WALKER ENGINEERING CONSULTANTS

# Geotechnical Assessment of Landslide Risk

142 Konini Road, Titiranga, Auckland, 0604

**Hugh Johnstone**

Project Reference: 24106

6 December 2025

M: +64 (0) 22 534 4973
E: peter@walkereng.co.nz
W: www.walkereng.co.nz

Walker Engineering Consultants
1/133 Bayswater Avenue, Bayswater
Auckland, 0622

**Document Prepared by:**
Walker Engineering Consultants Limited (WEC)
1/133 Bayswater Avenue, Bayswater, Auckland, 0622

**Document Prepared for:**
Hugh Johnstone

Attention: Hugh Johnstone

**Project Information:**

| | |
|---|---|
| Client: | **Hugh Johnstone** |
| Document: | Geotechnical Assessment of Landslide Risk |
| Project Reference: | 24106 |
| Location: | 142 Konini Road, Titiranga, Auckland, 0604 |
| Proposal: | Proposed Extensions and Upgrades of an Existing Property |

**Revision History:**

| Revision Number: | Prepared by: | Description: | Date: |
|---|---|---|---|
| 01 | Peter Walker | Original Assessment | 27 November 2025 |
| 02 | Peter Walker | Updated Section 4.2, 4.6 | 6 December 2025 |

**Document Applicability:**

This report has been prepared for the benefit of the contractually engaged client with respect to the particular brief given to us, and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

If you require any further professional services or have any queries, please contact us.

Report prepared by:

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Peter Walker
**Director - Chartered Professional Engineer- Geotechnical & Structural**
CPEng, CMEngNZ, IntPE, B.Eng(Civil)(Hons), M.EngNZ (Civil/Geotech) (1st Hons)

Report reviewed and authorised by:

.....

Peter Walker
**Director - Chartered Professional Engineer - Geotechnical & Structural**
CPEng, CMEngNZ, IntPE, B.Eng(Civil)(Hons), M.EngNZ (Civil/Geotech) (1st Hons)

**M: +64 (0) 22 534 4973**
**E: peter@walkereng.co.nz**
**W: www.walkereng.co.nz**

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# 1 Introduction

Walker Engineering Consultants Limited (WEC) have been engaged by Hugh Johnstone to undertake a geotechnical assessment of the landslide risk for the Proposed Extensions and Upgrades of an Existing Property located at 142 Konini Road, Titiranga, Auckland, 0604.

The assessment must accompany a resource consent application. The requirement is due to a recent Auckland Unitary Plan Change 120, which requires a landslide hazard risk assessment in accordance with PC120 Appendix 24 for landslide susceptible areas. The requirement from Plan Change 120: E36.9. - Natural hazards and flooding is outlined below:

3) "A landslide hazard risk assessment prepared by a suitably qualified and experienced person in accordance with Appendix 24 Landslide hazard risk assessment methodology must accompany a resource consent application for the subdivision, use or development of land within a landslide hazard area. "

This assessment's purpose is to cover the landslide hazard risk assessment for the specific site in detail through reviewing all existing documentation, designs, site features, geotechnical information, online map information, and the planned upgrades. PC120 Appendix 24 has been followed, as outlined in the Appendix A documentation attached to this report. This assessment should be read in conjunction with the other documents submitted in support of the consent—particularly the existing geotechnical assessment report included in Appendix B, which provides supporting context and is directly relevant to this assessment.

# 2 Existing Documentation

A number of existing assessments and design documents relevant to the site were reviewed in conjunction with this assessment. Table 1 provides a summary of the key documents to be considered in combination with this report.

*Table 1: Summary of Important Existing Documentation*

| Documents in Reading Order: | Document: | Party: |
|---|---|---|
| 01 | Geotechnical Report: Covers geotechnical investigation testing, geotechnical analysis, natural hazards reporting, soil bearing capacity reporting and general geotechnical reporting aspects | Walker Engineering Consultants Limited |
| 02 | Stormwater Report:<br>Stormwater assessment report and specifications of detention tanks. Includes new cover letter which covers existing design aspects. | Walker Engineering Consultants Limited |
| 03 | Architectural Drawings showing the Layout:<br>Site Plan Drawings of the overall proposed layout | Technitrades Architecture |
| 04 | Architectural Drawings of the Alterations of the Existing House:<br>Drawings of the Alterations of the Existing House | Technitrades Architecture |
| 05 | Architectural Drawings of the New Garage Area:<br>Drawings of the New Garage Area requiring Resource Consent | Technitrades Architecture |
| 06 | Architectural Drawings of the New Pool, Pool Shed, Breezeway & Decking:<br>Drawings of the New Pool, Pool Shed, Breezeway & Decking Area | Technitrades Architecture |
| 07 | Structural and Civil Engineering Drawings for all Works:<br>Covers structural, civil, stormwater and geotechnical design drawings. | Walker Engineering Consultants Limited |
| 08 | PS1 and Design Certificate of Works:<br>Covers final engineering signoffs for the designed items | Walker Engineering Consultants Limited |
| 09 | Structural Design Report : Structural Design Report covering inspection lists and structural design reporting | Walker Engineering Consultants Limited |
| 10 | Engineering Design Calculations: Covers engineering design calculations of structures, foundations and retaining walls. | Walker Engineering Consultants Limited |

# 3 Site Description and Proposed Development Summary

The site location is shown in Figure 1. Figure 2 illustrates the current existing structures on the site. The proposed dwelling extension concept is shown in Figure 3. A new pool house and new pool, which includes a

decking area, is proposed on the southern side of the existing building. The proposed new pool is to replace an existing pool. A new garage is proposed to replace the existing carport and storeroom, which is located on the northern side of the existing dwelling. The existing house is being extended in area to the south and as part of the extension the owner is proposing to replace and alter various building elements in the existing structure. A timber retaining wall is proposed on the northern side to provide stability to the new garage. The building components for the extensions and new works consist of lightweight timber framed flooring, timber walls, timber roofing, reinforced block walls and timber retaining walls. The majority of the site earthworks are expected to be limited to excavating down to the underside of the new garage foundations and the fill materials behind the proposed retaining walls.

*Figure 1: Site Location*

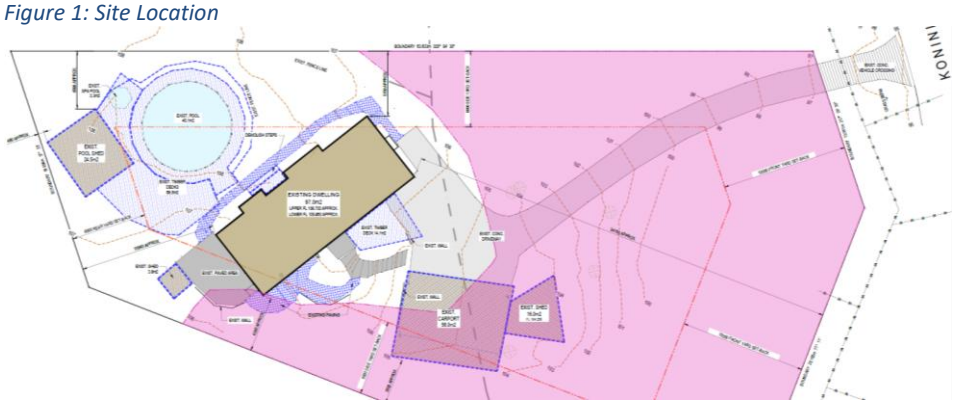



*Figure 2: Existing Site*


*Figure 3: Proposed Building Footprint Extension*

# 4 Landslide Risk Assessments and Geotechnical Review Procedure

A landslide hazard risk assessment was carried out in accordance with Appendix 24 of PC120. The attached Appendix A figures include clearly marked maps following the procedure taken for the specific site and illustrating the areas of shallow and large-scale landslide susceptibility, consistent with the Stage 1 assessment methodology. Steps 2 - 4, along with the assessed ranking, is illustrated in Appendix A.

## 4.1 Stage 1 Desktop Assessment

A review of existing landslide inventories for the site has been completed, including the Auckland Council GeoMaps database, the GNS Science Te Pū Ao New Zealand Landslide Database, and the MBIE New Zealand Landslide Database. This review confirms that **no mapped landslides**—recent or historic—are present within or directly affecting the project site. A review of the landslide susceptibility mapping assigned to the site in Auckland Council GeoMaps has also been undertaken. The mapped categories are as follows as illustrated in Appendix A:

- Shallow landslide susceptibility: **Very Low to Medium.**
- Large-scale landslide susceptibility: **High.**

The highest susceptibility class mapped for the site is therefore **High**. Accordingly, the Stage 1 assessment indicates **high susceptibility to large-scale landslides** and **very low to very medium susceptibility to shallow landslides**. It is noted that the Level A assessment is derived primarily from slope gradients and regional-scale hazard mapping, and is therefore not site-specific.

Given these findings, the site warrants further assessment in subsequent stages, including a detailed geotechnical review by a Chartered Professional Geotechnical Engineer (CPEng). This will involve a refined risk assessment incorporating existing geotechnical reports, on-site geomorphological observations, slope evaluations, and an assessment of the proposed works. These tasks will form Stages 2 to 4 of the assessment process.

## 4.2 Stage 2 Risk Assessment Method Selection

Table 1 of Appendix 24 of PC120, read in conjunction with the definitions in Chapter J1, provides the appropriate risk-assessment framework for the natural hazard activity associated with the proposed works on this site. Stage 2's process is to carry out an engineering geological model which has already been developed for the site and is documented in detail in WEC's Geotechnical Assessment Report (2025) which is attached in Appendix B. A summary is provided in Figure 4, which should be read in conjunction with the geotechnical assessment report.

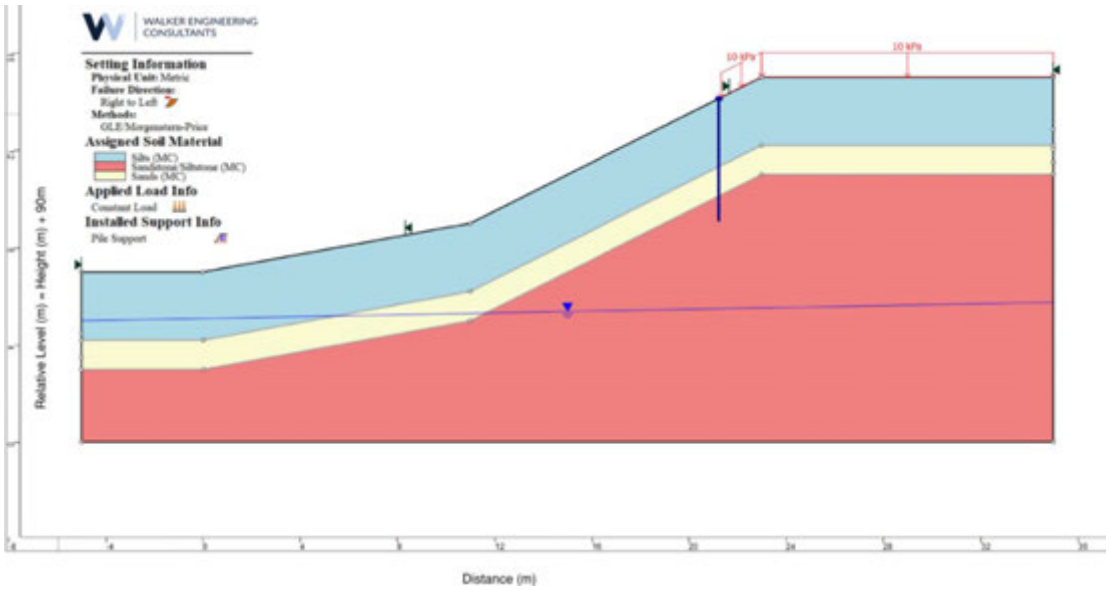



*Figure 4: Summary of Ground Model*

## 4.3 Stage 3 Risk Classification

A semi-quantitative risk assessment (Method 1) was carried out in accordance with the Appendix 24 methodology, as summarised in Appendix A of this report. The assessment requires evaluation of three potential landslide scenarios on the site. Refer to **Figure 5** for the indicative scenario layouts.

The three scenarios considered are:

1. Landslide Scenario 1 - Highest Chance of Likelihood:
   - Likelihood Category: Unlikely.
   - Description of Event: Shallow mass movement confined to the near-surface soils due to material being weaker in the upper surfaces.

2. Landslide Scenario 2 - Highest Chance of Likelihood:
   - Likelihood Category: Rare.
   - Description of Event: Shallow mass movement with a deeper failure profile extending below the new retaining wall.

3. Landslide Scenario 3 – Maximum Credible Event:
   - Likelihood Category: Barely Credible
   - Description of Event: Deep-seated mass movement to represent a large landslide event.

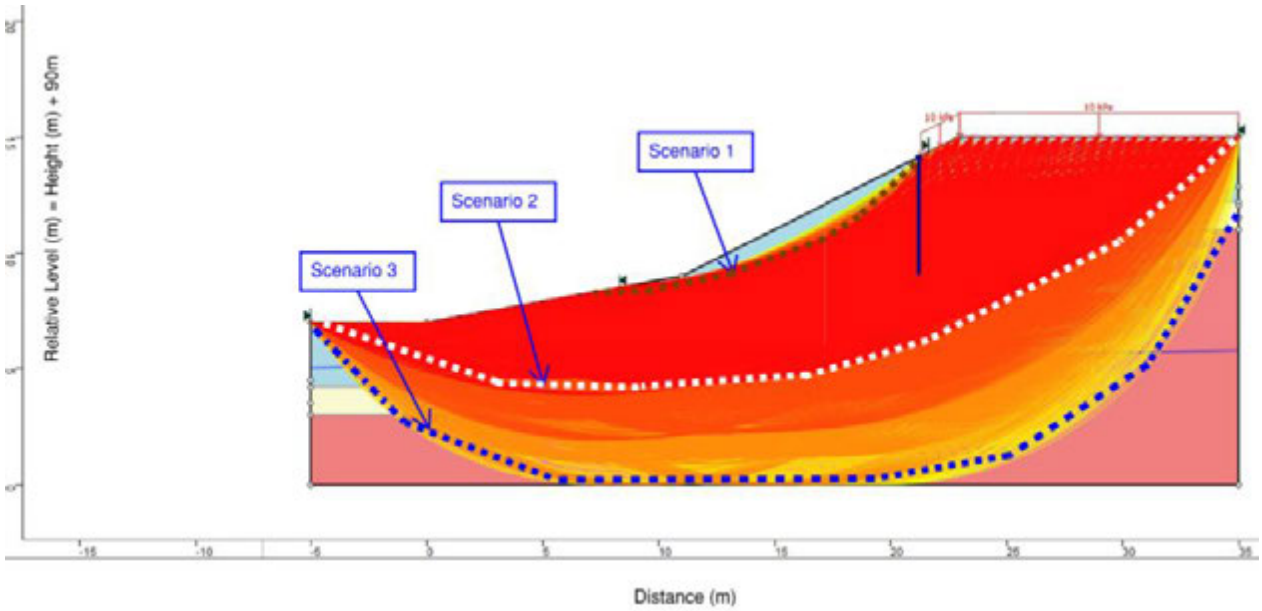



*Figure 5: Indicative Landslide Scenarios Considered*

Using Table 1 - 6 of Appendix 24, the risk classification for each scenario has been assessed as follows:

- Scenario 1: Unlikely **+ Medium consequences** → Low (acceptable) risk
- Scenario 2: Rare **+ Major consequence** → Low (acceptable) risk
- Scenario 3: Barely **credible + Major consequence** → Low (acceptable) risk

Based on the above, the overall risk classification for the site is assessed as Low (acceptable).

## 4.4 Stage 4 Activity Status - Landslide Risk Evaluation

The activity status of the proposed works in relation to natural hazards has been evaluated with reference to Table E36.4.1B of Chapter E36 – *Natural Hazards and Flooding* (PC120). Based on the outcomes of the site-specific Appendix 24 landslide hazard risk assessment, the site is classified as being within a **Low (Acceptable) landslide hazard risk area**.

Accordingly, the following provisions apply to the proposed works:

- **Rule E36.4.1B(A112):** The construction of a widened and regraded accessway and the installation of private stormwater pipes within a Low (Acceptable) landslide hazard risk area are classified as a **Permitted Activity**, provided compliance is achieved with Standard **E36.6.A1**.
- **Rule E36.4.1B(A124):** The construction of new structures and buildings—including the proposed retaining wall along the eastern boundary, garage/workshop, breezeway, and pool house—as well as additions and alterations to an existing building (existing as at 03/11/25) involving an increase of more than 20 m² of gross floor area associated with an **activity sensitive to natural hazards**, are classified as a **Permitted Activity**, provided compliance is achieved with Standard **E36.6.A1**.

For the purposes of demonstrating compliance with **Standard E36.6.A1**, we note the following:

- **E36.6.A1(1)(a):** A geotechnical report prepared by a suitably qualified and experienced person (SQEP), in accordance with Auckland Council's Code of Practice for Land Development and Subdivision – Section 2, has been provided in support of this application.
- **E36.6.A1(1)(b):** A hazard risk assessment prepared by a SQEP has been undertaken in accordance with **Appendix 24** and the **E36.9 hazard assessment matters**. This assessment confirms the overall risk level for the proposed works to be **Low (Acceptable)**.
- **E36.6.A1(1)(c):** Council retains the ability to impose conditions relating to geotechnical or landslide risk matters. The applicant is open to adopting any reasonable conditions that may be imposed, subject to further review.

Based on the above, the proposed works qualify as Permitted Activities under Rules E36.4.1B(A112) and E36.4.1B(A124), subject to continued compliance with Standard E36.6.A1.

## 4.5 Landslide Susceptibility - Site Specific Engineering Observations

The geotechnical assessment report, together with this landslide hazard assessment, addresses a range of slope-stability and natural hazard considerations. Key site-specific observations relevant to landslide susceptibility are summarised below:

1. **Slippage Risk:** Site investigations confirm a thin topsoil layer underlain by stiff to very stiff clays, which overlie hard to very dense siltstone/sandstone bedrock. Subsurface materials exhibited high strength and stiffness, as evidenced by difficult augering, resistance during trial pit excavation, and geotechnical strength indicators. These conditions are consistent with a generally stable slope profile. The likelihood of slope instability affecting the proposed development or neighbouring properties is therefore considered **low**. Slope stability analyses undertaken support this conclusion. Provided all proposed earthworks are appropriately battered or retained in accordance with standard engineering practice, no significant risk of localised shallow instability is anticipated.

2. **Erosion:** No significant erosion features or active surface degradation were observed during field investigations. Long-term site drainage should continue to direct runoff away from building platforms, slope edges, and neighbouring properties to avoid concentration of water. Standard temporary erosion and

sediment controls will be required during the earthworks phase, and permanent stabilisation (vegetation or planting) should be implemented as appropriate to protect exposed surfaces.

3. **Stormwater Management:** A stormwater management assessment has been completed to address increased runoff from new impermeable areas. The use of detention tanks will attenuate peak flows and reduce uncontrolled discharge over slopes, thereby lowering the potential for erosion or shallow slope movement. These stormwater measures will contribute positively to maintaining overall slope stability.

4. **Falling Debris:** The potential for falling debris originating from upslope areas is assessed as **very low**. The existing dwelling is located upslope of the proposed works at the garage area. In addition, the upper slope above the pool area contains dense, well-established vegetation with deep root systems, providing additional stabilisation and reducing the likelihood of debris mobilisation.

The combined assessment confirms that landslide risk at the site is **low and acceptable**. Potential shallow instability risks can be further effectively mitigated through the proposed retaining structures, foundation systems, and appropriate earthworks management. These measures have been developed with the site's slope geometry, soil conditions, and groundwater behaviour in mind. Overall, the proposed works are expected to improve local slope stability, and the likelihood of landslide effects on structures or occupants remains low.

### 4.6 Hazard Risk Assessment in Accordance with E36.9

An evaluation of natural hazard risk in accordance with **E36.9** of the Auckland Unitary Plan (PC120) was previously completed as part of the original geotechnical report. This assessment, included in **Appendix D**, addresses all hazard risk assessment matters listed under E36.9(a–l), including the potential natural hazard effects arising from the proposed works and the sensitivity of the activity to those hazards.

When assessed against the E36.9 matters, the proposed works **do not increase natural hazard risk** and remain appropriate for a site classified as having a **Low (Acceptable) landslide hazard risk**. These findings confirm compliance with **Standard E36.6.A1(1)(b)**, which requires a hazard risk assessment prepared by a suitably qualified and experienced person (SQEP).

For full details of the E36.9 assessment, refer to **Appendix D of the original geotechnical report**.

## 5 Conclusion

A detailed geotechnical review and landslide hazard risk assessment have been undertaken by an experienced Chartered Professional Geotechnical Engineer. The assessment incorporated site observations, existing geotechnical data, council guidance, natural hazard requirements, first-principles analysis, and both qualitative and quantitative risk methods.

The resulting evaluation confirms that the landslide risk associated with the proposed works is **low and acceptable** in accordance with the relevant planning and engineering criteria.

## 6 Report Limitations

This report and recommendations have been prepared by Walker Engineering Consultants Limited to complete the agreed scope as outlined above. The recommendations in this report do not supersede the recommendations of other engineering reports and shall be considered in conjunction with all other information available for the site. Should you be in any doubt as to the recommendations of this report, it is essential that you discuss these issues with Walker Engineering Consultants prior to proceeding with any work based on this report.

Testing portrays a limited percentage of ground conditions at this site and may not be representative of all soils present on the site. During excavation and construction, the site should be examined by a suitably qualified engineer in order to assess whether the exposed subsoils are compatible with the inferred soil conditions on which the recommendations have been based and potentially, further investigation and design rationalisation may be required.

Inspections and engineering reviews are essential during construction, as specified in this document. These steps should be undertaken as part of the construction monitoring phase to obtain the final engineering approval, which is indicated by the Producer Statement 4 document. This document is vital for meeting the code of compliance standards.

## 7 Attachments

Please refer to the relevant appendix attachments below that form part of the report documentation. The attachments can be found either embedded in this report or saved separately as per the council's consenting requirements or as per the external party's updated documentation

## 8 References


Ishihara, K. (1985). Stability of natural soil deposits during earthquakes. *International Conference on Soil Mechanics and Foundation Engineering.*

Leonard, G. S., et al. (2010). Geological maps. *Institute of Geological and Nuclear Sciences.*

MBIE. (2021a). AS/VM B1 - Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure. Ministry of Business, Innovation & Employment (MBIE).

MBIE. (2021b). Earthquake Geotechnical Engineering Practice: Module 1–6. New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation & Employment (MBIE).

Stockwell, M. (1977). Determination of allowable bearing pressure under small structures. *New Zealand Engineering, 32*(6), 15 June 1977.

Baynes, F. J., & Parry, S. (2024). Guidelines for the development and application of engineering geological models on projects (Version 2.0). International Association for Engineering Geology and the Environment (IAEG) Commission 25 Publication No. 1. Retrieved from https://www.iaeg.info/C25EGMGuidelines/

Auckland Council. (2025). Auckland Region Landslide Susceptibility Assessment (Technical Report TR2025/7). May 2025.

Auckland Council. (2023). Plan Change 120: Housing Intensification and Resilience – E36 Natural Hazards and Flooding.

GNS Science. (n.d.). New Zealand Landslide Database. Retrieved November 2025, from https://data.gns.cri.nz/landslides/

## Appendix A: Landslide Map Reviews and Geotechnical Process

Immediate legal effect under s86B(3)(f) RMA

## Process overview

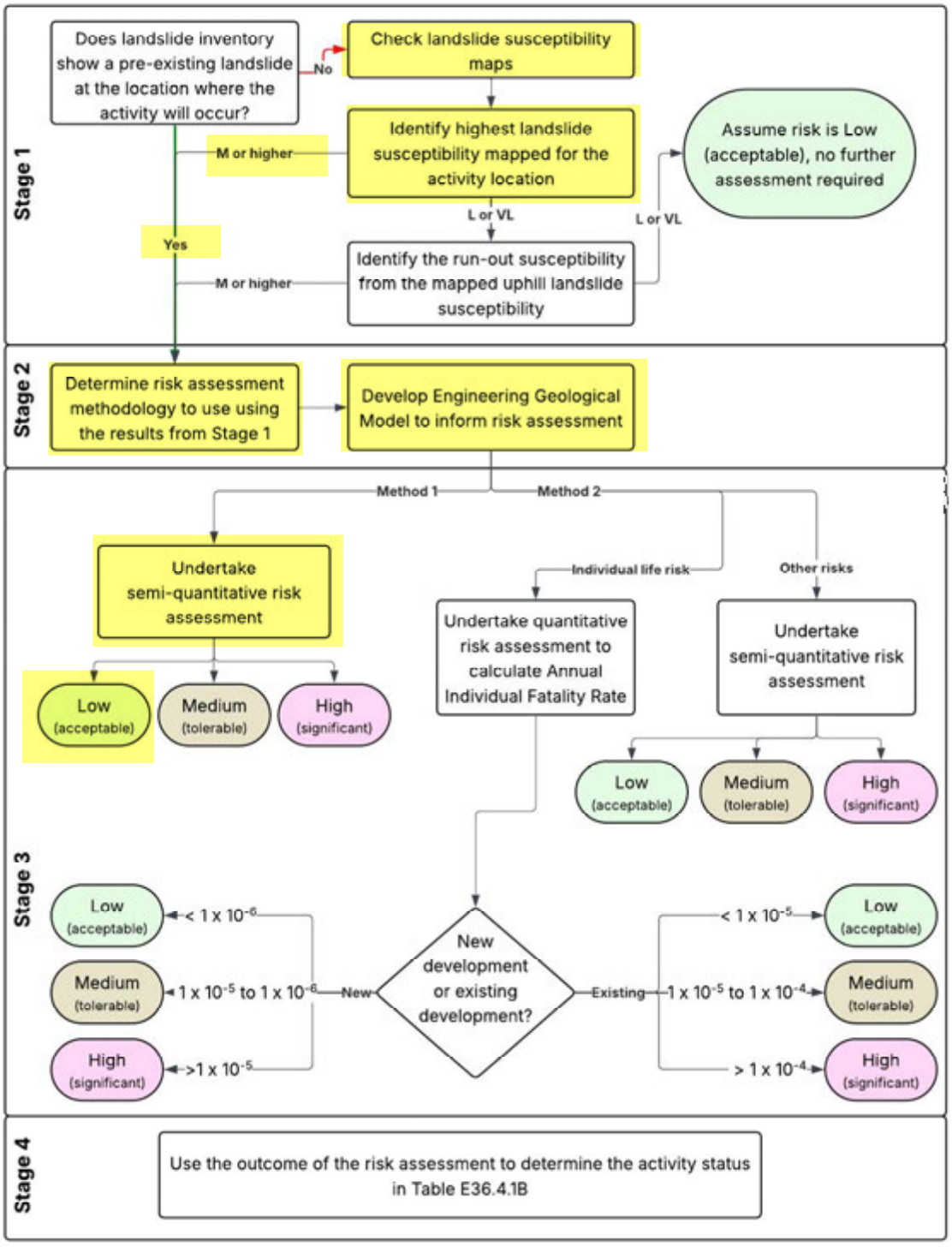
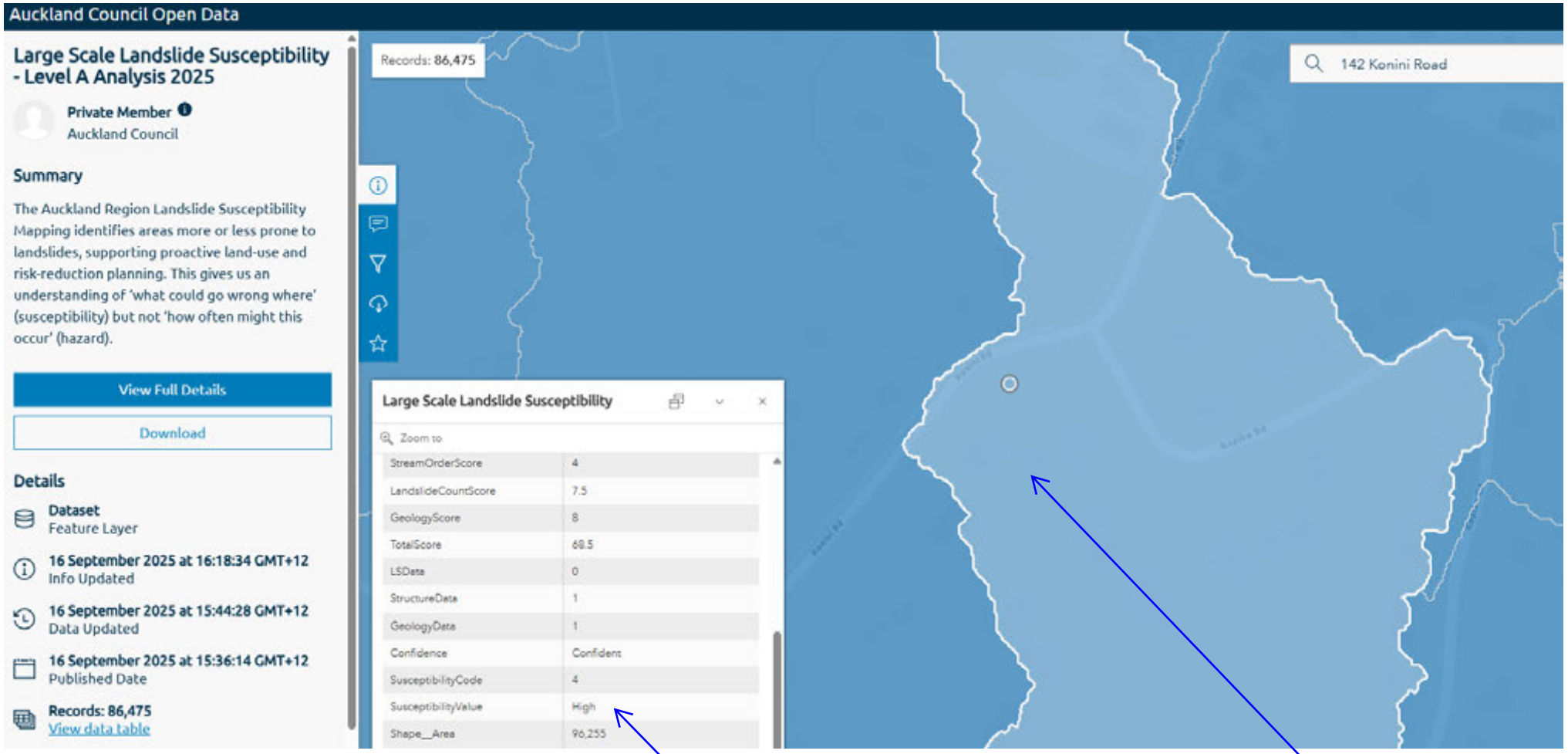
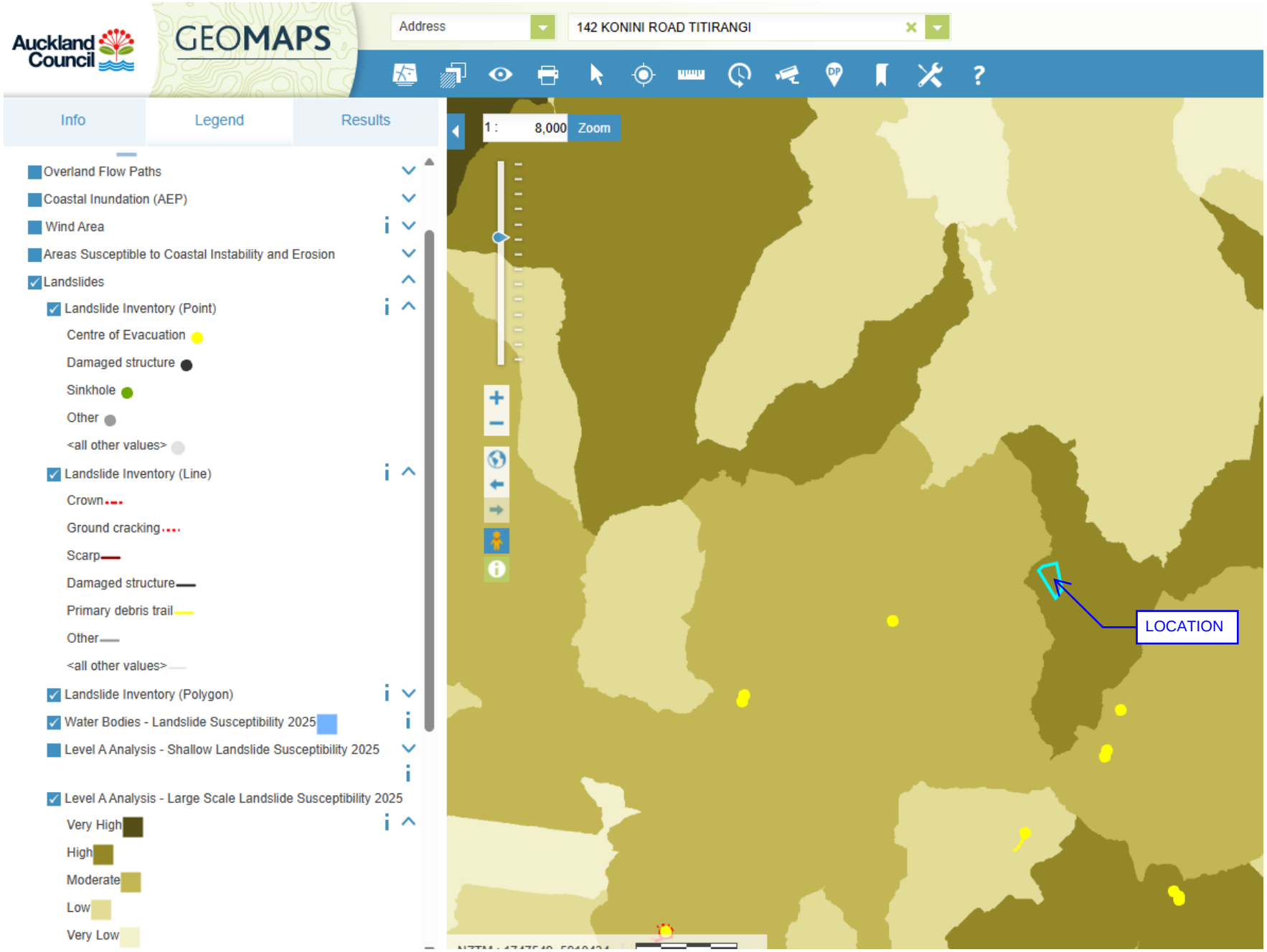



*Figure 2 Detailed process map*

Figure 2 shows a more detailed explanation of the stages required for a landslide risk assessment undertaken for the purposes of land use planning in Auckland.

# LARGE-SCALE LANDSLIDE SUSCEPTIBILITY MAP OUTPUTS




Auckland Council
GEOMAPS
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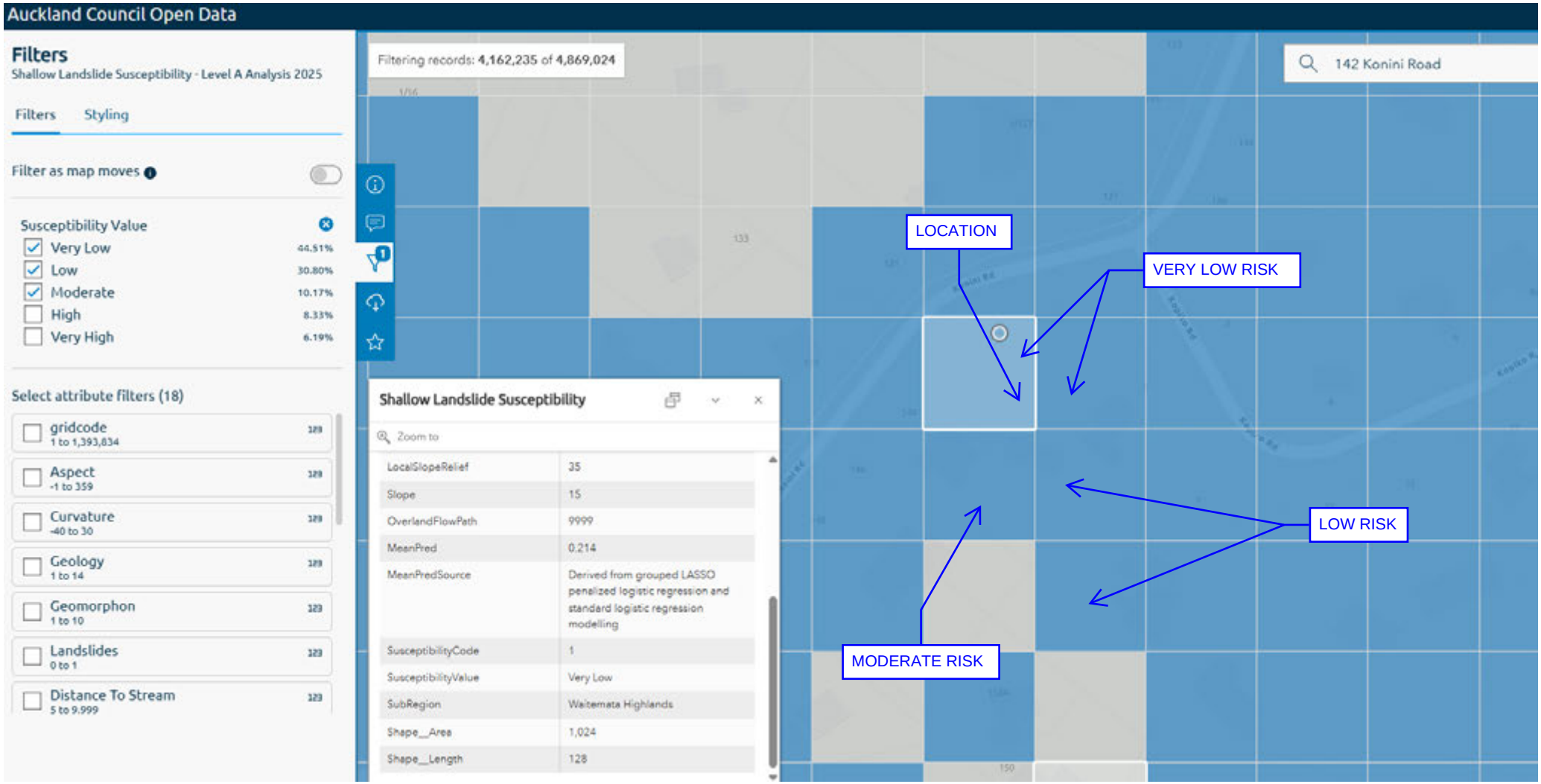
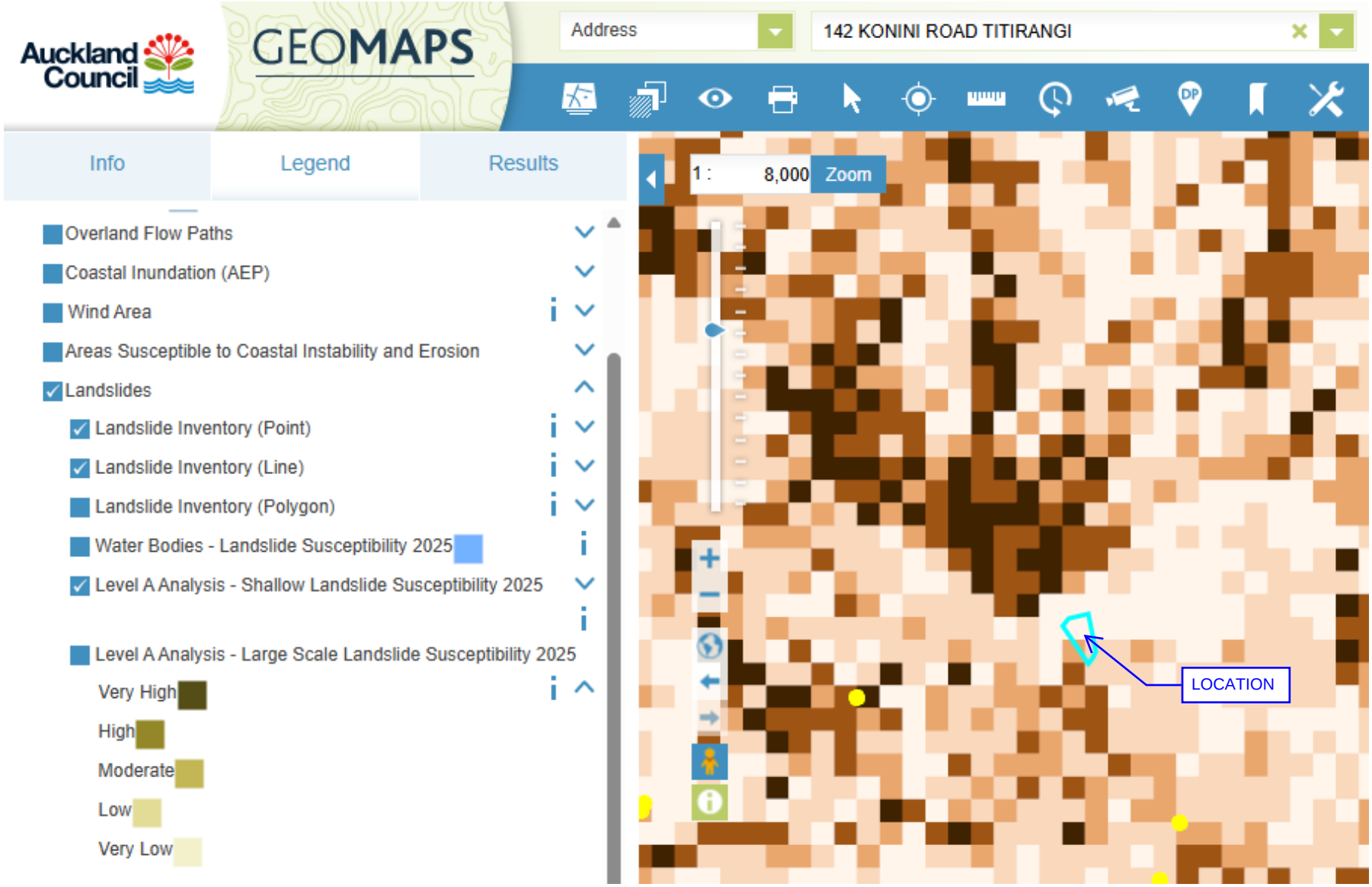
142 KONINI ROAD TITIRANGI
Info
Legend
Results
1 : 8,000
Zoom
Overland Flow Paths
Coastal Inundation (AEP)
Wind Area
Areas Susceptible to Coastal Instability and Erosion
Landslides
Landslide Inventory (Point)
Centre of Evacuation
Damaged structure
Sinkhole
Other
<all other values>
Landslide Inventory (Line)
Crown
Ground cracking
Scarp
Damaged structure
Primary debris trail
Other
<all other values>
Landslide Inventory (Polygon)
Water Bodies - Landslide Susceptibility 2025
Level A Analysis - Shallow Landslide Susceptibility 2025
Level A Analysis - Large Scale Landslide Susceptibility 2025
Very High
High
Moderate
Low
Very Low
LOCATION

# SHALLOW-SCALE LANDSLIDE SUSCEPTIBILITY MAP OUTPUTS

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Overland Flow Paths
Coastal Inundation (AEP)
Wind Area
Areas Susceptible to Coastal Instability and Erosion
Landslides
Landslide Inventory (Point)
Landslide Inventory (Line)
Landslide Inventory (Polygon)
Water Bodies - Landslide Susceptibility 2025
Level A Analysis - Shallow Landslide Susceptibility 2025
Level A Analysis - Large Scale Landslide Susceptibility 2025
Very High
High
Moderate
Low
Very Low
1 : 8,000
Zoom
LOCATION

Immediate legal effect under s86B(3)(f) RMA

| Land use activity | Landslide susceptibility class from Auckland Council published landslide susceptibility and landslide inventory maps | | | | |
|---|---|---|---|---|---|
| | Mapped landslide | | VH | H | M |
| | Recent | Ancient | | | |
| Activities potentially sensitive to natural hazards | 2 | 1 | 1 | 1 | 1 |
| Activities less sensitive to natural hazards | 1 | 1 | 1 | 1 | N/A |
| On-site septic tanks, wastewater treatment and disposal systems, effluent disposal fields, underground storage tanks, water tanks (including rainwater tanks) or stormwater pipes or soakage fields, accessways and private roads | 2 | 1 | 2 | 2 | 1 |
| Re-building of materially damaged or destroyed buildings | 2 | 1 | 2 | 2 | 2 |
| Storage of hazardous substances | 2 | 1 | 1 | 1 | 1 |
| Earthworks | 1 | 1 | 1 | 1 | 1 |
| Vegetation alteration or removal | 1 | 1 | 1 | 1 | 1 |
| Discharge of stormwater and/or wastewater directly to ground | 1 | 1 | 1 | 1 | 1 |

*Table 1 - Initial method (1 or 2) to be used to assess landslide risk for each combination of mapped landslide susceptibility and land use activity . Where the method shown is N/A, no further risk assessment is required and the risk can be taken as Low.*

| Land use changes | Landslide susceptibility class from Auckland Council published landslide susceptibility and landslide inventory maps | | | | |
|---|---|---|---|---|---|
| | Mapped landslide | | VH | H | M |
| | Recent | Ancient | | | |
| Plan Change proposal to residential zoning (not including large-lot and rural and coastal settlements) | 2 | 1 | 2 | 2 | 1 |
| Plan change proposal to rural (countryside living, Waitakere Ranges and foothills), business, future urban or residential (large lot and rural and coastal settlements) zoning | 1 | 1 | 1 | 1 | N/A |
| Plan change proposal to rural (rural production, mixed rural, rural conservation and rural coastal) and open space zoning | 1 | 1 | 1 | N/A | N/A |

Immediate legal effect under s86B(3)(f) RMA

*Table 2 - Initial method (1 or 2) to be used to assess landslide risk for each combination of mapped landslide susceptibility and land use change. Where the method shown is N/A, no further risk assessment is required and the risk can be taken as Low.*

*Note 1 - Applicants can choose to use a more comprehensive method than the minimum given in Table 1or Table 2 to provide a more robust level of analysis and greater certainty of risk level; in some cases this may achieve a preferred outcome (e.g. a lower risk class).*

(2.2) Develop an Engineering Geological Model[2] for the landslide hazard risk assessment area, incorporating the information gathered in the Desk Study (Stage 1) and any other relevant information, to develop credible landslide hazard scenarios to inform the risk assessment process.

**Stage 3 Overview**

For Stage 3 and in relation to the landslide hazard risk assessment area, the risk will be assessed:

- semi-quantitatively (for planning applications with lower anticipated landslide risk significance) using Method 1
- both semi-quantitatively and quantitatively (for planning applications with higher anticipated landslide risk significance) using Method 2

**Stage 3 - Method 1**

(3.1.1) Use the Engineering Geological Model to identify three landslide hazard scenarios. These should represent a high likelihood, median likelihood, and the maximum credible event, using the best available information.

(3.1.2) Use the likelihood table (Table ) to assign a likelihood category to each landslide hazard scenario. The likelihood assessment shall include consideration of the effect of climate change and should use the Shared Socio-Economic Pathway (SSP) scenario SSP5-8.5 presented in Auckland Council Guidance Document 15:Climate Change Scenarios(GD15) November 2024 and any subsequent replacement or revisions of this document..

(3.1.3) Use the applicable consequences table (Table 4 or Table , depending on the size of the proposed landslide hazard risk assessment area ) to assess the consequences for each of the three landslide hazard scenarios by selecting the highest applicable consequence category for every relevant assessment category.

