

# Nicola & Paul Harper

## Proposed Subdivision, Infringements of Stormwater Management & Setback from Boundaries Rules

### 13 Binnie Street, Paihia

Williams & King, Kerikeri<sup>1</sup>  
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<sup>1</sup> Williams & King - a Division of Survey & Planning Solutions (2010) Ltd  
Surveyors, Planners, Resource Managers - Kerikeri and Kaitaia  
PO Box 937 Kerikeri Phone (09) 407 6030 Email: nat@saps.co.nz

## 1.0 Overview

Nicola Harper and Paul Harper own a property at 13 Binnie Street, in Paihia. The application site is legally described as Lot 22 DP 40239 and is held in the Record of Title NA1104/68, comprising 838m<sup>2</sup> of land. The applicant is seeking resource consent to subdivide this property to create one additional Record of Title, with Lot 1 containing the existing dwelling and Lot 2 being vacant. Proposed Lots 1 and 2 are to have gross areas of 424m<sup>2</sup> and 411m<sup>2</sup> respectively. Shared access via the existing vehicle crossing and a newly formed driveway will be used. Earthworks and new retaining walls will be required to support the new section of driveway.

The subject site is zoned Residential in the Operative Far North District Plan, and the proposed subdivision has been assessed as a discretionary activity due to the lot sizes proposed and various infringements related to property access.

Under the Proposed Far North District Plan, the site is zoned General Residential, and the proposed activity would have a discretionary activity status.

This assessment accompanies the Resource Consent application made by the Applicant and is provided in accordance with Schedule 4 of the Resource Management Act 1991. It is intended to provide the necessary information, in sufficient detail, to provide an understanding of the proposal and any actual or potential effects the proposed activity may have on the environment.

## 2.0 Description of Proposal

### 2.1 Proposed Subdivision

The overarching purpose of the proposal is to enable the creation of one additional Record of Title without detriment to the natural or physical resources on the site and surrounding environment.

The existing dwelling is located very close to the Binnie Street frontage of the site, allowing a rear lot to be created while retaining sufficient private outdoor space at the rear of the existing dwelling.

The proposed subdivision creates Lots 1 and 2 as follows.

Lot Number	Gross Area (Subject to Final Survey)	Existing Use
Lot 1	424m <sup>2</sup>	Existing dwelling.
Lot 2	411m <sup>2</sup>	Vacant.

*Figure 1: Summary of lot sizes and existing and proposed land use.*

The Scheme Plan is attached in **Appendix 1** and in **Figure 2**. All areas and dimensions are subject to final survey.

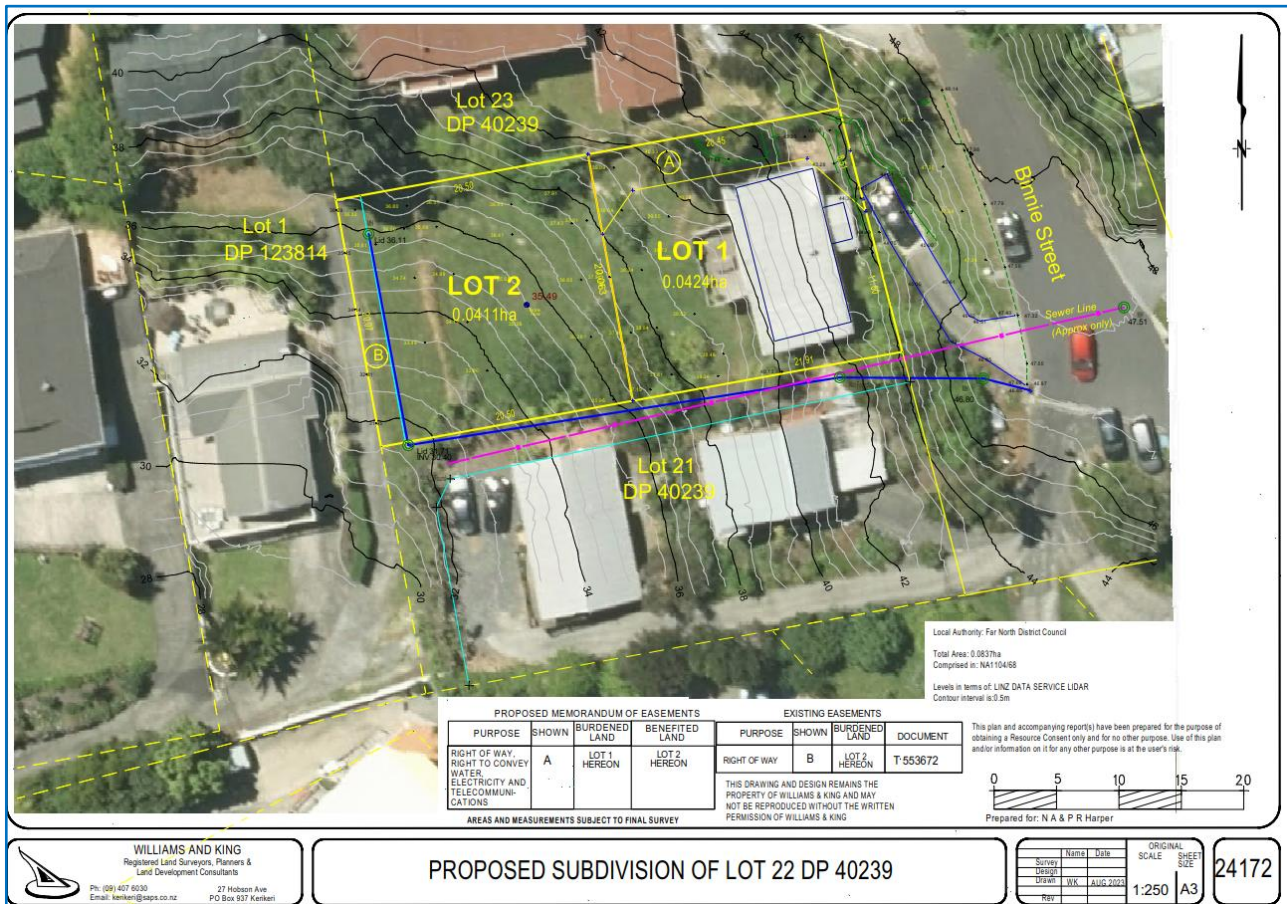


Figure 2: Scheme Plan of Proposed Subdivision.

## 2.2 Vehicle Access

The existing vehicle crossing off Binnie Street used by the existing dwelling will serve both Lots 1 and 2. No upgrades to the existing crossing are proposed.

Internal vehicle access via proposed easement A will be formed to provide a 3m wide concrete carriageway, with a crossfall to a kerb and channel on one side. Earthworks will be required to support the new section of driveway, and new retaining walls are likely to be required – these are described in Section 2.4. This would provide access to a future parking area within Lot 2, and a parking area on Lot 1 has also been indicatively designed to the rear of the existing dwelling on that Lot. Refer to the Site Suitability Report.

## 2.3 Wastewater and Stormwater Management

The Geologix Consulting Engineers Site Suitability Engineering Report (“Site Suitability Report”) in **Appendix 2** confirms that there is an existing wastewater lateral connection serving the site. This connection is located to the south of the site and is connected to the existing wastewater pipeline within the property to the south. This is intended to continue to be used for proposed Lot 1, and will be specifically located during the Engineering Plan Approval stage.



A new sanitary sewer lateral connection to Lot 2 will be constructed from the existing manhole which is also located in the property to the south. Although identified on the Far North Maps 3 Waters Mapping, the Site Suitability Report notes that the existing manhole was unable to be located, and should be verified on-site during the Engineering Plan Approval stage. The wastewater network capacity assessment in the Site Suitability Report demonstrates that the existing reticulated wastewater network has sufficient capacity to cater for the additional discharge volumes from the application.

Existing and proposed impermeable surface coverage on Lot 1 (comprising existing roof area, proposed access carriageway within Right of Way A, and new parking space), and indicative impermeable surface coverage on Lot 2 (comprising estimated roof and driveway area) will amount to 214m<sup>2</sup> / 50.47% and 200m<sup>2</sup> / 48.66% respectively. It can be seen that with the addition of the access carriageway and parking space on Lot 1, a negligible exceedance of the 50% allowable impermeable surface coverage of the lot's gross site area will result, while the overall anticipated impermeable surface coverage over the whole site will remain less than 50%.

A design for stormwater attenuation of 80% of the pre-development level within proposed Lot 2 during a 20% AEP storm event has been shown in the Site Suitability Report, and this would sufficiently cover the impermeable surface coverage proposed on Lot 1 that exceeds the permitted activity standard (additional 0.47%). This will involve the installation of an attenuation tank as detention, with specifically sized low-flow orifices to release the accumulated volume slowly. Final design of the attenuation system will need to be finalised and submitted at Building Consent stage, and a consent notice condition requiring this can be included for Lot 2. Minor stormwater treatment requirements to maintain high quality stormwater discharge will include use of leaf guards / first flush devices on gutters and downpipes, inclusion of volume for sedimentation, and discharge to stormwater connection (a new stormwater connection for Lot 2 is to be constructed). For further detail, refer to the Site Suitability Report.

The attenuation modelling has been conservatively designed to avoid exacerbating downstream flooding. Correctly sized discharge devices have adopted the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge.

## 2.4 Earthworks

Earthworks are required to complete the new accessway within easement A. These are described in the Site Suitability Report as comprising approximately 20m<sup>3</sup> of cut and 6m<sup>3</sup> of fill to a maximum depth of 1.0m and 6.5m<sup>3</sup> of fill to a height of 0.6m. The Site Suitability report notes that *"it is expected that there will be retaining walls, with a maximum height of 1.0m to the north and 0.6m to the south, to support the proposed accessway in terms of geotechnical aspects. It is proposed that a qualified geotechnical engineer undertake the detailed retaining wall design during the EPA stage, taking into account geotechnical stability control requirements"*.<sup>2</sup> The retaining walls will have a surcharge, and therefore will require building consent. For this reason, they also meet the definition of 'Building' in the Operative Far North District Plan.

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<sup>2</sup> Section 9.1 Geologix Subdivision Site Suitability Engineering Report 13 Binnie Street, Paihia. Ref C0372-S-01, November 2023, Revision 1.



# 3.0 Application Site Details and Description

## 3.1 Location

The subject site is located at 13 Binnie Street, in Paihia. The property has direct frontage to Binnie Street along its eastern boundary, and is located at the end of the road carriageway. Refer to the maps in **Figures 3 and 4**.



Figure 3: Location Map

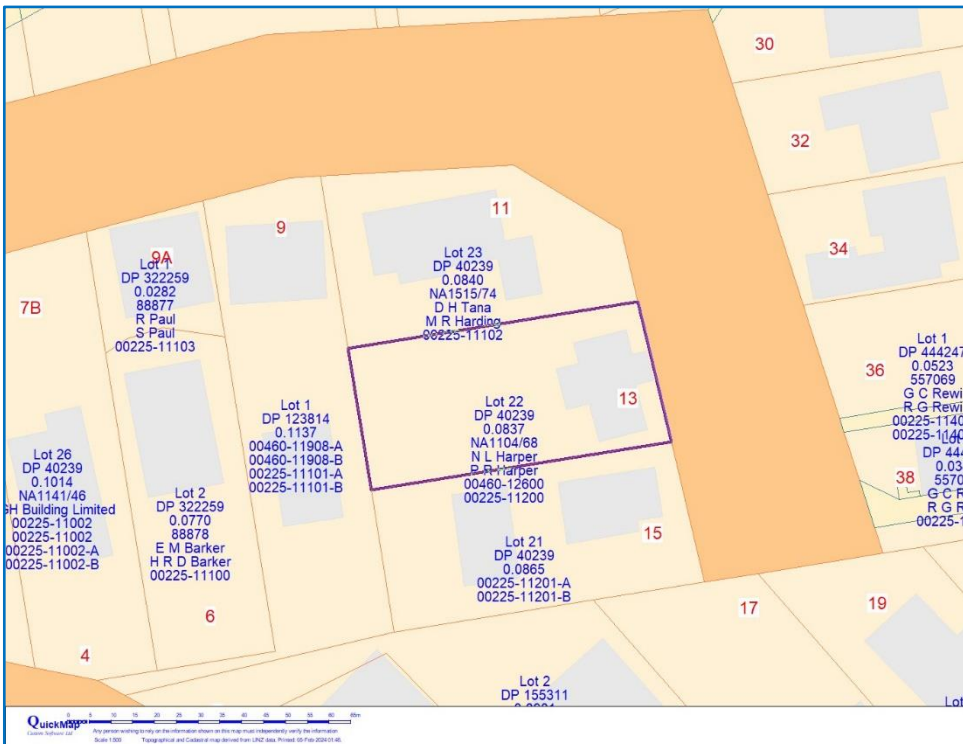


Figure 4: Cadastral Map

### 3.2 Legal Details

The subject land is legally described as Lot 22 DP 40239 and held in Record of Title NA1104/68, comprising 837m<sup>2</sup> more or less in area – refer to **Appendix 3**. The following relevant interests / encumbrances are listed on the Record of Title.

- Fencing Agreement in Transfer 538174 – 19.3.1954
- Subject to a right of way over part created by Transfer 553672 – 4.2.1955
- Appurtenant hereto are rights of way created by Transfer 553672 – 4.2.1955

### 3.3 Site Conditions

The subject site is developed with an existing dwelling, which is located within proposed Lot 1, near the eastern boundary. This is accessed by an existing concrete driveway from an entrance located near the southern end of the subject site's frontage to Binnie Street.

The subject site slopes steeply away from Binnies Street towards the existing concrete driveway, with the gradient easing through the existing dwelling and the remaining land. The existing dwelling is a split level structure with an elevated timber deck on the western face, and other landscaping features surrounding the dwelling. The remainder of the site is in lawn and household plantings.

A detailed description of the geology of the site is provided within the Geologix Consulting Engineers Site Suitability Report in **Appendix 2**.

### 3.4 Character of the Site and Surrounding Environment

The character of the subject land and its surrounding environment is based on the existing residential pattern of built development within an overall coastal setting.

### 3.5 Recorded Natural Features

The subject site is within the coastal environment but does not include any areas of high or outstanding natural character, or outstanding natural landscapes or features as recorded in the Regional Policy Statement.

The site is not part of any ecological unit recorded in the Department of Conservation Protected Natural Area mapping.

Together with the wider Paihia area, the site is mapped as being located within a 'kiwi present' kiwi habitat (indicated by less than five kiwi calls per hour) in Far North Maps "Species Distribution (DoC)" Map.<sup>3</sup>

The mapping related to kiwi habitat and Protected Natural Areas are non-statutory documents.

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<sup>3</sup> A map showing the distribution of Northland Brown Kiwi and Northland Mudfish in the Far North District. Kiwi habitat distribution based on call count monitoring in 2019 by Department of Conservation: Craig, E. (2020): Call count monitoring of Northland brown kiwi 2019. Department of Conservation, Whangarei, New Zealand.

## 4.0 District Plan Assessment

### 4.1 Far North District Operative District Plan

The application site is zoned Residential and is not subject to any Resource Features. The proposal is assessed against the relevant rules of the Operative District Plan as follows.

#### 4.1.1 Residential Zone

Existing built development is present on proposed Lot 1. This, along with future proposed development on Lot 2, is assessed against the relevant Residential zone standards below.

Rule	Discussion	Compliance
<b>7.6.5.1 PERMITTED ACTIVITIES</b>		
7.6.5.1.2 Residential Intensity	Following the subdivision, residential intensity will not exceed a single residential unit for a single household on each lot.	Complies
7.6.5.1.5 Sunlight	The existing building on Lot 1 is sufficiently set back from the proposed boundary to continue to comply with the permitted activity sunlight standard.	Complies
7.6.5.1.6 Stormwater Management	Lot 1 – with proposed ROW formation and parking space will have 50.5% coverage – marginal exceedance. Lot 2 – anticipated compliance.	Does not comply
7.6.5.1.7 Setback from Boundaries	No issues in terms of the proposed new boundaries to be created by the subdivision. The retaining wall to the north of the driveway will require building consent, therefore meets the definition of 'Building' and is within 1.2m of the site's northern boundary, and is within 3m of the Binnie Street boundary.	Does not comply.
<b>7.6.5.2 CONTROLLED ACTIVITIES</b>		
7.6.5.2.1 Stormwater Management	60% allowed.	Complies
<b>7.6.5.3 RESTRICTED DISCRETIONARY ACTIVITIES</b>		
7.6.5.3.7 Setback from Boundaries	Breach of Rule 7.6.5.1.7 is a restricted discretionary activity.	Complies

#### 4.1.2 Natural & Physical Resources

Clearance of indigenous vegetation is not required, and no consents are necessary as part of Section 12.2 for the proposal.



Minimal earthworks are required to complete the subdivision, and these comply with the volume and heights / depths specified as a permitted activity in Section 12.3 (refer to Section 9 of the Site Suitability Report). Earthworks to complete the subdivision are intended to be authorised via Rule 13.6.8.

#### 4.1.3 Subdivision

Rule	Discussion	Compliance
<b>13.6 GENERAL RULES</b>		
13.6.5 Legal Frontage	Each lot has frontage to Binnie Street, directly or via easement.	Complies
13.6.8 Subdivision Consent Before Work Commences	Earthworks are described in the Site Suitability Report. No vegetation clearance is required.	Complies
13.6.12 Suitability for Proposed Land Use	Lot 1 is developed. Lot 2 not affected by natural hazards – refer to the Site Suitability report.	Complies.
<b>13.7 CONTROLLED ACTIVITIES</b>		
13.7.2.1 Minimum Area for Vacant New Lots .....	Lots 1 and 2 do not have areas of 600m <sup>2</sup> .	Does not comply.
13.7.2.2 Allotment Dimensions	Lots 1 and 2 include a dimension of 14 x 14m, plus 1.2m boundary and 3m road setbacks.	Complies
<b>13.9 DISCRETIONARY ACTIVITIES</b>		
13.9.1 Discretionary (Subdivision) Activities	Each lot contains an area of more than 400m <sup>2</sup> .	Complies

#### 4.1.4 Financial Contributions

The proposal has no implications in terms of Chapter 14.

#### 4.1.5 Transportation

The proposal has no implication in terms of District Plan rules relating to traffic.

Rule	Discussion	Compliance
<b>15.1.6B.1 PERMITTED ACTIVITIES (PARKING)</b>		
15.1.6B.1.1 On-Site Car Parking Spaces	On Lot 1 – a new activity is not establishing and the nature of the activity is not changing. The future design of onsite car parking for Lot 2 will need to be incorporated when the lot is developed.	Complies
<b>15.1.6C.1 PERMITTED ACTIVITIES (ACCESS)</b>		
15.1.6C.1.1 Private Accessway in all Zones	Private access will be formed to a 3m width with single crossfall to kerb and channel to comply with (a). The existing vehicle crossing is marginally steeper than 1:8 adjacent to the road for the first 5m – does not comply with (b). The access serves less than 8 household equivalents and less than 9 sites as per (c) and (d). No new access crossing points are proposed, and (e) does not apply.	Does not comply.

15.1.6C.1.2 Private Accessways in Urban Zones	The proposed accessway serves less than four residential units, access is less than 60m long, however visibility is restricted by the existing dwelling. A 5m wide carriageway is not proposed. The access carriageway will be concreted to meet (c).	Does not comply
15.1.6C.1.3 Passing Bays on Private Accessways in all Zones	Passing bays are not proposed along the private accessway. At the vehicle crossing, no further widening is proposed (see Site Suitability Report) and there is no passing bay or vehicle queuing space available.	Does not comply
15.1.6C.1.4 Access Over Footpaths.	No additional crossings are proposed.	Complies
15.1.6C.1.6 Vehicle crossing standards in Urban Zones	No new vehicle crossings are proposed. Access to Lots 1 and 2 via an existing entrance does meet the double width standard as it is constrained by existing topography. As outlined in the Site Suitability Report, no modifications are recommended for the existing vehicle crossing.	Does not comply – existing crossing
15.1.6C.1.7 General Access Standards	Less than four parking spaces will gain access from Binnie Street as per (a). 3m wide access carriageway proposed – will depend on final manoeuvring design as per (b). Surplus easement areas will be in grass. Runoff along the access carriageway will be managed as outlined in the Site suitability Report to meet (d).	Complies
15.1.6C.1.8 Frontage to Existing Roads	Binnie Street is of sufficient legal and formation width to meet this Rule.	Complies
<b>15.1.6C.1 DISCRETIONARY ACTIVITIES</b>		
15.15.6C.2 Discretionary Activities	As compliance with Rules 15.1.6C.1.1-3 & 6 is not achieved, the proposal is a discretionary activity in terms of Access.	Complies

#### 4.1.6 Summary of Activity Status under the Far North Operative District Plan

Overall, the proposal has been assessed as a discretionary activity. The relevant considerations specified in Sections 104 and 104B of the Resource Management Act 1991 are addressed in Sections 5 and 6 of this Report.

## 4.2 Far North Proposed District Plan

The application site is zoned General Residential in the Far North Proposed District Plan, with a coastal overlay. The proposal is assessed against the relevant rules of the Proposed District Plan as follows.

#### 4.2.1 Area-Specific Matters – General Residential

Rule	Discussion	Compliance
GRZ-R2 Impermeable Surface Coverage	Lot 1 – with proposed ROW formation and parking space will have 50.5% coverage – marginal exceedance. Lot 2 – anticipated compliance.	Does not comply – restricted discretionary activity
GRZ-R3 Residential Activity	A single residential unit per lot is intended.	Complies
GRZ-S2 Height in Relation to Boundary	No issues in terms of the proposed new boundaries to be created by the subdivision.	Complies
GRZ-S3 Setback	No issues in terms of the proposed new boundaries to be created by the subdivision. The standard does not apply to “fences or walls no more than 2m in height above ground level”.	Complies
GRZ-S6 Outdoor living space	The existing dwelling on Lot 1 retains this area more than 8m <sup>2</sup> of outdoor living space to the west of the dwelling on the existing deck and other outdoor living space to the east of the dwelling.	Complies

#### 4.2.2 District-Wide Matters – General District-Wide Matters – Energy, Infrastructure, & Transport - Transport

Rule	Discussion	Compliance
TRAN-R1 Parking	Parking spaces on vacant Lot 2 will be designed at building consent stage, and there is sufficient area to meet the permitted standard.	Complies
TRAN-R2 Vehicle crossings and access, including private accessways	Shared private access will serve less than 8 household equivalents and does not have access off the road types listed in PER-3. Internal manoeuvring may not be suitable for fire fighting vehicles, however access and parking on Binnie Street will be available and less than 90m from the proposed lots. There will be no unused vehicle crossings. The private accessway will not meet TRAN-Table 9 for 2 residential units in an urban setting (4m minimum legal width not achieved), however will have a minimum carriageway surfacing width 3m). The maximum gradient for the first 5m is not achieved. Passing bays are not proposed where visibility is restricted or at the property entrance. No new vehicle crossings are required.	Does not comply - discretionary activity.



#### 4.2.3 District Wide Matters – Subdivision

Rule	Discussion	Compliance
SUB-R3 Subdivision of land to create a new allotment.	<p>CON-1</p> <ul style="list-style-type: none"> <li>• Lots 1 and 2 include 14 x 14m dimension, plus 1.2m boundary / 3m road setbacks.</li> <li>• New water, wastewater, power and telecommunications connections proposed for Lot 2.</li> <li>• Stormwater management can be achieved as reported on within the Site Suitability Report.</li> <li>• Proposed easement A is shown on the scheme plan.</li> </ul> <p>CON-2</p> <ul style="list-style-type: none"> <li>• Controlled activity minimum allotment size is not achieved – meets discretionary activity.</li> <li>• No esplanade reserve requirements.</li> </ul>	Does not comply with CON-2 - discretionary activity
SUB-R20 Subdivision of a site within the Coastal Environment	Discretionary Activity status	Discretionary activity status

#### 4.2.4 District Wide Matters – Subdivision

Rule	Discussion	Compliance
EW-R6 Earthworks for the ... upgrade of private roads and private accessways	<p>PER-2</p> <ul style="list-style-type: none"> <li>• Proposed earthworks meet EW-S1, S2.</li> <li>• EW-S4 will be met (Site reinstatement)</li> <li>• EW-S6 is not met as earthworks will be within 3m of the property boundary.</li> <li>• Compliance with EW-S7, 8 and 9 will be achieved.</li> </ul>	Does not comply with CON-2 – restricted discretionary activity
EW-R12 Earthworks and the discovery of suspected sensitive material	Compliance with EW-S3 is proposed (Accidental discovery protocol).	Complies
EW-R13 Earthworks and erosion and sediment control	Compliance with EW-S5 is proposed (Accidental discovery protocol).	Complies

#### 4.2.5 Summary of Activity Status under the Far North Proposed District Plan

Overall, the proposal has been assessed as a discretionary activity under the Proposed District Plan.

Rules with immediate effect are EW-R12 and EW-R13, both of which can be satisfied as a permitted activity via consent conditions and an advice note.

## 5.0 Assessment of Environmental Effects

Section 104(1)(a) and (ab) require the consent authority, subject to Part 2 of the Act, to have regard to any actual and potential effects on the environment of allowing the activity and any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity.

Section 104(2) indicates that a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard of the plan permits an activity with that effect and Section 104(3)(a)(ii) requires a consent authority to not, when considering an application, have regard to any effect on a person who has given written approval to the application (unless that person has withdrawn the written approval before the date of a hearing or before the application is determined, as set out in 104(4)).

Clauses 6 and 7 of Schedule 4 of the RMA indicate the information requirements and matters that must be addressed in or by an assessment of environmental effects, both of which are subject to the provisions of any policy statement or plan. The relevant criteria listed under Rules 13.10 (Assessment Criteria – Subdivision), 7.6.5.2.1 (Stormwater Management) and 7.6.5.3.7 (Setback from Boundaries) of the Operative Far North District Plan are also addressed in the following assessment.

### 5.1 Allotment Sizes and Dimensions & Building Locations

The dimensions of the proposed lots meet the controlled activity standard for subdivision in the Residential Zone. Lot 2 contains a geotechnically suitable, and regular shaped building area, which is located in the western half of the subject site. This lot will share access with Lot 1 so that less of the lot area will be occupied by access formations. This lot has sufficient area to accommodate a future residential building, and the ability to manage and discharge stormwater and wastewater. The existing land contour faces southwest, however, depending on the final design of the building and its foundations and/or earthworks on the lot, it could be developed to take advantage of passive solar gain.

The subject site is located within an existing urban area with predominantly residential development and associated subdivision pattern. Immediately to the south at number 15 Binnie Street, two existing developed cross lease titles exist, at an almost identical density to that proposed, and immediately opposite the subject site at numbers 36 and 38 Binnie Street are allotment sizes of 523m<sup>2</sup> and 345m<sup>2</sup> respectively. To the west, two developed cross lease titles exist at a density of one title per 565.5m<sup>2</sup>, while further west infill residential development has already occurred either via conventional or cross lease subdivision. Properties with a similar range of densities to the proposal are highlighted in **Figure 5** below.

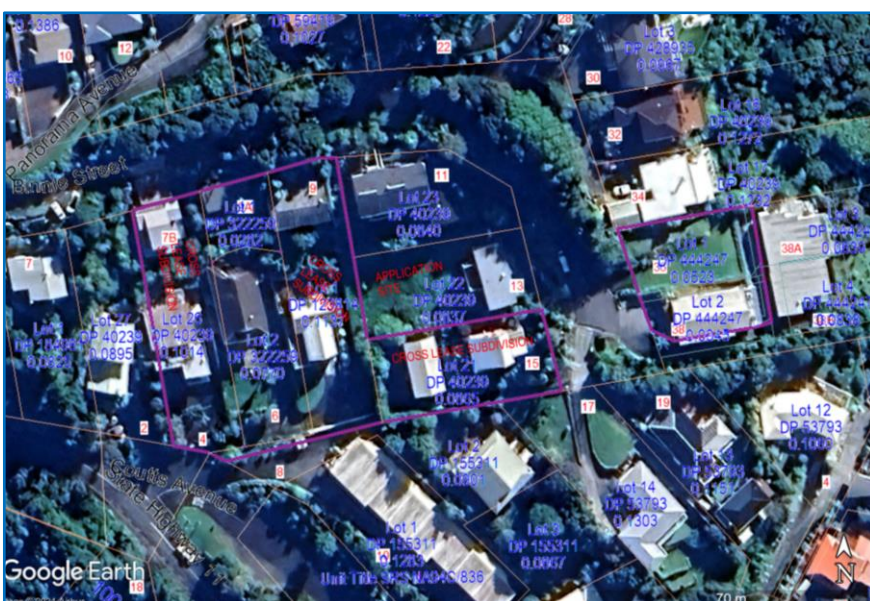


Figure 5: Google Earth Map



Although the overall prevailing density of subdivision along Binnie Street is lower than that proposed, a number of properties immediately surrounding the subject site have an existing density of development that is similar.

Therefore, although the area of the lots is a discretionary activity as provided for in the District Plan, they will fit within the range of existing development in the surrounding environment, and will retain the existing characteristics of the immediately surrounding area. This is demonstrated in **Photograph 1** below, which shows the developed context within which proposed Lot 2 will be located.



*Photograph 1: View from Binnie Street over subject site and surrounding properties to the south of Binnie Street.*

Overall, it is considered that the proposed subdivision is in context with the existing residential land use and subdivision pattern and that the proposed lots will share characteristics with the receiving environment. As a result, the character of the subject land following the development will be compatible with the present residential settlement pattern found surrounding the site within the Residential Zone, in order to retain the overall character of the existing environment.

Overall, direct or cumulative adverse effects on the wider rural environment generated by the proposal are considered to be less than minor, with the size of the lots being suitable for their intended purpose.

## **5.2 Natural and Other Hazards**

The Site Suitability Report provides an assessment of the natural hazard types included in Section 106 of the RMA, none of which are applicable to the application site or proposed activity.

Water supply for fire-fighting purposes for each lot is available via the existing fire hydrants on Binnie Street, as described in the Site Suitability Report. Furthermore, future built development on Lot 2 will not be within close proximity to any significant areas of vegetation that would generate an unreasonable degree of fire hazard. For these two reasons, potential adverse effects related to fire hazard are avoided and mitigated so as to be less than minor.



### 5.3 Water Supply

The property is within the area of benefit for water reticulation, with Lot 1 having an existing connection, and a new meter being required to supply Lot 2. No adverse effects with respect to water supply to the proposed lots are anticipated.

The Site Suitability Report notes an existing water supply pipeline crossing through Lot 2, potentially supplying the property to the south (Lot 21 DP 40239). This pipeline is recorded on Far North Maps. The Site Suitability Report recommends *“to determine the water meter's location to confirm this assumption and assess the feasibility of using the pipeline for the site's potable water service at the EPA stage. Any open-cut construction method in this area without realignment of the asset poses a high risk of intercepting the pipeline”*.

Water supply for fire fighting purposes is discussed in the preceding section of this report.

### 5.4 Stormwater Disposal

As previously outlined, design for stormwater attenuation of 80% of the pre-development level within proposed Lot 2 during a 20% AEP storm event is included in the Site Suitability Report, and will attenuate stormwater runoff from future development on Lot 1, as well as stormwater runoff from the portion of proposed impermeable surfaces on Lot 1 that exceed the permitted activity standard (additional 0.47%). For further detail, refer to the Site Suitability Report. The attenuation modelling has been conservatively designed to avoid exacerbating downstream flooding. Correctly sized discharge devices have adopted the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge.

The proposed design also includes minor measures to maintain high quality stormwater discharge, so as to avoid adverse effects on water quality. Such measures include leaf guards and first flush devices on roof gutters and downpipes, allowance for sedimentation volume within the attenuation tank, and direction of the stormwater discharge to the stormwater connection.

Overall, it is considered that the proposal avoids and mitigates adverse effects on stormwater quality and quantity, resulting in the adverse effects of the proposal arising from stormwater disposal being less than minor.

### 5.5 Sanitary Sewage Disposal

The Site Suitability Report confirms that the existing wastewater connection will be reused to serve Lot 1, and a new connection will be supplied to Lot 2 directly from the existing wastewater manhole, which is located outside the southwestern site corner, the location of which will need to be verified on site during the Engineering Plan Approval stage. If the assumed location of the existing manhole is correct, minor trenching will need to be undertaken within the neighbouring property, resulting in a temporary disturbance to the land cover. The Site Suitability Report confirms via their capacity assessment that the existing reticulated wastewater network has sufficient capacity to cater for the additional discharge volumes arising from future development of Lot 2.

Overall, it is considered that sanitary sewage disposal can be achieved in such a way that avoids and mitigates adverse environmental effects, such that they will be less than minor.

## 5.6 Energy & Telecommunications Supply

Lot 1 has existing power and telecommunications supply.

Refer to correspondence received from Top Energy (see **Appendix 4**). Costs to supply power to proposed Lot 2 could be provided at the development stage for the lot, following application and on-site survey.

## 5.7 Access

Property access from Binnie Street to the boundary of each lot will be formed as previously described. Shared access via the proposed Right of Way has been designed to accommodate 90<sup>th</sup> percentile car tracking curves, which will accommodate most car scenarios and be adequate for most situations arising from residential use of the property.

The existing vehicle crossing is not intended to be modified, but will serve the additional traffic generated by future development on Lot 2. In support of this, it is noted that the site is located at the termination of Binnie Street, where there is no through traffic, and therefore fewer traffic movements. Additional traffic generated by the subdivision will be in the vicinity of ten daily one-way movements.

The existing legal and carriageway width of Binnie Street meets the requirements of the FNDC Engineering Standards and Guidelines.

The proposal uses an existing vehicle crossing and shared access formations to avoid a proliferation of vehicle crossings, minimise the need for earthworks and additional impermeable surfaces associated with vehicle access, and associated environmental effects.

Overall, it is considered that the additional traffic generated by the proposal can be accommodated by existing vehicle access to each lot, and that the effects of the proposal on existing roading and traffic safety will be less than minor.

## 5.8 Earthworks

Earthworks required to complete the subdivision are outlined in the Site Suitability Report, and involve small volumes to complete vehicle access to the boundary of Lot 2. Recommendations, including typical erosion and sediment control measures are also described in the Site Suitability Report. With these in place, the earthworks required to complete the subdivision can be completed without generating any significant short or long term adverse environmental effect.

## 5.9 Heritage Resources

The site does not contain any known or mapped heritage resources or archaeological sites or sites of cultural significance. No earthworks are proposed as part of the subdivision, and the building site is already very modified through previous earthworks and pine tree removal activities. Nevertheless, the standard Accidental Discovery Protocol advice note can be applied to the consent, outlining the procedures to be followed should any archaeological site be inadvertently uncovered, in order to avoid adverse effects on heritage resources.

## 5.10 Ecological Resources

As noted, the site is not part of any protected natural area that has been mapped by the Department of Conservation but is part of a wider 'kiwi present' North Island brown kiwi habitat.

As the site is part of a 'kiwi present' habitat area as recorded in Far North Maps, it is suggested that an advice note be added to the consent recommending that cats and dogs be kept under control at all times and kept inside or locked up at night to ensure that adverse effects on indigenous fauna, in particular North Island brown kiwi, are suitably mitigated.

The proposal will not require clearance of indigenous vegetation, and no direct adverse ecological effects will arise from the proposed subdivision.

## 5.11 Soil

The site does not contain highly versatile soil or highly productive land, and is not in a primary production zone. Therefore, it is considered that the proposed subdivision and future use of Lot 2 for residential use will not have any adverse effect on soil resources and the availability of suitable land for primary production.

## 5.12 Land Use Incompatibility

Future residential development on Lot 2 will be located within an existing residential area, and will not be in close proximity with any incompatible land uses. Future development of Lot 2 is therefore unlikely to suffer any effects associated with land use incompatibility, nor is likely to generate any adverse reverse sensitivity effects.

Through its location, the proposal is considered to avoid adverse effects associated with incompatible land use and reverse sensitivity, such that the existing and proposed uses of the lots and surrounding land can be accommodated.

## 5.13 Visual Amenity and Natural Character

The site is not within an Outstanding Landscape, and does not have high or outstanding natural character.

