Before the Far North District Council Hearings Committee

In the Matter	of the Resource Management Act 1991 ("**RMA"**)
And	
In the Matter	of the Proposed Far North District Plan.

Evidence of Joseph Brady Henehan on behalf of Musson Family Trust (Submitter number S404)

Dated 9 June 2025

Reyburn and Bryant 1999 Ltd
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1. Introduction

1.1 My name is Joseph Brady Henehan. I am a planning consultant working for Reyburn and Bryant in Whangarei. I hold a Bachelor of Environmental Planning from the University of Waikato. I am a full member of the New Zealand Planning Institute (MNZPI).

1.2 I have 11 years of experience as a planning consultant in the Northland region. My role has typically been to lead project teams through various resource consent, notice of requirement, and plan change processes, and to provide environmental and strategic planning advice for these projects.

1.3 Most of my work has been in the Northland Region, and so I am very familiar with the history, content, and structure of the Far North District Plan and the higher-level planning documents.

2. Code of conduct

2.1 I have read and agree to abide by the Environment Court's Code of Conduct for Expert Witnesses (2023). This evidence is within my area of expertise. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

3. Scope of evidence

3.1 This evidence is focussed on the zoning applied to 21 titles located on both sides of Houhora Heads Road, Pukenui under the Proposed Far North District Plan ("PFNDP"). This relates to submission number 404 made by the Musson Family Trust ("MFT").

4. Original submission

4.1 The original submission sought that 21 titles located on both sides of Houhora Road are rezoned Settlement Zone ("SETZ"), or any other relief with similar effect. This is referred to as 'the submission area' for the remainder of this evidence.

4.2 **Attachment 1** includes plans showing the extent of the submission area and the zoning sought by the submission. The plans are addressed where relevant in this evidence.

4.3 The MFT owns one of the 21 titles within the submission area. The title is located at 30 Houhora Heads Road, is referenced as 864007, is legally described as Lot 4 DP 530683, and has a total area of 8,704m^2.

4.4 The following summarises the key characteristics of the submission area and surrounding environment:

(1) Soil composition: Under the LUC system, the soils within the submission area are class 4. Given this classification, the submission area is not 'highly productive' under the National Policy Statement for Highly Productive Land ("NPS-HPL") and the soils are not 'highly

versatile' under the Regional Policy Statement for Northland ("RPS").

(2) Built form: The majority of the titles located on the eastern side of Houhora Road accommodate residential development. Two of the titles (864008 and 864005) are vacant, while the title located on the western side of Houhora Heads Road (NA132C/87) is also vacant.

(3) Ground cover: Beyond the existing built form and associated curtilage areas, the submission area is primarily in pasture. There are scattered areas of mixed vegetation, which is primarily located along property boundaries on the eastern side of Houhora Heads Road and along the road boundaries and around the small watercourses on the western side of Houhora Heads Road.

(4) Topography: The submission area is essentially flat. There are some localised undulations, primarily around the small watercourses that traverse the submission area.

(5) Archaeology: The submission area is largely free of recorded archaeological sites. The Far North District Council ("FNDC") 'historic sites' GIS shows that there is one recorded site located near the western boundary of the title located on the western side of Houhora Heads Road (NA132C/87).

(6) Operative zonings and overlays: The submission area is zoned Coastal Living, while parts are identified as being flood susceptible Under the Operative Far North District Plan ("OFNDP").

(7) Proposed zonings and overlays: The submission area is zoned 'Rural Lifestyle', while parts are subject to the Coastal (Zone 1 – 3) and River (10 and 100 year) Flood Hazards under the PFNDP. A small portion of the title located on the western side of Houhora Heads Road (NA132C/87) is also subject to the Coastal Environment overlay.

(8) Surrounding environment: The surrounding area features a mix of zone types. To the west are two clusters zoned 'Settlement' under the PFNDP – Raio and Pukenui – separated by Rural Lifestyle zoned land. The submission area lies immediately east of the Raio Settlement and is part of a broader 'Rural Lifestyle Zone'. Further west and across the Houhora Harbour to the east, the land is zoned 'Rural Production'.

5. Reasons for the request

5.1 The reasons for the proposed rezoning are outlined below:

Housing supply and affordability

(1) The Far North District faces a significant housing affordability challenge, with the Housing and

Business Development Capacity Assessment ("HBA") classifying the market as severely unaffordable and identifying a growing shortfall in low-cost housing options. The current Rural Lifestyle Zone ("RLZ") limits development density and restricts the ability to deliver smaller, more affordable dwellings. Rezoning the submission area to SETZ would enable a broader range of housing types and densities, directly responding to identified demand and better aligning with the district's strategic housing objectives. Local real estate advice (refer to the two letters at **Attachment 2**) confirms that only five vacant sections are currently available in the Pukenui/Houhora area, with supply constrained by limited residential zoning and long-term land retention by local families. Demand remains strong among both permanent and seasonal residents, reinforcing the need to unlock more land for residential development.

Zoning and development potential

(2) The application of the RLZ under the PFNDP represents a down-zoning relative to the OFNDP. While both plans provide for controlled subdivision into 2-hectare lots, the OFNDP also allows for 8,000m² lots as a restricted discretionary activity and 5,000m² lots as a discretionary activity. In contrast, the PFNDP only provides for subdivision below 2 hectares via a non-complying pathway. This reduces practical development potential and limits the ability to respond to existing and future housing demand. Retaining a more enabling zoning framework is therefore critical to facilitating the small-lot residential development the area can support.

Constraints on other SETZ land

(3) Although the PFNDP proposes additional SETZ land in the wider Pukenui area, much of this land is constrained and unlikely to support full development. The large site immediately north of the submission area contains extensive wetlands, which significantly limit its yield. Similarly, SETZ land on Waterfront Road is affected by numerous archaeological sites and lacks appropriate road infrastructure, with any upgrades likely to incur substantial costs. In contrast, the submission area is unconstrained and readily serviceable, making it a more efficient and immediately developable location. The proposed rezoning would therefore help to offset yield lost from more constrained areas and support district-wide housing supply objectives.

Existing development pattern

(4) The submission area already reflects a density and development pattern more aligned with the SETZ. Of the 21 existing titles, 20 are smaller than the 2ha minimum lot size anticipated by the RLZ, ranging between 4,000m² and 1.9ha. These lots are already developed or used for lifestyle and residential purposes. The remaining 10.84ha title sits between this cluster and another large title proposed to be zoned SETZ, reinforcing the appropriateness of

applying the SETZ to better reflect existing land use and subdivision patterns.

Transport infrastructure

(5) The submission area is well located in terms of transport infrastructure. It is accessed via Houhora Heads Road, a local road that connects to State Highway 1 without requiring direct access. The intersection provides good sight distances, and although it lacks deceleration lanes or a median strip, any upgrades can be addressed through future development consenting processes. Notably, Waka Kotahi NZ Transport Agency has not opposed the rezoning, indicating no major concerns with the proposed access arrangements.

Productive land values

(6) The submission area does not contain highly productive land under the NPS-HPL, nor does it accommodate highly versatile soils as defined in the RPS. As such, the proposed rezoning will not compromise productive rural values or result in the loss of valuable agricultural land.

6. Alignment with FNDC 'general guidance criteria for rezoning submissions' (Minute 14)

6.1 The following section of this evidence addresses the rezoning request in the context of the 'general criteria' for rezoning submissions included in final minute 14 issued by the independent hearing panel.

Strategic direction

6.2 The strategic direction chapter includes 6 sections. Each section includes high-level objectives that are intended to ensure that growth and development across the district supports community wellbeing, protects environmental and cultural values, enables a resilient and efficient settlement pattern, and responds proactively to climate change and natural hazards.

6.3 The objectives and policies from the Rural Environment section are of most relevance to the proposed rezoning. The Rural Environment section seeks to support efficient primary production (SD-RE-O1) and to protect highly productive land from inappropriate development (SD-RE-O2). The submission area is not identified as highly productive under the NPS-HPL or the RPS and is therefore not subject to the protection intent of SD-RE-O2. With respect to SD-RE-O1, both the RLZ and the SETZ enable primary production as a permitted activity. As such, the proposed rezoning will not compromise the efficiency or viability of rural production activities in the area and remains consistent with the rural environment objectives of the plan.

6.4 With respect to the Historic and Cultural Wellbeing section, the submission area does not contain any sites of significance to Māori and there is only one recorded archaeological site located near the property at NA132C/87. Regardless, the rezoning does not alter legal obligations or the

application of relevant plan provisions, which remain in place regardless of zoning. Future resource consent and archaeological authority processes will ensure Te Tiriti o Waitangi is given effect to, and that tangata whenua values and kaitiakitanga are reflected in decision-making. The rezoning is therefore consistent with the objectives of the Historic and Cultural Wellbeing section.

6.5 The proposal is consistent with the Natural Environment Chapter as it proposes a zone that reflects existing and approved lot sizes for the submission area. There is no elevated landscape values identified for the submission area under the PFDNP. The Coastal Environment provisions apply regardless of the underlying zoning, ensuring that the values associated with the small portion of the title located on the western side of Houhora Heads Road (NA132C/87) are retained.

6.6 The proposal aligns with the objectives of the Economic and Social Wellbeing and Infrastructure and Development sections. It enables additional housing opportunities in a location with demonstrated demand and the capacity to accommodate on-site infrastructure. The rezoning supports local housing supply, contributes to social wellbeing, and represents an efficient use of land already fragmented and developed for lifestyle and residential purposes.

6.7 The Urban Form and Development section primarily relates to urban centres and is not relevant to the proposed rezoning. Likewise, the objectives within the Infrastructure and Social Wellbeing section that address renewable energy are not applicable to this proposal.

Alignment with zone outcomes

6.8 Alignment with the objectives and policies for the SETZ is demonstrated in **Table 1** below.

Table 1*: Assessment in context of SETZ objectives and policies.*

Objective	**Assessment**
RSZ-O1	The proposed rezoning reflects the existing residential and lifestyle development pattern and will enable further residential use consistent with the zone's primary purpose.
RSZ-O2	The existing lots are for the most part small and developed in a settlement-style pattern. Rezoning will formalise the existing character and will not increase density beyond what the area can absorb.
RSZ-O3	The land is unconstrained, not subject to significant environmental limitations, and has capacity for on-site servicing. Infrastructure requirements can be addressed at the resource consent stage. The MFT has also obtained two geotechnical suitability reports for previous development on their property (**Attachment 3**), which did not

	identify any impediments to development, indicating that the land is generally suitable.
RSZ-O4	The area is already characterised by residential and lifestyle uses. Additional development will not introduce new sensitive activities and will be compatible with surrounding land uses.
Policy	**Assessment**
RSZ-P1	The proposed rezoning enables residential use in line with the purpose of the zone There are no existing non-residential activities that are in conflict with the existing or anticipated role, function, or predominant character and amenity of the area.
RSZ-P2	Not applicable at this stage. Any future development will be assessed for servicing at the resource consent stage.
RSZ-P3	Any future proposals would be required to meet these criteria.
RSZ-P4	The proposal reflects existing development pattern and land use, with which residential activity is compatible.
RSZ-P5	The proposal aligns with the existing scale and pattern of development, can be serviced, and avoids areas of cultural or natural significance. Any future development will be subject to resource consent requirements to manage effects.

6.9 Overall, the proposed rezoning is consistent with the objectives and policies of the SETZ. It enables residential development in an area that already exhibits a settlement-style development pattern, with small, fragmented lots and existing lifestyle use. The submission area is physically suited to further development, can be serviced, and does not present environmental or cultural constraints that would preclude rezoning. The proposal will not give rise to reverse sensitivity effects and supports the intent of the zone to provide for residential living at a scale and intensity compatible with rural and coastal settlement character.

Higher order direction

NPS-HPL

6.10 Under the LUC system, soils within the submission area are Class 4. They are therefore not considered 'highly productive' and the NPS-HPL is not relevant to this rezoning request.

RPS

6.11 The RPS provides a framework for managing the region's natural and physical resources. The requested rezoning is consistent with the relevant objectives and policies of the RPS. Specifically:

Regional form and development (objective 3.11 and policies 5.1.1 and 5.1.3)

6.12 The proposed rezoning supports a consolidated and coordinated settlement pattern consistent with Objective 3.11 and Policy 5.1.1 of the RPS. The submission area is already highly fragmented, comprising predominantly small titles used for residential and lifestyle purposes. It adjoins land proposed to be zoned SETZ and is located in close proximity to existing infrastructure and the State Highway network. The submission area does not contain highly productive soils and has limited capacity for primary production, meaning the rezoning will not compromise rural productivity. In accordance with Policy 5.1.3, the proposal enables growth in a location that is well suited to absorb additional residential development without undermining the viability of nearby urban areas, supporting a logical extension of the existing settlement form.

Natural character, features, and landscapes (objective 3.14 and policy 4.6.1)

6.13 While a small portion of the submission area is located within the coastal environment, this is consistent with the development pattern of the wider Pukenui/Houhora area, where similar overlays apply to land proposed to be zoned SETZ. Importantly, the coastal overlay provisions under the PFNDP will continue to apply irrespective of the underlying zone, ensuring that any future development will be subject to appropriate controls to avoid, remedy, or mitigate adverse effects on natural character.

Sustainable infrastructure (objective 3.8 and policy 5.2.2)

6.14 The submission area is located near existing transport networks, and three waters are capable of being managed on-site. The rezoning request therefore supports efficient service provision and will not impose additional infrastructure demands.

Tangata whenua participation (objective 3.12 and policy 8.1.1)

6.15 Although direct engagement with tangata whenua has not yet occurred, the proposed rezoning aligns with Objective 3.12 and Policy 8.1.1 of the RPS, which seek to ensure that the principles of Te Tiriti o Waitangi are given effect to and that tangata whenua values are recognised and provided for. Any future subdivision (and some land uses) will require resource consent, providing statutory opportunities for tangata whenua engagement. The proximity of the submission area to the coast and a recorded archaeological site is acknowledged. Overlay provisions under the PFNDP and authority requirements under the Heritage New Zealand Pouhere Taonga Act 2014

will continue to apply while there will be further opportunities for tangata whenua to engage through the resource consent or subdivision process.

Climate change and hazard risk (objective 3.13 and policies 7.1.1 and 7.1.2)

6.16 While there are hazards that apply, there is limited exposure given that these areas are limited to areas adjoining the small watercourses that traverse the submission area. Future development can be located in hazard free locations. Future subdivision or building consents would also be subject to site-specific hazard assessments, allowing for detailed hazard avoidance and / or mitigation. The hazard overlay provisions in the PFNDP will continue to apply, regardless of zoning. These provisions will ensure that natural hazard risks are identified, assessed, and appropriately managed at the time of subdivision or development. The general suitability of the land is demonstrated in the two geotechnical reports obtained by the MFT (**Attachment 3**).

Productive land and soils (objective 3.9 and policy 5.3.1)

6.17 The submission area does not comprise high-class soils/highly productive land. The fragmented nature of the land further reduces productive values. These characteristics ensure that the requested rezoning does not undermine these RPS provisions.

Conclusion

6.18 Overall, the requested rezoning is consistent with the objectives and policies of the RPS.

National Policy Statement on Urban Development ("NPS-UD"):

6.19 The NPS-UD primarily addresses urban areas and is not directly applicable to SETZ. Therefore, the NPS-UD is not relevant to the proposed rezoning.

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health ("NES-CS"):

6.20 Based on available information, there are no indications of soil contamination in the submission area. If there are any historical activities that may have led to soil contamination, the NES-CS would apply and would need to be addressed at subdivision/development stage.

New Zealand Coastal Policy Statement ("NZCPS")

6.21 The proposed rezoning from RLZ to SETZ is consistent with the NZCPS, noting that only a very small portion of one of the 21 titles within the submission area lies within the coastal environment. Given this limited extent, the potential for adverse effects on coastal values is minimal. The existing provisions of the PFNDP that manage natural character, landscape, and cultural values

within the coastal environment will continue to apply, ensuring that any future development is appropriately assessed and managed in accordance with the NZCPS.

Assessment of site suitability and potential effects of rezoning

Natural environment and overlays (including natural hazards)

6.22 The proposed rezoning poses minimal risk from natural hazards, as these are confined to areas near small watercourses. Future development can be directed to hazard-free locations, with site-specific hazard assessments required at the subdivision or building consent stage to enable appropriate avoidance or mitigation. The natural hazard overlay provisions in the PFNDP will continue to apply regardless of zoning, ensuring that risks are identified and managed through future consenting processes. As outlined above, the general suitability of the land is demonstrated by the two geotechnical suitability reports that the MFT obtained for previous development on their property (**Attachment 3**), which did not identify any impediments to development.

6.23 As outlined above, given the limited extent of the submission area that is located within the Coastal Environment, the potential for adverse effects on coastal values is minimal. The existing provisions of the PFNDP that manage natural character, landscape, and cultural values within the coastal environment will continue to apply, ensuring that any future development is appropriately assessed and managed.

6.24 The rezoning request also supports future opportunities for tangata whenua to engage through the resource consent or subdivision process.

Compatibility and reverse sensitivity

6.25 The submission area directly adjoins residential zoned land and is not in proximity to any RPROZ land or large-scale productive rural activities. As a result, the proposed rezoning to SETZ is compatible with both the existing development pattern and reasonably anticipated land uses in the surrounding environment.

6.26 The proposed rezoning to SETZ is compatible with the surrounding rural lifestyle character and anticipated land uses, particularly as the submission area is already proposed to be rezoned to RLZ. Both zones enable low-density development, and the shift to SETZ does not introduce activities that are out of character with the area. Reverse sensitivity effects are unlikely, as future residential activities will be consistent with those already occurring or anticipated under the RLZ, and any potential effects can be managed through existing district plan provisions.

Infrastructure (three waters) servicing

6.27 Each lot will rely on on-site water supply, stormwater management, and wastewater management arrangements. This is consistent with rural-residential servicing expectations. Each of the existing dwellings within the submission area rely on such arrangements, signalling that there is no impediment to on-site servicing. This is confirmed in the geotechnical suitability reports included as **Attachment 3**. There will be no connections required to Council reticulated three waters infrastructure.

Transport infrastructure

6.28 The submission area is serviced by an existing Council maintained public road (Houhora Heads Road). No direct access to State Highway 1 is required. The intersection between Houhora Heads Road and State Highway 1 provides good sight distances, and although it lacks deceleration lanes or a median strip, any upgrades can be addressed through future development consenting processes. Notably, Waka Kotahi NZ Transport Agency has not opposed the rezoning, indicating no major concerns with the proposed access arrangements.

6.29 Applicants will be required to address access arrangements beyond the existing maintenance points on the public roads at the time of future subdivision or development. The provisions from the Transport Chapter of the PFNDP are sufficient to ensure that appropriate arrangements are provided.