*Note 2 - Where the consequence category descriptions are not directly applicable to the proposed development or scenario, it is acceptable to develop equivalent category descriptions that are similar in relation to the overall risk level being described.*

(3.1.4) Assess the risk classification for each landslide hazard scenario using Table 6 to combine the likelihood category of the scenario and the highest consequence category

[2] The model should be consistent with the methods and approaches described in the International Association of Engineering Geology and the Environment Commission 25 report (Baynes & Parry, 2024). https://iaeg.info/c25egmguidelines/

Immediate legal effect under s86B(3)(f) RMA

assessed for that scenario to identify its risk classification. The landslide hazard scenario with the highest risk classification level shall be carried through to Stage 4.

| **Likelihood category** | **Likelihood descriptor** | **Indicative value of approximate annual probability** | | **Equivalent AEP** |
|---|---|---|---|---|
| Almost certain | The event is expected to occur over the likely duration of the activity | $10^{-1}$ | 1 in 10 | 10% |
| Likely | The event will probably occur under adverse conditions over the likely duration of the activity | $10^{-2}$ | 1 in 100 | 1% |
| Possible | The event could occur under adverse conditions over the likely duration of the activity | $10^{-3}$ | 1 in 1000 | 0.1% |
| Unlikely | The event might occur under very adverse circumstances over the likely duration of the activity | $10^{-4}$ | 1 in 10,000 | 0.01% |
| Rare | The event is conceivable but only under exceptional circumstances over the likely duration of the activity | $10^{-5}$ | 1 in 100,000 | 0.001% |
| Barely credible | The event is inconceivable or fanciful over the likely duration of the activity | $10^{-6}$ | 1 in 1,000,000 | 0.0001% |

*Table 3 - Likelihood categories (in case of any contradiction between the likelihood descriptor and the numerical values of probability or AEP, the written descriptor takes precedence)*

## Consequence table for a landslide hazard assessment area less than 5ha

Immediate legal effect under s86B(3)(f) RMA

| Consequence category | Assessment category: Human safety | Critical buildings | Community buildings | Buildings accommodating activities sensitive or potentially sensitive to natural hazards (not including critical buildings or community buildings) |
|---|---|---|---|---|
| Catastrophic | >10 dead and/or >1000 injured | Building unusable for >1 week | Building unusable for more than 1 month | Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage. |
| Major | 1-10 dead and/or 101-1000 injured | Evacuation of building required and/or building unusable for 1 week or less | Building unusable for 1 week to 1 month | Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage. |
| Medium | 0 dead, 11-100 injured | Building in landslide hazard risk assessment area but useability not affected | Evacuation of building required and/or building unusable for 1 week or less | Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage. |
| Minor | 0 dead, 1-10 injured | N/A | Building in landslide hazard risk assessment area but useability not affected | Limited damage to part of structure, and/or part of site requiring some reinstatement stabilisation works. |
| Insignificant | 0 dead, 0 injured | Building outside landslide hazard risk assessment area and useability not affected | Building outside landslide hazard risk assessment area and useability not affected | Little damage. |

*Table 5 - Consequence table for a landslide hazard assessment area of less than 5ha*

*NB for the purpose of Tables 4-5:*

Immediate legal effect under s86B(3)(f) RMA

*• the term "Critical buildings" means buildings which have a post-disaster function and includes emergency services, hospitals and healthcare facilities.*
*• the term "Community buildings" means community facilities, correction facilities and educational facilities.*
*• the terms "Activities sensitive to natural hazards" and "Activities potentially sensitive to natural hazards" are defined in Chapter J of the Auckland Unitary Plan.*

**Risk classification table:**

| | | Consequence category | | | | |
|---|---|---|---|---|---|---|
| | | **Insignificant** | **Minor** | **Medium** | **Major** | **Catastrophic** |
| **Likelihood category** | **Almost certain** | Medium (tolerable) | High (significant) | High (significant) | High (significant) | High (significant) |
| | **Likely** | Low (acceptable) | Medium (tolerable) | High (significant) | High (significant) | High (significant) |
| | **Possible** | Low (acceptable) | Low (acceptable) | Medium (tolerable) | High (significant) | High (significant) |
| | **Unlikely** | Low (acceptable) | Low (acceptable) | Low (acceptable) | Medium (tolerable) | High (significant) |
| | **Rare** | Low (acceptable) | Low (acceptable) | Low (acceptable) | Low (acceptable) | Medium (tolerable) |
| | **Barely credible** | Low (acceptable) | Low (acceptable) | Low (acceptable) | Low (acceptable) | Low (acceptable) |

*Table 6 - Risk table combining consequence and likelihood*

**Stage 3 - Method 2**

Method 2 comprises two elements. Both are required to be undertaken in parallel so that the risks to life, society, and property can all be considered:

1. A semi-quantitative risk assessment which covers a wide range of potential impacts. The approach is identical to Method 1. If Method 1 has already been undertaken, the results from this earlier assessment can be used without revision.
2. A quantitative risk assessment which covers individual risk to life.

(3.2.1) Undertake a semi-quantitative risk assessment following steps 3.1.1 to 3.1.4.

(3.2.2) Use the Engineering Geological Model to develop a representative range of at least three landslide hazard scenarios with varying likelihoods to model, including the maximum credible event. These may be the same scenarios used in the semi-quantitative risk assessment.

(3.2.3) The likelihood assessment shall include consideration of the effect of climate change and should use the Shared Socio-Economic Pathway (SSP) scenario SSP5-8.5 presented in Auckland Council Guidance Document 15 "Climate Change Scenarios".

(3.2.4) Calculate the Annual Individual Fatality Risk (AIFR) for the person most at risk in each of the selected landslide hazard scenarios using the quantitative risk assessment equation below. These may be presented as an event tree (see details below) if preferred.

## Appendix B: Existing Geotechnical Report, Investigation Data and Geotechnical Model

**(If the document is not embedded in the report, refer to the separated latest PDF file revisions)**

# Geotechnical Assessment Report:
# 142 Konini Road, Titiranga, Auckland, 0604

**Hugh Johnstone**

Project Reference: 24106

18th April 2025

M: +64 (0) 22 534 4973
E: peter@walkereng.co.nz
W: www.walkereng.co.nz

Walker Engineering Consultants
1/133 Bayswater Avenue, Bayswater
Auckland, 0622

**Document Prepared by:**

Walker Engineering Consultants Limited (WEC)
1/133 Bayswater Avenue, Bayswater, Auckland, 0622

**Document Prepared for:**

**Hugh Johnstone**
142 Konini Road, Titiranga, Auckland, 0604

Attention: **Hugh Johnstone**

**Project Information:**

| | |
|---|---|
| Client: | **Hugh Johnstone** |
| Document: | Geotechnical Assessment Report |
| Project Reference: | 24106 |
| Location: | 142 Konini Road, Titiranga, Auckland, 0604 |
| Legal Description: | Lot 1 DP 57907 |
| Proposal: | Proposed Extensions and Upgrades of an Existing Property |

**Revision History:**

| Revision Number: | Prepared by: | Description: | Date: |
|---|---|---|---|
| 01 | Peter Walker | Original geotechnical report | 6th November 2024 |
| 02 | Peter Walker | Updates to include Hazard Risks | 3rd December 2024 |
| 03 | Peter Walker | Detailed slope stability assessment updates | 18th April 2025 |

**Document Applicability:**

This report has been prepared for the benefit of the contractually engaged client with respect to the particular brief given to us, and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement. If you require any further professional services or have any queries, please contact us.

Report prepared by:

.....
Peter Walker
**Director - Chartered Professional Engineer - Geotechnical & Structural**
CPEng, CMEngNZ, IntPE, B.Eng(Civil)(Hons), M.EngNZ (Civil/Geotech) (1st Hons)

Report authorised by:

.....
Peter Walker
**Director - Chartered Professional Engineer - Geotechnical & Structural**
CPEng, CMEngNZ, IntPE, B.Eng(Civil)(Hons), M.EngNZ (Civil/Geotech) (1st Hons)

**M: +64 (0) 22 534 4973**
**E: peter@walkereng.co.nz**
**W: www.walkereng.co.nz**

# Table of Content

# 1 Introduction

Walker Engineering Consultants Limited (WEC) has been engaged by Hugh Johnstone to provide engineering services that include the Geotechnical Assessments and Specific Engineering Design items for the Proposed Extensions and Upgrades of an Existing Property located at 142 Konini Road, Titiranga, Auckland, 0604.

This report summarises the geotechnical reviews and assessments carried out and confirms the suitability of the proposed foundation systems for the proposed house extension. The report provides an explanation of the site's features, seismic considerations, geotechnical interpretation, geotechnical assessments, ground parameters, and existing information, as well as how it applies to the proposed works. This report may support a Building Consent and Resource Consent application if the recommendations are followed.

The location of the existing dwelling and the proposed extension is shown in Figures 1 and 2. The concept drawings providing the engineering specifications and architectural layout are illustrated in Appendix C or submitted separately from this report. The most relevant geotechnical testing data and a map of test locations relative to the structure can be found in Appendix A. Photos of the existing site are shown in Appendix B.


*Figure 1: Site Location*

## 1.1 Scope

The scope of this report includes:

1. A summary of investigations and assessments relevant to the specific site and proposed works.
2. Recommendations of the type of foundations and retaining required.
3. Confirmation that a general geotechnical review of the drawings illustrating the foundation and retaining specifications has been completed.
4. Provide estimates of anticipated excavation amounts.

## 1.2 Proposed Development

The proposed dwelling extension concept is shown in Figure 2. Figure 3 illustrates the current existing structures on the site. A new pool house and new pool, which includes a decking area, is proposed on the southern side of the existing building. The proposed new pool is to replace an existing pool. A new garage is proposed to replace the existing carport and storeroom, which is located on the northern side of the existing dwelling. The existing house is being extended in area to the south and as part of the extension the owner is proposing to replace and alter various building elements in the existing structure. The existing dwelling is founded on shallow reinforced concrete foundations. A timber retaining wall is proposed on the northern side to provide stability to the new garage. Other proposed new walls include the 1m offset timber wall from the pool, block-reinforced walls for the garage, and the wall supporting the proposed extension. The building components for the extensions and new works consist of lightweight timber framed flooring, timber walls, timber roofing, reinforced block walls and timber retaining walls. Structural elements include reinforced block walls, timber posts, timber beams, and various timber elements that integrate with the extensions. The majority of the site earthworks are expected to be limited to excavating down to the underside of the new garage foundations and the fill materials behind the proposed retaining walls.

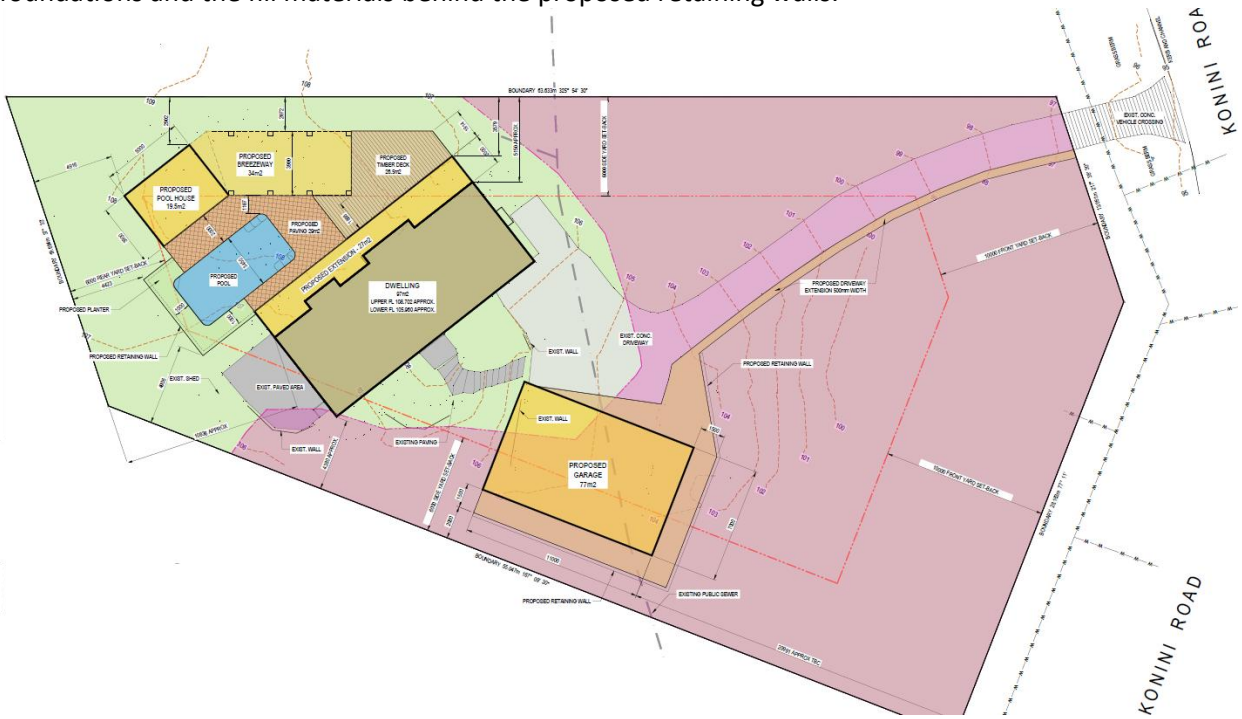



*Figure 2: Proposed Building Footprint Extension*

Geotechnical site-specific testing was completed for this site to confirm the suitability of the natural ground for this specific extension. For the purposes of our assessments, we have assumed that the proposed building structures are Importance Level 2 structures as defined by NZS1170.0:2002 Structural Design Actions Part 0 with a design life of 50 years.

## 1.3 Site Location and Description

The site is located at 142 Konini Road, Titiranga, Auckland, 0604 and is legally described as Lot 1 DP 57907.

The site consists of various existing structures, as illustrated in Figures 1 and 3. There is an existing driveway on the northeastern side that slopes up to the dwelling. The slope typically runs downwards from the south to the north direction. The existing dwelling is founded on a flattened-out area at the top of the slope.

The average slope is about 17% around the flattened-out dwelling area, and it varies between 1:6 and 1:3 gradients. It is clear that the ground is very stiff in the existing dwelling area, as physically observed in the below the basement existing foundations. The existing building was built in the 1950s. The plan is to retrofit the existing structure and extend it to make use of the open land areas. The intent of the new garage design is to provide better parking and a reduced driveway gradient into the property.

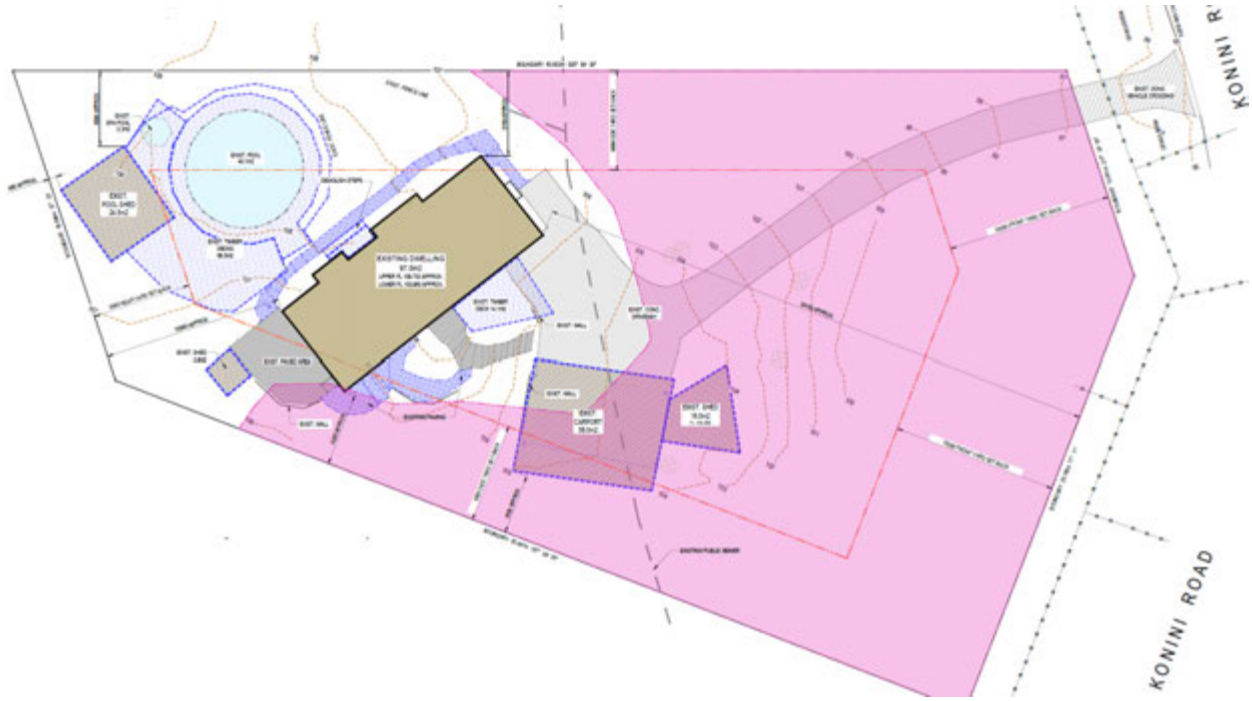



*Figure 3: Existing Site*

# 2 Desktop Study

## 2.1 Summary of Desktop Reviews

A desktop review study was conducted for the site to assess important features and possible relevance to the proposed works. The reviews included assessing GNS website, geotechnical testing on New Zealand's Geotechnical Database, the site's photos, the specific council's GIS map viewers, Google Earth Pro, and geotechnical maps of the area. Table 1 summarises the desktop review. Refer to the remaining chapter points for additional relevant items.

*Table 1: Summary of Desktop Reviews*

| Item | Comments Relevant to the Specific Site covering Natural hazards, Risks and Data |
|---|---|
| Previous geotechnical reports available | Not applicable. |
| Previous geotechnical testing available | Deep Borehole +-500m from the site as per NZGD map data. Sandstone/siltstone/ East Coast Bays formation rock (ECBF) was recorded below 3m - 4m depths. Firm to stiff silts or Weathered Cornwallis Formation recorded below ground up until ECBF layers. |
| Flood Hazard | Not affected. |
| Minimum floor level & flooding | Standard floor levels are required as per NZS3604. |
| Inundation Restriction Levels | Not affected. |
| Active Faulting | Outside of known active fault zones. |
| Liquefaction risks | Factors that affect the potential for liquefaction include high groundwater level, soil type, relative soil density, initial confining pressure, and the intensity and duration of ground shaking. Soils most susceptible to liquefaction are loose, uniformly graded sands and, to a lesser extent, silty sands located below the groundwater level. The ground water table for this site is relatively deep, and Auckland area has a lower seismic acceleration compared to common liquefaction-prone areas. The proposed building site is underlain by at least 2.00 m of non-saturated stiff clay materials, which are considered to form a natural raft that suppresses the surface manifestation of liquefaction. In addition, there are underlying sandstone/siltstone layers that are not associated with liquefaction manifestations. Taking into account these significant factors, liquefaction risks are considered to be highly unlikely for this area. |
| Landslide Susceptibility | Not applicable. |
| Buried Services | There is a buried 100mm diameter wastewater pipe, as illustrated in Figure 1 that runs below the driveway and existing carport and connects with the existing public sewer line located to the northeastern side of the property. The existing pipe will need to be located during construction if excavating works occur in the area to assess depths and ensure the proposed retaining wall posts are positioned on each side of the service. There are water lines shown on the northeastern side of the property. |
| Other Possible Services | It is noted that there may be other existing services that are not defined on maps or drawings, which is always a possibility for an existing site of this nature, and the Contractor completing the works would need to excavate with caution. |

## 2.2 Regional Geological Information

The published regional geology[1] for the area is outlined in Figure 4.

**NZL_GNS_250K_geological_units_scale500k.5896**

**NZL_GNS_250K_geological_units_scale500k**

- **geol_units:** 5897
- **geol_uni_1:** 29299
- **code:** eMi.sst20
- **unit_code:** Mwc
- **main_rock:** volcanic sandstone
- **sub_rocks:** siltstone
- **strat_unit:** Cornwallis Formation
- **stratlex:** Cornwallis Formation
- **supergroup:** Akarana Supergroup
- **group_equi:** Waitemata Group
- **subgroup_e:** Warkworth Subgroup
- **formation_:** Cornwallis Formation
- **strat_age:** eMi
- **abs_min:** 16.4
- **abs_max:** 23.8
- **confidence:** absolute age calculated from stratigraphic age range
- **descriptio:** Thick-bedded, graded, pebbly and gritty volcanic sandstone and thin-bedded fine sandstone and siltstone.
- **rock_group:** alternating sandstone/siltstone
- **rock_class:** clastic sediment
- **unique_cod:** eMi.wwc.sst
- **text_code:** Mwc
- **simple_nam:** Neogene sedimentary rocks
- **key_name:** Cornwallis Formation of Warkworth Subgroup (Waitemata Group)
- **key_group_:** Waitemata Group
- **qmap_name:** Auckland
- **qmap_numbe:** 3
- **basecolour:** 0 30 70 10


*Figure 4: Regional Geological Information based on Geological Maps (Leonard & al, 2010)*

# 3 Geotechnical Investigation

## 3.1 Investigation Procedure

A site investigation was carried out by Walker Engineering Consultants on the 7th July 2024 which comprised of the following:

- A site walkover by a Chartered Geotechnical Professional Engineer.
- 3 x hand auger boreholes with shear vane testing and 4 x scala tests up to 4m depth.

A test location plan and the test data is provided in Appendix A.

## 3.2 Ground Model

The soil layers encountered on this site are typical of the areas surrounding the site and are consistent with the regional geology. A summary of the soil profile is provided in Table 2 and 3 below. The tables summarises the localised geotechnical testing so that the ground profiles can be considered for specific engineering designs.

[1] G. S. Leonard et al (2010). Geological Map 3, Geology of the Auckland, 1:250,000 scale, Institute of Geological and Nuclear Sciences.

Due to the soil's nature and depositional processes, the continuity of soil away from the test locations has been inferred and may vary from the assumed ground model. Refer to the geotechnical test results for further detailed descriptions of each test. As outlined in Appendix C, a ground profile has also been completed as part of the timber retaining wall designs near the driveway to illustrate the slope, retaining aspects and estimated ground layers.

*Table 2: Soil profile summary* - HA1, SC1, HA2, SC2 – South Side of Property Near Pool Area*

| Unit | Description* | Consistency / Relative Density | Depth to base of unit* (m) | Undrained shear strength converted from shear vane results (kPa) | DCP Blows per 100mm |
|---|---|---|---|---|---|
| Topsoil | Topsoil intermixed with SILTS, stiff, light grey, dry, fine to medium, low plasticity. | Stiff | 0.1 – 0.3 | 70 – 100 | 2 |
| Silts | SILT, clayey, reddish orange, stiff to very stiff, low to moderate plasticity, fine to medium. | Stiff to very stiff | 0.6 – 0.8 | 75 – 100 | 2 - 3 |
| Silts | SILT, clayey, reddish orange, very stiff, low to moderate plasticity, fine to medium. | Very stiff, Dense to Very Dense | 1 – 2.1 | 100– 135 | 3 – 10 |
| Siltstone / Sandstone | East Coast Bays Formation – Sandstone and Siltstone | Hard, Very Dense | 2.1 + | - | 5 - 12 |

*Table 3: Soil profile summary* - HA4, SC3 - North Side of Property Near Retaining Wall Area*

| Unit | Description* | Consistency / Relative Density | Depth to base of unit* (m) | Undrained shear strength converted from shear vane results (kPa) | DCP Blows per 100mm |
|---|---|---|---|---|---|
| Topsoil | Topsoil intermixed with SILTS, stiff, light grey, dry, fine to medium, low plasticity. | Stiff | 0.1 – 0.2 | 70 – 100 | 2 |
| Silts | SILT, sandy, stiff, orange with some sands, low plasticity, fine to medium. | Very stiff, Dense to Very Dense | 0.9 | 60 – 75 | 3 - 11 |
| Sands | SAND, dense to very dense, orange, fine to medium. | Dense to Very Dense | 2.8 | - | 4– 6 |
| Sandstone / Siltstone | East Coast Bays Formation – Sandstone and Siltstone - Weathered | Very Dense | 4 + | - | 8 - 12 |

**Note: Refer to the attached different hand augers results for further information for each log. Results vary slightly per test. ECBF layers are estimated based on surrounding data and tests completed and must be verified during construction.*

### 3.3 Ground Water and Natural Ground

Groundwater was not observed in the actual hand auger holes completed down to a maximum of 2.8m. The rod of the DCP geotechnical tests was not moist or wet when extracting from the 4m depths. In addition, a hole was augered on site down to 4m at the garage area with no ground water observed. The site location was reviewed in detail to assess groundwater levels. It was noted that the site is high up on a hill and that a shallow ground water table is highly unlikely. A nearby deep borehole shows groundwater depths at around 6m depths, where the test was taken at RL 92, and for this specific site, geotechnical tests were taken from around RL 104 due to being on a hill. It is thus anticipated that the groundwater table will be very deep for this site ( an estimation of > 9m below natural ground level).

Based on the geotechnical test results near the existing pool, the natural soil consists of stiff to very stiff silts below the topsoil layer (100mm to 200mm) and is suitable for founding foundations similar to NZS3604. The topsoil layer is organic and not suitable for founding. Near the lower driveway area, the soil tests were similar, but silts were more sandy, translating into a very dense sand layer located just about the weathered siltstone/sandstone as part of the East Coast Bay Formation layer. The upper silt layers at the lower driveway area have low plasticity due to the sandy conditions.

When excavating the natural ground for a new or extended building platform, it is important to anticipate the presence of lower-strength soils or those that may experience a loss of strength when disturbed by earthmoving equipment due to their sensitivity. These soils could be encountered during construction; thus, construction monitoring and ground-bearing tests at subgrade levels are essential.

### 3.4 Filling

The site may involve excavation and filling operations, along with the essential placement of a compacted fill layer beneath certain foundations. The final subgrade level may need to be reviewed at construction and tested if considered a requirement by the Engineer to confirm “good ground” ultimate bearing capacity conditions as per NZS3604.

## 4 Geotechnical Assessments

### 4.1 Summary of Geotechnical Assessments

Geotechnical assessments were completed for this site to cover various items, as summarised in Table 4. Certain items have been further explained in the following sections.

*Table 4: Summary of Geotechnical Assessments*

| Item | Comments Relevant to the Specific Site |
|---|---|
| Ultimate Bearing Capacity | >300kpa ultimate bearing capacity is applicable below topsoil depths. |
| “Good ground” as per NZS3604 | “Good ground” criteria as per NZS3604 is thus applicable below topsoil depths due to ultimate bearing capacity meeting the code’s requirements. |
| Liquefaction Risks | Not applicable. |
| Lateral Spreading Risks | Not applicable. |
| Stormwater Assessments | Refer to the separate stormwater report and associated stormwater management specifications. |

| | |
|---|---|
| Cyclic Softening Risk | Not applicable. |
| Slope Stability Risk | The site is stable, and the proposed extensions will be in relatively flat areas near the pool. At the garage location, a timber retaining wall has been designed to increase the stability of the garage area. The retaining wall will consider the slopes, ground and existing features. Previously, there were no retaining walls at this location, so the layout will greatly improve the stability. |
| Expansive Soils | Class M soil types as a conservative measure for near the pool areas, as outlined in the below sections. |
| Potentially compressible soils | Not applicable due to foundations founded on very stiff materials. |
| Governing Criteria for Foundations | Specific engineering designs will likely govern in certain areas due to higher concentrated loads. Certain designs will need to consider depths, Class M conditions and loading criteria. |

## 4.2 Static Bearing Capacity

NZS3604:2011 Timber Framed Buildings definition of "Good Ground" requires soils to be capable of permanently withstanding a minimum Geotechnical Ultimate Bearing Capacity (GUBC) of 300 kPa below the proposed foundations. Allowable Bearing Capacity of 100 kPa for a Factor of Safety of 3 is typically applicable to limit settlements to a maximum of 25mm.

For cohesionless soils, the New Zealand Building Code requires 5 blows per 100mm down to a depth of twice the footing width or 3 blows per 100mm at greater depths to establish 'Good Ground' in terms of bearing capacity. For cohesive soils, a GUBC of 300kPa is indicated by soils with a minimum undrained shear strength of 60kPa.

The topsoil layer encountered during the site investigation of the extension areas is not suitable to support foundations due to the presence of organics. Stiff to very stiff cohesive silt materials are applicable below the topsoil layer with undrained shear strength Su values of 60 to 135kpa (converted from shear vane results). The material below the topsoil layer thus equates to GUBC of above 300kpa. NZS3604 foundation types thus may be used for the extensions of the layout where loading is within NZS3604 criteria. For shallow foundations, the top organic layers will need to be removed and replaced with compacted fill. Founding depths will require confirmation during construction, and certain foundations may need to be deeper to cater for Class M conditions, such as near the pool area.

## 4.3 Static Settlement

For foundations designed to the geotechnical ultimate bearing capacity values provided above, static elastic settlements are expected to be limited to 25mm between concentrated foundation supports due to maximum allowable bearing pressures of 100kpa associated with NZS3604.

## 4.4 Soil Site Reactivity

In the absence of laboratory testing and as per the client brief, we have assessed the site near the pool area as a Class M soil reactivity type in accordance with AS 2870, Table 2.1,2.2 and NZS3604, Section 17. The measure is conservative and safe as some of the deeper-lying soil has a low to medium plasticity. Through the physical inspection of the existing building foundations and the geological nature, the soil

type did not appear to be reactive. However, a conservative approach is the safest and can be easily integrated into the designs to consider future droughts for the full design life of the proposed pool dwellings. The soil in the garage area was low in plasticity, sandy, and had fill; thus, soil reactivity will be lower, and standard foundations are acceptable at that location.

## 4.5 Site Seismic Subsoil Category

In the absence of deeper testing, we have assessed the site as a Class C in accordance with NZS 1170.5, Section 3.1.3, which is appropriate for the area.

## 4.6 Slope Stability

There will be some minor cuts and fills near the existing pool area for the new timber and block retaining walls, providing stability to the areas. For the lower garage area, the existing driveway level is being cut down by up to 1m, thus reducing the slope gradients. The ground conditions have high strengths in this area as per the geotechnical test results and ground profile shown in Appendix C, and thus, the existing slope didn't show signs of any movements or slips. In addition, a timber retaining wall has been specified to increase overall stability. The wall has been designed for a high retaining height and a front slope of 1: 3 or 18.4 degrees to ensure overall stability. Drainage fill is specified behind the new wall, which will better manage the runoffs in the area. Weep holes specified in the timber retaining wall ensure any water entrapment behind the wall gently trickles out, avoiding pore water pressure build-up after storm events. The additions will thus improve the site's overall stability.

## 4.7 Slope Stability Assessments

### 4.7.1 Existing Slopes and Site Features

The site's existing slopes and general site features are shown in Figures 1 and 3 in plan view with an outline of the existing carport area and surrounding dense vegetation down the slope. Photographs in Appendix B further illustrate the nature of the vegetation. Drawings in Appendix B.2 show a cross section through the existing slope and the proposed changes.

### 4.7.2 Seismic Slope Stability Methods and Regularity Guidelines

The council have requested a detailed slope stability assessment of the slope to substantiate that the slope will be stable post-development. A site-specific geotechnical investigation, detailed cross-section profile, and detailed photographs of the site features were used to carry out the slope stability assessment. The existing slope below the building platform shows no signs of movement, contains dense vegetation at the toe. A detailed slope and geological profile is shown in Appendix B.2, indicating items to scale, and demonstrating the geotechnical tests, topographical survey, and the proposed new works. Slope stability analysis assessments are shown in Appendix B.3. The general concept is a safe design approach to ensure general slope strengthening, as the retaining wall piles have been designed for the surrounding slopes.

In addition, a slope stability assessment was completed using well-known engineering principles and methods, recognised software, and New Zealand's codes and standards. Software was used to model the slope under existing conditions, the proposed updated design and suggested engineering solutions to ensure slope stability. Various load cases and conditions were modelled with different design parameters. Engineering methods used in the assessment include the following:

- MBIE NZ Module 1 - 6: Earthquake Geotechnical Engineering Practice Guidelines
- NZGS Slope Stability Geotechnical Guidance Series
- Pseudo-Static and Wedge Design Methods
- Software using Morgenstern – Price method of slices.
- The model's materials were defined using Mohr-Coulomb principles.
- FHWA Pub. GEC No. 3, Vol. 1 and Noda et al. methods (1975) to correlate relationships between peak ground acceleration (amax) and the seismic coefficient (kh).
- Ambraseys, Franklin & Chang, and Bray & Travasarou Methods to assess earthquake-induced displacements of the slope.

### 4.7.3 Slope Stability Design Criteria

The most significant design assumptions implemented include the following:

- Assumes that the slope will behave in a 2-D manner.
- Assumes that the ground conditions are homogeneous and consistent as per the data.
- Assumes a maximum fill thickness equivalent to 10kpa on top of the existing building platform behind the retaining walls and that the new garage is 1.5m away from the wall, thus keeping the garage's surcharge to 10kpa.
- Assumes that the seismic assessment parameters are as outlined in the 2021 MBIE (Table A.1).
- A kh seismic value of 0.19 has been used as the input parameter in the slope stability model as a conservative upper bound parameter, which aligns with NZGS Module 1.
- Geotechnical parameters used as outlined in Table A.2, which are typically lower bound values compared to the existing report and geotechnical data found.

***Table A.1: Seismic Parameters***

| Design Life (years) | Importance Level | Earthquake Magnitude, Mw | Seismic Event | Return Period Factor | Annual Probability of Exceedance | Peak ground Acceleration, PGA (g) |
|---|---|---|---|---|---|---|
| 50 | 2 | 6.5 | SLS | 0.25 | 1/25 | 0.07 |
| | | | ULS | 1.0 | 1/500 | 0.19 |

***Table A.2: Soil Parameters for Slope Design Purposes***

| Unit | Effective friction angle (°) | Unit weight (kN/m³) | Effective cohesion(kPa) | Normal Pore Water Pressure Ratio (R) | Transient Pore Water Pressure Ratio (R) | Undrained Shear Strength(kPa) |
|---|---|---|---|---|---|---|
| Silts | 31 | 17* | 3* | 0.1* | 0.3* | 50 |
| Sands | 32* | 18* | 0* | 0.1* | 0.3* | - |
| Sandstone/Siltstone | 34* | 19* | 5* | 0.1* | 0.3* | - |

*Note: Completed sensitivity checks in the designs and used lower bound values where suitable.

### 4.7.4 Slope Stability Results

Slope stability assessments included the modelling of the slopes under various scenarios, as summarised in Table 5. As illustrated in Appendix B.3, assessment outputs have been completed, which demonstrate the appropriate safety of factors being achieved under various load cases. The method for assessing the slope is conservative to cater for variable scenarios. Engineering commentary has been provided, and safety factors have been reviewed, as indicated in Table B.

Displacement estimates under the major seismic event for the slip planes are negligible based on correlations of the slope's yield acceleration. Minor displacements are typically acceptable; however,

they are not relevant in this case, which indicates a very stable slope. The slope stability outputs for the post-development case consider the timber retaining wall poles, which increase stability under the larger fill loadings near the wall. The retaining poles have been designed for the associated slope geometry and loads, as well as per previous designs provided, where each pole can withstand 50 kn lateral forces. The outputs demonstrate that the existing slope would remain stable under the increased building and fill pressures.

***Table B: Summary Results of Slope Stability Analysis – Morgenstern – Price Method***

| Load Case Number and Condition | Pore Water Pressure Ratio (R) | Long Term Surcharge load (Kpa) | Seismic Event | Design Criteria Required | Minimum Slope Factor of Safety Outputs | Engineer's Comment |
|---|---|---|---|---|---|---|
| C1 – Pre Development – Static Long-Term Conditions - Normal | R = 0.1 throughout | 10 | - | 1.5 | 1.52 | Stable |
| C2 – Pre Development – Static Long- Term Conditions - Transient | R = 0.3 throughout | 10 | - | 1.2 | 1.18 | Stable |
| C3 – Pre Development – Normal – Seismic Conditions | R = 0.1 throughout | 10 | ULS,1/500 | 1 | 1.03 | Stable |
| C4 – Post Development – Static Long-Term Conditions - Normal | R = 0.1 throughout | 10 | - | 1.5 | 1.76 | Stable |
| C5 – Post Development – Static Long-Term Conditions - Transient | R = 0.3 throughout | 10 | - | 1.2 | 1.37 | Stable |
| C6 – Post Development – Normal – Seismic Conditions | R = 0.1 throughout | 10 | ULS,1/500 | 1 | 1.16 | Stable |

# 5 Recommendations

## 5.1 Foundations, Retaining Walls and Slope Stability

The following recommendations are to provide a suitable foundation for the proposed works, which minimises geotechnical risks identified to an acceptable level. Recommendations include the following:

1. A geotechnical safe bearing capacity of 100kPa (geotechnical ultimate bearing capacity of 300kPa) which is equivalent to NZS3604 criteria, may be adopted for the proposed foundations.
2. Topsoil must be replaced with compacted granular fill or ignored for the pile designs.
3. The current proposed new foundations include the new garage foundations, foundations for the existing building changes, the new pool foundations and foundations for the new structures near the pool.
4. It is recommended that foundations are founded a minimum of 600mm below natural ground level to mitigate soil effects associated with Class M soil materials for the new pool structures. The proposed foundations specified for the proposed basement are considered suitable for the soil conditions.
5. The garage foundations near the driveway may include shallow concrete foundations where a concrete waffle slab foundation would safely meet the ground criteria. After excavation of the driveway below the garage, the natural ground and fill must be reviewed by the Engineer to verify ground bearing capacity.
6. Piles must be founded at a minimum of 0.6m depth below natural ground level for the NZS3604 ordinary piles and 0.9m depth for anchor pile types. The extra depths are to ensure resistance against Class M soil types and to ensure bearing capacity of over "good ground" conditions as per NZS3604. The final depth must be inspected prior to concrete pouring.

7. The construction of the piles should be carried out using appropriate methods for clayey silt conditions. Piles should be dry and free of loose material immediately before pouring concrete.
8. The retaining wall, specific design foundations and associated structural aspects are to be designed by a Chartered Professional Engineer in accordance with NZ Building Code Verification Methods and can consider the below-ground parameters or interpolate from the geotechnical test results provided.

    **Loose to Medium-dense sands – For Fill or Insitu Ground:**
    Bulk unit weight: 17kN/$m^3$
    Effective friction angle: 32°
    Relative density: $R_d$<40%

    **Soft to Firm Clay – For insitu Ground:**
    Bulk unit weight: 16kN/$m^3$
    Undrained Shear Strength: 60kpa
    Adhesion Factor: 0.6

9. It is noted that the existing driveway is being lowered slightly, and the parking areas are being extended. Through reviews, cutting down the existing driveway and adding timber retaining walls with designed pole embedments will provide overall stability to the site. The cut platform will reduce the existing ground and the driveway slope and the higher-strength soils will be higher up in the soil platform, thus making it a suitable and stable proposed extension.
10. Slope stability assessments, making use of the latest costs, the site features and geotechnical testing data, demonstrate that the current proposal would result in a stable slope. This is evident in the slope stability assessment results, which achieve global slope stability outputs above the building code requirements. It is noted that the garage near the driveway should not be placed within 1.5m of the proposed new timber retaining wall to ensure surcharge loads are appropriate. Planting vegetation up the slope below the proposed retaining walls is recommended to provide natural slope strengthening.
11. For the timber retaining wall near the garage, specific engineering designs are required by a Chartered Professional Engineer to consider the gradients and specific ground conditions that increase in strength with depths. It is recommended that the piles be augered into the silt/sandstone layers with a minimum of 3 x diameter of the specified concrete pile. Engineering designs have been completed for this critical retaining wall as per the attached engineering drawings and separated design engineering documentation (PS1, design report and calculations).

## 5.2 Earthworks

The site earthworks shall be carried out in accordance with NZS 4431 *Code of Practice for Earth fill for Residential Development.* Important recommendations include the following:

1. All topsoil and unsuitable materials shall be stripped from the building platform to at least 600mm beyond the footprint of the proposed new concrete foundation slab. Pumice sand or an alternative fill material should be placed and compacted in layers of no greater than 200mm to form a level building platform.
2. Any fills greater than 600mm in depth should be tested and certified by a Chartered Professional Engineer familiar with the recommendations of this report. Inspection of the subgrade following removal of topsoil and testing of the backfill shall form minimum requirements for certification.
3. Between April and September, it's important to factor in the impact of rainy conditions that could potentially compromise the strength of cohesive fill. Earthworks should be scheduled during dry

weather, postponed until the summer season, or alternatively have gravel or pumice sand fill substituted for cohesive fill.

4. The gradients of slopes created during on-site excavation must adhere to the specifications outlined in the table below. These slopes should be shaped in a manner that maintains a minimum distance of 2.5m from any downhill structures, unless retaining measures are employed.

*Table 5: Maximum permissible batter angles.*

| Batter Height | Cut | Fill |
|---|---|---|
| <1.5m | 1H:1V | 2H:1V |
| 1.5 – 2.5m | 1.5H:1V | |
| >2.5m | 2H:1V | |

## 5.3 Geotechnical Review of Drawings

A geotechnical review of the drawings has been completed to assess the finalised proposed foundations and retaining aspects of the extensions. Various retaining and foundation elements has been designed by a Chartered Professional Engineer. The proposed structures for the pool dwelling are founded on piles similar NZS3604 but with greater depths to satisfy the conditions of this report. For the basement side, foundations include a concrete reinforcement slab with concrete foundation beams at certain intervals. The garage slab includes a concrete waffle slab. The new pool has a foundation specification to consider expansive soils as a conservative manner. Timber retaining and block wall retaining have been designed accordingly. The timber wall near the driveway extends deep into the harder ground layer, providing general stability for the area. The block wall foundation pads are large enough to consider various load cases and the client's requirements. Drawings have been reviewed in detail, and design calculations have been carried out to assess the various specific design components as per the design package provided separately. The current foundation and retaining specifications are considered suitable for the ground and overall site conditions.

# 6 Planning Considerations - Estimate of Excavation Works

The planning team has requested an estimate of the excavation areas and volumes required for the new site proposals to support consent planning. A detailed review was completed using the drawings outlining the existing structures, concept drawings showing the proposals and the topographical survey data. Engineering drawings in Appendix C illustrate the approximate excavation volume required, particularly in the driveway area, which represents the majority of the excavation. Table 6 summarises the estimated excavation volumes and plan areas.

*Table 6: Summary of Pre-development & Post-development Areas – Excavation Specific*

| Site Coverage Areas | Excavation for Extension Plan Areas (m2) | Excavation Total Volume due to cut below Extension Areas (m3) |
|---|---|---|
| Lower Area - Driveway Extension | +-15 | +-5 |
| Lower Area - Garage Area | +-168 | +-136 |
| Lower Area - Retaining Poles | +-5.3 | +-11.7 |
| Upper Area – Block Wall Extension | +-27 | +-56 |
| Upper Area – Pool Dwelling Currently Estimate Based on Standard Piles | +-8 | +-17 |
| Totals: | +-223 | +-226 |
| *Note: Values are approximate based on the information provided* | | |

A detailed review of the affected vegetation areas was also completed, as outlined in Table 7. The table illustrates the areas utilised for new extensions compared to the existing vegetation areas affected by these developments. For the new versus existing stormwater impermeable and permeable areas and proposed stormwater upgrades, refer to the submitted Stormwater Report submitted separately from this report. The tables indicate the relatively small nature of additions and can be considered for planning purposes. It is noted that these values are estimates based on the current information and may vary with future changes; refer to the latest drawings for accuracy.

*Table 7: Summary of Pre-development & Post-development Areas – Loss of Vegetation Area Specific*

| Site Coverage Areas | Vegetation Area used for New Extensions (m2) | Garden Area near Pool used for New Extensions (m2) | Existing Dwelling/Paving/Pool Areas used for New Extensions or Replacements (m2) |
|---|---|---|---|
| Lower Area - Driveway Extension | +-15 | 0 | 0 |
| Lower Area - Garage Area | +-58 | 0 | +-74 |
| Upper Area – Pool Dwellings | 0 | +-55 | +-28 |
| Totals: | +-68 | +-55 | +-102 |
| *Note: Values are approximate based on the information provided* | | | |

Further reviews of the amount of the cut and fill were carried out as outlined in the site earthworks plan Drawings (Sheet ISO), which has been completed for planning purposes. The plan and reviews consider the earthworks within and outside the Strategic Environment Assessment (SEA) area. Table 8 below provides a summary of the findings.

*Table 8: Summary of Earthworks – SEA Specific Area Reviews*

| Earthwork Type: | Earthworks Outside of SEA (m3) | Earthworks within SEA, but outside of existing Driveway & Vehicle Forecourt Formation(m3) | Earthworks within the SEA and within existing Driveway & Vehicle Forecourt Formation (m3) | Total Earthworks: (m3) |
|---|---|---|---|---|
| Cut: | 148 | 38 | 40 | 226 |
| Fill: | 0 | 35 | 0 | 35 |
| *Note: Values are approximate based on the information provided* | | | | |

## 7 Planning - Hazard Risk Assessment Information for the Existing Property Extensions

A hazard risk assessment was carried out as per Section E36.9 of the Auckland Unitary Plan Operative (AUP) as outlined in Appendix D. The assessment provides information for planning, mitigations of risk methods, construction and environmental considerations.

## 8 Required inspections

The following inspections are required for the engineered ground items outlined above:

1. Visual inspection of the building platform excavated to the base. This includes the garage foundations, basement foundations, retaining foundations and pool structures foundations.
2. Inspection and ground certification of compacted fill under the foundations and up against the retaining walls where applicable.
3. Retaining wall inspections after cutting ground and before placing drainage elements.
4. The foundation set out must be inspected prior to concrete pouring.
5. Pile holes and associated depths are to be inspected prior to pouring concrete.
6. Timber lagging and drainage reviews prior to backfilling.
7. Required quality documents for reviewing include:
    a. Evidence of pile depth records is to be provided.
    b. Evidence of the implementation of the required drainage metal and subsoils.
    c. Completion of PS3, further quality documents from the Contractor.

All pile excavations should be dry and free of loose material immediately before concrete is poured. If the site conditions change due to rainfall, over-excavation, etc. WECL should be contacted for reinspection prior to the placement of concrete. All inspections must be carried out by a suitably qualified professional to grant the PS4 certificate

## 9 Report Limitations

This report and recommendations have been prepared by Walker Engineering Consultants Limited to complete the agreed scope as outlined above. The recommendations in this report do not supersede recommendations of other engineering reports and shall be considered in conjunction with all other information available for the site. Should you have any doubts about the recommendations of this report, it is essential that you discuss these issues with Walker Engineering Consultants prior to proceeding with any work based on this report. Testing portrays a limited percentage of ground conditions at this site and may not be representative of all soils present on site. During excavation and construction, the site should be examined by a suitably qualified engineer in order to assess whether the exposed subsoils are compatible with the inferred soil conditions on which the recommendations have been based and potentially, further investigation and design rationalisation may be required. Inspections and engineering reviews are essential during construction, as specified in this document. These steps should be undertaken as part of the construction monitoring phase to obtain the final engineering approval, which is indicated by the Producer Statement 4 document. This document is vital for meeting the code of compliance standards.

## 10 Attachments

Please refer to the below relevant appendix attachments that form part of the report documentation. The attachments can be found either embedded in this report or saved separately as per the council's consenting requirements or as per the external party's updated documentation.

## 11 References


Bowen, H. J. (2013). *Liquefaction induced ground damage in the Canterbury earthquakes: prediction vs. reality.* Queenstown: 19th NZGS Geotechnical Symposium.

Henderson, D. (2013). *The performance of House Foundations in the Canterbury Earthquakes.* Christchurch: Department of Civil and Natural Resources Engineering,University of Canterbury.

Ishihara, K. (1985). Stability of natural soil deposits during earthquakes. International Conference on Soil Mechanics and Foundation Engineering.

Leonard, G. S., & al, e. (2010). *Geological Maps.* Institute of Geological and Nuclear Sciences.

MBIE. (2012-2015). *Repairing and rebuilding houses affected by the Canterbury earthquakes, Part A - E Technical Guidance.* Ministry of Business, Innovation & Development .

MBIE. (2021). *AS/VM B1 - Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure.* Ministry of Business, Innovation & Employment (MBIE).

MBIE. (2021). *Earthquake Geotechnical Engineering Practice: Module 1 - 6.* New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation & Employment (MBIE).

Standards New Zealand. (2011). *New Zealand Standard: NZS3604 : 2011 Timber – framed buildings.*

Stockwell, M. (1977). *Determination of allowable bearing pressure under small structures. .* New Zealand Engineering Vol. 32, Iss. 6, dated 15 June 1977.

