8.3  Flood, debris flow, and avalanche protection

What we do

Aoraki/Mount Cook village is situated in a geologically active area, and is at significant risk from flooding and debris flow hazard from Black Birch Stream, Glencoe Stream, and Kitchener Creek, as well as avalanches from slopes above the village. Various structures have been put in place over a number of years to protect the village from flooding, debris flows, and avalanches.

The flood and debris protection works have been installed in Black Birch Stream, Glencoe Stream, and Kitchener Creek, and include both structures and monitoring systems.

The local body team organises the management and monitoring of the flood and debris protection works and is responsible for ensuring that the procedures designed by consulting engineers for the management of this hazard are followed.

Figure 11 – Glencoe Stream flood protection – rock stop banks and concrete training wall (left).
Why we do it
The department, as the land manager of the park on behalf of the Crown, has statutory obligations around managing natural hazards. The following section outlines the background and history behind the natural hazards and existing mitigation measures to protect the Aoraki/Mount Cook village.

Early history of the park
Aoraki/Mount Cook National Park was established in 1953 with the first National Parks Act. Before this there had been a number of reserves under specific gazettal notices dating from the late 1800s. The current Hermitage site, eventually to evolve into Aoraki/Mount Cook village, was always an integral part of these processes and became a part of the park in 1953.

The first Hermitage was constructed in 1884 at White Horse Hill and was destroyed by flooding in 1914. In the same year the second Hermitage was opened on the present site, which is a terrace obviously picked to avoid the known flood hazard. Construction had commenced in 1911. This Hermitage was destroyed by fire in 1957. The third and current Hermitage was built on the same site, and was operational by May 1958. Up till this time the village comprised the Hermitage itself and ancillary buildings for staff accommodation.

During the 1950s and 1960s, there was additional building activity by the Department of Lands and Survey, i.e. housing for ranger staff and a Park Headquarters. There were also the beginnings of other resident concessionaire activities, i.e. ski planes and the airline. The 1970s saw the introduction of a resident guiding company, youth hostel, school, shop, and post office. Black Birch Fan was developed for staff accommodation, both houses and blocks of single units. In the mid-1970s, an additional wing (the Wakefield wing) was constructed at the Hermitage. A new youth hostel and public shelter were built in the mid-1980s.

Statutory requirements
The National Parks Act 1980 introduced the concept of amenities areas. The village has been managed as an amenity area since then and was finally gazetted as such in 1999.

Through the 1960s and 70s, when development was occurring, the Crown was exempt from many local authority statutory requirements especially in regard to building permits. The only requirement was that the local authority be notified. Within the park the private sector was not exempt from these requirements.

Flood hazards identified
The first major test was in 1985 when the Mackenzie District Council, in conjunction with the Waitaki Catchment Commission, declined a building permit to the Youth Hostel Association until additional river protection work in Black Birch Stream was completed. This additional stop bank was financed by the Crown, and benefited several agencies buildings on Black Birch Fan. The new youth hostel was completed in 1987.

The Building Act 1991 ended the Crown’s exemption from statutory building requirements.

A complex situation arose in 1995 when the Mount Cook Residents Association applied for a building consent from the Mackenzie District
Council to construct a community hall on Black Birch Fan adjacent to the Mount Cook School. The Council declined to issue the consent except under Section 36/2 of the Building Act 1991 because of the perceived risk of flooding or debris flow from Black Birch Stream. In the case of such an event, under Section 36/2 all liability would fall on the landowner, which in this case was the Crown (being a national park).

The department had no intention of accepting liability. There had been major events in Black Birch Stream in December 1979 and January 1994. On both occasions the lower village residents were evacuated as the structural mitigation only just contained the water flow.

With the declining of the building consent for the community hall, there was an immediate focus on potential risk throughout the village. For the first time, Glencoe Stream was identified as a potential hazard to the Hermitage complex. Kitchener Creek, immediately north of the village, previously had potential to spill over towards the Hermitage (Figure 12 – the Boxing Day flood of 1957). The catchment also had a history of being a major avalanche path.

**Village upgrading**

At the same time, the department had begun a major process of upgrading a very ‘tired’ village to again become a showpiece as a national park entrance and tourist destination. This process was originally driven by the then Minister of Conservation and the Aoraki Conservation Board. This was a consultative process involving the department, Mackenzie District Council, village stakeholders, non-resident concessionaires, Mount Cook Residents Association, Ngāi Tahu, the Royal New Zealand Forest and Bird Protection Society, and Federated Mountain Clubs. There was also a core steering group.

