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Oamaru Breakwater: Public Access Health and Safety Risk Assessment

Waitaki District Council

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CONFIDENTIAL





Contact Details

John Ford

Principal – Safety, Health and Environment

WSP

12 Moorhouse Avenue

Christchurch 8011

+64 3 363 5400

+64 27 201 4286

john.ford@wsp.com

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Prepared by

John Ford

Reviewed by

Grant Spedding

Approved for release by

Grant Spedding

Head of Safety, Health, Environment & Quality



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Disclaimers and Limitations

This report (**'Report'**) has been prepared by WSP exclusively for the Waitaki District Council (**'Client'**) in relation to a health and safety risk assessment relating to allowing public access to the Oamaru Breakwater (**'Purpose'**) and in accordance with the Short-form Agreement with the Client 'Assessing Public Access Feasibility - Oamaru Breakwater' dated 21 November 2019. The findings in this Report are based on and are subject to the assumptions specified in the Report and our Fee Proposal: Assessing Public Access Feasibility Oamaru Breakwater also dated 21 November 2019. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.

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1 Introduction and purpose

Prior to November 2019 the Waitaki District Council (WDC) requested a proposal from WSP to provide planning services to allow the re-introduction of public access to the Oamaru breakwater (the breakwater). In November 2019 WSP proposed a health and safety risk assessment (the risk assessment), relating to public access of the breakwater, be conducted prior to the commencement of the WSP planning services. The purpose of the risk assessment was to assist the WDC in making an informed decision as to whether a change to resource consent allowing the return of public access to the breakwater should be pursued. The risk assessment proposal was accepted and approved by the WDC on 10 January 2019.

Of significance is the public and media expectation that access be allowed, and that prior to the resource consent change the breakwater was open to the public.

The most significant risks to public safety on the breakwater are from the sea overtopping the breakwater either from heavy seas or high tide and sea conditions, and a member of the public being swept into the sea with a high risk of drowning. The purpose of this report is to also provide options for the consideration by the WDC to minimise this risk if public access is re-instated.

It is noted that some controls or improvements to controls may apply to Holmes Wharf and other breakwater structures under the control of the WDC.

We consider it reasonably practicable to reduce the health and safety risk of a fatality or serious injury by improving the controls on or around the breakwater.

This report has been written following the 'Write Plain Language Standard'. Unnecessary text has been omitted and information condensed to allow for ease of reading and reference.



Figure 1: Signage showing heritage status and public access.

2 Executive Summary

The Health and Safety at Work Act 2015 does not specifically apply in this situation, but its intent in addition to places of work is to also keep the public safe. It would therefore be prudent for the WDC to consider public safety in relation to the risk of a fatality or serious injury where the risk is known, and new and improved controls are available and reasonably practicable to apply.

Risks:

- Being washed off the breakwater during heavy seas or when the breakwater is overtopped by waves or the tide
- Falling into deep water
- Falling onto submerged objects
- Falling onto rocks
- Slip, trip or fall on the breakwater
- Human interaction with wildlife.

Factors to be considered when determining and agree controls:

- Human factors
- Changing environmental conditions
- Peoples inability to understand written signage
- Peoples unwillingness to follow written directions or take heed of warnings
- Poor light conditions.

Improvements to existing controls and new controls to be considered:

- Restrictions relating to the hours of darkness should remain and be extended to include public exclusion when sea conditions present a risk of being washed-off the breakwater; and
- Improve existing fencing and gates already in place by increasing their height to 1.8m; and
- Install additional 1.8m fencing and gate around carpark; and/or
- Install new fence and lockable-gate at base of breakwater at or about the high-tide mark; and
- Improve existing signage and install additional signs; and
- Install lifebuoys.

We recommend that the application to reinstate public access to the breakwater be progressed.

In addition, we recommend ensuring that the breakwater is included in the WDC risk register along with the controls. Additional controls yet to be installed should also be included and listed as 'planned'.