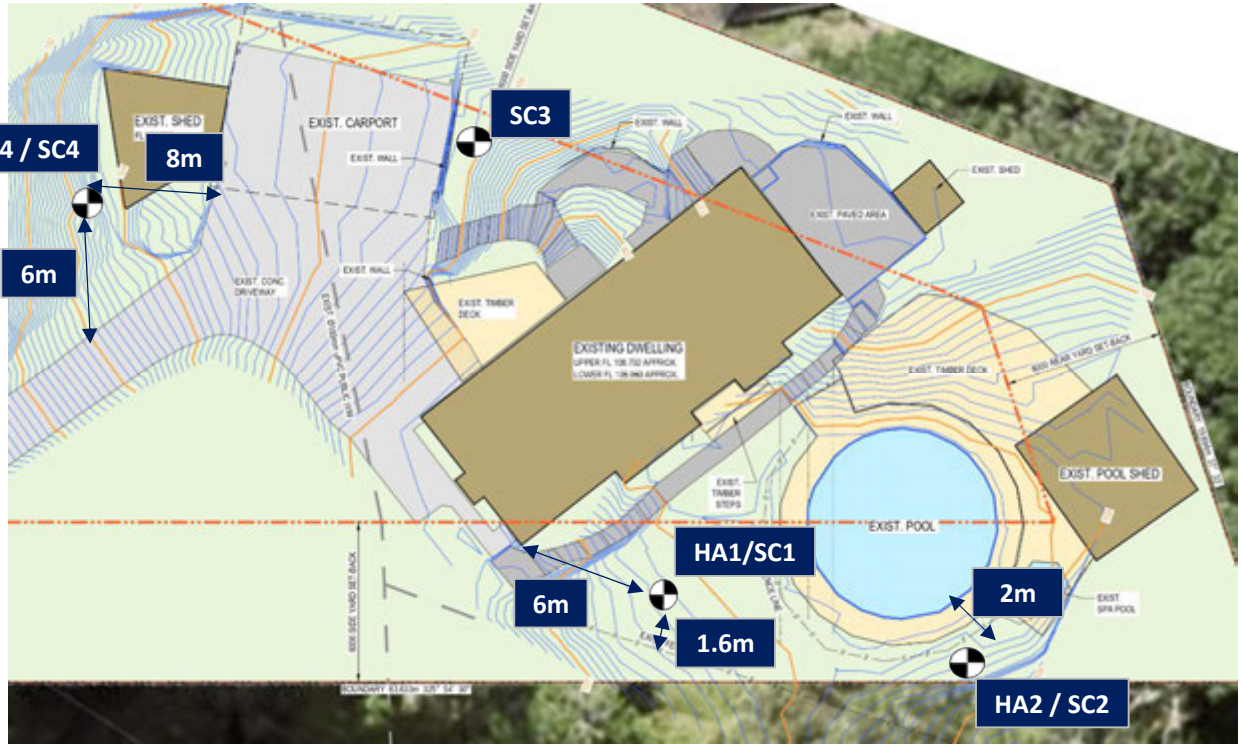
Tonkin & Taylor. (2013). *Liquefaction Vulnerability Study. Canterbury: Earthquake Commission.* Tonkin & Taylor Ltd.

## Appendix A: Geotechnical Testing and Locations

# TEST LOCATION PLAN

| | | | |
|---|---|---|---|
| **Project:** | Geotechnical investigations | **Project No.:** | 24106 |
| **Location:** | 142 Konini Road, Auckland | **Revision:** | 1 |
| **Client:** | Hugh Johnstone | **Prepared By:** | PW |

WALKER ENGINEERING CONSULTANTS




N

**Legend**

Test Location

**Notes:**

1 Test locations are indicative only.

2 Basemap: As built drawings.

# BOREHOLE LOG — HA1

WALKER ENGINEERING CONSULTANTS

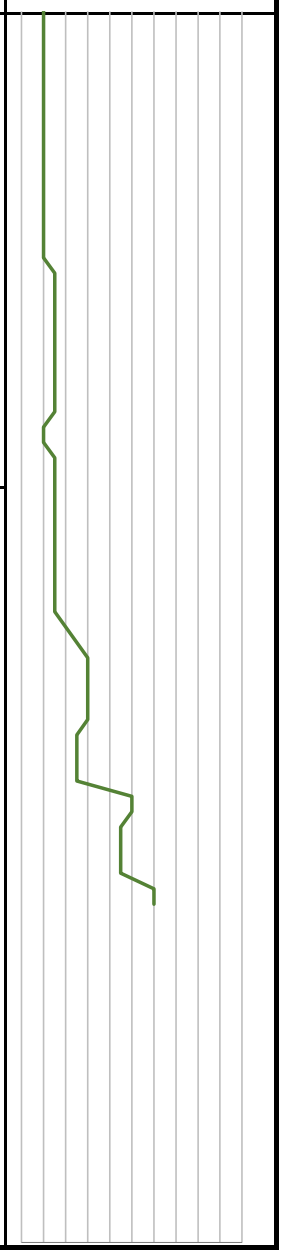
**Project:** Geotechnical investigations
**Location:** 142 Konini Road, Auckland
**Project No.:** 24106
**Client:** Hugh Johnstone

**Drill Type:** Hand Auger - 50mm
**Drilled by:** PW
**Logged by:** PW
**Date:** 7/7/2024

**Coordinates:**
*See test location plan*
**Relative Level (Moturiki):**

Logged in accordance with FIELD DESCRIPTION OF SOIL AND ROCK.Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes.NZ Geotechnical Society Inc.19mm Shear Vane with shear vane conversions applied.

| Depth (m) | G.W. Level | Graphic Log | Soil Description (strength/density - fraction - colour - structure - moisture - bedding - plasticity - sensitivity - additional) | Depth (m) | Shear Vane (kPa) |
|---|---|---|---|---|---|
| 0.0 | | | **TOPSOIL** intermixed with clayey silts and sands | | |
| | | | **SILT** - clayey **-** light grey - occasional organics - firm to stiff. | 0.30 | 70 |
| 0.5 | | | | 0.60 | 65 |
| 1.0 | | | | 0.90 | 60 |
| | | | | 1.20 | 90/60 |
| 1.5 | | | **SILT** - clayey - reddish orange - stiff to very stiff - low to moderate plasticity - fine to medium. | 1.50 | 90/60 |
| | | | End of borehole at 1.5m bgl - UTP. | | |
| 2.0 | | | ` | | |
| 2.5 | | | | | |
| 3.0 | | | | | |
| 3.5 | | | | | |
| 4.0 | | | | | |




**Notes:** No free groundwater observed.

**Legend:**
Organics | Clay | Silt | Sand | Gravel
UTP = Unable to Penetrate

**Reviewed:** PW
**Date:** 10/30/2024

# BOREHOLE LOG

# HA2

WALKER ENGINEERING CONSULTANTS

**Project:** Geotechnical investigations
**Location:** 142 Konini Road, Auckland
**Project No.:** 24106
**Client:** Hugh Johnstone

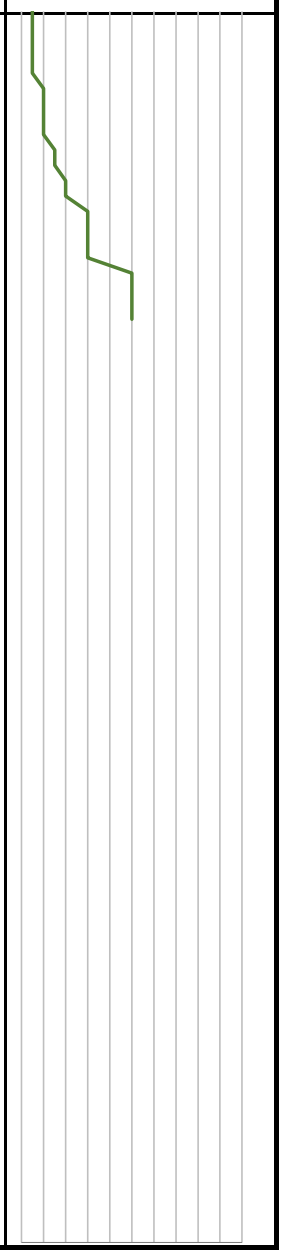
**Drill Type:** Hand Auger - 50mm
**Drilled by:** PW
**Logged by:** PW
**Date:** 7/7/2024

**Coordinates:**
*See test location plan*
**Relative Level (Moturiki):**

Logged in accordance with FIELD DESCRIPTION OF SOIL AND ROCK.Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes.NZ Geotechnical Society Inc.19mm Shear Vane with shear vane conversions applied.

| Depth (m) | G.W. Level | Graphic Log | Soil Description (strength/density - fraction - colour - structure - moisture - bedding - plasticity - sensitivity - additional) | Depth (m) | Shear Vane (kPa) |
|---|---|---|---|---|---|
| 0.0 | | | **TOPSOIL** intermixed with clayey silts and sands | | |
| | | | | 0.30 | 50 |
| 0.5 | | | **SILT** - clayey - reddish orange - stiff to very stiff - low to moderate plasticity - fine to medium. | | |
| | | | End of borehole at 0.6m bgl - UTP | | |
| 1.0 | | | | | |
| 1.5 | | | | | |
| 2.0 | | | | | |
| 2.5 | | | | | |
| 3.0 | | | | | |
| 3.5 | | | | | |
| 4.0 | | | | | |

**Scala Penetrometer (blows/50mm)**




**Notes:** No free groundwater observed.

**Legend:**
Organics | Clay | Silt | Sand | Gravel
UTP = Unable to Penetrate

**Reviewed:** PW
**Date:** 10/30/2024

# SCALA LOG

# SC3

WALKER ENGINEERING CONSULTANTS

**Project:** Geotechnical investigations
**Location:** 142 Konini Road, Auckland
**Project No.:** 24106
**Client:** Hugh Johnstone

**Drill Type:** Hand Auger - 50mm
**Drilled by:** PW
**Logged by:** PW
**Date:** 7/7/2024

**Coordinates:**
*See test location plan*
**Relative Level (Moturiki):**

Logged in accordance with FIELD DESCRIPTION OF SOIL AND ROCK.Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes.NZ Geotechnical Society Inc.19mm Shear Vane with shear vane conversions applied.

| Depth (m) | G.W. Level | Graphic Log | Soil Description (strength/density - fraction - colour - structure - moisture - bedding - plasticity - sensitivity - additional) | Depth (m) | Shear Vane (kPa) | Scala Penetrometer (blows/50mm) 0 1 2 3 4 5 6 7 8 9 10 |
|---|---|---|---|---|---|---|
| 0.0 | | | **TOPSOIL** intermixed with clayey silts and sands | | | |
| | | | **SILT** and **SAND** - sandy - stiff and very dense - orange with some sands - low plasticity - fine to medium. | | | |
| 0.5 | | | | | | |
| | | | **FILL** - Very Hard | | | |
| 1.0 | | | End of borehole at 1.0m bgl - UTP | | | |
| 1.5 | | | | | | |
| 2.0 | | | ` | | | |
| 2.5 | | | | | | |
| 3.0 | | | | | | |
| 3.5 | | | | | | |
| 4.0 | | | | | | |

**Notes:** No free groundwater observed.

**Legend:** Organics, Clay, Silt, Sand, Gravel

UTP = Unable to Penetrate

**Reviewed:** PW
**Date:** 10/30/2024

# BOREHOLE LOG

# HA4

WALKER ENGINEERING CONSULTANTS

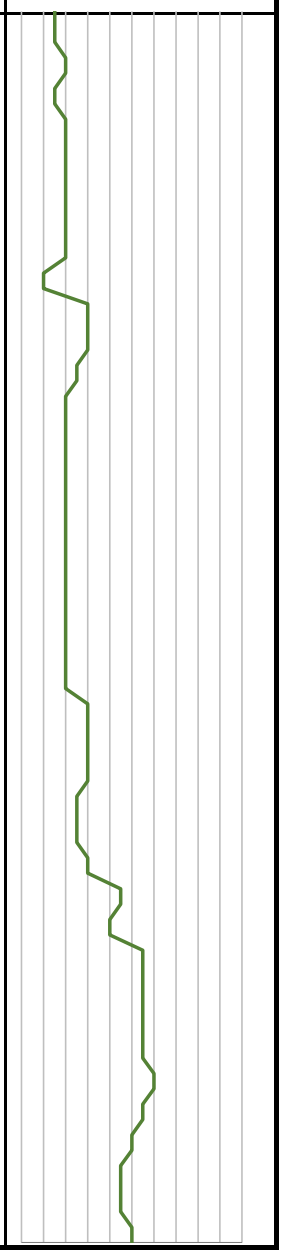
**Project:** Geotechnical investigations
**Location:** 142 Konini Road, Auckland
**Project No.:** 24106
**Client:** Hugh Johnstone

**Drill Type:** Hand Auger - 50mm
**Drilled by:** PW
**Logged by:** PW
**Date:** 7/7/2024

**Coordinates:**
*See test location plan*
**Relative Level (Moturiki):**

Logged in accordance with FIELD DESCRIPTION OF SOIL AND ROCK.Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes.NZ Geotechnical Society Inc.19mm Shear Vane with shear vane conversions applied.

| Depth (m) | G.W. Level | Graphic Log | Soil Description (strength/density - fraction - colour - structure - moisture - bedding - plasticity - sensitivity - additional) | Depth (m) | Shear Vane (kPa) |
|---|---|---|---|---|---|
| 0.0 | | | **TOPSOIL** intermixed with clayey silts and sands | | |
| | | | **SILT** - sandy - stiff - orange with some sands - low plasticity - fine to medium. | 0.30 | 60 |
| 0.5 | | | | 0.60 | 40 |
| 1.0 | | | | 0.90 | |
| | | | **SAND** - dense to very dense - orange - fine to medium. | | |
| 1.5 | | | | | |
| 2.0 | | | ` | | |
| 2.5 | | | | | |
| | | | **SANDSTONE/SILTSTONE** - Hard, very dense | 2.80 | |
| | | | End of borehole at 2.8m bgl - UTP | | |
| 3.0 | | | | | |
| 3.5 | | | | | |
| 4.0 | | | | | |




**Notes:** No free groundwater observed.

**Legend:**
Organics | Clay | Silt | Sand | Gravel | UTP = Unable to Penetrate

**Reviewed:** PW
**Date:** 10/30/2024

## Appendix B: Site Photos

Picture 1: Existing Carport before Removal

Picture 2: Existing Carport

Picture 3: Existing Decking around Existing Pool

Picture 4: Existing Driveway Being Extended

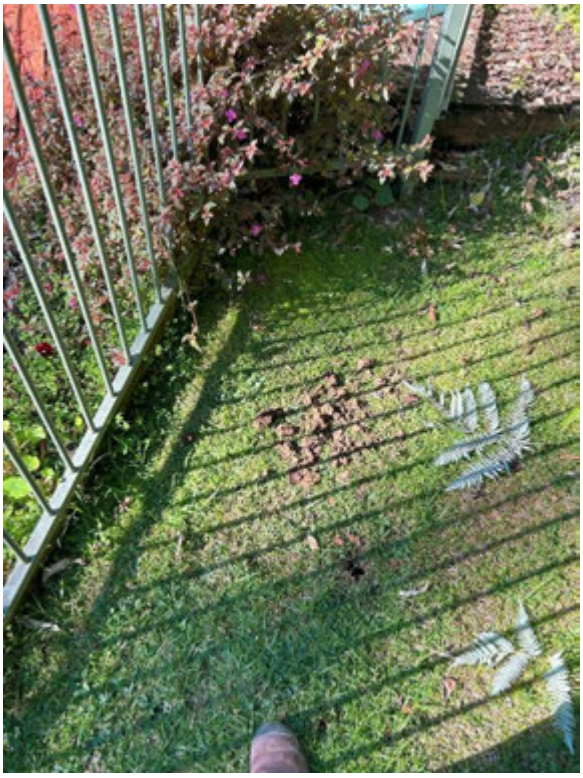
Picture 5: Existing Driveway with Shed Removed

Picture 6: Existing Driveway

Picture 7: Existing Shed and Position of Proposed Retaining Wall

Picture 8: Existing Shed Foundation Edge near Slope

Picture 9: Hand Auger & Scala 1 Test Area near Pool



Picture 10: Hand Auger & Scala 2 Test Area near Pool

Picture 11: Hand Auger, Scala 4 Test Area & Existing Shed (2)

Picture 12: Hand Auger, Scala 4 Test Area & Existing Shed

Picture 13: Hand Auger, Scala 4 Test Area (2)

Picture 14: Hand Auger, Scala 4 Test Area (3)

Picture 15: Hand Auger, Scala 4 Test Area

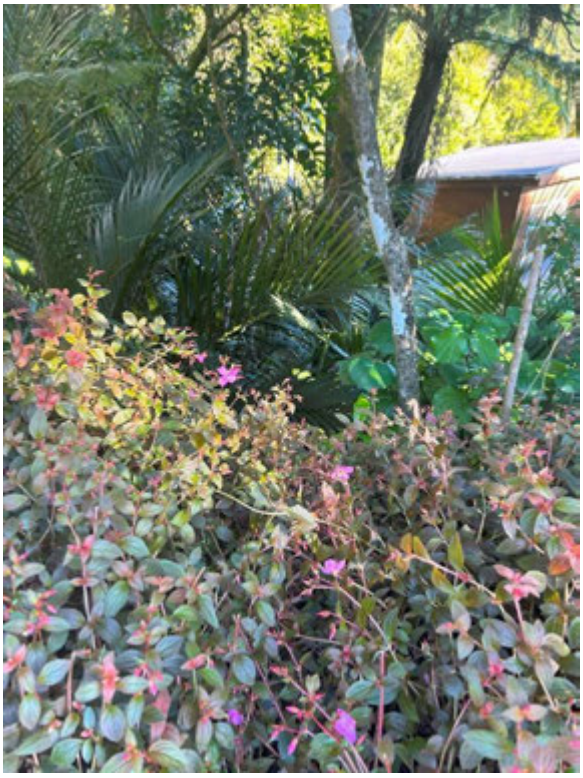
Picture 16: IMG_6462

Picture 17: IMG_6464

Picture 18: IMG_6466

Picture 19: IMG_6467

Picture 20: IMG_6468



Picture 21: IMG_6469

Picture 22: IMG_6470

Picture 23: IMG_6472

Picture 24: IMG_6473

Picture 25: IMG_6474

Picture 26: IMG_6476

Picture 27: IMG_6477

Picture 28: IMG_6480

Picture 29: IMG_6481

Picture 30: IMG_6482

Picture 31: IMG_6484

Picture 32: IMG_6489

Picture 33: IMG_6490

Picture 34: IMG_6494

Picture 35: IMG_6496

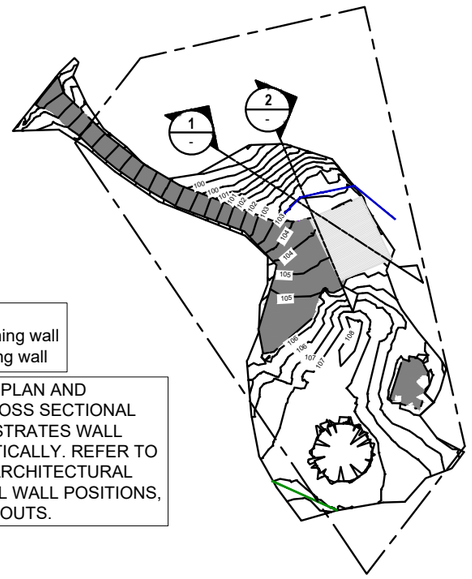
Picture 36: IMG_6497

Picture 37: IMG_6933

Picture 38: Scala 3 Test Area near Carport (2)

Picture 39: Scala 3 Test Area near Carport

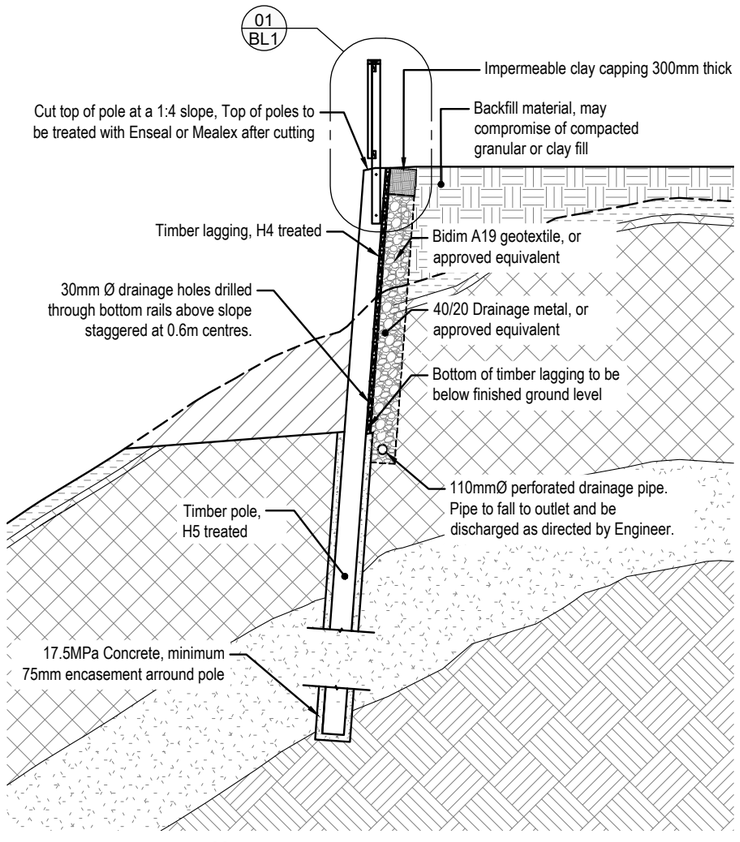
## Appendix B.2: Ground Profile



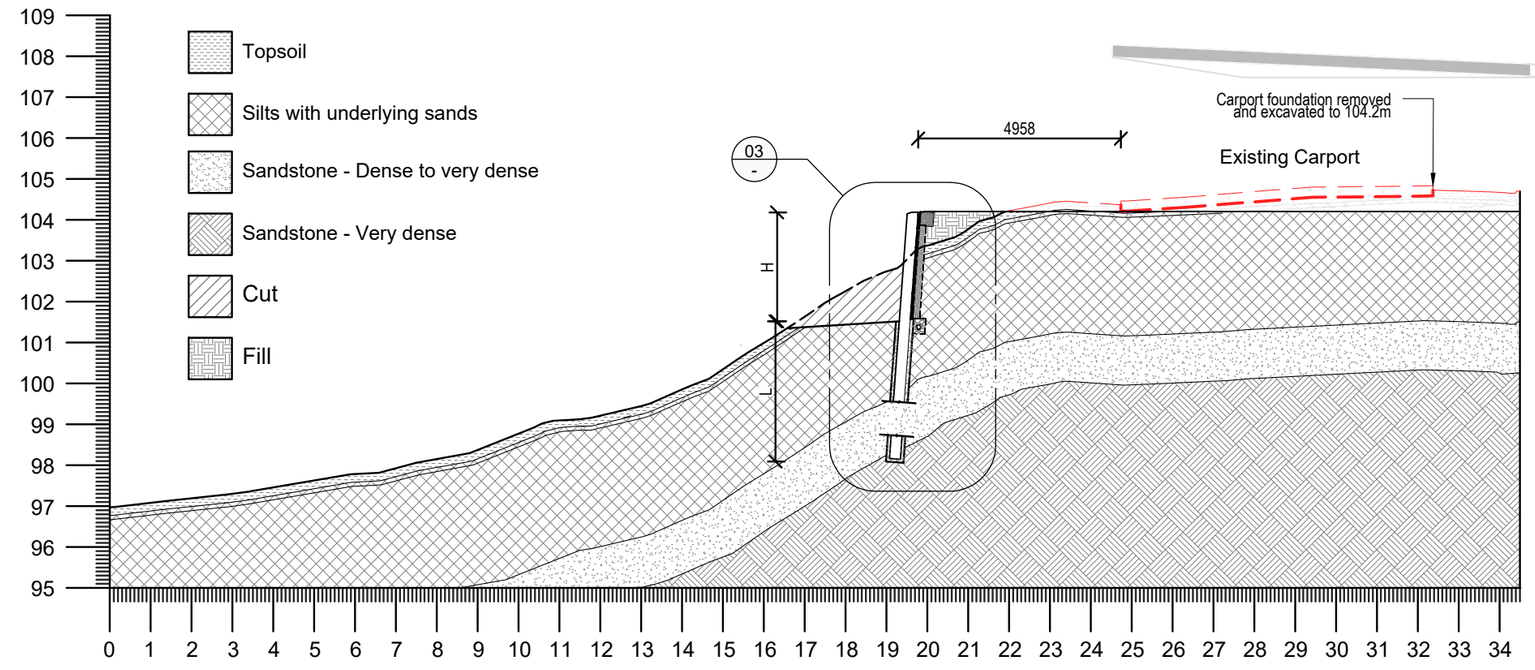
KEY:
: Timber retaining wall
: Block retaining wall

NOTE: THIS SITE PLAN AND ASSOCIATED CROSS SECTIONAL DRAWINGS ILLUSTRATES WALL TYPES SCHEMATICALLY. REFER TO THE FINALIZED ARCHITECTURAL PLANS FOR FINAL WALL POSITIONS, LEVELS AND LAYOUTS.

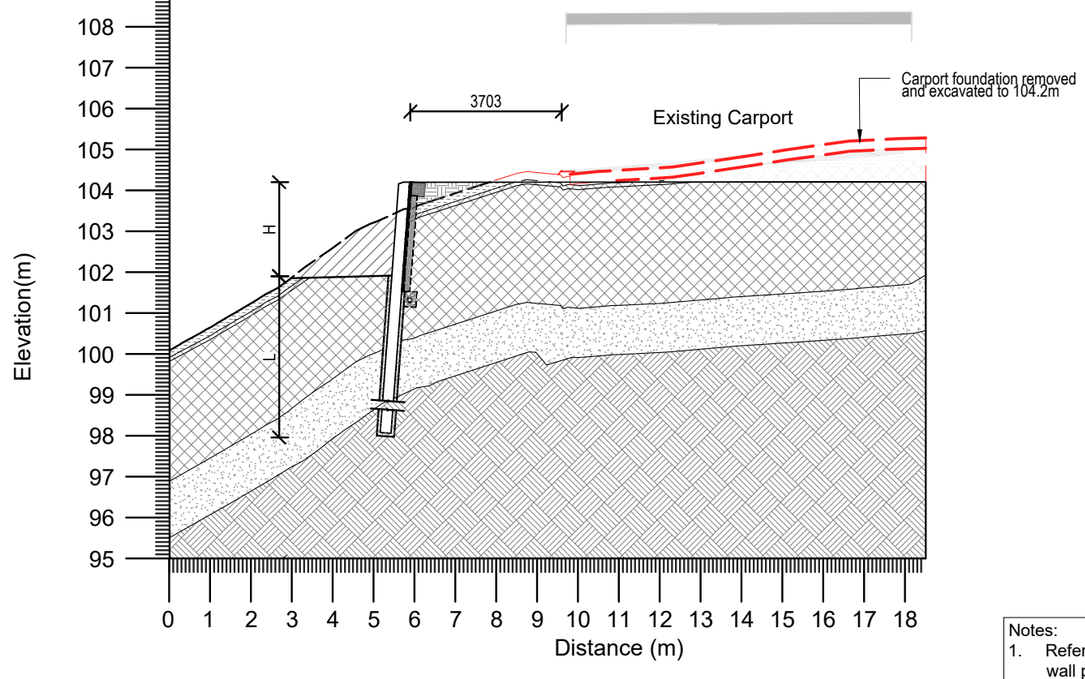
A - **SITE PLAN**
Scale 1:750



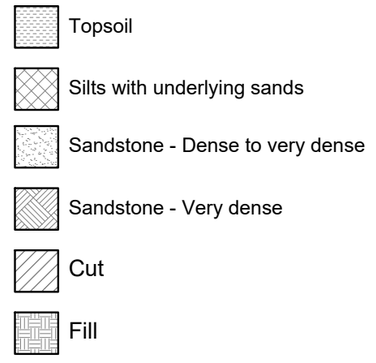

03 - **TIMBER RTW CALLOUT**
Scale 1:75




01 - **SECTION 01**
Scale 1:150




02 - **SECTION 02**
Scale 1:150




Notes:
1. Refer to finalized architectural drawings for the finalized wall positions, levels and layout.
2. Refer to Drawing T02 for pole size, depths and spacing.

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | 02 | FOR CONSENT | PW | APRIL 2025 |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TIMBER RETAINING WALL & GEOLOGICAL PROFILE SECTIONS

Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: T01
Rev No: 02

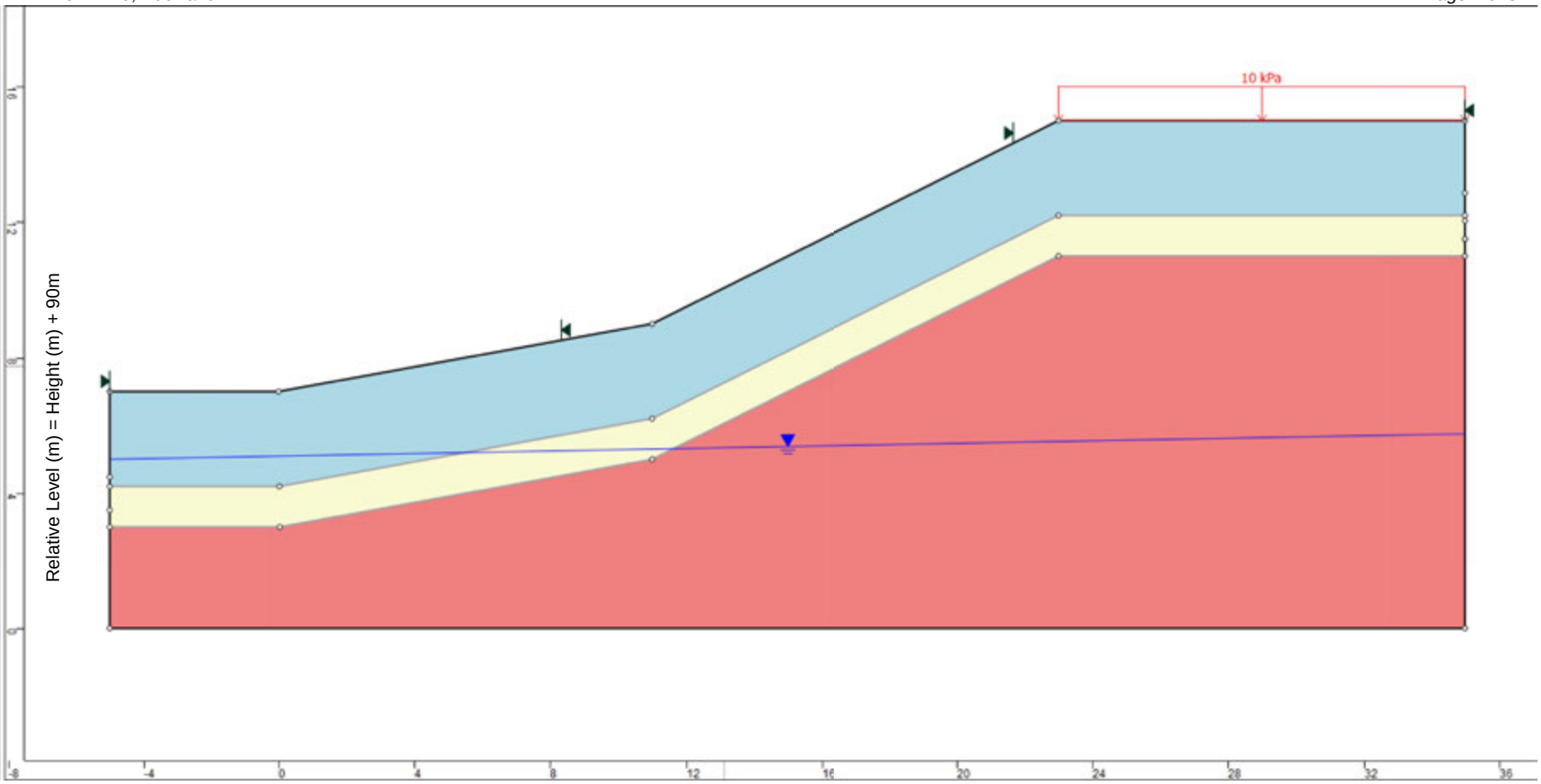
## Appendix B.3: Slope Stability Assessments

WALKER ENGINEERING CONSULTANTS

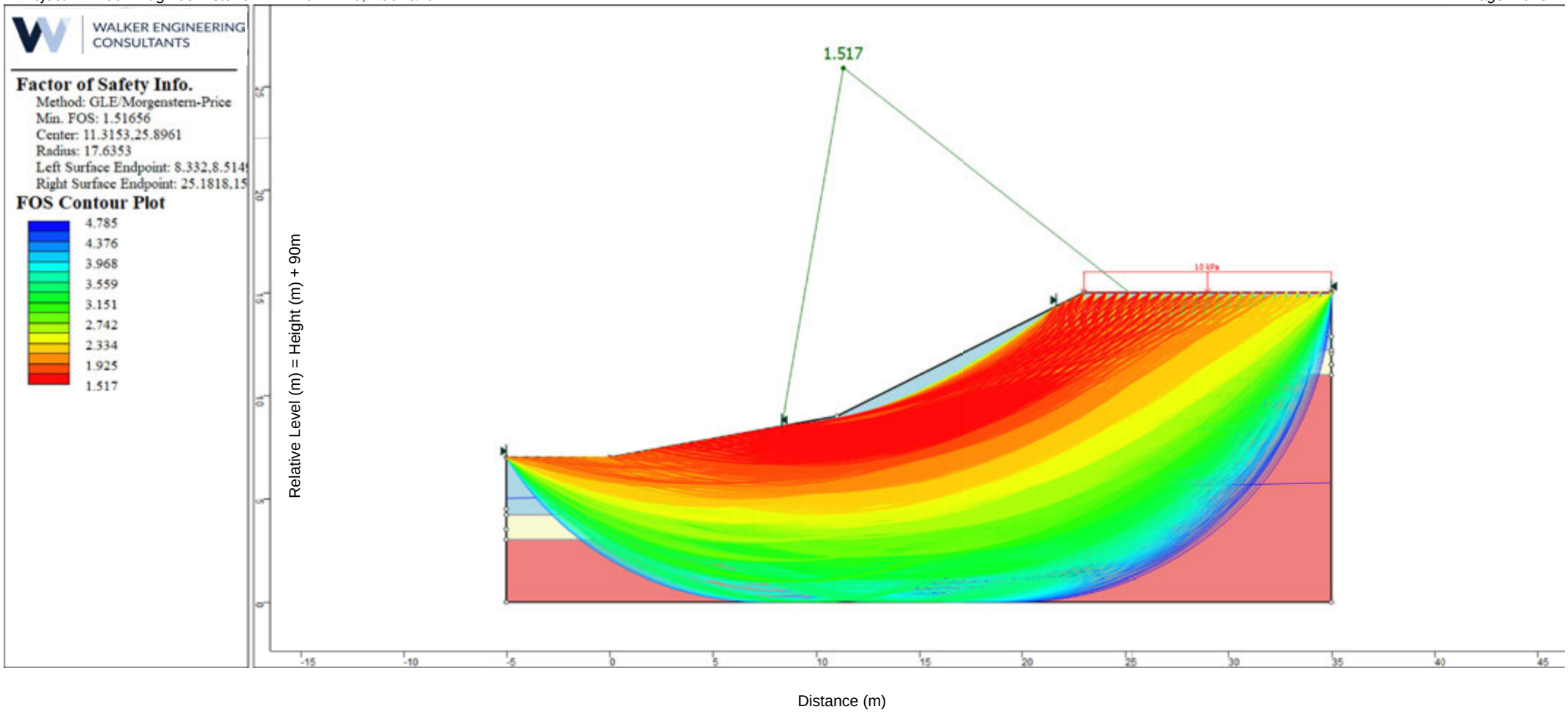
**Setting Information**
**Physical Unit:** Metric
**Failure Direction:**
Right to Left
**Methods:**
GLE/Morgenstern-Price