**Hazard assessment**

The process outlined above was well and truly diverted while the implications of Mackenzie District Council refusing to issue building consents, except under Section 36/2 of the Building Act 1991, were dealt with. What followed in 1995 was the completion of a major report: ‘Natural Hazard Assessment for Mount Cook/Aoraki Village and Environs’ by MJ McSaveney, TRH Davies & JD Gough, published by the Institute of Geological & Nuclear Sciences Limited (a Crown Research Institute).

They came up with a number of recommendations, a main one being that they felt unqualified to report on the hazard potential of Glencoe Stream, and indicated that overseas expertise in the alpine environment should be obtained.

A Canadian consortium, EBA were contracted to provide a hazard assessment and concept plans specifically for the Glencoe catchment. Meanwhile Royds Consulting (later to become Montgomery Watson) produced Geotechnical Report No. 2, Mount Cook village, 1996. This was a supplementary study to the IGNS 1995 report, and its purpose was to carry out preliminary design, estimate quantities and costs, and assign priorities to the work elements. The priority was Black Birch Fan to resolve the issue of the Mackenzie District Council withholding a building consent for the community hall.
EBA’s proposals included a training wall and major stop bank on the northern side of Glencoe Stream to protect the Hermitage complex, a stop bank on the southern side of Glencoe Stream to protect the village centre, and a stop bank below Bowen Bush to protect Glencoe Lodge. The proposed structural mitigation also meant major alterations, and re-routing of services such as water supply and electrical cables.

Montgomery Watson was used by the department to complete all the plans and specifications, obtain resource consents from Canterbury Regional Council, and run the tender process for the contract. Works Civil Construction (now Works Infrastructure) accepted the tender and commenced work on site in April 1999.

Following major consultation and negotiation, the project was funded by the owners of the Hermitage complex, the major village concessionaire. This involved a trade-off with the Crown, and a subsequent agreement to enable the Hermitage owners to progress with a major development proposal within a planning envelope.

The geotechnical work was completed in May 2000 at a cost of $2 million, including the costs of earlier reports and engineering consultancy. Contributions were made by stakeholders towards paying off the interest and principal costs of the loan for the geotechnical works with approximately $720,000 being paid off the principal of the loan.

The geotechnical works were purchased from the owners of the Hermitage by the Crown in 2007, and are now managed by the department. At the time of purchase, the residual value of the assets was $1.1 million. Since purchase by the Crown, the department has paid the full costs of the capital charge and depreciation on the assets in recognition of the past contributions made by village stakeholders.

Figure 13 shows the areas within the village that are designated as flood zones with the existing flood protection works. These are the floodways and pooling areas that are designed into the geotechnical flood protection works (shown in Figure 14).
Figure 12 – Aoraki/Mount Cook village following the Boxing Day 1957 flood
Managing the impacts of the activity
The main impacts of the protection works are from the building of dykes and disturbance of natural processes in river and stream beds.

The department holds resource consent from Environment Canterbury as follows:

**CRC981164 To place and reconstruct dykes in Black Birch and Glencoe Streams; to remove a footbridge over Glencoe Stream; and to excavate sand, gravel, and other natural material from the beds of Black Birch Stream, Glencoe Stream, and Kitchener Creek, at or about map references H36:7634-1437, H36:7589-1514 and H36:7595-1548; expires 25 February 2033.**

Conditions of the resource consent ensure that the activity is done in a sustainable manner. Impacts on village residents from noise of rock dredging and construction are managed by time limits on these activities, which are permitted between the hours of 7 am and 8 pm only.
Figure 13 – Village flood zones, showing the designed flood and debris flow routes and runoff/pooling areas
Figure 14 – Flood-protection structures
**Levels of service**

The department, through the local body, will manage the risk of flooding and debris flows to the service standards outlined below. The current level of service (which is the intended level of service) provided by the assets relates to the current environment. The Aoraki/Mount Cook region is dynamic geomorphically, and changes in climate or catchment conditions could change the level of service provided.

