Council Members
Chair: Frank Dooley
Cr Andy Campbell
Cr Brett Cummings
Cr Peter Haddock
Cr Peter Ewen
Cr Mark McIntyre

WEST COAST
REGIONAL COUNCIL

PUBLIC COPY

Meeting of Infrastructure Governance Committee

(Te Huinga Tu)

Tuesday, 7 May 2024

Following the completion of the Resource Management Committee Meeting

West Coast Regional Council Chambers,

388 Main South Road, Greymouth

and

Live Streamed via Council's Facebook Page:

https://www.facebook.com/WestCoastRegionalCouncil

Infrastructure Governance Committee Meeting

(Te Huinga Tu)

AGENDA

(*Rarangi Take)*

12.1.1 *April' 24 WCRC IGC Project Status Report – Franz Josef - Financials*

12.2 Greymouth IGC Programme Status Report April 2024

12.2.1 *April' 24 WCRC IGC Project Status Report – Greymouth - Financials*

12.3 Hokitika IGC Programme Status Report April 2024

12.3.1 *April' 24 WCRC IGC Project Status Report – Hokitika River and Sea Walls - Financials*

D. Lew
Chief Executive

Purpose of Local Government

The reports contained in this agenda address the requirements of the Local Government Act 2002 in relation to decision making. Unless otherwise stated, the recommended option promotes the social, economic, environmental, and cultural well-being of communities in the present and for the future.

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THE WEST COAST REGIONAL COUNCIL

MINUTES OF THE INFRASTRUCTURE GOVERNANCE COMMITTEE MEETING HELD ON 5 MARCH 2024 AT THE OFFICES OF THE WEST COAST REGIONAL COUNCIL 388 MAIN SOUTH ROAD, GREYMOUTH COMMENCING AT 1.06PM

PRESENT:

P. Haddock, P. Ewen, A. Campbell, M. McIntyre, B. Cummings

IN ATTENDANCE:

D. Lew (Chief Executive), F. Tumahai (Te Rūnanga o Ngāti Waewae), S. Morgan (Acting Infrastructure Manager), S. Hoare (Inovo – IRG Programme Manager), A. Pendergrast (Acting Corporate Services Manager), C. Mills (Project Accountant), N. Costley (Contractor), S. Tripathi (Governance Advisor), B. McMahon (Media)

1. Welcome *(Haere mai)*

Cr Haddock was elected to chair the meeting due to absence of the Committee Chair.

The Chair opened the meeting and welcomed everyone.

2. Apologies *(Ngā Pa Pouri)*

The Chair called for apologies. An apology was received by Cr Frank Dooley.

Moved (McIntyre/ Campbell) *that the apology from Cr F Dooley be received.*

Carried

3. Declarations of Interest

The Chair called for any declarations of interest and declared an interest related to the Greymouth Floodwall and Franz Josef. Cr Campbell also declared interest relating to Franz Josef and Wanganui.

4. Public Forum, Petitions and Deputations (He Huinga tuku korero)

There were no public forums or deputations.

5. Confirmation of Minutes

5.1 Minutes of IGC Meeting 5 March 2024

The Chair called for any corrections to the minutes of 5 March 2024 meeting. Some minor corrections noted.

Moved (Cummings/ Ewen) *that after the corrections the minutes of 5 March 2024 are a true and correct record.*

Carried

Matters Arising
There were none.

5.2 **Minutes of IGC Meeting 8 February 2024**
The Chair called for any corrections to the minutes of 8 February 2024 meeting. There were none.

Moved (Haddock/McIntyre) *that the minutes of 8 February 2024 are a true and correct record.*

Carried

6. Actions List

The actions list was reviewed and the following updates were noted.

- Item 1 – Ongoing.
- Item 2 – Completed. To be deleted.
- Item 3 – Ongoing.
- Item 4 – Ongoing.
- Item 5 – Ongoing.
- Item 6 – Ongoing, partially completed.
- Item 7 – Ongoing.
- Item 8 – Completed. To be deleted.
- Item 9 – Ongoing.
- Item 10 – Ongoing.
- Item 11 – Completed. To be deleted.
- Item 12 – Ongoing.
- Item 13 – Ongoing.
- Item 14 – Ongoing.
- Item 15 – Completed. To be deleted.
- Item 16 – Completed. To be deleted.
- Item 17 – Completed. To be deleted.

Moved (McIntyre/ Cummings) *that the Committee receives the Actions List for information.*

Carried

7. Chairs Report

The Chair highlighted that the management and staff had been actively engaged in all matters pertaining to the Infrastructure Governance Committee. This included Resilient Westport planning, the programme of works for the Infrastructure Governance Committee, as well as the rating district works, quarry management, and river management and monitoring.

Staff had planned Rating District meetings, with the first meeting commencing this week. The increase in our catchment team staff numbers and the appointment of Chris Heath as Quarry Manager were noted. The efforts of the catchment team, particularly in organizing the Rating District meetings, were appreciated.

The Chair thanked Shanti Morgan, on behalf of all the Councillors, for her contributions as Acting Infrastructure Manager.

Moved (McIntyre/ Cummings) *that the Chair's Report be received.*

Carried

8. Reports

8.1 Monthly Catchment Management Report

S Morgan spoke to the report and took the report as read. The report detailed the works conducted by the operations team from February 20 to March 20, 2024.

Key discussions –

- Providing technical advice and supporting the four capital infrastructure projects undertaken across the region.
- Supporting the Rural District with maintenance work.
    - Wanaganui – Two projects were completed for the Wanganui Rating District in March 2024: one downstream of SH6 and another at Blackburns stopbank.
    - Whataroa – Planning was underway for the installation of a new spur on the Whataroa River.
    - Franz Josef – The Catchments Management team continued to monitor Franz Josef for ongoing changes and emerging risks, with a particular focus due to the forecasted weather event.
- Monitoring assets and coordinating work across the Wanganui, Whataroa, Franz Josef, Kongahu and Karamea Rating Districts.

- Coordinating annual rating district meetings. The meetings scheduled for April 11, 2024, were postponed due to a weather event and will be rescheduled for a later date.
- Health & Safety – The Catchment Management team was reviewing all contractor health and safety prequalification information to ensure that current contractors prioritize health and safety and meet WCRC standards.
- Natural Hazards – Strategic efforts were made in the natural hazards domain to ensure the regional council provides the community with comprehensive and up-to-date data on potential hazards affecting the region.
- Havill Wall – The team was overseeing the construction of the wall and awaiting the final decision from the Design Engineer.
- Whataroa River – Planning had begun for the installation of a new spur on the Whataroa River. Due to its urgency, this work could not be left unresolved for months. The initial plan to tender the work was revised to progress it as emergency works.

The Chair commended the quality of the report.

Moved (McIntyre/ Cummings) *that the Committee resolves to receive the report.*

Carried

8.2 **Quarry Operations Monthly Report**

S Morgan spoke to the report.

Key Discussions –

- Working on Quarry Strategy development.
- WCRC was unsuccessful in its tender for a KiwiRail project. It was noted that there was an opportunity to sell rock from Inchbonnie Quarry to the winning contractor, should they wish to purchase.
- Okuru Quarry – Quarry access was an issue as WCRC awaited acceptance of the new access agreement, working in collaboration with DoC. The Quarry Manager aimed to expedite this process the following month.
- Camelback Quarry – A landowner agreement was in place for rehabilitation work on neighbouring land. An update for the Councillors was noted as an action point.
- Regarding the pending Hokitika works, it was noted that Stage 3 involved rock armouring.

- It was noted that quarry volumes would be included in future reports.

The Chair and the CE expressed satisfaction with the quality of the report.

Moved (Ewen/ McIntyre) *that the Committee receives the report.*

Carried

9. IRG Projects

9.1 Franz Josef IGC Programme Status Report March 2024

S Hoare spoke to the report and took the report as read.

Key discussions –

- The contractor successfully completed rock armouring from the top of the Link Bank down to the bottom end of the Havil Wall. Toe rock was installed along the Link Bank, and finalizing the toe rock level for the Havil Wall was underway. Discussions were held with Ben Pascoe and Peter Blackwood regarding the impact of the Tartare avulsion.
- It was noted that the CE had written to the CE of WDC regarding the Havil Wall, and this would be circulated to all Councillors.
- Concerns were noted about potential scope diversion with NZTA banks.
- Between the old NZTA bank and the Link Bank, there was a drainage issue, and additional material was needed to raise the banks at the Heliport.

Moved (McIntyre/ Campbell) *that the Committee receives the report and note the attachment.*

Carried

9.2 Greymouth IGC Programme Status Report March 2024

S Hoare spoke to the report and took the report as read.

Key discussions –

- The contractor had set up the site at Anzac Park and was awaiting Electronet's identification of a specific cable location.
- The project was a week behind schedule.

Moved (McIntyre/ Campbell) *that the Committee receives the report and note the attachment.*

Carried

9.3 **Hokitika IGC Programme Status Report March 2024**

S Hoare spoke to the report and took the report as read.

Key discussion –

- Stage 1B Resource Consent consultation with KiwiRail was ongoing.
- Of the 9 actions, 5 were closed out and 4 remained concerning drainage issues, which have been addressed. Final sign-off from KiwiRail was awaited.
- Approval received from Ngati Waewae.
- Monitoring the tracks during construction was part of the requirement.
- Obtaining a fee proposal from consultants for various parts of the work and initiating a condition assessment of the existing bank for Stage 3.
- Stage 2 was put on hold, while work continues on Stages 1A, 1B and 3.

The CE noted that Hokitika and Westport works had experienced delays due to KiwiRail's delayed responses. The matter required escalation within the organization.

Moved (McIntyre/ Ewen) *that the Committee receives the report and note the attachment.*

Carried

10. General Business

There was none.

PUBLIC EXCLUDED BUSINESS

Moved (Haddock/ McIntyre) *that*:

1. *the public be excluded from the following parts of the proceedings of this meeting, namely – **agenda items 11 and 12 (inclusive)***

Item No	***General Subject of each matter to be considered***	***Reason for passing this resolution in relation to each matter***	***Ground(s) under section 7 of LGOIMA for the passing of this resolution***
11.1	*Confidential Minutes*	*The item contains*	*To protect commercial and*

	Infrastructure Governance Committee Meeting – 5 March 2024	*information relating to commercial, privacy and security matters*	*private information and to prevent disclosure of information for improper gain or advantage (s7(2)(a), s7(2)(b), and s7(2)(j)).*
11.2	*Confidential Minutes Extraordinary Infrastructure Governance Committee Meeting – 8 February 2024*	*The item contains information relating to commercial, privacy and security matters*	*To protect commercial and private information and to prevent disclosure of information for improper gain or advantage (s7(2)(a), s7(2)(b), and s7(2)(j)).*
12.1	*Franz Josef IGC Financial Update Report March 2024*	*The item contains information relating to commercial matters.*	*To protect commercial information s7(2)(b)).*
12.2	*Greymouth IGC Financial Update Report March 2024*	*The item contains information relating to commercial matters*	*To protect commercial information s7(2)(b)).*
12.3	*Hokitika IGC Financial Update Report March 2024*	*The item contains information relating to commercial matters*	*To protect commercial information s7(2)(b)).*

and that

2. *Darryl Lew, Shanti Morgan, Aaron Pendergrast, Nic Costley and Scott Hoare be permitted to remain at this meeting after the public have been excluded due to their knowledge of the subjects. This knowledge will be of assistance in relation to the matters to be discussed; and*

3. *That the Governance Advisor also be permitted to remain.*

The meeting moved into the public excluded session at 1.45pm.

.....
Chair

.....
Date

6	**Actions List**
Author	Sarah Tripathi, Governance Advisors
Authorizer	Darryl Lew, Chief Executive
Public Excluded	No

Report Purpose

This report is a summary of items that require actions.

Recommendations

It is recommended that Council/the Committee resolve to:

1. Receive the report.

ACTIONS LIST

Item No.	Date of Meeting	Item	Officer	Update
1.	9 April 2024	To determine the timelines for the review and update the Flood Protection Bylaw	Principal Engineer	Underway and forecast for completion in quarter one 2024/2025
2.	9 April 2024	Orphan asset review.	Acting Infrastructure Manager	To be completed by July 2024.
3.	9 April 2024	To update on the project. To clarify the responsibility regarding hydrological modelling and survey work and report back for Mokihinui Township Flood Mitigation Advice Report.	Principal Engineer	Completed 11 April 2024
4.	9 April 2024	Final NIWA report on Township Flood Mitigation Advice to be submitted to the Mokihinui Ratings District Committee.	Acting Infrastructure Manager	Completed 11 April 2024
5.	9 April 2024	To email all the Councillors the list of the ratings district meetings proposed.	Acting Infrastructure Manager	Completed
6.	9 April 2024	To report back to the Councillors regarding the definite cost of the Asset Management Information System project.	Blair	Ongoing. This would be updated prior to 30 June 2024.

Item No.	Date of Meeting	Item	Officer	Update
7.	9 April 2024	To write a letter to NZTA regarding the concerns (signed by the Council Chair and Mayor WDC). [Previous Action - To follow-up and update Councillors on the post-inspection of the Wanganui – Whataroa left hand bank bridge area inspection with WCRC engineers (2 South Island engineers) last week to escalate the matter with the South Island Manager at NZTA.]	Acting Infrastructure Manager/ Chief People and Capability Officer	Remains on hold due to continuing capacity constraints within the infrastructure team. Will update once the new GM Catchment is on-board
8.	9 April 2024	To circulate update on flood mitigation options for Snodgrass and Carters Beach area.	Principal Engineer	Completed in April.
9.	9 April 2024	To email the Councillors the source of the gravel that was procured to build the extra wall in Waiho.	Area Engineer	Staff have not identified the source of the gravel. An effort will be made to contact contractors next month as time allows.
10.	9 April 2024	To investigate and clarify with Cr Campbell regarding the cumecs of the last two Waiho floods.	Area Engineer	It is not possible to measure cumecs on the Waiho river due to unstable riverbeds. Therefore, this data is not available.
11.	9 April 2024	To investigate the details about the funding availability for Wanganui and clarify on the status.	Area Engineer	This is being confirmed with finance and will be provided to the rating district during the annual meeting.

Item No.	Date of Meeting	Item	Officer	Update
12.	9 April 2024	To update Councillors regarding rehabilitation work on neighbouring landowners at Camelback Quarry.	Acting Infrastructure Manager	Completed in May Quarry report
13.	9 April 2024	To follow up timelines on Whataroa spur urgent repair.	Acting Infrastructure Manager	Completed sent 10 April 2024
14.	9 April 2024	To check the status and possibility of reopening Canavan's Knob quarry in Waiho	Acting Infrastructure Manager	Old reports suggest the rock in Canavan's Knob and Waiho Loop is of a poor quality. The bulk of the area is also on DOC National Park land. The Mineral maps show that the Waiho Loop Permit as very Narrow and looks to be practically unworkable. The Quarry manager intends to take a site visit in May to confirm reports.

8. OPERATIONS REPORTS

8.1	**Monthly Catchment Management Report**
Author	Shanti Morgan, Acting General Manager Catchments; Peter Blackwood, Chief Engineer; Kent Jacobsen, Southern Area Engineer; Oliver Rose, Catchments Officer; Kelly Maynard, Senior Asset Lead; Jordan Mandery Construction Engineer
Authorizer	Darryl Lew, Chief Executive
Public Excluded	No

Report Purpose

The purpose of this report is to provide Council with an overview of the work undertaken by the catchment Management team between, March 20th and April 20th, 2024.

Report Summary

This month the Catchment Management team have focused on organising and hosting the annual rating district meetings, managing capital works projects including Westport and responding to the significant rainfall event in South Westland, this has included a post flood response to assess damage to assets across the WCRC flood protection schemes.

Recommendation(s)

It is recommended that the Committee resolves to:

1. Receive the report.

Issues and Discussion

Background

The WCRC Catchment Management team undertake a variety of work from significant capital infrastructure projects in Westport, Greymouth, Hokitika and Franz Josef, Modelling, and investigatory work to improve flood management approaches, the management of 23 Rating districts which includes the maintenance of assets, consenting, compliance, community support and engineering assessments and the management of Natural Hazard data and its dissemination.

Current situation

The Catchment Management team are currently delivering annual meetings across the WCRCs 23 rating districts and have completed six. This month the team also responded to a high rainfall event and have been managing post flood event maintenance projects.

A summary of work that has been undertaken this month includes:

1. **Supporting our Rating districts**

Wanganui Rating District:

Emergency works were promptly conducted by Campbell Agriculture & Contracting in response to erosion taking place during the April 10-12 flood event, these works were successful in addressing erosion and slumping of flood defences in two locations. The WCRC Engineers, during an on-site meeting, with Wanganui RD Spokesperson Jon Sullivan, approved the works, which involved placing 323 tonnes of rock between the two sites. Landowners were glad to see action being taken as the event unfolded.

During the flood event, engineers conducted regular patrols, visiting key areas of the flood defences approximately every 2 hours. They began at the SH6 Bridge, assessing any changes in flow before completing their loop. Observations revealed that the natural bank below/upstream of the true left abutment eroded by <0.7 metres during the event. To track erosion over time in this location, a reference point using a fence post to the edge of the berm has been established. Upstream of this point, erosion has been more severe, possibly exceeding 1.5-3 metres over the span of the event (Figure 1).

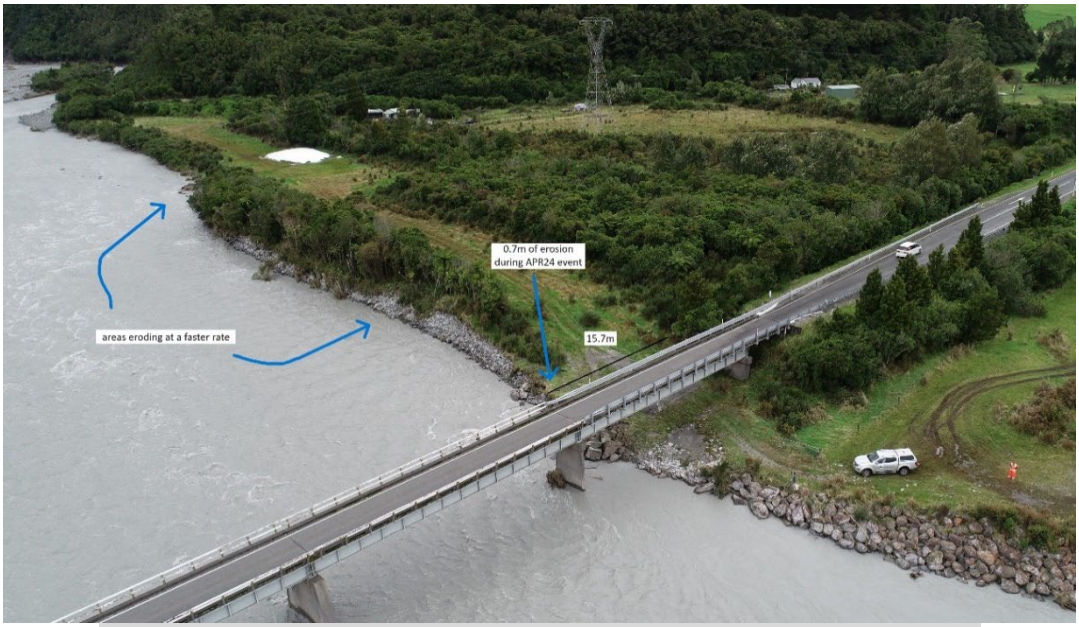


Figure 1: Areas being monitored for erosions Wanganui River

Franz Josef:

The Catchments Management team continue to undertake regular site visits to Franz Josef to monitor the continued changes and emerging risk areas observed across the Waiho river over the past few months.

Council engaged a Geotech survey to report on the actual depth of the riverbed on the Rubbish Dump stopbank and the Milton and others stopbank on the true left bank of the Waiho River. Excavation of nine test pits was undertaken under the supervision of a WCRC Engineer, a consistent methodology of following the rock armour lining the bank down the batter slope was undertaken to confirm the true depth of the rock toe currently in place.

The nine test holes confirmed that the true depth of the rock toe varies in depth between sites and therefore impact on the overall flood security of the south bank stopbanks. Unfortunately, at Miltons Bank a fast-flowing braid occupied the lower two thirds of the protection work and the contractor was unable to excavate test pits at this time. The two test holes along the upper section of the bank clearly indicated that the rock toe does not extend to any great depth, and this will need to be remedied at some time in the future.

A full report from TETRA TECH Coffey will be presented to Council at next month's meeting.

2. Flood Response - South Westland

The catchment management and Environmental science teams led a coordinated response to provide Risk Assessment and hazard information to Emergency Management staff during the April 2024 event.

The Catchment Management team focused on utilising rainfall and hydrological data to assess risks to infrastructure across the highest risk catchments over the span of the event. Prioritised catchments for this event were assessed as Wanganui, Franz Josef and Hokitika.

Two staff were deployed to monitor assets in Wanganui, two were allocated to monitor the Hokitika flood scheme and one contractor with the support of two staff from ECan were allocated to monitor the scheme in Franz Josef.

The team responded to the event by initialling identifying risks to flood protection assets and reviewing these twice daily prior to meetings with MetService through the intel of the deployed staff. This was intended to provide

emergency management and the Group Controller with the required information to make key decisions during the response. The team also fed through information to the intel team set up at the Emergency Operations Centre in real time which included over 100 site videos, eight risk assessment reports and hundreds of observations through ArcGIS apps.

During the flood event opportunities were taken to inspect rating district assets across our smaller schemes. Observations included:

a) Raft Creek still had capacity under the bridge.

Figure 1: Raft Creek bridge

b) Vine creek had a decent flow but was functioning as intended.

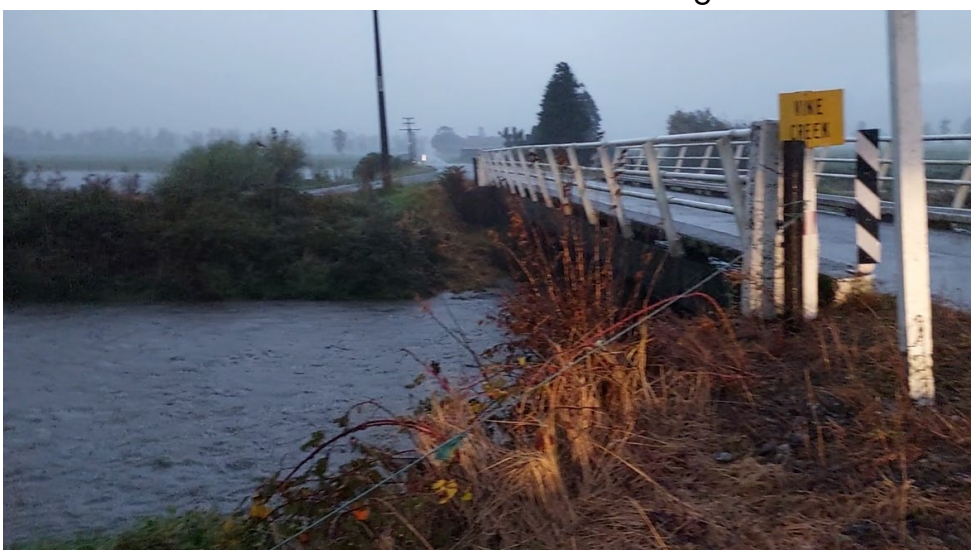


Figure 2: Vine Creek bridge

c) Kaniere has a few assets that need vegetation maintenance, this being a hindrance to making observations.

Figure 3: Vegetation maintenance required on asset

Overall, the team responded well to the event, a post flood debrief has highlighted several areas for improvement to build on the team's capability, system resiliency and documented procedures. This will be actioned over the next three- six months.

3. Post flood response

The catchments team have begun to undertake post flood response work. This is essential to ensure the WCRC fully understands the impact of the event to assets and how this might impact the level of service they are providing to West Coast communities. Post flood response includes:

- Damage Assessment: Heavy rainfall events such as those seen in April can cause considerable damage to flood protection assets. Immediate inspections are necessary to assess the extent of any damage. This helps in determining the specific repairs needed to restore the functionality of these assets.
- Safety Assurance: Ensuring the integrity of flood and coastal hazard protection structures is vital for public safety. Compromised flood and coastal hazard defences can pose immediate risks during subsequent rainfalls or storm surges. post event inspections help in identifying risks and taking timely action to mitigate them.
- Data collection for planning and Improvement: Post-flood inspections provide critical data that can be used to improve existing flood management strategies and infrastructure. Understanding how different assets performed during a flood helps in planning and upgrading flood protection measures, enhancing resilience to future floods.

During this period post flood response has been undertaken in the Hokitika, Wanganui and Franz Josef catchments which were identified as the highest risk to potential impairment.

Hokitika

After a post event inspection in the Hokitika catchment and response from concerned residents it was identified that the Hokitika seawall had been impaired by storm surges.

Several options were tabled to address the impairment:

- Do nothing,
  - This was not selected on the following basis, as there is an imminent risk to public with the potential of displaced rocks dislodging and crushing someone.

- Public safety,
  - This option involves minimised expenditure to maintain temporary protection and mitigates risks to public safety. This was the preferred option to ensure council were following due process under emergency works consent and prudent use of RD funds.

- Return to pre-storm state,
  - This was not selected on the following basis; it would involve considerable expenditure to return the damaged temporary works to pre-storm condition. This temporary wall does not provide a level of service and is only a stopgap solution until the extension/new seawall is funded.

- Build to seawall extension project design.
  - Was not selected on the following basis, huge investment, and commitment from the community, this is a decision that needs to be made by the joint committee, and the public safety option doesn't interfere with this option if it does go ahead.

It was decided that the structure, as originally constructed under emergency works, was only ever a temporary solution until the full design, consultation, and construction for the Hokitika sea wall was built. Spending further money on a stopgap solution would not be financially prudent it was estimated between 1600t to 2000t would be needed to return the seawall to its original "temporary" state. Which would have cost between $97,000 and $122,000 depending on final measure of imported rock. However, options for this will be tabled at the Hokitika Joint Committee meeting on May 6th, 2024.

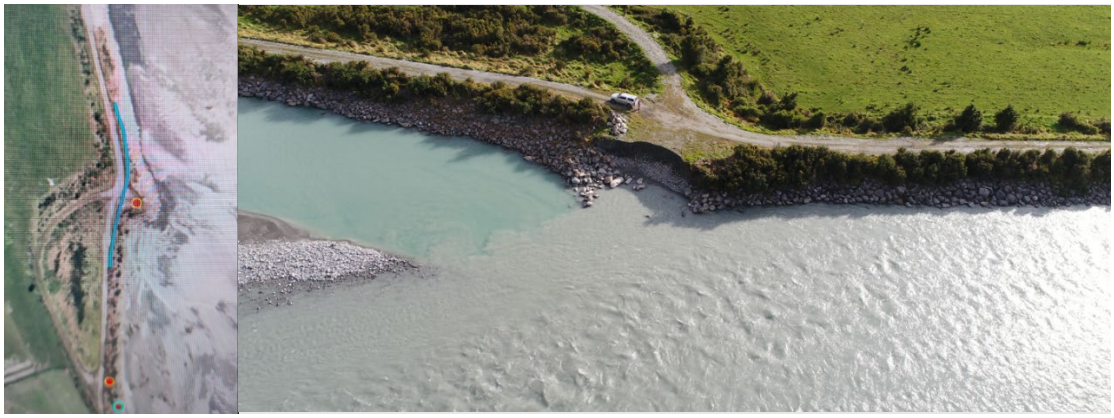
The Hokitika seawall public safety works have now been completed and were undertaken in alignment with the Wildlife and resource Management Acts.

Wanganui

Post-flood inspections of the Wanganui River have also been conducted, with accompanying images indicating observed damage locations.

WCRC engineers have compiled the data to create a hotspot map, highlighting areas needing attention or continuous monitoring. Selected hotspots are outlined below. There are several other areas not included in this report, however, these indicate the most significant observed damages.

Location: Left bank, Deflector groyne, overtopping and settlement of tip of the groyne



Location: Left bank, quotes are being sought and evaluated for remedial actions to repair this eroded spur groyne which was damaged during the event. The spokesperson and our team are assessing the urgency of initiating this remediation due to the heightened risk of erosion on the now exposed section of the stopbank. (See figure.)

Rather than opting for the reconstruction of the spur groyne, WCRC Engineers are planning a realignment of the rock lining along this section of the stopbank, as illustrated by the blue line in the figure.

Location: Left bank, an eddy has caused minor erosion behind a spur that will need ongoing monitoring.

Franz Josef

A post flood inspection in Franz Josef was undertaken however, further inspections are required due to the size of the scheme.

Due to post flood river changes an opportunity to complete work around the Rubbish Dump stopbank has opened, and a previous groyne that became buried from aggrading sediment is being recovered. Decisions on the use for this rock are yet to be made, but either reinstating the groyne on the surface, or creating a stockpile are two suggestions being considered.

Figure 4: Scavenging a buried groyne, some pickings in the background and one in the foreground in front of the excavator bucket.

The recent event has once again shifted the Waiho river. There is now flow against the new Link bank and Havill's wall that looks to have embedded itself.

Downstream, erosion has caused further loss of farmland, this image shows a large bite that was scoured out.

Figure 5: significant erosion down stream of Havills wall

4. Westport Flood Scheme Update

Good progress has been made on the design of the flood mitigation works and has included the following:

- The great news is the receipt of a letter from the Hon Nicola Willis Minister of Finance and Hon Simeon Brown Minister of Finance. This advises Government has "approved a drawdown of the remaining $19.918 million from the Westport Flood Resilience tagged operating contingency. The funding will be available from 1 July 2024 through to 30 June 2026".
- This follows extensive discussions between staff and the Department of Internal Affairs on the delineation of Council and Government financial responsibilities and the cash flow. By 30 June 2025 approximately 60 percent of the works are forecast for completion.
- The environmental effects assessments have been completed for the Cats Creek/Abattoir Drain and McKenna Stopbank. The planning report for the resource consents required from West Coast Regional Council is imminently complete.
- As consultation with KiwiRail on the small Cats Creek/Abattoir Drain is now close to a conclusion we are separating the Cats Creek/Abattoir Drain and McKenna consent applications. We will be calling quotations for this work very soon.

- Negotiation on the McKenna stopbank is briefly paused while further geotechnical advice is obtained. It is still hoped to make progress on the works for the first 400 metres of this stopbank this financial year and the first stage will cover at least 780m.
- Significant progress has been made on finalising alignments for final design of the 2024/25 year. Landowner consultations will be very important here.
- Assessments are close to completion on forecast flood depths on properties outside the stopbanks. Adaptation options can then be considered with the landowners.
- WSP Consultants have been commissioned to assess whether there are viable and warrantable options for mitigating flood levels at the Buller SH67 Bridge. Their report is being completed in conjunction with modelling produced by LandRiverSea and is due for completion around 30 June 2024.

5. Rating District Meetings

Rating district meetings are being rolled out over the next three months. The catchment team have successfully delivered six over the past month and dates for all 23 have been set (Table 1)

Rating district	Meeting date	Chair (proposed)	Status
Karamea	11-Apr-24	Brett Cummings	Complete
Kongahu	11-Apr-24	Brett Cummings	Complete
Mokihinui	11-Apr-24	Brett Cummings	Complete
Nelson Creek	17-Apr-24	Peter Ewen	Complete
Punakaiki	18-Apr-24	Brett Cummings	Complete
Rapahoe	23-Apr-24	Brett Cummings	Complete
Inchbonnie	2-May-24	TBC	On track
Taramakau	2-May-24	TBC	On track
Kowhitirangi	1-May-24	TBC	On track
Raft Creek	1-May-24	TBC	On track

Vine Creek	1-May-24	TBC	On track
Franz Joint Committee	6-May-24	Andy Campbell	On track
Hokitika Joint Committee	6-May-24	TBC	On track
Westport JC	*9-May-24 *To be rescheduled due to committee availability*	Frank Dooley	Delayed
Redjacks	15-May-24	Brett Cummings	On Track
Neils Beach	29-May-24	Andy Campbell	On Track
Okuru	29-May-24	Andy Campbell	On Track
Matanui	30-May-24	Andy Campbell	On Track
Waitangitaona	30-May-24	Andy Campbell	On Track
Whataroa	30-May-24	Andy Campbell	On Track
Greymouth JC	12-Jun-24	TBC	On Track
Wanganui	20-Jun-24	TBC	On Track

Table 1: Rating district meeting scheduled as of 30 March 2024

6. Asset management improvements

The catchment team had a workshop with Lawyer Phillip Maw this month which discussed current views on our position now, what if we have a failure on an asset, where does the liability sit and followed through with where there are current vulnerabilities with managing our assets. It was agreed our documentation, inspection frequencies & processes to physically carry out inspections, and procedures for the overall management of our flood protection assets, is where we are required to mitigate risk and improve on. The team have produced a list of action points to begin planning to remedy these areas.

There is progress on our interim asset management solution with the GIS data being tapered to suit the teams needs a little more, where the inspection Survey123 data is available on the mapping with the assets. This is working a little more positively with our recent post flood inspections so far. Our asset

inventory is yet to be fully documented with assured accuracy; however, the team are looking to complete an asset reconnaissance to ensure the WCRC has a complete and accurate asset inventory as a top priority.

