demand.

This information, including the projections, is sourced from Stats NZ.

We look at the immediate locality of Dargaville; the wider Kaipara District, and the target catchment of the whole of the Northland region.

- In the Kaipara district, population growth has been particularly strong in the past five years, growing to 24,100 in 2019. This is the result of strong international net migration and increasing housing pressures in Auckland<sup>10</sup>.
- Expected population growth of 1400 in Kaipara over next 25 years (concentrated around Mangawhai)
- COVID-19 is expected to have an initial impact on Kaipara’s population growth, slowing it down over 2020 and 2021. However, from 2021 onwards population growth is projected to resume at a steady rate: “Kaipara’s population is expected to continue growing out to 2051, although the rate of growth gently eases over that period, to reach a population of 32,600.”<sup>11</sup>.
- In the Dargaville urban area, population is expected to continue growing steadily: “prompted by steady employment growth in Dargaville, as well as the neighbouring rural area prompted by the Kaipara Kai initiative. Population growth in the Dargaville urban area predominantly takes place in the Dargaville SA2. However, if growth in Dargaville is stronger than projected, the Dargaville urban area may expand to include parts of the Kaipara Coastal SA2. Kaipara Coastal’s projected growth reflects the growth of settlements such as Baylys Beach and Te Kopuru. The population of Dargaville SA2 is expected to grow by 1,090 by 2051, Kaipara Coastal by 90.”<sup>12</sup>

<sup>10</sup> Infometrics, 2020a

<sup>11</sup> Infometrics, 2020a. p9

<sup>12</sup> Infometrics, 2020a. p10

## 2.1 Population Projections – Age Group

- The population of Kaipara is projected to age significantly over the next 30 years, along with most areas in New Zealand<sup>13</sup>
- The number of youth (aged below 15 years), is projected to remain steady at around 4,600 people<sup>14</sup>
- The population aged 15 to 64 years is projected to grow slightly, from 13,900 in 2019 to 15,700 in 2051<sup>15</sup>
- In the next ten years, the majority of growth takes place as the “baby boomer” population moves into the 65 years and older age group<sup>16</sup>
- Fast growing over-65 cohort (23% of population), expected to increase to 38% by 2043 (and decrease labour force).

## 2.2 Population Projections – Household Arrangement

- The average household size in Kaipara is projected to decrease, from an estimated 2.37 individuals per household in 2019 to 2.14 individuals per household in 2051<sup>17</sup>. This is driven by a combination of factors, including a changing age composition of the district’s population, increasing life expectancy, and societal trends<sup>18</sup>:
  - An ageing population leads to growth in households of couples without children or persons living alone (such as widows/ widowers).
  - Increasing life expectancy means that individuals are likely to spend longer periods in these household types.
  - Societal trends include couples having fewer children (i.e. smaller families), increasing numbers of childless couples, and delayed childbearing<sup>19</sup>.
- The combined effect of population growth and decreasing household size is a strong growth in the number of households: “Decreasing average household sizes means that more houses are required to house the same population”<sup>20</sup>. Dargaville SA2 is projected to experience steady growth of 530 households<sup>21</sup>

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<sup>13</sup> Infometrics, 2020a

<sup>14</sup> Ibid

<sup>15</sup> Ibid

<sup>16</sup> Ibid

<sup>17</sup> Ibid

<sup>18</sup> Ibid

<sup>19</sup> Infometrics, 2020a. p13

<sup>20</sup> Infometrics, 2020a. p14

<sup>21</sup> Ibid

### 2.3 What Does This Mean For The Development Of The Racecourse Site?

- The expected decrease in average household size will drive the need for more houses to accommodate the same population. This combined with general anticipated population growth means that there is a high need for more houses in Dargaville.
- The expected increase in migration to Dargaville, because of Auckland housing pressures, increases this need for more housing.
- The ageing population in Dargaville presents the need for more options for elderly.

## 3. HOUSING DEMAND ANALYSIS

Housing 'demand' analysis paints a picture of the type and number of houses that are needed, based on preference and ability to pay. This measure is reflective of the quantitative level of need for housing, but should be read in conjunction with qualitative insights from engagement with the community, to capture the full story.

This section provides an overview of relevant demographic information to build an initial picture of housing demand for the Dargaville Racing Club development by looking at the Dargaville area and the wider Kaipara district.

**Quick Stats:** (Source: stats.govt.nz, unless otherwise specified)

★ Occupied private dwellings	1,818
★ Unoccupied private dwellings	201
★ Occupied non-private dwellings	15
★ Median rent 01 Nov 2020 - 30 April 2021	\$390 <sup>22</sup>

**Number of new building consents issued (indicative of new buildings) in the Kaipara District, annual to March 2021:**

★ Houses	204
★ Farm buildings	52
★ Apartments, townhouses, units, and other dwellings	3
★ Hotels, motels, and other short-term accommodation	3
★ Commercial buildings	5
★ Retirement village units	0

- The majority of private dwellings in Dargaville in 2018 were owned, or partly owned.
- More private dwellings are rentals in Dargaville than the wider Kaipara District

<sup>22</sup> tenancy.govt.nz

- Households with one usual resident make up the largest proportion of households in Dargaville (n=618), followed by two usual residents (n=591)
- Of households in Dargaville with only one usual resident, houses with six rooms made up the largest proportion of households (32%), followed by five rooms (22%) and seven rooms (15%) [note that this is total number of (habitable) rooms, not just bedrooms]

### [Insert Housing Continuum Diagram]

The key themes that relate to housing demand that have emerged from the stakeholder and community engagement done to date include:

**This is a severe housing shortage in Dargaville.** A number of attendees commented on the lack of supply and choice available in Dargaville currently and raised concerns about younger residents being priced out of the local market to an increasing extent. Another concern was having enough options for existing locals as well as the influx of Auckland residents who had been able to cash in on high house sale prices and move to Dargaville for the lifestyle/larger home and land package.

**A mix of housing options (types and tenures) is critical.** The demand for rental properties was perceived to be very high; rent-to-buy schemes were also strongly suggested as a favoured solution by a number of attendees. At the moment, any rental listings will attract 30+ viewers, lots of competition and little choice in the market. Needing to cater to the existing community that was missing out on suitable housing options was a strong opinion held by many attendees. There were mixed views as to whether standalone large lot homes only or more variety i.e. terraced units or low-rise apartments were needed to suit more diverse needs. Some older residents have downsized to smaller units in old age, but still demand for retirement living option (not aged / hospital care). However, there were also mixed views about the appropriateness of a retirement village out of town, unless it was well-connected with a shuttle and if there were some additional facilities, such as a medical facility and a local produce/everyday item store.

## 3.1 Housing Affordability

- Historically Dargaville has been a comparatively more affordable housing option within Kaipara, providing alternative choices to other more expensive locations. However, house and rent prices have increased significantly over the past 10 years, and it is no longer considered an affordable housing market<sup>23</sup>
- The predicted population growth in Dargaville is anticipated to put pressure on both the rental and home ownership markets, with an estimated 13 new homes needed annually. The ageing population of Dargaville will put particular pressure on pensioner housing and affordable options for pensioners, which will in turn exacerbate strain on the overall housing market and affordable housing options<sup>24</sup>
- The Dargaville housing market is nearing unaffordability for both home ownership and private rentals, especially for those on or below the median annual income (Refer to Section 4) . As house prices rise

<sup>23</sup> The Property Group, 2021

<sup>24</sup> The Property Group, 2021. p9

steeply in Dargaville and Kaipara, this will put further strain on housing stock (especially the rental market).<sup>25</sup>

- Both the public and private building sectors are supplying only very few, if any, affordable housing options and supported housing for vulnerable members of the Dargaville community<sup>26</sup>
- To meet the needs of the 35 applicants currently on the Housing Register in Dargaville, an increased supply of transitional and/or public housing is urgently needed. In addition to the five new transitional housing places recommended under the housing demand assessment, the demand for public housing typologies include the following<sup>27</sup>:

**Table 2** Housing Register for Dargaville as at 27 November 2020<sup>28</sup>

Typology	1-bed	2-bed	3-bed	4-bed
Number	14	12	9	n/a

- Within Kaipara there are currently 112 public housing tenancies (from 2,178 public houses within Northland) and 56 pensioner dwellings.<sup>29</sup>
- With the median weekly rent now nearing \$400 per week for Dargaville, it can be assumed that housing is unaffordable for many families in Dargaville<sup>30</sup>. On the housing affordability index, the Kaipara District (score of 6.7) is less affordable than other areas of Northland, and New Zealand on average<sup>31</sup>, with a sharp rise in unaffordability since 2014.
- Kaipara scored 23.9 on a rental affordability index (calculated as average annualised rents to annual average income), suggesting rental accommodation is less affordable than neighbouring areas, including Auckland<sup>32</sup>
- An average 26% of dwellings in the Kaipara District (3,186 of 12,231, including those under construction) were unoccupied at the time of the 2018 Census. The Dargaville unoccupancy rate was considerably lower in comparison (9.9%), likely reflective of normal rates of vacant dwellings; those under renovation, awaiting new owners or tenants etc.<sup>33</sup>
- Between 2013 and 2018, Dargaville saw 13% population growth. This far exceeded dwelling growth of 2% over the same period. Consequently, house prices climbed 60.5% over the three years to 30 June 2017, and have continued to climb, and the town now has a shortage of available rental properties.<sup>34</sup>

<sup>25</sup> Ibid.

<sup>26</sup> Ibid.

<sup>27</sup> Ibid.

<sup>28</sup> MSD, as cited in The Property Group, 2021

<sup>29</sup> The Property Group, 2021. Appendix 1, p5

<sup>30</sup> The Property Group, 2021. Appendix 1, p6

<sup>31</sup> Infometrics, 2020g, as cited in Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020

<sup>32</sup> Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020.

<sup>33</sup> Kaipara District Council Infrastructure Strategy 2018–2048. p7

<sup>34</sup> Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020.



Figure 5 Comparison of housing affordability in June 2020<sup>35</sup>



Figure 6 Comparison of rental housing affordability in June 2020, higher numbers equal lower affordability<sup>36</sup>

### 3.2 Residential Sales Trends

This section breaks down residential dwelling sales for the Kaipara District, and the Northland region as a whole, and compares this to overall relevant national trends, and trends in Opōtiki, a similar sized town to Dargaville . Sales volumes tell us about the realised demand for housing, but not latent demand. Limited supply in Dargaville means these statistics alone do not show the housing need. *This information will be reviewed alongside results from our Housing Demand Survey, and engagement with real estate agents and the community, to paint a clearer picture of genuine need.*

- In New Zealand, the median price in the year to July 2020 is \$605,000 (7.1% annual increase) for apartments, \$640,000 (9.4% annual increase) for residences and \$285,000 (9.6% annual increase) for sections.<sup>37</sup>
- As of April 2021, median prices the Northland region have eased slightly to \$670,000, from the record high of \$720,000 in March 2021<sup>38</sup> These figures are comparatively high, when considered in the context of the New Zealand market (as above)
- Sales volumes also eased, down 20.1% month-on-month from 259 in March 2021 to 207 in April 2021.

<sup>35</sup> Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020, p54

<sup>36</sup> Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020, p54

<sup>37</sup> REINZ, as cited in Colliers International, 2020.

<sup>38</sup> Wendy Alexander REINZ ACTING CEO, as cited here: <https://propertyconsultants.nz/real-estate-market-updates/northland-latest-property-market-update/>

- According to real estate agents, investors have taken a pause and slowed in their enquiries as a result of the recent government announcements.<sup>39</sup>
- First home buyers struggle to secure a property at an appropriate price point, and new properties coming to market get a lot of attention and sell quickly. The number of days to sell has been at the lowest level for an April month since 2005 (37 days).<sup>40</sup> This represents a high level of need, with supply numbers not meeting demand.
- An analysis by Quotable Value (QV) of Northland property values shows Dargaville experienced a 60.5% increase in the median price of residential properties in the three years to 30 June 2017. [The period to June 2017 has been used for alignment with census data analysis, however house prices have continued to increase since then] This increase in house prices likely reflects that Dargaville's population growth (13% from 2013 to 2018) has far exceeded dwellings growth (2% from 2013 to 2018). The town is now considered by real-estate agents to have a shortage of available rental properties<sup>41</sup>

**Table 3** Residential Sales Data in the Kaipara District and Northland<sup>42</sup>

	<b>Kaipara District Annual</b> (Feb 2021 compared to Feb 2020)	<b>Northland Annual</b> (Feb 2021 compared to Feb 2020)	<b>Northland Month to Month</b> (Feb 2021 compared to Jan 2021)
<b>Median Price</b>	↑ <b>58.3%</b> <i>Record Median Price</i>	↑ 17.0%	↑ 4.8%
<b>Sales Count</b>	No data	↑ 22.5%	↑ 36.0%
<b>Days to Sell</b>	No data	↓ 13 days	↑ 3 days

- There are a small number of property listings in the area, particularly for residential and Dargaville town area (i.e. not rural). This highlights the lack of supply of housing. Listing numbers (as of 24th May 2021):  
For Sale:
  - Onerooof.co.nz: 32 residential listings. 3 of these are rural land packages.
  - PGG Wrightson: 18 listings (16 rural, 2 other).
  - Realestate.co.nz: 11 listings (rural, same as on PGG Wrightson)
  - Ray White: 9 listings. 4 commercial, 5 residential.
  - Bayleys: 4 residential listings, 12 rural listings.

<sup>39</sup> Wendy Alexander REINZ ACTING CEO, as cited here: <https://propertyconsultants.nz/real-estate-market-updates/northland-latest-property-market-update/>

<sup>40</sup> Wendy Alexander REINZ ACTING CEO, as cited here: <https://propertyconsultants.nz/real-estate-market-updates/northland-latest-property-market-update/>

<sup>41</sup> Northern Advocate, 2017, as cited in Kaipara, Place, People and Key Trends Kaipara District Environmental Scan 2020. p31

<sup>42</sup> REINZ, 2021b

- Harcourts:
- Trademe: 47 sale listings in Dargaville, rural and residential. House and land packages (Compass Homes: <https://compasshomes.co.nz/Home-Land>)

For Rent:

- Trademe: 4 rental listings in Dargaville (\$250pw 1 bed, 1 bath - \$500pw 3 bed, 1 bath)
- Ray White: 1 listing for rent, industrial.

**Table 4** Dargaville Sales Data [source: REINZ commissioned in May 2021]

Suburb Name	Category	Sale Count	Sale Count Change vs. Prior Year	Sale Price Median	Median Price Change vs. Prior Year
Dargaville	Commercial	5	67%	\$390,000	-
Dargaville	Residence	124	6%	\$382,500	13%
Dargaville	Residential Section	45	463%	\$149,500	-8%
Dargaville	Unit	8	-11%	\$320,000	10%

**Table 5** Opōtiki Sales Data [source: REINZ commissioned in May 2021]

Suburb Name	Category	Sale Count	Sale Count Change vs. Prior Year	Sale Price Median	Median Price Change vs. Prior Year
Opōtiki	Commercial	7	600%	250,000	-
Opōtiki	Residence	90	-3%	369,500	23%
Opōtiki	Residential Section	15	67%	209,000	19%
Opōtiki	Unit	8	33%	217,500	5%

### Input results from engagement

### 3.3 Building & Development

The residential building consent figures show that most of the annual building consents are for houses (stand-alone dwellings). In the three years to March 2021 (Q1 2018 to Q1 2021) a total of 635 residential dwellings have been consented in the Kaipara District. Apartments and retirement village units are absent from the data, with no new consents for these building types in the last three years in the Kaipara District.

Commercial unit building consent numbers are low, and have remained at a similar level over the last three years. Hospitals, nursing homes, and other health buildings are virtually absent from the data, with only one new consent in the last three years (in 2019).

- Number of building consents per 1000 people has decreased in Kaipara District from 2018 to 2020 (and Whangārei, and Far North)
- Houses make up the largest proportion of new building consents in Kaipara District, followed by non-residential and farm buildings
- “Over the past five years [up to 2019], Mangawhai has nearly two-thirds of the district’s residential building consents. However, Kaiwaka, Dargaville and Maungatūroto have bubbled away at an average of 26, 14 and 12 building consents per year, respectively combining to nearly 20% of the district’s development”<sup>43</sup>

The key themes that relate to building and development that have emerged from the stakeholder and community engagement done to date include:

**Local business owners mentioned challenges of consenting retrofit properties** for their businesses (4+ years for one farm motorcycle company) and even new builds, considered easier, are taking years to get consented in Dargaville. Both of these are challenges because the quality of industrial and commercial buildings in Dargaville is low - demand for new high quality buildings suitable for local business.

**Sportsville development was a massive community-led effort** to get funded and constructed for the benefit of Dargaville. Budget limitations / uncertainty meant lower spec development (without bells & whistles) resulted.

**Demand for retirement village clear** from 2017 Ansell report and discussion with local community members

**Ngāti Whātua have aspirations to develop and operate a retirement living facility**, to provide income and employment for local people.

**Table 6** Market Rent in Dargaville by house size 01 Nov 2020 - 30 April 2021.<sup>44</sup> \*NB no information available for 1-bedroom or 4-bedroom and above.

SIZE	ACTIVE BONDS	LOWER QUARTILE	MEDIAN RENT	UPPER QUARTILE
2 bedrooms	57	\$333	\$350	\$370
3 bedrooms	189	\$373	\$405	\$420

<sup>43</sup> Resilio Studio, AR & Associates. 2020. p13

<sup>44</sup> [www.tenancy.govt.nz](http://www.tenancy.govt.nz)

### 3.4 What Does This Mean For The Development Of The Racecourse Site?

- There is currently a high number of houses with lots of rooms, and only one or two people living in them. Therefore, there is a need for more appropriately sized housing to suit the needs of this population.
- There is a growing need for affordable housing options, this should be reflected in the development of the site.
- Supply of new housing needs to meet the level of demand, for the estimated 13 new homes needed annually in Dargaville.
- New development should consider the supply of transitional and/or public housing, because this is urgently required in Dargaville.
- New development should consider a variety of tenure options [not within the scope of this analysis], including rental options because there is a great shortage of available rental properties.
- New development should consider a range of options for first home buyers, because they continue to struggle in the market.
- Beyond housing, amenities should consider health and education facilities, because there is a lack of these in Dargaville and the need for them will continue to grow, alongside demographic changes.

## 4 COMMERCIAL & INDUSTRIAL DEMAND ANALYSIS

**Quick Stats:** (Source: stats.govt.nz)

★ <b>Employed full-time</b>	<b>37.4%</b>
★ <b>Unemployed</b>	<b>4.4%</b>
★ <b>Technicians and trades workers</b>	<b>11.2%</b>
★ <b>Sales workers</b>	<b>8.1%</b>
★ <b>Median income</b>	<b>\$22,200</b>
★ <b>Over \$70,000</b>	<b>6.9%</b>
★ <b>Full-time study</b>	<b>17.9%</b>
★ <b>Part-time study</b>	<b>2.2%</b>
★ <b>Not studying</b>	<b>79.8%</b>
★ <b>No qualification</b>	<b>32.7%</b>
★ <b>Bachelor's degree and level 7 qualification</b>	<b>5.7%</b>

This section of the analysis looks at industry and economic trends, alongside relevant employment figures, to identify where the demand lies for commercial and industrial units in Dargaville. **This information will be strengthened by engagement results, particularly from the Housing Demand Survey.**

The majority of information reported here is from Infometrics' *Dargaville Annual Economic Profile 2020*. Interestingly, Dargaville's GDP increased at a stronger rate (4.3%) in the year to March 2020 than New Zealand's overall GDP (1.6%), and Dargaville accounted for 0.1% of national GDP in 2020. The figures noted here capture only the very early stages of the COVID-19 pandemic, so we have not taken into account any economic impacts of COVID-19 and, rather, have used the March 2020 year as a pre-pandemic baseline (as per Infometrics' report).

Among broad industries Manufacturing was the largest in Dargaville in 2020 accounting for 13.7% of total. The second largest was Agriculture, Forestry and Fishing (10.8%) followed by Construction (9.4%). In the wider Kaipara District, as of 2018, industries employing the most people were Agriculture, Forestry and Fishing (2,439 workers), Construction (1,143) and Manufacturing (1,119). In the Target Catchment of the Northland region, Health Care and Social Assistance (9,624), Agriculture, Forestry and Fishing (9,057), and Construction (8,373) were the highest employing industries.

Construction made the largest contribution to employment growth in Dargaville between 2019 and 2020 with the industry adding 46 jobs. The next largest contributor was Public Administration and Safety (45 jobs) followed by Agriculture, Forestry and Fishing (29 jobs). The largest detractor from growth over the year was "Other Services" in which employment declined by 12.

## 4.1 Local Economy & Industries

- GDP in Dargaville measured \$343m in the year to March 2020, up 4.3% from a year earlier. New Zealand's GDP increased by 1.6% over the same period.<sup>45</sup>
- Economic growth in Dargaville averaged 3.2% pa over the last 10 years compared with an average of 2.8%pa in the national economy.<sup>46</sup>
- Growth in Dargaville reached a high of 8.9% in 2018 and a low of -3.0% in 2017.<sup>47</sup>

## 4.2 Industry

- Primary industries accounted for the smallest proportion of total GDP in Dargaville in 2020: 10.9% compared with 6.2% in the national economy.<sup>48</sup>
- Goods-producing industries accounted for 23.1% compared with 18.7% in the national economy.
- "Other services" accounted for the largest proportion of GDP (35.3%) in Dargaville, which is higher than in the national economy (34.7%).<sup>49</sup>
- High-value services accounted for 22.0% compared with 25.6% in the national economy.<sup>50</sup>

<sup>45</sup> Infometrics, 2020b

<sup>46</sup> Ibid

<sup>47</sup> Ibid

<sup>48</sup> Ibid

<sup>49</sup> Ibid

<sup>50</sup> Ibid

- Among broad industries Manufacturing was the largest in Dargaville in 2020 accounting for 13.7% of total. The second largest was Agriculture, Forestry and Fishing (10.8%) followed by Construction (9.4%)<sup>51</sup>
- Professional, Scientific & Tech Services made the largest contribution to overall growth in Dargaville between 2019 and 2020. The industry grew by 23.9% over the year and contributed 0.81 percentage points to the district's total growth of 4.3%. The next largest contributor was local government administration (0.67 percentage points) followed by finance (0.56 percentage points). The largest detractor from growth over the year was Meat & Meat Product Manufacturing which declined by 9.1% and contributed -0.74 percentage points to the total growth of 4.3%. Road Transport (-0.25 percentage points) was the next largest detractor.<sup>52</sup>
- "The māori contribution to the economy offers huge potential: It is hard to imagine a future prosperous New Zealand economy that does not include a productive and dynamic contribution from Māori. The Māori contribution to the economy offers three key areas of potential: workforce, productivity and assets."<sup>53</sup>
- "There is a distinct lack of official statistics relating to the Māori contribution to the economy. The most comprehensive profile of the Māori economy was commissioned by the Māori Economic Taskforce and produced by BERL in 2011. BERL's report will influence the development of consistent and robust official data in future."<sup>54</sup>
- "Addressing socio-economic outcomes will be critical Māori continue to experience lower socio-economic outcomes than non-Māori. This is a cost to the community, and to the economy, both today and in the future. We think addressing these disparities is a fundamental part of creating Māori economic growth."<sup>55</sup> Education, Employment and skills, Savings and wealth

The key themes that relate to local economy and industry that have emerged from the stakeholder and community engagement done to date include:

**Many community members agree with the vision for Kaipara to be the 'food bowl of NZ'.** The land in Kaipara is high quality and maintaining the production economy is important.

**Trend of land use change in rural areas,** less dairy farming activities (especially around Racecourse site) as farms transition to beef, chickens and seasonal cropping. Only one dairy farm off Awakino North Road now.

**Ngāti Whātua have a strong aspiration to purchase land and operate horticultural or crop activities,** and process botanicals (for example) in the Kaipara area.

<sup>51</sup> Ibid

<sup>52</sup> Ibid

<sup>53</sup> Te Puni Kōkiri, 2012. p12

<sup>54</sup> Ibid

<sup>55</sup> Te Puni Kōkiri. 2012. p13

### 4.3 Labour Force

- Dargaville has a high unemployment rate. It is comparatively high when compared to the wider Kaipara District.
- Māori comparatively high number of people employed (either part time or full time), when compared to the general population. Reflective of younger māori population.
- (More females not in the labour force, and more males employed full time. )
- Total employment in Dargaville averaged 3,610 in the year to March 2020, up 4.5% from a year earlier. Employment in New Zealand increased by 1.6% over the same period.<sup>56</sup>
- Employment growth in Dargaville averaged 1.8%pa over the last 10 years compared with 1.9%pa in the national economy.<sup>57</sup>
- Employment growth in Dargaville reached a high of 8.2% in 2018 and a low of -3.7% in 2012.<sup>58</sup>
- “Labourers” make up the highest proportion of occupations in Dargaville (28%). “Managers” in the Kaipara District.
- In the Māori population of workers, “labourers” make up 41% of the workforce.
- Construction made the largest contribution to employment growth in Dargaville between 2019 and 2020 with the industry adding 46 jobs. The next largest contributor was Public Administration and Safety (45 jobs) followed by Agriculture, Forestry and Fishing (29 jobs). The largest detractor from growth over the year was Other Services in which employment declined by 12.<sup>59</sup>

The key themes that relate to commercial demand that have emerged from the stakeholder and community engagement done to date include:

**The relationship between housing and light industrial needs to be carefully managed.** Concerns were raised by attendees about how housing and light industrial might coexist, what the transition or buffer between them might be.

**It is important to provide potential future residents with good access to amenities, but the town centre also needs to be looked after.** Connectivity to the town centre was raised as a concern for making development at the site favourable to locals. A wide range of amenities were raised by attendees as being potential options for the site, including medical facilities, café or restaurant, green space (i.e. park/reserve/garden/off-leash area for dogs/picnic area), community hall or facilities, accommodation, and/or leisure facilities (i.e. 9-hole golf course).

The key themes that relate to the labour force that have emerged from the stakeholder and community engagement done to date include:

**Struggle for youth to get training and employment in Dargaville.**

<sup>56</sup> Infometrics, 2020b

<sup>57</sup> Ibid

<sup>58</sup> Ibid

<sup>59</sup> Infometrics, 2020b

**Other workers travel to Dargaville from Mangawhai or Whangārei**, as there isn't housing in Dargaville for them to move.

**Dargaville High School Construction Academy is successful** in providing training and pathway into formal apprenticeships.

**Ngāti Whātua aspiration to provide employment for local people** through Retirement Village and construction of new development on Racecourse Site.

#### 4.4 What Does This Mean For The Development Of The Racecourse Site?

- Dargaville has a comparatively high unemployment rate, so new development could present the opportunity to provide jobs.
- Education facilities are important to support the growth of education rates in Dargaville. Development of the site should consider the potential for education or training facilities on site.

## 5 NEARBY FUTURE DEVELOPMENT

### 5.1 Regional Development

- Relevant projects noted in Tai Tokerau Northland Economic Action Plan: 2019 Refresh<sup>60</sup>
  - Support employers to provide an industry/employer driven response to skills and workforce requirements in Tai Tokerau to include a network of hubs.
  - Kaipara Kai – investigate higher value crops, commercial/financial analysis, and establish a Transformation Hub to support local farmers to navigate the transition process.
  - Twin Coast Discovery Route - Support implementation of township project packages.
  - Implement Kaipara District cycleway and walkway projects as per strategy.
  - Kaipara Wharves - Investigate wharf infrastructure and water transport networks in the Kaipara Harbour - based on findings, wharf infrastructure physical works to commence delivery of Kaipara moana based transport networks.
- Provincial Development Unit Projects in Kaipara (as of November 2020)<sup>61</sup>:
  - Northland Water Storage & Use - \$30.00m
  - Waimate Mid North Water Project - \$19.00m (no commencement date set)

<sup>60</sup> Tai Tokerau Northland Economic Action Plan Advisory Group. 2019. pp15-19.

<sup>61</sup> Provincial Development Unit, 2020.

- Kaipara Rooding Package - \$14.46m
- Mid Kaipara Water Project - \$7.00m (no commencement date set)
- Kaipara District Council - Kaipara Kickstart (Analysis and Feasibility Study - Wharves (Kaipara Moana Activation Plan) - \$4.95m
- Kaipara District Council - Kaipara Kickstart (Growing the Kai in Kaipara) - \$980k
- Kai for Kaipara Water – Phase 1B - \$740k
- Te Uri o Hau Kaipara Restoration - \$688k
- Kai Iwi Lakes Visitor Amenities - \$90k
- Provincial Development Unit Projects in Whangārei (as of November 2020):
  - Hundertwasser Art Centre - \$18.50m
  - Rohe Produce Limited - \$14.00m (no commencement date set)
  - Te Tai Tokerau Worker Redeployment Package – Next Phase - \$13.32m
  - 1BT Partnerships - Te Rūnanga o Ngāti Rēhia - Takou Block - \$6.25m
  - Oceania Marine 560T Travel Lift - \$5.84m
- Rail port & expansion, refer Context Analysis Report.

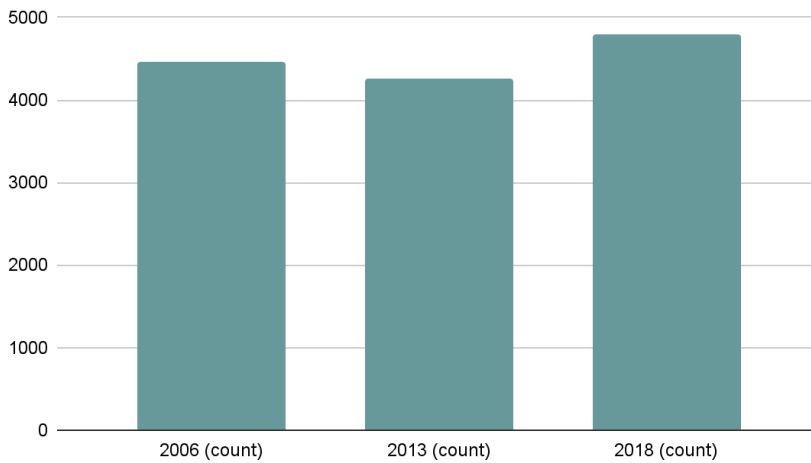
## 5.2 What Does This Mean For The Development Of The Racecourse Site?

- The Kaipara Kai initiative could bring more people to Dargaville, and the wider Kaipara District, meaning more housing is needed.
- There is an opportunity to consider development that ties in with, or supports, the Kaipara Kai initiative (eg. crops on site, processing on site etc.).
- The roading and rail projects should increase connectivity to Dargaville, increasing the number of visitors and possibly residents locally. This presents a possible case for visitor accommodation on site, in conjunction with housing.

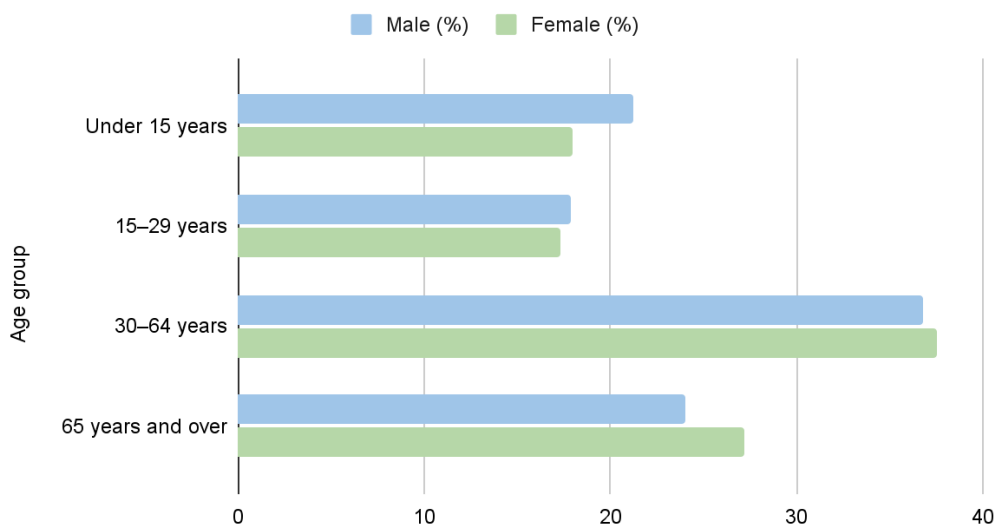
## Tables and Figures

[This is a repository for tables and figures until they are inserted into the appropriate place in the document (ie., document body, appendices, or removed if not relevant)]

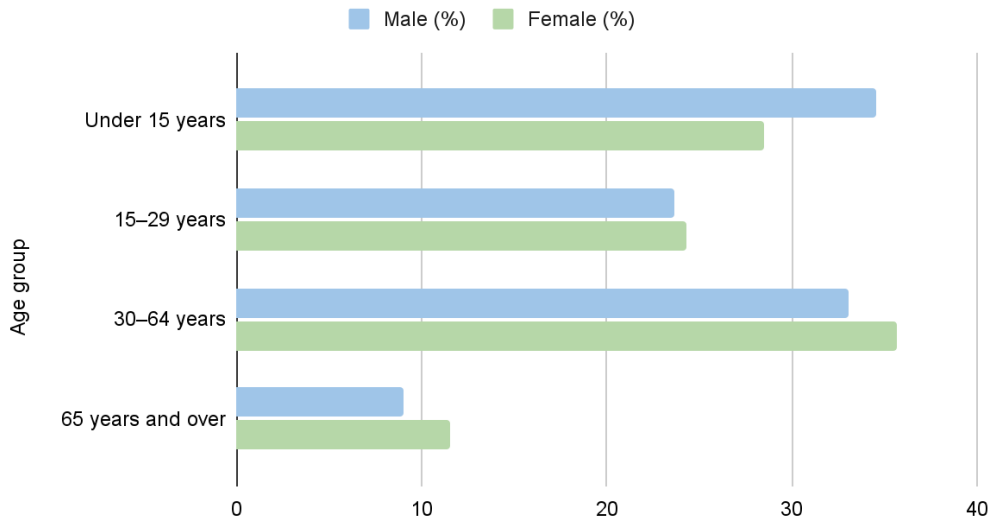
Population in Dargaville



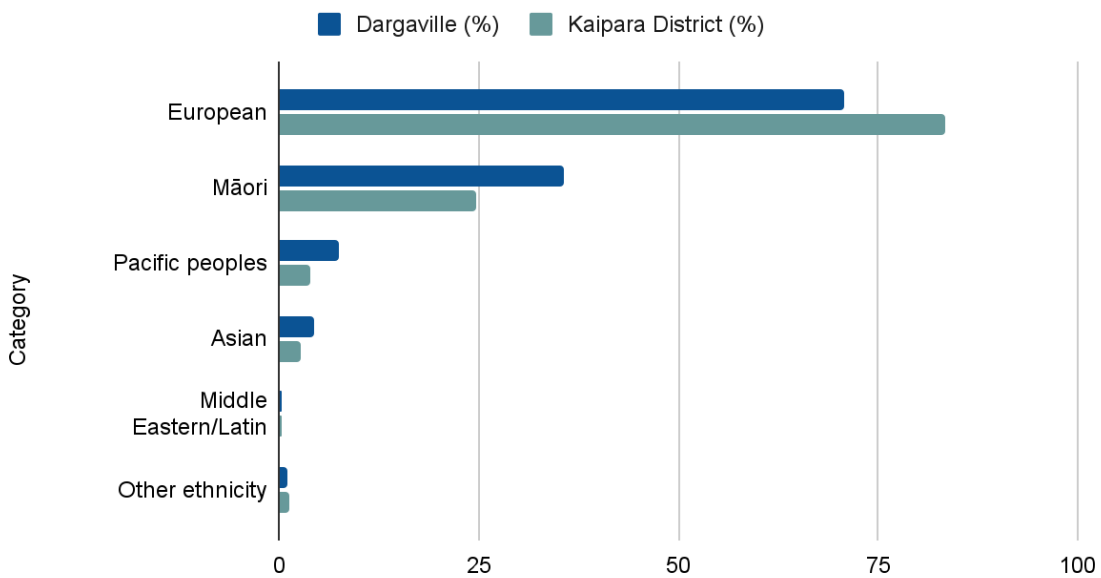
Age and Sex of People in Dargaville



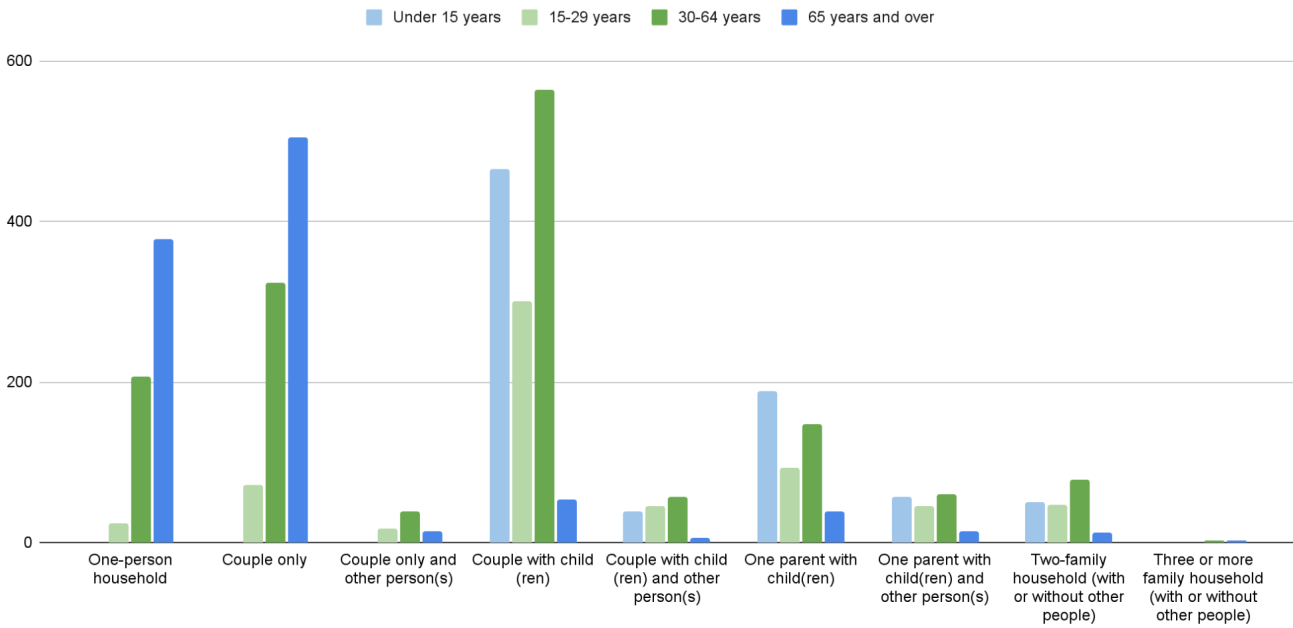
### Age and Sex of Māori in Dargaville, 2018 Census



### Ethnicity in Dargaville and Kaipara District



### Dargaville Household Composition by Age, 2018 Census



### Dargaville Extended Family Type (in Occupied Private Dwellings), 2018 Census

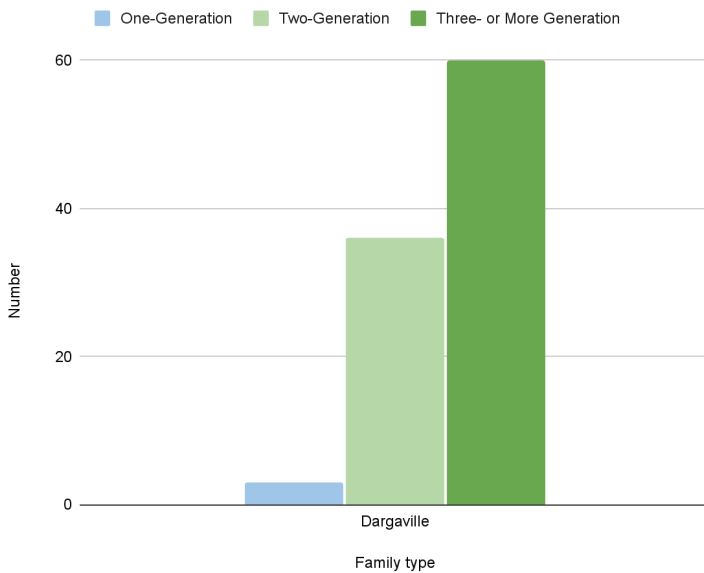
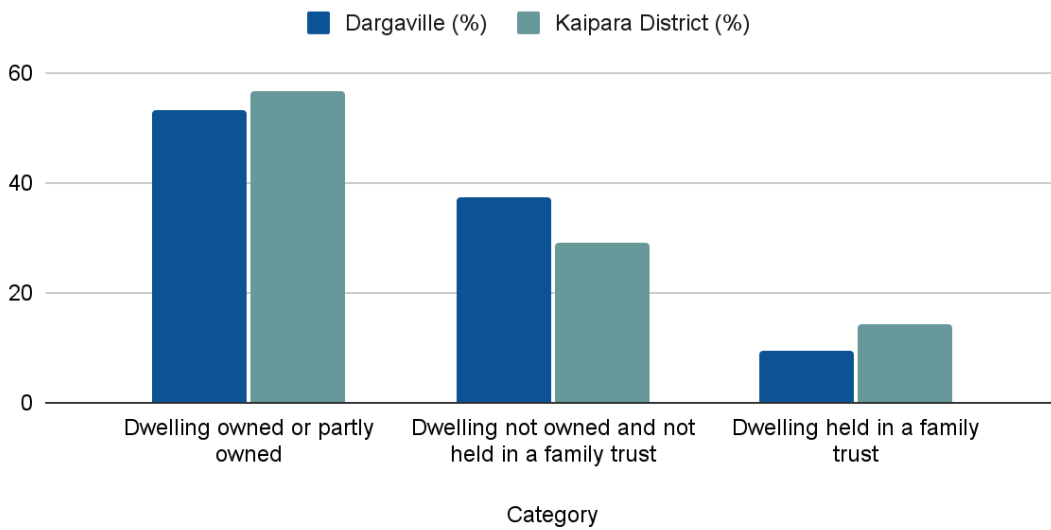


Table 7

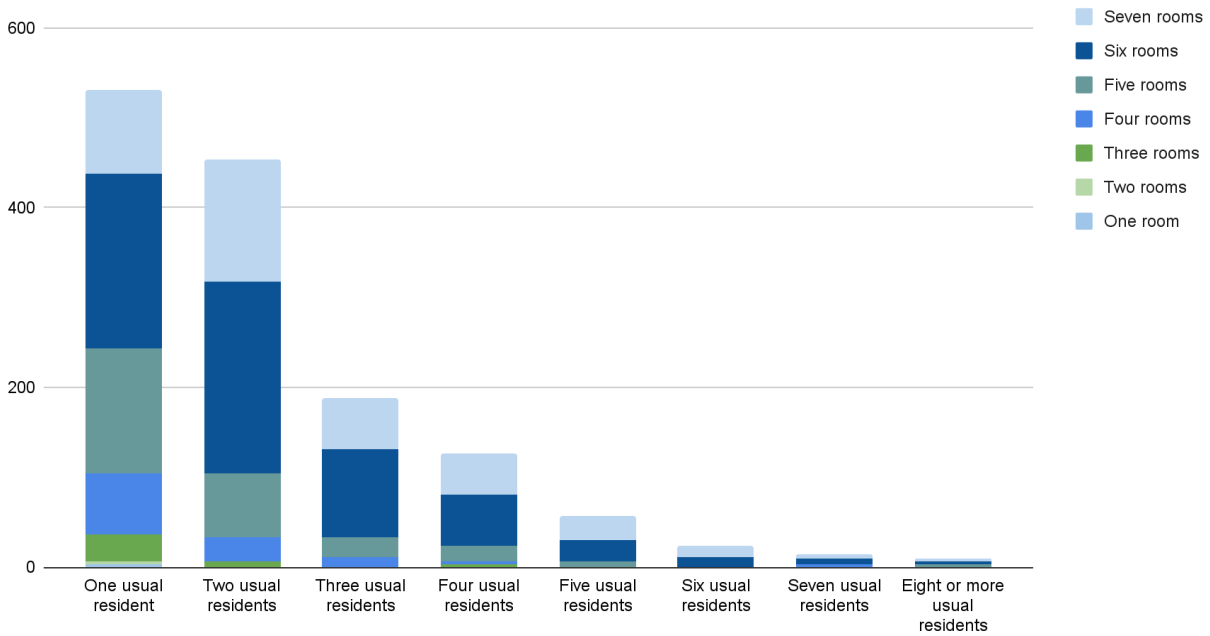
*Sub-District Population Projected Change (A Reproduction of Table 1 in Infometrics 2020a)*

<b>Statistical Area 2</b>	<b>2019</b>	<b>2051</b>	<b>Change 2019 - 2051</b>
Dargaville	5,077	6,169	1,092
Kaipara Coastal	3,776	3,862	86
Maungaru	1,865	1,607	-258
Ruawai-Matakohe	2,520	2,418	-102
Otamatea	1,785	1,541	-244
Maungaturoto	1,318	1,582	265
Kaiwaka	2,217	2,654	438
Mangawhai	1,060	2,828	1,768
Mangawhai Heads	2,184	4,675	2,490
Mangawhai Rural	2,298	5,215	2,917
<b>Total</b>	<b>24,100</b>	<b>32,552</b>	<b>8,452</b>

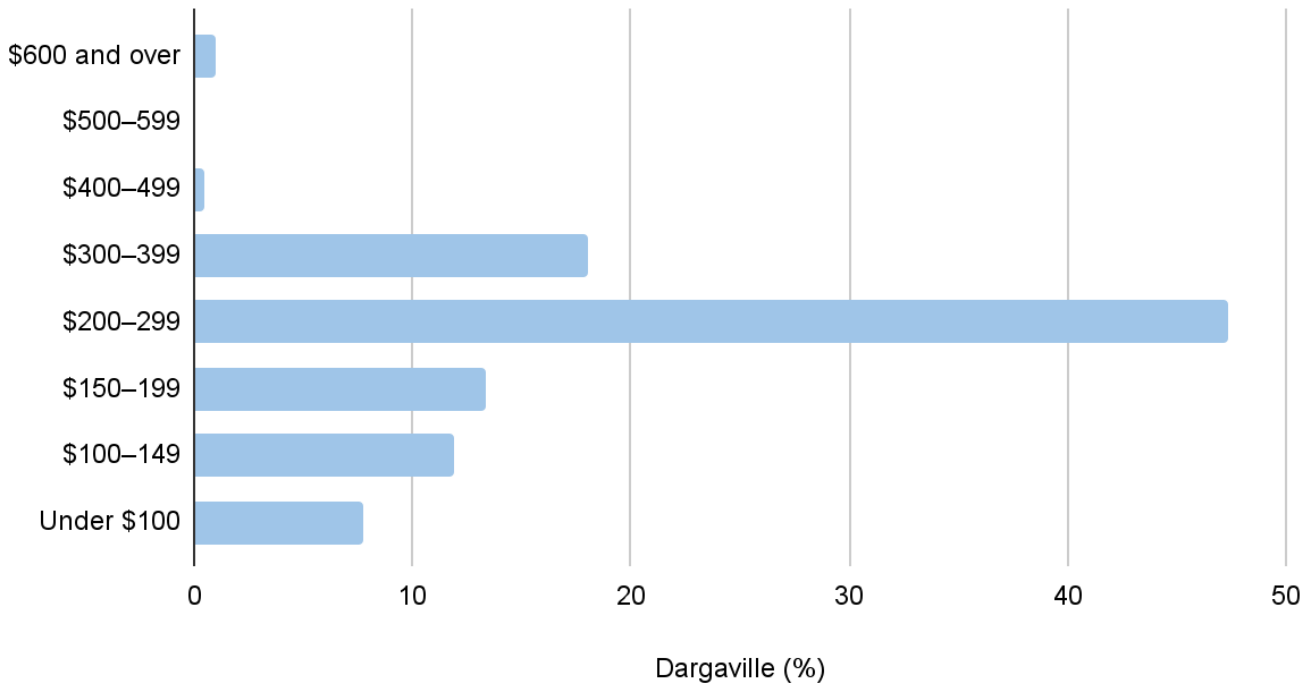
### Tenure of Households for Occupied Private Dwellings in Dargaville and Kaipara District, 2018 Census