3 Methodology

The methodology used to conduct this risk assessment consisted of reviews of:

- WSP reports, photos and Unmanned Aerial Vehicle (UAV) footage
- Recent news articles, YouTube videos and internet photos
- Legislation and WorkSafe information
- New Zealand and ISO standards
- Relevant literature relating to the management of risk.

Discussions were held with:

- Grant Rhodes – WDC Project and Asset Officer
- Iain MacDonald – WSP Senior Civil Engineer (Ports & Marine)
- Alisa Woods – WSP Resource Management Planner.

4 Risks and controls

4.1 Background

From the research conducted, the highest risk to human life is from extreme environmental conditions, primarily heavy seas, high tides and waves over-topping the breakwater. While it could be expected that a reasonable person would not access the breakwater during such hazardous conditions, it is known that from time-to-time members of the public may make poor decisions, errors of judgement, or not be aware of the significance of the risk.

Other risks are also present, and these should also be considered by the WDC prior to their decision on re-instating public access to the breakwater.

Generally accepted risk assessment practice has been applied to each risk below. Initial risk ratings have been calculated using the tables in Appendix A as if there were no controls in place. Residual risk ratings have also been calculated assuming that as many controls '*so far as is reasonably practicable*' have been applied in accordance with the Health and Safety at Work Act 2015 (HSWA) to achieve the requirement of elimination or minimisation of hazards.

The residual risk rating is likely to increase if the most or all the recommended controls are not adopted.

4.2 Access options

The following are considered the options open to the WDC regarding public access to the breakwater.

4.2.1 *Restrict access completely*

- Positives:
 - Highest level of public safety available.
- Negatives:
 - Considerable and ongoing expense to the council and ratepayers to completely restrict access and to police the exclusion
 - Likely to be a very unpopular decision
 - Contrary to the rights and expectations of the rate-payers and others to use and enjoy public spaces and amenities.
- This option is not recommended.

4.2.2 *Allow restricted access with reasonably practicable controls*

- Positives:
 - Second-best level of safety control available
 - Public would have unrestricted access other than during the hours of darkness and when sea conditions present a risk of being washed-off the breakwater
 - The WDC would have confidence that they are controlling the risks so far as is reasonably practicable and therefore likely to be meeting their legal obligations and expectations.
- Negatives:
 - Likely to be unpopular with some members of the public

- Some initial and ongoing expense to improve existing controls and install new controls, however less expensive than complete restriction.
- We recommended this option.

4.2.3 Allow unrestricted access with minimal controls (e.g. signage only)

- Positives:
 - Likely to be popular with the public
- Negatives:
 - Low level of safety control. Could be relatively in-effective putting the public at risk in hazardous situations
 - The WDC would not have confidence that they are controlling the risks so far as is reasonably practicable and therefore likely not to meet their legal obligations and expectations.
- This option is not recommended.

4.2.4 Allow unrestricted access with no controls

- Positives:
 - Likely to be very popular with the public
- Negatives:
 - No safety controls. The public are highly likely to be exposed to a high or critical level of risk in hazardous situations
 - The WDC could be viewed as being negligent in their duty of care to the public
 - The WDC would not have confidence that they are controlling the risks so far as is reasonably practicable and therefore likely not to be meeting their legal obligations and expectations.
- This option is not recommended.