In summary the catchment management team have completed significant work over the past month and with the response to the rainfall event and rating district meeting roll out absorbing significant staff time.

8.2	**Monthly Quarry Report**
Author	Shanti Morgan Acting General Manager Catchments
Authorizer	Darryl Lew, Chief Executive
Public Excluded	No

Report Purpose

To provide the Infrastructure Governance Committee with an overview of Quarry operations and management for April

Report Summary

During the month of April, the WCRC Quarry Manager undertook site visits to Okuru and Camelback quarries. Work has progressed on opening Okuru for operations and the blackball; quarry is forecast to be closed by June 2024.

Work was also completed by WSP to undertake an assessment for the closure of Kiwi Quarry which is attached to this report.

Recommendations

It is recommended that the Committee resolve to:

1. *Receive the report*

Issues and Discussion

Current situation

Inchbonnie Quarry

No sales have been made from Inchbonnie quarry in this period. However, a proposal from (Rosco's) Dave Stone to crush waste rock for aggregate at $2.00 per/t. has been agreed.[to ensure there is no cost to council for disposal of waste rock.

Rock status:
Rock on ground-16,000t Armour Rock
Rubble on ground- 10,000t of rubble

Upcoming rock requirements:
0t Armour Rock
0t Rubble

Camelback Quarry

An agreement has been progressed with the adjacent landowner to camelback quarry to dispose of waste rock and no remediation is required. Fencing along property boundaries is being progressed.
Work is being undertaken with DOC to secure the camelback walking route that is adjacent to the quarry.

Rock Status:

Rock on ground-7,863t Armour rock
Rubble on ground- 8-10,000t Rubble

Upcoming rock requirements- Henry Adams:
3000t Armour Rock
2500t Rubble

Kiwi Quary

The WorkSafe Prohibition notice still in force.
WSP have provided a geotechnical report (Attachment one). The report recommends an extensive amount of work which will be costly. The WCRC recommends a risk assessment is completed on the quarry's current status and another risk assessment on the works that will be required. This work will enable cost forecasting.

A drain that needs cleaning out has been identified and will be actioned next mont.

Blackball Quarry

Remediation and closure is still being progressed at Blackball quarry. A site visit from DOC this month identified the need for additional information, this will be progressed through may with the $20,000 bond forecast to be returned by June.
WorkSafe have received the abandonment report and the WCRC are awaiting feedback.

Okuru Quarry

The WCRC have gained the authority to access and operate Okuru quarry and have met Rosco Contracting Ltd and Henry Adams down in Okuru to assess a Plan for operations, the quarry manager will receive quotes from approved contractors as per procurement policy procedures.

A site cleanup will be required prior to operations; however an area has been identified to start blasting.

The Quarry manager intends to apply for an extension to the quarry footprint to enable development further back into the Mineral permitted area which will be required to ensure long term rock supply for that area.

Rock status:

Rock on ground- 0t
Rubble on ground- 0t

Upcoming rock requirements:
Armour Rock 6000- 10,000 tonnes for the Jacksons Bay Road after the last weather event on the 11th of April.

Attachments

Attachment 1: WSP Kiwi quarry report

9 April 2024

Attn: Shanti Morgan
West Coast Regional Council
388 Main South Road
Paroa
Greymouth, 7805

Kiwi Quarry Decommissioning – Stage 1

Project number 6-WWES1.32 / 005GG

Dear Shanti,

Thank you for commissioning WSP to complete an options assessment for the decommissioning of the Kiwi Quarry located above SH7, approximately 500m southeast of the Brunner Mine Site.

We understand that the West Coast Regional Council (WCRC) are planning to decommission the old quarry site and wish to reduce the perceived geotechnical risks posed to rail and road corridors below the site (north and east), as highlighted in recent geotechnical reports compiled by Terra Firma Engineering, to more acceptable levels.

This offer of service outlines the scope, outputs, and costs for the above-mentioned work.

1 Scope of Work – Stage 1

1) Completion of a brief walkover of the Kiwi Quarry site and access road

2) Complete desktop study to review:

   - Existing topographical data,
   - Geotechnical data and reports from the quarry site
   - Resource consents
   - Other relevant information provided by WCRC (WorkSafe, KiwiRail, DOC, WCRC information)

3) Make recommendations for additional information (if any), required to complete the options assessment. This may include further information or site investigations such as geotechnical mapping, laboratory testing of rock samples, ecological survey, surveying (UAV photogrammetry survey) and rockfall/slope stability modelling.

4) Provide recommendations for safe access for plant (past recent landslip on lower part of quarry access road) with consideration to risk to rail corridor (KiwiRail landholdings) below (east) of the access road.

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2 Desktop study

Site Description

The Kiwi Quarry is located 500m southeast of the historical Brunner Mine on steep sloping terrain above State Highway 7 (SH7), refer to Figure 1.

The West Coast Regional Council has been operating the quarry under Mining Permit 41295, (40 years) and Resource Consent No N97336, (32 years) since 1997 with various local contractors extracting armour rock for river protection and aggregate when needed for local projects.

The Quarry has been inactive since 11 May 2018 when a Prohibition Notice on all quarry activities was issued to the WCRC due to unstable rock faces being observed by a Work Safe inspector. The access road is currently blocked by a large rock and locked gate at approximately 50m south of SH7.

A large underslip occurred on 13 June 2022 along a 30m section of the lower part of the access road, which has reduced road width significantly and limited safe access for plant.

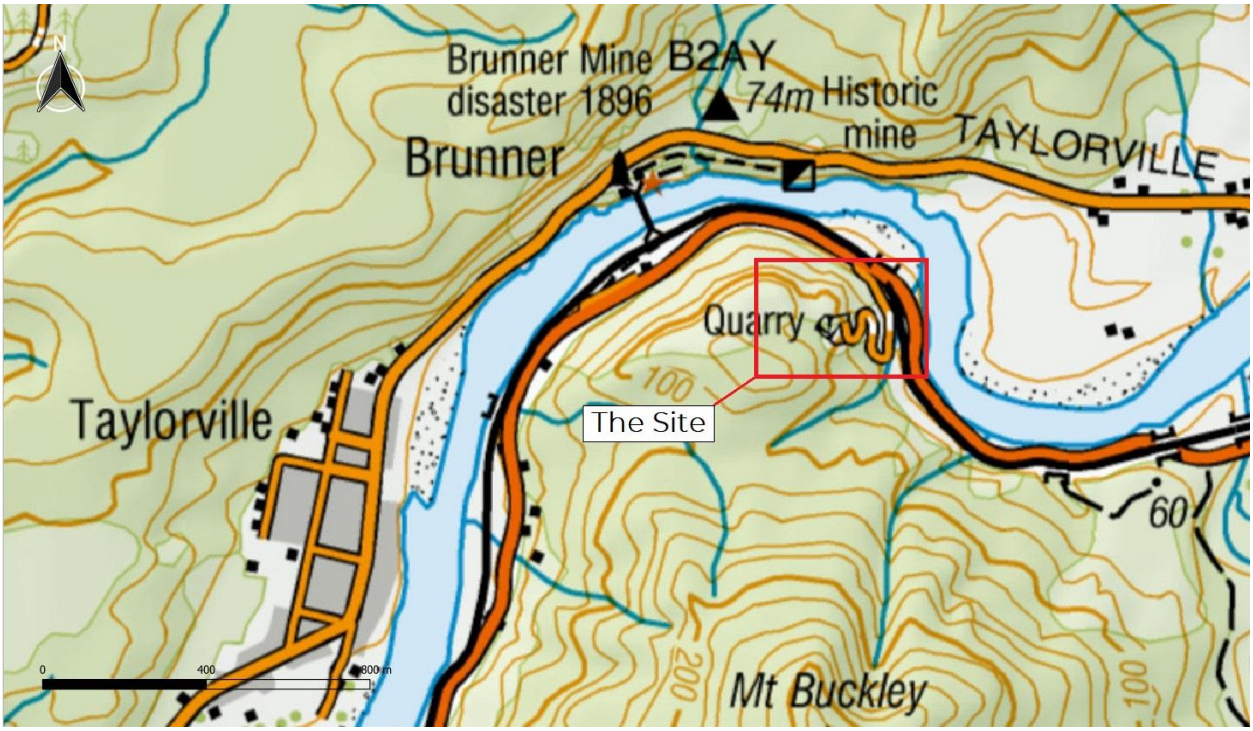


Figure 1 Location plan of the Kiwi Quarry site.

Geology

Published geological maps[1] indicate the geology at the Site is dominated by Eocene age bedrock consisting of brown carbonaceous Kaiata Mudstone (Erk). Quartz sandstone, conglomerate and carbonaceous shale with lensoid coal seams from the Brunner Coal Measures (Eb) are present northeast of the site, refer to Figure 2.

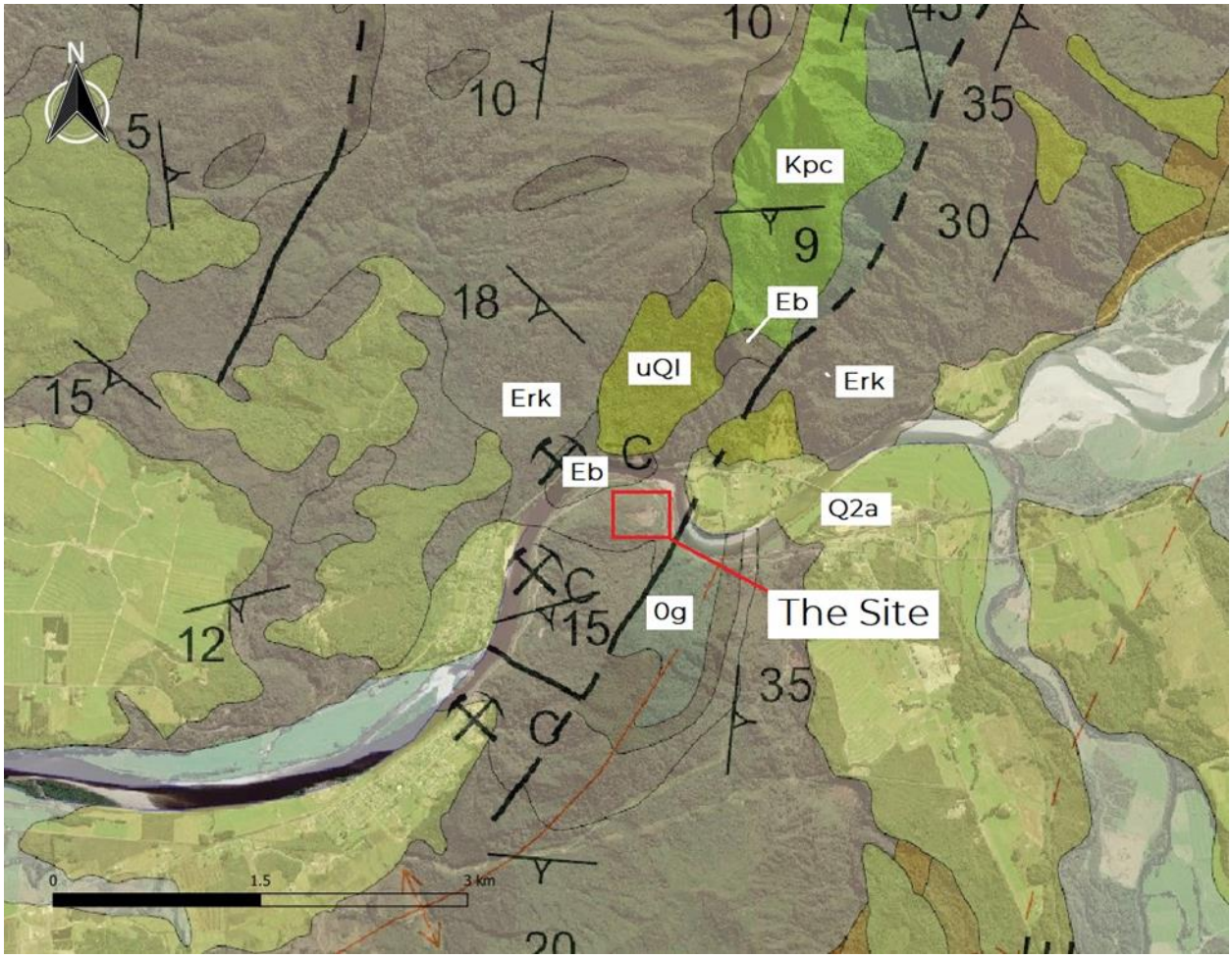


Figure 2 Geological map of the Taylorville -Stillwater area. The Site is dominated by brown carbonaceous Kaiata Mudstone (Erk). Quartz sandstone, conglomerate and carbonaceous shale with lensoid coal seams from the Brunner Coal Measures (Eb) outcrop northwest of the site.

Seismic hazards

Over the last 100 years there have been several large earthquakes on the West Coast with epicentres close to Greymouth.

Historical earthquakes affecting the Greymouth area include Murchision Earthquake (1929, M7.8), Westport Earthquake (1962, M5.9) and Inangahua Earthquake (1968, M7.1).

[1] Nathan, S.; Rattenbury, M.S.; Suggate, R.P. (compilers) 2002: Geology of the Greymouth area, Institute of Geological & Nuclear Sciences 1:250,000 geological map 12. 1 sheet + 58 p. Lower Hutt, New Zealand. Institute of Geological & Nuclear Sciences Limited.

The Site is located approximately 10km south of the active Montgomery Fault (recurrence interval: >5000 to <=10000 years) and 32km northwest of the active Alpine Fault (recurrence interval: <=2000 years) [2]. The Alpine Fault will govern the seismic hazard of the site because of its known high slip rate and recurrence interval (frequency of movement).

A lifeline study commissioned by Grey District Council from 2007[3] indicate that a Peak Ground Acceleration (PGA) in excess of 0.35g is to be expected for an Alpine Fault Earthquake for the Dobson-Stillwater area with predicted Modified Mercalli Intensity of 8 (MMVIII) with slips and landslides likely to cause considerable damage to roads and railways.

Current assessments of the Alpine Fault indicate there is a 75% chance of rupture within the next 50 years. On this basis the seismic hazard posed to the West Coast is considered to be high and almost certain to occur.

Site History

A review of historical aerial photos[4] from the site indicate that the quarry has been operating since around 1973 when the access road was constructed, refer to Appendix A for selection of annotated aerial photos.

By 1994 the lower switchback on the access road had been constructed and the quarry was relatively developed with the area west of the lower leg of the access track being the active quarry area.

By 2001 the active quarry area had moved further west and northwest and previous active quarry areas had started to revegetate.

By 2008 the access road had been extended west including two additional switchbacks. A mining remanent feature, referred to as the 'Pinnacle', had been left behind by the second switchback.

By 2013 the active quarry area had moved further west and north relative to 2008 conditions. Waste material was being dumped (in gully) on slope between high eastern rock face and lower section of the access road.

By 2020 most quarry activities appear to have ceased. The waste dump (in gully east of the quarry, visible on the 2013 photo) is covered (in parts) in low vegetation. The western and northern areas of the quarry have started to revegetate.

On 13 June 2022 a large slip occurred on the lower part of the access road inundating the rail corridor below. The Trans Scenic Train hit the slip debris shortly after causing train to stop in its track. The slip debris was cleared in the week following the slip and the slope excavated to more uniform contours, but effectively half of the width of the access road was lost to the slip and cleanup along a 30m section. The stormwater drain on the upslope side of the access track was cleaned out and deepened. A bund was constructed along the crest of the excavated slope. A sock was fitted on an old concrete culvert installed under the access road on (northern flank of slip) directing stormwater to the toe of the slope to an

[2] New Zealand Active Faults Database https://data.gns.cri.nz/af/
[3] Grey District Lifelines Plan - Communities and Council (Dec 2007): Alpine Fault Earthquake Scenario & Lifelines Vulnerability Assessment. Grey District Council, 299p.
[4] Retrolens https://retrolens.co.nz/ and Google Earth

existing drain running parallel with the rail corridor. Tiltmeters and camera monitoring was installed on top of the bund by KiwiRail.

By 2024 (current condition) the wider quarry area is now well vegetated. The slip on the lower part of the access road which occurred on 13 June 2022 has started to re-vegetate.

Previous Reports

Terra Firma Engineering Ltd (Terra Firma) has previously conducted a series of inspections of the quarry over the last 10 years. Review of recent reports relevant to this assessment include:

> *Geotechnical quarry closure assessment Kiwi Quarry – Stillwater (Terra Firma, 13 Jan 2022)*

In Jan 2022 Terra Firma completed a geotechnical assessment of the site for the purposes of detailing what remedial works would be required to make the site safe. The assessment identified the following geotechnical hazards at the quarry:

1) Danger of face instability causing harm to people within the quarry.

2) Rockfall hazard affecting SH7 or the Midland railway line.

3) Over-steepened, saturated waste dumps becoming unstable during heavy rainfall events, leading to landsliding (considered only likely to affect the main area of the quarry itself).

4) Natural rockfall hazard affecting the lower part of the access roadway (recent rockfall onto the roadway was observed during our inspection). The rock outcrop above the roadway has an intersecting jointing pattern which leads to wedge failure and block release.

Recommended remedial works (refer to Figure 3) to reduce the risk of harm to acceptable levels included:

A) Removal of the rock on the 'Nose' above the railway line.

B) Localised extension of the north-eastern end of the existing rockfall protection bund to butt into the existing quarried face.

C) Provision of a generous rockfall catchpit and bund along the base of the existing northern slope (bund material should not be taken from the main north-western debris slope to avoid oversteepening it).

D) Buttressing of existing over-steepened rock faces with granular waste material.

E) General respreading of available soil material and reestablishment of vegetation to aid long term rehabilitation and stabilisation of the site.

F) If vehicular access is not required, permanent closure of the road should be implemented by digging a trench and building a bund or placing rocks across it in the general area of the existing entrance gateway. It is appreciated that permanently excluding

the public from a large, deserted quarry in a rural area is likely impossible, but a robust bund/ditch arrangement should prove an effective deterrent to many potential visitors.

The existing gate does not appear to have been 100% effective in keeping people out.

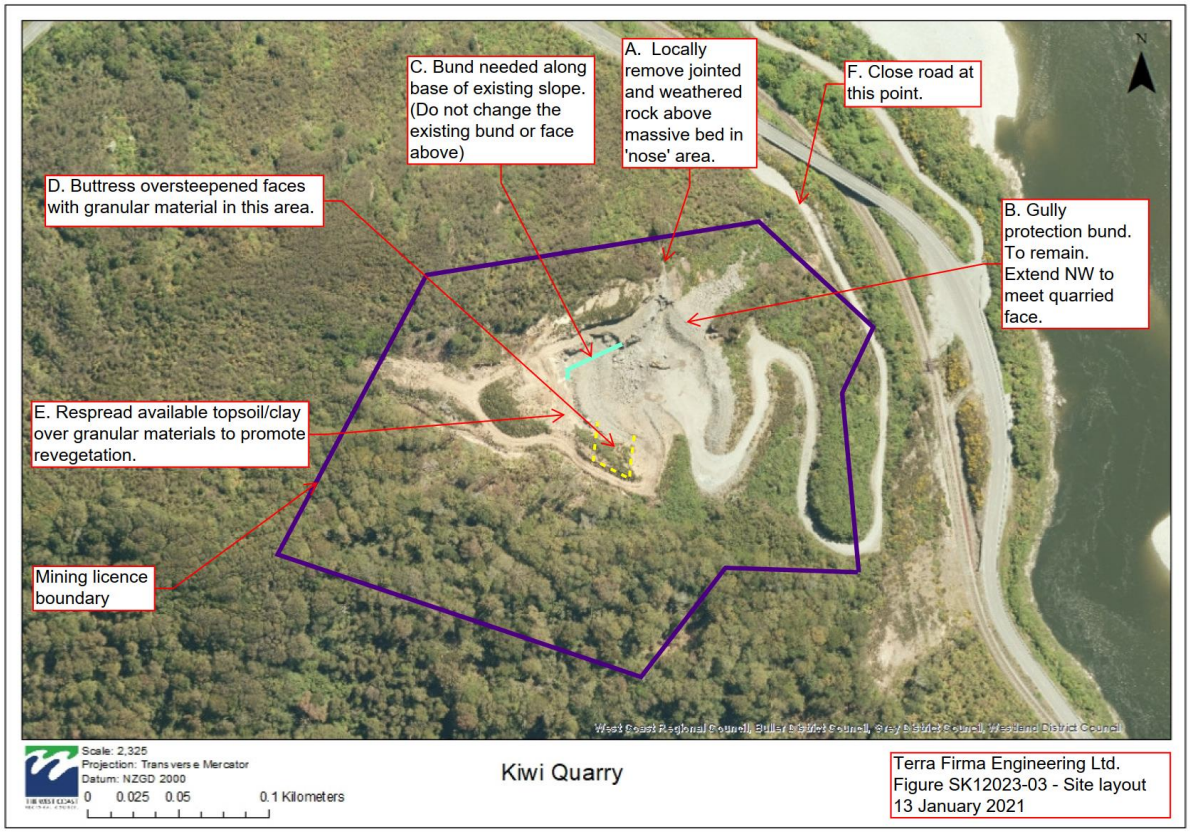


Figure 3 Remedial works plan for Kiwi Quarry decommissioning, suggested by Terra Firma in January 2022 letter report.

Geotechnical quarry closure assessment Kiwi Quarry – Stillwater (Terra Firma, 15 Dec 2022).

This letter report was issued as a supplementary piece of work to the Jan 2022 assessment following a site visit with the WCRC Quarry Manager on 14 Nov 2022.

TerraFirma responded to a request from WCRC to provide additional interim recommendations for works required to reduce geotechnical risk, specifically for the feature referred to as the 'Pinnacle'.

The report states that the area of the Pinnacle does not have any downslope protection measures and that rockfall modelling suggests that a sizeable failure here could impact the railway line.

The recent slip (KiwiRail 198.7km Slip) on the lower part of the access road has reduced the ability of this part of the access road to work effectively as a catch bench for rockfall.

Terra Firma proposed that the Pinnacle should be removed down to the level of the access road hairpin bend and recommended the following methodology:

1) That an experienced contractor be engaged to carry out remedial blasting works on both the Nose and the Pinnacle. The contractor should have good experience in blast design to reduce Peak particle Velocity (PPV), unintended outcrop damage and possibility of fly rock.

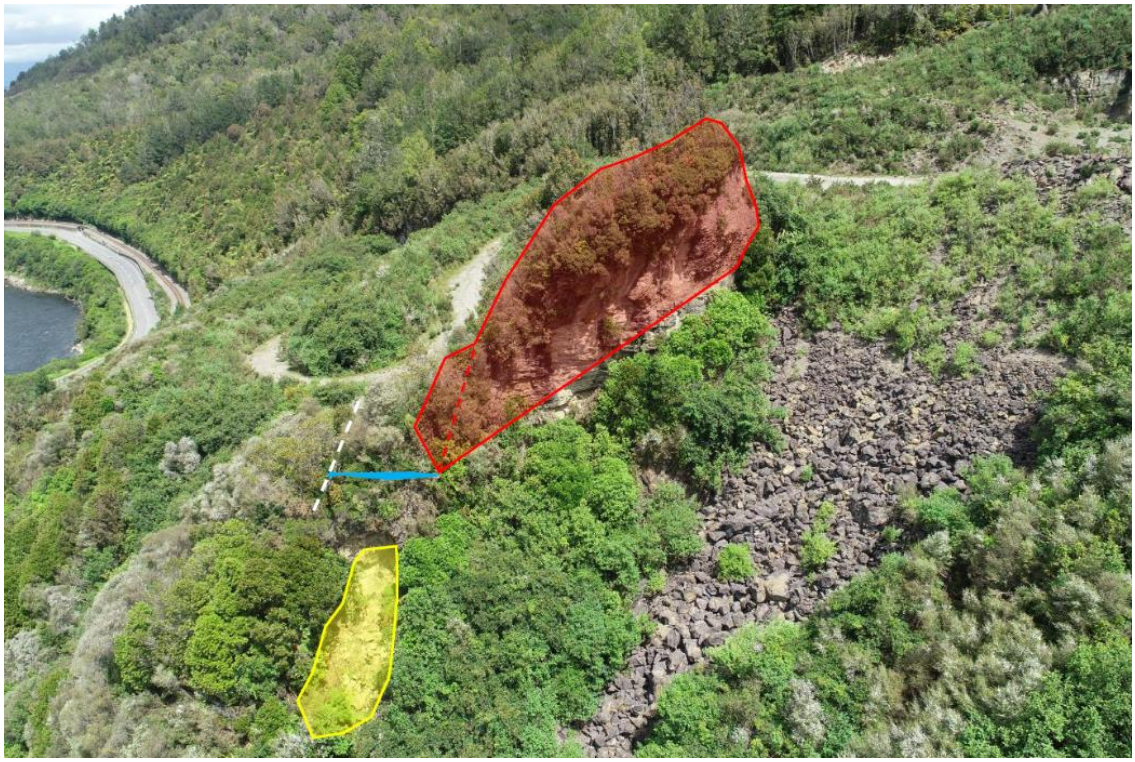
2) Temporary protection works be reinstated along the access road where the bund previously was located above the railway line OR a robust corridor possession arrangement be negotiated with KiwiRail to prevent any risk of fly rock or boulder roll from impacting a train.

3) The Pinnacle to be reduced by blasting, refer to Figure 4. Following removal of the Pinnacle removal of a cluster of hung up boulders can be removed by excavation.

4) The Nose be reduced by removing jointed and weathered rock above massive bed (presumably sandstone), refer to Figure 5. Exact method not specified, but presumably by combination of blasting and airbagging from roped access.

5) The material removed by blasting should be used to buttress the faces in the quarry.

6) The remainder of recommendations by Terra Firma to be implemented in order to allow complete closure of the quarry at the earliest opportunity.



(A)

(B)

*Figure 4 Pinnacle feature **(A)** Looking southeast, **(B)** Looking Northwest. Proposed remedial work by Terra Firma in dec 2022 report includes removal by blasting (highlighted red) and removal of hung up boulders (highlighted yellow) subsequently with excavator from hairpin widening (highlighted blue).*

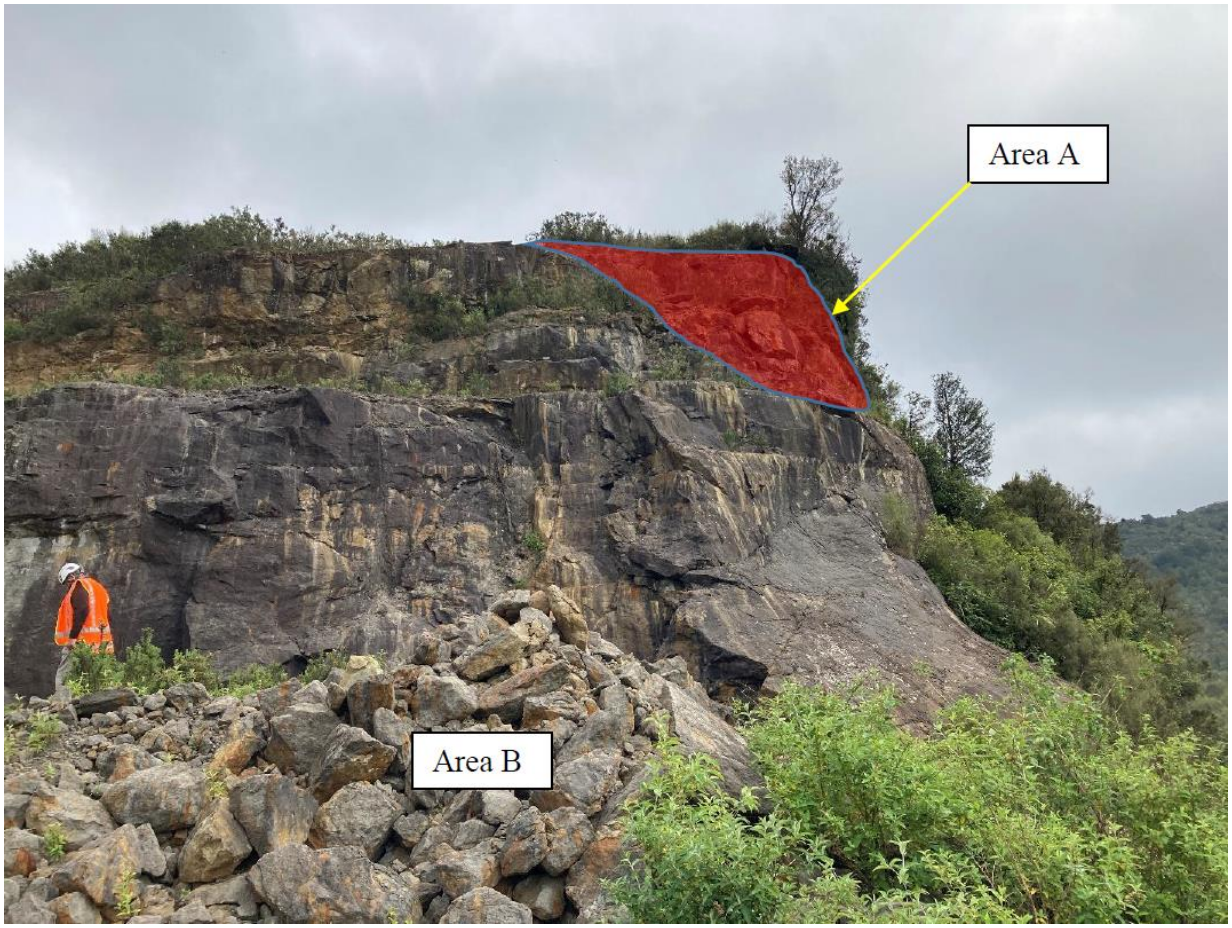


Figure 5 Remedial work for the Nose proposed by Terra Firma in Jan 2022 report includes removal of jointed and weathered rock above massive bed (highlighted red, Area A) and extension of bund (Area B) to meet the rockface beyond.

Topographical data review

A review of available topographical data identified the following two Digital Elevation Models (DEM) to be available for the site:

- LIDAR survey data (Grey District Council, 2015)
- LIDAR survey data (Aerial Surveys - West Coast Regional LIDAR Programme, (2020-21)

The 2015 LIDAR survey data was acquired at a late stage of the quarry development. The 2020-21 LIDAR survey data was acquired at the time when quarry activities had ceased and effectively reflects to current topography. Both LIDAR data sets have been reviewed in QGIS to evaluate the suitability of DEMs for rockfall modelling and slope stability assessment.

A series of topographical sections though the quarry area, sloping terrain west of the quarry and rail and road (SH7) corridors have been presented in Appendix B.

Some issues with incorrect classification (mostly ground versus vegetation) have been identified for the most recent LIDAR data (2020-21). For example, on Sections A and B, presented in Appendix B, the top of the Pinnacle has been incorrectly classified as

vegetation (likely due to the very steep gradients on the western and northern sides of the landscape feature).

Although quality assurance and reclassification of certain parts of the LIDAR survey data will be required WSP have assessed that the data will provide a topographical model with sufficient detail be used for detailed rockfall modelling and slope stability assessment.

3 Walkover

A walkover of the access road and wider quarry area was completed by WSP staff on 8 Feb 2024 in fine weather conditions. The following observation were made from the site:

- The access road is currently blocked by large rock placed in front of the gate preventing vehicle access.
- The failed section of the access road (KiwiRail 198.7km Slip) south of the gate is starting to vegetate with gorse and broom. The road width is currently 4.40m at the narrowest point measured between the upslope road cut and tiltmeters installed along the bund straddling the crest of the slip, refer to Site Photo 1 in Appendix C.
- Significant debris accumulation was observed in the swale drain above KiwiRail Slip 198.7km relative to 2022 site conditions, refer to Site Photos 2A and 2B in Appendix C. The culvert intake on the north side is filling up with gravel (water still flowing into pipe at the time of the site visit), refer to Site Photos 3A and 3B in Appendix C.
- Recent scour was observed in the swale drain on the upslope side of the access road approximately 20m below lower switchback, refer to Site Photo 4 in Appendix C. The scour has eroded into the road subgrade (estimated 1x10m) and is the most likely source area for the recent gravel built up in stormwater channel above the KiwiRail Slip 198.7km.
- Rockfall was noted in shoulder of access road by lower switchback. Block size up to 0.80x0.55x0.45m maximum size. The source area appears to be from small wedge failure 8.5m from overhanging rockface above the road, refer to Site Photos 5 and 6 in Appendix C.
- The southeastern side of the Pinnacle was briefly inspected from the switchback. Some surface cracking was noted in exposed rockface, refer to Site Photos 7 and 8 in Appendix C
- The eastern extent of the quarry was inspected from safe position of the bund constructed along the slope crest, refer to Site Photos 9 and 10 in Appendix C. The northwestern face of the Pinnacle is subvertical and straddling the southern side of the debris field (effectively terminating into a moderately steep debris slope). Access to the lower part of the Pinnacle was not attempted.
- The northern highwall was inspected from the quarry floor. Rock has been extracted from the lower batter and the width of the bench above has been significantly reduced since 2015 conditions. A bund has been constructed along the toe of the wall. The lower part of the eastern end of the high wall, referred to as the ‘Nose’, was inspected from the bund, refer to Site Photos 12 and 13 in Appendix C.