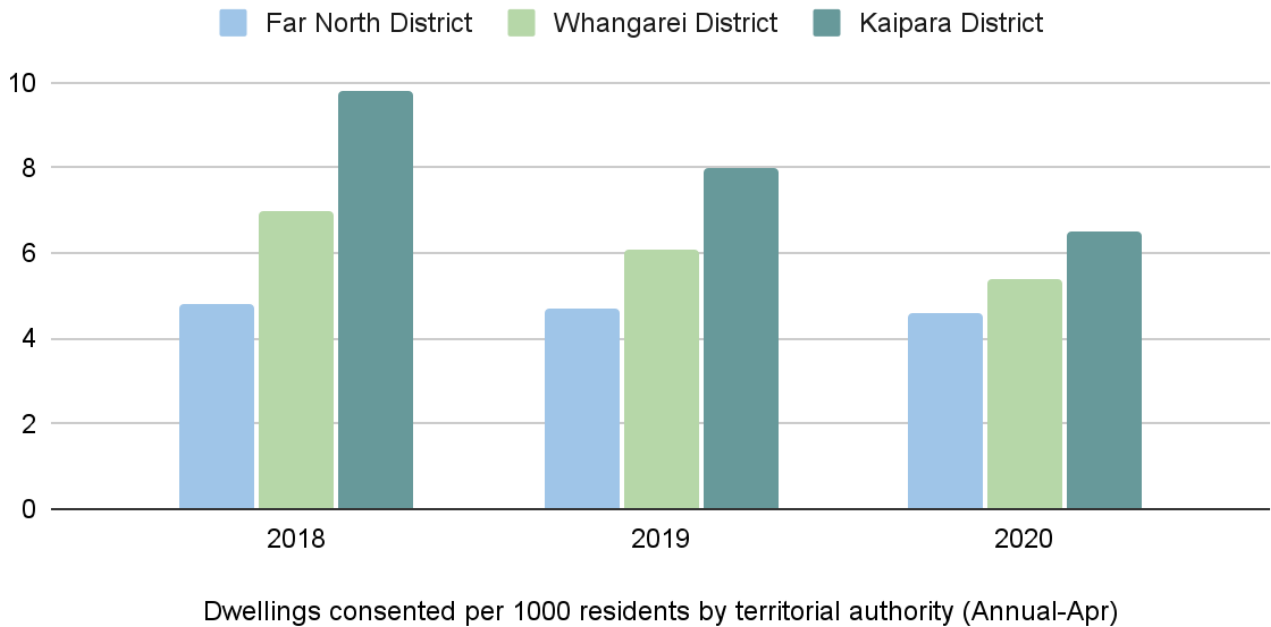
### Number of Usual Residents in Household by Number of Rooms, for Households in Occupied Private Dwellings, 2018 Census (Dargaville )



### Weekly Rent Paid by Households in Dargaville, 2018 Census

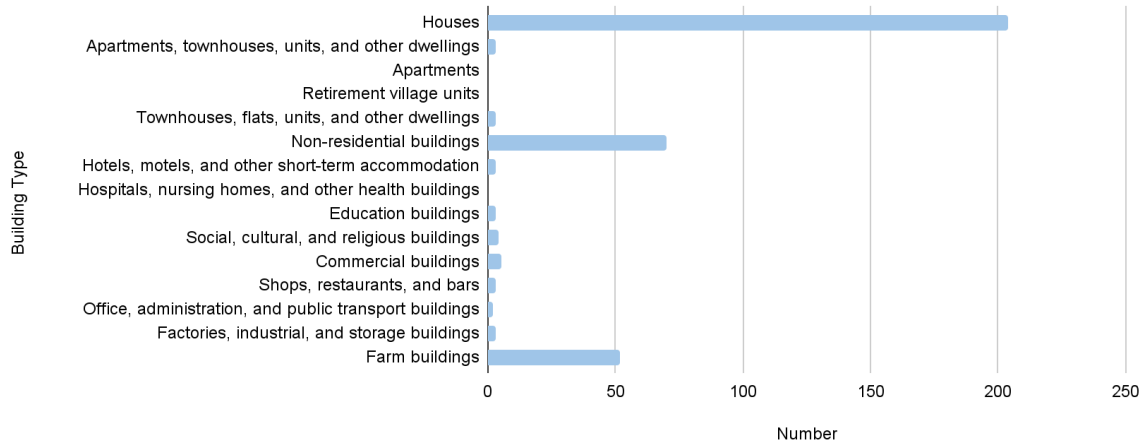


### Dwellings Consented per 1000 Residents (Far North District, Whangarei District and Kaipara District)

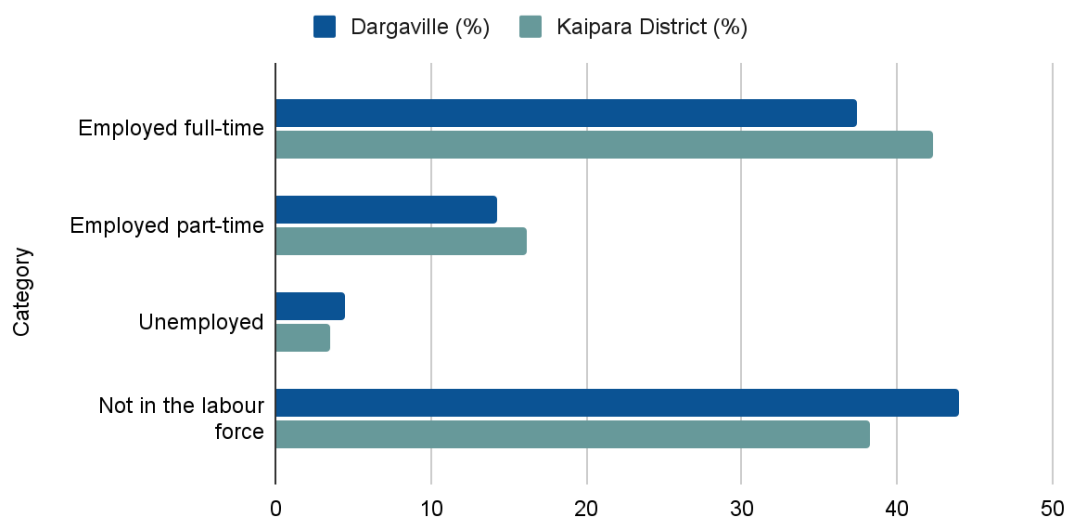


Dwellings consented per 1000 residents by territorial authority (Annual-Apr)

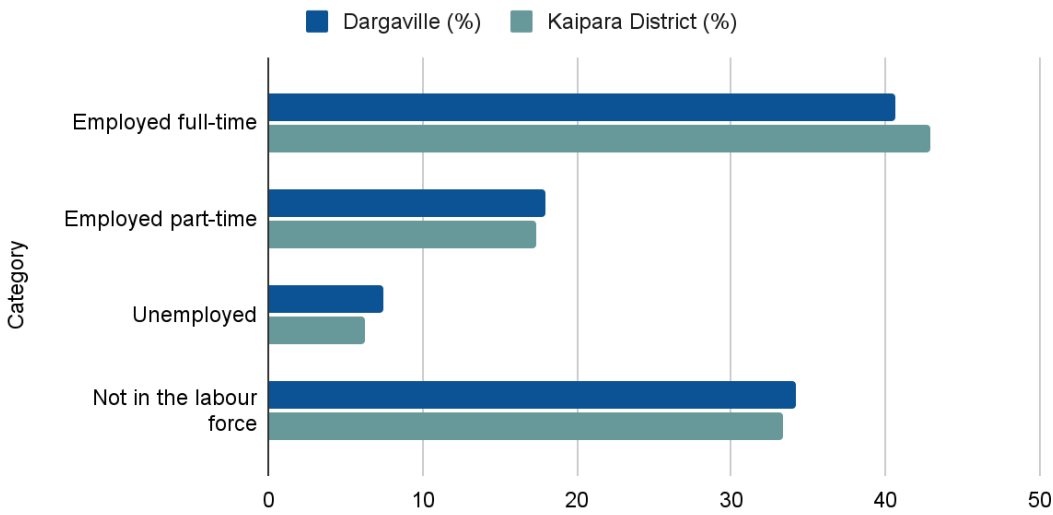
### Kaipara District New Building Consents Issued, by Building Type (Annual to March, 2021)



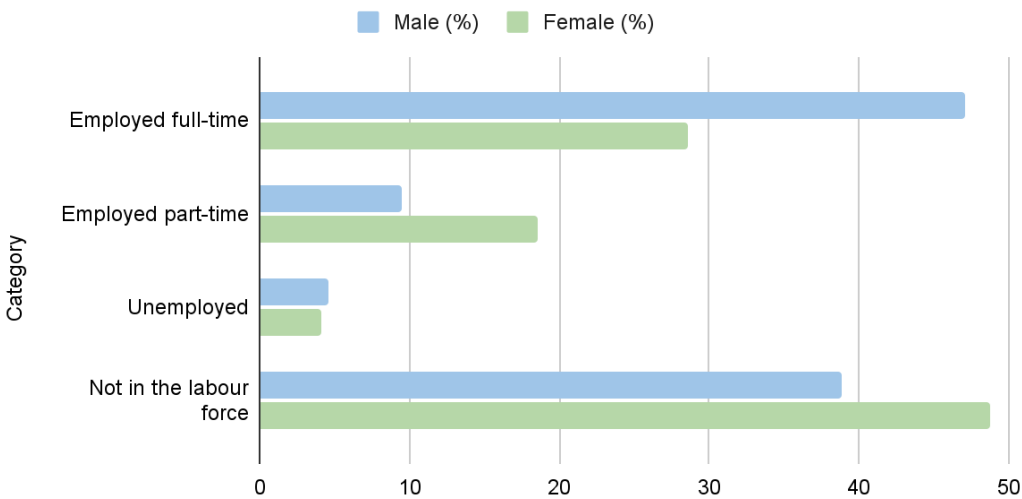
### Work and Labour Force Status for People in Dargaville and Kaipara District, 2018 Census



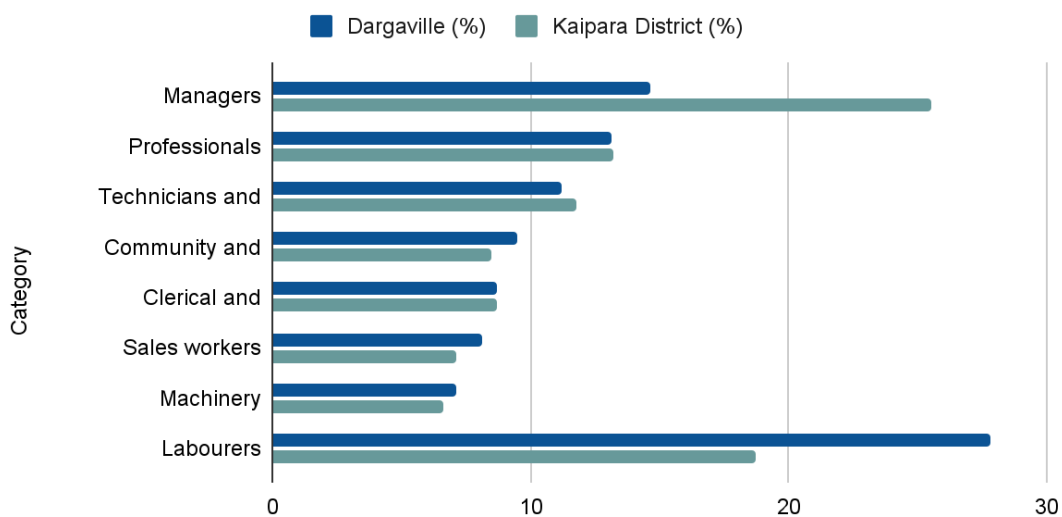
### Work and Labour Force Status for Māori in Dargaville and Kaipara District, 2018 Census



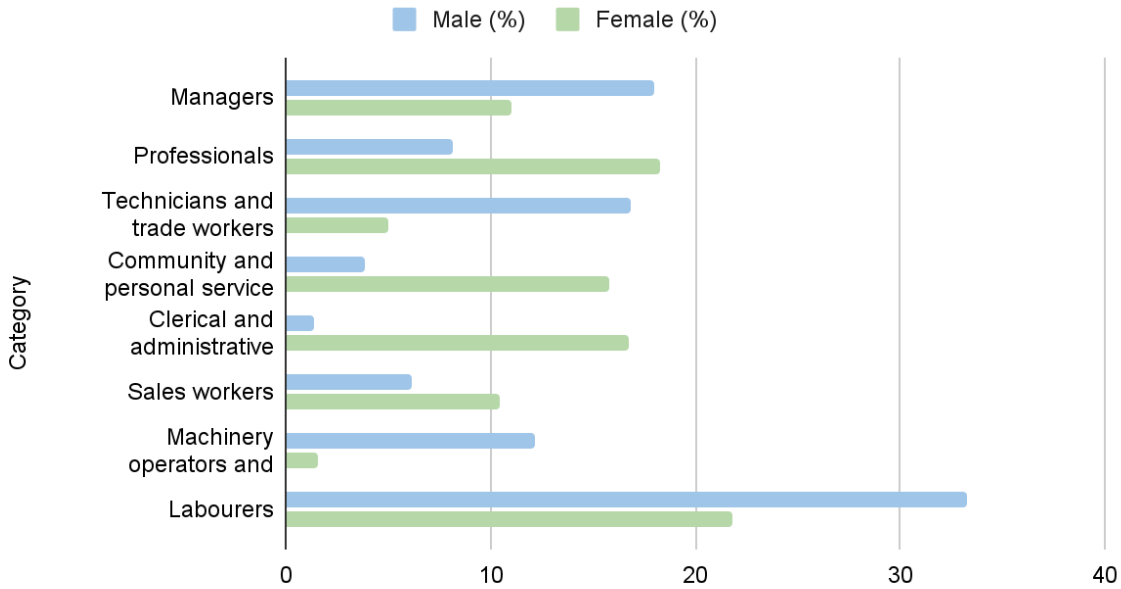
### Work and Labour Force Status by Sex for People in Dargaville, 2018 Census



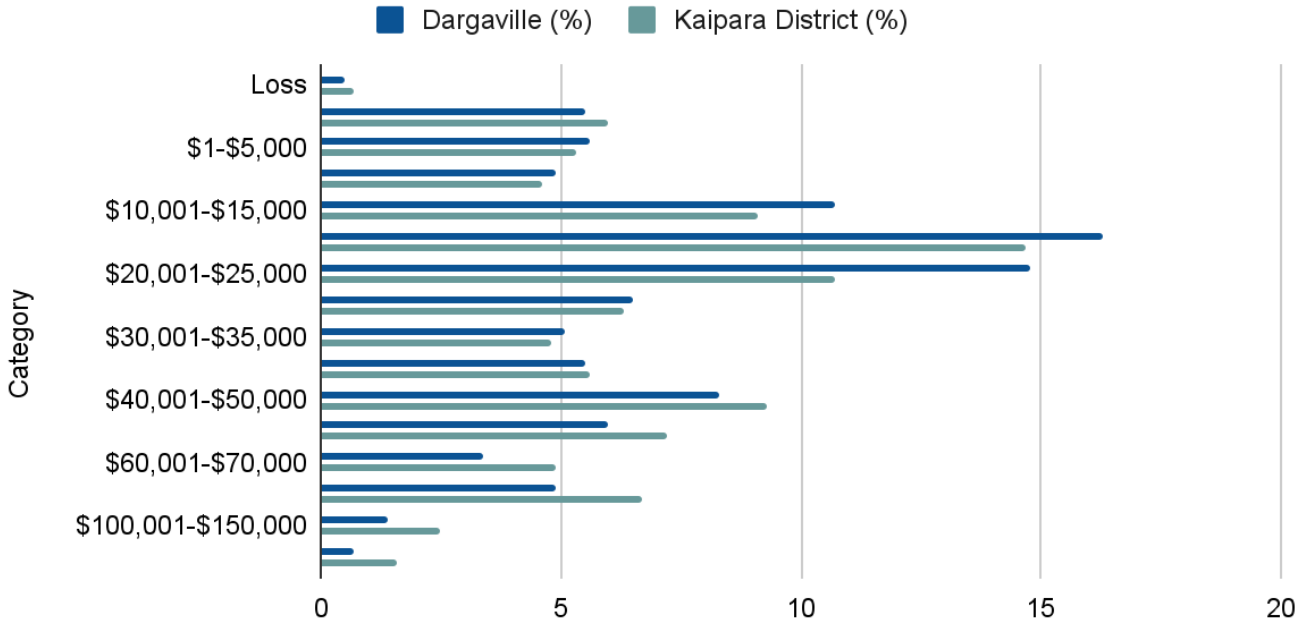
## Occupations for People in Dargaville and Kaipara District, 2018 Census



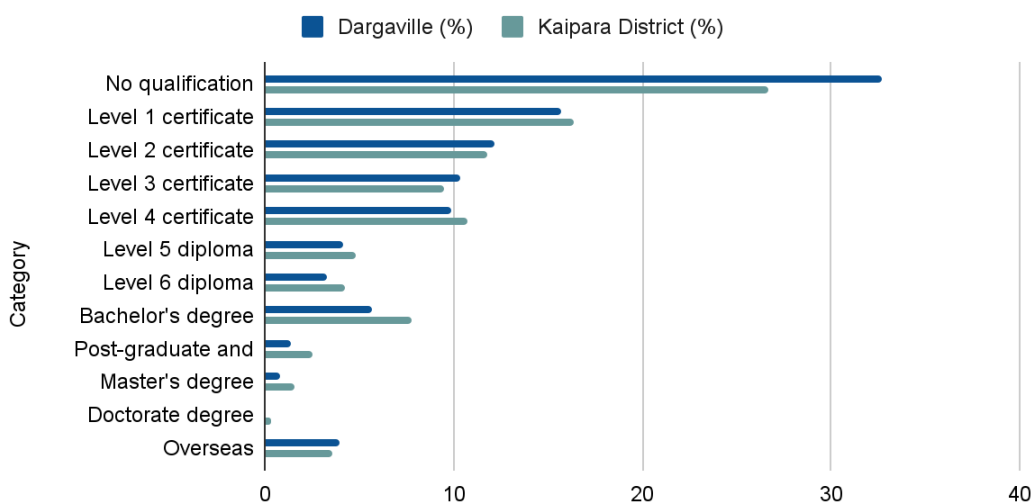
### Occupations by Sex for People in Dargaville, 2018 Census



### Total Personal Income for People in Dargaville and Kaipara District, 2018 Census



### Highest Qualification for People in Dargaville and Kaipara District, 2018 Census



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# Context Analysis for the Dargaville Racing Club Site

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## Summary Report

**04 June 2021**

Prepared by The Urban Advisory

  
THE URBAN ADVISORY  
RETHINKING OUR CITIES

# Context Analysis

## Dargaville Racing Club

This document summarises the strategic and spatial context analysis for the Dargaville Racing Club Site

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# INTRODUCTION

## Purpose

Context analysis is crucial to delivering quality urban design and planning outcomes in development. It develops understanding about the wider context surrounding a development and the site context itself, from environmental and economic aspects to infrastructure, community and cultural contexts. This analysis highlights the strengths, weaknesses, opportunities and constraints for a development proposal on that site.

This context analysis for the Dargaville Racing Club site will be used to inform the design of the concept development plan for the site, for the purposes of a plan change. The Cultural Narrative Analysis is the subject of a separate report.

## Scope of analysis

The context analysis has considered key strategic planning documents for Kaipara and Dargaville, and other maps, studies and relevant resources about the Dargaville Racing Club site and wider Dargaville.

## Key Strategic Documents

- The Kaipara District Spatial Plan (2020)
- Kaipara Infrastructure Strategy 2021-2051
- Spatial Plan for Key Urban Areas - Dargaville
- Northern Townships - Dargaville (NZTA)
- Kaipara Walking and Cycling Strategy 2017
- Kaipara Long Term Plan 2021-2031
- Northland Regional Policy Statement
- Te Rūnganga o Ngāti Whātua 2020-2021 Annual Plan

## Other Resources

- Northland Regional Council Local Maps
  - Managing Northland Soil Factsheets Viewer
  - Wairoa Northland Water Priority Areas
  - Selected Landuse Register
  - Biodiversity wetlands
- Geotechnical Assessment, Dargaville, Kaipara District 2019
- Kaipara Environmental Scan 2020

## Structure

This analysis is summarised in a number of contextual themes:

- Mana whenua & cultural context
- Community & social context
- Physical Environment Context
- Economic Context
- Transport & Travel
- Four waters Infrastructure
- Future Growth and Development
- Vision - Community aspirations
- Regulatory Planning Context

## STRATEGIC PLANNING CONTEXT

### Wider Context - Kaipara District

The Kaipara District Spatial Plan (2020) maps the possible future growth of the district, including the cost of providing infrastructure, and where housing density can increase and be supported by existing infrastructure in Dargaville (and other urban areas in the District)<sup>1</sup>.

- Three main priorities for the Spatial Plan are Wharves, Roads (improve safety and resilience) and Kai (e.g. Kaipara Kai programme, to support horticulture and aquaculture businesses)
  - DarKaipara 1.2% of NZ land mass, 1.1% of kai production (underperforming), but potential to inject \$20-230m into regional GDP
- Dargaville is a key urban centre in Kaipara District which serves district needs, including banks, council facilities, medical services, employment beyond rural activities)

The Spatial Plan process distilled the key community aspirations for the Kaipara district which are:

- **Food bowl of New Zealand - Kai for Kaipara**
- **Create a destination rather than a gateway**
- **Connect the town centre and wider community with the Northern Wairoa River**
- **Tertiary institution - more choices**
- **Build on our successful industries**



### Local Context - Dargaville

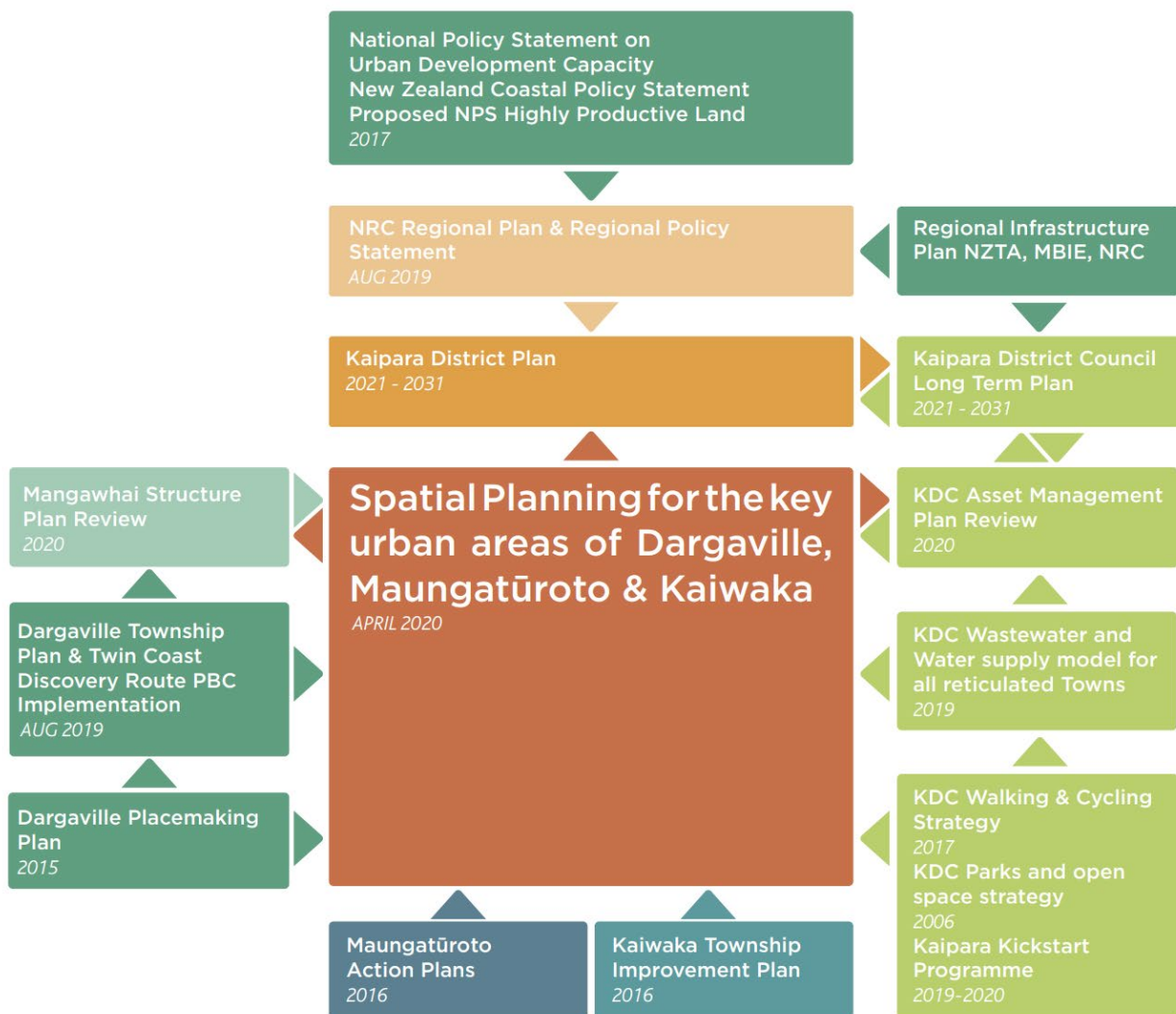
The Spatial Plan Key Urban Centres (Part 2) also established a vision for the next 30 years for the Dargaville.

<sup>1</sup> It also takes consideration of NPS Freshwater Management, NPS UDC, NZ Coastal Policy Statement, Northland Regional Policy Statement, regard to new NPS UD, NPS Highly Productive Land, NPS Indigenous buildiversity. There is a balance to be struck between growth potential, economic development opportunities for rural-production economic based districts such as the Kaipara, and protection of natural values.

**In 2050, Dargaville is the epicentre of Kaipara food production & technology, a visitor hub for our natural and cultural tourism attractions and a place where our history and the community are celebrated.** This involves:

- Engaging mana whenua
- Strengthening core of town, people-focused
- Shared pedestrian and cycle link from the riverfront to other areas in Dargaville, connecting industrial, residential and recreational spaces.
- Intensification of residential areas close to town, including infill.
- Medium density papakāinga and retirement village close to hospital and good transport routes to town centre.
- Urban and industrial development to the north east on rural land and SH14 will avoid sensitive ecology and productive soils.

The Spatial Plan informs a range of other plans and strategies for the Kaipara District and Dargaville which informed the context analysis (see below diagram). The following sections consider how the local context and wider context provide opportunities or constraints for the development of the Dargaville Racing Club site.



## CONTEXT ANALYSIS THEMES

### Mana whenua & cultural context

Refer also to the *Cultural Narrative Analysis and Cultural Impact Assessment report for the Dargaville Racing Club site (Matakohe, 2021)*.

- Kaipara settlement goes back more than seven centuries, when the ancestors of the many iwi and hapū lived by fishing, hunting and growing crops in an area blessed with rich harvests from the harbour, ocean, river, forests and soil.
- Kaipara was also a major travel route
- The major iwi/hapū of the Kaipara are Te Roroa and Te Uri o Hau. Te Roroa occupy the hinterland and rich valleys between the Kaipara and Hokianga harbours, particularly the Kaihu Valley, Waipoua, Tunatahi (Dargaville) and Maunganui Bluff areas.
- Dargaville was formerly known as Kaihū by Māori
- Te Houhanga marae, urupā and waka landing around Dargaville
  - Te Houhanga marae and Rahiri whare (built 1914)
- Te Rūnanga o Ngāti Whātua
  - Values: uphold **mana** of Ngāti Whātua, **manaakitanga** / care for people, **kaitiakitanga** / protect papatuanuku
  - Principles: Reo (māori language), Mua (cultural heritage), Toi (arts and creativity), Ihi (intrinsic wellness), Ako (education), Ora (health and social development), Hau (air quality, airwaves), Tai (marine-based activities), Hua (land-based)
  - 14,784 uri in NZ, 85% living in Te Tai Tokerau and 50% in Tāmaki makaurau
  - Jobs, housing, health and wellbeing, and the generation of data that identifies Ngāti Whātua uri across key statistics are priorities.
- Māori land parcels to the North of racecourse site
- Archaeology
  - There are no recorded archaeological sites on the DRC property and very few in the surrounding area.
  - The low-lying nature of the ground on which the race course is located may account for the absence of Māori archaeological sites.
  - No archaeological features were visible on the surface of the property, including the northeastern high-ground. Shovel test-pitting on Racing Club site found natural soil profiles with no evidence of archaeological deposits.
- Engagement with mana whenua was part of the Spatial Plan process:
  - Te Aranga Principles noted:
    - Mana Rāngatiratanga (mana whenua status)
    - Whakapapa (names, tūpuna, narratives honoured)
    - Tohu (sites and cultural landmarks)
    - Taiao (protect natural environment)
    - Mauri Tū (ecology, water and soil wellbeing)
    - Mahi Toi (narratives expressed creatively)
    - Ahi kā (living presence of iwi hapū)
  - Opportunity to integrate cultural narrative into development for tourism

- Needs of marae: recognise need for papakāinga development, infrastructure maintenance in addition to improving capacity of marae to **deliver work experience, apprenticeships/internships**, workshops in finance, governance, submission writing and funding applications.
- Mana whenua engagement themes for Dargaville
  - Developing and fostering relationships
  - Bringing our people home
  - Papakāinga, **warm and dry homes, kaumatua housing, increase housing choice, supporting ahi kā**
    - **Pathways to papakāinga are considered arduous (complicated planning rules, funding and infrastructure challenges) - consider in District Plan review**
    - **Warm healthy affordable housing**
  - Marae restoration, appropriate zoning and infrastructure
  - Education
  - Industry and workforce opportunities
  - Aspiration for self-sufficiency on the land
  - Protect the Northern Wairoa River edge and adjacent fertile land from the effects of climate change i.e. increased potential of extreme flooding.
  - Culturally and environmentally sensitive land use and development required
  - Mana whenua don't want to be regarded as a testing ground for experimental development or failed infrastructure projects.
  - Be the food basket of the north: e.g. Market garden industries, fishing and kai moana, Waipoua forest and cultivation.
  - Tinopai: local resource management plan, to advise development in the area

## Community & social context

*Refer also to the Market Demand Analysis (TUA, 2021) report for the Dargaville Racing Club site which provides detailed demographic analysis of Dargaville and the Kaipara District.*

- Dargaville (5,000pp) largest settlement in Kaipara, a District of 23,000 residents (2018 census)
- 4.6% population decrease 2006 to 2013, but increase 12% by 2018
- 26.7% of residents are over 65yrs (2018 census) in Dargaville, 22.2% for Kaipara.
- Median age 44.1yrs in Dargaville
- ~19% under 15yrs
- English migrants, as well as croatians, dalmations.
- Fast growing over-65 cohort (23% of population), expected to increase to 38% by 2043 (and decrease labour force.
- Some rural-urban migration occurring (e.g. moving to Dargaville)
- Expected population growth of 1400 in Kaipara over next 25 years (concentrated around Mangawhai)
- Community design principles in the Spatial Plan:
  - Kaitiakitanga / Guardianship / stewardship
  - Engagement
  - Diversity
  - Integration of uses
  - Connectivity (network of walkways, cycleways, streets)
  - Legibility
  - Accessibility

- Resilience and Adaptation (to sea level rise, extreme weather events, market conditions and economic contraction)
- Celebration
- Treasured
- Safety (access, good surveillance and clear sightlines, clear and logical layout, a mix of activity, a sense of ownership, high quality environments)
- Revitalisation (heritage, sense of place and identity)
- Feasibility and Vitality

## Built Environment

Refer also Market Demand Analysis report for information on demand for housing, industrial and commercial properties (TUA, 2021).

- Occupied dwellings 1,818
- Building consents, 2015-2019 =71
- Recognition that reverse sensitivities need to be avoided between industrial and residential issues.
- Urban intensification encouraged in appropriate and suitable locations
  - Responding to change over time, changing needs of people, communities and future generations
  - Responding to social, economic and cultural wellbeing needs while stimulating growth, that is not at an unreasonable expense or burden on infrastructure.
- Subdivision trends
  - Trend of smaller subdivisions on the fringe of settlements, large 1200m<sup>2</sup> sections. Resulted in infrastructure to support growth not being provided, and limiting future development approvals.
  - Want to integrated subdivision into urban form and pattern - attract development in centres, to support business growth and provide quality housing
    - **Opportunities with Public Private Partnerships (e.g. this project), large land holdings in common ownership that can be developed in a comprehensive manner**
- Dargaville Racing club heritage
  - The DRC (then the Northern Wairoa Racing Club) conducted race meets in several locations near Dargaville before settling on the current course, possibly in 1914. Buildings on the site have been significantly remodeled over the years and have no clear heritage value.

## Natural Environment

- The site is approximately 4km to the northeast of Dargaville township and adjacent to SH14
- The site lies within a broad meander of the Wairoa River named Awakino Point, that is mostly used for agricultural purposes.
- Seeking no loss of soil-based primary production on land with highly versatile soils - Kaipara has a large area of highly versatile soils.
- In Dargaville / Awakino: Previously extensive Kahikatea forests, wet ground, also pukatea common, swamp maire and kiekie, supplejack and gahnia xanthocarpa
- Racing Club site and surrounding area is underlain by recent alluvial/colluvial deposits of Tauranga Group (The GNS Science Geological Map ).
- Local Quarry issues: Mauharu quarry and Turiwiri Quarry Dargaville
- Harbour was historically an important transport link for Māori and settlers

- Dargaville has a reasonably high flood risk; to protect against this it has stopbanks, floodgates and a floodwall along the Kaihu and Northern Wairoa Rivers.
- Natural Hazard map (Figure 1): does not affect subject site, though flood susceptible land area does extend up to southern corner of site (potentially).
- Geotechnical (regional)
  - Northland is one of the lowest earthquake activity regions in New Zealand. GNS New Zealand Active Faults Database indicates there are no known active faults within the study area.
  - Dormant volcanic field
  - Flat site, no major slope angle, therefore low slope instability (see Figure 8)
  - Risk of sulphate attack on concrete (hill area in North of Racecourse site)?
  - Site has high liquefaction susceptibility and settlement susceptibility (from Dargaville wide study)
- Most of the site comprises an alluvial plain which is essentially flat.
- There are 3 soil types on this property (Racecourse) (Figure 2)<sup>2</sup>:
  - Soil type: KP covers 5.1ha. -> (11.53%) Relevant factsheet: 1.1.1 & 1.1.2 (Along Awakino North Rd)
    - Recent alluvial soils: Fertile, can have flood impacts
  - Soil type: KRa covers 34.67ha. -> (78.39%) Relevant factsheet: 7.0
    - Old Podzol soils: Gumland soils or pipe clay, infertile acidic soil
  - Soil type: WE covers 4.46ha. -> (10.08%) Relevant factsheet: 4.3 (north-east)
    - Old rhyolite ash soils, winter wet & low natural fertility
- Geology of site, two geological units: Pleistocene aged alluvial deposits underlie the elevated northern portion of the site, with more recent Holocene aged alluvial deposits forming the flat remainder of the site.
  - Holocene aged Alluvial deposits (Q1a1): Unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins.
  - Early to Middle Pleistocene aged River & Hill Slope deposits (eQa1): Partly consolidated mud, sand, gravel and peat or lignite of alluvial, colluvial, lacustrine, swamp and estuarine origins.
- Geotechnical (site)
  - The low-lying regions which contain low strength clays and silts are deemed to be Class D or E (Deep or Very soft soil) while the mid-slopes to upper slopes containing Pleistocene deposits exhibit Class C (Shallow soil) characteristics.
  - Little to no expression of liquefaction occurring on site (low probability of occurring during a ULS event, the effects are expected to be nil to minor and within standard design tolerances for settlement)
  - The GNS NZ Geology webmap and Active Faults Database<sup>6</sup> do not show any faults passing beneath the site.
  - A historic and now overgrown dam exists at the base of the hill. Earthworks have excavated into the hill to form a track and likely borrow source for the dam embankment material. Instability was observed in the over steepened slope above the dam.
  - The overall stability of the subject site and the immediate surrounding slopes has a geomorphology that is indicative of fundamental stability. Overall slope instability is not considered to be a significant geotechnical risk for this development.
- Groundwater: Within low-lying land, 1.5m to 3.5m below ground level, beneath elevated areas it can be greater than 5m bgl.
- Site falls outside of any major aquifers.

<sup>2</sup> Managing Northland Soil Factsheets Viewer

- Hydrology: site within catchment area that feeds into the Wairoa River which in turn flows out to the Kaipara Harbour. The site sits along the upper extent of the catchment and will be bounded by the ridgeline of the hillform along the northern boundary of the site, and SH14 to the west of the site.
  - Modified site with excavation of multiple irrigation drainage channels that drain in an easterly and northerly direction to the Wairoa River.
- 
- No contaminated site noted at Racecourse property
- No marsh, swamp or known wetland noted at Racecourse property (Biodiversity)
- Wairoa Northland Water Priority Areas
  - None affecting site
  - Note bore log at the end Of Awakino Point North Rd
- Significant maunga, Tokatoka and Maungaraho (south along Wairoa river)
- Kaipara’s most productive land is located on the alluvial flood plains around the Northern Wairoa River and its tributaries. Protecting this land from inundation and flooding is achieved by a series of land drainage schemes consisting of drains, stopbanks and floodgates.
  - Governance of these schemes is via a number of drainage boards comprised of representatives from the landowners protected by each scheme

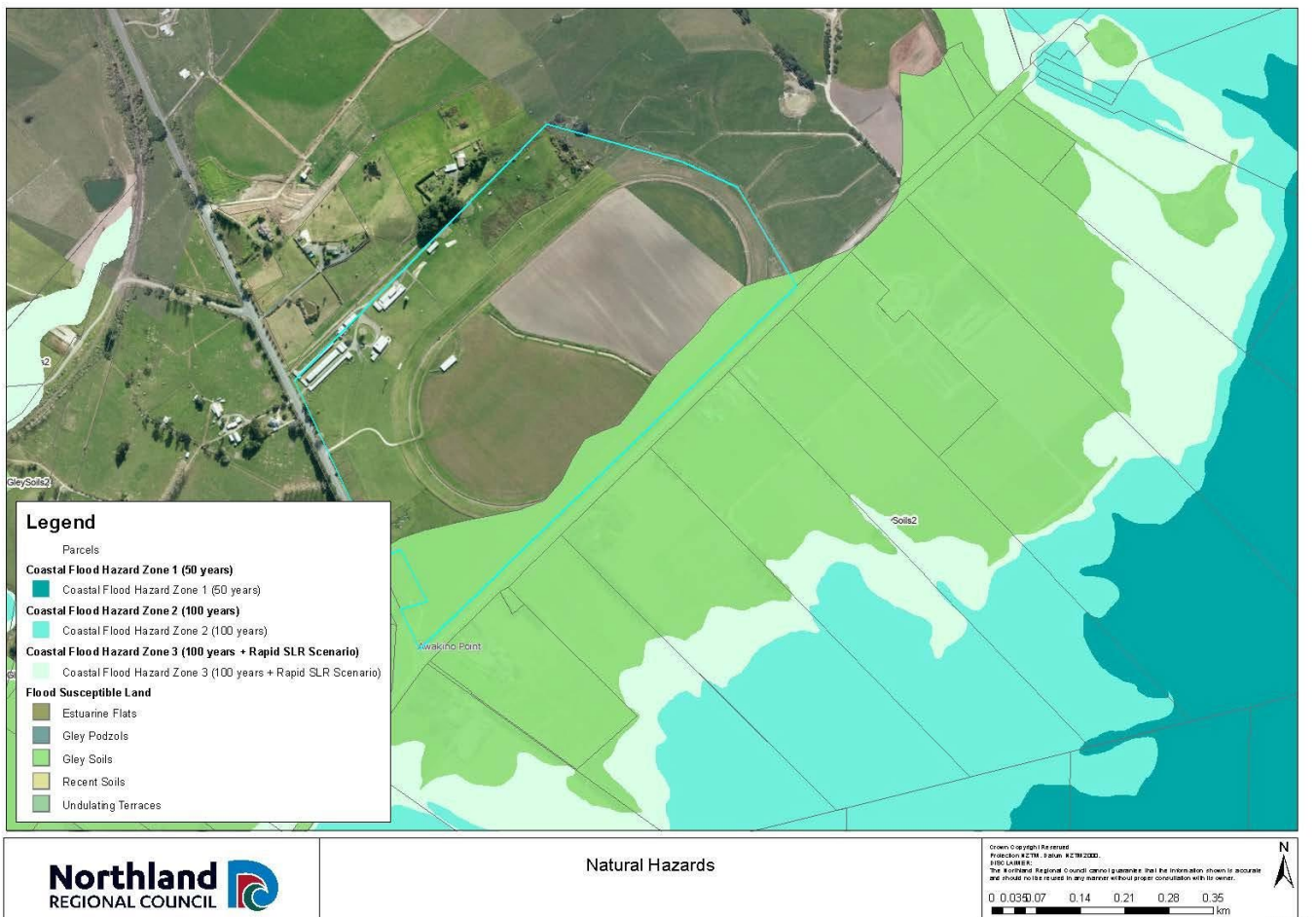


Figure 1. Natural Hazard map of Dargaville Racing Club [Source: NRC maps]

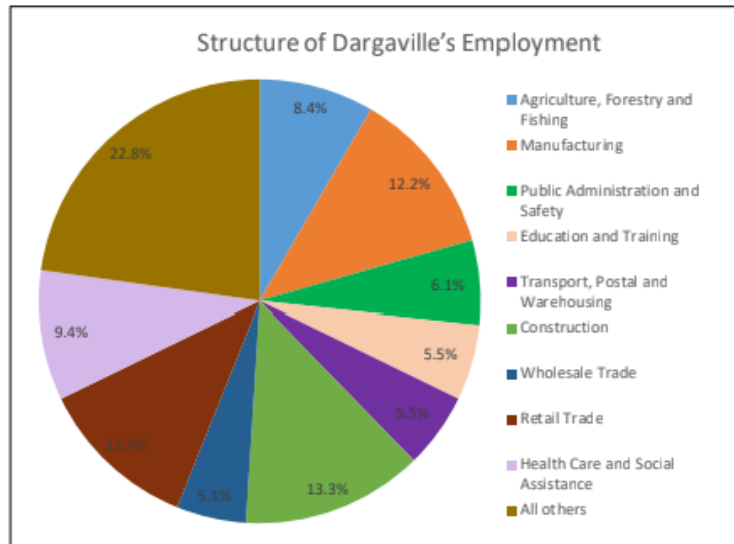


Figure 2. Soil map of Dargaville Racing Club [Source: NRC maps]

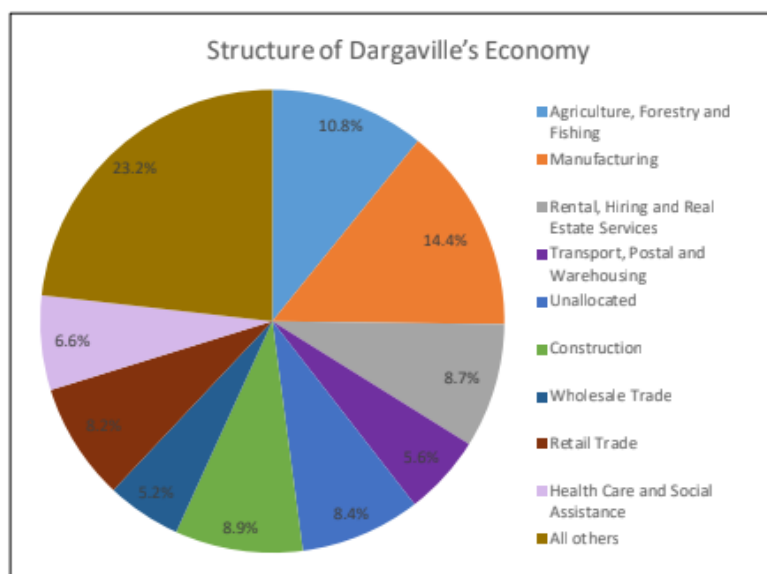
## Economy & Employment

- Kaipara contributes just 10% of northland GDP (compared to Whangārei's 61%)
- Some employment growth in urbanised areas
- Rural growth associated with shift from agricultural activity to land-based farming
- Tourism
  - Opportunity for tourism linked to the harbour, the landscape, culture, history and people, but physical constraints in coastal areas. Limited range of tourism opportunities.
  - Kaipara Missing Link Cycle Trail
  - Wharf infrastructure is key for tourism, and local fishing market (estimated market of 200,000 in Auckland)
  - 'Integrated community tourism' or 'slow tourism' integrating tours or self-guided experiences with bike shops, cafes, guides and accomodation.
- Limited by transport routes/links, low socioeconomic conditions and business development
- Dominant surrounding land use of rural primary production
- Industry & Economic development statistics
  - Industry employment, 2018 = 2450
  - Major industry, Silver Fern Farms processing industry
  - Former industry, kauri timber and gum, then moved to predominantly farming and later horticulture also

- 'Kūmara capital of NZ'
- Limited industrial land in all three main Kaipara towns (some businesses moving to areas in Wellsford and Whangārei, considered more viable)
- Kaipara District at present does not have its own Economic Development Strategy or Tourism Strategy and is relying on the government and Northland Inc. Te Tai Tokerau - Northland Economic Development Strategy
- Primary industry economy (dairy and manufacturing), resilient through COVID-19 as a food production centre little affected by Lockdowns



**Figure 3.** The contribution of different sectors to the number of filled jobs in Dargaville in 2019 [Source: Infometrics 2020a via Kaipara environmental scan]



**Figure 4.** The contribution of different sectors to Dargaville's GDP in 2019 [Source: Infometrics, 2020a via Kaipara environmental scan]

### Transport & Access

- Local roads are sealed/unsealed, some narrow. 71% of local roads in Kaipara are unsealed
- Dargaville township plan (Figure 5) designed to manage the effects of the state highway traffic on the town.
- Engagement with Waka Kotahi on Spatial Plan

- Recognises that development along State Highways create reverse sensitivities
- State Highways are designated for long distance, high volume through traffic which can be compromised if many access points are proposed.
- Rail upgrades only proposed for freight, with potential noise, vibration and reverse sensitivity effects.
- Aspirational Regional Cycle Trail from Dargaville through past Racecourse site / beside SH14 and railway (also links to Kauri Coast cycleway to NW)
- SH14 is a commercial link between Dargaville, Whangārei and Marsden Point Port.
- Rail is mainly used for freight.
- Future development of Auckland-Northland line planned, including Rail Village around Maungatūroto.
- Rail system in a state of managed decline recently, but now receiving a major upgrade. Services on the Dargaville branch still suspended (but with planned future use)
  - Opportunity to connect rail to NorthPort
- Proposed Kaihū Valley Rail Trail will be a significant catalyst for public infrastructure (NZTA)
- Crash data for Racecourse site area: one fatality, one minor incident at junction of Awakino North Rd and SH14
- New east-west collector road connection proposed between Meadowpark Drive and Paritai Place can provide secondary access to Racecourse site, in addition to town centre link (for employment and housing)

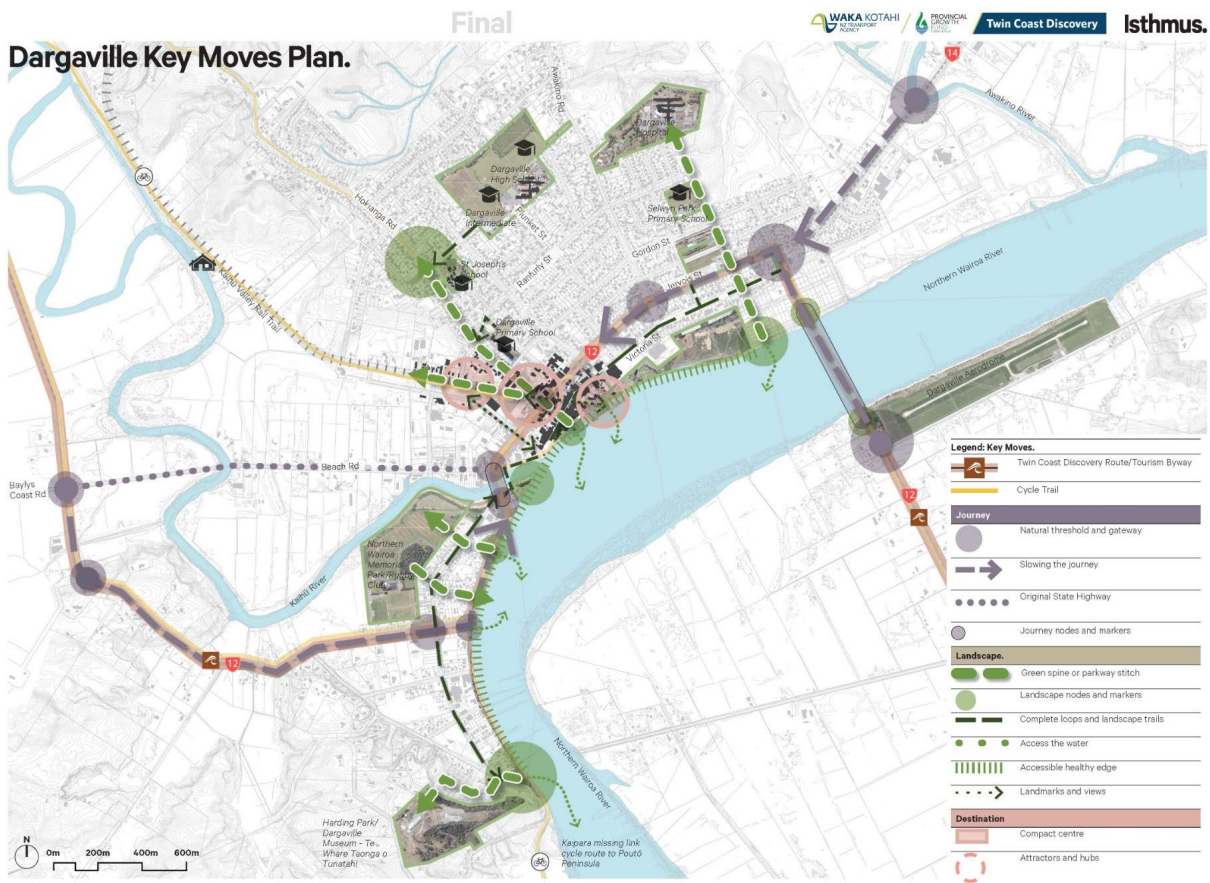
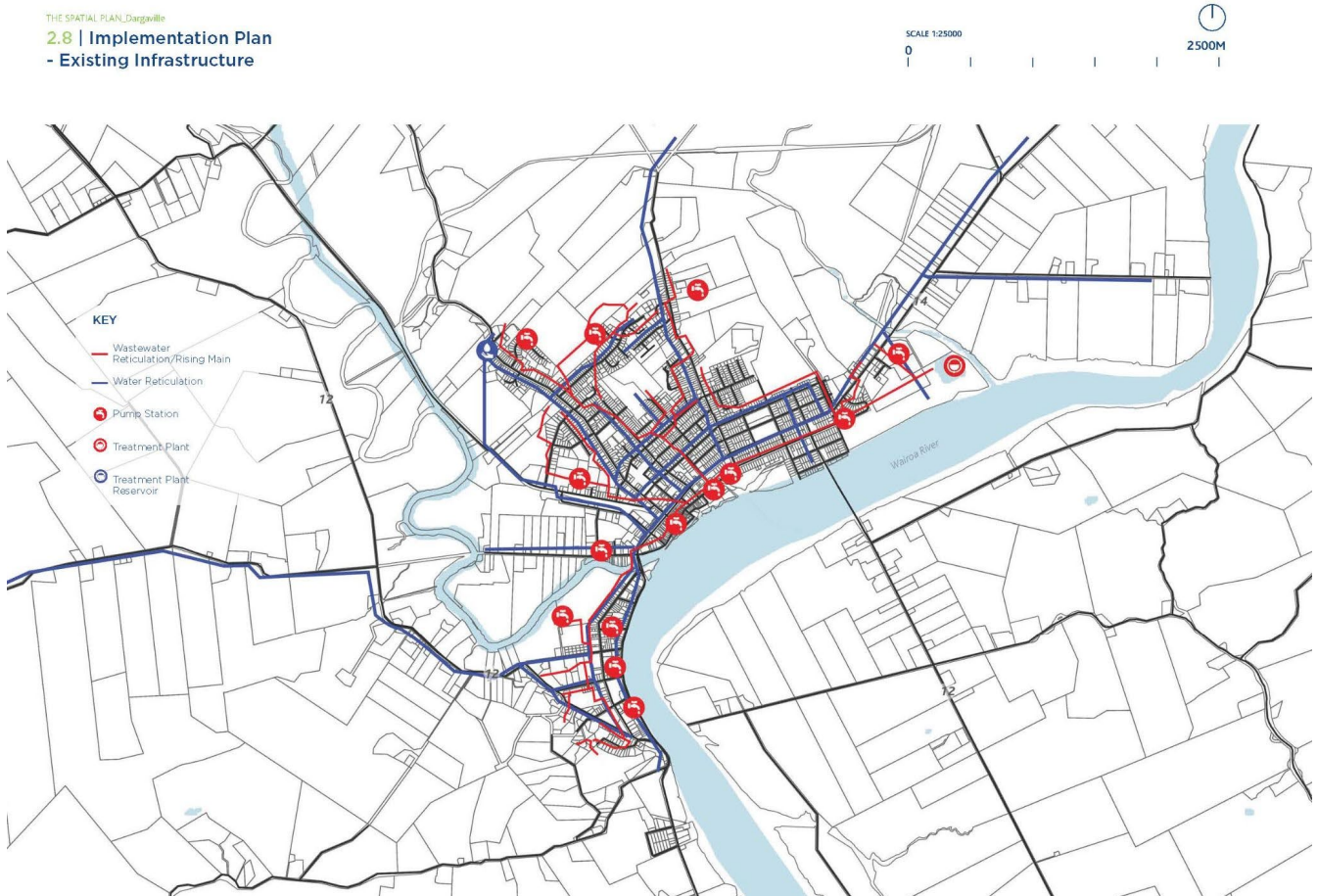