**Assigned Soil Material**
Silts (MC)
Sandstone/Siltstone (MC)
Sands (MC)

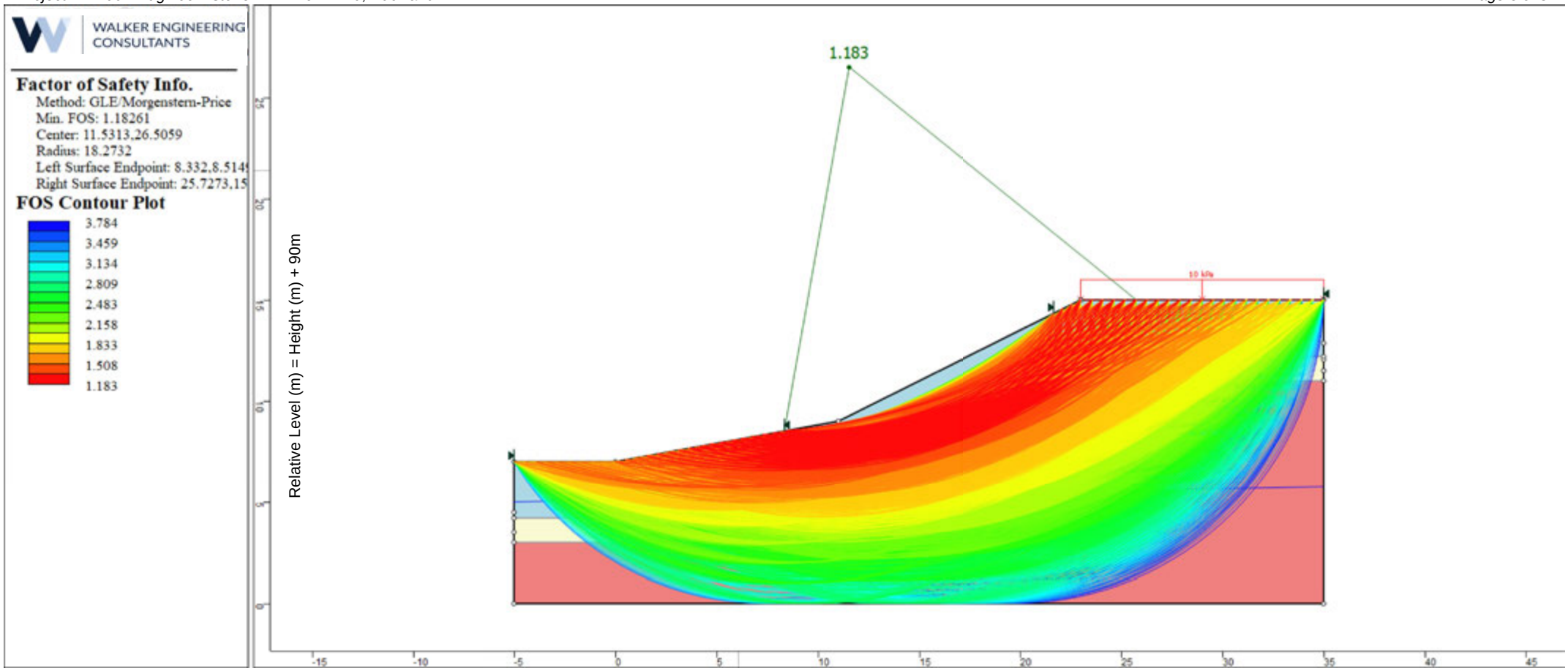
**Applied Load Info**
Constant Load



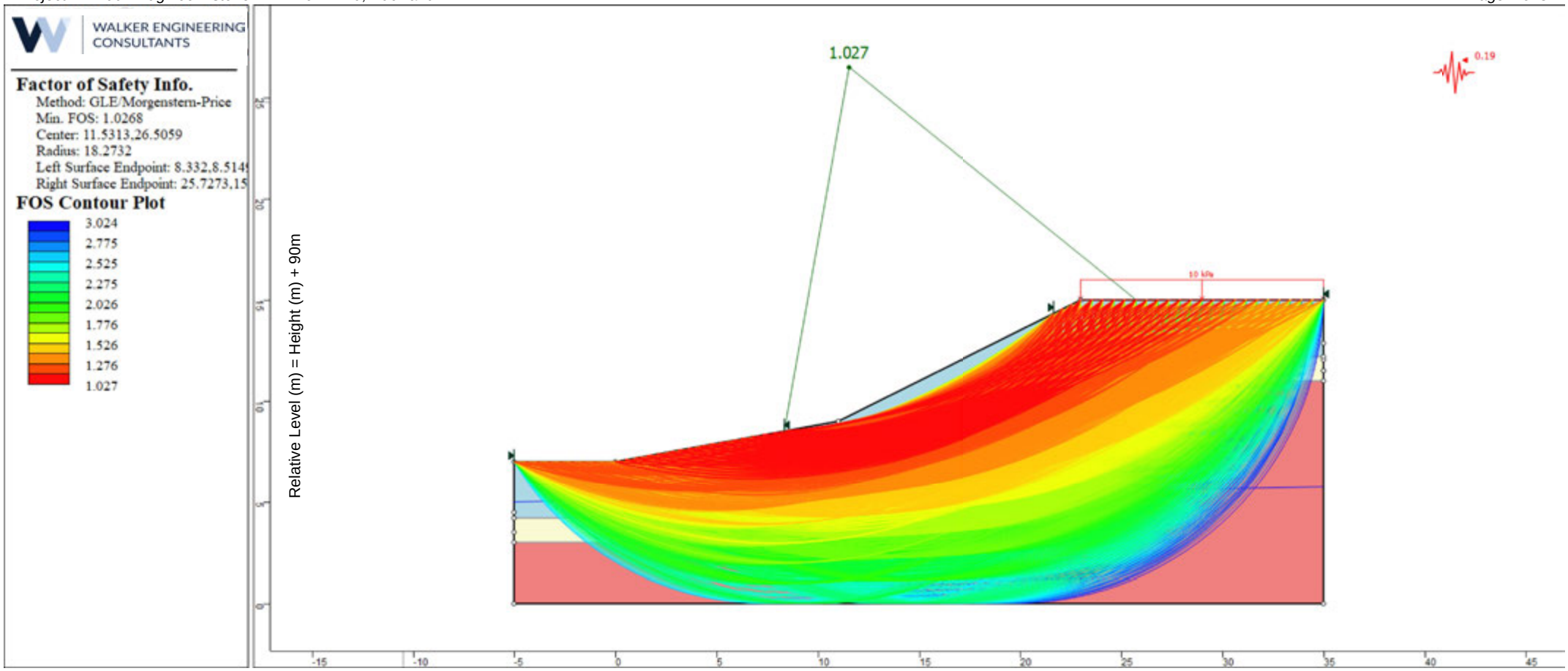

## CASES: PRE DEVELOPMENT



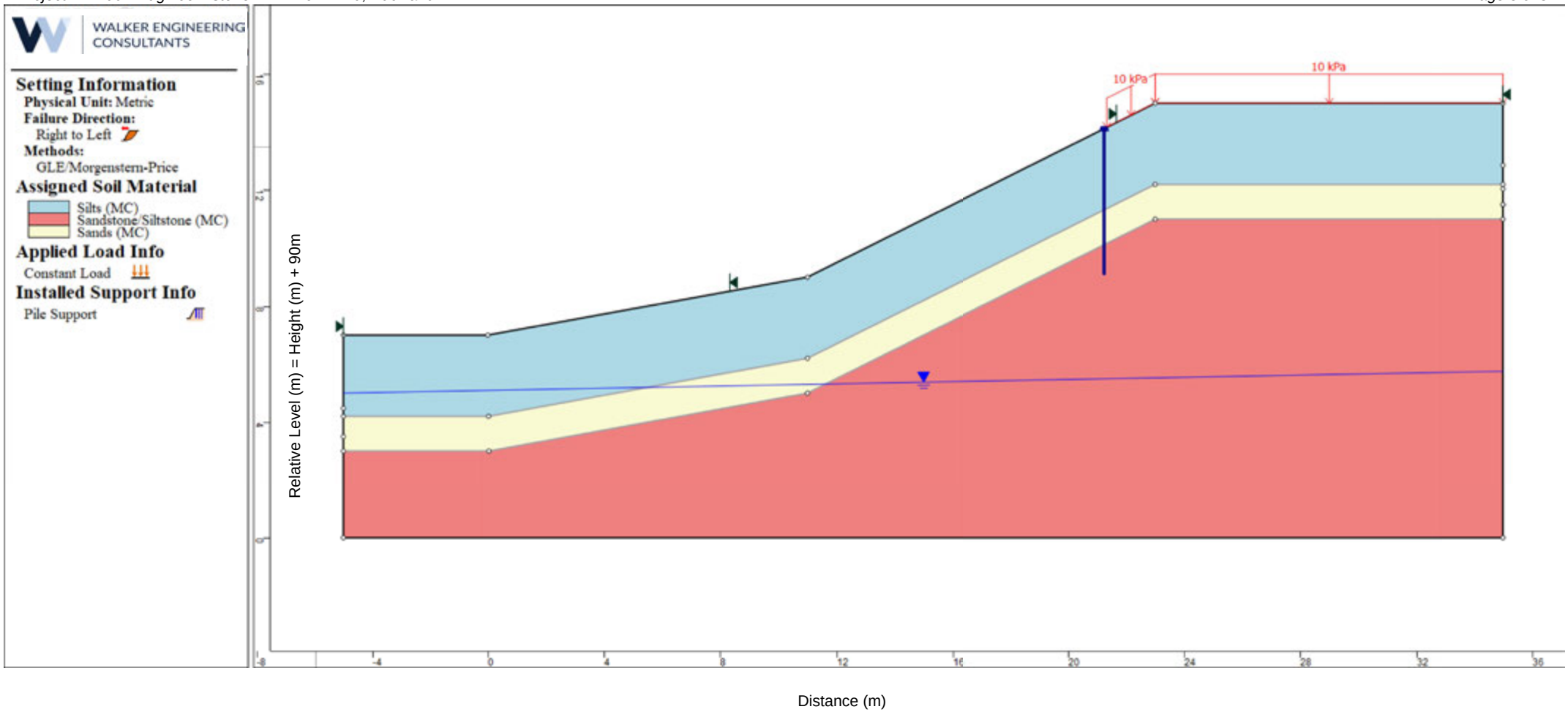

CASE: C1 – PRE DEVELOPMENT – STATIC LONG-TERM CONDITIONS - NORMAL



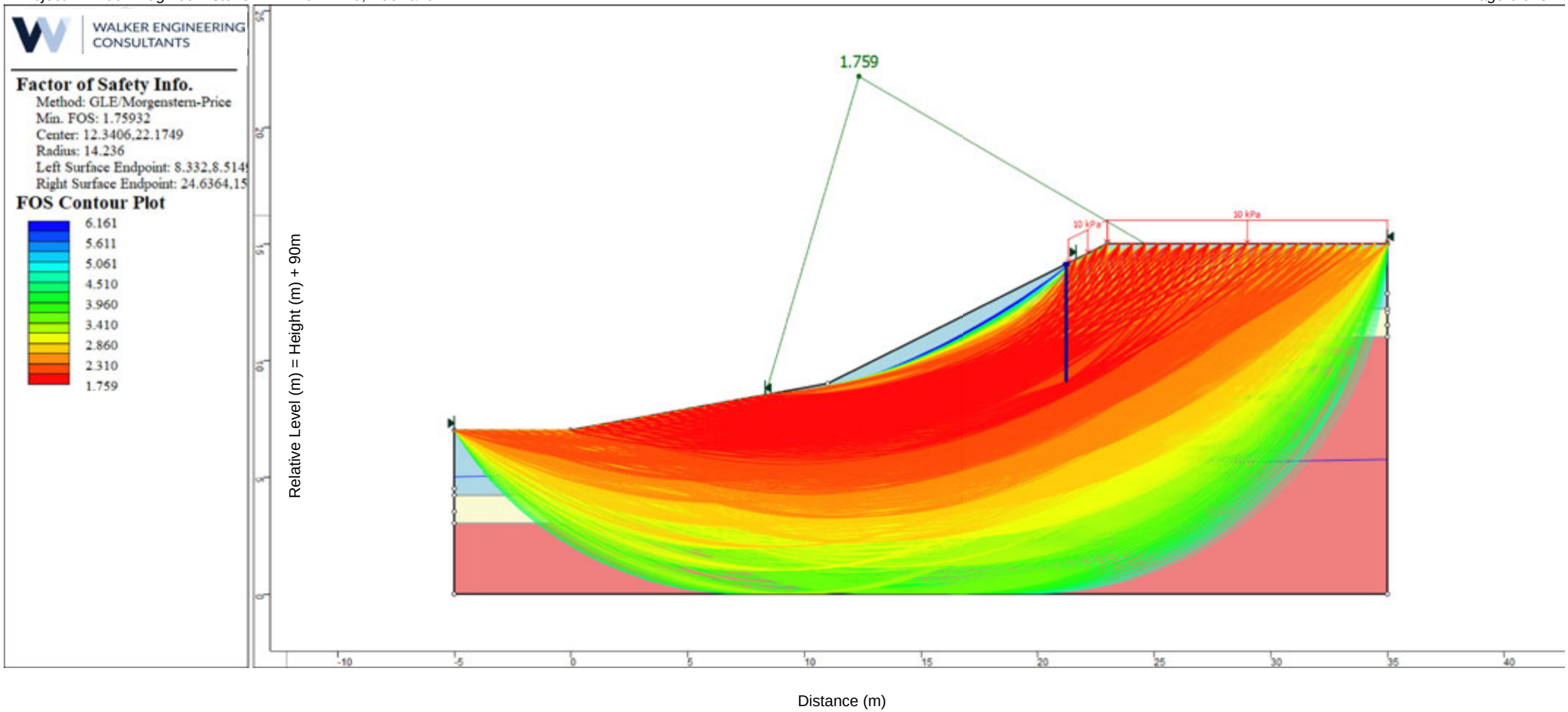

CASE: C2 – PRE DEVELOPMENT – STATIC LONG-TERM CONDITIONS - TRANSIENT



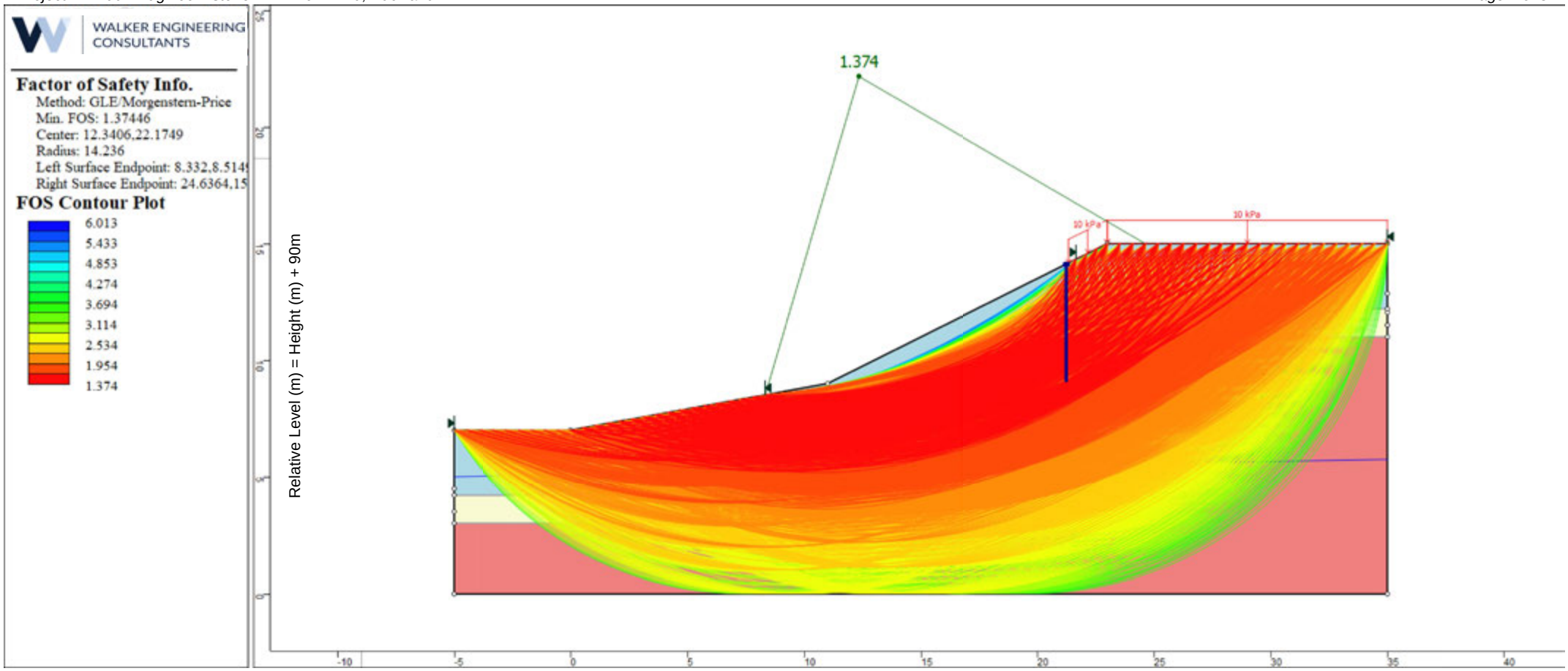

## CASE: C3 – PRE DEVELOPMENT – NORMAL – SEISMIC CONDITIONS



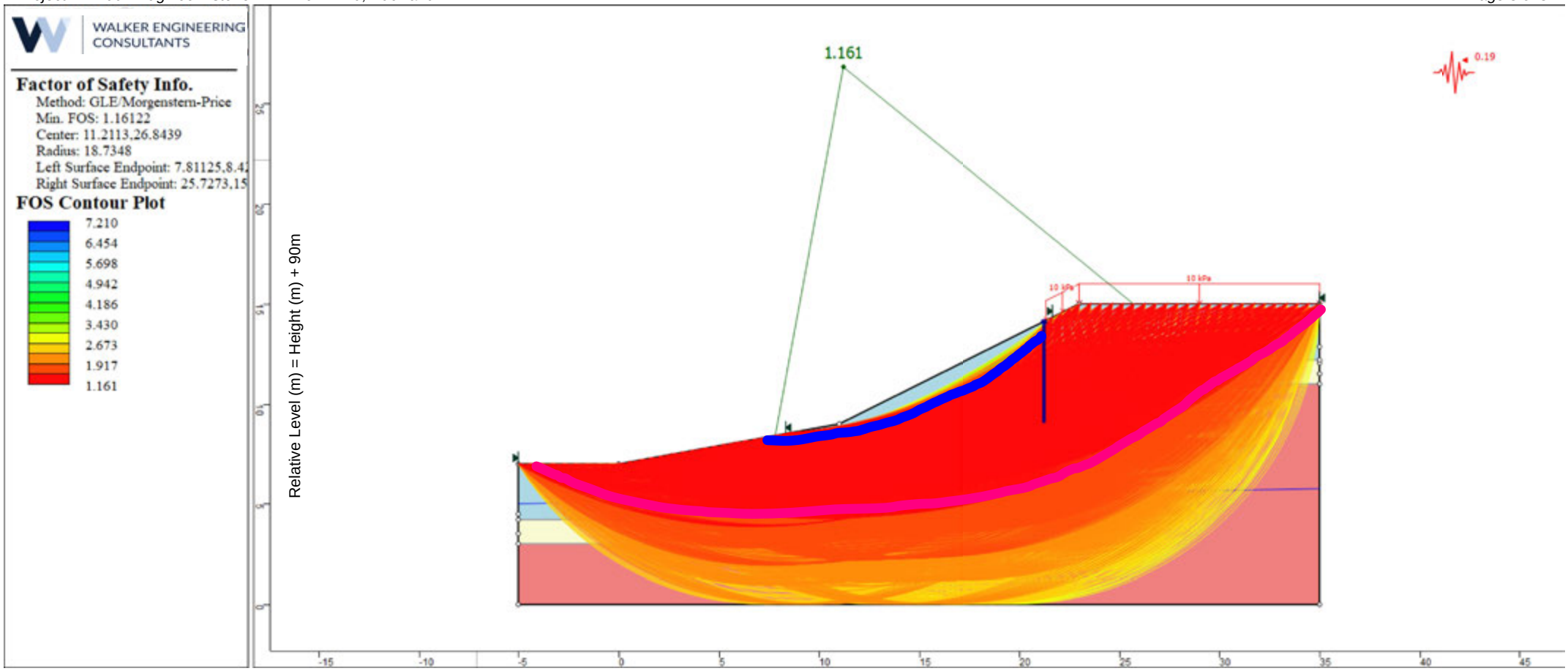

CASES: – POST DEVELOPMENTS




## CASE: C4 – POST DEVELOPMENT – STATIC LONG-TERM CONDITIONS - NORMAL




CASE: C5 – POST DEVELOPMENT – STATIC LONG-TERM CONDITIONS - TRANSIENT




## CASE: C6 – POST DEVELOPMENT – NORMAL – SEISMIC CONDITIONS

## Appendix C: Selected Concept Drawings and Geological Profile Sections

**(If the document is not embedded in the report, refer to separated latest PDF file revisions)**

| 24106 - SHEET LIST TABLE | | | |
|---|---|---|---|
| SHEET CATEGORY | SHEET No. | SHEET LIST | REVISION No. |
| COVER PAGE AND STANDARD NOTES/DETAILS | CP1 | COVER PAGE AND SHEET LIST | 02 |
| | SN1 | STANDARD NOTES SHEET 01 | 01 |
| | SN2 | STANDARD NOTES SHEET 02 | 01 |
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| | SCD | STANDARD CONCRETE DETAILS | 01 |
| EXISTING HOUSE ALTERATION DETAILS | F01 | SLAB JOINT AND CONCRETE FOOTING DETAILS | 01 |
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| | T02 | TYPICAL TIMBER RETAINING WALL AT GARAGE SHEET 02 | 01 |
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| | BR1 | TYPICAL BLOCK RETAINING WALL SHEET 01 | 01 |
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| | BR4 | LAGGING TO MASONRY WALL CONNECTION DETAIL | 01 |
| DECK AND POOL SUBFLOOR STRUCTURAL DETAILS | TP1 | SUBFLOOR ANCHOR PILE AND ORDINARY PILE DETAILS | 01 |
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| | EC01 | GENERAL SEDIMENT CONTROL SHEET 01 | 01 |
| | EC02 | GENERAL SEDIMENT CONTROL SHEET 02 | 01 |
| | ESC | EROSION AND SEDIMENT CONTROL PLANS | 01 |
| | ISO | SITE EARTHWORKS PLAN | 01 |

WALKER ENGINEERING CONSULTANTS

PREPARED BY: WALKER ENGINEERING CONSULTANTS

CONTENT: STRUCTURAL AND CIVIL ENGINEERING DETAILS

ISSUED FOR: CONSENT

PROJECT NUMBER: 24106

LOCATION: 142 KONINI ROAD, AUCKLAND

PROJECT TITLE: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

PREPARED FOR: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | 02 | FOR CONSENT - REVISED | PW | FEBRUARY 2025 |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: COVER PAGE AND SHEET LIST

Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: CP1

Rev No: 02

## GENERAL NOTES:

1. THE STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS DRAWINGS SPECIFICATIONS AND WITH SUCH OTHER INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT.
2. MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE NEW ZEALAND BUILDING CODE. THE CURRENT EDITION OF THE RELEVANT NZ STANDARD NOTES. INCLUDING ASSOCIATED STANDARDS AND LOCAL AUTHORITY REGULATIONS EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
3. THE CONTRACTOR SHALL COMPLY WITH ALL OSH AND ON SITE HEALTH AND SAFETY REQUIREMENTS AS AT ALL TIMES.
4. THESE DRAWINGS SHOW THE DESIGN INTENT AND ARE NOT SHOP DRAWINGS. IF REQUIRED, ALL TO COMPLETE SHOW DRAWINGS FOR FABRICATION, SHOP DRAWINGS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
5. REFER TO THE ARCHITECTURAL DRAWINGS FOR ALL SETTING OUT, NIBS, REBATES, SET-DOWNS AND THE LIKE.
6. ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT, CONSULTANT OR THE ENGINEER IF APPROPRIATE BEFORE PROCEEDING WITH THE WORK.
7. ALL THE DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION AND FABRICATION IS COMMENCED. THE ENGINEERS DRAWINGS SHALL NOT BE SCALED.
8. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE IN A STABLE CONDITION AND ENSURE NO PARTS SHALL BE OVER STRESSED UNDER CONSTRUCTION ACTIVITIES. THIS INCLUDES ALL EXISTING OR TEMPORARY STRUCTURES FORMING PART OF, OR AFFECTED BY THE WORKS.
9. IF DURING CONSTRUCTION ANY PART OF THE WORKS SHOWS SIGNS OF DISTRESS, EXCESSIVE DEFLECTION, CONFLICT OF COMPONENTS OR OTHER PROBLEMS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER, WHO SHALL INVESTIGATE AND ISSUE INSTRUCTIONS AS CONSIDERED NECESSARY.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, INSTALLATION AND THE MAINTENANCE OF ALL NECESSARY TEMPORARY WORKS TO ENSURE STRENGTH AND STABILITY OF THE STRUCTURE THROUGHOUT THE COURSE OF THE WORKS.
11. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, INSTALLATION AND MAINTENANCE OF ALL NECESSARY TEMPORARY WORKS TO ENSURE STRENGTH AND STABILITY OF THE STRUCTURE THROUGHOUT THE COURSE OF THE WORKS.
12. THE CONTRACTOR IS TO DISCONNECT ALL SERVICES NECESSARY TO PROGRESS THE WORKS AT THE SITE BOUNDARY IN ACCORDANCE WITH THE BEST PRACTICE METHODS.
13. THE CONTRACTOR IS TO ENSURE NO SITE UTILITY OR OTHER SERVICE IS DISRUPTED FOR ANY REMAINING TENANTS OR OTHER SERVICE USERS.
14. UNLESS OTHERWISE NOTED, ALL LEVELS ARE IN METERS RELATIVE TO THE DATUM, ALL DIMENSIONS ARE IN MILLIMETERS.
15. WHERE CONSTRUCTED WORKS DIFFER FROM THOSE SHOWN ON THE DRAWINGS THEN THE CONTRACTOR SHALL MARK THE AS-BUILT DETAILS ON A SET OF DRAWINGS AND SHALL INCLUDE BUT NOT LIMITED TO : LOCATION OF DRAINAGE OUTLETS AND EXTENT OF DRAINAGE WORKS, CHANGES TO WALL HEIGHT, ALIGNMENT, POLE SIZE, SPACING ECT.CHANGES AS PERTINENT TO THE STRUCTURE SHALL ALSO HAVE A WRITTEN CONFIRMATION FROM THE ENGINEER ATTACHED TO THE AS BUILT DRAWINGS.

## APPLICABLE STANDARDS:

GENERAL SPECIFICATIONS FOR CONCRETE, STRUCTURAL STEELWORK, STRUCTURAL TIMBER AND MINOR EARTHWORKS

| | STANDARDS | |
|---|---|---|
| NZTA BRIDGE MANUAL | | SP/M/022 |
| CORRUGATED PLASTIC PIPE SUBSOIL DRAIN CONSTRUCTION | TNZ | F/02 |
| PIPE SUBSOIL DRAIN CONSTRUCTION | TNZ | F/05 |
| STRUCTURAL STEEL AND HOLLOW SECTIONS | AS | 1163 |
| PILING | AS | 2195 |
| STEEL STRUCTURES STANDARD - MATERIALS, FABRICATION AND CONSTRUCTION | NZS | 3404.1:2009 |
| PERFORATED PLASTIC DRAINAGE AND EFFLUENT PIPE AND FITTING | NZS | 2439 |
| CONCRETE STRUCTURES STANDARD | NZS | 3101 |
| CONCRETE CONSTRUCTION | NZS | 3109 |
| SPECIFICATION FOR CONCRETE SURFACE FINISHES | NZS | 3114 |
| CODE OF PRACTICE FOR SPECIFYING TIMBER AND WOOD-BASED PRODUCTS FOR USE IN BUILDING | NZS | 3602 |
| TIMBER STRUCTURES STANDARD | NZS | 3603 |
| CHEMICAL PRESERVATION OF ROUND AND SAWN TIMBER | NZS | 3640 |
| TIMBER PILES AND POLES FOR USE IN BUILDINGS | NZS | 3605 |
| NEW ZEALAND TIMBER GRADING RULES | NZS | 3631 |
| ISO METRIC HEXAGON COMMERCIAL BOLTS AND SCREWS | AS/NZS | 1111 |
| STRUCTURAL DESIGN ACTIONS | AS/NZS | 1170 |
| STRUCTURAL WELDING, PART 1 : WELDING OF STEEL STRUCTURES | AS/NZS | 1554 |
| GUIDE TO THE PROTECTION OF STRUCTURAL STEEL AGAINST CORROSION BY THE USE OF PROTECTIVE COATING:<br>PART 1 : PAINT COATINGS<br>PART 2 : HOT DIP GALVANISING | AS/NZS | 2312 |
| STRUCTURAL STEEL - HOT ROLLED PLATES, FLOOR PLATES AND SLAB | AS/NZS | 3678 |
| STRUCTURAL STEEL HOT-ROLLED BARS AND SECTIONS | AS/NZS | 3679 |
| COLD-FORMED STEEL STRUCTURES | AS/NZS | 4600 |
| STEEL REINFORCING MATERIALS | AS/NZS | 4671 |
| HOT-DIP GALVANISED (ZINC) COATINGS ON FABRICATED FERROUS ATRICLES | AS/NZS | 4680 |

## TIMBER WALL SPECIFICATION :

THIS SPECIFICATION APPLIES TO THE PROPOSED TIMBER WALL RETAINING WALLS. IT SHOULD BE READ IN CONJUNCTION WITH THE DRAWINGS. WHERE THIS SPECIFICATIONS AND THE DRAWINGS CONTRADICT, THE DRAWINGS SHALL TAKE PRECEDENCE.

(i)

| | Timber Poles | Rough sawn timber |
|---|---|---|
| Bending | 38 MPa | 7.5 Mpa |
| Modulus of Elasticity | 8700 MPa | 4800 Mpa |
| Shear strength | 3.1 MPa | 2.4 Mpa |
| Preservative treatment class | H5 | H4 |
| Treatment for cut surfaces | Liberal brush of "Ensele" or approved equivalent | |
| Density | Normal | No.1 Framing |
| *Green condition assumed* | | |

(ii) CONSTRUCTION WORKS PERFORMED ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE LATEST REVISIONS OF THE NEW ZEALAND BUILDING CODE HANDBOOK AND APPROVED DOCUMENTS (NZBC) AND COMPLY WITH THE GENERAL REQUIREMENTS OF THE LATEST REVISIONS.

(iii) ENGINEER INSPECTIONS - ALL OR SOME WILL BE REQUIRED AND ARE TO BE CONFIRMED WITH THE ENGINEER.

- PRIOR TO INSTALLATION OF POLES TO CONFIRM THE FOUNDING LEVEL OF THE POLES, POLE SPACINGS AND HOLE DIAMETER.
- PRIOR TO BACK FILLING OF THE DRAINAGE SYSTEMS. CONFIRMING TIMBER LAGGING AND DRAINAGE SYSTEMS IS PER DRAWINGS OR OTHERWISE APPROVED.
- TIMBER POLES, LAGGING, DRAINAGE METAL & CONCRETE DOCKETS TO BE INSPECTED FOR SIZE, TREATMENT LEVEL AND ANY OTHERWISE APPROVED.
- UPON COMPLETION OF THE TIMBER WALL. CONFIRMING SOIL CAPPING AND DRAINAGE MATERIAL DEPTH BY PHYSICAL INSPECTION.

(iv) OTHER:

- TIMBER LAGGING TO BE No.1 FRAMING GRADE, MINIMUM THICKNESS OF 50MM, SPAN 4 OR MORE POLES, BE BUTT JOINED AT TIMBER POLES ONLY
- PRIOR TO SETTING OUT THE ALIGNMENT AND LOCATION OF THE TIMBER POLE WALL THE CONTRACTOR SHALL IDENTIFY AND LOCATE ALL SERVICES. IF THERE IS A POSSIBILITY OF CONFLICT BETWEEN SERVICES AND TIMBER POLES THE ENGINEER WILL THEN CONFIRM THE LOCATION OF THE TIMBER POLES, BASED ON THE CONTRACTOR'S SERVICES INFORMATION IN ORDER TO ENSURE THAT THE POLE LOCATIONS DO NOT CONFLICT WITH THOSE SERVICES.

## TIMBER:

1. ALL TIMBER TO BE MINIMUM RADIATA PINE GRADE VSG8.
2. ALL TIMBER TO RECEIVE A MINIMUM OF H3 PRESERVATIVE TREATMENT UNLESS NOTED OTHERWISE.
3. ALL CUT SURFACES TO RECEIVE A LIBERAL COATING OF METALEX CLEAR PRESERVATIVE.

## CONCRETE REINFORCEMENT:

1. SPLICES IN THE REINFORCEMENT SHALL BE AT LEAST 50 BAR DIAMETER UNO
2. REINFORCEMENT SPLICES AND DEVELOPMENT LENGTH OF BARS AND WIRE IN TENSION AND/OR COMPRESSION SHALL NOT BE MADE OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS, OR IN ACCORDANCE WITH NZS 3101 SECTION 8.6.
3. REINFORCEMENT SYMBOLS:
   HR - DENOTES GRADE 500E PLAIN BAR
   HD - DENOTES GRADE 500E DEFORMED BAR
4. ALL WELDED MESH SHALL COMPLY WITH AS/NZS 4671 AND SHALL BE SUPPLIED AS FLAT SHEETS.TYPICAL WELDED MESH LAP: 350 min
5. PLACE SUFFICIENT BAR CHAIRS UNDER BOTTOM REINFORCEMENT RODS AND TOP CROSS RODS IN SLABS TO ALLOW THEM TO BE SUPPORTED IN THEIR CORRECT POSITIONS DURING CONCRETING (NOT GREATER THAN 900MM CENTERS BOTH WAYS FOR BARS, 750MM FOR FABRIC)
6. BAR CHAIRS TO BE PLASTIC.
7. REINFORCING SHALL NOT BE WELDED WITHOUT WRITTEN PERMISSION OF ENGINEER, UNLESS OTHERWISE SHOWN ON THE DRAWINGS. IN NO CASE SHALL THE REINFORCING BE WELDED WITH IN 10 BAR DIA OF ANY BEND.
8. HOOKS AND BENDS ARE TO BE IN ACCORDANCE WITH NZS 3109 SECTION 3.3 AND NZS 3101 SECTION 8.4
9. DO NOT BEND STEEL ON SITE, UNLESS ABSOLUTELY NECESSARY, AND THEN ONLY WITH EQUIPMENT FIT FOR THE PURPOSE.
10. DO NOT RE-BEND REINFORCING STEEL ONSITE WITHOUT PROPER EQUIPMENT/TOOLS, AND THE PROPER PREPARATION AND PREHEATING AS PER MBIE PRACTICE ADVISORY No.1.
11. MINIMUM LAP LENGTH FOR REINFORCING SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
    - D-BAR - 35 BAR DIA (CONC.) 40 BAR DIA (BLOCKWORK)
    - H-BAR - 60 BAR DIA (CONC.) 70 BAR DIA (BLOCKWORK)

## CONCRETE NOTES:

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH NZS 3109 UNO & 4120
2. MINIMUM CONCRETE STRENGTH AT 28 DAYS SHALL BE AS FOLLOWS.

| ELEMENT | MIN CONCRETE STRENGTH (UNLESS OTHERWISE NOTED) |
|---|---|
| SED FOUNDATIONS | 25MPa |
| BLOCKWORK | 25MPa |
| SITE CONCRETE (BLINDING) | 17.5MPa |

3. SCHEDULE OF SURFACE FINISHES TO NZS 3114

| ELEMENT | FINISH |
|---|---|
| SLABS | U3 |
| FORMED SURFACES | F3 |

4. TOLERANCES TO BE AS PER NZS 3109 SECTION 5.3.
5. 15 x 15 CHAMFERS SHALL BE PROVIDED TO OUTER EDGES OF CONCRETE MEMBERS, UNO.
6. MINIMUM CONCRETE COVER :75mm BOTTOM, 50mm SIDES AND TOP.
7. EXPOSURE CLASSIFICATION FOR ALL ABOVE GROUND CONCRETE IS B1 AS PER NZS 3101 SECTION 3.4.2
   EXPOSURE CLASSIFICATION DEFINITIONS:

A1:
- PROTECTED BY DAMP PROOF MEMBRANE
- FULLY ENCLOSED WITHIN A BUILDING EXCEPT FOR A BRIEF PERIOD OF WEATHER EXPOSURE DURING CONSTRUCTION.

A2:
- IN NON AGGRESSIVE SOILS
- ABOVE GROUND EXTERIOR IN AN INLAND ENVIRONMENT.

B1 :
- IN BUILDING PARTS THEREOF WHERE MEMBERS MAY BE SUBJECT TO REPEATED WETTING AND DRYING.
- ABOVE GROUND EXTERIOR IN A COASTAL ENVIRONMENT.

B2 :
- WITHIN 100M OF HIGH TIDE MARK OR BETWEEN 100-500M OF THE HIGH TIDE MARK IN DIRECTION OF A PREVAILING OR COMMON WIND.

OTHER:
- WHERE CONCRETE IS CAST IN FORMWORK COMPLYING WITH NZS 3109 AND COMPACTED IN ACCORDANCE WITH NZS 3109, THE COVER SHALL BE NOT LESS THAN THE VALUE GIVEN IN THE TABLE BELOW, APPROPRIATE TO THE EXPOSURE CLASSIFICATION AND SPECIFIED CONCRETE STRENGTH.
- WHERE CONCRETE IS CAST ON OR AGAINST GROUND AND COMPACTED IN ACCORDANCE WITH NZS 3109, THE MINIMUM COVER FOR A SURFACE IN CONTACT WITH THE GROUND SHALL BE 75MM OR 50MM IF USING A DAMP-PROOF MEMBRANE BETWEEN THE GROUND AND THE CONCRETE TO BE CAST.

| EXPOSURE CLASSIFICATION | SPECIFIED COMPRESSIVE STRENGTH F'c (Mpa) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 17.5 | 20 | 25 | 30 | 35 | 40 | 50 | 60 | 70 |
| | MINIMUM REQUIRED COVER (mm) | | | | | | | | |
| A1 | 30 | 25 | 25 | 20 | 20 | 20 | 15 | 15 | |
| A2 | 50 | 40 | 35 | 30 | 30 | 25 | 25 | 20 | 20 |
| B1 | 60 | 50 | 40 | 35 | 35 | 30 | 30 | 25 | 25 |
| B2 | - | - | - | 45 | 40 | 35 | 30 | 30 | 25 |

## DRAWING ABBREVIATIONS:

| | | | | | |
|---|---|---|---|---|---|
| REF | - | REFER | CRS | - | CENTERS |
| REINF | - | REINFORCEMENT | Ø | - | DIAMETER |
| SOP | - | SET OUT POINT | DWG | - | DRAWING |
| THK | - | THICK | EW | - | EACH WAY |
| TOS | - | TOP OF STEEL | GALV | - | GALVANIZED |
| U/S | - | UNDERSIDE | HD GALV | - | HOT DIP GALVANIZED |
| UNO | - | UNLESS NOTED OTHERWISE | MAX | - | MAXIMUM |
| SFL | - | STRUCTURAL FLOOR LEVEL | NOM | - | NOMINAL |
| SIM | - | SIMILAR | MIN | - | MINIMUM |
| | | | NTS | - | NOT TO SCALE |

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: STANDARD NOTES SHEET 01

| Job #: | Scale (A3 Original): |
|---|---|
| 24106 | As Shown |
| Client Drawing #: | Sheet #: SN1 / Rev No: 01 |

## DRAINAGE AND WATERPROOFING:

1. DRAINAGE METAL SHALL BE A LAYER OF SUITABLE GRANULAR MATERIAL WITH PERFORATED PIPE TO DISCHARGE AS REQUIRED BY THE BUILDING CONSENT AUTHORITY.

2. WATERPROOFING TO BE CERTIFIED BY THE SUPPLIER AND THE INSTALLER.

## HARDFILL AND COMPACTION:

1. CONSOLIDATE THE BASE OF ALL THE EXCAVATIONS FOR FOUNDATIONS. COMPACT THE EXPOSED SURFACE USING COMPACTING PLATE-HAMMERS OR OTHER METHODS ACHIEVE 95% OF MAX DRY DENSITY, DEFINED AT OPTIMUM WATER CONTENT, IN ACCORDANCE WITH NZS 4402.

2. HARDFILL MATERIAL:
HARDFILL MATERIAL TO BE BASALTIC ROCK OR GOOD QUALITY METAL OR PUMICE SAND OR OTHER APPROVED MATERIAL, FROM AN APPROVED ORIGIN, WELL GRADED & ABLE TO BE COMPACTED TO THE TARGET DENSITY AS SPECIFIED BELOW. IT SHALL BE FREE FROM MATERIAL WHICH MAY CAUSE IT WEAVE WHEN WET

3. FILL MATERIAL SHALL HAVE A MAX SIZE OF 60mm, WITH 35-55% PASSING 19mm & NOT MORE THAN 15% PASSING 600mm STANDARD SIEVES. ON SITE MEASUREMENTS SHOULD BE CONDUCTED TO DETERMINE INSITU DENSITY & MOISTURE CONTENT OF THE COMPACTED MATERIAL. DENSITY TESTING (NDM) ON EACH LAYER OF PLACED MATERIAL SHOULD BE CONDUCTED AT A SPACING OF ABOUT 10x10m GRID. NOTICE SHALL BE GIVEN TO THE ENGINEER OF WHEN DENSITY TESTING IS REQUIRED & FILLING SHALL NOT PROCEED UNTIL THE ENGINEER ADVISES THAT THE MIN DENSITY REQUIREMENTS HAVE BEEN MET. ALL FILL MATERIAL SHALL BE COMPACTED TO A MIN OF 98% MAX DRY DENSITY AS DETERMINED BY THE NZS4402 1968 TEST 4.2.2. TARGET DRY DENSITY OF COMPACTED HARDFILL SHALL BE 1.8 TONNES/MP UNLESS OTHERWISE NOTED ON THE CONSTRUCTION ISSUE DRAWINGS.

4. FILL UNDER SLABS ON GRADE:
FILL AS NECESSARY OVER THE AREA OF THE GROUND SLAB TO WITHIN 25mm OF THE UNDERSIDE OF THE SLAB WITH 150mm MIN. APPROVED FREE DRAINING TAILINGS TO A MAX DEPTH OF 800mm. A FINAL LAYER OF 25mm OF NO-FINES GRANULAR FILL SHALL BE LAID READY TO RECEIVE A DAMP PROOF MEMBRANE AS SHOWN ON THE DRAWINGS

5. BACKFILL: BACKFILL
BEHIND RETAINING WALLS WITH APPROVED FREE DRAINING MATERIAL. REFER TO THE DRAWINGS FOR SPECIFIC REQUIREMENTS. BACKFILL AROUND FOUNDATIONS WITH APPROVED MATERIAL SUITABLE FRO THE CONDITIONS INDICATED ON THE DRAWINGS. SPECIFIC COMPACTION REQUIREMENTS TO BE IN ACCORDANCE WITH THE HARDFILL AND COMPACTION NOTES ABOVE. REMOVE ALL RUBBISH, TIMBER AND OTHER DEBRIS PRIOR TO BACK FILLING.

6. FREE DRAINING BACKFILL TO BE WRAPPED IN BIDIM A19 GEOTEXTILE FILTER FABRIC OR EQUIVALENT APPROVED WITH MINIMUM 400mm LAP.

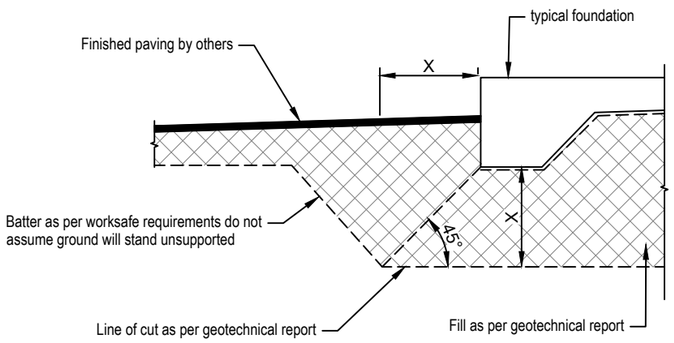
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR USING TECHNIQUES AND EQUIPMENT APPROPRIATE FOR THE CONDITIONS AND SOIL/ROCK TYPES EXPECTED TO BE ENCOUNTERED ON SITE. ALL EXCAVATED MATERIAL BE DISPOSED OF IN A SUITABLE STOCKPILE FOR INCORPORATION INTO THE PROJECT EARTHWORKS OR SUBSEQUENT REMOVAL FROM SITE.

## SITE EXCAVATION NOTE:

1. EXTREME CARE SHALL BE TAKEN WHEN COMPLETING ANY EXCAVATIONS ON SITE. EXCAVATIONS SHALL COMPLY WITH THE WORKSAFE NZ EXCAVATION GUIDELINES, UNLESS OTHERWISE SPECIFIC WRITTEN PERMISSION IS OBTAINED FROM ENGINEER, WHO SHALL COMPLETE SITE SPECIFIC GEOTECHNICAL INVESTIGATIONS.

2. EXCAVATIONS SHALL NOT UNDERMINE ANY EXISTING STRUCTURES WITHIN OR OUTSIDE THE PROPERTY BOUNDARIES. IN GENERAL A STRUCTURE IS UNDERMINED IN GOOD STIFF SOILS IF THE EXCAVATION CROSSES A 45 DEGREE (1V:1H) THRESHOLD STARTING FROM THE LOWER OUTSIDE CORNER OF THE EXISTING FOUNDATION. IN LOOSE SANDS OR POOR SOILS IT IS RECOMMENDED THIS THRESHOLD ANGLE BE DECREASED TO 30 DEGREES (1V:1.8H). NO EXCAVATIONS SHALL BE DEEPER THAN 500mm BELOW EXISTING FOUNDATION LEVEL WITHOUT PERMISSION FROM ENGINEER, AS ABOVE THRESHOLD LINES MAY DIFFER WITH DEEP EXCAVATIONS.

3. EROSION CONTROL - ALL SILT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH GD05 AND PLACED PRIOR TOCOMMENCEMENT OF EARTHWORKS. SUCH MEASURES SHALL BESUBJECT TO FURTHER ADDITIONS AND ALTERATIONS, WHERE CONSIDERED NECESSARY, AS DIRECTED BY THE PROJECT MANAGER OR NRC, DURING THE PROGRESSION OF WORKS. IT IS ADVISED TO CONTACT NRC PRIOR TO COMMENCEMENT OF EARTHWORKS, AFTER INSTALLATION OF EROSION AND SEDIMENT CONTROL DEVICES TO ENSURE THEY HAVE BEEN INSTALLED TO THE SATISFACTION OF NRC.




**Foundation Excavation zone**

**NOTE:** This is a guideline only and should be read in conjunction with geotechnical report for all cut and fill requirements

## MASONRY NOTES:

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH NZS 4120

2. RETAINING WALL BACKFILL TO BE APPROVED BY THE ENGINEER AND COMPACTED IN MINIMUM LAYERS OF 200mm THICK. ALL TOP SOIL AND ORGANICS TO BE REMOVED BELOW FOOTINGS.

3. BLOCKWALL AND SLAB TO CURE 3 DAYS PRIOR TO BACKFILLING.

4. MINIMUM TYPE B MASONRY BLOCK WORK TYPE AS PER NZS CRITERIA, OR OTHERWISE NOTED.

5. SCABBLE THE SURFACE OF THE CONCRETE BETWEEN THE BLOCKWORK AND THE CONCRETE SLAB.
6. THE FIRST (BOTTOM) BLOCK TO BE LAID UPSIDE DOWN WITH CLEAN-OUT OPENINGS (AS PER NZS 4210) FOR ALL WALLS.

7. CJ = SUGGESTED CONTROL JOINT IN WALL (MARKED UP IN PLAN)D = DIAMETER OF LARGER LAPPING BAR

8. REFER TO ARCHITECTURAL DRAWINGS FOR FURTHER DETAIL. THESE DRAWINGS DEMONSTRATE ENGINEERING LIMITATIONS AND DETAILS.

## BOLTED SPLICE CONNECTIONS:

1. UNLESS SPECIFICALLY APPROVED, ALL CRITICAL CONNECTIONS(e.g TRANSFER BEAM, SPLICE JOINT OF BRIDGE GIRDER) AS IDENTIFIED ON THE DRAWING USING GRADE 8.8 AND SHALL BE TENSIONED BY USING ONE OF THE METHODS BELOW;

(i) PART TURN METHOD:

- ON ASSEMBLY, ALL BOLTS IN THE CONNECTION SHALL BE FIRST TIGHTENED TO A SNUG TIGHT CONDITION. ANY BOLTS THAT BECOME LOOSE DURING THE SNUG TIGHTENING OF ADJACENT BOLTS WILL REQUIRE RE-TIGHTENING. RE-TENSIONING OF BOLTS THAT HAVE BEEN FULLY TENSIONED SHALL NOT BE PERMITTED.
- SNUG TIGHT IS THE TIGHTNESS ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR BY THE EFFORT OF A PERSON USING A STANDARD PODGER SPANNER.
- AFTER COMPLETING SNUG-TIGHTENING, LOCATION MARKS SHALL BE ESTABLISHED TO MARK THE RELATIVE POSITION OF THE BOLT AND THE NUT AND TO CONTROL THE FINAL NUT ROTATION.
- OBSERVATION OF THE FINAL NUT ROTATION MAY BE ACHIEVED BY USING MARKED WRENCH SOCKETS, BUT LOCATION MARKS SHALL BE PERMANENT WHEN REQUIRED FOR INSPECTION.
- BOLTS SHALL BE FINALLY TENSIONED BY ROTATING THE NUT BY THE AMOUNT GIVEN IN THE TABLE BELOW. DURING THE FINAL TENSIONING, THE COMPONENT NOT TURNED BY THE WRENCH SHALL NOT ROTATE.

| BOLT LENGTH (UNDERSIDE OF HEAD TO END OF BOLT) | BOTH FACES TO BOLT AXIS |
|---|---|
| UP TO AND INCLUDING 4 DIAMETERS | $\frac{1}{3}$ TURN |
| OVER 4 DIAMETERS BUT NOT EXCEEDING 8 DIAMETERS | $\frac{1}{2}$ TURN |

(ii) DIRECT-TENSION INDICATION DEVICE:

- ON ASSEMBLY, ALL BOLTS AND NUTS IN THE CONNECTION SHALL BE FIRST TIGHTENED TO A SNUG TIGHT CONDITION.
- AFTER COMPLETING SNUG-TIGHTENING, THE BOLT SHALL BE TENSIONED TO PROVIDE THE MINIMUM BOLT TENSION SPECIFIED IN THE TABLE BELOW. THIS SHALL BE INDICATED BY THE TENSION INDICATION DEVICE.
-

| NOMINAL DIAMETER OF A BOLT | MINIMUM BOLT TENSION, Kn |
|---|---|
| M16 | 95 |
| M20 | 145 |
| M22 | 180 |
| M24 | 210 |
| M30 | 335 |
| M36 | 490 |

2. CONTACT AREAS BETWEEN PLATES ARE TO BE SANDBLASTED TO CLASS 2½ (SSPC SP10) AND MASKED TO PREVENT PAINTING OF THE SURFACE.

3. PAINTING OVER AND AROUND THE CONNECTION TO BE IN ACCORDANCE WITH THE PAINTING SPECIFICATION NOTES.

4. ALL INTERIOR STRUCTURAL STEEL TO BE COATED WITH CARBOZINC 11 COATING SYSTEMS AS PER MANUFACTURERS DETAILS.

## STEELWORK NOTES:

1. ALL MATERIALS, FABRICATION AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NZS 3404 AND AS/NZS 1554, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

2. UNLESS OTHERWISE NOTED, ALL STEEL SHALL BE IN ACCORDANCE WITH:

- AS/NZS 3679.1 GRADE FOR BHP-300 PLUS ROLLED SECTIONS AND MERCHANT BAR, EXCEPT WHERE NOTED.
- AS/NZS 3679.2 GRADE 300 FOR ALL WELDED SECTION(WB & WC)
- AS 1163 GRADE C350 FOR RECTANGULAR HOLLOW SECTIONS
- AS 1163 GRADE C350 FOR CIRCULAR HOLLOW SECTIONS (EXTRA LIGHT WALL)
- AS 1163 GRADE C350 FOR CIRCULAR HOLLOW SECTIONS ( MEDIUM AND HEAVY)

3. UNLESS OTHERWISE NOTED, ALL STEEL SHALL BE IN ACCORDANCE WITH:
THE CONTRACTOR SHALL PREPARE WORKSHOP DRAWINGS AND SUBMIT COPIES OF EACH DRAWING FOR REVIEW. ALLOW 7 DAYS FOR SHOP DRAWING REVIEW. FABRICATION SHALL NOT COMMENCE UNTIL REVIEW HAS BEEN COMPLETED. REVIEW DOES NOT INCLUDE DIMENSIONS.

4. HIGH STRENGTH STRUCTURAL BOLTS AND WASHES SHALL COMLPY WITH AS1252 & NZS 3404.

5. WELDING:
- WELDING TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE NZS 3404 AND NZS/AS 1554.1 UNLESS SPECIFICALLY SHOWN ONTHE DRAWINGS ALL WELDS SHALL BE CATEGORY SP (STRUCTURAL PURPOSE) E41XX/W40X 6mm FWAR IN ACCORDANCE WITH NZS/AS 1554.1, UNO.
- STEEL FABRICATOR SHALL PROVIDE THE ENGINEER WITH ONE COPY OF THEIR WELD PROCEDURE PRIOR TO COMMENCE WELDING.
- ALL WELDING SHALL BE A MINIMUM OF 6mm CFW UNLESS NOTED OTHERWISE.

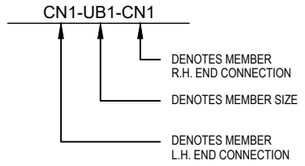
6. ALL ELECTRICALLY DISSIMILAR CONSTRUCTION MATERIALS EG. STAINLESS STEEL AND CARBON STEEL SHALL BE ISOLATED BY MEANS OF NYLON WASHERS AND/OR GROMMETS.

7. PERIODIC MAINTENANCE (IF APPLICABLE) IS TO BE CARRIED OUT AS PER THE MAINTENANCE SCHEDULE AND PAINTING SPECIFICATIONS.

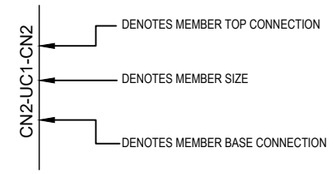
8. PAINTING IS TO BE CARRIED OUT BY THE PROJECT SPECIFIC STRUCTURAL STEEL PAINTING SPECIFICATION.

## STEEL WORK LEGEND:

1. STEEL BEAM MEMBER NOTATION




2. STEEL COLUMN MEMBER NOTATION




3. ——— INDICATES RELEVANT PROJECT SPECIFIC DETAIL

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
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WALKER ENGINEERING CONSULTANTS

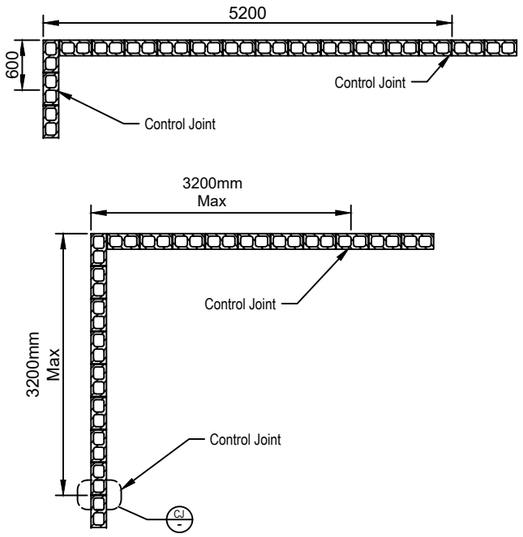
Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: STANDARD NOTES SHEET 02

Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: SN2
Rev No: 01

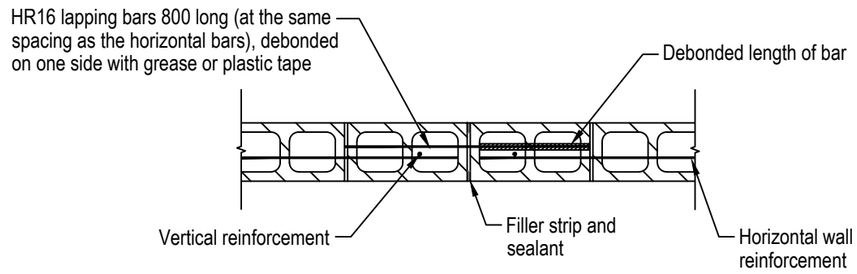



## Control Joint Location

Scale: 1:75

Shrinkage control joints:
Longitudinal shrinkage stresses in concrete masonry shall be controlled by providing vertical control joints at not more than 6m CRS.

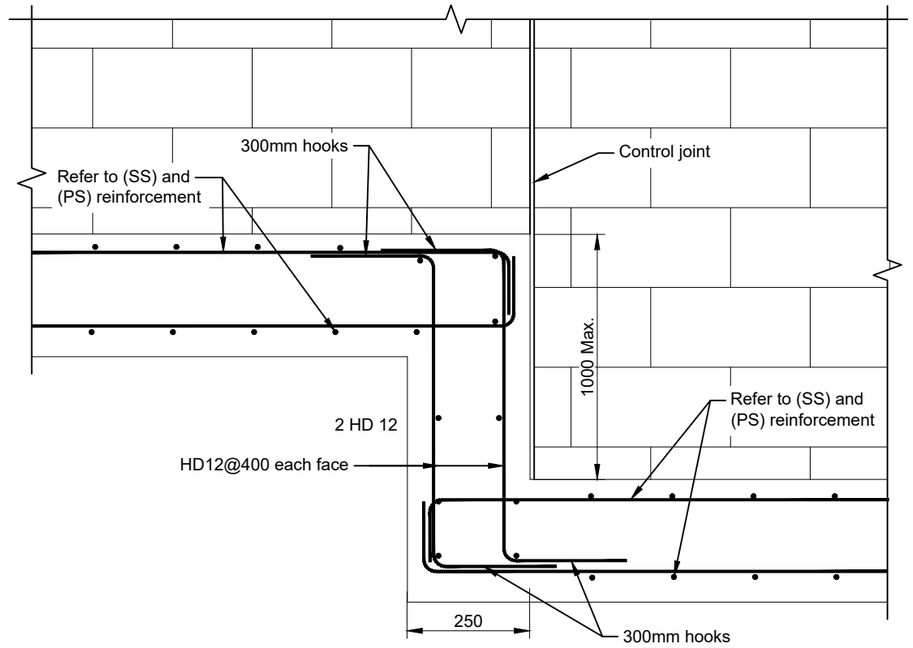
Vertical control joints shall be located:
(A) Within 600mm of return angles in T and U shaped floor structures.
(B) Within 600mm of L-shaped corners or by restricting the spacing to the next control joint to 3.2 Max
(C) At changes in wall height, exceeding 600mm
(D) At changes in wall thickness




Control joint detail for solid-filled walls and partially filled walls where horizontal bars are placed between floors but not bond beams.