A large slab (estimated at 3x2x1m) of rock appears to be partly detached and likely a hazard to the rail corridor. This slab was also noted by Work Safe quarry inspection report (dated 14 Feb 2023).

An attempt was made to inspect the upper batter of the Nose from the bench, but the reduced bench width (below upper batter) and vegetation cover made access hazardous and was not pursued further.

- The western pit wall (Upper batter) was inspected from the bench. A bund (1.5-3.0m high) has been constructed along the toe of the pit wall, which has effectively stopped rockfall (large block of sandstone visible behind the bund), refer to Site Photos 15 and 16 in Appendix C.
- Rock exposed in the western pit wall consist of 'Slightly to moderately weathered, light grey, fine SANDSTONE. Moderately strong to strong' most likely belonging to the Brunner Coal Measures.

4 Summary

Historical aerial photos confirm that the Kiwi Quarry has been developed since 1973. Extraction from the quarry has been conducted intermittently by various contractors at times when rock for river protection and aggregate was needed for local projects. Hence, the quarry has been dormant for longer periods with limited long term mine planning, which has caused some areas of the quarry to be left with unmitigated geotechnical hazards including high and over-steepened batters, insufficient bench widths and unstable rock features.

Recent LIDAR survey data provides up to date detail on topography of the wider quarry area essential for assessing the geotechnical risk at the site. Digital Elevation Models from the site provide a tool for assessing geometry and gradients around key geotechnical hazards in detail.

The access road to Kiwi Quarry is currently closed due to a current Prohibition Notice on all quarry activities (issued 11 May 2018) and a reduced road width behind the head scarp of KiwiRail 198.7km Slip. The swale drain constructed during emergency works in 2022 is in need of maintenance to remove accumulated debris at risk of blocking the culvert diverting stormwater runoff from the quarry under the access road to a drain in the rail corridor. Scour observed in the swale drain near the lower switchback is likely to cause ongoing problems for stormwater management and trigger renewed slope instability at the KiwiRail 198.7km Slip site.

Rockfall from an overhanging rockface by the lower switchback has landed in the shoulder. Further rockfall is likely to be infrequent but risk to plant and people should be considered should the access road need to be reopened. Above the lower switchback the access road is in relatively good condition.

Inspection of the wider quarry area has confirmed key areas with geotechnical risk of concern:

- Rockfall risk from the Pinnacle area to rail and road corridors downslope (east) of the quarry. The Pinnacle feature is an isolated feature, steep sided (including 16m high subvertical northern rockface) likely consisting of fractured and unstable rock mass.
- Rockfall risk from the Nose area to rail and road corridors downslope (east and northeast of the quarry).
- Rockfall risk from unstable pit walls to the public entering (walking) the access road and quarry area following decommissioning.
- Slope instability caused by failing or insufficient drainage.

5 Recommendations

Stage 2 - Further work

WSP propose the following work to be completed:

- Complete detailed inspection and geotechnical mapping of the Pinnacle area. Details on rock type, structural orientation and condition of natural defects and intact rock strength will be required to assess the stability the rock mass and likely failure mode (natural or associated with removal). Estimates based on LIDAR survey data indicate the volume of the Pinnacle feature to be in the order of 3000m^3. Removal by blasting (as proposed by Terra Firma) would require extensive blast preparation (drilling) and careful consideration to blast impact (inundation and fly rock) to rail and road corridors considering the size, proud position of the feature and average slope gradients of 30-40^0 on the east facing slope below the feature.
- Complete detailed inspection and geotechnical mapping of the Nose area. Moderate risk to rail and road corridors from hazardous and fractured and rock has been reported by Terra Firma from the Nose and visually confirmed by WSP for the lower batter (below the Nose). Details on rock type, structural orientation and condition of natural defects and intact rock strength will be required to assess the stability the rock mass and likely failure mode.
- Complete UAV photogrammetry survey to support detail assessment of key geotechnical risk areas with difficult access including the Pinnacle and Nose features.
- Complete rockfall modelling (using Rocfall software) for the east and northeast facing slopes below the Pinnacle and Nose source areas based on available DEMs from 2015 and 2020-21 and information acquired from geotechnical mapping and UAV survey.
- Develop conceptual remedial options based on results from geotechnical mapping and rockfall modelling, which will likely include a combination of removal (blasting and air bagging), stabilisation (spot bolting or anchored steel mesh), downslope protection (earth bund) and improvement to capacity and resilience of the current stormwater system.

Plant Access

The future access requirements to the quarry are dependent upon preferred remedial options.

Access for light vehicles is likely to be a minimum requirement for contractors needing to bring small plant and equipment up to the quarry (e.g. compressor and drilling gear) for scaling work and blast preparation. WSP has considered the following access options:

1) Access not required.

If there is no need for plant to access the quarry, simply the road can be left in its current condition. This option does not consider the need for slope stabilisation or protection work at the KiwiRail 198.7km Slip site. In 2022 WSP completed a conceptual remedial options assessment[5] for the slip site on behalf of KiwiRail, which proposed either a gravel bund (2m high, 10m wide) to be constructed inside KiwiRail landholding or a reinforced soil slope (buttress 10m wide, 4m high and 20m long) to be constructed along the toe (inside Grey District Council landholding) to stabilise the failed, excavated slope. The slip is currently being monitored and no slope stabilisation or protection work has been implemented.

2) Access required for minimal equipment.

If access is required for minimal equipment and a single-entry exit scenario then in opinion the road is usable as is with some minimal spreading of existing gravels and temporary filling of the water table. After the works are finished a simple exit and close off access with locked gate and large rock. The current road width of 4.40m (maximum width at pinch point) is adequate for most large excavators and 6-wheeler trucks to pass. The final say on this would be the Contractor themselves as in experience some would be fine with it and others not.

3) Access required for multiple pieces of equipment and daily trafficking of slip site.

If a higher degree of access is required by the contractor to tackle remedial works of Pinnacle and the Nose areas, then it is recommended access road remediation to be completed. The recommended repair would be to install a reinforced soil slope at the toe of the slip and build it up in ever decreasing layer widths (finished level 10m wide, 4m high and 20m long) to buttress the failed slope. Then reconstruct the lost road width to previous condition by constructing a 3m wide and 2.5m high reinforced soil slope. A windrow (gravel bund) will be required to be installed along the shoulder in accordance with Work Safe guidelines (at least half the wheel height of the largest vehicle that operates on the access road), refer to Figure 6. Materials for the repair could be sourced from the quarry as there is an abundance of loose rock and rubble within the quarry ideal for creating hardened benches. Laboratory testing should be completed to confirm Particle Size Distribution and optimum compaction moisture content.

[5] KiwiRail Slip MDLND 198.7km. Letter report (WSP, 2 Nov 2022).

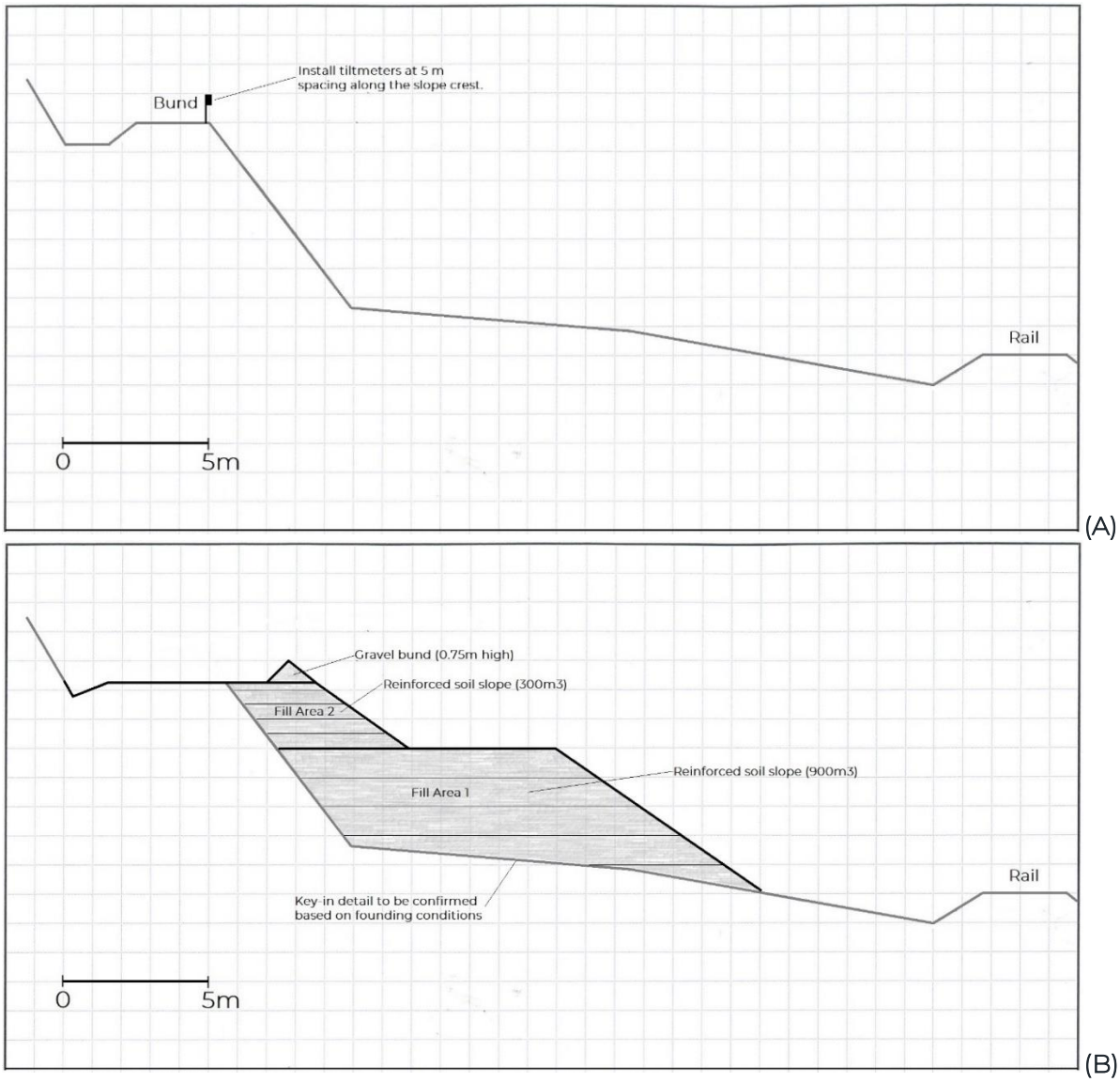


Figure 6 Section of KiwiRail 198.7km Slip on lower section of the access road: (A) Current site condition – Bund and drainage channel installed, slip debris removed and monitoring installed (inclinometers) along the bund, (B) Remedial work proposed to reconstruct the lost access road.

Kind regards,

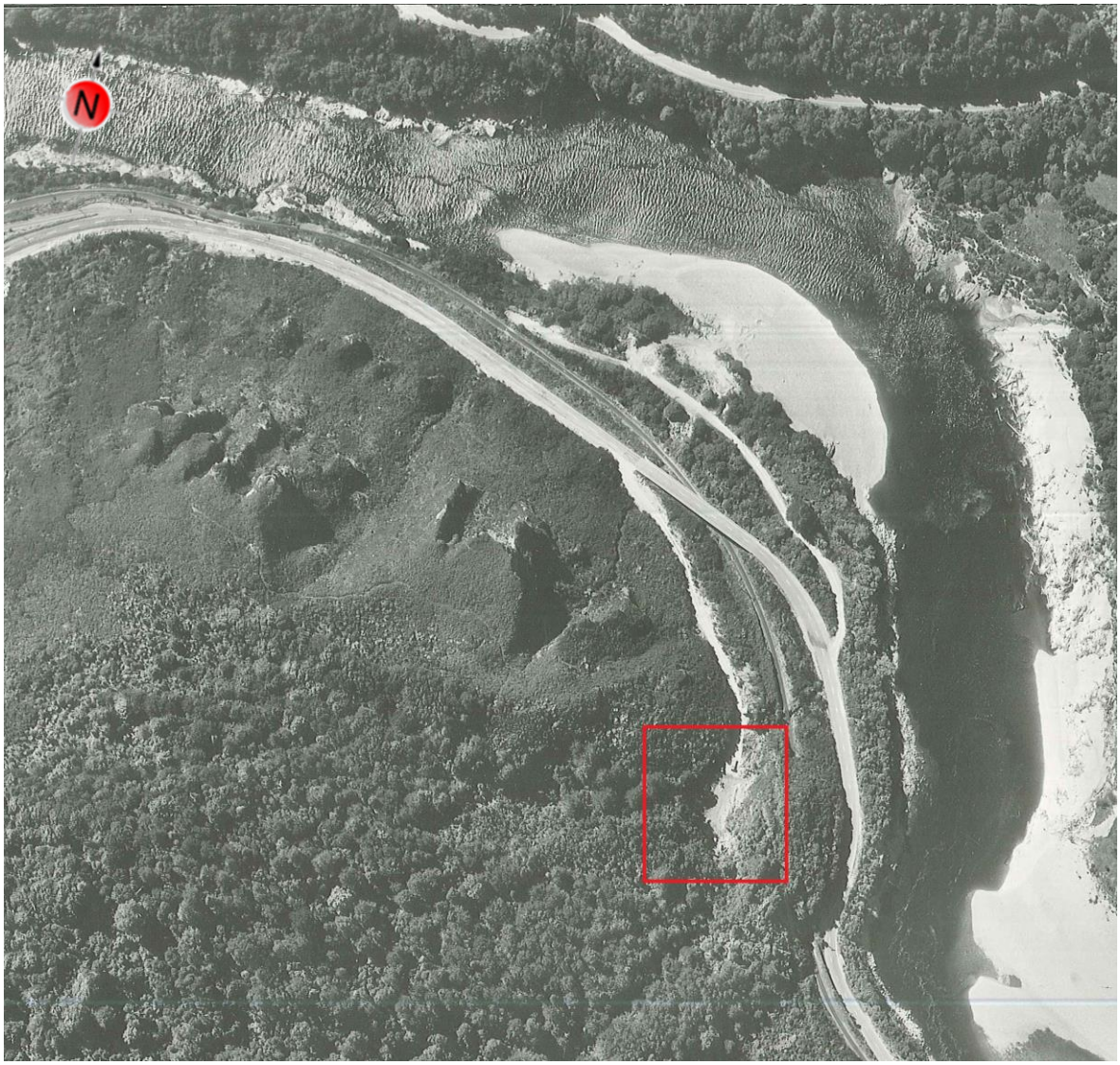
Torben Fischer

Senior Geologist

Appendix A – Historical aerial photos

Aerial Photo 1 *Site condition Anno 1970. Natural topography with no signs of ground disturbance.*

Aerial Photo 2 *Site condition Anno 1973. An access road has been constructed upslope (west) and parallel to the rail corridor with some extraction likely at the end of the road (red outline).*



Aerial Photo 3 *Site condition Anno 1975. Slightly widening of the extraction area at the southern end the access road relative to 1973 conditions.*

Aerial Photo 4 *Site condition Anno 1994. The first (lower) switchback has been constructed on the access road (red outline). The area west of the lower leg of the access track is now an active quarry area (magenta outline).*

Aerial Photo 5 *Site condition Anno 2001. The active quarry area has moved further west and northwest and previous active quarry area (yellow outline) has started to revegetate.*

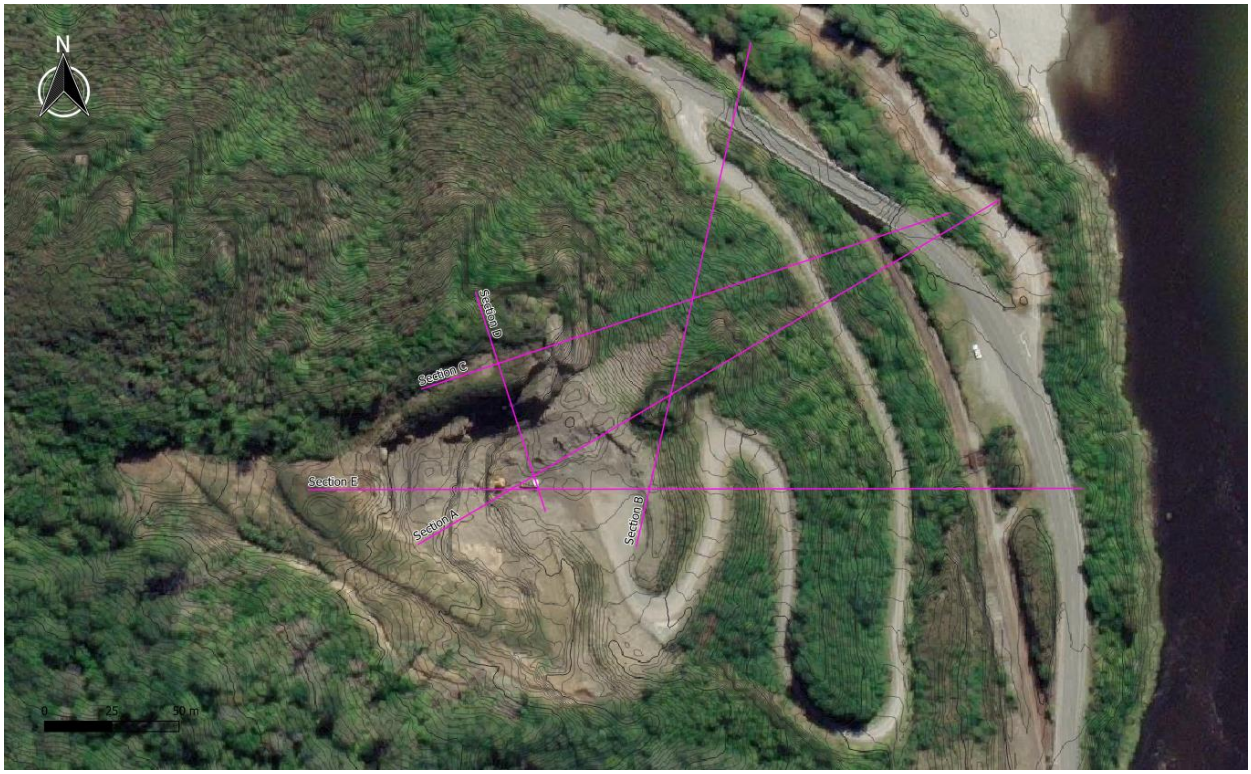
Aerial Photo 6 *Site condition Anno 2008. The access road has been extended west including two additional switchbacks. A mining remanent feature, referred to as 'The Pinnacle', has been left behind by the second switchback.*

Aerial Photo 7 *Site condition Anno 2013. The active quarry area has moved further west and north relative to 2008 conditions. Waste material appears to be dumped (in gully) on slope between high eastern rock face and lower section of the access road (red outline).*

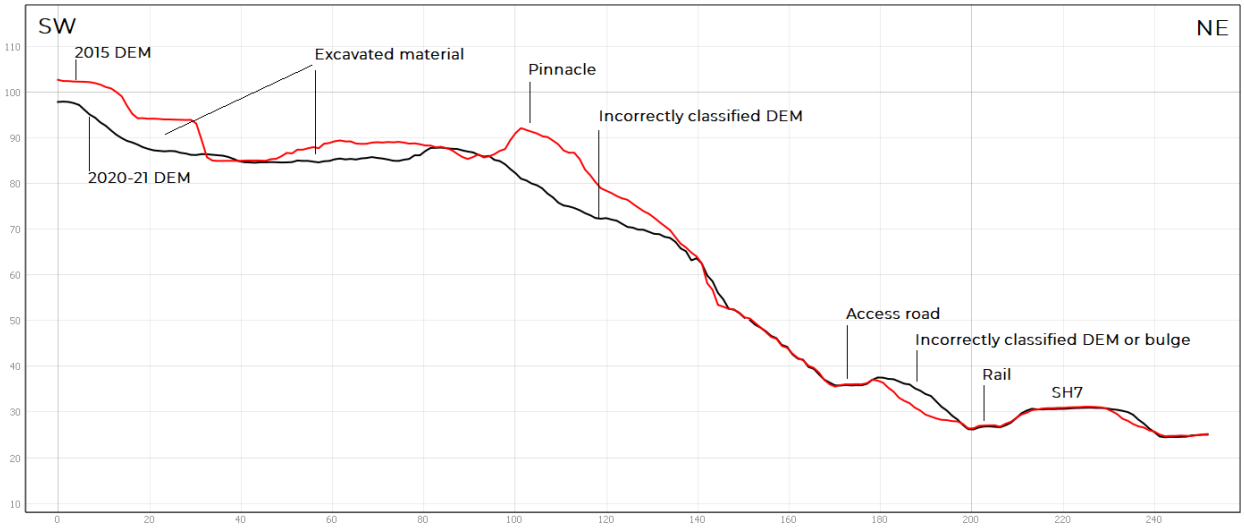
Aerial Photo 8 *Site condition Anno 2020. Most quarry activities appear to have ceased. The waste dump (in gully east of the quarry, visible on the 2013 photo) is almost fully covered in low vegetation. The western and northern areas of the quarry have started to revegetate.*

Aerial Photo 9 *Site condition Anno 2024. The wider quarry area is now well vegetated. The slip on the lower part of the access road which occurred on 13 June 2022 has started to revegetate (blue outline).*

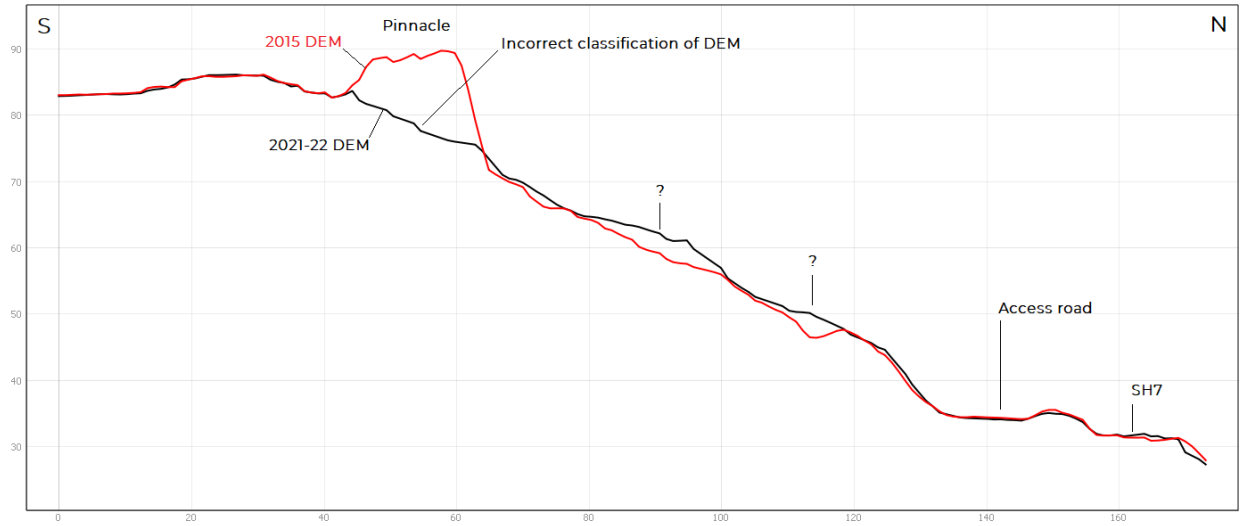
Appendix B – Topographical sections



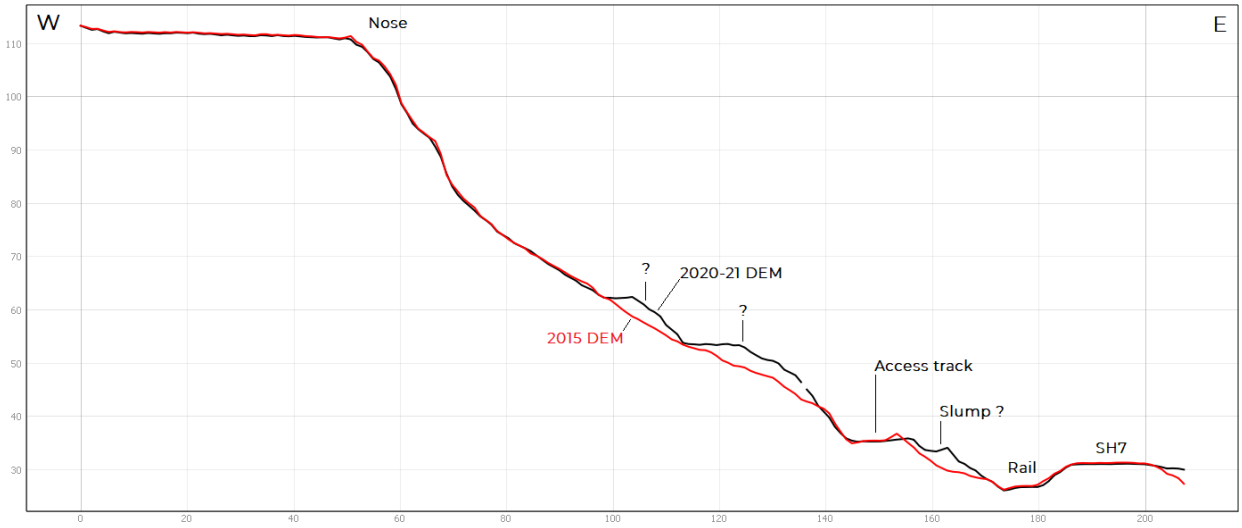
Site plan - including LIDAR Sections A to E.



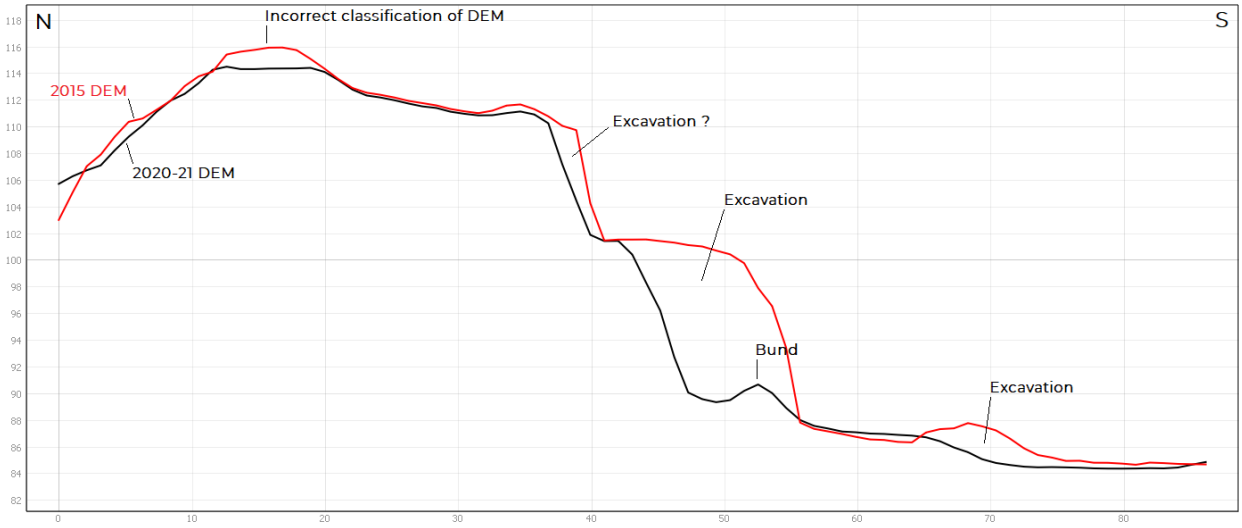
Section A – Southwest to northeast topographical section through western pit wall, pit floor, the Pinnacle, lower part of access road, rail corridor and SH7.



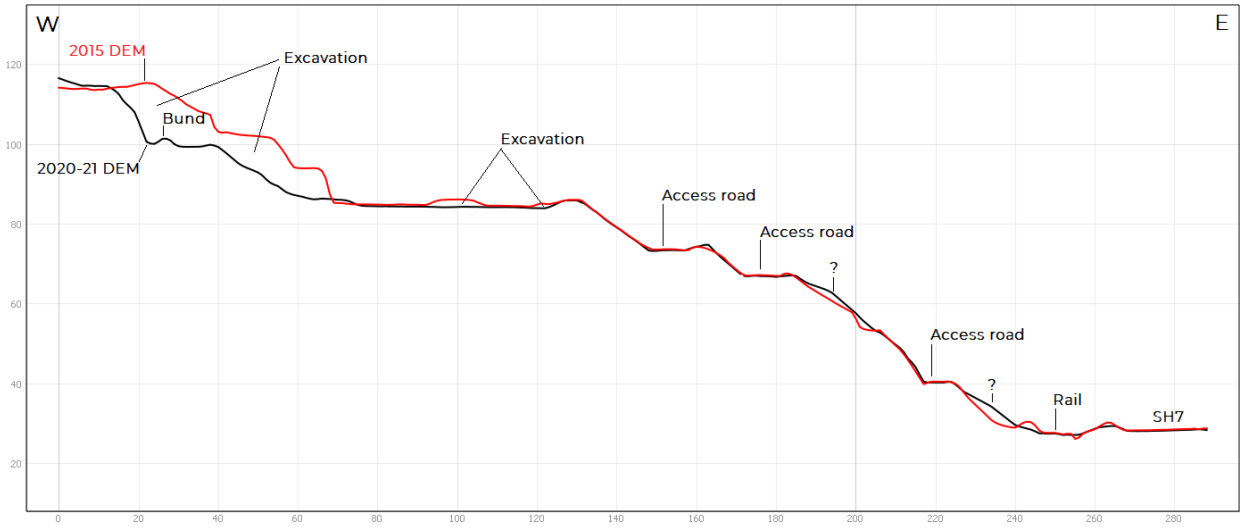
Section B – South to north topographical section through the Pinnacle, start of access road and SH7.



Section C – West to east topographical section through the Nose, lower part of access track, KiwiRail Slip 198.7km (pre slip), rail corridor and SH7.



Section D – North to south topographical section through the northern high wall, bund below highwall and pit floor.



Section E - West to east topographical section through western pit wall, pit floor, access road (3 intercepts), rail corridor and SH7.

Appendix C – Site Photos

Site Photo 1 Failed section (KiwiRail Slip 198.7km) of the lower part of access road to Kiwi Quarry. KiwiRail has installed a series of tiltmeters along a bund straddling the crest of the slip to monitor the slope. The road width is currently 4.40m at the narrowest point.

(A)

(B)

Site Photo 2 Swale drain above KiwiRail Slip 198.7km: (A) Current site conditions on 8/2/2024, (B) Site conditions on 14/6/2022, following emergency works. Significant debris accumulation was noted relative to 2022 site conditions, refer to Site Photos 3 and 4.

(A)

(B)

Site Photo 3 Culvert intake north side of KiwiRail Slip 198.7km: (A) Current site conditions on 8/2/2024, (B) Site conditions on 14/6/2022. The intake needs a cleanout to prevent blockage.

Site Photo 4 Swale drain - upslope side of access road approximately 20m below lower switchback. Recent scour of road subgrade, which is the most likely source area for recent gravel built up in stormwater channel above the KiwiRail Slip 198.7km, refer to Site Photo 2A.