Proposed Lot 1 is fully developed, with the exception that a rear parking space is to be provided, and there will be negligible additional effects on the surrounding locality from the use of this site, which will retain sufficient outdoor living space.

The existing dwelling is located very close to the Binnie Street frontage of the site, allowing a rear lot to be created while retaining sufficient private outdoor space at the rear of the existing dwelling on Lot 1. The proposed boundary location allows space for additional planting or landscaping, including hedging and/or fencing to maintain privacy between the two lots. The existing dwelling will continue to meet permitted activity standards for sunlight and setback in relation to the proposed boundary.

The new retaining wall along the northern boundary of the proposed accessway requires building consent due to the surcharge that it will support, and is therefore a building in terms of the Operative District Plan definition. The retaining wall will not exceed a height of 1.0m, however will be located

within the permitted activity boundary setbacks. The new northern retaining wall required to support access will not affect the street scene or reduce the outlook or privacy of adjacent properties, given that it will support an excavation. Given the sloping nature of land along Binnie Street, earthworks for access formation that are supported by retaining walls is a common feature, and the retaining walls that are proposed will be in character with the existing surrounding environment.

Surrounding properties to the south and west of Binnie Street in this location are generally orientated towards the south and east to take advantage of views over Te Haumi estuary and towards the coastal marine area. Proposed Lot 2 is located at a lower contour than the surrounding buildings that are located to the north and north west of this proposed site, which will limit the extent of visual dominance of a future building. Properties to the east of Binnie Street face east or south east towards the coast, and away from the subject site.

A future dwelling on Lot 2 will generally be screened from Binnie Street by the existing building on Lot 1 and taking into account the topography of the land, which slopes away from the formed road, other than momentary views through gaps in buildings. Future development of built development on Lot 2 is unlikely to be a dominating visual element in the context of the surrounding residential environment, allowing the existing level of amenity values to be retained, with a less than minor effect on the existing character of the surrounding neighbourhood.

## 6.0 Statutory Assessment

*Section 104(1)(b) of the Resource Management Act 1991 requires the consent authority, subject to Part 2 of the Act, to have regard to any relevant provisions of a national environmental standard, other regulations, a national policy statement, a New Zealand coastal policy statement, a regional policy statement, a plan or proposed plan, and any other matter the consent authority considers relevant and reasonably necessary to determine the application. Of relevance to the proposed activity are the following documents, which are commented on in the proceeding Sections 6.1 – 6.5 of this Report. This is followed by an assessment of Part 2 of the Act.*

- *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011*
- *Resource Management (National Environmental Standards for Freshwater) Regulations 2020*
- *National Policy Statement for Indigenous Biodiversity*
- *Regional Policy Statement for Northland*
- *Operative Far North District Plan*
- *Proposed Far North District Plan*
- *Proposed Regional Plan for Northland*

### 6.1 National Environmental Standards

#### 6.1.1 Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (“NESCS”)

The subject land is not recorded on the Northland Regional Council Selected Land-use Register as a site that has been used for any activity included in the Ministry for the Environment’s Hazardous Activities and Industries List.<sup>4</sup>

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<sup>4</sup> Northland Regional Council (n.d.): *Selected Land-use Register Map*. Retrieved 22 January 2024 from <https://localmaps.nrc.govt.nz/localmapsviewer/?map=65b660a9454142d88f0c77b258a05f21>



Far North Maps confirms that the site is part of a 'Built-up Area (settlement)' on the 1996, 2001, 2008, 2012, and 2018 Land Cover and Land Use mapping.

Review of historic aerial photography using Retrolens, and more recent aerial and satellite photography indicates that the property has had a residential use since at least 1972, while before that the 1953 Retrolens photograph shows the area as being in a bush cover.<sup>5</sup>

As such, the subject site is not considered to be a 'piece of land' in terms of the above regulations.

## **6.1.2 Resource Management (National Environmental Standard for Freshwater) Regulations 2020**

The Northland Regional Council Biodiversity Wetlands mapping does not record any wetlands within 100m of the subject site and there are no wetlands in close proximity (within 100m) apparent on aerial photography. The proposed subdivision does not involve any vegetation clearance, earthworks or taking, use, damming, diversion or discharge of water within 100m of a wetland. Therefore, the proposal is not considered to have any implications in terms of the above regulations.

## **6.2 National Policy Statements**

### **6.2.1 National Policy Statement for Indigenous Biodiversity ("NPSIB")**

The above National Policy Statement applies to indigenous biodiversity in the terrestrial environment. Its objective of is set out in 2.1, as copied below:

*(1) The objective of this National Policy Statement is:*

*(a) to maintain indigenous biodiversity across Aotearoa New Zealand so that there is at least no overall loss in indigenous biodiversity after the commencement date; and*

*(b) to achieve this:*

*(i) through recognising the mana of tangata whenua as kaitiaki of indigenous biodiversity; and*

*(ii) by recognising people and communities, including landowners, as stewards of indigenous biodiversity; and*

*(iii) by protecting and restoring indigenous biodiversity as necessary to achieve the overall maintenance of indigenous biodiversity; and*

*(iv) while providing for the social, economic, and cultural wellbeing of people and communities now and in the future.*

The 17 listed policies set out to achieve this objective, and of most relevant to this proposal is Policy 8:

*Policy 8: The importance of maintaining indigenous biodiversity outside SNAs is recognised and provided for.*

Part 3 guides the implementation of the NPSIB. Of relevance is the following approach to implementing the NPSIB.

#### *3.16 Indigenous biodiversity outside SNAs*

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<sup>5</sup> Sourced from <http://retrolens.nz> and licensed by LINZ CC-BY 3.0

(1) If a new subdivision, use, or development is outside an SNA and not on specified Māori land, any significant adverse effects of the new subdivision, use, or development on indigenous biodiversity outside the SNA must be managed by applying the effects management hierarchy.

Effects Management Hierarchy is defined as follows:

*effects management hierarchy means an approach to managing the adverse effects of an activity on indigenous biodiversity that requires that:*

*(a) adverse effects are avoided where practicable; then*

*(b) where adverse effects cannot be avoided, they are minimised where practicable; then*

*(c) where adverse effects cannot be minimised, they are remedied where practicable; then*

*(d) where more than minor residual adverse effects cannot be avoided, minimised, or remedied, biodiversity offsetting is provided where possible; then*

*(e) where biodiversity offsetting of more than minor residual adverse effects is not possible, biodiversity compensation is provided; then*

*(f) if biodiversity compensation is not appropriate, the activity itself is avoided.*

The subject site is part of a residential area which is devoid of indigenous vegetation, and direct adverse effects on indigenous biodiversity are avoided. The site is part of a wider kiwi habitat. It is considered that some advisory notes related to the keeping of pets, for example, that they are kept indoors or caged at night, may be of benefit. It is considered that the proposal is consistent with the above National Policy Statement.

### **6.3 Regional Policy Statement for Northland (“RPS”)**

The RPS provides an overview of resource management issues and gives objectives, policies, and methods to achieve integrated management of natural and physical resources of the region.

The subject site is in the coastal environment, but does not include any outstanding natural landscapes or features and does not include any areas of high or outstanding natural character.

Relevant policies from the RPS are addressed below.

In terms of Policy 4.4.1 – Maintaining and protecting significant ecological areas and habitats – the relevant policy requires adverse effects of subdivision, use and development to be avoided, remedied or mitigated so that they are no more than minor, on threatened or at risk indigenous taxa, significant areas of indigenous fauna, amongst other listed natural areas and habitats.

The site is part of a wider kiwi habitat. Some advisory notes can be used to reduce the risk of predation of North Island brown kiwi and other indigenous birdlife. The proposal will not result in any direct adverse effects on natural areas and habitats.

Policy 5.1.1 – Planned and coordinated development, requires co-ordinated location, design and building or subdivision, use and development. Relevant matters are listed under (a), (c), (e), (g) and (h). These matters have been considered in preceding sections of this report. In particular:

- Servicing with the necessary infrastructure is viable, as described in the Site Suitability Report. Power and telecommunication connections can be supplied.
- The site is not near any significant mineral resources.

- The proposal does not result in incompatible land use activities and avoids reverse sensitivity, given that it is located amongst an established residential environment.
- The proposal does not affect any landscape or natural character values, historic or cultural heritage values, or transport corridors.
- No new direct adverse effects on significant ecological areas or species will result. Provided that omnivorous and carnivorous pets are adequately managed, adverse effects on indigenous bird habitat can be avoided to an appropriate level.
- Adverse effects associated with natural hazards and downstream flooding are not exacerbated by the proposal. Existing impermeable surface coverage has been assessed and will comply with the permitted activity standard of the Operative District Plan.
- The site does not contain highly versatile soils.
- The existing and proposed residential use of the lots is consistent within the predominant land use and subdivision development in the surrounding environment. The character of the surrounding environment can be retained.
- The proposal has no implications on matters such as renewable energy, sustainable design technologies.

## 6.4 Objectives and Policies – Far North Operative District Plan

The objectives and policies of the Urban Environment, Residential Zone, Subdivision, and Transportation Sections of the District Plan are relevant to this proposal. As discussed below, it has been concluded that the proposal is generally consistent with the overall objectives and policies of the District Plan.

### **URBAN ENVIRONMENT**

#### 7.3 OBJECTIVES

7.3.1 To ensure that urban activities do not cause adverse environmental effects on the natural and physical resources of the District.

7.3.3 To avoid, remedy or mitigate the adverse effects of activities on the amenity values of existing urban environments.

7.3.4 To enable urban activities to establish in areas where their potential effects will not adversely affect the character and amenity of those areas.

7.3.6 To ensure that sufficient water storage is available to meet the needs of the community all year round.

#### 7.4 POLICIES

7.4.1 That amenity values of existing and newly developed areas be maintained or enhanced.

7.4.3 That adverse effects on publicly-provided facilities and services be avoided or remedied by new development, through the provision of additional services.

7.4.4 That stormwater systems for urban development be designed to minimise adverse effects on the environment. 7.4.5 That new urban development avoid:

(e) areas where natural hazards could adversely affect the physical resources of urban development or pose risk to people's health and safety;

(g) adversely affecting the safety and efficiency of the roading network;

7.4.8 That infrastructure for urban areas be designed and operated in a way which:

(a) avoids remedies or mitigates adverse effects on the environment;

(b) provides adequately for the reasonably foreseeable needs of future generations; and

(c) safeguards the life-supporting capacity of air, water, soil and ecosystems.

- The proposed residential infill development matches the density of the property immediately to the south. Although there will be a resultant increase in the density of residential use over

the site, the adverse effects on amenity values are considered to be less than minor, and the current residential character and amenity values can be retained.

- Adverse effects on natural resources are avoided, as the site lacks any particular natural, ecological, or landscape value. Servicing of the site with the connections to sanitary sewer, reticulated stormwater system, water supply, power and telecommunications can all be achieved without generating adverse effects on those systems.
- New water supply is proposed to Lot 2 from the reticulated system.
- Stormwater management concept design avoids adverse downstream effects.
- The subject site is not affected by natural hazards.
- Multiple use of the existing crossing is proposed to avoid adversely impacting the efficiency of the roading network.
- A new car park is proposed for Lot 1, and Lot 2 parking and manoeuvring areas will be designed at building consent stage. The property is located at the end of Binnie Street's cul-de-sac, where there will be limited traffic movements and no through traffic, and the additional traffic is unlikely to adversely affect the safety of the roading network.

### **RESIDENTIAL ZONE**

*7.6.3 OBJECTIVES These objectives supplement those set out in Section 7.3.*

*7.6.3.1 To achieve the development of new residential areas at similar densities to those prevailing at present.*

*7.6.4 POLICIES These policies supplement those set out in Section 7.4.*

*7.6.4.3 That the Residential Zone be applied to areas where expansion would be sustainable in terms of its effects on the environment.*

*7.6.4.4 That the Residential Zone provide for a range of housing types and forms of accommodation.*

*7.6.4.7 That residential activities have sufficient land associated with each household unit to provide for outdoor space, planting, parking and manoeuvring.*

*7.6.4.8 That the portion of a site or of a development that is covered in buildings and other impermeable surfaces be limited so as to provide open space around buildings to enable planting, and to reduce adverse hydrological, ecological and amenity effects.*

*7.6.4.9 That sites have adequate access to sunlight and daylight.*

*7.6.4.10 That provision be made to ensure a reasonable level of privacy for inhabitants of buildings on a site.*

- The overall prevailing density along the whole of Binnie Street is lower than what is proposed, however the proposed density of subdivision, and resultant residential use, will match much of the existing development in the immediately surrounding properties.
- Residential infill development often supports the provision of a wider range of house types.
- Each allotment has a suitable dimension, which is regular in shape, in order to have sufficient outdoor space, areas for planting and landscaping, parking and manoeuvring. Note that Lot 1 will be developed with a new car park to the south of the existing dwelling.
- Existing and anticipated impermeable surface coverage is very nearly able to comply with the permitted standard. Attenuation is proposed, as outlined previously, to ensure that there are no downstream hydrological effects.
- Existing and proposed development is able to comply with permitted activity Sunlight standards to ensure adequate access to sunlight and daylight.
- There is space along the common boundary between Lots 1 and 2 to add further landscaping, hedging, or fencing to retain privacy between the existing dwelling on Lot 1 and a future dwelling on Lot 2.



## **SUBDIVISION**

### **13.3 OBJECTIVES**

13.3.1 To provide for the subdivision of land in such a way as will be consistent with the purpose of the various zones in the Plan, and will promote the sustainable management of the natural and physical resources of the District, including airports and roads and the social, economic and cultural well being of people and communities.

13.3.2 To ensure that subdivision of land is appropriate and is carried out in a manner that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and that any actual or potential adverse effects on the environment which result directly from subdivision, including reverse sensitivity effects and the creation or acceleration of natural hazards, are avoided, remedied or mitigated.

13.3.5 To ensure that all new subdivisions provide a reticulated water supply and/or on-site water storage and include storm water management sufficient to meet the needs of the activities that will establish all year round.

13.3.8 To ensure that all new subdivision provides an electricity supply sufficient to meet the needs of the activities that will establish on the new lots created.

13.3.9 To ensure, to the greatest extent possible, that all new subdivision supports energy efficient design through appropriate site layout and orientation in order to maximise the ability to provide light, heating, ventilation and cooling through passive design strategies for any buildings developed on the site(s).

13.3.10 To ensure that the design of all new subdivision promotes efficient provision of infrastructure, including access to alternative transport options, communications and local services.

### **13.4 POLICIES**

13.4.1 That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on: (a) natural character, particularly of the coastal environment;

(d) amenity values;

(e) cultural values;

and (g) existing land uses.

13.4.2 That standards be imposed upon the subdivision of land to require safe and effective vehicular and pedestrian access to new properties.

13.4.3 That natural and other hazards be taken into account in the design and location of any subdivision.

13.4.4 That in any subdivision where provision is made for connection to utility services, the potential adverse visual impacts of these services are avoided.

13.4.5 That access to, and servicing of, the new allotments be provided for in such a way as will avoid, remedy or mitigate any adverse effects on neighbouring property, public roads (including State Highways), and the natural and physical resources of the site caused by silt runoff, traffic, excavation and filling and removal of vegetation.

13.4.8 That the provision of water storage be taken into account in the design of any subdivision.

13.4.11 That subdivision recognises and provides for the relationship of Maori and their culture and traditions, with their ancestral lands, water, sites, waahi tapu and other taonga and shall take into account the principles of the Treaty of Waitangi.

13.4.13 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to s6 matters. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:

(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;

(e) providing planting of indigenous vegetation in a way that links existing habitats of indigenous fauna and provides the opportunity for the extension, enhancement or creation of habitats for indigenous fauna, including mechanisms to exclude pests;

(f) protecting historic heritage through the siting of buildings and development and design of subdivisions.

(g) achieving hydraulic neutrality and ensuring that natural hazards will not be exacerbated or induced through the siting and design of buildings and development.

13.4.14 That the objectives and policies of the applicable environment and zone and relevant parts of Part 3 of the Plan will be taken into account when considering the intensity, design and layout of any subdivision.

13.4.15 That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for achieving the following:

(a) development of energy efficient buildings and structures;

(b) reduced travel distances and private car usage;

(c) encouragement of pedestrian and cycle use;

(d) access to alternative transport facilities;

*(e) domestic or community renewable electricity generation and renewable energy use.*

- Consistency with the Urban Environment and Residential Zone is assessed previously. The proposal is considered to represent sustainable development.
- Reticulated water supply will be provided to the boundary of each lot.
- Stormwater management has been conceptually designed, including proposed attenuation.
- Separate electricity connections will be provided to each lot.
- Each lot contains a square shaped allotment, giving options to design future or upgraded residential dwellings to support energy efficient design.
- Shared use of the existing vehicle crossing represents efficient use of existing infrastructure.
- There is no footpath along Binnie Street, but the remaining route to central Paihia, and its local services, has a footpath and is a total distance of approximately 1.7km from the subject site.
- The size of the proposed lots represents a discretionary activity, while the allotment dimension meets the controlled activity standard. These lots are situated in an existing urban residential environment, and will not diminish natural character, ecological values, landscape values, cultural or heritage values, or be inconsistent with nearby land use activities. The existing level of amenity can be retained.
- There is no existing footpath access along Binnie Street. Vehicle access will involve the formation and upgrade of an existing driveway to provide for both lots. This has been designed by Geologix taking into account the existing site constraints, and represents the best practicable option to provide safe and effective vehicle access, while also reducing the amount of earthworks and impermeable surfaces required to provide access to the lots, in order to avoid and mitigate adverse effects.
- The subject site is not affected by natural hazards.
- All new utility services will be installed below ground to avoid adverse visual impacts.

## **TRANSPORTATION**

### **15.1.3 OBJECTIVES**

*15.1.3.1 To minimise the adverse effects of traffic on the natural and physical environment.*

*15.1.3.3 To ensure that appropriate provision is made for on-site car parking for all activities, while considering safe cycling and pedestrian access and use of the site.*

*15.1.3.4 To ensure that appropriate and efficient provision is made for loading and access for activities.*

*15.1.3.5 To promote safe and efficient movement and circulation of vehicular, cycle and pedestrian traffic, including for those with disabilities.*

### **POLICIES**

*15.1.4.1 That the traffic effects of activities be evaluated in making decisions on resource consent applications.*

*15.1.4.2 That the need to protect features of the natural and built environment be recognised in the provision of parking spaces.*

*15.1.4.3 That parking spaces be provided at a location and scale which enables the efficient use of parking spaces and handling of traffic generation by the adjacent roading network.*

*15.1.4.6 That the number, size, gradient and placement of vehicle access points be regulated to assist traffic safety and control, taking into consideration the requirements of both the New Zealand Transport Agency and the Far North District Council.*

*15.1.4.7 That the needs and effects of cycle and pedestrian traffic be taken into account in assessing development proposals.*

- Minimal additional traffic will be generated by the proposed subdivision. The effects of traffic will be minimised through the shared use of access, and appropriate upgrading of the internal private accessway.
- Car parking will be improved for Lot 1 through the installation of a new car parking space behind the existing dwelling. There is space for off-street parking within Lot 2, however this will need to be designed at building consent stage.
- There is no footpath or cycle route along Binnie Street, but the remaining route to central Paihia, and its local services, has a footpath and is a total distance of approximately 1.7km from the subject site.
- The proposed private access design provides tracking for a 90th percentile vehicle, and represents the best practicable option for access to the existing and future residential activities.
- The installation of a new car park on Lot 2 will improve manoeuvring for the existing dwelling, so that vehicles using this parking space will not need to reverse onto Binnie Street.
- No additional vehicle crossing points are proposed. The gradient of the existing crossing only marginally exceeds the permitted standard. Use of the existing vehicle crossing for an additional allotment / future dwelling has been recommended within the Site Suitability Report. The site is located at the end of Binnie Street's cul-de-sac, where there will be limited traffic movements and no through traffic in support of retaining the single width crossing.

## 6.5 Objectives and Policies - Far North Proposed District Plan

Relevant objectives and policies are set out under the chapters General Residential Zone, Subdivision and Coastal Environment and 'Transport', and are commented on below. It is concluded that the proposal will generally be consistent with the relevant strategies.

### **GENERAL RESIDENTIAL ZONE**

#### *Objectives*

*GRZ-O1 The General Residential zone provides a variety of densities, housing types and lot sizes that respond to:*

- a. housing needs and demand;*
- b. the adequacy and capacity of available or programmed development infrastructure;*
- c. the amenity and character of the receiving residential environment; and*
- d. historic heritage.*

*GRZ-O2 The General Residential zone consolidates urban residential development around available or programmed development infrastructure to improve the function and resilience of the receiving residential environment while reducing urban sprawl.*

*GRZ-O4 Land use and subdivision in the General Residential zone is supported where there is adequacy and capacity of available or programmed development infrastructure.*

*GRZ-O5 Land use and subdivision in the General Residential zone provides communities with functional and high amenity living environments.*

*GRZ-O6 Residential communities are resilient to changes in climate and are responsive to changes in sustainable development techniques.*

#### *Policies*

*GRZ-P1 Enable land use and subdivision in the General Residential zone where:*

- a. there is adequacy and capacity of available or programmed development infrastructure to support it; and*
- b. it is consistent with the scale, character and amenity anticipated in the residential environment.*

*GRZ-P2 Require all subdivision in the General Residential zone to provide the following reticulated services to the boundary of each lot:*

- a. telecommunications:*
  - i. fibre where it is available; or*

- ii. copper where fibre is not available;
- b. local electricity distribution network; and
- c. wastewater, potable water and stormwater where they are available.

GRZ-P6 Encourage and support the use of on-site water storage to enable sustainable and efficient use of water resources.

GRZ-P7 Encourage energy efficient design and the use of small-scale renewable electricity generation in the construction of residential development.

GRZ-P8 Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:

- a. consistency with the scale, design, amenity and character of the residential environment;
- b. the location, scale and design of buildings or structures, potential for shadowing and visual dominance;
- c. for residential activities:
  - i. provision for outdoor living space;
  - ii. privacy for adjoining sites;
  - iii. access to sunlight;
- f. the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity, including:
  - i. opportunities for low impact design principles
  - ii. ability of the site to address stormwater and soakage;
  - g. managing natural hazards; and
  - h. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

- The proposed subdivision will supply a vacant allotment, with the potential to contribute to the variety of housing options in an existing residential area to reduce urban sprawl. This can be created at a similar density to a number of nearby sites to reduce adverse effects on the amenity values of the existing neighbourhood. The proposed scale of development is anticipated as a discretionary activity.
- Suitable infrastructure (roading, electricity, telecommunications, water, sanitary sewer and stormwater services) is available to the additional allotment. These will be installed through conditions of subdivision consent.
- Stormwater management is proposed, as described in the Site Suitability Report.
- There is scope for energy efficient design to be incorporated into the development of Lot 2.
- The placement of the existing dwelling is very close to the Binnie Street frontage of the site, allowing a rear lot to be created while retaining sufficient private outdoor space at the rear of the existing dwelling on Lot 1. The proposed boundary location allows space for additional planting or landscaping, including hedging and/or fencing to maintain privacy between the two lots. Sunlight angles for the existing dwelling are met as a permitted activity.
- Proposed Lot 2 is located at a lower contour, and future development can avoid visual dominance or significant adverse privacy impacts.

## **SUBDIVISION**

### *Objectives*

SUB-O1 Subdivision results in the efficient use of land, which:

- a. achieves the objectives of each relevant zone, overlays and district wide provisions;
- b. contributes to the local character and sense of place;
- c. avoids reverse sensitivity issues that would prevent or adversely affect activities already established on land from continuing to operate;
- d. avoids land use patterns which would prevent land from achieving the objectives and policies of the zone in which it is located;
- e. does not increase risk from natural hazards or risks are mitigated and existing risks reduced; and



- f. manages adverse effects on the environment.

*SUB-O3 Infrastructure is planned to service the proposed subdivision and development where:*

- a. *there is existing infrastructure connection, infrastructure should provided in an integrated, efficient, coordinated and future-proofed manner at the time of subdivision; and*
- b. *where no existing connection is available infrastructure should be planned and consideration be given to connections with the wider infrastructure network.*

**Policies**

*SUB-P3 Provide for subdivision where it results in allotments that:*

- a. *are consistent with the purpose, characteristics and qualities of the zone;*
- b. *comply with the minimum allotment sizes for each zone;*
- c. *have an adequate size and appropriate shape to contain a building platform; and*
- d. *have legal and physical access.*

*SUB-P4 Manage subdivision of land as detailed in the district wide, natural environment values, historical and cultural values and hazard and risks sections of the plan*

*SUB-P5*

*Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone to provide for safe, connected and accessible environments by:*

- a. *minimising vehicle crossings that could affect the safety and efficiency of the current and future transport network;*
- b. *avoid cul-de-sac development unless the site or the topography prevents future public access and connections;*
- c. *providing for development that encourages social interaction, neighbourhood cohesion, a sense of place and is well connected to public spaces;*
- d. *contributing to a well connected transport network that safeguards future roading connections; and*
- e. *maximising accessibility, connectivity by creating walkways, cycleways and an interconnected transport network.*

*SUB-P6 Require infrastructure to be provided in an integrated and comprehensive manner by:*

- a. *demonstrating that the subdivision will be appropriately serviced and integrated with existing and planned infrastructure if available; and*
- b. *ensuring that the infrastructure is provided is in accordance the purpose, characteristics and qualities of the zone.*

*SUB-P11 Manage subdivision to address the effects of the activity requiring resource consent including ( but not limited to) consideration of the following matters where relevant to the application:*

- a. *consistency with the scale, density, design and character of the environment and purpose of the zone;*
- b. *the location, scale and design of buildings and structures;*
- c. *the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity; or the capacity of the site to cater for on-site infrastructure associated with the proposed activity;*
- d. *managing natural hazards;*
- e. *Any adverse effects on areas with historic heritage and cultural values, natural features and landscapes, natural character or indigenous biodiversity values; and*
- f. *any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.*

- The proposed subdivision is an efficient use of existing residential land. It will be consistent with the surrounding land use pattern in order to avoid reverse sensitivity, is not affected by natural hazards, and is considered to achieve the objectives of the General Residential Zone.
- The subdivision is consistent with the purpose of the General Residential Zone – it complies with the discretionary activity standard for minimum allotment sizes and the controlled activity allotment dimension. Legal access is available to the boundary of each lot, and a shared access carriageway will be formed to provide physical access.
- Suitable infrastructure (existing public roading, electricity, telecommunications, water, sanitary sewer and stormwater services) is available to the additional allotment. These will be installed via conditions of subdivision consent, and all be installed below ground.
- The site is not within an area affected by natural hazards or risks.
- There are no particular natural environment or heritage values associated with the subject site.
- The subject site is located at the end of the Binnie Street cul-de-sac, no new vehicle crossings are proposed.
- As an infill subdivision surrounded by existing residential properties, there is negligible opportunity to create walkways, roading connections, cycleways and so forth.

- The proposed subdivision meets the purpose of the General Residential zone “*The General Residential zone represents those areas where there is an expectation of higher density residential development, compared to rural environments, and that generally provides adequacy and capacity of available or programmed development infrastructure*”.
- The scale of the subdivision represents a discretionary activity, and the siting of the existing dwelling allows for further intensification of the site.

## **COASTAL ENVIRONMENT**

### *Objectives*

*CE-O2 Land use and subdivision in the coastal environment:*

- preserves the characteristics and qualities of the natural character of the coastal environment;*
- is consistent with the surrounding land use;*
- does not result in urban sprawl occurring outside of urban zones;*
- promotes restoration and enhancement of the natural character of the coastal environment; and*
- recognises tangata whenua needs for ancestral use of whenua Māori.*

*CE-O3 Land use and subdivision in the coastal environment within urban zones is of a scale that is consistent with existing built development.*

### *Policies*

*CE-P3 Avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of land use and subdivision on the characteristics and qualities of the coastal environment not identified as:*

- outstanding natural character;*
- ONL;*
- ONF.*

*CE-P4 Preserve the visual qualities, character and integrity of the coastal environment by:*

- consolidating land use and subdivision around existing urban centres and rural settlements; and*
- avoiding sprawl or sporadic patterns of development.*

*CE-P5 Enable land use and subdivision in urban zones within the coastal environment where:*

- there is adequacy and capacity of available or programmed development infrastructure; and*
- the use is consistent with, and does not compromise the characteristics and qualities.*

*CE-P8 Encourage the restoration and enhancement of the natural character of the coastal environment.*

*CE-P10 Manage land use and subdivision to preserve and protect the natural character of the coastal environment, and to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:*

- the presence or absence of buildings, structures or infrastructure;*
- the temporary or permanent nature of any adverse effects;*
- the location, scale and design of any proposed development;*
- any means of integrating the building, structure or activity;*
- the ability of the environment to absorb change;*
- the need for and location of earthworks or vegetation clearance;*
- the operational or functional need of any regionally significant infrastructure to be sited in the particular location;*
- any viable alternative locations for the activity or development;*
- any historical, spiritual or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6;*
- the likelihood of the activity exacerbating natural hazards;*
- the opportunity to enhance public access and recreation;*
- the ability to improve the overall quality of coastal waters; and*
- any positive contribution the development has on the characteristics and qualities.*

- The site is part of an existing residential environment with no high or outstanding levels of natural character. The subdivision design is consistent with the subdivision and built scale of some immediately surrounding properties, and is consolidated within an existing urban environment in order to avoid sprawling or sporadic development.
- No significant adverse effects on the characteristics and qualities of this part of the coastal environment will arise.
- Infrastructure and services are available to service the proposed subdivision and future development of Lot 2.
- The activity can proceed without necessitating clearance of indigenous vegetation, producing adverse effects on water quality. The nature of the existing residential surroundings, the sloping contours of the land and the highly modified nature of the site indicates that the proposal is unlikely to adversely affect natural character.

## **TRANSPORT**

### **Objectives**

TRAN-O4 Parking, loading and access provisions support the needs of land use and subdivision activities, and ensure safe and efficient operation for users.

TRAN-O5 The safe and efficient movement of vehicular, cycle and pedestrian traffic that also meets the needs of persons with a disability or limited mobility.

### **Policies**

TRAN-P3 Ensure the safe, efficient and well connected operation of the transport network through the management of:

- a. the subdivision layout, and location of buildings, structures and other potential visual obstructions that may impact on sightlines and the integrity of the road carriageway;
- b. the design of access and parking;
- c. vehicular access to and from sites;
- d. the volume of traffic from land use activities;
- e. vehicular, pedestrian, and cyclist needs, including persons with a disability or limited mobility;
- f. the adverse cumulative effects of land use and subdivision on the transport network; and
- g. reverse sensitivity effects that may impact regionally significant infrastructure.

TRAN-P8 Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:

- a. the type and level of traffic anticipated;
- b. the location of high traffic generating activities and their relationship to existing roads and their status under the National Transport Network classification system, and adjacent properties;
- c. low impact design principles, including green spaces;
- d. safety requirements and improvements;
- e. the management of stormwater;
- f. any natural hazards;
- g. any cumulative effects arising from lawfully established activities in the surrounding environment;
- h. current and future connectivity including pathways and parking, and open space networks;
- i. any traffic assessment prepared by a suitably qualified and experienced transport professional;
- j. impacts on any State Highway or Limited Access Road; and
- k. any historical, spiritual or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

- The design of shared private access to support the 90<sup>th</sup> percentile car and provision of an additional car parking space on Lot 1 is considered to be safe and efficient for most scenarios. As noted, there are no connecting footpaths.
- Minimal additional traffic will be generated from future residential use on Lot 2. The property is located at the end of the Binnie Street cul de sac in order to avoid cumulative adverse effects.
- The subdivision and access layout is the best practicable option for the proposed activity.
- Shared vehicle access increases the availability of land for green space.
- Stormwater from the new access surface will be managed as detailed in the Site Suitability Report.
- Proper engineering design of the earthworks and retaining required for the new accessway is proposed.

## **6.6 Part 2 of the Resource Management Act 1991**

An assessment of the proposal in relation to the relevant purpose and principles of Part 2 of the Resource Management Act 1991 is given below.

### **PART 2 PURPOSE AND PRINCIPLES**

#### **5 Purpose**

- (1) The purpose of this Act is to promote the sustainable management of natural and physical resources.
- (2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while-
  - (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
  - (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
  - (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

## **6 Matters of national importance**

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:*

- (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;*
- (h) the management of significant risks from natural hazards.*

## **7 Other matters**

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources, shall have particular regard to-*

- (b) The efficient use and development of natural and physical resources;*
- (c) The maintenance and enhancement of amenity values;*
- (f) Maintenance and enhancement of the quality of the environment;*

## **8 Treaty of Waitangi**

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).*

The proposal is considered to promote sustainable management as per the purpose of the Act (Section 5) by creating an additional residential allotment within an established residential environment. Adverse effects on natural resources are avoided through the location and scale of the proposal, and through the management of wastewater and stormwater. Adverse effects on physical resources, such as the local roading network are mitigated through the proposed design of property access, which represents the best practicable option.

Relevant section 6 matters can be taken into account. Protection of kiwi habitat can be achieved via an advice note recommending that cats and dogs be kept under control at all times and kept inside or locked up at night. The subject site is not subject to natural hazards.

The proposed subdivision is considered to be an efficient use of this land, which supports existing built development and provides for future residential development of Lot 2 within an existing residential setting. In these circumstances there will be no detriment to amenity values, or the overall quality of the environment in terms of section 7.

The proposal has no known implications in terms of the Treaty of Waitangi.

The proposal is considered to be consistent with the purpose and principles of the Resource Management Act 1991.

## **6.7 Regional Plans**

### **Proposed Regional Plan for Northland (October 2023)**

The proposed subdivision does not involve any works that would require consent under the Proposed Regional Plan.



## 7.0 Consultation & Notification Assessment

### 7.1 Public Notification

**Step 1:** Public notification is not required in terms of the criteria listed in 95A(3).

**Step 2:** Public notification is not precluded in terms of 95A(5).

**Step 3:** There are no relevant rules that require public notification. Section 95A(8)(b) requires Council to assess, in accordance with section 95D, whether the activity will have or is likely to have adverse effects on the environment that are more than minor. Section 95D directs Council, among other things, to disregard any effects on persons who own or occupy the application site and any adjacent land; and allows adverse effects of activities permitted by a rule or national environmental standard to be disregarded.

As outlined in Section 5 of this report, it is submitted that the adverse effects associated with the proposed subdivision will be less than minor. The application can therefore proceed without being publicly notified.

**Step 4:** No special circumstances are considered to exist that warrant the application being publicly notified in terms of 95A(9).

### 7.2 Limited Notification

**Step 1:** There are no affected customary rights groups in terms of Section 95B(2)(a). The proposed activity is not on or adjacent to, or may affect, land that is the subject of a statutory acknowledgement in terms of Section 95B(3)(a).

**Step 2:** Limited notification is not precluded in terms of Section 95B(6).

**Step 3:** In terms of 95B(8) an assessment has been undertaken in accordance with section 95E.

Section 95E(1) specifies that a person is an affected person if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor).

Section 95E(2) provides further guidance as to how a consent authority should assess an activity's adverse effects on a person for the purposes of Section 95E, including clause (a), where they may disregard an adverse effect of the activity on a person if a rule or national environmental standard permits an activity with that effect. There is no permitted baseline for subdivision that needs to be considered as part of this assessment.

No written approvals have been obtained by the applicant.

The physical changes to the site resulting from the subdivision will be in relation to the future development of Lot 2, which is assumed to be a residential dwelling and possible accessory buildings, with associated increase in impermeable surfaces and traffic, and the development of shared access over easement A. A future building on Lot 2 will be surrounded by existing buildings on all four boundaries allowing integration into the existing neighbourhood without generating any significant amenity effects. Buildings

which will overlook Lot 2 are located on the sloping ground above, and are generally built as multi or split level buildings with decks located on the higher level/s to maximise views to the estuary and coastal marine area.

The new retaining wall to the north of ROW A will result in a setback from boundary infringement in relation to Lot 23 DP 40239 (NA1515/74) to the north. The wall will be designed by an engineer to ensure stability of the land above, and will support excavation and as such will not obstruct views or privacy. Council may consider the owners Lot 23 DP 40239 to be an affected party.