Consultation and further submissions

Consultation

6.30 Consultation has primarily occurred through the statutory PFNDP submissions process. While no direct engagement with tangata whenua has occurred (given the absence of sites of significance and that there is only one recorded archaeological site that is partially located within the submission area), no submissions have been received expressing an interest in the submission area.

6.31 As each of the 21 titles located within the submission area can be accessed via Houhora Heads Road and that no direct access is required from State Highway 1, no consultation has been undertaken with Waka Kotahi NZ Transport Agency. They have not opposed the rezoning, indicating no major concerns with the proposed access arrangements.

Further submissions

6.32 There are no further submissions.

Section 32AA evaluation

6.33 A Section 32AA evaluation is provided in the following tables:

***Table 2**: Efficiency and effectiveness.*

Matter	Assessment
Efficiency	The proposed rezoning to SETZ is considered efficient. The submission area is fragmented, comprising 21 small titles that are already used predominantly for lifestyle or residential purposes. Rezoning to SETZ better aligns with existing land use and provides a clearer, more enabling framework for future development, reducing compliance costs and unnecessary consent requirements. Importantly, the rezoning would enable a broader range of housing types and densities, directly supporting improved housing supply and affordability in the Far North District, which is identified in the HBA report as facing a severe affordability challenge and a growing shortfall in low-cost housing. Local real estate advice confirms a very limited supply of vacant sections in the Pukenui/Houhora area, with strong demand from both permanent and seasonal residents. The area is serviced by public roading and can accommodate on-site infrastructure for water, wastewater, and stormwater. Natural hazard risks are confined to watercourse margins and can be managed through site-specific assessments, with existing hazard overlays continuing to apply.
Effectiveness	The rezoning is effective in achieving the objectives and policies of the SETZ, which provides for low-density residential development in locations with an existing settlement pattern and limited productive land use potential. The zone enables housing opportunities that respond to local demand while maintaining rural character and amenity. It also allows for smaller, more affordable dwellings that are not as easily delivered under the RLZ framework, helping to address the district's housing supply and affordability issues. The rezoning reflects the land's physical characteristics — including existing fragmentation, low-quality soils, and environmental constraints — and ensures that sensitive values are protected through the continued application of overlay provisions. Overall, the SETZ offers a more effective planning approach that supports both community housing needs and sustainable land use.

***Table 3**: Appropriateness in achieving the purpose of the RMA.*

Section	Alignment
Section 5 – Purpose of the RMA	The proposed rezoning to SETZ promotes the sustainable management of natural and physical resources by enabling people and communities to provide for their social, economic, and housing needs while safeguarding the environment for future generations. It reflects existing rural-residential use and facilitates more efficient use of fragmented, low-productive land without compromising environmental outcomes. While a small part of the submission area lies within the coastal environment and some areas are subject to flooding, these constraints are managed through existing overlay provisions in the PFNDP, which will continue to apply and ensure that development avoids or mitigates adverse effects.
Section 6 – Matters of National Importance	The proposal is consistent with Section 6 matters. Although the submission area is not subject to any landscape or heritage overlays, a small portion lies within the coastal environment and some areas are identified as flood susceptible. These matters are addressed through existing plan overlays, which apply regardless of zoning. Any future subdivision (and some development) will be subject to resource consent processes, allowing for assessment and management of potential effects on natural character and natural hazard risks, in line with section 6(a) and 6(h).
Section 7 – Other Matters	The proposed rezoning supports the efficient use and development of natural and physical resources (s7(b)) by applying a zoning framework that reflects the existing land use pattern and the site's low productive capacity. It maintains and enhances amenity values (s7(c)) by recognising and supporting the established rural-residential character of the area. It also promotes the ethic of stewardship (s7(aa)) by encouraging more active land management on smaller, individually maintained lots, and contributes to maintaining environmental quality (s7(f)) through continued application of relevant plan overlays.
Section 8 Treaty of Waitangi	Section 8 requires that the principles of the Treaty of Waitangi be taken into account. While there has been no direct engagement with tangata whenua on this rezoning, consideration of impacts on cultural and environmental values will be considered in future resource consent

	processes. This framework helps ensure that the principles of Te Tiriti o Waitangi are recognised and provided for through ongoing statutory processes.

6.34 The proposed rezoning aligns with Part 2 of the RMA by enabling efficient use of land already used for rural-residential purposes, supporting housing supply and affordability, and responding to community needs. It manages environmental effects through existing overlay provisions and avoids inappropriate development in sensitive areas. Overall, the rezoning promotes sustainable management and gives effect to the purpose and principles of the RMA.

***Table 4**: Costs and benefits.*

Category	Benefits	Costs
Environmental	- Maintains existing environmental protections through continued application of overlay provisions. Specifically, overlay controls ensure natural hazard risks and sensitive coastal areas remain appropriately managed. - Enables development consistent with existing land use patterns and the zoning under the OFNDP. - Provision of on-site infrastructure avoids pressure on public networks.	None identified.
Social and Cultural	- Broadens housing choices, allowing smaller, more affordable dwellings than typically permitted under RLZ. - Responds to identified housing demand, helping alleviate local shortages and affordability challenges. - Supports both permanent residents and seasonal population needs with more flexible housing options.	None identified.

Economic	- Provides clearer and more enabling planning framework, reducing uncertainty and resource consent costs. - Facilitates more efficient land use aligned with actual development potential, improving land value and utility. - Supports local economy by enabling controlled population growth and accommodating seasonal workers.	None identified.

Risk of acting or not acting

6.35 The risk of not proceeding with the proposed rezoning includes perpetuating existing constraints on housing supply and affordability, which may exacerbate social and economic pressures in the area. Maintaining the current RLZ zoning could limit development opportunities despite the fragmented and low-productivity nature of the land, leading to inefficient land use and ongoing demand for more suitable residential options. Conversely, the risk of acting is low, as environmental and hazard risks are managed through existing overlay provisions and resource consent processes. The rezoning therefore enables responsive, managed growth while safeguarding key values, minimizing potential adverse effects through established planning controls.

Overall conclusions

6.36 The proposed rezoning from RLZ to SETZ represents an efficient and effective response to the existing character and use of the land within the submission area. The land is already fragmented and primarily used for rural-residential purposes, with limited productive potential. Environmental and hazard risks are managed through existing overlay provisions that continue to apply irrespective of the underlying zoning, ensuring protection of sensitive areas and sustainable development outcomes.

6.37 In the context of section 32AA, the proposed rezoning is a more appropriate method to achieve the objectives of the PFNDP and the purpose of the RMA. It promotes sustainable management by aligning zoning with actual land use and community housing needs, supporting improved housing supply and affordability while maintaining amenity values. The benefits of the rezoning clearly outweigh the costs, and the risk of not acting – continuing with a less efficient zoning framework – is greater than the risk associated with the proposed change.

7. Conclusion and relief sought

7.1 The proposed rezoning from RLZ to SETZ is appropriate and justified. It better reflects the existing land use and development pattern, responds to local housing needs and land capability, and aligns with the objectives of the PFNDP, RPS, and NZCPS, while being consistent with Part 2 of the RMA. This change promotes sustainable management, supports housing supply and affordability, and ensures environmental and cultural values continue to be protected through existing overlay provisions.

7.2 The following relief is sought:

(1) Rezone the submission area SETZ; or

(2) Any other relief with similar effect.

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Joseph Henehan (Planner)

9 June 2025

ATTACHMENT 1

PLANS

ESPLANADE RESERVE

ALLOTMENT 7 PSH OF MURIWHENUA

LOT 1 DP 45290

LOT 1 DP 175431

LOT 1 DP 346136

LOT 2 DP 346136

LOT 3 DP 175431

LOT 7 DP 204703

40.5

91.4

34.5

328.1

500.4

LOT 8 DP 204703 10.87Ha NA132C/87

20.12m WIDE

611.9

HOUHORA HEADS ROAD

LOT 1 DP 204703

STATE HIGHWAY 1

181.9

20.12m WIDE

LOT 3 DP 204703

LOT 1 DP 103717 9468m²

LOT 6 DP 530683 1.0536Ha

LOT 1 DP 530683 1.1039Ha

LOT 1 DP 156112 4090m²

LOT 2 DP 156112 4200m²

LOT 3 DP 156112 4140m²

LOT 10 DP 156112 4120m²

LOT 4 DP 156112 4008m²

LOT 9 DP 156112 4100m²

LOT 5 DP 156112 4003m²

LOT 8 DP 156112 4180m²

LOT 7 DP 156112 4722m²

LOT 6 DP 156112 4280M²

LOT 5 DP 503751 9243m²

LOT 4 DP 530683 8704m²

LOT 2 DP 530683 1.2270Ha

LOT 3 DP 530683 9713m²

LOT 2 DP 328077 1.9456Ha

LOT 1 DP 103614 8241m²

LOT 1 DP 328077 1.2616Ha

N

60 0 60

METRES - 1:3000

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POTENTIAL WETLANDS ON LOT 7 DP 204703

PROPOSED SETTLEMENT ZONE

PFNDP NOTIFIED SETTLEMENT ZONE

REV	DATE	DESCRIPTION
A	06/05/25	FIRST ISSUE - KM/JH

REF. DATA:

reyburn & bryant
Ph: 09 438 3563
7 Selwyn Ave, Whangarei
PO Box 191, Whangarei 0140
www.reyburnandbryant.co.nz

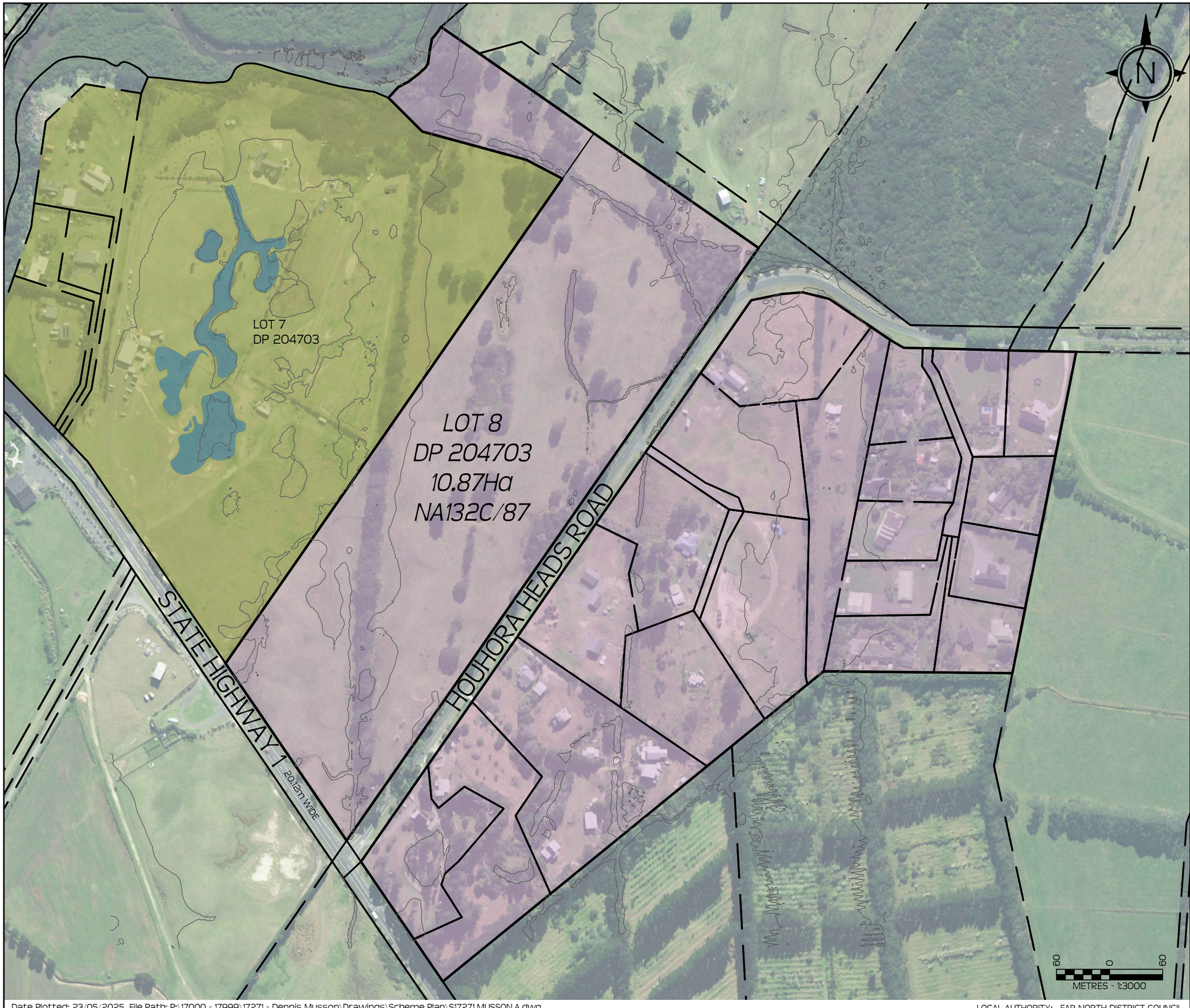
CLIENT

MUSSON FAMILY TRUST
HOUHORA HEADS ROAD
PUKENUI

TITLE

PROPOSED REZONING OF LOT 8 DP 204703

DATE	SCALE	DRAWING REF.	SHEET	REV
MAY 2025	1:3000 @A3	S17271	01 OF 02	A



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6. THIS PLAN IS COPYRIGHT TO REYBURN & BRYANT (1999) LIMITED.
7. DESIGNED BY REYBURN & BRYANT - WHANGAREI - NEW ZEALAND
8. 03m 2023-2024 RURAL AERIAL SOURCED FROM AERIAL SURVEYS LTD INFORMATION AVAILABLE ON LINZ DATA SERVICE.
9. 2020 [1m] LIDAR CONTOUR INFORMATION COURTESY OF THE NRC.
10. BOUNDARIES SOURCED FROM QUICKMAP. COORDINATES IN TERMS OF MOUNT EDEN 2000.

POTENTIAL WETLANDS ON LOT 7 DP 204703

PROPOSED SETTLEMENT ZONE

PFNDP NOTIFIED SETTLEMENT ZONE

MAJOR CONTOURS ARE ALL 5m

REV	DATE	DESCRIPTION
A	06/05/25	FIRST ISSUE - KM/JH

REF. DATA:

reyburn & bryant
Ph: 09 438 3563
7 Selwyn Ave, Whangarei
PO Box 191, Whangarei 0140
www.reyburnandbryant.co.nz

CLIENT

MUSSON FAMILY TRUST
HOUHORA HEADS ROAD
PUKENUI

TITLE

PROPOSED REZONING OF LOT 8 DP 204703

DATE	SCALE	DRAWING REF.	SHEET	REV
MAY 2025	1:3000 @A3	S17271	02 OF 02	A

Date Plotted: 23/05/2025 File Path: P:\17000 - 17999\17271 - Dennis Musson\Drawings\Scheme Plan\S17271.MUSSON.A.dwg

LOCAL AUTHORITY: FAR NORTH DISTRICT COUNCIL

ATTACHMENT 2

REAL ESTATE LETTERS

26 May 2025

Dennis Musson
By Email: dbmusson@gmail.com

Dear Dennis,

Re: Section availability Pukenui/Houhora

The current stock of sections for sale in the Pukenui/Houhora area is constrained with only 5 sections currently available for sale in the wider area. This lack of supply has been driven by historically low levels of development predominantly due to a lack of residentially zoned land and that land with development potential being closely held by families with long term ties to the area.

There is strong demand for properties in Pukenui/Houhora with it being a desirable location for both permanent residents looking to get out of Kaitaia and temporary residents looking for an idyllic holiday location.

It is my view that more land needs to be unlocked for development to meet the obvious surplus demand.

Yours faithfully

Sean Stratton
Managing Director Licensed REAA 2008
Far North Circle Real Estate Limited Licensed REAA 2008

Ray White Kaitaia
123 Commerce Street
Kaitaia, 0410
09 408 2900 phone
09 408 2902 fax
kaitaia.nz@raywhite.com

Ronald McDonald House Charities New Zealand

Far North Circle Real Estate Limited - Licensed (REAA 2008)
rwkaitaia.co.nz

Raine&Horne.

Kaitaia
85 Commerce Street
Kaitaia 0410
New Zealand
t 09 408 1241
e office@kaitaia.rh.co.nz

27 May, 2025

Denis Musson,
Houhora Heads Road,
RD4, Pukenui
Kaitaia 0484

Dear Denis,

Availability of Land for Development in Houhora

Throughout my nineteen years of working in real estate in Pukenui and the wider Houhora area, I have noted a shortage of available residential and lifestyle land.

The Houhora area in particular has seen major growth over the past ten years, particularly due to the growth of the avocado industry and other horticulture. Significant numbers have been employed in this sector however land for residential subdivision to accommodate workers and the associated support services, has not been made available.

The area is a popular retirement and lifestyle location and we see buyers form all over the country and overseas keen to settle in the area. Options however for settlement are limited.

In addition, the area has significant potential as a tourist destination, being the main route to Cape Reinga and an area with exceptional local coastal attractions. The Te Araroa Trail also brings many visitors visit the area.

It is difficult for the Houhora locale to capitalise on tourism dollars when there are limited accommodation options for the service industry that is required, in order to support tourism development.

Raine&Horne.

Kaitaia
85 Commerce Street
Kaitaia 0410
New Zealand
t 09 408 1241
e office@kaitaia.rh.co.nz

At present I am aware of only three residential sections on the market in the Pukenui area (under 1ha) and another two small land blocks (2ha or under).

Further development in the area will not be possible without appropriate subdivision within proximity to the Pukenui residential area. In addition, development is further constrained by current restrictions applicable to subdivision of uneconomic rural production land.

Regards

Sue Ferens
Houhora-based licensed salesperson (REAA 2008)
Raine and Horne Kaitaia
M 021612855
E sue.ferens@kaitaia.rh.co.nz or sue@sueferens.nz

ATTACHMENT 3

GEOTECHNICAL REPORTS

Job# S1195-J02931

Lot 4 Houhora Heads Road Houhora

Geotechnical Site Suitability Report

17 December 2019

TMC Consulting Engineers Ltd
41 Norfolk Street
PO Box 252
Whangarei
Ph. (09) 438 8699
www.tmcengineers.co.nz

TMC Consulting Engineers Ltd.