Site Photo 5 *Rockfall in shoulder of access road by lower switchback. Block size up to 0.80x0.55x0.45m maximum size.*

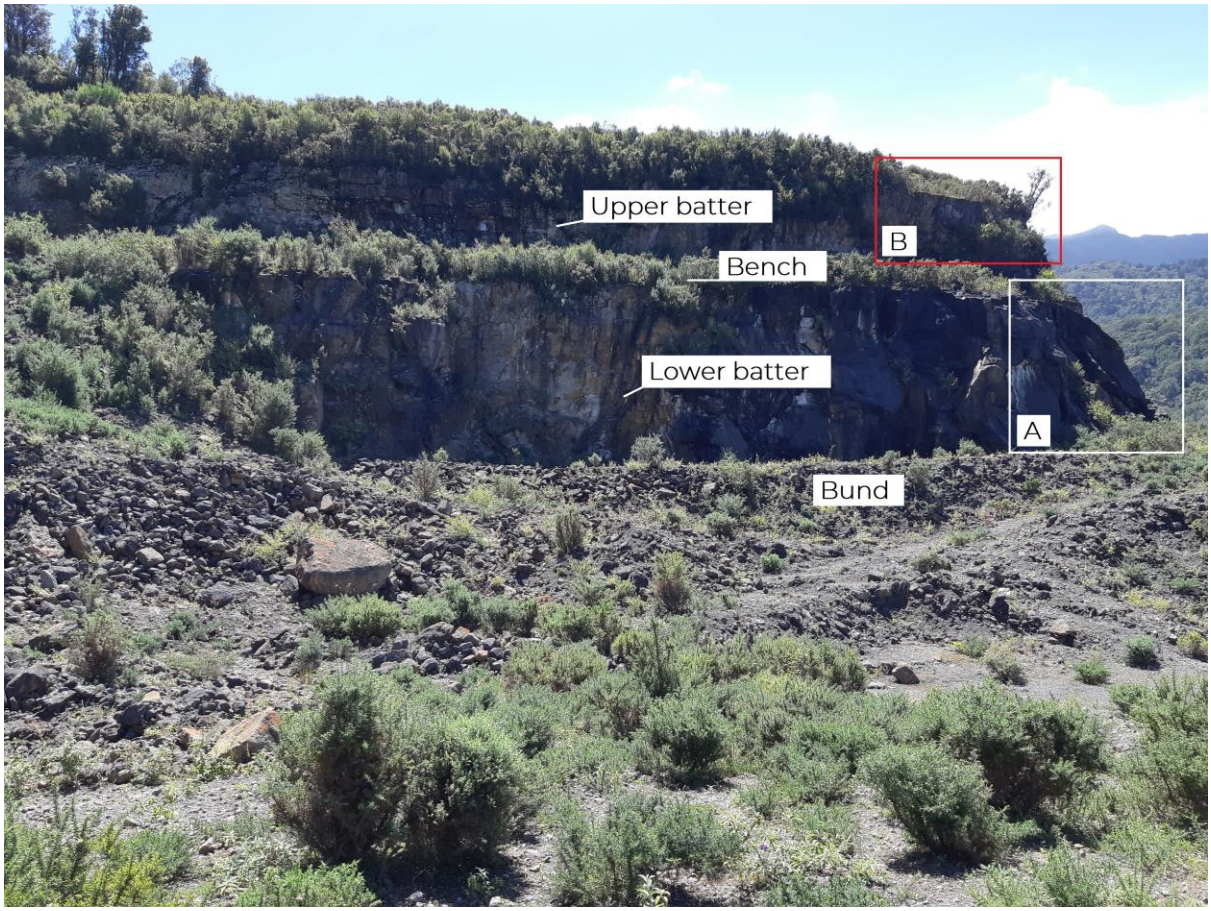
Site Photo 6 *Overhanging face above rockfall by lower switchback. Source area of rockfall likely from small wedge failure 8.5m vertical distance above the road.*

Site Photo 7 *Southeastern side of the Pinnacle observed from the switchback.*

Site Photo 8 *Developing surface cracks observed in rockface on southeastern side of the Pinnacle.*

Site Photo 9 Eastern extent of Kiwi Quarry. Photo taken from a bund constructed along the slope crest, looking down the debris filled gully (east) towards SH7. The Pinnacle can be seen in the RHS of the photo.

Site Photo 10 Northwestern face of the 'Pinnacle' with view of SH7 and Kiwi Overbridge below.



Site Photo 11 Northern highwall, looking north. Rock has been extracted from the lower batter and the width of the bench above has been significantly reduced since 2015 conditions. A bund has been constructed along the toe of the wall. The lower part of the eastern end of the high wall, referred to as the 'Nose', was inspected during the walkover (Area A), refer to Site Photos 12 and 13 for details. The upper part of the Nose (Area B) could not be accessed safely from the bench and was not inspected during the walkover.

Site Photo 12 *Lower batter of the Nose. A large slab (estimated at 3x2x1m) of rock appears to be partly detached.*

Site Photo 13 *Lower batter of the Nose. Large slab (estimated at 3x2x1m) of rock appears to be partly detached.*

Site Photo 14 *Northern highwall, looking east.*

Site Photo 15 Western pit wall. A bund has been constructed at the toe, refer to Site Photo 14.

Site Photo 16 Western pit wall. Large block of sandstone caught behind earth bund (post 2015 rockfall).

8.3	**09th to 12th April 2024 Flood Event Report**
Author	Samwell Warren, Manager Hydrology; Izelda Mulder, Hydrology Data Analyst
Authorizer	Darryl Lew, Chief Executive
Public Excluded	No

Report Purpose

The purpose of this report is to summarise the flood event of the 9th to 12th April 2024, including forecasted weather conditions and alerts, antecedent river and rainfall conditions, river response to rainfall, and place the event significance in a long term climate context.

Report Summary

Between April 9th and 12th, 2024, the southern half of the West Coast experienced a slow-moving front advancing northward with a preceding humid northerly to north-west flow. Following the front, the flow shifted southeasterly, bringing cooler temperatures and increased rainfall.

River levels and catchments were dry and low before the event.

Metservice initially issued an orange warning on the morning of April 8th for Westland south of Hokitika. The forecast predicted 600-800mm of rain about the ranges south of Hokitika and 200-300mm along the coast, with peak rates of 20-30mm/h over 57 hours. The warning indicated a potential extension and the possibility of an upgrade to a red warning, although it remained at the orange level throughout the event.

By Wednesday morning, rainfall intensities had slightly decreased, allowing rivers to discharge overnight rainfall. An additional orange warning was issued for the Buller district south of Seddonville and northwest of Reefton. Despite this, river levels in the Buller and Grey catchments remained below first stage alarms, necessitating no flood response from the hydrology team.

Rainfall intensified early Thursday morning and persisted throughout the day, causing the Hokitika River to reach its first and second stage alarms, recording a 2.2-year annual return interval flow, peaking at 5158mm (2248.54m³/s).

The event lasted a little over three days, easing on Friday morning. Observed rainfall totals generally aligned with Metservice predictions, with the Tuke River at Tuke Hut (NIWA) gauge surpassing 800mm and recording 989mm of rainfall.

Recorded rainfall totals and river flow levels can be found in Attachment 1, "*9th to 12th April 2024 Event Report".*

Of note,

- The Haast River peaked at 5433mm, below the first stage alarm of 6.0m.
- The Hokitika River reached its first and second stage alarms, recording a 2.2-year annual return interval flow, peaking at 5158mm and 2248.54m³/s.
- Rainfall totals were comparable to the March 2019 event and exceeded those of January 2024, but over a longer duration (three days).
- In the Waiho catchment, rainfall totals exceeded their 10-year return intervals over three days, triggering the Waiho River's second-stage alarm with a peak of 8729mm on Thursday afternoon.
- The Whataroa catchment experienced lesser rainfall totals, with the river peaking at 4828mm and a flow of 1938.747m³/s, surpassing its 1-year annual return interval (ARI) flow.
- Despite significant rainfall totals over longer durations (24-72 hours), shorter intervals (30-6 hours) mostly remained at 2.33-year return intervals or below.

Recommendations

It is recommended that the Committee resolve to:

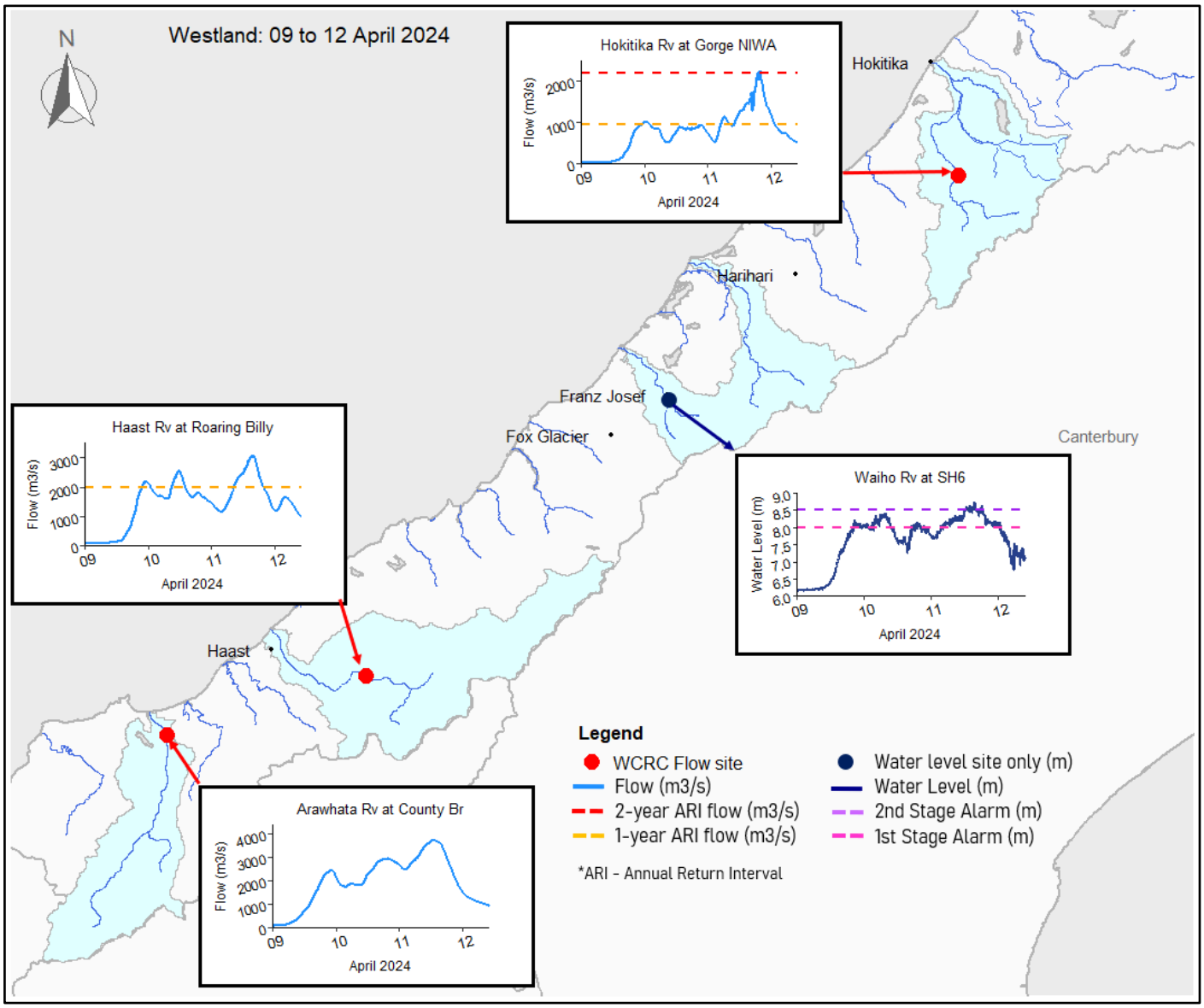
1. Receive the report.

Attachments

Attachment 1: 9th to 12th April 2024 Event Report

09 to 12 April 2024 Event Report

WCRC Hydrology – IM



Contents

1. Event summary

Between April 9th and 12th, 2024, the southern half of the West Coast experienced a slow-moving front advancing northward with a preceding humid northerly to north-west flow. Following the front, the flow shifted southeasterly, bringing cooler temperatures and increased rainfall, particularly in the southern regions. River levels and catchments were relatively dry and low prior to the event.

Metservice initially issued an orange warning on the morning of April 8th for Westland south of Hokitika. The forecast predicted 600-800mm of rain about the ranges south of Hokitika and 200-300mm along the coast, with peak rates of 20-30mm/h over 57 hours. The warning indicated a potential extension and the possibility of an upgrade to a red warning, although it remained at the orange level throughout the event.

By Wednesday morning, rainfall intensities had slightly decreased, allowing rivers to discharge overnight rainfall. An additional orange warning was issued for the Buller district south of Seddonville and northwest of Reefton. Despite this, river levels in the Buller and Grey catchments remained below first stage alarms, necessitating no flood response from the hydrology team. The Haast River peaked at 5433mm, below the first stage alarm of 6.0m, similarly not requiring a flood response.

As rainfall intensified again early Thursday morning and persisted throughout the day, the Hokitika River reached its first and second stage alarms, recording a 2.2-year annual return interval flow, peaking at 5158mm and 2248.54m3/s. Rainfall intensity totals were comparable to the March 2019 event and mostly exceeded those of January 2024, but with a longer duration of just over three days in April 2024.

In the Waiho catchment, rainfall totals exceeded their 10-year return intervals over three days, triggering the Waiho River's second-stage alarm with a peak of 8729mm on Thursday afternoon. The Whataroa catchment experienced slightly smaller rainfall totals, with the river peaking at 4828mm and a flow of 1938.747m3/s, surpassing its 1-year annual return interval (ARI) flow.

Despite significant rainfall totals over longer durations (24-72 hours), shorter intervals (30-6 hours) mostly remained at 2.33-year return intervals or below. With the brief respite on Wednesday morning and evening, most Westland rivers had the opportunity to discharge enough flow into the sea, recording flows below their mean annual flood (2.33yr ARI).

The event lasted a little over three days, easing on Friday morning. Observed rainfall totals generally aligned with Metservice predictions, with the Tuke River at Tuke Hut (NIWA) gauge surpassing 800mm and recording 989mm of rainfall.

Table 1: minimum and maximum rainfall totals and hour intensities per catchment.

Catchment	Rainfall intensity				Total rainfall (mm)	
	30 minute (mm/0.5hr)		Hourly (mm/hr)			
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Buller	4.5	12.5	7.8	27.2	35	244
Grey	3.7	20.6	6.1	20.7	16	149
Haast	9.5	21.0	17.5	36.5	297	702
Hokitika	4.2	35.5	8.4	43.0	72	989
Karamea	4.0	15.2	6	26	14	*352**
Mokihinui	4	12	6	17.4	36	74
Waiho	7.5	17.1	15	29.5	286	784
Whataroa	7.5	20.5	15	36.1	286	461

**Recorded by Aorere gauge (TDC), most of the rain fell towards the Tasman side of the range*.

Table 2: peak level and flow and annual return interval per river monitoring station.

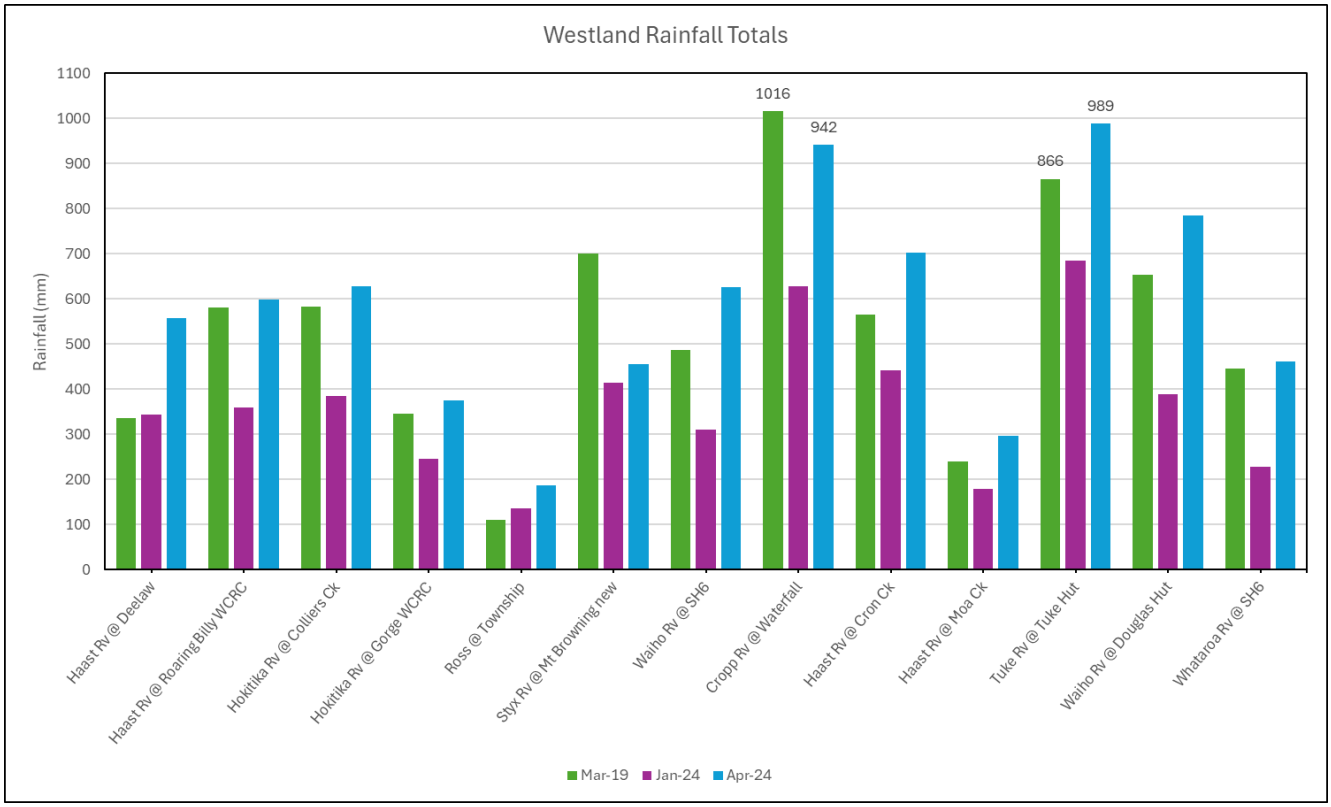
River / Location of main gauge	Date and time of peak	Peak level (mm)	Peak flow (m3/s)	Estimated return period (years)
Buller River / Te Kuha	12/04/2024 03:00	5624	1818.14	<1.0
Grey River / Dobson	12/04/2024 08:35	1727	815.97	<1.0
Haast River / Roaring Billy	11/04/2024 16:00	5433	3100.37	<1.4
Hokitika River Gorge (NIWA)*	11/04/2024 19:55	5158	2248.54	2.2
Karamea River / Gorge (NIWA)**	12/04/2024 00:20	2806	563.66	<1.0
Mokihinui River / Welcome Bay	12/04/2024 00:05	3664	766.6	<1.0
Waiho River / SH Bridge	11/04/2024 15:50	8729	N/A	N/A
Whataroa River / SH Bridge	11/04/2024 14:55	4828	1938.747	<1.2

** NIWA had the highest peak, and WCRC data was every 15mins at the time of peak.*

*** Karamea WCRC site comms down.*

1.2 Comparison rainfall totals against 25-27 March 2019 and 18-20 January 2024 events

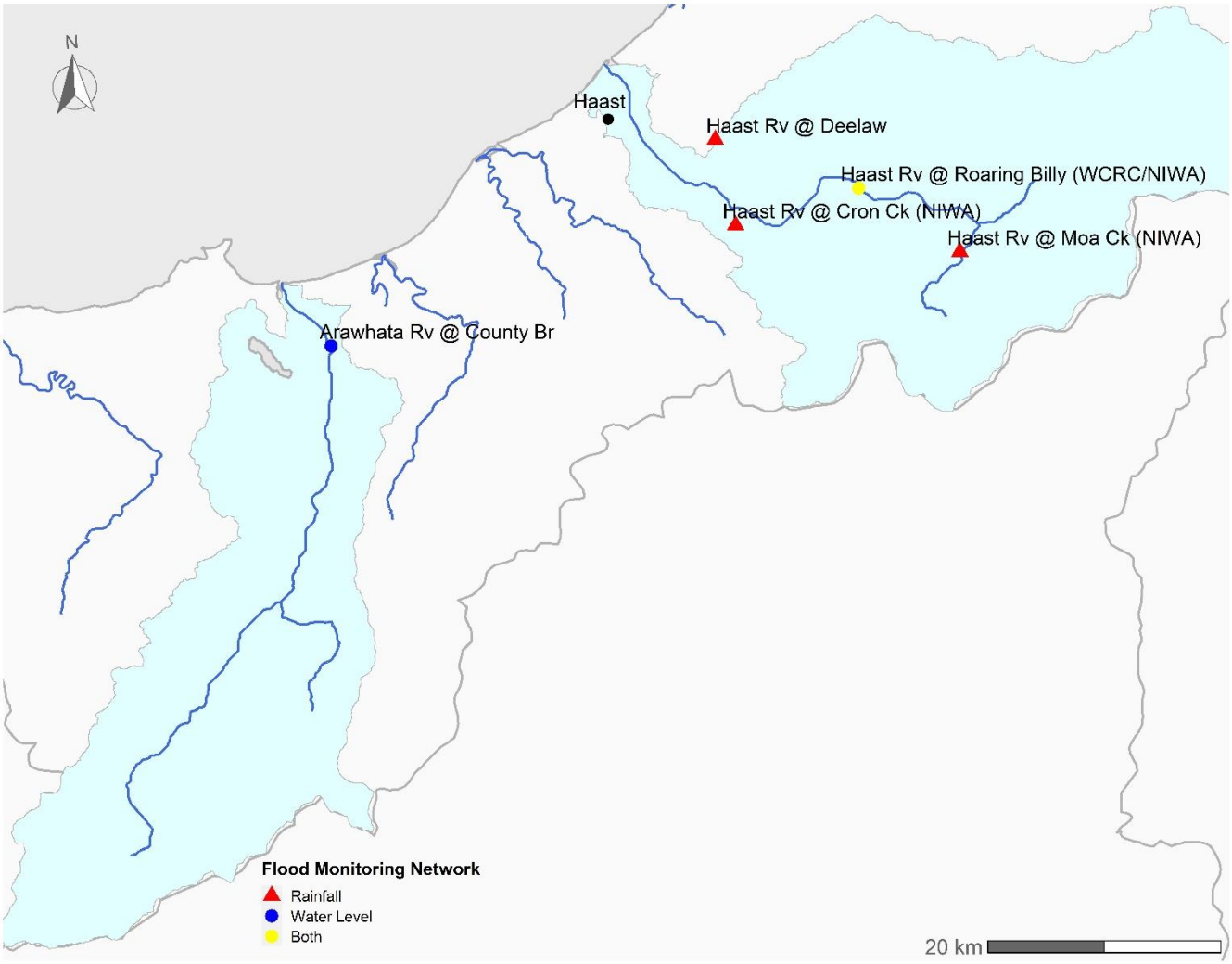
Rainfall totals for the April 9th to 12th, 2024 event were compared to those of the January 2024 and March 2019 events. While the totals resembled those of the March 2019 event, the duration in March 2019 was notably shorter at approximately two days. In contrast, both the January and April events lasted around three days, with the April event slightly longer than the January event.



2. Westland

2.1 Haast and Arawhata Rivers

The Arawhata river is located south of the Haast river and reacts similarly when both rivers are influenced by a southerly rainfall flow. Differences between the two can be contributed to the Landsborough river which is located at the northern part of the Haast catchment.



2.1.1 River flows and levels

The Haast River level stayed below its first stage alarm of 6.0m, eliminating the need for a flood response from the hydrology team. The peak flow for this event was 3100m3/s, indicating a less than 1.4-year ARI flow. Similarly, the Arawhata River also recorded a higher flow in January 2024.

Monitoring site	Date and time of peak	Peak water level (mm)	Peak flow (m3/s)	Return period
Haast Rv at Roaring Billy	11/04/2024 16:00	5433	3100	<1.4
Arawhata Rv at County Br*	11/04/2024 13:05	6462	*3788**	N/A

**Tentative peak flow, rating curve preliminary and needs more calibration.*

2.1.2 Rainfall ARI tables and duration curves

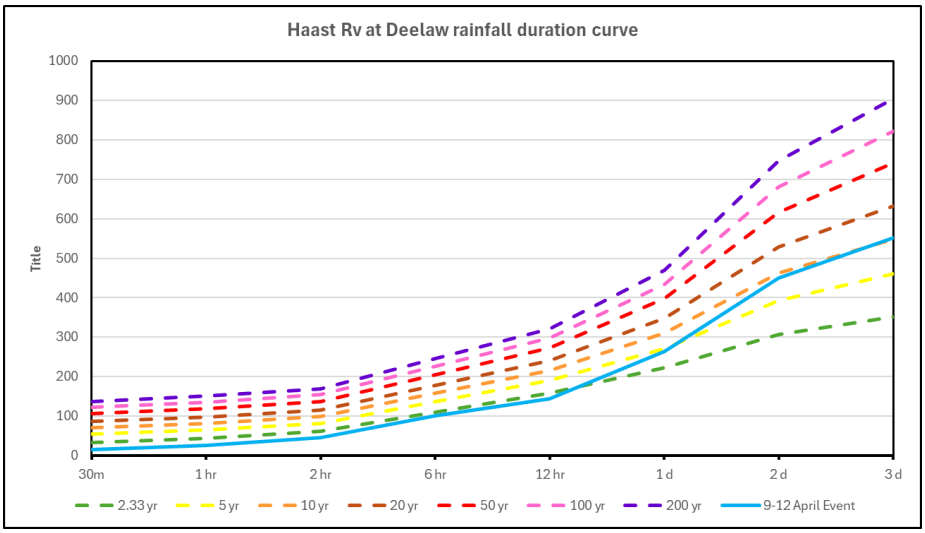
The annual return interval table for rainfall sites in the Haast catchment revealed ARIs ranging from 2.33 to 10 years for intervals between 24 and 72 hours, with further upstream sites showing ARIs between 2.33 to 5 years for intervals spanning 1 to 12 hours.

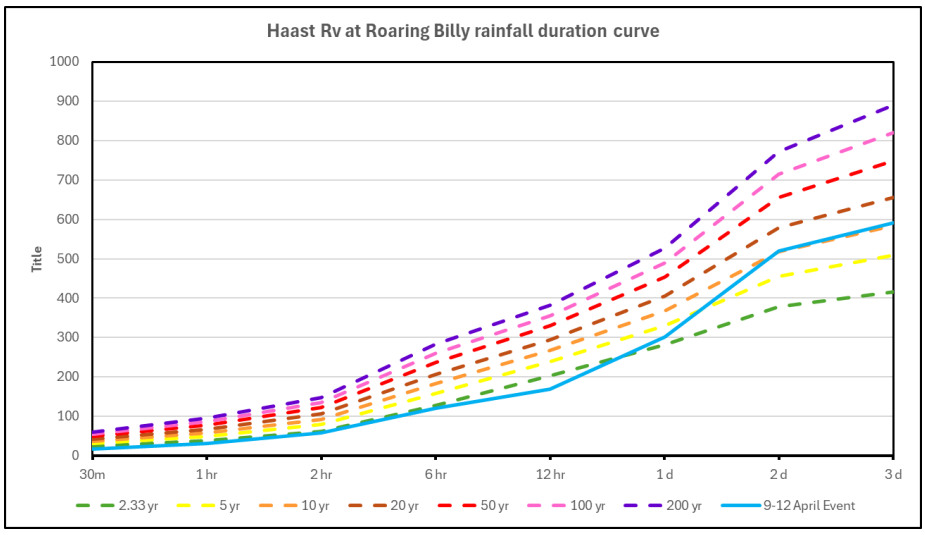
Compared to the March 2019 event, rainfall totals during this period generally remained below recorded intensities in Roaring Billy, only exceeding them at a 3-day interval, which can be attributed to the shorter duration of the March event. Meanwhile, intensities recorded in Deelaw were very similar to those of the other events for intervals ranging from 30 minutes to 12 hours but exceeded both events from the 1-day to 3-day intervals.

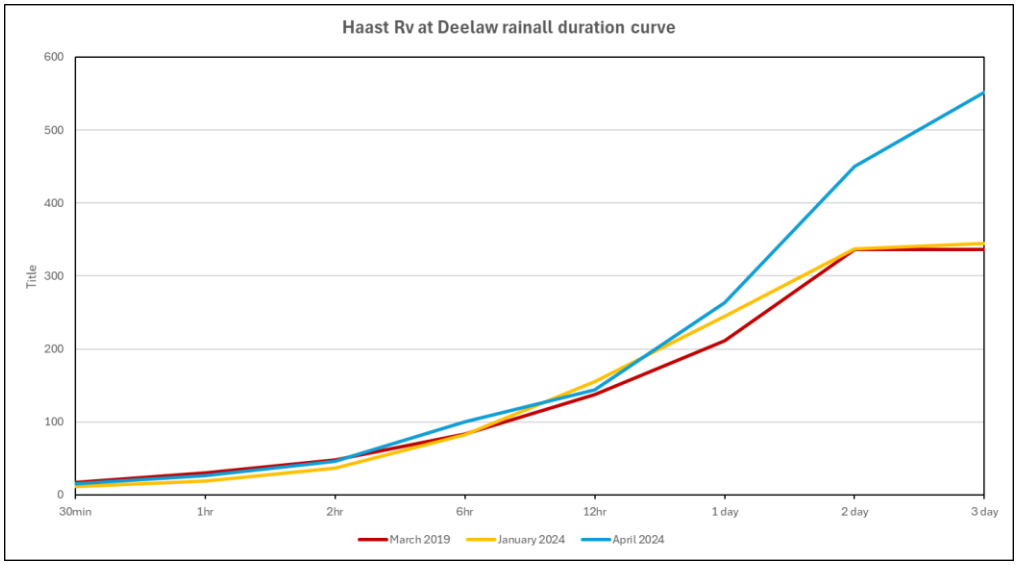
Duration curve line graphs were constructed for Deelaw and Roaring Billy, along with an additional graph comparing the duration curves of the March 2019, January 2024, and April 2024 events.