Installation of a wastewater connection from Lot 2 to the existing manhole within Lot 21 DP 40239, more particularly the Cross Lease Record of Title NA117C/111 legally described as Flat 2 DP 187450, will require minor trenching, within this neighbouring property, if the assumed manhole location is correct. Council may also consider the owners of NA117C/111 to be affected.

No incompatible land use activities are proposed, and no person is considered to be affected by land use incompatibility or reverse sensitivity.

The subject site is within 500m of Opuia Forest, being land that is managed by the Department of Conservation. The proposal will not result in any adverse impacts on the ability of the Department of Conservation to manage their land.

Additional traffic that will be generated by the proposal remains within the permitted activity standard for the Residential Zone.

Stormwater management can be achieved without generating any downstream adverse effects, provided that the recommendations of the Site Suitability Report are followed.

As summarised above, pending Council's own notification assessment, the owners of NA1515/74 and NA117C/111 may be considered to be affected, in which case limited notification would be required.

**Step 4:** There are no special circumstances that warrant notification of the application to any other person.

### 7.3 Summary of Notification Assessment

As outlined above, it is considered that public notification is not required, and pending Council's own notification assessment, limited notification may be required.

## 8.0 Conclusion

In terms of section 104 and 104B of the Resource Management Act 1991, we consider that:

- the actual and potential adverse effects of the activity on the environment resulting from the proposed activity will not be more than minor;
- the proposal is considered to be generally consistent with the objectives and policies of the Operative District Plan and Proposed District Plan;
- The proposal is in accordance with the Purpose and Principles of the Resource Management Act 1991; and

- The proposal is not contrary to the Regional Policy Statement for Northland, the National Policy Statement for Indigenous Biodiversity.

We also note that:

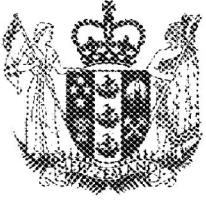
- Written approvals have not been obtained.



Date ..... *4 March 2024* .....  
WILLIAMS & KING  
Kerikeri

## 9.0 Appendices

- Appendix 1** Scheme Plan
- Appendix 2** Geologix Consulting Engineers Site Suitability Engineering Report
- Appendix 3** Record of Title
- Appendix 4** Top Energy Letter



**RECORD OF TITLE  
UNDER LAND TRANSFER ACT 2017  
FREEHOLD  
Search Copy**



R. W. Muir  
Registrar-General  
of Land

**Identifier** NA1104/68  
**Land Registration District** North Auckland  
**Date Issued** 19 March 1954

**Prior References**

NA659/42

---

<b>Estate</b>	Fee Simple
<b>Area</b>	837 square metres more or less
<b>Legal Description</b>	Lot 22 Deposited Plan 40239

**Registered Owners**

Nicola Louise Harper and Paul Richard Harper

---

**Interests**

Fencing Agreement in Transfer 538174 - 19.3.1954

Subject to a right of way over part created by Transfer 553672 - 4.2.1955 at 10.40 am

Appurtenant hereto are rights of way created by Transfer 553672 - 4.2.1955 at 10.40 am

12019029.3 Mortgage to ANZ Bank New Zealand Limited - 18.2.2021 at 1:46 pm

**Image Quality due  
to Condition  
of Original**

203 87  
22  
0-0-33-1  
210-85  
100.00  
- OVER 100 -





Local Authority: Far North District Council

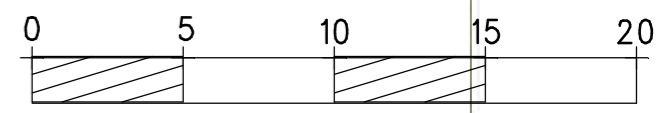
Total Area: 0.0837ha  
Comprised in: NA1104/68

Levels in terms of: LINZ DATA SERVICE LIDAR  
Contour interval is: 0.5m

PROPOSED MEMORANDUM OF EASEMENTS				EXISTING EASEMENTS			
PURPOSE	SHOWN	BURDENED LAND	BENEFITED LAND	PURPOSE	SHOWN	BURDENED LAND	DOCUMENT
RIGHT OF WAY, RIGHT TO CONVEY WATER, ELECTRICITY AND TELECOMMUNICATIONS	A	LOT 1 HEREON	LOT 2 HEREON	RIGHT OF WAY	B	LOT 2 HEREON	T 553672

THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF WILLIAMS & KING AND MAY NOT BE REPRODUCED WITHOUT THE WRITTEN PERMISSION OF WILLIAMS & KING

This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.



Prepared for: N A & P R Harper

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

**WILLIAMS AND KING**  
Registered Land Surveyors, Planners & Land Development Consultants

Ph: (09) 407 6030      27 Hobson Ave  
Email: kerikeri@saps.co.nz      PO Box 937 Kerikeri

# PROPOSED SUBDIVISION OF LOT 22 DP 40239

	Name	Date	ORIGINAL SCALE	SHEET SIZE
Survey Design			1:250	A3
Drawn	WK	AUG 2023		
Rev				

24172



30 January 2024

Natalie Watson  
Williams & King  
PO Box 937  
KERIKERI 0230

Email: [nat@saps.co.nz](mailto:nat@saps.co.nz)

*Top Energy Limited*

Level 2, John Butler Centre  
60 Kerikeri Road  
P O Box 43  
Kerikeri 0245  
New Zealand  
PH +64 (0)9 401 5440  
FAX +64 (0)9 407 0611

To Whom It May Concern:

**RE: PROPOSED SUBDIVISION  
NA & PR Harper – 13 Binnie Street, Paihia. Lot 22 DP 40239.**

Thank you for your recent correspondence with attached proposed subdivision scheme plans.

Top Energy's requirement is that power be made available for the additional lot. Top Energy advises that proposed Lot 1 has an existing power supply. Costs to make power available to proposed Lot 2 would be provided after application and an on-site survey have been completed.

Link to application: [Top Energy | Top Energy](#)

In order to get a letter from Top Energy upon completion of your subdivision, a copy of the resource consent decision must be provided.

Yours sincerely



**Aaron Birt**  
Planning and Design  
T: 09 407 0685  
E: [aaron.birt@topenergy.co.nz](mailto:aaron.birt@topenergy.co.nz)





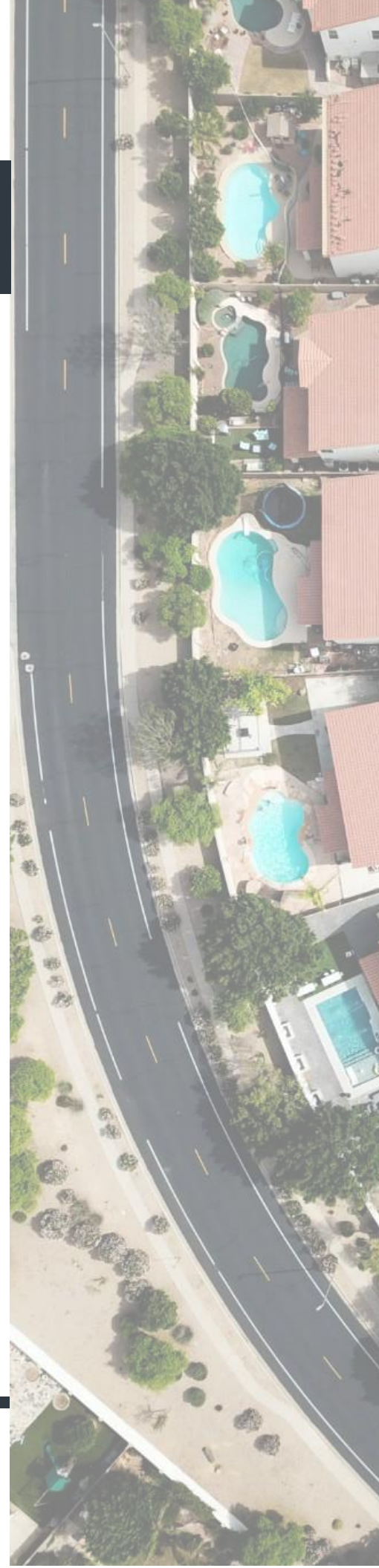
**geologix**  
consulting engineers

# SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

13 BINNIE STREET,  
PAIHIA


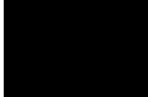
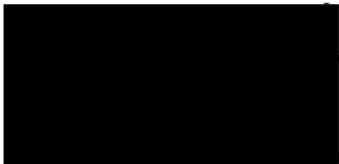
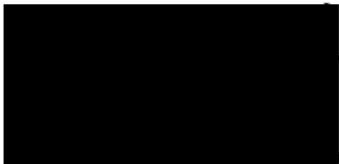
NIKKI & PAUL HARPER

**C0372-S-01**  
**NOVEMBER 2023**  
**REVISION 1**





## DOCUMENT MANAGEMENT

<b>Document Title</b>	Subdivision Site Suitability Engineering Report
<b>Site Reference</b>	13 Binnie Street, Paihia
<b>Client</b>	Nikki and Paul Harper
<b>Geologix Reference</b>	C0372-S-01
<b>Issue Date</b>	8 November 2023
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<b>Prepared by</b>	Sean Shin Geotechnical Engineer, BEng (Hons) 
<b>Approved by</b>	Edward Collings Managing Director, CEnvP Reg. 0861, CPEng Reg. 1033153, CMEngNZ 
<b>File Reference</b>	 - C0372\06 - Reports\C0372-S-01-R01.docx Signer ID: BVJRNOBNO9...

## REVISION HISTORY

Date	Issue	Prepared	Approved
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## 1 INTRODUCTION

This Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Nikki and Paul Harper as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

The purpose of this report is to assist with Resource Consent application in relation to the proposed subdivision of an urban residential lot at 13 Binnie Street, Paihia, the 'site' to create one new residential lot. Specifically, this assessment addresses engineering elements of geotechnical assessment, natural hazards, wastewater, stormwater, internal roading and associated earthwork requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

### 1.1 Proposal

It is understood the Client proposes to subdivide the site into two lots as outlined in Table 1 below.

This understanding has been established from a proposed scheme plan by Williams and King<sup>1</sup> supplied to Geologix at the time of writing and discussions with the client. Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical urban residential development concepts.

*Table 1: Summary of Proposed Scheme*

Proposed Lot	Size	Purpose
1	0.0424 ha	Existing Residential
2	0.0411 ha	New Residential Lot

## 2 DESKTOP APPRAISAL

The site has an existing vehicle crossing and is accessed from the end of Binnie Street which is east of the site. The site is legally described as Lot 22 DP 40239 and designated as a "Residential Zone". Topographically, the site is located on the southern slope of a larger hill and dips very steeply from Binnie Street towards the existing driveway at approximately 38 degrees. Then the site dips steeply at approximately 20 degrees through the existing dwelling, and dips moderately over the proposed building site at a shallower average angle of approximately 13 degrees. Existing structures are present on-site including a single-storey dwelling located near the eastern boundary. At the time of writing, a topographic survey plan was presented to us by Williams and King<sup>1</sup> to supplement our assessment and design work.

<sup>1</sup> Williams and King Ltd, Proposed Subdivision of Lot 22 DP 40239, Ref No. 24172, dated AUG 2023.

Figure 1: Site Setting<sup>2</sup>



## 2.1 Existing Reticulated Networks

Available infrastructure information is provided by Far North District Council (FNDC) Far North Maps GIS system. The GIS mapping indicates that the site is within a well-established reticulated network area in terms of stormwater, wastewater and water supply.

The report has been prepared to utilise the existing infrastructure to support the proposed developments.

## 2.2 Geological Setting

Available geological mapping<sup>3</sup> indicated that the site is directly underlain by Waipapa Composite Terrane comprising Greywackes described as massive to thin-bedded lithic volcanoclastic sandstone and argillite which are expected to be forming the larger hill sloping towards the Coastal Marine Area (CMA).

Typically, the local Greywacke geology is subject to weathering to residual soil, and this can be up to 10 m thick to highly weathered rock. Residual Greywacke soils tend to form an upper firm to stiff clay layer overlying a lower very stiff to hard silt layer. Undisturbed residual soils are generally stable at shallower angles. However, on steep slopes (>20 °), the transition between these weathered layers can experience shallow surface failures commonly triggered by extreme rainfall events.

## 2.3 Existing Geotechnical Information

An existing geotechnical report by Hawthorn Geddes Engineers & Architects Ltd<sup>4</sup> for a new dwelling similar to the proposed development was made available to Geologix at the time of writing. The report commented that evidence of shallow instabilities were present between Binnie Street and the existing dwelling within the cut slope with a shallow slip and multiple

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<sup>2</sup> Source: <https://app.grip.co.nz/>

<sup>3</sup> Geological & Nuclear Science, 1:250,000 scale Geological Map, Sheet 2, Whangarei, 2009.

<sup>4</sup> Hawthorn Geddes Engineers & Architects Ltd, Geotechnical Report for New Building, 13 Binnie Street, Paihia, HG Ref 11985, dated 29 October 2019.

cracks within the driveway and the stairway caused by soil creep and soil erosion. Three hand augers were conducted around the site and is summarised as Table 2 below.

*Table 2: Summary of Ground Investigation by Hawthorn Geddes Engineers & Architects Ltd*

Borehole ID	Depth of Boreholes	Depth to groundwater	Depth of fill	Depth of Greywacke Residual Soil*
HA1 - HA3	4.6 - 5.8 m	NE	NE	4.4 - 5.7 m

*\* Taken as up to scala blow counts of 20 per 100 mm penetration.*

Additionally, a review of available GIS databases, including the New Zealand Geotechnical Database<sup>5</sup> did not indicate borehole records within 500 m of the site. To improve the NZGD, exploratory records from our ground investigation were uploaded to the system.

### 3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of the supplied topographic data, Geologix have developed an understanding of surface water features and overland flow paths within the vicinity to the site.

#### 3.1 Surface Water Features

According to available GIS data, there are no evident surface water features such as ponds or streams within the site boundaries.

#### 3.2 Sensitive Receptors

Based on available GIS data, there are no apparent sensitive receptors such as wetlands within the site boundaries.

The site is located close to the CMA with approximately 160 m to the west.

#### 3.3 Overland Flow Paths

In general, it is expected that surface water will move as sheet flow following the natural topography towards the southwest across the site. Available GIS information showed that there is no indicated flood potential under the 1 % AEP event to influence the site and no clearly defined overland flow paths are evident within the site boundaries.

## 4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 28 August 2023. The ground investigation was scoped to confirm the findings of the above information and to provide parameters for geotechnical assessment. The ground investigation comprised:

- Two hand augered boreholes designated BH01 and BH02, were formed across suitable future building site with a target depth of 5.0 m below ground level (bgl).

<sup>5</sup> <https://www.nzgd.org.nz/>



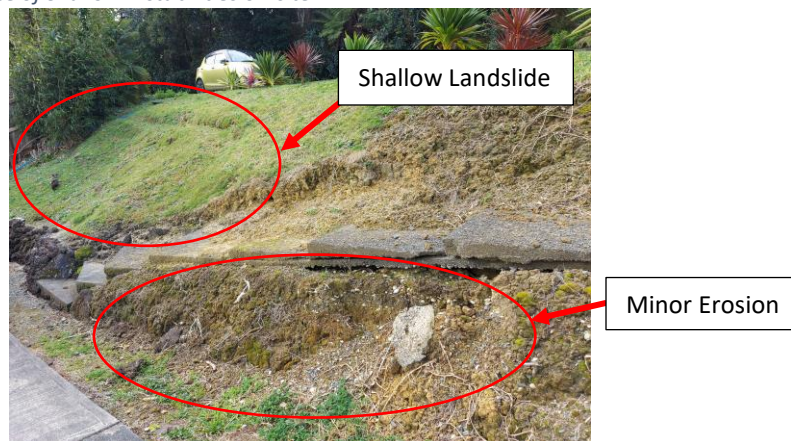
- Both boreholes were supplemented by dynamic cone penetrator (DCP) probing from surface to 4.8 m bgl at BH01, and until refusal returning >25 blows per 100 mm at 2.5 m bgl at BH02.
- Monitoring of groundwater levels with a groundwater dip meter on the day of drilling.

#### 4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- Topography is in general accordance with that outlined in Section 2 and the supplied contours on the scheme plan. The site dips very steeply from Binnie Street towards the existing driveway through approximately 38 degrees. Then the site dips steeply at approximately 20 degrees through the existing dwelling, and moderately over the proposed building site at a shallower average angle of approximately 13 degrees.
- In alignment with the existing geotechnical report, there were signs of shallow instabilities along the very steeply sloping ground between Binnie Street and the driveway located to the east of the existing dwelling. Evidence of shallow instabilities included a historical landslide along the batter slope and minor erosion along the walkway and the driveway were observed. See Figure 2 below.

*Figure 2: Observed Evidence of Shallow Instabilities on-site*



- Binnie Street defines the eastern site boundary. Land in all directions includes similar urban residential properties of various sizes. Recent intensification development was not evident on adjacent lots.
- There were multiple retaining walls made of rocks around the site including some rock retaining as terraces along the upslope and downslope sides of the driveway, adjacent to and below the existing dwelling. It is expected that the lower level of the dwelling is supported by a block wall.
- Existing structures present on site including a two-storey dwelling and a concrete driveway at the east of the site. There was an elevated deck extending out to the west of the existing dwelling which is founded upon timber pole foundations.



- The alignment of existing FNDC pipelines are visible from the manholes and stormwater catchpits located on-site. Some uncontrolled fill is possible around these infrastructure alignments.

## 4.2 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines<sup>6</sup>. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 200 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered up to 0.3 m bgl.** Described as grassed topsoil comprising organic silt, dark blackish brown, moist, low plasticity.
- **Greywacke Residual Soil to depths of 2.1 to 3.2 m bgl.** The residual soil was generally cohesive, described as silty clay, light yellowish brown becoming orange streaked light brown with depth. The residual soil was encountered as low plasticity, becoming high plasticity with depth.

Sixteen in-situ field vane tests within the residual soil enabled statistically confirmation of soil strength. The in-situ tests recorded vane shear strengths ranging from 99 kPa to Unable to Penetrate (UTP). Characteristic unit vane shear strength has been determined to be 146 kPa at 95% confidence, indicative of a very stiff residual soil.

- **Hard Greywacke Residual Soils to depths >5.0 m bgl.** From the base of the residual soil detailed above the unit became hard, demonstrating exceedance of 200 kPa in-situ field vane strength and >20 blows per 100 mm of penetration with the DCP.

Hard residual soils locally contained trace fine sand from 2.2m bgl at BH02. In addition, both boreholes exhibited medium plasticity around 4.0 m bgl.

A summary of the above information is presented as Table 3 below.

Table 3: Summary of Ground Investigation

Hole ID	Proposed Lot	Hole Depth	Fill Depth	Depth of Residual Soil	Groundwater <sup>2</sup>
BH01	2	5.0 m	NE	3.2 m	NE
BH02	2	5.0 m	NE	2.1 m	NE

1. All depths recorded in m bgl unless stated otherwise.

2. Groundwater measurements taken on day of drilling.

3. NE – Not Encountered.

<sup>6</sup> New Zealand Geotechnical Society, *Field Description of Soil and Rock*, 2005.

## 5 GEOTECHNICAL ASSESSMENT

Geotechnical design parameters are presented in Table 4 below. They have been developed based on our ground investigation, the results of in-situ testing and experience with similar materials. The parameters were then confirmed by back analysis within slope stability analysis.

Table 4: Geotechnical Effective Stress Parameters

Geological Unit	Unit Weight, kN/m <sup>3</sup>	Effective Friction Angle, °	Effective Cohesion, kPa	Undrained shear strength, kPa
Greywacke Residual Soil	18	32	7	135*
Hard Greywacke Residual Soil	18	34	10	>200

\* Adopting Bjerrum correction factor of 0.8 from the characteristic vane shear strength.

### 5.1 Seismic Hazard

New Zealand Standard NZS1170.5:2004 Clause 2.1.4 specifies that to meet the requirements of the New Zealand Building Code, design of structures is to allow for two earthquake scenarios:

1. *Ultimate Limit State (ULS) shall provide for... “avoidance of collapse of the structural system...or loss of support to parts... damage to non-structural systems necessary for emergency building evacuation that renders them inoperable”.*
2. *Serviceability Limit State (SLS) are to avoid damage to... “the structure and non-structural components that would prevent the structure from being used as originally intended without repair after the SLS earthquake...”.*

The seismic hazard in terms of Peak Ground Acceleration (PGA) has been assessed based on the NZGS Module 17. Table 5 presents the return periods for earthquakes with ULS and SLS ‘unweighted’ PGAs and design earthquake loads for the corresponding magnitude. The PGAs were determined using building Importance Level (IL) 2, defined by NZS1170.5:2004. Reference should be made to the structural designer’s assessment for the final determination of building importance level.

Table 5: Summary of Seismic Hazard Parameters

Limit State	Effective Magnitude	Return Period (years)	Unweighted PGA	Horizontal Coefficient <sup>1</sup> , K <sub>h</sub>
ULS	6.5	500	0.19 g	0.1273 g
SLS	5.8	25	0.03 g	

*K<sub>h</sub> = PGA × 0.67 for slope stability analysis to represent pseudo static conditions.*

<sup>1</sup> New Zealand Geotechnical Society, Earthquake Geotechnical Engineering Practice, Module 1, November 2021, Appendix A, Table A1.

## 5.2 Site Stability

### 5.2.1 Qualitative Stability Analysis

At the time of writing, there were signs of shallow instabilities over the very steeply sloping land to the west of the existing dwelling between Binnie Street and the existing driveway. The slope was measured to be 38 degrees during the time of investigation which lies beyond the equilibrium of the underlying residual soil. Additionally, cracks were observed along the concrete footpath and the driveway. No other signs of instabilities including deep-seated instability were observed across the site.

### 5.2.2 Quantitative Stability Analysis

Within the scope of this ground investigation, Geologix have undertaken a computer modelled slope stability analysis through a critical section of the site topography aligned from Binnie Street, following the steepest topography through the existing shallow landslide, through the existing dwelling and the proposed building site, and ending at the southwestern site corner of the site.

The slope was analysed within propriety software Slide 2 Version 9.02, developed by RocScience Inc. The purpose of the stability assessment was to:

- Ensure the proposed development concepts are feasible.
- Provide a working, accurate ground model in relation to site stability refined according to observed conditions and the results of this ground investigation.
- Develop a concept development engineering solution with any specific geotechnical stability requirements.

The stability analysis process was undertaken by calibrating the model to observed conditions, refining the ground investigation data to develop the effective stress parameters presented in Table 4. The existing condition under elevated groundwater scenario was adopted for model calibration, to give a Factor of Safety (FS) close to 1.0 through the historical slip towards the existing driveway. This was undertaken by completely saturating the overlying Greywacke Residual Soil ( $R_u$  value of 0.5) and partially saturating the underlying hard residual soils.

Limit equilibrium stability analysis was adopted in the analysis to express the results as a Factor of Safety (FS). When  $FS = 1.0$ , the represented mechanism is in equilibrium with the disturbing, active forces equal to the resisting, stabilising forces. A lower FS indicates that instability could occur under the modelled scenario whereas a higher FS demonstrates a margin of safety in respect of stability. Minimum FS criteria have been developed for use in residential development by Auckland Council<sup>8</sup> which are widely adopted in the Far North

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<sup>8</sup> Auckland Council, *The Auckland Code of Practice for Land Development and Subdivision, Chapter 2: Earthworks and Geotechnical, Version 2.0, May 2023.*

region. Modelling three separate event scenarios the accepted minimum FS are summarised as follows:

- Minimum FS = 1.5 for static, normal groundwater conditions.
- Minimum FS = 1.3 for elevated groundwater conditions (storm events).
- Minimum FS = 1.0 Pseudo-static seismic loading using ULS PGA.

### 5.2.3 Stability Analysis Results

Slope stability analysis results are presented in full as Appendix G and summarised below as Table 6.

Table 6: Summary of Stability Analysis Results

Profile	Scenario	Global Min FS	Development Footprint (min FS)	Result within Development Footprint
Existing (calibration model)	Static <sup>1</sup>	1.306	>1.5	Pass
	Elevated GW <sup>2</sup>	1.000	>1.3	
	Seismic <sup>3</sup>	1.055	>1.0	
Proposed	Static	1.306	>1.5	
	Elevated GW	1.000	>1.3	
	Seismic	1.055	>1.0	

1. Static, normal groundwater minimum FS = 1.5
2. Static, elevated groundwater minimum FS = 1.3
3. Seismic, pseudo-static ULS condition minimum FS = 1.0

### 5.2.4 Stability Analysis Conclusions

The developed slope stability model is considered to be a reasonable representation of the observed conditions on site. Specifically, the developed model has been calibrated to observed conditions on site from Binnie Street through the existing landslide and the existing dwelling, passing the proposed building site towards the southwestern site corner. As there was no specific engineering designs or certifications available for the existing rock walls, these walls were not considered in this analysis.

Greywacke Residual Soil and hard residual soils were modelled as partially saturated ( $R_u$  value of 0.3) under the static and seismic scenario. Under the elevated groundwater scenario, the overlying Greywacke Residual Soil was modelled completely Saturated ( $R_u$  value of 0.5).

The slope analysis results indicate that under the existing condition for the static, elevated groundwater and seismic scenarios showed global minimum FS of 1.306, 1.000 and 1.055 respectively. The global minimum FS was observed at the steeply sloping ground at the existing landslide between Binnie Street and the existing driveway which matched the observed conditions on-site. The potential failure planes under all scenarios trended through the upper Greywacke Residual Soil. However, the potential failure planes under both scenarios were outside the proposed building site. The observed FS were identical to the



existing condition which indicates that the proposed building site is not expected to affect the stability of the site.

However, any cuts proposed to support the driveway, including any earthworks for widening as part of this application shall be supported by specifically engineered retaining walls as part of a detailed design phase.

The proposed building site within proposed lot 2 can provide adequate FS for residential development and does not need a stability control to provide a safe and stable building site free of natural hazards.

### 5.3 Soil Expansivity

Clay soil may undergo appreciable volume change in response to changes in moisture content and be classed as expansive. The reactivity and the typical range of movement that can be expected from potentially expansive soils underlying any given building site depends on the amount of clay present, the clay mineral type, and the proportion, depth, and distribution of clay throughout the soil profile. Clay soils typically have a high porosity and low permeability causing moisture changes to occur slowly and produce swelling upon wetting and shrinkage upon drying. Apart from seasonal moisture changes (wet winters and dry summers) other factors that can influence soil moisture content include:

- Influence of garden watering and site drainage.
- The presence of mature vegetation.
- Initial soil moisture conditions at the time of construction.

Prior to a quantitative analysis of the soil, the underlying Greywacke Residual Soil is conservatively expected to meet the requirements of a highly expansive or Class H soil type. In accordance with AS2870:2011<sup>9</sup> and New Zealand Building Code<sup>10</sup>, Class H or Highly Expansive soils typically have a soil stability index ( $I_{ss}$ ) range of 3.8 to 6.5% and a 500-year design characteristic surface movement return ( $y_s$ ) of 78 mm.

It is recommended that a quantification of the soil expansivity are made by a geotechnical laboratory analysis at the Building Consent stage.

### 5.4 Liquefaction Potential

Liquefaction occurs when excess pore pressures are generated within loose, saturated, and generally cohesionless soils (typically sands and silty sands with <30 % fines content) during earthquake shaking. The resulting high pore pressures can cause the soils to undergo a partial to complete loss of strength. This can result in settlement and/ or horizontal movement (lateral spread) of the soil mass.

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<sup>9</sup> AS2870, *Residential Slabs and Footings*, 2011.

<sup>10</sup> New Zealand Building Code, *Structure B1/AS1 (Amendment 19, November 2019)*, Clause 7.5.13.1.2.





The Geologix ground investigation indicates the site to be predominantly underlain by fine-grained Greywacke Residual Soil with no groundwater. Based on the materials strength and consistency, and our experience with these materials, there is no liquefaction potential/ risk in a design level earthquake event.

## 5.5 Conceptual Foundations

### 5.5.1 *Concept Shallow Foundation*

Outside the zone of influence of the existing FNDC pipelines, as the natural Greywacke Residual Soil has an average undrained shear strength exceeding 100 kPa, it is expected that shallow foundations such as timber pole foundations or standard raft/ strip footings can be adopted for the future dwelling. Such foundations may be designed by a professional structural engineer adopting an Ultimate Bearing Capacity of 300kPa for a highly expansive soil type and a geotechnical reduction factor of 0.5.

Where shallow standard raft and/ or strip footing foundations are proposed, it is recommended that any non-engineered fill, underlying soft spots ( $S_u < 60$  kPa) and any other unsuitable or deleterious materials (such as relic foundations, driveway hardstanding etc.) are sub-excavated and replaced with suitably selected and compacted materials such as GAP65 hard fill.

If piled foundations are proposed, it is recommended that all piled foundations are taken down to a minimum of 1.0 m bgl and designed by a professional structural engineer to take into account a highly expansive soil type and the moderately sloping terrain. If groundwater is encountered within the pile holes, tremie concrete pour methodology will most likely be required to displace groundwater and an allowance should be made for this by the Contractor.

If filling is required within proposed dwelling footprint, the retaining of placed materials may be required, which could comprise of concrete block walls. It is recommended that all retaining walls are designed by a suitably qualified professional engineer familiar with the findings of this report. Blockwork retaining walls can be designed for an ultimate bearing capacity of 300 kPa for a highly expansive soil class and a geotechnical reduction factor of 0.5.

### 5.5.1 *Concept Bridged Foundations*

There are existing Council water supply pipelines anticipated to lie roughly at the centre of the proposed building footprint which will influence the proposed foundations as shown on Drawing No. 200 and 201. In addition a potential future dwelling could be influenced by Council stormwater pipelines within and adjacent to the western boundary and outside and adjacent to the southern boundary.

These pipelines should not be structurally loaded, and a suitable bridging design adopting deep bored and cast piles prepared by a professional structural engineer is required over any pipeline zones of influence intercepted by the footprint of a future dwelling.

According to the requirements of Auckland Council Design Manual Stormwater Code of Practice Chapter 3.22 and associated typical detail Drawing No. SW22 (which are widely adopted in the Far North region), the bridging foundation requirements include:

- Zone of influence determined as a line drawn up at 45 ° from a point 0.5 m below the pipes invert level to proposed Finished Ground Level (FGL).
- Bored and cast piles required to transfer building loads within the pipeline zones of influence.
- No piling within 1.0 m horizontally from the outer diameter of the pipeline.
- Piles extended a minimum of 1.0 m below the zones of influence.

The associated zones of influence have been indicated schematically on Drawing No. 201 within Appendix A of this report. It is recommended that piles are subject to specific engineering design by a professional structural engineer adopting the parameters outlined in Table 7 below for deep end-bearing piles.

Table 7: Deep Piled Foundation Geotechnical Parameters

Strata	Geotechnical Design Parameters	
Greywacke	Ultimate end-bearing capacity	900 kPa
Residual Soil	ULS design end-bearing capacity <sup>1</sup>	450 kPa
	SLS design end-bearing capacity	300 kPa
	Ultimate skin friction <sup>2</sup>	50 kPa
	ULS design skin friction <sup>1</sup>	25 kPa
	SLS design skin friction	15 kPa

1. Based on  $S_u = 100$  kPa for a residential development.
2. Adopting a geotechnical strength reduction factor of 0.5.
3. Adopting  $S_u * \alpha$ . With  $\alpha$  determined from Figure 5 of NZBC B1/VM4.
4.  $\alpha = 0.5$  for undrained shear strength of 100 kPa.

The ground investigation indicates that the pipelines were originally trenched and as such, it is recommended that skin friction is ignored through the zone of influence to account for the potential of non-engineered fill. If groundwater is encountered within the pile holes, tremie concrete pour methodology will most likely be required to displace groundwater and an allowance should be made for this by the Contractor.

We also noted in our review that invert levels were not provided in the FNDC GIS data. It is recommended that invert levels at Council wastewater pipe ref. WL2443 is surveyed by a registered surveyor at the time of structural design.

## 6 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprised an assessment of anticipated wastewater flows from proposed lots and the suitability of connecting to the existing reticulated network. Relevant design guideline documents adopted include:



- Watercare, Water and Wastewater Code of Practice for Land Development and Subdivision, Version 1.5, dated May 2015.
- FNDC Engineering Standards, Version 0.6, Date Issued: May 2023.

### 6.1 Existing On-site Wastewater Systems

According to the current site condition, there is no record of any existing on-site wastewater systems.

### 6.2 Existing Wastewater Reticulated Network

According to available information provided on the survey scheme plan and Far North District Council 3 water infrastructure GIS Map<sup>11</sup>, the site surrounding wastewater networks as follows:

- An existing 150 mm diameter uPVC gravity pipeline is in service and runs along the outside of the southern boundary, trending from east to west. (Asset ID: SL1043\_1041.)
- An existing manhole is located within the southern neighbouring site, just outside of the southwestern corner of the site. (Asset ID: SP1621.)
- An existing manhole located within Binnie Street which is east of the site. (Asset ID: SP1543.)

It is recommended that the existing wastewater manhole located within the southern neighbouring site to be identified during further investigation, and the invert level of the wastewater pipe is confirmed during the EPA stage.

### 6.3 Existing Wastewater Connection

Based on the Land Information Memorandum (LIM) report<sup>12</sup>, there is an existing wastewater lateral connection in place that serves the site. This connection is located to the south of the site and is connected to the existing wastewater pipeline within southern neighbouring site boundary. The above findings are taken from the consented drainage plan and are attached within Appendix D.

It is understood that the existing wastewater connection will be reused to serve proposed Lot 1 only, and its specific location to be determined during the EPA stage.

### 6.4 Proposed Wastewater Connection

It is proposed to construct the proposed Lot 2 lateral connection directly from the existing wastewater manhole which is located outside of the southwestern site corner and extend within the proposed lot 2 site boundary. The location and details of the proposed wastewater connection are shown on Drawing No. 400 within Appendix A.

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<sup>11</sup> <https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=9b351ce681e34ec29443ae1a6468cc2c>

<sup>12</sup> Land Information Memorandum Report, No. 2017/1260.



The existing wastewater manhole is referenced as FNDC Asset ID: SP1621. Based on the FNDC infrastructure GIS Map, the depth to inlet is calculated as 1.83 m and the lid level is 30.35 m NZVD 2016 in elevation. However, during our site walkover survey, we were unable to locate the existing wastewater, which was also confirmed by the surveyors during their on-site survey. Therefore, it is recommended that the location of the existing wastewater manhole be verified on-site during the EPA stage by using CCTV or any other measurements. Any discrepancies between our assumed design and the actual location may require further assessment.

## 6.5 Wastewater Generation Volume

The existing downstream reticulated network from the site has been analysed in accordance with FNDC Engineering Standards. The point of the analysis has been undertaken for the existing 150 mm uPVC pipeline immediately downstream of the site. This is the pipeline referenced as Asset ID: SL1043\_1041, where flows are expected to increase as a result of the application.

According to the FNDC Engineering Standards, Section 5.2.2.2, residential design flows have been taken as follows.

*Table 8: Residential Wastewater Design Flows*

Design Item	Criteria
Average dry weather flow	200 litres/ day/ person
Dry weather diurnal Peaking Factor	2.5
Wet weather diurnal Peaking Factor	5
Peak wet weather flow (PWWF)	1000 litres/ day/ person
No. of people per dwelling	4

The design criteria and potential wastewater flow is outlined by Table 8 above. This considers an existing wastewater network catchment above the point of analysis of **11** upstream households, increasing to **12** as a result of the application. Calculations are presented in full as Appendix E to this report and the results summarised below as Table 9.

*Table 9: Summary of Wastewater Flow Calculations*

Item	Calculated Wastewater Flow, l/s
Existing catchment, PWWF	0.51
Proposed catchment, PWWF	0.56
Increase PWWF from application	+0.04

## 6.6 Wastewater Network Capacity Assessment

Our analysis has established that the proposed application within the scope of this report provides only a minor, 0.04 litre/ second increase in discharge to the reticulated wastewater network at the point of injection.