Figure 5. Dargaville township Plan 2019 [Source: NZTA]

## Four waters Infrastructure

- Kaipara District Council operates community water supply, wastewater, stormwater and flooding schemes in Dargaville (targeted rates)

- Trade waste going into WW plant creates more work for system of retention ponds
- Dargaville stormwater system under capacity for population levels.
- After large storm events, stormwater infiltrates wastewater system, and some overflow to Wairoa River
- Main water source at Waiparataniwha Stream supplies Dargaville and Baylys, but in drought security of supply at risk
- North Kaipara Agricultural Delta: protect highly productive land (versatile soils) through increased stopbank protection, enable high value horticulture conversions where there are reliable water sources.
  - Will create demand for new zoning in Dargaville to allow for businesses associated with processing and value add products.
- Provincial Growth funding for water storage projects to release potential of this area and stimulate growth of agricultural and horticultural jobs.
  - Baylys Beach and Te Kōpuru are key settlements for this programme
- Underinvestment in Four waters historically, significant Four waters renewal programme proposed, much work initially to understand condition and priorities for renewals
- Each wastewater, stormwater and water supply scheme has a targeted rate
- Flood protection and control targeted rates
- Dargaville Hard Infrastructure assets: Water, wastewater, stormwater reticulation, broadband, mobile coverage, roads sealed, footpaths, street lights, rail line (limited).
- Four waters infrastructure requires upgrade through renewals & treatment plant upgrades (addressed through LTP and Infrastructure Strategy)
- Dargaville needs to secure a quality water source that does not compete with agricultural uses
- Future Growth and Development: Awakino Point Neighbourhood
  - High demand for more commercial land (industrial / light industrial / business park)
  - Some areas prone to flooding, may need additional modelling.
  - Good transport infrastructure access to site
  - Needs reticulated sewer and drinking water supply.
  - Refer to Council Infrastructure Strategy for Dargaville
  - Stormwater can be managed on-site or centralised through greenfield development



**Figure 6.** Dargaville existing infrastructure assets [Source: Kaipara District Council, 2020]

## Community Amenities

- Dargaville social infrastructure assets: Primary and secondary schools, access to tertiary education, reserves, playground, sports facilities, churches, 20+ businesses, community centre, public transport (limited), wharves.
- Youth engagement feedback for Dargaville
  - Demand for places to go and eat, places to gather and be active including more recreation activities, entertaining activities and public events.
  - Walking and cycling
  - Disconnect between training provided at NorthTec and skills required by large manufacturing firms in Kaipara

## Key moves & Opportunities from Spatial Plan for Awakino Point

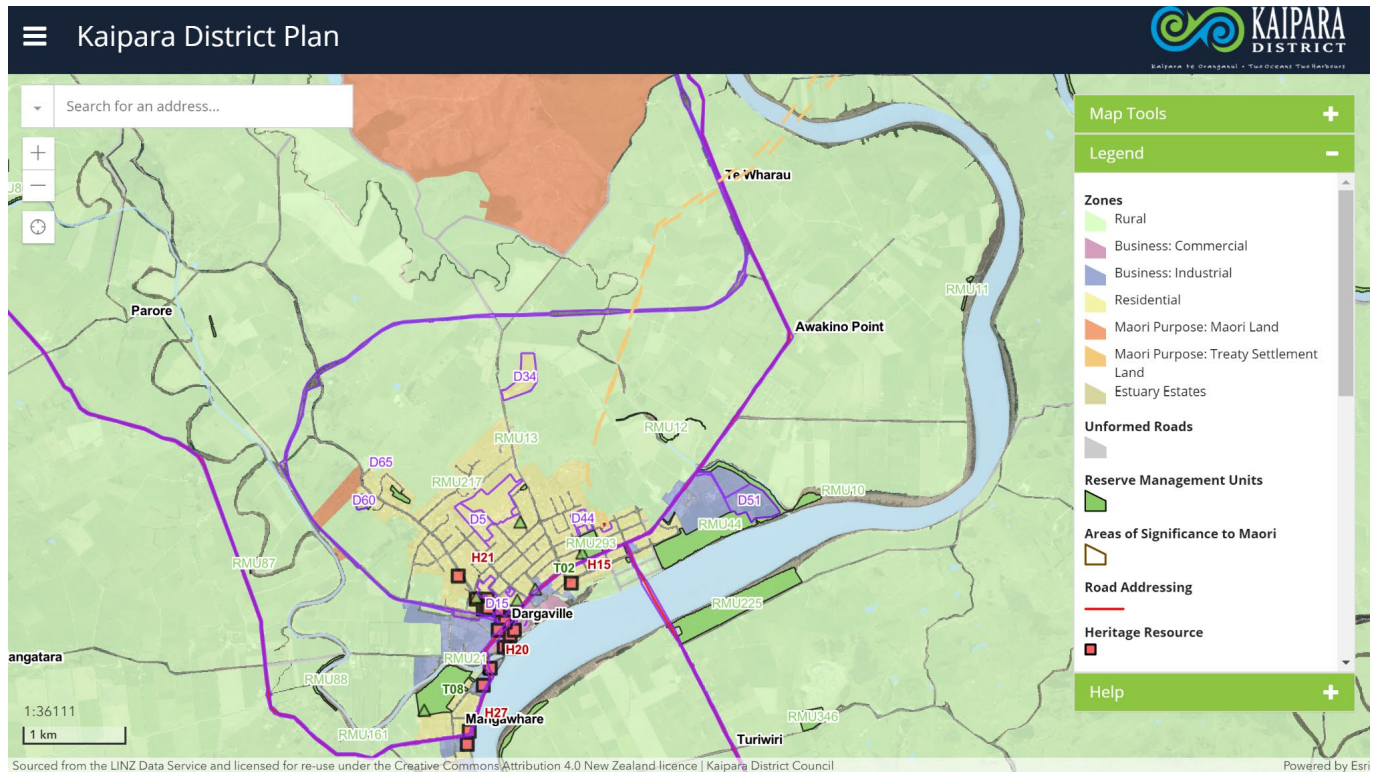
THE SPATIAL PLAN\_Dargaville  
Part 2 | Dargaville\_Key Moves



**Figure 7.** Dargaville Key Moves map from Spatial Plan, 2020 [Source: Kaipara District Council]

- Awakino site zones as future industrial.
- High points around Awakino intersection, as open space reserves
- Opportunity to link up or extend walking and cycling routes proposed for Rail corridor into Racecourse site and with path proposed for Awakino River (forms a loop).
- Ahi kā, opportunities for papakāinga housing
- Recognise and protect sites of significance to mana whenua (viewshafts, land holdings, avoiding reverse sensitivity)
- Intersection of SH14 and Awakino North Road is a 'Gateway' entrance to Dargaville. Opportunity for an artistic gateway e.g. celebrate Awakino River
- New housing on the Periphery - identifies need to investigate housing and care choices for elderly people and those requiring care or assistance, on greenfield areas close to local hospital.
- Industrial area on NE should integrate water sensitive design, and to avoid open space network, productive soils and land.
- Greening the highway proposal - Racecourse development can support boundary 'green' treatment. Vision: tree-lined boulevard.

# REGULATORY PLANNING CONTEXT



**Figure 8. District Plan zoning for Dargaville [Source: Kaipara District Council]**

- In the current Kaipara District Plan the Racing Club site is zoned Rural (Figure 8)
- As per Figure 7, the spatial plan proposes a range of additional zoning controls and new development areas, including light industrial for the Awakino Point area.
- The District Plan will be updated in 2022, to give effect to the Spatial Plan through legal regulatory controls as per the National Planning Standards. This includes a range of residential and industrial zones (more than the current District Plan).
- For the purposes of concept development for this project, the zone definitions from the National Planning standards and the density controls from the Whangārei District Plan have been adopted (Table 1). This offers a relevant set of planning controls that will be similar to the future District Plan. .

**Table 1. Summary of Future zone density**

Whangarei District Plan - Residential Zone	Density per residential unit
Large Lot	5,000m2 average & 2,500m2 minimum
Low Density	2,000m2
General	400m2
Medium	300m2
Mixed Use	100m2

## References

Kaipara District Spatial Plan - Ngā Wawata 2050 - Our aspirations (Dec 2020)  
Kaipara Spatial Plan - Key Urban Centres PART 1 2020  
Kaipara Spatial Plan - Key Urban Centres PART 2 Dargaville 2020  
Kaipara District Council - Infrastructure Strategy 2018-2048  
Kaipara Walking and Cycling Strategy 2017  
Kaipara Long Term Plan 2018-2028  
Kaipara Long Term Plan 2021-2031  
Northland Regional Policy Statement  
Te Rūnganga o Ngāti Whātua 2020-2021 Annual Plan  
Northland Regional Council Local Maps  
Kaipara Environmental Scan 2020  
Geotechnical Assessment, Dargaville, Kaipara District 2019  
DCDB Notes on Kaipara Spatial Plan, November 2019  
Dargaville Township Plan, Northland Townships, NZTA  
National Planning Standards (MfE) 2018  
Kaipara District Plan  
Archaeology Assessment of Dargaville Racing Club property, Horizon Archaeology, 2021  
Geotechnical Assessment of Dargaville RACING Club Property, Land Development and Engineering Ltd, 2021



# Market Demand Analysis: Dargaville Racecourse site

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## Summary Report

**27 July 2021**

Prepared by The Urban Advisory

  
**THE URBAN ADVISORY**  
RETHINKING OUR CITIES

# Market Demand Analysis: Dargaville Racecourse Site

## Summary Report / Brief document

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This document outlines possible market development opportunities for the Dargaville Racecourse site, including residential, commercial, industrial and wider economic development activation for Dargaville. It forms part of the brief for financial feasibility analysis and cost benefit analysis.

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## 1. Project Background

An opportunity to develop the Dargaville Racecourse site has been enabled through a tripartite arrangement with the Dargaville Racing Club, the Dargaville Development Board and Te Rūnanga o Ngāti Whātua. The tripartite group has received Provincial Growth funding to prepare a plan change application to Kaipara District Council for future development of the site.

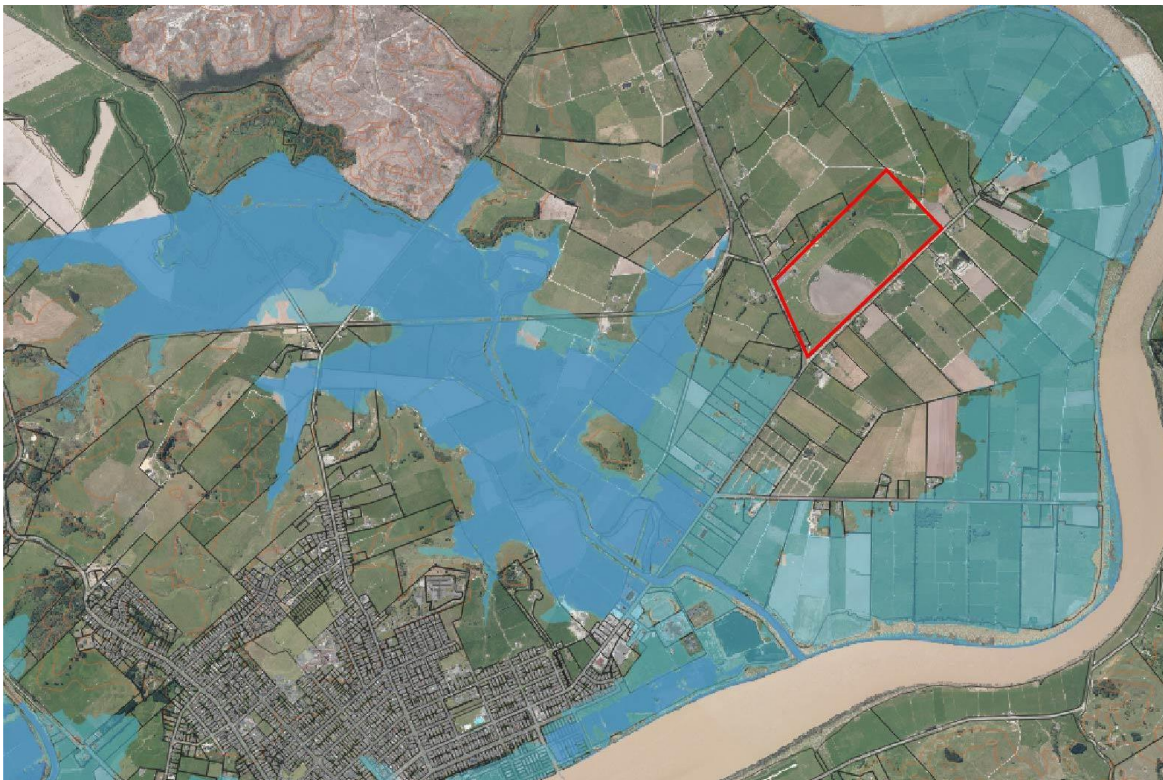
The objectives of this plan change and development proposition are mixed and various:

- To provide land value uplift for profitable resale of the Racecourse site
- To deliver a retirement village
- To respond to current community needs, including providing jobs, training and housing.
- To contribute positively to the growth of Dargaville town and its future
- To provide a profitable income stream or asset(s) for future developer / landowner
- To deliver ongoing benefits to the Dargaville and Northern Wairoa community

This report outlines future possible development opportunities for the Dargaville Racecourse site, including residential, commercial, industrial and wider economic development activation for Dargaville. The purpose of this report is to inform financial feasibility analysis, economic cost benefit analysis, provide market advice to the tripartite group and provide evidence to support the plan change section 32 application. These market insights and recommendations are informed by market conversations and research, statistical analysis, community engagement and an online housing demand survey (90 respondents).

## 2. Site Location and Context

Dargaville is a town in the west of the Kaipara District, in Northland, situated 60km west from Whangārei on State Highway 14 and 175km from Auckland via State Highway 12 and 1. The Dargaville Racecourse is located approximately 4km west from the Dargaville town centre in the Awakino Point area. The Racecourse site (Figure 1) is 47ha in area, with pastoral land cover and largely flat topography with a sloped area rising to the northern corner. The site is currently zoned Rural in the Kaipara District Plan, and the Spatial Plan for Kaipara indicates future Industrial land use for this site and the surrounding Awakino Point area.



**Figure 1.** Dargaville Racecourse local context.

The site is accessed directly from SH14 on the western boundary and Awakino Point North Road, an unsealed local road, to the south. Surrounding land uses are dairy farms and agricultural activities. The site is currently serviced by reticulated potable water supply from the township but there is no public wastewater service connection. On-site stormwater drainage channels convey runoff and overland flow through the site to the ditch drains along Awakino North Road and north-east to the Wairoa River. The site is not subject to flood hazards.

See the Context Analysis summary (TUA, 2021) and technical consultant reports for the plan change for more contextual information about the site.

### 3. Options to Respond to Market Opportunities in Dargaville

There are three orders of opportunity in the market (Figure 2) for the tripartite group to consider against their various project objectives and the objectives of Kaipara District Council. This consideration is necessary to develop a strategic, best-use approach to this development including site programming, timeframes, landowner / developer financial returns and the realisation of wider economic benefits to Dargaville.

- **Quick response to development objectives (0-5 years)**  
A lower risk development approach that seeks to realise development objectives quickly, such as the release of capital (e.g. upzoning of site for resale only), but may not achieve all the tripartite development objectives due to the short timeframe.
- **Development aligned with economic development growth strategy (5-20 years)**  
A development approach that is consistent with the local and regional economic development growth strategy (including local and central government policy and plans), with future growth being enabled by agents with a capacity to deliver and where development capacity leverages off existing infrastructure. Anticipates changes to economic geography, economic density and employment density in Dargaville
- **Future-focused anchor development, an alternative growth strategy (20-50 years+)**  
A higher risk development approach that anticipates change or limitations to current economic development growth strategy. A large commitment to meet the demand for new infrastructure to support an alternative growth trajectory. For example, this may include considerations of climate change impacts and resilience or significant shifts to the local social and economic geography.

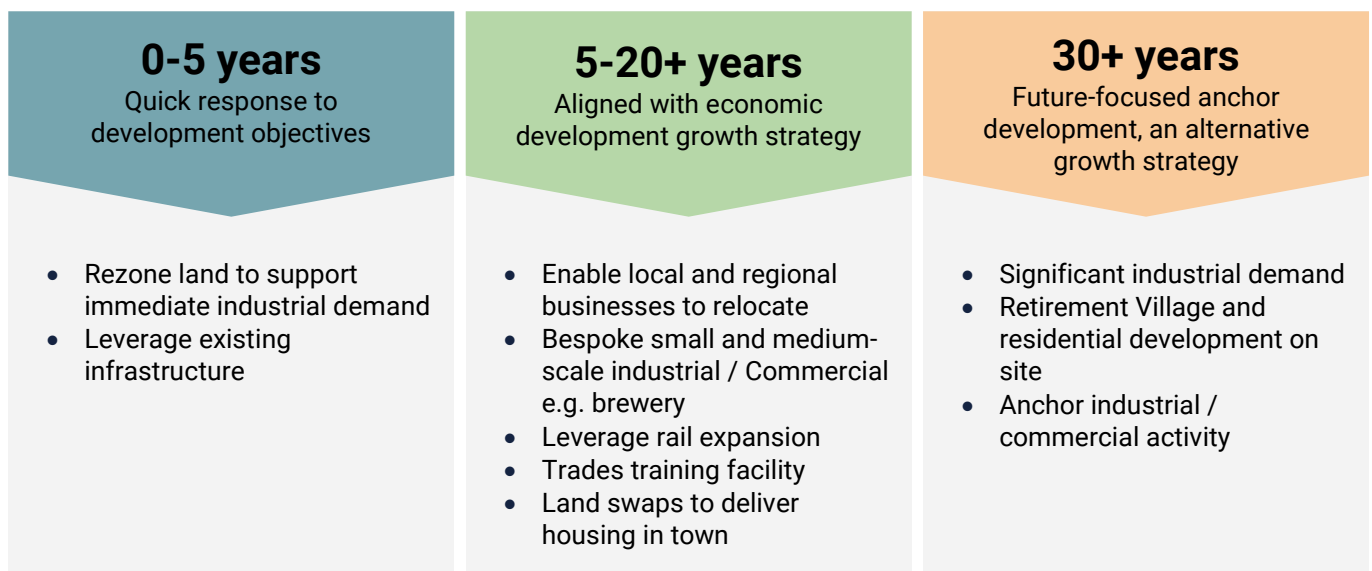


Figure 2. Summary of the options to respond to market opportunities in Dargaville.

## 4. Demand for Commercial & Industrial

### 4.1 Regional context

- Situated on the approaches into Dargaville town from Whangārei on State Highway 14, this site has an attractive gateway location with marquee site appeal for commercial or industrial activities. Development on this site could anchor future growth along the SH14 corridor. Due to the distance from Dargaville town centre, however, this site lends itself particularly to low activation activities such as light industrial or storage facilities.
- The potential future expansion of Northport in Whangārei, and railway links to support this, is expected to enable the reactivation of the existing Dargaville line for freight. This would unlock regional growth opportunities and economic development opportunities in Dargaville and enhance the market proposition for commercial and industrial development on the Racecourse site.
- In the regional context, there is notable pressure on light industrial premises in Auckland with low vacancy rates and low capitalisation rates. As such, new light industrial development in Dargaville is considered low risk. Also, given the current general rate of growth in Northland, we can be reasonably confident that there is demand within the region as a whole.
- There is demand for medium-sized commercial or light industrial property (500-5,000m<sup>2</sup>) in Dargaville, to support businesses across the region that are seeking more affordable leases than Auckland or Whangārei, space for growth, bespoke facilities and perhaps proximity to primary production areas. High quality, purpose-built developments offer the opportunity for higher yield for property owners compared to 'shell' developments or existing leases. These businesses could include breweries, distilleries (e.g. botanicals, vodka) or processing (e.g. Pic's peanuts) and storage units, or larger sites for medium-scale light industrial or manufacturing businesses (e.g. joinery).
- The Kaipara Kai initiative is important to the economic development of Kaipara & Dargaville and the development of this site could promote and nurture the Kaipara Kai vision. Industry insights show that relevant local businesses (producers) are largely looking to develop ancillary facilities (e.g. packing and processing) on their own land, close to production, rather than locations elsewhere off-site. However, there is an opportunity for new large 'anchor' tenants to occupy larger lots (5,000-20,000m<sup>2</sup>+) on the site as owner occupiers (e.g. Ngāti Whātua or tenants attracted from across the region). Research suggests that these purpose-built developments could include horticultural activities with ancillary processing, packing or retail premises, or construction innovation and training activities.
- A mixed-use industrial, commercial and business development model has been cited as a good precedent for this site. Examples of this approach to regional economic development in Northland include Ngāwhā Innovation Park in nearby Kaikohe which has developed an integrated site with innovation, horticulture, business and other value-add primary production activities. There is an opportunity for the Dargaville Racecourse site development to emulate some of what Ngāwhā has created and to complement this Innovation Park in the wider Northland market. By attracting businesses from across the North Island and providing opportunities for innovation, R&D and production, this development could offer localised agglomeration benefits for businesses, advance the innovation offering in the local economy and strengthen industry networks in Northland.

### 4.2 Local context

- Industry insights suggest that there is no demand for large-scale office developments in Dargaville. However, there may be demand for smaller offices co-located with industry or commercial activities because industrial or commercial uses tend to have their offices located on site. Medium and large-scale office development is not considered viable due to low demand and site location, as office workers appreciate proximity to amenities (e.g. town centres).
- In the local context, there is demand for small light industrial premises (60-300m<sup>2</sup>) in Dargaville among existing local businesses seeking to relocate from older premises to newer, fit-for-purpose premises. Consenting challenges are a significant barrier to redeveloping existing premises to meet business needs, including flooding issues in existing industrial areas (see Appendix 3). Local businesses that could relocate

to the Racecourse site could include mechanics, parts shops, plumbers, electricians as well as small scale light manufacturing such as joinery, aluminium joinery manufacture, kitchen manufacture, boat building, and smaller scale prefabricated construction products. Relocation of current businesses to new premises could free up land in Dargaville town centre for other development opportunities.

- Relocation of existing businesses to new premises on the racecourse site could free-up industrial land in town for redevelopment and renewal for other activities. This could provide a basis for a land swap arrangement to support the delivery of housing in locations close to amenities and existing infrastructure. A strategic approach to the market development of this site, considering the wider Dargaville context, could help achieve a broader range of objectives for stakeholders.
- While there may be local demand for heavy industrial properties, these create potential reverse sensitivities (noise, emissions etc) with existing and future residential neighbours within and around this site. This supports the conclusion that this site is not the appropriate location to meet this demand.
- Demand for some amenities and support services for future residents of the proposed development was identified through engagement. This may include a health services hub (e.g. relocation of Te Hā Oranga, which is at capacity at current premises), or small-scale neighbourhood retail (e.g. a dairy, hairdresser). These services would be complementary to future residential. However, the general provision of community services on this site is a risk, due to two factors:
  - the walkable distance from town and lack of pedestrian infrastructure along the main road.
  - the potential to undermine other businesses and services located more centrally in Dargaville.

Conversely, the reform of the District Health Board system may support the development of health hubs.

- It has been noted that there is the ambition or expectation that the Racecourse site should or could be used to grow crops. This was also reflected in engagement sessions. However, technical insight from Kaipara Kai staff and regional soil maps have confirmed that the in-situ soil on the Racecourse site is not suitable for in-ground crop growing. Any on-site crops would need to be grown in raised planters, separate growing material, or hydroponically. Despite this, there is a demand for horticultural activities such as a nursery or glasshouse activities.
- Engagement sessions and demand analysis identified the ambition for more tertiary education opportunities in Dargaville, particularly in trades and horticulture. Tertiary education, apprenticeships and on-site trades training could be provided, in conjunction with the above recommended commercial and industrial uses. In particular, the demand for housing in Dargaville, and the wider Northland region (as shown in the residential market demand analysis below), means there is demand for more industrial sites for construction activity and local construction-training. An on-site house-construction facility could directly contribute to local housing supply, while also providing education and skills training. Also, Dargaville has a comparatively high unemployment rate, so development like this could present the opportunity to grow the workforce and provide new jobs in Kaipara.
- Local market demand for education and trades training is also supported by the government funding boost for trades training, with a focus on upskilling local people. To secure this funding for a programme in Dargaville, an arrangement with Northtec or another existing provider would be preferred.
- There is ongoing demand for storage unit premises in Dargaville, with existing facilities at capacity, with limited vacancies and lease turnover.

## 5. Demand for Residential

### 5.1 Regional context

- Residential development on the Racecourse site presents some risk given the context and economic development growth strategy for Dargaville outlined in the Spatial Plan. Residential development on this site would be most appropriate as part of a future-focused anchor development (third order opportunity).

- There is a growing older population in Northland and Dargaville and there are currently very limited housing options for elderly in Dargaville and the Kaipara District. There is currently no 'lifestyle' option for retirees, however there are rest homes (approximately 40 beds across two facilities), that offer hospital level care and a secure dementia unit. In the general housing market there is currently a shortage of suitable market housing stock or rentals for elderly to move into (e.g. accessible units, smaller homes), so they remain in housing that is unsuitable for them (eg. too big, too expensive). New housing supply that meets housing demand of elderly residents would free up stock for other people in the market (eg. first home buyers, families, workers) to move into.
- Analysis has shown that there is a severe housing shortage in Dargaville. Factors contributing to this shortage include the influx of migrants from Auckland (and further afield) which is increasing housing pressure locally. Historically Dargaville has been a comparatively more affordable housing option within Kaipara, providing alternative choices to other more expensive locations. However, house and rent prices have increased significantly over the past 10 years, and it is no longer considered an affordable housing market for locals. As such there is significant demand for both rental housing and market home ownership.

## 5.2 Local context

- From community engagement, there was a clear aspiration for a retirement village in Dargaville. Some older people have aspirations for a 'resort-style' retirement village with many amenities, however the scale of development required to support a wider range of quality amenities is not viable given the estimated demand for retirement living choices in Kaipara and Dargaville. About 60-100 retirement living units across a precinct around 5 hectares is considered viable in Dargaville, to meet local and regional demand for retirement living.
- The availability of a large site like the Racecourse is a significant and rare market opportunity for development in Dargaville, especially with the support of the PGF. For example, previous opportunities to develop a retirement village in Dargaville on a site near the hospital were not progressed by the Development Board due to a lack of funds for securing the land. The advantage of site availability and support funding makes it unsurprising that a proposal for retirement living is under consideration for the Racecourse site. However, retirement development on the Racecourse site is not without risk. It could be a stranded asset for many years, until the town expansion reaches Awakino, and significant investment is required to provide infrastructure and amenities to support residential development.
- A more viable option to realise the aspirations for a retirement village in Dargaville is to set up a land swap arrangement so that retirement development could leverage off existing infrastructure and access to amenities in a more central location. Stakeholders maintain that the hospital-adjacent site is preferred by possible residents, but this would only be viable if adequate funds were available to secure a development agreement.
- Due to limited choice in the current housing market, engagement with residents and agents highlighted that new development should ideally provide a range of housing options including different tenures and types or sizes of homes. Lifestyle preferences range from rural living to standalone homes and units. Apartments were unsurprisingly not preferred. Beyond traditional freehold purchase, housing models people are most interested in seeing locally include rent-to-buy, build-to-rent, shared equity, and cohousing.
- Local first home buyers continue to struggle in the market. However, for out-of-towners, Kaipara is considered a comparably affordable and accessible market that offers the family-friendly 'kiwi dream' of a rural or suburban lifestyle.
- Many local households in rental housing have been 'priced-out' of home ownership in recent years. There is a great shortage of available rental properties and thus there is demand for new rental properties; including public rental administered by Kāinga Ora or Community Housing Providers for lower income households.
- Due to the severity of the housing shortage in Dargaville, there is also urgent demand for transitional and/or emergency accommodation.

- Beyond housing, amenities should consider health and education facilities because there is a lack of these in Dargaville and the need for them will continue to grow, alongside demographic changes (outlined in more detail in the commercial/ industry section above).

## Appendix 1: Commercial/Industrial Feasibility Metrics

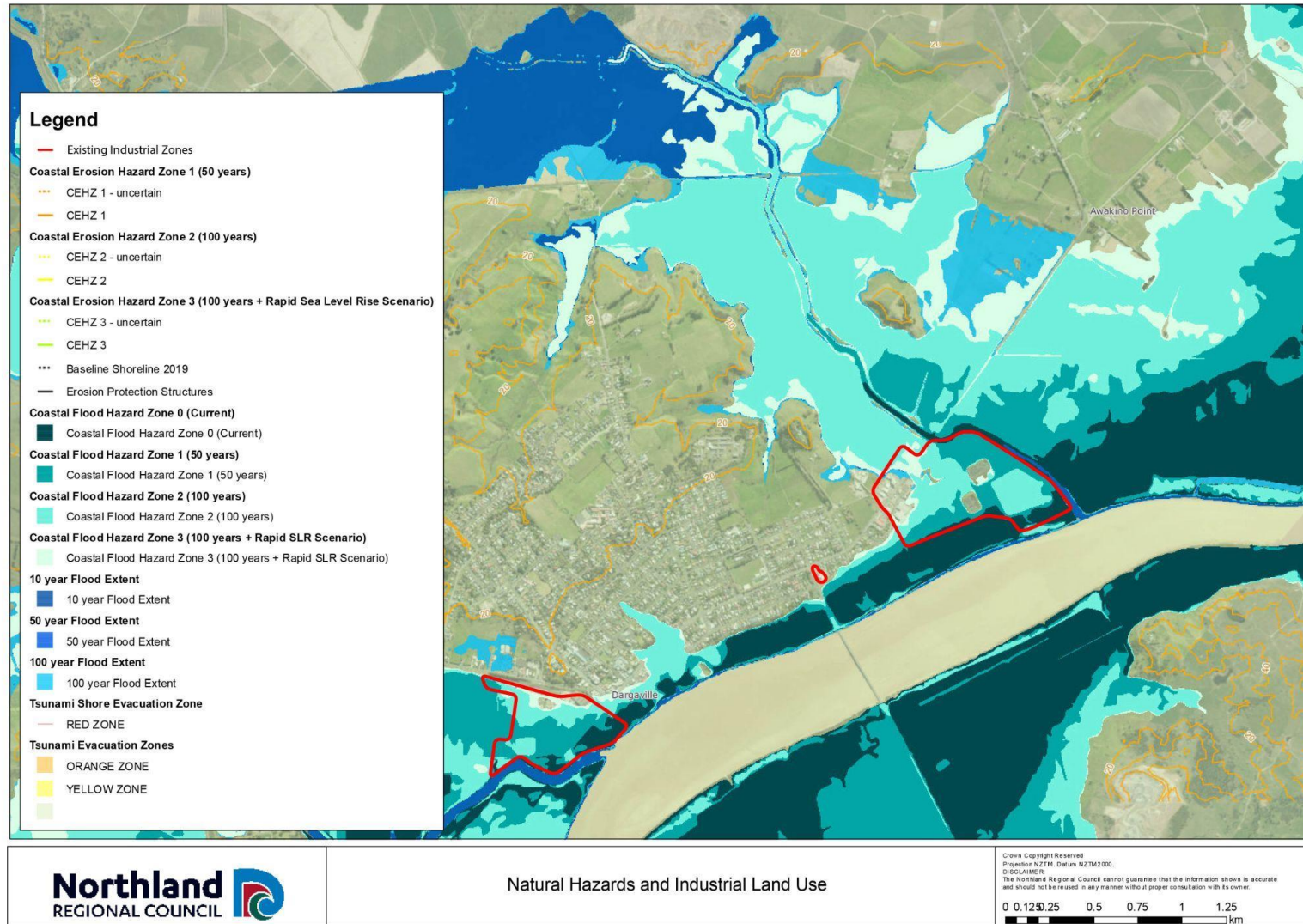
Proposed use/ programme	Site Area (m <sup>2</sup> )	GFA (m <sup>2</sup> )	Lease rate \$	Sales rate \$	Potential yield (number of units)	Possible Land Use Zoning
<b>Small Mixed light industrial:</b> <i>Parts shop</i> <i>Storage units</i> <i>Mechanic / Plumber / Electrician etc</i> <i>Corner shop</i>	60-300m <sup>2</sup> (100% developed area)	A range of units from 60- 300	\$350-\$600 per week  Storage units at \$200 per month		<b>10-30 units</b> of 60-300sqm GFA and site area (local businesses) - small Lot	<b>Light Industrial Zone</b> <b>Commercial Zone</b>
<b>Medium mixed light industrial / business and commercial:</b> <i>Light manufacturing e.g. Joinery factory, aluminium joinery manufacture, kitchen manufacture, boat building, smaller scale prefabrication activities</i>  <i>Brewery / Distillery etc (including botanicals)</i> <i>Health Hub / Services (e.g. Te Hā Oranga)</i>	500-5,000 m <sup>2</sup> (60-100% building coverage)				<b>10 units</b> of 500-3000sqm GFA (regional businesses to relocate) - medium Lot	<b>Commercial Zone</b>
<b>Business / community hub</b> (including conference facilities) <i>Flexible &amp; multi-use, can be adapted to whatever is needed, opportunity for start-up hosting/ hot-desking, employment/ small-business support/ networking.</i>	Site: 8,300 (including carparks, outdoor seating)	Office etc: 1,400	\$200 - \$250/ m <sup>2</sup> <b>annual</b> (to get adequate return on cost) \$5,000 per week?			

<p><b>Horticulture / nursery / greenhouses/ botanicals</b> (like Ngāwhā). Difficult to grow in current soil, so look at raised planting or hydroponics</p>	<p>Site Area (incl open nursery): 90,000-293,000 (Ngāwhā)</p>	<p>Raised beds/ greenhouse : 90,000 (Ngawha)</p> <p>Plant: 1,500</p> <p>Packing: 3,500</p>	<p>Dependent on anchor tenant? Owned and operated by Ngāti Whātua?</p> <p><b>TBD</b></p> <p><i>As an indication, Ngāwhā is advertising rentals and land between 60-80% less than Auckland prices</i></p>		<p><b>1 anchor lot</b></p>	<p><b>Commercial Zone</b></p>
<p><b>Construction Innovation and Training</b> <i>Building houses available for social and community housing</i> <i>Manufacturing innovative building products / pre-fabrication etc</i></p> <p><i>Trades training (apprenticeships, partnership with NorthTec)</i></p>	<p>Site: 9,000-14,000+</p>	<p>Production: 1,500-3,400</p> <p>Office: 280</p> <p>Yard: 2,100</p> <p>Future expansion: 2,000</p>	<p>Dependent on anchor tenant? Owned and operated by Ngāti Whātua?</p> <p><b>TBD</b></p> <p><i>As an indication, Ngāwhā is advertising rentals and land between 60-80% less than Auckland prices</i></p>		<p><b>1 anchor lot</b></p>	

## Appendix 2: Residential Feasibility Metrics

Proposed use/ programme	Lot Area (m <sup>2</sup> )	GFA (m <sup>2</sup> )	Lease rate \$	Sales rate \$	Potential yield (number of units)
<b>Residential - Medium Density</b>	300				
Terraced homes/ townhouse - 3bed		100-120	\$400-\$500 per week		
<b>Residential - General</b>	500				
Standalone - 3bed		120	\$500-\$600 per week Recommended to sell, not rent	\$650,000 - \$700,000	
<b>Residential - Low Density</b>	1000				
Standalone - 3bed		150	\$400-\$500 per week Recommended to sell, not rent	\$750,000+	
Standalone - 4bed		180	Recommended to sell, not rent	<b>TBD</b>	
<b>Retirement [To be adjusted in line with outcomes from retirement-specific report, currently underway]</b>	150-180				
Retirement - 1 and 2 bedroom		70-130	\$300 per week \$565 per month as licence to occupy		

### Appendix 3: Existing Industrial Land and Flood Overlay





20 April 2021

Dargaville Racing Club  
c/o Sophie Herzog-Bell  
Griffiths and Associates Limited  
PO Box 454  
Whangarei  
(via email)

Tena koe

As requested, I have carried out a desk-based review and field inspection of the Dargaville Racing Club (DRC) property at Awakino Point, Dargaville. The purpose of this work was to determine if any archaeological site(s) will be impacted by the plan change and subsequent developments on the property. Advice about cultural values of the site should be sought from mana whenua.

All archaeological sites, whether recorded or not, are subject to the provisions of the Heritage New Zealand Pouhere Taonga Act 2014. An archaeological authority must be obtained from Heritage New Zealand before any work occurs that may affect archaeological site(s).

## DESKTOP RESEARCH

Desktop review of the property involved consultation with the NZAA site recording scheme, historic aerial imagery, historic survey plans and other documentary evidence.

There are no recorded archaeological sites on the DRC property and very few in the surrounding area. Historic survey plans (e.g., Fig. 1) suggest the area around the racecourse was wet and covered in manuka and fern scrub or Kahikatea forest until at least 1912. The DRC (then the Northern Wairoa Racing Club) conducted race meets in several locations near Dargaville before settling on the current course, possibly in 1914<sup>1</sup>. Buildings on the site have been significantly remodeled over the years and have no clear heritage value.

The low-lying nature of the ground on which the race course is located may account for the absence of Māori archaeological sites. Where present, sites of this kind appear to be on raised ground (e.g., P07/34) such as is present in the northwest of the DRC property. On this basis this area was a focus of the field inspection.

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<sup>1</sup>Mary Mountier, 'Horse and Greyhound racing – Racing clubs', Te Ara – the Encyclopedia of New Zealand.

## ARCHAEOLOGICAL FIELD INSPECTION

I carried out an archaeological field inspection on Tuesday 6 April 2021. It is clear that the racecourse has been heavily modified, therefore the field inspection focused on areas outside of the track, particularly the high ground in the northeast of the property, where it was deemed that sites were most likely to occur.

No archaeological features were visible on the surface of the property, including the northeastern high-ground. To test the presence of subterranean features/deposits a shovel test-pitting exercise was carried out across the property (Fig. 2). All test pits found natural soil profiles with no evidence of archaeological deposits.

On the basis of the results of the archaeological field inspection and desktop research, I consider it unlikely that archaeological features will be found during earthworks on the property. However, the presence of subterranean archaeological features or deposits (e.g., midden) cannot be ruled out entirely.

## ADVICE & RECOMMENDATIONS

1. There is no evidence of archaeological sites on the Dargaville Racing Club property.
2. On the basis of the field survey and desk-based research, it is considered that the risk of damage to intact archaeological deposits during any earthworks on the property is low and does not warrant the need for a prior archaeological authority from Heritage New Zealand.
3. An Archaeological Site Discovery Protocol should be used during all ground disturbances. All staff and contractors should be made aware of the requirements of the protocol, prior to the commencement of any ground disturbance, to ensure that appropriate action is taken in the unlikely event that buried archaeological deposits are encountered.
4. Any archaeological features that may be encountered are subject to the provisions of the Heritage New Zealand Pouhere Taonga Act 2014. If archaeological material is encountered during ground disturbance, all work in the area of the find must cease and further archaeological advice should be obtained.

Please do not hesitate to contact me if you have questions about the advice.

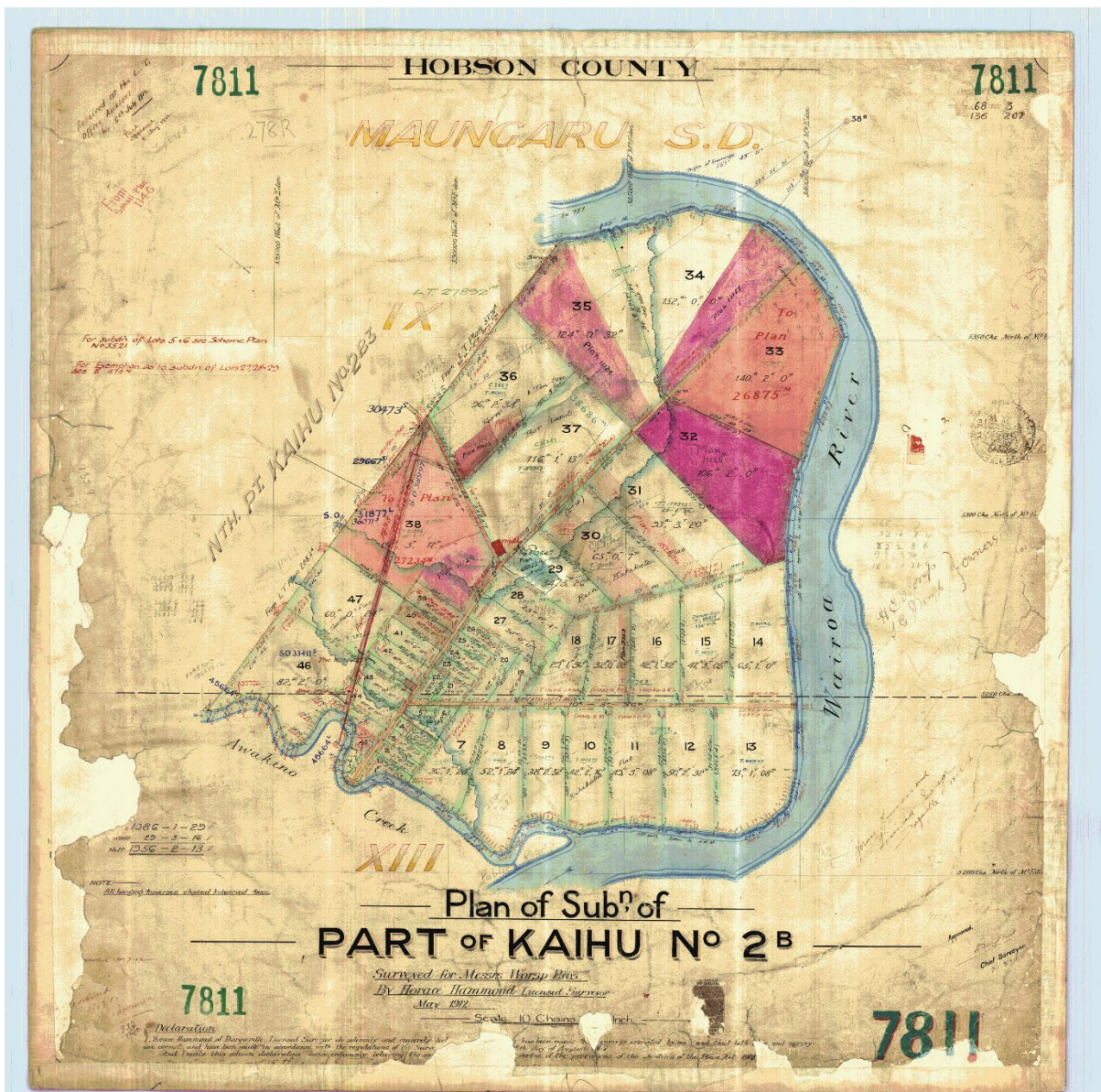
Naku noa na



Dr Andrew Brown

Director | Horizon Archaeology Ltd





Land Information New Zealand, Custom Software Limited, Date Scanned 2002, Last modified February 2002, Plan is probably current as at 02/03/2020

Figure 1 – Historic survey plan of Awakino Point (DP 7811 - 1912) showing the presence of manuka, fern and kahikatea forests in the area prior to clearance and drainage for farming.



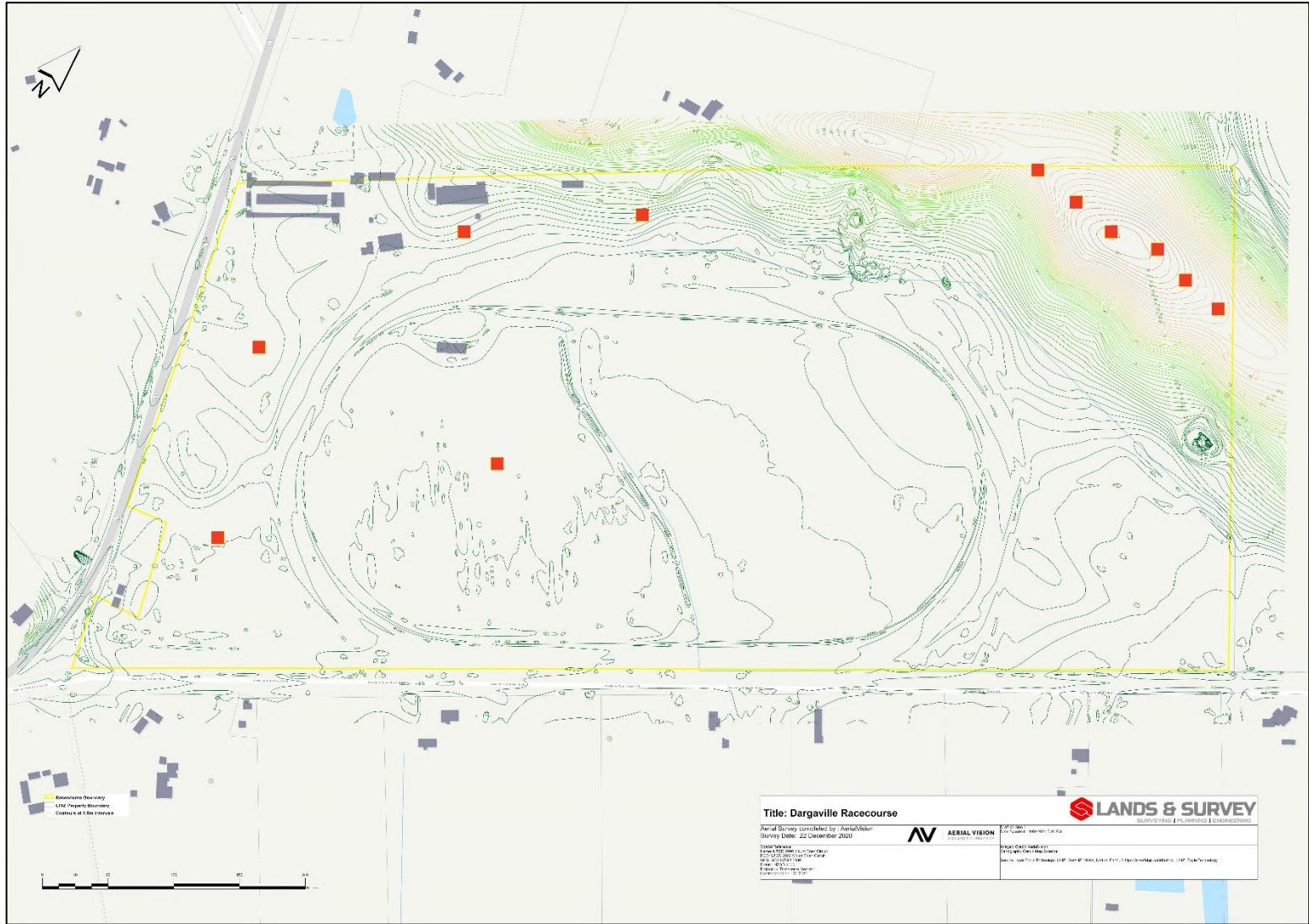


Figure 2 – Location of test pits (red squares) within the DRC property. Map supplied by Griffiths and Associates.