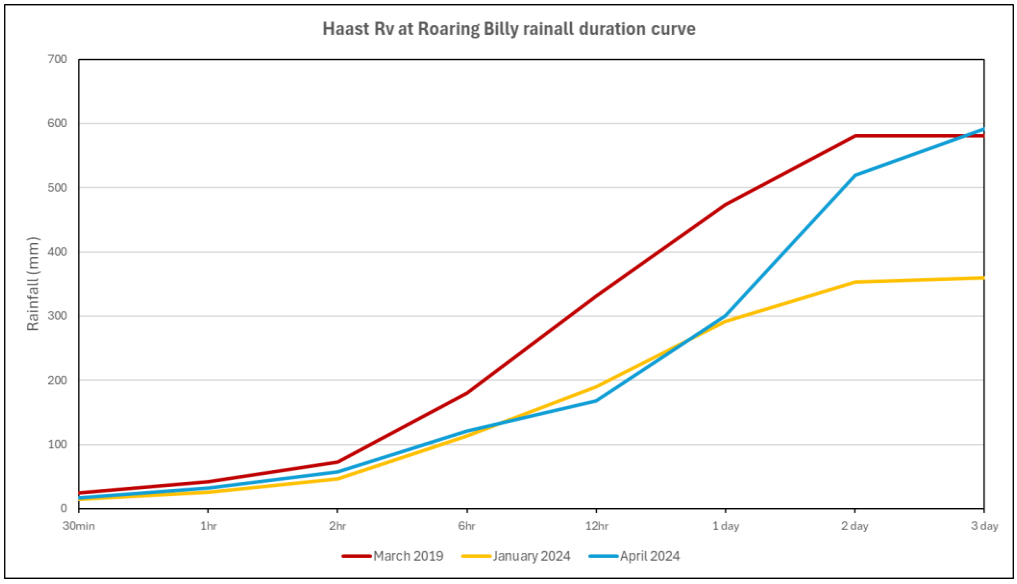
Site	Maximum rainfall (mm)								
	30min	1hr	2hr	6hr	12hr	24hr	48hr	72hr	Total
Deelaw	15.6	26.6	45.7	100.2	144.4	263.9	450.3	552	557
Roaring Billy	17.3	31.7	57.3	121.3	168.1	300.7	519.5	591.9	598
NIWA SITES									
Cron Ck	21	36.5	60.5	147	221.5	380.5	618.5	697.5	702
Moa Ck	9.5	17.5	25	57.5	96.5	133.5	239.5	296.5	297

ARI (years)	2.33	5	10	20	50	100	200

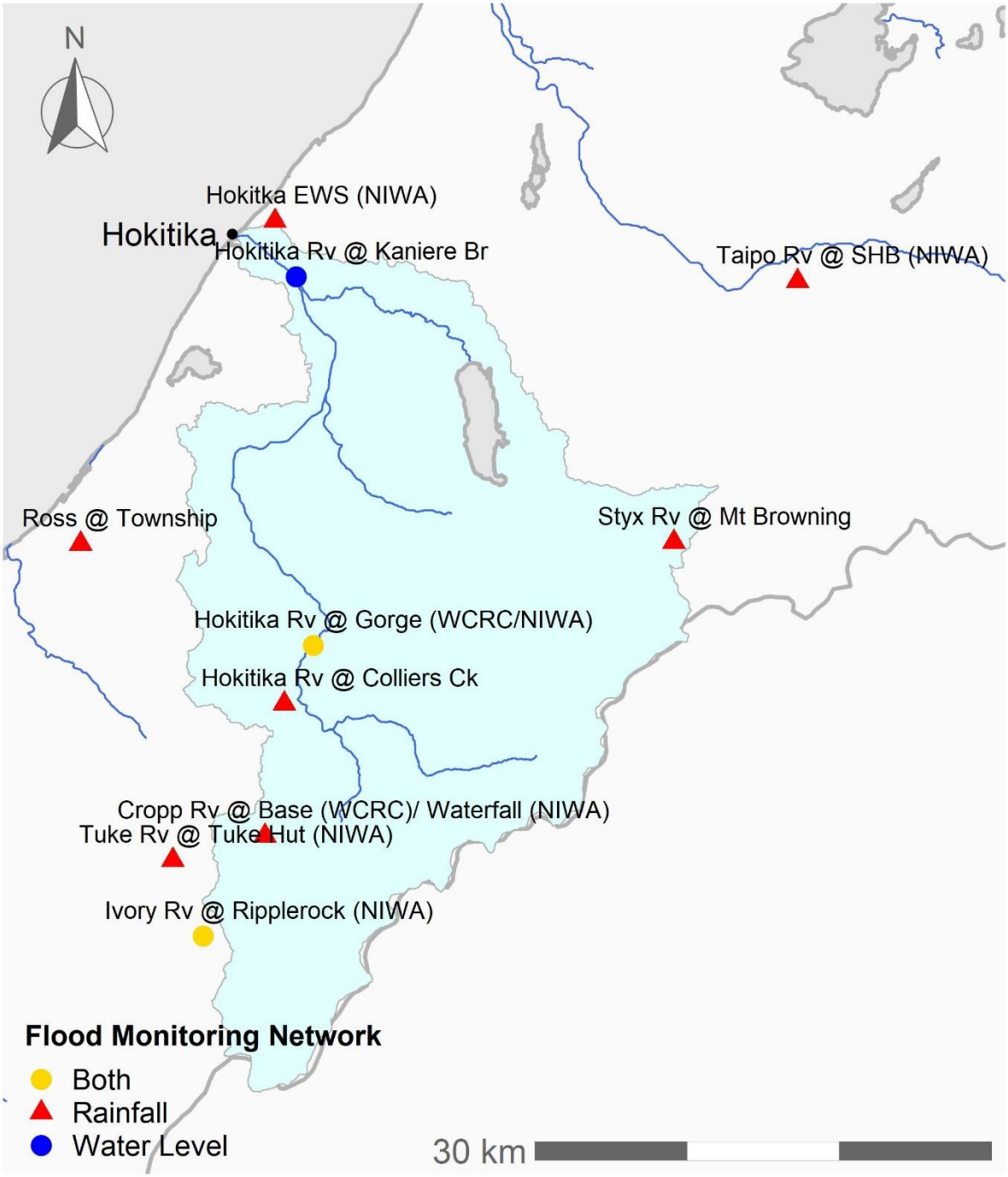





Haast Rv at Deelaw rainall duration curve
600
500
400
300
200
100
0
Title
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
January 2024
April 2024


Haast Rv at Roaring Billy rainall duration curve
700
600
500
400
300
200
100
0
Rainfall (mm)
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
January 2024
April 2024

2.2 Hokitika River



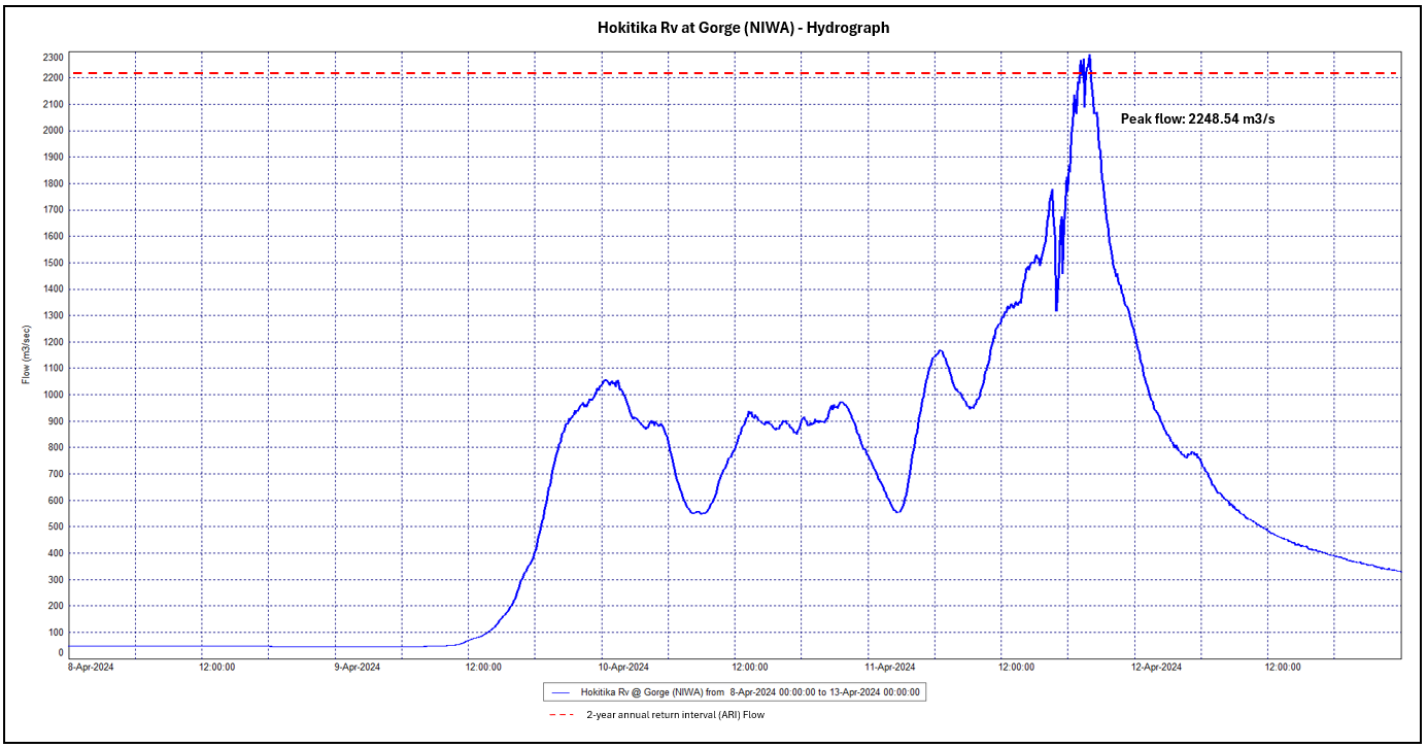
2.2.1 River flows and levels

The Hokitika River peaked at 2279m3/s, representing a 2.2-year ARI flow. Despite most of the rain gauges recording ARIs ranging from 2.3 to 5 years in the catchment, the event lasted a bit more than three days, with a brief respite on Wednesday morning and evening, allowing the river to discharge most of the accumulated flow.

Monitoring site	Date and time of peak	Peak water level (mm)	Peak flow (m3/s)	Return period
Hokitika Rv at Kanerie Br*	11/04/2024 21:40	5555	2279	N/A
Hokitika Rv at Gorge (NIWA)**	11/04/2024 19:55	5158	2249	2.2
Kokatahi Rv at Middle Terrace Br	N/A	N/A	N/A	N/A

**Not enough data to generate a reliable ARI.*

***NIWA peak used as WCRC site was flatlining data every 15mins.*



2.2.2 Rainfall ARI tables and duration curves

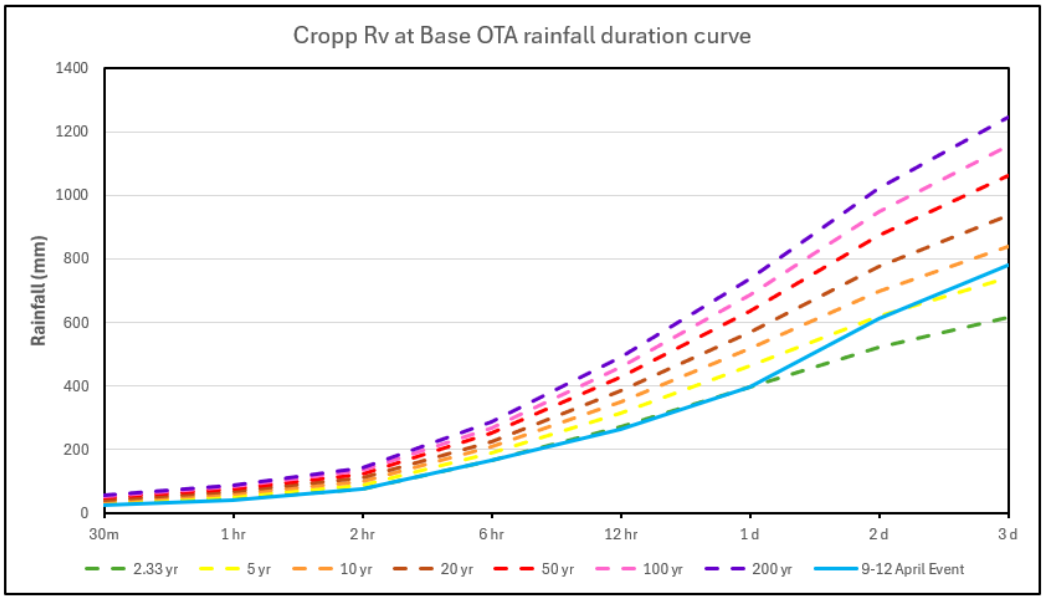
The annual return interval table for rainfall sites in the Hokitika catchment revealed ARIs ranging from 2.33 to 5 years for intervals between 24 and 72 hours, with the Tuke gauge recording a peak of a 10-year ARI for 72-hour totals. Ross, Mt Browning, and Hokitika EWS did not exceed their mean annual return intervals (2.33yr ARI).

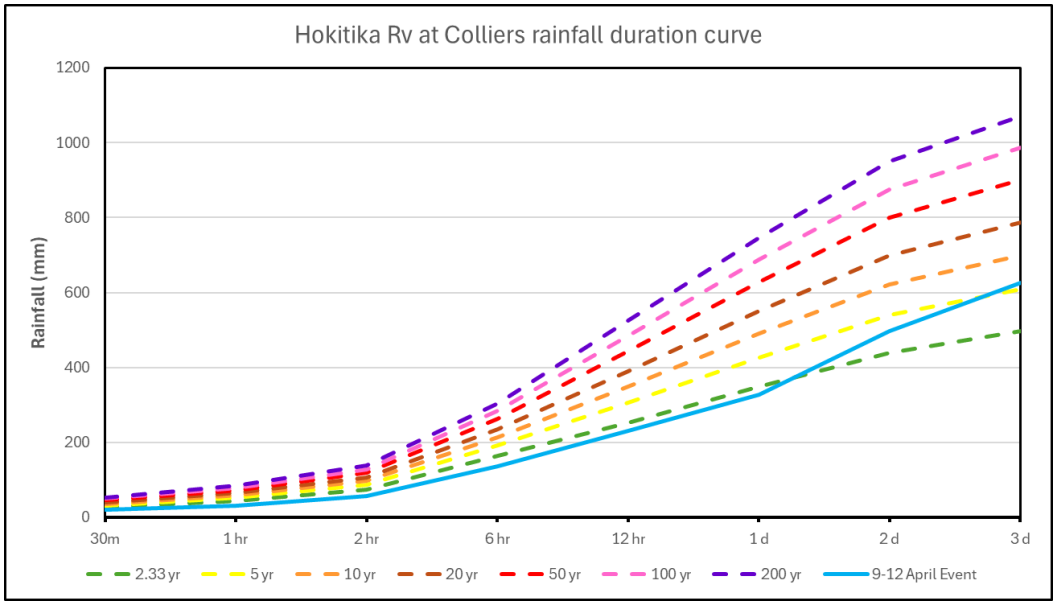
The rainfall duration curves below compare the March 2019, January 2024, and April 2024 events. The curves show that while the maximum rainfall totals of the April 2024 event were mostly below those of the March 2019 event for intervals from 30 minutes to 2 days, they surpassed those of the January 2024 event for intervals from 12 hours to 2 days. It's worth noting that this event lasted a little more than 3 days (~78 hours), while the other events had much shorter durations, with the March 2019 event lasting approximately 2 days and the January event approximately 3 days.

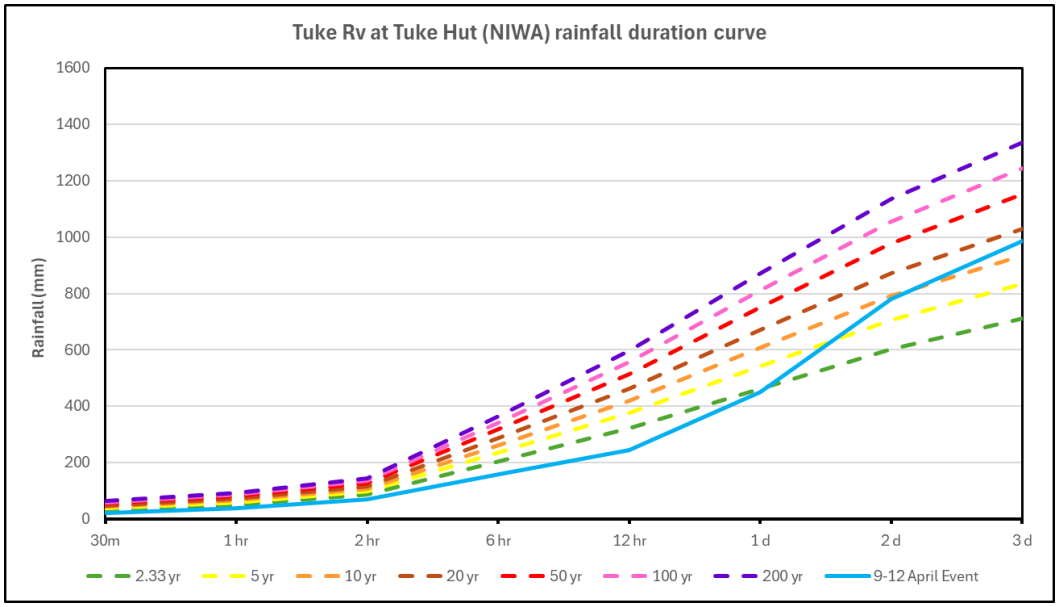
ARI duration curve line graphs were completed for Cropp Base, Colliers and Tuke Hut.

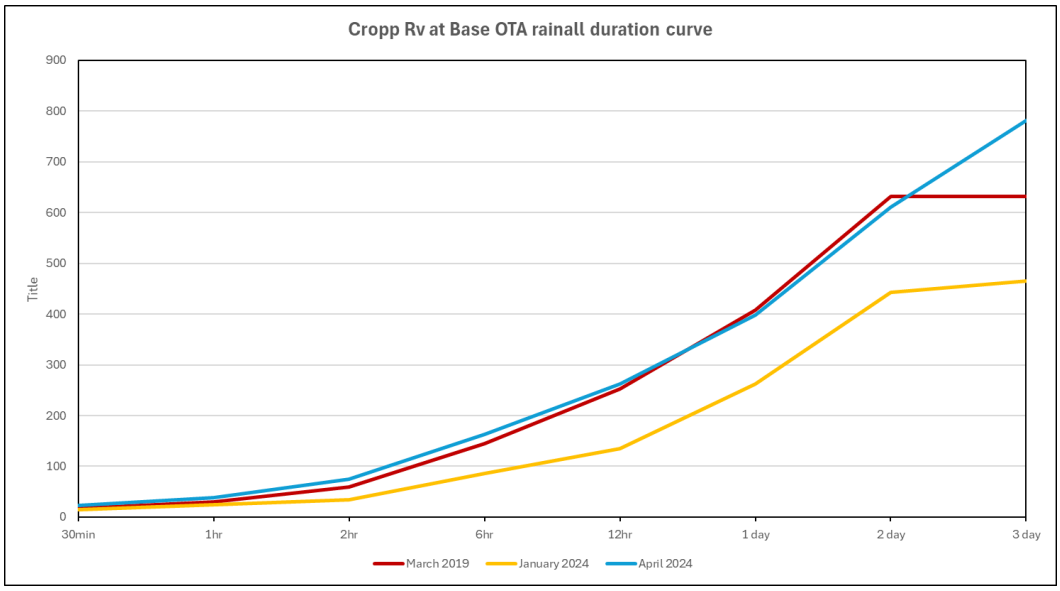
Site	Maximum rainfall (mm)								
	30min	1hr	2hr	6hr	12hr	24hr	48hr	72hr	Total
Cropp Base	23.5	38.4	75.4	163	261.7	397.7	611.3	781.5	789
Colliers	19.4	30.3	56	136.6	231.5	326.9	496.1	626	628
Gorge	13.2	20.8	34.9	80.9	141.3	174	302.2	374	374
Ross	7.2	12.5	19.2	41.5	69.5	107.1	167.1	185.5	186
Mt Browning	11.7	19.2	33.7	88	145.4	256.2	372.9	452	456
NIWA SITES									
Cropp Waterfall	22.5	43	70	164	272	414	741	931.5	942
Hokitika EWS	4.2	8.4	13.2	18.4	32.6	45.2	64.4	72.2	72
Ivory Ripplerock	18.5	35	61	162	264	383	619.5	799.5	802
Tuke Hut	20.5	39.5	69	158	243.5	450.5	781.5	986.5	989

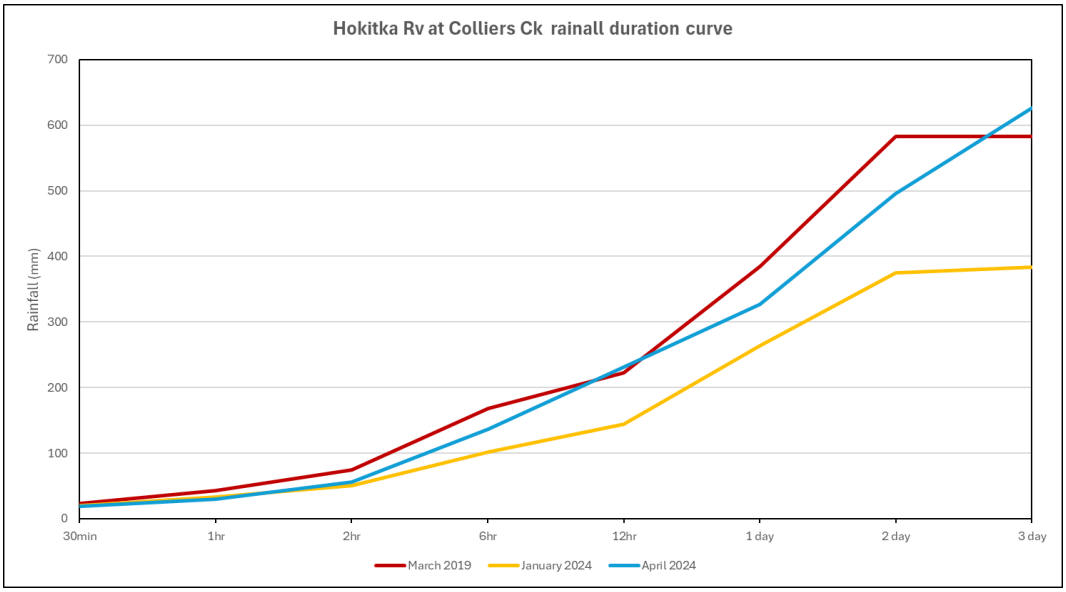
ARI (years)	2.33	5	10	20	50	100	200

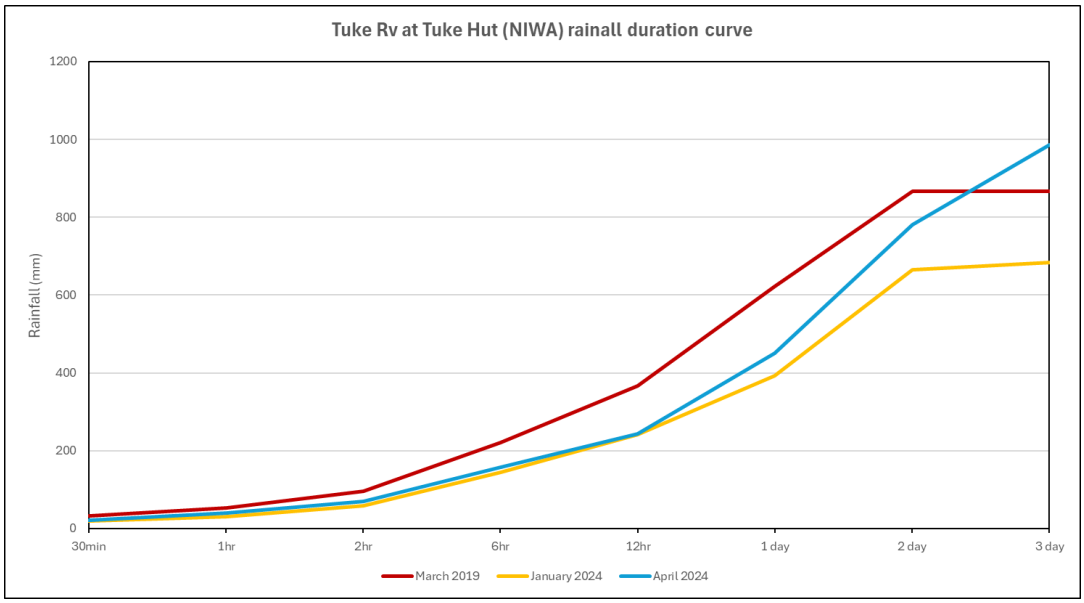

Cropp Rv at Base OTA rainfall duration curve
Rainfall (mm)
1400
1200
1000
800
600
400
200
0
30m
1 hr
2 hr
6 hr
12 hr
1 d
2 d
3 d
2.33 yr
5 yr
10 yr
20 yr
50 yr
100 yr
200 yr
9-12 April Event


Hokitika Rv at Colliers rainfall duration curve
Rainfall (mm)
1200
1000
800
600
400
200
0
30m
1 hr
2 hr
6 hr
12 hr
1 d
2 d
3 d
2.33 yr
5 yr
10 yr
20 yr
50 yr
100 yr
200 yr
9-12 April Event

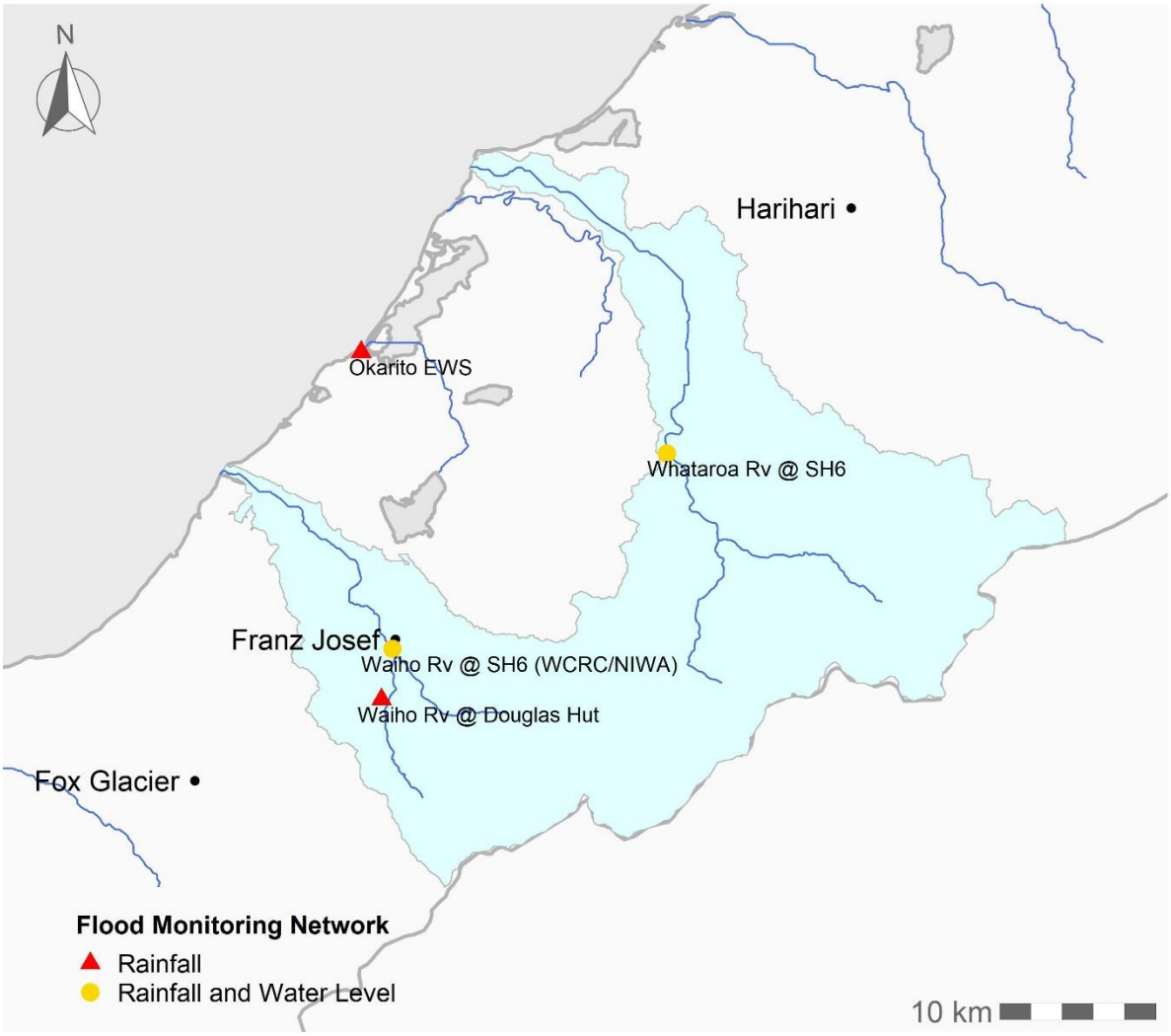

Tuke Rv at Tuke Hut (NIWA) rainfall duration curve
Rainfall (mm)
1600
1400
1200
1000
800
600
400
200
0
30m
1 hr
2 hr
6 hr
12 hr
1 d
2 d
3 d
2.33 yr
5 yr
10 yr
20 yr
50 yr
100 yr
200 yr
9-12 April Event


Cropp Rv at Base OTA rainall duration curve
900
800
700
600
500
400
300
200
100
0
Title
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
January 2024
April 2024


Hokitka Rv at Colliers Ck rainall duration curve
700
600
500
400
300
200
100
0
Rainfall (mm)
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
January 2024
April 2024


Tuke Rv at Tuke Hut (NIWA) rainall duration curve
1200
1000
800
600
400
200
0
Rainfall (mm)
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
January 2024
April 2024

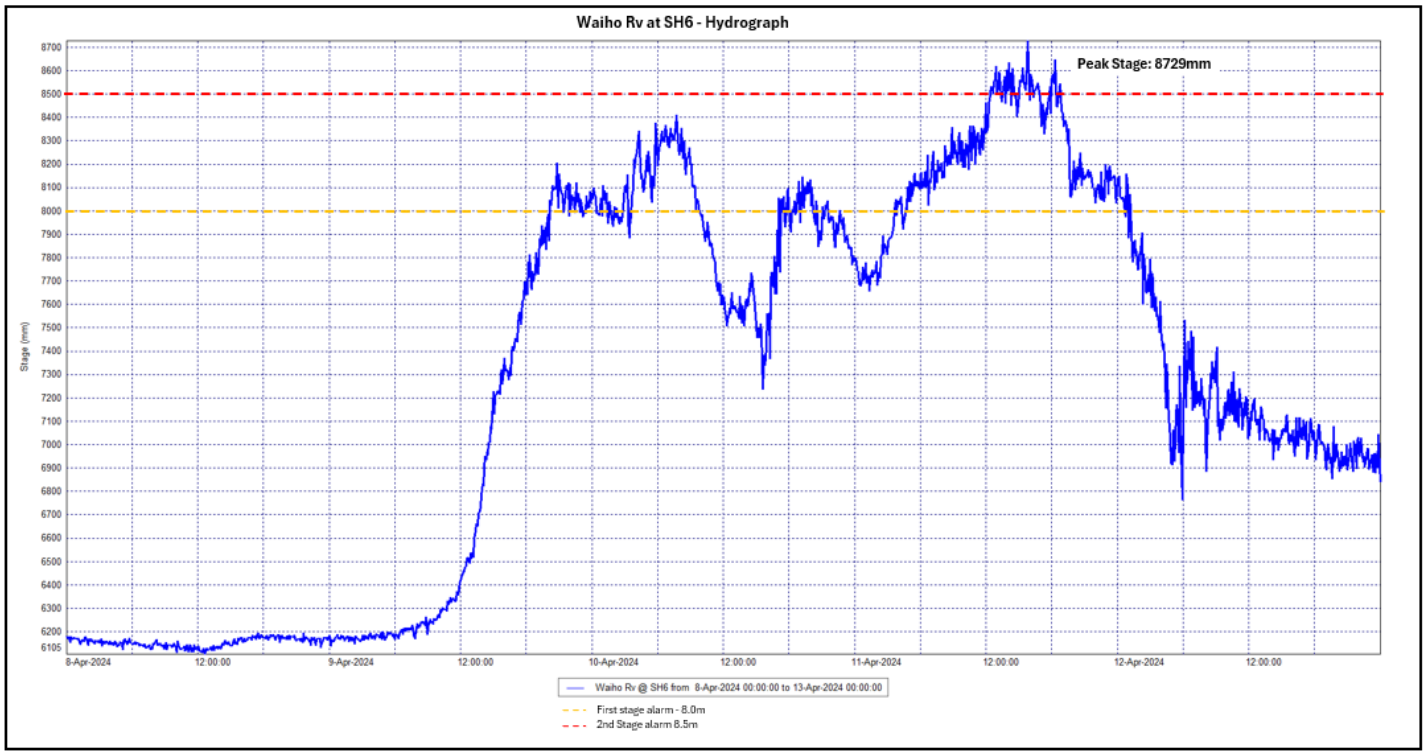
2.3 Waiho and Whataroa Rivers



2.3.1 River flows and levels

The Waiho River triggered its first stage alarm on Tuesday, the 9th, and rose again, reaching its second stage alarm of 8.5m on Thursday, the 11th. It's worth noting that due to the river's highly mobile bed, predicting its rise based on accumulated rainfall is challenging. Meanwhile, the Whataroa River peaked at 4828mm, remaining below its first stage alarm of 5.0m. The corresponding flow was 1938.747m3/s, with a flow return interval of less than 1.2 years.

Monitoring site	Date and time of peak	Peak water level (mm)	Peak flow (m3/s)	Return period
Waiho Rv at SH6	11/04/2024 15:50	8729	N/A	N/A
Whataroa Rv at SHB	11/04/2024 14:55	4828	1938.747	<1.2



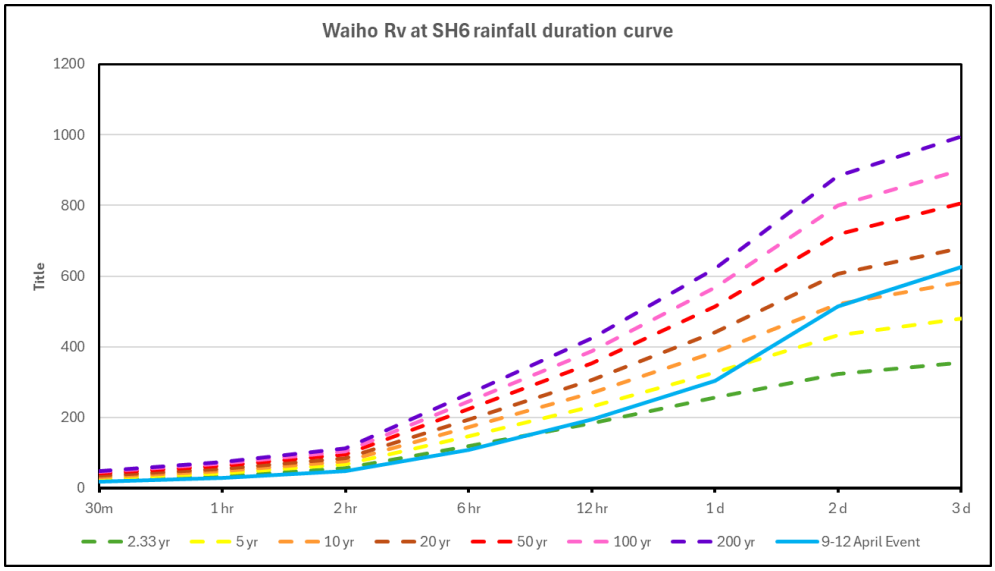
2.3.2 Rainfall ARI tables and duration curves

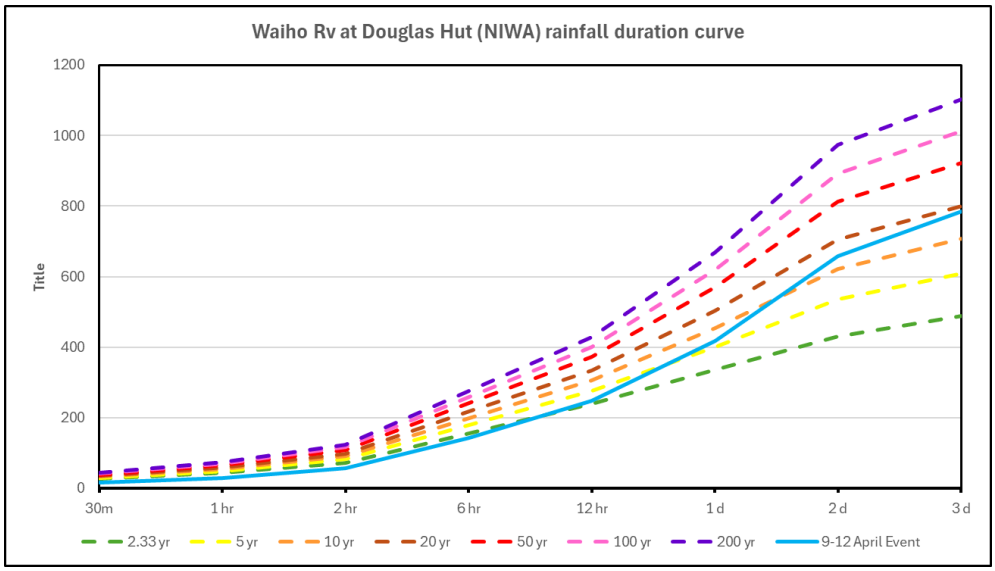
The rainfall duration curves below compare the March 2019, January 2024, and April 2024 events. They illustrate that the maximum rainfall totals of the April event were very similar to those of the March 2019 event and surpassed the January 2024 totals for intervals ranging from 1 hour to 2 days. Notably, this event lasted a little more than 3 days (~78 hours), while the other events were much shorter in duration, with the March 2019 event lasting approximately 2 days and the January event around 3 days.