<table>
<thead>
<tr>
<th>Function</th>
<th>Level of service</th>
<th>Performance standards</th>
<th>How we will measure this</th>
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<tbody>
<tr>
<td>Protection of the village from flood and debris-flow events.</td>
<td>To prevent at least a 1:200-year flood and debris-flow event in the Glencoe catchment from causing damage in the village. To prevent at least a 1:100-year flood event and a 1:50 year debris-flow event in the Black Birch catchment from causing damage in the village. To prevent at least a 1:100-year flood and debris-flow event in the Kitchener, Hermitage Creek and/or Governors Bush catchments from causing damage in the village.</td>
<td>Maintenance and monitoring of geotechnical protection works and geological hazards will be carried out as per the Standard Operating Procedure for Aoraki/Mount Cook Village Flood and Debris Flow Protection Works. All waterway and floodway management will be in accordance with the recommendation of the hazard assessment and geotechnical reports.</td>
<td>Events at these levels do not cause any damage in the village and are contained by Flood and Debris Flow protection works. Note: Events larger than these levels may cause damage despite the protection work.</td>
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<td>Function</td>
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<td>Performance standards</td>
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<tr>
<td>Protection of the village from avalanches.</td>
<td>To provide protection from avalanches from the Kitchener and Black Birch avalanche paths for avalanches up to 1:300-year events.</td>
<td>An avalanche monitoring and assessment SOP (along the lines of the flood-monitoring SOP) is developed by 1 June 2010.</td>
<td>Events at these levels are contained by geotechnical protection works and do not cause any damage in the village.</td>
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<td>An assessment of the likely effectiveness of the Kitchener protection works is to occur by 1 November 2009 and implementation of its recommendations started by 1 June 2010.</td>
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<td>Monitoring and recording of avalanche events in these two paths for all events greater than size three will occur.</td>
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Asset information

Summary

- Concrete training wall at Glencoe Stream to protect the Hermitage and water tank and treatment infrastructure.
- Concrete training wall behind the old Alpine Guides base, to protect the buildings on the true right of Glencoe Stream around the petrol pumps, old shop, and Alpine Guides base.
- Rock stop banks and dykes in Glencoe Stream, Black Birch Stream, and Kitchener Creek to protect the village from flood, rock debris and avalanche flows.
- Fuse-plug spillway and secondary rock protection dykes below the village to contain any spilled flows.

Description of assets

Flood and debris protection works in the Black Birch stream comprise a primary stop bank following the Black Birch Stream, and secondary stop banks to the southeast of the lower village, and around the department’s workshop. Further stop banks around the oxidation ponds are designed to protect the ponds in the event of the primary stop bank being breached.

The primary stop bank at Black Birch Stream has a weak spot where it intersects the secondary stop bank. This is designed as a ‘fuse plug’ spillway where water will be diverted into the secondary channel if there is a risk that the primary stop bank could be breached.

Flood and debris protection works in the Glencoe Stream comprise of a concrete training wall (visible to the left of the water tanks in Figure 3), and rock wall dykes extending down each side of the stream way to the road bridge in Bowen Drive (visible in the foreground of Figure 3). There is a lower dyke on the true right of the stream below Bowens Bush which prevents water and debris flows from getting to the Hermitage Glencoe Wing. The Glencoe dyke system is designed to constrain flows to the stream bed until below Bowen’s Bush where the water is intended to flow out the waterway towards Lower Terrace Road and to pool on the lower areas around Lower Terrace Road and the Glencoe Access Road.

A concrete training wall was built in 1984 at Governors Bush, behind the old Alpine Guides base, to protect that building and the petrol pumps.

Rock protection dykes were built in Kitchener Creek in 1957 following the Boxing Day storm (shown in Figure 12), which caused flows to be diverted towards the Hermitage. These were described by MWH consultants when assessed in 2003 to be two to three ‘indistinct’ stop banks several hundred metres in length and parallel to the main stream channel.

Significant risks and issues

An avalanche hazard exists on the Kitchener Fan. The existing stop bank has had several size 4 avalanche events overtop it in the last 30 years. Avalanche debris from size 5 avalanche events have potential to affect the Hermitage, Chalets, Visitor Centre, and Old Mountaineers’ Café/Bar.
Hazard from avalanche also exists in the Black Birch catchment. It’s expected that the existing flood and debris protection works should contain avalanche flows from Black Birch Stream.