Geotechnical Report

Geotechnical Investigation and Assessment Report for Proposed Residential Dwelling, at:
Lot 4 DP 530683, Lot 4 Houhora Heads Road, Houhora

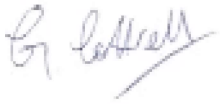
Prepared by:

Kurt Davies
BEng Tech (Civil)

Reviewed by:

Cameron Hales
Dip. Eng. (Civil)

Approved for Release by:



Gareth Cottrell
CMEngNZ, CPEng, IntPE (NZ), MCGI

Date:	17 December 2019
Reference:	S1195-J02931
Status:	Final
Revision:	NA
Revision Date:	NA

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Ground Conditions

- In general terms, the investigated site consists of dense Peaty Silty SAND (BH 1) and dense to very dense SAND (BH 2), with up to approximately 0.1 m TOPSOIL overlying .
- The natural soils on-site are assessed as CLASS A, Non Expansive .
- No groundwater was encountered in the boreholes during investigations.
- The property and site are within a geology grouping that has a potential Acid Sulphate Soil Risk. Based on the current development proposal and ground conditions TMC consider the risk to be low.
- The site is not currently mapped for stability risk. Provided that all the recommendations of this report are implemented and subject to satisfactory TMC Development Review we conclude that the site stability risk is low.

Foundations	See Section 7

Reinforced Concrete Raft Type Floor Slab on Engineered Fill

Due to the presence of Peat in the shallow SAND (BH 1), specifically on this site:

- All excavations will require an inspection by a Chartered Professional Geotechnical Engineer or their Agent who is familiar with both this site and the contents of this geotechnical report to confirm ground conditions or advise otherwise during the construction works.

- All deleterious material should be removed from the building area and replaced with compacted engineered fill as directed by the Engineer on site.

- Shallow foundations can be designed in accordance NZS 3604:2011, but will need to be founded; on / embedded in Engineer approved materials. TMC will need to be contacted to advise the design parameters should this type of foundation be required.

- It is recommended that the raft slab is placed on a minimum 200 mm layer of Engineer approved compacted hardfill that also extends a minimum of 1.0m out beyond the building footprint. The installation of a proprietary separation geotextile will be required at the sand / hardfill interface.
- Allowable bearing capacity 50 kPa.

Construction

- All works must be undertaken in accordance with the Health and Safety at Work Act 2015.
- The Development Designer will need to confirm the locations of all on-site / adjacent services prior to the commencement of design / any construction works, etc.
- All earthworks should be undertaken in accordance with both the District and Regional rules.
- If you require TMC to issue a PS4 we will need to carry out inspection of the work at the key construction stages as per the BC and Council requirements.

Stormwater

- Stormwater run-off from the development should be appropriately controlled and managed on-site both in accordance with the New Zealand Building Code, as per Council requirements and to align with Haig Workman Report (30/05/2019).
- Overflow from water tanks is to be piped into the existing swale drain along the eastern boundary.

Wastewater

- We recommend that a secondary treated effluent system that complies with the relevant district and regional rules is used with disposal to a pressurised drip irrigation system.

1. INTRODUCTION

This Geotechnical Investigation Report (GIR) has been prepared by TMC Consulting Engineers Ltd. (TMC) for Denis Musson (the Client) in accordance with instructions received from them with regard to the above property, and in accordance with the short form agreement dated 30 October 2019.

The purpose of TMC's work was to evaluate the surface and subsurface conditions at the site by undertaking a geotechnical investigation to determine the suitability of the site for the proposed development including on-site wastewater disposal and comments for stormwater overflow.

This report presents the results of the geotechnical investigation, describes the existing conditions, details any identifiable geological hazards affecting the site and provides geotechnical recommendations against the requirements of NZS3604:2011 where appropriate.

The geotechnical assessment is based on site conditions as observed during the site walkover and site investigation fieldworks carried out by TMC on 13 November 2019.

1.1 CLIENT SUPPLIED INFORMATION

In preparing this GIR, we have also reviewed the following documentation:

Document Type	Reference
Plans	Beard, D (23/09/2019). *Proposed New Dwelling & Detached Garage.* Prepared for D Musson
Subdivision Report	Pille, W (15/11/2006). *Report on Suitability of Site for Subdivision*. Prepared for Mark & Lisa Collins. Job Reference Number 06 391 (Haig Workman Consultants Ltd)
Stormwater and Effluent Disposal Report	Pille, W (30/05/2007). *On-site Stormwater and Effluent Disposal for 6 Lots in Subdivision.* Prepared for Mr & Mrs Collins. Job Reference number 06 391 (Haig Workman Consultants Ltd)
Consent Notice	The Resource Management Act 1991 – Section 221: Consent notice. Regarding RC2170075. Issued by Far North District Council.

The sourcing and provision of a Land Information Memorandum (LIM) or Project Information Memorandum (PIM) from the Far North District Council (FNDC) has not been included in our brief. However, it may be prudent for the Client / Development Designer to obtain this documentation to provide an early stage capture of any further information about the area from any records on the FNDC GIS database. The LIM / PIM may provide information on relevant considerations, hazards, etc. that could later be raised at the time of a building consent application.

2. DEVELOPMENT PROPOSAL

The Client has indicated that an approximate 80m² single-level, lightweight 2-bedroom residential dwelling and a separate 55 m^2 garage / 1-bedroom sleep-out is to be constructed within the centre of the property.

We understand from the supplied plans that the dwelling and garage / sleep-out are to be supported on reinforced concrete ribraft type foundations.

In addition, that the development proposal includes the construction of an engineered cut/fill building platform to support the foundations.

3. SITE DESCRIPTION

The property (legally described as Lot 4 DP 530683) is located to the east of Houhora Heads Road, Houhora. The property is sized at approximately 8,704 m^2 and is irregular in shape.

The property is accessed of Houhora Heads Road approximately 300 m from State Highway 1. Access to the site is yet to be established.

The property has minor rolling terrane sloping to the east, away from the road. The slopes were generally assessed as being; around 5°, with the slope of the proposed building site no greater than 3°.

The property has some mature pines on the western boundary and a few scatters of shrubs with the site generally being covered in pasture.

Shallow overland flow paths flow east within the property to a more prominent stormwater drain on the eastern boundary.

The walkover of the site and subsurface investigations undertaken provide no evidence of recent or historic ground movement on or adjacent to the site.

An overhead power line is located on the berm between Houhora Heads Road and the property.

4. GEOLOGY AND NATURAL HAZARDS

4.1 GEOLOGY

Local geology at the property is shown and described on the GNS Science New Zealand Geology Web Map, Scale 1:250,000, as; Karioitahi Group (eQd): Uncemented to moderately cemented and partly consolidated sand in coastal foredunes. Clay-rich sandy soils., refer; 'GNS Science Website.'

The soils map of the area indicates that the site is within an area of Te Kopuru sand, Tangitiki sandy loam and Ruakaka peaty sandy loam. Sutherland, C. F.; Cox, J. E.; Taylor, N. H.; Wright, A. C. S. 1980: Soil map of North Cape-Houhora area (sheets N02/03), North Island, New Zealand. Scale 1:100,000 N.Z. Soil Bureau Map 181.

4.2 POTENTIAL ACID SULPHATE SOILS

We note from recent soil mapping undertaken in the Whangarei region that the Karioitahi Group has been identified to contain potential Acid Sulphate Soil Risk. The property and site are within this geology.

These soils, where present, can generate acidic groundwater and may require consideration with regard to land drainage and selection of building materials for buried structures.

In addition, we have referred to the following associated documentation and information:

- Opus Acid Sulphate Soil guidance document dated August 2015

In summary of these ground conditions and proposals, TMC conclude and recommend with sole regard to the geotechnical aspects as follows:

i. Based on the;

   - Ground conditions encountered and observed during the fieldworks,
   - Site topography, and
   - Site development proposal and engineering.

ii. In general, TMC do not anticipate there to be a substantial potential Acid Sulphate Soil Risk.

iii. All provided that these ground conditions and proposed engineering are confirmed at the; design review, site cut inspection and subsequent construction stages, or otherwise.

4.3 NATURAL HAZARDS

At the time of report writing, TMC are unaware of any mapped hazards associated with the property.

5. FIELDWORKS INVESTIGATION SUMMARY

The purpose of the following intrusive fieldworks investigation was to provide information on the general soil profile, the variability, relative density and strength of soils together with any observed groundwater levels within the proposed building sites.

TMC undertook a shallow ground investigation comprising two hand auger boreholes (BH) of 50 - 75 mm diameter to depths ranging between 0.9 m to 2.1 m below ground level (bgl).

Scala Penetrometer tests (SP) were undertaken commencing from ground level adjacent to the boreholes to a depth of 0.9 m. SP tests were restarted in the base BH 2 to a depth of 2.9 m to assess the strength and consistency of the strata beyond the depth of the boreholes.

Four further SP tests were carried out to depths ranging from 0.5 to 0.9 m to determine if homogeneous and uniform soil conditions exist across the building site.

One additional BH was undertaken within the area of the proposed effluent disposal field to assess the ground conditions and any groundwater levels.

The fieldwork results consisting of both the Boreholes and SP data are attached to this report. Approximate locations of the BH Logs and SP Tests are shown on the attached site plan.

Classification of the recovered soil borehole arisings was carried out in accordance with the "Field Description of Soil and Rock", NZGS, December 2005.

6. FINDINGS AND CONCLUSIONS

6.1 GROUND CONDITIONS

The ground conditions encountered during the shallow ground investigation have been interpreted from the BH logs, shear vane and Scala Penetrometer testing undertaken.

In general terms, the investigated site consists of dense Peaty Silty SAND (BH 1) and dense to very dense SAND (BH 2), with up to approximately 0.1 m TOPSOIL overlying, refer: 'BH Logs' attached.

In BH 1 a 'hard pan' soil structure was encountered at termination depth, refer also; 'Scala Penetrometer Testing' and results.

The natural subsurface conditions encountered are considered to be generally consistent with the published geological information.

It should be noted that actual ground conditions may vary across the investigated development site, and in some locations may differ from those described.

6.2 EXPANSIVE SOILS

Based on the results of our fieldwork investigation, along with our knowledge and experience with these soils, we classify the investigated site as CLASS A, Non-Expansive in terms of AS2870:2011.

6.3 GROUNDWATER

Groundwater was not encountered during the fieldwork investigation.

Groundwater levels may rise during wet winter conditions or following periods of heavy or prolonged rainfall / other events.

Use of drainage control measures may be required depending on weather conditions and timing of the construction works, etc.

6.4 SCALA PENETROMETER TEST RESULTS

Scala Penetrometer test values in terms of (number of blows /100mm ground penetration) were noted commencing adjacent to, and at the base of BH: 1-2. Four additional SP tests were undertaken across the proposed building sites. This testing was undertaken to provide an indicative allowable bearing capacity of the site soils encountered with depth and to determine any uniformity in ground conditions across the investigated site, refer; 'Scala Penetrometer Resistance Test Results' and Borelogs attached in the report appendices.

The blow counts: 20+ blows being the highest and 1 blow being the lowest.

In general terms of soil bearing capacity, NZS3604:2011 for the Construction of Timber-Framed Buildings defines 'Good Ground' as having an allowable bearing capacity of at least 100 kPa: indicatively 5 blows per 100 mm.

6.5 NATURAL HAZARDS

Site Stability

The site is not currently mapped for stability risk.

A review of historical aerial photography commencing from 1942 provides no clear evidence of previous instability at the property, refer; 'Retrolens Historical Image Resource Website.'

No recent or historic ground movement was evident at the property / proposed building sites or in the immediate surrounds at the time of the fieldwork investigation.

Provided that all the recommendations of this report are implemented and subject to satisfactory TMC Development Review, with regard to the Building Act 2004; Sections 71-72, we believe on reasonable grounds that;

i. The land on which the building work is to take place is neither subject to, nor likely to be subject to subsidence and slippage; and
ii. The building work itself is not likely to accelerate, worsen or result in subsidence or slippage of that land or any other property.

7. RECOMMENDATIONS

7.1 FOUNDATIONS

7.1.1 General

The natural soils on-site are assessed as CLASS A, Non Expansive.

Due to the presence of Peat in the shallow SAND (BH 1), specifically on this site:

- All excavations will require an inspection by a Chartered Professional Geotechnical Engineer or their Agent who is familiar with both this site and the contents of this geotechnical report to confirm ground conditions or advise otherwise during the construction works.

- All deleterious material should be removed from the building area and replaced with compacted engineered fill as directed by the Engineer on site.

- Shallow foundations can be designed in accordance NZS 3604:2011, but will need to be founded; on / embedded in Engineer approved materials. TMC will need to be contacted to advise the design parameters should this type of foundation be required.

Based on the information provided to TMC at the time of report writing we understand that the new dwelling and garage is to be founded on reinforced concrete 'ribraft' / raft floor slabs.

A description of the following foundation options follow;

7.1.2 Reinforced Concrete Raft Type Floor Slab on Engineered Fill

From the site soil investigation and assessment, the following bearing capacity values are considered appropriate for design purposes for the above foundation:

Ultimate Bearing Capacity	150 kPa
Allowable Bearing Capacity (F.O.S =3)	50 kPa

It is recommended that the raft slab is placed on a minimum 200 mm layer of Engineer approved compacted hardfill that also extends a minimum of 1.0m out beyond the building footprint. The installation of a proprietary separation geotextile will be required at the sand / hardfill interface.

7.2 CONSTRUCTION RISK MANAGEMENT

Any and all works including (but not limited to); design, construction, operations and maintenance must be undertaken in accordance with the Health and Safety at Work Act 2015.

The Development Designer will need to confirm the locations of all on-site / adjacent services prior to the commencement of design / any construction works, etc.

Any open excavations should be fenced off or covered, and/or access restricted as appropriate.

With all excavation and construction work there is a risk of collapse. Whenever ground conditions are suspect, bad weather conditions are forecast or when there is a risk of damage to adjacent property, excavations should all be carried out in a "hit and miss" pattern and / or temporary ground support, cover protection used.

The Contractor is responsible for determining the width of each excavation to suit his plant and construction programme.

Cut faces should not be left unsupported. Similarly, cut faces should not be left uncovered for any length of time, especially during periods of rain.

The Contractor is responsible at all times for ensuring that all necessary precautions are taken to protect all aspects of the works and services.

7.3 CONSTRUCTION INSPECTIONS

It is increasingly common for the Building Consent Authorities' (BCA) to require a Producer Statement; PS4, this is an important document. The purpose of the PS4 is to confirm the Engineers' professional opinion to the BCA that aspects of a building's design comply with the Building Code, or that elements of construction have been completed satisfactorily in accordance with the approved Building Consent (BC).

If you require TMC to issue a PS4 we will need to carry out inspection of the work at the key construction stages as per the BC and Council requirements.

SED will likely require an Engineer to inspect that aspect of the work and confirm satisfactory completion.

During construction, site inspections also allow the timely provision of solutions and recommendations should any engineering problems arise.

Prior to works commencement, the Engineer should be contacted to confirm the construction methodologies, inspection and testing frequency.

Upon satisfactory completion of all the inspected work aspects, TMC would then be in a position to issue the PS4 as required by Council.

We require at least 48 hours' notice for site inspections.

To request a PS4 from TMC: ensure all works have been completed and checked, all documentation complete. Send an email to: office@tmcengineers.co.nz ensuring the subject line has: "PS4 request", followed by the "property address".

7.4 EARTHWORKS

7.4.1 General

All earthworks should be undertaken in accordance with both the District and Regional rules.

In addition, we recommend that all earthworks activities be carried out in full accordance with the following technical publications, in particular:

i. Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region June 2016 Guideline Document 2016/005.

ii. Auckland Council; Building on small sites - Doing it right. BC5850.

Refer for downloads the above Auckland Council documentation as below:

https://ourauckland.aucklandcouncil.govt.nz/articles/news/2017/09/auckland-council-leads-the-way-in-erosion-and-sediment-control/

https://www.aucklandcouncil.govt.nz/building-and-consents/understanding-building-consents-process/starting-building-renovation-work/Documents/bc5850-building-small-sites-brochure.pdf

iii. New Zealand Standard Code of Practise for Earthfill for Residential Development, NZS 4431:1989.

iv. Code of Practise for Urban Land Subdivision – NZS 4404:2010, and

v. Any other relevant publications, including any of the above as superseded.

Some general recommendations are provided below, however where possible site-specific advice should be sought from an appropriately experienced Engineer.

We strongly recommend that earthworks are not undertaken during wet conditions.

7.4.2 Site Specific Earthworks Requirements

For filling to form a final subgrade for the raft floor slabs, it is recommended that clean, well graded compacted hardfill is used such as; GAP 20 to GAP 65, or as otherwise approved by the Engineer.

Any fill placement within 3.0 m of the building envelope will be subject to controlled filling operations and observation by an Engineer.

All exposed soils should be re-grassed, planted, covered or paved as soon as practicable to reduce the risk of erosion.

Due to the presence of organic material, all earthworks and foundation excavations shall be inspected by a Chartered Professional Engineer or their Agent who is familiar with this site and the contents of this suitability report.

Preceding the placement of any fill or foundation construction a geotechnical Engineer should be contacted to discuss the earthworks methodology, inspection requirements and testing frequency.

7.4.3 Site Clearance and Preparation

All deleterious material including vegetation, topsoil, etc. should be removed from all proposed foundation / construction areas.

If cut and/or imported materials are stockpiled elsewhere on site, stockpiles must be located well clear of the works and formed in an appropriate manner so that land stability and/or existing structures, etc. are not compromised.

Wherever any deposits of soft, or other unsuitable material is encountered at the surface cut/foundation level at the building site, it should in general be undercut and replaced with Engineer approved compacted fill, or as otherwise recommended by the Engineer.

7.4.4 Temporary and Permanent Earthworks

Particular care should be taken during the construction phase with respect to excavations to form the building platforms and access driveways, etc.

7.5 STORMWATER AND DRAINAGE

General

Stormwater run-off from the development should be appropriately controlled and managed on-site both in accordance with the New Zealand Building Code, as per Council requirements and to align with the recommendations of Haig Workman Report (30/05/2007).

The Development Designer will need to confirm the drainage proposals compliance with all of the above requirements.

Stormwater flows must not be allowed to run onto or over site slopes, or to saturate the ground so as to adversely affect site stability or foundation conditions.

As a minimum, runoff from any higher ground should be intercepted by means of shallow surface drains or small bunds to ensure protection of the building platform(s) from both saturation and erosion. Water collected in interceptor drains should be diverted away from the building site to a disposal point as appropriate.

Subsequent to drainage construction, a programme of regular monitoring must be initiated to assess the continued effectiveness of drainage function and if necessary, the instigation of any maintenance required to ensure fully effective drainage, etc.

Overflow

Stormwater overflow from the water tanks is to be piped into the swale drain along the eastern boundary. To protect against the effects of potential scour, suitable outlet protection will be required.

Refer, “Standard Drain Coil Outlet Protection Detail” attached and Site Plan – Mark Up.