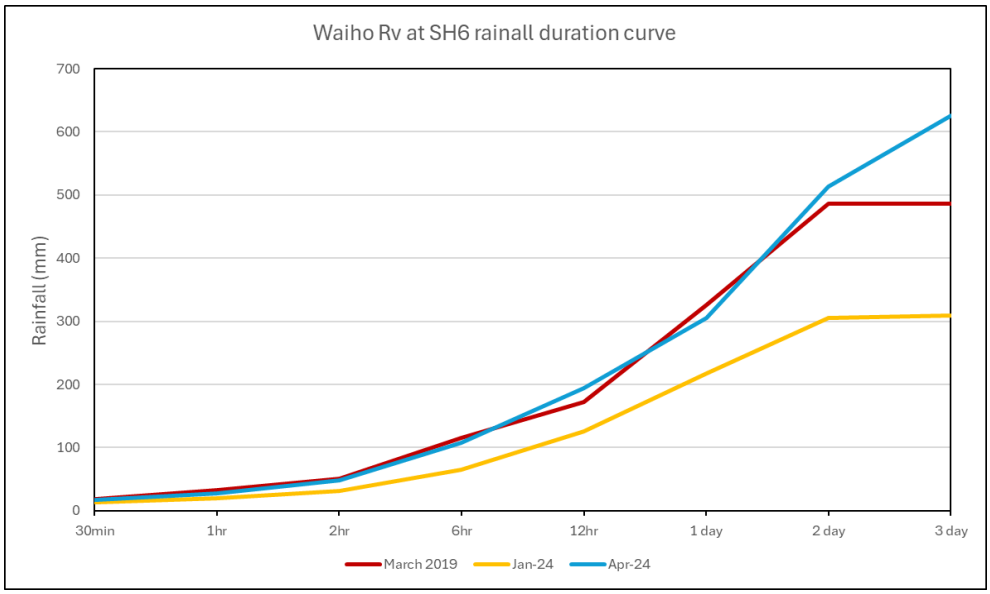
Site	Maximum rainfall (mm)								
	30min	1hr	2hr	6hr	12hr	24hr	48hr	72hr	Total
Waiho SH6	17.1	27.8	47.7	107.4	193.7	304.7	513.5	626	626
*Harihari	20.5	36.1	60.1	93.4	150.8	196.4	314.4	354	354
NIWA SITES									
*Okarito EWS	7.5	15	25.6	59.4	80	137.2	226.8	285.6	286
Waiho Douglas	16	29.5	57	142	248.5	418.5	659	784.5	784
Whataroa SH6	15.5	24.5	44	79.5	135.5	205	376.5	460	461

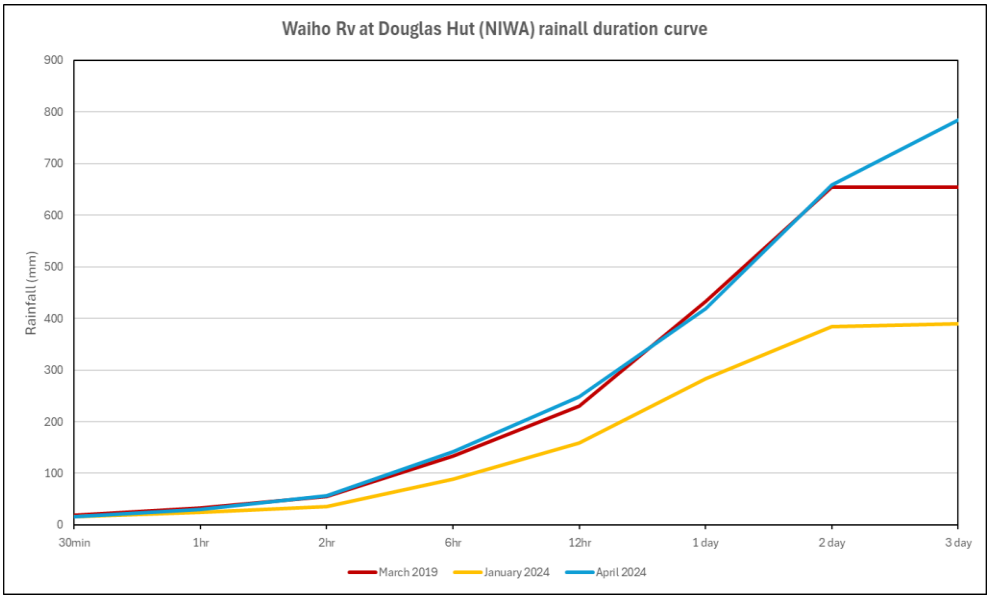
*Not enough data to generate a annual return interval.

ARI (years)	2.33	5	10	20	50	100	200


Waiho Rv at SH6 rainfall duration curve
Title
1200
1000
800
600
400
200
0
30m
1 hr
2 hr
6 hr
12 hr
1 d
2 d
3 d
2.33 yr
5 yr
10 yr
20 yr
50 yr
100 yr
200 yr
9-12 April Event


Waiho Rv at Douglas Hut (NIWA) rainfall duration curve
Title
1200
1000
800
600
400
200
0
30m
1 hr
2 hr
6 hr
12 hr
1 d
2 d
3 d
2.33 yr
5 yr
10 yr
20 yr
50 yr
100 yr
200 yr
9-12 April Event


Waiho Rv at SH6 rainall duration curve
Rainfall (mm)
700
600
500
400
300
200
100
0
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
Jan-24
Apr-24


Waiho Rv at Douglas Hut (NIWA) rainall duration curve
Rainfall (mm)
900
800
700
600
500
400
300
200
100
0
30min
1hr
2hr
6hr
12hr
1 day
2 day
3 day
March 2019
January 2024
April 2024

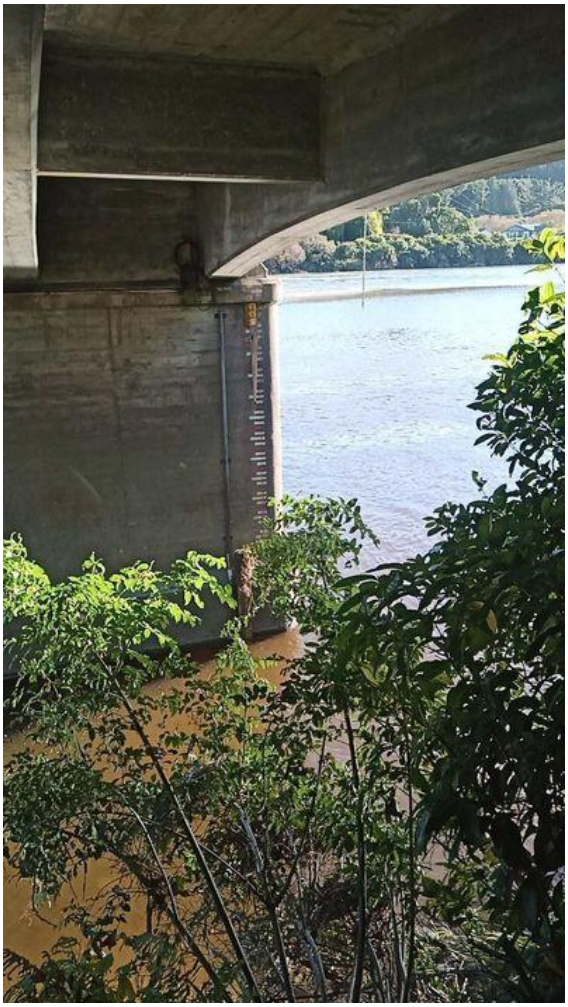
Appendix

A. Rainfall summary table

Catchment	Rainfall Site	Maximum rainfall intensity		Total rainfall
		mm/30min	mm/1hr	(mm)
Buller	Buller Rv @ Bald Hill	11.3	14.6	52
	Buller Rv @ Three Channel Flat	12.5	18.1	78
	Inangahua Rv @ Brunner Range	11.9	20.2	119
	Inangahua Rv @ Landing	7.5	12.1	78
	Maruia Rv @ Springs Junction	4.5	7.8	54
	Matakitaki @ Horse Terrace Br (TDC)	10	18.5	70
	Ohikanui Rv @ Buckland Peaks	12.5	23.1	244
	Orikaka Rv @ Plateau Stm	17	27.2	139
	Reefton @ Township	7.9	14	65
	Westport EWS (NIWA)	4.6	9.2	35
Grey	Ahaura Rv @ Gorge WCRC	20.6	20.7	47
	Arnold Rv @ Moana	7.1	9.9	53
	Grey Rv @ Conical Hill	4	6.9	43
	Grey Rv @ Haupiri	4.6	8.5	48
	Grey Rv @ Ngahere	8.3	12.3	67
	Grey Rv @ Waipuna WCRC	3.7	6.1	16
	Grey Rv @ WCRC Office2	7.3	10.2	44
	Greymouth Aero EWS (NIWA)	5.1	10.2	40
	Mawheraiti Rv @ Atarau Br	4.6	8	22
	Pigeon Creek CWS (NIWA)	12	15.4	117
	Sirdar Ck @ Paparoa	7.9	14.8	149
Haast	Haast Rv @ Cron Ck (NIWA)	21	36.5	702
	Haast Rv @ Deelaw	15.6	26.6	557
	Haast Rv @ Moa Ck (NIWA)	9.5	17.5	297
	Haast Rv @ Roaring Billy WCRC	17.3	31.7	598
Hokitika	Cropp Rv @ Waterfall (NIWA)	22.5	43	942
	Hokitika EWS (NIWA)	4.2	8.4	72
	Hokitika Rv @ Colliers Ck	19.4	30.3	628
	Hokitika Rv @ Gorge WCRC	13.2	20.8	374
	Ivory Rv @ Ripplerock (NIWA)	18.5	35	802
	Ross @ Township	7.2	12.5	186
	Styx Rv @ Mt Browning	11.7	19.2	456
	Tuke Rv @ Tuke Hut (NIWA)	20.5	39.5	989
Karamea	Karamea Rv @ Garibaldi	5.5	6.7	38
	Karamea Rv @ Township	6.1	7.1	14
Mokihinui	Mokihinui Rv @ Stoney Ck	12	17.4	74
Waiho	Okarito EWS (NIWA)	7.5	15	286
	Waiho Rv @ Douglas Hut (NIWA)	16	29.5	784
	Waiho Rv @ SH6	17.1	27.8	626
Wanganui	Harihari @ School	20.5	36.1	354
Whataroa	Whataroa Rv @ SH6 (NIWA)	15.5	24.5	461

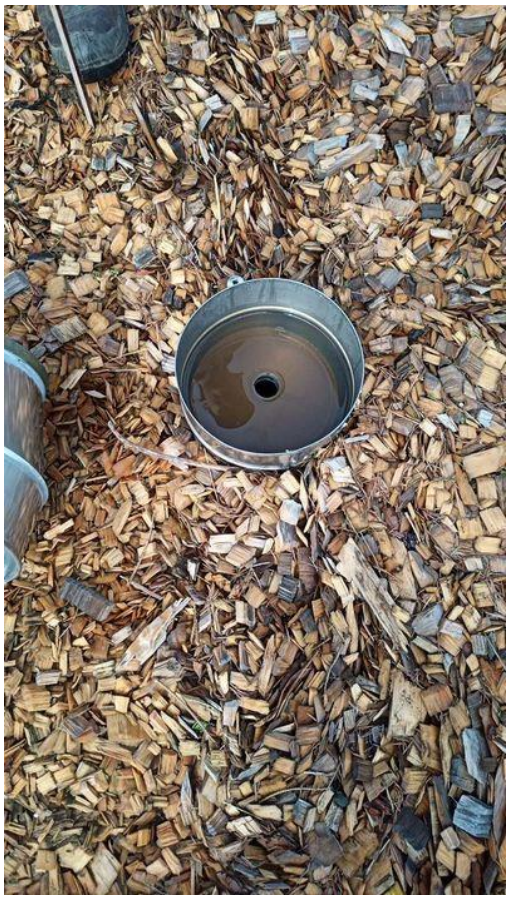
B. Post Flood Photos

Hokitka Rv at Kanerie Br:
Left photo is of SG, note the painted lines are in feet.
Right photo shows the radar sensor attached to the bridge. Sensor located D/s of bridge on the TR section.



Harihari rain gauge:

Photo shows flooded check gauge, intensity gauge was sitting higher up so was not flooded.



C. MetService warnings

Monday 8th April 10:08 am:

Situation:
A front is expected to move northwards over Fiordland on Tuesday, and become slow moving in Westland during Wednesday and Thursday. A humid north to northwest flow precedes the front, and is expected to bring periods of heavy rain to Fiordland and Westland, and strong north to northwest winds to Fiordland and the Canterbury High Country.

Watches and warnings are in force for heavy rain and severe gales.
This is expected to be a significant heavy rain event for Westland, with potential for an upgrade to a Red Warning over the coming days. However, there is some uncertainty with the movement of this front.

Heavy Rain Warning for Westland - Orange
Issued: 10:08am Monday, 8th April 2024
Area: Westland District south of Hokitika
Valid: 9:00am Tuesday to 6:00pm Thursday
Periods of heavy rain. Expect 600 to 800mm to accumulate about the ranges, and 200 to 300mm about the coast. Peak rates of 20 to 30 mm/h about the ranges. This is a significant heavy rain event with the potential for upgrade to a Red Warning.and the placement of heaviest rain may change.

Monday 8th April 8:45pm:

Situation

A front is expected to move northwards over Fiordland on Tuesday, and become slow moving in Westland during Wednesday and Thursday. A humid north to northwest flow precedes the front, and is expected to bring periods of heavy rain to Fiordland and Westland, and strong north to northwest winds to Fiordland and the Canterbury High Country. Watches and warnings are in force for heavy rain and severe gales. This is expected to be a significant heavy rain event for Westland, with potential for an upgrade to a Red Warning over the coming days. However, there is some uncertainty with the movement of this front, and the placement of heaviest rain may change. People are advised to keep up to date with the latest forecasts.

Heavy Rain Warning for Westland – Orange

Issued: 8:43pm Monday, 8th April 2024
Area: Westland District south of Hokitika
Valid: 9:00am Tuesday to 6:00pm Thursday
Periods of heavy rain. Expect 600 to 800mm to accumulate about the ranges, and 200 to 300mm about the coast. Peak rates of 20 to 30 mm/h about the ranges. This is a significant heavy rain event with the potential for upgrade to a Red Warning.

Tuesday 9th April 09:49am:

Situation:

A front is expected to move northwards over Fiordland today (Tuesday), and become slow moving between Westland and Fiordland during Wednesday and early Thursday, then move northwards later on Thursday. A humid northerly flow precedes the front, and is expected to bring periods of heavy rain to Fiordland and Westland, strong north to northwest winds to Fiordland and the Canterbury High Country, and large waves to the west coast of the South Island.

This is expected to be a significant heavy rain event for Westland, with potential for an upgrade to a Red Warning over the coming days. However, there is some uncertainty with the movement of this front, and the placement of heaviest rain may change.

Heavy Rain Warning for Westland – Orange
Issued: 9:49am Tuesday, 9th April 2024
Area: Westland District south of Hokitika
Valid: 10:00am Tuesday to 12:00am Friday
Periods of heavy rain. Expect 600 to 800mm to accumulate about the ranges, and 200 to 300mm about the coast. Peak rates of 25 to 35 mm/h about the ranges from mid Tuesday afternoon until Wednesday evening, then again from mid Thursday morning onwards. This is a significant heavy rain event with the potential for upgrade to a Red Warning.

Tuesday 9th April 8:41pm:

Situation:
A front is expected to move northwards over Fiordland Tuesday night and become slow moving between Westland and Fiordland during Wednesday and early Thursday, then move northwards later on Thursday.
A humid northerly flow precedes the front, and is expected to bring periods of heavy rain to Fiordland and Westland, strong north to northwest winds to Fiordland and the Canterbury High Country, and large waves to the west coast of the South Island.
This is a significant rain event for Westland and impacts are already being felt. People should listen to advice from local authorities, and those who need to travel through the region need to take extra care. For Westland there is increased likelihood of escalation of this Warning to a Red Warning Wednesday morning

Heavy Rain Warning for Westland - Orange
Issued: 8:41pm Tuesday, 9th April 2024
Area: Westland District south of Hokitika
Valid: 8:00pm Tuesday to 9:00pm Thursday
Periods of heavy rain. On top of what has already fallen, expect 500 to 700mm to accumulate about the ranges, and 150 to 250mm about the coast. Peak rates of 25 to 35 mm/h about the ranges until about midday Wednesday, and then again from early Thursday morning onwards. This is a significant heavy rain event and there is increased likelihood of escalation of this Warning to a Red Warning Wednesday morning.

Wednesday 10th April 10:00am:

Situation:
Heavy rain and northerly gales for much of the South Island and parts of the North Island, including significant heavy rain for Westland.
A front lies slow moving between Westland and Fiordland and is expected to move northwards on Thursday and onto the North Island on Friday. A humid northerly flow precedes the front, and is expected to bring periods of heavy rain and strong north to northwest winds to

many places. Large waves are also expected to affect the west coast of the South Island. The flow turns cooler southeasterly behind the front, bringing heavy rain to the far south of the South Island.

Heavy Rain Warning for Buller - Orange
Issued: 9:56am Wednesday, 10th April 2024
Area: Buller District south of Seddonville and northwest of Reefton
Valid: 6:00am Thursday to 12:00am Friday
Expect 80 to 120 mm of rain, especially about the Paparoa Range. Peak rates of 15 to 25 mm/h expected Thursday afternoon and evening.

Heavy Rain Warning for Westland - Orange
Issued: 9:56am Wednesday, 10th April 2024
Area: Westland District south of Hokitika
Valid: 9:00am Wednesday to 9:00pm Thursday
On top of what has already fallen, expect 250 to 400 mm to accumulate about the ranges, and 100 to 200 mm about the coast. Peak rates of 25 to 35 mm/h about the ranges from Thursday afternoon onwards. Please note, much of this rain will fall during Thursday.

Wednesday 10th April 8:48pm

Situation:
Heavy rain and northerly gales for much of the South Island and parts of the North Island, including significant heavy rain for Westland and Southland.

A front lies slow moving between Westland and Fiordland and is expected to move northwards on Thursday and onto the North Island on Friday. A humid northerly flow precedes the front, and is expected to bring periods of heavy rain and strong north to northwest winds to many places. Large waves are also expected to affect the west coast of the South Island. The flow turns cooler southeasterly behind the front, bringing heavy rain to the far south of the South Island.

This is a significant event for Westland, with potential for upgrade
to a Red Warning.

Heavy Rain Warning for Buller - Orange
Issued: 8:48pm Wednesday, 10th April 2024
Area: Buller District south of Seddonville and northwest of Reefton
Valid: 6:00am Thursday to 12:00am Friday
Expect 80 to 120 mm of rain, especially about the Paparoa Range. Peak rates of 15 to 25 mm/h expected Thursday afternoon and evening.

Heavy Rain Warning for Westland - Orange
Issued: 8:48pm Wednesday, 10th April 2024
Area: Westland District south of Hokitika
Valid: 8:00pm Wednesday to 9:00pm Thursday
On top of what has already fallen, expect 200 to 300 mm to accumulate about the ranges south of Bruce Bay, and 250 to 350 mm about the ranges further north. About the coast, expect 100 to 150 mm. Peak rates of 25 to 35 mm/h about the ranges from Thursday morning onwards. This is a significant event, with the potential for upgrade to a Red Warning.

Thursday 11th April 10:00am:

Situation:
Heavy rain and northerly gales for much of the South Island and parts of the North Island, including significant heavy rain for Westland and Southland

A complex trough of low pressure over the Tasman Sea is moving slowly towards New Zealand, while an associated front moves over the South Island overnight tonight and over the North Island during Friday. A humid northerly flow precedes the front, and is expected to bring periods of heavy rain and strong north to northeast winds to many places. Large waves are also expected to affect the west coast of the South Island. A cooler southeasterly flow behind the front is bringing heavy rain to the far south of the South Island.

This continues to be a significant event for Westland.

Heavy Rain Warning for Buller - Orange
Issued: 9:56am Thursday, 11th April 2024
Area: Buller District south of Seddonville and northwest of Reefton
Valid: 9:00am Thursday to 12:00am Friday
On top of what has already fallen, expect 70 to 100 mm of rain, especially about the Paparoa Range. Peak rates of 15 to 25 mm/h expected this afternoon and evening, thunderstorms possible.

Heavy Rain Warning for Westland - Orange
Issued: 9:56am Thursday, 11th April 2024
Area: Westland District south of Hokitika
Valid: 9:00am Thursday to 3:00am Friday
On top of what has already fallen, expect 150 to 200 mm to accumulate about the ranges, and 50 to 100 mm nearer the coast. Peak rates of 25 to 35 mm/h about the ranges today, thunderstorms possible. Please note, the heaviest rain should ease late afternoon and evening, but showers and possible thunderstorms continue through into early Friday morning.

Thursday 11th April 8:22pm:

Situation:
Heavy rain and northerly gales for much of the South Island and parts of the North Island, including significant heavy rain for Westland

A complex trough of low pressure over the Tasman Sea is moving slowly towards New Zealand, while an associated front moves over the South Island overnight tonight(Thursday) and over the North Island during Friday. A humid northerly flow precedes the front, and is expected to bring periods of heavy rain and strong north to northeast winds to many places. Large waves are also expected to affect the west coast of the South Island. A cooler southeasterly flow behind the front is bringing heavy rain to the far south of the South Island.

Heavy Rain Warning for Buller - Orange
Issued: 8:22pm Thursday, 11th April 2024
Area: Buller District south of Seddonville and northwest of Reefton
Valid: 8:00pm Thursday to 2:00am Friday

On top of what has already fallen, expect 30 to 45 mm of rain, especially about the Paparoa Range. Peak rates of 15 to 25 mm/h with possible thunderstorms.

Heavy Rain Warning for Westland - Orange
Issued: 8:22pm Thursday, 11th April 2024
Area: Westland District south of Hokitika
Valid: 8:00pm Thursday to 5:00am Friday
On top of what has already fallen, expect 50 to 80 mm to accumulate about the ranges, and 30 to 50 mm nearer the coast. Peak rates of 20 to 30 mm/h, with thunderstorms possible.

Cancellations
Heavy Rain Warning for Fiordland – Orange

Friday 12th April 09:45am:

Cancellations
Heavy rain warnings lifted for Buller and Westland.

8.4	**18th to 20th January 2024 Flood Event Report**
Author	Samwell Warren, Manager, Hydrology; Izelda Mulder, Hydrology Data Analyst
Authorizer	Darryl Lew, Chief Executive
Public Excluded	No

Report Purpose

The purpose of this report is to summarise the flood event of the 18th to 20th January 2024, including forecasted weather conditions and alerts, antecedent river and rainfall conditions, river response to rainfall, and place the event significance in a long term climate context.

Report Summary

Between January 18th and 20th, 2024, the Westland District of the West Coast experienced a humid north-northwest atmospheric flow which saw higher than average rainfalls.

River levels and catchments were moderately dry and low before the event.

On Thursday, January 18th, Metservice issued a red rainfall warning forecasting 600-800mm in the ranges south of Otira and 100-200mm along the coast, with peak rates of 30-35mm/hr over 47 hours. The initial warning hinted at a possible extension in event duration, and implied the event forecasted was similar to the March 2019 event that washed away the Waiho bridge.

In response a local state of emergency was declared for Westland District at 2:37 pm on Friday, 19th.

Observed rainfall at all rainfall monitoring sites following the state of emergency were just above half those forecast, with the exception of the Tuke Rv at Tuke Hut (NIWA) gauge, which recorded 684mm of rainfall.

The event lasted 3 days, easing on Saturday at 10 am.

Recorded rainfall totals and river flow levels can be found in Attachment 1, *"18th to 20th January 2024 Event Report".*

Of note,

- The Hokitika River exceeded its 1-year AEP flow but stayed below its peaking at 4123mm or 1337m³/s.
- In the Waiho catchment, rainfall totals remained below the mean annual rainfall totals.
- The Waiho River triggering its second-stage alarm and peaked at 8511mm.
- The Whataroa River water level peaked at 4720mm with a flow of 1844m³/s, just exceeding its 1-year annual return interval flow.
- In the Haast River catchment all rain gauges exceeding their mean annual rainfall totals over a 2-day period; and
- The Haast and Arawhata rivers responded rapidly, with the Haast River peaking at 5511mm and a flow of 3195m³/s, exceeding its 1-year annual return interval, and the Arawhata River peaking at 7015mm.

Recommendations

It is recommended that the Committee resolve to:

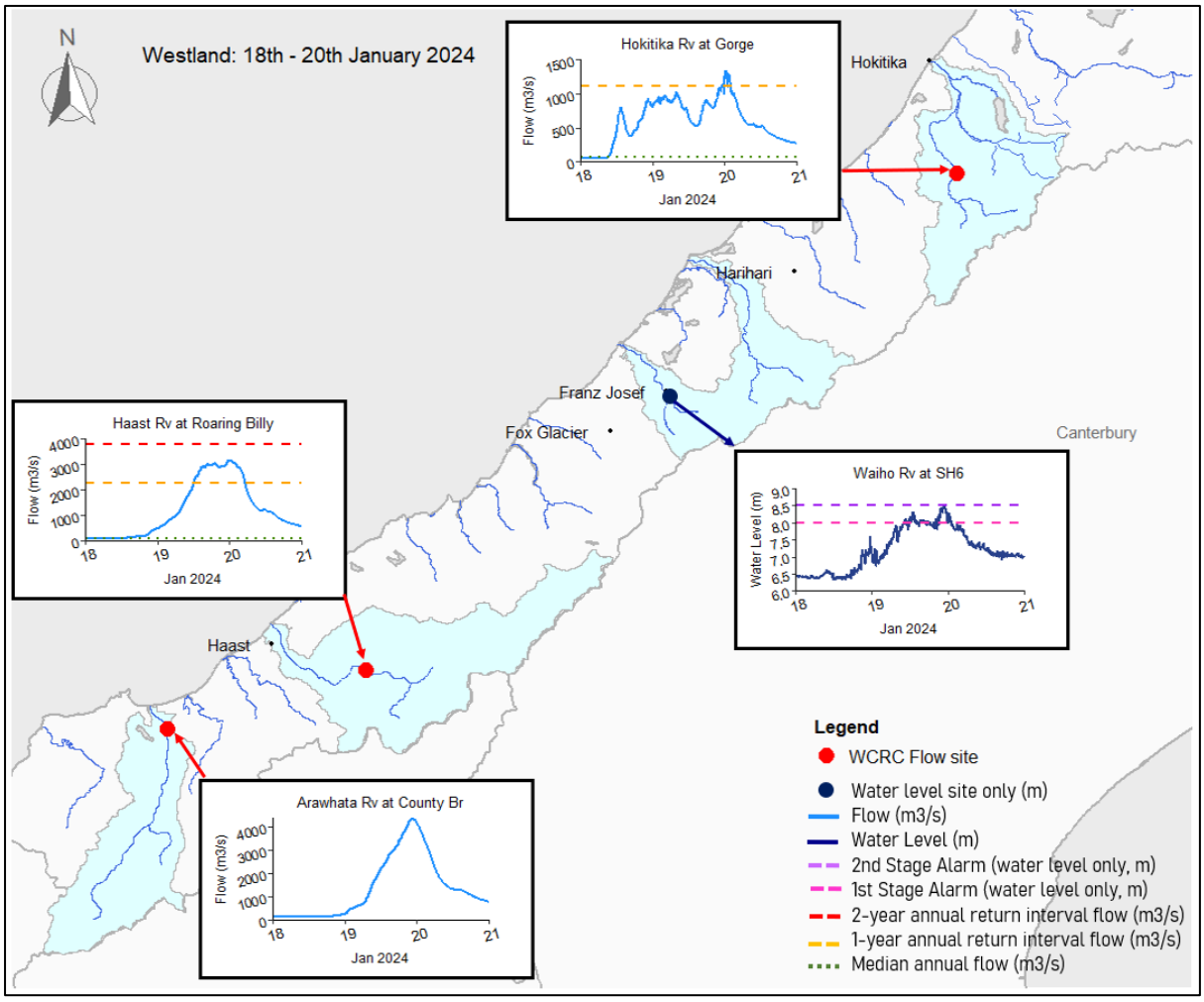
1. Receive the report.

Attachments

Attachment 1: 18th to 20th January 2024 Event Report

18th to 20th January 2024 Event Report

WCRC Hydrology – IM



Contents

1. Event summary

Between January 18th and 20th, 2024, the southern half of the West Coast experienced a humid north-northwest flow. River levels and catchments were moderately dry and low before the event.

On Thursday, January 18th, Metservice upgraded an orange warning to red, forecasting 600-800mm in the ranges south of Otira and 100-200mm along the coast, with peak rates of 30-35mm/hr over 47 hours. The initial warning hinted at a possible extension, implying significant impact for the Waiho River, akin to the March 2019 event that washed away the Waiho bridge.

By Friday, there was a delay in heavy rain, allowing rivers to discharge overnight rainfall. The event lasted 3 days, easing on Saturday at 10 am. Observed rainfall totals were just above half the predictions, apart from Tuke Rv at Tuke Hut (NIWA) gauge, recording 684mm, surpassing its mean annual rainfall interval (2.33-year ARI).

The Hokitika River exceeded its 1-year annual return flow but stayed below its mean annual return interval, peaking at 4123mm or 1337m³/s.
In the Waiho catchment, rainfall totals remained below the mean annual rainfall interval, with the Waiho River triggering its second-stage alarm and peaking at 8511mm. The Whataroa peaked at 4720mm with a flow of 1844m³/s, just exceeding its 1-year annual return interval flow.
Meanwhile, the Haast catchment observed all rain gauges exceeding their mean annual rainfall interval over a 2-day period; however, over a 3-day period, Haast at Roaring Billy was the only gauge not exceeding its mean annual interval. The Haast and Arawhata rivers responded rapidly, with the Haast River peaking at 5511mm and a flow of 3195m³/s, exceeding its 1-year annual return interval, and the Arawhata River peaking at 7015mm.
Note: a local state of emergency was declared for Westland District at 2:37 pm on Friday, 19th.

Table 1: minimum and maximum rainfall totals and hour intensities per catchment in Westland.

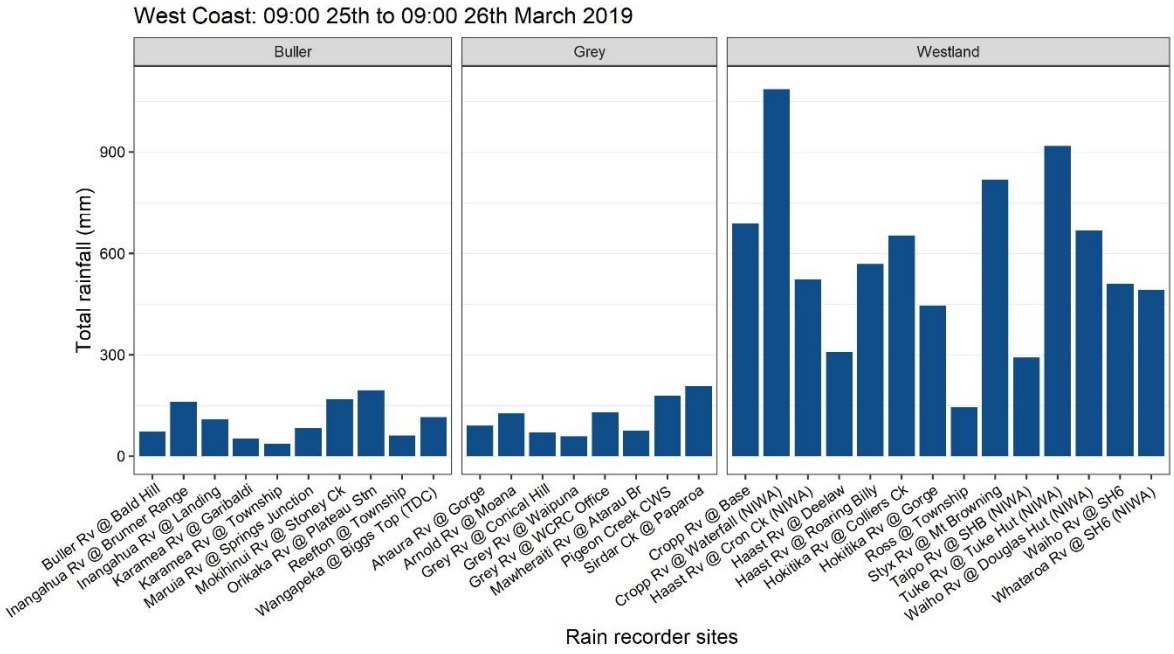
Catchment	Rainfall intensity				Total rainfall (mm)	
	30 minute (mm/0.5hr)		Hourly (mm/hr)			
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Haast	10.5	15.5	19.2	27.5	345	442
Hokitika	5.7	18.5	11.4	34.6	126	684
Waiho	7.2	15.5	14.4	21.5	139	389
Whataroa	7.2	11.5	14.4	16.0	139	229

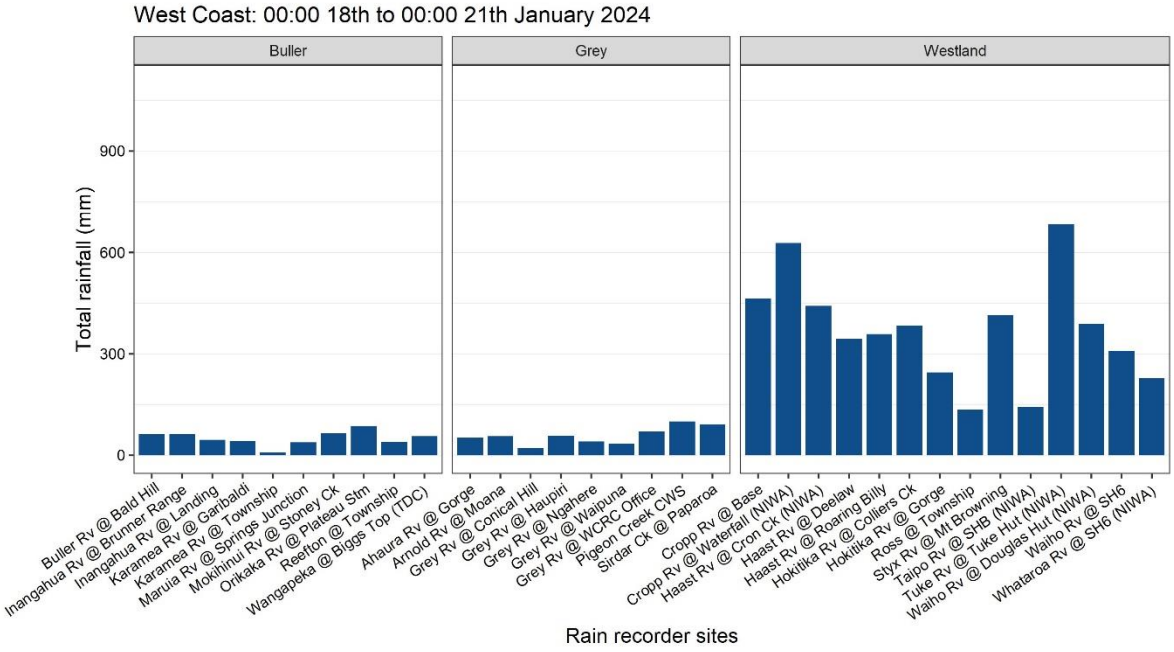
Table 2: peak level and flow and annual return interval per river monitoring station in Westland.