4.3 Risks

4.3.1 Being swept off the breakwater during heavy seas or when the breakwater is overtopped by waves or tide

- Risk of drowning

Initial risk rating without controls	Critical
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Medium

4.3.2 Falling into deep water from the breakwater

- o Risk of drowning

Initial risk rating without controls	High
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Medium

- o Risk of hypothermia

Initial risk rating without controls	Medium
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Low

4.3.3 Falling onto submerged objects from the breakwater

- o Risk of drowning

Initial risk rating without controls	High
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Medium

- o Risk of fatality (other than from drowning)

Initial risk rating without controls	High
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Medium

- o Risk of physical injury (ranging from minor to serious)

Initial risk rating without controls	High
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Low

4.3.4 Falling onto rocks from breakwater

- o Risk of fatality

Initial risk rating without controls	High
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Medium

- o Risk of physical injury (ranging from minor to serious)

Initial risk rating without controls	High
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Low

4.3.5 Slip, trip or fall on breakwater

- o Risk of physical injury. Fractures, internal injuries, strains, sprains, cuts and abrasions.

Initial risk rating without controls	Medium
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Low

4.3.6 Human interaction with wildlife – Fur seals, leopard seals, penguins, red-billed gulls or other seabirds

- o Risk of bites from seals and minor lacerations from penguins or birds.

Initial risk rating without controls	Medium
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Low

- o Risk of slip, trip or fall contributed to by being chased by seals or birds.

Initial risk rating without controls	Medium
Residual risk rating with controls that minimise the risk 'so far as is reasonably practicable'.	Low

4.4 Considerations

Factors that could increase the risk of a fatality or serious injury should be considered in relation to each of the hazards. These considerations help provide an understanding of why incidents sometimes occur.

4.4.1 Human factors

A person may:

- o Make a mistake, an error of judgement or a poor decision
- o Have limited understanding or awareness of the risks
- o Have a high tolerance to risk or a willingness to take risks that others may not
- o Be under the influence of drugs or alcohol or be impaired in some way
- o Be very young, frail or unable to move quickly in unsafe situations.

4.4.2 *Changing environmental conditions*

The environmental situations may change quickly:

- o Worsening sea conditions; waves or tide over-topping the breakwater
- o Very strong winds, gusts or squalls.

4.4.3 *Inability to understand written signage*

Tourists or members of the public may:

- o Not understand, or have a poor understanding of the English language
- o Have a low-level of literacy.

4.4.4 *Poor light conditions*

The light-level may contribute to a person's inability to see or assess hazards or changes to the environment:

- o Hours of darkness.

4.5 Controls for consideration

4.5.1 *Improve existing fencing and gates already in place*

Raise the height of the existing fence and gate to 1.8m to significantly reduce the likelihood of the public climbing over the fence or gate when locked.

- o Continue to lock gate from dusk to dawn.
- o Also lock the gate when sea conditions present a significant risk to the public of being swept off the breakwater.
- o Locking the gate to continue to be the responsibility of the WDC.

4.5.2 *Install additional 1.8m fencing and gate around carpark*

Extend the existing fence to include the carpark and other areas where access to the beach and breakwater can be gained.

- o Lock the gate as in 4.5.1 above.
- o Consider 4.5.3 below as an alternative if deemed practicable.

4.5.3 *Install new fence and lockable-gate at base of breakwater at or about the high-tide mark*

This may not be a practicable additional control unless the fence and gate can be installed at the start of the breakwater adjoining the penguin colony, and adequately exclude the public from the breakwater.

Comments:

- o Potentially highly susceptible to damage and corrosion from extreme sea conditions
- o Unlikely to be an acceptable option due to the breakwater being a heritage structure that would require a consent change
- o Any structure would need to be removable to allow for maintenance vehicles and hydraulic excavator access for breakwater repairs from time-to-time.

4.5.4 *Improve signage*

Improve the existing signage and make the hazard and warning signs larger.

Consider installing additional signage on the breakwater near the base. The intent being to ensure any person walking along the breakwater from the base must walk past the sign.