**Future demand**

The village and protection works have been planned with designated flood pathways and floodwater and debris pooling areas. These must be retained for this purpose in a natural undeveloped state. Any significant change to the layout of the village could potentially require changes to the flood-protection works.

No such change to the village layout is planned or anticipated in the next 10 years.

**What we’re planning to do**

We’re planning further investigation of the avalanche hazard from Kitchener Creek. This is described under Levels of Service.

If a major upgrade or repair of any of the protection works is required, the department will seek funding from government.

**Maintenance and operating**

Maintenance and inspection requirements for the geotechnical protection works are set out by the Standard Operating System (SOP) for the scheme. This is written for the department by MWH New Zealand, and these requirements are carried out by local body staff and/or consulting geologists or engineers as specified by the SOP.

Every six months the system is checked for visible damage and the level of streambed debris build-up is checked. Every five years, the scheme should be inspected by engineers and geologists, and the procedures reviewed. A helicopter survey of the upper catchments, including an experienced engineering geologist, is required every five years to assess, film, and map the debris load which could potentially come down as a debris flow.

Other maintenance and operating is reactive, depending on storm or earthquake events. The six-month monitoring process must be completed within one week of a flood in excess of a five-year return period. A review of the scheme is also recommended following any significant flood, debris flow or earthquake in which overtopping or extensive damage occurs to any of the primary structures.

Build-up of debris in the beds of the Black Birch and Glencoe Streams is removed as required to maintain the capacity of the streambeds to contain additional debris and flood flows in a flood event.

**How it will be funded**

The flood, debris flow, and avalanche protection expenditure for the village will be recovered by general recovery funding principles. The capital value (QV valuations) of the concessionaires and the departments’ properties will be used to determine the allocation of expenses recovered.

The allocation of these expenses to be recovered will be determined by the capital value of the properties as a percentage of the total capital value of the occupied properties in the village. The expenses to be recovered will be invoiced quarterly.
## Financial statements

**Aoraki-Mt Cook Local Body**

**STATEMENT OF FINANCIAL PERFORMANCE**

10 Year Annual Forecast to June 2019

### FLOOD, DEBRIS FLOW AND AVALANCHE PROTECTION

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### FLOOD MONITORING ASSETS SUMMARY

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<td>LB Assets - Depreciation Levied</td>
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Refer also to Section 12 for "Assumption and Notes" to financial information
8.4 Solid-waste disposal

What we do
The department provides a solid-waste removal service for the Aoraki/Mount Cook village. A significant upgrade of the solid-waste management system is planned for the 2009/10 financial year.

On completion of this project, the village will have a waste management system that will mesh with the region’s future waste management streams. It will maximise the economy of scale possible in the village and be flexible in its use of available transport providers, making significant cost savings. Once fully operational, the new system will reduce transport costs, manpower requirements, and waste handling. It will also provide a saving in carbon emissions by maximising waste tonnage per kilometre travelled. This system upgrade will be a significant improvement in resource recovery from the existing waste stream.

Figure 15 – Existing solid-waste truck and workshop facility
**Why we do it**

Due to the statutory requirements of the Conservation and National Parks Acts and the operational requirements of managing and doing business in a national park, the department is mandated to provide an environmentally sustainable solid-waste disposal and recycling recovery system.

Solid waste has the potential to cause significant pollution and visual impact in the Park. The isolation of Aoraki/Mount Cook means that transporting waste has potential to generate high carbon emissions. The present system also requires significant manpower to sort the waste which will be reduced by the new system.

The proposed solid-waste collection and removal system will ensure that it is dealt with appropriately and in a sustainable manner. The Mackenzie District Council has a target of achieving zero residual waste by 2014. The Aoraki/Mount Cook village solid-waste system will go a long way towards the village meeting this target by enabling all recyclable and compostable waste to be removed from the waste stream going to landfill.

**Managing the impacts of the activity**

The largest impact of solid-waste removal is the level of transport required to move waste from the village to landfill or recycling facilities. Use of the proposed compactor system to compress waste, and ensuring that loads are full will reduce the amount of trips required for waste to landfill and the recycling plant. This will reduce carbon emissions.

The planned new system is current best practice for solid-waste disposal. There is potential to work together with other councils using this system to achieve efficiencies and cost savings for all involved. Neighbouring councils have been approached by the department and the Hermitage (as the largest concessionaire and contributor in the village) to see if they are interested in participating.