8. EFFLUENT DISPOSAL

The following section has been prepared in accordance with the relevant standards and the Regional Council rules.

8.1 SOIL AND GROUNDWATER INVESTIGATIONS

A soil and groundwater borehole was drilled to a depth of 0.9 m in the location of the proposed effluent disposal field (BH 7). BH 1 and 2 were also used to assess soil profile and groundwater levels. The locations of the boreholes are noted on the attached site plan.

8.2 SITE ASSESSMENT

Feature	Comment
Topography	Linear divergent slope of between 2 to 5 °. Aspect – North to North-east.
Ground Cover	Pasture.
Geology	The geology and soils are noted above in Section 4.1. Investigations concur with the published information and we consider the soils to be Category 2 terms of AS/NZS 1547:2012.
Seasonal Ground Water Variations	It is unlikely that there will be seasonal variations in soil drainage that will impact negatively on the disposal system. Groundwater was not observed in Borehole 7 during the investigation.
Fill	No fill was observed in the proposed location of the effluent field.
Drainage Control	Surface water from developed areas should be collected by drains or sumps and discharged as noted above.
Rock Content	No rocks or boulders were observed within the site.
Site Stability	No recent instability was observed within the area of the proposed disposal field.
Climate & Rainfall	Annual rainfall is in the order of 1400mm. Rainfall intensity is approximately 40 mm/hr for a storm with a 10% probability of occurring annually and of one-hour duration.
Lot Size	The Lot is sized at approximately 0.87 ha.

8.3 PERMEATION TESTING

No permeation tests were carried out due to both the site topography and nature of the soils encountered in the boreholes.

8.4 DESIGN PARAMETERS

For a 2-bedroom household with a separate sleep-out attached within the garage with standard water reduction fixtures and dual flush toilets on a rainwater tank water supply we have used a per capita volume of 165 litres/day resulting in a treated effluent loading rate of 990 litres/day based on a six-person occupancy. Garbage disposal units have not been allowed for in the effluent design. The rates below are in accordance with AS/NZS1547:2012 taking into consideration the soils, topography and the plans currently provided.

Summary of Design Parameters	
Number of bedrooms / maximum occupancy	3 bedroom / 6 person
Wastewater design flow	165 L/person/day
Treated Effluent Loading Rate	990 L/day
Soil category	2
Design Irrigation Rate (DIR)	5 mm/day
Disposal Area	200 m^2
Reserve Area (100%)	200 m^2
Total Area	400 m^2

To minimise any risk to public health and the environment any proposed disposal field is required by the Regional Council Rules and relevant standards to comply with the following horizontal and vertical offsets from existing features:

Guidelines for Disposal Field Setback Distances	
Primary Disposal Field Offsets	**Secondary Disposal Field Offsets**
Horizontal Setback Distances	
1.5 m to boundaries	1.5 m to boundaries
3.0 m to buildings	3.0 m to buildings
5.0 m Downslope stormwater flow path	5.0 m Downslope stormwater flow path
20 m to River, lake, stream, pond, dam, natural wetland or costal marine area.	15 m to River, lake, stream, pond, dam, natural wetland or costal marine area.
20 m to ground water bores	20 m to ground water bores
Vertical Setback Distances	
1.2 m Winter groundwater table	0.6 m Winter groundwater table

8.5 DISPOSAL SYSTEM RECOMMENDATIONS

Based on the soils encountered and topography of the site a secondary treatment system is recommended. An area adjacent to the southern boundary was identified as a suitable site for effluent disposal.

8.6 SECONDARY WASTEWATER TREATMENT SYSTEM

For design purposes, based on a visual and tactile inspection of the soils, we have classified the soils as Category 2 in terms of AS/NZS 1547:2012. We have therefore used an irrigation rate of 5.0 mm / day for a secondary treated wastewater irrigation system. These rates are in accordance with AS/NZS1547:2012 in recognition of the field test results.

We recommend that a secondary treated effluent system that complies with the Regional Rules is used with disposal to a pressurised drip irrigation system. The drip irrigation system should be placed on the ground surface in rows not exceeding 85 m, with a minimum
150 mm layer of mulch or 100 mm of topsoil placed over the lines.

Vegetation should be planted above the dripper lines to increase efficiency; suggested plantings includes shrubs, flaxes and grasses or lawn grass for topsoil buried lines to provide evapotranspiration and nutrient removal.

For a flow rate of 990 litres/day, 200 m of dripper line will be required through an area of 200 m^2. A further 200 m^2 is to be set aside as a minimum 100 % reserve area as required by Haig Workman Report (30/05/2007). This should allow easy rejuvenation of the field should operational difficulties be experienced, or field extension be required. The effluent disposal field should be fenced off from stock, etc.

To protect against system failure, the system must provide at least 24 hours' buffer and a visible and audible alarm to alert the homeowners to any possible problem(s). To protect against any possible failure of the disposal area, the reserve area should be maintained with a vegetated surface ready for the possible installation of dripline into or onto it.

The manufacturers of treatment systems supply detailed maintenance schedules that must be adhered to. It is imperative that the operator of the system schedule and undertake maintenance of the system to ensure its effectiveness.

With the area available on the subject property it is our opinion that a satisfactory effluent disposal system can be installed that will satisfy the parameters set out in AS/NZS 1547:2012. A producer statement should be provided by the supplier of the system selected by the owner/developer.

8.7 ASSESSMENT OF ENVIRONMENTAL EFFECTS

The soils have been assessed as Category 2 in terms of AS/NZS 1547:2012. With a daily application rate of 5.0 mm/day, the soil should be capable of coping well with long-term application of wastewater.

Similar systems around Northland produce no noticeable odour or noise impact on neighbours or the homeowners themselves if installed and maintained properly.

Based on the information currently provided, our site assessment and calculations, we consider that the site is able to provide for the sustainable treatment and land application of domestic effluent generated from the proposed development.

As the proposed system flow does not exceed 3,000 litres/day and complies with the groundwater and surface water clearance rules in the Regional Rules, the application falls under Permitted Activities and therefore a Discharge Consent is not required.

Provided that all the recommendations of this report are followed we believe on reasonable grounds that on-site effluent disposal on this property will have no adverse effect on the environment.

Producer Statement 1 and Far North District Council TP58 Forms are attached to this report.

LIMITATIONS

This report has been prepared solely for the use of our Client with respect to both the particular brief and specific purpose provided to TMC Consulting Engineers Ltd. (TMC), with regard to the specific project described herein. No liability or any duty of care is acknowledged or accepted for the use of any part of this report in any other context or for any other purpose, or by any other person, other party or entity.

This document is both the property and copyright © of TMC. Any unauthorised employment or reproduction, in full or part is forbidden. This report may not be read or reproduced other than in its entirety. This report does not address matters relating to the National Environmental Standard for Contaminated Sites.

The opinions, recommendations and comments given in this report are the result from the application of accepted industry methods of site investigation.

As factual evidence has been obtained solely from boreholes, shear vanes and Scala Penetrometer tests which by their nature only provide information about a relatively small volume of subsoils at that exact location, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in our report.

Inferences are made about the nature and continuity of subsoils away from and beyond the testing locations but cannot be guaranteed. The soil descriptions detailed on the exploratory bore logs provided are based on the field descriptions of the soils encountered.

During the processes of site development and construction, an Engineer competent to judge whether the conditions are compatible with the assumptions made in this report should examine the site. In all circumstances, if any variations in the ground conditions occur which differ from those described or are assumed to exist, and then it is essential that the matter be referred back to TMC immediately to advise accordingly.

The soil performance behaviour outlined by this report is dependent on the construction activity and actions of the builder/contractor. Inappropriate actions before or during the construction phase may cause behaviour outside the limits provided in this report.

With regard to the design of an on-site wastewater disposal system and all concept drainage design is up to the connection point for each building face of any new structures/slabs; no internal building plumbing or layouts have been done.

All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

APPENDICES

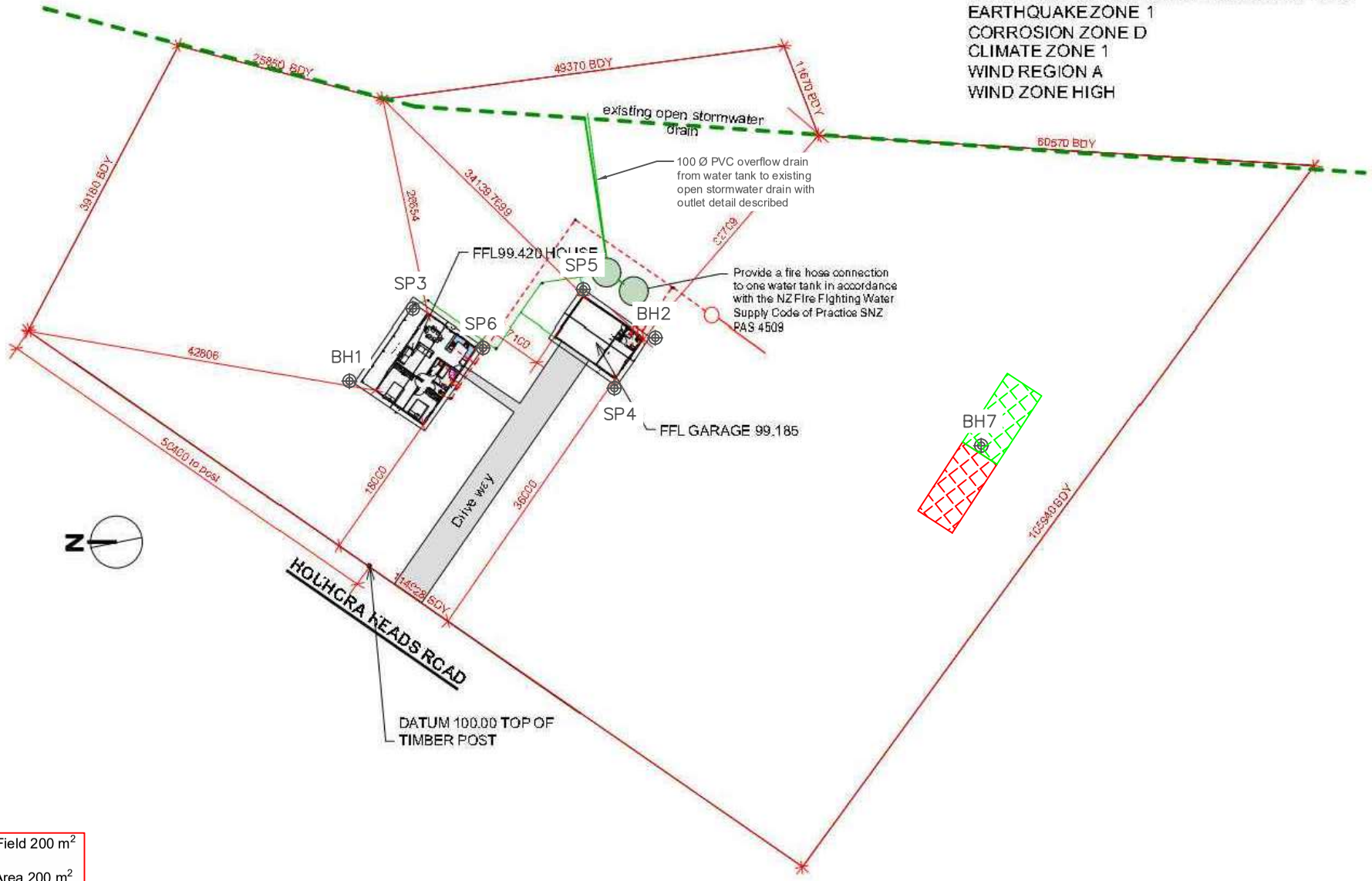
Table of Contents

SITE PLAN - Mark Up

Approximate locations of soil tests.

TMC Job#S1195-J02931

HOUHORA HEADS ROAD
COASTAL LIVING ZONE
LOT 4
DP 5300683
VALUATION NUMBER:
TOTAL LAND AREA: 0.8704Ha
PROPOSED BUILDING AREA:
DWELLING=82m2
GARAGE = 54m2
WATER TANKS= 20m2
DRIVE WAY = 154m2
TOTAL AREA OF IMPERMEABLE SURFACES:380m2
TOTAL % OF IMPERMEABLE SURFACES: 4.4%
EARTHQUAKE ZONE 1
CORROSION ZONE D
CLIMATE ZONE 1
WIND REGION A
WIND ZONE HIGH



Disposal Field 200 m²

Reserve Area 200 m²

	ISSUE	DATE	BY	ISSUE AMENDMENTS	REVISION AMENDMENTS	BY	DATE	REV

NOTES

ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK.

DRAWINGS ARE NOT TO BE SCALED.

USE ONLY FIGURED DIMENSIONS.

beard online ARCHITECTURE

Address - 106 Arawhata Road, Kaingaroa 0483
Work - 09 408 7123
Doug Cell - 021 125 8866
Tyler Cell - 021 247 7232

Client
D MUSSON

Project:
PROPOSED NEW DWELLING/GARAGE

Sheet Name:
SITE PLAN

Date: 23/09/2019

Drawn By: TB/DB | Scale: 1:500

Sheet: A001

Total Sheets: 70

BOREHOLE LOG 1

Project: Lot 4 Houhora Heads Road
Client: Denis Musson
Job No: S1195-J02931
Date: 13/11/2019

TMC CONSULTING ENGINEERS

Graphic Symbol


Fill


Rock


Cobbles


Gravel


Sand


Silt


Clay


Organic Soil

In situ shear vane reading
Remoulded shear vane reading
Scala Penetrometer
5 blows/100 mm (Scala)

Depth mm	G.W.L	Geology	Graphic Log	Field Description	Undrained Shear Strength (kPa) Corrected (Per NZGS guideline)	Scala Penetrometer (blows/ 100 mm)
0	No groundwater observed	Karioitahi Group (eQd)		100 mm peaty silty TOPSOIL, moist, black		
300				Silty peaty SAND, reddish black, moist, dense		
600						
900				very dense		
1200				Auger terminated due to hard pan		
1500						
1800						
2100						
2400						
2700						
3000						
3300						
3600						
3900						
4200						
4500						
4800						
5100						

Drill Method	50 - 100 mm hand auger
Location	Refer to site plan
Inspector	KD
Shear Vane No	2090

NOTES 1) The subsurface data described above has been determined at this specific borehole location. The data will not identify any variations away from this location.
2) UTP - Unable to penetrate

BOREHOLE LOG 2

Project: Lot 4 Houhora Heads Road
Client: Denis Musson
Job No: S1195-J02931
Date: 13/11/2019

TMC CONSULTING ENGINEERS

Graphic Symbol


Fill


Rock


Cobbles


Gravel


Sand


Silt


Clay


Organic Soil

In situ shear vane reading
Remoulded shear vane reading
Scala Penetrometer
5 blows/100 mm (Scala)

Depth mm	G.W.L	Geology	Graphic Log	Field Description	Undrained Shear Strength (kPa) Corrected (Per NZGS guideline)	Scala Penetrometer (blows/ 100 mm)
0	No groundwater observed	Karioitahi Group (eQd)		50 mm Silty TOPSOIL, dark brown, moist		
300				SAND, brown mottled grey, moist, dense to very dense		
600						
900				grey		
1200						
1500						
1800				dark grey, wet		
2100						
2400				Auger terminated at 2.1 m		
2700						
3000						
3300						
3600						
3900						
4200						
4500						
4800						
5100						

Drill Method	50 - 100 mm hand auger
Location	Refer to site plan
Inspector	KD
Shear Vane No	2090

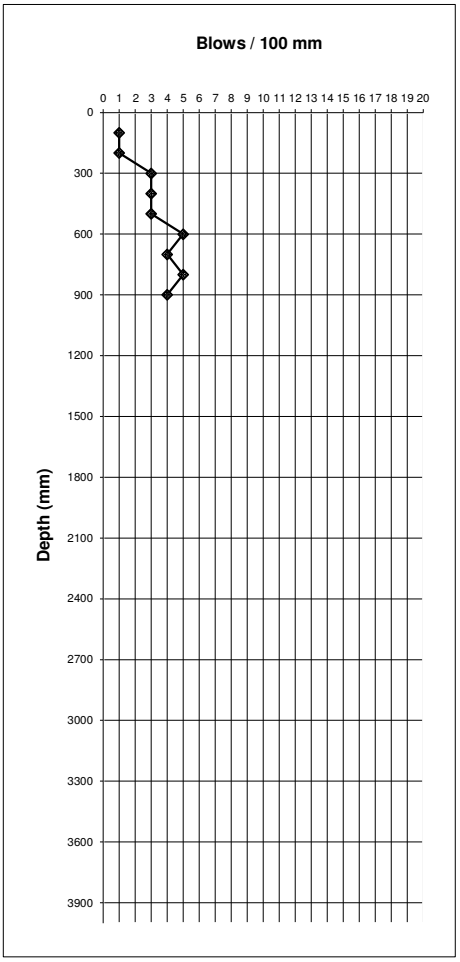
NOTES 1) The subsurface data described above has been determined at this specific borehole location. The data will not identify any variations away from this location.
2) UTP - Unable to penetrate

SCALA PENETROMETER RESULTS

Client: Denis Musson
Job No: S1195-J02931
Date: 13/11/2019
Logged: KD

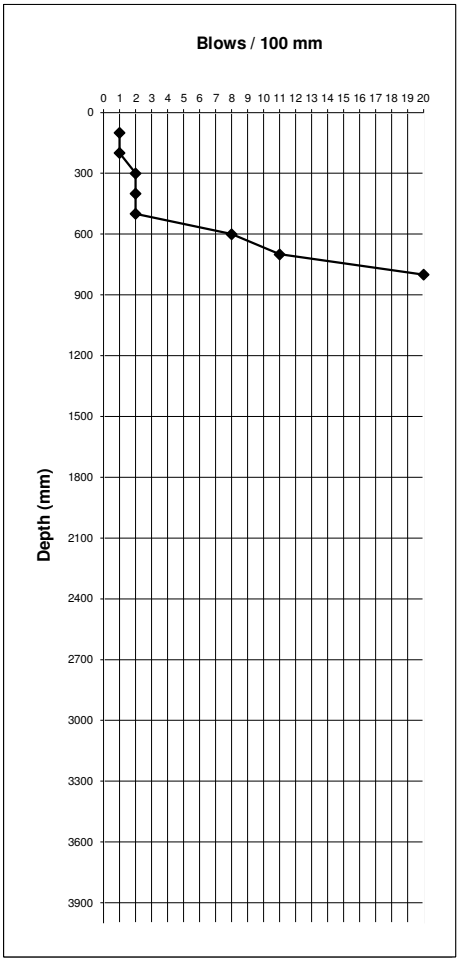
Scala 3

Depth of reading	Number of blows/100 mm
100	1
200	1
300	3
400	3
500	3
600	5
700	4
800	5
900	4
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	
2400	
2500	
2600	
2700	
2800	
2900	
3000	
3100	
3200	
3300	
3400	
3500	
3600	
3700	
3800	
3900	
4000	