# Civil Engineering Assessment

Dargaville Racecourse Plan  
Change

[landsandsurvey.co.nz](http://landsandsurvey.co.nz)




### DOCUMENT CONTROL RECORD

**CLIENT:** Dargaville Racing Club Incorporated C/- Griffiths & Associates  
**PROJECT:** Dargaville Racecourse Plan Change  
**PROJECT NO:** 10484  
**DOCUMENT TYPE** Civil Engineering Services Assessment

### ISSUE AND REVISION RECORD

Revision N <sup>o</sup>	Prepared By	Description	Date
0	HdW	Draft – Issued for Information	20/07/2021
1	HdW	Draft – Update to feedback from specialists	13/08/2021
2	HdW	Issued for Review and Comment	10/09/2021

Action	Name	Signed	Date
<b>Prepared by</b>	Henk de Wet, BTech Eng (Civil), CMEngNZ, PrTech(Eng) Technical Director, Engineering		13/09/2021
<b>Approved by</b>	Jarred Martin BSc (Nat Science) Managing Director		13/09/2021
<b>on behalf of</b>	<b>Lands and Survey (Whangarei) Ltd</b>		

This report is for the use by our Client and should not be used or relied upon by any other person or entity or for any other project. This report has been prepared for the particular project described to us and its extent is limited to the scope of work agreed between the Client and Lands and Survey (Whangarei) Limited. No responsibility is accepted by Lands and Survey (Whangarei) Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.

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## 1.0. Overview

### 1.1. Executive Summary

The information included in the summary below provides the reporting outcomes of this report and should be read in conjunction with the relevant sections as referenced herein.

Feature	Summary
Natural Hazards	According to the NRC hazard layers, the site is not located in an area susceptible to flooding. Assessment of Geotechnical hazards is not included in this assessment.
Wastewater Disposal	Combined gravity / low pressure system required to collect and convey wastewater to single pump station and low pressure rising main to convey wastewater from proposed development to Council network/wastewater treatment plant. Discharge points a) Pump Station 14, b) Wastewater Treatment Plant.
Stormwater Management	Runoff generated from proposed development to be collected and conveyed through sealed pipe network and discharge to proposed attenuation and detention devices (ponds). Controlled release of treated stormwater to the receiving environment to ensure no adverse effect on downstream infrastructure, property, or environment. Design, construction, and maintenance of proposed stormwater system to comply with relevant engineering standards and be designed to satisfy the provisions relating to <i>Te Mana o te Wai</i> and the objectives and policies for freshwater management in accordance with the National Policy Statement for Freshwater 2020.
Potable Water Supply	Council water supply is present in the direct vicinity of the proposed development. Network capacity to meet the demand of the proposed development was assessed and confirmed. Although, water treatment plant capacity assessment is inconclusive, it has been suggested that the plant has capacity to supply the proposed development, albeit that seasonal shortage of raw water to the treatment plant may be one of the major constraints to meet the demand of the development and expected growth for Dargaville. Alternative water supply or supplementary supply by way of rainwater harvesting and ground water supply should be considered. Testing and analysis of groundwater quality can be further investigated.
Sediment and Erosion Control	Appropriate erosion and sediment control practices to be implement in accordance with Guideline Document 2016/005 Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05). Proposed stormwater attenuation structures are recommended to be incorporated into the temporary works and service as settlement ponds during the development stage.
Other Utilities (Electricity and Telecommunications)	Network capacity for electrical supply is available, however detailed response from Nortpower is outstanding.  No fibre is available; however, the site is currently within area of benefit for VDSL and Wireless connectivity.

## 1.2. Introduction

This engineering assessment report has been prepared by Lands and Survey Engineering LTD for Dargaville Racing Club Incorporated (the client) in accordance with instructions received via the client's consultant (Griffiths & Associates) responsible for investigating the feasibility and preparing an application for a private plan change. The purpose of this report is to provide commentary and recommendations on the civil engineering aspects of the proposed development envisaged for which the plan change is sought.

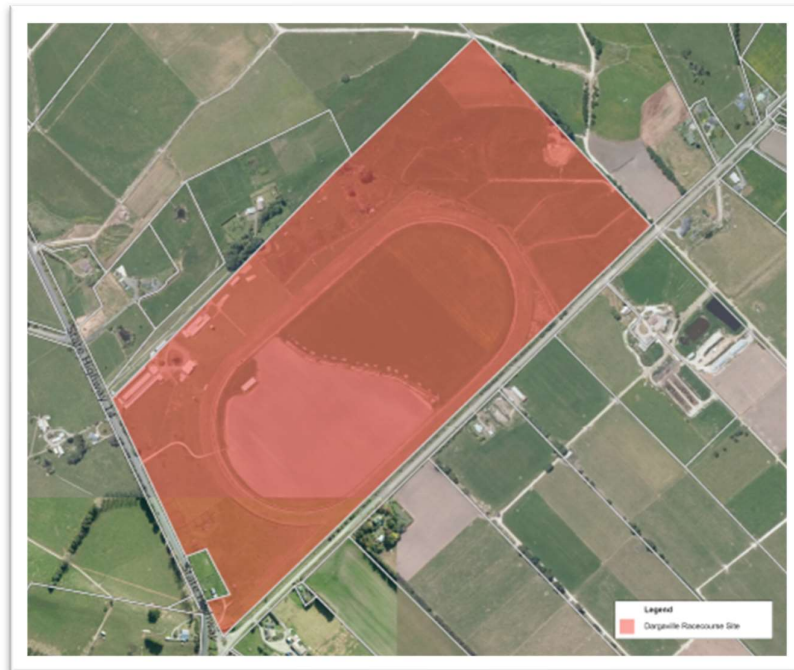
An assessment of the following engineering aspects is included in this report:

- Wastewater disposal,
- Stormwater management,
- Potable water supply,
- Sediment and erosion control, and
- Telecommunications and power.

## 1.3. Site Description

The site is located on the corner of State Highway 14 and Awakino Point North Road, Dargaville. The legal description of the site is Part Lot 37 DP 7811. The site has an area of 46.6729ha, located approximately 3.5km north-east from Dargaville Town Centre, on the eastern side of State Highway 14.

The site is a decommissioned horseracing facility that was owned and operated by the Dargaville Racing Club. The site has several access crossings from State Highway and Awakino Point North Road with the main access from the State Highway. Buildings on site consists of a range of stables, outbuildings and the main viewing pavilion.



*Figure 1: Site Locality (Source: <https://map.grip.co.nz/map>)*

Several site visits were conducted between June and August 2021 to gain an understanding of the site and investigate aspects that may affect this assessment. The site is generally assessed as being relatively flat, with an overall flat slope in an eastern direction, with elevated sections towards the northern corner of the site.



Figure 2: Depicting Contours and General Direction of Site Slope (Source: NRC Online Maps)

The site currently only has access to Council water infrastructure. There is no stormwater or wastewater infrastructure in proximity of the site.

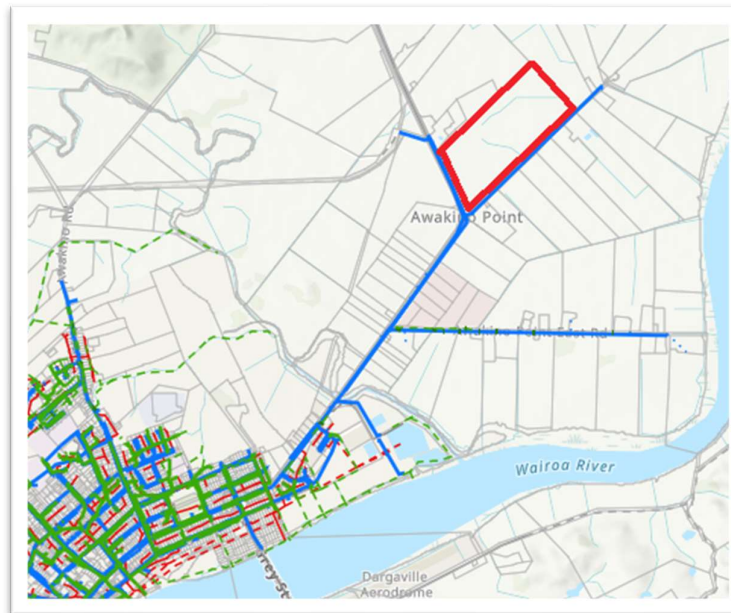


Figure 3: Overview of Council 3 Water Assets (Source: KDC Utility Services Maps)

#### 1.4. Supplied Information

The following information has been supplied by the client's agent:

- High level brief via email dated 7 April 2021 with subject title "*Civils & Three Waters Assessment for Dargaville Racecourse Plan Change*".
- Draft Concept Development Plan, received via email dated 8 June 2021 with subject title "*Dargaville Racecourse Plan Change - approach going forward ...*".
- Geotechnical Assessment prepared by Land Development & Engineering Ltd (LDE), dated 7 May 2021, received via email dated 19 July 2021 with subject title "*Geotech report for Dville Racecourse site*",
- Draft Outline Development Plan, received via email dated 9 August 2021 with subject title "*Dargaville Racecourse - Outline Development Plan*".

#### 1.5. Development Proposal

The development proposal, obtained from the client's agent, is to undertake large subdivision of the site with a total area of 46.6729 ha into several allotments with a mix of land uses. It is envisaged that further subdivision and staged development will follow the initial large first stage of subdivision.

The draft concept development plan envisaged the following land use and activities:

- Light Industrial/Commercial – 72,000m<sup>2</sup> consisting of 115 allotments of average size of 500m<sup>2</sup>,
- Medium Density Residential - 75,000m<sup>2</sup> consisting of 200 allotments of average size of 300m<sup>2</sup>,
- General Residential - 120,000m<sup>2</sup> consisting of 213 allotments of average size of 450m<sup>2</sup>,
- Low Density Residential - 28,000m<sup>2</sup> consisting of 22 allotments of average size of 1,000m<sup>2</sup>,
- Passive reserve – 90,000m<sup>2</sup>
- Public open space / buffer areas – 81,729.00m<sup>2</sup>
- Possible small-scale commercial – Areas subject to confirmation and included in above.

The draft outline development plan envisaged the following land use and activities:

Land Use	Area sum (m <sup>2</sup> )	Number of lots
<b>Commercial / Light Industry</b>	<b>155,268.00</b>	25
Small	6,867.00	13
Medium	39,215.00	9
Anchor site	109,186.00	3
<b>Residential</b>	<b>158,127.20</b>	124
Low Density Residential	17,574.00	13
Medium Density Residential	13,710.00	32
General Residential	44,070.00	69
Large Lot Residential	29,803.20	7
Retirement / Marae	52,970.00	1
Neighbourhood Commercial	<b>4,774.00</b>	2
<b>Open Space</b>	<b>93,015.00</b>	7
<b>Road reserve</b>	<b>77,897.00</b>	n/a
<b>TOTAL</b>	<b>489,081.20</b>	

The concept and outline development plans are a work in progress and subject to changes, informed by input from various consultants and stakeholders, undertaking assessments and consultations which include, but is not limited to Acoustics, Engineering (Traffic and Transport, Geotechnical, Civil), Local Iwi, Landscape and Visual, Market Research and Demand Analysis, and Urban Planning.

A copy of the draft outline development plan prepared by *The Urban Advisory* is included in **Appendix A**.

## 2.0. Description of Environment

### 2.1. Geology and Geotechnical Considerations

The geological map of the area produced by the Institute of Geological and Nuclear Sciences shows the property as underlain by Late Quaternary alluvium and colluvium soils, which is described as unconsolidated, to poorly consolidated mud, sand, gravel, and peat. These geotechnical characteristics pose several development challenges, to the extent, and in extreme cases, that certain areas may not be suitable for development due to ongoing consolidation, differential settlement and liquefaction risk.



Figure 4: Site Location (Source: New Zealand Geology Web Map (GNS))

A geotechnical investigation report was sought from Land Development and Engineering (LDE) to provide the client with the following information:

- “Large scale cross-sections through the property showing the subsurface geology which will help identify areas which will require a higher level of investigation,
- Geomorphological map of the site
- Liquefaction analysis
- One dimensional static settlement analysis
- Consideration for lateral spread along the stream/drainage margins”

An investigation report, prepared by LDE dated 7 May 2021 with reference 19457 was reviewed. The key points summarised in the report includes:

1. “Specific consideration will be required for the points summarised within this document when developing the scheme plan.” and

2. *“Consolidation and settlement analysis should be conducted in more detail and be site specific for the different stages of the scheme plan, with remediation methods considered to overcome potential consolidation settlement.”*

The design and construction of 3 waters infrastructure, other infrastructure, and buildings would have to consider the restrictions and recommendations included in the LDE report. The selection of products, materials and construction methodologies should align with these recommendations to mitigate risks associated with differential settlement and should exhibit resilience characteristics in environments with ongoing consolidation.

It is strongly recommended that the findings, recommendations, restrictions, and limitations contained in the geotechnical report from LDE is considered, when the outline development plan revisions and subdivision development staging is being contemplated.

## 2.2. Natural Hazards

The Northland Regional Council (NRC) natural hazard layers have been reviewed to identify potential hazards to be considered in this assessment. According to the NRC hazard layers, the site is not located in an area susceptible to:

- **Flood Risk**  
River flood hazards and coastal flood hazards, for up to and including the 100-year reoccurrence interval (including in a rapid sea level rise scenario).
- **Flood Susceptible Land**  
Gley Soils are suggested along the south-eastern boundary of the subdivision, marginally within proposed footprint area for development, However, the site footprint areas for development generally fall outside this area.  
  
*<sup>1</sup>Gley Soils are strongly affected by waterlogging and have been chemically reduced. They have light grey subsoils, usually with reddish brown or brown mottles. The grey colours usually extend to more than 100 cm depth. Waterlogging occurs in winter and spring, and some soils remain wet all year.*
- **Tsunami Risk**  
The NRC hazard layers suggest that the site is in an area marked as a safe zone in respect to Tsunami Evacuation Areas.

<sup>1</sup> *Gley Soils – Soils Portal: Characterising Soils » New Zealand Soil Classification (NZSC) » Soil orders » Gley Soils [G] - <https://soils.landcareresearch.co.nz/describing-soils/nzsc/soil-order/gley-soils>*



Figure 5: Natural Hazards (Source: NRC Natural Hazard Map)

### 3.0. Planning Assessment

This engineering assessment is undertaken to establish the total engineering infrastructure requirements to support such proposed development, however it is equally important to compare such requirements to the objective and outcomes included in district and regional policies. This will enable our client and local authorities to establish a baseline from where the additional impact of the development can be determined.

#### 3.1. Kaipara District Plan

The Operative Kaipara District Plan depicts the site within the rural zone.

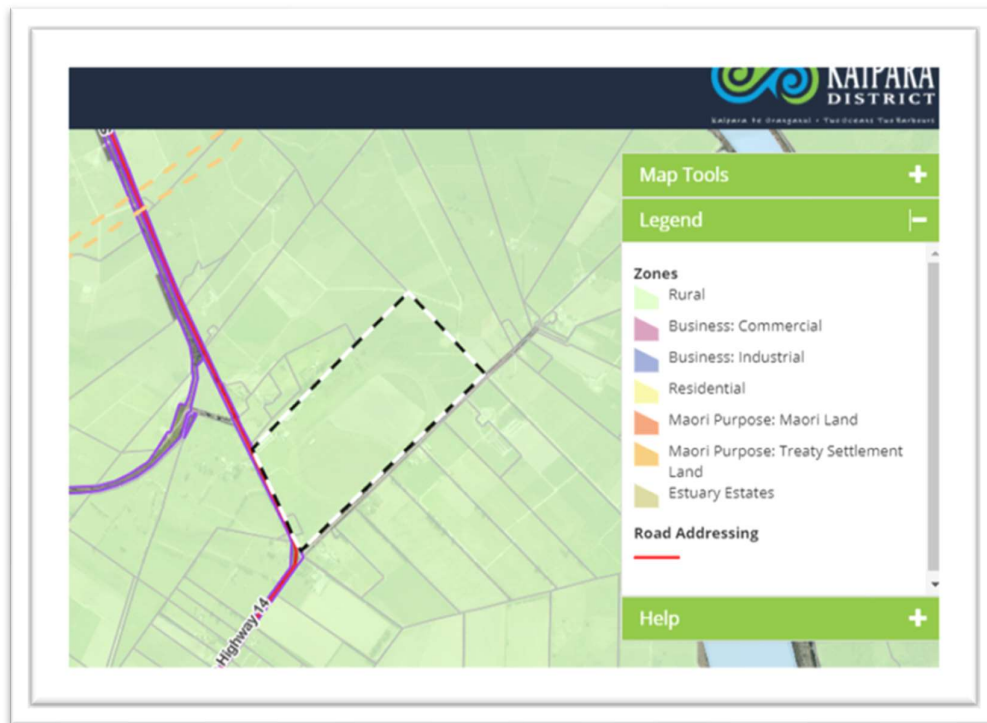


Figure 6: Current KDC Zoning (Source: KDC District Plan Map)

The Indicative Growth Area for Dargaville does not include the subject site as being a growth area in the Operative District Plan. Therefore, it is not envisaged that infrastructure development and planned capital works programmes would have included the subject site as an area of benefit.



Figure 7: Mapped Growth Areas for Dargaville (Source: KDC District Plan Appendix A)

### 3.2. Kaipara Long Term Plan

The current Kaipara District Long Term Plan was adopted in June 2021, therefore considered to be current and relevant to matters associated with the proposed development of the subject site.

<sup>2</sup> *The Long-Term Plan (LTP) sets Council's strategic direction and work programme for the 10 years ahead. It outlines the services Council will provide, the projects that will be undertaken, the cost of doing this work, how it will be paid for and how Council will measure performance.*

Items identified in the long-term plan relevant to this assessment:

- Council have identified a project to upgrade the Dargaville Wastewater Treatment Plant to Increase Capacity (2024/2031).
- Council have listed the security of water supply for Dargaville as a challenging risk and issue and have identified several projects for the feasibility study, consents for water take and business cases for water storage.

<sup>2</sup> KDC Long Term Plan 2021 - 2031 – Web page cover statement on Long Term Plan:  
<https://www.kaipara.govt.nz/ltp>

### 3.3. Proposed Kaipara District Spatial Plan

The Kaipara District Spatial Plan for Dargaville have identified the subject site to be within new Industrial Zone, with 184ha area in Awakino Point to be developed, creating approximately 420 to 1472 new allotments, based on minimum lot sizes ranging between 1000-3500m<sup>2</sup>.

The key observation in respect to infrastructure, is that Council envisaged that development is projected to start beyond the 10 years scope of the Long-Term Plan.

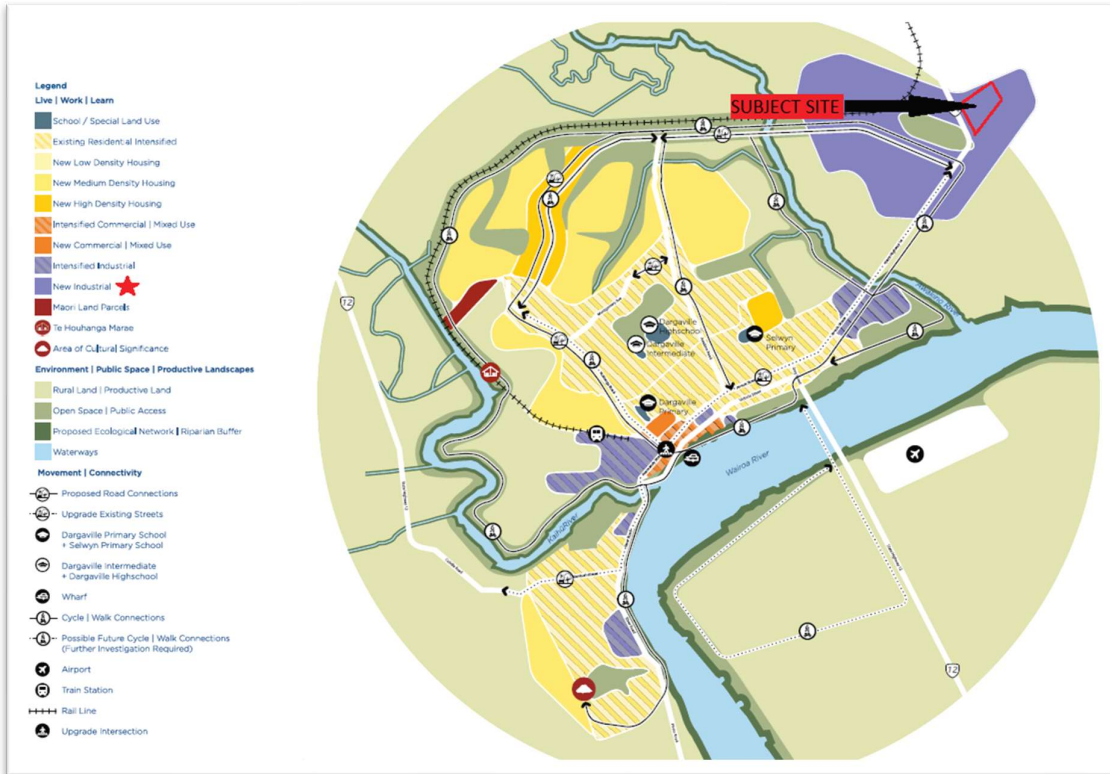


Figure 8: Spatial Plan for Dargaville depicting the subject site within new Industrial Zone (Source: KDC Spatial Plan)

## 4.0. Engineering Assessment

### 4.1. Wastewater Disposal

#### 4.1.1. Existing Public Network

The KDC Asset Maps depict no wastewater network in proximity of the site. Therefore, wastewater collection and disposal will be through a combination of gravity and low-pressure systems, with storage and conveyance capacity to counter events that may impact the capacity of the public networks and treatment plant.

Although the site is relatively flat, it will be possible to construct an internal gravity system that will collect, convey, and store wastewater, from where it can be pumped towards the point of disposal, currently envisaged to be the Dargaville Wastewater Treatment Plant.

An internal low-pressure network can also be considered as a feasible option, however, does involve a rigid operation and maintenance regime. The benefit of low-pressure systems is that it provides better discharge and flow control and reduces the risk of inflow and infiltration.

The Dargaville wastewater treatment plan is approximately 3km from the site. The site has a mean elevation of 35MSL whereas the treatment plant is at 58MSL. This would require all wastewater to be conveyed via a pressure pipeline. More information on the existing network and wastewater treatment plant was sought from Council and its Maintenance Contractor (Ventia).

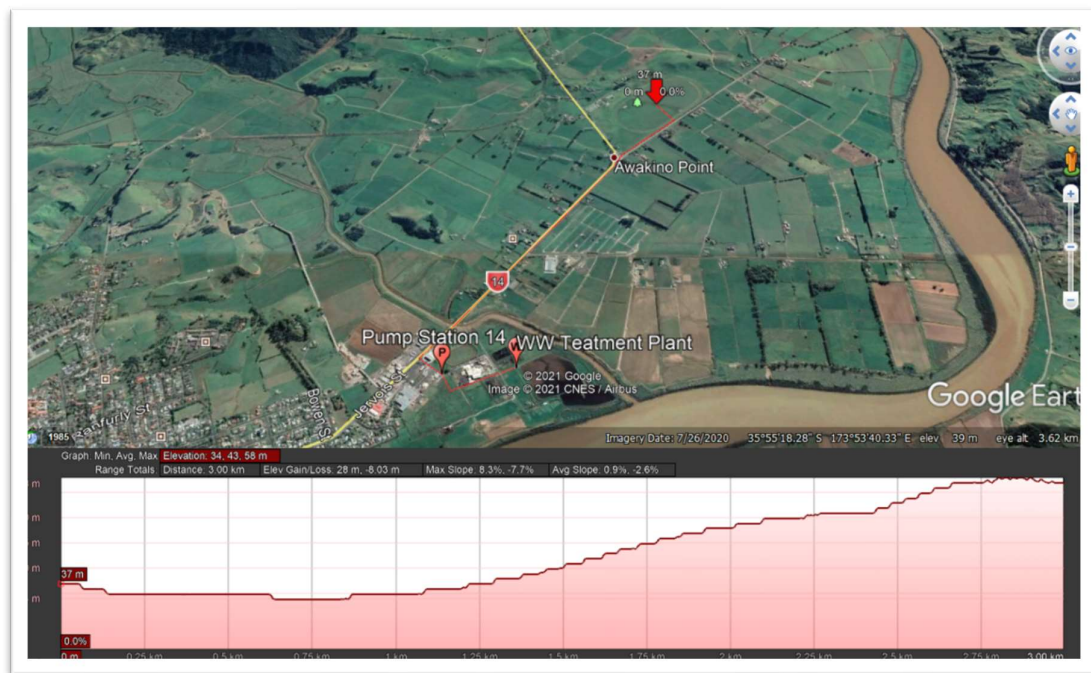


Figure 9: Overland Profile from Site to Dargaville WW Treatment Plant (Source: Google Earth)

The profile suggests that an internal gravity system would be possible, however wastewater from the development will have to be conveyed via pump scheme to discharge to the existing Dargaville Wastewater Treatment Plant.

A connection to Council's "Pump Station 14" may also be possible, subject to capacity, saving the construction of approximately 420m of the 3km rising main.

#### 4.1.2. Wastewater Generation

With the proposed land use, the following wastewater runoff is estimated at a point when the site is fully developed.

	Population	Expected flow (l/d)
Light Industrial	460	181,440.00
Medium Density Residential	800	168,000.00
General Residential	852	178,920.00
Low Density Residential	88	18,480.00

Discharge from the site is recommended to be via 150mm dia PVC-U rising main, estimated to be approximately 3km long. Pump station with a wet well with storage provision to Council's requirements for wet weather flow conditions would be required.

The duty point to convey estimated flow from the site to the pump station is estimated at 6.33l/s @ 28.75m dynamic head, for a 6-hour daily pump cycle. Any proposed low-pressure sewer systems and scheme conveyance pump station will be subject to specific design in accordance with section 7 of Council's Engineering Standards.

#### 4.1.3. Rising Main Construction

The construction of a rising main from the site to the wastewater treatment plant would require the proposed pipeline to be constructed in the public road reserve where available, and across private property where insufficient reserve space is not available. A crossing over Awakino River on State Highway 14 (entering Dargaville) would also be required.

The bridge across the river currently hosts several services such as water, electrical cables, and comms.

Specific approval for the crossing would be required from NZTA. It is recommended that this requirement be addressed together with access connections between Dargaville and the development.

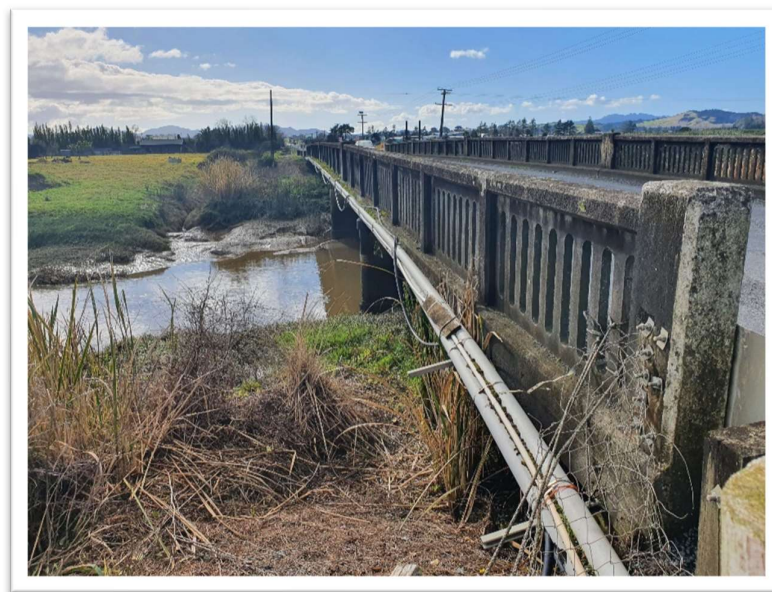


Figure 10: SH14 Bridge 545 Across Awakino River

## 4.2. Stormwater Management

### 4.2.1. Overview

The site has a mixture of grassed with isolated thicker vegetated areas. Stormwater drains have been formed diagonally across the site, appearing to be on the alignment of the natural overland flow paths depicted on Council maps. There is no clear connection and discharge points for these drains, however it may not be evident due to a lack of maintenance. It is assumed that the drains discharge to the table drains along Awakino Point North Road.

A review of the geology of the site and characteristics of the area, it is discovered that the permeability rate of the underlain soils is considered very low and negligible. The site appears to be generally waterlogged.

### 4.2.2. Current stormwater runoff discharge from the site

- Runoff flows overland towards the south-eastern boundary where runoff is intercepted by the overland flow paths,
- Channelled flow is directed and discharged towards the roadside table drain along the northern side of Awakino Point North Road.
- No culverts have been identified across Awakino road.
- Council's Utility Services Maps suggests that all overland flow generated by the site is conveyed towards the north-eastern end of Awakino Point North Road, from where it is directed south-eastwards towards the discharge point into the Wairoa River.



Figure 11: Overland Flow Paths (Source: KDC Utility Services Maps)

### 4.2.3. Kaipara District Council Engineering Standards

Section 6.1.1 – Minimum Requirements in the KDC Engineering Standards provide that “*on-site stormwater detention shall be provided to attenuate post development peak stormwater flows to no more than pre-development peak flows for storm events of up to 100 year ARI (1%AEP).*”

Guidance Notes under section 6.1.1 includes the following:

“2. Where stormwater attenuation is required, stormwater detention ponds or basins should be provided to serve the entire site catchment. A proliferation of small stormwater ponds or individual detention tanks will not generally be accepted because they are not as reliable or efficient as larger detention ponds or basins.

3. *Water quality treatment options should be considered where appropriate, particularly in conjunction with stormwater attenuation.*"

It is recommended to undertake a catchment wide management approach at resource consent stage, however for the purpose of concept development, a high-level analysis is undertaken to provide outcomes, sufficient to inform a more detailed concept development design, which includes stormwater detention locations, size and type.

#### 4.2.4. Stormwater Management Approach

A numerical model was developed with the aid of a spreadsheet powered storage calculator, to estimate the runoff from the site pre- and post-development, determine the system volume, peak runoff and stormwater volume required.

The predevelopment state is taken as the site at current status quo where stormwater is conveyed through the site overland and through natural overland flow paths, discharged to the roadside table drain.

The post development state is allowing for the added impermeable surfaces (45%) associated with the development as suggested by the draft concept development plan.

The management approach is to maintain the pre-developed status quo post development, by attenuating runoff from the developed site, to ensure that peak discharge post development is equal or less to that estimated for the predeveloped state.

A second, more detailed deterministic model was built for the pre- and post-developed site to verify the numerical model and provide more detailed results. The modelling approach is to route the flow from the entire site through two detention devices, to throttle the post development flows to a value equal or less than the pre-developed state, whilst checking the flow depths of the downstream table drains.

#### 4.2.5. Runoff Calculations

HIRDS V4 Depth-Duration-Frequency Results was utilised for the rainfall data. The rainfall was applied for respective storms from 10minutes to 24 hours for the 1% AEP event, utilising the Rational Calculation Method, analysing for the critical storm duration.

Rainfall depth selected (for 1%AEP event, Longitude: 173.901 Latitude: -35.912)

Pre-development - Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h
100	0.01	21	29.2	35.3	48.5	65.8	104	135	171	212

Post Development - RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h
100	0.01	22.6	31.5	38.1	52.3	70.9	111	143	180	221

A copy of the HIRDS V4 Depth-Duration-Frequency Results is included in **Appendix B**.

The catchment boundaries are limited to the boundaries of the site under this assessment. A more detailed analysis would be required to size and design infrastructure to cater for the conveyance of flow of runoff through the site from areas that may fall outside the boundaries of the site, but part of the contributing catchment.

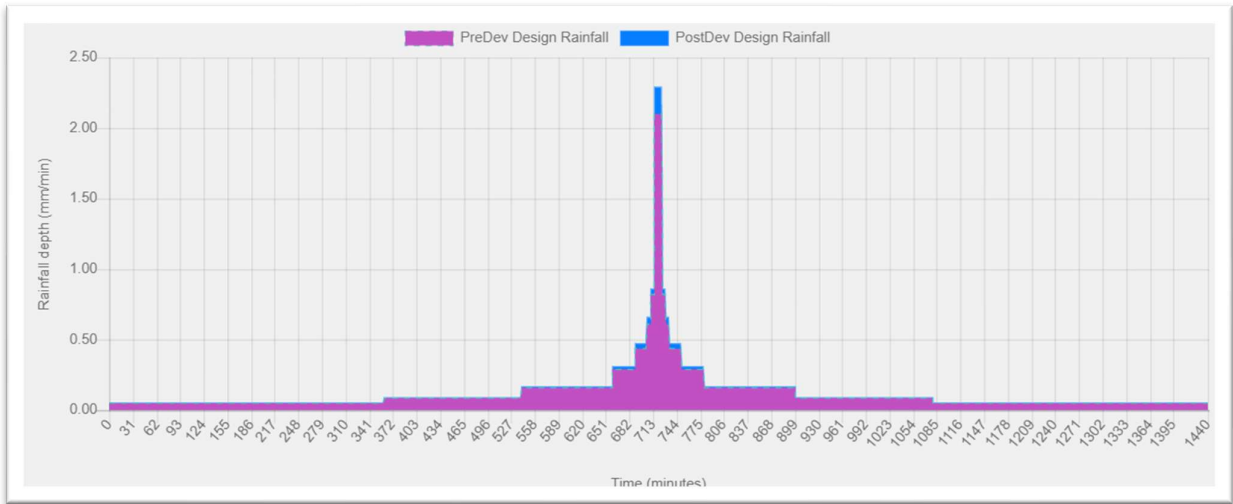


Figure 12: Pre and Post Development Rainfall Applied

**Numerical Model**

Effective area for the site, for the purpose of runoff calculations and this assessment = total site area (46.7ha), The catchment has been taken as a uniform surface, at an average slope of 2.5%, with the longest water course path of 583m, measured from the highest point of the site to the lowest point.

Calculating the time of concentration, combined flow types are considered, where 80% of flow is considered as overland flow, and 20% defined watercourse, where runoff is channelled in swales and pipes. A network time of 15 minutes have been used in the initial calculations.

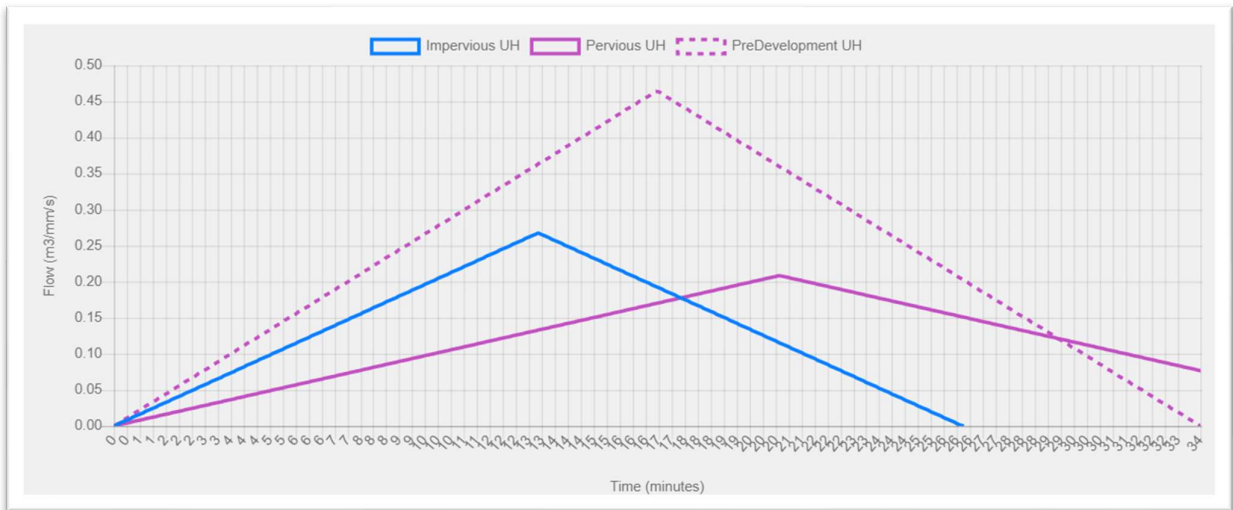


Figure 13: Unit Hydrographs for Pre and Post Development State

**Deterministic Model**

The catchment for the model can be described as:

- Light Industrial 72,000 m<sup>2</sup>
- Medium Density Residential 75,000 m<sup>2</sup>
- General Residential 120,000 m<sup>2</sup>
- Low Density Residential 28,000 m<sup>2</sup>
- Reserve 9,000 m<sup>2</sup>
- Buffer 8,1729 m<sup>2</sup>
- Total Area 466,729 m<sup>2</sup>**

While there is been a range of continuous changes in the concept and outline development plans for the site, which has not been finalised, the calculations do not take into account the details but rather based on a high-density development to ensure a 'worst case scenario' for impermeable surfaces.

Thus, the model is based on KDC Operative plan for 550 lots as follows:

- Light Industrial – 115 with 100% impervious surfaces
- Medium Density Residential – 200 lots with 68% impervious surfaces
- General Residential – 213 lots with 47% impervious surfaces
- Low Density Residential – 22 lots with 53% impervious surfaces

Note that the impervious surfaces are calculated at 100% impervious surface area for infrastructure.

Pre-Development calculations suggests that the stormwater flows across the site and enters the drain along Awakino Road.

Post-Development modelling results suggests that there is a reduction in peak runoff velocity and flow rate from 2.63 m/s to 2.54 m/s and 3.5784 m<sup>3</sup>/s to 3.1336 m<sup>3</sup>/s respectively.

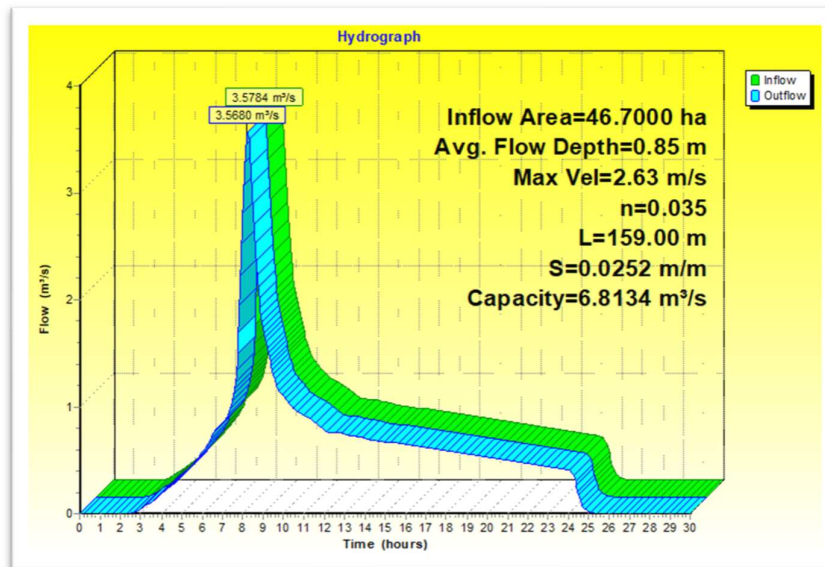


Figure 14: Hydrograph of Pre-development stormwater calculations

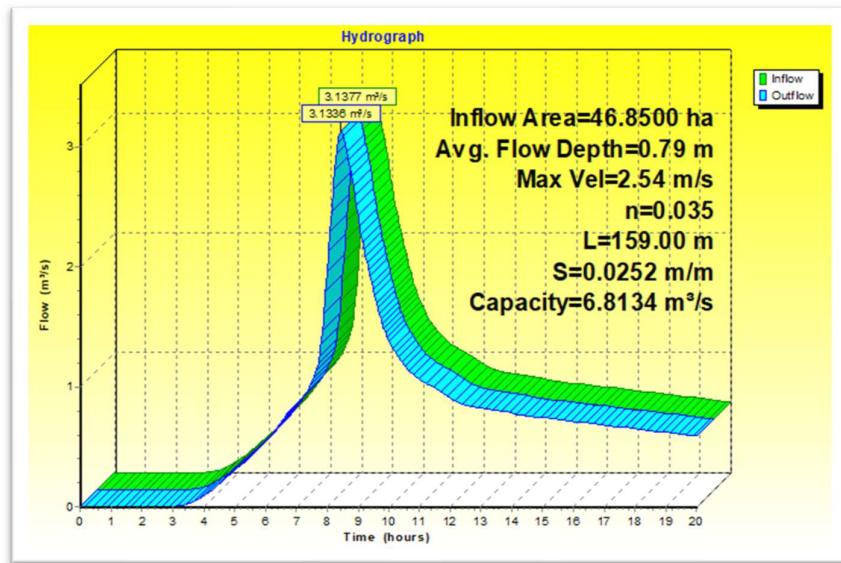


Figure 15: Hydrograph of Post-development calculations

The downstream roadside table drain (downstream receiving) was included in the model to check that conveyance capacity is maintained.

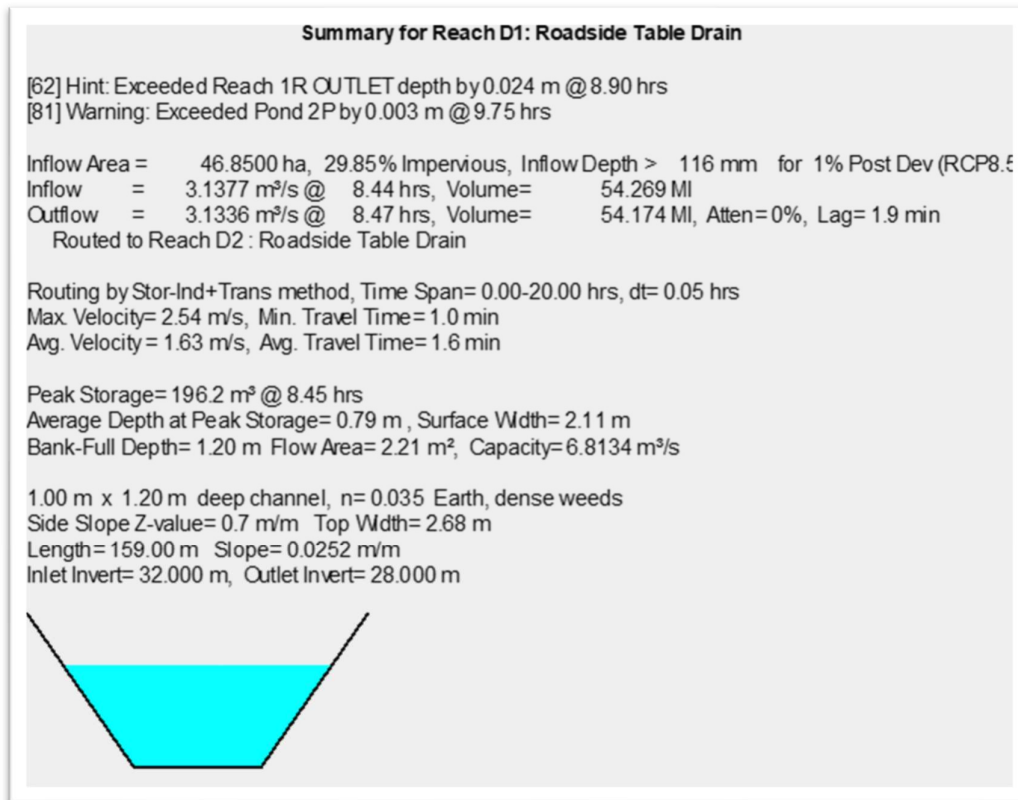


Figure 16: Details of Table Drain from Model

A copy of the detailed stormwater model report is included in **Appendix C**.



Figure 17: Picture depicting roadside table drain downstream of site

#### 4.2.6. Stormwater Detention

The deterministic model results suggest that a total of 2809.3m<sup>3</sup> and 2,585.1m<sup>3</sup> storage is required for the respective sub catchments to ensure the post development discharge from the development is limited to the current pre-developed discharge.

The storage volume quoted above is based on storage device (pond) with a storage depth of approximately 1m deep. Storage devices are detailed as trapezoidal structures with side slopes of 1:3, where a total reserve area to be set aside for stormwater detention be a minimum of 6,000.00, with adequate buffer areas for riparian planting and landscaping.

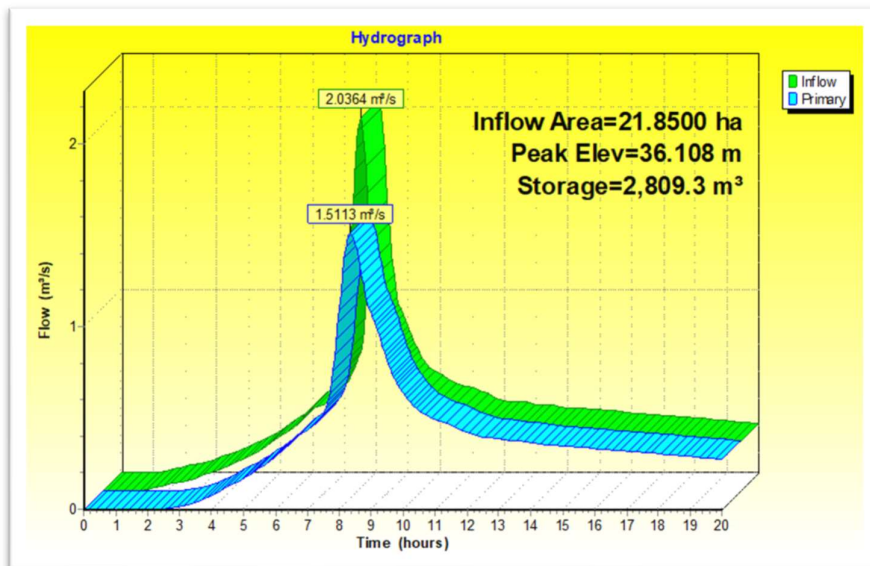


Figure 18: Detention Pond 1 Hydrograph

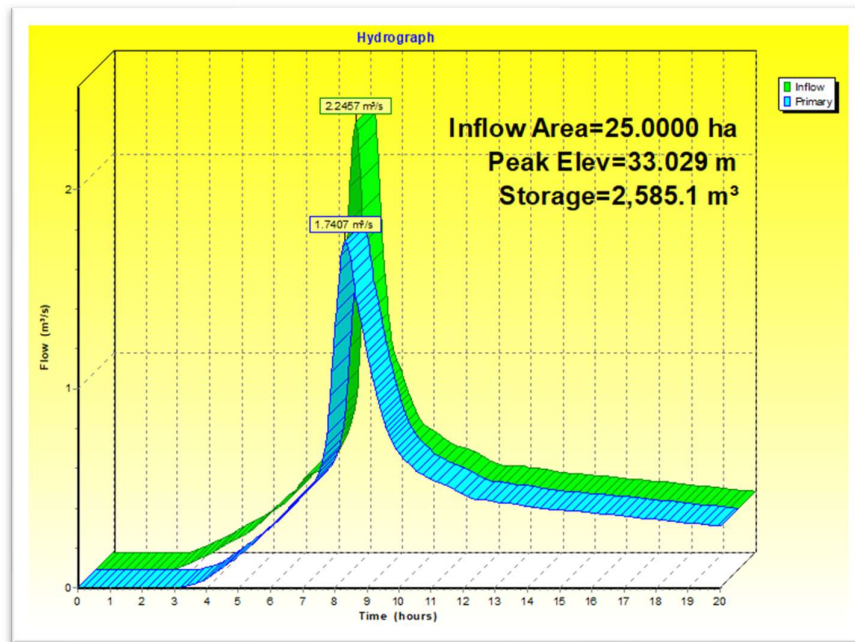


Figure 19: Detention Pond 2 Hydrograph

### 4.3. Potable Water Supply

The Council water network is immediately available. Feedback from Council confirmed that the network and treatment plant have current capacity to serve the proposed development, however several future challenges are anticipated, with a consistent and reliable supply of raw water to the treatment plant being one of the major challenges.

#### 4.3.1. Network Capacity

To understand the council's network capacity to serve ongoing development and future growth, AWA Environmental have developed a network model of the Dargaville water network on behalf of Kaipara District Council. Lands and Survey Engineering engaged AWA to undertake a high-level analysis to identify the nodes and links likely to be point of constraints to meet the demand of the proposed development.

Although it was established that the existing network will have capacity to meet the additional demand created by the proposed development, it is recommended that a more detailed analysis is required, which includes a staged approach together with population growth for Dargaville, to inform the design of a staged development and integrate and align development with Council's capital works programme.

A copy of the network model assessment is included in **Appendix D**.

#### 4.3.2. Water Treatment Plant Capacity

Investigation and feedback from Council's O&M contractor suggested that Dargaville water treatment plant have adequate capacity to meet demand for development and growth, subject to consistent and reliable raw water supply. This assessment finding is subject to further investigation and confirmation from Council at resource consent stage.