Adopting the Colebrook-White equation and design factors from FNDC Engineering Standards, a summary of design assumptions and the calculated pipeline capacity of the downstream network at the point of analysis is summarised below within Table 10.



Table 10: Summary of Wastewater Catchment Analysis

Item	Value
<b>Design Criteria</b>	
Roughness coefficient (Colebrook-White)	0.6 mm from FNDC Engineering Standards 5.2.2.4
Slope of Pipeline	23.97 % (Calculated between manhole Asset ID SP1621 and Manhole Asset ID SP1543)
Size of Pipeline	150 mm diameter
<b>Calculation</b>	
Existing Pipe Flow Capacity, 100 %	87.77 l/s
Existing Pipe Capacity, 67 %	69.30 l/s
Existing Pipe Velocity Capacity	4.97 m/s
Existing Catchment PWWF	0.51 l/s
Proposed Catchment PWWF	0.56 l/s

The capacity assessment demonstrates the existing reticulated wastewater network has sufficient capacity to cater for the additional discharge volumes from the application.

## 7 STORMWATER ASSESSMENT

Considering the nature of urban subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as internal roading or future on-lot building and driveway.

### 7.1 Regulatory Requirements

Stormwater management for the proposed activity is controlled by the FNDC Operative District Plan<sup>13</sup>. The requirement for subdivision and probable future development under these legislations is summarised below.

#### 7.1.1 District Wide Provisions

Subdivision activity and provisions for probable future development within urban residential environments is controlled by District Plan Rule 13.7.3.4. In relation to both urban and rural residential subdivision the following apply which this concept design provisions for:

*(a) All allotments shall be provided, within their net area, with a means for the disposal of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces, in such a way so as to avoid or mitigate any adverse effects of stormwater runoff on receiving environments, including downstream properties. This shall be done for a rainfall event with a 10% Annual Exceedance Probability (AEP).*

*(b) The preferred means of disposal of collected stormwater in urban areas will be by way of piping to an approved outfall, each new allotment shall be provided with a piped connection to the outfall laid at least 600mm into the net area of the allotment. This includes land allocated on a cross lease or company lease. The*

<sup>13</sup> <https://www.fndc.govt.nz/Your-Council/District-Plan/Operative-plan>





*connection should be at the lowest point of the site to enable water from driveways and other impervious surfaces to drain to it. Where it is not practical to provide stormwater connections for each lot then the application for subdivision shall include a report detailing how stormwater from each lot is to be disposed of without adversely affecting downstream properties or the receiving environment.*

*(c) The provision of grass swales and other water retention devices such as ponds and depressions in the land surface may be required by the Council in order to achieve adequate mitigation of the effects of stormwater runoff.*

*(d) All subdivision applications creating sites 2ha or less shall include a detailed report from a Chartered Professional Engineer or other suitably qualified person addressing stormwater disposal.*

*(d) Where flow rate control is required to protect downstream properties and/or the receiving environment then the stormwater disposal system shall be designed in accordance with the onsite control practices as contained in "Technical Publication 10, Stormwater Management Devices – Design Guidelines Manual" Auckland Regional Council (2003).*

#### 7.1.2 Environmental Zone Provisions

Permitted activity status for proposed impervious surface areas within the urban residential zone is determined by Rule 7.6.5.1.6 which is presented below.

*The maximum proportion of the gross site area covered by buildings and other impermeable surfaces shall be 50%.*

## 7.2 Impervious Surfaces and Activity Status

The proposed activity has been assessed in accordance with rules outlined by Sections 7.1.1 to 7.1.2. A summary of this is provided as Table 11 below which have been developed from the proposed scheme plan.

It is understood that the future residential activities will comprise a total impervious area of 205 m<sup>2</sup> (50 % of site area of 411 m<sup>2</sup>) to be categorized as Permitted Activity. Any impervious surfaces exceeding 50 % of the gross site area will breach the rule and need assessment of related criteria. In our design assumption, we have considered a typical urban residential roof of 150 m<sup>2</sup> and associated driveways/ car parking area of 50 m<sup>2</sup>, resulting in a total impervious area of 200 m<sup>2</sup> which is roughly equivalent to complete development of a 14 x 14m building site area. Therefore, the proposed lot 2 is considered as **Permitted Activity**.

Taking into account the proposed Right of Way (RoW) within proposed lot 1 with an impervious area of 77 m<sup>2</sup>, additional parking area with an impervious area of 26 m<sup>2</sup>, and the existing dwelling with a roof area of 111 m<sup>2</sup>, it is anticipated that the total impervious area under post-development conditions will be 214 m<sup>2</sup>, representing 50.47% of the proposed lot

1 site area of 424 m<sup>2</sup>. This activity falls under the category of **Controlled Activity**, according to FNDC Operative District Plan Rule 7.6.5.2.6.

Based on FNDC Operative District Plan Rule 7.6.5.2.1, it is expected that the additional impervious area needs to be mitigated back to the permitted threshold of buildings and other impermeable surface coverage, as outlined in Rule 7.6.5.1.6. However, considering the proposed development concepts and the overall site area with post-development impervious area provides 414 m<sup>2</sup>, which accounts for 49.58% (less than 50%) of the overall site area of 835 m<sup>2</sup>, which is eligible to be categorised as **Permitted Activity**. Therefore, we are seeking a dispensation from providing stormwater mitigation measures for the additional RoW and parking space within proposed lot 1. The reason is that the stormwater tank has been designed to provide attenuation of 80% of the pre-development level within proposed lot 2 during a 20% AEP storm event, which is considered sufficient to cover the additional 0.47% impervious area from the permitted threshold of impermeable surface coverage within proposed lot 1.

Table 11: Summary of Impervious Surfaces

Surface	Proposed Lot 1		Proposed Lot 2		Overall Site Area	
<b>Existing Condition</b>	<b>(424 m<sup>2</sup>)</b>		<b>(411 m<sup>2</sup>)</b>		<b>(835 m<sup>2</sup>)</b>	
Roof	111 m <sup>2</sup>	26.18 %	0 m <sup>2</sup>	0 %	111 m <sup>2</sup>	13.29 %
Driveway	0 m <sup>2</sup>	0 %	0 m <sup>2</sup>	0 %	0 m <sup>2</sup>	0 %
Right of Way	0 m <sup>2</sup>	0 %	0 m <sup>2</sup>	0 %	0 m <sup>2</sup>	0 %
Total impervious	111 m <sup>2</sup>	26.18 %	0 m <sup>2</sup>	0 %	111 m <sup>2</sup>	13.29 %
<b>Proposed Condition</b>	<b>(424 m<sup>2</sup>)</b>		<b>(411 m<sup>2</sup>)</b>		<b>(835 m<sup>2</sup>)</b>	
Roof (Concept)	0 m <sup>2</sup>	0 %	150 m <sup>2</sup>	36.50 %	150 m <sup>2</sup>	17.96 %
Driveway (Concept)	26 m <sup>2</sup>	6.13 %	50 m <sup>2</sup>	12.17 %	76 m <sup>2</sup>	9.10 %
Right of Way	77 m <sup>2</sup>	18.16 %	0 m <sup>2</sup>	0 %	77 m <sup>2</sup>	9.22 %
Total impervious	103 m <sup>2</sup>	24.29 %	200 m <sup>2</sup>	48.66 %	303 m <sup>2</sup>	36.29 %
<b>Post-Development Condition</b>						
Total impervious	214 m <sup>2</sup>	50.47 %	200 m <sup>2</sup>	48.66 %	414 m <sup>2</sup>	49.58 %
Activity Status	<b>Controlled</b>		<b>Permitted</b>		<b>Permitted</b>	

### 7.3 Stormwater Management Concept

The stormwater management concept considered in this report has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development.** The proposed application includes subdivision development only and not lot specific residential development. As such a conservative model of probable future on-lot development has been developed for this assessment considering a lot gross size area of 411 m<sup>2</sup>. The probable future development concept includes up to 150 m<sup>2</sup> potential roof area and up to 50 m<sup>2</sup> potential driveway or parking areas.
- **Existing On-site Development.** An existing dwelling with a roof area of 111 m<sup>2</sup> is situated at the front of the site. It is understood that this area will be included in the proposed lot 1 area during the subdivision.



- **Subdivision Development.** Access to the new proposed lot will be via a proposed concrete driveway within the proposed lot 1 area. The proposed driveway will create additional impervious area up to 77 m<sup>2</sup>. Additional parking space will be required to provide on-site parking area for proposed lot 1 which resulting an increased impervious area of 26 m<sup>2</sup>. As discussed in Section 7.2, we are seeking a dispensation from providing attenuation for these additional impervious areas during the subdivision application.

#### 7.4 Design Storm Event

For the purpose of this assessment and considering there is no initial downstream properties are susceptible under flooding hazard, this assessment has been modelled to provide stormwater attenuation up to and including 80 % of the pre-development condition for the 50 and 20 % AEP storm events which is recommended for the site including any future activities to comply with FNDC Engineering Standard Table 4-1. This provides additional conservatism over the 10% AEP predevelopment model to comply with NRP Rule C6.4.2(2). Attenuation modelling under this scenario avoids exacerbating downstream flooding.

Correctly sized discharge devices have adopted the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model<sup>14</sup>. NIWA provides guidelines for modelling the effects of potential climate change effects of rainfall intensity increase by applying a potential change factor to historical data. This report has adopted potential change factors to account for a 2.1 °c climate change increase scenario. NIWA HIRDSv4 and climate change factor data is presented in full within Appendix C.

#### 7.5 Probable Future Development Management

As detailed above, it is recommended that future residential developments provide on-lot stormwater attenuation for all impervious surface areas to 80 % of pre-development peak runoff condition for the design storm event. This is achievable by installing specifically sized low-flow orifices into the roof runoff attenuation tank which will attenuate the concept development additional runoff volume from the pre-development condition as detention, releasing the accumulated volume slowly.

This assessment should be subject to verification and an updated design at Building Consent stage once final development plans are available. This is typically applied as a notice to the applicable titles. The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards<sup>15</sup> to provide a suitable attenuation design to limit post-development peak flows to pre-development conditions. A summary of the concept design assumptions is presented as Table 12 and a typical schematic detention tank arrangement is presented as Drawing No. 420.

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<sup>14</sup> NIWA High Intensity Rainfall Data System v4, <https://hirds.niwa.co.nz>.

<sup>15</sup> FNDC Engineering Standards Version 0.6, Date Issued: May 2023.

Table 12: Summary of Probable Future Development Concept

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
<b>Proposed Lot 1 Future Concept Development</b>			
Total building area	111 m <sup>2</sup>	0 m <sup>2</sup>	Refer to Section 7.2. We are seeking dispensation from providing attenuation.
Proposed RoW and parking space	0 m <sup>2</sup>	103 m <sup>2</sup>	
<b>Total</b>	<b>111 m<sup>2</sup></b>	<b>103 m<sup>2</sup></b>	
<b>Proposed Lot 2 Future Concept Development</b>			
Potential buildings	0 m <sup>2</sup>	150 m <sup>2</sup>	Detention within roof water tanks
Potential driveways	0 m <sup>2</sup>	50 m <sup>2</sup>	Off-set detention in roof water tanks
<b>Total</b>	<b>0 m<sup>2</sup></b>	<b>200 m<sup>2</sup></b>	

Calculations to support the concept design are presented as Appendix C to this report. A summary of the proposed on-lot stormwater attenuation design is presented as Table 13. As mentioned above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available. A Consent notice may be required to be applied to each title to ensure this is undertaken.

Table 13: Probable Future Development Attenuation Concept

Design Parameter	50 % AEP	20 % AEP	10 % AEP	1 % AEP
<b>Proposed Lot 2</b>				
Regulatory Compliance	FNDC Engineering Standards		NRC Proposed Regional Plan	
Pre-development peak flow	2.44 l/s	3.20 l/s	3.74 l/s	
80 % pre-development peak flow	1.95 l/s	2.56 l/s	NA	
Post-development peak flow	4.88 l/s	6.39 l/s	7.48 l/s	
Total Storage Volume Required	4,826 litres	6,381 litres	4,664 litres	
Concept	Adopt attenuation to 80 % of pre-development condition for 20 % AEP storm as critical condition. Assuming 1 x 6,500 litre tank, install 10 mm orifice 0.15m above based of tank for sedimentation purpose.			

## 7.6 Stormwater Quality

The proposed application is for an urban residential subdivision and future development. The key contaminant risks in this setting include:

- Sediments and minor contaminants washed from impervious surfaces.
- Leaf matter, grass, and other organic debris.

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. However, additional measures of stormwater filtration have been adopted due to the proximity to sensitive surface water receptors. Stormwater quality will be provided by:



- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Room for sedimentation (minimum 150 mm according to Auckland Council GD01) within the base of the stormwater attenuation pond and roof runoff tanks as dead storage volume.
- Stormwater discharges directed towards lot lateral connection.

The risk of other contaminants being discharged out of the site boundaries (hydrocarbons, metals etc.) as a result of the proposed activities once stormwater has been processed through the above measures that will affect the downstream water quality is considered low.

## 7.7 Existing Stormwater Network

According to available information provided on the survey scheme plan and Far North District Council 3 water infrastructure GIS Map<sup>16</sup>, the site surrounding stormwater networks as follows:

- An existing 300 mm diameter concrete gravity pipeline is in service and runs along the southern boundary, trending from east to west. (Asset ID: BI\_SWL0110.)
- An existing 300 mm diameter concrete gravity pipeline is in service and runs along the western boundary, trending from north to south. (Asset ID: BI\_SWL0108). It is noted that, according to the FNDC GIS map, the existing stormwater pipeline is located outside the western boundary of the site. However, based on our site walkover survey and the available topographic plan, the pipeline is within the site boundary, by approximately 2.1m.
- An existing manhole located at the northwest corner of the site within site boundary which differs from FNDC GIS map showing the manhole beyond the western boundary of the site. (Asset ID: BI\_SWL0287).
- An existing manhole located at the southwest corner of the site, on the southern site boundary, which differs from FNDC GIS map showing the manhole beyond the western boundary of the site. (Asset ID: BI\_SWL0287)

## 7.8 Proposed Stormwater Connections

It is proposed to verify the existing stormwater connection on-site during the EPA application process and decommission the existing stormwater connection for the purpose of forming the subdivision.

A new 150 mm uPVC stormwater pipeline will be constructed at least 0.6 m within proposed lot 1 boundary and extend to the existing stormwater manhole which is situated at the southwest corner of the site with referenced Asset ID: BI\_SWL0287.

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<sup>16</sup> <https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=9b351ce681e34ec29443ae1a6468cc2c>





A 100 mm lateral connection to serve proposed lot 2 will be constructed directly from the proposed 150 mm stormwater pipeline using a wye junction or other approved methods.

These recommendations are indicated schematically as Drawing No. 400 within Appendix A.

## 7.9 Assessment Criteria and Consent Status

### 7.9.1 District Plan

The proposed activity has been assessed as a **Discretionary Activity** according to Table 13.7.2.1(v). An assessment criterion according to Rule 13.9 are presented within the District Plan for this activity classification.

## 8 POTABLE WATER & FIRE FIGHTING

### 8.1 Potable Water Reticulation

The site is located within a well-established public water supply area and is currently located adjacent to a public 65 mm MDPE water supply pipeline outside the eastern boundary. Since the proposed development is under provision of subdivision, the existing water connection will be reused for serving proposed lot 1 and a new water meter will be installed at the east of the site within Binnie Street road berm area from a public 65 mm pipeline for servicing proposed lot 2.

It is important to note that there is an existing 25 mm uPVC water supply pipeline within the proposed lot 2 area crossing the site from north to south. This pipeline potentially serves as the water supply for the southern neighbouring site. It is recommended to determine the water meter's location to confirm this assumption and assess the feasibility of using the pipeline for the site's potable water service at the EPA stage. Any open-cut construction method in this area without realignment of the asset poses a high risk of intercepting the pipeline.

### 8.2 Fire Fighting

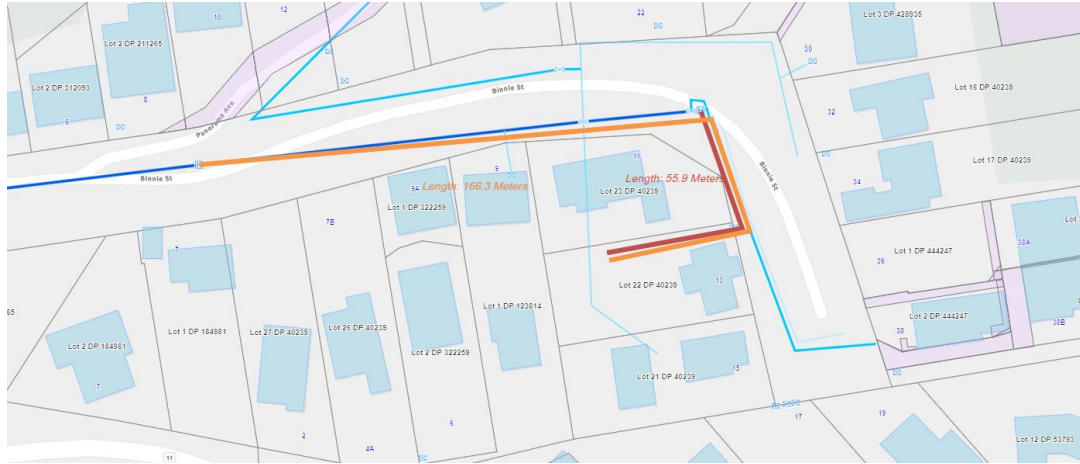
There are two fire hydrants within Binnie Street north of the site with approximate 56 m and 166 m from the proposed development, this is shown as Figure 3 below.

The fire-fighting requirements for the proposed development are determined to be FW2 in accordance with the SNZ PAS 4509:2008, New Zealand Fire Service Firefighting Water Supplies Code of Practice. The standard requires a minimum of two fire hydrants – one within 135 m, and the second within 270m to the entrance of the furthest property.

According to above assumption, the proposed developments comply with the SNZ PAS 4509:2008, New Zealand Fire Service Firefighting Water Supply Code of Practice.



Figure 3: Fire Hydrant Mapping



## 9 EARTHWORKS

As part of the subdivision application, earthworks are required as follows:

- **New accessway within Easement A.** Cut/ fill earthworks are required to create a suitable driveway for accessing proposed lot 2.

Table 14: Summary of Proposed Earthworks Volumes

Activity	Proposed Volume	Net	Max. Height
Cut	7.8 m <sup>3</sup>		1.0 m
Fill	6.4 m <sup>3</sup>		0.6 m
Sub-total	14.2 m <sup>3</sup>	1.4 m <sup>3</sup> – Cut	

According to the above Table 14, proposed earthwork volumes are well within the 200 m<sup>3</sup> Permitted Activity volume limit outlined by FNDC District Plan Rule 12.3.6.1.3(a) and the maximum cut and fill height is <3 m to comply with 12.3.6.1.3(b).

Rule C.8.3.1, Table 13 of the Proposed Regional Plan outlines a Permitted Activity as 5,000 m<sup>2</sup> of exposed earth at any time for 'other areas'. Proposed earthwork areas to form the subdivision, comply with the Permitted Activity standard for other areas. A full assessment according to the criteria is presented within Appendix F.

### 9.1 General Recommendations

Bulk fill with site-won earth can be moderately sensitive to disturbance when exposed to rain or runoff which may cause saturation or vehicle movements and trafficking during earthworks. Accordingly, care should be taken during construction, including probable future developments to minimise degradation of any earth fill due to construction traffic and to minimise machinery on site.

Any areas of proposed bulk fill which are required to meet specific subgrade requirements within should be subject to a specific earthwork specification prepared by a professional Engineer such as Geologix.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within close proximity to excavations should be undertaken in accordance with Occupational Safety and Health regulations.

All earthworks should be carried out in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

It is expected that there will be retaining walls, with a maximum height of 1.0 m to the north and 0.6 m to the south, to support the proposed accessway in terms of geotechnical aspects. It is proposed that a qualified geotechnical engineer undertake the detailed retaining wall design during the EPA stage, taking into account geotechnical stability control requirements.

## 9.2 Erosion and Sediment Control

Erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. Erosion and sediment control measures to form the subdivision are summarised as follows:

- Silt fences around the downslope face of the proposed accessway.
- Stabilised entrance to be put in place at site entrance.

## 10 NATURAL HAZARD ASSESSMENT

To satisfy the Resource Management Act, 1991 the proposed subdivision must plan for and manage the risk from natural hazards to reduce the potential adverse effects to less than minor. Regulatory assessment of natural hazards at the site location are managed under the jurisdiction of the FNDC District Plan<sup>17</sup>, Northland Regional Council (NRC) Proposed Regional Plan for Northland<sup>18</sup> and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 15.

*Table 15: Summary of Natural Hazards*

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	NA	No mitigation required, less than minor.
Overland flow paths, flooding, inundation	NA	No indication of flooding hazard within site boundaries. No mitigation required.
Landslip	NA	No mitigation required, less than minor. Driveway retaining to take into account geotechnical stability control requirements.
Rockfall	NA	No mitigation required, less than minor.
Alluvion	NA	No mitigation required, less than minor.
Avulsion	NA	No mitigation required, less than minor.
Unconsolidated fill	NA	No mitigation required, less than minor.
Soil contamination	NA	No mitigation required, less than minor.

<sup>17</sup> Operative District Plan Rule 13.7.3.2.

<sup>18</sup> Proposed Regional Plan for Northland June 2023 – Appeals Version, Chapter D.6.

Subsidence	NA	No mitigation required, less than minor.
Fire hazard	NA	No mitigation required, less than minor.
Sea level rise	NA	Site is away from coastal area. No mitigation required, less than minor.

*NA – Not Applicable.*

## 11 INTERNAL ROADING AND VEHICLE CROSSINGS

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of these works.

### 11.1 Traffic Intensity Factor and Household Equivalents

According to Appendix 3A of the Operative District Plan, providing for one standard residential unit per lot, each accounting for up to 10 traffic movements per unit per day the following Traffic Intensity Factors (TIF) and Household Equivalents have been developed for each proposed road.

- Existing vehicle crossing for serving proposed accessway: TIF of 20 from two HE per vehicle crossing.

### 11.2 Vehicle Crossings

An existing vehicle crossing provides access to the site from the end of Binnie Street. Due to the steep drop in topography, it is deemed inappropriate to create a new vehicle crossing or modify the existing vehicle crossing. Therefore, the existing consented vehicle crossing will remain and function in its current condition. No modifications are recommended for the existing vehicle crossing.

### 11.3 Right of Ways

Proposed RoW at this time will provide internal access to the proposed lot 2 and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan and in accordance with Drawing Sheet No. 7 of the FNDC Engineering Standards, as summarised in Table 16.

*Table 16 Summary of Proposed RoW specification*

Location	Lots	Current H.E.	Combined Future H.E	Min. Legal Width	Min. Carriageway Width
Access Road (Easement A)	1 & 2	1	2	5.0 m	3.0 m formed width with single crossfall to kerb and channel.

According to the site features and proposed development plan, the existing dwelling within proposed lot 1 does not have a garage. Therefore, an additional on-site parking space has been designed and provided within the rear yard area of proposed lot 1. The design and location of this single parking space are detailed in Appendix A Drawing No. 100, in compliance with FNDC Operative District Plan Rule 15.1.6B.



The proposed accessway within Easement A will be constructed as an urban private way with details shown on FNDC Engineering Standards Sheet No. 7 and in accordance with FNDC District Plan Appendix 3B. It will have a carriageway width of 3.0 m. 90<sup>th</sup> percentile car tracking curve has been provided on Drawing No. 100 to demonstrate that the proposed accessway can accommodate most cars scenarios and on-site manoeuvring space will be provided within proposed lot 2 in the future once detailed development plans are determined.

## 12 LIMITATIONS

This report has been prepared for Nikki and Paul Harper as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk and no reliability is provided by Geologix Consulting Engineers Ltd.

The opinions and recommendations of this report are based on plans, specifications and reports provided to us at the time of writing, as referenced. Any changes, additions or amendments to the project scope and referenced documents may require an amendment to this report and Geologix Consulting Engineers should be consulted. Geologix Consulting Engineers Ltd reserve the right to review this report and accompanying plans.

The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these specific ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Differences from the encountered ground conditions during subdivision construction may require an amendment to the recommendations of this report.



## APPENDIX A

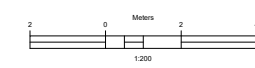
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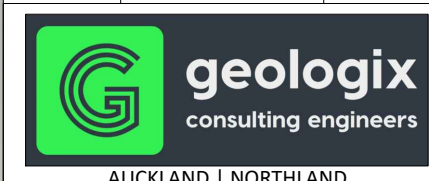
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- MINOR CONTOURS AT 0.5M INTERVALS  
MAJOR CONTOURS AT 2.0M INTERVALS
- CUT AREA
- FILL AREA
- PROPOSED BUILDING SHAPE FACTOR
- VEHICLE TRACKING CURVE
- PROPOSED RETAINING WALL ALIGNMENT
- EXISTING STORMWATER PIPE (SW)
- EXISTING WASTEWATER PIPE (SS)
- EXISTING WATER SUPPLY PIPE



A	CONSENT	05/09/2023
Revision	Issue	Date



Project Name and Address  
**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

Project: **C0372** | Drawn By: **GC**

Client: **NIKKI & PAUL HARPER**

Sheet Title: **PROPOSED ACCESSWAY PLAN**

Sheet: **100**




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DATE: 05/09/2023

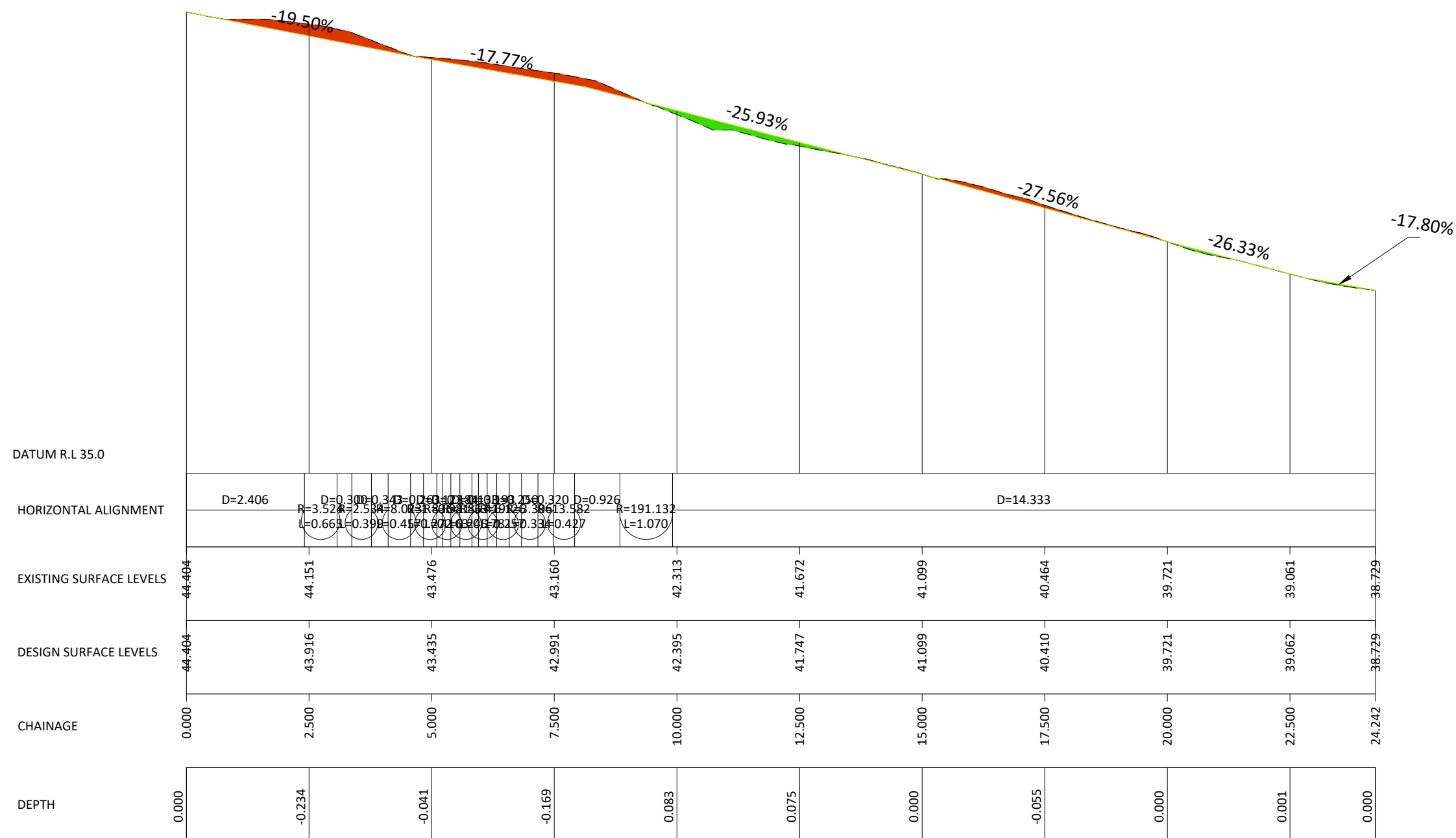


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 CUT AREA

 FILL AREA



LONGITUDINAL SECTION - ACCESSWAY  
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Revision	Issue	Date



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Project Name and Address  
**13 BINNIE STREET,  
PAIHIA  
LOT 22 DP 40239**

Project  
**C0372**

Drawn By  
**GC**

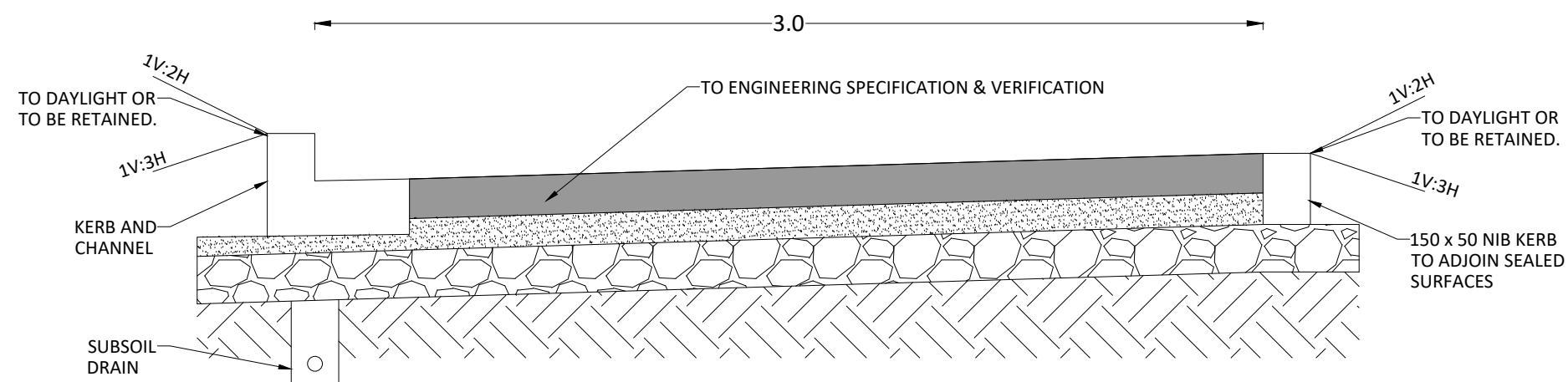
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**NIKKI & PAUL HARPER**

Sheet Title  
**LONGSECTION - ACCESSWAY**

Sheet  
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PRIVATE ROAD TYPICAL DETAIL  
 ACCORDING TO FNDC ENGINEERING STANDARDS SHEET NO. 7 & DISTRICT PLAN  
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Revision	Issue	Date
A	CONSENT	05/09/2023



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Project Name and Address  
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 PAIHIA  
 LOT 22 DP 40239

Project C0372	Drawn By GC
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Client  
 NIKKI & PAUL HARPER

Sheet Title  
 TYPICAL PRIVATE ROAD DETAIL


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 MINOR CONTOURS AT 0.5M INTERVALS  
 MAJOR CONTOURS AT 1.0M INTERVALS

 PROPOSED BUILDING SITE

 GEOLOGIX HAND AUGER & DYNAMIC CONE PENETROMETER - AUGUST 2023  
 BH01



A	CONSENT	08/09/2023
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address

**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

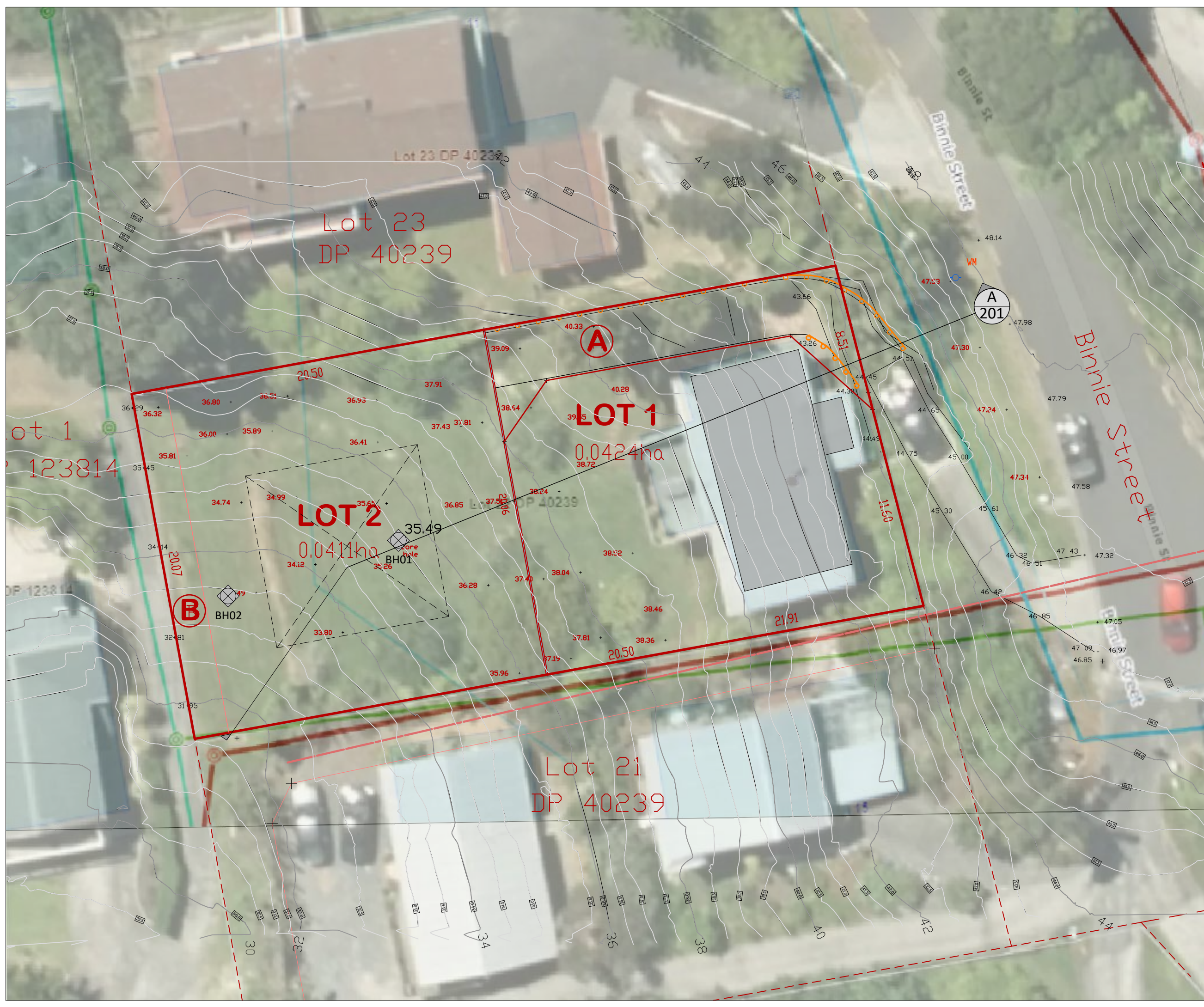
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**C0372**