Scala 4

Depth of reading	Number of blows/100 mm
100	1
200	1
300	2
400	2
500	2
600	8
700	11
800	20
900	
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	
2400	
2500	
2600	
2700	
2800	
2900	
3000	
3100	
3200	
3300	
3400	
3500	
3600	
3700	
3800	
3900	
4000	

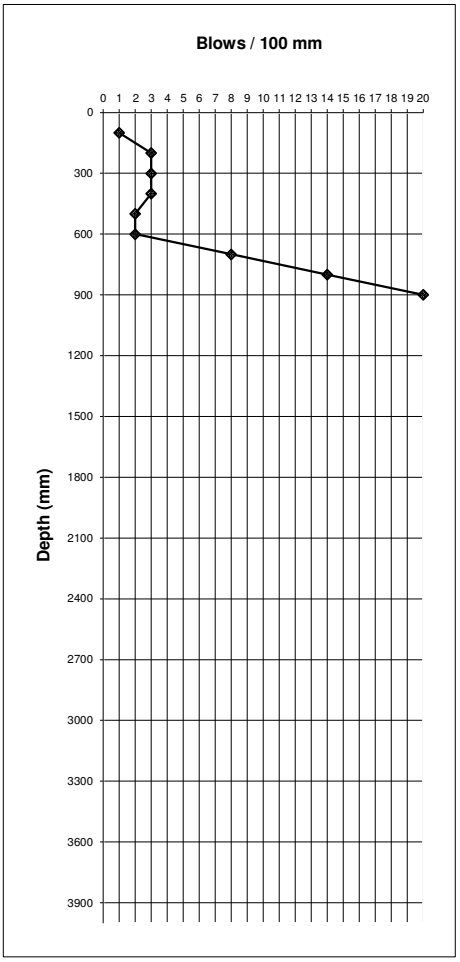


SCALA PENETROMETER RESULTS

Client: Denis Musson
Job No: S1195-J02931
Date: 13/11/2019
Logged: KD

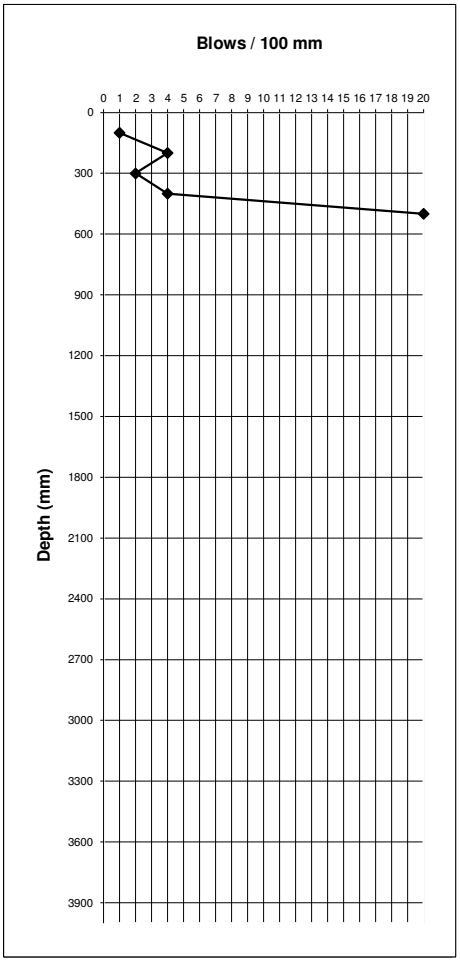
Scala 5

Depth of reading	Number of blows/100 mm
100	1
200	3
300	3
400	3
500	2
600	2
700	8
800	14
900	20
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	
2400	
2500	
2600	
2700	
2800	
2900	
3000	
3100	
3200	
3300	
3400	
3500	
3600	
3700	
3800	
3900	
4000	



Scala 6

Depth of reading	Number of blows/100 mm
100	1
200	4
300	2
400	4
500	20
600	
700	
800	
900	
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	
2400	
2500	
2600	
2700	
2800	
2900	
3000	
3100	
3200	
3300	
3400	
3500	
3600	
3700	
3800	
3900	
4000	



SOIL & GROUNDWATER LOG 7

Project: Lot 4 Houhora Heads Road
Client: Denis Musson
Job No: S1195-J02931
Date: 13/11/2019

TMC CONSULTING ENGINEERS

Graphic Symbol


Fill


Rock


Cobbles


Gravel


Sand


Silt


Clay


Organic Soil

In situ shear vane reading
Remoulded shear vane reading
Scala Penetrometer
5 blows/100 mm (Scala)

Depth mm	G.W.L	Geology	Graphic Log	Field Description	Undrained Shear Strength (kPa) Corrected (Per NZGS guideline)	Scala Penetrometer (blows/ 100 mm)
	No groundwater observed	Karioitahi Group (eQd)		100 mm TOPSOIL		
				SAND, brown and grey, moist, dense		
300						
600						
900				Auger terminated at 0.9 m		
1200						
1500						
1800						
2100						
2400						
2700						
3000						
3300						
3600						
3900						
4200						
4500						
4800						
5100						

Drill Method	50 - 100 mm hand auger	
Location	Refer to site plan	NOTES 1) The subsurface data described above has been determined at this specific borehole location. The data will not identify any variations away from this location.
Inspector	KD	
Shear Vane No	2090	2) UTP - Unable to penetrate

FAR NORTH DISTRICT COUNCIL

Appendix E

TP58

On-site Wastewater Disposal Site Evaluation Investigation Checklist

Part A –Owners Details

1. Applicant Details:

Applicant Name	Denis Musson	
Company Name		
	First Name(s)	Surname
Property Owner Name(s)	Denis Urszula	Musson Musson

Nature of Applicant*	Owner

*(*i.e. Owner, Leasee, Prospective Purchaser, Developer)*

2. Consultant / Site Evaluator Details:

Consultant/Agent Name	TMC Consulting Engineers Ltd			
Site Evaluator Name	Kurt Davies			
Postal Address	PO BOX 252			
	WHANGAREI 0140			
Phone Number	Business	(09) 393 0337	Private	N/A
	Mobile	021 020 9835	Fax	N/A
Name of Contact Person	Kurt Davies			
E-mail Address	kurt@tmcengineers.co.nz			

3. Are there any previous existing discharge consents relating to this proposal or other waste discharge on this site?

Yes		No	✓	(Please tick)

If yes, give Reference Numbers and Description

4. List any other consent in relation to this proposal site and indicate whether or not they have been applied for or granted

If so, specify Application Details and Consent No.

(eg. LandUse, Water Take, Subdivision, Earthworks Stormwater Consent)

Part B- Property Details

1. Property for which this application relates:

Physical Address of Property	Lot 4 Houhora Heads Drive
	Houhora
Territorial Local Authority	FAR NORTH DISTRICT COUNCIL
Regional Council	NORTHLAND REGIONAL COUNCIL
Legal Status of Activity	Permitted: ✓ Controlled: Discretionary:
Relevant Regional Rule(s) (Note 1)	
Total Property Area (m^2)	8703
Map Grid Reference of Property If Known	

2. Legal description of land (as shown on Certificate of Title)

Lot No.	4	DP No.	530683	CT No.	
Other (specify)					

Please ensure copy of Certificate of Title is attached

PART C: Site Assessment - Surface Evaluation

(Refer TP58 - Sn 5.1 General Purpose of Site Evaluation and Sn 5.2.2(a) Site Surface Evaluation)

Note: Underlined terms defined in Table 1, attached

Has a relevant property history study been conducted?

Yes		No	✓	(Please tick one)

If yes, please specify the findings of the history study, and if not please specify why this was not considered necessary.

Undeveloped lot.

1. Has a Slope Stability Assessment been carried out on the property?

Yes	✓	No		Please tick

If No, why not?

If Yes, please give details of report (and if possible, please attach report):

Author	Kurt Davies
Company/Agency	TMC Consulting Engineers Ltd
Date of Report	12 December 2019 JOB# S1195-J02931
Brief Description of Report Findings: No instability observed in area proposed for effluent disposal.	

2. Site Characteristics (See Table 1 attached):

Provide descriptive details below:
Performance of Adjacent Systems:
No problems observed
Estimated Rainfall and Seasonal Variation:
87 mm/hr for a 1 in 10 year storm (10 minute duration)
Vegetation / Tree Cover:
Pasture
Slope Shape: (Please provide diagrams)
Linear planar
Slope Angle:
2 to 5 degrees
Surface Water Drainage Characteristics:
Surface water from developed surfaces is to be directed to the overland flow path to the south away from the disposal area.
Flooding Potential: YES/NO
No
If yes, specify relevant flood levels on appended site plan, I.e. one in 5 years and/or 20 year and/or 100 year return period flood level, relative to disposal area.
Surface Water Separation:
No surface water within the NRC off set requirements.
Site Characteristics: or any other limitation influencing factors
None

3. Site Geology **Check Rock Maps**

Uncemented to moderately cemented and partly consolidated sand (eQd) of the Karioitahi Group
Te Kopuru sand, Tangitiki sandy loam and san and Ruakaka peaty sandy loam

Geological Map Reference Number	NZMS 290 SOILS Sheet N02/03

4. What Aspect(s) does the proposed disposal system face? (please tick)

North	✓	**West**	
North-West		**South-West**	
North-East	✓	**South-East**	
East		**South**	

5. Site clearances,(Indicate on site plan where relevant)

Separation Distance from	Treatment Separation Distance (m)	Disposal Field Separation Distance (m)
Boundaries	1.5 m minimum	1.5 m minimum
River, lake, stream, pond, dam, natural wetland or costal marine area.	15 m secondary/20 m primary	15 m secondary/20 m primary
Downslope of stormwater flow path	5 m minimum	5 m minimum
Groundwater	600 mm secondary/1200 mm primary	600 mm secondary/1200 mm primary
Stands of Trees/Shrubs		
Wells, water bores	20 m minimum	20 m minimum
Embankments/retaining walls	3 m minimum	3 m minimum
Buildings	3 m minimum	3 m minimum

PART D: Site Assessment - Subsoil Investigation

(Refer TP58 - Sn 5.1 General Purpose of Site Evaluation, and Sn 5.2.2(a) Site Surface Evaluation and Sn 5.3 Subsurface Investigations)
Note: Underlined terms defined in Table 2, attached

1. Please identify the soil profile determination method:

Test Pit			No of Test Pits	
Bore Hole	✓	900 mm bore log attached	No of Bore Holes	1
Other (specify):	Two boreholes undertaken for house site, see above noted report (Part C-1).			

Soil Report attached?

Yes	✓	No		Please tick

2. Was fill material intercepted during the subsoil investigation?

Yes		No	✓	Please tick

If yes, please specify the effect of the fill on wastewater disposal

3. Percolation testing (mandatory and site specific for trenches in soil type 4 to 7)

Please specify the method:					
Test Report Attached?	Yes		No	✓	Please tick

4. Are surface water interception/diversion drains required?

Yes		No	✓	Please tick

If yes, please show on site plan

4a Are subsurface drains required

NO

5. Please state the depth of the seasonal water table:

Winter	>0.9 m	m	Measured		Estimated	✓
Summer	>0.9 m	m	Measured	✓	Estimated	

6. Are there any potential storm water short circuit paths?

Yes		No	✓	Please tick

If the answer is yes, please explain how these have been addressed

7. Based on results of subsoil investigation above, please indicate the disposal field soil category *(Refer TP58 Table 5.1)*

Is Topsoil Present? YES	If so, Topsoil Depth? 0.05 (m)

Soil Category	Description	Drainage	Tick One
1	Gravel, coarse sand	Rapid draining	
2	Coarse to medium sand	Free draining	✓
3	Medium-fine & loamy sand	Good drainage	
4	Sandy loam, loam & silt loam	Moderate drainage	
5	Sandy clay-loam, clay loam & silty clay-loam	Moderate to slow drainage	
6	Sandy clay, non-swelling clay & silty clay	Slow draining	
7	Swelling clay, grey clay, hardpan	Poorly or non-draining	

Reasons for placing in stated category

Geotechnical investigation indicates coarse to medium sand – free drainage

PART E: Discharge Details

1. Water supply source for the property (please tick):

Rainwater (roof collection)	✓
Bore/well	
Public supply	

2. Calculate the maximum daily volume of wastewater to be discharged, unless accurate water meter readings are available

(Refer TP58 Table 6.1 and 6.2)

Number of Bedrooms	3			
Design Occupancy	6			(Number of People)
Per capita Wastewater Production	140	165 ✓	180	(tick) (Litres per person per day)
Other - specify	200	220	145	
Total Daily Wastewater Production	990 L			(litres per day)

3. Do any special conditions apply regarding water saving devices

a) Full Water Conservation Devices?	Yes		No	✓	(Please tick)
b) Water Recycling - what %?	0%				(Please tick)

If you have answered yes, please state what conditions apply and include the estimated reduction in water usage

Doesn't allow for garbage grinders.

4. Is Daily Wastewater Discharge Volume more than 3000 litres:

Yes		(Please tick)
No	✓	(Please tick)

Note if answer to the above is yes, an N.R.C wastewater discharge permit may be required

5. Is a Northland Regional Council Discharge Consent Required?

Yes		No	✓	(Please tick)

PART F: Primary Treatment *(Refer TP58 Section 7.2)*

1. Please indicate below the no. and capacity (litres) of all septic tanks including type (single/dual chamber grease traps) to be installed or currently existing: If not 4500 litre, duel chamber explain why not

Number of Tanks	Type of Tank	Capacity of Tank (Litres)
	Total Capacity	

2. Type of Septic Tank Outlet Filter to be installed?

PART G: Secondary and Tertiary Treatment

(Refer TP58 Section 7.3, 7.4, 7.5 and 7.6)

1. Please indicate the type of additional treatment, if any, proposed to be installed in the system: (please tick)

Secondary Treatment	✓		
Home aeration plant	✓		
Commercial aeration plant			
Intermediate sand filter			
Recirculating sand filter			
Recirculating textile filter	✓		
Clarification tank			
Tertiary Treatment			
Ultraviolet disinfection			
Chlorination			
Other	✓	Specify	Secondary treatment that meets requirements of RWSPN

PART H: Land Disposal Method

(Refer TP58 Section 8)

1. Please indicate the proposed loading method: (please tick)

Gravity	
Dosing Siphon	
Pump	✓

2.High water level alarm to be installed in pump chambers

Yes ✓	no

If secondary system is installed

3. If a pump is being used, please provide the following information:

Total Design Head	21.8	(m)
Pump Chamber Volume	120 min	(Litres)
Emergency Storage Volume	1200 min	(Litres)

4. Please identify the type(s) of land disposal method proposed for this site: (please tick)
(Refer TP58 Sections 9 and 10)

Surface Dripper Irrigation	✓		
Sub-surface Dripper irrigation			
Standard Trench			
Deep Trench			
Mound			
Evapo-transpiration Beds			
Other		Specify	

5. Please identify the loading rate you propose for the option selected in Part H, Section 4 above, stating the reasons for selecting this loading rate:

Secondary - DIR	5.0 mm/day		**Primary -** DLR	
Disposal Area	Design	200 m^2	Disposal Area	
100 % Reserve	Reserve	200 m^2		

Explanation *(Refer TP58 Sections 9 and 10)*

Secondary - DIR = 5 mm per day for free drainage – Category 2 soils.

6. What is the available reserve wastewater disposal area *(Refer TP58 Table 5.3)*

Reserve Disposal Area (m^2)	200 Secondary
Percentage of Primary Disposal Area (%)	100% Secondary

7. Please provide a detailed description of the design and dimensions of the disposal field and attach a detailed plan of the field relative to the property site:

Description and Dimensions of Disposal Field:

See above referenced report (Part C-1) and site plan

Plan Attached?	Yes	✓	No		(Please tick)

If not, explain why not

PART I: Maintenance & Management

(Refer TP58 Section 12.2)

1. Has a maintenance agreement been made with the treatment and disposal system suppliers?

Yes		No	✓	(Please tick)

Name of Suppliers

PART J: Assessment of Environmental Effects

1. Is an assessment of environmental effects (AEE) included with application?

(Refer TP58 section 5. Ensure all issues concerning potential effects addressed)

Yes	✓	No		(Please tick)

If Yes, list and explain possible effects

Refer to above referenced report (Part C-1).

PART K: Is Your Application Complete?

1. In order to provide a complete application you have remembered to:

Fully Complete this Assessment Form	
Include a *Location Plan* and *Site Plan*	
Attach an Assessment of Environmental Effects (AEE)	

1. Declaration

I hereby certify that, to the best of knowledge and belief, the information given in this application is true and complete.

Name: Kurt Davies	Signature	
Position: Engineer	Date	18 December 2019

Note
Any alteration to the site plan or design after approval will result in non compliance.

Building Code Clause(s) G13/VM4

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY: TMC Consulting Engineers Limited
(Design Firm)

TO: Denis Musson
(Owner/Developer)

TO BE SUPPLIED TO: Far North District Council
(Building Consent Authority)

IN RESPECT OF: On-site Residential Wastewater Disposal System design.
(Description of Building Work)

AT: Lot 4 Houhora Heads Road
(Address)

Town/City: Houhora **LOT** 4 **DP** 530683 **SO**
(Address)

We have been engaged by the owner/developer referred to above to provide:

On-site Residential Wastewater System design.