### 4.3.3. Raw Water Supply

Investigation and feedback from Council, and its contractors suggest that the supply of raw water continues to be an issue, especially during summer. Council have experienced significant shortages in raw water supply, resulting in restrictions in capacity to produce potable water for Dargaville. Several projects have been identified towards providing relief to the water shortages during dry seasons, however status and progress on these projects are unknown.



Figure 20: Map extract depicting 100mm and 180mm diameter water mains along the western and southern boundaries of the site (Source: KDC Utility Services Maps)

### 4.3.4. Alternative Water Supply

- It is recommended that development includes conservative approaches to the management of **rainwater runoff and harvesting**. Effective rainwater harvesting can reduce the system demand substantially.
- **Groundwater by way of community bore** is another potable water source that can be explored. Bores and extraction of groundwater will be subject to resource consent from Northland Regional Council (NRC). An enquire to NRC was submitted to query the current groundwater model. Initial feedback from NRC suggested that there is an unrestricted supply on site however, drainage through the site to be considered. Water levels and quality is unknown at this stage.

### 4.3.5. Water Demand

Water demand for the proposed development will gradually increase as the development progress through the stages. No information on staging and, priority areas or timelines are available at this stage, therefore water demand calculations and the network analysis is based on the development, connected to the network at its current status.

Water demand for the proposed land uses is indicated below:

	Water Requirements								Firefighting Requirements		
	Area (ha)	Lot size (m <sup>2</sup> )	Total Lots	Average daily flow (l/p/d)	Peak Flow Factor	Occupancy Rate	Population	Average Daily Flow (m <sup>3</sup> /d)	Peak Daily Flow (m <sup>3</sup> /d)	Supply Requirements (l/s)	Supply Requirements (m <sup>3</sup> /h)
<i>Light Industrial</i>	7.2	500	115	135	1.5	4	460	62.1	93.15	50	180
<i>Medium Density Residential</i>	7.5	300	200	250	1.5	2.5	500	125	187.5	25	90
<i>General Residential</i>	12	500	213	250	1.5	2.5	533	133.125	199.6875	25	90
<i>Low Density Residential</i>	2.8	1000	22	250	1.5	2.5	55	13.75	20.625	25	90
<b>Totals</b>							<b>1548</b>	<b>334</b>	<b>501</b>		

With the daily demand being only 334kl, it may serve the development to consider various forms of on-site storage or a communal elevated command reservoir, supplemented by on site rainwater harvesting and groundwater supply for specific use.

#### 4.3.6. Connection Size and Location

It is envisaged that a connection will be available on the 180mm diameter pipeline along State Highway 14, however in terms of table 6.2 of NZS 4404:2020 (Empirical guide for principal main sizing) suggests that for single direction feeds the following connection would be required:

	Total Lots	Nominal Diameter of Main (mm)
<i>Light Industrial</i>	115	300
<i>Medium Density Residential</i>	200	200
<i>General Residential</i>	213	200
<i>Low Density Residential</i>	22	100

This suggests that the Council supply may suffice for consumption supply, however, may be restricted under peak demands or to meet firefighting flows at adequate pressure. Detailed design and analysis will be required at development stage to ensure adequate provision of water for firefighting purposes.

## **4.4. Erosion and Sediment Control**

### **4.4.1. Purpose**

The purpose of sediment and erosion control plans are to describe and detail the methods and practices recommended to minimise the effects of sediment generation and yield on the receiving environments associated earthworks and other activities during and after development.

### **4.4.2. General Principles**

1. Erosion and sediment control measures will be undertaken and implemented with a hierarchy and priority order as follows:
  - Avoidance of effects will be the priority. Any discharge locations will be carefully selected, and any stream works will only be undertaken where they are a necessary component of the Project construction.
  - Erosion control will be a priority in all circumstances by preventing sediment generation through a range of structural (physical measures) and non-structural (methodologies and construction sequencing) means.
  - Sediment Retention Ponds (SRPs) will be utilized where appropriate and if required. Priority of controls will then be decanting earth bunds, super silt fences and silt fences. Various innovative products may also be used and could include measures such as filter socks.
2. Erosion and sediment control measures will be implemented in accordance with this ESCP and are based upon appropriate solutions for the site to achieve an outcome, complying with the resource consent conditions as a minimum.
3. No specific discharge water quality standards are proposed; however, the discharge from the Project is designed to avoid conspicuous change in the colour or visual clarity of the discharge (after reasonable mixing) in the receiving environment.
4. All erosion and sediment control devices should be located outside the 5% AEP flood level unless no other viable alternative exists. During construction activity and where it is considered to be the only option and devices are required within this flood level, then the placement of such a device will be undertaken with consideration of minimizing catchment areas and ensuring more regular maintenance activities.

### **4.4.3. Erosion And Sediment Control Methodology**

1. All sediment and erosion control measures recommend to be implemented prior to commencement of any earthworks.
2. Exposed areas should be limited during construction where possible to reduce the potential for generating erosion and wash from site.
3. Clean water diversion channels or benching should be constructed above the works area to divert any runoff from entering the site where bare soils are exposed. Outlets must discharge water down slope in a controlled manner.
4. Silt fences to be utilised to prevent silt transportation during construction phases. Silt fences are recommended to be placed along the downstream edge of runoff diversion bunds and areas where overland flow is expected that have the potential to transport sediment during rainfall events.
5. Excavated material must be stockpiled away from sensitive areas and on vegetated areas that act as runoff buffers.
6. Runoff from the works area to be diverted by earth bunds to low points as indicated on indicative layouts attached.

7. Bunds can be constructed using any topsoil found onsite. The bund construction on steeper slopes (>2%) must be stabilised. Method of stabilisation can be proposed at construction stage; however, it is recommended that such proposals are to be assessed and endorsed by an engineering professional.

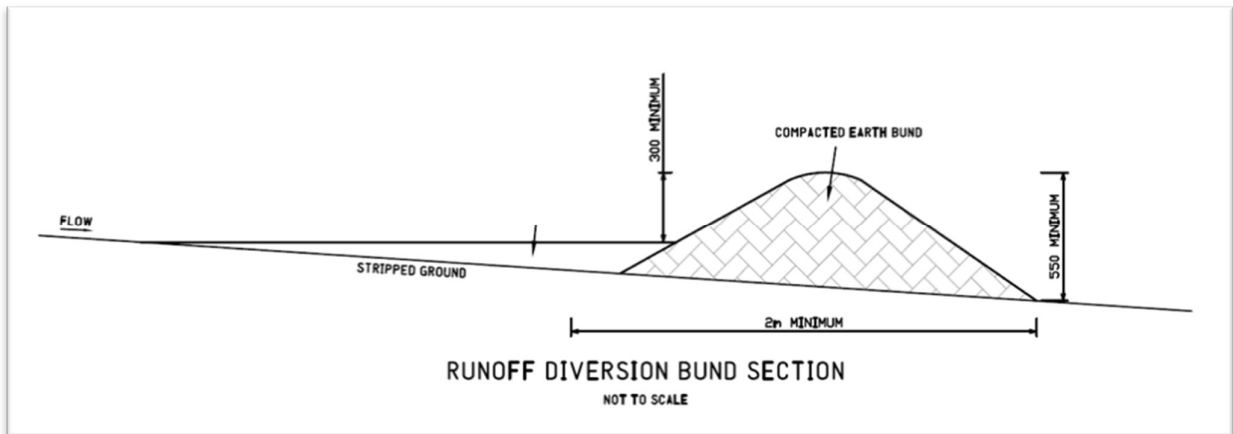


Figure 21: Typical Section of Recommended Earth Diversion Bund

8. Drainage should follow a uniform gradient so as not to cause sediment build up and impede flow.
9. A desktop assessment of the site identified three possible sites where the decanting points (at low points) can be located where water is likely to gather.
10. Log rolls, cascades or rip rap material will be placed in drain outlets where flow is concentrated in order to reduce flow velocity that will minimise the risk of erosion and mobilising silts and soils.
11. It is recommended that erosion controls and silt detention measures will be inspected and maintained weekly, and that any sediment build up is removed. Check the inlet and outlet for signs of scouring and implement remedial fixes immediately.

Details and guidelines for the design and construction of decanting earth bunds and silt fences are included in **Appendix G**.

12. Heavy Rainfall Response:
- Works are anticipated to be carried out in settled weather.
  - Following any heavy rainfall warning, the erosion and sediment control measures will be inspected, repaired and cleaned (if necessary). Exposed surfaces will be prepared by removing loose material and ensuring silt fences are in place to contain sediment laden runoff.
  - If extreme weather is forecast, the site will be secured and protected as much as practicable.
  - Machinery and loose material will be removed from site or moved into a location where it cannot be mobilised by overland runoff.
13. Exposed slopes will be grassed, and silt fences will not be removed until the grass has established.
14. No machinery will be entering watercourses and areas of concentrated overland flow stream, nor refuelled nearby.
15. Remove temporary controls only after works have ceased and the area below bund has been secured. Topsoil can then be reused onsite.

#### **4.4.4. Monitoring**

1. As part of the erosion and sediment control methodology, ongoing site monitoring by the Project team will occur to ensure that the proposed erosion and sediment control measures have been installed correctly, methodologies are being followed and are functioning effectively throughout the duration of the works.
2. Any measures requiring attention will be identified, and if necessary, relevant team members consulted to ensure continual improvement is sought. This may include undertaking further assessment of risk, including sediment yields. In the circumstance of higher risk areas being identified more stringent controls will be considered, in particular more progressive stabilisation.
3. Visual assessments of the receiving environment will continue to be undertaken during the works period by the Project team with particular attention during and after periods of rainfall and activities likely to increase the risk of sedimentation. In the context of visual assessment, the receiving environment is defined as the immediate receiving environment adjacent to the area of works. Any noticeable change in water clarity from that prior to the rainfall event, or upstream of the site of works as a result of the construction activity, will require a review of the erosion and sediment control measures implemented and changes to be made as necessary.
4. Weather forecast monitoring will also ensure that critical works likely to increase the risk of sedimentation will only occur during a suitable weather window. Internet weather forecast sites such as [www.metvuw.co.nz](http://www.metvuw.co.nz) will provide one of the key tools in this regard with local weather forecasting utilised as necessary.

#### **4.5. Other Utility Services**

##### **4.5.1. Electricity**

Accessibility to power supply for the proposed subdivision will be sought from North Power. Development specific enquiries will have to be lodged with the services provider at resource consent stage. Detailed feedback from the Northpower engineering team has been sought. Feedback will be communicated in a revised version of this report.

##### **4.5.2. Telecommunications**

Fibre is not available in proximity of the site, nor is it planned at this stage; however, the site is currently within area of benefit for VDSL and Wireless as depicted below.



Figure 22: Map depicting special reach of telecommunication infrastructure (Source: <https://broadbandmap.nz/>)

## 5.0. Conclusion and Recommendations

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Engineering services included in this assessment, required to deem the proposed development feasible (conceptually) can be provided. There are several challenges which will require sound engineering solutions, innovative alternatives, and further investment from local and regional authorities, however from this assessment, such solutions are not outside the norm for a development of this nature.

The information contained in this report may be further supplemented by future input from Council, where a neutral position has been taken by Council due to the status of the proposed development.

### 5.1. Wastewater Disposal

Combined gravity / low pressure system required to collect and convey wastewater to single pump station and low pressure rising main to convey wastewater from proposed development to Council network/wastewater treatment plant. Discharge points a) Pump Station 14, b) Wastewater Treatment Plant.

Alternative low-pressure systems where solids loading on the receiving treatment plans could also be considered where the wastewater treatment plant is found to lack treatment capacity due to sludge build up, compounded by lack of pre-treatment and screening. Information on an alternative (Pressurised Liquid Only Sewer) system is included in **Appendix F**.

### 5.2. Stormwater Management

The effect of the proposal in respect to stormwater runoff quantity and quality, is less than minor, provided mitigation by way of detention, on-site treatment and controlled discharge is provided.

Runoff generated from proposed development to be collected and conveyed through sealed pipe network and discharge to proposed attenuation and detention devices (ponds). Controlled release of treated stormwater to the receiving environment to ensure no adverse effect on downstream infrastructure, property, or environment.

Design, construction, and maintenance of proposed stormwater system to comply with relevant engineering standards and be designed to satisfy the provisions relating to *Te Mana o te Wai* and the objectives and policies for freshwater management in accordance with the National Policy Statement for Freshwater 2020.

### 5.3. Potable Water Supply

Council water supply is present in the direct vicinity of the proposed development. Network capacity to meet the demand of the proposed development was assessed and confirmed.

Although, water treatment plant capacity assessment is inconclusive, it has been suggested that the plant has capacity to supply the proposed development, albeit that seasonal shortage of raw water to the treatment plant may be one of the major constraints to meet the demand of the development and expected growth for Dargaville.

Alternative water supply or supplementary supply by way of rainwater harvesting and ground water supply should be considered. Testing and analysis of groundwater quality can be further investigated.

## 6.0. Limitations

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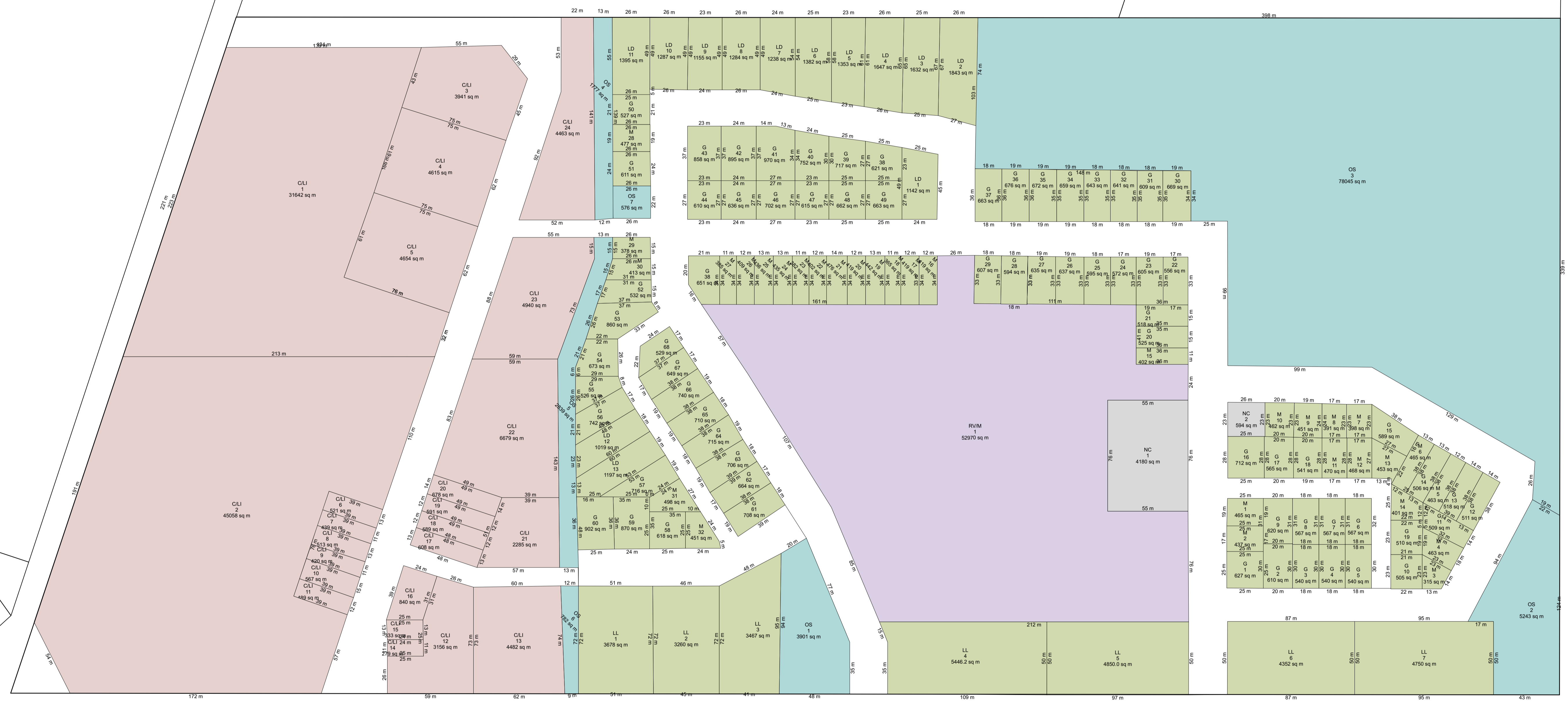
This report has been prepared solely for the benefit of our client (Dargaville Racing Club Incorporated C/- Griffiths & Associates) and its authorised agents in relation to the private plan change application for which this document has been prepared. The comments herein are limited to the purpose identified within this report. No responsibility is accepted by Lands and Survey (Engineering) Limited for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes. The reliance by other parties on the information or opinions contained herein shall, without our prior review and agreement in writing, do so at their own risk. This report is for the use of by our Client and should not be or relied upon by any other person or entity.

# Appendix A - Concept Development Plan

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# DRAFT

- Light industrial
- Residential
- Open Space
- Retirement Village Medium Density
- Neighbourhood Commercial



CLI	1	32486 sq m	G	4	540 sq m	G	32	641 sq m	G	59	870 sq m	LL	6	4352 sq m	M	27	385 sq m
CLI	1	31642 sq m	G	5	540 sq m	G	33	643 sq m	G	60	902 sq m	LL	7	4750 sq m	M	28	477 sq m
CLI	2	45058 sq m	G	6	567 sq m	G	34	659 sq m	G	61	708 sq m	LL	8	465 sq m	M	29	378 sq m
CLI	3	3941 sq m	G	7	567 sq m	G	35	672 sq m	G	62	664 sq m	LL	9	437 sq m	M	30	413 sq m
CLI	4	4615 sq m	G	8	567 sq m	G	36	706 sq m	G	63	706 sq m	LL	10	437 sq m	M	31	498 sq m
CLI	5	4654 sq m	G	9	620 sq m	G	37	663 sq m	G	64	715 sq m	LL	11	463 sq m	M	32	451 sq m
CLI	6	521 sq m	G	10	505 sq m	G	38	651 sq m	G	65	710 sq m	LL	12	463 sq m	NC	1	4180 sq m
CLI	7	7439 sq m	G	11	509 sq m	G	39	621 sq m	G	66	740 sq m	LL	13	498 sq m	NC	2	594 sq m
CLI	8	513 sq m	G	12	511 sq m	G	40	649 sq m	G	67	715 sq m	LL	14	498 sq m	OS	1	3901 sq m
CLI	9	9420 sq m	G	13	518 sq m	G	41	670 sq m	G	68	740 sq m	LL	15	498 sq m	OS	2	5243 sq m
CLI	10	567 sq m	G	14	506 sq m	G	42	695 sq m	G	69	752 sq m	LL	16	498 sq m	OS	3	77897 sq m
CLI	11	1489 sq m	G	15	589 sq m	G	43	858 sq m	G	70	828 sq m	LL	17	498 sq m	OS	4	1777 sq m
CLI	12	3156 sq m	G	16	565 sq m	G	44	610 sq m	G	71	828 sq m	LL	18	498 sq m	OS	5	2839 sq m
CLI	13	134482 sq m	G	17	565 sq m	G	45	636 sq m	G	72	828 sq m	LL	19	498 sq m	OS	6	6782 sq m
CLI	14	279 sq m	G	18	541 sq m	G	46	702 sq m	G	73	828 sq m	LL	20	498 sq m	OS	7	576 sq m
CLI	15	333 sq m	G	19	510 sq m	G	47	615 sq m	G	74	828 sq m	LL	21	498 sq m	OS	8	7576 sq m
CLI	16	840 sq m	G	20	525 sq m	G	48	662 sq m	G	75	828 sq m	LL	22	498 sq m	OS	9	152970 sq m
CLI	17	608 sq m	G	21	518 sq m	G	49	663 sq m	G	76	828 sq m	LL	23	498 sq m	OS	10	77897 sq m
CLI	18	589 sq m	G	22	556 sq m	G	50	527 sq m	G	77	828 sq m	LL	24	498 sq m	OS	11	498 sq m
CLI	19	591 sq m	G	23	605 sq m	G	51	611 sq m	G	78	828 sq m	LL	25	498 sq m	OS	12	498 sq m
CLI	20	678 sq m	G	24	572 sq m	G	52	532 sq m	G	79	828 sq m	LL	26	498 sq m	OS	13	498 sq m
CLI	21	2285 sq m	G	25	595 sq m	G	53	532 sq m	G	80	828 sq m	LL	27	498 sq m	OS	14	498 sq m
CLI	22	6679 sq m	G	26	637 sq m	G	54	532 sq m	G	81	828 sq m	LL	28	498 sq m	OS	15	498 sq m
CLI	23	4940 sq m	G	27	635 sq m	G	55	526 sq m	G	82	828 sq m	LL	29	498 sq m	OS	16	498 sq m
CLI	24	4463 sq m	G	28	594 sq m	G	56	742 sq m	G	83	828 sq m	LL	30	498 sq m	OS	17	498 sq m
CLI	25	31540 sq m	G	29	607 sq m	G	57	716 sq m	G	84	828 sq m	LL	31	498 sq m	OS	18	498 sq m
CLI	26	627 sq m	G	30	669 sq m	G	58	618 sq m	G	85	828 sq m	LL	32	498 sq m	OS	19	498 sq m
CLI	27	4463 sq m	G	31	609 sq m	G	59	618 sq m	G	86	828 sq m	LL	33	498 sq m	OS	20	498 sq m
CLI	28	1627 sq m	G	32	641 sq m	G	60	618 sq m	G	87	828 sq m	LL	34	498 sq m	OS	21	498 sq m
CLI	29	2610 sq m	G	33	643 sq m	G	61	618 sq m	G	88	828 sq m	LL	35	498 sq m	OS	22	498 sq m
CLI	30	31540 sq m	G	34	659 sq m	G	62	664 sq m	G	89	828 sq m	LL	36	498 sq m	OS	23	498 sq m
CLI	31	3941 sq m	G	35	672 sq m	G	63	706 sq m	G	90	828 sq m	LL	37	498 sq m	OS	24	498 sq m
CLI	32	4615 sq m	G	36	706 sq m	G	64	715 sq m	G	91	828 sq m	LL	38	498 sq m	OS	25	498 sq m
CLI	33	4654 sq m	G	37	663 sq m	G	65	710 sq m	G	92	828 sq m	LL	39	498 sq m	OS	26	498 sq m
CLI	34	521 sq m	G	38	651 sq m	G	66	740 sq m	G	93	828 sq m	LL	40	498 sq m	OS	27	498 sq m
CLI	35	7439 sq m	G	39	621 sq m	G	67	715 sq m	G	94	828 sq m	LL	41	498 sq m	OS	28	498 sq m
CLI	36	513 sq m	G	40	649 sq m	G	68	740 sq m	G	95	828 sq m	LL	42	498 sq m	OS	29	498 sq m
CLI	37	9420 sq m	G	41	670 sq m	G	69	752 sq m	G	96	828 sq m	LL	43	498 sq m	OS	30	498 sq m
CLI	38	567 sq m	G	42	695 sq m	G	70	828 sq m	G	97	828 sq m	LL	44	498 sq m	OS	31	498 sq m
CLI	39	1489 sq m	G	43	858 sq m	G	71	828 sq m	G	98	828 sq m	LL	45	498 sq m	OS	32	498 sq m
CLI	40	3156 sq m	G	44	610 sq m	G	72	828 sq m	G	99	828 sq m	LL	46	498 sq m	OS	33	498 sq m
CLI	41	134482 sq m	G	45	636 sq m	G	73	828 sq m	G	100	828 sq m	LL	47	498 sq m	OS	34	498 sq m
CLI	42	279 sq m	G	46	702 sq m	G	74	828 sq m	G	101	828 sq m	LL	48	498 sq m	OS	35	498 sq m
CLI	43	333 sq m	G	47	615 sq m	G	75	828 sq m	G	102	828 sq m	LL	49	498 sq m	OS	36	498 sq m
CLI	44	840 sq m	G	48	662 sq m	G	76	828 sq m	G	103	828 sq m	LL	50	498 sq m	OS	37	498 sq m
CLI	45	608 sq m	G	49	663 sq m	G	77	828 sq m	G	104	828 sq m	LL	51	498 sq m	OS	38	498 sq m
CLI	46	589 sq m	G	50	527 sq m	G	78	828 sq m	G	105	828 sq m	LL	52	498 sq m	OS	39	498 sq m
CLI	47	591 sq m	G	51	611 sq m	G	79	828 sq m	G	106	828 sq m	LL	53	498 sq m	OS	40	498 sq m
CLI	48	678 sq m	G	52	532 sq m	G	80	828 sq m	G	107	828 sq m	LL	54	498 sq m	OS	41	498 sq m
CLI	49	2285 sq m	G	53	532 sq m	G	81	828 sq m	G	108	828 sq m	LL	55	498 sq m	OS	42	498 sq m
CLI	50	6679 sq m	G	54	526 sq m	G	82	828 sq m	G	109	828 sq m	LL	56	498 sq m	OS	43	498 sq m
CLI	51	4940 sq m	G	55	526 sq m	G	83	828 sq m	G	110	828 sq m	LL	57	498 sq m	OS	44	498 sq m
CLI	52	4463 sq m	G	56	742 sq m	G	84	828 sq m	G	111	828 sq m	LL	58	498 sq m	OS	45	498 sq m
CLI	53	31540 sq m	G	57	716 sq m	G	85	828 sq m	G	112	828 sq m	LL	59	498 sq m	OS	46	498 sq m
CLI	54	627 sq m	G	58	618 sq m	G	86	828 sq m	G	113	828 sq m	LL	60	498 sq m	OS	47	498 sq m
CLI	55	4463 sq m	G	59	618 sq m	G	87	828 sq m	G	114	828 sq m	LL	61	498 sq m	OS	48	498 sq m
CLI	56	1627 sq m	G	60	618 sq m	G	88	828 sq m	G	115	828 sq m	LL	62	498 sq m	OS	49	498 sq m
CLI	57	2610 sq m	G	61	618 sq m	G	89	828 sq m	G	116	828 sq m	LL	63	498 sq m	OS	50	498 sq m
CLI	58	31540 sq m	G	62	664 sq m	G	90	828 sq m	G	117	828 sq m	LL	64	498 sq m	OS	51	498 sq m
CLI	59	3941 sq m	G	63	706 sq m	G	91	828 sq m	G	118	828 sq m	LL	65	498 sq m	OS	52	498 sq m
CLI	60	4615 sq m	G	64	715 sq m	G	92	828 sq m	G	119	828 sq m	LL	66	498 sq m	OS	53	498 sq m
CLI	61	4654 sq m	G	65	710 sq m	G	93	828 sq m	G	120	828 sq m	LL	67	498 sq m	OS	54	498 sq m
CLI	62	521 sq m	G	66	740 sq m	G	94	828 sq m	G	121	828 sq m	LL	68	498 sq m	OS	55	498 sq m
CLI	63	7439 sq m	G	67	715 sq m	G	95	828 sq m	G	122	828 sq m	LL	69	498 sq m	OS	56	498 sq m
CLI	64	513 sq m	G	68	740 sq m	G	96	828 sq m	G	123	828 sq m	LL	70	498 sq m	OS	57	498 sq m
CLI	65	9420 sq m	G	69	752 sq m	G	97	828 sq m	G	124	828 sq m	LL	71	498 sq m	OS	58	498 sq m
CLI	66	567 sq m	G	70	828 sq m	G	98	828 sq m	G	125	828 sq m	LL	72	498 sq m	OS	59	498 sq m
CLI	67	1489 sq m	G	71	828 sq m	G	99	828 sq m	G	126	828 sq m	LL	73	498 sq m	OS	60	498 sq m
CLI	68	3156 sq m	G	72	828 sq m	G	100	828 sq m	G	127	828 sq m	LL	74	498 sq m	OS	61	498 sq m
CLI	69	134482 sq m	G	73	828 sq m	G	101	828 sq m	G	128	828 sq m	LL	75	498 sq m	OS	62	498 sq m
CLI	70	279 sq m	G	74	828 sq m	G	102	828 sq m	G	129	828 sq m	LL	76	498 sq m	OS	63	498 sq m
CLI	71	333 sq m	G	75	828 sq m	G	103	828 sq m	G	130	828 sq m	LL	77	498 sq m	OS	64	498 sq m
CLI	72	840 sq m	G	76	828 sq m	G	104	828 sq m	G	131	828 sq m	LL	78	498 sq m	OS	65	498 sq m
CLI	73	608 sq m	G	77	828 sq m	G	105	828 sq m	G	132	828 sq m	LL	79	498 sq m	OS	66	498 sq m
CLI	74	589 sq m	G	78	828 sq m	G	106	828 sq m	G	133	828 sq m	LL	80	498 sq m	OS	67	498 sq m
CLI	75	591 sq m	G	79	828 sq m	G	107	828 sq m	G	134	828 sq m	LL	81	498 sq m	OS	68	498 sq m
CLI	76	678 sq m	G	80	828 sq m	G	108	828 sq m	G	135	828 sq m	LL	82	498 sq m	OS	69	498 sq m
CLI	77	2285 sq m	G	81	828 sq m	G	109	828 sq m	G	136	828 sq m	LL	83	498 sq m	OS	70	498 sq m
CLI	78	6679 sq m	G	82	828 sq m	G	110	828 sq m	G	137	828 sq m	LL	84	498 sq m	OS	71	498 sq m
CLI	79	4940 sq m	G	83	828 sq m	G	111	828 sq m	G	138	828 sq m	LL	85	498 sq m	OS	72	498 sq m
CLI	80	4463 sq m	G	84	828 sq m	G	112	828 sq m	G	139	828 sq m	LL	86	498 sq m	OS	73	498 sq m
CLI	81	31540 sq m	G	85	828 sq m	G	113	828 sq m	G	140	828 sq m	LL	87	498 sq m	OS	74	498 sq m
CLI	82	627 sq m	G	86	828 sq m	G	114	828 sq m	G	141	828 sq m	LL	88	498 sq m	OS	75	498 sq m
CLI	83	4463 sq m	G	87	828 sq m	G	115	828 sq m	G	142	828 sq m	LL	89	498 sq m	OS	76	498 sq m
CLI	84																

# Appendix B - HIRDS V4 Depth-Duration-Frequency Results

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HIRDS V4 Depth-Duration-Frequency Results

Site name: Dargaville Racecourse

Coordinate system: WGS84

Longitude: 173.901

Latitude: -35.912

DDF Mode Parameter c d e f g h i  
 Values: 0.001344 0.444183 -0.01219 -0.00146 0.25789 -0.01217 2.95172  
 Example: Duration (ARI (yrs) x y Rainfall Depth (mm)  
 24 100 3.178054 4.600149 171.0399

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
100	0.01	21	29.2	35.3	48.5	65.8	104	135	171	212	237	256	270
250	0.004	23.7	33	39.9	54.8	74.5	117	153	194	241	270	291	307

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.1	1.4	1.6	2.3	3.1	6	7.8	12	16	18	19	21
2	0.5	1.3	1.6	1.7	2.5	3.4	6.6	8.7	14	18	20	21	23
5	0.2	1.8	2.3	2.5	3.5	4.7	8.8	12	19	24	27	29	31
10	0.1	2.3	3	3.3	4.4	6	11	15	22	29	33	34	38
20	0.05	2.9	3.8	4.4	5.6	7.6	13	18	26	34	39	40	44
30	0.033	3.3	4.5	5.2	6.5	8.8	15	20	29	37	42	44	49
40	0.025	3.7	5	5.8	7.2	9.7	16	22	31	39	45	47	52
50	0.02	4	5.4	6.3	7.8	11	18	24	32	41	47	49	54
60	0.017	4.3	5.8	6.8	8.3	11	19	25	34	43	49	51	57
80	0.012	4.7	6.4	7.6	9.2	13	20	27	36	46	53	54	60
100	0.01	5.1	7	8.3	10	14	22	29	38	48	55	57	63
250	0.004	7.1	9.7	12	14	19	30	39	46	59	68	69	77

Rainfall depths (mm) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	8.96	12.4	15	20.5	27.6	42.7	54.8	68.9	84.5	94	101	106
2	0.5	9.84	13.6	16.5	22.5	30.4	47	60.4	75.9	93.1	104	111	117
5	0.2	12.9	17.8	21.5	29.5	39.8	61.8	79.4	99.9	123	137	147	154
10	0.1	15.1	20.9	25.3	34.6	46.8	72.7	93.6	118	145	161	173	182
20	0.05	17.3	24.1	29.1	39.9	53.9	83.9	108	136	167	186	200	211
30	0.033	18.7	25.9	31.3	43	58.2	90.5	117	147	181	202	216	228
40	0.025	19.6	27.3	32.9	45.2	61.2	95.3	123	155	190	212	228	240
50	0.02	20.4	28.3	34.2	47	63.6	99	128	161	198	221	237	250
60	0.017	21	29.1	35.2	48.4	65.5	102	132	166	204	228	244	257
80	0.012	21.9	30.5	36.9	50.6	68.5	107	138	174	214	239	256	270
100	0.01	22.6	31.5	38.1	52.3	70.9	111	143	180	221	247	265	279
250	0.004	25.6	35.6	43.1	59.2	80.3	125	162	204	252	281	302	318

Rainfall depths (mm) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
100	0.01	22.6	31.5	38.1	52.3	70.9	111	143	180	221	247	265	279
250	0.004	25.6	35.6	43.1	59.2	80.3	125	162	204	252	281	302	318

Rainfall depths (mm) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.11	12.6	15.2	20.8	28	43.2	55.4	69.6	85.2	94.7	101	107
2	0.5	10	13.9	16.7	22.9	30.9	47.6	61.1	76.7	94	104	112	118
5	0.2	13.1	18.2	21.9	30	40.5	62.7	80.5	101	124	138	148	156
10	0.1	15.3	21.3	25.7	35.3	47.6	73.8	94.8	119	146	163	175	184
20	0.05	17.6	24.5	29.6	40.6	54.9	85.2	109	137	169	188	202	212
30	0.033	19	26.4	31.9	43.8	59.2	92	118	149	183	203	218	230
40	0.025	20	27.8	33.6	46.1	62.3	96.8	125	156	192	214	230	242
50	0.02	20.7	28.8	34.9	47.8	64.7	101	129	163	200	223	239	252
60	0.017	21.4	29.7	35.9	49.3	66.7	104	133	168	206	230	247	260
80	0.012	22.3	31.1	37.6	51.6	69.8	109	140	176	216	241	259	272
100	0.01	23.1	32.1	38.8	53.3	72.2	112	145	182	224	249	268	282
250	0.004	26.1	36.3	43.9	60.4	81.8	127	164	207	255	284	305	321

Rainfall depths (mm) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.57	13.3	16	21.9	29.4	45	57.4	71.8	87.5	96.9	104	109
2	0.5	10.5	14.6	17.6	24.1	32.4	49.7	63.4	79.1	96.5	107	115	120
5	0.2	13.8	19.1	23.1	31.7	42.6	65.5	83.7	105	128	142	152	159

10	0.1	16.2	22.5	27.2	37.2	50.2	77.2	98.8	123	151	168	179	188
20	0.05	18.6	25.9	31.3	42.9	57.9	89.3	114	142	174	194	208	218
30	0.033	20.1	27.9	33.8	46.3	62.5	96.4	123	154	189	210	225	236
40	0.025	21.1	29.4	35.5	48.7	65.7	102	130	162	199	221	237	249
50	0.02	21.9	30.5	36.9	50.6	68.3	105	135	169	207	230	246	258
60	0.017	22.6	31.4	38	52.1	70.4	109	139	174	213	237	254	267
80	0.012	23.6	32.9	39.7	54.6	73.7	114	146	182	223	248	266	280
100	0.01	24.4	34	41.1	56.4	76.2	118	151	189	231	257	276	290
250	0.004	27.6	38.4	46.5	63.9	86.3	134	171	215	263	293	314	330

Rainfall depths (mm) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.05	12.5	15.1	20.7	27.8	43	55.2	69.4	84.9	94.4	101	107
2	0.5	9.94	13.8	16.6	22.7	30.7	47.4	60.8	76.4	93.6	104	112	117
5	0.2	13	18	21.8	29.8	40.2	62.3	80.1	101	123	137	147	155
10	0.1	15.2	21.2	25.5	35	47.3	73.3	94.3	119	146	162	174	183
20	0.05	17.5	24.3	29.4	40.3	54.5	84.7	109	137	168	187	201	212
30	0.033	18.9	26.2	31.7	43.5	58.8	91.4	118	148	182	203	218	229
40	0.025	19.8	27.6	33.3	45.7	61.8	96.2	124	156	192	214	229	241
50	0.02	20.6	28.6	34.6	47.5	64.2	99.9	129	162	199	222	238	251
60	0.017	21.2	29.5	35.6	48.9	66.2	103	133	167	205	229	246	259
80	0.012	22.2	30.8	37.3	51.2	69.3	108	139	175	215	240	258	271
100	0.01	22.9	31.9	38.5	52.9	71.6	112	144	181	223	248	267	281
250	0.004	25.9	36	43.6	59.9	81.2	127	163	206	253	283	304	320

Rainfall depths (mm) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.99	13.8	16.7	22.8	30.6	46.6	59.1	73.8	89.4	98.8	106	111
2	0.5	11	15.3	18.4	25.2	33.8	51.5	65.5	81.4	98.8	109	117	123
5	0.2	14.4	20	24.2	33.1	44.6	68.1	86.7	108	131	145	155	163
10	0.1	17	23.6	28.5	39	52.5	80.3	102	127	155	172	183	193
20	0.05	19.5	27.2	32.8	45	60.6	93	118	147	179	199	213	223
30	0.033	21.1	29.3	35.4	48.6	65.4	100	128	159	194	215	230	241
40	0.025	22.1	30.8	37.2	51.1	68.8	106	135	168	204	227	242	254
50	0.02	23	32	38.7	53.1	71.5	110	140	174	213	236	252	265
60	0.017	23.7	32.9	39.8	54.7	73.7	113	144	180	219	243	260	273
80	0.012	24.8	34.5	41.7	57.3	77.2	119	151	188	230	255	273	286
100	0.01	25.6	35.6	43.1	59.2	79.8	123	157	195	238	264	283	296
250	0.004	28.9	40.3	48.7	67	90.4	139	178	222	271	300	322	338

Rainfall depths (mm) :: RCP8.5 for the period 2031-2050

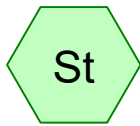
ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.22	12.8	15.4	21.1	28.3	43.7	55.9	70.1	85.7	95.2	102	107
2	0.5	10.1	14	16.9	23.2	31.2	48.1	61.7	77.3	94.6	105	113	118
5	0.2	13.3	18.4	22.2	30.4	41	63.3	81.3	102	125	139	149	156
10	0.1	15.5	21.6	26.1	35.7	48.2	74.6	95.7	120	147	164	176	185
20	0.05	17.9	24.8	30	41.2	55.6	86.1	111	139	170	190	203	214
30	0.033	19.3	26.8	32.4	44.4	60	93	119	150	184	205	220	231
40	0.025	20.2	28.1	34	46.7	63.1	97.9	126	158	194	216	232	244
50	0.02	21	29.2	35.3	48.5	65.5	102	131	164	202	224	241	253
60	0.017	21.6	30.1	36.4	49.9	67.5	105	135	169	208	232	248	261
80	0.012	22.6	31.5	38.1	52.3	70.7	110	141	177	218	243	260	274
100	0.01	23.4	32.5	39.3	54.1	73.1	114	146	184	226	251	270	284
250	0.004	26.4	36.8	44.5	61.2	82.8	129	166	209	257	286	307	323

Rainfall depths (mm) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.9	15.2	18.3	25	33.3	50.2	63.1	78.2	93.9	103	110	115
2	0.5	12.1	16.7	20.2	27.6	37	55.7	70.1	86.3	104	115	122	128
5	0.2	15.9	22.1	26.6	36.5	48.9	73.9	93.2	115	138	153	163	170
10	0.1	18.7	26	31.4	43	57.7	87.4	110	136	164	181	193	202
20	0.05	21.6	30	36.2	49.7	66.7	101	128	157	190	210	224	234
30	0.033	23.3	32.3	39.1	53.6	72	109	138	170	206	227	243	254
40	0.025	24.5	34	41.1	56.4	75.8	115	146	179	217	240	255	268
50	0.02	25.4	35.3	42.7	58.7	78.8	120	151	186	226	249	266	278
60	0.017	26.2	36.4	44	60.4	81.2	124	156	192	233	258	274	287
80	0.012	27.4	38.1	46.1	63.3	85.1	130	164	202	244	270	288	301
100	0.01	28.3	39.4	47.6	65.5	88	134	170	209	253	280	298	312
250	0.004	32	44.5	53.9	74.1	99.7	152	193	237	288	318	340	355

# **Appendix C - Stormwater Calculations (HydroCAD Project Reports)**

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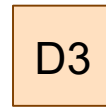
Racecourse Site



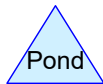
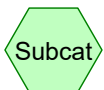
Roadside Table Drain



Roadside Table Drain



Roadside Table Drain



**Routing Diagram for Dargaville Pre-Devolpment**

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## Dargaville Pre-Development

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### Area Listing (all nodes)

Area (hectares)	CN	Description (subcatchment-numbers)
46.7000	84	Pasture/grassland/range, Fair, HSG D (St)
<b>46.7000</b>	<b>84</b>	<b>TOTAL AREA</b>

## Dargaville Pre-Development

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### Soil Listing (all nodes)

Area (hectares)	Soil Group	Subcatchment Numbers
0.0000	HSG A	
0.0000	HSG B	
0.0000	HSG C	
46.7000	HSG D	St
0.0000	Other	
<b>46.7000</b>		<b>TOTAL AREA</b>

## Dargaville Pre-Development

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### Ground Covers (all nodes)

HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Subcat Numbe
0.0000	0.0000	0.0000	46.7000	0.0000	46.7000	Pasture/grassland/range, Fair	
<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>46.7000</b>	<b>0.0000</b>	<b>46.7000</b>	<b>TOTAL AREA</b>	

**Dargaville Pre-Development**

Type IA 24-hr 1% Pre Dev Rainfall=171 mm

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Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment St: Racecourse Site** Runoff Area=46.7000 ha 0.00% Impervious Runoff Depth=124 mm  
Tc=30.0 min CN=84 Runoff=3.5784 m<sup>3</sup>/s 57.957 MI

**Reach D1: Roadside Table** Avg. Flow Depth=0.85 m Max Vel=2.63 m/s Inflow=3.5784 m<sup>3</sup>/s 57.957 MI  
n=0.035 L=159.00 m S=0.0252 m/m Capacity=6.8134 m<sup>3</sup>/s Outflow=3.5680 m<sup>3</sup>/s 57.957 MI

**Reach D2: Roadside Table** Avg. Flow Depth=1.34 m Max Vel=1.37 m/s Inflow=3.5680 m<sup>3</sup>/s 57.957 MI  
n=0.035 L=222.00 m S=0.0045 m/m Capacity=4.4680 m<sup>3</sup>/s Outflow=3.5484 m<sup>3</sup>/s 57.957 MI

**Reach D3: Roadside Table** Avg. Flow Depth=0.82 m Max Vel=2.72 m/s Inflow=3.5484 m<sup>3</sup>/s 57.957 MI  
n=0.035 L=396.00 m S=0.0278 m/m Capacity=7.1595 m<sup>3</sup>/s Outflow=3.5302 m<sup>3</sup>/s 57.957 MI

**Total Runoff Area = 46.7000 ha Runoff Volume = 57.957 MI Average Runoff Depth = 124 mm**  
**100.00% Pervious = 46.7000 ha 0.00% Impervious = 0.0000 ha**

# Dargaville Pre-Development

Type IA 24-hr 1% Pre Dev Rainfall=171 mm

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## Summary for Subcatchment St: Racecourse Site

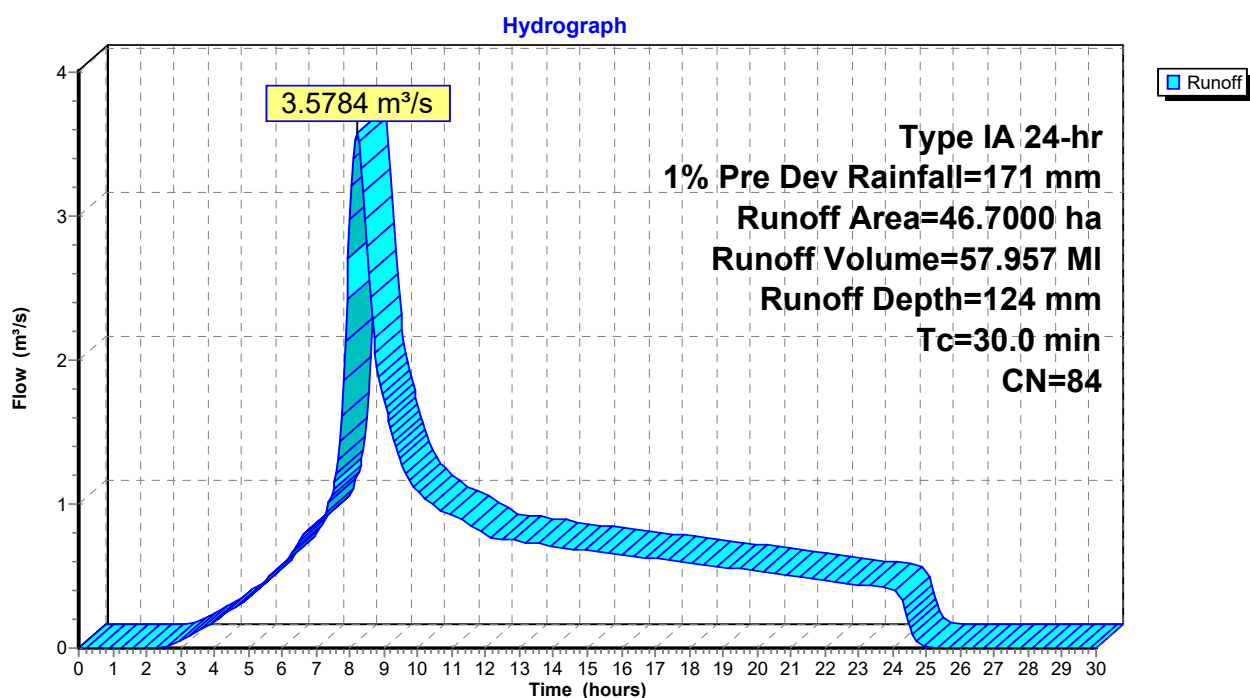
Runoff = 3.5784 m<sup>3</sup>/s @ 8.21 hrs, Volume= 57.957 MI, Depth= 124 mm  
Routed to Reach D1 : Roadside Table Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 1% Pre Dev Rainfall=171 mm

Area (ha)	CN	Description
46.7000	84	Pasture/grassland/range, Fair, HSG D
46.7000		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m <sup>3</sup> /s)	Description
30.0					Direct Entry, Combined TC

## Subcatchment St: Racecourse Site



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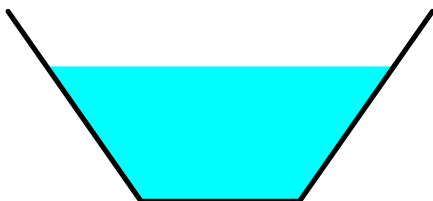
### Summary for Reach D1: Roadside Table Drain

Inflow Area = 46.7000 ha, 0.00% Impervious, Inflow Depth = 124 mm for 1% Pre Dev event  
Inflow = 3.5784 m<sup>3</sup>/s @ 8.21 hrs, Volume= 57.957 MI  
Outflow = 3.5680 m<sup>3</sup>/s @ 8.24 hrs, Volume= 57.957 MI, Atten= 0%, Lag= 1.8 min  
Routed to Reach D2 : Roadside Table Drain

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.63 m/s, Min. Travel Time= 1.0 min  
Avg. Velocity = 1.52 m/s, Avg. Travel Time= 1.7 min

Peak Storage= 216.3 m<sup>3</sup> @ 8.23 hrs  
Average Depth at Peak Storage= 0.85 m , Surface Width= 2.19 m  
Bank-Full Depth= 1.20 m Flow Area= 2.21 m<sup>2</sup>, Capacity= 6.8134 m<sup>3</sup>/s