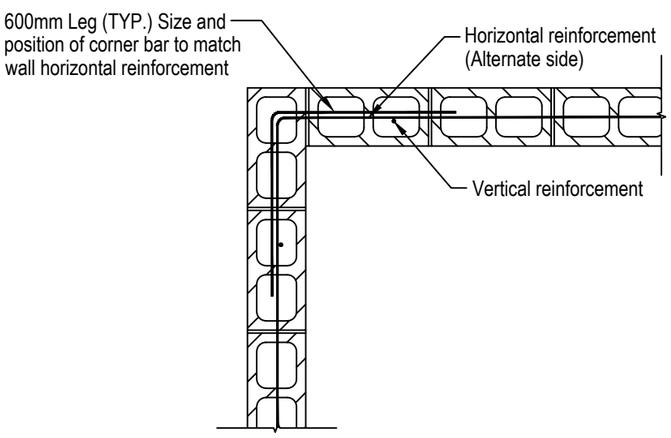
## CJ - Vertical control joint detail

Scale: 1:20



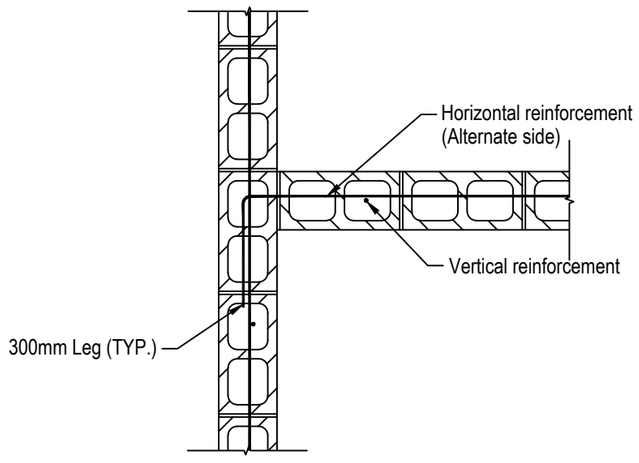

## CJ & S - 1000mm Max.Block wall step foundation (if required at construction)

Scale: 1:20




## Typical masonry wall corner

Scale: 1:20

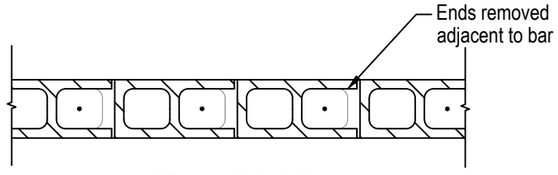



## Typical masonry wall intersection

Scale: 1:20

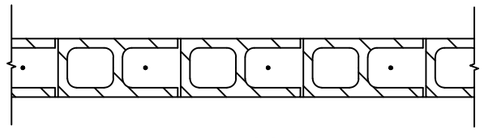
NOTE:

For 20 Series block walls with H20 starters
Type 20.05 Open end blocks to be used or
Type 20.15 with ends removed




## Type 20.15

Scale: 1:20



## Type 20.05

Scale: 1:20

| | | | | | |
|---|---|---|---|---|---|
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: STANDARD MASONRY DETAILS

Job #: 24106

Scale (A3 Original): As Shown

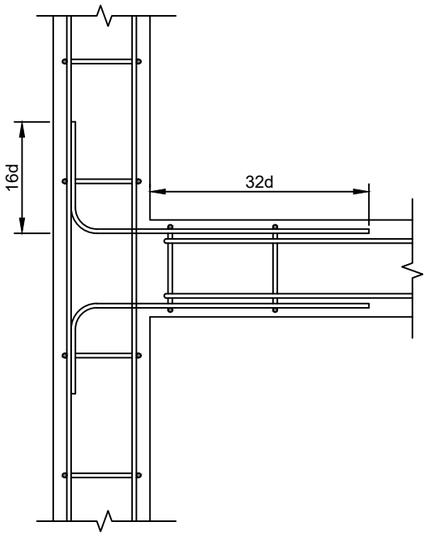
Client Drawing #:

Sheet #: SMD

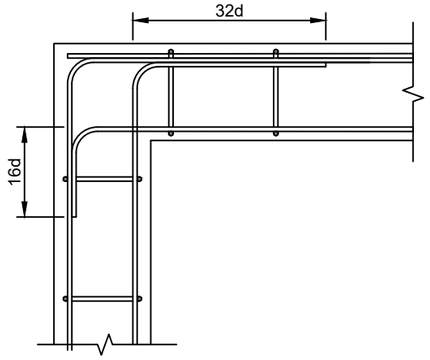
Rev No: 01

**NOTE:** Applicable to simple foundations only.
Foundation beam systems have specific detailing.

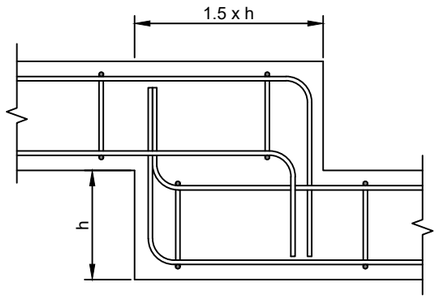
d = bar diamter



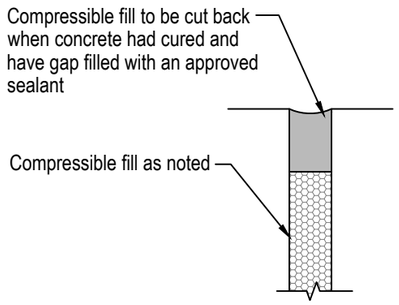

**Plan Foundation Junction**



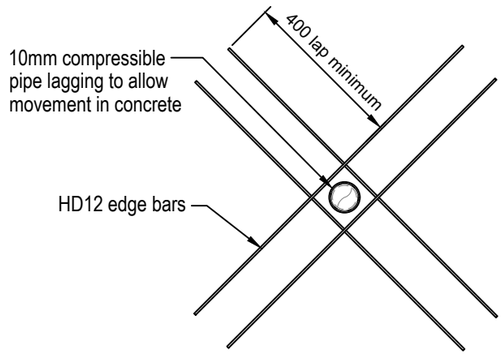

**Plan Foundation Corner**



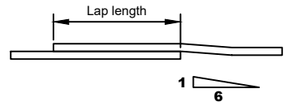

**Section Foundation Step**




**Standard Column**
**Isolation Joint (IJ) Finishing**




**Typical Slab Isolated Penetration Detail**



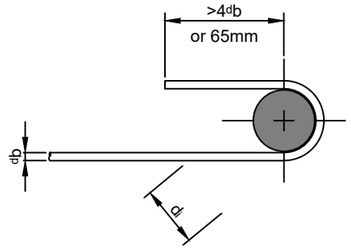

**NOTE**

- All reinforcing hooks, bends and lap lengths to comply with NZS 3101.

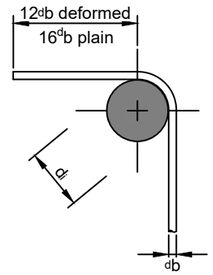
| Minimum Lap Length of Grade 300E Bars | | | | | | |
|---|---|---|---|---|---|---|
| Bar Diameter (mm) | Concrete Strength (Mpa) | | | | | |
| | 20 | 25 | 30 | 35 | 40 | |
| 10 | 350 | 300 | 275 | 275 | 250 | |
| 12 | 425 | 375 | 350 | 325 | 300 | |
| 16 | 550 | 500 | 450 | 425 | 400 | |
| 20 | 675 | 600 | 550 | 525 | 475 | |
| 25 | 850 | 750 | 700 | 650 | 600 | |
| 32 | 1075 | 975 | 900 | 825 | 775 | |
| 40 | 1350 | 1200 | 1100 | 1025 | 950 | |

| Minimum Lap Length of Grade 500E Bars | | | | | | |
|---|---|---|---|---|---|---|
| Bar Diameter (mm) | Concrete Strength (Mpa) | | | | | |
| | 20 | 25 | 30 | 35 | 40 | |
| 10 | 550 | 500 | 450 | 425 | 400 | |
| 12 | 675 | 600 | 550 | 500 | 475 | |
| 16 | 900 | 800 | 725 | 675 | 625 | |
| 20 | 1125 | 1000 | 925 | 850 | 800 | |
| 25 | 1400 | 1250 | 1150 | 1050 | 1000 | |
| 32 | 1800 | 1600 | 1450 | 1350 | 1275 | |
| 40 | 2225 | 2000 | 1825 | 1700 | 1575 | |

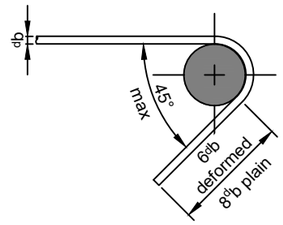
**Standard reinforcing lap lengths**
For pour lengths less than 300mm
multiply by 1.3 for pour depths greater than 300mm



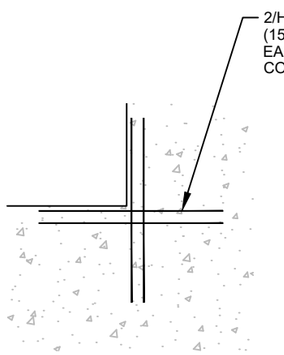

**Standard Semi-circular Hook**



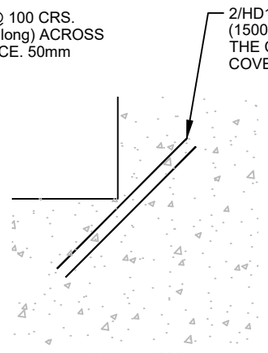

**Standard 90° Hook**



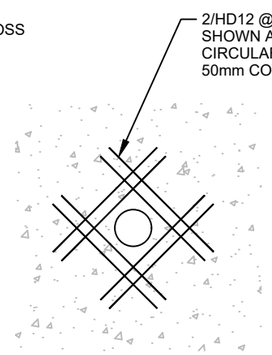

**Standard Stirrup Hook or Tie**



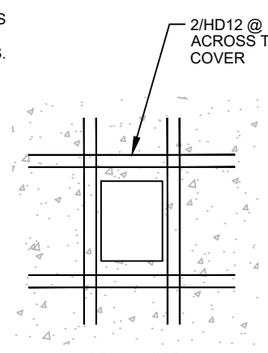

DETAIL LR01
LARGE RE-ENTRY CORNERS




DETAIL R02
RE-ENTRY CORNERS




DETAIL P02
PENETRATIONS




DETAIL P03
PENETRATIONS

# CONCRETE SLAB RETURN BARS

Scale 1:50 on A3

| f,(MPa) | Reinforcing Bar type | Bar Diamter $^{d}$b (mm) | Minimum Diameter bend $d_i$ (mm) | |
|---|---|---|---|---|
| | | | Plain Bars | Deformed Bars |
| 300 or 500 | Main Bar | 6-20 | $5^{d}$b | |
| | | 24-40 | $6^{d}$b | |
| | Stirrups & Ties | 6-20 | $2^{d}$b | $4^{d}$b |
| | | 24-40 | $3^{d}$b | $6^{d}$b |

**NOTE**

- Where deformed bars are galvanized before bending, the minimum bend diamter shall be :
- (A) $5^{d}$b for bar diameters of 16mm or less.
- (B) $8^{d}$b for bar diameters of 20mm or greater.

**Standard reinforcing hooks and bends**

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: STANDARD CONCRETE DETAILS

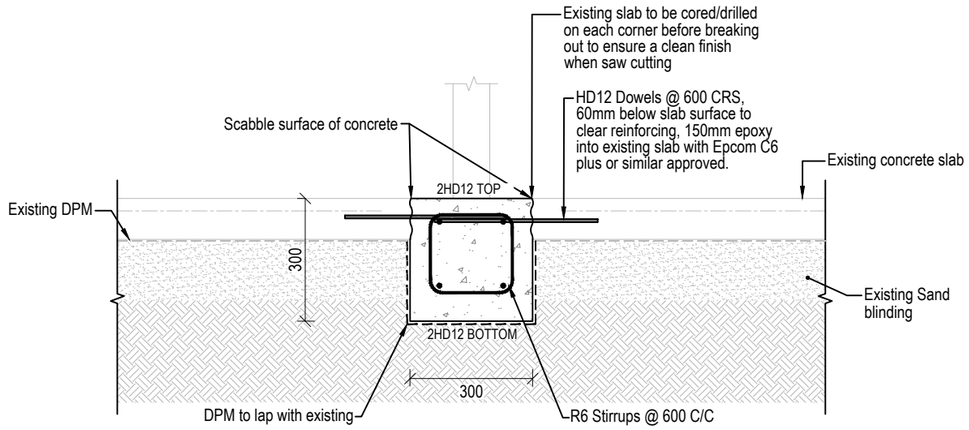
Job #: 24106

Scale (A3 Original): As Shown

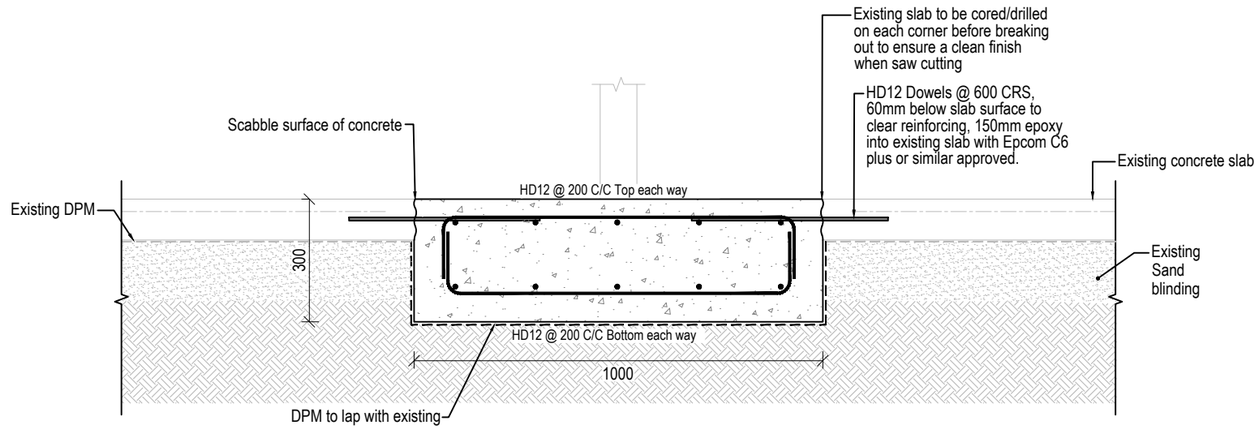
Client Drawing #:

Sheet #: SCD

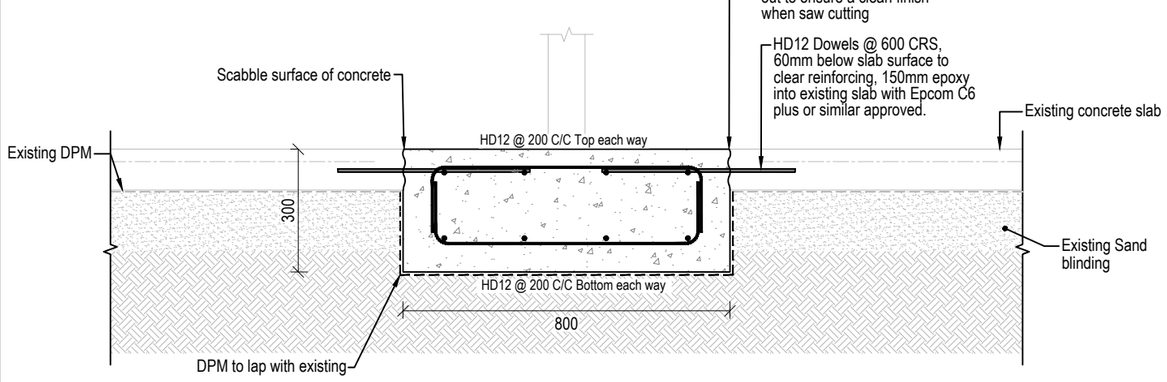
Rev No: 01




G1 - **FOOTING TYPE - G1**
Scale 1:15




F1 - **FOOTING TYPE - F1**
Scale 1:15




G2 - **FOOTING TYPE - G2**
Scale 1:15

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: SLAB JOINT AND CONCRETE FOOTING DETAILS

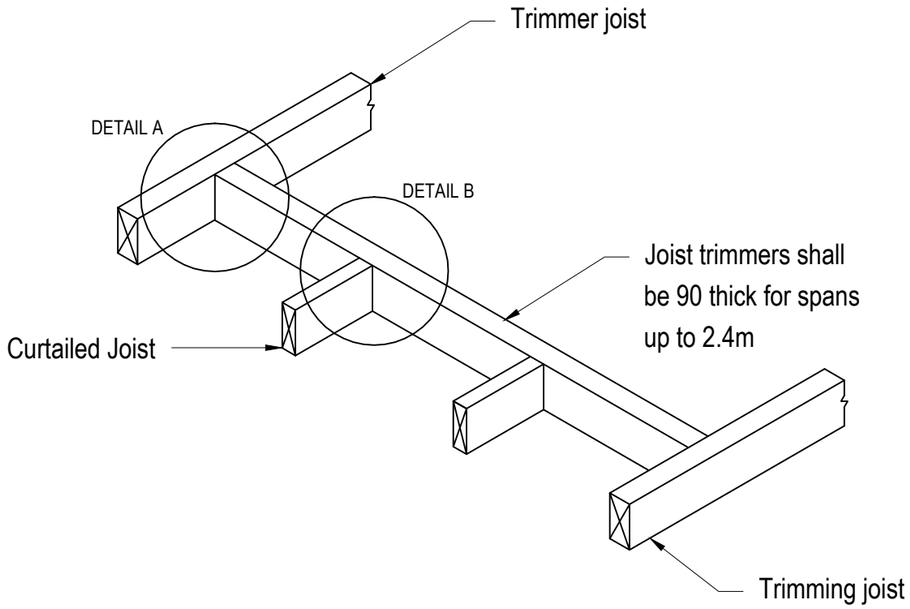
Job #: 24106

Scale (A3 Original): As Shown

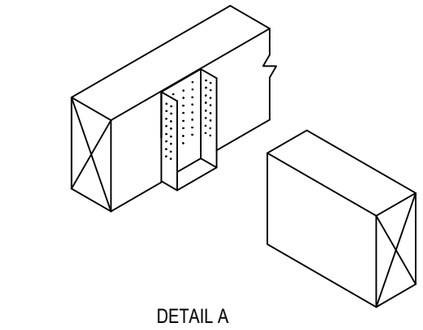
Client Drawing #:

Sheet #: F01

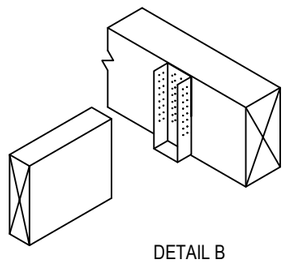
Rev No: 01




01 - **GENERAL TRIMMER LAYOUT**
Scale 1:15




02 - **TRIMMER TO TRIMMER JOIST DETAIL**
Scale 1:15




03 - **TRIMMER TO CURTAILED JOIST DETAIL**
Scale 1:15

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TIMBER JOIST CONNECTION DETAILS

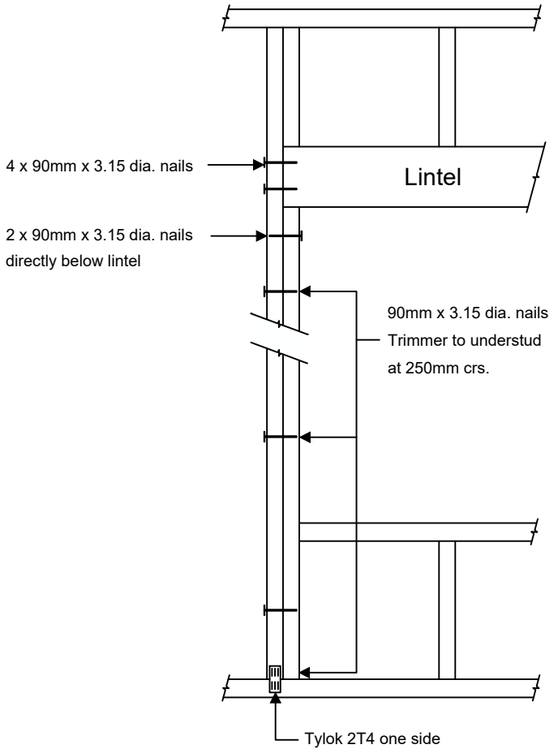
Job #: 24106

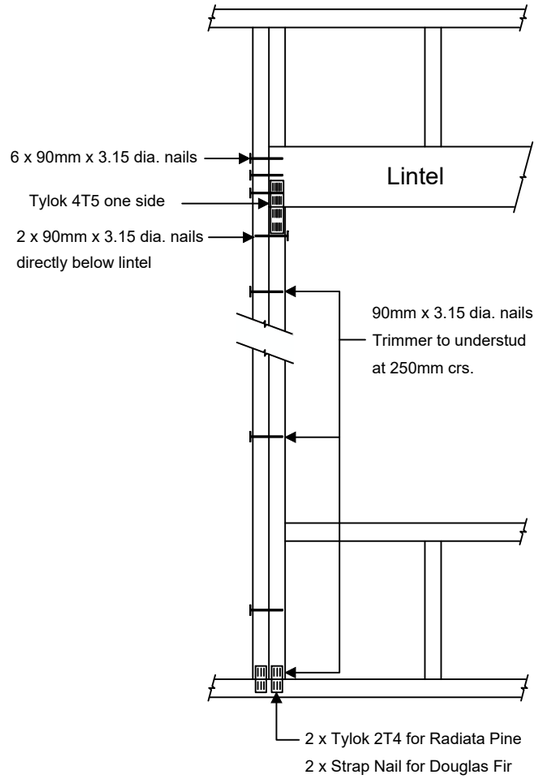
Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: TJ

Rev No: 01



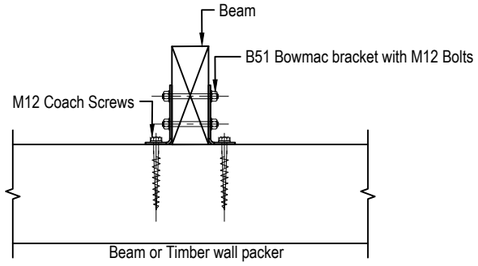

Note:
Stud Numbers indicatively only Refer to Table 8.5 NZS 3604:2011 and plan drawing stud number call ups.

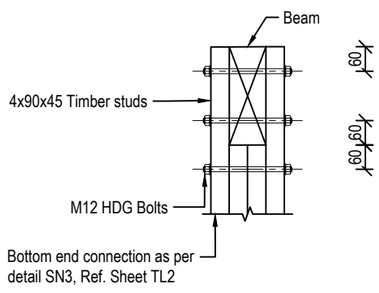
## 01 - SN0 DETAIL TOP & BOTTOM ACCEPTABLE SUPPORT LAYOUTS

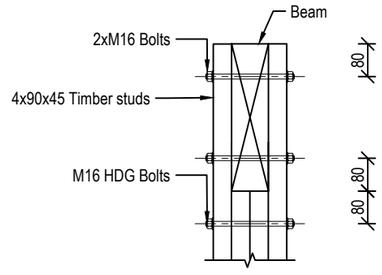
Scale 1:10

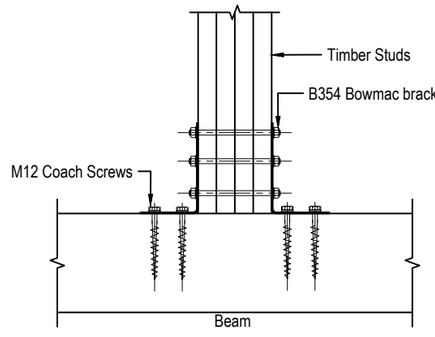
## 02 - SN1 DETAIL TOP & BOTTOM SUPPORT ACCEPTABLE LAYOUTS

Scale 1:10




## 03 - SN3 ALTERNATIVE DETAIL - 03

(FOR INTERSECTING BEAMS)

Scale 1:15

## 04 - SN3 ALTERNATIVE DETAIL - 04

(FOR INTERSECTING WALLS)

Scale 1:15

## 05 - SN4 ALTERNATIVE DETAIL - 05

(FOR INTERSECTING WALLS)

Scale 1:15

## 06 - SN4 ALTERNATIVE DETAIL - 06

(FOR INTERSECTING BEAMS)

Scale 1:15

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client:
HUGH JOHNSTONE

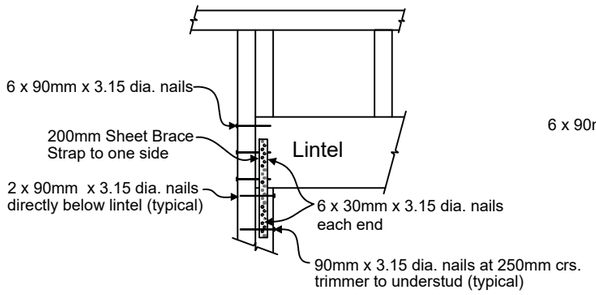
JOHNSTONE CONSTRUCTION

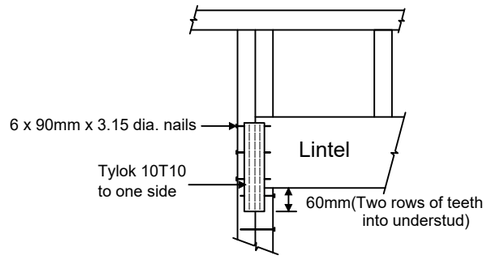
Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND - SED

Sheet Title:
TIMBER LINTEL DETAILS
SHEET 01

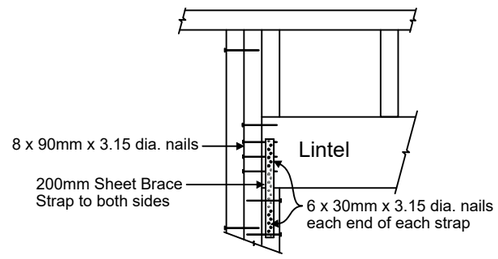
| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: TL1 | Rev No: 01 |

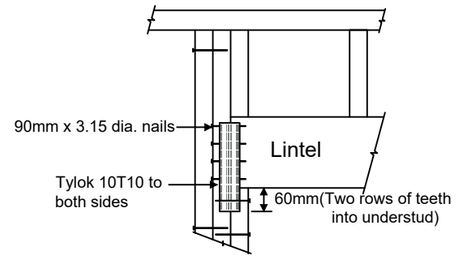
Note:
Stud Numbers indicatively only Refer to Table 8.5 NZS 3604:2011 and plan drawing stud number call ups.



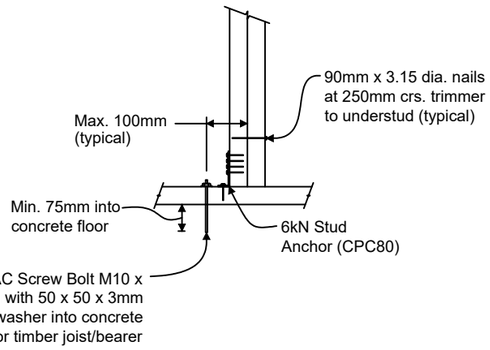



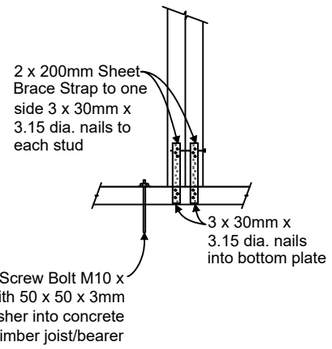

## 02A SN2 DETAIL - TOP SUPPORT ACCEPTABLE LAYOUTS
Scale 1:15

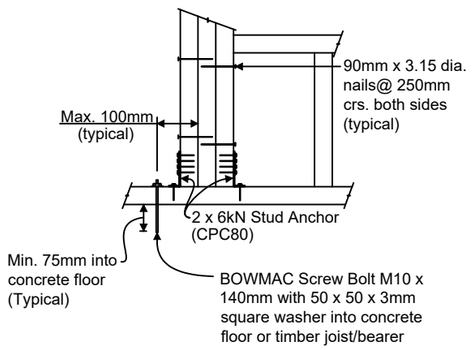


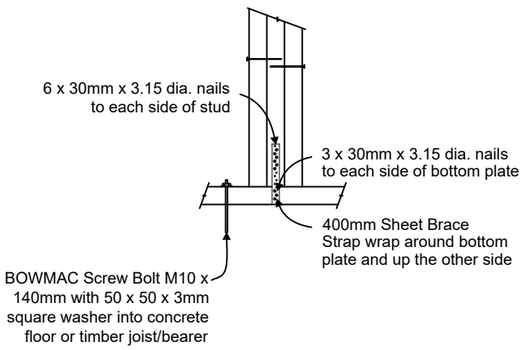



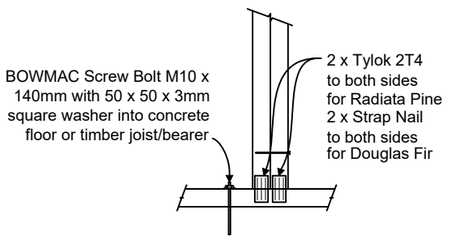

## 03A SN3 DETAIL - TOP SUPPORT ACCEPTABLE LAYOUTS
Scale 1:15

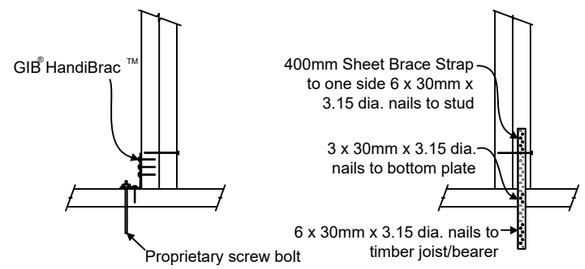


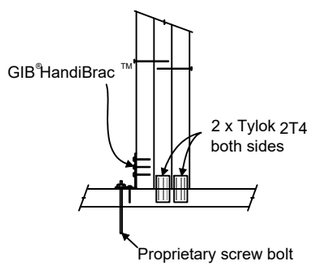



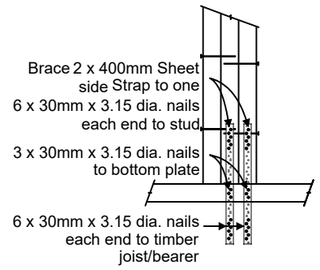




## 02B SN2 DETAIL - ACCPETABLE BOTTOM SUPPORT LAYOUTS
Scale 1:15




## 03B SN3 DETAIL - BOTTOM SUPPORT ACCEPTABLE LAYOUTS
Scale 1:15

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

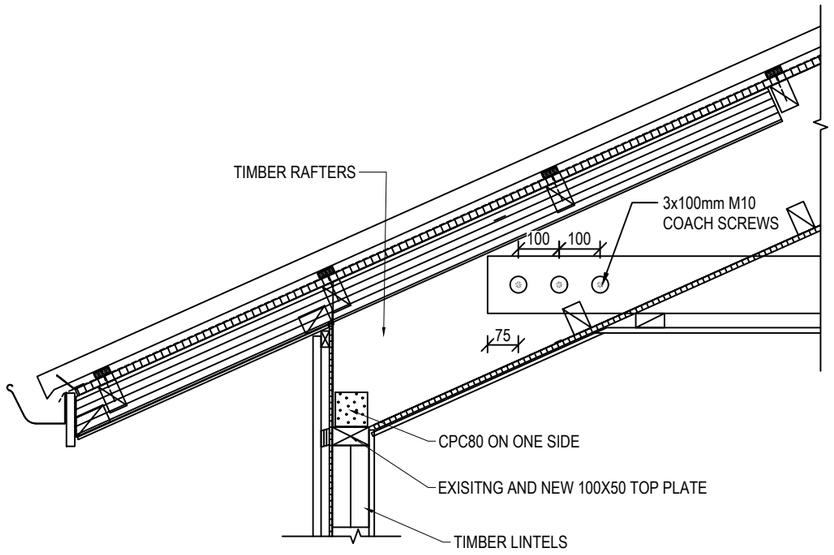
Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

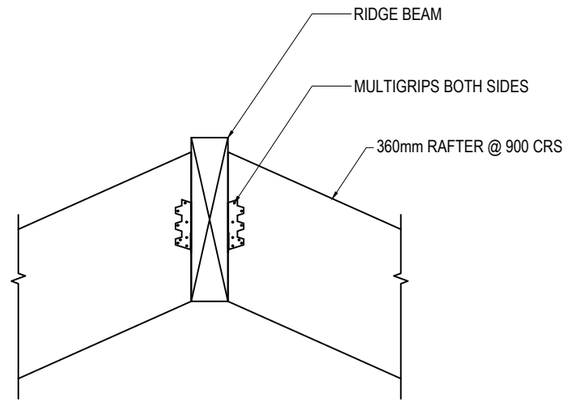
Sheet Title: TIMBER LINTEL DETAILS SHEET 02

| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: TL2 | Rev No: 01 |

Note:
Stud Numbers indicatively only Refer to Table 8.5 NZS 3604:2011 and plan drawing stud number call ups.




05 - **SN5 DETAIL - RAFTER TO TOP PLATE CONNECTION**
Scale 1:15




06 - **SN6 DETAIL - RAFTER TO RIDGE BEAM CONNECTIONS**
Scale 1:15

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TIMBER LINTEL DETAILS SHEET 03

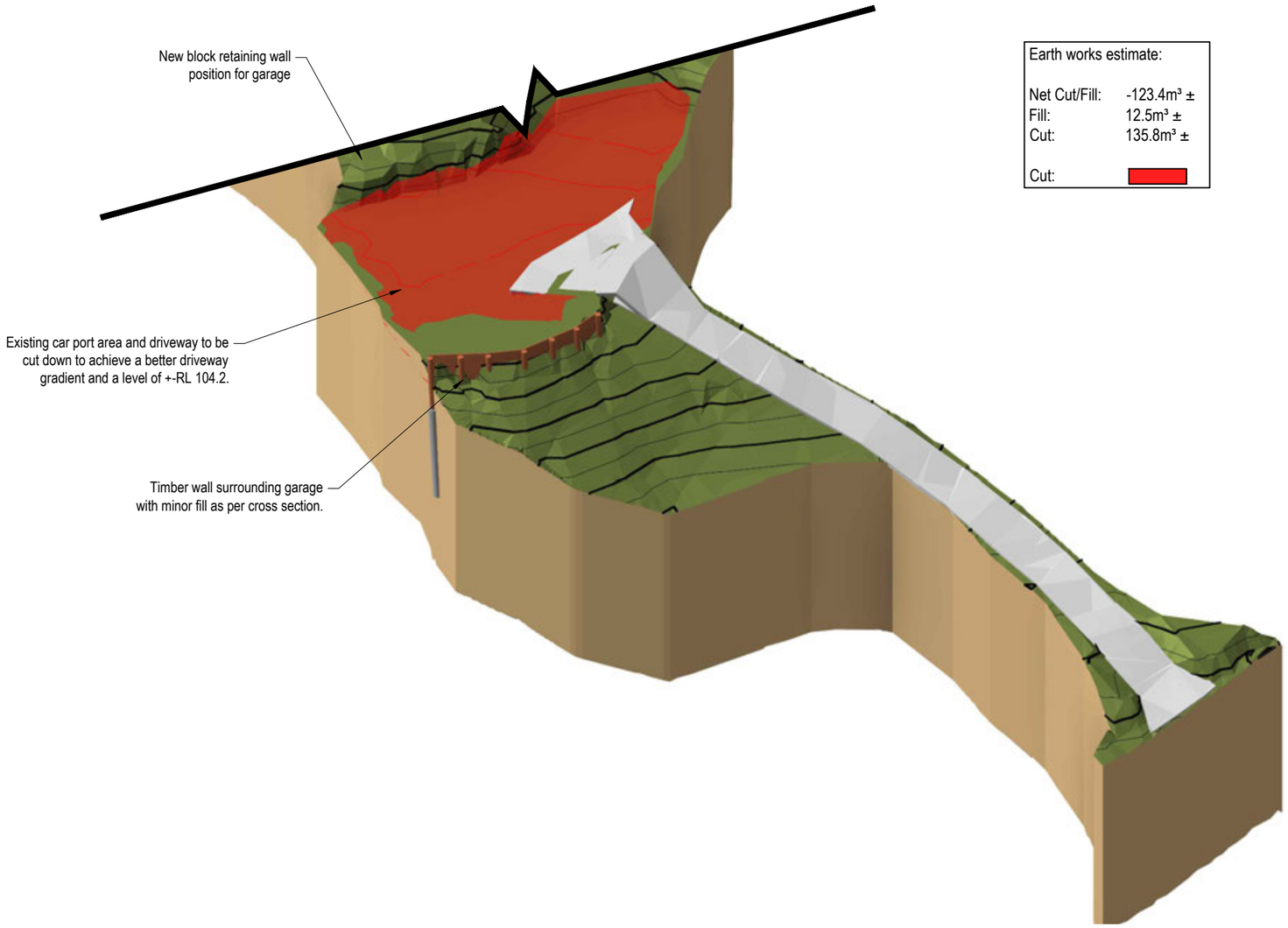
Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: TL3

Rev No: 01




Earth works estimate:

| | |
|---|---|
| Net Cut/Fill: | -123.4m³ ± |
| Fill: | 12.5m³ ± |
| Cut: | 135.8m³ ± |
| Cut: | |

Important Note:
The 3D drawing is for illustration only. It may not be to scale or accurate. For instance indicative timber retaining wall position, driveway heights and positioning, ground slopes and illustrative cut area position/size etc.

3D - **ILLUSTRATIVE EXCAVATION AMOUNT NEAR GARAGE**
Scale : NTS

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

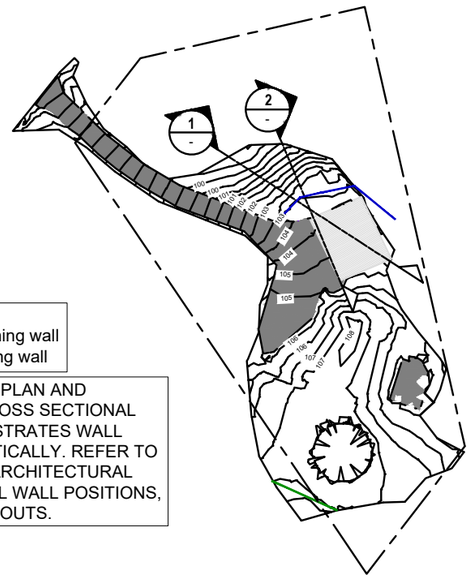
Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: EARTH WORKS SITE PLAN AND 3D

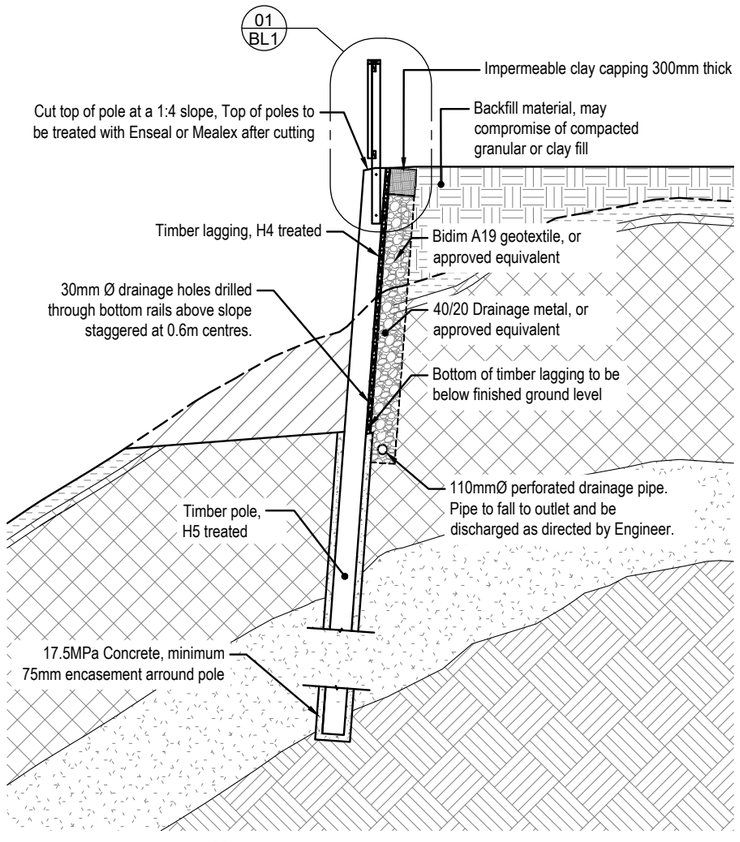
Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: E01
Rev No: 01



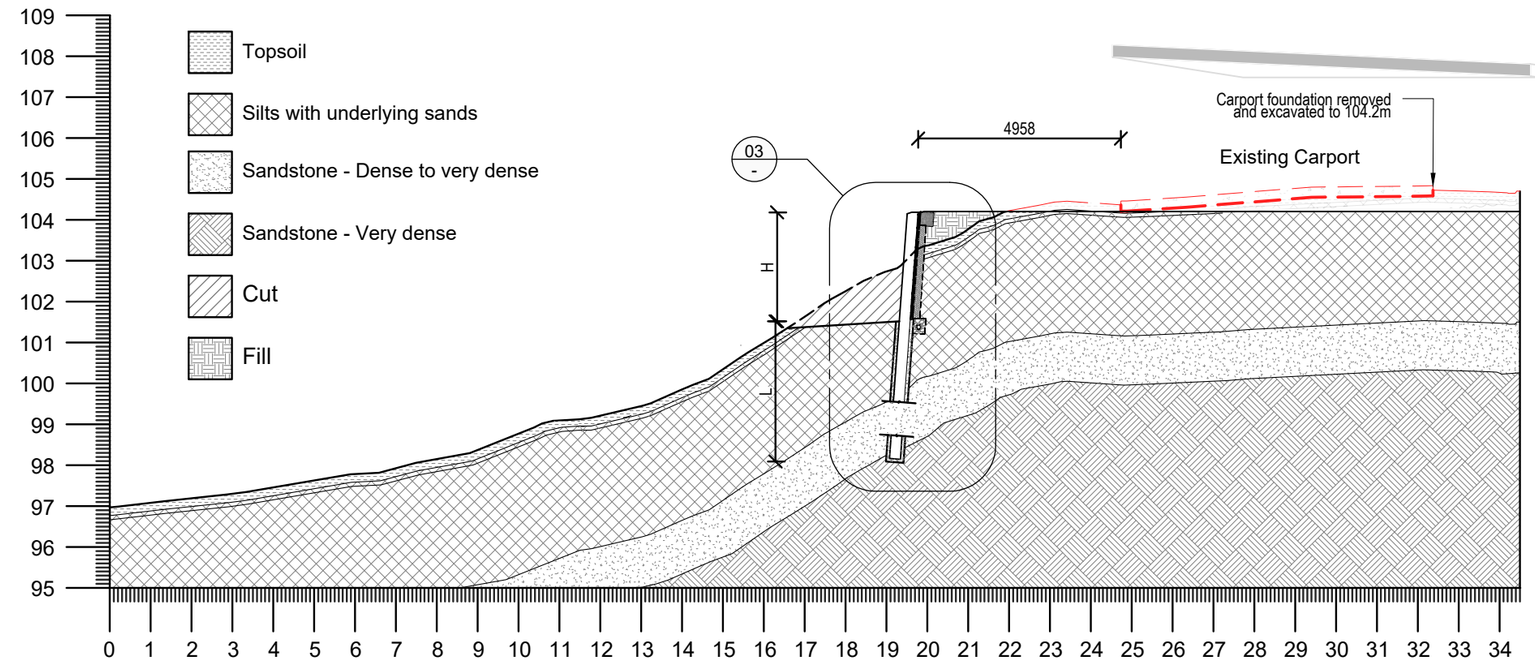
KEY:
: Timber retaining wall
: Block retaining wall

NOTE: THIS SITE PLAN AND ASSOCIATED CROSS SECTIONAL DRAWINGS ILLUSTRATES WALL TYPES SCHEMATICALLY. REFER TO THE FINALIZED ARCHITECTURAL PLANS FOR FINAL WALL POSITIONS, LEVELS AND LAYOUTS.

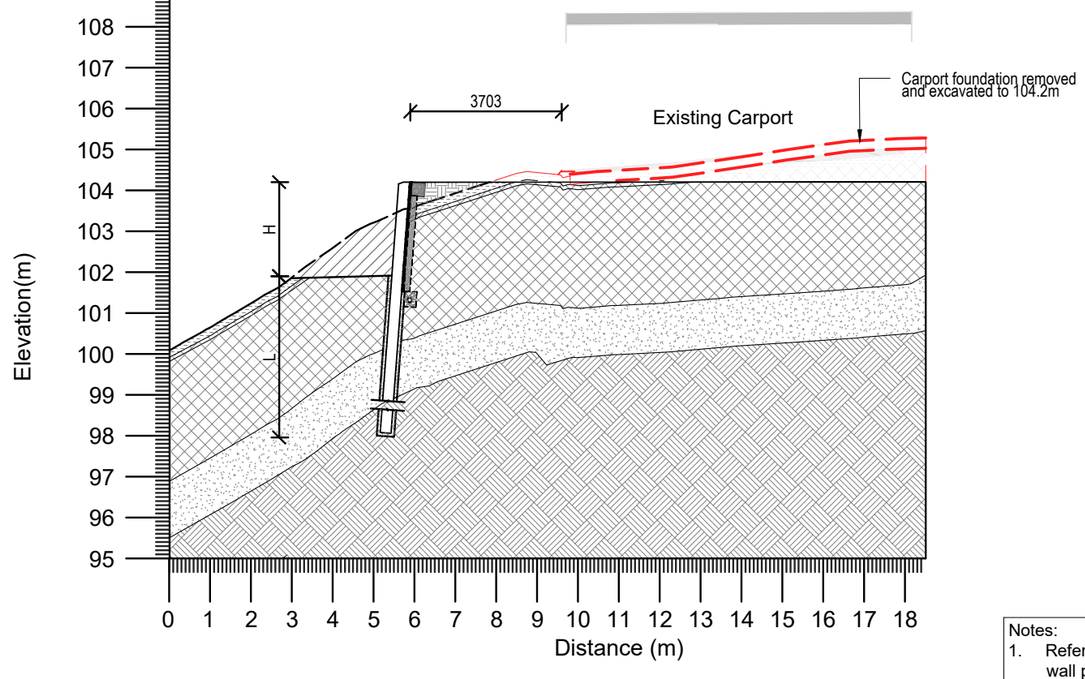
A - **SITE PLAN**
Scale 1:750



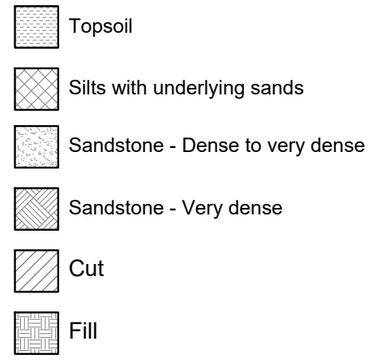

03 - **TIMBER RTW CALLOUT**
Scale 1:75




01 - **SECTION 01**
Scale 1:150




02 - **SECTION 02**
Scale 1:150




Notes:
1. Refer to finalized architectural drawings for the finalized wall positions, levels and layout.
2. Refer to Drawing T02 for pole size, depths and spacing.

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | 02 | FOR CONSENT | PW | APRIL 2025 |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TIMBER RETAINING WALL & GEOLOGICAL PROFILE SECTIONS

Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: T01
Rev No: 02

Notes:

1. Timber lagging to be 50mm thick from top of wall to 1.4m below top of retaining wall. Lower positioned timber lagging shall be 2 x 50mm boards thick from 1.4m below top of wall. All boards are to be No 1 Framing Grade.

2. All poles are normal density except for HD marked poles(if applicable) which are high density strength (tested for 52MPa)

3. Safety Rail/Fence 1.1m high to retained areas(H2) over 1.0m high as per NZBC F4 by others (proprietary product). Design heights over 1m high may not be applicable. Review architectural drawings.

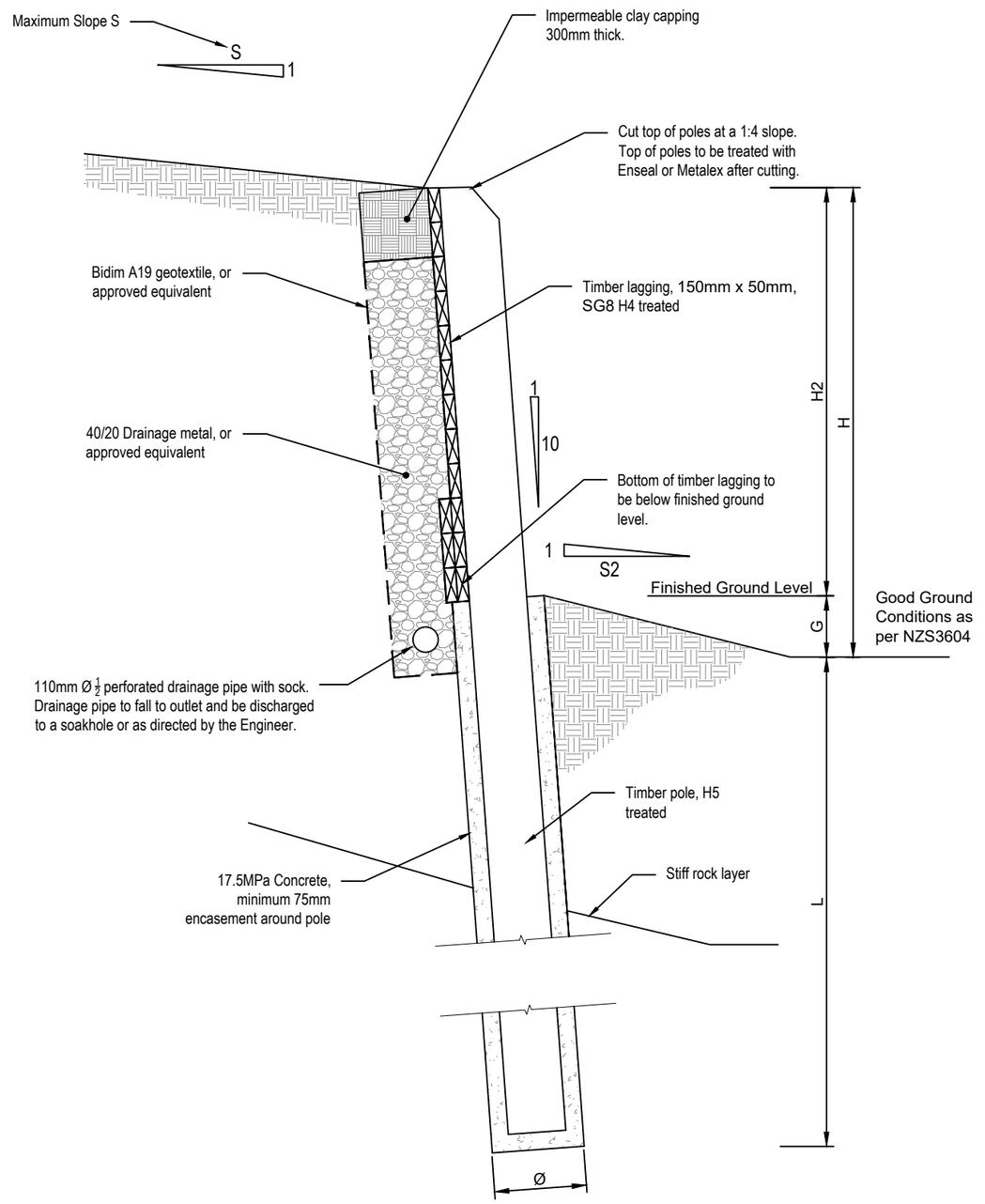
4. All fixings to be SS304

5. *Estimate depth to good ground conditions as per NZS3604 based on the site's geotechnical report/testing. The Contractor must feed back photos to Engineer for review to verify depth of organics. If there is any deeper organics found on site contact the Engineer. The areas may be filled with granular fill in layers of 200mm thick, compacted and tested OR timber poles may need to be extended deeper.