(Extent of Engagement)

services in respect of the requirements of Clause(s) G13/VM4 of the Building Code for:

☐ All or ■ Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

■ Compliance Documents issued by the Ministry of Business, Innovation & Employment G13/VM4 or
(verification method/acceptable solution)

☐ Alternative solution as per the attached schedule

The proposed building work covered by this producer statement is described on the drawings titled:

TMC Consulting Engineers Ltd Report and numbered S1195-J02931;
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:
(i) Site verification of the following design assumptions
(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ■ as per agreement with owner/developer (Architectural)

I, Gareth Cottrell am: ■ CPEng 1022740 # ☐ Reg Arch #
(Name of Design Professional)

I am a member of: ■ Engineering New Zealand ☐ NZIA and hold the following qualifications: MCGI CMEngNZ CPEng IntPE
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☐

SIGNED BY Gareth Cottrell (Signature)
(Name of Design Professional)

ON BEHALF OF TMC Consulting Engineers Limited Date 12/12/19
(Design Firm)

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

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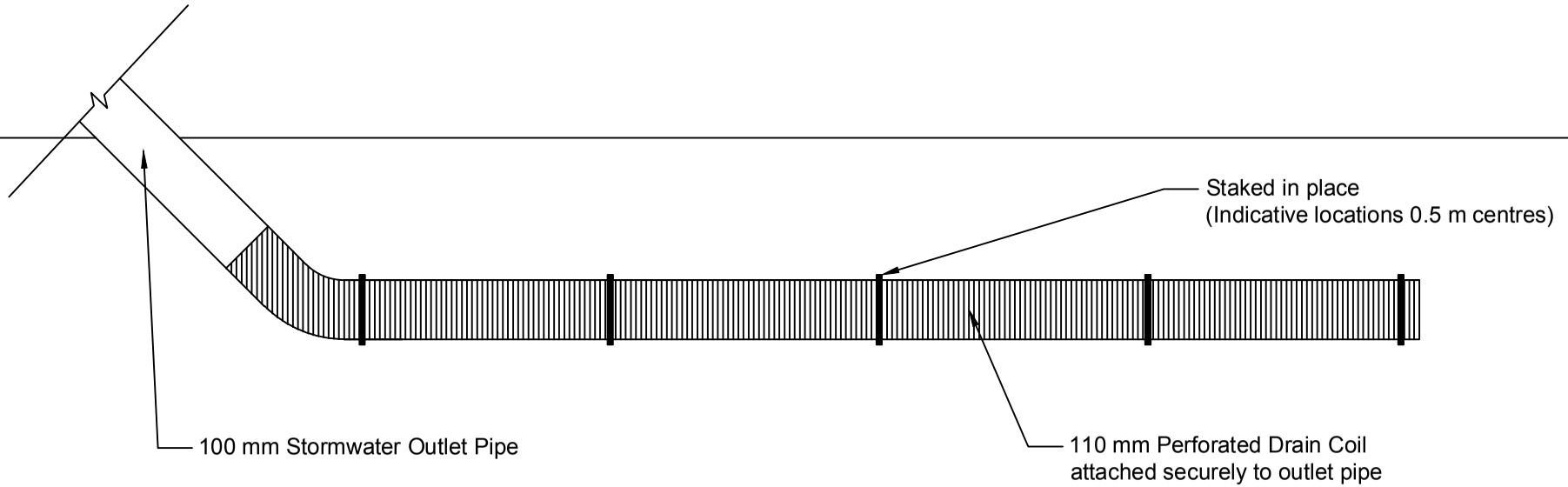
Standard Drain Coil Outlet Protection Detail



Direction of Flow (Within Overland Flowpath/Drain)

Client :

Property:

TMC Consulting Engineers
41 Norfolk Street
P.O.Box 252,
Whangarei
Ph: 09 3930337
Email: office@tmcengineers.co.nz

Project No :

Revision No :

Drawn : TK

Checked :

Scale : Not to Scale

Date :

Sheet : 1

VISION CONSULTING
Engineers

GEOTECHNICAL REPORT

30 Houhora Heads Road, Pukenui

Prepared for

Dennis Musson

14/11/2022

Report Information Summary

Job no.	J15259
Report Author	Daniel Arama
Report Reviewer	Dan Simmonds
Version No.	1
Status	Final
Date	14/11/2022

Version No.	Date	Description
1	14/11/2022	Final issued to client.

Document Acceptance

Action	Name	Signed	Date
Author	Daniel Arama	 Engineer Technician, BBSCi (Project Management)	14/11/2022
Reviewer	Dan Simmonds	 Senior Geotechnical Engineer, MIEAust CPEng (Civil), CMEngNZ	14/11/2022

Limitations

This report has been prepared by Vision Consulting Engineers Limited (VISION) based on the scope of our engagement. It is solely for our Client's use for the purpose for which it is intended in accordance with the agreed scope of work. VISION does not accept any liability or responsibility in relation to the use of this report contrary to the above, or to any person other than the Client. Any use or reliance by a third party is at that party's own risk. Where information has been supplied by the Client or obtained from other external sources, it has been assumed that it is accurate, without independent verification, unless otherwise indicated. No liability or responsibility is accepted by VISION for any errors or omissions to the extent that they arise from inaccurate information provided by the Client or any external source.

The ground conditions given in this report are based on visual methods and investigations at discrete locations. The nature and continuity of the subsurface conditions are inferred and it must be appreciated that actual conditions could vary from that described herein. We should be contacted immediately if variations are encountered for those assumed in this report. It is possible that further investigation or modification of recommendations is required.

VISION CONSULTING Engineers

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Appendices

Tables

Figures

1 General

Vision Consulting Engineers Ltd (VISION) was engaged to undertake a ground investigation for a proposed part habitable shed to be located on a site at 30 Houhora Heads Road, Pukenui in accordance with the Far North District Council (FNDC) building requirements.

The purpose of the investigation was to determine the nature and strength distribution of the soils beneath the proposed building and provide recommendations for foundation design.

2 Site Setting and Conditions

The property is located at 30 Houhora Heads Road, Pukenui, being Lot 4 Deposited Plan 530683 and covers an area of 8,704m². The property is bounded by Houhora Heads Road to the north- west, and coastal living lots in all other directions. The approximate location of the property is presented below on Figure 1.

The property is flat to gently sloping to the east and is covered in grass and bare sand with mature trees and bush running along the south-western boundary and a portion of the north-eastern boundary. An open drain runs along the eastern boundary and flows south to north. The property contains an existing stand alone house, small garage with a sleepout, two water tanks and an onsite wastewater system and disposal field.

For the purpose of this report the 'site' is limited to the proposed part habitable shed building area and the area appurtenant to the proposed building area.

The proposed site is flat and generally covered in grass with several small to medium trees and bamboo along the south western side of the proposed building. The proposed shed is located approximately 10m away from the open drain that is present near the eastern boundary.

Figure 1. Property Location

Approximate property boundary outlined in red, north to top of page, not to scale

3 Proposed Building

Concept plans provide by the client are included in Appendix A. It is understood that a part habitable shed 12m x 9m (108m^2) steel portal frame, with colorsteel lightweight roofing and colorsteel cladding on concrete slab is proposed.

4 Geology

The 1:250,000 geological map, Geology of the Kaitaia Area (Isaac et al 1996) indicates that the property is underlain by the Karioitahi Group, comprising uncemented to moderately cemented and partly consolidated sand in coastal foredunes, clay-rich sandy soils.

Landcare Research have mapped the site as being underlain by Ruakaka peaty sandy loam being soils of the coastal sand dune complex, imperfectly to very poorly drained, Te Kopuru sand being soils of the coastal sand dune complex, imperfectly to very poorly drained and the Tangitiki sandy loam and sand being soils of the coastal sand dune complex, well to moderately well drained.

5 Site Investigation

Our investigation of the site included the following;

- A walkover assessment of the site and surrounding area to assess its geomorphology and any geological features which may potentially influence the long term behaviour of the site.
- Three 300mm machine augered boreholes and five dynamic cone penetrometer tests (penetrometer) progressed to a maximum depth of 3.0m below ground surface level (m bgl) or refusal. The soils encountered were logged in accordance with NZ Geotechnical Society Logging Guidelines for the field classification of soil and rock for engineering purposes and the methodology given in NZS3604 (2011). The penetrometer tests were measured in 100mm increments.
- Observations and measurements of the soil moisture content and levels of groundwater encountered in the boreholes were taken. The possible seasonal variation of these levels was noted and compared to the regional groundwater table expected for the area and the timing of the investigation.

The approximate location of the subsurface investigations are shown below on Figure 2. Logs of the boreholes and penetrometer tests are included in Appendix B.

The field work was completed on the 07/11/2022.

Figure 2. Geotechnical Test Location Plan

Proposed shed location in yellow, as marked onsite by client, approximately property boundary shown in red, 1m contours from the NRC, north to top of page, not to scale.

6 Subsurface Conditions

6.1 Soil Profile and Strength

The borehole logs and penetrometer profiles included in Appendix B show the ground conditions encountered beneath the site during the site investigation.

Machine auger borehole BH1 encountered black silty sand (Topsoil) to a depth of 0.1m bgl. Underlying the topsoil, black medium dense sand was encountered to a depth of 0.3m, which was in turn underlain by medium dense to dense light yellow and light pale brown sand to the target depth of 3.0m bgl.

Machine auger boreholes BH2 and BH3 encountered black silty sand (Topsoil) to a depth of 0.3m bgl. Underlying the topsoil, boreholes BH2 and BH3 encountered brown/dark brown sand to depths of 0.8 and 1.0m respectively. Penetrometer testing with the boreholes indicate that the density of the sand was very loose to loose to a depth of 0.5 to 0.6m bgl, before increasing to medium dense to dense. Underlying the brown/dark brown sand, dark reddish brown very dense cemented sand (hardpan) was encountered to 1.5m bgl. Underlying the hardpan, very loose to medium dense pale brown sand was found to a depth of 3.0m bgl. Penetrometers BH2/P and BH3/P were continued from the base of the machine auger hole below the hardpan layer from 1.5m bgl.

The depth to the hardpan was inferred across the proposed building footprint from penetrometer readings of greater than 20 blows per 100mm increment. Penetrometer tests BH2/P, BH3/P, P1 and P2 encountered hard pan depths of 0.9m, 0.8m, 1.9m and 0.8m bgl respectively.

6.2 Soil Moisture and Ground Water Levels

Ground conditions were generally dry and no groundwater was observed during the shallow ground investigation (progressed to a maximum depth of 3.0 mbgl).

Perched groundwater table could be expected during the winter months or extended periods of wet weather.

6.3 Site Subsoil Category

The site subsoil class is considered to be Class D deep or soft soil site as defined by NZS 1170.5 (2004) “Structural Design Actions: Part 5: Earthquake actions – New Zealand” based on our database of deep investigation data and published geological information.

7 Vertical and Lateral Movement Potential

7.1 Soil Shrink-swell Potential

The near surface soils appear to be non expansive soils with a liquid limit below 50% based on their physical characteristics determined during testing and relevant project experience. We note that no laboratory testing of the material to confirm the liquid limit or presence of clay swelling minerals has been undertaken, however material characteristics indicate that they do not appear to be expansive.

7.2 Possible Liquefaction Potential

A detailed liquefaction hazard assessment for the site was outside our work scope, however the soils underlying the site are considered to have a low potential for liquefaction-induced settlement due to the cemented sands present and no groundwater being encountered during the investigation.

8 Engineering Recommendations

8.1 Site Preparation

8.1.1 Removal of Unsuitable Materials

The topsoil and very loose to loose sand present is to be removed where any site filling is proposed or where slab-on-grade foundations are proposed. Based on site testing, topsoil is expected to extend 0.1m bgl and very loose to loose sand is expected to extend up to approximately 0.6m bgl. It is noted that borehole BH1 and penetrometer P1 did not encounter very loose to loose sand.

8.1.2 Site Filling

It is recommended that all permanent fill batters up to a maximum height of 0.6m should be at a maximum of 1V:3H. All permanent fill batters should be appropriately protected with planting, mulch or geotextile to protect the cut face from erosion.

Where the proposed filling is to support the loads of the building it will need to be certified by a Chartered Professional Engineer in accordance with NZS4431:1989, as required by NZS3604:2011 "Timber Framed Buildings" and NZS4229 (1999) "Concrete Masonry Buildings Not Requiring Specific Engineering Design". If certification is not achieved, specific engineering design will be required to comply with the NZ Building Code.

Where required, the excavation for the fill needs to extend horizontally at least 1.0m beyond the footprint of the building with a fill batter extending to natural ground at an angle of 1V:2H. Removal beyond the footprint area is not required if the strip footings for the building extend down into competent identified natural ground.

Where filling is proposed and on removal of topsoil /very loose to loose sand / unsuitable materials an inspection of the base of the excavation by the certifying Engineer or their representative is required prior to the commencement of filling. The replacement fill should comprise suitable well graded granular material (GAP65 or similar approved), placed uniformly into the excavation in layers not exceeding 150mm in thickness. The fill should be placed at its optimum moisture content. Alternatively, the material should be inspected and approved as suitable material by the certifying Engineer or their representative. Material which is wet or saturated should not be placed into the excavation unless that is the optimum moisture content for the fill.

The fill should be compacted to achieve the minimum strengths given in Table 1.

Table 1. Fill Compaction Specification

Clegg Hammer (hardfill)	
Minimum single value	25 CIV

Compaction should be carried out using several passes over each lift with a steel drum roller for non-cohesive fill (sand or gravel) or a sheep's foot roller for cohesive fill (silt and clay). Compaction using a Bobcat, excavator, truck or other vehicle other than a compactor is not likely to achieve the required strength for the fill to be certified.

Provision should be made to ensure that the earthworks are conducted with due respect for the weather, particularly due to the low permeability of the underlying ground. The fill should not be placed into a saturated excavation, especially if ponded water is present.

Vibration compaction should not be used if the base of the excavation is wet or if the fill is above optimum moisture content otherwise the fill strength may be significantly reduced from the resultant moisture uptake until the excess pore pressures have dissipated. The time for this to occur is variable, but is likely to take more than one day.

8.1.3 Site Cutting

It is recommended that all site cuts are limited to a maximum height of 1.0m and are to be no steeper than 1V:3H. Where this cannot be achieved it is recommended that engineer designed retaining walls are used and/or specific geotechnical analysis is undertaken by a chartered professional engineer. All permanent cut slopes should be appropriately protected with planting, mulch or geotextile to protect the cut face from erosion.

8.1.4 Gardens, Trees and Shrubs

There are presently no large trees within 5m of the building footprint which would have the potential to result in soil settlement due to the uptake of water from the tree roots or ground heave from tree root growth.

Development of the gardens should not interfere with any subfloor ventilation and drainage system. Garden beds adjacent to foundations should be avoided. Care should be taken to avoid over watering of gardens close to house footings. Planting of trees near foundations should be avoided. To reduce damage, trees should be planted a minimum of 0.5 times the mature height of the tree away from the foundation; however the owner should check the anticipated extent of a trees root system before planting a tree. It is recommended that trees which have a dripline within the building area should be removed prior to construction.

8.1.5 Ground contouring

The site should be graded so that water cannot pond against, or around the building for the economic life of the structure. To achieve this it will be important that the soils beneath the topsoil grade away from the buildings.

Contouring should avoid the potential for concentration and discharge of surface water over point locations which could result in soil erosion or instability.

8.2 Foundation Recommendations

8.2.1 Concrete slab on grade with perimeter footings

The ground conditions present do not meet the requirements of 'good ground' in accordance with NZS3604(2011) due to the presence of very loose to loose sand with a low bearing capacity.

It is recommended that unsuitable material (topsoil and very loose to loose sand) is removed from the building area. Based on site testing, topsoil is expected to extend 0.1m bgl and very loose to loose and to a depth of up to 0.6m bgl.

Following the removal of unsuitable material, ground with an ultimate geotechnical bearing capacity of at least 200kPa and a vertical movement potential of less than 25mm is expected to exist beneath the subject site.

Prior to the construction of the foundations, the founding material is to be confirmed to be medium dense (or denser) sand and all cuttings from the foundation excavations need to be removed to avoid the excessive foundation settlement due to the consolidation of the cuttings with loading.

8.3 Verification Checks Required

8.3.1 Fill (if required)

As required by NZS3604 (2011) and NZS4229 (1999), the fill beneath the building will need to be certified by a Chartered Professional Engineer in accordance with NZS4431 (1989). A "Certificate of Suitability of Earthfill for Residential Development" will also be required in accordance with NZS3604 and NZS4229.

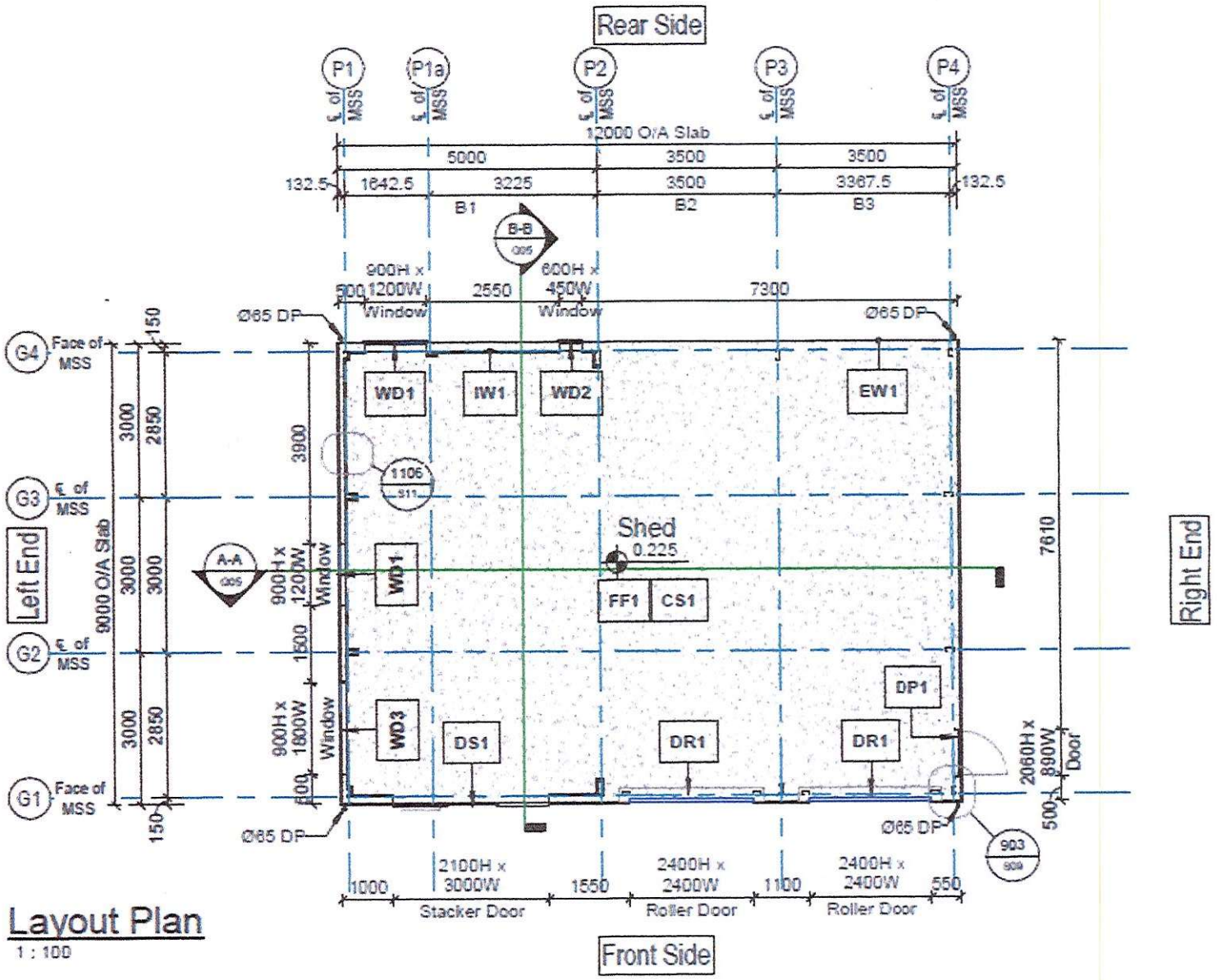
In order for the fill to be certified, the excavation will need to be inspected by the certifying Engineer or Engineer's representative to ensure that all compressible materials are removed prior to the placement of the new fill.