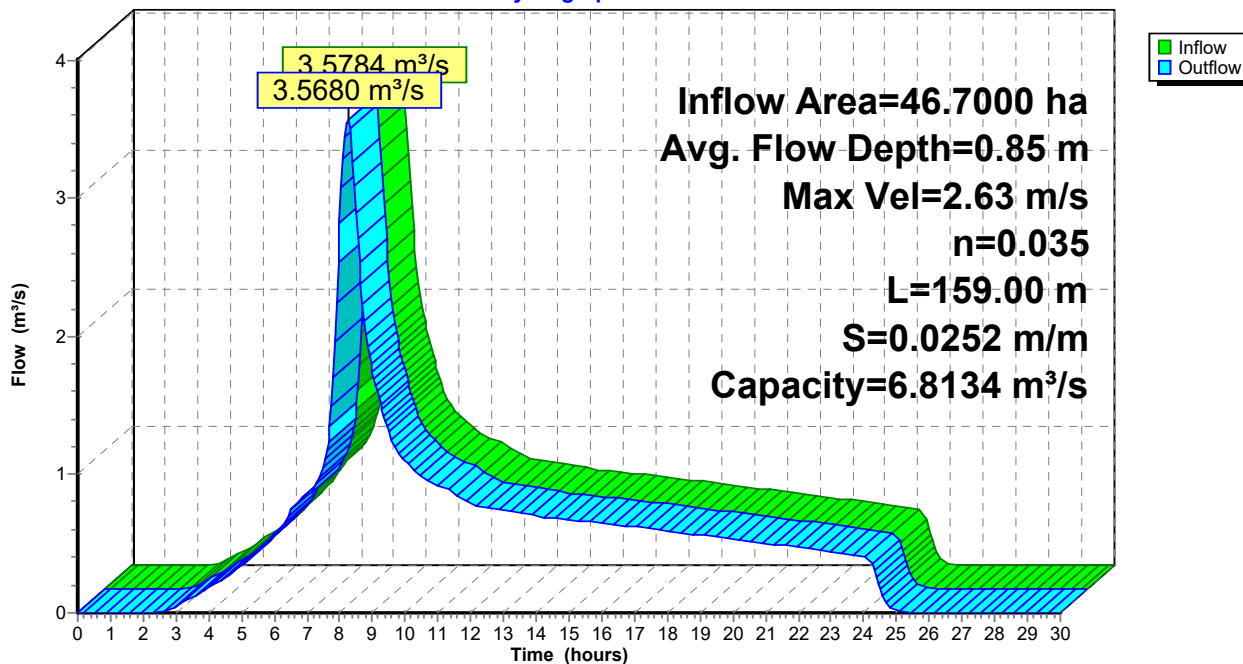
1.00 m x 1.20 m deep channel, n= 0.035 Earth, dense weeds  
Side Slope Z-value= 0.7 m/m Top Width= 2.68 m  
Length= 159.00 m Slope= 0.0252 m/m  
Inlet Invert= 32.000 m, Outlet Invert= 28.000 m



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**Reach D1: Roadside Table Drain**

Hydrograph



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### Summary for Reach D2: Roadside Table Drain

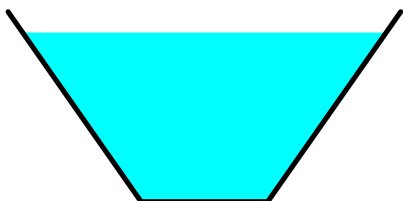
[62] Hint: Exceeded Reach D1 OUTLET depth by 0.497 m @ 8.35 hrs

Inflow Area = 46.7000 ha, 0.00% Impervious, Inflow Depth = 124 mm for 1% Pre Dev event  
Inflow = 3.5680 m<sup>3</sup>/s @ 8.24 hrs, Volume= 57.957 MI  
Outflow = 3.5484 m<sup>3</sup>/s @ 8.32 hrs, Volume= 57.957 MI, Atten= 1%, Lag= 4.7 min  
Routed to Reach D3 : Roadside Table Drain

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.37 m/s, Min. Travel Time= 2.7 min  
Avg. Velocity = 0.76 m/s, Avg. Travel Time= 4.9 min

Peak Storage= 573.7 m<sup>3</sup> @ 8.28 hrs  
Average Depth at Peak Storage= 1.34 m , Surface Width= 2.87 m  
Bank-Full Depth= 1.50 m Flow Area= 3.07 m<sup>2</sup>, Capacity= 4.4680 m<sup>3</sup>/s

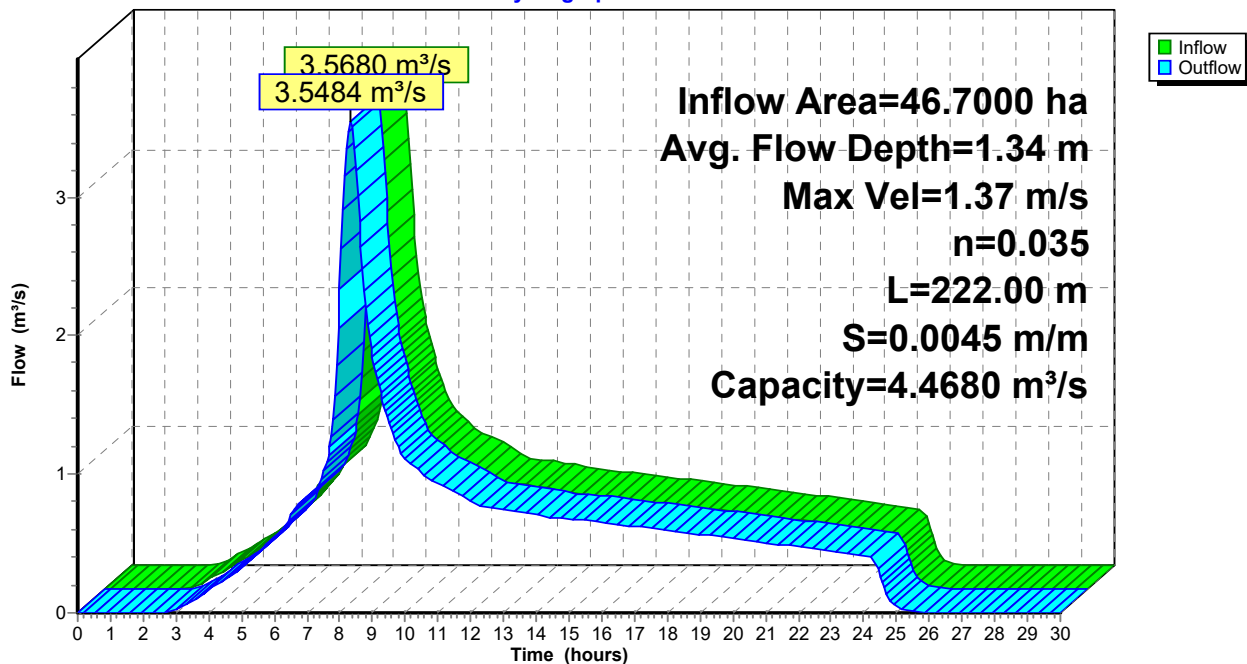
1.00 m x 1.50 m deep channel, n= 0.035 Earth, dense weeds  
Side Slope Z-value= 0.7 m/m Top Width= 3.10 m  
Length= 222.00 m Slope= 0.0045 m/m  
Inlet Invert= 28.000 m, Outlet Invert= 27.000 m



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**Reach D2: Roadside Table Drain**

Hydrograph



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### Summary for Reach D3: Roadside Table Drain

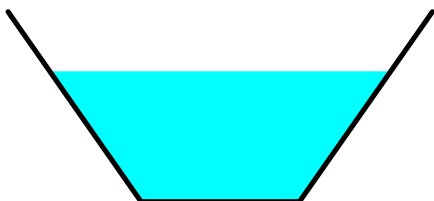
[62] Hint: Exceeded Reach D2 OUTLET depth by 0.002 m @ 26.55 hrs

Inflow Area = 46.7000 ha, 0.00% Impervious, Inflow Depth = 124 mm for 1% Pre Dev event  
Inflow = 3.5484 m<sup>3</sup>/s @ 8.32 hrs, Volume= 57.957 MI  
Outflow = 3.5302 m<sup>3</sup>/s @ 8.39 hrs, Volume= 57.957 MI, Atten= 1%, Lag= 4.3 min  
Routed to nonexistent node 2R

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.72 m/s, Min. Travel Time= 2.4 min  
Avg. Velocity = 1.45 m/s, Avg. Travel Time= 4.6 min

Peak Storage= 514.8 m<sup>3</sup> @ 8.35 hrs  
Average Depth at Peak Storage= 0.82 m, Surface Width= 2.15 m  
Bank-Full Depth= 1.20 m Flow Area= 2.21 m<sup>2</sup>, Capacity= 7.1595 m<sup>3</sup>/s

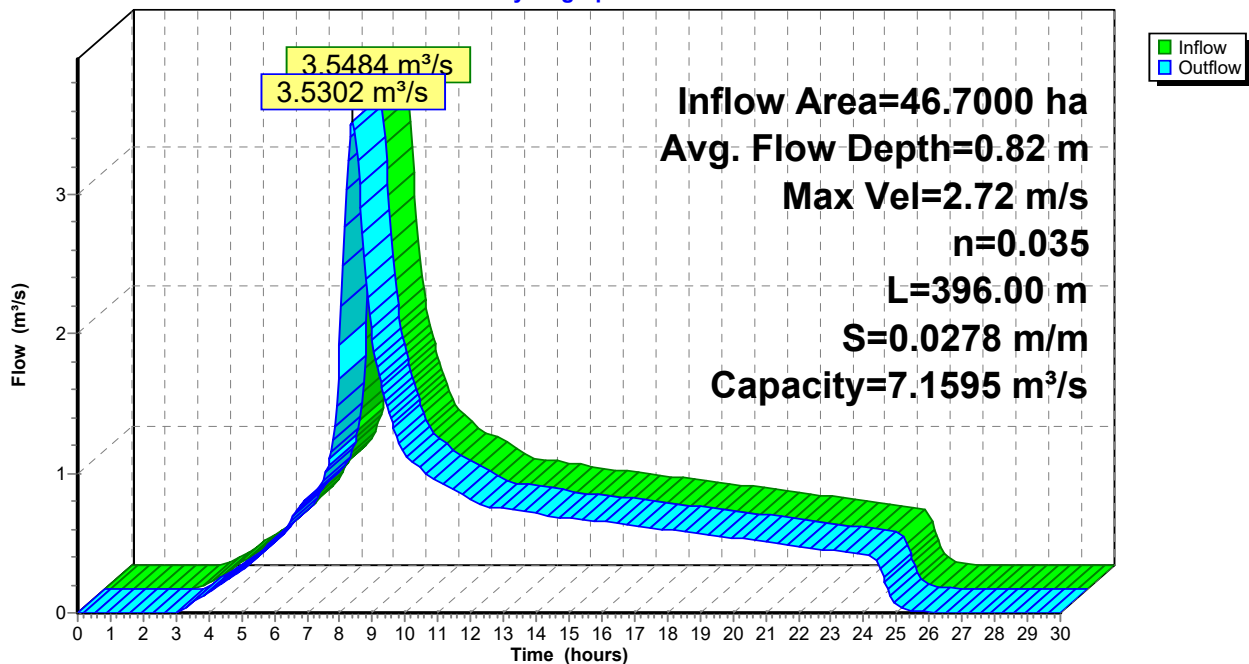
1.00 m x 1.20 m deep channel, n= 0.035 Earth, dense weeds  
Side Slope Z-value= 0.7 m/m Top Width= 2.68 m  
Length= 396.00 m Slope= 0.0278 m/m  
Inlet Invert= 27.000 m, Outlet Invert= 16.000 m

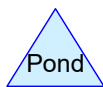
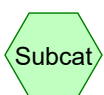
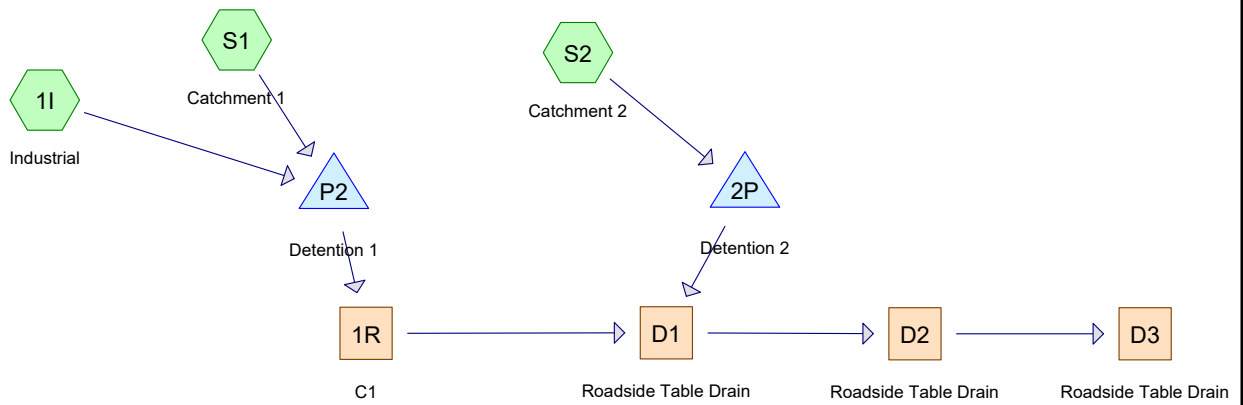


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**Reach D3: Roadside Table Drain**

Hydrograph





## Dargaville Post Development - Industrial v 2

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### Area Listing (all nodes)

Area (hectares)	CN	Description (subcatchment-numbers)
2.8000	86	1/3 acre lots, 30% imp, HSG D (S2)
19.5000	87	1/4 acre lots, 38% imp, HSG D (S1, S2)
8.0000	77	Brush, Fair, HSG D (S2)
8.8000	73	Brush, Good, HSG D (S1, S2)
7.2000	93	Urban industrial, 72% imp, HSG D (1I)
0.5500	98	Water Surface, HSG D (S1, S2)
<b>46.8500</b>	<b>84</b>	<b>TOTAL AREA</b>

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### Soil Listing (all nodes)

Area (hectares)	Soil Group	Subcatchment Numbers
0.0000	HSG A	
0.0000	HSG B	
0.0000	HSG C	
46.8500	HSG D	1I, S1, S2
0.0000	Other	
<b>46.8500</b>		<b>TOTAL AREA</b>

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### Ground Covers (all nodes)

HSG-A (hectares)	HSG-B (hectares)	HSG-C (hectares)	HSG-D (hectares)	Other (hectares)	Total (hectares)	Ground Cover	Subcatchm Numbers
0.0000	0.0000	0.0000	2.8000	0.0000	2.8000	1/3 acre lots, 30% imp	
0.0000	0.0000	0.0000	19.5000	0.0000	19.5000	1/4 acre lots, 38% imp	
0.0000	0.0000	0.0000	8.0000	0.0000	8.0000	Brush, Fair	
0.0000	0.0000	0.0000	8.8000	0.0000	8.8000	Brush, Good	
0.0000	0.0000	0.0000	7.2000	0.0000	7.2000	Urban industrial, 72% imp	
0.0000	0.0000	0.0000	0.5500	0.0000	0.5500	Water Surface	
<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>46.8500</b>	<b>0.0000</b>	<b>46.8500</b>	<b>TOTAL AREA</b>	

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### Pipe Listing (all nodes)

Line#	Node Number	In-Invert (meters)	Out-Invert (meters)	Length (meters)	Slope (m/m)	n	Width (mm)	Diam/Height (mm)	Inside-Fill (mm)
1	2P	32.000	32.000	10.00	0.0000	0.011	0	675	0
2	2P	32.000	32.000	10.00	0.0000	0.011	0	675	0
3	2P	32.000	0.000	10.00	3.2000	0.011	0	450	0
4	P2	35.000	35.000	10.00	0.0000	0.011	0	675	0
5	P2	35.000	35.000	10.00	0.0000	0.013	0	675	0

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Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1I: Industrial** Runoff Area=7.2000 ha 72.00% Impervious Runoff Depth>146 mm  
 Flow Length=500.0 m Tc=20.0 min CN=93 Runoff=0.7876 m³/s 10.489 MI

**Subcatchment S1: Catchment 1** Runoff Area=14.6500 ha 21.84% Impervious Runoff Depth>112 mm  
 Tc=20.0 min CN=81 Runoff=1.2495 m³/s 16.361 MI

**Subcatchment S2: Catchment 2** Runoff Area=25.0000 ha 22.40% Impervious Runoff Depth>117 mm  
 Tc=20.0 min CN=83 Runoff=2.2457 m³/s 29.295 MI

**Reach 1R: C1** Avg. Flow Depth=0.78 m Max Vel=1.23 m/s Inflow=1.5113 m³/s 25.980 MI  
 n=0.035 L=500.00 m S=0.0060 m/m Capacity=3.3274 m³/s Outflow=1.4867 m³/s 25.690 MI

**Reach D1: Roadside Table** Avg. Flow Depth=0.79 m Max Vel=2.54 m/s Inflow=3.1377 m³/s 54.269 MI  
 n=0.035 L=159.00 m S=0.0252 m/m Capacity=6.8134 m³/s Outflow=3.1336 m³/s 54.174 MI

**Reach D2: Roadside Table** Avg. Flow Depth=1.25 m Max Vel=1.33 m/s Inflow=3.1336 m³/s 54.174 MI  
 n=0.035 L=222.00 m S=0.0045 m/m Capacity=4.4680 m³/s Outflow=3.1248 m³/s 53.924 MI

**Reach D3: Roadside Table** Avg. Flow Depth=0.77 m Max Vel=2.63 m/s Inflow=3.1248 m³/s 53.924 MI  
 n=0.035 L=396.00 m S=0.0278 m/m Capacity=7.1595 m³/s Outflow=3.1166 m³/s 53.694 MI

**Pond 2P: Detention 2** Peak Elev=33.029 m Storage=2,585.1 m³ Inflow=2.2457 m³/s 29.295 MI  
 Outflow=1.7407 m³/s 28.579 MI

**Pond P2: Detention 1** Peak Elev=36.108 m Storage=2,809.3 m³ Inflow=2.0364 m³/s 26.850 MI  
 Outflow=1.5113 m³/s 25.980 MI

**Total Runoff Area = 46.8500 ha Runoff Volume = 56.145 MI Average Runoff Depth = 120 mm**  
**70.15% Pervious = 32.8660 ha 29.85% Impervious = 13.9840 ha**

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### Summary for Subcatchment 1I: Industrial

Runoff = 0.7876 m<sup>3</sup>/s @ 8.08 hrs, Volume= 10.489 MI, Depth> 146 mm  
 Routed to Pond P2 : Detention 1

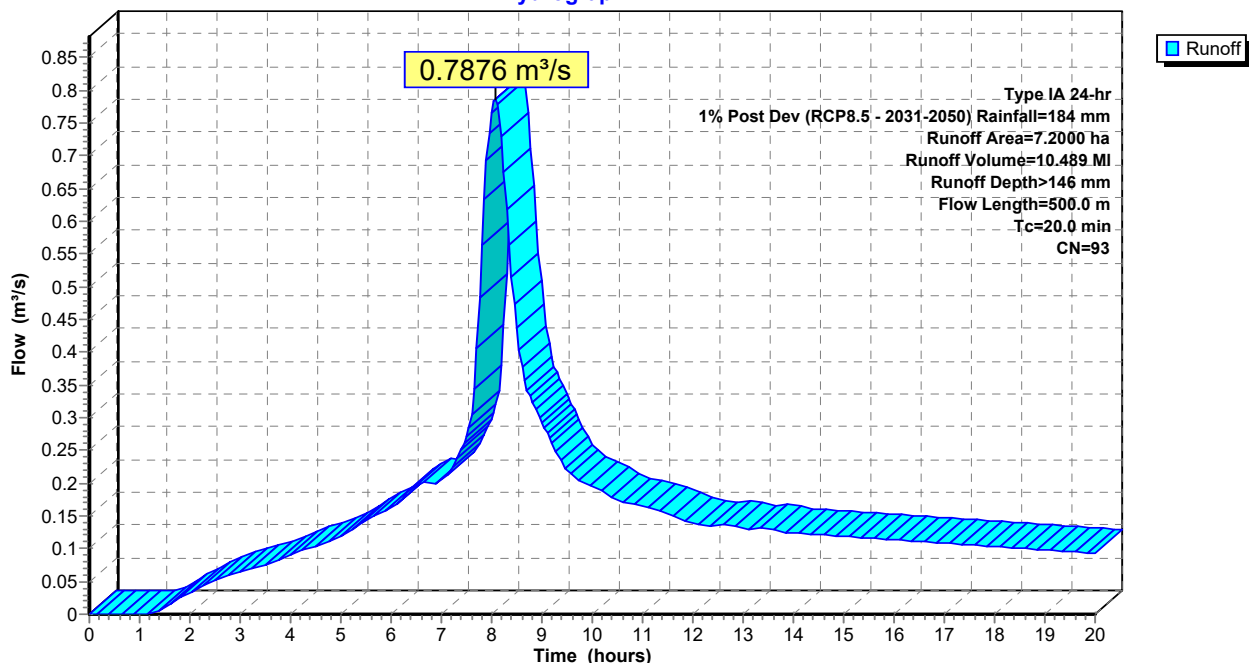
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 1% Post Dev (RCP8.5 - 2031-2050) Rainfall=184 mm

Area (ha)	CN	Description
7.2000	93	Urban industrial, 72% imp, HSG D
2.0160		28.00% Pervious Area
5.1840		72.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m <sup>3</sup> /s)	Description
20.0	500.0		0.42		Direct Entry, Storm

### Subcatchment 1I: Industrial

Hydrograph



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### Summary for Subcatchment S1: Catchment 1

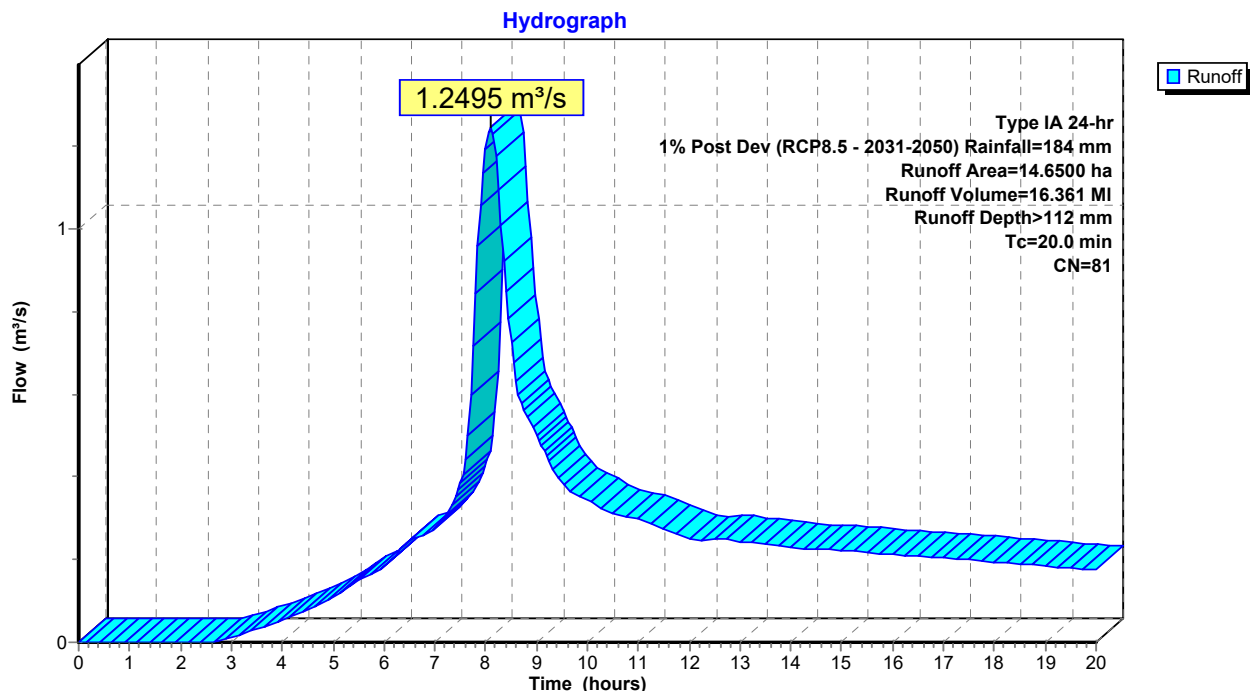
Runoff = 1.2495 m<sup>3</sup>/s @ 8.10 hrs, Volume= 16.361 MI, Depth> 112 mm  
 Routed to Pond P2 : Detention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 1% Post Dev (RCP8.5 - 2031-2050) Rainfall=184 mm

Area (ha)	CN	Description
7.5000	87	1/4 acre lots, 38% imp, HSG D
5.8000	73	Brush, Good, HSG D
0.3500	98	Water Surface, HSG D
1.0000	73	Brush, Good, HSG D
14.6500	81	Weighted Average
11.4500		78.16% Pervious Area
3.2000		21.84% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m <sup>3</sup> /s)	Description
20.0					Direct Entry, Single S1

### Subcatchment S1: Catchment 1



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### Summary for Subcatchment S2: Catchment 2

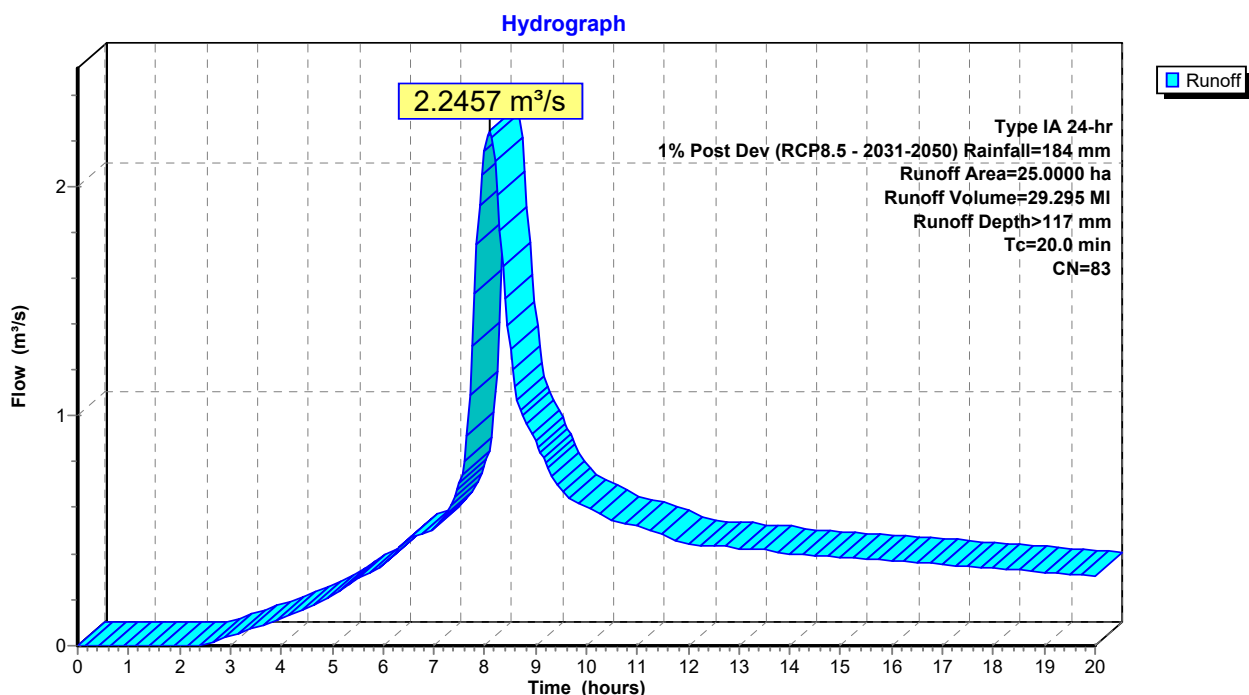
Runoff = 2.2457 m<sup>3</sup>/s @ 8.09 hrs, Volume= 29.295 MI, Depth> 117 mm  
 Routed to Pond 2P : Detention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Type IA 24-hr 1% Post Dev (RCP8.5 - 2031-2050) Rainfall=184 mm

Area (ha)	CN	Description
12.0000	87	1/4 acre lots, 38% imp, HSG D
2.8000	86	1/3 acre lots, 30% imp, HSG D
8.0000	77	Brush, Fair, HSG D
2.0000	73	Brush, Good, HSG D
0.2000	98	Water Surface, HSG D
25.0000	83	Weighted Average
19.4000		77.60% Pervious Area
5.6000		22.40% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m <sup>3</sup> /s)	Description
20.0					Direct Entry, Single S2

### Subcatchment S2: Catchment 2



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### Summary for Reach 1R: C1

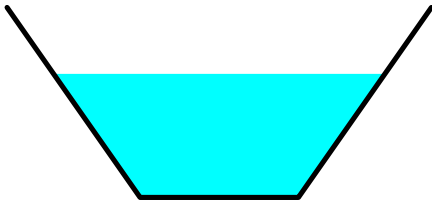
[79] Warning: Submerged Pond P2 Primary device # 1 by 0.781 m  
[79] Warning: Submerged Pond P2 Primary device # 2 by 0.781 m

Inflow Area = 21.8500 ha, 38.37% Impervious, Inflow Depth > 119 mm for 1% Post Dev (RCP8.5 - 2031-2050)  
Inflow = 1.5113 m<sup>3</sup>/s @ 8.34 hrs, Volume= 25.980 MI  
Outflow = 1.4867 m<sup>3</sup>/s @ 8.55 hrs, Volume= 25.690 MI, Atten= 2%, Lag= 12.6 min  
Routed to Reach D1 : Roadside Table Drain

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.23 m/s, Min. Travel Time= 6.8 min  
Avg. Velocity = 0.78 m/s, Avg. Travel Time= 10.6 min

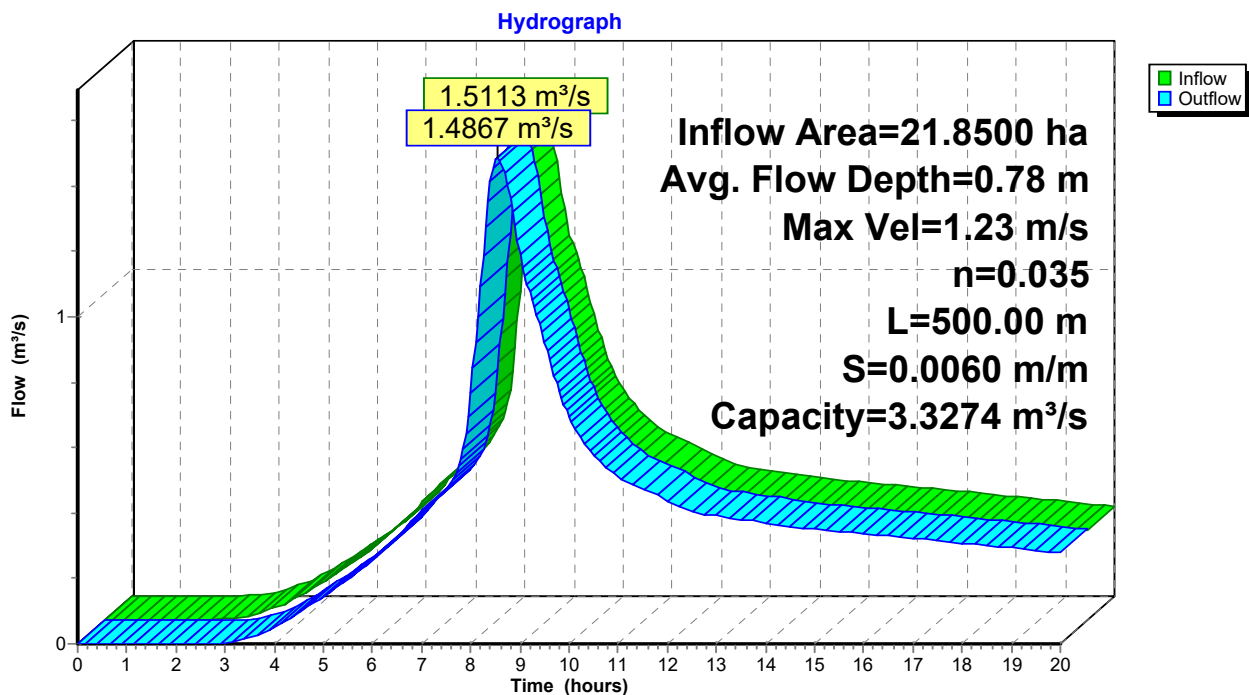
Peak Storage= 603.7 m<sup>3</sup> @ 8.44 hrs  
Average Depth at Peak Storage= 0.78 m , Surface Width= 2.09 m  
Bank-Full Depth= 1.20 m Flow Area= 2.21 m<sup>2</sup>, Capacity= 3.3274 m<sup>3</sup>/s

1.00 m x 1.20 m deep channel, n= 0.035 Earth, dense weeds  
Side Slope Z-value= 0.7 m/m Top Width= 2.68 m  
Length= 500.00 m Slope= 0.0060 m/m  
Inlet Invert= 35.000 m, Outlet Invert= 32.000 m



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### Reach 1R: C1



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### Summary for Reach D1: Roadside Table Drain

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.024 m @ 8.90 hrs

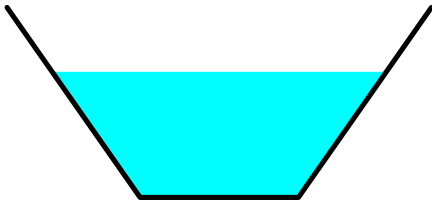
[81] Warning: Exceeded Pond 2P by 0.003 m @ 9.75 hrs

Inflow Area = 46.8500 ha, 29.85% Impervious, Inflow Depth > 116 mm for 1% Post Dev (RCP8.5 - 2031-2050)  
Inflow = 3.1377 m<sup>3</sup>/s @ 8.44 hrs, Volume= 54.269 MI  
Outflow = 3.1336 m<sup>3</sup>/s @ 8.47 hrs, Volume= 54.174 MI, Atten= 0%, Lag= 1.9 min  
Routed to Reach D2 : Roadside Table Drain

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.54 m/s, Min. Travel Time= 1.0 min  
Avg. Velocity = 1.63 m/s, Avg. Travel Time= 1.6 min

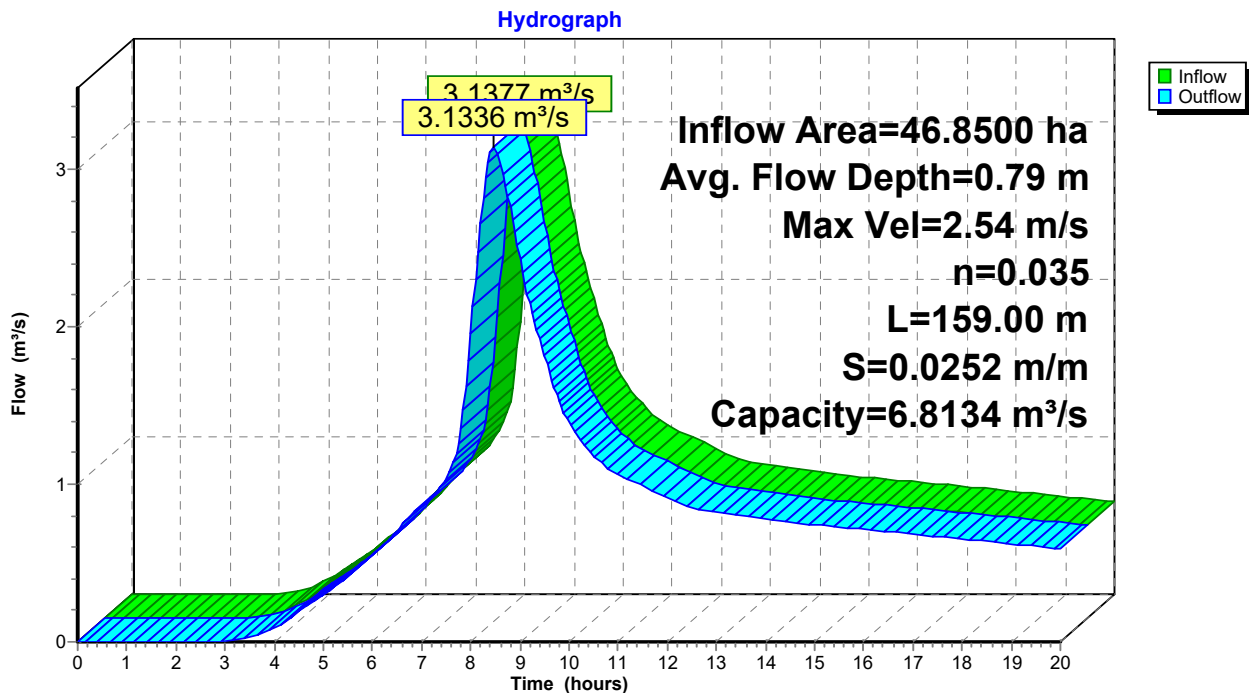
Peak Storage= 196.2 m<sup>3</sup> @ 8.45 hrs  
Average Depth at Peak Storage= 0.79 m, Surface Width= 2.11 m  
Bank-Full Depth= 1.20 m Flow Area= 2.21 m<sup>2</sup>, Capacity= 6.8134 m<sup>3</sup>/s

1.00 m x 1.20 m deep channel, n= 0.035 Earth, dense weeds  
Side Slope Z-value= 0.7 m/m Top Width= 2.68 m  
Length= 159.00 m Slope= 0.0252 m/m  
Inlet Invert= 32.000 m, Outlet Invert= 28.000 m



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### Reach D1: Roadside Table Drain



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### Summary for Reach D2: Roadside Table Drain

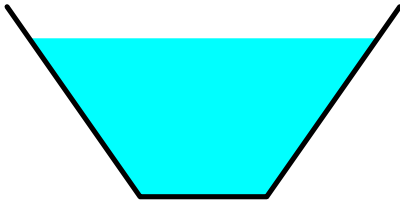
[62] Hint: Exceeded Reach D1 OUTLET depth by 0.464 m @ 8.60 hrs

Inflow Area = 46.8500 ha, 29.85% Impervious, Inflow Depth > 116 mm for 1% Post Dev (RCP8.5 - 2031-2050)  
Inflow = 3.1336 m<sup>3</sup>/s @ 8.47 hrs, Volume= 54.174 MI  
Outflow = 3.1248 m<sup>3</sup>/s @ 8.55 hrs, Volume= 53.924 MI, Atten= 0%, Lag= 5.0 min  
Routed to Reach D3 : Roadside Table Drain

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 1.33 m/s, Min. Travel Time= 2.8 min  
Avg. Velocity = 0.87 m/s, Avg. Travel Time= 4.2 min

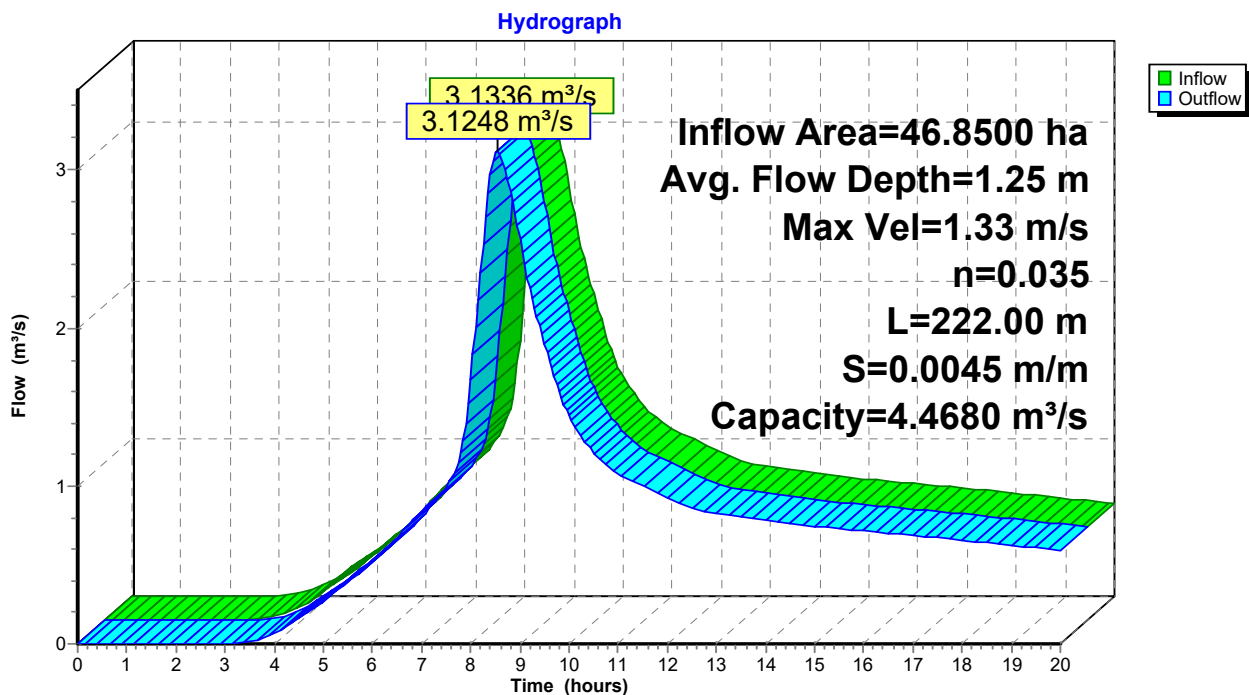
Peak Storage= 521.0 m<sup>3</sup> @ 8.50 hrs  
Average Depth at Peak Storage= 1.25 m, Surface Width= 2.75 m  
Bank-Full Depth= 1.50 m Flow Area= 3.07 m<sup>2</sup>, Capacity= 4.4680 m<sup>3</sup>/s

1.00 m x 1.50 m deep channel, n= 0.035 Earth, dense weeds  
Side Slope Z-value= 0.7 m/m Top Width= 3.10 m  
Length= 222.00 m Slope= 0.0045 m/m  
Inlet Invert= 28.000 m, Outlet Invert= 27.000 m



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### Reach D2: Roadside Table Drain



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### Summary for Reach D3: Roadside Table Drain

[61] Hint: Exceeded Reach D2 outlet invert by 0.769 m @ 8.60 hrs

Inflow Area = 46.8500 ha, 29.85% Impervious, Inflow Depth > 115 mm for 1% Post Dev (RCP8.5 - 2031-2050)  
Inflow = 3.1248 m<sup>3</sup>/s @ 8.55 hrs, Volume= 53.924 MI  
Outflow = 3.1166 m<sup>3</sup>/s @ 8.63 hrs, Volume= 53.694 MI, Atten= 0%, Lag= 4.4 min  
Routed to nonexistent node 2R

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.63 m/s, Min. Travel Time= 2.5 min

Avg. Velocity = 1.71 m/s, Avg. Travel Time= 3.9 min

Peak Storage= 468.9 m<sup>3</sup> @ 8.58 hrs

Average Depth at Peak Storage= 0.77 m, Surface Width= 2.08 m

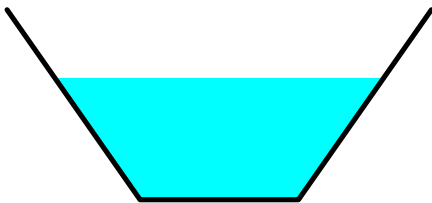
Bank-Full Depth= 1.20 m Flow Area= 2.21 m<sup>2</sup>, Capacity= 7.1595 m<sup>3</sup>/s

1.00 m x 1.20 m deep channel, n= 0.035 Earth, dense weeds

Side Slope Z-value= 0.7 m/m Top Width= 2.68 m

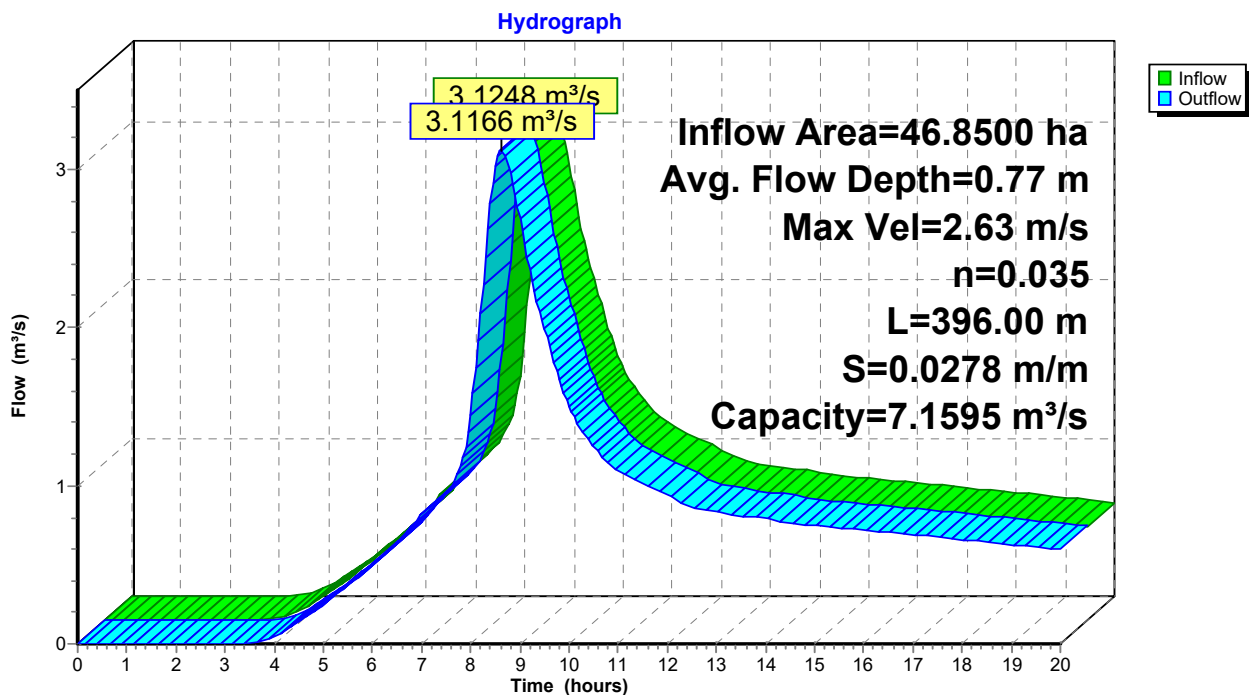
Length= 396.00 m Slope= 0.0278 m/m

Inlet Invert= 27.000 m, Outlet Invert= 16.000 m



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### Reach D3: Roadside Table Drain



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### Summary for Pond 2P: Detention 2

Inflow Area = 25.0000 ha, 22.40% Impervious, Inflow Depth > 117 mm for 1% Post Dev (RCP8.5 - 2031-2050)  
 Inflow = 2.2457 m³/s @ 8.09 hrs, Volume= 29.295 MI  
 Outflow = 1.7407 m³/s @ 8.32 hrs, Volume= 28.579 MI, Atten= 22%, Lag= 13.6 min  
 Primary = 1.7407 m³/s @ 8.32 hrs, Volume= 28.579 MI  
 Routed to Reach D1 : Roadside Table Drain

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 33.029 m @ 8.32 hrs Surf.Area= 2,827.5 m² Storage= 2,585.1 m³

Plug-Flow detention time= 31.6 min calculated for 28.508 MI (97% of inflow)  
 Center-of-Mass det. time= 18.7 min ( 683.8 - 665.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	32.000 m	3,077.6 m³	<b>Custom Stage Data (Pyramidal)</b> Listed below (Recalc)

Elevation (meters)	Surf.Area (sq-meters)	Inc.Store (cubic-meters)	Cum.Store (cubic-meters)	Wet.Area (sq-meters)
32.000	2,209.0	0.0	0.0	2,209.0
33.200	2,937.6	3,077.6	3,077.6	2,977.0

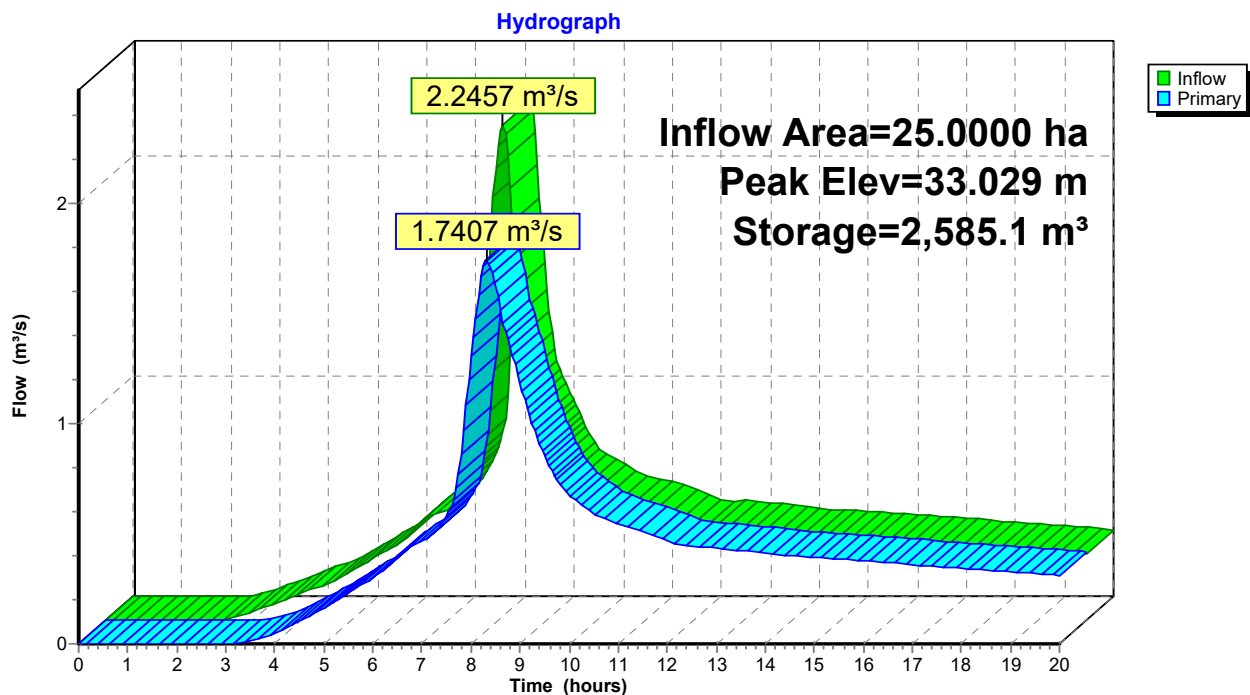
Device	Routing	Invert	Outlet Devices
#1	Primary	32.000 m	<b>675 mm Round Culvert</b> L= 10.00 m Ke= 0.600 Inlet / Outlet Invert= 32.000 m / 32.000 m S= 0.0000 m/m Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.358 m²
#2	Primary	32.000 m	<b>675 mm Round Culvert</b> L= 10.00 m Ke= 0.600 Inlet / Outlet Invert= 32.000 m / 32.000 m S= 0.0000 m/m Cc= 0.900 n= 0.011, Flow Area= 0.358 m²
#3	Primary	32.000 m	<b>450 mm Round Culvert</b> L= 10.00 m Ke= 0.600 Inlet / Outlet Invert= 32.000 m / 0.000 m S= 3.2000 m/m Cc= 0.900 n= 0.011, Flow Area= 0.159 m²

**Primary OutFlow** Max=1.7378 m³/s @ 8.32 hrs HW=33.028 m (Free Discharge)

- 1=Culvert (Barrel Controls 0.6914 m³/s @ 1.93 m/s)
- 2=Culvert (Barrel Controls 0.6914 m³/s @ 1.93 m/s)
- 3=Culvert (Inlet Controls 0.3551 m³/s @ 2.23 m/s)

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### Pond 2P: Detention 2



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### Summary for Pond P2: Detention 1

Inflow Area = 21.8500 ha, 38.37% Impervious, Inflow Depth > 123 mm for 1% Post Dev (RCP8.5 - 2031-2050)  
 Inflow = 2.0364 m³/s @ 8.09 hrs, Volume= 26.850 MI  
 Outflow = 1.5113 m³/s @ 8.34 hrs, Volume= 25.980 MI, Atten= 26%, Lag= 15.1 min  
 Primary = 1.5113 m³/s @ 8.34 hrs, Volume= 25.980 MI  
 Routed to Reach 1R : C1

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 36.108 m @ 8.34 hrs Surf.Area= 2,877.9 m² Storage= 2,809.3 m³

Plug-Flow detention time= 42.3 min calculated for 25.980 MI (97% of inflow)  
 Center-of-Mass det. time= 24.8 min ( 677.1 - 652.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	35.000 m	3,077.6 m³	<b>Custom Stage Data (Pyramidal)</b> Listed below (Recalc)

Elevation (meters)	Surf.Area (sq-meters)	Inc.Store (cubic-meters)	Cum.Store (cubic-meters)	Wet.Area (sq-meters)
35.000	2,209.0	0.0	0.0	2,209.0
36.200	2,937.6	3,077.6	3,077.6	2,977.0

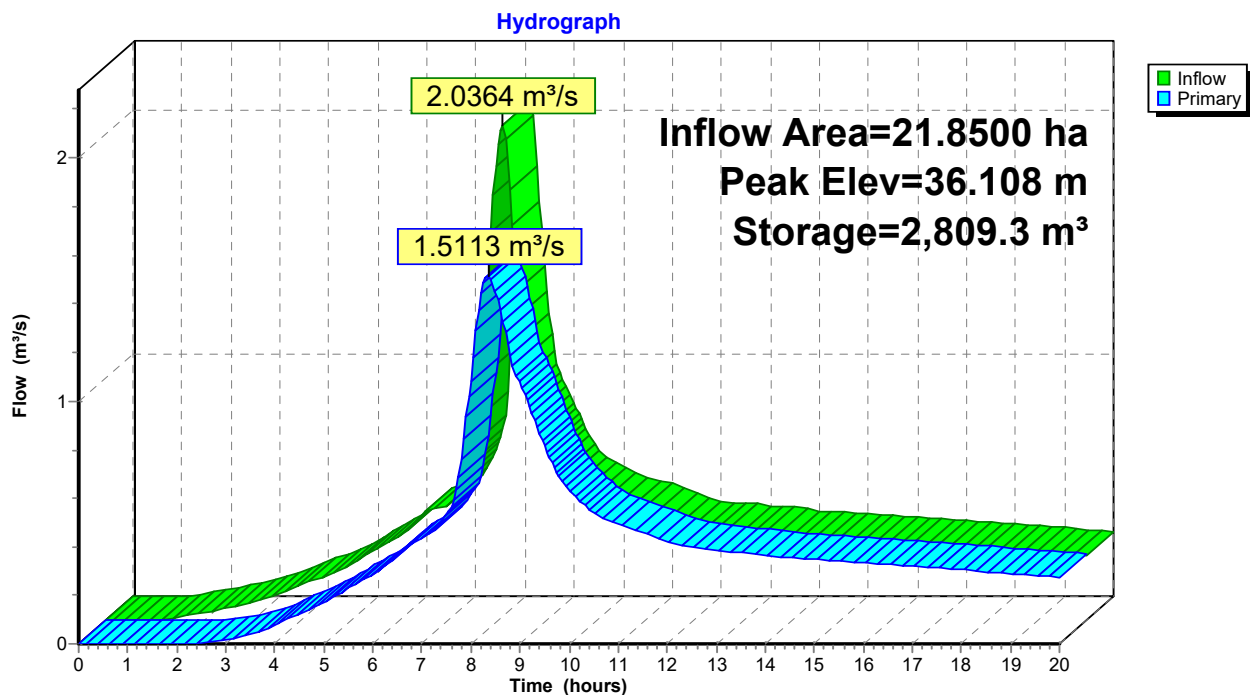
Device	Routing	Invert	Outlet Devices
#1	Primary	35.000 m	<b>675 mm Round Culvert</b> L= 10.00 m Ke= 0.600 Inlet / Outlet Invert= 35.000 m / 35.000 m S= 0.0000 m/m Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.358 m²
#2	Primary	35.000 m	<b>675 mm Round Culvert</b> L= 10.00 m Ke= 0.600 Inlet / Outlet Invert= 35.000 m / 35.000 m S= 0.0000 m/m Cc= 0.900 n= 0.013, Flow Area= 0.358 m²

**Primary OutFlow** Max=1.5105 m³/s @ 8.34 hrs HW=36.107 m (Free Discharge)

1=Culvert (Barrel Controls 0.7653 m³/s @ 2.14 m/s)  
 2=Culvert (Barrel Controls 0.7453 m³/s @ 2.08 m/s)

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### Pond P2: Detention 1



# **Appendix D - Water Network Capacity Analysis (Memo from AWA Environmental Limited)**

---

# MEMO

**TO:** Henk de Wet **DATE:** 13<sup>th</sup> August 2021  
**FROM:** Kirsten Henden **PROJECT NO.:** J000434  
**REVIEWED:** James Taylor  
**SUBJECT:** Dargaville Racecourse Development

---

## INTRODUCTION

Dargaville Racing Club Incorporated intend to submit a Plan Change to support the development of the existing Dargaville Racing Club (DRC) site in Dargaville. The proposed Plan Change aims to allow a mixed-use development, consisting generally of the land use details supplied by Lands and Survey Limited as follows:

*Table 1 Concept development plan with yields (supplied by Lands and Survey Limited)*

ZONE	AREA OF ZONE (M <sup>2</sup> )	DENSITY OF LOTS (M <sup>2</sup> )	LOT YIELD (LOTS)	COMMENT
<b>Light Industrial</b>	72,000	500	115	Assumed occupancy is an average of 4 to 6 people from 8 am to 6 pm
<b>Medium Density Residential</b>	75,000	300	200	
<b>General Residential</b>	120,000	400-500	213	Used 450 m <sup>2</sup> for calculations
<b>Low Density Residential</b>	28,000	1,000	22	
<b>Total</b>			500	

Lands and Survey Limited have engaged Awa Environmental Ltd (Awa), on behalf of DRC, to undertake a high-level capacity assessment of the proposed new development on Kaipara District Council's water distribution network. The objective of the assessment will be to identify any adverse effects on the network as a result of the development, and to determine whether the network has capacity to meet the required level of service to support the intensified land use.