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**GC**

Client  
**NIKKI & PAUL HARPER**

Sheet Title  
**GEOTECHNICAL SITE PLAN**

Sheet  
**200**



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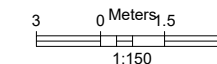
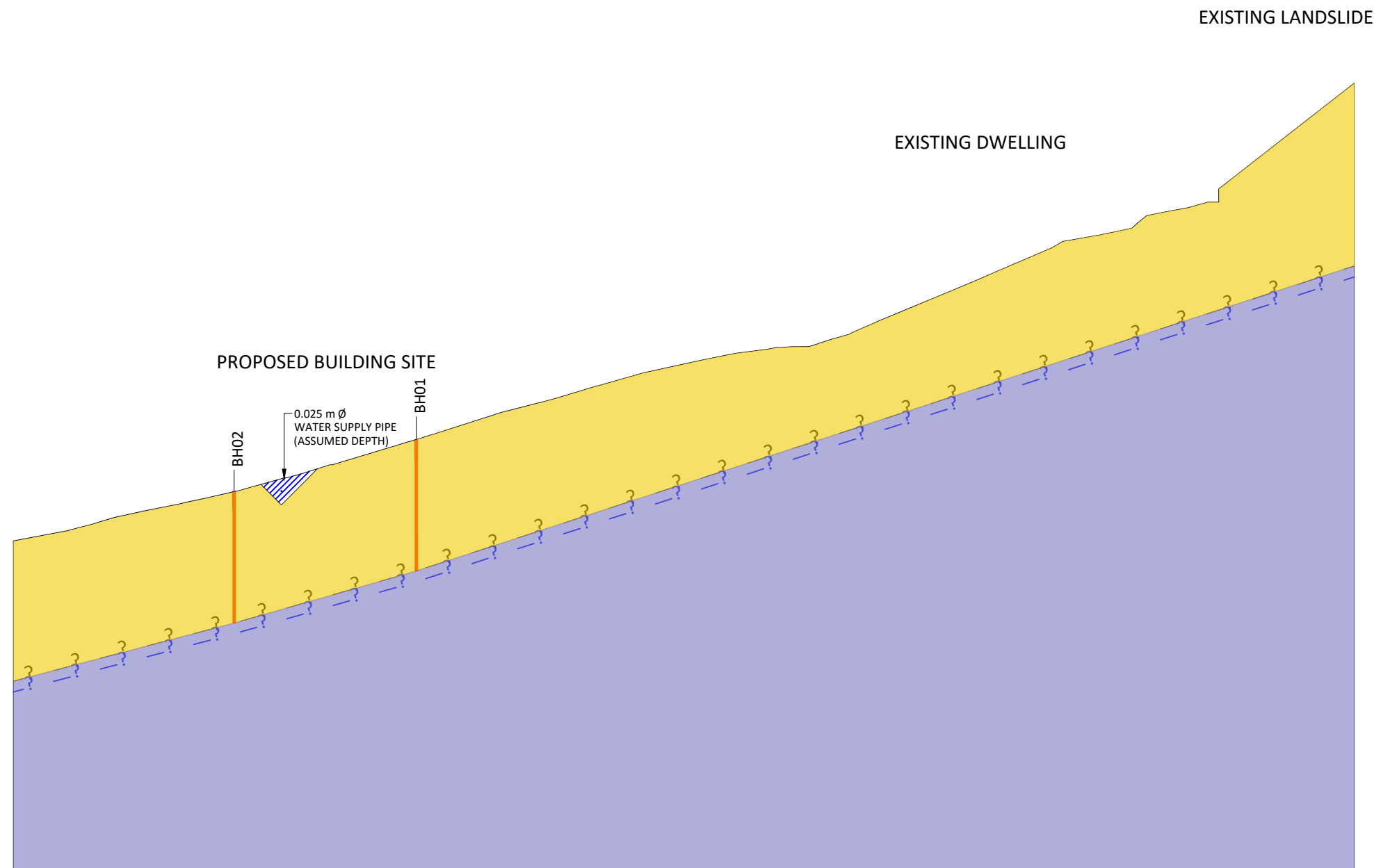
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- GREYWACKE RESIDUAL SOIL
- GREYWACKE COMPLETELY WEATHERED PARENT ROCK
- WATER SUPPLY PIPE EXAMPLE ZONE OF INFLUENCE
- ? STRATA BOUNDARY
- ? GROUNDWATER PROFILE (STATIC)



A	CONSENT	08/09/2023
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address  
**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

Project **C0372** Drawn By **GC, SBS**

Client  
**NIKKI & PAUL HARPER**

Sheet Title  
**GEOTECHNICAL CROSS-SECTION**

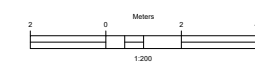
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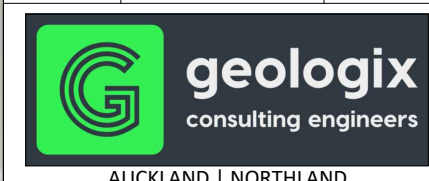
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- MINOR CONTOURS AT 0.5M INTERVALS  
MAJOR CONTOURS AT 1.0M INTERVALS
- PROPOSED BUILDING SHAPE FACTOR
- EXISTING ROADSIDE SWALE DRAIN
- EXISTING STORMWATER PIPE
- PROPOSED PUBLIC STORMWATER PIPE
- PROPOSED PRIVATE STORMWATER PIPE
- EXISTING WASTEWATER PIPE
- PROPOSED PUBLIC WASTEWATER PIPE
- EXISTING WATER SUPPLY PIPE
- EXISTING STORMWATER/ WASTEWATER MANHOLE
- PROPOSED STORMWATER TANK



A	CONSENT	05/09/2023
Revision	Issue	Date



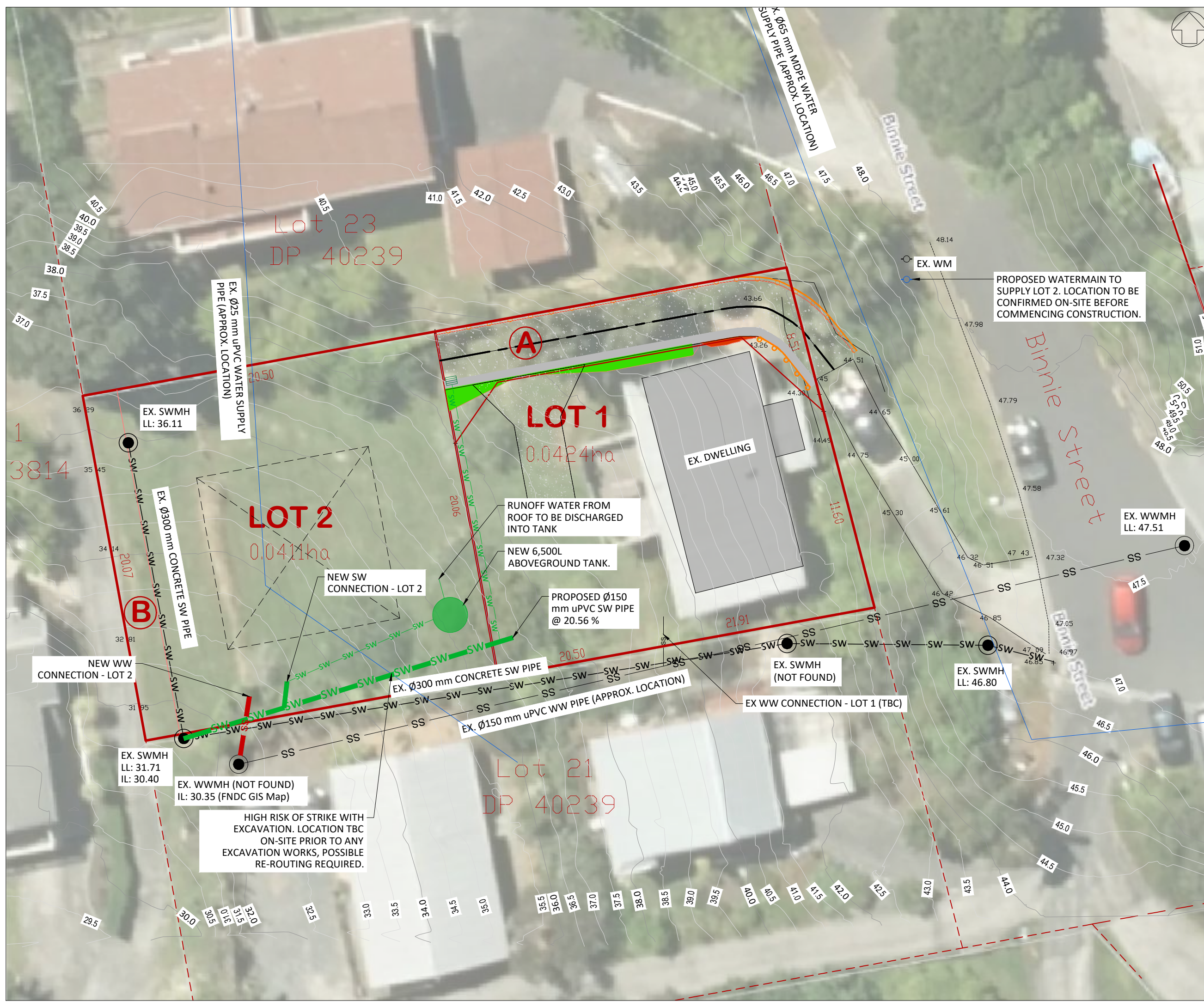
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**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

Project **C0372** Drawn By **GC**

Client  
**NIKKI & PAUL HARPER**

Sheet Title  
**3 WATER PLAN**

Sheet  
**400**



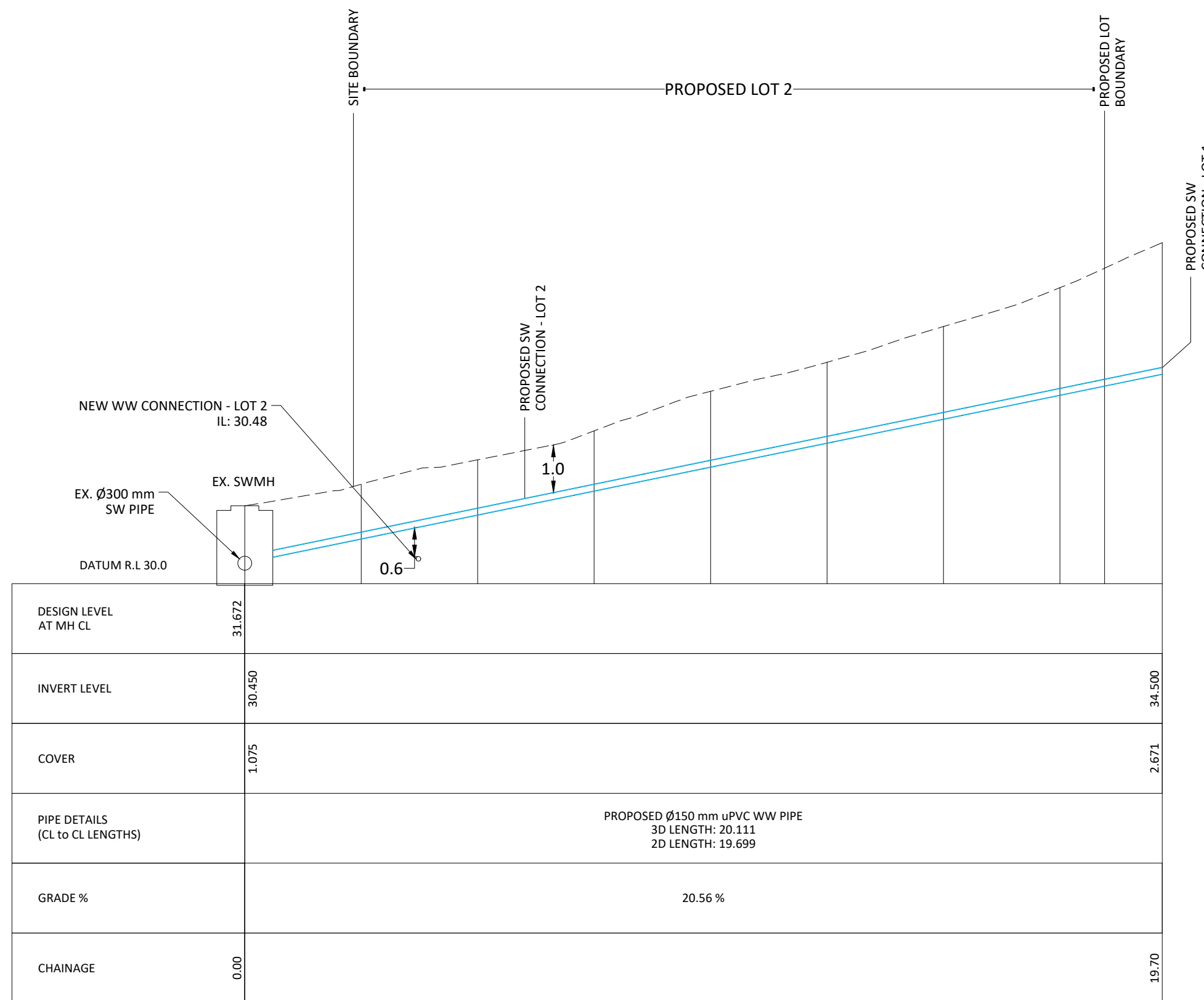
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 SCALE - HORIZ 1:200.000, VERT. 1:200.000

A	CONSENT	05/09/2023
Revision	Issue	Date



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Project Name and Address  
**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

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Client  
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Sheet Title  
**LONGSECTION - SW PIPELINE**

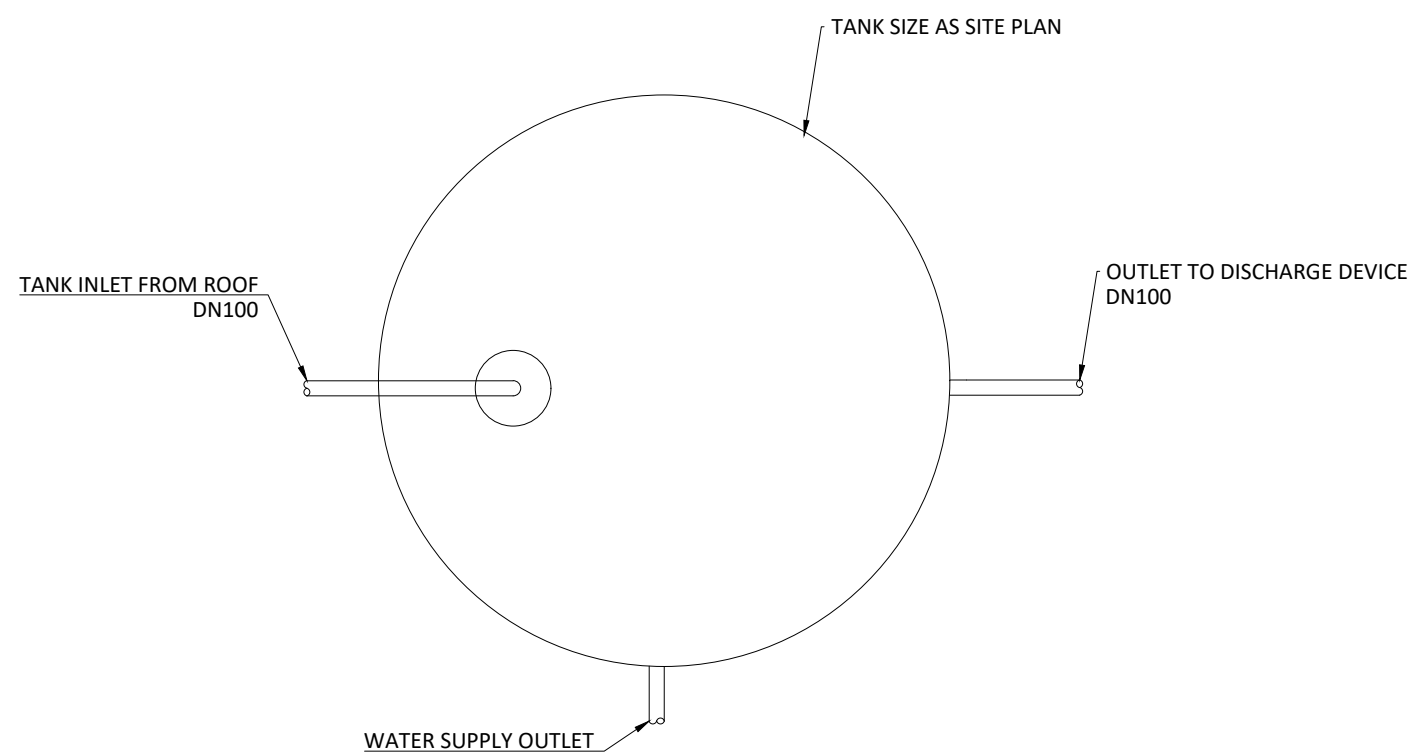
Sheet  
410

## GENERAL NOTES

1. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
2. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
3. DO NOT SCALE FROM THIS DRAWING.

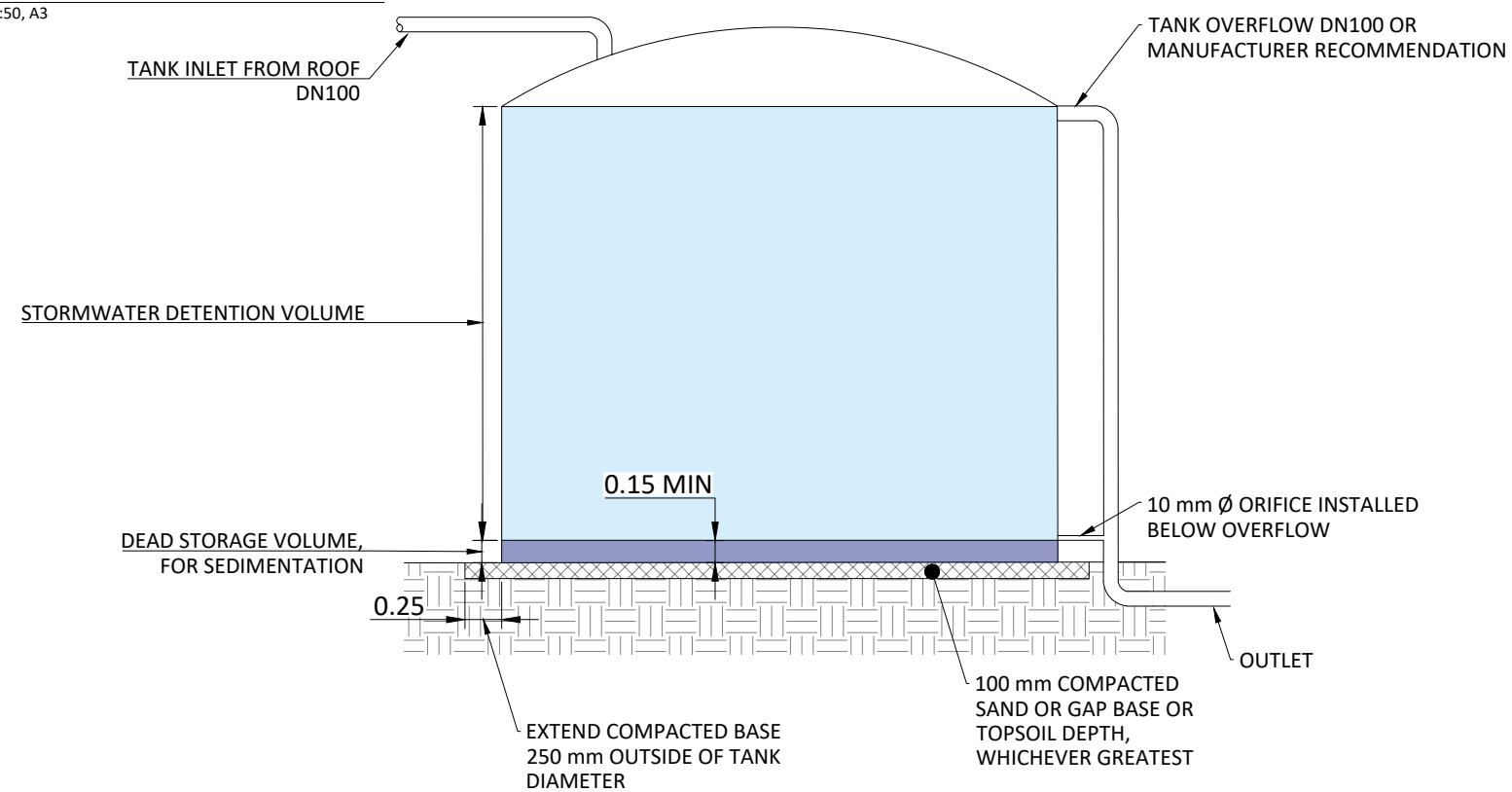
### PROPOSED TANK PLAN VIEW

1:50, A3



### PROPOSED TANK SIDE VIEW

1:50, A3



Revision	Issue	Date
A	CONSENT	05/09/2023



AUCKLAND | NORTHLAND

Project Name and Address

13 BINNIE STREET,  
PAIHIA  
LOT 22 DP 40239

Project  
C0372

Drawn By  
GC

Client

NIKKI & PAUL HARPER

Sheet Title

TYPICAL SW TANK DETAIL

Sheet

420

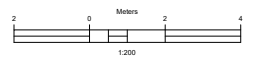




### GENERAL NOTES

1. DRAWING REPRODUCED FROM WILLIAMS AND KING LTD REF.24172, DATED AUG 2023.
2. CONTOURS AT 0.5 m INTERVALS.
3. TOPOGRAPHIC SURVEY DATA IS CAPTURED FROM WILLIAMS AND KING LTD REF.24172, DATED AUG 2023.
4. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
5. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
6. DO NOT SCALE FROM THIS DRAWING.

- MINOR CONTOURS AT 0.5M INTERVALS  
MAJOR CONTOURS AT 1.0M INTERVALS
- PROPOSED SILT FENCE, SEE DRAWING NO. 610 FOR DETAILS
- PROPOSED STABILISED ENTRANCE, SEE DRAWING NO. 611 FOR DETAILS



A	CONSENT	05/09/2023
Revision	Issue	Date



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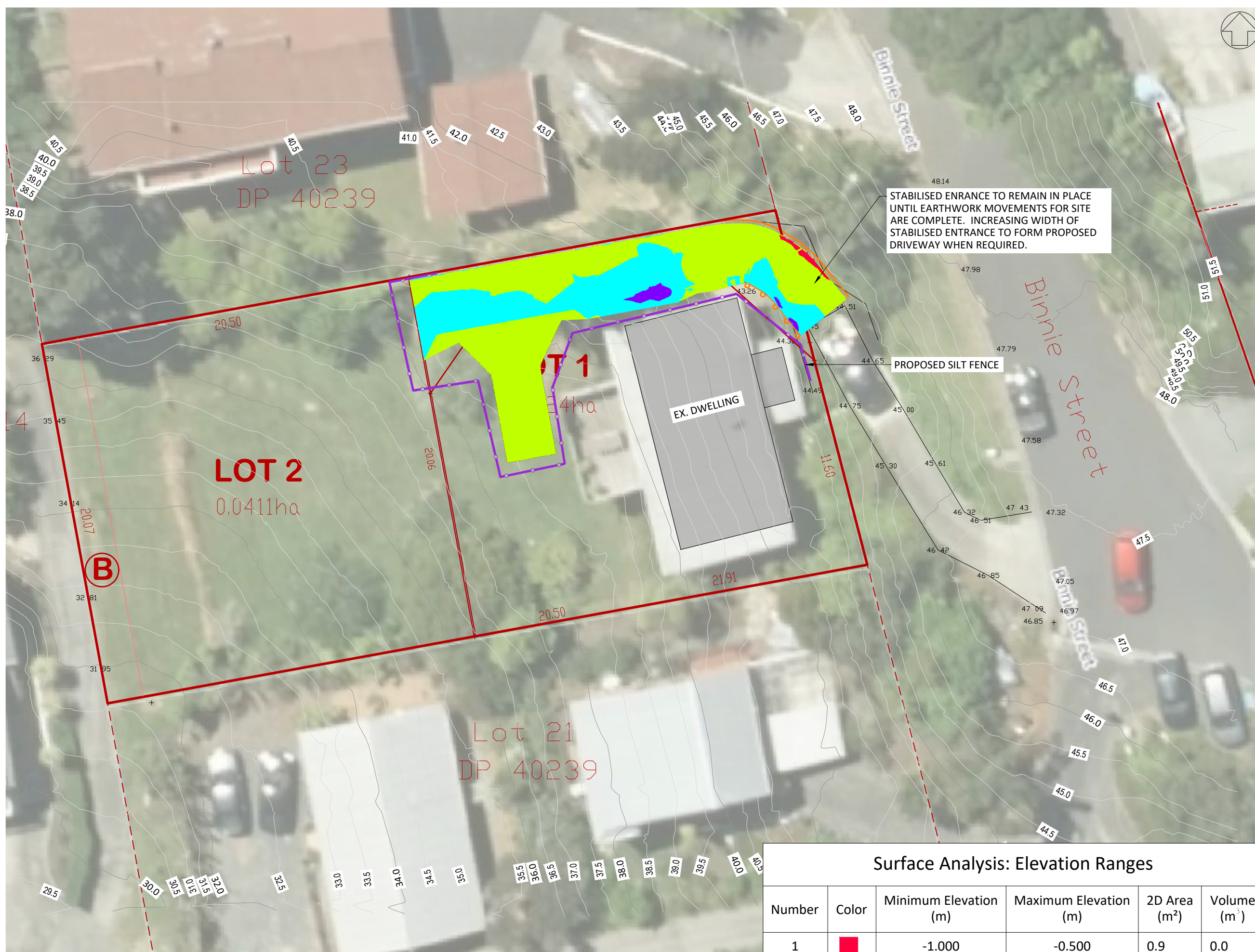
Project Name and Address  
**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

Project **C0372** Drawn By **GC**

Client **NIKKI & PAUL HARPER**

Sheet Title **EARTHWORKS PLAN**

Sheet **600**



STABILISED ENTRANCE TO REMAIN IN PLACE UNTIL EARTHWORK MOVEMENTS FOR SITE ARE COMPLETE. INCREASING WIDTH OF STABILISED ENTRANCE TO FORM PROPOSED DRIVEWAY WHEN REQUIRED.

PROPOSED SILT FENCE

EX. DWELLING

### Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
Earthwork Calcs	<b>1.000</b>	<b>1.000</b>	109.49sq.m	16.66 Cu. M.	5.91 Cu. M.	10.76 Cu. M.<Cut>
Totals			109.49sq.m	16.66 Cu. M.	5.91 Cu. M.	10.76 Cu. M.<Cut>

### Surface Analysis: Elevation Ranges

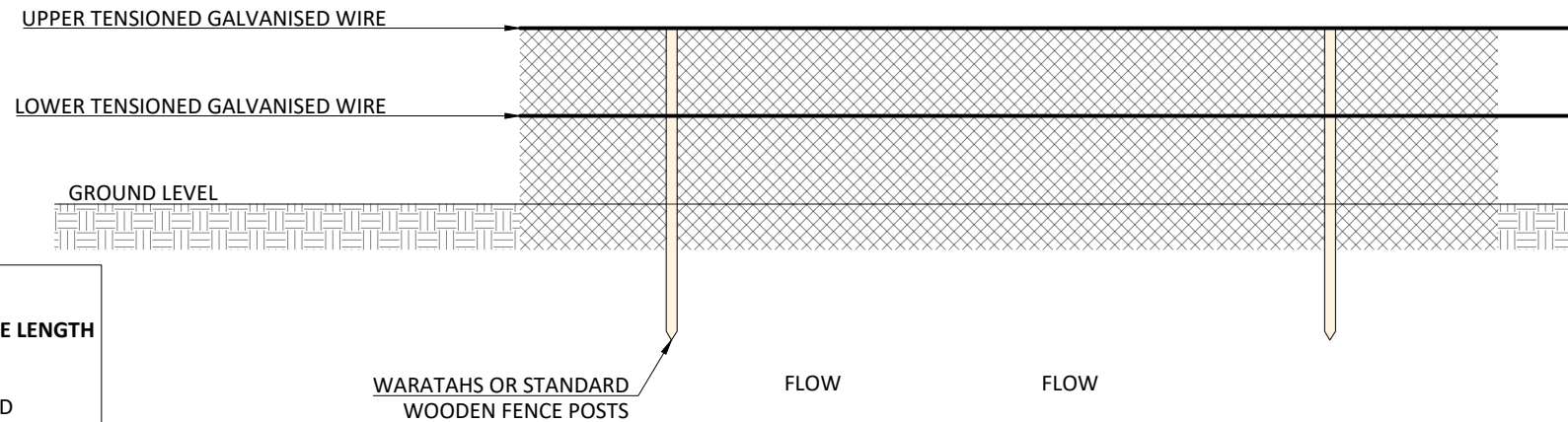
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m <sup>2</sup> )	Volume (m <sup>3</sup> )
1	Red	-1.000	-0.500	0.9	0.0
2	Yellow	-0.500	0.000	71.9	16.6
3	Cyan	0.000	0.500	35.2	5.8
4	Purple	0.500	1.000	1.6	0.1

FILE PATH: Z:\Projects\C0372\03\13 Binnie Street, Paihia - C0372\07 - Technical & Drawing\Drawings\C0372-5-01.dwg, C0372-5-01.dwg

LOT/ED: 05/09/2023



**ELEVATION VIEW**  
NTS



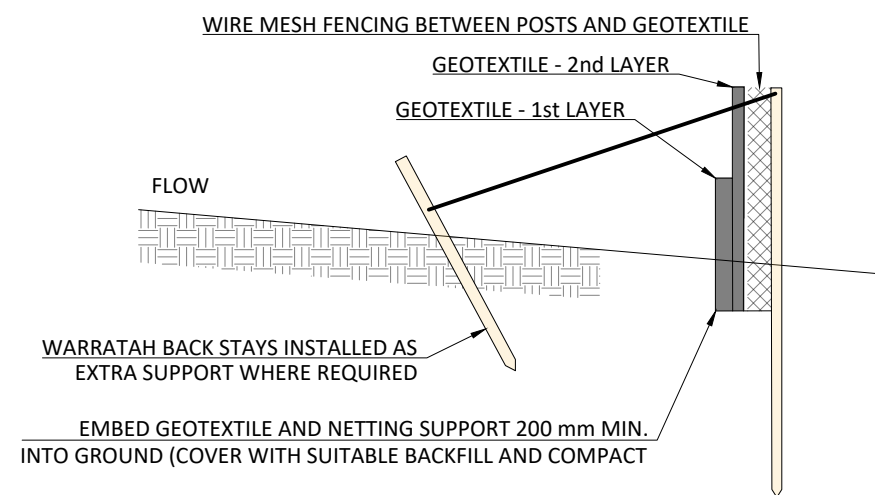
SILT FENCE DESIGN CRITERIA			
SLOPE ANGLE	SLOPE LENGTH MAX. (m)	SPACING OF RETURNS (m)	SILT FENCE LENGTH MAX. (m)
0 - 10 %	UNLIMITED	60	UNLIMITED
10 - 20 %	60	50	450
20 - 33 %	30	40	300
33 - 50 %	30	30	150
>50 %	15	20	75

**SPECIFICATION OF SUPER SILT FENCES**

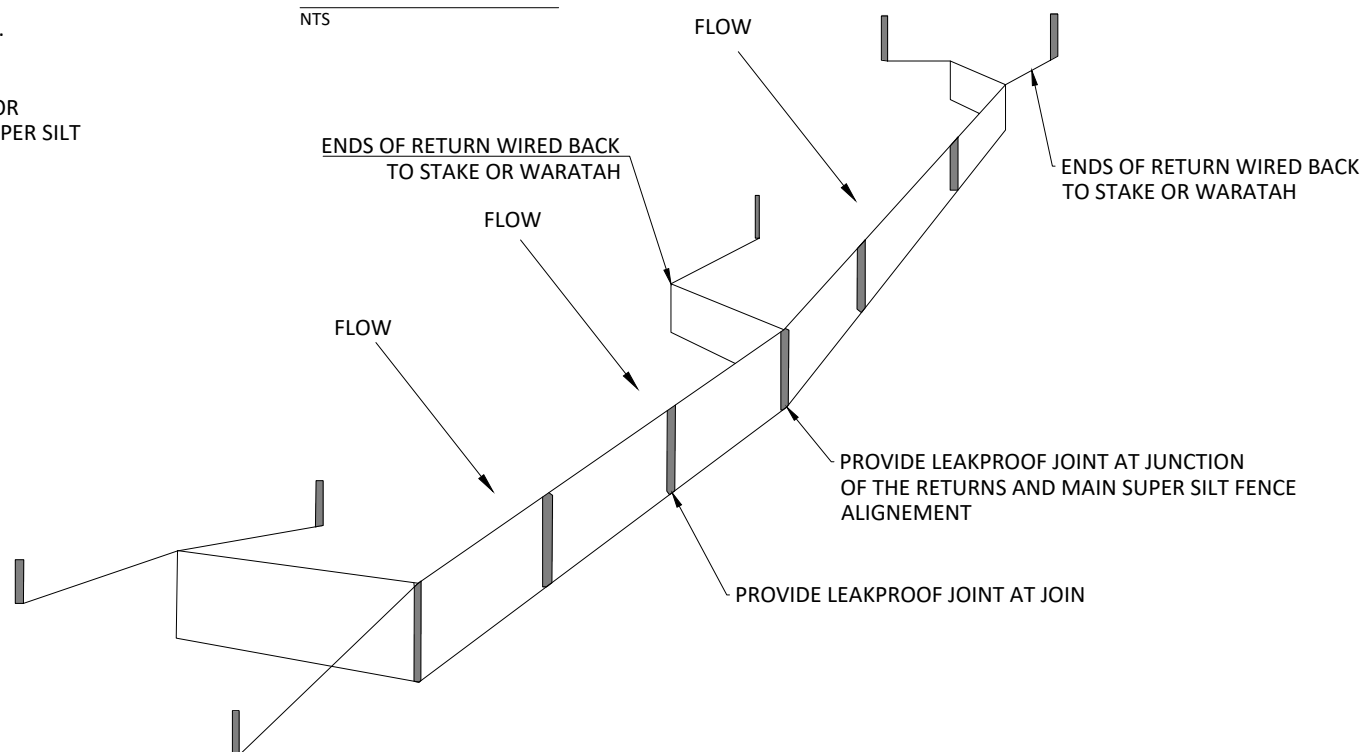
SUPER SILT FENCES HAVE BEEN PROVISIONED WHERE THERE IS A NEED TO CONTROL SEDIMENT RUNOFF BY INTERCEPTING FLOW, PARTICULARLY WITHIN CLOSE PROXIMITY TO SENSITIVE ENVIRONMENTS REQUIRING GREATER PROTECTION. THEY ARE APPROPRIATE TO THE SITE DUE TO THE LOW-GRADIENT AND SMALL CONTRIBUTING CATCHMENT.