Verification strength testing of the backfill by the certifying Engineer or Engineer's representative will also be required to ensure that the minimum fill strengths specified in this report have been achieved.

8.3.2 Foundations

Verification testing of the ground by a Building Inspector or Suitably Qualified Professional is recommended to ensure that the ground conditions at the base of the foundation excavations are as described in this report, and that all unsuitable and loose materials have been removed as required by NZS3604 (2011) and NZS4229 (1999). We should be contacted immediately if these conditions vary from that described in this report. Deepening of the foundations or a modification to the recommendations or design may be required.

Appendix A
Client provided drawings



Layout Plan

1 : 100

Appendix B
Field Logs

MACHINE AUGERED BOREHOLE LOG

BOREHOLE No: BH1

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:**	J15259
Project Location: 30 Houhora Heads Road, Pukenui	**Borehole Location:** Refer to site plan	**Hole started:**	07/11/02022
		Hole completed:	07/11/02022
Drill method: 300mm Solid Flight Auger		**Logged by:**	DA
		Checked by:	DS

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0			D	Silty SAND; black, trace orange, trace rootlets, fine grained	TOPSOIL
0.1		MD	D	SAND; black trace dark brown, trace orange brown, trace cemented sand,	KARIOITAHI GROUP
0.2				fine to coarse grained	
0.3				light yellow, trace orange, trace brown, fine to coarse grained	
0.4					
0.5					
0.6					
0.7		MD			
0.8		D			
0.9					
1.0					
1.1					
1.2					
1.3		MD			
1.4			VM	light pale brown, trace yellow brown	
1.5					
1.6					
1.7		D			
1.8					
1.9					
2.0					
2.1					
2.2					
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0				End of machine augered borehole at 3.0m bgl	
3.1				Target depth achieved	
3.2				Groundwater not encountered	
3.3					
3.4					
3.5					
3.6					
3.7					
3.8					
3.9					
4.0					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
4.9					
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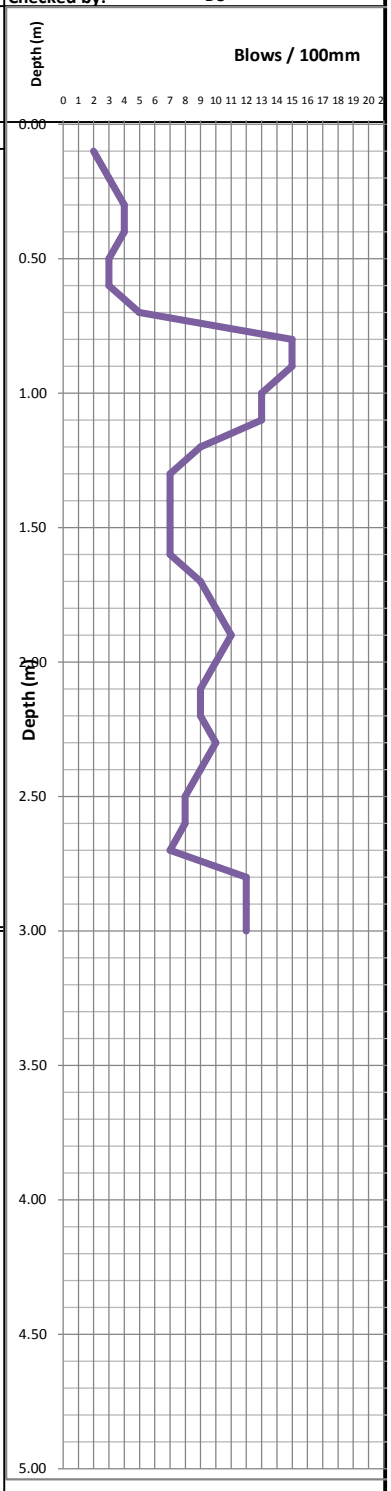
5.5					
5.6					
5.7					
5.8					
5.9					



Notes: Shear strength lines are indicative only.
Shear strength calibrated and adjusted for plasticity

VISION CONSULTING Engineers

DYNAMIC CONE PENETROMETER TEST LOG

PENETROMETER TEST No: BH1/P

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:** J15259
Location: 30 Houhora Heads Road, Pukenui	**Test Location:** Refer to site plan	**Test date:** 07/11/02022
Test method: Dynamic Cone Penetrometer	**Tested by:** DA	**Checked by:** DS

Depth (m)	Blows/100mm
0.10	2.0
0.20	3.0
0.30	4.0
0.40	4.0
0.50	3.0
0.60	3.0
0.70	5.0
0.80	15.0
0.90	15.0
1.00	13.0
1.10	13.0
1.20	9.0
1.30	7.0
1.40	7.0
1.50	7.0
1.60	7.0
1.70	9.0
1.80	10.0
1.90	11.0
2.00	10.0
2.10	9.0
2.20	9.0
2.30	10.0
2.40	9.0
2.50	8.0
2.60	8.0
2.70	7.0
2.80	12.0
2.90	12.0
3.00	12.0
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
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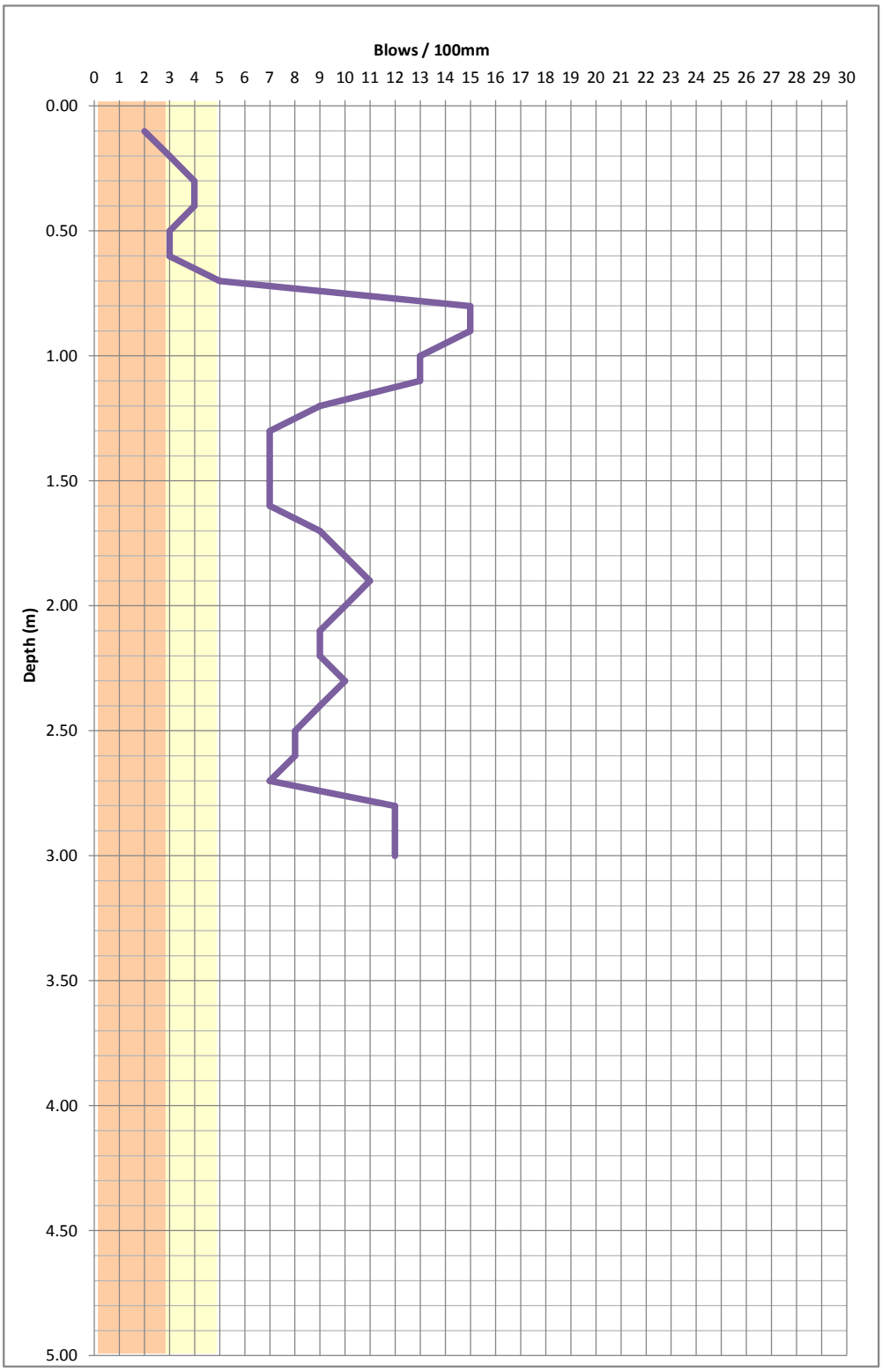
4.70	
4.80	
4.90	
5.00	



*Indicative only. Based on Stockwell (1977) correlation, bearing capacity factors excluded.

- Very low strength ground <2 blows per 100mm or less
- Low strength ground 2 to 4 blows per 100mm
- Ground with indicative ultimate bearing capacity of at least 300kPa*

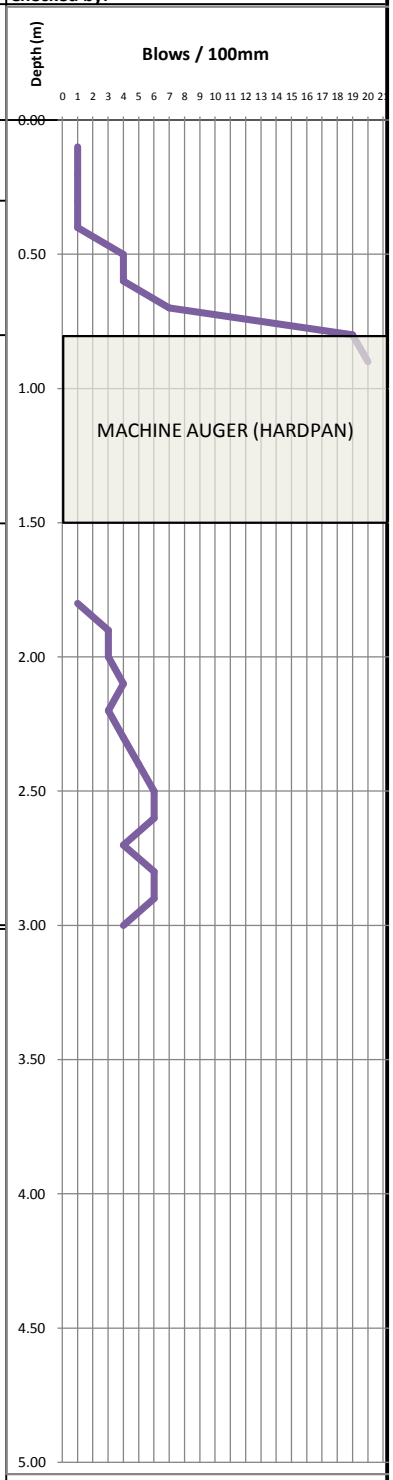
Notes:

MACHINE AUGERED BOREHOLE LOG

BOREHOLE No: BH2

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:**	J15259
Project Location: 30 Houhora Heads Road, Pukenui	**Borehole Location:** Refer to site plan	**Hole started:**	07/11/02022
		Hole completed:	07/11/02022
Drill method: 300mm Solid Flight Auger		**Logged by:**	DA
		Checked by:	DS

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0 – 0.2		VL	D	Silty SAND; black, trace rootlets, fine grained	TOPSOIL
0.3 – 0.7		VL / MD / D	D	SAND; dark brown, trace orange, trace black, fine to coarse grained	KARIOITAHI GROUP
0.8 – 1.4		VD	D	Cemented SAND; dark reddish brown, trace black, fine to coarse grained	HARDPAN ENCOUNTERED FROM 0.8m to 1.5m bgl
1.5 – 2.9		VL / L / MD	D-M / VM	SAND; light pale brown, trace brown, trace orangish brown, fine to coarse grained	
3.0				End of machine augered borehole at 3.0m bgl	
3.1				Target depth achieved	
3.2				Hardan encountered from 0.8 to 1.5m bgl	
3.3				Penetrometer BH2/P encountered refusal at 0.9m bgl	
3.4				Penetrometer BH2/P continued below hard pan from 1.5m to 3.0m bgl	
3.5				Groundwater not encountered	
3.6 – 5.9					



Notes: Shear strength lines are indicative only.
Shear strength calibrated and adjusted for plasticity

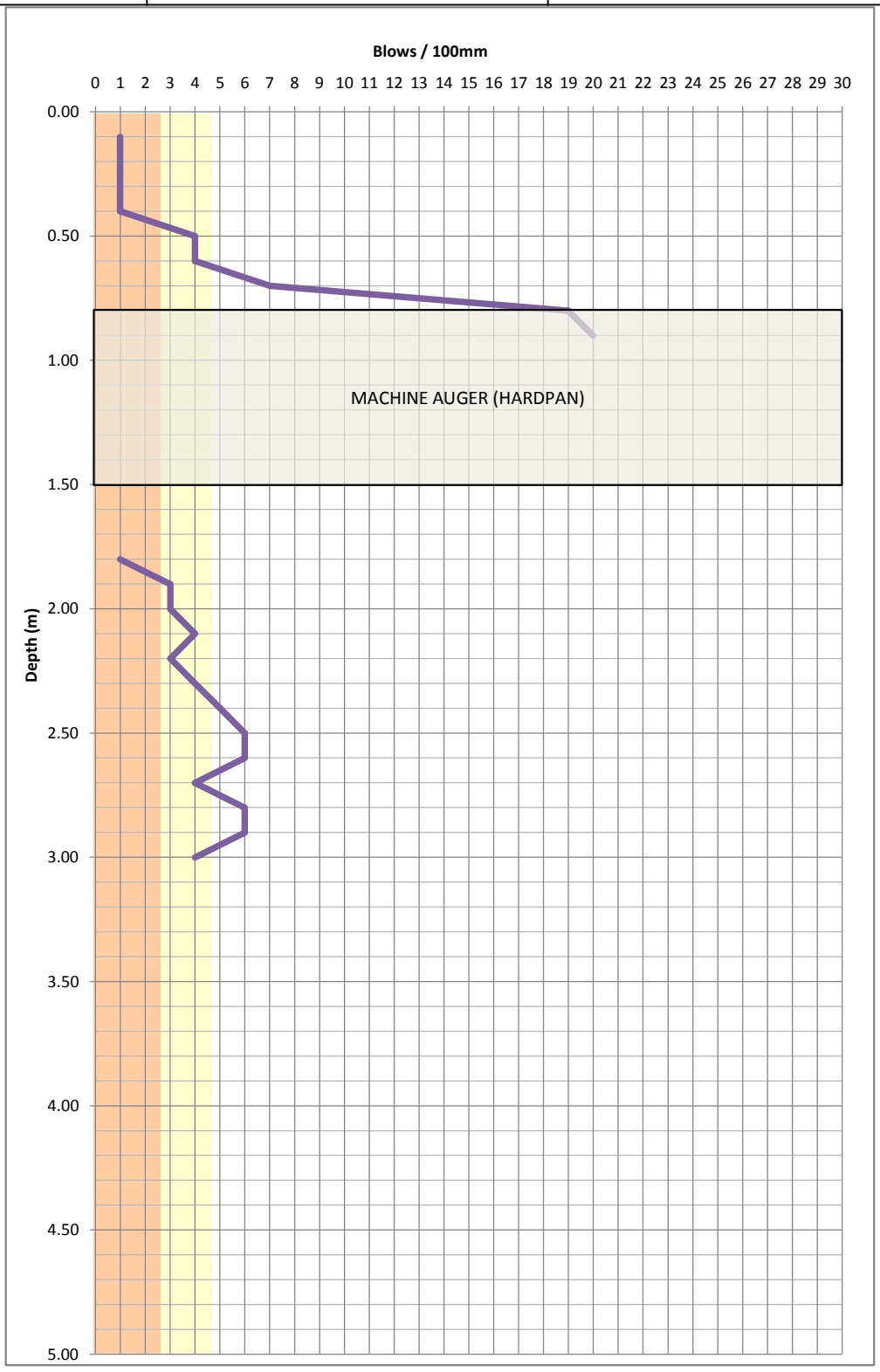
VISION CONSULTING Engineers

DYNAMIC CONE PENETROMETER TEST LOG

PENETROMETER TEST No: BH2/P

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:** J15259
Location: 30 Houhora Heads Road, Pukenui	**Test Location:** Refer to site plan	**Test date:** 07/11/02022
Test method: Dynamic Cone Penetrometer	**Tested by:** DA	**Checked by:** DS

Depth (m)	Blows/100mm
0.10	1.0
0.20	1.0
0.30	1.0
0.40	1.0
0.50	4.0
0.60	4.0
0.70	7.0
0.80	19.0
0.90	20.0
1.00	
1.10	
1.20	
1.30	
1.40	
1.50	
1.60	
1.70	
1.80	1.0
1.90	3.0
2.00	3.0
2.10	4.0
2.20	3.0
2.30	4.0
2.40	5.0
2.50	6.0
2.60	6.0
2.70	4.0
2.80	6.0
2.90	6.0
3.00	4.0
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



*Indicative only. Based on Stockwell (1977) correlation, bearing capacity factors excluded.