## MODELLING APPROACH

The Dargaville Water Supply Projected Population Growth Model has been used to assess the impact of the proposed new development on the water distribution network. This model has been built using DHI's MIKE URBAN modelling software and includes the entirety of the Dargaville water reticulation network downstream of the Dargaville Water Treatment Plant.

This model includes an increase in demand as a result of future development and intensification to represent a future scenario representative of the Proposed KDC Spatial Plan, and projected population increases in the Kaipara District.

## ASSUMPTIONS

The following assumptions were made in modelling:

- The Demand Pattern is based on flow monitoring completed in 2012, adjusted to include a 4x peaking factor, whilst retaining the overall daily volume.
- Existing demand has been included based on a 4-year period of water meter readings.
- Future domestic demand has been calculated based on a daily usage of 250L/person and occupancy of 2.2 persons per lot. For the Light Industrial zone, an occupancy of 5 persons has been used based on the information provided in Table 1. The Daily Demand Volume for each zone is shown in Table 2.
- The total Daily Demand Volume for the proposed development has been applied at a single node within the network.

Table 2 Daily Demand Volume for each zone

ZONE	LOT YIELD (LOTS)	OCCUPANCY (PERSONS)	DAILY DEMAND (L/S)
<b>Light Industrial</b>	115	5	1.66
<b>Medium Density Residential</b>	200	2.2	1.27
<b>General Residential</b>	213	2.2	1.36
<b>Low Density Residential</b>	22	2.2	0.14
<b>Total</b>			4.43

## NETWORK ANALYSIS

The network has been upgraded since the Dargaville water supply model was built and there is now a 180mm PE main in place of a 100mm AC main along State Highway 14, adjacent to the Racecourse. The model has been updated to include this upgrade, which will be referred to as the pre-development scenario. An assessment of the pre-development, in comparison with the post-development scenario has been carried out.

The model suggests that there is sufficient capacity within the network to supply the proposed development. The model predicts a reduction in supply pressures from 35m head to 25m head, however this reduction is still within recommended limits (25-80m head). The minimum network pressure and maximum head loss pre- and post-development is shown in Figure 1.

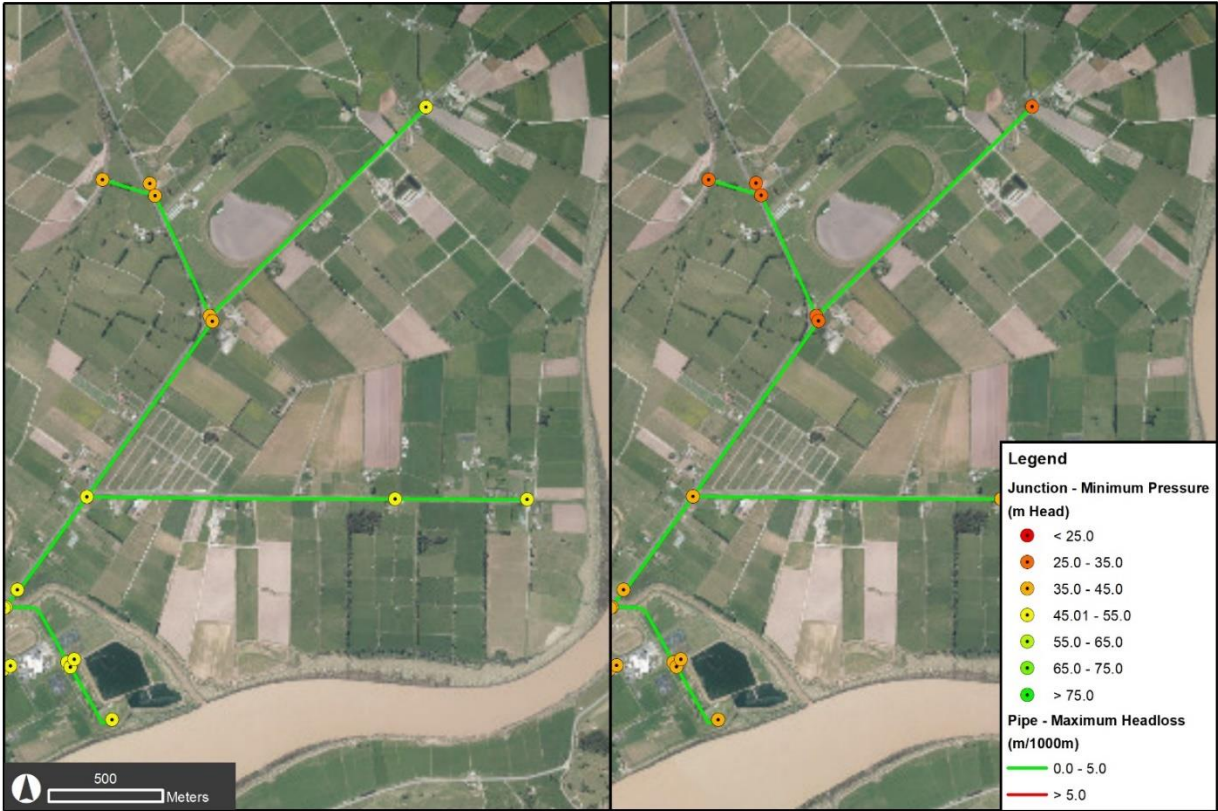


Figure 1 Pre-Development (left) and Post-Development (right) network capacity

## CONCLUSIONS

Modelling of the proposed development in conjunction with the new 180 mm PE main shows that there is sufficient capacity in the network to supply the development, and that there are no adverse on the ability of the network to meet KDC's Levels of Service.

# **Appendix E - Emailed Discussions - WDC Maintenance Contractor (Ventia)**

---

## Henk de Wet

---

**From:** Guy, Johan <Johan.Guy@broadspectrum.com>  
**Sent:** Tuesday, 27 July 2021 2:24 pm  
**To:** Henk de Wet  
**Subject:** FW: Dargaville Racecourse Plan Change - Three Waters discussion

Hi Henk

I haven't heard from KDC. I would have thought they send it to you. (Please see below answers in red.)

Kind regards

**Johan Guy**  
Contract Manager – Kaipara 3 Waters

---



**M** +64 (27) 265 3871

**E** [johan.guy@broadspectrum.com](mailto:johan.guy@broadspectrum.com)

**W** [www.ventia.com](http://www.ventia.com)

A list of Ventia Group entities can be found [here](#).

---

**From:** Guy, Johan  
**Sent:** Friday, 16 July 2021 8:21 am  
**To:** Donnick Mugutso (dmugutso@kaipara.govt.nz) <dmugutso@kaipara.govt.nz>  
**Cc:** Brian Armstrong <barmstrong@kaipara.govt.nz>; Donna Powell <dpowell@kaipara.govt.nz>  
**Subject:** Dargaville Racecourse Plan Change - Three Waters discussion

Hi Donnick

I've been contacted by Land Survey Engineering asking a view questions.  
Question raised by "Land Survey Engineering"

### Water and Wastewater

1. Known network issues or constraints, to receive addition flow or provide supply to new development, (note that this query refers to operations issues. Hydraulic capacity will be assessed by AWA by querying the network models),
2. Preferred / available point of connection / discharge including arrangement of such connections, (nodes / pump stations etc, subject tom capacity to receive such connections), **New 125mm PE water main to stables. No wastewater connections. Mains and pumpstation required.**
3. General operational status of the respective treatment plants, including their treatment / production capacity, current and near future capacity envisaged, based on information at hand and confirmed improvement projects (if any), **Potable water plant (settling/rapid sand filtration) design flow rate at 210m3hr, will require consent renewals and favourable seasonal conditions to achieve this. At present averaging around the 120-130 m3hr. Wastewater process design rate 10ha conventional pond treatment (Primary/tertiary ponds) just domestic loading at 84kg BOD could process a population of 12000. We have industrial loading and the process will require an upgrade to achieve this, e.g.. screening, primary or activated sludge process.**
4. Actual treatment and productions rates, with possible variation in time of day / seasonal, **as per above**

5. Restrictions and limitations on treatment / production capacity (i.e. wet weather events with wastewater treatment, raw water supply restrictions for water production) **as per above.**
6. Details of known/confirmed upgrades / enhancement projects and when they are envisaged to be implemented (if any), **Principal to answer.**
7. Description of the treatment plants (Type and process). **as per above.**

“A response to the above items for the respective water and wastewater systems will provide us with a good point of departure and steer to develop conceptual solutions for our client, in support to the application for the proposed private plan change.”

We answered the questions to the best of our ability. KDC can access and probably answer remaining question before it is forwarded to Land Survey Engineering.

Kind regards

**Johan Guy**  
Contract Manager – Kaipara 3 Waters

---



**M** +64 (27) 265 3871

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# Appendix F - Emailed Discussion and Case Study for Wastewater Alternative

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## Henk de Wet

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**From:** Brent Hawthorn <brenth@innoflow.co.nz>  
**Sent:** Friday, 3 September 2021 4:19 pm  
**To:** Henk de Wet  
**Subject:** Waipu and Ngati Whatua Projects  
**Attachments:** NCS-55\_JacksPoint\_v1.pdf; Prelos Brochure.pdf; SHO-EFS-1 Considering a Pressure Sewer.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Henk,

Thank you for your time on the phone today.

To get the ball rolling please find attached some information on our Liquid Only Sewers (equivalent to a LPS but discharging liquid).

We call our tanks Prelos (PReSSurised Liquid Only Sewer), but they have been known as STEP sewers for 25 years. The first STEP sewer was installed in Mangawhai in 1994, so we have a long history of their use in NZ.

Our largest liquid only sewer is Jacks Point Subdivision in Queenstown, which will be over 850 tanks once fully built. There are over 500 installed currently.

I am attaching a Brochure on Prelos and a Case Study on Jacks Point, and a comparison between (STEP/Prelos and Grinders).

Some other things to consider:


1. Prelos provide 50% or more treatment on the owners property before discharging effluent into a main and off to a Council/Private treatment plant. This has been a significant criterion for other iwi groups around NZ.
2. We offer a 10 year warranty on our Prelos pump. Grinders only have 2 years.
3. Prelos Tanks reduce solids by up to 80% and need desludging generally once a decade.
4. Prelos has a fraction of the OPEX cost of grinders (at least half).
5. There are plenty more benefits which we can cover if this goes further.

We also have plenty of reference sites and clients (Council/consultants and developers), which we can pass on as needed.

Please let me know if you would like anything more specific for these projects.

Regards

 Brent Hawthorn

 021-749-126



wastewater specialists

311A Postman Road, RD4,




Albany 0794

New Zealand

PO Box 300 572, Albany,

North Shore City 0752,

New Zealand

 [www.innoflow.co.nz](http://www.innoflow.co.nz) |  09-426-1027 |  09-426-1047

# Considering a Pressure Sewer?

## Orenco Effluent Sewers vs. Grinder Systems

### **PUMPS**

#### **High head turbine effluent pumps...**

- don't corrode — stainless steel and/or thermoplastic
- are lightweight — 25 to 30 pounds
- have a longer life — 20 to 30 years
- have a higher head capacity (½ hp — ≈ 250 ft)
- use smaller motors (½ hp most common)
- are available in 115 or 230 V power
- are easy to service and rebuild
- cost \$400 to replace
- have typically low energy costs (moving liquids only)

#### **Grinder pumps...**

- corrode over time, even with protective coatings
- are heavy — most weigh over 100 pounds
- have a much shorter life — 5 to 10 years
- have a lower head capacity (1½ hp — ≈150 ft)
- use larger motors (1½ to 2 hp most common)
- require 230 V power
- are more difficult to remove, service, and rebuild
- typically cost more than \$1200 to replace
- have higher energy costs (moving solids)

### **COLLECTION LINES**

#### **Effluent sewer lines...**

- use smaller pipe sizes — typical service line is 1 in.
- handle only the liquid portion of sewage
- do not require periodic pigging (cleaning)
- do not require minimum velocities and can be oversized for future growth
- use a Hazen-Williams coefficient (C) of 150 (lower friction)
- use low-cost air release valves as used in water delivery systems

#### **Grinder pump lines...**

- use larger pipe sizes — typical service line is 1¼ in.
- handle all liquids and solids in macerated slurry
- require periodic pigging
- require minimum scouring velocities — pipe sizing is critical  
~ pipe sizes that are too small cause excessive headloss  
~ pipe sizes that are too large clog and require frequent cleaning
- use a Hazen-Williams coefficient (C) of 120 (higher friction)
- use expensive sewage air release valves

### **ON-SITE FACILITIES**

#### **Processing tanks...**

- perform 45% to 55% of sewage treatment (95% grease and oil removal and 85% solids removal)
- have minimum 24 hours emergency storage and approximately 5 days hydraulic retention time
- generally require septage pumping no more frequently than every 10-15 years depending on occupancy loading

#### **Grinder chambers...**

- provide no treatment nor removal of grease or oil
- have little or no emergency storage/hydraulic retention time, requiring service personnel to respond to alarms immediately

*Continued on back*

# Considering a Pressure Sewer?

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## **EFFLUENT AND THE TREATMENT FACILITY**

### **Processing tank effluent...**

- has primary treatment and superior quality:  
BOD<sub>5</sub> = 130 mg/L, TSS = 30 mg/L (w/effluent filter), G&O = 15 mg/L
- has better solids management: produces 3 pounds per person/year\*
- will require sulfide control when used in conjunction with conventional gravity sewers (sulfide generation proportional to BOD<sub>5</sub> of waste stream)
- allows smaller, low-cost low-maintenance treatment facilities, such as media filters and subsurface dispersal

### **Grinder pump effluent...**

- is a poor quality, macerated slurry of solids:  
BOD<sub>5</sub> = 450 mg/L, TSS = 500 mg/L, G&O = 160 mg/L
- has no solids management: produces 50 pounds per person/year\*
- will require sulfide control when used in conjunction with conventional gravity sewers (sulfide generation proportional to BOD<sub>5</sub> of waste stream)
- requires larger, more costly treatment facilities

## **OPERATION AND MAINTENANCE**

### **Effluent sewer systems...**

- do not require line pigging
- use non-corrodible, lightweight, long-lasting pumps
- have large emergency storage capacity (underground tank) allowing a long window of time for emergency response
- have fewer service calls
- minimize electrical demands (small motors)

### **Grinder pump systems...**

- require line pigging
- use corrodible, heavy, shorter-lived pumps
- have little or no emergency storage capacity (basin) requiring immediate response to emergencies
- have longer and more frequent service calls
- have greater electrical demands

\* "Wastewater Alternatives for Your Community" video

# The Next Step In Sewer Evolution

# Prelos™



Covered by  
patent number:  
10,392,281

**Prelos™** (Pressurized Liquid-Only Sewer)  
is based on four decades of proven community sewer solutions.

The **Prelos Processor** is the core of the **Prelos** Wastewater Collection System.



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# Prelos™ The Next Step In Sewer Evolution

## The Prelos™ Processor

- Complete, high-quality package
  - Compatible, long-lifespan components
  - Minimal inventory requirements
  - Easy to maintain
  - Low power consumption
- Single line item that's easy to specify
- Unique meander tank design for superior solids removal
- Optional industry-leading, extended 10-year limited pump warranty
- Lightweight, easily rebuildable effluent pump that can last 25+ years<sup>1</sup>
- Single riser and lid provide access to all components

## The Prelos Sewer

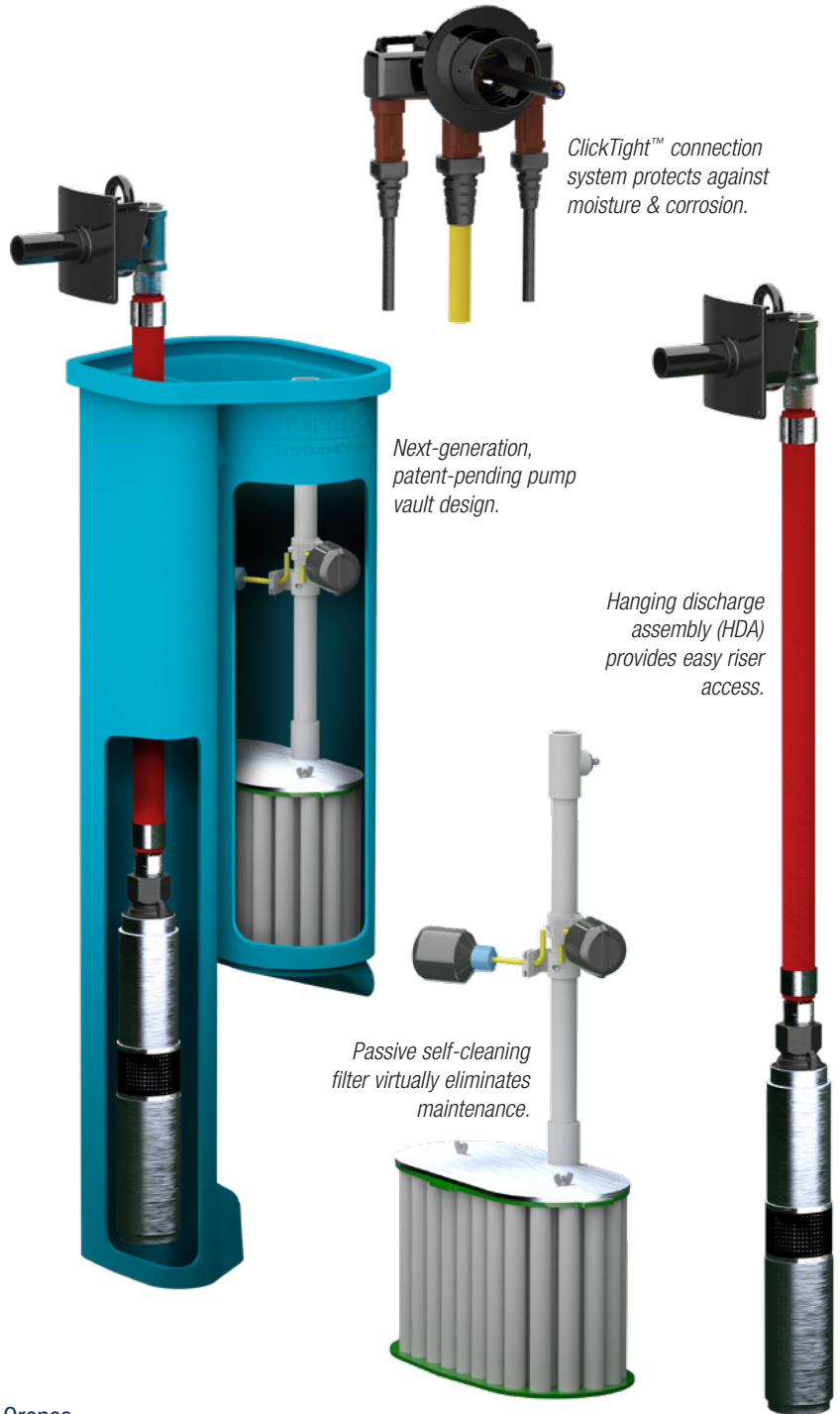
- Pressurized liquid-only (effluent) sewer technology
- Eliminates the need for scouring velocities
- Small-diameter, liquid-only sewer lines have minimal burial depth and follow grade
- Minimal community disruption during installation
- 24- to 48-hr. reserve storage in each on-lot tank<sup>2</sup>
- Documented low life-cycle costs<sup>3</sup>
- Deferred capital costs on slow build-out developments
- Allows for smaller, lower-cost, highly efficient treatment plants<sup>4</sup>

<sup>1</sup>. As seen in Elkton, Oregon liquid-only (effluent) sewer system.

<sup>2</sup>. Based on average flow of 150 gpd (568 L/day)/household.

<sup>3</sup>. Bill Cagle, Terry Cargil, and Roger Dickinson, "20-Year Life Cycle Analysis of an Effluent Sewer (STEP) System," 14 (paper presented at the Water Environment Federation Technical Exhibition and Conference, Chicago, IL, October 2013).

<sup>4</sup>. As seen in Montesano, Washington liquid-only (effluent) sewer system.



*ClickTight™ connection system protects against moisture & corrosion.*

*Next-generation, patent-pending pump vault design.*

*Hanging discharge assembly (HDA) provides easy riser access.*

*Passive self-cleaning filter virtually eliminates maintenance.*



For more information, contact Orengo.

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# CASE STUDY

## A Sustainable Wastewater Collection and Treatment Solution for New Developments

### JACK'S POINT, NEW ZEALAND

#### Problem

The expansive Jack's Point development outside Queenstown, New Zealand, needed a wastewater collection and treatment system that could meet strict nitrogen-reduction limits. But local sewer service was over 8 km (5 mi.) away, and the municipal wastewater treatment plant would require an upgrade to accommodate the additional flow.

#### Solution

Considering the pumping distance to the nearest sewer and the capacity issues of the area wastewater plant, developers pursued a decentralized wastewater plan. The design would need to minimize visual impact, allow for modular development, and be capable of reducing nutrients to low levels. Following a lengthy bid process, a design-build-operate contract was awarded to Innoflow Technologies, whose design incorporated an Orenco® liquid-only sewer, AdvanTex® secondary wastewater treatment, and subsurface drip irrigation.

### New Zealand's Largest Subdivision

At the time of its conception in 2002, Jack's Point subdivision was set to become the largest planned residential community in New Zealand, with developers envisioning approximately 900 luxury homes. The selected location was just outside Queenstown, a resort community on the shores of Lake Wakatipu with a view of the snow-capped Southern Alps.



The developers of Jack's Point envisioned a subdivision of 900 luxury homes. They needed an affordable wastewater collection system that could handle variable terrain, followed by a reliable treatment system that would produce high-quality effluent and could be installed in stages.

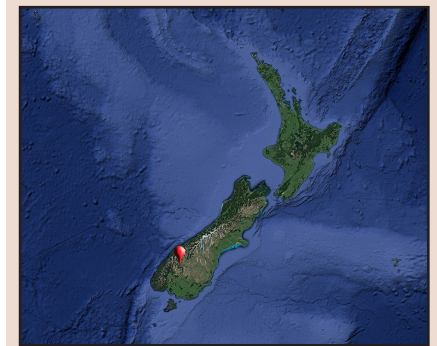
Photo courtesy of Innoflow Technologies.

The development would include a clubhouse (with a restaurant, pro shop, and offices), a golf course, and 25 km (15 mi.) of walking and biking trails. Every detail of construction would be focused on maintaining and enhancing the naturally breathtaking environment, while offering the comforts and conveniences of city living.

### New Development Market

#### Project Overview

#### QUEENSTOWN, NEW ZEALAND



#### Design Parameters

- 750 homes (484 currently built), plus a clubhouse
- 728 m<sup>3</sup>/day (191,500 gpd) peak capacity

#### Actual Flow (October 2017-April 2020)

- Actual Ave. Flow: 245 m<sup>3</sup>/day (64,700 gpd)
- Actual Peak Flow: 460 m<sup>3</sup>/day (121,500 gpd)

#### Resource Consent Limits

- 15 mg/L cBOD<sub>5</sub>
- 20 mg/L TSS
- 20 mg/L TN\*
- 12 mg/L TP
- 10,000 cfu/100mL E. coli

#### Collection

- A 3800-L (1000-gallon) tank at each home
- Orenco® liquid-only sewer

#### Treatment

- Orenco AdvanTex® AX100 Treatment Systems

#### Monitoring and Control

- Orenco TCOM™ telemetry panel

#### Equipment Supplier

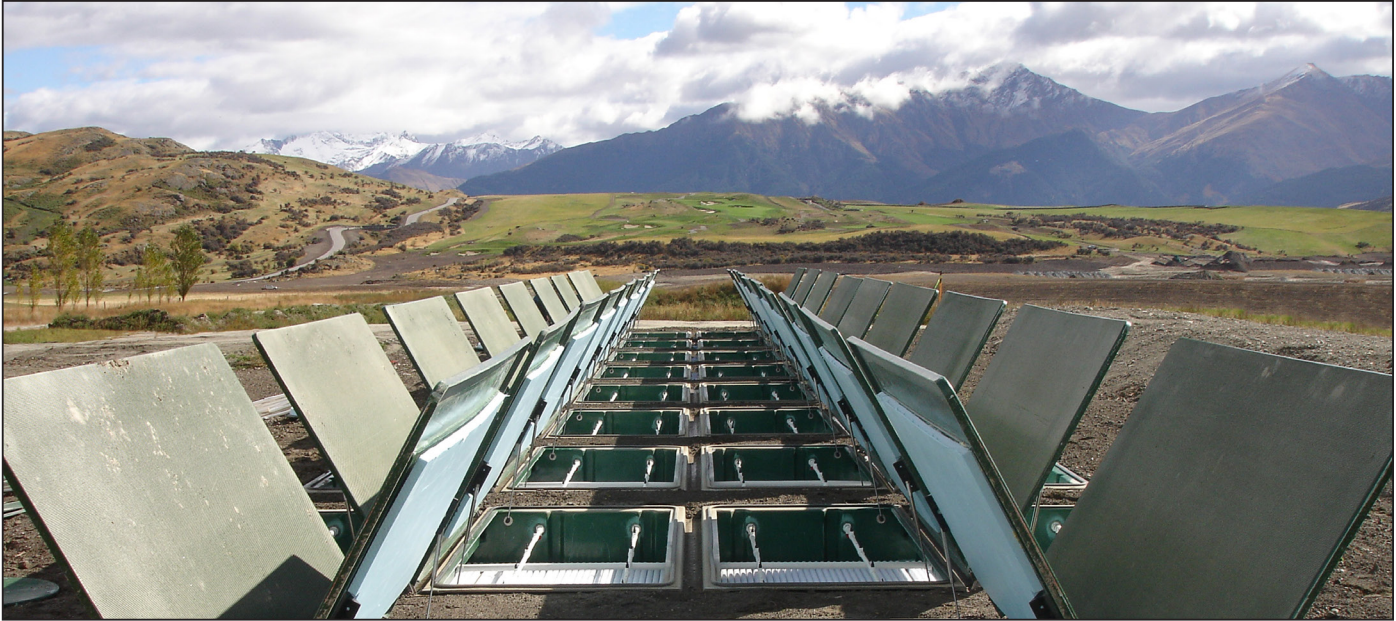
- Innoflow Technologies NZ Ltd.

#### Operation and Maintenance

- S3 Ltd. (a subsidiary of Innoflow)

\*Limit drops to 5 mg/L if total flows are greater than 425 m<sup>3</sup>/day five times in a calendar year.

sidebar continued on back page

**JACK'S POINT, NEW ZEALAND**

Primary-treated effluent is pumped from each home through small-diameter, liquid-only sewer lines to one of the subdivision's three AdvanTex wastewater treatment facilities, which operate efficiently with minimal odor or sound. Photo courtesy of InnoFlow Technologies.

One of those conveniences is reliable wastewater treatment. But local sewer service was over 8 km (5 mi.) away, and the municipal wastewater treatment plant would require an upgrade to accommodate the additional flow generated by Jack's Point.

With these circumstances in mind, developers looked for more adaptable wastewater collection and treatment solutions. They needed an economically sustainable collection system that could handle variable terrain, followed by a reliable treatment system that would produce high-quality effluent and could be installed in stages, with minimal visual impact on the community.

### **A Winning Combination**

During the bidding process, InnoFlow Technologies put forth a design-build-operate proposal that incorporated an Orenco® liquid-only sewer, AdvanTex® secondary wastewater treatment, and subsurface drip irrigation. This proposal was ultimately accepted by the developer and later approved by the Otago Regional Council, which issued the Resource Consent (discharge permit).

Rob Potts of Lowe Environmental Impact, one of the project engineers, says, “[We] undertook an options assessment for Jack's Point sewerage systems and considered at least three package plant options and

three reticulation options. The effluent [liquid-only] sewer option was selected due to the shallow depth to bedrock and undulating nature of the terrain, as it allowed the sewer to follow the contour of the land. It was selected above a pressure sewer [grinder collection] system due to the lower overall whole-of-life operating costs.”

Other unique advantages of a liquid-only sewer included the following:

- Watertight collection, with no need for manholes or expensive lift stations
- No minimum flushing velocity requirements
- Low capital expenses, with on-lot tanks installed only as each home is built
- Passive, on-lot primary treatment
- Ability to expand in stages
- Reduced size, complexity, and cost of the treatment system<sup>1</sup>

In a paper presented at the 2006 Annual Conference of the New Zealand Land Treatment Collective, Potts and his fellow project engineer, Ken Gousmett, wrote, “Use of interceptor tanks at individual residential lots has advantages over traditional raw sewage gravity flow and pump station systems, which are

more difficult to engineer over undulating ground, with shallow bedrock (as is the case at Jack's Point). Effluent is pretreated and can be easily pumped through small diameter pipes installed in a common service trench to the wastewater treatment plant. Sludge production at the treatment plant is reduced and there is greater capacity in the system to store wastewater if a breakdown occurs."<sup>2</sup>

Regarding the chosen treatment – Orenco's AdvanTex AX-100 technology – the paper continued, "Recirculating packed bed reactor technology is robust to varying inflows and provides high quality effluent, using simple systems that require low operation and maintenance requirements. The textile treatment system is modular and can be installed incrementally as development within the residential zones progresses. Other technologies considered (sequencing batch reactors, other aerated systems) require higher levels of operator input, produce significant quantities of sludge that requires disposal and are not as robust with regard to treating varying hydraulic loadings."<sup>3</sup>

Before the regional council would grant the Resource Consent, it wanted assurance that post-development nutrient content (particularly nitrogen) would be significantly less than it was pre-development. Innoflow was able to demonstrate through effluent testing at similar sites that the AdvanTex system could meet the required nitrogen limits.

Initially, developers had been concerned about the visual impact of the treatment facilities. But once they saw how low to the ground the first AdvanTex units were installed, their concerns were put to rest. AdvanTex facilities are also known to minimize odor and sound. Steve Murch, the operations manager at Jack's Point, says, "These plants are located in close proximity to dwellings and other recreational facilities and we have not received any complaints from homeowners."

Treated effluent from the AdvanTex units is used to irrigate nearby fields, some of which are used for

grazing sheep. The fields are also cropped at least once a year, and the hay is used as fodder. Because of the strict limits on nitrogen, the number of bales produced each year is used in nitrogen mass-balance calculations.

### Jack's Point Today

The community is roughly divided into seven neighborhoods (N1-N7). The clubhouse has a 9000-L (2400-gallon) on-lot tank, while each house has a 3800-L (1000-gallon) tank. Primary-treated effluent is pumped from these tanks through small-diameter, liquid-only sewer lines to one of the subdivision's three AdvanTex wastewater treatment facilities. Treated effluent is dispersed through subsurface, pressure-compensating driplines into the irrigation fields.



*Treated effluent is dispersed through subsurface, pressure-compensating driplines into irrigation fields. The Resource Consent requires the effluent to meet strict requirements. Photo courtesy of Innoflow Technologies.*

The development is still growing, with a current total of 484 connections. The total treatment capacity is 750 homes, but if additional treatment capacity is added, the Resource Consent allows for up to 1430 homes. As of May 2020, this is the breakdown:

- Facility #1 (serving N1 and 4, plus the clubhouse): 258 homes completed, 382 possible connections
- Facility #2 (serving N2 and 3): 93 homes completed, 164 possible connections
- Facility #3 (serving N5, 6, and 7): 133 homes completed, 182 possible connections

## JACK'S POINT, NEW ZEALAND



Using a liquid-only sewer at Jack's Point has reduced upfront capital expenses, because on-lot tanks are installed only as each home is built. Photo courtesy of InnoFlow Technologies.

The three treatment systems are being upgraded one by one to enhance nutrient reduction. In 2017, facility #3 serving N5/6/7 was the first to be upgraded, and the details are shown in the sidebar at right.

Jack's Point has the largest liquid-only sewer system in the Southern Hemisphere that uses Orenco Systems on-lot tanks followed by AdvanTex wastewater treatment. And further development is planned that would connect to one of the existing treatment facilities. According to Potts, "The selected system is still considered the optimal type of system for this development, as it is still progressing, some 20 years later ... If we had to redo the option assessment, we believe that we would still arrive at the same solution."

<sup>1</sup> As seen in the Montesano, WA (USA), sewer system.

<sup>2</sup> Rob Potts, Ken Gousmett, "Wastewater treatment and land treatment at Jack's Point Development, Queenstown," New Zealand Land Treatment Collective: Proceedings for the 2006 Annual Conference, 105.

<sup>3</sup> Ibid.

*"The selected system is still considered the optimal type of system for this development, as it is still progressing, some 20 years later."*

~ Rob Potts, Senior Principal  
Lowe Environmental Impact

Data used by Orenco to derive the representations and conclusions contained within this Case Study were current as of August 2020.

## New Development Market

All figures below pertain only to the 2017 upgrade of the N5/6/7 treatment facility.

## Design Parameters

- 182 homes
- 175 m<sup>3</sup>/day (46,150 gpd) peak capacity

## Installation Date

- 2006 (upgrade to two-stage AdvanTex® treatment in 2017)

## Actual Flow (October 2017-April 2020)

- Actual Ave. Flow: 55 m<sup>3</sup>/day (14,500 gpd)
- Actual Peak Flow: 100 m<sup>3</sup>/day (26,400 gpd)

## Liquid-Only Sewer Effluent Quality\*\*

- 199 mg/L cBOD<sub>5</sub>
- 65 mg/L TSS
- 64 mg/L TKN
- 10 mg/L TP
- 613,000 cfu/100 mL E. coli

## AdvanTex® Effluent Quality\*\*

- 3 mg/L cBOD<sub>5</sub>
- 5 mg/L TSS
- 13 mg/L TN
- 9 mg/L TP
- 280 cfu/100 mL E. coli

## Stage 1 Treatment

- Two 18-m<sup>3</sup> (4755-gallon) and two 23-m<sup>3</sup> (6075-gallon) pre-anoxic tanks
- Three 55-m<sup>3</sup> (14,500-gallon) recirculation tanks with dosing pumps
- Twelve AdvanTex AX100 units

## Stage 2 Treatment

- Four 23-m<sup>3</sup> (6075-gallon) post-anoxic tanks
- One 55-m<sup>3</sup> (14,500-gallon) recirculation tank with dosing pumps
- Four AdvanTex AX100 units

## Treated Effluent Storage

- Four 23-m<sup>3</sup> (6075-gallon) tanks with discharge pumps
- Two pulse water meters

## Land Treatment System

- 14,560 meters (47,800 feet) of subsurface drip line

\*\*Samples collected and analyzed by a third party between 7 November 2017 and 18 March 2020.

For information about Prelos™ Sewer, AdvanTex® Wastewater Treatment, or Orenco Controls™, contact Orenco Systems®, Inc.



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# **Appendix G - Guidelines for The Construction of Decanting Earth Bunds and Silt Fences**

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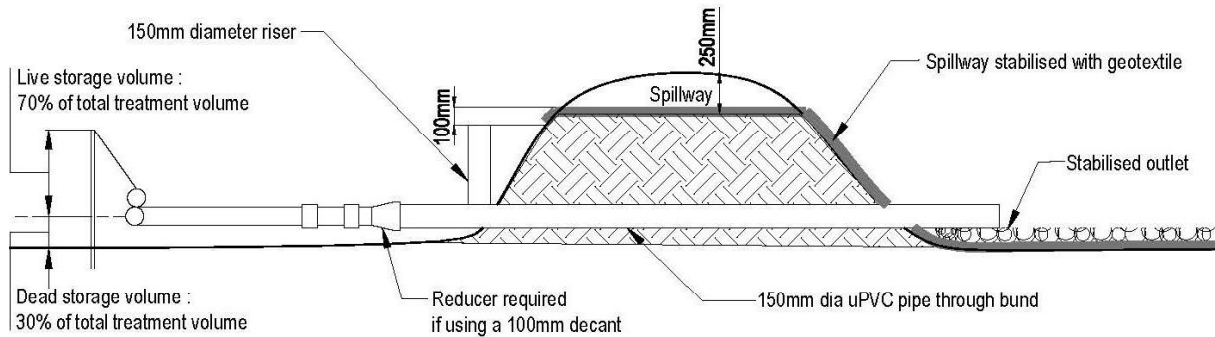
### Appendix C1.13 Decanting earth bund (DEB)

Contractor:	Date: Time:	Consent #:	Site:
-------------	----------------	------------	-------

Construction checklist (refer Figures over page and Section F1.2 of GD05 for further details)	Yes (✓)	No (X) (Add comments to explain)
DEB has been built along the contour to obtain the required volumes		
All organic/ vegetation is removed before construction		
The DEB is keyed into the existing ground to a minimum depth of 0.3 m		
The DEB is built with a clay-silt mix of suitable moisture content to achieve a reasonable compaction standard (90%). This can be achieved, in most instances, by track rolling at 150 – 200 mm lifts. Particular care is required to achieve good compaction around the outlet pipe that passes through the bund to avoid seepage and potential failure		
A 150 mm diameter non-perforated outlet pipe has been installed through the bund and discharges to a stable erosion proofed area or stormwater system		
A T-Bar decant has been attached by way of a standard joint (glued and screwed). The decant is 100 or 150 mm dia. PVC pipe, 0.5 m long with equally spaced holes of 10 mm diameter and fixed firmly to a waratah standard to achieve 0.3 litres/ second/1,000 m <sup>2</sup> of contributing catchment		
A sealed PVC pipe (with endcaps) has been placed on top of the decant to provide buoyancy		
A flexible thick rubber coupling has been used to provide a connection between the decant arm and the discharge pipe. The flexible coupling has been fastened using strap clamps, glue and screws		
The decant is fastened to two waratahs by way of a nylon cord to the correct height		

Construction checklist (refer Figures over page and Section F1.2 of GD05 for further details)	Yes (✓)	No (X) (Add comments to explain)
An emergency spillway has been provided to a stabilised outfall 100 mm freeboard height above the primary spillway. This can be a trapezoidal spillway with a minimum invert length of 2 m that is smooth, has no voids and is lined with a soft needle punched geotextile to the stabilised outfall. The geotextile is pinned at 0.5 m centres		
The emergency spillway has a minimum freeboard of 250 mm, i.e. between the invert of the spillway to the lowest point of the top of the bund		
An as-built assessment has been completed at the completion of construction to check against the design. Any discrepancies have been rectified.		

Note: The purpose of this checklist is for contractors to complete on-site self-checks of construction quality for ESC practices. This is not a compliance or as-built checklist.



Cross - section



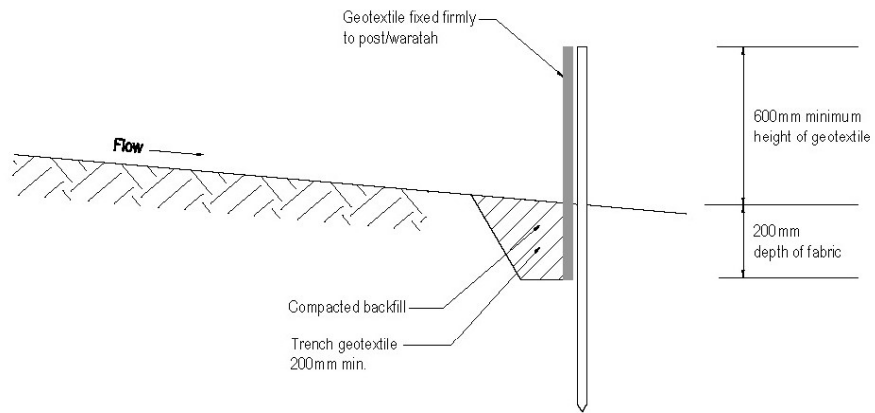
### Appendix C1.14 Silt fence

Contractor:	Date: Time:	Consent #:	Site:
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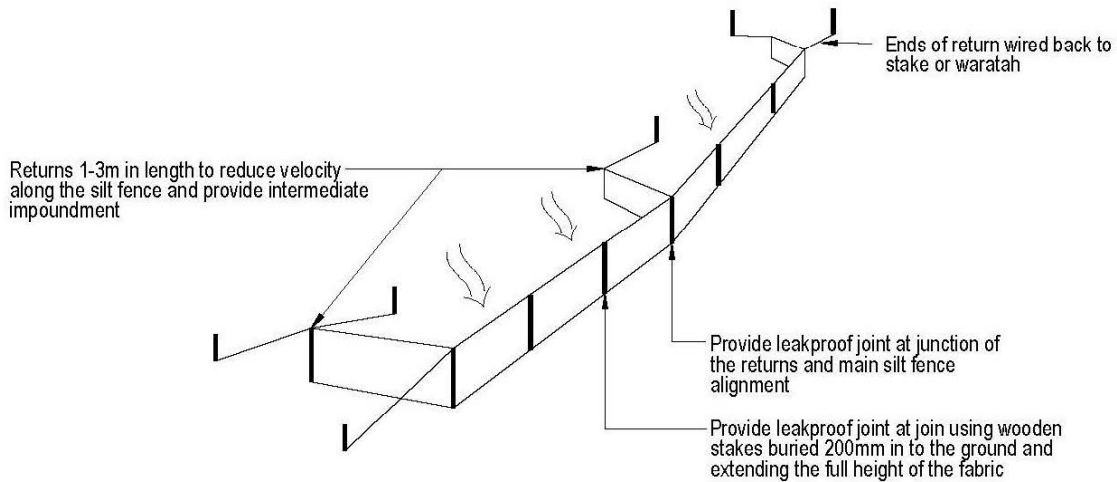
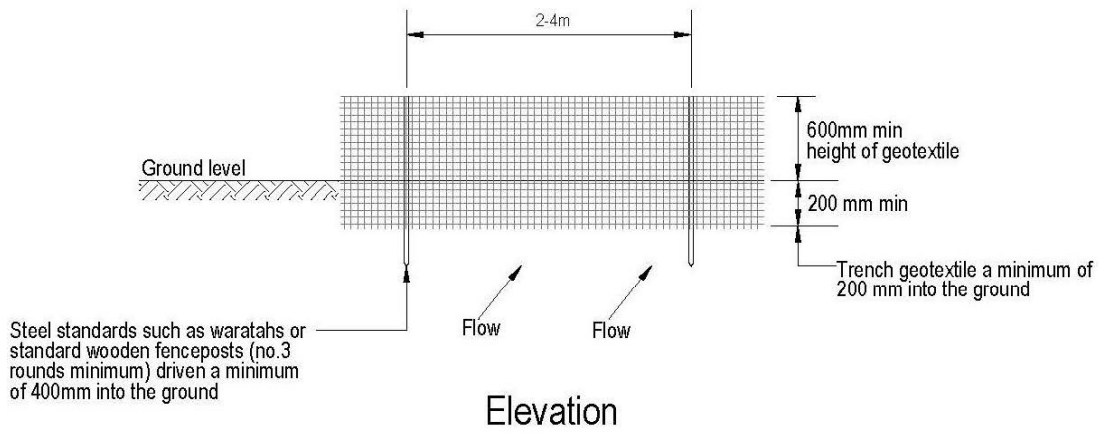
Construction checklist (refer Table and Figure over page and Section F1.3 of GD05 for further details)	Yes (✓)	No (X) (Add comments to explain)
The silt fence material used is appropriate to the site conditions and in accordance with the manufacturer’s specifications		
Silt fences have been installed along the contour		
A trench of a minimum of 100 mm wide and 200 mm deep has been excavated along the proposed line of the silt fence		
Supporting posts /steel waratahs are installed at least 1.5 m length and 2-4 m apart		
Support posts/waratahs are installed on the down-slope edge of the trench, with silt fence fabric on the up-slope side of the support posts to the full depth of the trench. The trench is backfilled with compacted soil		
The top of the silt fence fabric is reinforced with a support made of high tensile 2.5 mm diameter galvanised wire. The wire is tensioned using permanent wire strainers attached to angled waratahs at the end of the silt fence		
The silt fence fabric is doubled over and fastened to the wire with silt fence clips at 500 mm spacings		
Where ends of the silt fence fabric come together, they are overlapped, folded and stapled/screwed to prevent sediment bypass		

Note: The purpose of this checklist is for contractors to complete on-site self-checks of construction quality for ESC practices. This is not a compliance or as-built checklist.

Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Silt fence length (m) (maximum)
Flatter than 2%	Unlimited	N/A	Unlimited
2 – 10%	40	60	300
10 – 20%	30	50	230
20 – 33%	20	40	150
33 – 50%	15	30	75
> 50%	6	20	40



Cross section



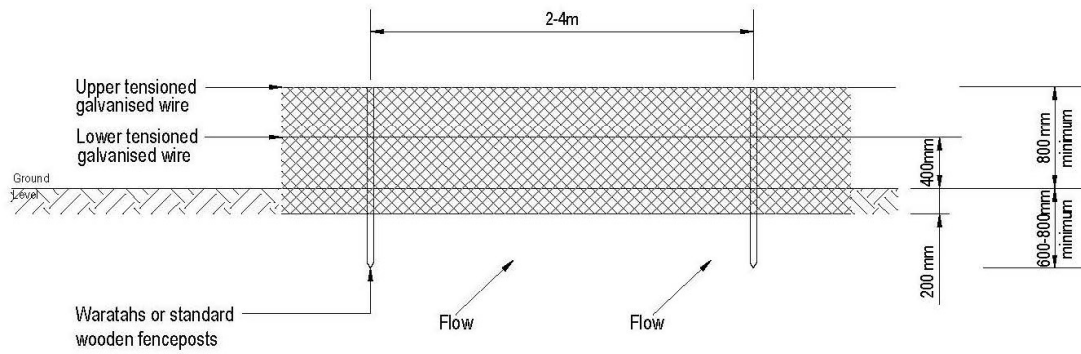
Silt fence with returns and support wire

## Appendix C1.15 Super silt fence

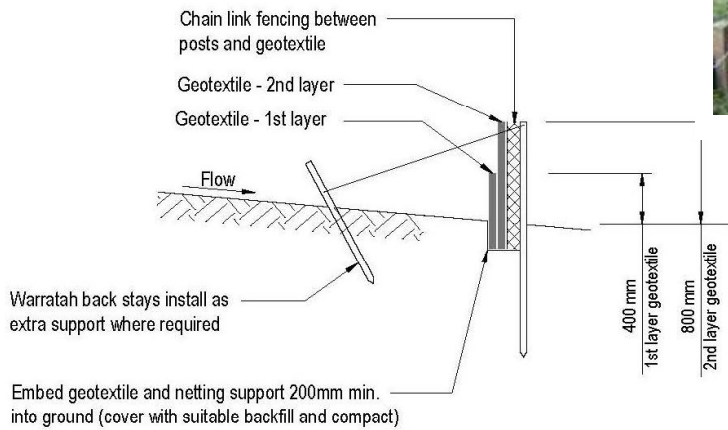
Contractor:	Date: Time:	Consent #:	Site:
-------------	----------------	------------	-------

Construction checklist (refer Figure and table over page and Section F1.4 of GD05 for further details)	Yes (✓)	No (X) (Add comments to explain)
Super silt fence material used is appropriate to the site conditions and in accordance with the manufacturer's specifications		
Super silt fences are installed along the contour		
A trench of a minimum of 100 mm wide and 200 mm deep has been excavated along the proposed line of the silt fence		
Supporting posts /steel waratahs are installed at least 1.8 m length and 2–4 m apart		
Support posts/waratahs are installed on the down-slope edge of the trench, with silt fence fabric on the up-slope side of the support posts to the full depth of the trench. The trench is backfilled with compacted soil		
Tensioned galvanised wire (2.5 mmHT) is installed at 400 mm and again at 800 mm above ground. The wire has been tensioned using permanent wire strainers attached to angled waratahs at the end of the super silt fence		
Chain link fence is secured to the fence posts with wire ties or staples, ensuring the chain link fence goes to the base of the trench		
Two layers of geotextile fabric are secured to the base of the trench (a minimum of 200 mm into the ground), with compacted backfill installed to the original ground level		
Where ends of the silt fence fabric come together, they are overlapped, folded and stapled/screwed to prevent sediment bypass		

Note: The purpose of this checklist is for contractors to complete on-site self-checks of construction quality for ESC practices. This is not a compliance or as-built checklist.



Elevation



Cross - section

Slope steepness %	Slope length (m) (maximum)	Spacing of returns (m)	Super silt fence length (m) (maximum)
0 – 10%	Unlimited	60	Unlimited
10 – 20%	60	50	450
20 – 33%	30	40	300
33 – 50%	30	30	150
> 50%	N/A	20	N/A



## Appendix B: Mitigation Measures



## Mitigation Measures

Cultural Value	Mitigation Measures
<b>Mana Atua</b>	<ul style="list-style-type: none"> <li>• The plan change process should involve Tāngata Whenua members in a partnership capacity. They should be provided the opportunity to evaluate and inform how tāngata whenua values are addressed throughout the life of the project (plan change process and future development across the site). To achieve a meaningful partnership a co-governance arrangement is recommended. This would involve a Governance Roopu being established. The Roopu will comprise the applicant and members appointed by tāngata whenua. The Roopu will remain active through to the completion of the plan change process.</li> <li>• Once the plan change is operative, the provisions shall clearly articulate the expectation of developers to work in partnership with tāngata whenua.</li> <li>• The plan change provisions shall provide the opportunity for cultural induction wananga facilitated by Tāngata Whenua to avoid adverse cultural effects from large scale development.</li> <li>• Karakia and other tikanga as directed by Tāngata Whenua representatives is to be carried out prior to any works commencing on the whenua and after the project is complete.</li> <li>• Provisions shall be made in the plan change to ensure an appropriate ADP, which incorporate tikanga māori, is carried out in the event of an 'accidental discovery'. An example of an appropriate Accidental Discovery Kaupapa is provided at <b>Appendix C</b>.</li> </ul>
<b>Mana Whenua</b>	<ul style="list-style-type: none"> <li>• Appropriate and effective erosion and sediment controls shall be established prior to any earthworks commencing on the whenua. These controls shall be captured by provisions included in the plan change.</li> <li>• No contaminated stormwater runoff from any earth worked areas shall discharge directly off site or to any watercourse. Stormwater from the works site shall be directed via a treatment device or over land prior to discharging off site to cool, treat and slow any stormwater runoff.</li> <li>• The plan change shall incorporate Low Impact Urban Design Principles including passive stormwater treatment.</li> <li>• Plan change provisions shall implement maximum earthworks thresholds to avoid adverse mana whenua effects.</li> </ul>

- Plan change provisions shall implement maximum impervious surfaces thresholds to avoid adverse mana whenua effects.
- Kaitiaki Monitors shall be on site prior to, during and post any earthworks.
- Provisions shall be included in the plan change to ensure the future development of the whenua incorporates large trees and vegetation (landscaping) across the site (public and private spaces) to enhance the mauri and ecology of the whenua. The density of tree/plant species shall be agreed in collaboration with Tāngata Whenua.
- The plan change provisions shall require areas of open space to be set aside for recreation and wellbeing.
- Single storey buildings are encouraged on the flat land to avoid the need for deep piles. Two storey buildings are appropriate on the elevated land within the northern part of the whenua. The plan change provisions shall provide for this configuration of development.

**Mana o te  
Wai**

- Appropriate erosion and sediment controls shall be established prior to any works commencing on site.
- All land disturbance activities, including the placement of material or structures near waterways, shall be managed by use of appropriate plan change provisions. Such provisions should allow for monitoring by kaitiaki monitors, as appointed by Tāngata Whenua at the time of works, to ensure they are carried out in accordance with tikanga Māori.
- The plan change provisions shall ensure existing waterways/watercourses within the whenua are safe guarded from adverse effects these provisions shall include no build areas and appropriate setbacks from the puna (spring) and waterways across the whenua.
- Kaitiaki Monitors shall be on site prior, during and post to any earthworks.
- The disposal of wastewater may be provided via on site disposal or Council's reticulated network.
- In accordance with tikanga māori, it is imperative that the discharge of wastewater is cleansed via Papatūānuku. While it is outside the scope of this CIA, it is expected that KDC shall provide the opportunity for tāngata whenua to work with Council to ensure the future management of the reticulated wastewater network and system are safe and in accordance with tikanga māori.
- The plan change provisions shall ensure where on-site disposal of wastewater is proposed that the system has been designed in accordance with tikanga māori

and avoids existing waterways and accounts for the shallow ground water conditions.

- Mana Tāngata**
- Prior to the plan change being lodged with KDC, the applicant shall engage with Tāngata Whenua to demonstrate how the recommendations of this CIA have been provided for.
  - Tāngata Whenua are given the opportunity to name the whenua including streets and other areas within the project area. It is foreseen that this will take place at the development stage of the proposal. This engagement process will be facilitated by the plan change provisions.
  - Provisions within the plan change shall provide Tāngata Whenua with the opportunity to incorporate their whakaaro into the Development Plan and future land use of the whenua.
  - With the Dargaville Racecourse's approval, an area shall be set aside to showcase the old photos held by the Racecourse.
  - Tāngata Whenua kaitiaki, Kaiārahi and any other cultural input (technical/kaumatua etc) required throughout the duration of project works shall be remunerated by the applicant (Tripartite Group). Such remuneration shall be agreed to prior to any works being carried out on site.
  - Economic opportunities for local Tāngata Whenua should be provided as the development project moves into the planning stage. Dialogue and negotiations should be entered into as part of a formal process so these aspirations can be accommodated and integrated into the project at an appropriate time, as agreed by both parties.
  - Communal vegetable gardens (mara kāi) and orchards (Oro) shall be incorporated across the site.
  - Provisions shall be included in the plan change to ensure the future development of the whenua incorporates communal mara kai, oro in public areas across the site to enhance mana tāngata's ability to grow kai and be self-sustaining.
  - To ensure an appropriate level of privacy and open space is provided between each lot, the plan change provisions shall provide appropriate setbacks, lot size, building coverage, height, bulk, and form of development.
  - A purpose-built community hub, incorporating a communal building and other facilities, shall be established as a part of the future development.



**Mana Ao  
Tūroa**

- Any works shall be carried out in accordance with mātauranga and tikanga Māori and as agreed between Tripartite Group and Tāngata Whenua.
- Environmental controls shall be included in the plan change provisions covered in this CIA to ensure adverse effects on Ao Tūroa are avoided.
- Water is a precious resource and must be collected and used in a sustainable way. The plan change shall ensure all new allotments and future buildings must collect and store water on-site in tanks as a source of potable water, to comply with NZ Fire Safety requirements and to uphold Tāngata Whenua's obligations to mana ao tūroa.



Appendix C:  
Example Accidental Discovery Protocol Kaupapa



### **Accidental Discovery Kaupapa**

In the event of a discovery, of archaeological material and taonga, Accidental Discovery Kaupapa shall be immediately implemented as follows:

- All work on the site will cease immediately. The contractor/works supervisor will shut down all equipment and activity.
- The contractor/works supervisor/owner will take immediate steps to secure the site (tape it off) to ensure the archaeological remains are undisturbed and the site is safe in terms of health and safety requirements and tikanga Māori.
- The contractor/works supervisor/owner will immediately notify the Kaitiaki Monitor on site who will contact Kaumatua and the Area Archaeologist of Heritage New Zealand Pouhere Taonga (Northland Office). The Kaitiaki Monitor will have a direct line of communication with the Heritage New Zealand appointed archaeologist.
- The Kaitiaki Monitor will tautoko Kaumatua regarding the process of implementing tikanga Māori.
- If the material is confirmed as being archaeological, as defined by the Heritage New Zealand Pouhere Taonga Act 2014, an assessment will be carried out before work resumes. If koiwi tāngata are uncovered, the above step must be taken, and the area dealt with according to tikanga Māori and the law.

Works at the site area shall not recommence until an archaeological assessment is made and, the Kaitiaki Monitor together with the on-site archaeologist confirm that all archaeological material has been dealt with appropriately, and statutory requirements met which includes the active Crown protection of Māori interests which includes their culture, taonga and their future generations in accordance with Te Tiriti.

Works may continue within unaffected areas of the site subject to the approval of the on-site archaeologist and Kaitiaki.



Appendix D:  
Title Documents

Rec'd 4.8.90

10

T. 13081

T. 13081

CERTIFICATE ESTABLISHED

Vol. Fol. 60 19

System XV

KAIHU No 2A B.L. S.D.

ORDER 190 for taking Land for Railway



Francis Joseph Dargaville  
by his Solicitor

*[Handwritten signature]*

22.7.90

I, Francis John Hosking, of Dargaville, a surveyor duly licensed under "The Land Transfer Act 1888" do solemnly and sincerely declare that the parcel of land hereon delineated, being portion of the land in certificate, Vol. Fol. 60 of the land register of the District, has been surveyed and pegged on the ground and plotted, in accordance with the regulations of the Surveyor-General, and that this map is in all respects accurate; that the said land is not within the limits of any borough or town district.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of an Act of the General Assembly of New Zealand entitled "The Justices of the Peace Act, 1882."

Declared at Dargaville, this twenty sixth day of July, one thousand eight hundred and ninety

before me Justice of the Peace for the Colony of New Zealand.

Plan of Part of KAIHU No. 2A BLOCK  
Surveyed for J.M. Dargaville Esq.  
By Frank J. Hosking Licensed Surveyor  
May and July 1890  
Scale - Ten

924

Recd 24/7/98

5400 Chs N. of Mt Eden

8800 Chs W. of Z

T O A R I V E R

72-45-36  
737

Plan 5291A

D2  
122.22  
1750.5  
1582.0  
21.38  
20.00

See Description of  
Plan 5291A

37-10-36  
744.56

K A I H U N O 2 B

67  
1945-0-0

B L O C K To Large Plan  
7811

Awake  
Creech  
235.6  
137.7  
323.1  
135.20  
155.42  
3411.22  
1612.0  
196.29  
435.9  
94.4  
118.33  
665.0  
19.0  
50.0  
122.51  
100.15  
17.81  
67.00  
54.0  
60.58  
60.58  
213.7  
466.0  
133.0  
151.5  
65.4  
112.25  
Cheats peg  
Cheats peg

W a i r o a R i v e r



John Mitchelson  
Richard Mitchelson

Francis John Hosking  
7/9/98

1146

Plan of Part of Kaihu Block No 2B  
Surreyed for Mr John Mitchelson  
By Francis John Hosking Licensed Surveyor  
July 1893

Scale 20 Chains to an Inch

Entd on Block Sheets IX & XIII Maungaru S.D.

1146

W.T.  
5/9/98

Case 1067  
11/11/98



60/78

Reference: Warrant No. 756 Vol 4<sup>A</sup> 96  
P.B. folio

Vol. 60, folio 78

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the fourth day of June, one thousand eight hundred and ninety one, under the hand and seal of the District Land Registrar of the Land Registration District of Auckland, being a Certificate in lieu of Grant, under Warrant of His Excellency the Governor, in exercise of the powers enabling him in that behalf, Witnesseth that Pouaka te Awha and Pouitanga te Awha Aboriginal Natives of New Zealand are

in seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under-written or indorsed hereon; subject also to any existing right of the Crown to take and lay off roads under any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan drawn hereon, bordered green, be the several admeasurements a little more or less, which said land is in the said Warrant expressed to have been originally acquired by the above named as from the sixth day of July, one thousand eight hundred and ninety one, under "The Native Land Court Act 1886", that is to say: All that parcel of land containing Ten thousand and twenty three acres more or less being the block of land called or known by the name of Naiehu N<sup>o</sup> 2<sup>B</sup> and numbered 3509<sup>B</sup> situated in the Naiehu and Maungarau Survey Districts in the Provincial District of Auckland. Reserving the right of taking and laying off Public Roads as provided by "The Native Land Court Act 1886"



Mohiaka  
District Land Registrar

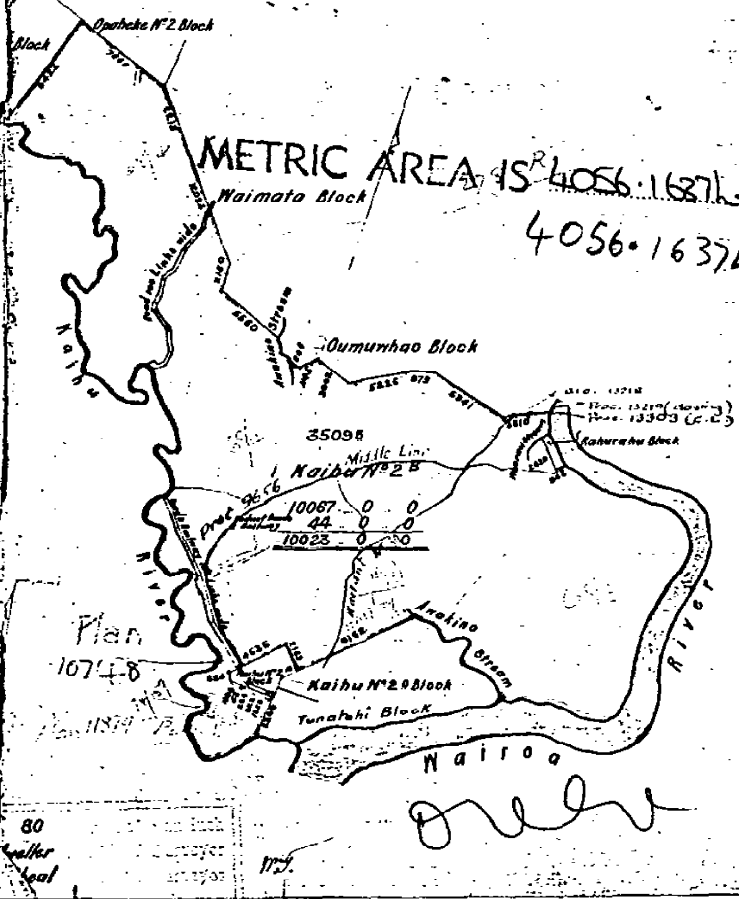
Subject to a transfer dated the 11<sup>th</sup> day of July 1877 for twenty one years of the Maori rights in the Awatomo Creek with certain rights and easements in and over land within one chain from the banks of the Awatomo Creek from Parore to Awha to William Smellie Graham and deposited in the Deeds Register Office Auckland as N<sup>o</sup> 6757 - Mohiaka Dist Land Reg<sup>r</sup>

Deed N<sup>o</sup> 1038 from Pouaka te Awha and Pouitanga te Awha both above named to Richard Mulherson, John Mulherson, and Benjamin all of Bayville Strathfields produced and entered the 6<sup>th</sup> July 1891 at noon Mohiaka

Caveat N<sup>o</sup> 773 by Francis Joseph Danville produced and entered the 6<sup>th</sup> July 1891 at 1 pm Mohiaka

withdrawal of caveat N<sup>o</sup> 773 produced and entered the 1<sup>st</sup> September 1891 at noon Mohiaka

Order N<sup>o</sup> 13080 of part of the land contained in deed N<sup>o</sup> 1038 from Richard Mulherson, John Mulherson, and John Benjamin above named to Francis Joseph Danville of Bayville Strathfields produced the 1<sup>st</sup> September 1891 at and entered the 11<sup>th</sup> September 1891 at 10 am Mohiaka



80  
Water Seal

60/78

# REGISTER

Transfer No 13081 from Pouaka to Awaha and Pourianga to Awaha both within named Francis Joseph Dargaville within named of part of within land produced the 1<sup>st</sup> September 1891 at and entered the 11<sup>th</sup> September 1891 at 10<sup>o</sup> am

and Land Reg<sup>r</sup>

Part cancelled and Certificate issued Vol 60 p 88

and Land Reg<sup>r</sup>

Governor Wanaui No 30 taking that portion of within land colour pink produced and entered the 29<sup>th</sup> October 1891 at 10 am

and Land Reg<sup>r</sup>

Transfer No 15033 from Pouaka to Awaha and Pourianga to Awaha both within named to John Mitchelson within named of all that part of within land shown on Deposited Plan No 1146 subject to transfer of Water Rights, Deposited in the Deeds Registry Office as No 6767 to Lease No 1038, and to proviso in this transfer apportioning Rent, produced and entered the 28<sup>th</sup> September 1893 at 11 am

and Land Reg<sup>r</sup>

Part cancelled and Certificate issued Vol 68 Folio 3

and Land Reg<sup>r</sup>

Transfer No 15034 from Pouaka to Awaha and Pourianga to Awaha both within named to Richard Mitchelson within named of all that part of within land shown on Deposited plan No 1147 subject to transfer of Water Rights Deposited in the Deeds Registry Office as No 6767 to Lease No 1038 and to proviso in this transfer apportioning Rent produced and entered the 2<sup>nd</sup> September 1893 at 11.2 a m

and Land Reg<sup>r</sup>

Part cancelled and Certificate issued Vol 68 Folio 4

and Land Reg<sup>r</sup>

Lease No 902 by the Deputy Land Registrar produced and entered the 4<sup>th</sup> October 1893 at 11.30 am

and Land Reg<sup>r</sup>

Transfer No 15460 from Pouaka to Awaha and Pourianga to Awaha both above named to William Archibald Spiers of part of within land as shown on Plan No 1288, produced and entered the 18<sup>th</sup> August 1894 at 11.30 a.m

Edwin Samford  
Dist Land Reg<sup>r</sup>

7/134

Transfer No 16236 from Pouaka to Awaha and Pourianga to Awaha, both above named, to William Archibald Spiers, of part of within land shown on Plan 1322, produced and entered the 19<sup>th</sup> November 1894 at 2.10 pm

Edwin Samford  
Dist Land Reg<sup>r</sup>

Transfer No 16281 from Pouaka to Awaha and Pourianga to Awaha both within named, to Francis Joseph Dargaville, of part of within land shown on Plan 1329, produced and entered the 3<sup>rd</sup> December 1894 at 12.4.0 p.m.

Edwin Samford  
Dist Land Reg<sup>r</sup>

Transfer No 16728 from Pouaka to Awaha and Pourianga to Awaha both above named to Elega Moros of part of within land shown on plan No 1378 produced and entered the 11<sup>th</sup> May 1896 at 2 p.m.

Edwin Samford  
Dist Land Reg<sup>r</sup>

Cancelled Certificate of Title for Residue issued Vol 76 fol 41

Proclamation 9656 defining middle line of railway Entered 16/6/1938  
CERTIFICATE OF TITLE  
Vol. folio at 36

Order in Council 13218 declaring part of road (N 30) to be Government Road Entered 24/4/1951 at 2 p.m

Proclamation 13219 stopping Government Road (O.S. 6 13218) Entered 24/4/1951 at 2 p.m

Proclamation 13303 declaring land in Proclamation 13219 to be Crown land subject to the Land Act, 1948. Entered 1/1/1951 at 10 am

THIS REPRODUCTION (ON A REDUCED SCALE) CERTIFIED TO BE A TRUE COPY OF THE ORIGINAL REGISTER FOR THE PURPOSES OF SECTION 215A LAND TRANSFER ACT 1952.

L. G. Steman

D.L.R.



60/78  
60/148



Lease No 1797 from Francis Joseph Dargaville to Robert Brydson, with consent of the Mortgagee, produced the 29<sup>th</sup> March 1900 at 11 a.m.

*Walter L. Rege*  
Dist. Reg.



Lease no. 443 of Francis Joseph Dargaville to Benjamin George Williams term 14 years from 1<sup>st</sup> February 1910 with consent of Mortgagee. produced the 12<sup>th</sup> September 1910 at 11.20 p.m.

*Walter L. Rege*  
Dist. Reg.

Sub Mortgage 47794 Murdoch McLean to the Bank of New Zealand Limited produced 7<sup>th</sup> May 1912 at 2.41 p.m.

*Walter L. Rege*  
Dist. Reg.

Mortgage No 76056 Francis Joseph Dargaville to the Bank of New Zealand produced the 2<sup>nd</sup> April 1914 at 2.10 p.m.

*Walter L. Rege*  
Dist. Reg.

Transfer No 112697 of Mortgage No 15328 Murdoch McLean to Isabella Melik McLean his wife produced the 23<sup>rd</sup> May 1919 at 3.41 p.m.

*Walter L. Rege*  
Dist. Reg.

Transfer No 150609 Francis Joseph Dargaville to the Mayor Councillors and Burgesses of the Borough of Dargaville of part discharged from Mortgage No 76056 for a road produced 17<sup>th</sup> November 1921 at 11.48 a.m.

*Walter L. Rege*  
Dist. Reg.

CERTIFICATE OF TITLE,  
Vol. , folio

Discharge of Mortgage No 76056 as to Lots 9, 10, 11 and 12 on plan 15296 produced 4<sup>th</sup> May 1922 at 2.28 p.m.

*Walter L. Rege*  
Dist. Reg.

Transfer No 152751 Francis Joseph Dargaville to Horace Hammond of Lots 9 and 10 on plan 15296 produced 4<sup>th</sup> May 1922 at 2.35 p.m.

*Walter L. Rege*  
Dist. Reg.

Transfer No 155772 Francis Joseph Dargaville to the Church of Lots 11 and 12 on plan 15296 produced 4<sup>th</sup> May 1922 at 2.33 p.m.

*Walter L. Rege*  
Dist. Reg.

Transfer No 159586 Francis Joseph Dargaville to John Ernest Mann of Lot 2 on plan 15296 discharged from mortgage No 76056 produced 31<sup>st</sup> August 1922 at 12.25 p.m.

*Walter L. Rege*  
Dist. Reg.



REGISTER

Register-book  
Vol. 68, folio 3

Reference: Vol. 60, folio 78  
Transfer No. 15033

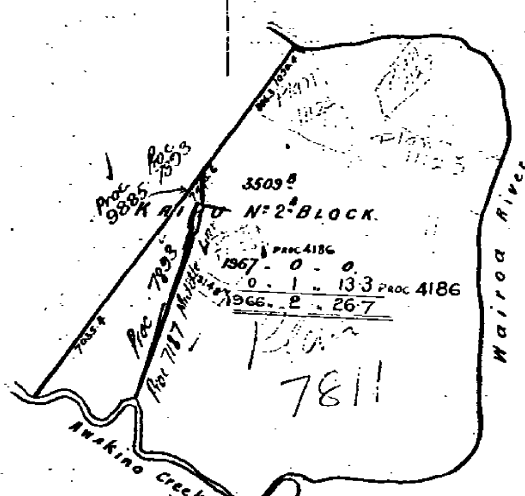


CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

DUPLICATE DESTROYED

This Certificate, dated the twenty eighth day of September, one thousand eight hundred and ninety three, under the hand and seal of the District Land Registrar of the Land Registration District of Auckland Witnesseth that John Mitchelson of Otago

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or indorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered green be the several admeasurements a little more or less, that is to say: All that parcel of land containing One thousand nine hundred and sixty seven acres more or less being portion of the Hauru No 2 Block No 3509 B as the same is delineated on the plan deposited in the Land Transfer Office Auckland as No 1116 reserving the right of taking and laying off Public Roads as provided by the Native Land Court Act 1886



John  
District Land Registrar

Subject to a Transfer Dated the 11<sup>th</sup> day of July 1877 for twenty one years of the Water rights in the Waikato Creek with certain rights and easements in and over the land within described one chain from the banks of the Waikato Creek from Taron to Julia to William Smellie Graham and deposited in the Deeds Registry Office Auckland as No 6767

Subject to the proviso for apportionment of rent payable under lease No 1035 as more fully set forth in Transfer No 15033

Mortgage of No 10350<sup>A</sup> from John Mitchelson, above named, to William Cameron of Remuera contractor ~~of~~ to Water rights granted ~~to~~ deposited in the Deeds Registry Office as No 6767 and apportionment of rent payable under lease 1032 as set forth in Transfer No 15034 produced and entered the 4<sup>th</sup> October 1893 at 12.34

Proc 7833 13-1-203

Proc 9885 0-2-203

METRIC AREA IS

796.0165 ha

Scale - 10 Chains to an inch

Geo. Hunter  
Surveyor

*con*

*over*

68/3

1801/21 No 12031 from John Mitchellson above named SCARCE National Bank of New Zealand Ltd produced and entered the 2nd February 1911 at 2.30 pm

Edwin Bamford Dist. Court Reg.

2.2096 The above named William Casson died on the 9th day of June 1898 and probate of his will was granted to John Chambers Inspector and David Goldie Timber Merchant both of Auckland on the 24th day of June 1898 Entered the 24th November 1898 at 1 pm

Edwin Bamford Dist. Ct. Reg.

Transfer N 29076 of mortgage N 10350A from John Chambers and David Goldie to William Randall of Auckland Gentleman produced the 11th August 1903 at 2.46 pm

Edwin Bamford Dist. Ct. Reg.

Transfer N 31847 John Mitchellson and Donald Finlayson and Kenneth Finlayson both of which were contractors as tenants in common in equal shares, discharged from mortgage N 10350A produced the 22nd September 1903 at 10.16 am

Edwin Bamford Dist. Ct. Reg.

Cancelled as to the undivided moiety of Donald Finlayson Certificate of title issued Vol 136 fol 207

X 3523 bequeath by Harry Ernest Wood and Sydney Ernest Wood produced 17 June 1912 at 2.27 pm

Withdrawal of X 3523 as to land in Transfer N 70328 for produced the 13th December 1912

Transfer N 70328 Kenneth Finlayson to the Public of all roads sh. work on plan N 7811 as public roads produced the 15th December 1912 at 2.51 pm

X 3523 withdrawn as to the land in Transfer N 74880 produced the 2nd August 1913 at 11.24 am

Transfer 74880 Kenneth Finlayson to Woolsey Allen the Elder of lot 2 on plan 7811 produced 21st August 1913 at 2.25 pm

210/285

Arthur W. Kitchin Ass't Reg.

# REGISTER 68/3

X 3523 withdrawn as to land in Transfer 75279 produced 9th September 1913 at 12.59 pm

Transfer 75279 Kenneth Finlayson to Arthur Bedford Hammond of lots 7 and 26 on plan 7811 produced 9th September 1913 at 2 pm

X 3523 withdrawn as to lot 26 on plan 7811 produced the 14th October 1915 at 10 am

Transfer N 75997 Kenneth Finlayson to Charles Eric Thompson of lot 26 on plan 7811 produced 13th October 1913 at 10.4 am

X 4204 bequeath by Harry Ernest Wood against John W. Galt and David Williamson as tenants in common in equal shares of lot 14 on plan 7811 produced the 11th December 1913 at 11.40 am

X 3523 bequeath withdrawn as to lot 14 on plan 7811 produced the 9th June 1914 at 2 pm

CERTIFICATE OF TITLE, Transfer N 10136 Kenneth Finlayson to Ernest John W. Galt and David Williamson as tenants in common in equal shares of lot 14 on plan 7811 produced the 9th June 1914 at 10.50 am

Withdrawal of bequeath 3523 as to lot 26 on plan 7811 produced the 4th June 1915 at 10.1 am

Transfer 1086302 Kenneth Finlayson to Harry Waller Page of lot 26 on plan 7811 produced the 11th June 1915 at 10.2 am

Transfer 1086927 Kenneth Finlayson to George Allen Rawlings and Frederick Norman Rawlings of lot 13 on plan 7811 as tenants in common in equal shares produced the 9th July 1915 at 11.10 am

Transfer 103880 Kenneth Finlayson and Annie Elizabeth Finlayson to Ernest John W. Galt, William Galt, Arthur Bedford Hammond, Harry Ernest Wood and Sydney Ernest Wood being a joint and several grant and reservation of drainage rights over parts of lots 14, 15, 16, 17, 18, 19, 27, 28, 29, 30, 31 and 32 subject to bequeath 3523 and with consent of bequeathor produced the 9th October 1915 at 11.47 am

Transfer 103880 Kenneth Finlayson and Annie Elizabeth Finlayson to Ernest John W. Galt, William Galt, Arthur Bedford Hammond, Harry Ernest Wood and Sydney Ernest Wood being a joint and several grant and reservation of drainage rights over parts of lots 14, 15, 16, 17, 18, 19, 27, 28, 29, 30, 31 and 32 subject to bequeath 3523 and with consent of bequeathor produced the 9th October 1915 at 11.47 am

Transfer 103880 Kenneth Finlayson and Annie Elizabeth Finlayson to Ernest John W. Galt, William Galt, Arthur Bedford Hammond, Harry Ernest Wood and Sydney Ernest Wood being a joint and several grant and reservation of drainage rights over parts of lots 14, 15, 16, 17, 18, 19, 27, 28, 29, 30, 31 and 32 subject to bequeath 3523 and with consent of bequeathor produced the 9th October 1915 at 11.47 am



REGISTER  
Register-book,  
Vol. 68 folio 3

Reference: Vol. , folio  
Transfer No.

1454

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the \_\_\_\_\_ day of \_\_\_\_\_, one thousand eight hundred and ninety- \_\_\_\_\_, under the hand and seal of the District Land Registrar of the Land Registration District of \_\_\_\_\_ Witnesseth that

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or indorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered \_\_\_\_\_, be the several admeasurements a little more or less, that is to say: All that parcel of land containing \_\_\_\_\_

*Memorials Continued*

- 8 Transfer n° 93338 Kenneth Finlayson to Thomas Henry Wells of Lot 5 on plan 7811 produced the 26<sup>th</sup> June 1916 at 12:30pm  
*W. McEbley*  
*Dist. Land Reg.*
- 5 254/8  
28 Transfer n° 94553 Kenneth Finlayson to Josephs Bayre Johnston of Lots 21 and 22 on plan 7811 produced the 18<sup>th</sup> August 1916 at 2:56pm  
*W. McEbley*  
*Dist. Land Reg.*
- 15 257/153  
Transfer n° 95277 Kenneth Finlayson to Thomas Martin of Lot 15 on plan 7811 produced the 26<sup>th</sup> September 1916 at 2:56pm  
*W. McEbley*  
*Dist. Land Reg.*
- 16 257/154  
Transfer n° 95763 Kenneth Finlayson to Peter Andrew Day of Lot 16 on plan 7811 and all the land on plan 19269 produced the 20<sup>th</sup> October 1916 at 11:14am  
*W. McEbley*  
*Dist. Land Reg.*
- 11 257/145  
Transfer n° 96150 Kenneth Finlayson to Robert Ernest Clements of Lots 11 and 12 on plan 7811 produced the 9<sup>th</sup> November 1916 at 10:28am  
*W. McEbley*  
*Dist. Land Reg.*

*Cur(3)*

*dlp*

*13/12/16*

*68/3*

REGISTER

68/3

34  
35  
Transfer No 96764 Kenneth Finlayson to James Eliza Taylor of part of lots 34 and 35 on plan 7811 produced the 12<sup>th</sup> December 1916 at 10:22 am  
260/33  
McClellan  
C. S. D. Reg.

34  
Transfer No 96765 Kenneth Finlayson to Walter Stanley Brown of all land on plan 11127 produced the 12<sup>th</sup> December 1916 at 10:30 am  
260/33  
McClellan  
C. S. D. Reg.

38  
Transfer No 94856 Kenneth Finlayson to James Hemming Carpe of Lot 38 on plan 7811 (except the land on plan 11442) produced the 20<sup>th</sup> February 1917 at 10:20 am  
263/16  
McClellan  
C. S. D. Reg.

1  
Transfer No 94864 Kenneth Finlayson to Thomas Charles Hawkins of Lot 1 on plan 7811 produced the 26<sup>th</sup> February 1917 at 11:45 am  
263/16  
McClellan  
C. S. D. Reg.

9  
Transfer No 94878 Kenneth Finlayson to William Kennedy of Lot 9 on plan 7811 produced the 2<sup>nd</sup> April 1917 at 2:16 pm  
264/118  
McClellan  
C. S. D. Reg.

3  
Transfer No 99426 Kenneth Finlayson to Arthur Bedford Hammon of Lot 3 on plan 7811 produced the 19<sup>th</sup> May 1917 at 11 am  
266/11  
McClellan  
C. S. D. Reg.

35  
Transfer No 99491 Kenneth Finlayson to Ruth Lowe of all the land on plan 11124 produced the 22<sup>nd</sup> May 1917 at 12:20 pm  
266/170  
McClellan  
C. S. D. Reg.

31  
Transfer No 100393 Kenneth Finlayson to Alban Thomas Thomas of Lot 31 and part of Lot 30 on plan 7811 produced the 24<sup>th</sup> July 1917 at 11:58 am  
268/293  
McClellan  
C. S. D. Reg.

33  
Transfer No 100501 Kenneth Finlayson to William Phillips of Lot 33 on plan 7811 produced the 10<sup>th</sup> July 1917 at 2:55 pm  
268/131  
McClellan  
C. S. D. Reg.

32  
Transfer No 101188 Kenneth Finlayson to John Phillips of Lot 32 on plan 11125 produced the 13<sup>th</sup> August 1917 at 11:50 am  
269/109  
McClellan  
C. S. D. Reg.

Transfer No 101189 Kenneth Finlayson to John Phillips George Edward Prince of Lot 6 on plan 7811 produced the 13<sup>th</sup> August 1917 at 11:55 am  
269/110  
McClellan  
C. S. D. Reg.

Transfer No 101566 Kenneth Finlayson to Thomas Henry Wells of Lots 19 and 20 on plan 7811 produced the 30<sup>th</sup> August 1917 at 2:30 pm  
270/17  
McClellan  
C. S. D. Reg.

Transfer No 101699 Kenneth Finlayson to Alfred Rolfe of Lot 25 on plan 7811 produced the 7<sup>th</sup> September 1917 at 10:13 am  
271/16  
McClellan  
C. S. D. Reg.

Transfer No 101701 Kenneth Finlayson to Samuel Phillip of Lot 32 on plan 11125 produced the 7<sup>th</sup> September 1917 at 10:17 am  
270/105  
McClellan  
C. S. D. Reg.

Transfer No 102474 Kenneth Finlayson to George Edward Prince of Lots 23 and 24 on plan 7811 produced the 19<sup>th</sup> October 1917 at 11:58 am  
272/37  
McClellan  
C. S. D. Reg.

CERTIFICATE OF TITLE,

Vol. , folio

Transfer to 102475 Kenneth Finlayson to Bora Bowman of Lot 10 on plan 7811 produced the 19<sup>th</sup> October 1917 at 12 noon  
272/32  
McClellan  
C. S. D. Reg.

Transfer No 105402 Kenneth Finlayson to Alexander Williams Morris of Lot 18 on and balance of Lot 17 on plan 7811 produced the 1<sup>st</sup> May 1918 at 11:20 am  
273/11  
McClellan  
C. S. D. Reg.

Transfer No 105409 Kenneth Finlayson to James Hanna of Lots 27 and 28 on plan 7811 produced the 2<sup>nd</sup> May 1918 at 12 noon  
273/13  
McClellan  
C. S. D. Reg.

Transfer No 109452 Kenneth Finlayson to Michael Victor Kennedy of Lot 41 on plan 7811 produced the 12<sup>th</sup> December 1918 at 12:20 pm  
284/192  
McClellan  
C. S. D. Reg.

5/2/17

18

17

29

41



Reference: { Vol. folio  
Transfer No.

1454

68/3

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the \_\_\_\_\_ day of \_\_\_\_\_, one thousand eight hundred and ninety-\_\_\_\_\_, under the hand and seal of the District Land Registrar of the Land Registration District of \_\_\_\_\_, Witnesseth that

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or indorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered \_\_\_\_\_, be the several admeasurements a little more or less, that is to say: All that parcel of land containing

Vol 68, folio 3, cont'd 68/3

- 44 Transfer No 10203 Kenneth Finlayson to Allan King the younger and John Henry King of lots 44 and 48 on plan 7811 as tenants in common in equal shares produced the 22<sup>nd</sup> January 1919 at 2:36 pm  
285/256  
Mills  
Dist Land Reg.
- 42 Transfer No 111076 Kenneth Finlayson to Henry Francis Kimber of lot 42 on plan 7811 produced the 28<sup>th</sup> February 1919 at 2:59 pm  
287/1144  
Mills  
Dist Land Reg.
- 45 Florence Wynn of Lot 45 on Plan 7811 produced the 7<sup>th</sup> August 1919 at 10:52 am  
293/69  
L. Maguire  
Dist Land Reg.
- 39 + 40 Transfer No 126268 Kenneth Finlayson to John Frost of lots 39 and 40 plan 7811 produced the 18<sup>th</sup> May 1920 at 12:37 pm  
309/65  
E. Adams  
Dist Land Reg.
- 43 + 47 Transfer No 128365 Kenneth Finlayson to William Charles Brown of lots 43 and 47 on plan 7811 produced the 24<sup>th</sup> June 1920 at 10:23 am  
309/64  
E. Adams  
Dist Land Reg.
- 30 Transfer No 130085 Kenneth Finlayson to Edward Robert Kingzett of all the lands on Plan 11537 produced 26<sup>th</sup> July 1920 at 12 noon  
313/171  
Mills  
Dist Land Reg.
- Transfer No 131403 Kenneth Finlayson to Samuel James Blake of Lot 4 on plan 7811 produced the 18<sup>th</sup> August 1920 at 10:15 am  
317  
Mills  
Dist Land Reg.
- Transfer No 19907 Kenneth Finlayson to Francis Joseph Dargaville, James Allison, James Hemphill and Frank Peter Best of lot 37-37 plan 7811 produced 28/5/25 at 10:50 am  
413/269  
Mills  
Dist Land Reg.
- No 4187 Proclamation defining the middle line of a railway through the land on plan 11442 entered 19.2.29 at 10 am  
16-9-31
- No 4893 Proclamation taking part land on plan 11442 for a railway entered 11/4/31 at 10:00 am  
at 10:00 am
- Proclamation No 9885 taking part of the land on plan 11442 for small farms purposes entered 3/4/39 at 10:00 am  
at 10:00 am

THIS REPRODUCTION (ON A REDUCED SCALE) CERTIFIED TO BE A TRUE COPY OF THE ORIGINAL REGISTER FOR THE PURPOSES OF SECTION 215A LAND TRANSFER ACT 1952.  
L.G. Stoman D.L.R.

CANCELLED





**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Historical Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

**Identifier** NA692/361  
**Land Registration District** North Auckland  
**Date Issued** 25 August 1937

**Prior References**  
NA413/269

---

**Estate** Fee Simple  
**Area** 46.6729 hectares more or less  
**Legal Description** Part Lot 37 Deposited Plan 7811  
**Original Registered Owners**  
Northern Wairoa Racing Club Incorporated

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**Interests**

462327 Mortgage to Australia and New Zealand Bank Limited - 12.11.1958 at 9.27 am  
5237587.1 Gazette notice declaring part adjoining road State Highway 14 to be limited access road - produced 30.5.2002 at 1.21pm and entered 29.7.2002 at 9.01am  
5237587.2 Notice pursuant to Section 91 Transit New Zealand Act 1989 - produced 30.5.2002 at 1.21pm and entered 29.7.2002 at 9.01am  
8657969.2 Change of Name of Northern Wairoa Racing Club Incorporated to The Dargaville Racing Club Incorporated - 9.12.2010 at 3:43 pm

# REGISTER

[Land and Deeds - 4]  
[Form B.]

## NEW ZEALAND.

Reference: Vol. 413, Folio 269  
Transfer No.  
Application No.  
Order for N/O No. G.16252.



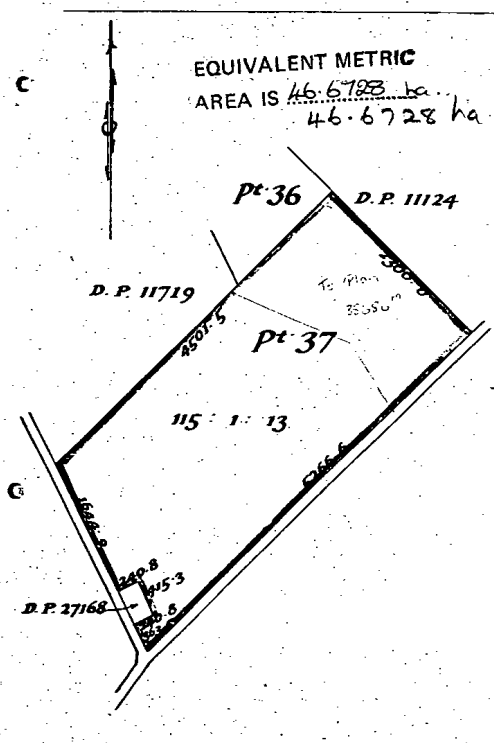
Register-book,  
Vol. 692, folio 361.

692/361

### CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the twenty-fifth day of August one thousand nine hundred and thirty-seven under the hand and seal of the District Land Registrar of the Land Registration District of AUCKLAND Witnesseth that JAMES ALLISON STEIN HEMPHILL of Napuna, Farmer, FRANK OSCAR PEAT of Dargaville, Jeweller and ALFRED JOHN FINCH of Dargaville, Dentist, are

inseised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under written or endorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered green, be the several admeasurements a little more or less, that is to say: All that parcel of land containing one hundred and fifteen acres one rood and thirteen perches more or less situated in Block IX of the Maungaru Survey District being part Lot thirty-seven (37) on a plan deposited in the Land Registry Office at Auckland as No. 7811 and being portion of the Block called Kaitu No. 28.



EQUIVALENT METRIC  
AREA IS 46.6728 ha.  
46.6728 ha.



W. Williams

Assistant District Land Registrar.

Mortgage No. 241708 James Alliston Stein Hemphill, Frank Oscar Peat and Alfred John Finch to The Union Bank of Australia Limited dated 25th May 1937 at 10.15 a.m.

W. Williams

Asst. L.R.

Z 52435 Transmission to Alfred John Finch and  
Alfred Peat, entered 18/4/37 at 12.5 o'clock  
W. Williams  
Transfer 415005 Alfred John Finch  
to James Norman Harrison, farm  
manager and Sydney Edmund Thomas  
stock agent both of Dargaville  
Produced 3-4-1947 at 10.26 a.m.  
W. Williams  
Deed 22145 of the same or plan 38686 - the  
repealed proprietors to Thomas Anthony Condon  
term 10 years from and inclusive of 26th September  
1950 - Produced 24-8-1951 at 11.12 a.m.  
W. Williams  
Z 70827 Transmission to James Norman  
Harrison, farm manager and Sydney Edmund  
Thomas, stock agent, both of Dargaville  
as survivors entered 3-12-1951 at 11.16 a.m.  
W. Williams

Scale: 10 Chains to an inch

over

just

REGISTER

692/361

692/361

Transfer 509104 James Norman Harrison  
and Sydney Edmund Thomas to the said  
James Norman Harrison Sydney Edmund  
Thomas and John Bruce of Danangia,  
Transfer Produced 5.12.1951 at 11.17%

Transfer 581906 to Northern  
Waikato Racing Club Incorporated  
Produced 6.12.1956 at 10.140 oc

Mortgage 462327 to Australia and New  
Zealand Bank Limited. Produced 12.11.1958  
at 9.27 oc.

THIS REPRODUCTION (ON A REDUCED SCALE)  
CERTIFIED TO BE A TRUE COPY OF THE  
ORIGINAL FOR THE PURPOSES OF  
SECTION 124A OF THE TRANSFER ACT 1952.  
D.L.R.

113714.1 Mortgage of the N.Z.  
Savings Bank (New Zealand) Limited  
- 25.8.1972 at 2.49 oc.  
B990455.1

113714.2 Memorandum of Priority  
making Mortgage 113714.1 a first  
Mortgage and Mortgage 462327 a  
second Mortgage - 25.8.1972 at  
2.49 oc.





**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** **NA692/361**  
**Land Registration District** **North Auckland**  
**Date Issued** 25 August 1937

**Prior References**  
NA413/269

---

**Estate** Fee Simple  
**Area** 46.6729 hectares more or less  
**Legal Description** Part Lot 37 Deposited Plan 7811

**Registered Owners**  
The Dargaville Racing Club Incorporated

---

**Interests**

462327 Mortgage to Australia and New Zealand Bank Limited - 12.11.1958 at 9.27 am  
5237587.1 Gazette notice declaring part adjoining road State Highway 14 to be limited access road - produced 30.5.2002 at 1.21pm and entered 29.7.2002 at 9.01am  
5237587.2 Notice pursuant to Section 91 Transit New Zealand Act 1989 - produced 30.5.2002 at 1.21pm and entered 29.7.2002 at 9.01am