River / Location of main gauge	Date and time of peak	Peak level (mm)	Peak flow (m3/s)	Estimated return period (years)
Arawhata River / County Br	19/01/2024 22:25	7015	*4360**	15.5**
Haast River / Roaring Billy	20/01/2024 00:10	5511	3195	1.7 – 1.8
Hokitika River / Gorge	20/01/2024 00:30	4123	1337	<1.3
Waiho River / SH Bridge	19/01/2024 23:00	8511	N/A	N/A
Whataroa River / SH Bridge	19/01/2024 23:30	4720	1844	<1.2

** Very tentative peak flow based on one gauging measurement done on 16/01/2024 at mid stage.*
*** High uncertainty, ARI based on historical flow data collected by NIWA from 1988-2016, large gap between 2016 and 2024 as site was only reinstated on 16/01/2024. The current rating curve has only one gauging measurement at mid stage (1474mm).*

1.2 Comparison rainfall totals against March 2019 event

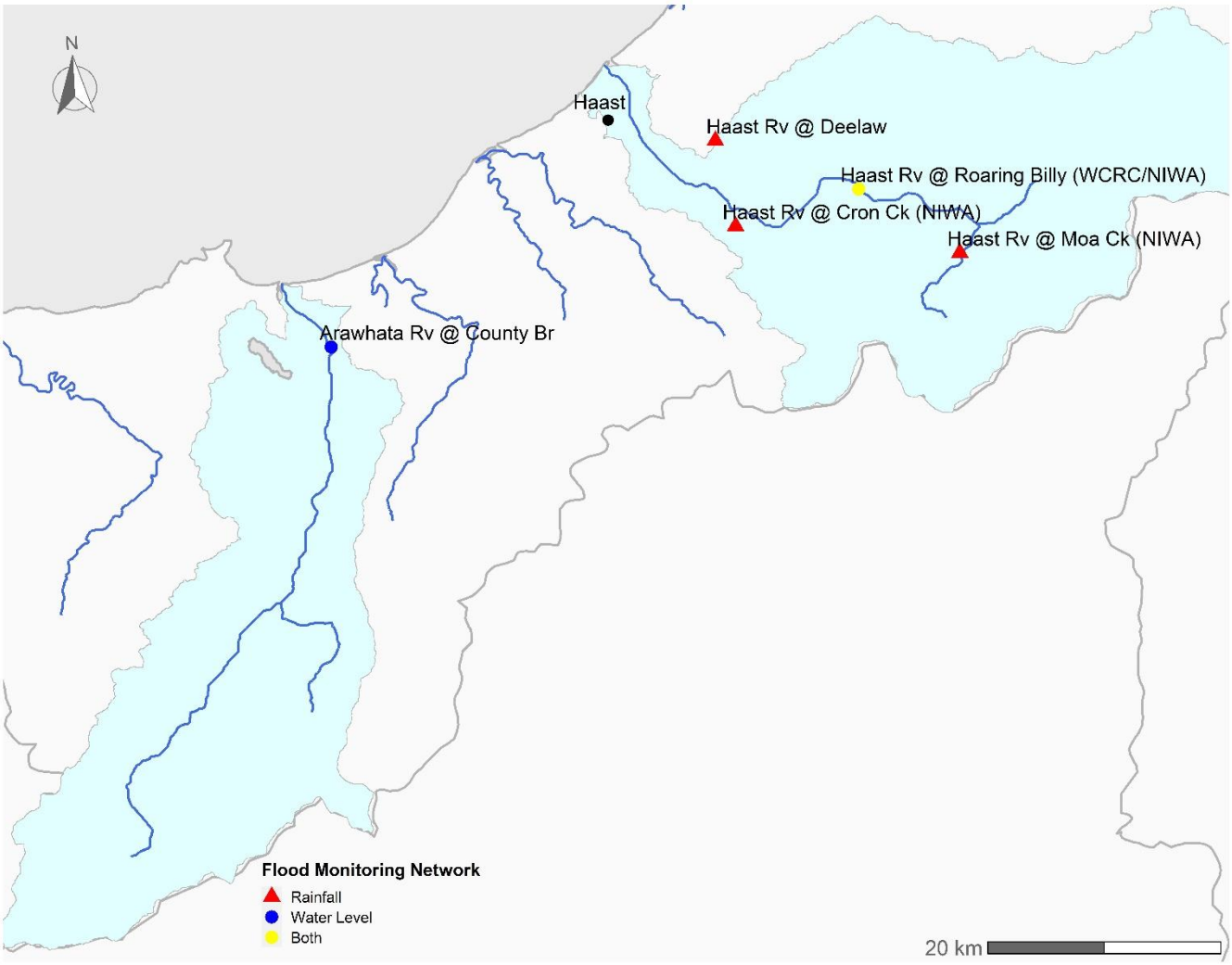




2. Westland

2.1 Haast and Arawhata River

The Arawhata river is located south of the Haast river and reacts similarly when both rivers are influenced by a southerly rainfall flow. Differences between the two can be contributed to the Landsborough river which is located at the northern part of the Haast catchment.



2.1.1. River flows and levels

Monitoring site	Date and time of peak	Peak water level (mm)	Peak flow (m3/s)	Return period
Haast Rv at Roaring Billy	20/01/2024 00:10	5511	3195	1.7 – 1.8
Arawhata Rv at County Br	19/01/2024 22:25	7015	4360*	15.5**

* Tentative flow based on one gauging measurement done on 16/01/2024

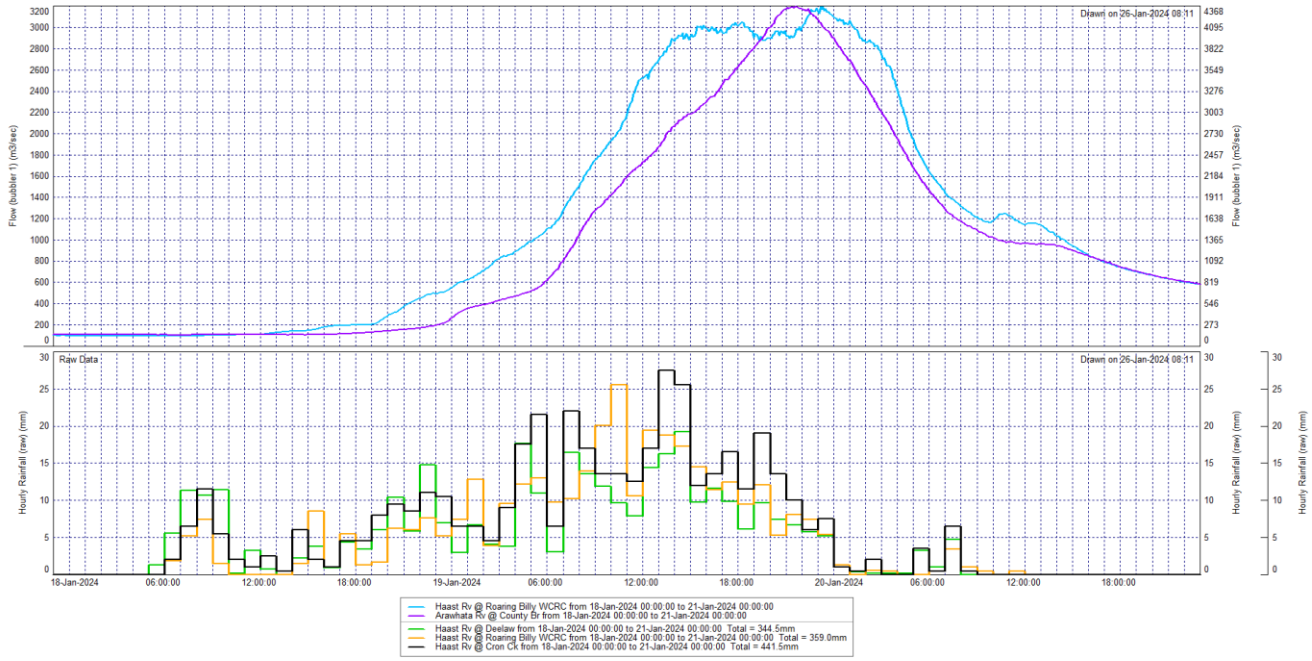
** High uncertainty, ARI based on historical flow data collected by NIWA from 1988-2016, large gap between 2016 and 2024 as site was only reinstated on 16/01/2024 and the current rating curve has only one gauging measurement at mid stage (1474mm).

2.1.2. Rainfall intensities and totals

Site	Maximum rainfall (mm)								
	30min	1hr	2hr	6hr	12hr	24hr	48hr	72hr	Total
Deelaw	10.5	19.2	35.5	79.0	124.4	232.1	328.4	344.5	345
Roaring Billy	14.5	25.5	45.5	92.4	146.6	290.0	345.3	359.0	359
NIWA SITES – NA Sites out of action									
Cron Ck	15.5	27.5	53.0*	108.0	184.5	333.0	419.5	441.5	442
Moa Ck	N/A								

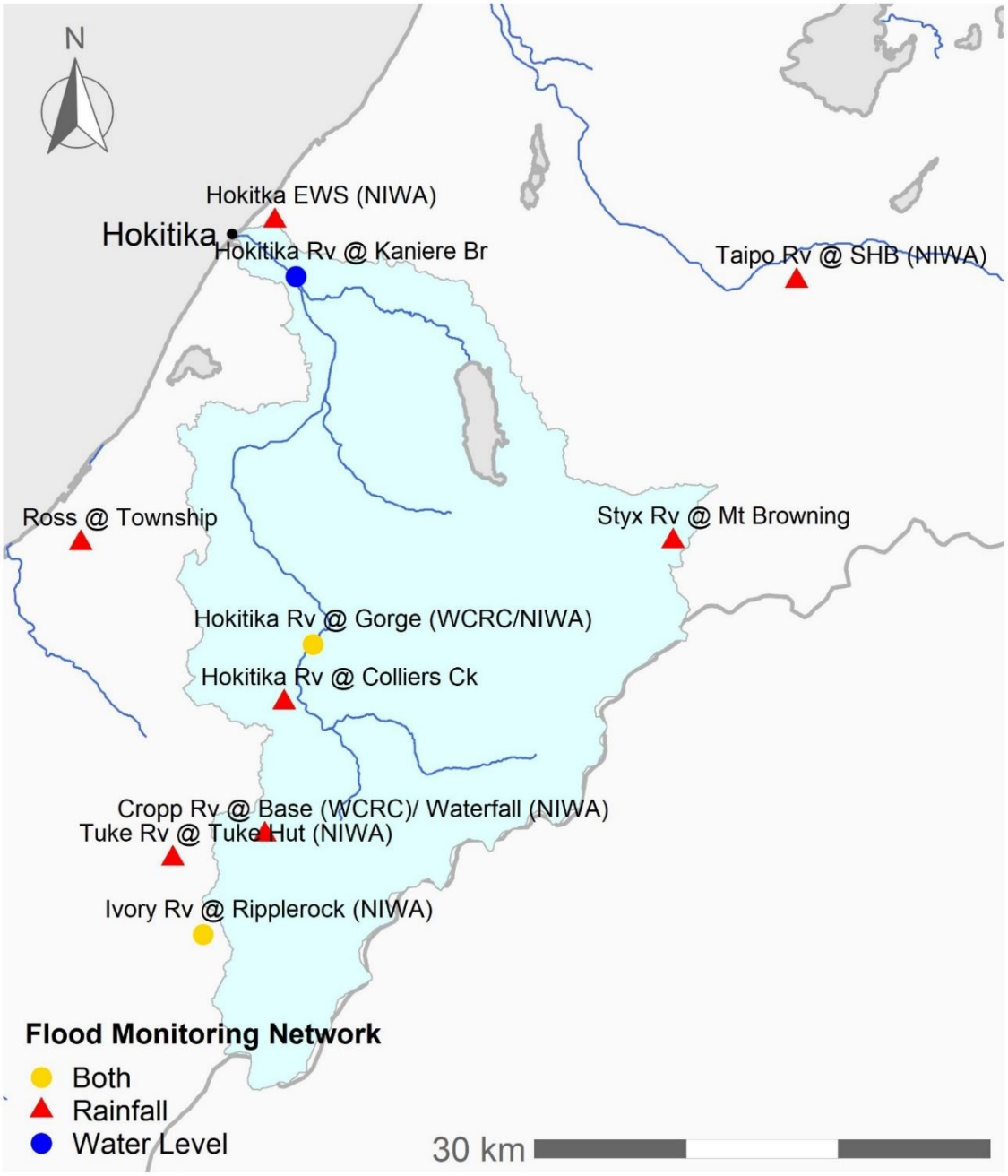
ARI (years)	2.33	5	10	20	50	100	200

2.1.3. River flows and hourly rainfall overplot



2.2. Hokitika River

Hokitika Rv at Kaniere is located downstream of Hokitika Rv at Gorge and just upstream of the town. Works are underway to establish a water level and flow site for Kokatahi Rv at Middle Terrace Rd Bridge to capture the northern part of the Hokitika catchment.



2.2.1. River flows and levels

Monitoring site		Date and time of peak	Peak water level (mm)	Peak flow (m3/s)	Return period
Hokitika Rv at Kaniere Bridge		20/01/2024 04:25	4703	1685	N/A*
	Hokitika Rv at Gorge**	20/01/2024 00:30	4123	1337	<1.3
	Kokatahi Rv at Middle Terrace Rd Bridge	N/A	N/A	N/A	N/A

**Not enough data to calculate ARI, <5 years.*

*** Without the combined recorded of Colliers Ck*

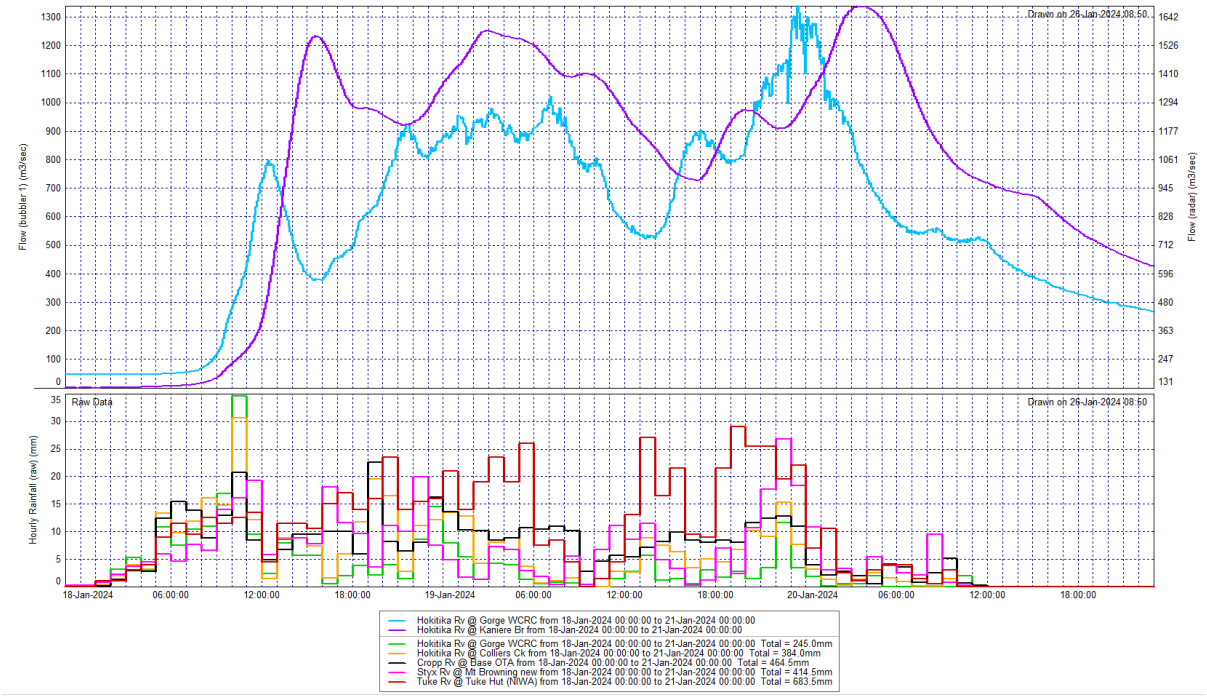
2.2.2. Rainfall intensities and totals

Site	Maximum rainfall (mm)								
	30min	1hr	2hr	6hr	12hr	24hr	48hr	72hr	Total
Cropp Base	14.4	22.6	33.6	84.2	117.3	223.4	425.3	464.5	465
Gorge	18.4	34.6	51.5	91.2	103.5	157.0	234.5	245.0	245
Colliers	15.7	30.6	45.4	96.3	108.5	214.6	363.5	384.0	384
Mt Browning	15.5	26.8	44.5	68.4	134.3	200.9	353.6	414.5	415
Ross	8.7	15.7	21.2	47.4	63.1	110.0	134.5	135.5	136
NIWA SITES									
Cropp Waterfall	18.5	30.0	40.5	91.0	162.5	319.5	550.5	628.0	628
Hokitika EWS	5.7	11.4	20.4	44.6	76.6	110.0	125.2	125.6	126
Ivory Ripplerock	14.5	26.5	42.0	100.5	160.0	311.5	496.5	519.5	520
Tuke Hut	17.5	29.0	54.5	130.0	222.0	382.5	624.5	683.5	684

ARI (years)	2.33	5	10	20	50	100	200

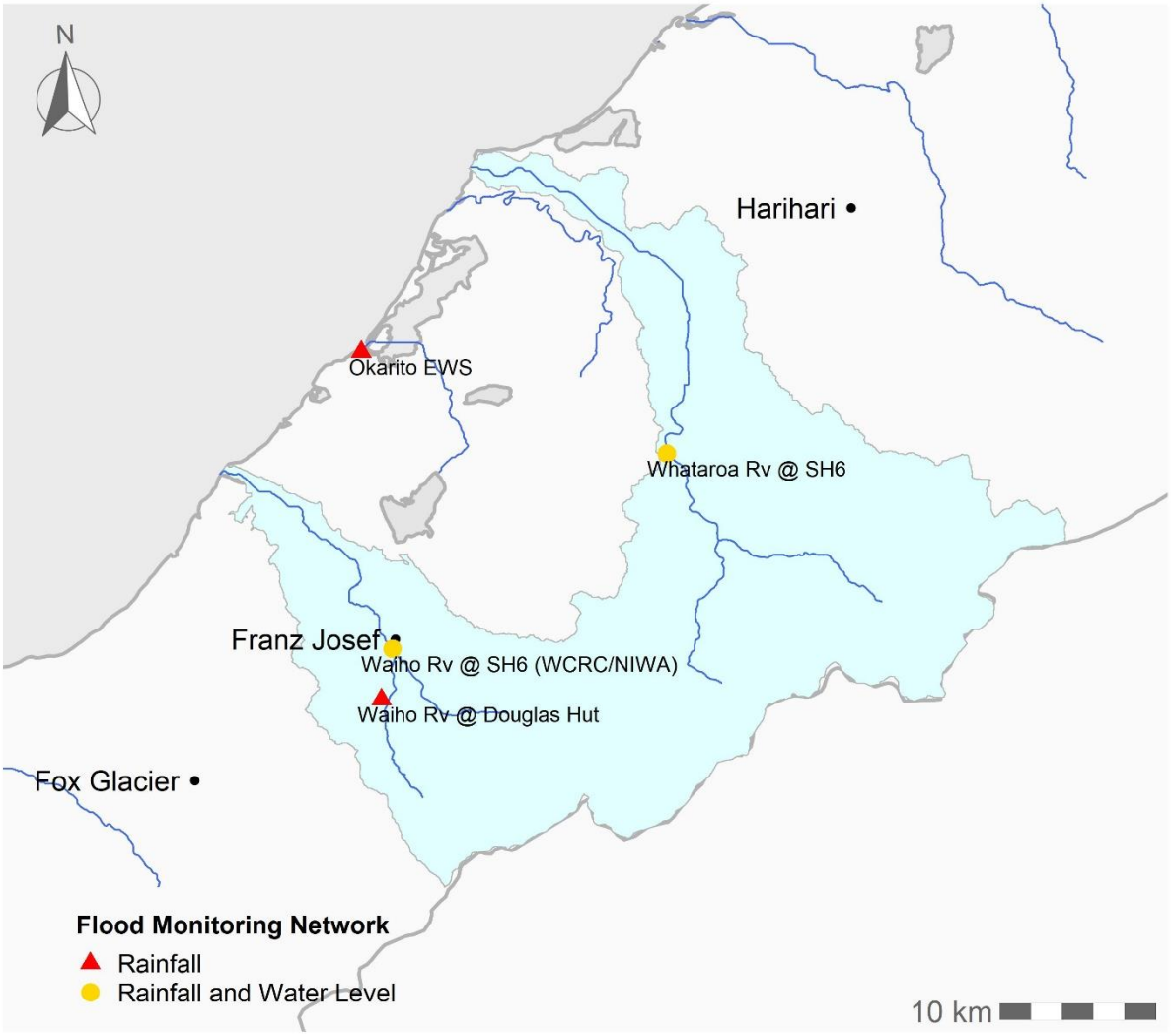
Only Tuke Rv at Tuke Hut exceeded its mean annual return interval (2.33 ARI) over a 2-day period. All other rainfall sites recorded just below their mean ARI at all instances.

2.2.3. River flow and rainfall overplot



2.3. Waiho and Whataroa Rivers

The Waiho river has a very dynamic and active river bed, making it impossible to establish a reliable flow record. The Whataroa river is located north of the Waiho and is maintained by NIWA, all of the rain gauges in the Waiho, Okarito and Whataroa catchment, apart from Waiho Rv at SH6, are maintained by NIWA.



2.3.1. River flows and levels

Monitoring site	Date and time of peak	Peak water level (mm)	Peak flow (m3/s)	Return period
Waiho Rv at SH6	19/01/2024 23:00	8511	N/A	N/A
Whataroa Rv at SHB	19/01/2024 23:30	4720	1844	1.1 – 1.2

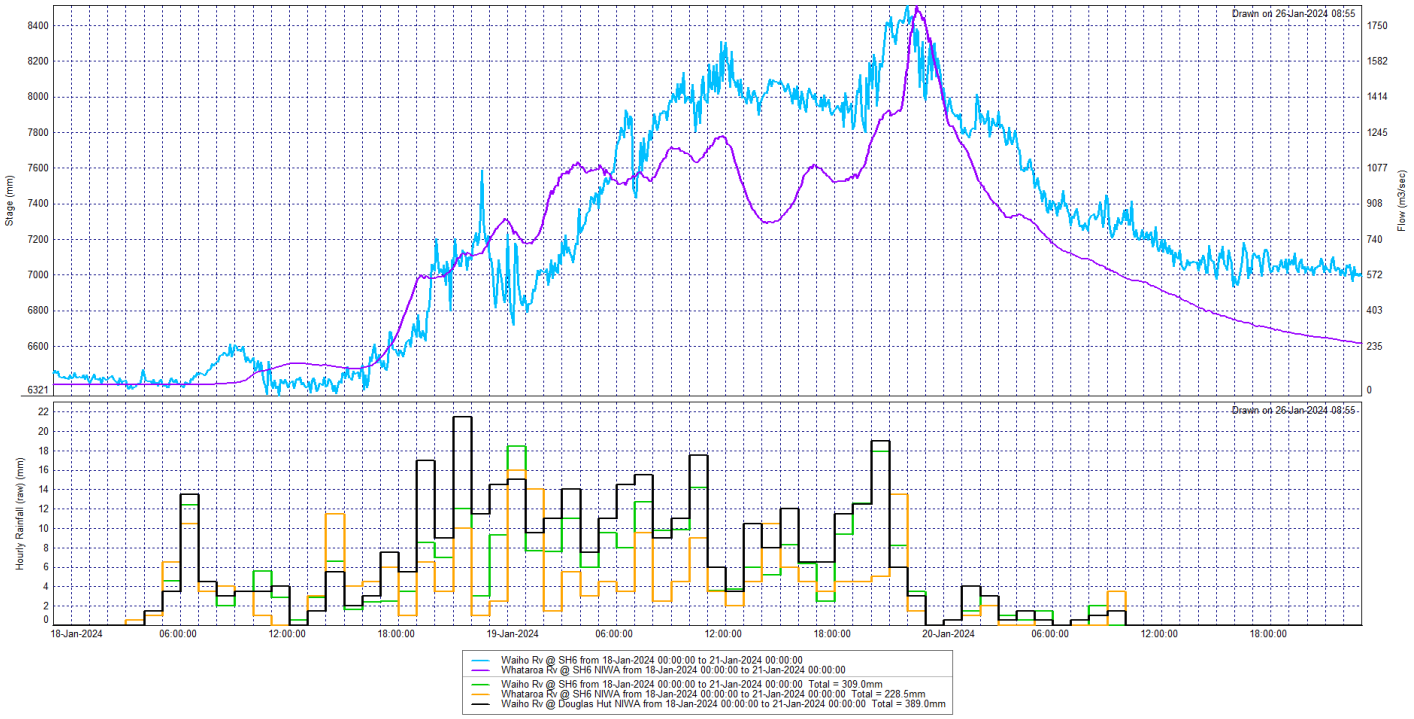
2.3.2. Rainfall intensities and totals

Site	Maximum rainfall (mm)								
	30min	1hr	2hr	6hr	12hr	24hr	48hr	72hr	Total
Waiho SH6	11.8	18.4	30.5	64.0	124.0	211.0	299.0	309.0	309
NIWA SITES									
Okarito EWS (ARI n/a)	7.2	14.4	20.2	32.2	43.6	70.0	138.4	139.4	139
Waiho Douglas	15.5	21.5	33.0	78.5	150.0	255.0	376.0	389.0	389
Whataroa SHB	11.5	16.0	18.5	42.5	76.0	139.5	221.0	228.5	229

None of the sites exceeded their mean annual intervals (2.33 ARI).

ARI (years)	2.33	5	10	20	50	100	200

2.3.3. River flow, Stage and Rainfall overplot



Predicted flows.

NIWA provide 6-hourly flow forecasting for rivers around New Zealand using their Nation River Flood Forecasting model.

This Model was made available to the West Coast Regional Council for use during the event, and was used to assess the likely timing and peak flows in the Waiho and Hokitika Rivers during the event.

the flood forecast model predicted peak flows in the Waiho River to be 2am on the 20th Jan. The recorded peak occurred at 11pm.

In the Hokitika River at Kaniere Bridge, the peak flow was modelled to occur at 10am on the 20th January but was recorded at 5am.

Appendix

A. MetService warnings

18th January 2024 – 09:57

Situation:

Significant heavy rain for the west of the South Island until Saturday. Period of strong northerly winds for the South Island.

A humid north to northwest flow is expected to bring periods of heavy rain to the west of the South Island until Saturday morning.
This long duration of heavy rain is expected to be especially impactful for Westland south of Otira, and the rain warning there has been upgraded to a RED WARNING.
Warnings and Watches for heavy rain and severe gales are in force for other areas .

Heavy Rain Warning for Westland – Red
Issued: 9:57am Thursday, 18th January 2024
Area: Westland
Valid: 9:00am Thursday to 8:00am Saturday
Expect 600 to 800 mm of rain to accumulate about the ranges, and possibly more in localised areas, and 100 to 200 mm about the coast. Peak rates of 25 to 30 mm/h. Note, heaviest rain is expected from late Friday morning, when peak rates are also expected to increase to 30 to 35 mm/h. Thunderstorms possible at times. Heavy rain is expected to ease from the south from early Saturday morning.

18th January 2024 – 20:41

Situation:
Significant heavy rain for the west of the South Island until Saturday. A period of strong northerly winds for parts of the South Island on Friday and Saturday.

A humid north to northwest flow is expected to bring periods of heavy rain to the west of the South Island until Saturday morning.

This long duration of heavy rain is expected to be especially impactful for Westland south of Otira, and a RED WARNING for rain is in place. Warnings and Watches for heavy rain and severe gales are in force for other areas.

Heavy Rain Warning for Westland - Red
Issued: 8:41pm Thursday, 18th January 2024

Area: The Westland District
Valid: 8:00pm Thursday to 9:00am Saturday
On top of what has already fallen, expect 500 to 700 mm of rain to accumulate about the ranges, and possibly more in localised areas, and 100 to 200 mm about the coast. Peak rates generally 20 to 30 mm/h but the heaviest rain is expected from late Friday morning, when peak rates of 30 to 35 mm/h are likely. Thunderstorms possible at times. Heavy rain is expected to ease from the south from early Saturday morning.

19th January 2024 – 09:24

Situation:
Significant heavy rain for the west of the South Island until Saturday. A period of strong northerly winds for parts of the South Island on Friday and Saturday.

A humid north to northwest flow is expected to bring periods of heavy rain to the west of the South Island until Saturday morning.

This long duration of heavy rain is expected to be especially impactful for Westland south of Otira, and a RED WARNING for rain is in place. Warnings and Watches for heavy rain and severe gales are in force for other areas.

Heavy Rain Warning for Westland - Red
Issued: 9:24am Friday, 19th January 2024
Area: The Westland District
Valid: 9:00am Friday to 9:00am Saturday
On top of what has already fallen, expect 350 to 550 mm of rain to accumulate about the ranges, and possibly more in localised areas, and 50 to 150 mm about the coast. Peak rates generally 20 to 30 mm/h but the heaviest rain is expected from late Friday morning, when peak rates of 30 to 35 mm/h are likely. Thunderstorms possible at times. Heavy rain is expected to ease from the south from early Saturday morning.

19th January 2024 – 20:31

Situation:
Significant heavy rain for the west of the South Island easing during Saturday. Strong northerly winds for the Canterbury high-country easing early Saturday. Possible heavy rain for Gisborne/Tairawhiti Sunday and Monday.

A humid north to northwest flow is bringing heavy rain to the west of the South Island. The heavy rain is expected to ease tonight and during Saturday.

A RED WARNING for rain remains in place for the Westland District.

Warnings and Watches for heavy rain and severe gales are in force for other areas of the South Island, and also Mount Taranaki.

Heavy Rain Warning for Westland - Red
Issued: 8:31pm Friday, 19th January 2024
Area: The Westland District
Valid: 8:00pm Friday to 8:00am Saturday
On top of what has already fallen, expect 150 to 250 mm of rain to accumulate about the ranges, and possibly more in localised areas, and 40 to 100 mm about the coast. Peak rates of 30 to 35 mm/h about the ranges. Heavy rain is expected to ease in the south tonight then further north during Saturday morning.

20th January 2024 – 09:01

Warning lifted for Westland

9. IRG REPORTS

9.1	**Franz Josef IGC Programme Status Report April 2024**
Author	Scott Hoare, Inovo – IGC Programme Manager
Authorizer	Shanti Morgan, Acting Infrastructure Manager
Public Excluded	No

Report Purpose

The purpose of this report is to receive the Franz Josef IGC Project Status Report for April 2024.