6. Refer to architectural drawings for retaining heights and wall positions.

7. Engineering inspections are required for the embedment of poles to verify ground conditions prior to placing the poles into the hole and pouring concrete.

| TIMBER RETAINING WALL AT GARAGE | | | | | | |
|---|---|---|---|---|---|---|
| Timber Pole Retaining Wall Type (See Plan Drawings) | Wall Type 1 | | | | | |
| Retained Height H2 (mm) | 2600 | 2400 | 2000 | 1600 | 1200 | 800 |
| Pole diameter SED (mm) | 325 | 300 | 275 | 225 | 175 | 150 |
| Pole spacing SP (mm) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| *Estimated depth to "good ground" to be verified during construction G (mm) | 0 | 0 | 0 | 0 | 0 | 0 |
| Embedment Depth L (mm) | 4800 | 4400 | 3800 | 3000 | 2300 | 1600 |
| Maximum retained height H2+G=H (mm) | 2600 | 2400 | 2000 | 1600 | 1200 | 800 |
| Total Pole Length H+L (mm) | 7400 | 6800 | 5800 | 4600 | 3500 | 2400 |
| Timber lagging thickness (mm) | *See Note 1 | | | 50 | 50 | 50 |
| Minimum concrete diameter if applicable (mm) | 600 | 600 | 600 | 450 | 450 | 350 |
| Minimum design front slope | 1:3 | 1:3 | 1:3 | 1:3 | 1:3 | 1:3 |
| Maximum design back slope S (ratio) | 1:10 | 1:10 | 1:10 | 1:10 | 1:10 | 1:10 |
| Design surcharge (kpa), Static Load | 5kpa | 5kpa | 5kpa | 5kpa | 5kpa | 5kpa |




A
-
**TYPICAL RTW AT GARAGE (SECTION A - A)**
Scale 1:25

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client:
HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND -
SED

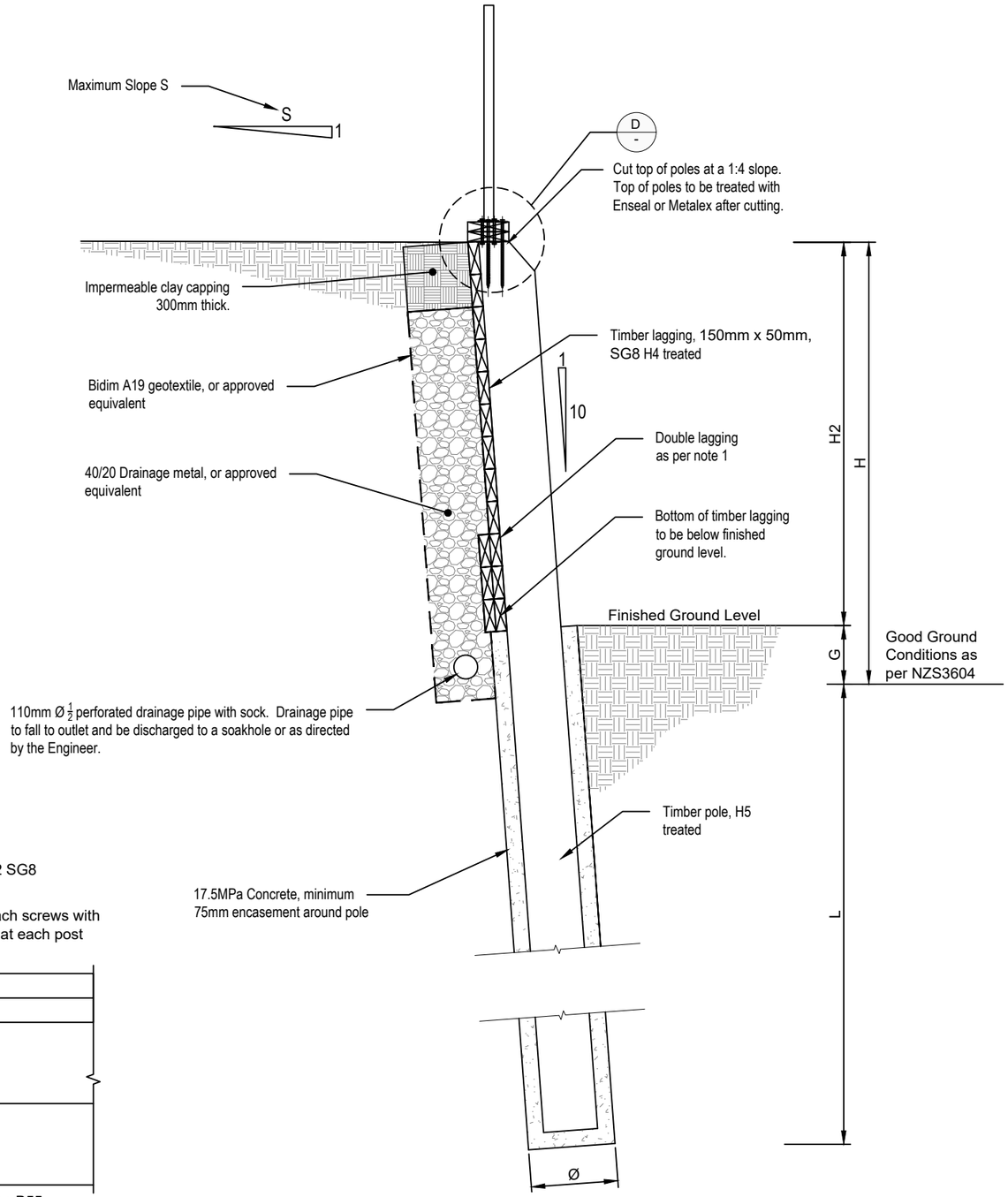
Sheet Title:
TYPICAL TIMBER RETAINING
WALL AT GARAGE SHEET 01

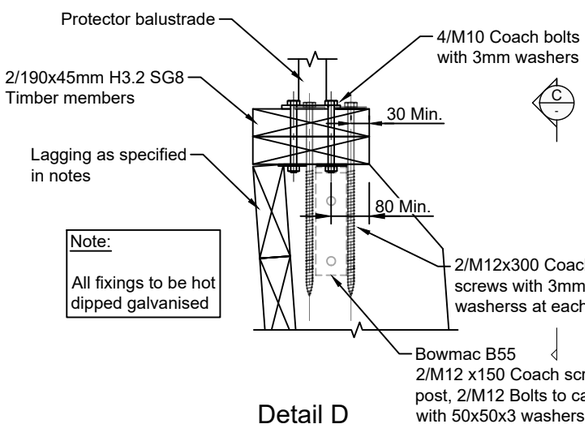
| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: | Rev No: |
| | T02 | 01 |

Notes:

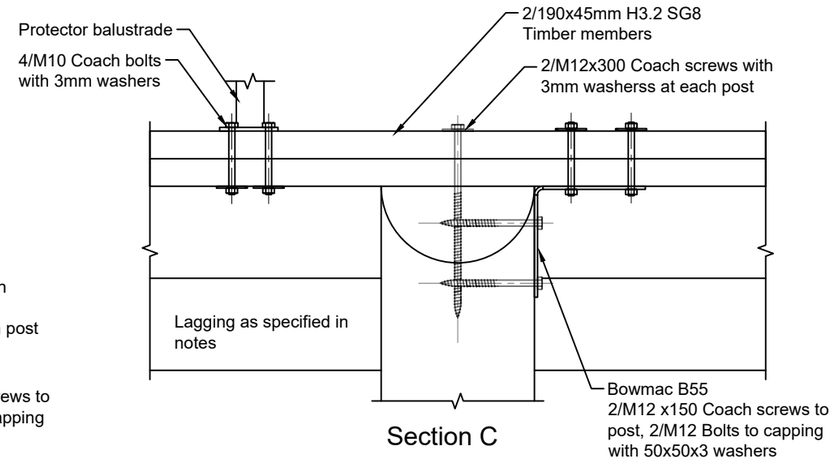
1. Timber lagging to be 50mm thick from top of wall to 1.4m below top of retaining wall. Lower positioned timber lagging shall be 2 x 50mm boards thick from 1.4m below top of wall. All boards are to be No 1 Framing Grade.
2. All poles are normal density except for HD marked poles(if applicable) which are high density strength (tested for 52MPa)
3. Safety Rail/Fence 1.1m high to retained areas(H2) over 1.0m high as per NZBC F4 by others (proprietary product). Design heights over 1m high may not be applicable. Review architectural drawings.
4. All fixings to be SS304
5. *Estimate depth to good ground conditions as per NZS3604 based on the site's geotechnical report/testing. The Contractor must feed back photos to Engineer for review to verify depth of organics. If there is any deeper organics found on site contact the Engineer. The areas may be filled with granular fill in layers of 200mm thick, compacted and tested OR timber poles may need to be extended deeper.
6. Refer to architectural drawings for retaining heights and wall positions.
7. Engineering inspections are required for the embedment of poles to verify ground conditions prior to placing the poles into the hole and pouring concrete.

| TIMBER RETAINING WALL AT POOL | | | | | | |
|---|---|---|---|---|---|---|
| Timber Pole Retaining Wall Type (See Plan Drawings) | Wall Type 2 | | | | | |
| Retained Height H2 (mm) | 2300 | 2000 | 1700 | 1400 | 1100 | 800 |
| Pole diameter SED (mm) | 250 | 225 | 175 | 150 | 150 | 150 |
| Pole spacing SP (mm) | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| *Estimated depth to "good ground" to be verified during construction G (mm) | 300 | 300 | 300 | 300 | 300 | 300 |
| Embedment Depth L (mm) | 2700 | 2400 | 2100 | 1800 | 1500 | 1200 |
| Maximum retained height H2+G=H (mm) | 2600 | 2300 | 2000 | 1700 | 1400 | 1100 |
| Total Pole Length H+L (mm) | 5300 | 4700 | 4100 | 3500 | 2900 | 2300 |
| Timber lagging thickness (mm) | *See Note 1 | | | 50 | 50 | 50 |
| Minimum concrete diameter if applicable (mm) | 450 | 450 | 450 | 450 | 450 | 350 |
| Minimum design front slope | N/A | N/A | N/A | N/A | N/A | N/A |
| Maximum design back slope S (ratio) | 1:10 | 1:10 | 1:10 | 1:10 | 1:10 | 1:10 |
| Design surcharge (kpa), Static Load | 5kpa | 5kpa | 5kpa | 5kpa | 5kpa | 5kpa |




Detail D




Section C

**BARRIED TO FALLIING POST DETAIL**

Scale 1:10

B
-

**TYPICAL RTW AT POOL (SECTION B-B)**

Scale 1:25

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TYPICAL TIMBER RETAINING WALL AT POOL SHEET 01

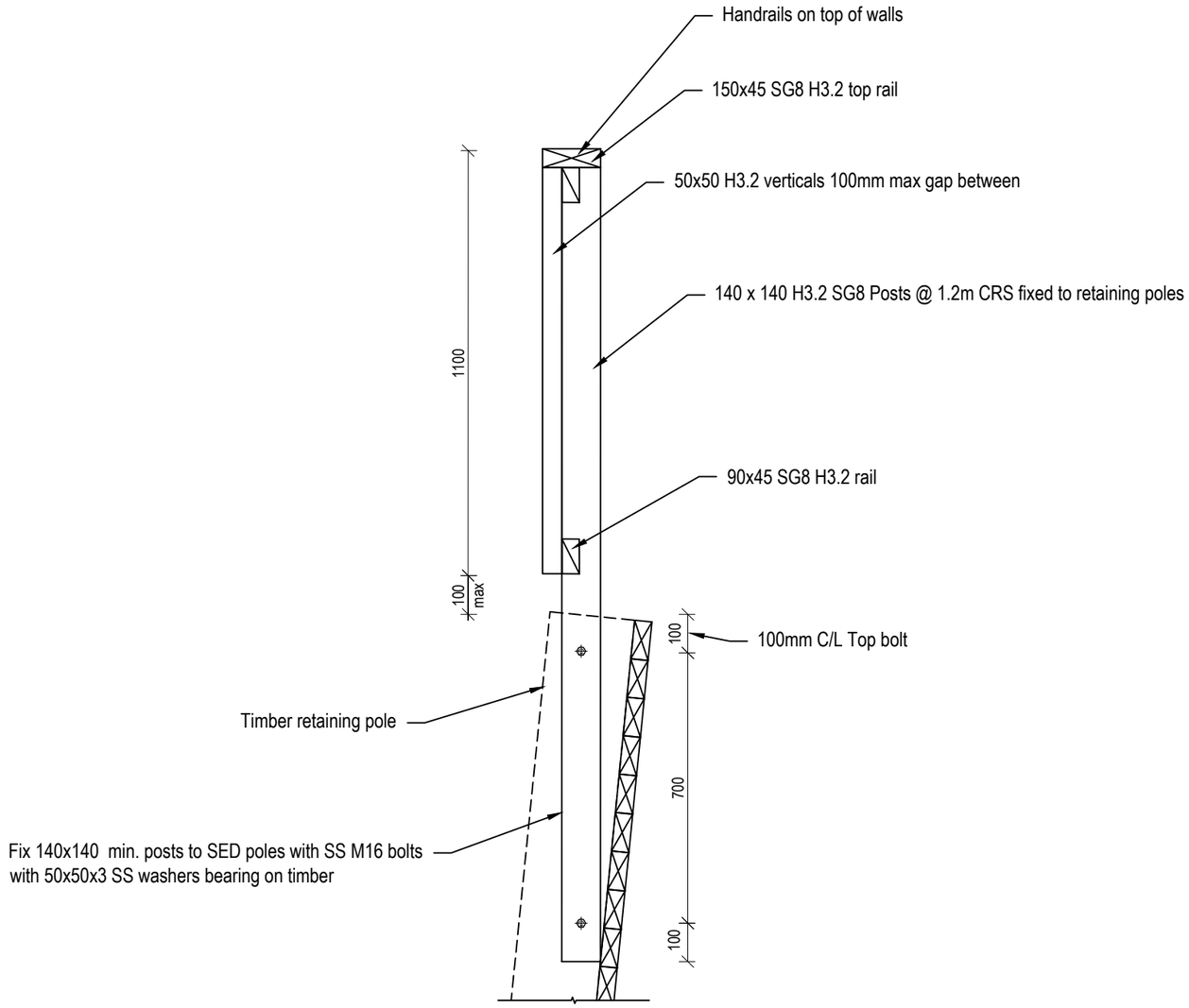
Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: T03

Rev No: 01




01 - **TYPICAL BALUSTRADE DETAIL - 1M HEIGHT FALLS AND ABOVE**

Scale 1:15

NOTES:

- 50x50 verticals may be replaced with 50x100 members if the client/owner permits.
- Refer to architectural/landscape drawings for final position of balustrades.

FIXINGS:

- All fixings to be stainless steel.
- All rails to have a minimum of type T fixing as per NZS 3604, table 2.2 (1/10g self driving screw, 80mm long). Any proposed alternatives must have a minimum fixing capacity of 1KN in each direction.
- All verticals may be fixed with a nominal fixing as per NZS 3604 with a minimum fixing capacity of 0.5KN in each direction. Type T fixing or similar.

TIMBER:

- All timber to be minimum radiata pine grade VSG8
- All timber to receive a minimum of H3 preservative treatment unless noted otherwise.
- All cut surfaces to receive a liberal coating of metalex clear preservative.

APPLICABLE STANDARDS:

| | Standards | |
|---|---|---|
| Code of practice for specifying timber and wood-based products for use in building | NZS | 3602 |
| Timber structures standard | NZS | 3603 |
| Timber framed buildings | NZS | 3604 |
| Chemical preservation of round and sawn timber | NZS | 3640 |
| Timber piles and poles for us in buildings | NZS | 3605 |
| New Zealand timber grading rules | NZS | 3631 |
| ISO metric hexagon commercial bolts and screws | AS/NZS | 1111 |

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TYPICAL TIMBER BALUSTRADE DETAIL

Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

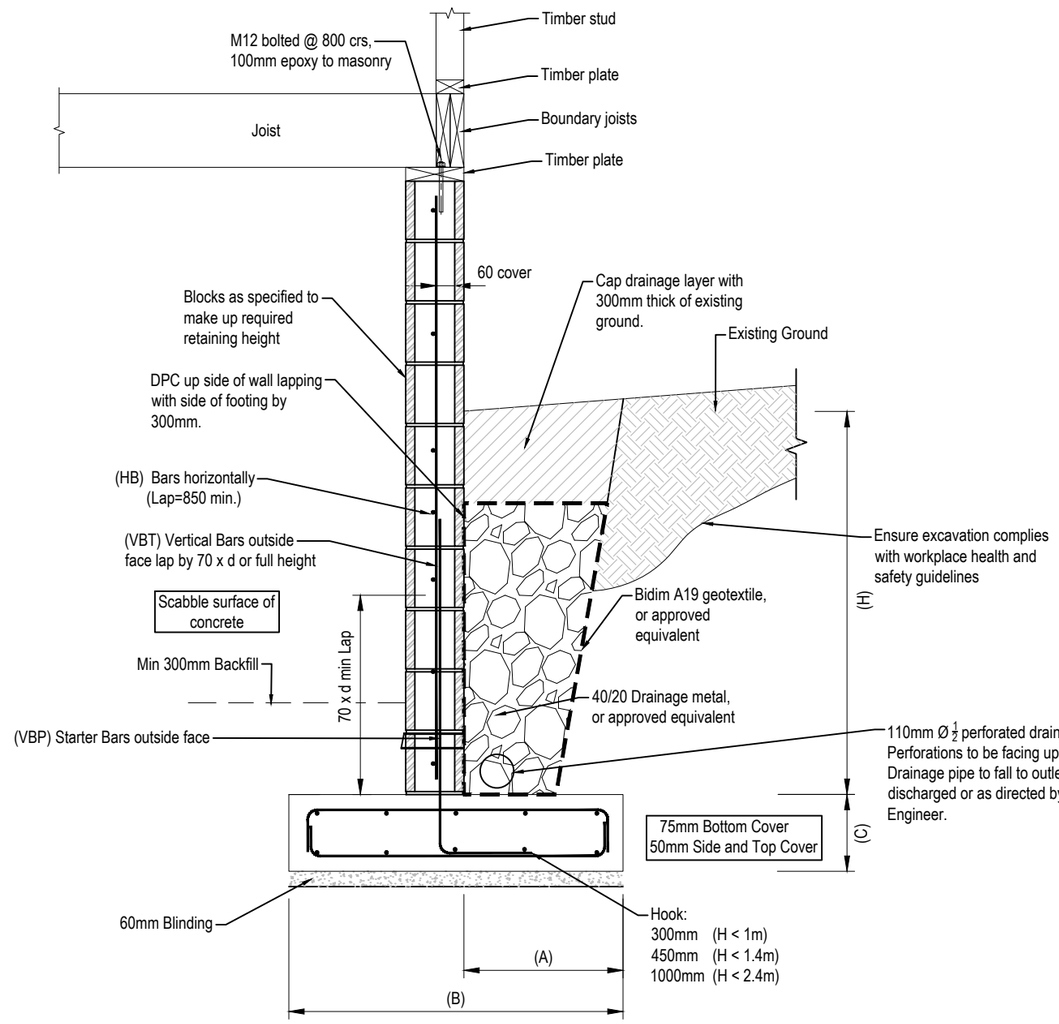
Sheet #: BL1

Rev No: 01

## NOTES:

1. Construction to be in accordance with NZS 4210.
2. Concrete for foundation to be 20Mpa at 28 days.
3. Reinforcement is deformed 500 E grade
4. CJ = Suggested control joint in wall (marked in plan)
5. d = Diameter of larger lapping bar
6. Block wall and slab to cure 3 days prior to backfilling
7. Refer to architectural drawings for further details. These drawings demonstrate engineering limitations and details.
8. Drainage metal shall be a layer of suitable granular material with perforated pipe to discharge as required by the building consent authority.
9. Waterproofing to be certified by the supplier and the installer.
10. Cover: 75mm bottom, 50mm sides and top.
11. Acceptable alternative to step detail: return walls to be attached to wall via 4xHD12 Chemset bars spaced vertically and evenly at step change. Epoxy embedded by 150mm. bars to be 1,0m long.
12. Backfill to be approved by the Engineer and compacted in minimum layers of 200mm thick. All top soil and organics to be removed below footings.

| BLOCK WORK RETAINING WALL | | | |
|---|---|---|---|
| DESCRIPTION | WALL TYPE 1 | WALL TYPE 2A, 2B, 2C | WALL TYPE 3 |
| Maximum Retained height (H) | 0.0m | 1.0m Max. | 2.0m Max. |
| Minimum Thickness of Wall | 20 Series Block | 20 Series Block | 20 Series Block |
| Minimum Heel Width (A) | 0.4m | 0.5m | 0.8m |
| Minimum Total Width of Footing (B) | 1.0m | 1.2m | 2.0m |
| Outside Toe Width | 0.6m | 0.7m | 1.2m |
| Minimum Thickness of Footing (C) | 0.3m | 0.3m | 0.3m |
| Minimum Depth of Shear Key (K) | No Shear Key Required | No Shear Key Required | No Shear Key Required |
| Maximum Backslope | 10° | 10° | 10° |
| Vertical Control joint Spacing | 7.0m Max. | 7.0m Max. | 7.0m Max. |
| Vertical Bars Top (VBT) | HD12 @ 600 C/C | HD12 @ 600 C/C | HD12 @ 200 C/C |
| Horizontal Bars (HB) | HD12 @ 400 C/C | HD12 @ 400 C/C | HD12 @ 400 C/C |
| Vertical Primary Bars (VPB) | HD12 @ 600 C/C | HD12 @ 600 C/C | HD12 @ 200 C/C |
| Footing Primary Steel Bars (PS) | HD12 @ 600 C/C | HD12 @ 600 C/C | HD12 @ 200 C/C |
| Footing Secondary Steel Bars (SS) | HD12 @ 400 C/C | HD12 @ 400 C/C | HD12 @ 300 C/C |




01 - **TYPICAL SECTION 01 BLOCKWORK RETAINING WALL**
Scale 1:20

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

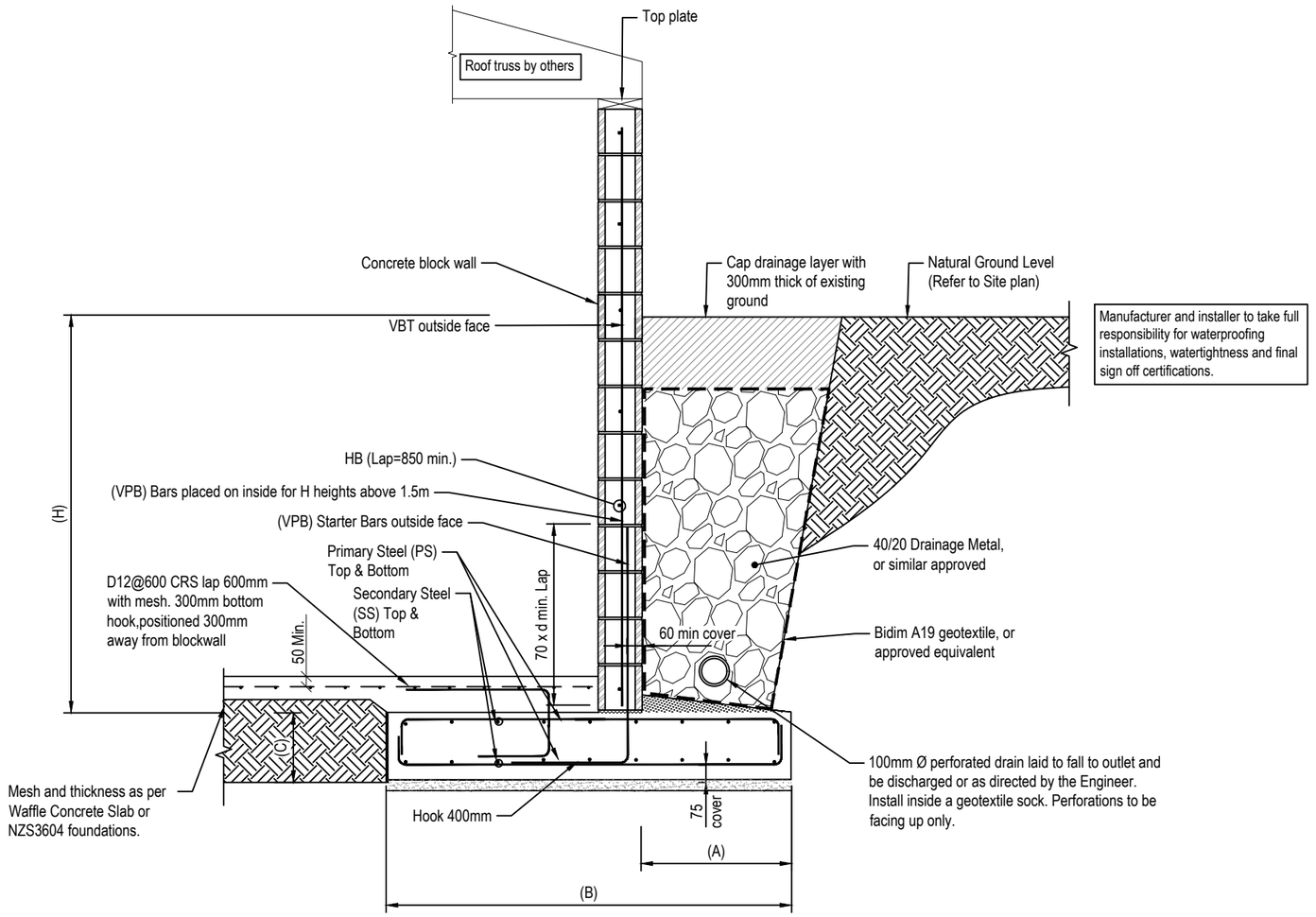
Sheet Title: TYPICAL BLOCK RETAINING WALL DETAILS SHEET 01

Job #: 24106
Client Drawing #:
Scale (A3 Original): As Shown
Sheet #: BR1
Rev No: 01

Notes:

1. Construction to be in accordance with NZS 4210.
2. Concrete for foundation to be 25Mpa at 28 days.
3. Reinforcement is deformed 500 E grade
4. CJ = Suggested control joint in wall (marked in plan)
5. d = Diameter of larger lapping bar
6. Block wall and slab to cure five (5) days prior to backfilling
7. Refer to architectural drawings for further details with precise dimensions. These drawings demonstrate engineering limitations and details.
8. Drainage metal shall be a layer of suitable granular material with perforated pipe to discharge as required by the building consent authority.
9. Waterproofing to be certified by the supplier and the installer.
10. Cover: 75mm bottom, 50mm sides and top.
11. NZS3604 and Waffle Concrete Slab Foundations to be attached to wall via 2xHD12 Chemset bars at step change, epoxy embedded by 130mm. Bars to be 1,0m long.
12. Backfill to be approved by the Engineer and compacted in minimum layers of 200mm thick.
13. Subsoil may be placed directly behind the wall as an alternative on approval from the waterproofing supplier and installer. Subsoiil to drain on each end to drainage point. Subsoil may penetrate the return block walls if required.

| BLOCK WORK RETAINING WALL | | | | |
|---|---|---|---|---|
| DESCRIPTION | WALL TYPE 7 | WALL TYPE 4 | WALL TYPE 5 | WALL TYPE 6 |
| Maximum Retained height (H) | 0.5m Max | 1.5m Max. | 2.0m Max | 2.5m Max |
| Minimum Thickness of Wall | 20 Series Block | 20 Series Block | 20 Series Block | 25 Series Block |
| Minimum Heel Width (A) | 0.0m | 0.6m | 0.8m | 1.0m |
| Minimum Total Width of Footing (B) | 0.8m | 1.5m | 2.0m | 2.4m |
| Outside Toe width | 0.8m | 0.9m | 1.2m | 1.4m |
| Minimum Thickness of Footing (C) | 0.3m | 0.3m | 0.3m | 0.3m |
| Minimum Depth of Shear Key (K) | No Shear Key required | No Shear Key required | No Shear Key required | No Shear Key required |
| Maximum Backslope | 20° | 20° | 20° | 20° |
| Vertical Control joint Spacing | 7.0m Max. | 7.0m Max. | 7.0m Max. | 7.0m Max. |
| Vertical Bars Top (VBT) | HD12 @ 400 C/C | HD12 @ 200 C/C | HD16 @ 200 C/C | HD16 @ 400 C/C |
| Horizontal Bars (HB) | HD12 @ 400 C/C | HD12 @ 400 C/C | HD12 @ 400 C/C | HD12 @ 400 C/C |
| Vertical Primary Bars (VPB) | HD12 @ 400 C/C | HD12 @ 400 C/C | HD16 @ 200 C/C | HD16 @ 400 C/C |
| Footing Primary Steel Bars (PS) | HD12 @ 200 C/C | HD12 @ 200 C/C | HD12 @ 200 C/C | HD12 @ 200 C/C |
| Footing Secondary Steel Bars (SS) | HD12 @ 300 C/C | HD12 @ 300 C/C | HD12 @ 300 c/c | HD12 @ 300 c/c |




## TYPICAL SECTION : SRW
## STEP INTEGRAL BLOCK WORK RETAINING WALL

Scale: 1:25

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | 02 | FOR CONSENT - REVISED | PW | FEBRUARY 2025 |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

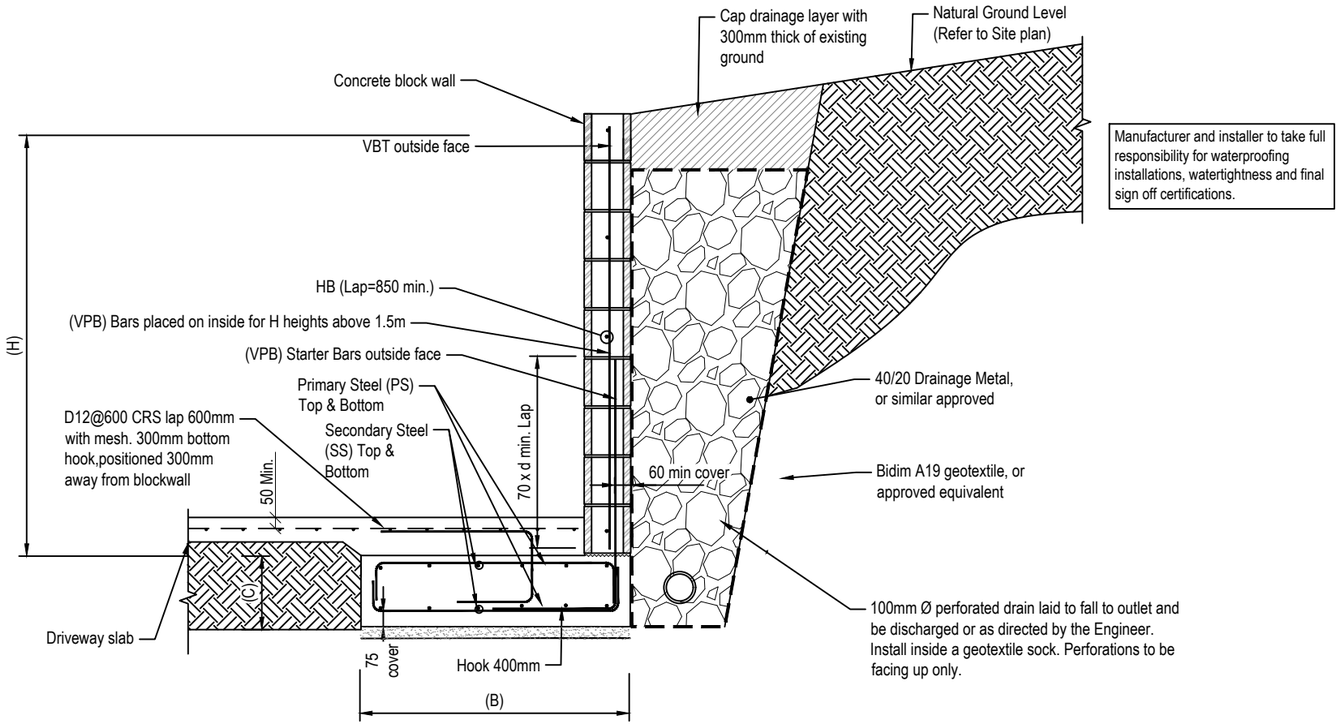
Sheet Title: TYPICAL BLOCK RETAINING WALL DETAILS SHEET 02

| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: | Rev No: |
| | BR2 | 02 |

Notes:

1. Construction to be in accordance with NZS 4210.
2. Concrete for foundation to be 25Mpa at 28 days.
3. Reinforcement is deformed 500 E grade
4. CJ = Suggested control joint in wall (marked in plan)
5. d = Diameter of larger lapping bar
6. Block wall and slab to cure five (5) days prior to backfilling
7. Refer to architectural drawings for further details with precise dimensions. These drawings demonstrate engineering limitations and details.
8. Drainage metal shall be a layer of suitable granular material with perforated pipe to discharge as required by the building consent authority.
9. Waterproofing to be certified by the supplier and the installer.
10. Cover: 75mm bottom, 50mm sides and top.
11. NZS3604 and Waffle Concrete Slab Foundations to be attached to wall via 2xHD12 Chemset bars at step change, epoxy embedded by 130mm. Bars to be 1,0m long.
12. Backfill to be approved by the Engineer and compacted in minimum layers of 200mm thick.
13. Subsoil may be placed directly behind the wall as an alternative on approval from the waterproofing supplier and installer. Subsoiil to drain on each end to drainage point. Subsoil may penetrate the return block walls if required.

| BLOCK WORK RETAINING WALL | |
|---|---|
| DESCRIPTION | WALL TYPE 8 |
| Maximum Retained height (H) | 1.5m Max |
| Minimum Thickness of Wall | 20 Series Block |
| Minimum Heel Width (A) | N/A |
| Minimum Total Width of Footing (B) | 2.0m |
| Outside Toe width | 2.0m |
| Minimum Thickness of Footing (C) | 0.3m |
| Minimum Depth of Shear Key (K) | No Shear Key required |
| Maximum Backslope | 20° |
| Vertical Control joint Spacing | 7.0m Max. |
| Vertical Bars Top (VBT) | HD20 @ 200 C/C |
| Horizontal Bars (HB) | HD12 @ 400 C/C |
| Vertical Primary Bars (VPB) | HD12 @ 200 C/C |
| Footing Primary Steel Bars (PS) | HD20 @ 200 C/C |
| Footing Secondary Steel Bars (SS) | HD12 @ 300 C/C |




**SECTION 3: SRW**
**STEP INTEGRAL BLOCK WORK RETAINING WALL**
Scale: 1:25

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | 02 | FOR CONSENT - REVISED | PW | FEBRAURY 2025 |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

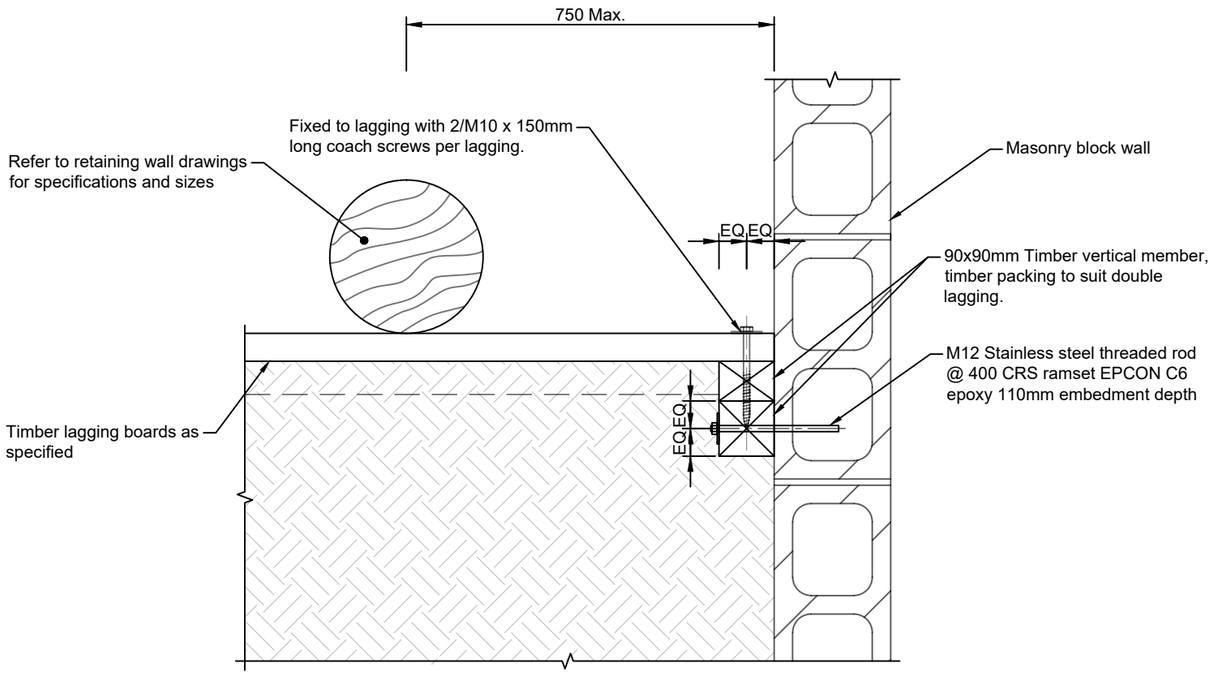
Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TYPICAL BLOCK RETAINING WALL DETAILS SHEET 02

Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: BR3
Rev No: 02




**LAGGING TO MASONRY BLOCK WALL FIXING**

Scale 1:10

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

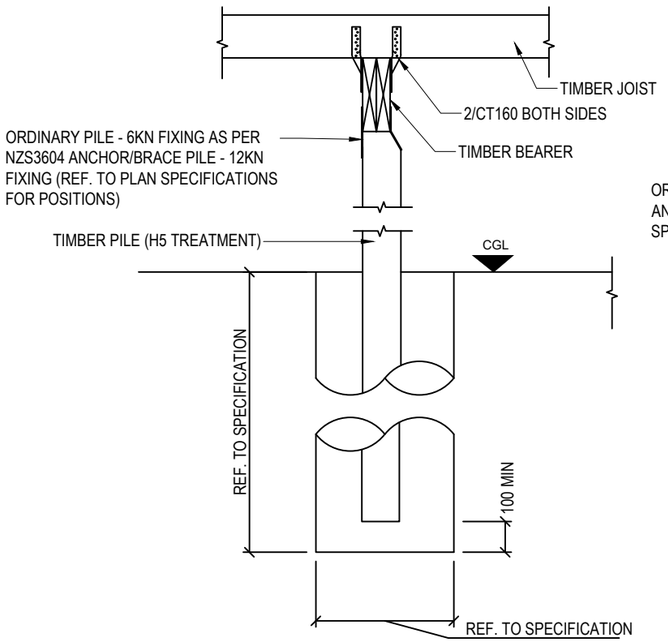
Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

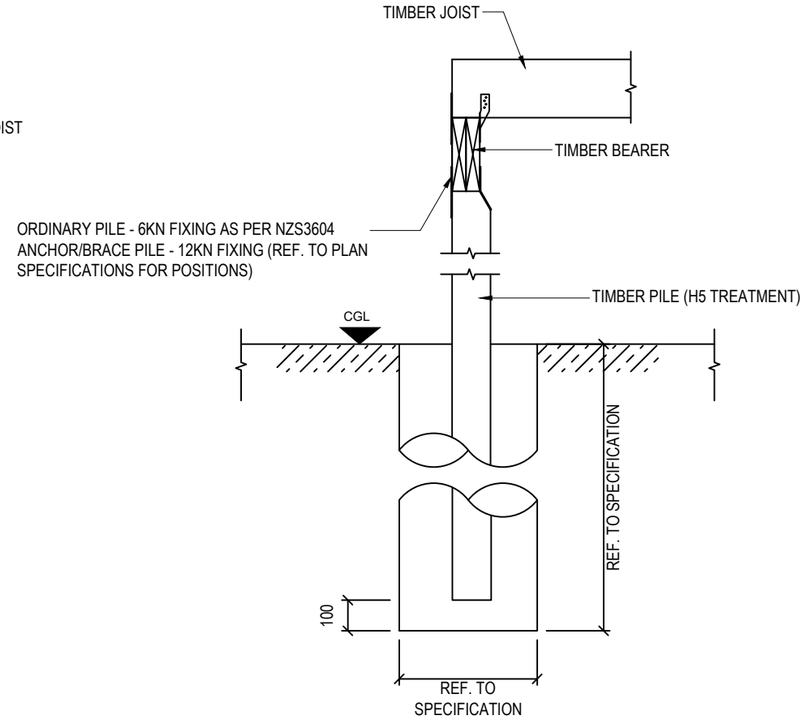
Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TYPICAL BLOCK RETAINING WALL DETAILS SHEET 03

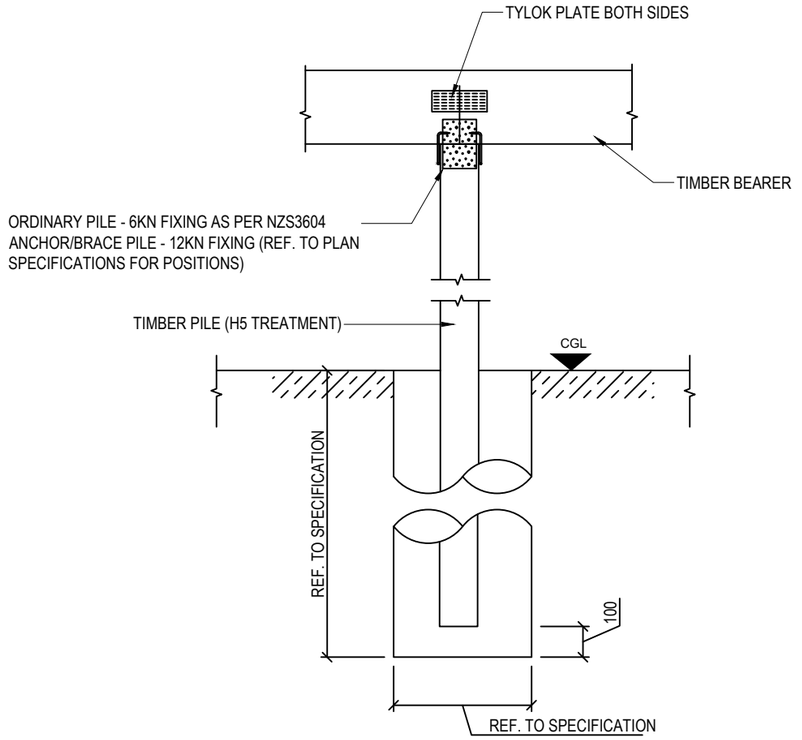
| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: BR3 | Rev No: 01 |




01 - **JOIST TO PILE FIXING**
Scale 1:20




02 - **JOIST TO PILE JOIST EDGE FIXING**
Scale 1:20




03 - **BEARER SPLICE DETAIL**
Scale 1:20

| SPECIFIC PROJECT SUBFLOOR FOUNDATION REFERENCE TABLE | |
|---|---|
| DEPTH REQUIREMENT FROM GOOD GROUND LEVEL - ANCHOR & BRACE PILES (mm) | 900 |
| DEPTH REQUIREMENT FROM GOOD GROUND LEVEL - ORDINARY PILES (mm) | 600 |
| CONCRETE PILE DIAMETER (mm) | 450 |
| TIMBER PILE SIZE (mm) - REF. TO NZS 3604 Fig 6.2 | 125x125 SG8 |
| ANCHOR PILE REFERENCE | DETAIL 1, 2, 3, 5 & 6 |
| ORDINARY PILE REFERENCE | DETAIL 1,2,3 |
| BRACED PILE REFERENCE | DETAIL 1,2,3,5 & 7 |

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
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WALKER ENGINEERING CONSULTANTS

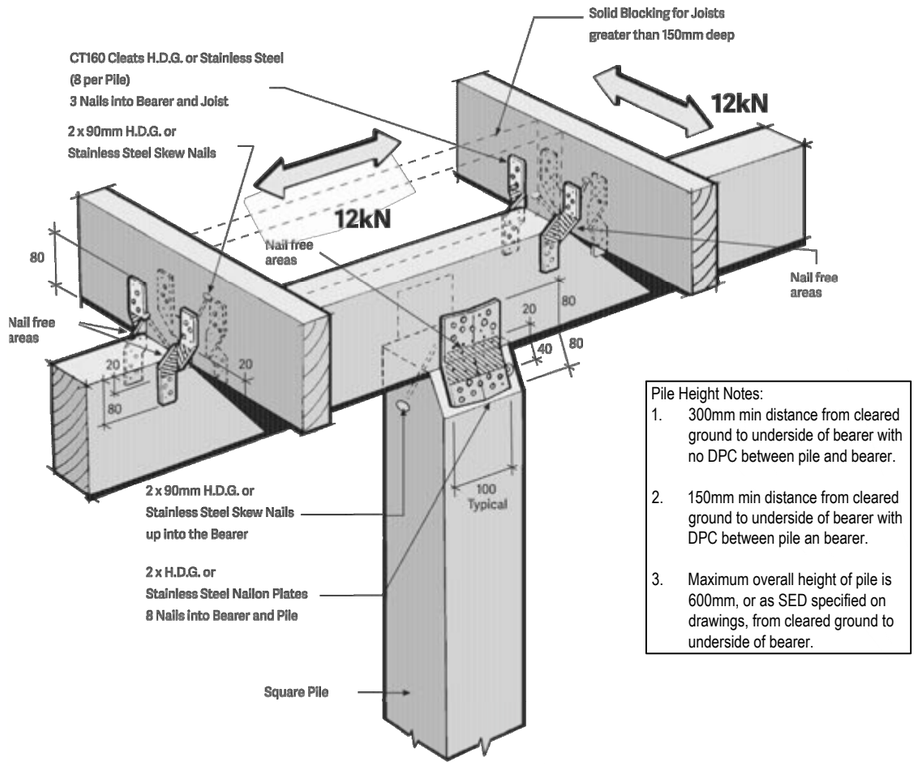
Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE
JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: SUBFLOOR ANCHOR PILE AND ORDINARY PILE DETAILS

Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: TP1
Rev No: 01

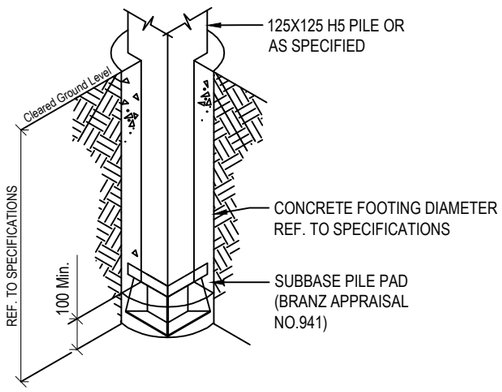



Pile Height Notes:

1. 300mm min distance from cleared ground to underside of bearer with no DPC between pile and bearer.
2. 150mm min distance from cleared ground to underside of bearer with DPC between pile an bearer.
3. Maximum overall height of pile is 600mm, or as SED specified on drawings, from cleared ground to underside of bearer.