1. ENSURE SUPER SILT FENCE HEIGHT IS 800 mm ABOVE GROUND LEVEL.
2. MAXIMUM SLOPE LENGTHS, SPACING RETURNS AND MAXIMUM SILT FENCE LENGTHS ARE SHOWN IN THE DESIGN CRITERIA TABLE ABOVE.
3. ALWAYS INSTALL SUPER SILT FENCES ALONG THE CONTOUR (AT A BREAK IN SLOPE). WHERE THIS IS NOT POSSIBLE, OR WHERE THERE ARE LONG SECTIONS OF SUPER SILT FENCE, INSTALL SHORT SILT FENCE RETURNS PROJECTING UP-SLOPE FROM THE SILT FENCE TO MINIMISE THE CONCENTRATION OF FLOWS. SILT FENCE RETURNS SHOULD BE A MINIMUM 2 m IN LENGTH AND CAN INCORPORATE A TIE-BACK, SEE DETAILS. THEY ARE GENERALLY CONSTRUCTED BY CONTINUING THE SILT FENCE AROUND THE RETURN AND DOUBLING BACK, ELIMINATING JOINS.
4. JOIN LENGTHS OF SILT FENCE BY DOUBLING OVER FABRIC ENDS AROUND A WARATAH OR BY STAPLING THE FABRIC ENDS TO A BATTEN AND BUTTING THE TWO BATTENS TOGETHER.
5. INSTALL SILT FENCE RETURNS AT EITHER END OF THE SILT FENCE, PROJECTING UP-SLOPE TO A SUFFICIENT HEIGHT TO PREVENT OUTFLANKING.
6. BASE THE LENGTH OF THE SUPER SILT FENCE ON THE LIMITS SHOWN IN THE DESIGN CRITERIA ABOVE.
7. WHERE THE ENDS OF THE GEOTEXTILE FABRIC COME TOGETHER, OVERLAP, FOLD AND STAPLE THE FABRIC ENDS TO PREVENT SEDIMENT BYPASS.
8. THE GEOTEXTILE FABRIC MUST MEET THE FOLLOWING REQUIREMENTS:
  - 8.1. WIDE WIDTH TENSILE STRENGTH  $\geq 14$  kN/m MINIMUM (AS, ASTM OR ISO TEST METHODS ALLOWED).
  - 8.2. RETAINED STRENGTH AT 500 hr UV = 70 % MINIMUM (AS, ASTM OR ISO TEST METHODS ALLOWED).
  - 8.3. OPENING SIZE (EOS) = 0.2 - 0.4 um (AS, ASTM OR ISO TEST METHODS ALLOWED).
9. SUPER SILT FENCE WIRE MESH SHALL CONSIST OF A KNOTTED OR WELDED WIRE MESH. THE KNOTTING OR WELDING PROCESS SHALL NOT LEAVE ANY SHARP OR PROTRUDING OBJECTS THAT MAY DAMAGE THE SUPER SILT FENCE FABRIC WHEN INSTALLED. THE WIRE MESH MUST MEET THE FOLLOWING REQUIREMENTS:
  - 9.1. WIRE DIAMETER = 1.5 mm MINIMUM.
  - 9.2. MESH APERTURE = 100 mm MAXIMUM.
  - 9.3. MESH HEIGHT = 1 m MINIMUM.
  - 9.4. COATING = GALVANISED OR ZINC

**CROSS SECTION**  
NTS



**SCHEMATIC VIEW**  
NTS



**GENERAL NOTES**

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3. DO NOT SCALE FROM THIS DRAWING.

A	CONSENT	05/09/2023
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address  
**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

Project  
**C0372**

Drawn By  
**GC**

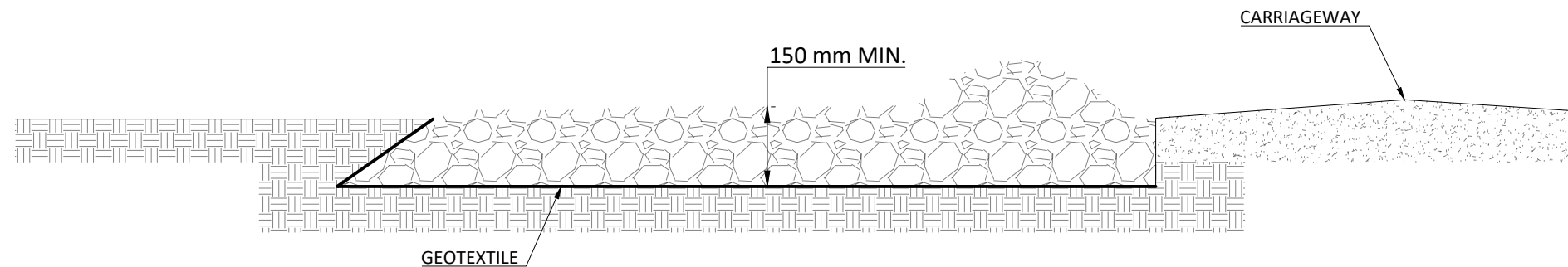
Client  
**NIKKI & PAUL HARPER**

Sheet Title  
**TYPICAL SILT FENCE DETAIL**

Sheet  
**610**

**SIDE ELEVATION**

NTS



**STABILISED ENTRANCE SPECIFICATIONS**

DESIGN PARAMETER	SPECIFICATION
AGGREGATE SIZE	50 - 150 mm WASHED AGGREGATE
MINIMUM THICKNESS	150 mm
MINIMUM LENGTH	10 m
MINIMUM WIDTH	4 m

**NOTES FOR STABILISED ENTRANCE**

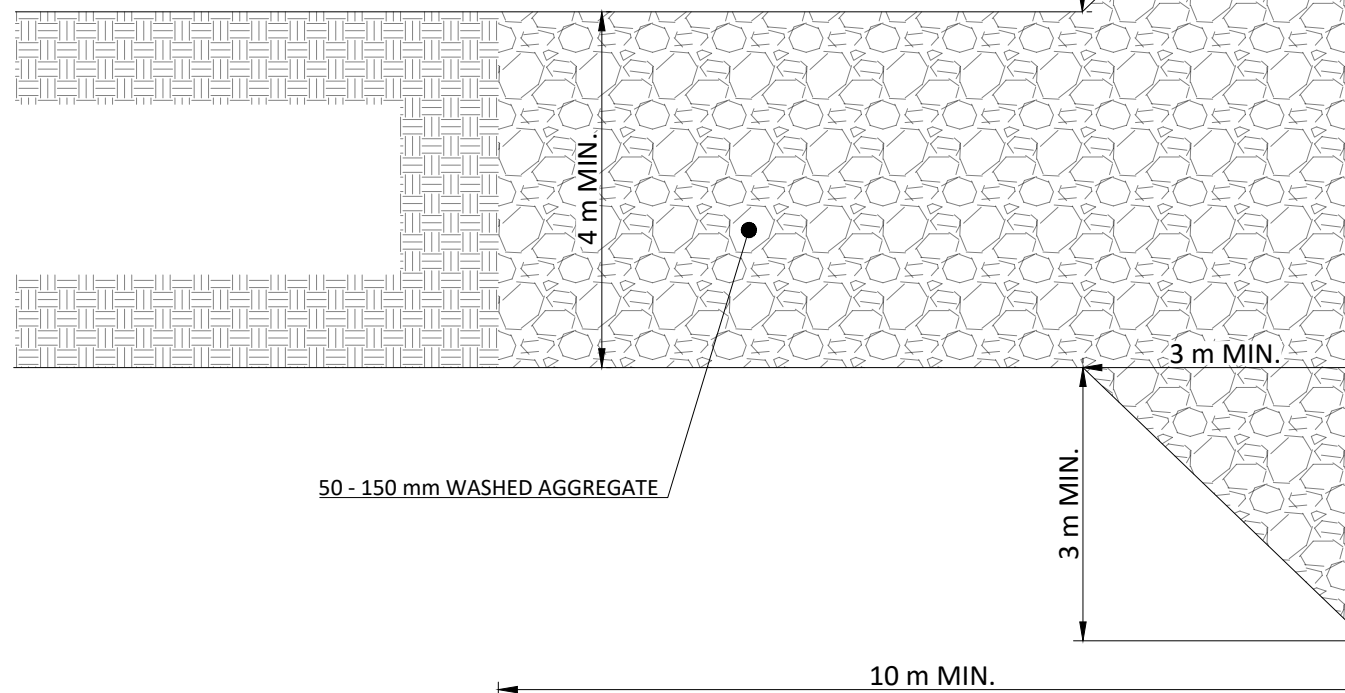
STABILISED ENTRANCES WILL REDUCE SEDIMENT MOVEMENT BUT WILL NOT REMOVE SEDIMENT FROM A VEHICLE. CARE NEEDS TO BE TAKEN TO IMPLEMENT OTHER TECHNIQUES, SUCH AS WHEEL WASH OR STABILISED PARKING AND TURNAROUND AREAS TO MAINTAIN SITE TRAFFIC IN A 'CLEAN' STATE.

1. STABILISED ENTRANCES TO BE LOCATED AT A SINGLE ACCESS POINT FOR EARTHWORK (TRUCK) MOVEMENTS.
2. SITE FENCING TO BE ESTABLISHED SO VEHICLES CANNOT BYPASS THE DEVICE. PERIMETER SILT FENCES OR BUNDS MAY SUFFICE FOR THIS.
3. ONLY A SINGLE ACCESS/ EGRESS POINT TO BE USED FOR EARTHWORK MOVEMENTS AS OUTLINED ON DRAWING NO. 200.
4. ENSURE STABILISED ENTRANCE DRAINS BACK INTO SITE BY UTILISING A SPEED BUMP, SEE DETAIL DRAWING.
5. STABILISED ENTRANCE TO BE REVIEWED ON SITE BY ENGINEER PRIOR TO WORKS.

THIS ZONE NOT POSSIBLE AT SITE DUE TO PROXIMITY TO BOUNDARY

**PLAN VIEW**

NTS



**GENERAL NOTES**

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2. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
3. DO NOT SCALE FROM THIS DRAWING.

A	CONSENT	05/09/2023
Revision	Issue	Date



AUCKLAND | NORTHLAND

Project Name and Address  
**13 BINNIE STREET,  
 PAIHIA  
 LOT 22 DP 40239**

Project  
**C0372**

Drawn By  
**GC**

Client  
**NIKKI & PAUL HARPER**

Sheet Title  
**STABILISED ENTRANCE DETAIL**

Sheet  
**611**



**geologix**  
consulting engineers

## APPENDIX B

### Engineering Borehole Logs





# INVESTIGATION LOG

HOLE NO.:  
**BH01**

CLIENT: Nikki & Paul Harper  
PROJECT: 13 Binnie Street, Paihia

JOB NO.:  
**C0372**

SITE LOCATION: West of Binnie Street

START DATE: 28/08/2023

CO-ORDINATES:

ELEVATION: Ground

END DATE: 28/08/2023

CONTRACTOR: Internal

RIG: Hand Auger and DCP

DRILLER: RM, EC

LOGGED BY: SBS

MATERIAL DESCRIPTION <small>(See Classification &amp; Symbology sheet for details)</small>	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER <small>(Blows / 100mm)</small>	VANE SHEAR STRENGTH <small>(kPa)</small> Vane: 3467	WATER
				2 4 6 8 10 12 14 16 18	50 100 150 200 Values	
Grassed TOPSOIL comprising organic SILT, dark blackish brown, moist, low plasticity.		0.2	1			
Silty CLAY, very stiff, light yellowish brown streaked orange and white, moist, low plasticity (Greywacke Residual Soil)		0.3	3			170
		0.4	2			68
		0.5	3			
		0.6	2			184
		0.7	2			82
		0.8	2			
		0.9	3			196
		1.0	3			54
		1.1	3			
		1.2	5			142
Silty CLAY, very stiff, light yellowish brown streaked white, moist, low plasticity (Greywacke Residual Soil)		1.3	4			71
		1.4	4			
		1.5	5			142
		1.6	5			71
		1.7	5			
		1.8	6			198+
		1.9	7			-
		2.0	7			
Silty CLAY, very stiff, orange streaked light brown, moist, high plasticity (Greywacke Residual Soil)		2.1	7			133
		2.2	7			6
		2.3	8			
		2.4	8			167
		2.5	9			28
		2.6	10			
		2.7	t2			150
		2.8	10			17
		2.9	t3			
		3.0	12			198+
3.1m: becoming dark orange streaked orange and light brown.		3.1	t5			-
		3.2	16			
		3.3	18			198+
		3.4	20			-
		3.5	20			
		3.6	20			198+
		3.7	19			-
		3.8	19			
		3.9	23 >>			198+
		4.0	24 >>			-
4.0m: becoming low plasticity.		4.1	18			UTP
		4.2	14			-
		4.3	17			
		4.4	19			198+
		4.5	17			-
		4.6	18			
		4.7	20			196
		4.8	18			91
4.2m: becoming orange mottled dark orange, white and grey.		4.9				196
		5.0				96
End Of Hole: 5.00m						

Groundwater Not Encountered

**PHOTO(S)**

**REMARKS**

1. Hand auger completed at target depth.
2. Conducted DCP from surface to target depth.
3. Groundwater not encountered at the time of drilling.

**WATER**

- ▼ Standing Water Level
- ▽ Out flow
- ↔ In flow

**INVESTIGATION TYPE**

- Hand Auger
- Test Pit



# INVESTIGATION LOG

HOLE NO.:  
**BH02**

CLIENT: Nikki & Paul Harper  
PROJECT: 13 Binnie Street, Paihia

JOB NO.:  
**C0372**

SITE LOCATION: West of Binnie Street

START DATE: 26/08/2023

CO-ORDINATES:

ELEVATION: Ground

END DATE: 28/08/2023

CONTRACTOR: Internal

RIG: Hand Auger and DCP

DRILLER: RM, EC

LOGGED BY: SBS

MATERIAL DESCRIPTION <small>(See Classification &amp; Symbology sheet for details)</small>	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER <small>(Blows / 0mm)</small>		VANE SHEAR STRENGTH <small>(kPa)</small> Vane: 3467		WATER
				2	4	50	100	
Grassed TOPSOIL comprising organic SILT, dark blackish brown, moist, low plasticity.		0.2	1					198+
SILT with trace fine sand, light yellowish brown mottled white, moist, low plasticity. (Greywacke Residual Soil)		0.4	2					-
		0.6	3					198+
		0.8	3					-
		1.0	4					UTP
Silty CLAY, very stiff, light brown streaked orange, moist, high plasticity. (Greywacke Residual Soil) 1.1m: becoming orange streaked light brown.		1.2	5					105
		1.4	6					40
		1.6	6					111
		1.8	6					17
		2.0	5					99
	2.0m: becoming medium plasticity.	2.2	8					17
		2.4	10					170
		2.6	15					14
	2.2m: contains trace fine sand. 2.3m: contains some fine clasts.	2.8	19					198+
		3.0	20					-
		3.2	22 >>					198+
		3.4	26 >>					-
	3.6	27 >>					198+	
2.7m: becoming orange streaked light brown.	3.8						-	
	4.0						198+	
3.2m: becoming low plasticity.	4.2						-	
	4.4						198+	
3.5m: becoming orange streaked light grey.	4.6						-	
	4.8						198+	
3.8m: becoming dark orange streaked light grey.	5.0						-	
4.4m: becoming dark orange mottled grey.							170	
4.6m: becoming medium plasticity.							79	
End Of Hole: 5.00m								198+

Groundwater Not Encountered

**PHOTO(S)**

**REMARKS**

- Hand auger completed at target depth.
- Conducted DCP from surface until refusal at 2.5 m.
- Groundwater not encountered at the time of drilling.

**WATER**

- ▼ Standing Water Level
- ▽ Out flow
- ↖ In flow


**INVESTIGATION TYPE**

- Hand Auger
- Test Pit



## APPENDIX C

### Stormwater Attenuation Design

Project Ref:	C0372	<b>STORMWATER ATTENUATION TANK DESIGN</b>	<b>50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>	
Project Address:	13 BINNIE STREET, PAIHIA			
Design Case:	CONCEPT FUTURE DEVELOPMENT			
Date:	8 November 2023 REV 1			

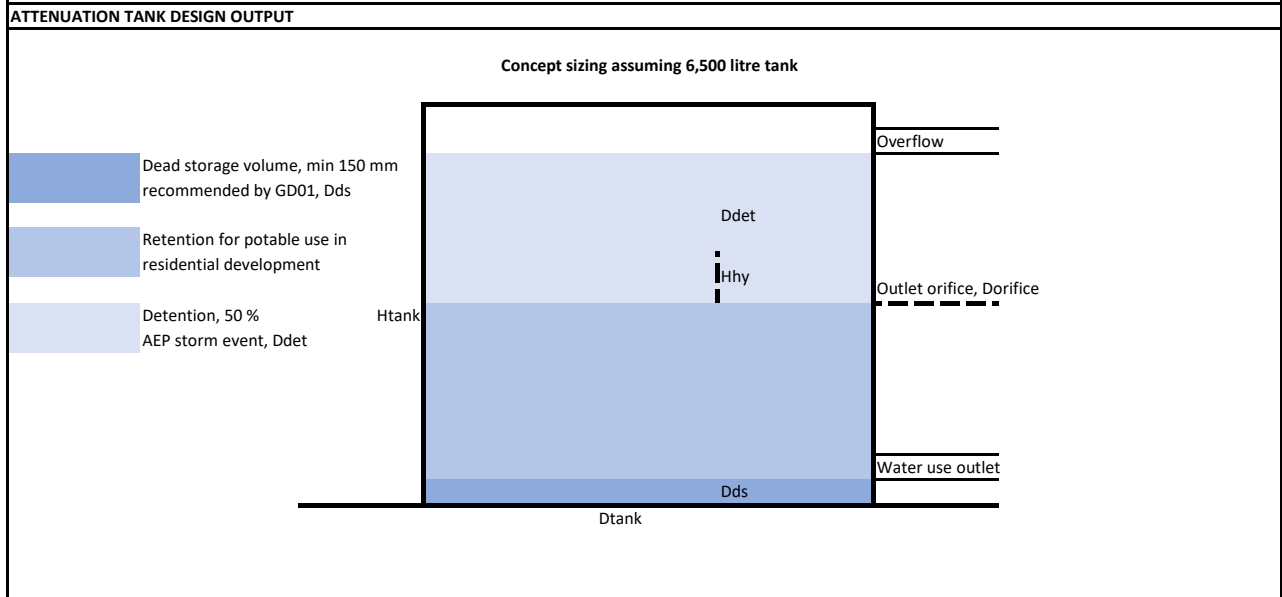
ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.  
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PREDEVELOPMENT SCENARIO				POST DEVELOPMENT SCENARIO			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	RUNOFF, l/s	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	RUNOFF, l/s
IMPERVIOUS A	0	0	0.00	TO TANK	150	0.96	3.66
IMPERVIOUS B	0	0	0.00	OFFSET	50	0.96	1.22
IMPERVIOUS C	0	0	0.00	PERVIOUS	0	0	0.00
EX. PVIOUS	200	0.48	2.44	EX. CONSENTED	0	0	0.00
<b>TOTAL</b>	<b>200</b>	<b>TYPE C</b>	<b>2.44</b>	<b>TOTAL</b>	<b>200</b>	<b>TYPE C</b>	<b>4.88</b>


PRE DEVELOPMENT RUNOFF			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	72.8	mm/hr	* CLIMATE CHANGE FACTOR CALCULATED IN ACCORDANCE WITH NIWA
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	25.62	%	HIRDS RECOMMENDATIONS. HISTORIC RAINFALL INTENSITY, 10 MINUTES IS
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	91.45	mm/hr	MULTIPLIED BY POTENTIAL CLIMATE CHANGE FACTORS. NIWA
50 % AEP PRE DEVELOPMENT PEAK FLOW	2.44	l/s	RECOMMENDS THAT FOR 10 MINUTE TO 1 HOUR ADOPT THE 1 HR FACTOR.
<b>80 % OF PRE DEVELOPMENT PEAK FLOW</b>	<b>1.95</b>	<b>l/s</b>	

INCREASED POST DEVELOPMENT RUNOFF, 50 % AEP WITH CLIMATE CHANGE PROJECTION OF 2.1 DEGREES							
TIME, min	INTENSITY, mm/hr	CC FACTOR	CC INTENSITY, mm/hr	RUNOFF, Q, l/s	Allowable flow, l/s	Difference, l/s	Required Storage, litres
10	72.80	1.2562	91.45	4.88	0.73	4.15	2487
20	52.50	1.2562	65.95	3.52	0.73	2.79	3343
30	43.10	1.2562	54.14	2.89	0.73	2.16	3881
60	30.40	1.2562	38.19	2.04	0.73	1.31	4698
120	21.10	1.2457	26.28	1.40	0.73	0.67	4826
360	11.20	1.2058	13.50	0.72	0.73	No Att. Req.	0
720	7.16	1.1785	8.44	0.45	0.73	No Att. Req.	0
1440	4.42	1.1512	5.09	0.27	0.73	No Att. Req.	0
2880	2.60	1.1281	2.93	0.16	0.73	No Att. Req.	0
4320	1.87	1.1155	2.09	0.11	0.73	No Att. Req.	0

NOTE: ALLOWABLE FLOW PROVIDES FOR ANY OFFSET ARISING FROM FLOWS NOT DIRECTLY DISCHARGING TO TANK



SPECIFICATION		NOTES:
TOTAL STORAGE REQUIRED	4.826 m <sup>3</sup>	
TANK HEIGHT, Htank	2.18 m	Concept sizing assuming 6,500 litre tank
TANK DIAMETER, Dtank	2.00 m	No. of Tanks 1
TANK AREA, Atank	3.14 m <sup>2</sup>	Single tank area
TANK MAX STORAGE VOLUME, Vtank	6849 litres	
REQUIRED STORAGE HEIGHT, Ddet	1.54 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.69 m	
AVERAGE DISCHARGE RATE, Qavg	0.00006 m <sup>3</sup> /s	
AVERAGE HYDRAULIC HEAD, Hhy	0.77 m	
AREA OF ORIFICE, Aorifice	2.32E-05 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	5 mm	Minimum 10 mm diameter
VELOCITY AT ORIFICE	5.49 m/s	
ACHIEVABLE STORAGE OF SURFACES TO TANK IN 24 HOURS	35473 litres/ 24hrs	
AREA TO TANK CAN SERVICE ATTENUATION?	YES	

Project Ref:	C0372	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	13 BINNIE STREET, PAIHIA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	8 November 2023 REV 1		
		<b>20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>	

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA. RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

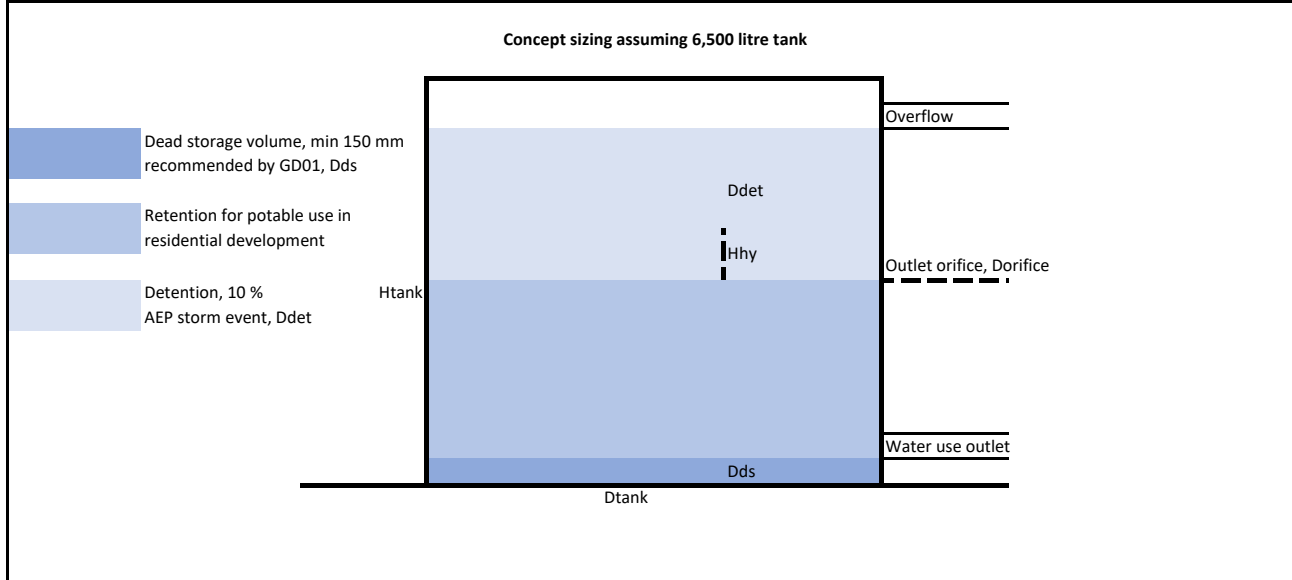
PREDEVELOPMENT SCENARIO				POST DEVELOPMENT SCENARIO			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	RUNOFF, l/s	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	RUNOFF, l/s
IMPERVIOUS A	0	0	0.00	TO TANK	150	0.96	4.80
IMPERVIOUS B	0	0	0.00	OFFSET	50	0.96	1.60
IMPERVIOUS C	0	0	0.00	PERVIOUS	0	0	0.00
EX. PERVIOUS	200	0.48	3.20	EX. CONSENTED	0	0	0.00
<b>TOTAL</b>	<b>200</b>	<b>TYPE C</b>	<b>3.20</b>	<b>TOTAL</b>	<b>200</b>	<b>TYPE C</b>	<b>6.39</b>

PRE DEVELOPMENT RUNOFF			
20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	94.5	mm/hr	* CLIMATE CHANGE FACTOR CALCULATED IN ACCORDANCE WITH NIWA
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	26.88	%	HIRDS RECOMMENDATIONS. HISTORIC RAINFALL INTENSITY, 10 MINUTES
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	119.9	mm/hr	IS MULTIPLIED BY POTENTIAL CLIMATE CHANGE FACTORS. NIWA
20 % AEP PRE DEVELOPMENT PEAK FLOW	3.20	l/s	RECOMMENDS THAT FOR 10 MINUTE TO 1 HOUR ADOPT THE 1 HR
<b>80 % OF PRE DEVELOPMENT PEAK FLOW</b>	<b>2.56</b>	<b>l/s</b>	<b>FACTOR.</b>

INCREASED POST DEVELOPMENT RUNOFF, 10 % AEP WITH CLIMATE CHANGE PROJECTION OF 2.1 DEGREES							
TIME, min	INTENSITY, mm/hr	CC FACTOR	CC INTENSITY, mm/hr	RUNOFF, Q, l/s	Allowable flow, l/s	Difference, l/s	Required Storage, litres
10	94.50	1.2688	119.90	6.39	0.96	5.44	3261
20	68.20	1.2688	86.53	4.62	0.96	3.66	4387
30	56.10	1.2688	71.18	3.80	0.96	2.84	5107
60	39.70	1.2688	50.37	2.69	0.96	1.73	6218
120	27.50	1.2583	34.60	1.85	0.96	0.89	6381
360	14.60	1.2205	17.82	0.95	0.96	No Att. Req.	0
720	9.39	1.1932	11.20	0.60	0.96	No Att. Req.	0
1440	5.80	1.1638	6.75	0.36	0.96	No Att. Req.	0
2880	3.43	1.1407	3.91	0.21	0.96	No Att. Req.	0
4320	2.46	1.1302	2.78	0.15	0.96	No Att. Req.	0


NOTE: ALLOWABLE FLOW PROVIDES FOR ANY OFFSET ARISING FROM FLOWS NOT DIRECTLY DISCHARGING TO TANK

#### ATTENUATION TANK DESIGN OUTPUT



#### SPECIFICATION

TOTAL STORAGE REQUIRED	6.381 m <sup>3</sup>	
TANK HEIGHT, H <sub>tank</sub>	2.18 m	Concept sizing assuming 6,500 litre tank
TANK DIAMETER, D <sub>tank</sub>	2 m	No. of Tanks 1
TANK AREA, A <sub>tank</sub>	3.14 m <sup>2</sup>	Single tank area
TANK MAX STORAGE VOLUME, V <sub>tank</sub>	6849 litres	
REQUIRED STORAGE HEIGHT, D <sub>det</sub>	2.03 m	Below overflow
DEAD STORAGE VOLUME, D <sub>ds</sub>	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	2.18 m	
AVERAGE DISCHARGE RATE, Q <sub>avg</sub>	0.00007 m <sup>3</sup> /s	
AVERAGE HYDRAULIC HEAD, H <sub>hy</sub>	1.02 m	
AREA OF ORIFICE, A <sub>orifice</sub>	2.67E-05 m <sup>2</sup>	
ORIFICE DIAMETER, D <sub>orifice</sub>	6 mm	<b>Minimum 10 mm diameter</b>
VELOCITY AT ORIFICE	6.31 m/s	
ACHIEVABLE STORAGE OF SURFACES	46881 litres/ 24hrs	
AREA TO TANK CAN SERVICE ATTENUATION?	YES	

Project Ref:	IC0372	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	13 BINNIE STREET, PAIHIA		
Design Case:	CONCEPT FUTURE DEVELOPMENT		
Date:	8 November 2023 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PREDEVELOPMENT SCENARIO				POST DEVELOPMENT SCENARIO			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	RUNOFF, l/s	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	RUNOFF, l/s
IMPERVIOUS A	0	0	0.00	TO TANK	150	0.96	5.61
IMPERVIOUS B	0	0	0.00	OFFSET	50	0.96	1.87
IMPERVIOUS C	0	0	0.00	PERVIOUS	0	0	0.00
EX. PERVIOUS	200	0.48	3.74	EX. CONSENTED	0	0	0.00
<b>TOTAL</b>	<b>200</b>	<b>TYPE C</b>	<b>3.74</b>	<b>TOTAL</b>	<b>200</b>	<b>TYPE C</b>	<b>7.48</b>

**PRE DEVELOPMENT RUNOFF**

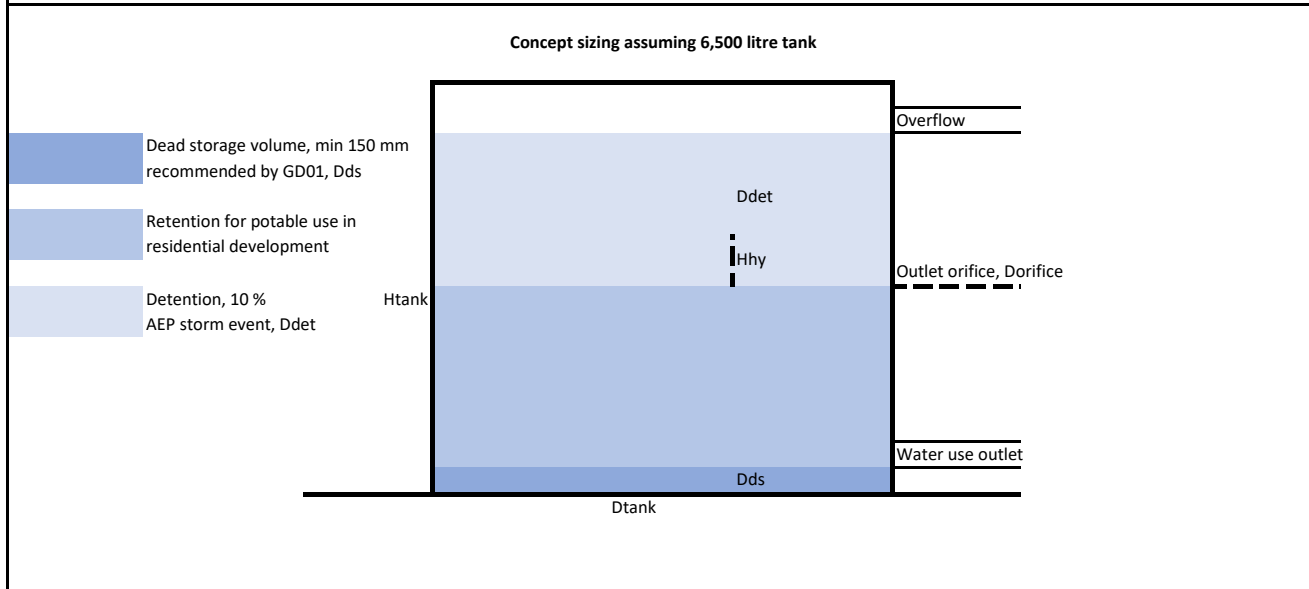
10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	110.0	mm/hr	* CLIMATE CHANGE FACTOR CALCULATED IN ACCORDANCE WITH NIWA HIRDS RECOMMENDATIONS. HISTORIC RAINFALL INTENSITY, 10 MINUTES IS MULTIPLIED BY POTENTIAL CLIMATE CHANGE FACTORS. NIWA RECOMMENDS THAT FOR 10 MINUTE TO 1 HOUR ADOPT 1 HR FACTOR
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	27.51	%	
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	140.3	mm/hr	
10 % AEP PRE DEVELOPMENT PEAK FLOW	3.74	l/s	

**INCREASED POST DEVELOPMENT RUNOFF, 10% AEP WITH CLIMATE CHANGE PROJECTION OF 2.1 DEGREES**

TIME, min	INTENSITY, mm/hr	CC FACTOR	CC INTENSITY, mm/hr	RUNOFF, Q, l/s	Allowable flow, l/s	Difference, l/s	Required Storage, litres
10	110.00	1.2751	140.26	7.48	1.87	5.61	3366
20	79.80	1.2751	101.75	5.43	1.87	3.56	4268
30	65.60	1.2751	83.65	4.46	1.87	2.59	4664
60	46.50	1.2751	59.29	3.16	1.87	1.29	4652
120	32.30	1.2646	40.85	2.18	1.87	0.31	2220
360	17.20	1.2268	21.10	1.13	1.87	No Att. Req.	0
720	11.00	1.1995	13.19	0.70	1.87	No Att. Req.	0
1440	6.83	1.1701	7.99	0.43	1.87	No Att. Req.	0
2880	4.04	1.147	4.63	0.25	1.87	No Att. Req.	0
4320	2.90	1.1365	3.30	0.18	1.87	No Att. Req.	0

NOTE: ALLOWABLE FLOW PROVIDES FOR ANY OFFSET ARISING FROM FLOWS NOT DIRECTLY DISCHARGING TO TANK


**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	4.664 m <sup>3</sup>	
TANK HEIGHT, Htank	2.18 m	Concept sizing assuming 6,500 litre tank
TANK DIAMETER, Dtank	2 m	No. of Tanks 1
TANK AREA, Atank	3.14 m <sup>2</sup>	Single tank area
TANK MAX STORAGE VOLUME, Vtank	6849 litres	
REQUIRED STORAGE HEIGHT, Ddet	1.48 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.63 m	
AVERAGE DISCHARGE RATE, Qavg	0.00005 m <sup>3</sup> /s	
AVERAGE HYDRAULIC HEAD, Hhy	0.74 m	
AREA OF ORIFICE, Aorifice	2.28E-05 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	5 mm	<b>Minimum 10 mm diameter</b>
VELOCITY AT ORIFICE	5.40 m/s	
ACHIEVABLE STORAGE OF SURFACES	55331 litres/ 24hrs	
AREA TO TANK CAN SERVICE ATTENUATION?	YES	



Project Ref:	C0372	<b>STORMWATER ATTENUATION TANK DESIGN</b>	
Project Address:	13 BINNIE STREET, PAIHIA		
Design Case:	CONCEPT FUTURE DEVELOPMENT	<b>CLIMATE CHANGE FACTORS</b>	
Date:	8 November 2023	REV 1	

## CLIMATE CHANGE PROJECTIONS

REPRODUCED FROM NIWA HIRDS, <https://niwa.co.nz/information-services/hirds/help>

Duration/ARI	2 yr	5 yr	10 yr	20 yr	30 yr	40 yr	50 yr	60 yr	80 yr	100 yr
1 hour	12.2	12.8	13.1	13.3	13.4	13.4	13.5	13.5	13.6	13.6
2 hours	11.7	12.3	12.6	12.8	12.9	12.9	13	13	13.1	13.1
6 hours	9.8	10.5	10.8	11.1	11.2	11.3	11.3	11.4	11.4	11.5
12 hours	8.5	9.2	9.5	9.7	9.8	9.9	9.9	10	10	10.1
24 hours	7.2	7.8	8.1	8.2	8.3	8.4	8.4	8.5	8.5	8.6
48 hours	6.1	6.7	7	7.2	7.3	7.3	7.4	7.4	7.5	7.5
72 hours	5.5	6.2	6.5	6.6	6.7	6.8	6.8	6.9	6.9	6.9
96 hours	5.1	5.7	6	6.2	6.3	6.3	6.4	6.4	6.4	6.5
120 hours	4.8	5.4	5.7	5.8	5.9	6	6	6	6.1	6.1

HIRDS V4 Intensity-Duration-Frequency Results

Sitename: palha  
Coordinate system: WGS84  
Longitude: 174.0885  
Latitude: -35.291

DDF Mode Parameters: c d e f g h i  
Values: 0.00207266 0.4848605 -0.0205007 -0.00275848 0.25651731 -0.0121514 3.3235666  
Example: Duration [hrs] ARI (yrs) x y Rainfall Rate (mm/hr)  
24 100 3.17805383 4.60014923 10.4228817

Rainfall Intensities (mm/hr) :: Historical Data

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Intensity standard error (mm/hr) :: Historical Data

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP2.6 for the period 2031-2050

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP2.6 for the period 2081-2100

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP4.5 for the period 2031-2050

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP4.5 for the period 2081-2100

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2031-2050

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2081-2100

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2031-2050

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2081-2100

Table with columns: ARI, AEP, 10m, 20m, 30m, 1h, 2h, 6h, 12h, 24h, 48h, 72h, 96h, 120h. Rows include values for 1.58, 2, 5, 10, 20, 30, 40, 50, 60, 80, 100, 250 ARI levels.