Report Summary

The report presents an update on the progress of the project including the completion of the Link Bank and Havil wall up to the final levels.

Draft Recommendations

It is recommended that the Committee resolves to:

1. Receive the report.

Considerations

Implications/Risks

There is a risk to the project budget based on approved and forecasted variations.

Significance and Engagement Policy Assessment

There are no issues within this report which trigger matters in this policy.

Tangata whenua views

Tangata whenua have not been consulted on these matters.

Views of affected parties

Consultation with Glacier Country Heliport is ongoing in relation to the impact on the helipads and fuel browsers.

Financial implications

Works have been funded from the IRG Project budgets.

Legal implications

There are no legal implications as a result of this report.

Attachments

Attachment 1: April' 24 WCRC IGC Project Status Report – Franz Josef

WCRC IGC PROJECT STATUS REPORT

FRANZ JOSEF STAGE 1

WEST COAST REGIONAL COUNCIL
ISSUE 17 - 24 APRIL 2024

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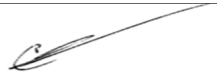
QUALITY ASSURANCE

PREPARED BY	Nic Bell	Project Manager	24 April 2024	
REVIEWED BY	Chris Hoskins	Senior Project Manager	24 April 2024	
APPROVED BY	Scott Hoare	Programme Manager	24 April 2024	

1. PROJECT STRUCTURE

Reporting Month Ending	24/04/2024
Project Sponsor	Darryl Lew, CEO
Senior Responsible Officer	Shanti Morgan, Acting Infrastructure Manager
Benefit Owner(s)	Franz Josef Rating District
IRG Programme Manager	Scott Hoare
Council Project Manager	Kent Jacobsen, Area Engineer
IRG Project Manager	Chris Hoskins / Nic Bell

2. INFRASTRUCTURE GOVERNANCE COMMITTEE MEETINGS

Last Infrastructure Governance Committee Meeting	9/04/2024	Next Infrastructure Governance Committee Meeting	7/05/2024

3. R.A.G (RED, AMBER, GREEN) STATUS

Category	Current Month	Commentary
Overall		Project is overall ok but risks with budget keep it at amber.
Trend	→	Project continues to improve with the placement of Rock up to design level on the Link Bank Jan/ Feb 2024.
Budget		Forecast is tracking over budget, mitigation strategy agreed to reduce scope and manage budget.
Scope		Scope is generally well defined for upgrade of the North Stopbanks.
Resource		No issues noted
Schedule		**Changed from Green to Amber:** Recent delays have pushed the completion of the North Bank into July 2024.
Risks/ Issues		The main risks to the project are the budget.

4. GOVERNANCE DOCUMENTS AND RECOMMENDATIONS TO SRO / COUNCIL / KANOA

docCM #	Document	Submission Date	Approval Date	Comments
	Variation 01 - Emergency Works	15/09/2022	31/10/2022	Inclusion of funding for Southside emergency works within phase 1 and the first draw down, approved by WCRC and Kanoa.
	Variation 02 - Combined Projects	14/02/2023	28/02/2023	Slight changes to funding moving from one project to another to balance actual costs, approved by WCRC and Kanoa.
	LiDAR Survey Memo	29/05/2023	12/06/2023	Variation to undertake LiDAR Survey, approved by WCRC.
	Tetra Tech Coffey Fee Variation	20/09/2023	26/09/2023	Variation to scope of works for designer, approved by WCRC.
	Variation 03 - Change in funding timeline	5/10/2023	25/10/2023	Change in funding timeline to match actual progress on site, approved by WCRC and Kanoa.

5. STATE OF PLAY

Last Month	Next Month
The contractor demobilised from site in advance of the recent weather event and to allow for confirmation of Havil Wall Toe rock, diversion bund, agreement to proceed within Heliport to Church Bank section. Havil Wall: ▪ Completion of above ground rock armouring on the Havil Wall, Planning: ▪ Continued processing and responding to RFI's for a consent to remove gravel from area between the new Link Bank and old NZTA Bank at the end of the Heliport facility, ▪ Additional questions received from WDC and responded to regarding vegetation clearance for the remaining North Bank works. Design: ▪ Additional drawings prepared showing change from retaining wall to steeper rock (1:1.5) within section of Church Stopbank, ▪ Investigation and agreement to toe rock along chainage 100 to 350 of Havil Wall to 5 m - or as deep as the contractor can safely complete, ▪ Agreement to proceed with installation of Electronet and Chorus poles and overhead lines.	Havil Wall: ▪ Reinstatement of diversion bund, ▪ Supply and placement of toe rock to chainage 100 to 350. Heliport - Church Bank: ▪ Obtain price from Heliport Contractor and mobilise to complete works within Heliport to allow for raising of stopbank, ▪ Mobilise Electronet and Chorus to begin works on poles. Planning: ▪ Obtain additional consent, ▪ Close out questions relating to vegetation clearance. Design: ▪ Complete drawings and review with contractor for steeper rock within section of Church Stopbank.

Total Project

- Placement and compaction of bulk fill of approximately 147,000 m^3,
- Supply and placement of approximately 78,000 T of rock.

Current Tasks and Decisions

- Heliport stopbank: Agreement of scope of works almost completed, final review requested through CAA safety advisor, heliport contractor to be asked for a price following final set of drawings released,
- Church Bank: Design review to be completed to construct section with steeper rock through narrow section of stopbank by the Church,
- Overhead services: Mobilisation with Chorus and Electronet, Electronet require the contractor to place some of the bulkfill behind the North Bank before the pole can be moved, a site visit to confirm location and details is being planned for 9 May,
- Diversion works: Additional diversion works will be required to complete the Havil Wall toe rock and retrieval of bulk fill material for Heliport and Church Banks,
- South NZTA Bank: Updated modelling is being undertaken to determine if this is to be included as a part of stage 1.

Photo 1 below was taken on 16 April 2024 and was taken at approximately chainage 100 (Havil Wall) looking toward the Link Bank showing completed stopbank raising and rock armouring.

Photo 1

6. HIGH LEVEL ROADMAP

Project Name	FY 2022/23				FY 2023/24				FY 2024/25	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Month Starting	July	October	January	April	July	October	January	April	July	October
North Bank										
- **Link Bank**										
- **Heliport - Church Bank**										
- **Havil Wall**										

7. MILESTONES

Milestone	Baseline Date	Tracking	Actual Date	Comment
Scope of Works - Preliminary Design	01-Jul-21		01-Jul-21	Complete
Peer Review - Scope of Works				Complete
Draft Engineering Drawings / Design Documentation	01-Mar-22		01-Mar-22	Complete
Consent Documentation/Application	02-May-22		25-Sep-23	Complete
Tender Preparation & Award	02-May-22		02-May-22	Complete
Emergency work instruction			19-May-23	Notification of Section 330 Emergency works from Council.
Construction:				
- North Bank	30-Apr-23	31-Jul-24		
- South Side Stage 1 (NZTA Banks)		(On Hold)		10 Year Flood Management Plan
- Waiho Loop (Tatare Stopbank)	31-Aug-23	Not Proceeding		

8. CONSENTS

The process for the North Bank has been completed with the acceptance of Land Use Resource Consent.
An additional North Bank consent has been applied for, to obtain gravel from the area between the new Link Bank and the old NZTA Bank to provide bulk fill for the Heliport bank uplift.
During construction the contractor will complete post flood inspections but, condition 19 of the land use consent requires inspection post rain event be

completed by the consent holder following the completion of works.
Westland District Council have raised additional questions about the vegetation clearing for the construction of the remaining North Bank, they are being responded to. These questions were unexpected and are being responded to promptly to avoid delay.

9. PROJECT RISKS

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
FJ-RIS-01		Consent Processing	Single entity in opposition to works, delaying obtaining resource consent.	Delay to Programme	Project Manager	Complete	Medium	Closed	Provide support and input into hearing when required.	Hearing held with Independent Commissioner to resolve.
FJ-RIS-02		Existing Infrastructure	Upgrades may require relocation of power/fibre poles and have effect on adjacent roading network and stormwater system.	Potential for delay to Programme Costs for this work included in the Project Budget	Project Manager	Not Fully Resolved	Low	No Change	Confirm any additional cost for relocations when works confirmed.	Negotiations to be had with utility operators and investigations into stormwater run off at Heliport.
FJ-RIS-03		Insufficient Budget	Delays to programme and additional work required to obtain resource consent.	Increased cost	Project Manager	Unresolved	Low	No Change	Approve variations when requested.	Forecast expenditure and apply for variations.
FJ-RIS-04		Scope of works	Scope increases (Heliport pad relocation, Retaining Wall, Tatare avulsion protection etc.)	Increased cost	Project Manager	Unresolved	Low	No Change	Approve variations when requested.	Forecast expenditure and apply for variations.

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
			causing additional cost.							
FJ-RIS-05		Fuel Cost Adjustment	Contract provision allowing fuel cost adjustment. Current fuel costs are above the agreed rate at the time of contract signing.	Increased cost	Project Manger	Not Fully Resolved	Medium	No Change	Approve variations when requested.	Forecast additional cost and apply for variations.
FJ-RIS-06		Rock Supply	Risk that the rock supplied or installed under the contract does not meet specification or is in excess of the quantity included in the contract.	Work Quality	Engineer to Contract	Not Fully Resolved	Medium	No Change	Confirm monitoring plan.	Establish monitoring plan (containing rock inspection and rock weighing at quarry) for rock supply/placement including as built documentation.
FJ-RIS-07		Injunction of works progressing under S330	Risk that public opposition apply for an injunction to stop the works progressing under S330.		Project Manager	Complete	Low	Closed	Provide support and willingness to work with opposition and argue the injunction if required.	Continue progressing the resource consent application and affected party consultation.
FJ-RIS-08		Weather	Flooding from weather events causing damage.	Delay to programme Health and Safety	Contractor	Actions in Place	High	No Change	Review plans and on-site implementation	Contractor management plans including monitoring

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
				Equipment damage Environmental					Forward look ahead.	progress of the works and programme updates and post event inspection as per condition 19.
FJ-RIS-09		Engineer is non-responsive	Engineer fails to respond to questions and view hold points.	Delay to programme.	Project Manager	Not Fully Resolved	Low	No Change	Confirm monitoring plan, escalate if necessary.	Establish monitoring plan and two week look ahead for hold points.
FJ-RIS-10		Adherence to resource consent conditions	Strict conditions in place that the contractor fails to adhere to.	Environmental damage, Reputational damage. Non-compliance notices. Work held up on site	Project Manager/Engineer to the Contract	Not Fully Resolved	Low	No Change	Review plans and on-site implementation Confirm monitoring plan, escalate if necessary	Contractor management plans including monitoring progress of the works and programme updates.

x

10. PROJECT ISSUES

ID #	Date Raised	Issue Description	Priority	Action Required	Issue Owner
FJ-ISS-01	01-Jul-22	Obtaining resource consent has become difficult and drawn out.	Medium	Project Manager to continue assisting lawyers through the resource consent hearing process.	Closed.
FJ-ISS-02	16-May-22	Damage to Waiho Tatare connection with difficulty in confirming a remedial approach.	Medium	Project Manager to consult with designer to provide options for discussion. Technical Advisory Group (TAG) to consider possible options	Works on hold, refer to TAG report.
FJ-ISS-03	22-May-23	Additional design work is required to ensure that a clear roadway can remain by the church near the top of the North Bank.	Low	Designer is finalising drawings and completing design review showing steeper rock armouring in the section.	Lead Designer
FJ-ISS-04	15-Jul-23	Upgrading the Heliport stopbank will require the placement of bulkfill on Heliport property impacting access to helipads. Work has been requested to relocate helipads and infrastructure to reduce impact.	Medium	Project Manager to continue negotiations with RD Petroleum, Heliport, and Westland District Council to fully understand works required, in final stages of obtaining approval.	Project Manager

11. DEPENDENCIES

Ref #	Description	Urgency	Owner	Critical Date	Progress / Actions
FJ-DEP-01	Scope of works within Heliport to be confirmed and agreed with GCH and WDC to allow for construction to commence on the Heliport section as noted in FJ-ISS-04.	Medium	Project Manager	06-May-24	Works have been deferred to the next low season (mid 2024). Project Manager to continue liaising with parties to reach agreement. **Scope of works** in final stages of reaching agreement. Critical date changed to reflect end of peak season.
FJ-DEP-02	Design of Church Bank to be completed and approved to allow for the commencement of works in the Heliport to Church section as noted in FJ-ISS-03.	Medium	Designer	01-Jun-24	Design has been completed and shared with contractor for constructability and pricing feedback. **Critical date changed** to June as contractor is planning to work from Heliport toward the Church.

12. IWI / HAPŪ / WHĀNAU

Partnership / Relationship	Notes

13. PARTNERSHIPS / RELATIONSHIP MANAGEMENT

Partnership / Relationship	Notes
Glacier Country Heliport	They require works on the heliport section to be completed in the offseason (April - September) to minimize disruption to Helicopters.
Westland District Council	The current owner of the Havil wall, reports have been completed and issued to WDC to understand stability of the wall with protection of the oxidation ponds being a key function.

14. HEALTH AND SAFETY

There were no health and safety incidents / accidents reported in April 2024.
The contractor completed a health and safety audit on
The Engineers representative undertook a site inspection on 16 April 2024.
No issues were noted during the audit or inspections.

9.2	**Greymouth IGC Programme Status Report April 2024**
Author	Scott Hoare, Inovo – IGC Programme Manager
Authorizer	Shanti Morgan, Acting Infrastructure Manager
Public Excluded	No

Report Purpose

The purpose of this report is to receive the Greymouth IGC Mawhera Quay Project Status Report for April 2024.

Report Summary

The report presents an update on the progress of the project including review of tenders and award of contract.

Draft Recommendations

It is recommended that the Committee resolves to:

1. Receive the report.

Considerations

Implications/Risks

The received tenders have confirmed the project budget is insufficient to complete the full scope. A contract has been awarded to undertake Stages 1 and 3 while the scope for Stages 2, 4, and 5 are reviewed.

Significance and Engagement Policy Assessment

There are no issues within this report which trigger matters in this policy.

Tangata whenua views

Tanga whenua are being consulted on these matters.

Views of affected parties

Work is being carried out under pre-existing Consents. Forma Consultation was undertaken at the time these Consents were obtained. Informal Consultation has been completed and public notices issued.

Financial implications

Works have been funded from the IRG Project budgets.

Legal implications

There are no legal implications as a result of this report.

Attachments

Attachment 1: April' 24 WCRC IGC Project Status Report - Greymouth

WCRC IGC PROJECT STATUS REPORT

GREYMOUTH FLOOD WALLS (MAWHERA QUAY)

WEST COAST REGIONAL COUNCIL
ISSUE 16 - 24 APRIL 2024

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QUALITY ASSURANCE

PREPARED BY	Mike Murray	Senior Project Manager	24 April 2024	
REVIEWED / APPROVED BY	Scott Hoare	Programme Manager	24 April 2024	

1. PROJECT STRUCTURE

Reporting Month Ending	24/04/2024
Project Sponsor	Darryl Lew, CEO
Senior Responsible Officer	Shanti Morgan, Acting Infrastructure Manager
Benefit Owner(s)	Grey Rating District
IRG Programme Manager	Scott Hoare
Council Project Manager	Paulette Birchfield
IRG Project Manager	Mike Murray

2. INFRASTRUCTURE GOVERNANCE COMMITTEE MEETINGS

Last Infrastructure Governance Committee Meeting	9/04/2024	Next Infrastructure Governance Committee Meeting	7/05/2024

3. R.A.G (RED, AMBER, GREEN) STATUS

Category	Current Month	Commentary
Overall		Construction for stages 1 and 3 is commencing on 2 April 2024. This work will be completed within the existing budget. Remaining stages will exceed budget, and scope is to be reviewed prior to committing to further construction works.
Trend	→	No change.
Budget		The initial budget was based on preliminary information. Received tenders have confirmed the project budget is insufficient to complete the full scope. A contract has been awarded to undertake stages 1 and 3, which can be completed within the current budget, while the scope for stages 2, 4 and 5 is reviewed.
Scope		Scope is well defined, Upgrade of existing stop banks to 1:150 year plus 600 mm freeboard. This level is to align with the existing concrete walls along Mawhera Quay.
Resource		No resource concerns at this stage.
Schedule		Project schedule is confirmed and work is commencing on 2 April 2024
Risks/ Issues		Budget poses the current key risk.

4. GOVERNANCE DOCUMENTS AND RECOMMENDATIONS TO SRO / COUNCIL / KANOA

docCM #	Document	Submission Date	Approval Date	Comments
	Funding Agreement Variation (2)	16-Feb-23	09-Jun-23	Application for transfer or funds from Westport Early Warning Project and an Extension of Time with new Completion date of May 2024
	Mawhera Quay Tender Evaluation and Recommendation	11 Dec 23	21 Dec 23	Contract signed by both WCRC and MBD received 23 Dec 23

5. STATE OF PLAY

Last Month	Next Month
▪ Site establishment commenced on 2 April 2024 ▪ CCTV of existing stormwater requested by WCRC. Pricing received and work is expected to be undertaken 1st week of May	▪ CCTV existing stormwater. ▪ Commence raising of stopbank
Total Project	
▪	
Current Tasks and Decisions	
▪	

6. HIGH LEVEL ROADMAP

Project Name	FY 2022/23				FY 2023/24				FY 2024/25	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Month Starting	July	October	January	April	July	October	January	April	July	October
Design										
Consent										
Stage 1										
Stage 2										
Stage 3										
Stage 4										
Stage 5 (Cobden)										

The project is currently tracking behind programme due to delays with resolving resource consent requirements and obtaining initial GDC approval. Physical construction works is commencing 2 April 2024.

7. MILESTONES

Milestone	Baseline Date	Tracking	Actual Date	Comment
Scope of Works - Preliminary Design			03-Feb-23	Complete
Peer Review- Scope of Works			30-Mar-23	Complete
Feedback from GDC			16-May-23	Complete
GDC Engineering approval of revised drawings	9-Aug-23		24-Aug023	Conditional approval provided
Consent Documentation/Application	31-May-23		19-Oct-2023	Legal opinion and GDC acceptance received.
Tender Preparation, analysis, negotiation	31-May-23		11 Dec 2023	
Council review and award	02-Jun-23		21 Dec 2023	
Completion of Construction	31-May-24	25-Jul-24		Stages 1 & 3

8. CONSENTS

Updated modelling received from Land River Sea (modelling was undertaken for other projects but is being reviewed to further inform the IRG project).

Wynn Williams legal opinion received confirming existing Consent has been given effect.

Acceptance of Legal opinion received from GDC.

Meeting held with Iwi 15 Feb 2024, letter of support received 28 Feb 2024.

Plans sent to Heritage NZ 5 Feb 2024, Archaeological review carried out and confirmation no impact to Heritage Sites received 5 March 2024

Meeting held with Grey Heritage Trust 21 February 2024, positive feedback received. Arrange site walk with Contractor prior to starting work in this area.

9. PROJECT RISKS

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
G-RIS-01		Consent Processing	Public opposition to works, delaying obtaining resource consent amendments or new Consents	Delay to Programme	Project Manager	Actions in Place	Low	Reducing	Provide support and input when required.	Legal opinion and GDC acceptance to progress under existing Consent
G-RIS-02		Existing Infrastructure	Upgrades may require relocation of power poles.	Delay to Programme Increased cost	Project Manager	Not Fully Resolved	Medium	Increasing	Approval of additional cost for relocations if required.	Current Westpower plans include changing to underground cabling across roads that had not been anticipated. Negotiation to be undertaken.
G-RIS-03		Insufficient Budget	Tenders have confirmed insufficient budget	Increased cost	Project Manager	Not Fully Resolved	High	Confirmed - extent of issue now known	Source additional funding or reduce scope	Review scope and prepare funding variation application
G-RIS-04		Scope of works	Scope increases	Increased cost	Project Manager	Unresolved	Low	No Change	Approve variations when requested.	Forecast expenditure and apply for variations.

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
G-RIS-05		Weather	Flooding from weather events causing damage during construction	Delay to programme HS Equipment damage Environmental	Contractor	Unresolved	Medium	No Change	Review plans and on-site implementation	Contractor management plans.

10. PROJECT ISSUES

ID #	Date Raised	Issue Description	Priority	Action Required	Issue Owner
G-ISS-01	16 March 2023	Amendment to existing Consent will require additional Consents due to updated District Plans and TTP	High	Review design and GDC feedback to meet existing Consent requirements where possible.	Closed
G-ISS-02	4 April 2023	GDC Engineering Sign Off delayed due to lack of resource	High	GDC to be advised of pending documentation and date sign off required by 9 August 023	Closed
		No current issues			

11. DEPENDENCIES

Ref #	Description	Urgency	Owner	Critical Date	Progress / Actions
G-DEP-01	GDC to sign off design before tendering	High	Project Manager	09-Aug-23	GDC provided Conditional acceptance 24 August 2023
G-DEP-02	Tender Evaluation	High	Project Manager	13-Nov-23	Recommendation provided to WCRC and Contract awarded 23 December 2023
	No current dependencies				

12. IWI / HAPŪ / WHĀNAU

Partnership / Relationship	Notes
Philippa Lynch / Susan Aitken, Ngai Tahu	Final plans issued 5 Feb 2024, discussion held 15 Feb 2024. No CIA required as operating under existing consent. Letter of support received 28 Feb 2024

13. PARTNERSHIPS / RELATIONSHIP MANAGEMENT

Partnership / Relationship	Notes
Heritage NZ	Archaeological review carried out and confirmation no impact to Heritage Sites received 5 March 2024 and issued to HNZ (Note existing Consent does not require any sign off from HNZ).
GDC	Meeting held 8 Feb 2024 to confirm stages 1 and 3 proceeding. GDC requested late change to one accessway. GDC have been advised of work commencing, and have approved submitted TMP's
Grey Heritage Trust	Meeting held 21 February, 2024.

14. HEALTH AND SAFETY

Traffic and Construction Management plans have been submitted and approved, work is commencing 2 April 2024.

9.3	**Hokitika IGC Programme Status Report April 2024**
Author	Scott Hoare, Inovo – IGC Programme Manager
Authorizer	Shanti Morgan, Acting Infrastructure Manager
Public Excluded	No

Report Purpose

The purpose of this report is to receive the Hokitika River Walls IGC Project Status Report for April 2024.

Report Summary

The report presents an update on the progress of the project including the completion of Stage 1A, design and consenting on Stage 1B, and planning for Stage 3.

Draft Recommendations

It is recommended that the Committee resolves to:

1. Receive the report.

Considerations

Implications/Risks

There is a risk of further delays to the resource consent for Stage 1B due to resolving feedback from KiwiRail. Most queries are now resolved with only some minor Stormwater queries to close out.

WCRC have now requested seepage modelling of Stage 1B and CCTV of existing WDC stormwater pipework be carried.

Significance and Engagement Policy Assessment

There are no issues within this report which trigger matters in this policy.

Tangata whenua views

Tangata whenua have been consulted on these matters.

Views of affected parties

Consultation with KiwiRail is ongoing. Affected Party Approval been received from Waka Kotahi.

Financial implications

Works have been funded from the IRG Projects budgets.

Legal implications

There are no legal implications as a result of this report.

Attachments

Attachment 1: April' 24 WCRC IGC Project Status Report – Hokitika River Walls

WCRC IGC PROJECT STATUS REPORT

HOKITIKA RIVER FLOOD WALLS

WEST COAST REGIONAL COUNCIL
ISSUE 15 - 24 APRIL 2024

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1. PROJECT STRUCTURE

Reporting Month Ending	24/04/2024
Project Sponsor	Darryl Lew, CEO
Senior Responsible Officer	Shanti Morgan, Acting Infrastructure Manager
Benefit Owner(s)	Hokitika Community Rating Zone
IRG Programme Manager	Scott Hoare
Council Project Manager	Jordan Mandery
IRG Project Manager	Mike Murray (River Walls)

2. INFRASTRUCTURE GOVERNANCE COMMITTEE MEETINGS

Last Infrastructure Governance Committee Meeting	9/04/2024	Next Infrastructure Governance Committee Meeting	7/05/2024

3. R.A.G (RED, AMBER, GREEN) STATUS

Category	Current Month	Commentary
Overall		Project is generally tracking ok but continual monitoring of budget and consenting risk is required.
Trend	→	No change this month.
Budget		The initial budget has been identified as being insufficient to complete all 3 stages. Stage 1A has been completed under the current budget. Stage 1B tenders have been received and will be completed within budget. Stage 2 and 3 draft estimates have been prepared and the scope is being reviewed.
Scope		WCRC have now requested seepage modelling is undertaken for stage 1B (previously agreed not required). WCRC have also requested CCTV of existing WDC stormwater pipework passing beneath stopbanks. Increased investigation into seepage and existing infrastructure may have potential impacts on stage 3 scope.
Resource		No resource issues at this time.
Schedule		Project schedule is to be revised once Kiwirail queries resolved and Proposal for Stage 3 suitability investigation received
Risks/ Issues		Further consultation with KiwiRail for stage 1B is required.

4. GOVERNANCE DOCUMENTS AND RECOMMENDATIONS TO SRO / COUNCIL / KANOA

docCM #	Document	Submission Date	Approval Date	Comments
	Funding Agreement Variation	16-Feb-23	09-Jun-23	Application for an extension of time with new completion date of May 2024.

5. STATE OF PLAY

Last Month	Next Month
▪ Stage 1B Resource Consent consultation with Kiwirail continuing. Queries now mostly resolved with only some minor additional Stormwater questions to close out. ▪ Fee proposals for 1B seepage modelling received ▪ Fee proposal for Stage 3 GPR received ▪ Tenders issued for CCTV of existing Stormwater for stage 1 and 3	▪ Completion of Resource Consent for Stage 1B. ▪ Execute Stage 1B Contract and commence Construction. ▪ Commence seepage modelling for stage 1B ▪ Commence condition assessment of existing Stage 3 bank.

Total Project
▪

Current Tasks and Decisions
▪

6. HIGH LEVEL ROADMAP

Project Name	FY 2022/23				FY 2023/24				FY 2024/25	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Month Starting	July	October	January	April	July	October	January	April	July	October
Stage 1A Professional fees / Surveying/ Project Management/Design										
Stage 1A Preparation of Resource Consent Documents										
Stage 1A Construction										
Stage 1B Professional fees / Surveying/ Project Management/Design										
Stage 1B Preparation of Resource Consent Documents										
Stage 1B Construction										
Stage 2 / 3 Concepts / Budget										

7. MILESTONES

Milestone	Baseline Date	Tracking	Actual Date	Comment
Stage 1A Professional fees / Surveying/ Project Management/Design	31-Aug-23	18-Aug-23		
Stage 1A Preparation of Resource Consent Documents and monitoring	08-Sep-23	08-Sep-23	21-Jul-23	Resource Consent received, WDC have requested application for District Consent for vegetation removal. This was lodged 23/8/23
Stage 1A Construction Complete	31-Aug-23	09-Sep-23	25-Sep-23	Work is complete, Practical completion to be awarded on receipt of as-built drawings. Final account yet to be received.
Stage 1B Professional fees / Surveying/ Project Management/Design	22-Dec-23	22-Dec-23		
Stage 1B Preparation of Resource Consent Documents and monitoring	14-Jul-23	26-Apr-24		Application lodged 18/8/23
Stage 1B Construction Complete	15-Dec-23	16-Aug-24		
Stage 2 / 3 Concepts	31-Jul-23	31-May-24		Concepts received. DO to complete condition assessment of existing bank and provide additional details prior to presenting to WCRC / WDC
Stage 1A Professional fees / Surveying/ Project Management/Design	31-Aug-23	18-Aug-23		
Stage 1A Preparation of Resource Consent Documents and monitoring	08-Sep-23	08-Sep-23	21-Jul-23	Resource Consent received, WDC have requested application for District Consent for vegetation removal. This was lodged 23/8/23
Stage 1A Construction Complete	31-Aug-23	09-Sep-23	25-Sep-23	Work is complete, Practical completion to be awarded on receipt of as-built drawings. Final account yet to be received.

8. CONSENTS

Retrospective Consent for Stage 1A granted 21/7/23. WDC have requested application for District Consent for vegetation removal. This was lodged 23/8/23.

Resource Consent Application for Stage 1b was lodged 18/8/23.

- Response to further KiwiRail queries was provided 18 April. Awaiting KiwiRail confirmation to close out.

9. PROJECT RISKS

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
HR-RIS-01		Consent Processing	Lack of response or changing responses from affected parties	Delay to Programme	Project Manager	Actions in Place	Medium	No Change	Provide support and input when required.	Most approvals now received, follow up remaining and if needed amend Consent application to limited notified
HR-RIS-02		Existing Infrastructure	Upgrades may require relocation of power poles and have effect on adjacent roading network and stormwater system.	Delay to Programme Increased cost	Project Manager	Not Fully Resolved	Low	No Change	Approval of additional cost for relocations if required.	Negotiations to be had with utility operators and investigations into stormwater.
HR-RIS-03		Insufficient Budget	QS estimates indicate that the budget is insufficient for all 3 stages.	Increased cost	Project Manager	Unresolved	Medium	No Change	Approve variations when requested.	Competitively tender full scope and apply for additional funding if needed
HR-RIS-04		Scope of works	Scope increases due to requirements from WDC,	Increased cost	Project Manager	Unresolved	Medium	No Change	Approve variations when requested.	Forecast expenditure and apply for variations.

ID #	Date last Reviewed	Short Risk Name	Source of Concern / Opportunity	Implications	Risk Owner	Governance Status	Rating	Trend	Governance Actions	Treatments / Mitigations
			Heritage Hokitika, etc.							
HR-RIS-05		Weather	Flooding from weather events causing damage during construction	Delay to programme HS Equipment damage Environmental	Contractor	Unresolved	Medium	No Change	Review plans and on-site implementation	Contractor management plans.
HR-RIS-06		Iwi	Completing consultation for 1B Affected Party Approval	Delay to Programme	Project Manager, Planner	Resolved	Low	Improving	Review plans and on-site implementation	

10. PROJECT ISSUES

ID #	Date Raised	Issue Description	Priority	Action Required	Issue Owner
HR-ISS-01	15 May 2023	Joint Committee request was made to review the priority and investigate feasibility/costs to progress Stage 3 ahead of Stage 2. This will delay design until the next stage is agreed.	High	Prepare concepts and budgets for discussion/review by Joint Committee	Project Manager

11. DEPENDENCIES

Ref #	Description	Urgency	Owner	Critical Date	Progress / Actions
HR-DEP-01	Joint Committee request was made to review the priority and investigate feasibility/costs to progress Stage 3 ahead of Stage 2. This will delay design until the next stage is established	High	Project Manager	15-Sep-23	Concepts and budgets have been prepared for discussion/review by Joint Committee

12. IWI / HAPŪ / WHĀNAU

Partnership / Relationship	Notes
Philippa Lynch / Susan Aitken	▪ Affected Party Approval provided for Stage 1B. ▪ Stage 2/3 Cultural Impact Assessment to be discussed once priority established.

13. PARTNERSHIPS / RELATIONSHIP MANAGEMENT

Partnership / Relationship	Notes
Heritage NZ	Discussion required for Stage 3 once concept established.
WDC	Plans and request for 1B affected party approval and District Consent application sent 8/8/23. APA has been received. WDC Resource Consent application for 1A placed on hold however notification not received. Queries now being addressed.
Kiwirail	Response to latest Kiwirail RFI was provided 18 March. Most items now resolved with only some stormwater queries to be closed out
Ngati Waewae	Stage 1B Affected Party Approval received 28 March 2024
Waka Kotahi	Waka Kotahi affected party approval received 4 December 2023

14. HEALTH AND SAFETY

Currently no construction activities taking place.

WEST COAST REGIONAL COUNCIL

To: **Chair, West Coast Infrastructure Governance Committee**

I move that the public be excluded from the following parts of the proceedings of this meeting, namely ***– items 11 and 12 (inclusive)*** *due to privacy and commercial sensitivity reasons and that:*

1. *Darryl Lew, Shanti Morgan, and Scott Hoare be permitted to remain at this meeting after the public have been excluded due to their knowledge of the subjects. This knowledge will be of assistance in relation to the matters to be discussed; and*

2. *That the minutes taker also be permitted to remain.*

Item No	**General Subject of each matter to be considered**	**Reason for passing this resolution in relation to each matter**	**Ground(s) under section 7 of LGOIMA for the passing of this resolution**
11.1	Confidential Minutes Infrastructure Governance Committee Meeting – 9 April 2024	The item contains information relating to commercial, privacy and security matters	To protect commercial and private information and to prevent disclosure of information for improper gain or advantage (s7(2)(a), s7(2)(b), and s7(2)(j)).
12.1	Franz Josef IGC Programme Status Report April 2024	The item contains information relating to commercial matters	To protect commercial information s7(2)(b)).
12.2	Greymouth IGC Programme Status Report April 2024	The item contains information relating to	To protect commercial information s7(2)(b)).

		commercial matters	
12.3	Hokitika IGC Programme Status Report April 2024	The item contains information relating to commercial matters	To protect commercial information s7(2)(b)).