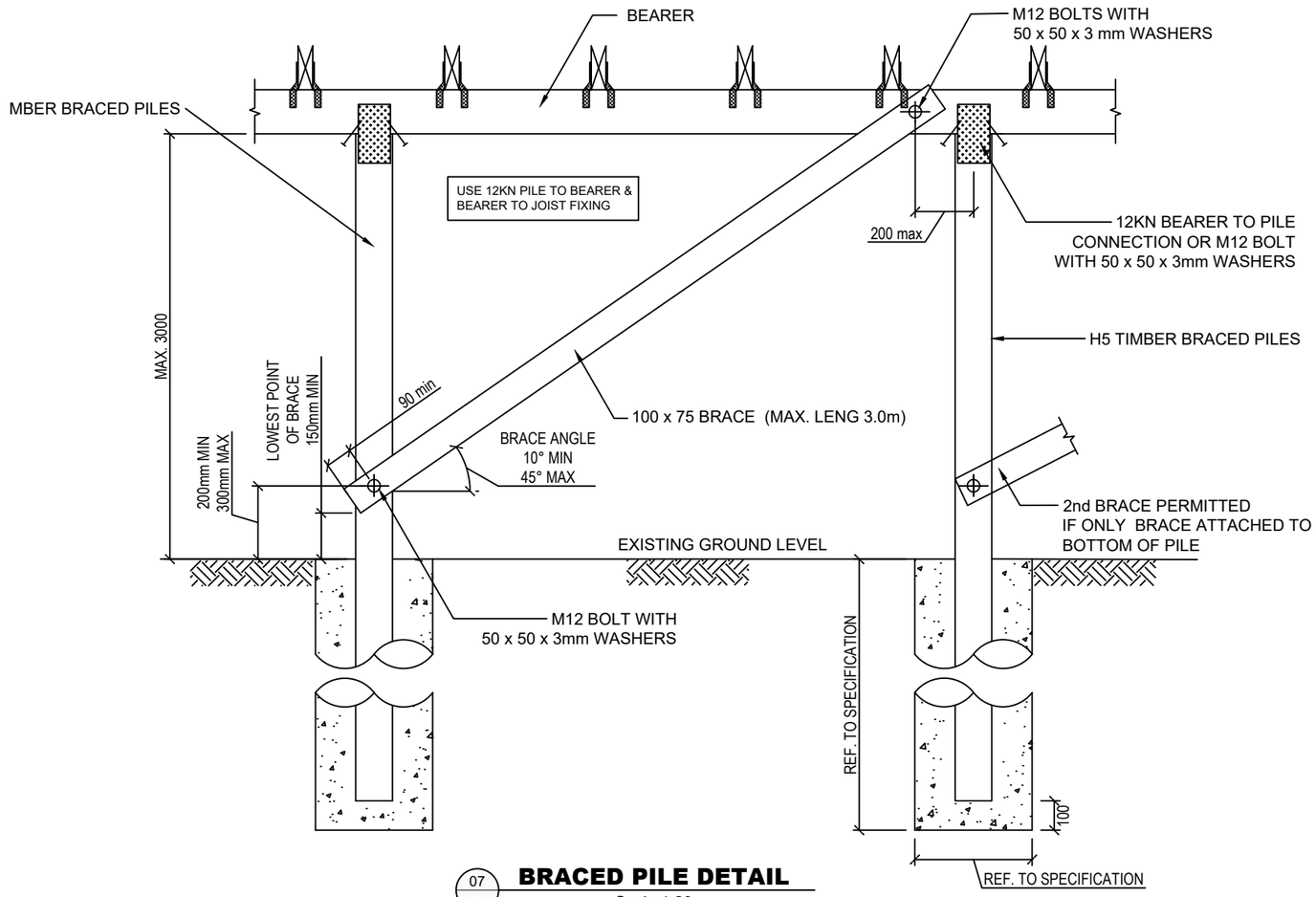
## 05 - PILE TO BEARER & JOIST CONNECTION

Scale 1:20




## 06 - TYPICAL PILE

Scale 1:20




## 07 - BRACED PILE DETAIL

Scale 1:20

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client:
HUGH JOHNSTONE

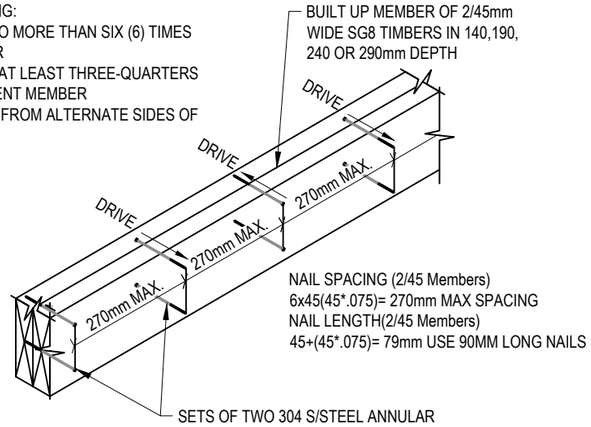
JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND -
SED

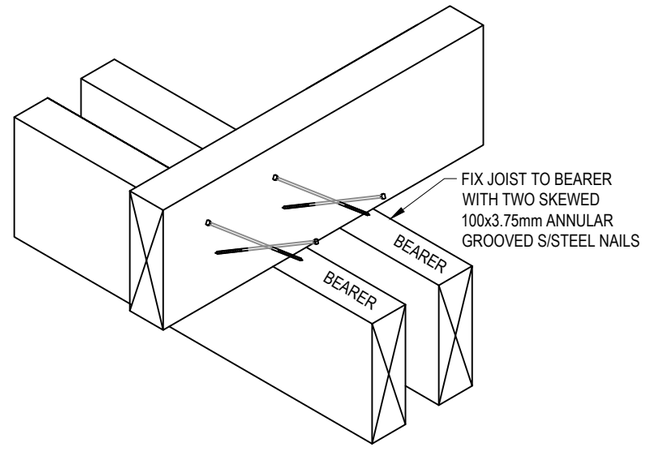
Sheet Title:
BRACED PILE DETAIL

| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: TP2 | Rev No: 01 |

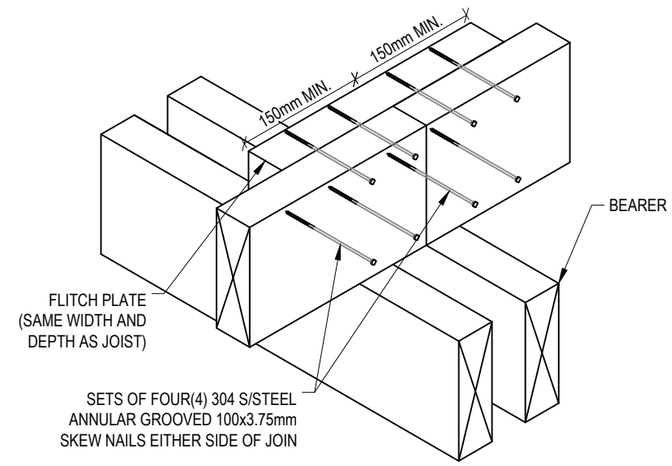
BUILT-UP MEMBER NAILING:
- SPACING OF NAILS IS NO MORE THAN SIX (6) TIMES THE THINNEST MEMBER
- ALL NAILS PENETRATE AT LEAST THREE-QUARTERS OF THE LAST COMPONENT MEMBER
- NAIL SETS ARE DRIVEN FROM ALTERNATE SIDES OF BUILT-UP MEMBER



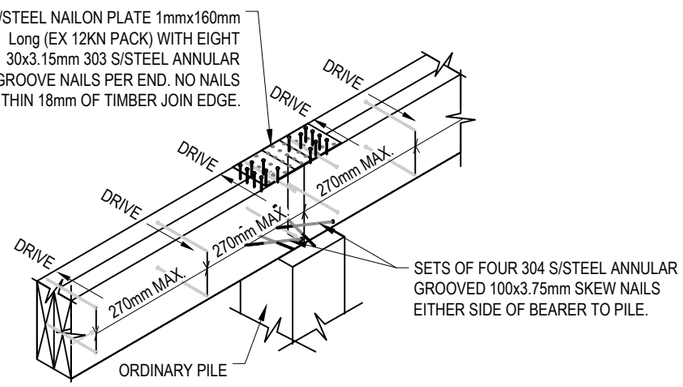

01 - **BUILT-UP 2/45mm BEARER**
Scale 1:10



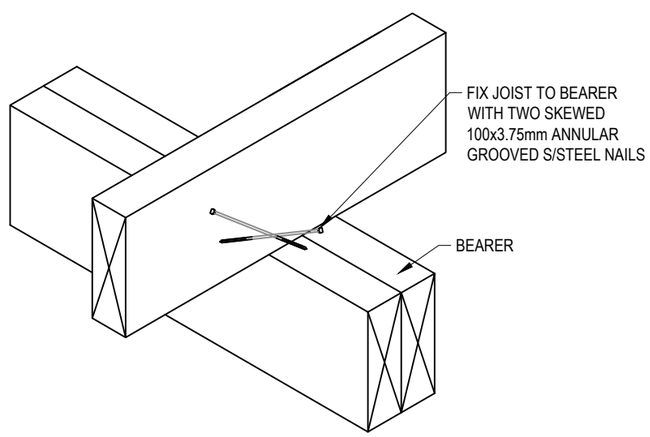

02 - **JOINING OF JOISTS AT BEARER**
Scale 1:10



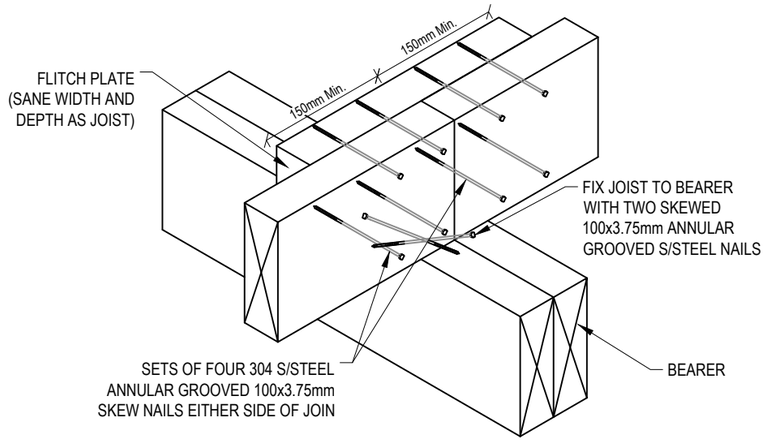

03 - **JOINING OF JOSITS AT BEARER**
Scale 1:10




04 - **JOINING OF BUILT-UP BEARER OVER ORDINARY PILE**
Scale 1:10




05 - **STANDARD JOIST TO BEARER CONNECTION**
Scale 1:10




06 - **JOINING OF JOISTS AT BEARER**
Scale 1:10

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

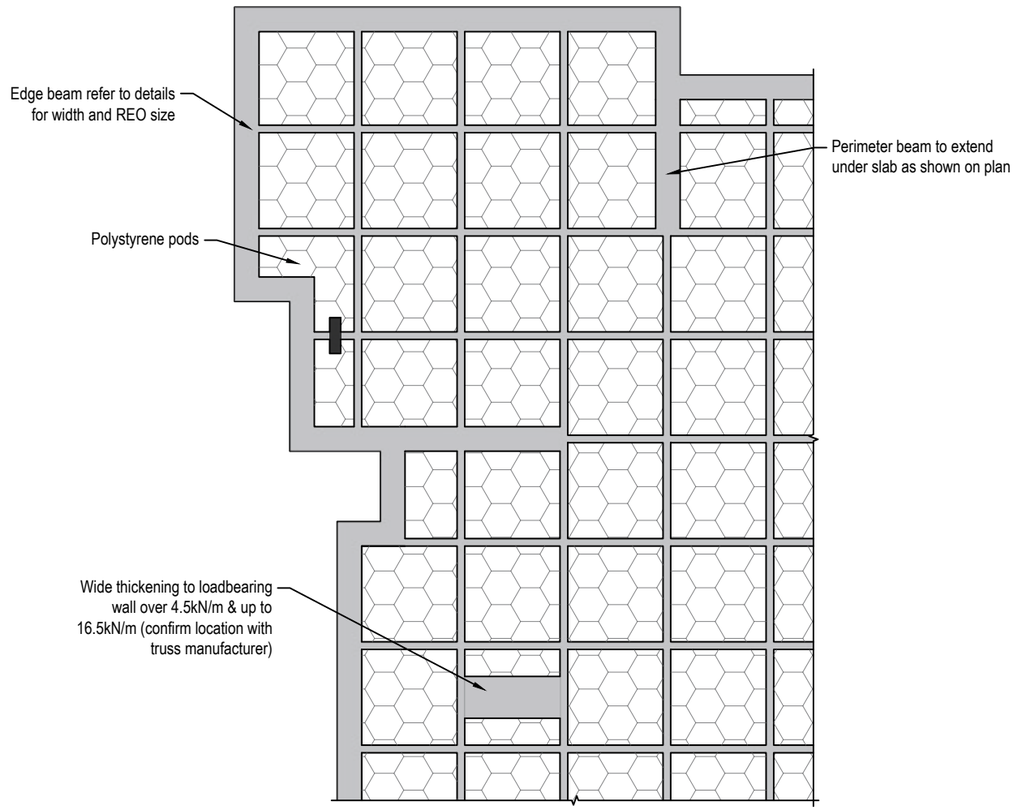
Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: TIMBER BEARER AND JOIST CONNECTION DETAILS

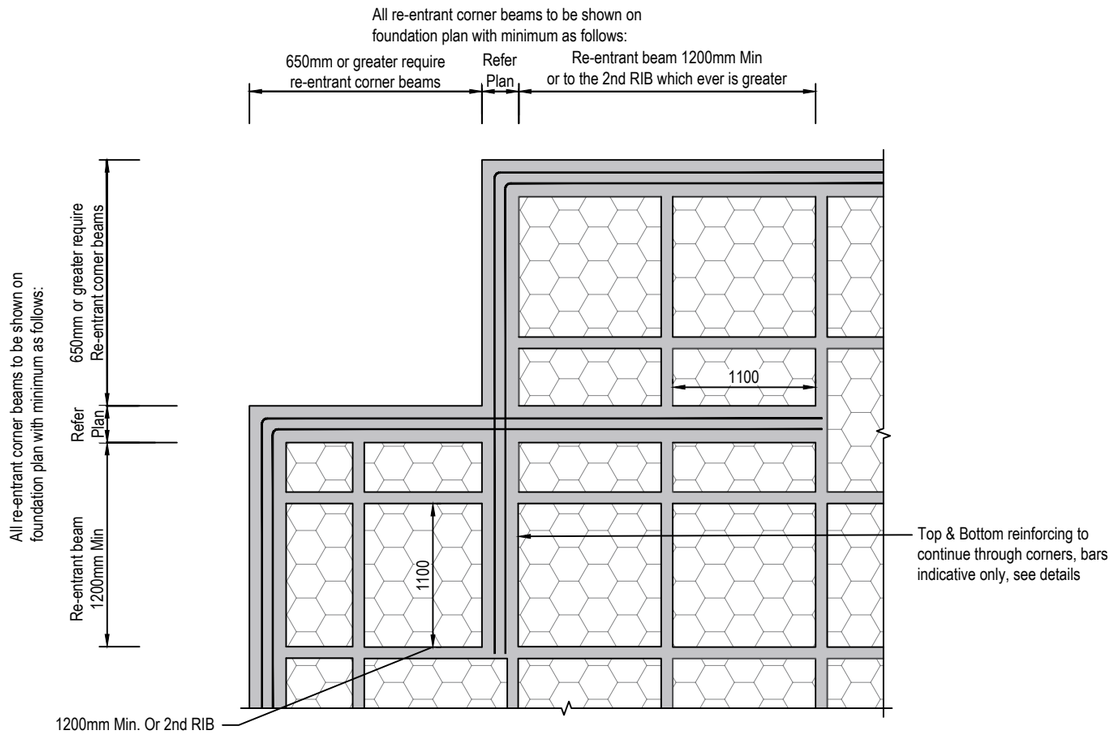
| Job #: | Scale (A3 Original): |
|---|---|
| 24106 | As Shown |
| Client Drawing #: | Sheet #: TBJ / Rev No: 01 |




Note:
These details illustrate typical configurations only and must be read with the architectural drawings to assess the applications of details. refer to architectural foundation layout for specfic geometry and configurations.

## P1 - TYPICAL TC1 WAFFLE SLAB FOUNDATION - PLAN

Scale 1:75




Refer to architects signed foundation plan for location of re-entrant corner beams, if these are required
Refer specific details for steel re-inforcing in edge beams, re-entrant corners, slab thickening and ribs
If slab thickening under bearing wall is required in place of re-entrant beam, slab thickening reinforcing details (if different to edge beam reinforcing) is to be used and lapped back into edge beam, lap HD12 900mm Min.

## P2 - TYPICAL TC1 RE-ENTRANT CORNER STEEL LAYOUT

Scale 1:50

Note: These details illustrate typical configurations only and must be read with the architectural drawings to assess the applications of details. refer to architectural foundation layout for specfic geometry and configurations.

| | | | | | |
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| Designed: | PW | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: WAFFLE SLAB FOUNDATION DETAILS SHEET 01

Job #: 24106

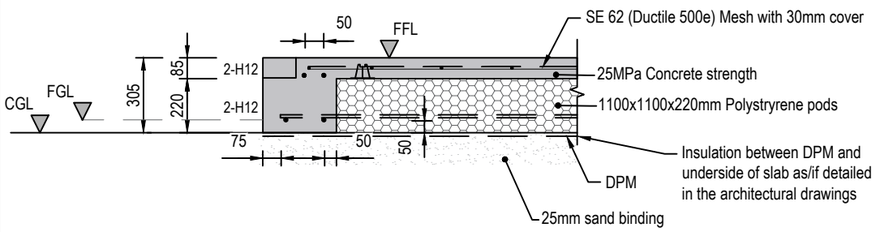
Scale (A3 Original): As Shown

Client Drawing #:

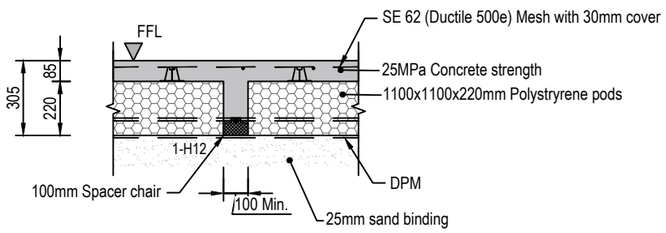
Sheet #: FT01

Rev No: 01

KEY:
FFL : Finished floor level
FGL: Finished ground level
CGL: Cleared ground level
DPM: Damp proof membrane

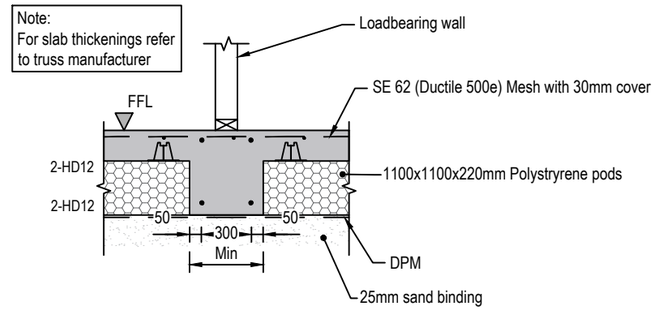



A1 **TYPICAL EDGE BEAM**
Scale 1:25

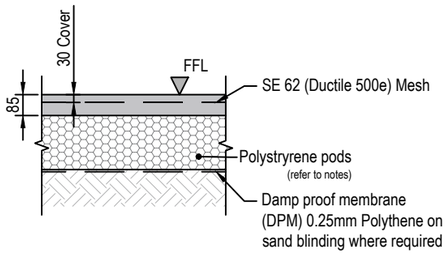



A2 **TYPICAL RIB DETAIL**
Scale 1:25

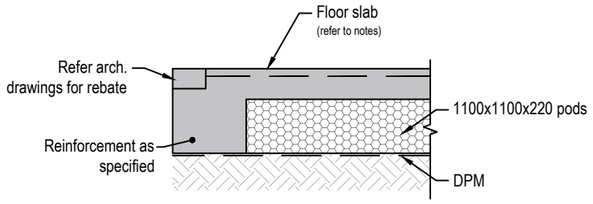
Note:
For slab thickenings refer to truss manufacturer



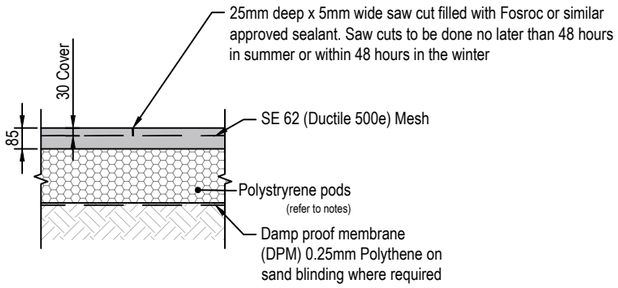

A3 **TYPICAL SLAB THICKENING OR INTERNAL BEAM**
Scale 1:25



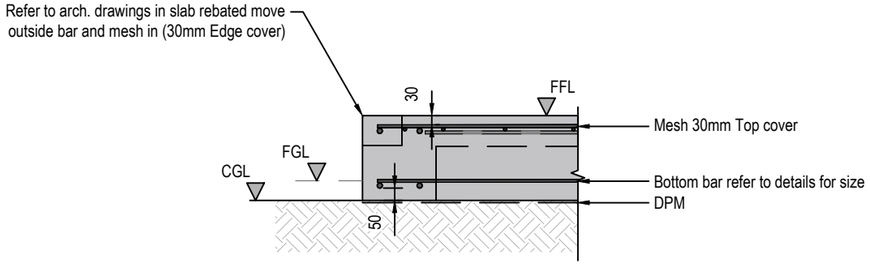

B1 **SLAB THICKNESS & MESH**
Scale 1:25




B2 **DETAIL SHOWING POD SIZES**
Scale 1:25




B3 **TYPICAL SAWCUT JOINT**
Scale 1:25




C1 **TYPICAL TOP BAR SECTION**
Scale 1:25

| | | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

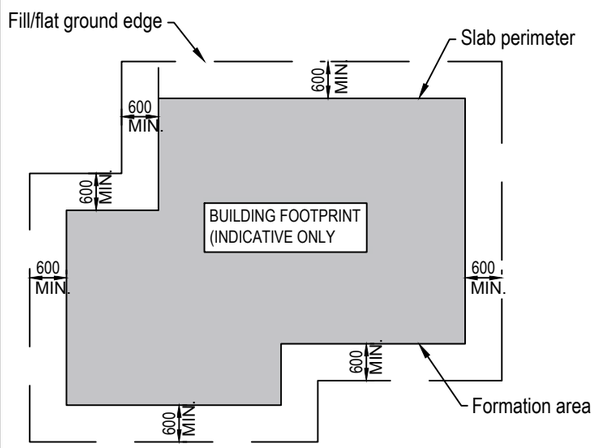
Client:
HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND -
SED

Sheet Title:
WAFFLE SLAB FOUNDATION
DETAILS SHEET 02

Job #: 24106
Scale (A3 Original): As Shown
Client Drawing #:
Sheet #: FT02
Rev No: 01



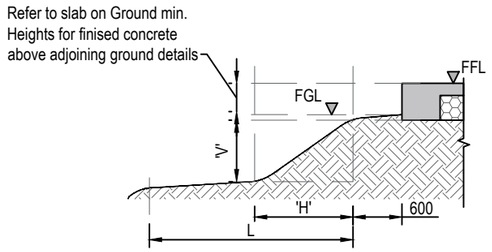

A1 - **TYPICAL FORMATION AREA**
Scale 1:100

Key:
'V' : Vertical distance
'H' : Horizontal distance

The ratios H/V &L/V shall be:

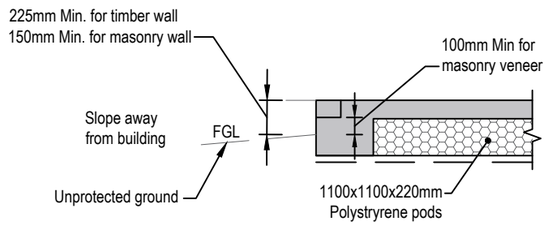
A: Rock: H/V > 1, L/V > 2
B: Clay or sandy clay :H/V > 2, L/V >3
C: Other materials: H/V > 3, L/V > 4

Or as advised by the geotechnical engineer



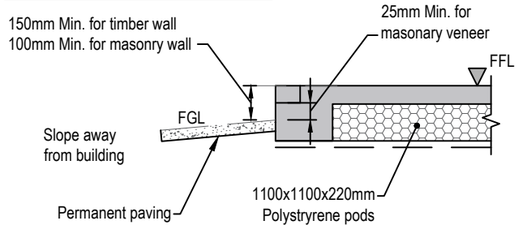

A2 - **TYPICAL SLOPING GROUND**
Scale 1:75

Slab on the ground minimum heights of finished concrete above adjoining ground



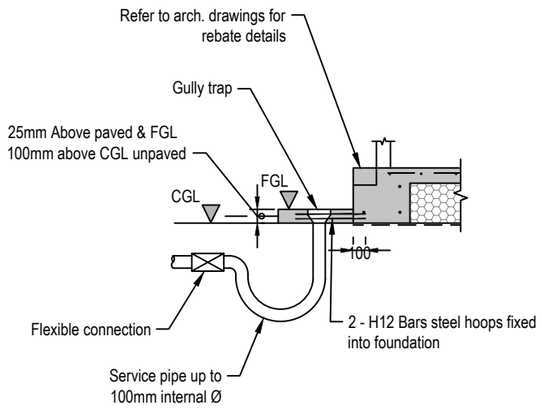

A3 - **TYPICAL NON PAVED AREAS**
Scale 1:50

Slab on the ground minimum heights of finished concrete above adjoining ground



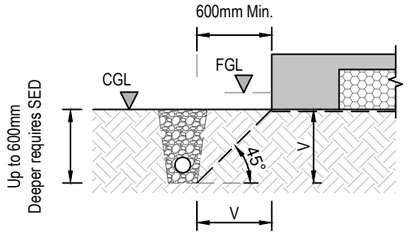

A4 - **TYPICAL PAVED AREAS**
Scale 1:50

KEY:
FFL : Finished floor level
FGL: Finished ground level
CGL: Cleared ground level
DPM: Damp proof membrane

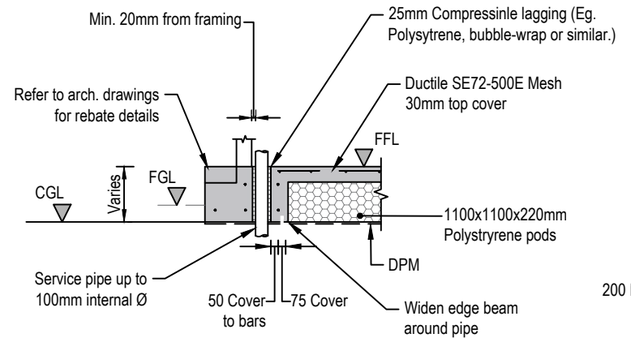



B1 - **TYPICAL GULLY TRAP TO FOUNDATION**
Scale 1:50

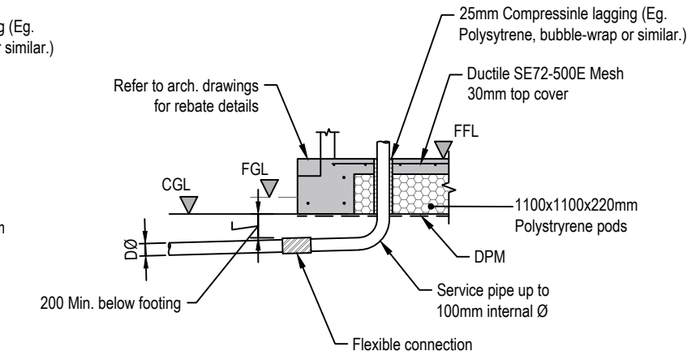
Where trenches are left open less than 48 hours only if trenches are to be left open more than 48 hours then 'V' distance from slab to be min '3V'



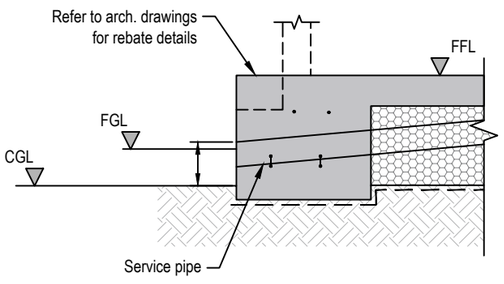

B2 - **TRENCH TO SLAB EDGE DISTANCE**
Scale 1:50



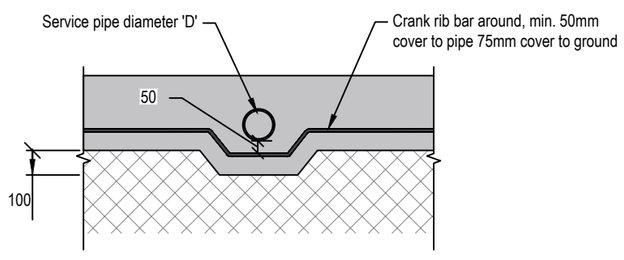

B3 - **TYPICAL SECTION AT EDGE**
Scale 1:50



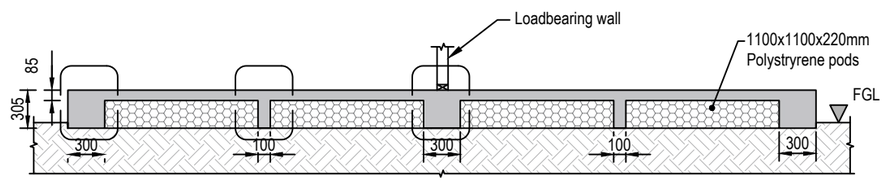

B4 - **TYPICAL SERVICE PIPE TO FLEXIBLE CONNECTION**
Scale 1:50




C1 - **TYPICAL PIPE AT FOUNDATION EDGE**
Scale 1:25




C2 - **TYPICAL PIPE PENETRATION AT FOUNDATION EDGE**
Scale 1:25




D1 - **TYPICAL SECTION**
Scale 1:50

NOTE * : * INSULATION BETWEEN DPM AND UNDERSIDE OF SLAB AS PER ARCHITECTURAL DRAWINGS AND SHEET FT07

| | | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client:
HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND -
SED

Sheet Title:
WAFFLE SLAB FOUNDATION
DETAILS SHEET 03

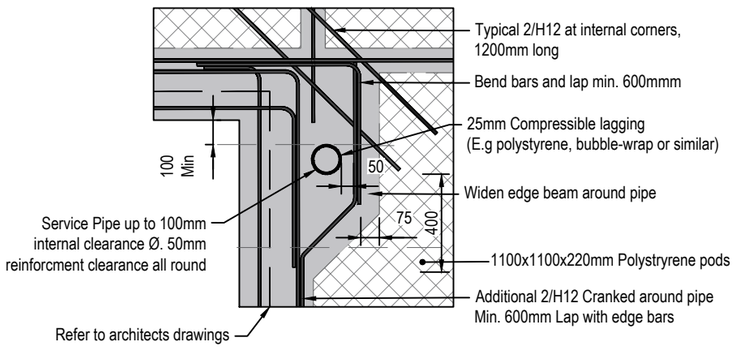
Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

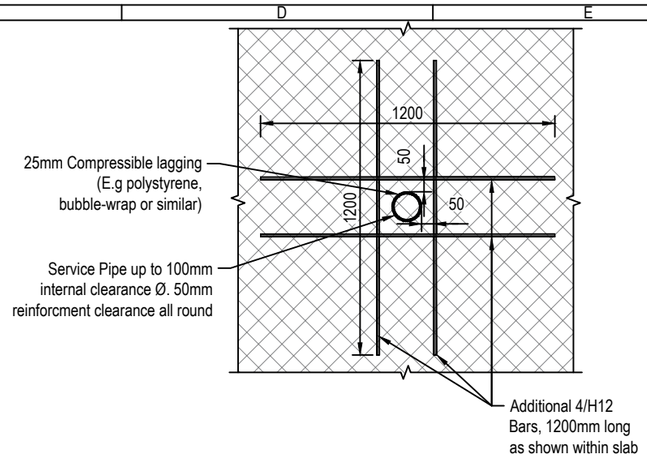
Sheet #: FT03

Rev No: 01



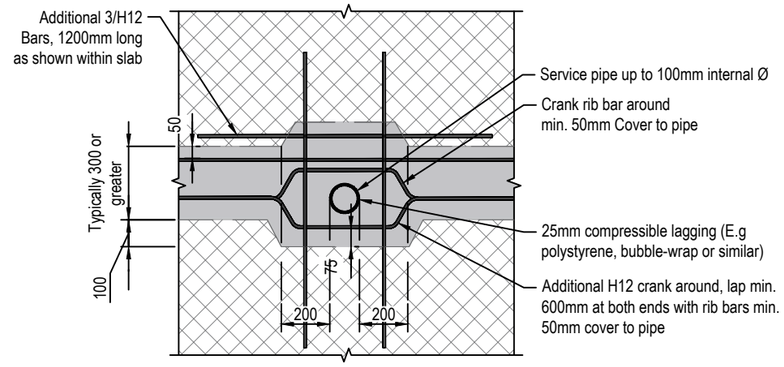

A1 - **TYPICAL PLAN VIEW: AT CLOSED EDGE**

Scale 1:25




A2 - **TYPICAL SECTION PLAN: ABOVE POD**

Scale 1:25




A3 - **TYPICAL SECTION VIEW: FOR THICKENING**

Scale 1:25




B1 - **TYPICAL SECTION VIEW: AT EDGE**

Scale 1:25



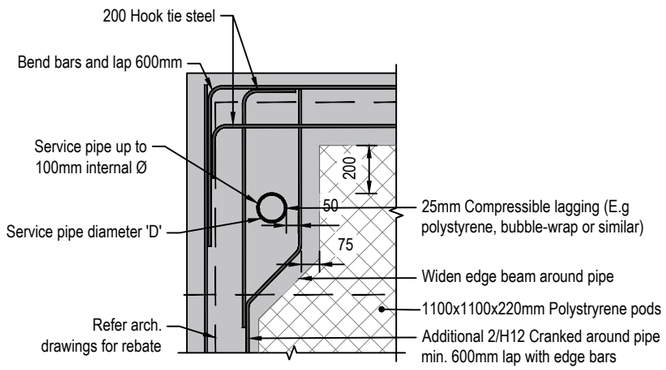

B2 - **TYPICAL SECTION VIEW: FOR RIB**

Scale 1:25



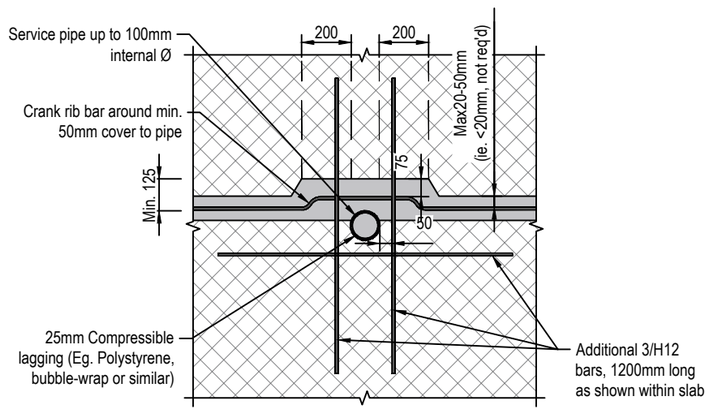

B3 - **TYPICAL SECTION VIEW: ABOVE POD**

Scale 1:25




C1 - **TYPICAL SECTION VIEW: AT OPEN CORNER**

Scale 1:25




C2 - **TYPICAL SECTION VIEW: ABOVE POD**

Scale 1:25

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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: WAFFLE SLAB FOUNDATION DETAILS SHEET 04

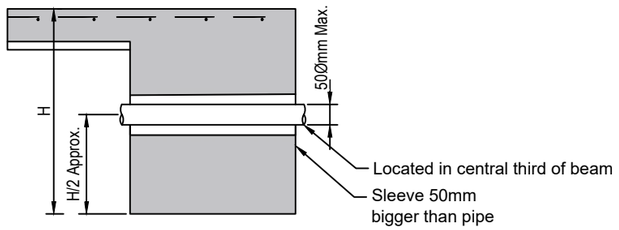
Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: FT04

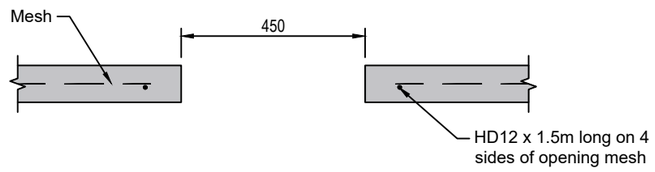
Rev No: 01




D1 - **TYPICAL DETAIL: PIPE PENETRATION IN RIB**

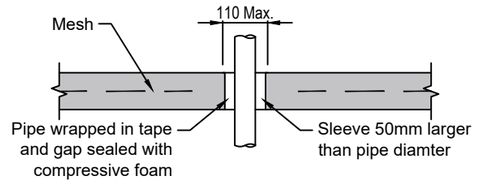
Scale 1:15

Large penetration through slab ( Shower, waste traps ect.)




D2 - **TYPICAL DETAIL: LARGE PENETRATION THROUGH SLAB**

Scale 1:15




D3 - **TYPICAL DETAIL: SMALL PENETRATION THROUGH SLAB**

Scale 1:15

**Figure 65: Levels and garage openings**
Paragraphs 9.1.3, 9.1.3.4, 9.2.5, Table 18

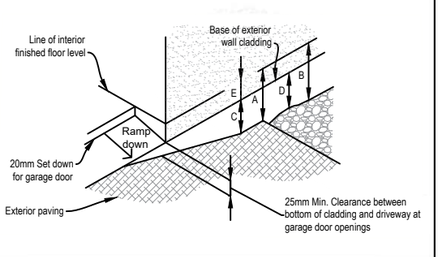
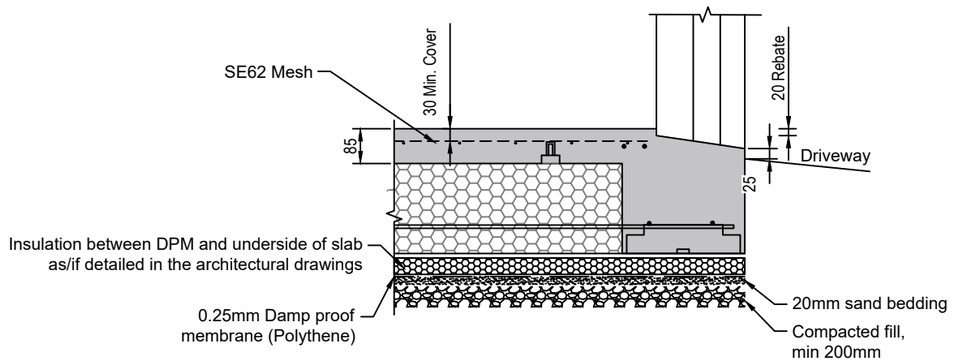



**Table 18: Minimum clearances**
Paragraphs 9.1.3, 9.1.3.1, 9.1.3.2, 9.1.3.3, 9.1.3.4, 9.1.3.5 and 9.2.7

| Minimum clearances (mm) | Masonry veneer | | Other claddings | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | A | B | C | D | E |
| Concrete slab | 100 | 150 | 150 | 225 | 100 | 175 | 50 |
| Timber floor Refer Note 1) | | | | | 100 | 175 | 50 2) |

**NOTE:** 1) Refer to NZS 3604 for requirements.
2) Cladding to extend minimum 50 mm below bearer or lowest part of timber floor framing.

Min. 25mm clearance between bottom of cladding and driveway




A3 - **TYPICAL DETAIL: GARAGE DOOR SECTION**

Scale 1:15

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Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

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HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND -
SED

Sheet Title:
WAFFLE SLAB FOUNDATION
DETAILS SHEET 05

| Job #: | Scale (A3 Original): | |
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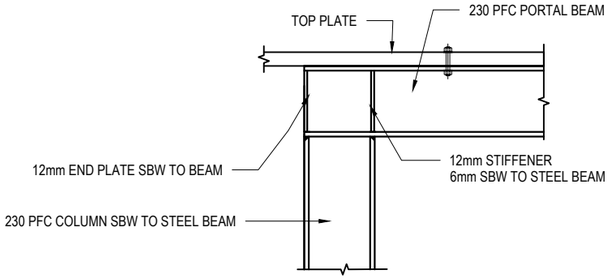
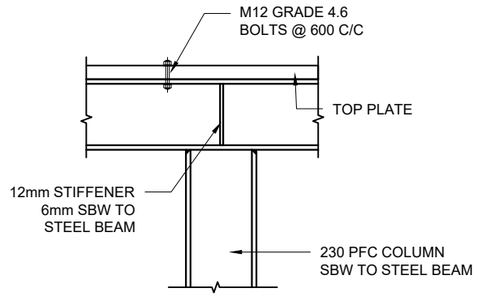
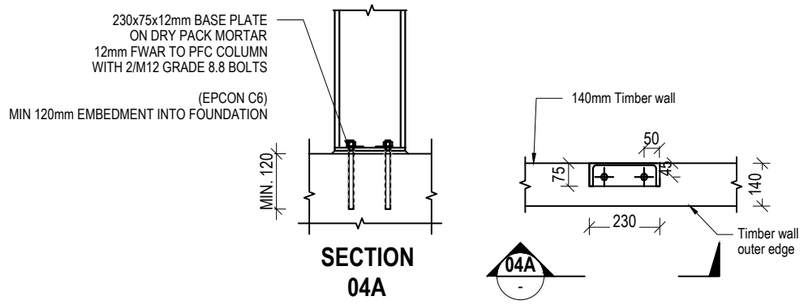
| Client Drawing #: | Sheet #: FT05 | Rev No: 01 |



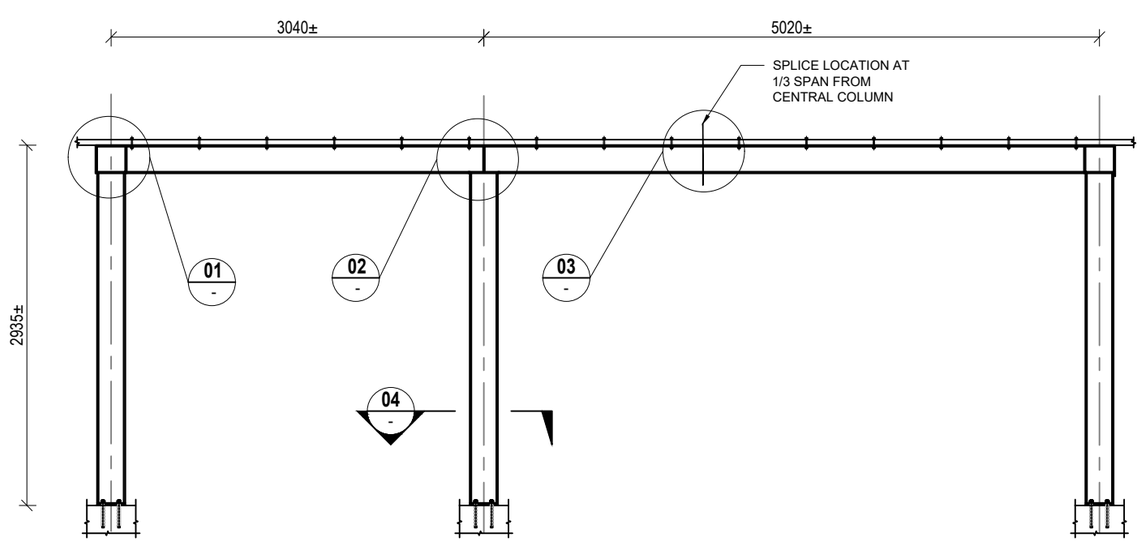

01 - **COLUMN TO BEAM CONNECTION DETAIL**
Scale 1:20



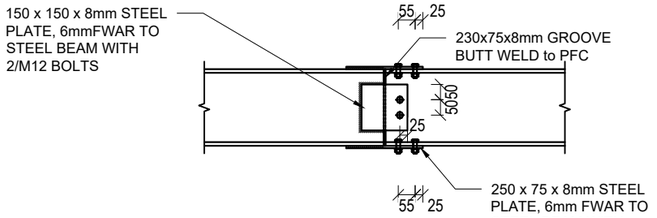

02 - **CENTRAL COLUMN TO BEAM CONNECTION DETAIL**
Scale 1:20



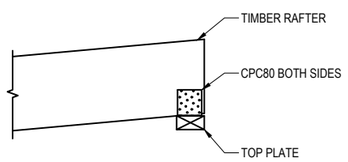

04 - **PORTAL COLUMN TO FLOOR CONNECTION DETAIL**
Scale 1:20




A - **PFC PORTAL DETAIL**
Scale 1:50




03 - **PFC SPLICE CONNECTION DETAIL**
Scale 1:20




05 - **RAFTER CONNECTION DETAIL**
Scale 1:20

NOTE:

1. DIMENSIONS ARE TO BE CROSS-REFERENCED WITH ARCHITECTURAL DRAWINGS. ARCHITECTURAL DRAWINGS TAKE PRECEDENCE OVER STRUCTURAL DRAWINGS, INCLUDING THE PORTALS HEIGHTS AND SPANS.
2. THE STEEL MEMBERS TO BE CONSTRUCTION CATEGORY 2, CORROSIVE CATEGORY C3 AND COATING IZS4.

| | | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client:
HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND - SED

Sheet Title:
PFC PORTAL, CONNECTION DETAILS AND RAFTER DETAIL

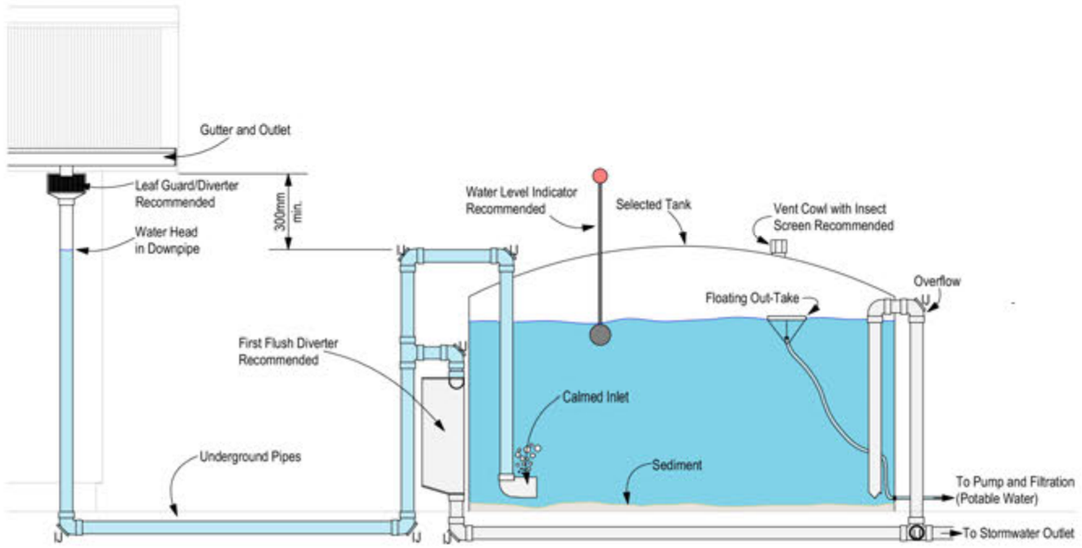
Job #: 24106

Scale (A3 Original): As Shown

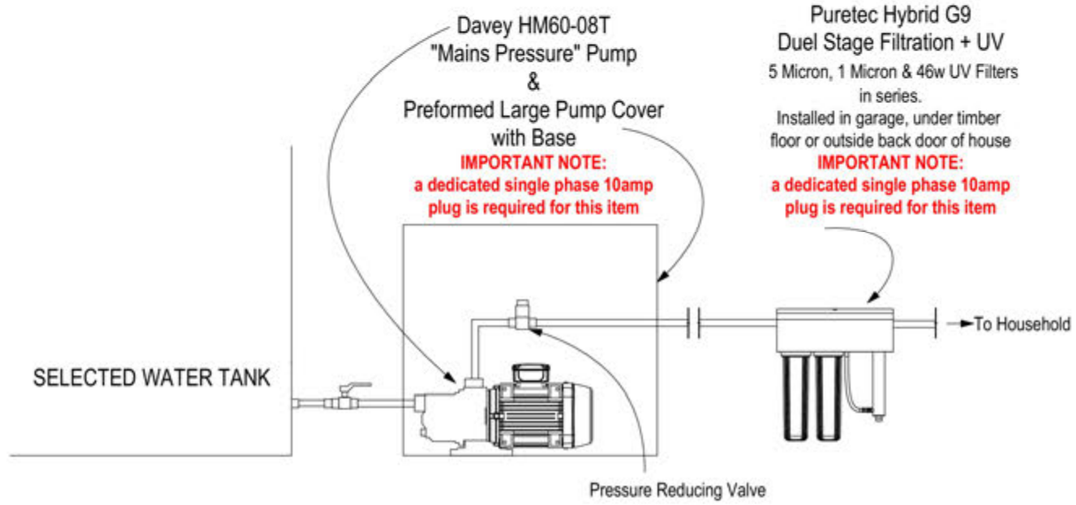
Client Drawing #:

Sheet #: S01

Rev No: 01




01 TYPICAL "WET" RAIN WATER TANK SETUP




Puretec PERFECTING WATER

WaterMark WMTS103:2016 Licence No. WM 74593 Australian Certification Services

DAVEY HM60-08T Tested in compliance with AS/NZS 4020 for use in contact with safe drinking water

02 PUMPING AND FILTERING WATER
BOPRC Requirements

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: RAIN-WATER TANK DETAILS

Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: SW01

Rev No: 01

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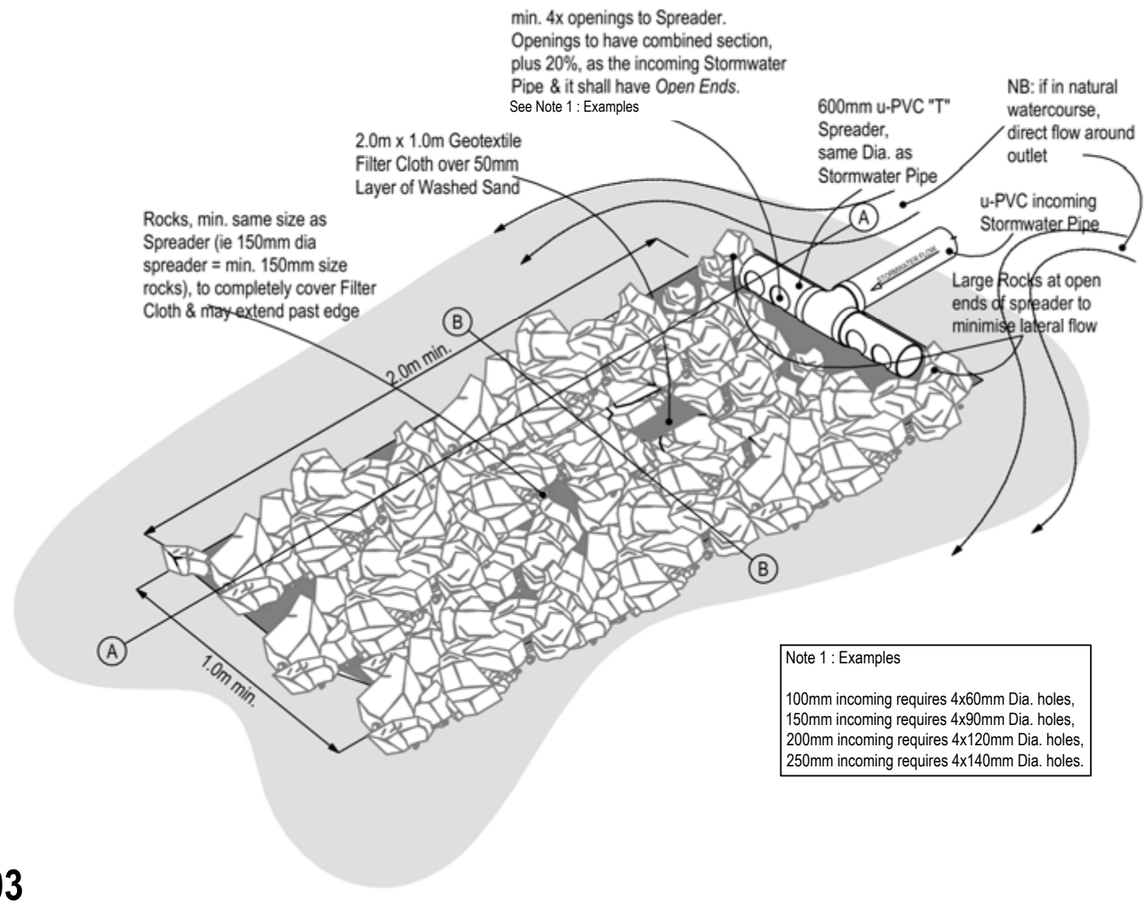
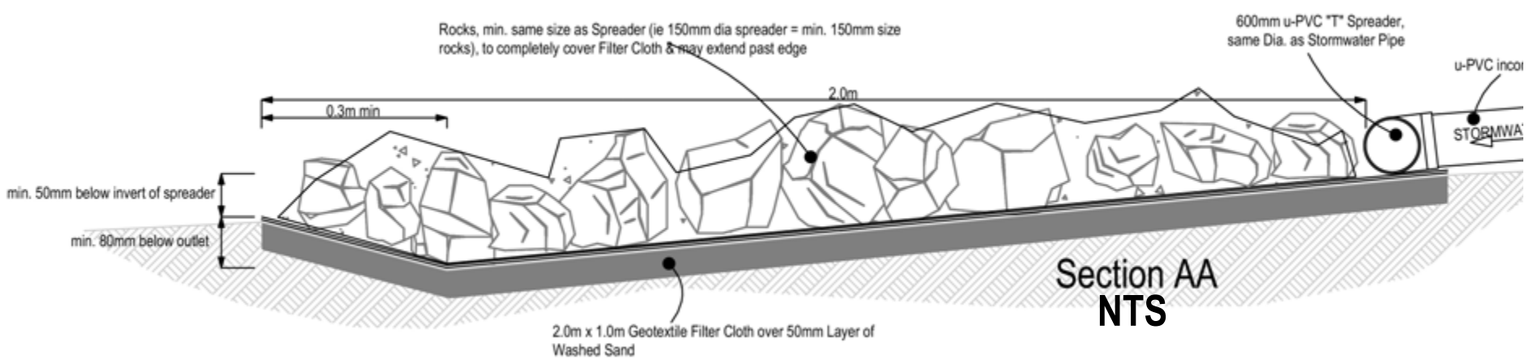


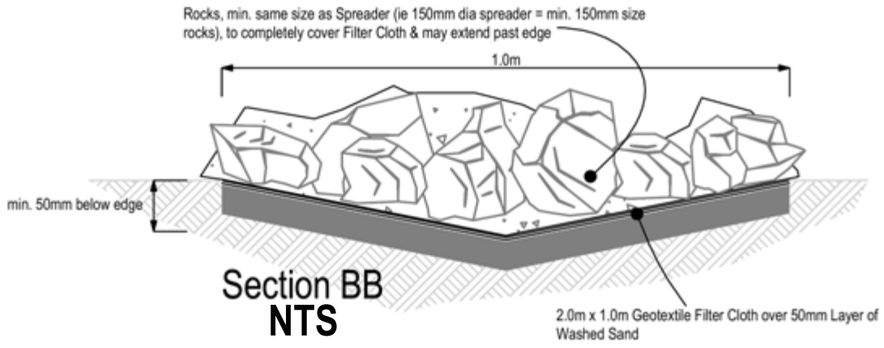

Note 1 : Examples

100mm incoming requires 4x60mm Dia. holes,
150mm incoming requires 4x90mm Dia. holes,
200mm incoming requires 4x120mm Dia. holes,
250mm incoming requires 4x140mm Dia. holes.