- Very low strength ground <2 blows per 100mm or less
- Low strength ground 2 to 4 blows per 100mm
- Ground with indicative ultimate bearing capacity of at least 300kPa*

Notes:

MACHINE AUGERED BOREHOLE LOG

BOREHOLE No: BH3

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:**	J15259
Project Location: 30 Houhora Heads Road, Pukenui	**Borehole Location:** Refer to site plan	**Hole started:**	07/11/02022
		Hole completed:	07/11/02022
Drill method: 300mm Solid Flight Auger		**Logged by:**	DA
		Checked by:	DS

Depth (m)	Graphic	Strength	Moisture	Soil Description	GEOLOGY & additional observations
0.0		VL	D	Silty SAND; black, trace orange, trace rootlets, fine grained	TOPSOIL
0.1					
0.2				trace borwn sand, fine to coarse grained	
0.3		VL	D	SAND; brown, trace dark brown, fine to coarse grained	KARIOITAHI GROUP
0.4					
0.5					
0.6		D			
0.7					
0.8		VD			
0.9					
1.0		VD		Cemented SAND; dark reddish brown, trace black, trace dark orange	HARDPAN ENCOUNTERED FROM
1.1			D	fine to coarse grained	1.0m to 16m bgl
1.2					
1.3					
1.4					
1.5					
1.6		VL	D-M	SAND; light pale brown, fine to coarse grained	
1.7		L			
1.8					
1.9		D			
2.0		MD	VM		
2.1					
2.2					
2.3					
2.4					
2.5					
2.6					
2.7					
2.8					
2.9					
3.0				End of machine augered borehole at 3.0m bgl	
3.1				Target depth achieved	
3.2				Hardan encountered from 1.0 to 1.6m bgl	
3.3				Penetrometer BH3/P encountered refusal at 0.8m bgl	
3.4				Penetrometer BH3/P continued below hard pan from 1.6m to 3.0m bgl	
3.5				Groundwater not encountered	
3.6					
3.7					
3.8					
3.9					
4.0					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
4.9					
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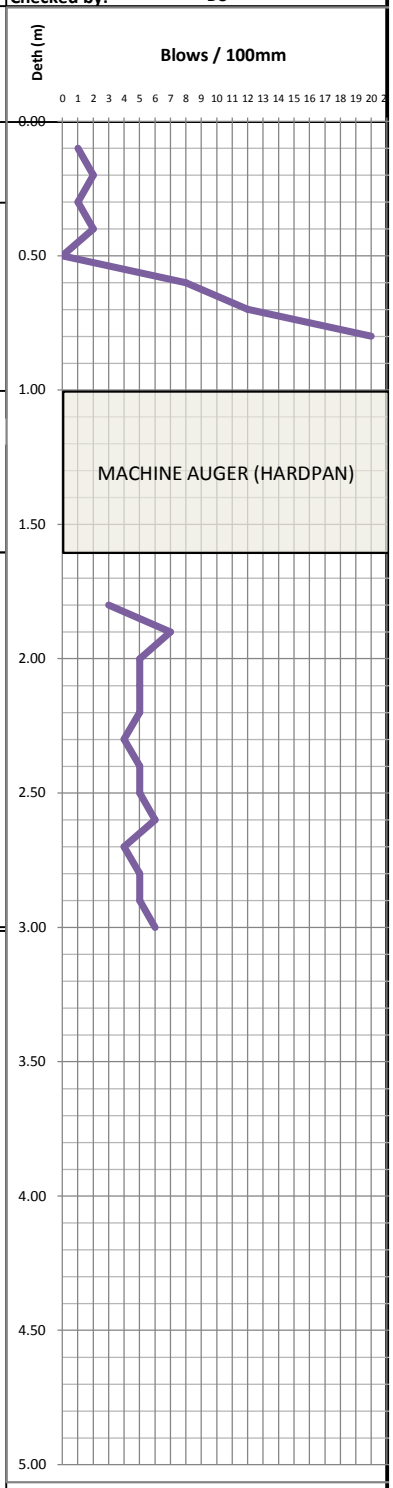
5.7					
5.8					
5.9					



Notes: Shear strength lines are indicative only.
Shear strength calibrated and adjusted for plasticity

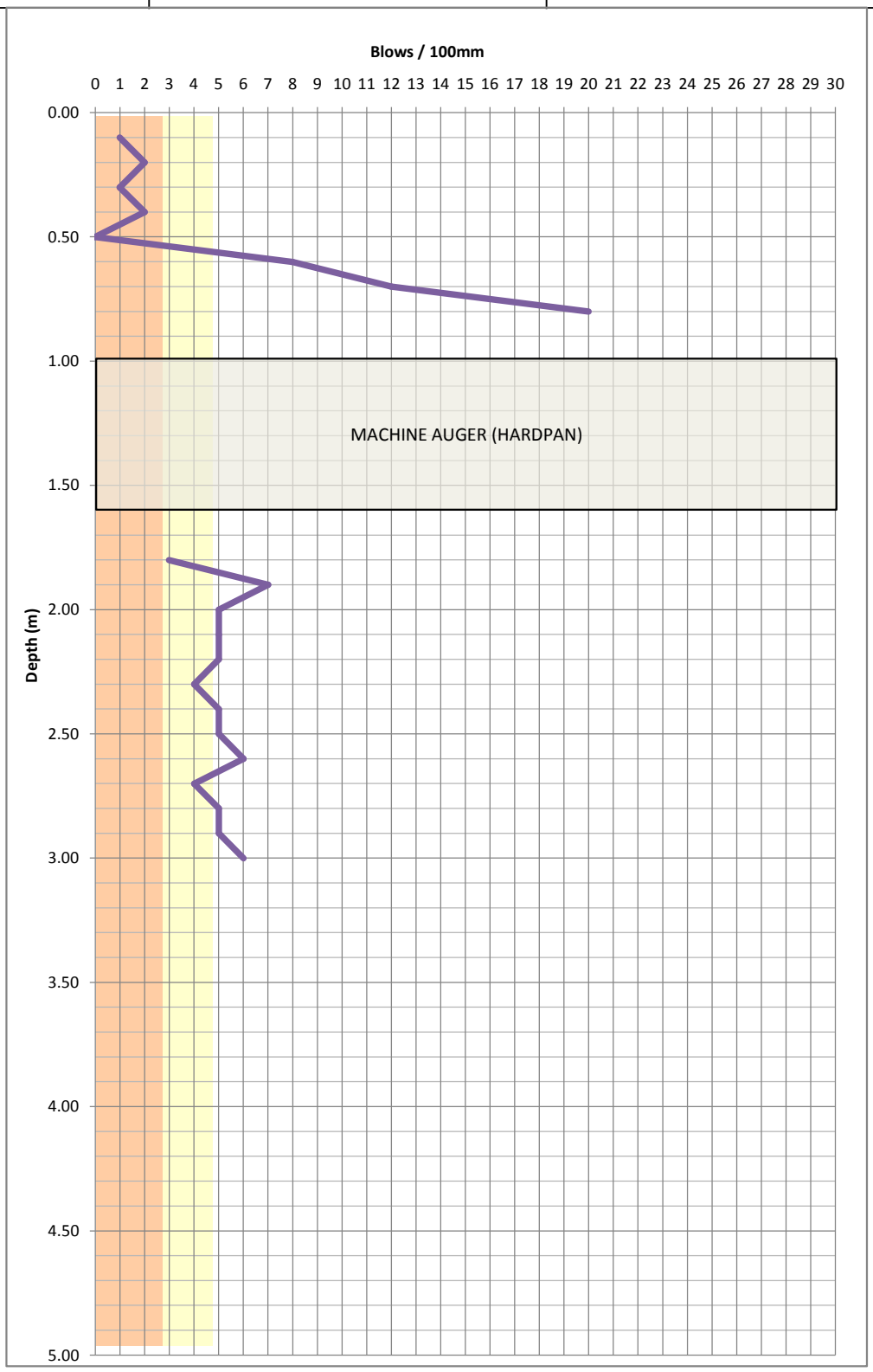
VISION CONSULTING Engineers

DYNAMIC CONE PENETROMETER TEST LOG

PENETROMETER TEST No: BH3/P

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:** J15259
Location: 30 Houhora Heads Road, Pukenui	**Test Location:** Refer to site plan	**Test date:** 07/11/02022
Test method: Dynamic Cone Penetrometer	**Tested by:** DA	**Checked by:** DS

Depth (m)	Blows/100mm
0.10	1.0
0.20	2.0
0.30	1.0
0.40	2.0
0.50	0.0
0.60	8.0
0.70	12.0
0.80	20.0
0.90	
1.00	
1.10	
1.20	
1.30	
1.40	
1.50	
1.60	
1.70	
1.80	3.0
1.90	7.0
2.00	5.0
2.10	5.0
2.20	5.0
2.30	4.0
2.40	5.0
2.50	5.0
2.60	6.0
2.70	4.0
2.80	5.0
2.90	5.0
3.00	6.0
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



*Indicative only. Based on Stockwell (1977) correlation, bearing capacity factors excluded.

- Very low strength ground <2 blows per 100mm or less
- Low strength ground 2 to 4 blows per 100mm
- Ground with indicative ultimate bearing capacity of at least 300kPa*

Notes:

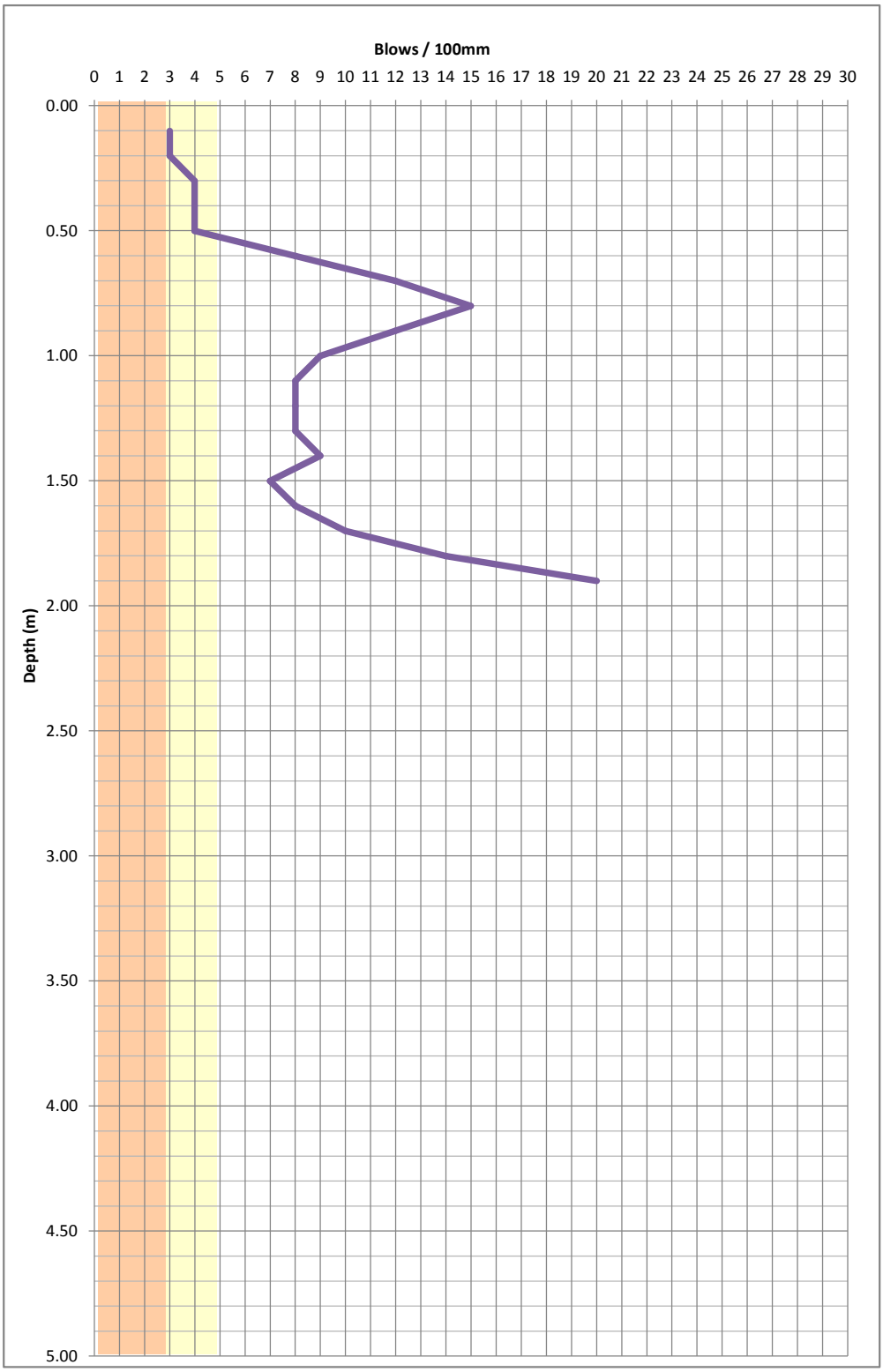
VISION CONSULTING Engineers

DYNAMIC CONE PENETROMETER TEST LOG

PENETROMETER TEST No: P1

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:** J15259
Location: 30 Houhora Heads Road, Pukenui	**Test Location:** Refer to site plan	**Test date:** 07/11/02022
Test method: Dynamic Cone Penetrometer	**Tested by:** DA	**Checked by:** DS

Depth (m)	Blows/100mm
0.10	3.0
0.20	3.0
0.30	4.0
0.40	4.0
0.50	4.0
0.60	8.0
0.70	12.0
0.80	15.0
0.90	12.0
1.00	9.0
1.10	8.0
1.20	8.0
1.30	8.0
1.40	9.0
1.50	7.0
1.60	8.0
1.70	10.0
1.80	14.0
1.90	20.0
2.00	
2.10	
2.20	
2.30	
2.40	
2.50	
2.60	
2.70	
2.80	
2.90	
3.00	
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



*Indicative only. Based on Stockwell (1977) correlation, bearing capacity factors excluded.

- Very low strength ground <2 blows per 100mm or less
- Low strength ground 2 to 4 blows per 100mm
- Ground with indicative ultimate bearing capacity of at least 300kPa*

Notes:

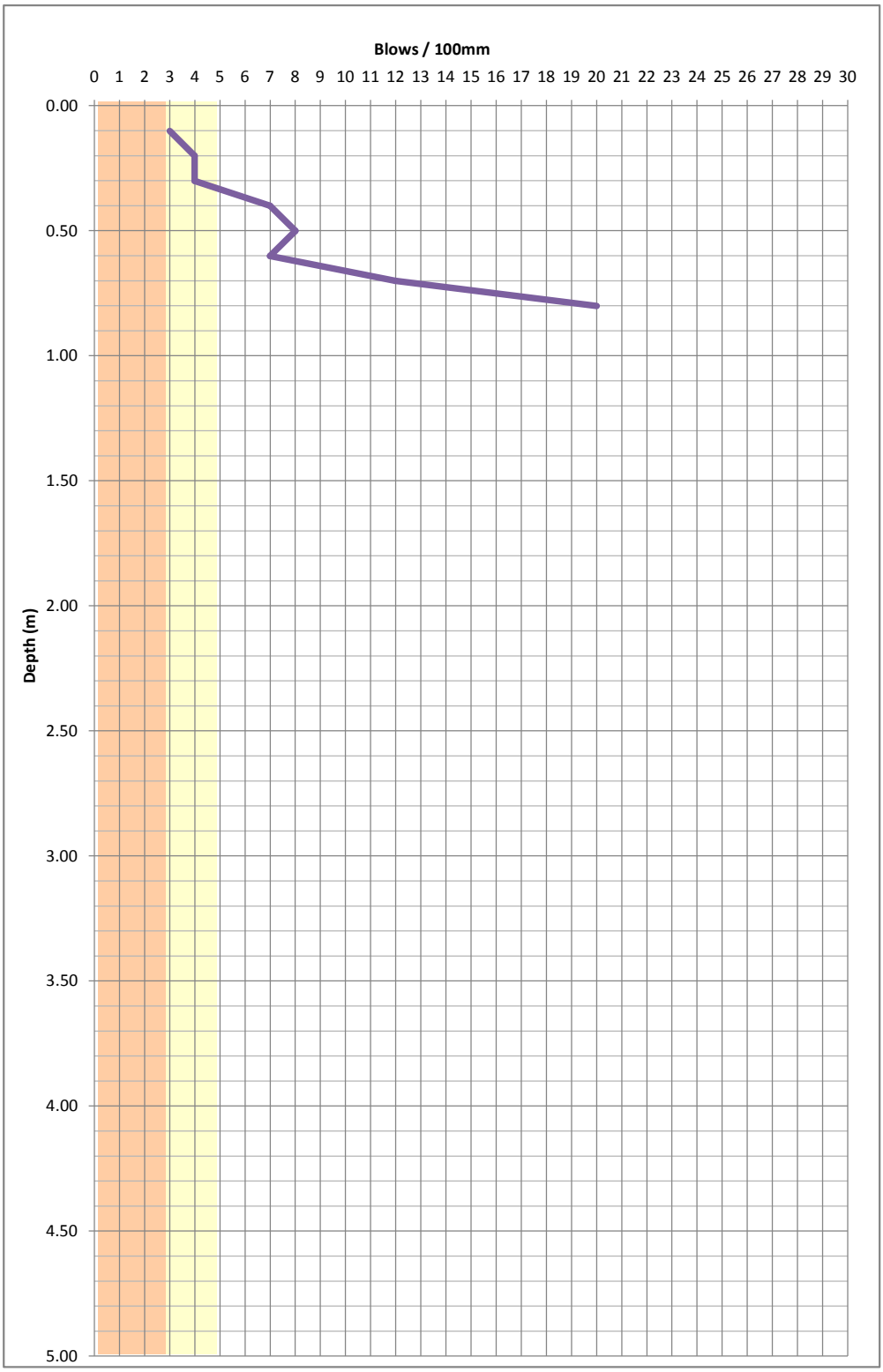
DYNAMIC CONE PENETROMETER TEST LOG

VISION CONSULTING Engineers

PENETROMETER TEST No: P2

Client: Dennis Musson	**Project:** Geotech Investigation	**VISION Project No.:** J15259
Location: 30 Houhora Heads Road, Pukenui	**Test Location:** Refer to site plan	**Test date:** 07/11/02022
Test method: Dynamic Cone Penetrometer	**Tested by:** DA	**Checked by:** DS

Depth (m)	Blows/100mm
0.10	3.0
0.20	4.0
0.30	4.0
0.40	7.0
0.50	8.0
0.60	7.0
0.70	12.0
0.80	20.0
0.90	
1.00	
1.10	
1.20	
1.30	
1.40	
1.50	
1.60	
1.70	
1.80	
1.90	
2.00	
2.10	
2.20	
2.30	
2.40	
2.50	
2.60	
2.70	
2.80	
2.90	
3.00	
3.10	
3.20	
3.30	
3.40	
3.50	
3.60	
3.70	
3.80	
3.90	
4.00	
4.10	
4.20	
4.30	
4.40	
4.50	
4.60	
4.70	
4.80	
4.90	
5.00	



*Indicative only. Based on Stockwell (1977) correlation, bearing capacity factors excluded.

- Very low strength ground <2 blows per 100mm or less
- Low strength ground 2 to 4 blows per 100mm
- Ground with indicative ultimate bearing capacity of at least 300kPa*

Notes: