

13 May 2024



Tēnā koe 

### Request for information regarding the ruptured Porirua Pipe: LGOIMA IRO-634

Thank you for your information request of 12 March 2024 for the following:

1. *All correspondence related to the ruptured Porirua Pipe on Sunday the 10<sup>th</sup> of March and the following week.*
2. *All advice Wellington Water sought in relation to the same ruptured pipe relating to its fix and the environmental damage that it has caused.*

On 3 April 2024, your request was extended by a further 20 working days due to consultations necessary to make a decision on your request. I apologise for any inconvenience this delay has had on your deadlines.

We have considered your request in accordance with the Local Government Official Information and Meetings Act (LGOIMA) 1987.

In response to your first question the initial search for all correspondence found 132 emails, which would result in your request being refused under section 17(f) of the LGOIMA *as the information requested cannot be made available without substantial collation or research.*

However, I have attached a collation of updates from titled *Collapsed Wastewater Main – Bothamley Park, Aotea* that were emailed to numerous Wellington Water staff from the Wellington Water Resolution Team.

In response to your second question there are two Geotechnical Inspection reports dated 13 March and 5 April 2024 respectively and included in this response.

Information in all three documents has been withheld under section 7(2)(a) *to protect the privacy of natural persons.* In accordance with section 7(1) of the Act, we do not consider the withholding of information under section 7(2)(a) of the Act is outweighed by other considerations which render it desirable, in the public interest, to make that information available.

For the latest news and updates, follow us on our social channels:

 /wellingtonwater  @wgtwaternz & @wgtwateroutage  @wellington\_water

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

**Our water, our future.**

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at [www.ombudsman.parliament.nz](http://www.ombudsman.parliament.nz) or freephone 0800 802 602.

Please note that it is our policy to proactively release our responses to official information requests where possible. Our response to your request will be published shortly at <https://www.wellingtonwater.co.nz/about-us/official-requests/official-information-act-responses/> with your personal information removed.

If you wish to discuss this decision with us, please feel free to email us at [official.information@wellingtonwater.co.nz](mailto:official.information@wellingtonwater.co.nz)

Nāku noa, nā



**Group Manager**  
**Customer Operations Group**

**From:** [Resolution Team](#)  
**To:** 7(2)(a)  
**Subject:** FW: UPDATE 5 – 27/03/2024 - COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA  
**Date:** Thursday, 2 May 2024 3:19:36 pm  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image004.png](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)  
[image009.png](#)  
[image011.png](#)  
[image012.png](#)

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**From:** Resolution Team <[ResolutionTeam@wellingtonwater.co.nz](mailto:ResolutionTeam@wellingtonwater.co.nz)>

**Sent:** Wednesday, March 27, 2024 2:43 PM

**To:** 7(2)(a)

[REDACTED]

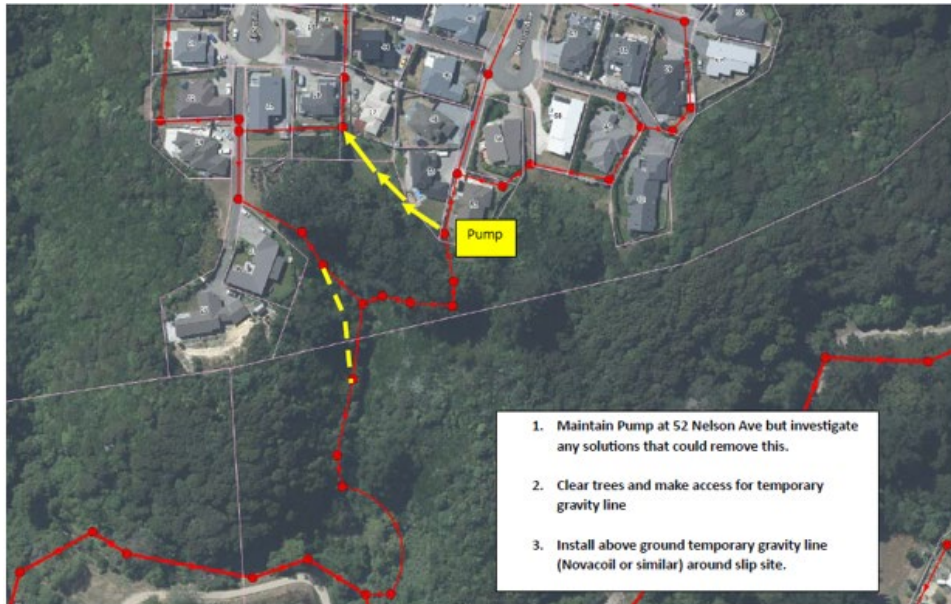
**Subject:** UPDATE 5 – 27/03/2024 - COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA

**UPDATE 5 – 27/03/2024 - COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA**

Kia Ora Koutou

**Current Status**

- Phase 2 of removing the pump from Tasman Close has been completed. However, there is still an active pump inside a private property at Nelson Avenue servicing the Nelson Avenue wastewater flows.



- In consultation with the Geotechnical Engineer, a solution temporary pipe bridge to reconnect the Nelson Avenue gravity main is still being worked through which will remove the need for the secondary pump.
- ETA for this is the end of next week.
- Geotechnical drilling and assessment of ground conditions to assess feasibility of this was completed last week with temporary design work being completed.

**Future Works**

- Once the temporary solution is in place, the operational phase of the incident will come to a close and the CAPEX team will take over.
- Currently there is no timeframe on the permanent repair (Phase 3) as this will be developed through the project planning team with detailed consideration of all long-term options and funding.
- Engagement with stakeholders including community and property owners regarding the long-term solution will occur as part of the project.

**Environmental**

- The Rahui placed by Ngatitōia for Kenepuru Stream, Porirua Stream and the outlet into the Porirua Harbour has been lifted and the public warning signs have been removed.

The next update will be provided once Phase 2 has been completed.

Nga mihi  
Glenis

**UPDATE 4 – 12/03/2024: COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA**

Kia Ora Koutou

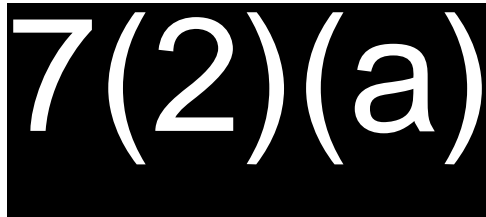
Just a short update to advise that the pumps are fully operational as at 16:15 this afternoon and the discharge has now stopped.

The team will commence phase 2 from tomorrow.

Nga mihi  
Glenis

**UPDATE 3 - 12/03/2024: COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA**

Response Level:	Level 3
Incident Controller:	
Site Manager:	
Stakeholder Comms:	
Customer Care Specialist:	
External Comms:	
Iwi Liaison:	
PCC Liaison:	
Tier 1 Contractor:	Action Civil
Geotech:	ABuild
Supported by	Service Delivery
<b>JDE GL Code</b>	<b>CODE 40H710I</b>



Kia Ora Koutou

**Current Action Plan :**

- Stage 1
- As per the phased plan, pumps have now been installed on site and will be operational by close of business today.
- Once the pumps are in operation, no further discharges of wastewater will enter the environment.
  - Pumps and hoses will be monitored throughout the repair process by our Tier 1 Contractor (Action Civil).



**Geotechnical Engineers (ABuild):**

- An initial assessment has been undertaken of the whole site and WWL will work closely with ABuild for each phase as it is implemented to ensure any risk of instability is minimised.
- We are awaiting a full report of the initial assessment of site stability and are expecting this to be available by Friday 15<sup>th</sup> March.
- Once the report is available, we will have a clearer indication of risk, and may indicate the timing of the incident, as well as the teams being able to incorporate any recommendations into further works.

**Customer Impact:**

- A letter was distributed yesterday to customers within the zone of impact, a copy of which is attached.
- Feedback from Customers was positive, with an understanding of the urgency of the works and the timeframes indicated.
- Our Customer Care Specialist will continue to work closely with affected customers for the duration of the works.

**Stakeholders:**

- WWL have identified, and engaged with, Key Stakeholders regarding all works, and will continue to work closely with them.

**In line with the principles of Te Mana o Te Wai –**

- **Actions:**
  - Sampling has been in place since Monday by Eurofins along the Kenepuru and Porirua Streams as well as the Harbour outlet. This will continue for a further 72 hours after the discharge has stopped.
  - Additional signs, including the ones from the initial response, have been erected along the Kenepuru Stream to advise members of the public of any potential risk.

**Incident Management Team:**

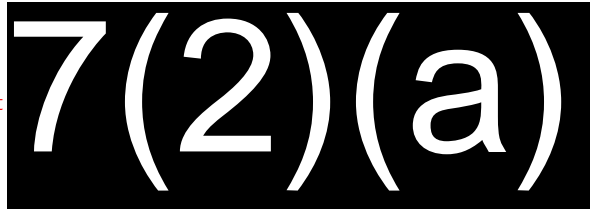
- The initial Incident Management Team will now stand down.
- The Incident Manager will continue to work with individual project owners and teams to ensure planned phased works are completed on time and appropriate updates are furnished to stakeholders.

Nga mihi  
Glenis

**UPDATE 2 - 11/03/2024: COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA**

Response Level:  
Incident Controller:  
Site Manager:  
Stakeholder Comms:  
Customer Care Specialist  
External Comms:  
Iwi Liaison:  
PCC Liaison:  
Tier 1 Contractor:  
Geotech:  
Supported by  
**JDE GL Code**

Level 3



Action Civil  
ABuild  
Service Delivery  
**CODE 40H710I**

Kia Ora Koutou

**Incident:**

- Wellington Water, Action Civil and a Geotechnical Engineer from ABuild have met on site this morning and have provided an interim solution to eliminate the immediate overflow whilst the permanent repair is investigated.
- The Capex Panel are supporting the initiatives of the Operational Crews and Contractors to ensure all resources available are directed as quickly as possible to the area.
- Further Impact Signs will be placed along the Kenepuru Stream from Mephram Place to Champion Street to advise the public of any potential health risk.

Please see below photos taken this morning, of the extent of the damage and the steepness of the terrain.

Extent of Damage

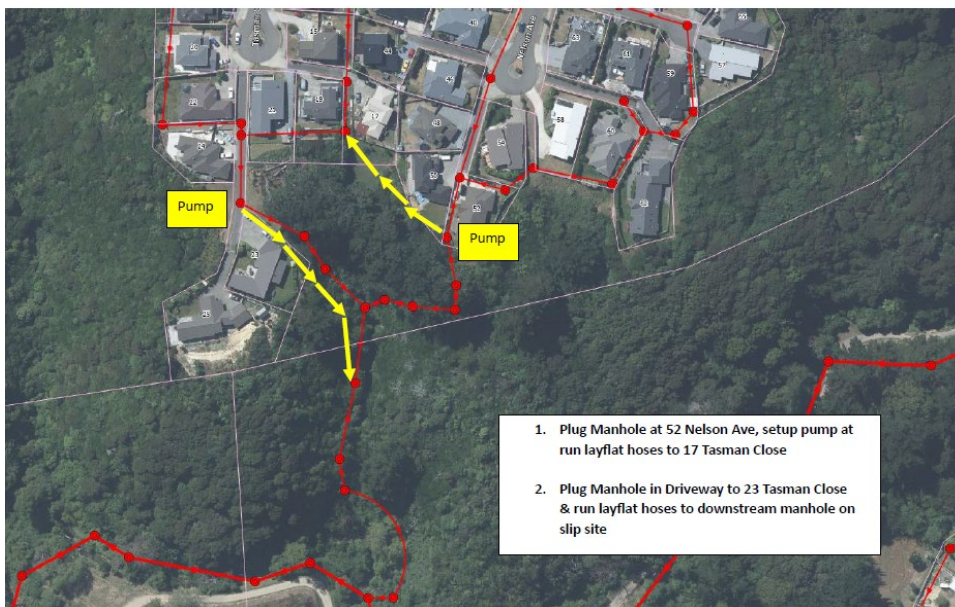


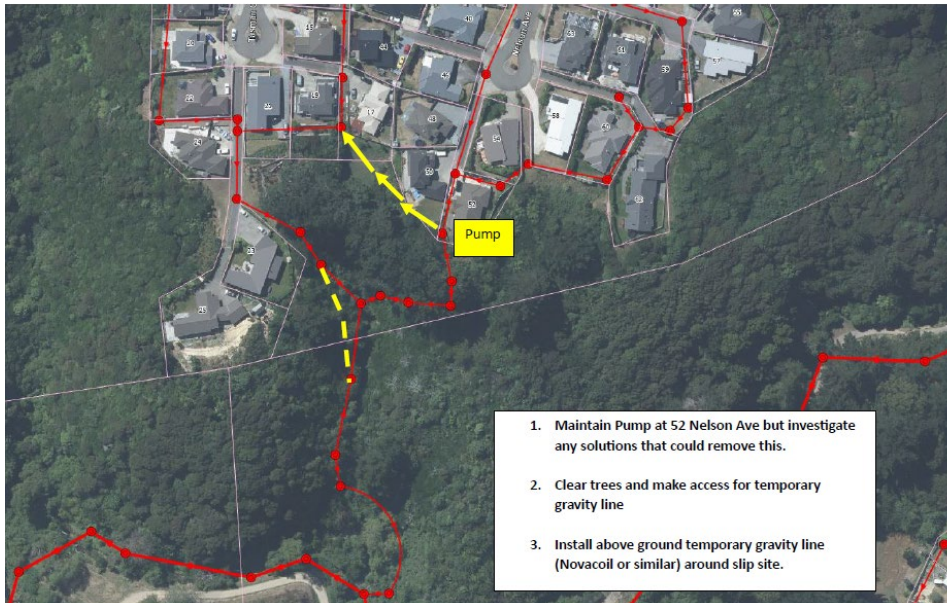


**Current Action Plan – agreed on by the Incident Management Team and being immediately implimented:**

PHASE 1 OPERATIONAL RESPONSE – IMMEDIATE TO STOP WASTEWATER OVERFLOW  
 OPERATIONAL RESPONSE – REDUCE PUMPS  
 (Next 24-48 Hours)

PHASE 2





- **Phase 1** will be implemented within the next 24 hours. This will eliminate all overflows into the environment.
- **Phase 2** will be implemented over a 2-week period which will restore temporary connectivity.

**Customer Impact:**

- Customers within close proximity to the pump locations may be inconvenienced in the short term.
  - A Customer Care Specialist has been engaged to support the customers within the zone of impact.
  - Impacted Customers will be notified and able to contact our Resolution Team on the number provided or email [customer@wellingtonwater.co.nz](mailto:customer@wellingtonwater.co.nz) for further assistance and information.

**Environmental Impact:**

- Initially, we are working with the contractors to minimise the immediate environmental impact on the Kenepuru Stream and any further residual impact downstream.
  - In consideration of the possible impact, Iwi have placed a Rahui on the Kenepuru and Porirua streams as well as the outlet into the Harbour.

A further update will be provided tomorrow morning.

Nga mihi  
Glenis

**UPDATE 1 - 17:45**

Kia Ora Koutou

Here are some photos of the collapsed main.







Nga mihi  
Glenis

#### **COLLAPSED WASTEWATER MAIN – BOTHAMLEY PARK, AOTEA**

Response Level: Level 3  
Incident Controller:  
Site Manager:  
Supported By:  
SLT Member:  
Stakeholder Comms:  
External Comms:  
Tier 1 Contractor: Action Civil  
Geotech: TBA  
Supported by Service Delivery

**7(2)(a)**

Kia Ora Koutou

#### **Incident:**

Our team have responded to a rupture of a wastewater line at the bottom of Tasman Close causing an overflow of wastewater into the Kenepuru Stream in Bothamley Park. Public access to Bothamley Park is currently restricted due to the ongoing Wastewater Renewal Project. and flowing into the Porirua Stream at Mephram Place.

Access to the break is extremely difficult and high risk due to unstable nature of the location.

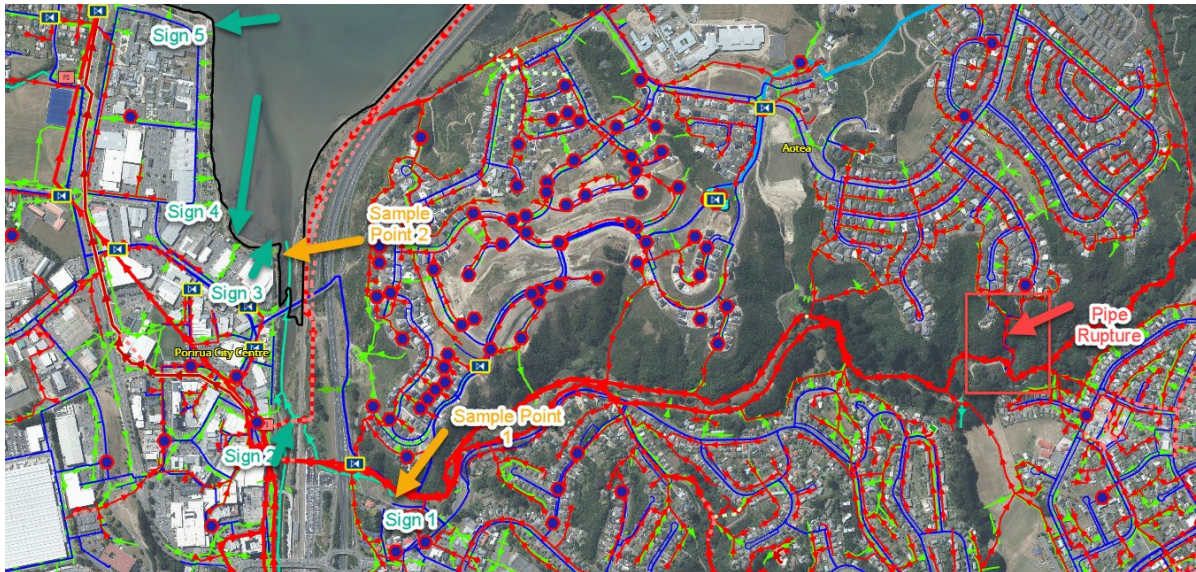
Wellington Water's on-call crews respond and are currently assessing the situation.

A Geotechnical Engineer and Tier 1 Contractor will be on site early tomorrow morning with Wellington Water's Planning Engineers and Drainage Crews to further ascertain the methodology for the repair; ensuring minimal risk to the health and safety of all teams.

#### **Current Actions:**

- Warning signs of possible contamination will be erected this afternoon at the points indicated on the map (in Green)
- Sampling at the points indicated in Yellow will be undertaken by Eurofins and will continue until a fix is in place.
- The Incident Response Team are updating Iwi, Porirua City Council and Greater Wellington Regional Council
- Greater Wellington City Council have also been advised by phone from a Wellington Water Planning Engineer





We will provide a further update mid-morning tomorrow once the Geotechnical Engineer has completed the assessment.

Nga mihi



7(2)(a)

Senior Information & Escalation Coordinator  
Customer Experience



7(2)(a)

Private Bag 39804, Wellington Mail Centre 5045  
Level 4, 25 Victoria Street, Petone, Lower Hutt



11 March 2024

**Collapsed Wastewater Main – Bothamley Park, Aotea**

Kia ora,

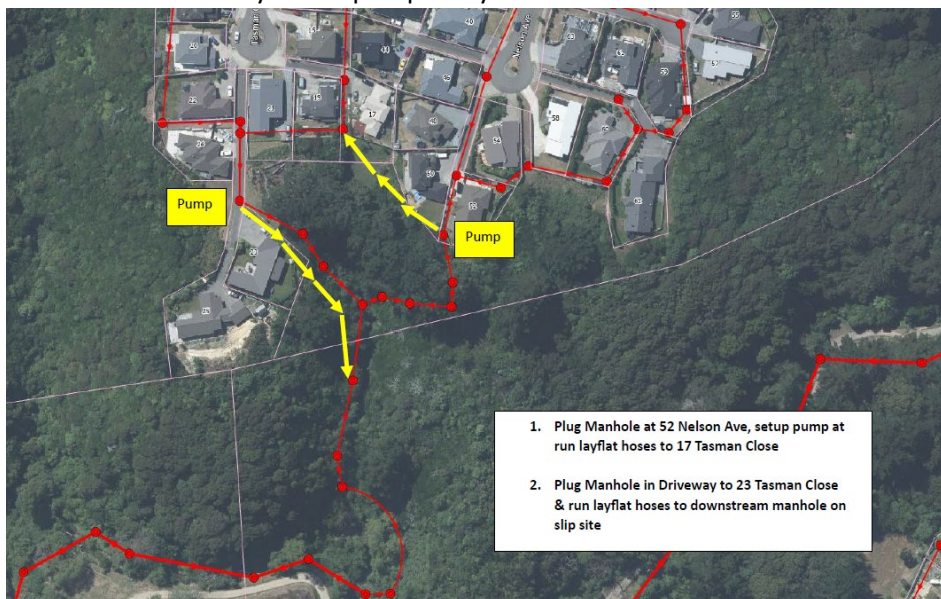
Wellington Water has responded to a rupture of a wastewater line at the bottom of Tasman Close, causing an overflow of wastewater into the Kenepuru Stream at Bothamley Park.

Access to the break is extremely difficult and there are numerous risks associated with the unstable nature of the location.

We are working with our contractors to stop the wastewater overflow and minimise the immediate environmental impact on the Kenepuru Stream and any further residual impact downstream.

As an interim solution to stop the wastewater overflow, we have sourced pumps to redirect the flow back into the wastewater network. Please see the map below detailing the location of this set up.

Customers within close vicinity of the pumps may be inconvenienced in the short term.



If you have any questions about this work, please contact any of the following:

**7(2)(a)**, Customer Resolution Specialist, **7(2)(a)**  
**7(2)(a)**, Customer Planning Engineer, **7(2)(a)**

After hours, please contact Porirua City Council Contact Centre on 04 237 5089.

Ngā mihi nui,  
Customer Operations Group  
**Wellington Water**

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 /wellingtonwater  @wgtwaternz & @wgtwateroutage  @wellington\_water

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

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## WELLINGTON WATER INITIAL GEOTECHNICAL INSPECTION

**ABuild Reference:** 14730-01

**Asset ID no:** TBC

**Address:** Below 23 Tasman Close, Aotea, Wellington

**Rev A**

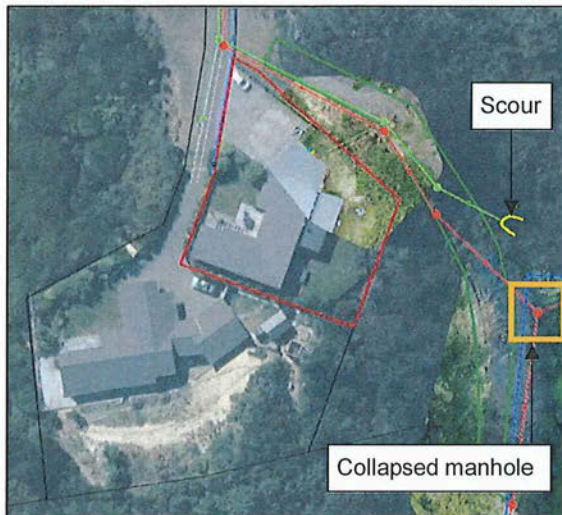
**Date Assessed:** 03 April 2024

**Report Date:** 05 March 2024

**Site Assessed By:** *FCZ/CA* - ABuild Consulting Engineers Limited (ABuild)

**Site Description (Refer to Figures 1 to 5)**

- A landslide has occurred on the true right of a gully to the east of Tasman Close, Porirua, resulting in the collapse of a manhole and pipe bridge (Figure 1).
- To facilitate access for emergency remedial works, a track was cut from Tasman Close along the alignment of the SW/SS pipes to the north of No. 23 Tasman Close, within public land.



**Figure 1: Approx. track location (in green)**

This supplementary report provides factual information relating to the track and adjacent property boundaries.

Track details

The temporary access track to facilitate access for emergency works has been cut to the north and east of the two properties with a maximum height of approx. 4 m.

Highly to moderately weathered greywacke rock has been exposed, with a thin veneer of topsoil along the majority of the track. Adjacent to No. 23, where cut heights are lower, approx. 1.6 m, colluvial silty gravel has been exposed in the upper cut, overlying rock at the toe.

As noted in the previous report, scour was observed adjacent to the existing SW outlet a significant distance downslope of the properties.

No. 25 Tasman Close

This property is located a significant distance from the track cut (>20 m), in which rock is exposed for the majority of the cut.

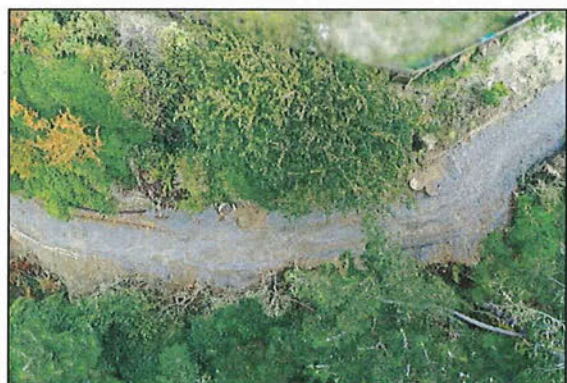
No. 23 Tasman Close

The new track is located a min. of 3.7 m from the property boundary (where cut height is approx. 1.6 m). Along the northeastern corner of the property is a timber landscape wall, with a max. RH of 1.5 m. The dwelling is set back approx. 9 m (min) from the track cut.

An existing cut appears to have been in place downslope of No. 23 for some time, adjacent to the existing manholes. The material exposed in this cut is primarily in situ rock.



**Figure 2: Drone image showing cut proximity to No. 23. Note existing vegetated slope already in place.**



**Figure 3: Drone image showing cut proximity to No. 23, incl. existing manholes that would have been exposed prior to the emergency works cut.**



## Inferred Ground Conditions

The 1:50,000 scale Institute of Geological and Nuclear Sciences (IGNS) geological map of the Wellington area indicates that the site is underlain by deformed and indurated sandstone and mudstone colloquially known as Wellington Greywacke (Begg & Mazengarb, 1996).

The inspection revealed that the majority of the cut has been made in in-situ greywacke rock, with a thin layer of colluvial material present along the northern boundary with No. 23.

## Ground Movement Assessment

Typical indicators of displacement due to removal of downslope material (within Council land) include tension cracking and rotating structures, however neither of these were observed on site, consistent with the height/distance of the track cut from private property boundaries, and the nature of the in-situ material.

Visual observations of the landscape retaining wall nearest to the cut also do not show any indicators of recent movement.

Scour at the SW outlet downslope is a significant distance from either dwelling, and regression to the property boundary is considered very unlikely over the design life of the asset.

## Risk Assessment (see attached Risk Assessment)

- Track cuts causing slope stability issues in the short term.

Failure of the cuts causing regression into private land and damage to private structures, within the short term of the works, is considered unlikely, and very low risk.

## Recommendations

A series of recommendations are proposed to monitor and quantify any movement, and remediate the site at the completion of works.

The risk to No. 25 is considered negligible, therefore no specific recommendations are made for this property.

- Monitoring pins may be placed along the toe of the existing retaining wall at 23 Tasman Close, and the property boundary, to quantify any movement during the emergency works period and measured in accordance with an agreed monitoring plan.
- A dilapidation survey could be completed for No. 23 to quantify any pre-existing cracking/damage or displacement.
- Inspection of the track slopes can be completed during the course of remedial works, with this report acting as a baseline for site conditions.
- The cuts for the track should be, where reasonably practicable, reinstated to the previous contours with suitable fill material, to be specified at a later date.

## Summary and Conclusion

The inspection has revealed:

- No visual evidence of movement above the new emergency works tracks.
- The track is located away from the property boundary, and within relatively high strength material with a very low short-term risk of slope instability.
- Monitoring and surveys may be completed to quantify any displacement/pre-existing damage.
- Reinstatement of the track should be completed following completion of the works.

## Scope and Limitations

This report presents the results of a geotechnical appraisal prepared for the purpose of this commission.

The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent geotechnical engineer before being used for any other purpose. ABuild Consulting Engineers Limited (ABuild) accepts no responsibility for other use of the data.

The advice within this report is based on a visual geotechnical appraisal. No ground investigations have been conducted. An assessment of the topographical land features has been made based on this information. It is emphasised that geotechnical conditions may vary substantially across the site from where observations have been made. Subsurface conditions, including groundwater levels can change in a limited distance or time. In evaluation of this report cognisance should be taken of the limitations of this type of investigation.

An understanding of the geotechnical site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experienced based. Hence this report should not be altered, amended or abbreviated, issued in part and issued incomplete in any way without prior checking and approval by ABuild. ABuild accepts no responsibility for any circumstances, which arise from the issue of the report, which have been modified in any way as outlined above.

## Report prepared by:

*F(2)(a)*

*F(2)(a)*  
Senior Geotechnical Engineer

## Report reviewed/approved by:

*F(2)(a)*

*F(2)(a)*  
Technical Director – Geotechnical  
BSc MSc (Hons) CPEng

## Qualitative Risk Assessment Framework

### Risk Assessment and Remedial Works

Event	Element at Risk	Likelihood of Occurrence	Consequence	Risk Level	Remedial Works Options (long term)
Failure of upslope track cuts impacting private property.	Private land, private retaining wall.	<i>Unlikely</i>	Loss of public and private land.	<i>Very low</i>	Reinstatement of pre-existing contours (where practicable)

\* Note that this price assumes a suitably experienced contractor would undertake the construction works. Cost estimates exclude ground investigation, engineering design, building consent and construction monitoring fees.

### Measures of Likelihood

Level	Descriptor	Description	Annual Probability of Occurrence
A	Almost Certain	The event is on-going, or is expected to occur during the next year	100%
B	Very Likely	The event is expected to occur	20% to 100%^
C	Likely	The event is expected to occur under somewhat adverse conditions	5% to 20%
D	Possible	The event is expected to occur under adverse conditions	1 to 5%
E	Unlikely	The event is expected to occur under high to extreme conditions	0.2 to 1%
F	Rare	The event could occur under extreme conditions	Less than 0.2%

### Measures of Consequence (see notes below)

Level	Descriptor	Amenities	Dwelling
1	Catastrophic	Cannot occur.	Extension of slip over majority of dwelling. Large scale damage involving major engineering works for stabilisation of dwelling and reinstatement of slope.
2	Disastrous	Cannot occur.	Extension of slip over portion of dwelling, undermining foundation. Engineering works required for stabilisation of dwelling and reinstatement of slope.
3	Major	Entirety of roading corridor removed by slip. Retaining required for reinstatement of slope.	Extension of slip to edge of foundation. Engineering works required for reinstatement of slope.
4	Medium	Significant portion of roading pavement required for reinstatement of slope.	Extension of slip halfway to dwelling, jeopardising stability of structure under lateral loading. Engineering works required for reinstatement of slope.
5	Low	Small portion slip. Minor earthworks required for reinstatement of slope.	Extension of slip towards foundation. Engineering works required for reinstatement of slope to prevent further failures.
6	Minor	Minor surficial ravelling of slope. No earthwork required.	Minimal regression of slip towards dwelling

### Risk Matrix

		Consequences to Property/Assets					
		1: Catastrophic	2: Disastrous	3: Major	4: Medium	5: Low	6: Minor
Likelihood	A – Almost Certain	VH	VH	VH	H	H	M
	B – Very Likely	VH	VH	H	H	M	L
	C – Likely	VH	H	H	M	L	L
	D – Possible	VH	H	M	L	VL-L	VL
	E – Unlikely	VH	M	L	VL	VL	VL
	F – Rare	M	L	VL	VL	VL	VL



## Qualitative Risk Assessment Framework

### Risk Level Implications

Risk Level		Implications for Risk Management
VH	Very High Risk	Detailed investigation, design, planning and implementation of treatment options to reduce risk to acceptable levels: May involve very high costs.
H	High Risk	Detailed investigation, design, planning and implementation of treatment options to reduce risk to acceptable levels.
M	Moderate Risk	Broadly tolerable provided treatment plan is implemented to maintain or reduce risks, may require investigation and planning of treatment options.
L	Low Risk	Acceptable. Treatment requirements to be defined to maintain or reduce risk.
VL	Very Low Risk	Acceptable. Manage by normal maintenance procedures.

### Notes: Considering Above Risk Assessment.

1. The examples of consequence given should only be used as a general guide. The implications for a particular situation may be required to be specifically determined.
2. The risk matrices above are based on those given in Appendix G of AGS (2000): Landslide Risk Management Concepts and Guidelines
3. "Insignificant damage" – comprise small scale failures (e.g., minor rockfall or surficial sliding).

**WELLINGTON WATER  
INITIAL GEOTECHNICAL INSPECTION**

**ABuild Reference:** 14730-01

**Asset ID no:** PCC\_WW008700

**Address:** Below 23 Tasman Close, Aotea, Wellington

**Rev A**

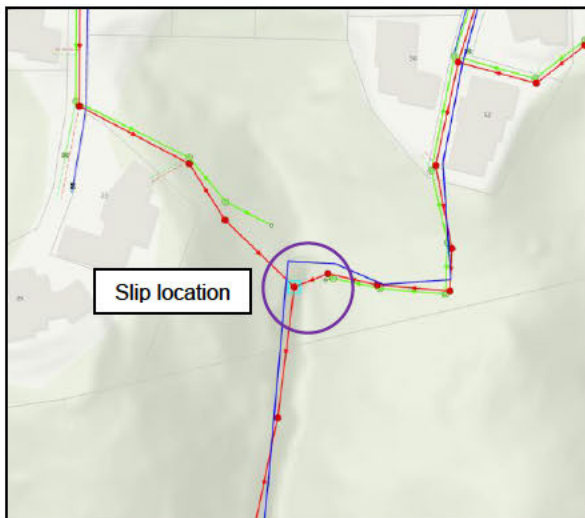
**Date Assessed:** 12 March 2023

**Report Date:** 14 March 2024

**Site Assessed By:** [REDACTED] - ABuild Consulting Engineers Limited (ABuild)

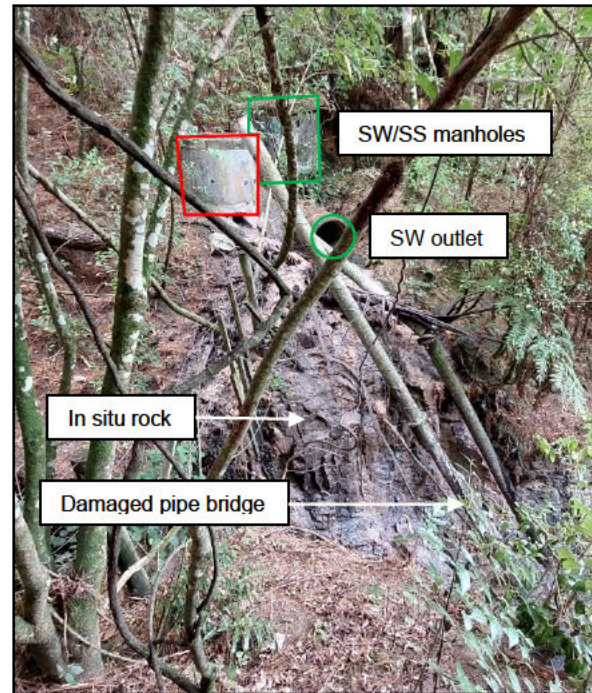
**Site Description (Refer to Figures 1 to 5)**

- A landslide has occurred on the true right of a gully to the east of Tasman Close, Porirua, resulting in the collapse of a manhole and pipe bridge (Figure 1).
- The slip occurred at the convergence of two WW lines; one from Tasman CI and another from Nelson Ave. At this location a stormwater outlet from both streets also empties into the gully. An abandoned water pipe also passes through the area.
- The slip is immediately adjacent to a stormwater outlet and has resulted in the collapse of a manhole and aerial 'pipe bridge' connecting the SS manholes (PCC\_WW008699, and PCC\_WW008700) into the base of the gully.
- The SW outlet on the true left of the gully discharges directly below the collapsed manhole, in addition to another SW outlet on the true right of the gully discharging (and scouring) above the manhole.

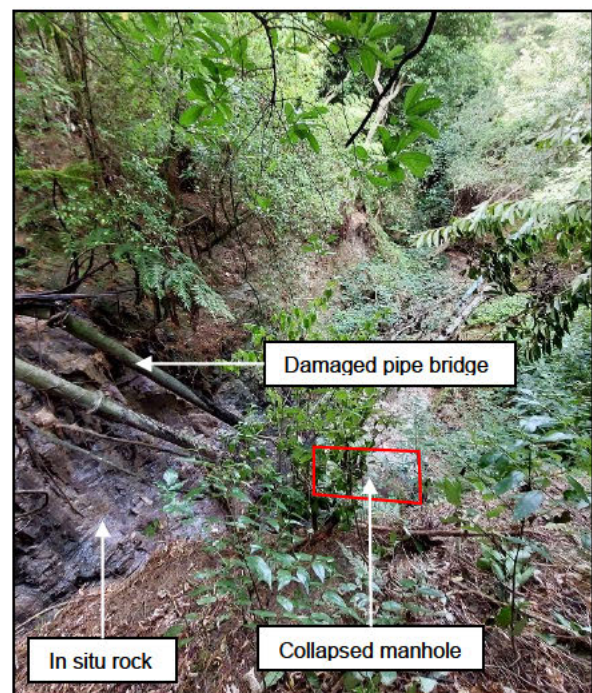


**Figure 1: Slip location**

An initial inspection report (IIR) and emergency inspection was commissioned by Wellington Water Limited (WWL) to provide details about the site, risk level and concept remedial options as part of WWL's response. The following IIR provides the results of two visual geotechnical inspections of the site and makes recommendations for possible remedial works.



**Figure 2: True left SW and SS manholes and broken aerial pipe bridge**





## Inferred Ground Conditions

The 1:50,000 scale Institute of Geological and Nuclear Sciences (IGNS) geological map of the Wellington area indicates that the site is underlain by deformed and indurated sandstone and mudstone colloquially known as Wellington Greywacke (Begg & Mazengarb, 1996).

The inspection revealed that the materials present within the scarp on the true right below the collapsed manhole are low strength topsoil and colluvium. These materials are likely to fail again given their low strength and susceptibility to erosion.

Scouring of the true left bank below the stormwater outlet shows in situ weathered greywacke rock below a thin veneer of topsoil.

## Identified Ground Movement

The inferred ground movement was a shallow seated movement within the overburden material.

## Interpretation of Failure Mechanism/s

The principal failure mechanism was scour of the true right bank followed by circular soil failure which triggered the collapse of the infrastructure into the stream. The mechanism was circular and/or translational, within the thick residual/colluvial profile in the true right bank.

## Drivers of Movement / Failure

- Ongoing weathering and heavy rainfall events are inferred to be trigger mechanisms.
- Uncontrolled flow from the true left stormwater outlet impacting the area below the failed manhole is likely to be the main driver of erosion and failure below the manhole.
- Contributing factors could also include uncontrolled overland flow from another stormwater outlet upslope, on the true right side of the gully; and rupturing of the SS connection between the pipe from Tasman CI and manhole, introducing more water into the slope.
- The addition of more water into the thick colluvial profile rapidly increases the stresses on the infrastructure and reduces the strength of slope soils due to pore water pressure increases (saturation).
- It cannot be confirmed if the pipes ruptured before the slip, or because of the landslide, it is possible they are coincident.

## Risk Assessment (see attached Risk Assessment)



Further slope failure and extension of surface failure farther upslope

- Failure of true left manholes (SS/SW)

Further slope failure on the true right side of the gully is considered very likely, with failure below the true left manholes likely.

## Short Term Solutions

The following short-term solutions should be implemented considering the associated health and safety concerns with discharge of sewage into the gully.

- A series of lay flat pipes pumping sewage from the upstream manholes to a nearby intact manhole, following by gravity feeding where possible.
- Lay flat pipes connecting to the downstream manholes within the gully area.

## Medium Term Solutions

To minimise the time, cost and disruption from pumping and a return to gravity flows, we recommend the investigation and design of a temporary (design life <2 years) pipe bridge from the remaining intact manhole on the true left of the gully to the true right side, with a T junction in place in lieu of a permanent manhole.

This is anticipated to comprise a bored pile or anchored connection at each end of the bridge, with a steel UC upon which a new pipe can be strapped.

## Long Term Remedial Solutions

We would recommend two (2) options including:

**Option 1:** Investigation, design and construction of a retaining structure on either side of the pipe crossing (most likely anchored shotcrete retaining wall with inset manhole along with specifically designed pipe bridge and or suspended wire bridge and associated pipe work). Include flume to both SW outlets.

**Option 2:** Investigate design and construction an alternative route involving laying of supplementary pipe along the alignment of the emergency works lay flat line.

This is dependent upon the gradients and may not be possible due to invert levels and the inability to gravity feed the surge network.

## Remedial pathway recommendations

Investigation, design and construction steps are outlined below:

- Ground investigation at the location of the existing and proposed manhole/s and pipe bridge, comprising window samples at a minimum.
- Drone and/or topographical survey to define site geometry.
- Detailed design of medium/long term remedial works.
- Contractor construction sequence review, incl. temporary works review.
- Construction of the confirmed remedial solutions.



**Scope and Limitations**

This report presents the results of a geotechnical appraisal prepared for the purpose of this commission.

The data and advice provided herein relate only to the project and structures described herein and must be reviewed by a competent geotechnical engineer before being used for any other purpose. ABuild Consulting Engineers Limited (ABuild) accepts no responsibility for other use of the data.

The advice within this report is based on a visual geotechnical appraisal. No ground investigations have been conducted. An assessment of the topographical land features has been made based on this information. It is emphasised that geotechnical conditions may vary substantially across the site from where observations have been made. Subsurface conditions, including groundwater levels can change in a limited distance or time. In evaluation of this report cognisance should be taken of the limitations of this type of investigation.

An understanding of the geotechnical site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure specific and some experienced based. Hence this report should not be altered, amended or abbreviated, issued in part and issued incomplete in any way without prior checking and approval by ABuild. ABuild accepts no responsibility for any circumstances, which arise from the issue of the report, which have been modified in any way as outlined above.

**Report prepared by:**

[Redacted Name]

Senior Geotechnical Engineer

**Report reviewed/approved by:**

[Redacted Name]

Technical Director – Geotechnical

## Qualitative Risk Assessment Framework

### Risk Assessment and Remedial Works

Event	Element at Risk	Likelihood of Occurrence	Consequence	Risk Level	Remedial Works Options (long term)	Construction Cost Estimate (TBC)
Further slope failure and extension of failure surface farther upslope	Existing SS pipeline and location for new SS manhole	<i>Very Likely</i>	Public safety (biological), infrastructure damage	<i>High</i>	Anchored shotcrete facing to gully slope, installation of new manhole.	\$75,000-125,000
Failure of remaining manholes on true left bank	2x existing manholes	<i>Likely</i>	Failure of manholes into gully, public safety (biological)	<i>Medium</i>	Anchored shotcrete facing to existing slope, installation of new pipe bridge.	\$50,000 – 100,000

\* Note that this price assumes a suitably experienced contractor would undertake the construction works. Cost estimates exclude ground investigation, engineering design, building consent and construction monitoring fees.

### Measures of Likelihood

Level	Descriptor	Description	Annual Probability of Occurrence
A	Almost Certain	The event is on-going, or is expected to occur during the next year	100%
B	Very Likely	The event is expected to occur	20% to 100%^
C	Likely	The event is expected to occur under somewhat adverse conditions	5% to 20%
D	Possible	The event is expected to occur under adverse conditions	1 to 5%
E	Unlikely	The event is expected to occur under high to extreme conditions	0.2 to 1%
F	Rare	The event could occur under extreme conditions	Less than 0.2%

### Measures of Consequence (see notes below)

Level	Descriptor	Damage to WWL Assets
1	Catastrophic	Principal services damaged for an extended length of time (several days to weeks) – significant effects to communities for extended periods.
2	Disastrous	Services damaged for an extended length of time (several days). Major emergency works.
3	Major	Services interrupted temporarily for an extended length of time (few hours to a day). Significant emergency works.
4	Medium	Some emergency works necessary. Limited alternative routes are available.
5	Low	Emergency works limited to clean up only. Alternative alignments available.
6	Minor	Minimal regression of slip towards infrastructure. Minor remedial works or monitoring regime may be implemented.

### Risk Matrix

		Consequences to Property/Assets					
		1: Catastrophic	2: Disastrous	3: Major	4: Medium	5: Low	6: Minor
Likelihood	A – Almost Certain	VH	VH	VH	H	H	M
	B – Very Likely	VH	VH	H	H	M	L
	C – Likely	VH	H	H	M	L	L
	D – Possible	VH	H	M	L	VL-L	VL
	E – Unlikely	VH	M	L	VL	VL	VL
	F – Rare	M	L	VL	VL	VL	VL

### Risk Level Implications

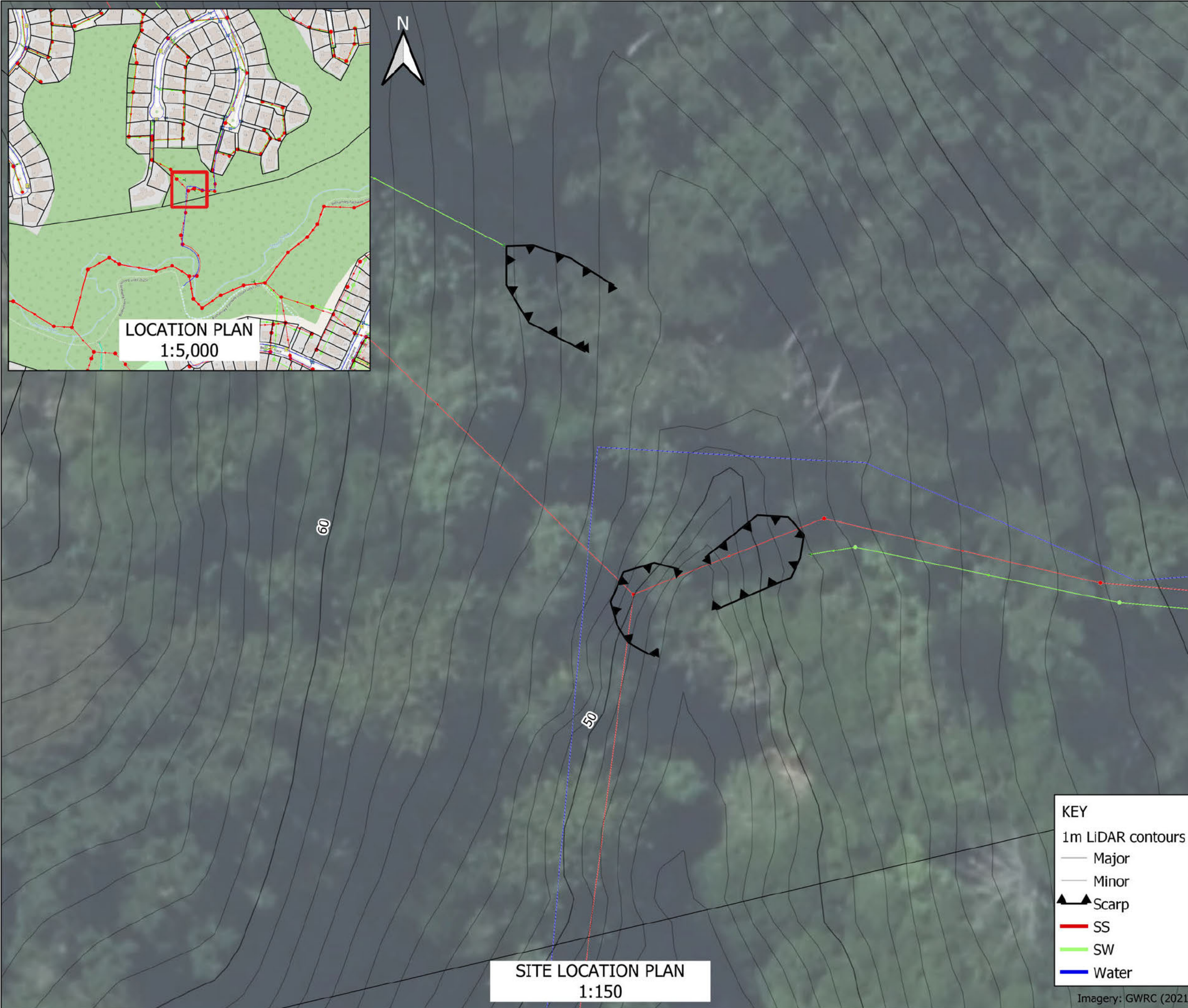
## Qualitative Risk Assessment Framework

Risk Level		Implications for Risk Management
VH	Very High Risk	Detailed investigation, design, planning and implementation of treatment options to reduce risk to acceptable levels: May involve very high costs.
H	High Risk	Detailed investigation, design, planning and implementation of treatment options to reduce risk to acceptable levels.
M	Moderate Risk	Broadly tolerable provided treatment plan is implemented to maintain or reduce risks, may require investigation and planning of treatment options.
L	Low Risk	Acceptable. Treatment requirements to be defined to maintain or reduce risk.
VL	Very Low Risk	Acceptable. Manage by normal maintenance procedures.

**Notes: Considering Above Risk Assessment.**

1. The examples of consequence given should only be used as a general guide. The implications for a particular situation may be required to be specifically determined.
2. The risk matrices above are based on those given in Appendix G of AGS (2000): Landslide Risk Management Concepts and Guidelines
3. "Insignificant damage" – comprise small scale failures (e.g., minor rockfall or surficial sliding).





NOTES:  
1. DIMENSIONS AND LOCATIONS ARE APPROXIMATE ONLY.

Rev	Date	By	Reason	Approval
A	3.24		First issue	

Job GEOTECHNICAL ASSESSMENT  
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 Porirua  
 Client Wellington Water Limited  
 Owner Porirua City Council

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 Traced  
 Scale AS SHOWN AT A3  
 Date 14/03/2024

Sheet title  
**SITE PLAN**

Job No 14730-01	Sheet S1	Rev. A
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- KEY**
- 1m LiDAR contours
  - Major
  - Minor
  - ▲ Scarp
  - SS
  - SW
  - Water

Imagery: GWRC (2021)





LOCATION PLAN  
1:5,000



SITE LOCATION PLAN  
1:100

**KEY**

- 1m LiDAR contours
- Major
- Minor
- SS
- SW
- Water
- Proposed flume
- Proposed pipe bridge
- Proposed manhole

NOTES:  
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Sheet title  
**PROPOSED  
 SITE PLAN**

Job No 14730-01	Sheet S1	Rev. A
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Imagery: GWRC (2021)