## 03 NTS




Section AA
NTS




Section BB
NTS

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Walker Engineering
Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client:
HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title:
HUGH JOHNSTONE 142
KONINI ROAD, AUCKLAND -
SED

Sheet Title:
RAIN-WATER TANK FILTRATION
SYSTEM

| Job #: | Scale (A3 Original): | |
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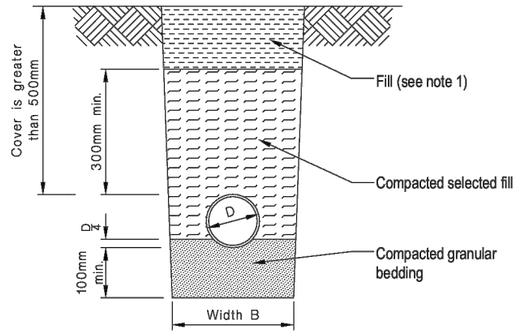
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: SW02 | Rev No: 01 |

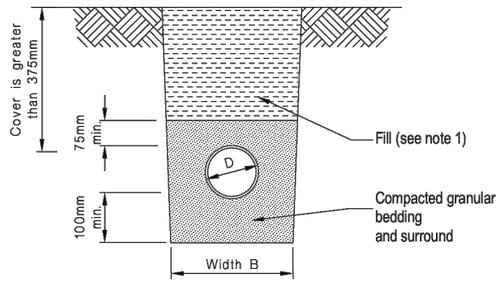



**(a) Cover greater than 500 mm**

Bedding type 'B' of NZS 4452

See Note 2* See Note 1*

**01** TRENCH BEDDING AND BACKFILL (a) E1/AS1 NTS

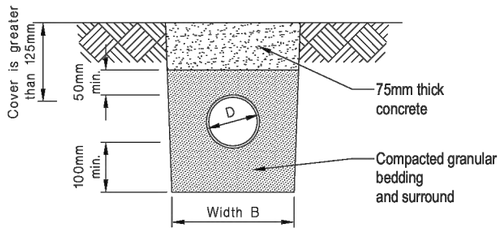



**(b) Cover greater than 375 mm**

Bedding type 'D' of NZS 4452

See Note 2* See Note 1*

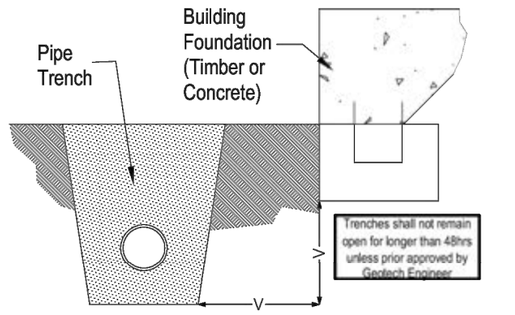
**02** TRENCH BEDDING AND BACKFILL (b) E1/AS1 NTS



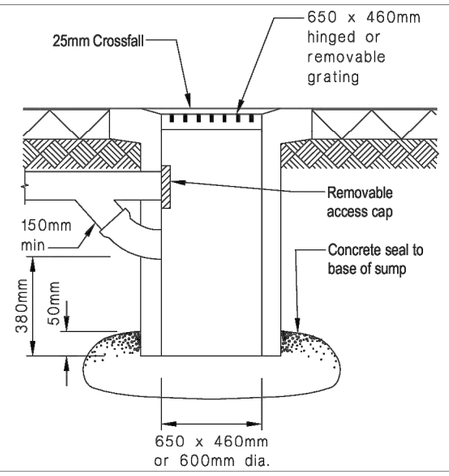

**(c) Cover greater than 125 mm**

See Note 2* See Note 1*

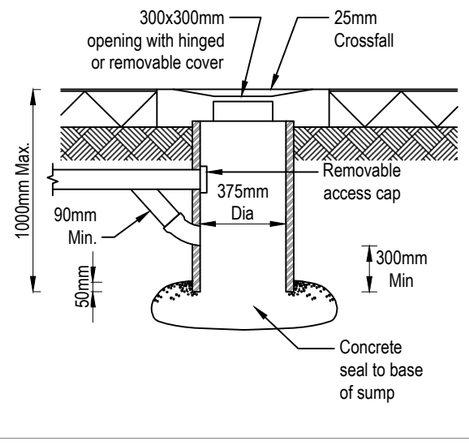
**03** TRENCH BEDDING AND BACKFILL (c) E1/AS1 NTS



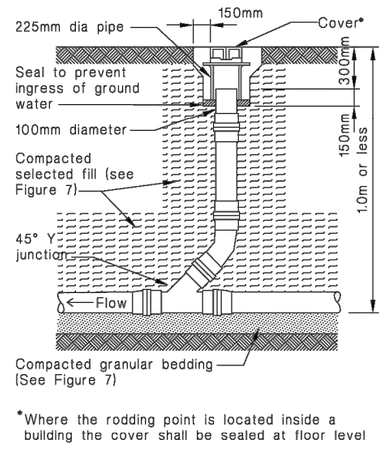

**04** TRENCH TO BUILDING FOUNDATION E1/AS1 NTS




**05** TYPE 2 SURFACE WATER SUMP E1/AS1 NTS

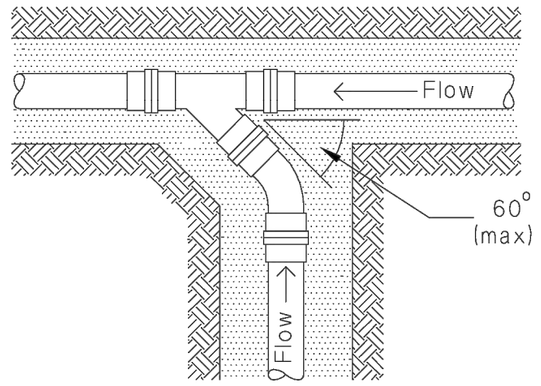



**06** TYPE 1 SURFACE WATER SUMP E1/AS1 NTS

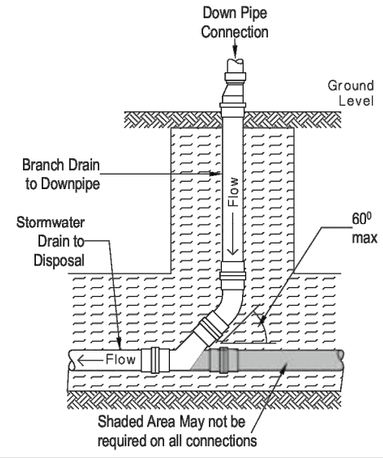



*Where the rodding point is located inside a building the cover shall be sealed at floor level

**07** TYPICAL RODDING POINT E1/AS1 NTS




**08** CONNECTION OF DRAIN - HORIZONTAL E1/AS1 NTS




**09** CONNECTION OF DRAIN - VERTICAL E1/AS1 NTS

**Table 2: Minimum Gradients** Paragraph 3.4.1

| Drain internal diameter | Minimum gradient |
|---|---|
| 85 mm | 1 in 90 |
| 100 mm | 1 in 120 |
| 150 mm | 1 in 200 |
| 225 mm | 1 in 350 |

**10** PIPE SIZES AND FALLS E1/AS1 NTS

Note 1: Fill shall be:

- Ordinary fill where drains are located below gardens and open country

- Compacted certified fill where drains are located below residential driveways, walkways, or other similar areas

Note 2:

"Width B" of the trench shall be no less than the pipe diameter D plus 200 mm. Trench width at the top of the pipe shall be no more than 600 mm unless the pipe(s) in the trench are covered with concrete.

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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: STORMWATER DRAINS AND TRENCHES

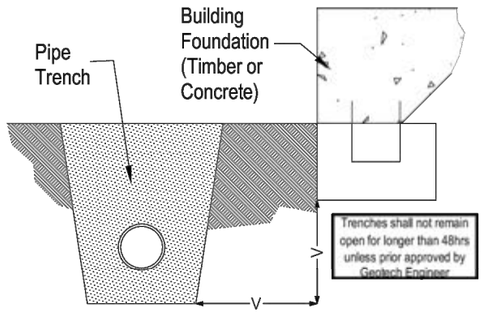
Job #: 24106

Scale (A3 Original): As Shown

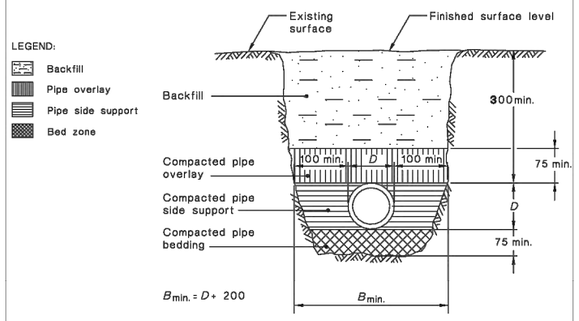
Client Drawing #:

Sheet #: SW03

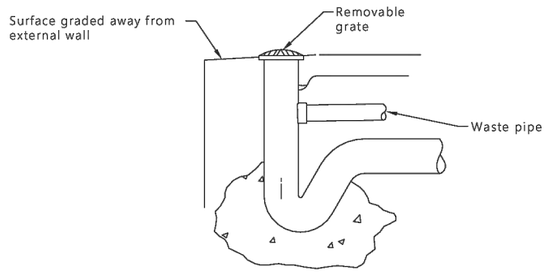
Rev No: 01



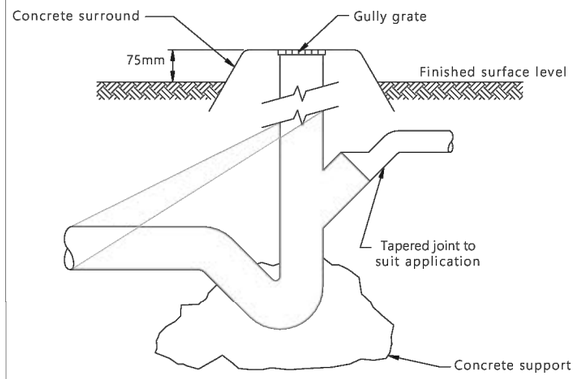

**01** TRENCH TO BUILDING FOUNDATION — AS/NZS3500 — NTS



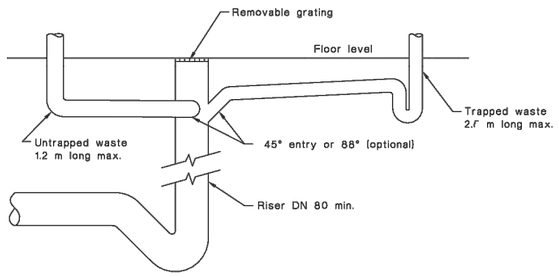

**02** TRENCHS TYPICAL — AS/NZS3500 — NTS



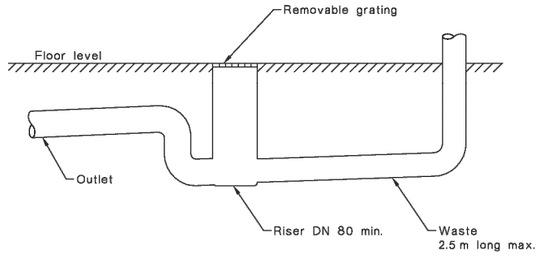

**03** TYPICAL OVERFLOW RELIEF GULLY ON PAVED SURFACE — AS/NZS3500 — NTS



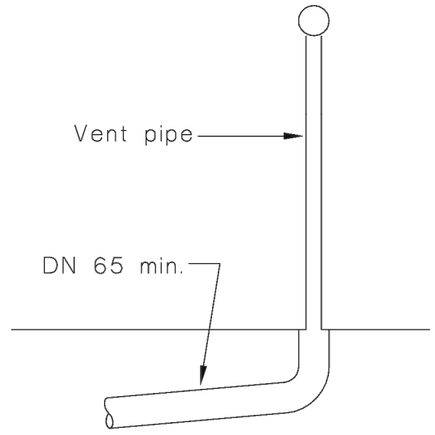

**04** TYPICAL OVERFLOW RELIEF GULLY ON UNPAVED SURFACE — AS/NZS3500 — NTS



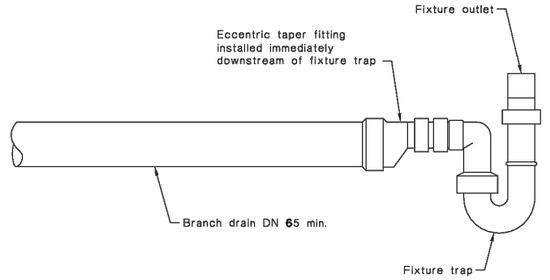

**05** TYPICAL FLOOR WASTE GULLY — AS/NZS3500 — NTS



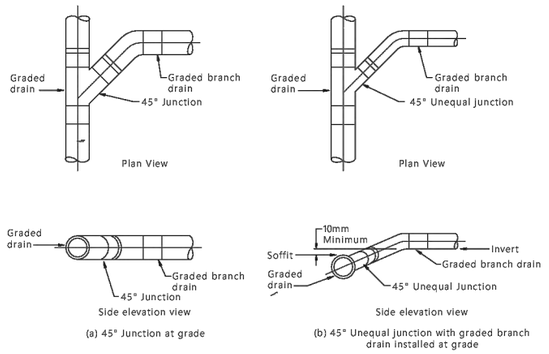

**06** TYPICAL SUBMERGED FLOOR WASTE GULLY — AS/NZS3500 — NTS



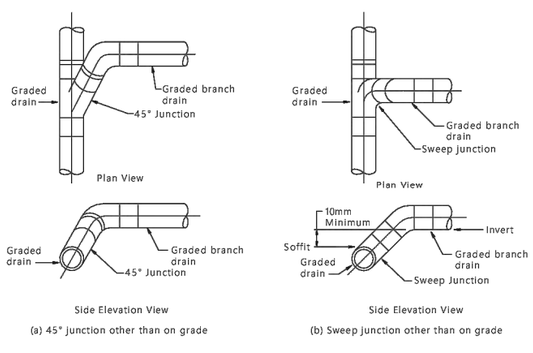

**07** TYPICAL VENT PIPE CONNECTION — AS/NZS3500 — NTS




**08** TYPICAL TRAP TO BRACH — AS/NZS3500 — NTS




**09** CONNECTION OF DRAIN - ON GRADE — AS/NZS3550 — NTS




**10** CONNECTION OF DRAIN - NOT ON GRADE — AS/NZS3550 — NTS

## TABLE 4.11.1
## MINIMUM GRADES OF DRAINS

| Nominal size DN | Minimum grade, % |
|---|---|
| 65 | 2.50 (1 in 40) |
| 80 | 1.65 (1 in 60) |
| 100 | 1.65 (1 in 60) |
| 125 | 1.25 (1 in 80) |
| 150 | 1.00 (1 in 100) |

**10** TYPICAL MINIMUM GRADES OF DRAINS — AS/NZS3550 — NTS

| | | | | | |
|---|---|---|---|---|---|
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited
Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: G13/AS3 DRAINS AND TRENCHES

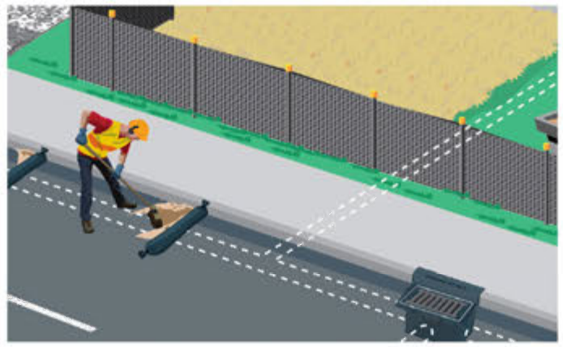
Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: SW04

Rev No: 01



How?
- Retain as much vegetation cover as possible.
- Do your work in stages.
- Use mulch, hay, pea straw or other material to cover exposed areas.
- Keep a berm of grass around the outside of the site to keep hold of water and allow another layer of filtration.
- Revegetate exposed areas as rapidly as possible.

Why?
- Uncovered areas can be easily eroded.
- The less soil that is exposed, the less that can be washed away.

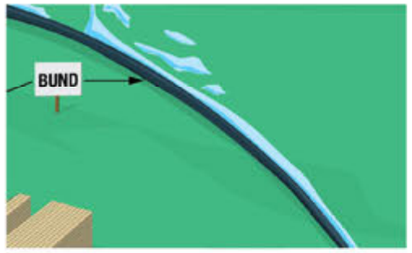
**01** **Minimize Exposed Areas** Sediment and erosion control guideline **NTS**

How?
- Cover stockpiles with mulch, straw or a tarpaulin as soon as practicable to prevent soil loss.
- Soil and other materials should be stockpiled away from kerbs and areas where run-off may enter the stormwater system or drains.
- Use a silt fence around a stockpile or on the downhill side of the stockpile to contain sediment.
- Avoid locating a stockpile in a low-lying area which may form part of the natural drainage pattern of the site.

Why?
- Exposing soil stockpiles to rainfall can result in surface run-off.
- Uncovered soil can be blown off the site.

Maintenance
- Check after each rainfall event.

**02** **Manage Stockpiles** Sediment and erosion control guideline **NTS**

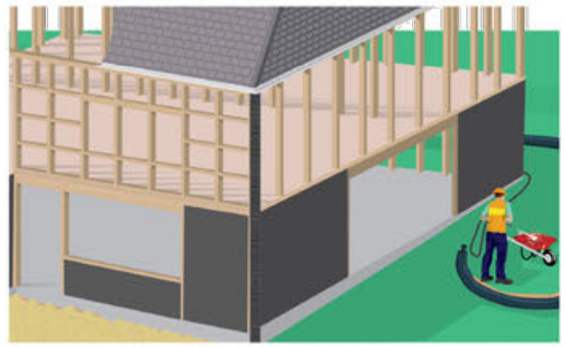



How?
- Create a diversion channel or contour drain above the earthworks on the site so clean water does not enter the work area.
- Ensure sediment-laden water from the works area is channelled to an appropriate area where it can be retained onsite.

Why?
- Left unmanaged, dirty water will contaminate clean water and increase the amount of treatment control devices required to prevent sediment leaving the site.
- Divert clean rainwater away from your exposed worksite to prevent it from dislodging sediment.
- Prevent diverted water from adversely affecting neighbouring properties or public areas.

Maintenance
- Ensure diversion channels and bunds have not been eroded by rainfall.
- Remove accumulated sediment from retention area.

**03** **Clean Water Diversion** Sediment and erosion control guideline **NTS**

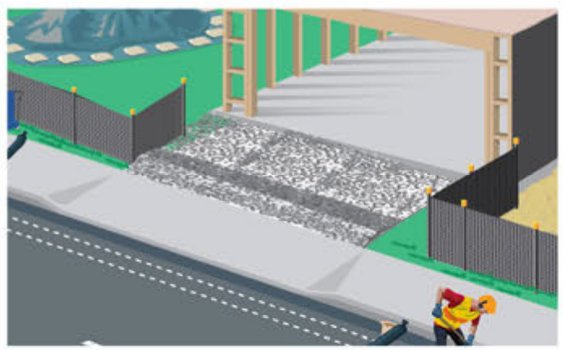


How?
- Use temporary downpipes once you have installed your roof and gutters.
- Alternatively, non-erosive, temporary ground cover shall be placed under downpipes to prevent splash erosion and divert water to turfed areas on the site.

Why?
- Installing drainage early enables you to remove clean water from your site – keeping clean water clean.
- Reduces the amount of water requiring treatment.

Maintenance
- Regularly check that the temporary downpipes are securely fastened before and after rainfall events.

**04** **Connection to Stormwater System** Sediment and erosion control guideline **NTS**



How?
- A minimum entranceway should:
  - have a 150mm thick layer of 65-100mm aggregate
  - be long enough for your site with "wings " (to allow for vehicles cutting corners)
  - be 4m minimum width, with 1.5m wide "wings " on either side to cater for larger delivery vehicles
- Use large washed aggregate.
- Do not use materials such as sand, crushed concrete or asphalt to make your entranceway as they are not effective.

Why?
- A stabilised entrance way will enable vehicles to be kept off exposed soil and clay.
- A stabilised entrance way is required to prevent vehicles tracking mud and clay onto the road (which is a common source of complaints to Council).
- Soil and contaminants can be washed directly off your site onto the road making it slippery and dangerous. They can then enter the stormwater system by rain or create a dust nuisance in dry weather.

Maintenance
- Inspect weekly and after each rainfall event.
- Maintain the stabilised driveway to prevent sediment from leaving the construction site.
- Remove sediments from sealed pavements by sweeping. Do not use a water truck to wash the road as this will wash any sediment into the stormwater system.
- Soil or other aggregate material should be swept back onto the site and not onto the road.

**05** **Stabilise Construction Entranceway** Sediment and erosion control guideline **NTS**

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Phone: 022 534 4973
Email: peter@walkereng.co.nz
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Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: GENERAL SEDIMENT CONTROL SHEET 01

Job #: 24106

Scale (A3 Original): As Shown

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Sheet #: EC01

Rev No: 01

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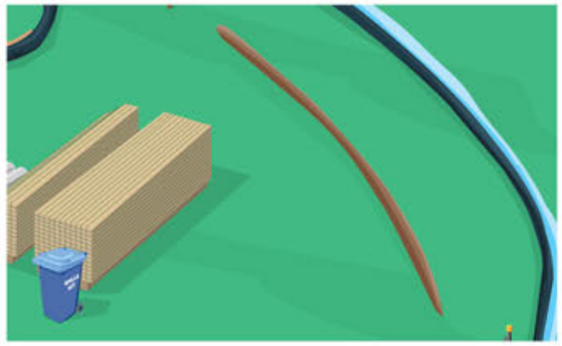


How?

- Construct a compacted earth bund around the outer edges of your site.
- Construct a bund through compacting clay or topsoil and cover them with geotextile cloth.

Why?

- Earth bunds will divert clean rainwater from the exposed works and provide a barrier for the retention of dirty water allowing sediment to settle out.

Maintenance

- Earth bunds need to be checked regularly throughout the build to ensure they are still providing an effective barrier.
- Soil needs to be recompacted to provide an effective barrier should damage occur.

**01** **Earth Bunds Retain Soil and Prevent Run-off** NTS
Sediment and erosion control guideline


- Regularly check and systematically carry out audits to ensure the controls onsite are maintained to the appropriate standard.
- Be ready to alter your site controls as the site or conditions change.
- Create a checklist to ensure all appropriate measures are in place on the site.
- Continue to educate staff and share ideas on how to maintain sediment and erosion controls on your site.
- Work as a team to get it right and take pride in doing your part in protecting our environment and region.

**02** **Manage Stockpiles** NTS
Sediment and erosion control guideline


How?

When installing catchpit controls:

- Protection measures should be installed before works start.
- Ensure the filter cloth covers the extent of the grate and the inlet at the back.
- Install a series of sand socks in the kerb and channel before the catchpit to intercept the stormwater – this will slow the velocity of the water allowing more sediment to settle out of the water.
- Remember to remove the filter cloth after you have completed your project.

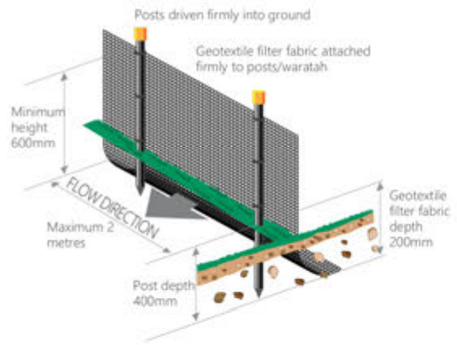
Why?

- Catchpit/drain protection measures are placed within or around stormwater inlets to intercept sediment-laden run-off before it enters the Council 's stormwater system .
- Drain or catchpit protection should only be considered as your secondary protection and is designed to assist your primary site controls such as a bund or silt fence.

Maintenance

- Ensure that your catchpit protection remains effective by checking it once a week and following large rain events.

**03** **Drain/Catchpit Protection** NTS
Sediment and erosion control guideline




How?

- Correct installation of a silt fence is critical to its performance. To be effective a silt fence needs to:
  - be installed in a trench 200mm deep by 100mm wide.
  - have waratahs or posts hammer-staked at least 400mm deep on the downhill side of the fabric, no more than 2m apart.
  - be 600mm high above the ground, with an additional 200mm of cloth below ground in the trench.
  - have each end of the fence return up the slope by roughly 2m to prevent water going around the edges.
  - be anchored by backfilling the trench and placing soil on top of the fabric.
  - it is recommended that woven 100-micron geotextile cloth is used.
  - weedmat and other materials (including tarpaulins) do not work properly as silt fences and should not be used.

Why?

- A silt fence is a temporary barrier used to intercept dirty water and retain sediment on site.
- A silt fence is installed around the downhill side of your site to contain sediment – to ensure that when rainfall events occur, muddy water stays behind the fence.
- Silt fences should be used for containing stockpiles of earth or other areas of disturbed soil or clay on your site.

Maintenance

- Inspect silt fences at least once a week and after a rain event. Fences should also be checked for wind damage.
- Remove accumulated sediment to a secure area when it reaches 50% of the fabric height. This will reduce pressure and allow for adequate sediment storage.
- Check the integrity of the fence to confirm effectiveness - replace or reinstate where required.
- A silt fence should remain in place until the site is stabilised or the exposed area is less than 100m ².
- Where water ponds behind the fence, extra support should be provided.

**04** **Silt Fences** NTS
Sediment and erosion control guideline

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: GENERAL SEDIMENT CONTROL SHEET 02

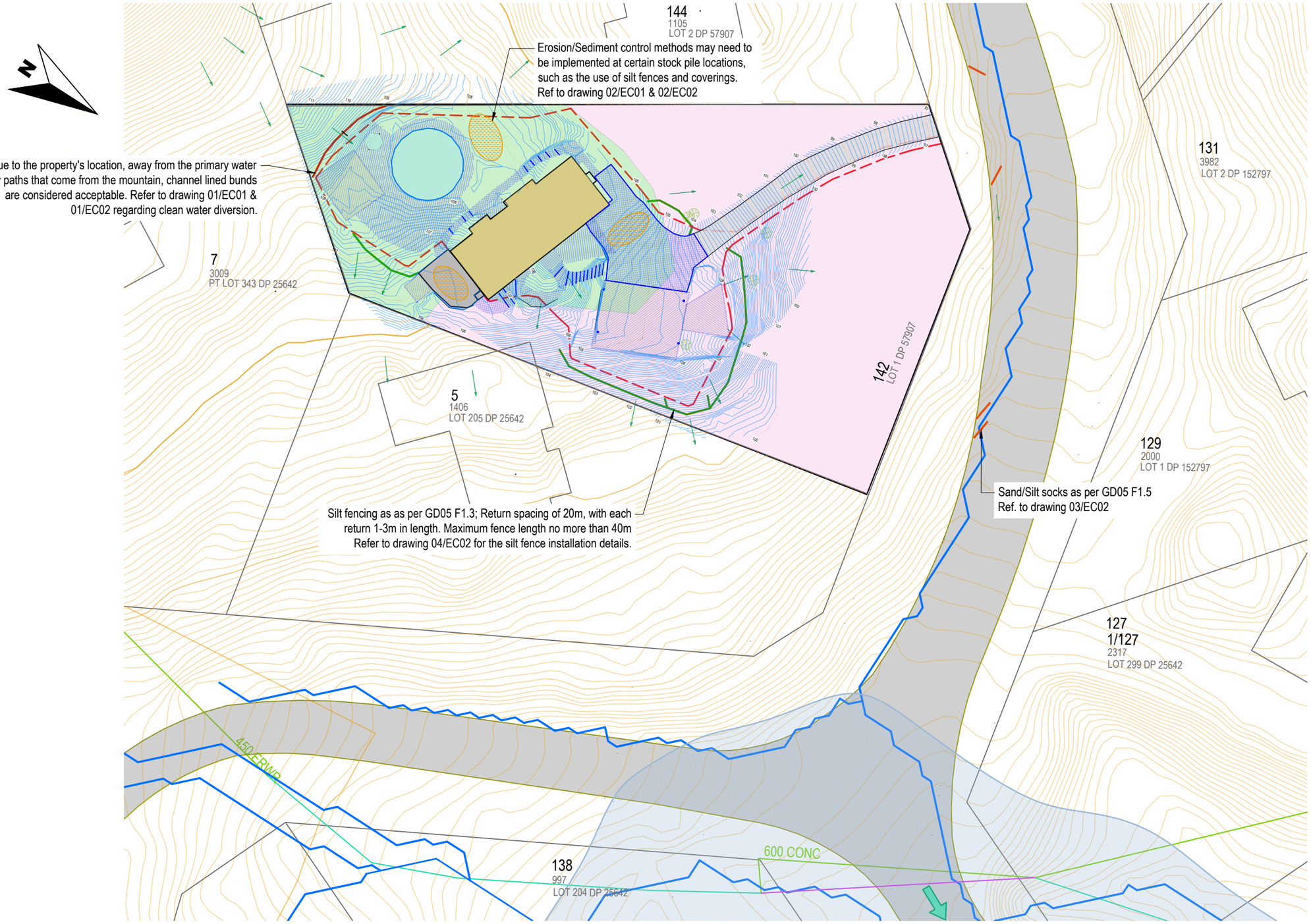
Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: EC02

Rev No: 01




## EROSION & SEDIMENT CONTROL FOR EXISTING SITE: PLAN

ESC -

Scale 1:400

Map Key:

- : Overland flow paths
- : Stormwater pipelines
- : Stormwater catchments
- : Indicative contours outside of 142 Konini Rd at 0.25m intervals
- : Indicative 105m contour line outside of 142 Konini Rd
- : Indicative slope direction arrow
- : Culvert
- : Open Watercourse
- : Flood plain
- : Direction to nearest stormwater catchments

*Data and information presented herein have been sourced from Auckland Geomaps. Users are advised to verify the accuracy of this information independently.*

ESC (Erosion and Sediment Control) Key:

All references are made to sections within the "GD05 Erosion Sediment Control Guide for Land Disturbing Activities in the Auckland Region"

- : Approximate extent of earthworks
- : Proposed Stockpile locations
- : Silt fence (F1.3)
- : Clean water diversion bund's (E2.1)
- : Sand/Silt Socks - May be placed in series (F1.5)

Exposed soils to be covered with crushed aggregate/mulch as described in GF05 E3.0

Erosion control - all silt control measures shall be installed in accordance with GD05 and placed prior to commencement of earthworks. Such measures shall be subject to further additions and alterations, where considered necessary, as directed by the project manager or relevant council, during the progression of works. It is advised to contact the local council prior to commencement of earthworks, after installation of erosion and sediment control devices to ensure they have been installed to the satisfaction of the applicable council.

Refer to drawings EC01-EC02 for general sediment control details

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
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WALKER ENGINEERING CONSULTANTS

Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

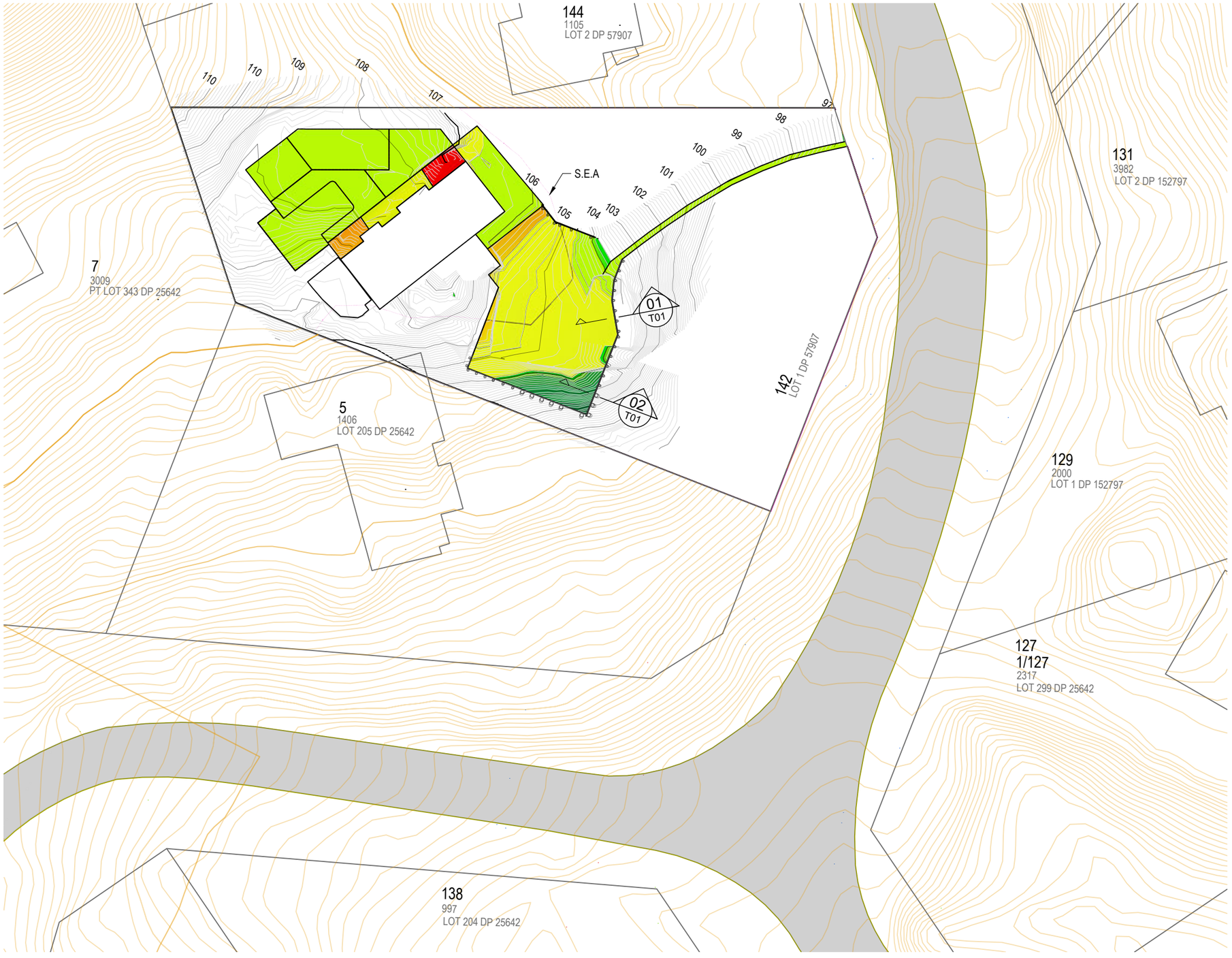
Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: EROSION AND SEDIMENT CONTROL PLANS

| Job #: | Scale (A3 Original): | |
|---|---|---|
| 24106 | As Shown | |
| Client Drawing #: | Sheet #: | Rev No: |
| | ESC | 01 |




ESTIMATED EARTHWORKS VOLUMES:

1. Total:

Cut = ± 230.0m ³
Fill = ± 35.4m³

2. Within the SEA & Outside of the Existing driveway formation:

Cut = ± 37.72m ³
Fill = ± 35.4m³

3.Within SEA & Existing driveway formation:

Cut = ± 40.4m ³
Fill = ± 0.0m³

4. Outside of SEA (Strategic Environmental Assessment):

Cut = ± 151.8m ³
Fill = ± 0.0m³

DEPTH RANGE KEY

| Lower | to | Upper_Value | Colour |
|---|---|---|---|
| -2.0 | to | -1.5 m | |
| -1.5 | to | -1.0 m | |
| -1.0 | to | -0.5 m | |
| -0.5 | to | -0.25 m | |
| 0.0 | | | |
| 0.0 | to | +0.25 m | |
| +.25 | to | +0.5 m | |
| +0.5 | to | +1.0 m | |
| +1.0 | to | +1.5 m | |
| +1.5 | to | +2.0 m | |
| +2.0 | to | +2.5 m | |
| +2.5 | to | +3.0 m | |
| +3.0 | to | +3.5 m | |

ISO - **EARTHWORKS PLAN**
Scale 1:250

| | | | | | |
|---|---|---|---|---|---|
| Surveyed: | LOSC | | | | |
| Designed: | PW | | | | |
| Drawn: | JLB | 01 | FOR CONSENT | PW | NOVEMBER 2024 |
| Checked: | PW | Rev | Revision Details | Approved by | Date |



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Walker Engineering Consultants Limited

Phone: 022 534 4973
Email: peter@walkereng.co.nz
Website: www.walkereng.co.nz

Client: HUGH JOHNSTONE

JOHNSTONE CONSTRUCTION

Project Title: HUGH JOHNSTONE 142 KONINI ROAD, AUCKLAND - SED

Sheet Title: SITE EARTHWORKS PLAN

Job #: 24106

Scale (A3 Original): As Shown

Client Drawing #:

Sheet #: ISO

Rev No: 01

## Appendix D: Hazard Risk Assessment Information - Existing Property Extensions

**(If the document is not embedded in the report, refer to separated latest PDF file revisions)**

## Hazard Risk Assessment Information: Existing Property Extensions

*A hazard risk assessment report must accompany a resource consent application for the subdivision, use or development referenced in E36.9(1) of the Auckland Unitary Plan Operative (AUP) and must identify whether the land is, or is likely to be, within one of the areas listed in Table 1.*

**Table 1: Identification of natural hazards that are relevant to the subject site**

| Control Review as outlined in E36.9 (1) | Response Comment [Yes/No] |
|---|---|
| a) Subject to coastal erosion | No |
| b) Coastal storm inundation 1 per cent annual exceedance probability (AEP) | No |
| c) Coastal storm inundation 1 per cent annual exceedance probability (AEP) plus 1 metre sea level rise | No |
| d) The 1 per cent annual exceedance probability (AEP) floodplain | No |
| e) Overland flow paths | Yes – Existing Impermeable area increased. Detention stormwater tanks have been specified to reduce stormwater runoff overland flow paths. |
| f) Land instability, over at least the next 100 years | No – The existing land is stable and new retaining walls are proposed to provide further stability. |

*The level of information required to be provided should be proportionate to the hazard risk, the nature of the hazard. It should also be appropriate to the scale, nature and location of the development and reflective of the scale of the activity proposed. For coastal hazards this should include a consideration of the effects of climate change over at least a 100-year timeframe.*

**Comment from Engineer: It is noted that the property is existing, and the extension is residential and small in nature compared to typically larger developments. A geotechnical, structural and stormwater assessment reports has been provided to illustrate carried out engineering assessments which demonstrate stormwater management and overall land stability. The level of information provided is proportionate and suitable to the scale of the project.**

*If found to be subject to one or more of these hazards, a hazard risk assessment should accompany, but not duplicate, an assessment of environmental effects in an application for resource consent. The hazard risk assessment should address all of the following:*

The following relate to the proposed works that will be constructed within the property along

a) the type, frequency and scale of the natural hazard and whether adverse effects on the development will be temporary or permanent;

**Comment from Engineer: The proposed works will result in an increase in impermeable area, causing a slight increase in stormwater runoff compared to the existing area. The existing stormwater system is directed from the impermeable areas naturally towards the existing stormwater network, and due to the site being on a hill and small in area, runoffs are observed to be minor. Stormwater tanks have now been specified to permanently reduce runoff flow discharge into the existing network.**

b) the type of activity being undertaken and its vulnerability to natural hazard events;

**Comment from Engineer: Extension of garage, existing house and existing driveway. Overland stormwater flow vulnerability is addressed by using detention tanks.**

c) the consequences of a natural hazard event in relation to the proposed activity and the people likely to be involved in that activity;

**Comment from Engineer: Not applicable. Site is stable, and runoff is controlled.**

d) the potential effects on public safety and other property;

**Comment from Engineer: Not applicable. Site is stable and well away from the public.**

e) any exacerbation of an existing natural hazard risks or creation of a new natural hazard risks;

**Comment from Engineer: Not applicable.**

f) whether any building, structure or activity located on land subject to natural hazards near the coast can be relocated in the event of severe coastal erosion, coastal storm inundation or shoreline retreat;

**Comment from Engineer: Not applicable.**

g) the ability to use of non-structural solutions, such as planting or the retention or enhancement of natural landform buffers to avoid, remedy or mitigate the hazard, rather than hard engineering solutions or protection structures;

**Comment from Engineer: The client/owner will be planting vegetation downhill from the proposed new retaining walls to minimize erosion.**

h) the design and construction of buildings and structures to mitigate the effects of natural hazards;

**Comment from Engineer: Retaining walls are proposed to increase land stability.**

i) the effect of structures used to mitigate hazards on landscape values and public access;

**Comment from Engineer: Not applicable.**

j) site layout and management to avoid or mitigate the adverse effects of natural hazards, including access and exit during a natural hazard event;

**Comment from Engineer: Not applicable.**

k) the duration of consent and how this may limit the exposure for more or less vulnerable activities to the effects of natural hazards including the effects of climate change;

**Comment from Engineer: The item is not applicable as the extensions will not affect climate change or natural hazards. It is estimated that construction may take 2 - 4 months to complete.**

l) any measures and/ or plans proposed to mitigate the natural hazard or the effects of the natural hazard.

**Comment from Engineer: As described above, retaining walls are proposed to provide further strength to the land stability, as demonstrated in the retaining wall designs. Stormwater tanks are proposed to reduce stormwater flow, as illustrated in the stormwater report. Vegetation, such as shrubs, will be planted around new structures to increase stability further.**

Prepared by:

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Peter Walker – Walker Engineering Consultants Limited

**Director - Chartered Professional Engineer - Geotechnical & Structural**

CPEng, CMEngNZ, IntPE, B.Eng(Civil)(Hons), M.EngNZ (Civil/Geotech) (1st Hons)