HIRDS V4 Depth-Duration-Frequency Results  
 Site name: 13 BINNIE STREET  
 Coordinate system: WGS84  
 Longitude: 174.0985  
 Latitude: -35.291  
 DDF Model

paaha  
 Parameters: c d e f g h i  
 Values: 0.00207266 0.4848605 -0.0205007 -0.00275848 0.25651731 0.0121514 3.32357  
 Example: Duration (hrs) ARI (yrs) x y Rainfall Depth (mm) 24 100 3.17805383 4.60014923 250.1491609

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.1	15.9	18.6	17.7	38.4	61	78.2	96	114	122	127	131
2	0.5	12.1	17.5	21.6	42.2	67	85.9	106	125	135	140	144	
5	0.2	15.7	22.7	28	39.7	55.1	87.7	113	139	164	177	185	190
10	0.1	18.4	26.6	32.8	46.5	64.6	103	133	164	194	209	218	224
20	0.05	21.1	30.5	37.7	53.4	74.3	119	153	189	224	242	252	259
30	0.033	22.7	32.8	40.6	57.5	80.1	128	165	204	242	261	273	280
40	0.025	23.8	34.5	42.6	60.5	84.2	135	174	215	255	275	292	295
50	0.02	24.7	35.8	44.2	62.8	87.4	140	180	224	265	286	299	307
60	0.017	25.4	36.8	45.5	64.6	90	144	186	231	274	295	308	317
80	0.013	26.5	38.5	47.6	67.6	94.2	151	195	242	287	310	323	332
100	0.01	27.4	39.7	49.1	69.9	97.4	156	202	250	297	321	335	344
250	0.004	30.9	44.8	55.5	79	110	177	229	285	338	365	382	393

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.3	1.8	1.9	2.8	3.8	7.3	10	15	18	20	21	22
2	0.5	1.5	2.1	2.1	3.1	4.2	8	11	16	20	22	24	25
5	0.2	2.1	2.8	3	4.4	5.8	11	15	22	27	30	32	34
10	0.1	2.7	3.6	4	5.7	7.5	14	19	27	32	36	39	40
20	0.05	3.5	4.7	5.3	7.5	9.9	19	24	31	38	43	46	48
30	0.033	4	5.5	6.2	8.8	12	22	27	35	41	47	51	52
40	0.025	4.4	6.1	6.9	9.8	13	24	30	37	44	51	54	56
50	0.02	4.8	6.6	7.5	11	14	27	34	41	48	54	58	59
60	0.017	5.1	7	8.1	12	15	29	35	41	48	56	60	61
80	0.013	5.6	7.8	9	13	17	32	39	44	51	59	64	65
100	0.01	6.1	8.5	9.8	14	19	35	42	46	54	63	67	69
250	0.004	8.3	12	14	20	27	50	59	67	77	83	84	

Rainfall depths (mm) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.8	17.1	21	29.7	40.9	64.3	81.9	100	117	126	131	134
2	0.5	13	18.7	23.1	32.6	45.1	70.9	90.3	111	130	139	144	148
5	0.2	16.9	24.4	30.2	42.7	59.1	93.1	115	146	171	184	191	196
10	0.1	19.8	28.6	35.4	50.1	69.4	110	140	172	202	217	226	231
20	0.05	22.7	32.9	40.6	57.6	79.9	126	162	198	234	251	261	268
30	0.033	24.5	35.4	43.8	62.1	86.1	136	175	214	253	272	283	290
40	0.025	25.7	37.2	46	65.3	90.6	144	184	226	266	286	298	306
50	0.02	26.7	38.6	47.7	67.8	94.1	149	191	235	277	298	310	318
60	0.017	27.4	39.7	49.1	69.8	96.9	154	197	242	287	307	320	328
80	0.013	28.7	41.5	51.4	73	101	161	206	254	299	322	335	344
100	0.01	29.6	42.9	53.1	75.5	105	167	214	263	310	334	348	356
250	0.004	33.4	48.4	59.9	85.3	119	189	243	299	353	380	397	407

Rainfall depths (mm) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.8	17.1	21	29.7	40.9	64.3	81.9	100	117	126	131	134
2	0.5	13	18.7	23.1	32.6	45.1	70.9	90.3	111	130	139	144	148
5	0.2	16.9	24.4	30.2	42.7	59.1	93.1	115	146	171	184	191	196
10	0.1	19.8	28.6	35.4	50.1	69.4	110	140	172	202	217	226	231
20	0.05	22.7	32.9	40.6	57.6	79.9	126	162	198	234	251	261	268
30	0.033	24.5	35.4	43.8	62.1	86.1	136	175	214	253	272	283	290
40	0.025	25.7	37.2	46	65.3	90.6	144	184	226	266	286	298	306
50	0.02	26.7	38.6	47.7	67.8	94.1	149	191	235	277	298	310	318
60	0.017	27.4	39.7	49.1	69.8	96.9	154	197	242	287	307	320	328
80	0.013	28.7	41.5	51.4	73	101	161	206	254	299	322	335	344
100	0.01	29.6	42.9	53.1	75.5	105	167	214	263	310	334	348	356
250	0.004	33.4	48.4	59.9	85.3	119	189	243	299	353	380	397	407

Rainfall depths (mm) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12	17.4	21.4	30.2	41.6	65.2	82.8	101	118	127	132	135
2	0.5	13.2	19.1	23.5	33.2	45.8	71.8	91.4	112	131	140	145	149
5	0.2	17.2	24.9	30.7	43.4	60.1	94.5	120	147	173	185	193	197
10	0.1	20.2	29.2	36	51	70.6	111	142	174	204	219	228	233
20	0.05	23.2	33.5	41.4	58.7	81.3	128	160	192	224	242	252	259
30	0.033	24.9	36.1	44.6	63.2	87.7	139	177	217	255	274	285	292
40	0.025	26.2	37.9	46.8	66.5	92.2	146	186	229	269	289	301	308
50	0.02	27.2	39.3	48.6	69	95.8	152	194	238	280	301	313	321
60	0.017	27.9	40.5	50.1	71.1	98.7	156	200	245	288	310	323	331
80	0.013	29.2	42.3	52.3	74.4	103	164	209	257	303	325	339	347
100	0.01	30.2	43.7	54.1	76.9	107	169	217	266	313	337	353	360
250	0.004	34	49.3	61.1	86.9	121	192	246	303	357	384	400	410

Rainfall depths (mm) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.7	18.2	22.5	31.7	43.6	67.9	85.7	105	122	130	135	138
2	0.5	13.9	20.1	24.7	34.9	48.1	74.9	94.8	115	134	144	149	152
5	0.2	18.2	26.3	32.4	45.8	63.3	98.8	125	152	178	190	197	202
10	0.1	21.3	30.8	38	53.9	74.4	116	148	180	210	225	234	239
20	0.05	24.5	35.4	43.7	62	85.8	135	171	208	244	261	271	277
30	0.033	26.4	38.1	47.4	66.9	91.5	145	185	228	263	282	292	300
40	0.025	27.7	40.1	49.5	70.3	97.3	153	194	237	278	298	309	317
50	0.02	28.7	41.6	51.4	73	101	159	202	246	289	310	322	329
60	0.017	29.6	42.8	52.9	75.2	104	164	209	254	298	320	332	340
80	0.013	30.9	44.8	55.4	78.7	109	172	218	267	313	335	348	357
100	0.01	31.9	46.3	57.2	81.4	113	178	225	276	324	347	361	369
250	0.004	36	52.2	64.6	92	128	202	257	314	369	396	412	422

Rainfall depths (mm) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12	17.2	21.2	30	41.3	64.8	82.4	101	118	126	131	135
2	0.5	13.1	18.9	23.3	33	45.5	71.4	90.9	111	130	140	145	148
5	0.2	17.1	24.7	30.5	43.1	59.7	93.9	120	147	172	185	192	196
10	0.1	20	29	35.7	50.6	70.1	111	141	173	203	218	227	232
20	0.05	23	33.3	41.1	58.3	80.7	128	163	200	235	252	263	269
30	0.033	24.7	35.8	44.2	62.8	87.1	138	176	216	254	273	284	291
40	0.025	26	37.6	46.5	66	91.6	145	185	228	263	282	292	300
50	0.02	27	39	48.3	68.5	95.1	151	193	237	279	300	312	320
60	0.017	27.7	40.2	49.7	70.6	98	155	199	244	287	309	322	330
80	0.013	29	42	52	73.8	103	163	208	256	301	324	337	346
100	0.01	29.9	43.4	53.7	76.3	106	168	215	265	313	336	350	358
250	0.004	33.7	49	60.6	86.3	120	191	245	301	355	383	399	409

Rainfall depths (mm) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	13.2	19	23.5	33.1	45.4	70.3	88.4	107	124	132	137	140
2													



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## APPENDIX D

**Consented Drainage Plan Extracted from LIM**

# FAR NORTH DISTRICT COUNCIL

## PERMIT FOR A PLUMBER OR DRAINLAYER TO CARRY OUT PLUMBING OR DRAINAGE WORK

PERMIT N<sup>o</sup> 2

Val. Ref. <u>4/</u>	
File N <sup>o</sup> <u>15</u>	

M. J. H. H. H. Registered Craftman Plumber  
and/or Registered Drainlayer

of Opura is hereby authorised  
to carry out the work described herein and as set forth in the plans deposited with me, on the premises  
owned (or occupied) by:

M. J. H. H. H.

and situated on 13 Borneo Road. Lot 20 D.P. 4 Section 11

Blk        Survey District       

Main Contractor        Address       

Description of Work Sanitary plumbing & drainage

Estimated Cost of Work Including Materials \$0

Fee Paid \$ 160 Receipt N<sup>o</sup>        Date       

Such work is to be carried out in strict accordance with the Drainage and Plumbing Regulations, 1978, and  
shall be completed on or before the 7th May 1981 Day of        19 81

**IMPORTANT NOTE :** You are required to confirm this subcontract with Main Contractor / Owner and  
return this form within 14 days if you do not get the contract.

Date        Authorised Officer       

FOR OFFICE USE ONLY	
SEWER CONNECTION DATE <u>      </u>	
Signed by Authorized Officer	
NATURE OF BUILDING:	N <sup>o</sup> of WC's
MOTEL UNITS <u>      </u>	<u>      </u>
RESIDENTIAL UNITS <u>      </u>	<u>      </u>
FACTORY UNITS <u>      </u>	<u>      </u>
RESTAURANT (Staff) <u>      </u>	<u>      </u>
RESTAURANT (PUBLIC) (N <sup>o</sup> of Urinals) <u>      </u>	<u>      </u>
OTHER (State) <u>      </u>	
	N <sup>o</sup> of WC's <u>      </u>
N.B. Each 600mm of Wall Urinal is considered to be <span style="font-size: small;">one urinal.</span>	

### NOTIFIABLE INSPECTIONS REQUIRED

Site Inspection ( (pre works)	<input type="checkbox"/>
Open Drainage Inspection and Test	<input type="checkbox"/>
Sewer Connection Inspection	<input type="checkbox"/>
Stormwater Connection Inspection	<input type="checkbox"/>
Prelining Plumbing Inspection and Test	<input type="checkbox"/>
Soil & Waste Stack Inspection & Test	<input type="checkbox"/>
Final Inspection	<input type="checkbox"/>

**24 HOURS NOTICE REQUIRED  
FOR INSPECTIONS**

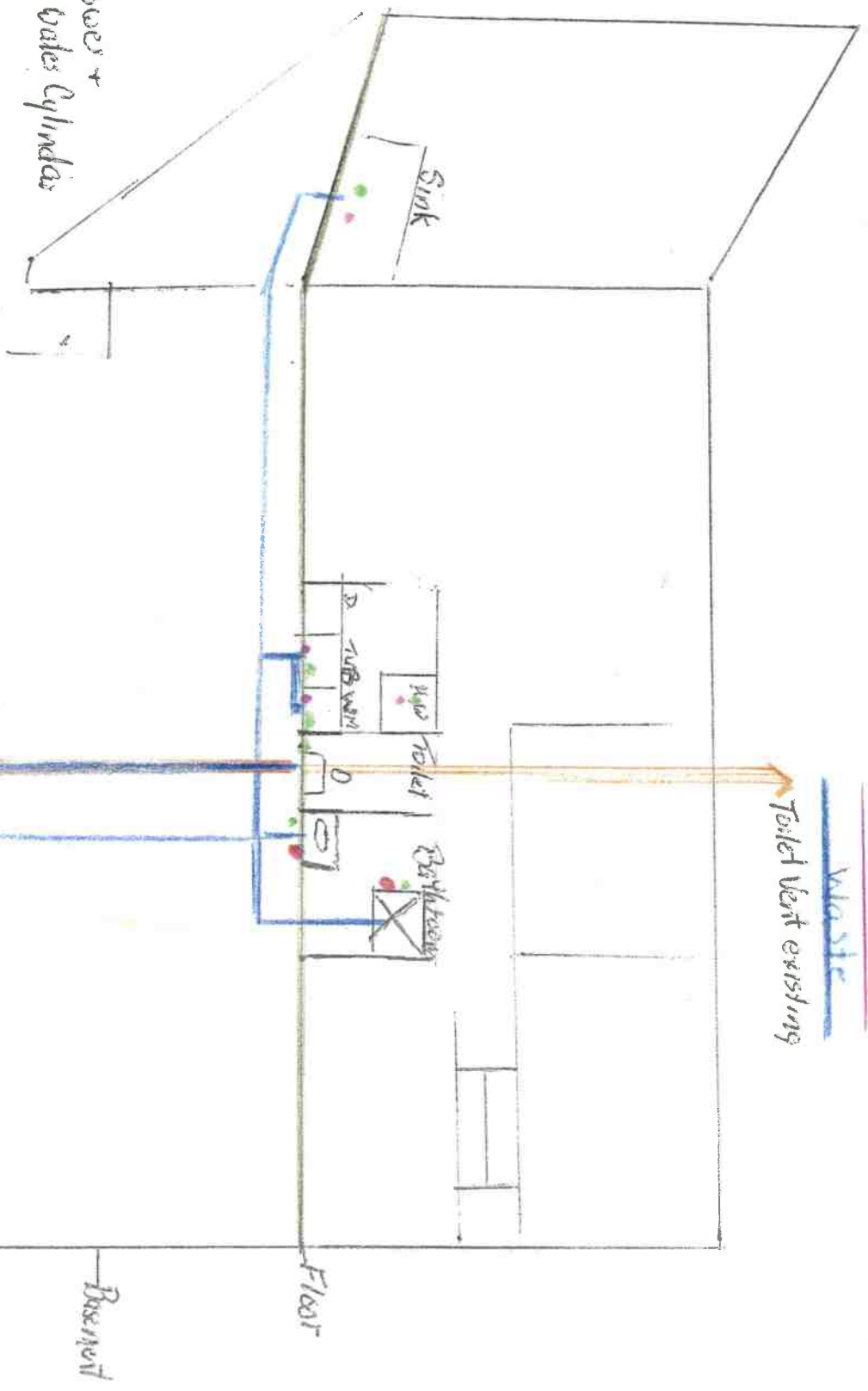
Conditions STORMWATER

All yard - stormwater on driveways,  
paths, courtwards, etc. is to be  
collected by cesspit(s) and piped to  
an outfall to the satisfaction of the  
County Engineer.

Written notice must be in the hands of the Plumbing and Drainage Inspector of the relevant Service Centre at  
least 24 hours prior to the work being commenced.

Cold  
HOT  
Waste

Toilet Vent existing



Inside House

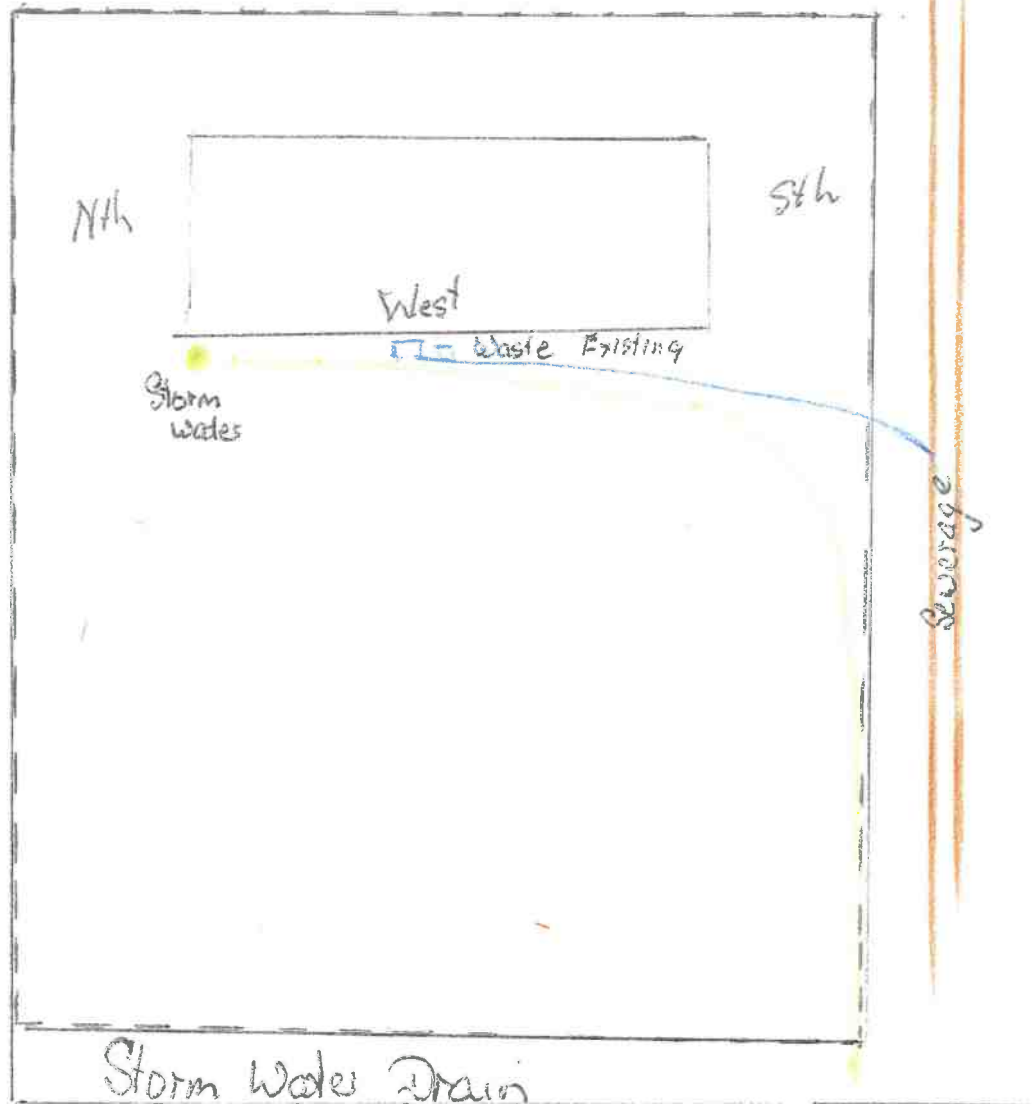
New Pipes for 1 shower +  
Hot Water Cylinders

Other pipes existing

Toilet Trap to Sewerage Existing  
Sewerage Trap to Sewerage (existing)



# Binnie St



Some water pipes under house  
to be renewed

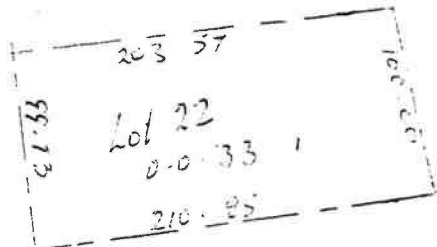
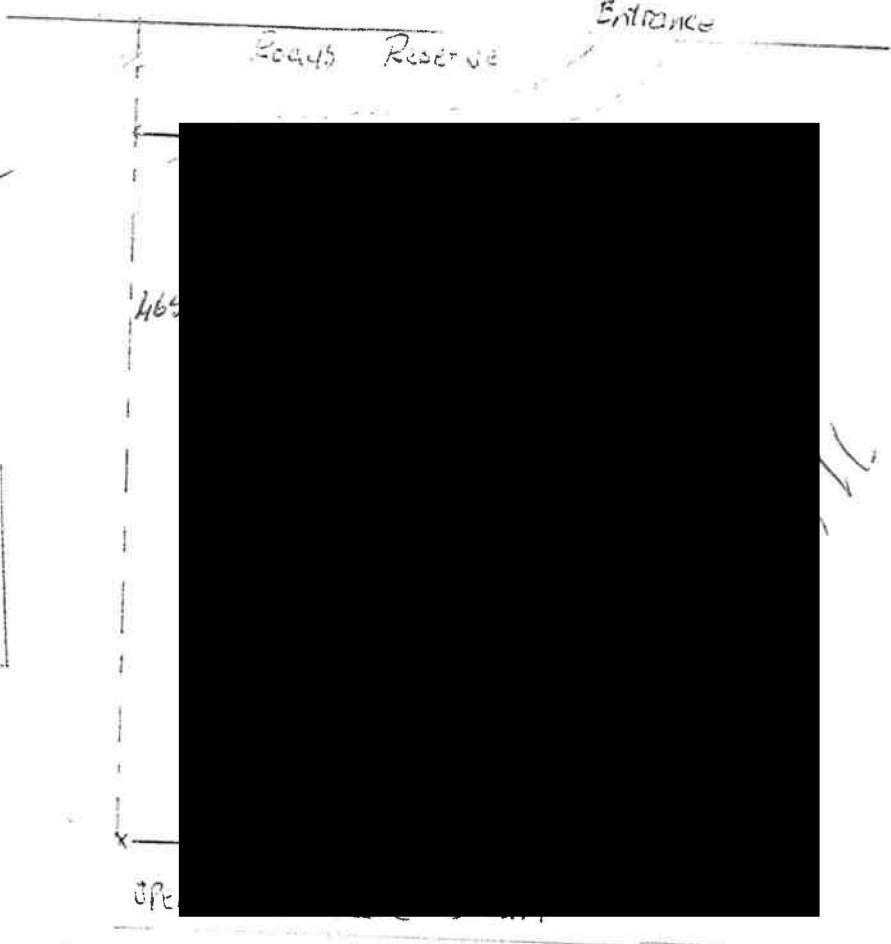
Binnie St

Entrance

Roads Reserve

NOTIFIABLE INSPECTIONS	
Footing Inspection Required	<input checked="" type="checkbox"/>
Band Beam Inspection required	<input type="checkbox"/>
Pre-floor Inspection required	<input type="checkbox"/>
Preining Inspection required	<input checked="" type="checkbox"/>
Final Inspection required	<input checked="" type="checkbox"/>

These plan and specifications must be kept 'on site' during construction. All boundary pegs must be oared and flagged before work is commenced.



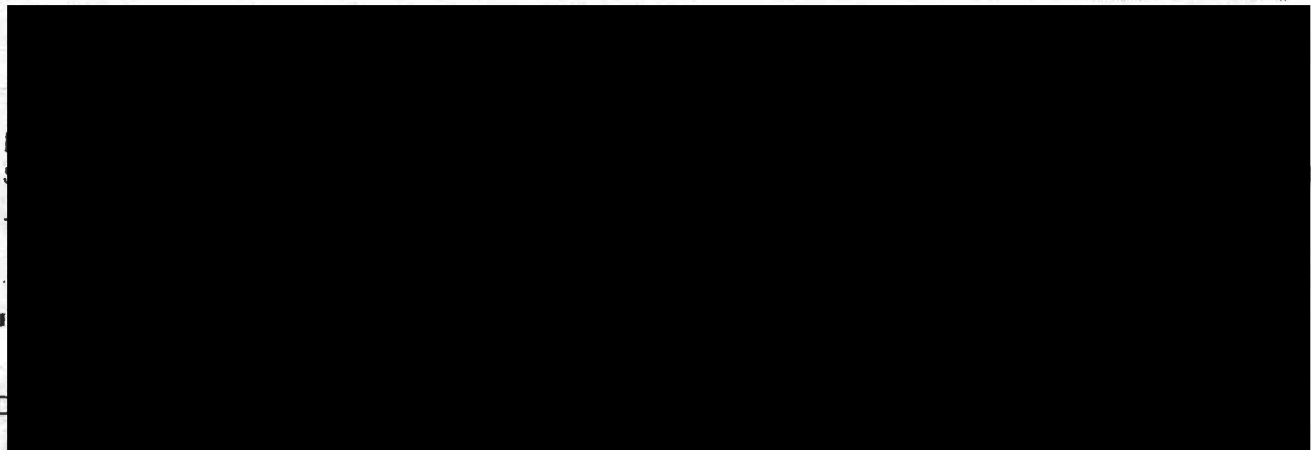
1 chain to an inch

RAY OF ISLANDS COUNTY COUNCIL

PERMIT NO 5722

# Permit for a Plumber or Drainlayer to carry out Plumbing or Drainage Work

Mr M. HORO ..... a Plumber or (Drainlayer)  
of PAIHIA ..... is hereby authorised to carry out the work described herein and as set  
th in the plans deposited with me, on the premises owned (or occupied) by  
Mr E. D. HARGREAVES .....  
and situated on BINNIE Road LOT 22 DP 40239 Section  
PAIHIA Survey District  
Main Contractor ..... Address .....



I shall be commencing the plumbing detailed on this permit on ..... 19.....  
drainage

No 5722 Conditions: .....

This slip or other written notice must be in the hands of the County Health Inspector, P.O. Box 11, Kawakawa, at least 24 hours before the work is commenced.

PLUMBER/DRAINLAYER

H. HARGRAVES

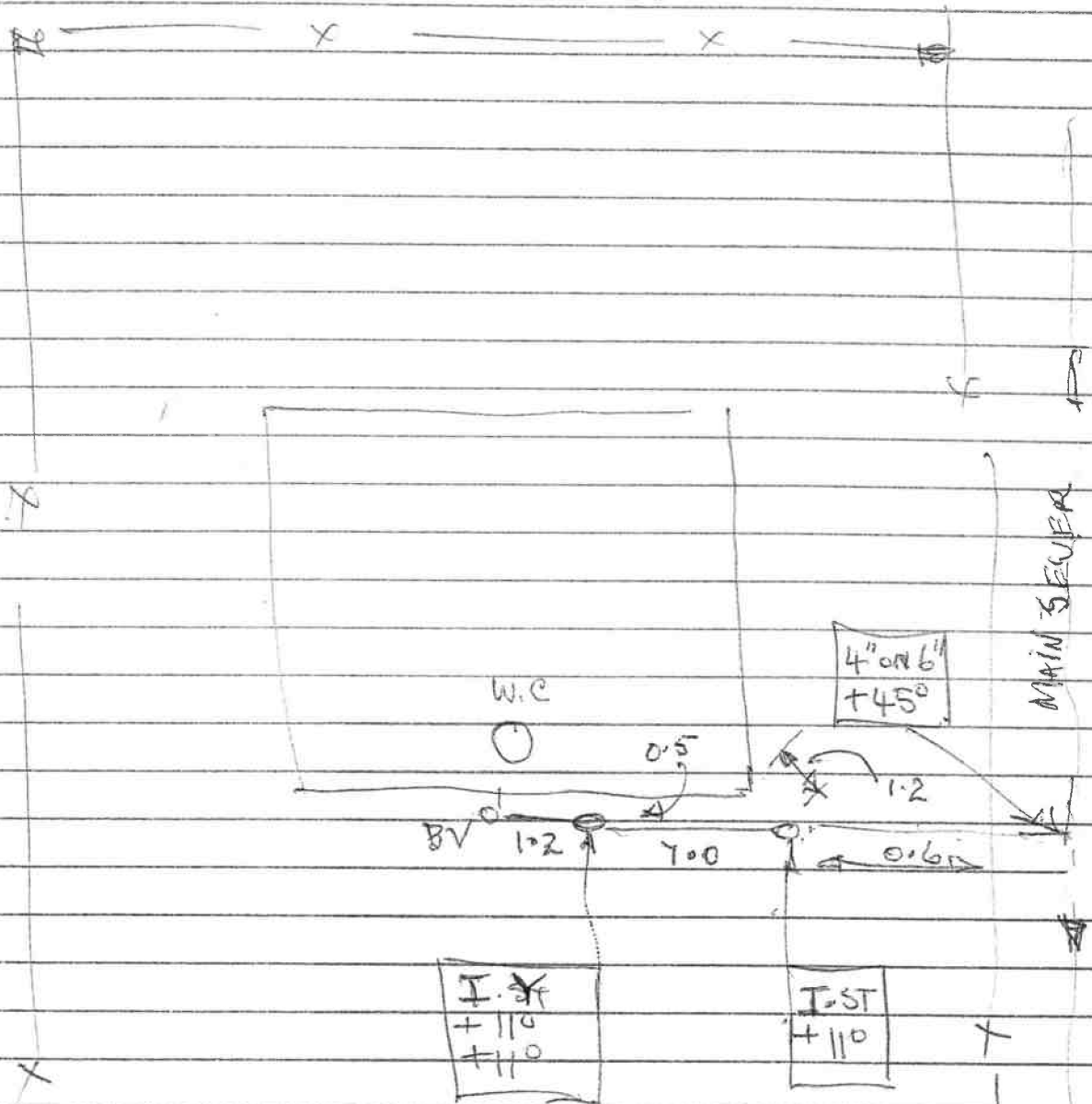
1583.

14

11-8-81

BINNIE STREET

BINNIE ST.



- ① All NEW PVC LINES - WATER TESTED - OK
- ② G.T. 75<sup>mm</sup> ABOVE GROUND - OK
- ③ STORM WATER - PIPED AWAY - OK
- ④ HOUSE ONLY
- ⑤ ONE TOILET
- ⑥ DRAWN/LAID BY - M. HORO

QUADRUPPLICATE

Copy of Building Permit for Retention by Local Authority

Permit No. B 133012

Receipt No. G1463

Date: 1/5/1967.

Number on Valuation Roll: 46/126

Description of land on which building is to be erected:

Lot: 22 D.P. 40239 PANORAMA AVE. Section:

Block: S.D. Street,

Township. Riding.

Received from B.J. TAYLOR. the sum of

£ 4 / - / - in payment of building fee, etc.

on 1/5/67. Date

Name of local authority: BAY OF ISLANDS COUNTY COUNCIL.

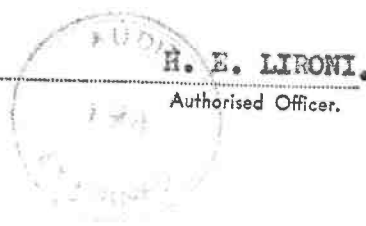
Name of owner: Mr. & Mrs. Hargreaves.

Address of owner: PAIHIA.

Name of builder: B. J. Taylor.

Address of builder: Te Haumi Bay, PAIHIA.

Purpose for which building is to be used: ADDITIONS TO DWELLING.



Permission is hereby granted you to carry out the works as proposed in accordance with the drawings and other documents submitted; such work to be subject at any time during progress to inspection, and to be carried out in strict conformity with all the requirements of the Council bylaws, and subject to taking full responsibility for any damage done to any works such as telephone cables, power cables, water mains, sewers, pipes, footpaths, roads, or other services.

Estimated value of proposed building work:

New houses ..... £

New flats ..... £

State number of flats in block: .....

Other new buildings ..... £

Alterations and additions to houses and flats £750. 0. 0.

Alterations and additions to all other buildings ..... £

If work valued at £10,000 or more:

Estimated date of commencement of work—Month: Year:

Estimated date of completion of work— Month: Year:



Issuing Officer.