Comments:

- Focus on the risks that have an initial risk rating of critical or high; those most likely to result in a fatality
- Also include risks with an initial rating of medium but place less emphasis on these to ensure that the highest risks are clearly understood
- Include information on contacting emergency services
- Focus on easy to understand signage that uses hazard symbols to negate the need to be able to read English; and/or make the signs multi-lingual
- Reference the standards:
 - AS/NZS2416.1-2010 Water safety signs and beach safety flags - Specifications; and
 - AS/NZS2416.3-2010 Water safety signs and beach safety flags - Guidance for use.
- Investigate the opportunity to partner and coordinate with the Department of Conservation (DoC).
 - They are experts in signage relating to the natural environment and health and safety information.
 - They are likely to be concerned about the human interaction with the penguins, seals and birds.

4.5.5 *Install lifebuoys*

Consider installing one or more lifebuoys at the base of breakwater.

Comment:

- Due to extreme sea conditions, it may not be practicable to install lifebuoys on other locations on breakwater
- These will require regular monitoring to counter theft and vandalism
- There may be an opportunity to expand the current security arrangements when gates are locked to also check the lifebuoys
- There is the potential to install an alarm that is activated when a lifebuoy is removed.

4.5.6 *Other controls not considered practicable*

The following control was also considered but determined not to be practicable.

- Install hand-rail along the length of the harbour side of the breakwater to provide support for pedestrians.

Comment:

- Not considered reasonably practicable due to the extreme force of waves and tides in storm conditions that would cause considerable damage.
- Would require change to consent.

5 File photos



Figure 2: View of breakwater from base.



Figure 3: Aerial view of beach.



Figure 4: Unguarded heights on the harbour side of the breakwater.



Figure 5: Signage on fence next to gate-access to beach.



Figure 6: Signage next to chain fence at base of breakwater, harbour side.



Figure 7: View of breakwater and chain fence at low tide, harbour side.



Figure 8: Signage and fenced area at base of breakwater.

6 Conclusions and recommendations

We conclude that the most favourable access option is to allow public access to the breakwater, with restrictions relating to the hours of darkness and when sea conditions present an unacceptable risk to the public.

The Health and Safety at Work Act 2015 does not specifically apply to a dormant public structure such as a breakwater and the safety of the public. It is unlikely to be considered a place of work other than from time-to-time when work is done on the breakwater. It would however be prudent for the WDC to consider public safety in relation to the risk of a fatality where the risk is known, and new and improved controls are available.

We consider it reasonably practicable to reduce the health and safety risk of a fatality or serious injury to a member of the public by improving the controls on or around the breakwater.

We recommend that the application to reinstate public access to the breakwater be progressed and that if successful, the existing controls are improved, and additional controls installed in accordance with this report.

In addition, we recommend ensuring that the breakwater is included in the WDC risk register along with the existing controls. Additional controls yet to be installed should also be included and be listed as 'planned'.

7 References

- WSP report, 'Oamaru Breakwater Inspection – November 2018'. Reference: 5-C3770.00/00100, number MO195; and associated photos and UAV images
- News articles:
 - Otago Daily Times, 27 July 2017. 'Ire as penguin-watchers light up night'. <https://www.odt.co.nz/regions/north-otago/ire-penguin-watchers-light-night>
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- YouTube videos:
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 - Man swept off Oamaru breakwater, 'The South Today', 22 February 2018. <https://www.youtube.com/watch?v=mFOYhSTRniE>
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- Internet photos:
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 - 'Sea And Sky Meet In The Middle', photograph by Nareeta Martin <https://pixels.com/featured/sea-and-sky-meet-in-the-middle-nareeta-martin.html>
- The UK Environment Agency report, 'Delivering benefits through science - Guide to Public Safety on Flood and Coastal Risk Management Sites'. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291178/scho0809bqvs-e-e.pdf
- AS/NZS2416.1-2010 Water safety signs and beach safety flags - Specifications. <https://shop.standards.govt.nz/catalog/2416.1%3A2010%28AS%7CNZS%29/view>
- AS/NZS2416.3-2010 Water safety signs and beach safety flags - Guidance for use. <https://shop.standards.govt.nz/catalog/2416.3%3A2010%28AS%7CNZS%29/view>
- The Health and Safety at Work Act 2015.
- WorkSafe policy clarification: Recreational access and the Health and Safety at Work Act (2015) <https://worksafe.govt.nz/laws-and-regulations/operational-policy-framework/operational-policies/policy-clarification-recreational-access-and-the-health-and-safety-at-work-act-2015/>
- WSP PM-SHEQ-701 Risk and Hazard Management Procedure.
- ISO 31000 Risk management - Guidelines.
- Guide to Integrated Risk Management (IRM) booklet v6 Lowres.
- UK RNLI guide to beach safety signs.