The contribution to the cost of the proposed solid-waste management service will be mandatory for all concessionaires in the village, to avoid impacts from the use of alternative systems. The proposed system is designed to mitigate and manage the effects of waste storage and transportation out of the village in the most environmentally friendly and cost-effective manner.

Allowing stakeholders to opt-out would undermine the integrity of the new system and increase the environmental footprint of solid-waste management in the village as a whole.
Levels of service

The department will supply waste disposal and removal to the service standards outlined below.

<table>
<thead>
<tr>
<th>Function</th>
<th>Level of service</th>
<th>Performance standards</th>
<th>How we will measure this</th>
</tr>
</thead>
<tbody>
<tr>
<td>All solid waste is removed from the village to the appropriate waste stream.</td>
<td>To provide a solid-waste disposal service for the village.</td>
<td>Waste is removed from the village to the appropriate waste stream.</td>
<td>Monitoring of waste system. Ensure that waste is directed to the correct destination.</td>
</tr>
<tr>
<td>Minimisation of solid waste to landfill.</td>
<td>Encourage recycling and reuse, and waste minimisation at source.</td>
<td>Amounts of solid waste to landfill as a proportion of total waste reduces over the 10-year period.</td>
<td>Monitoring of size and frequency of loads to landfill.</td>
</tr>
<tr>
<td>Hazardous waste.</td>
<td>No facilities will be provided for the disposal of solid waste.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Recycling and re-use.</td>
<td>To encourage recycling and reuse within the community by providing a way for the community to recycle and reuse.</td>
<td>Amounts of recyclable and compostable waste as a proportion of total waste increases over the 10 year period.</td>
<td>Measurement of recycling volumes. Monitoring of waste going into the landfill to ensure that does not include recyclable waste.</td>
</tr>
<tr>
<td>Illegal dumping.</td>
<td>To respond to complaints of illegal dumping, and ensuring it's removed.</td>
<td>Illegally dumped waste within the village is removed within one day.</td>
<td>Reports of illegal dumping will be kept.</td>
</tr>
</tbody>
</table>
Asset information

Summary
Current assets:

- Park and village solid-waste bins.
- Paper and cardboard press.
- Roller doors and part of workshop buildings.
- Rubbish truck (Ford N1017 9T).

Proposed assets (from 2009/10):

- Park and village solid-waste bins.
- 4 x twist lock compactable solid-waste containers.
- 2 x 50-degree low-loading trip trailers.
- 1 x ‘Junior’ residual waste compactor plus electronic pressure control system.
- 1 x weighbridge.
- Waste Transfer Station weatherproof building.
- Putrescible collection vehicle (purchased from Aoraki Mount Cook Village Limited – the Hermitage).
- 6 glass mini-skips (purchased from the Hermitage).

Description of assets
The existing local body assets for solid-waste disposal consist of a waste truck which is due for replacement, part of the workshop structure, a press for paper and cardboard, and bins for rubbish collection.

The truck, use of the workshop, and the existing paper press will no longer be required under the new system. The existing park and village bins will still be used.

The proposal will use a new purpose-built facility, located on Kitchener Drive (Figure 16), which will use a compactor-ram system to push waste into a purpose-built container, locked onto a tip trailer. Once the container reaches the maximum acceptable weight for road transport, it will be transported to the Redruth waste facility in Timaru by any available cartage contractor. The containers can take up to 38 cubic metres capacity or the maximum acceptable weight for road transport.

Recyclable waste (plastics, tin, and aluminium) will also be transported to Redruth by a similar system for automated sorting. Glass will be stored in existing mini-skips for transport out of the village as needed. Putrescible waste will be stored in mini-bins and transported to the Mackenzie District Council facility at Twizel using the Hermitage’s compactor vehicle. Transport is anticipated to be needed every two weeks for waste and every three weeks for recycling. The new system will require fewer trips to be made per cubic metre of solid waste.
**Significant risks and issues**
No risks or issues have been identified at this time.

**Future demand**
The system to be put in place in 2009/10 is expected to meet the foreseeable needs of the village for the term of this plan.

**What we’re planning to do**
After the upgrade planned for 2009/10 is complete, no further significant investment is anticipated.