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## APPENDIX E

### Wastewater Pipeline Analysis



### Colebrook-White Calculation

	<b>Project:</b>	13 Binnie Street, Paihia	<b>By:</b>	GC
	<b>Calculation:</b>	Wastewater Pipe Analysis	<b>Approved:</b> EC	
	Colebrook-White Pipe Analysis			
<b>Sheet Number:</b>	1	<b>Date:</b>	7-Sep	

<b>General Info</b>		
Kinematic Viscosity ( $\nu$ )	1.139	mm <sup>2</sup> /s
Gravity ( $g$ )	9.80665	m/s <sup>2</sup>

<b>Pipe Info</b>		
Roughness Coefficient ( $k_s$ )	0.6	mm
Hydraulic Gradient ( $S$ )	23.97	%
Internal Diameter ( $D$ )	150	mm

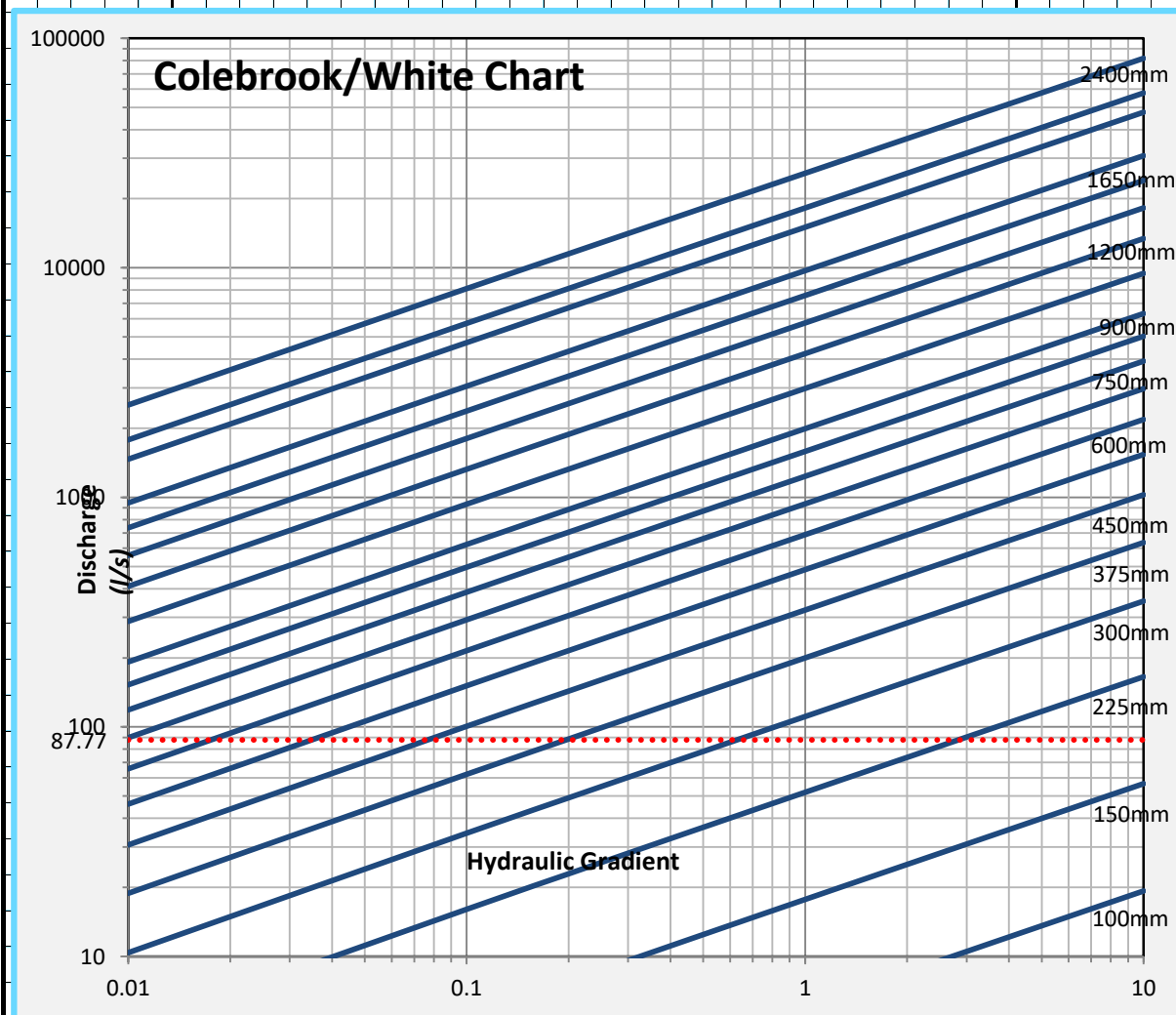
= 0.24 m/m  
or 1 in 4.17

$$Q = -2\sqrt{2gDS} \times \log \left[ \frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{2gDS}} \right] A$$

**Results When Flowing Full**

Velocity ( $v$ )	<u>4.97</u>	m/s
Flow ( $Q$ )	<u>87.77</u>	l/s

= 0.09 m<sup>3</sup>/s



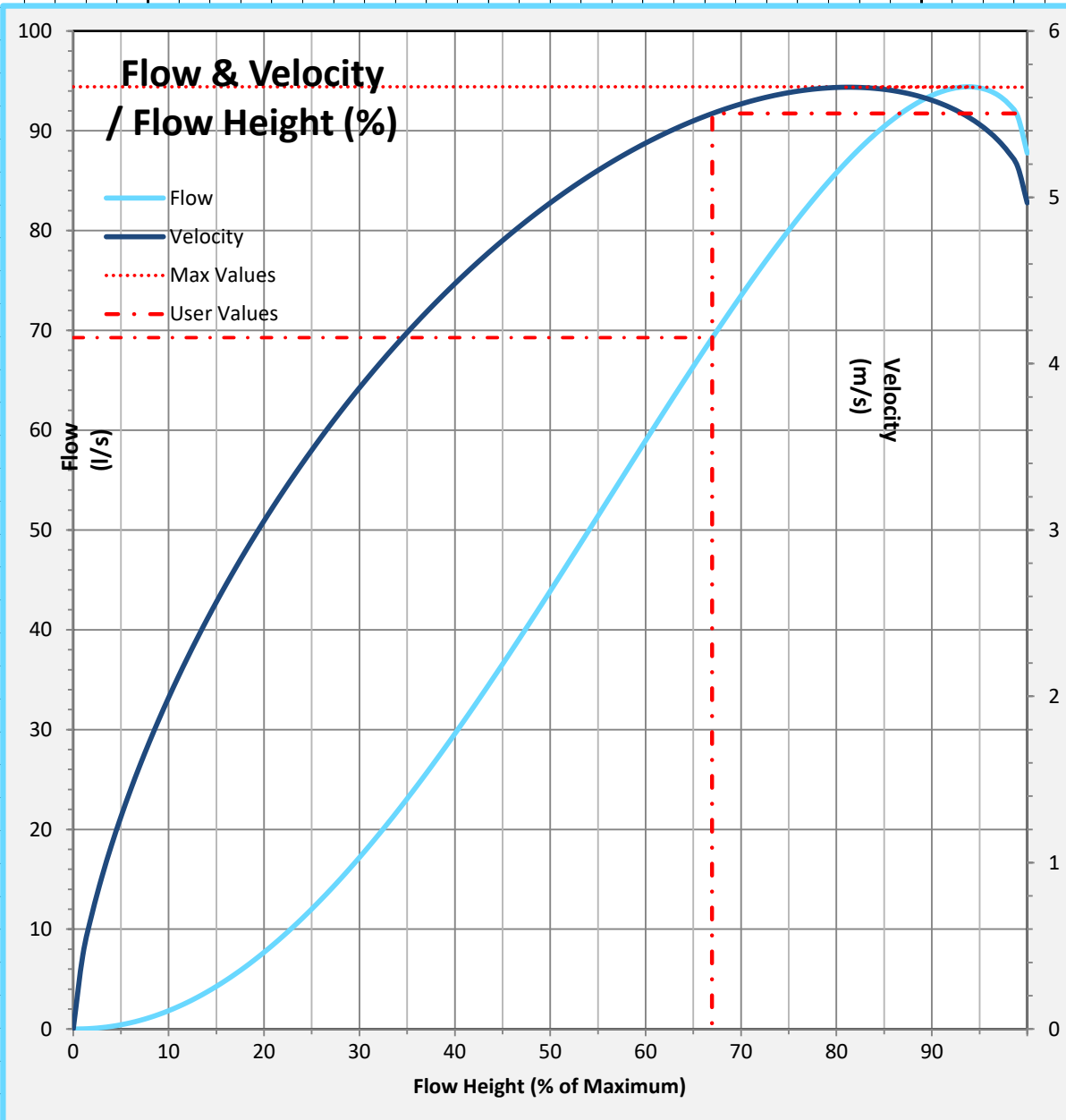
**Colebrook-White Calculation**



<b>Project:</b>	13 Binnie Street, Paihia	<b>By:</b>	GC
<b>Calculation:</b>	Wastewater Pipe Analysis	<b>Approved:</b>	EC
<b>Sheet Number:</b>	2	<b>Date:</b>	7-Sep

**Results When Flowing Partially Full**

Max Velocity at 81.4% Height		
Vmax	<b>5.66</b> m/s	
Max Flow at 93.8% Height		
Qmax	<b>94.4</b> l/s	= 0.09 m <sup>3</sup> /s
User Defined Height	<b>67</b> %	= 0.101 m
Velocity (v)	<b>5.50</b> m/s	
Flow (Q)	<b>69.3</b> l/s	= 0.07 m <sup>3</sup> /s



## APPENDIX F

### Assessment of Environmental Effects and Assessment Criteria

Table 17: Proposed Northland Regional Plan Earthworks Assessment Criteria, to rule C.8.3.1

Assessment Criteria	Comments
the area and volume of earthworks at a particular location or associated with a project complies with the thresholds in Table 15.	Complies – classed as ‘other areas’.
the discharge is not within 20 metres of a geothermal surface feature.	Complies. No geothermal features are around the subject site.
except for coastal dune restoration activities, good management practice erosion and sediment control measures equivalent to those set out in the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005), are implemented for the duration of the activity	Complies. See specific erosion and sediment control details, concept plan and typical details.
batters and side castings are stabilised to prevent slumping	Complies.
exposed earth is stabilised upon completion of the earthworks to minimise erosion and avoid slope failure	Can comply. Proposed earthworks will require support of retaining wall. A specific retaining wall design and construction methodology will be provided at building consent stage to reduce the risk.
earth and debris are not deposited into, or in a position where they can enter, a natural wetland, a continually or intermittently flowing river, a lake, an artificial watercourse, or the coastal marine	Complies. Erosion and sediment control measures have been implemented to control this.
the earthworks activity does not: a) reduce the height of a dune crest in a coastal riparian and foredune management area, except where dunes are recontoured to remove introduced materials or to remediate dune blow-outs as part of coastal dune restoration work, or b) exacerbate flood or coastal hazard risk on any other property, or c) create or contribute to the instability or subsidence of land on other property, or d) divert flood flow onto other property, and 216	Complies provided recommendations in this report and any accompanying detailed design is adhered to.
any associated damming, diversion and discharge of stormwater does not give rise to any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) any conspicuous change in colour or visual clarity, or b) the rendering of fresh water unsuitable for consumption by farm animals, or c) contamination which may render freshwater taken from a mapped priority drinking water abstraction point (refer I Maps   Ngā mahere matawhenua) unsuitable for human consumption after existing treatment	Complies provided recommendations in this report and any accompanying detailed design is adhered to.
information on the source and composition of any clean fill material and its location within the disposal site are recorded and provided to the Regional Council on request	Can comply. Materials are anticipated to be either site won or imported from a registered quarry facility. Details TBC according to an earthworks specification completed during a detailed design phase.
the Regional Council’s Compliance Manager is given at least five working days’ notice (in writing or by email) of any earthworks activity being undertaken within a high-risk flood hazard area, flood hazard area, where contaminated land will be exposed, or in sand dunes within a coastal riparian and foredune management area.	Can comply, if required.



Table 18: FNDC District Plan Stormwater Assessment Criteria, to rule 13.10.4

Assessment Criteria	Comments
(a) Whether the application complies with any regional rules relating to any water or discharge permits required under the Act, and with any resource consent issued to the District Council in relation to any urban drainage area stormwater management plan or similar plan.	NA
(b) Whether the application complies with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009 (to be used in conjunction with NZS 4404:2004).	Concept design complies and has adopted latest FNDC engineering standards for runoff curves and proposed area within lot 2 will be attenuated to 80 % of pre-development levels for the 50 and 20 % AEP events.
(c) Whether the application complies with the Far North District Council Strategic Plan - Drainage.	Not sited.
(d) The degree to which Low Impact Design principles have been used to reduce site impermeability and to retain natural permeable areas.	Proposed area within lot 2 to form the subdivision will be attenuated to 80 % of pre-development levels for the 50 and 20 % AEP events and stormwater disposal is directed into existing public reticulated pipe network.
(e) The adequacy of the proposed means of disposing of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces.	Low impact design adopted – attenuation within on-site tanks for proposed lot 2.
(f) The adequacy of any proposed means for screening out litter, the capture of chemical spillages, the containment of contamination from roads and paved areas, and of siltation.	Stormwater quality devices included in design to accommodate a residential subdivision.
(g) The practicality of retaining open natural waterway systems for stormwater disposal in preference to piped or canal systems and adverse effects on existing waterways.	Subject site is within an urban environment and no waterway is observed within the site boundary. No adverse effects anticipated on downstream environment.
(h) Whether there is sufficient capacity available in the Council's outfall stormwater system to cater for increased run-off from the proposed allotments.	Yes, the council's pipe is 300 diameter and our proposal involves to adopt attenuation tank within proposed lot 2 to reduce the peak flow rate to pre-development condition.
(i) Where an existing outfall is not capable of accepting increased run-off, the adequacy of proposals and solutions for disposing of run-off.	NA.
(j) The necessity to provide on-site retention basins to contain surface run-off where the capacity of the outfall is incapable of accepting flows, and where the outfall has limited capacity, any need to restrict the rate of discharge from the subdivision to the same rate of discharge that existed on the land before the subdivision takes place.	Proposed lot 2 surfaces to be attenuated to 80 % of pre-development levels of 50 and 20 % AEP storm events from the subdivision formation in a specifically sized detention tank.
(k) Any adverse effects of the proposed subdivision on drainage to, or from, adjoining properties and mitigation measures proposed to control any adverse effects.	Stormwater to be disposed into existing reticulated pipe network. No adverse effects anticipated on neighbouring properties or downstream environment.
(l) In accordance with sustainable management practices, the importance of disposing of stormwater by way of gravity pipelines. However, where topography dictates that this is not possible, the	All devices adopt and designed for gravity flows.



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adequacy of proposed pumping stations put forward as a satisfactory alternative.

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(m) The extent to which it is proposed to fill contrary to the natural fall of the country to obtain gravity outfall; the practicality of obtaining easements through adjoining owners' land to other outfall systems; and whether filling or pumping may constitute a satisfactory alternative.	No fill is required for the stormwater management purpose.
(n) For stormwater pipes and open waterway systems, the provision of appropriate easements in favour of either the registered user or in the case of the Council, easements in gross, to be shown on the survey plan for the subdivision, including private connections passing over other land protected by easements in favour of the user.	Easement of stormwater pipe across the proposed lot 2 will be generated by surveyor within the proposed scheme plan.
(o) Where an easement is defined as a line, being the centre line of a pipe already laid, the effect of any alteration of its size and the need to create a new easement.	NA.
(p) For any stormwater outfall pipeline through a reserve, the prior consent of the Council, and the need for an appropriate easement.	NA
(q) The need for and extent of any financial contributions to achieve the above matters.	TBC
(r) The need for a local purpose reserve to be set aside and vested in the Council as a site for any public utility required to be provided.	NA

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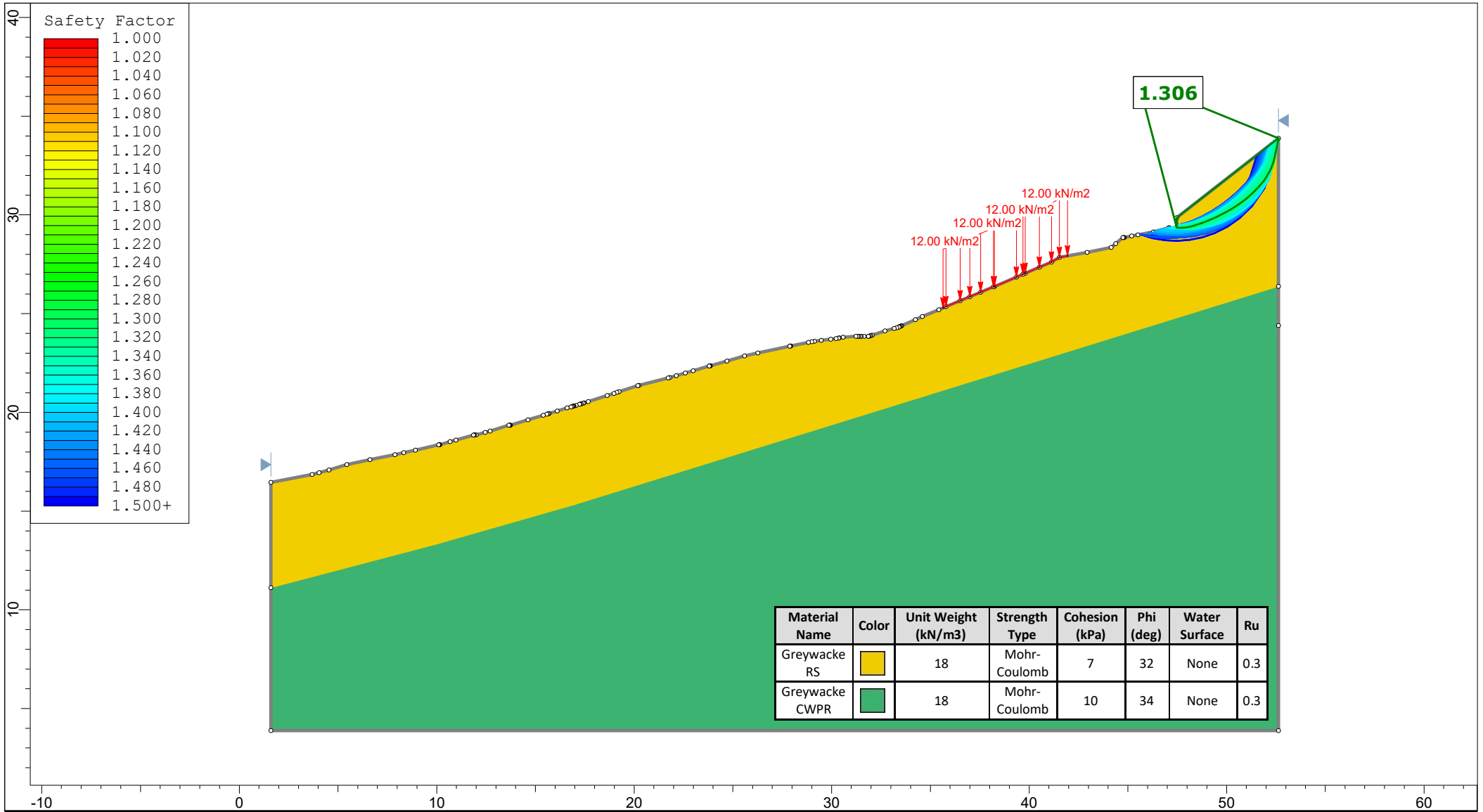





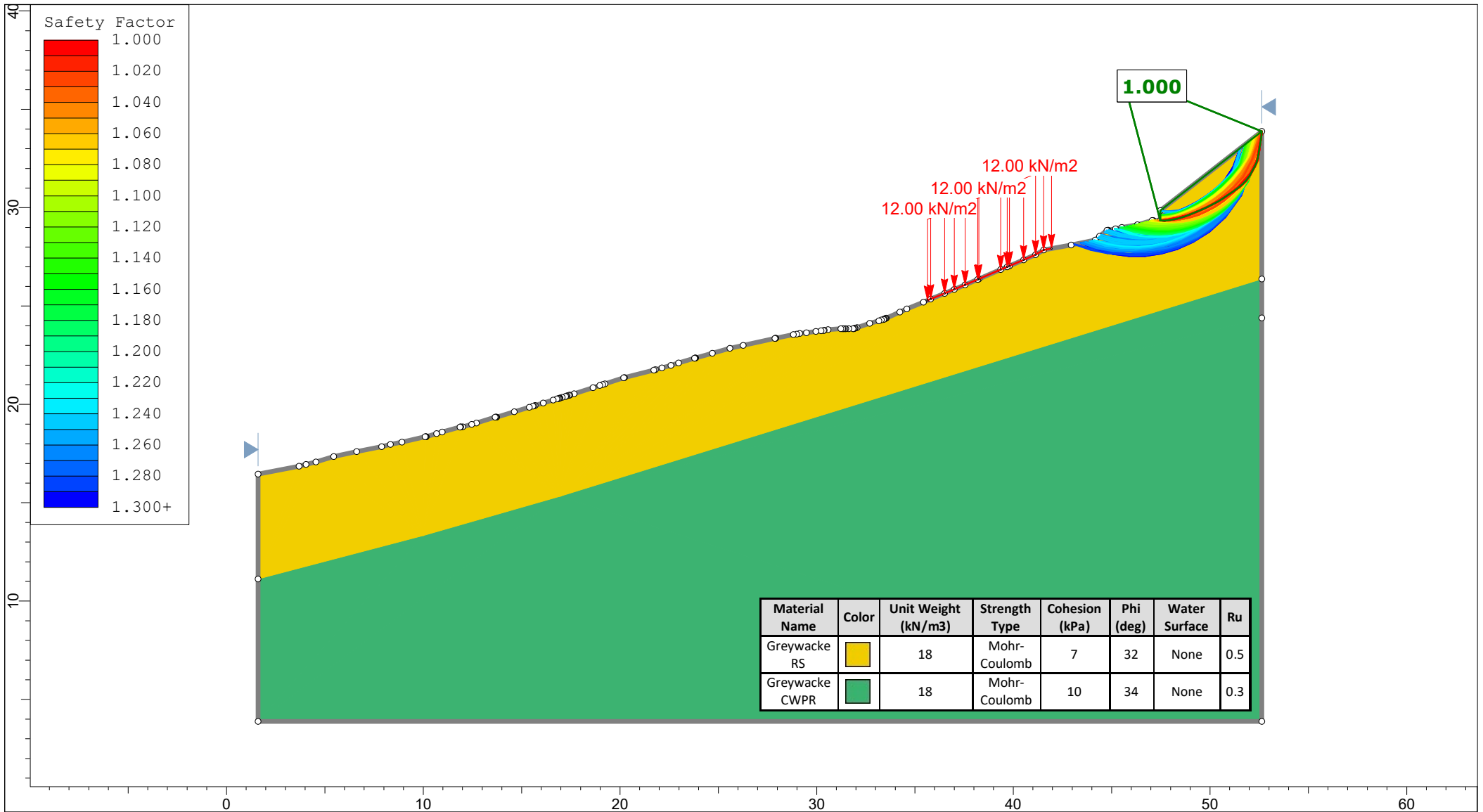
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## APPENDIX G

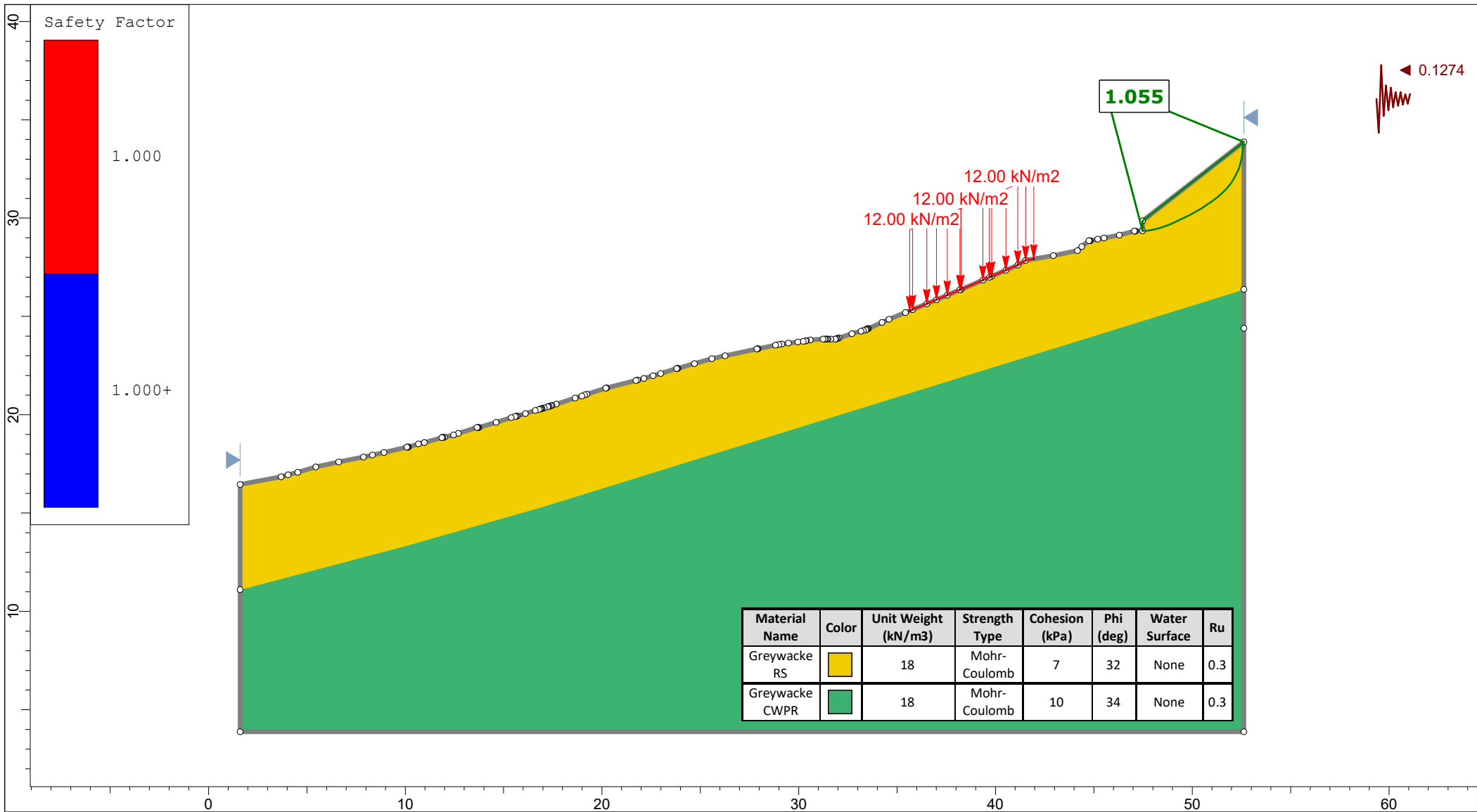
### Slope Stability Analysis




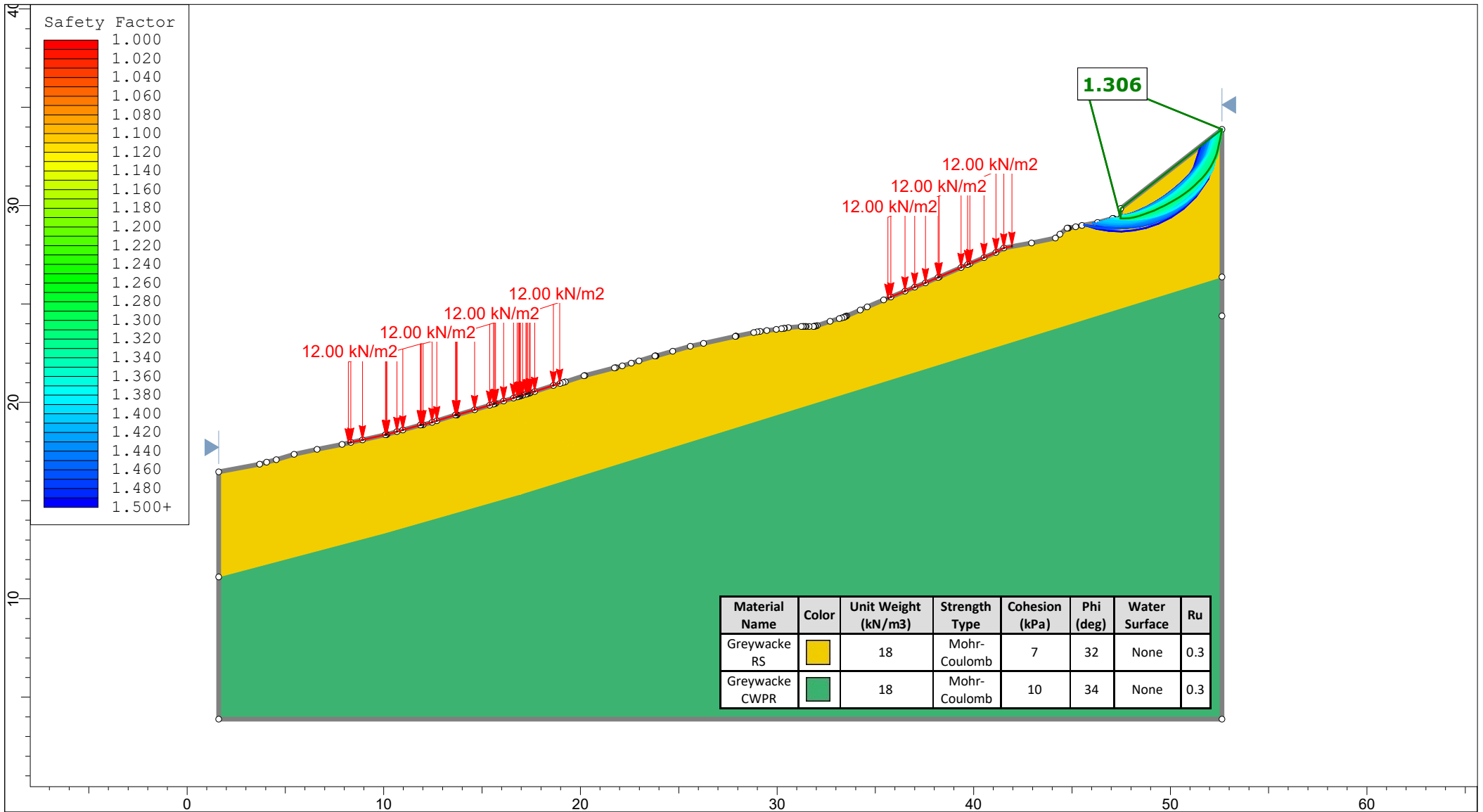
 <b>geologix</b> consulting engineers	Project		C0372 - 13 Binnie Street, Paihia	
	Group	Existing Condition	Scenario	Static
	Drawn By	SBS	Company	Geologix Consulting Engineers Ltd
	Date	16/10/2023	File Name	C0372 Slope Analysis.sldm




 <b>geologix</b> consulting engineers	Project		C0372 - 13 Binnie Street, Paihia	
	Group	Existing Condition	Scenario	Elevated GW
	Drawn By	SBS	Company	Geologix Consulting Engineers Ltd
	Date	16/10/2023	File Name	C0372 Slope Analysis.sldm

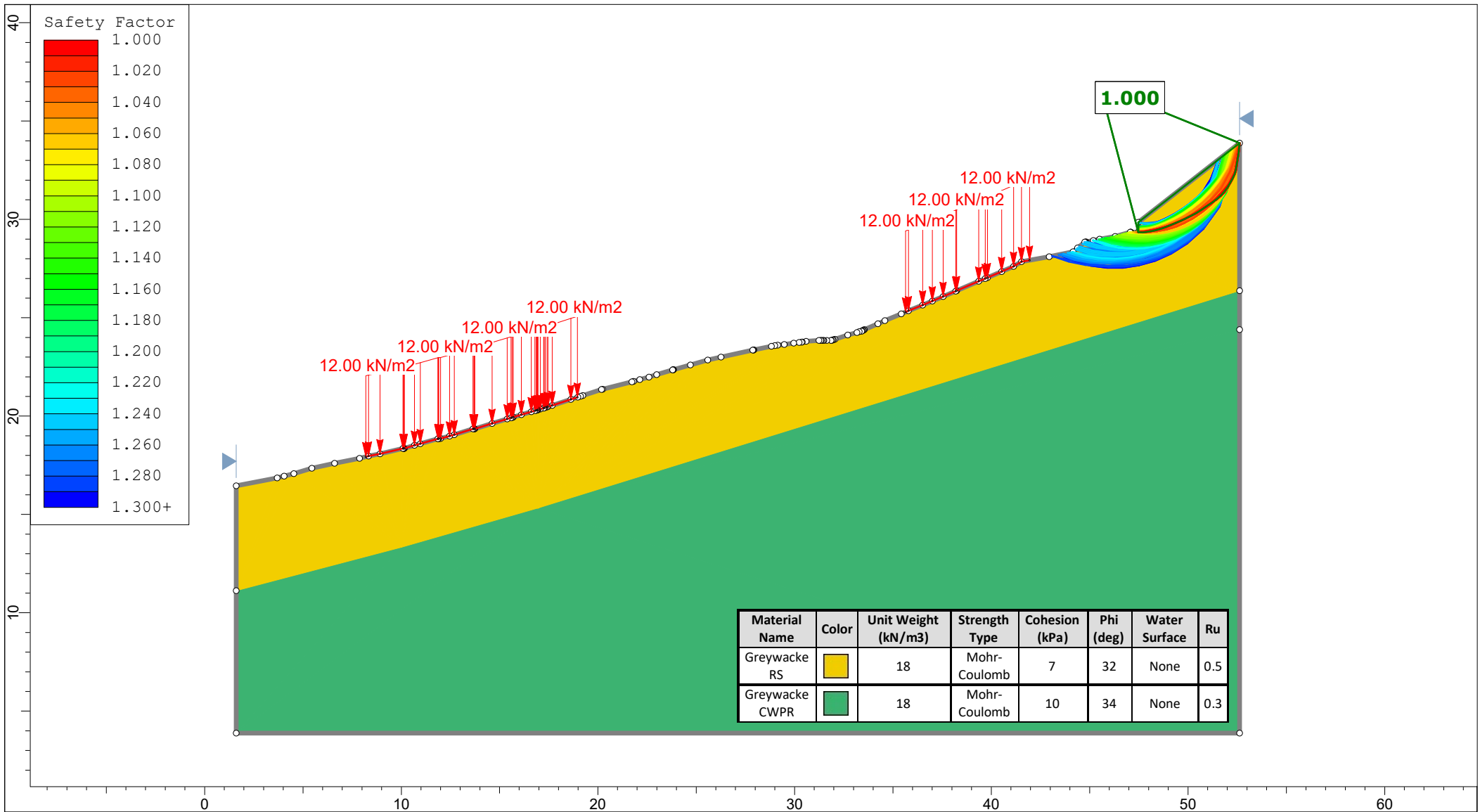



 <b>geologix</b> consulting engineers	Project		C0372 - 13 Binnie Street, Paihia	
	Group	Existing Condition	Scenario	Seismic
	Drawn By	SBS	Company	Geologix Consulting Engineers Ltd
	Date	16/10/2023	File Name	C0372 Slope Analysis.slm

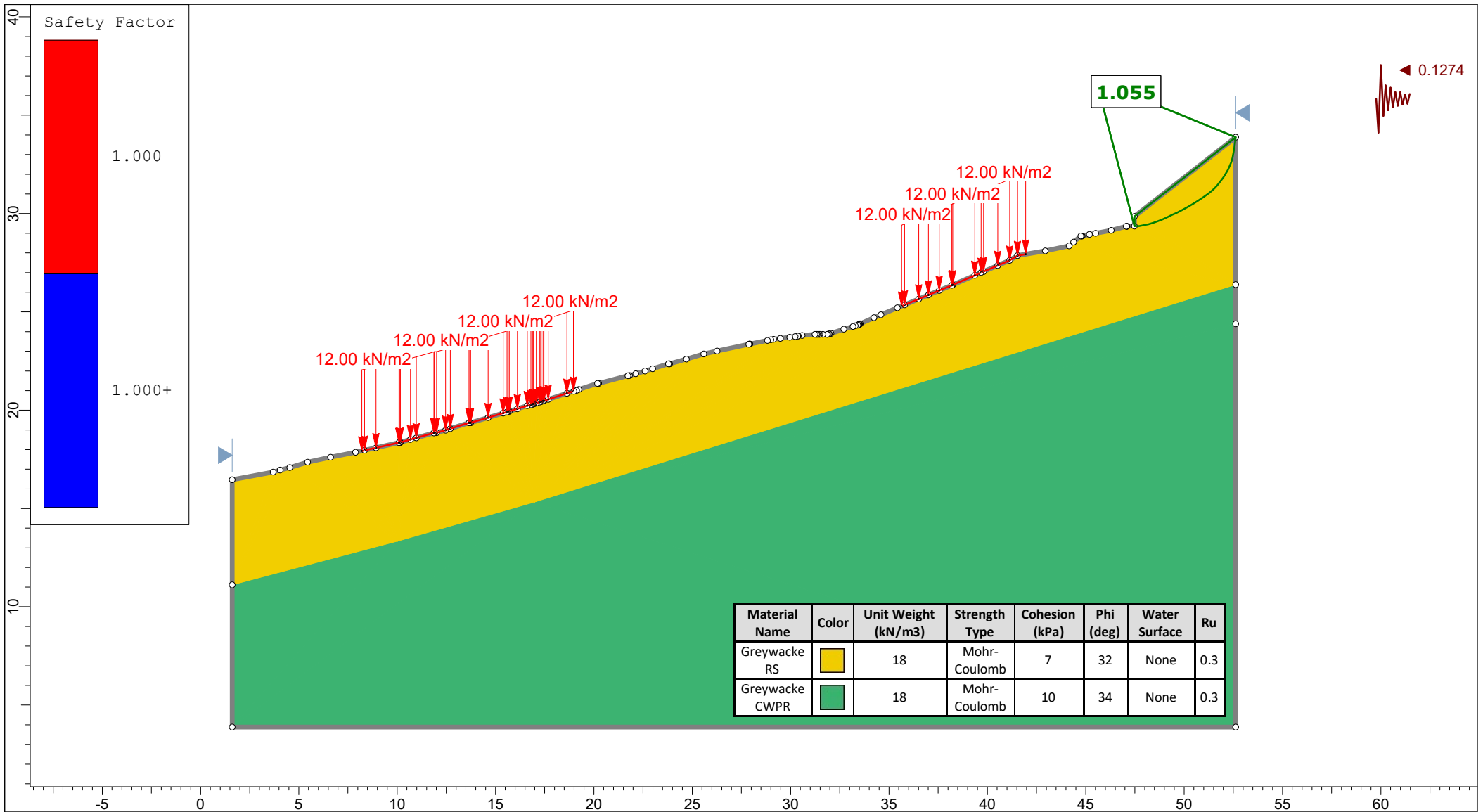



 <b>geologix</b> consulting engineers	Project		C0372 - 13 Binnie Street, Paihia			
	Group		Proposed Condition	Scenario	Static	
	Drawn By		SBS	Company		Geologix Consulting Engineers Ltd
	Date		16/10/2023	File Name		C0372 Slope Analysis.slm





 <p><b>geologix</b> consulting engineers</p>	Project		C0372 - 13 Binnie Street, Paihia		
	Group		Proposed Condition	Scenario	Elevated GW
	Drawn By		SBS	Company	Geologix Consulting Engineers Ltd
	Date		16/10/2023	File Name	C0372 Slope Analysis.slm



 <b>geologix</b> consulting engineers	Project		C0372 - 13 Binnie Street, Paihia	
	Group	Proposed Condition	Scenario	Seismic
	Drawn By	SBS	Company	Geologix Consulting Engineers Ltd
	Date	16/10/2023	File Name	C0372 Slope Analysis.slm