Appendix A

Risk Assessment Tables

Table 1: Determination of Consequence / Severity*

Consequence / Severity		
Scale	Safety	Health
Catastrophic	Death of a member of the public.	Death of a member of the public.
Major	Multiple major injuries.	Life-shortening health effect. Health effect causing significant irreversible disability.
Moderate	Single major injury.	Irreversible health effect (other than significant irreversible disability). Serious illness from which there is full recovery.
Minor	Minor injury. Medical treatment beyond first aid.	Reversible health effect Minor illness. Medical treatment beyond first aid.
Insignificant	First aid. Negligible safety impact.	Mild health effect for short period.

*Extract from WSP Risk and Hazard Management Procedure

Table 2: Determination of Probability / Likelihood*

Probability / Likelihood				
Almost Certain	Likely	Possible	Unlikely	Rare
Several times a year	Once annually	Once every 2 to 5 years	Once every 5 to 10 years	Less than once every 10 years

*Extract from WSP Risk and Hazard Management Procedure

Table 3: Risk Rating Matrix*

Risk Rating					
Consequence / Severity	Probability / Likelihood				
	Almost Certain	Likely	Possible	Unlikely	Rare
Catastrophic	Critical	Critical	High	High	Medium
Major	Critical	High	High	Medium	Low
Moderate	High	High	Medium	Low	Low
Minor	High	Medium	Low	Low	Low
Insignificant	Medium	Low	Low	Low	Low

*Extract from WSP Risk and Hazard Management Procedure

Table 4: Risk Treatment*

Risk Treatment	
Risk Rating	Treatment
Critical	Operation at this level is not acceptable. Stop people interacting with the hazard. Implement and/or improve controls.
High	Only tolerated if examination proves that the hazard cannot be eliminated <u>and</u> is minimised as far as is reasonably practicable. Review at regular intervals to ensure risk rating has not changed and determine if the hazard can be eliminated, or if new or improved controls are available to further reduce the risk.
Medium	Only tolerate if examination proves that the hazard cannot be eliminated <u>and</u> is minimised as far as is reasonably practicable. Review at regular intervals to ensure risk rating has not changed and determine if the hazard can be eliminated, or if new or improved controls are available to further reduce the risk.
Low	Risk is acceptable. Review at regular intervals to ensure risk rating has not changed and determine if the hazard can be eliminated, or if new or improved controls are available to further reduce the risk.

*Extract from WSP Risk and Hazard Management Procedure

Table 5: Risk Control – ‘The Hierarchy of Control’*

Hierarchy of Control		
Control	Ref.	Description
Eliminate	E	Remove the hazard or risk entirely.
Substitute	S	Minimise by substituting (wholly or partly) the hazard causing the risk, with something else that gives rise to a lesser risk.
Isolate	I	Minimise by isolating the hazard to prevent any person coming into contact with it.
Engineering Controls	EC	Minimise by establishing engineering controls to manage the hazard itself.
Administration Controls	AC	Minimise by also implementing administrative controls. Examples: policies, procedures, signage and training.
Personal Protective Equipment (PPE)	P	If a risk remains, further minimise the risk through the provision and use of suitable personal protective equipment where relevant.
If the control eliminates the hazard, the risk and hazard should no longer be present.		

*Extract from WSP Risk and Hazard Management Procedure

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