**Maintenance and operating**
No significant maintenance is anticipated in the next three years, as most of the plant associated with solid waste will be almost new. Existing equipment will be maintained as required until the new waste system is in operation. Operational activities will ensure that the agreed levels of service are met.

**How it will be funded**
The solid-waste disposal expenditure for the village will be recovered by user pays funding principles. The quantity of bins produced will be used to measure the usage by the concessionaires and the department’s properties in the village.

The allocation of these expenses to be recovered will be determined by the quantity of bins each quarter as a percentage of the total quantity of bins used by the village. The share of expenses to be recovered will be invoiced quarterly.
## Financial statements

### Aoraki-Mt Cook Local Body

#### STATEMENT OF FINANCIAL PERFORMANCE

10 Year Annual Forecast to June 2019

### SOLID-WASTE DISPOSAL

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#### Expenditure

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**Total Expenditure**

$154 $160 $162 $164 $167 $169 $171 $174 $177 $180

*Note: It is fully expected that the new waste management system will generate both personnel and operating savings. However, this has not been reflected in the 10-year forecast until the scope of the capital project is fully finalised and the total extent of expected savings are known.*

### WASTE ASSETS SUMMARY

<table>
<thead>
<tr>
<th>Year</th>
<th>Expected Capitalised</th>
<th>Expected Life</th>
<th>Cost Value</th>
<th>Accum. Depn</th>
<th>Annual Depn</th>
<th>NBV Jun-09</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ 000s</td>
<td>$ 000s</td>
<td>$ 000s</td>
<td>$ 000s</td>
<td>$ 000s</td>
<td>$ 000s</td>
</tr>
<tr>
<td>LB Assets - Depreciation Levied</td>
<td>205</td>
<td>168</td>
<td>8</td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>LB Assets - Depreciation Paid by DOC</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Forecast Future Acquisitions**

| New Refuse System | 2009/10 | 30 | 530 | 18 |

*Refer also to Section 12 for "Assumption and Notes" to financial information*
8.5 Roading

What we do

Development in the village has created a set of roads to provide access for residents and the public to businesses within the village and to the residential area. Roads are designed to maximise the use of residential sites, meet the needs of emergency services, facilitate snow clearing, avoid build-up of ice or scouring where possible, remain usable during storms with a 1 in 10-year flooding frequency, blend into the natural landscape, and be adequately lit where necessary.

Roads comprise several elements: the surface (tar seal or gravel), the foundation that provides a solid base to the road, and water control (storm water drains and sumps). This activity also includes signage, storm water management, and traffic control/calming.

Who pays for what?

The department’s local body team manages and maintains all roads, footpaths, and street lighting in the Aoraki/Mount Cook village. Roading is funded through three different streams – department national park/visitor funding; department covering full costs of some local body roads; roads levied to stakeholders.

The department has decided that roads used by visitors to move around the village and to access the park will be managed as national park visitor assets.

Bowen Drive, Terrace Road, and Larch Grove Road (the ‘loop road’) are designated as national park rather than local body assets. Costs of the management of these roads are paid by the department as part of park management, and are not levied to stakeholders. Also, some minor local body roads, used primarily for the servicing of the water system, are not levied to stakeholders.
Why we do it
People need well-maintained roads to easily and safely get around the village. Roads are maintained to minimise hazards from the poor condition of road surfaces or unnecessary build-up of ice and snow in winter.

Hard surfaces such as roads need management of runoff in heavy rain. Sealed roads have storm water management in the form of kerb and channel, drains, and sumps.

Some roads within the village are used by both residents and visitors. In the past, all roads were managed and funded through the local body, but now funding of roads is split between local body and general department park management work.

Managing the impacts of the activity
Environmental impacts of roading activity in the village are minimal. Any new road in the residential area or for access to any new commercial operation will need to have its effects assessed and mitigation measures will need to be put in place first. This will be managed as part of the concession application process.

Financial impacts of roading work will be minimised where possible by working with the New Zealand Transport Authority, and planning roading works in the village and around the park to combine projects. This will save considerable money for village stakeholders by sharing some of the fixed costs such as equipment relocation fees (estimated to be in the order of $20,000–30,000) with other works carried out by both the department and the New Zealand Transport Authority.

The department holds a resource consent from Environment Canterbury for the discharge of storm water from the car parking area around the Visitor Centre (consent CRC084612: expires 8 July 2043).