Your assets and their management

The following excerpt from the CODC's AMP that provides an overview of the council's bridge stock and includes detailed examples for two types of bridges.

The bridge stock was CODC's most significant area of concern in their 2015–18 AMP. The council undertook a review of their bridge asset and condition information to inform their 2018–21 AMP.

For the 2018–21 AMP, the CODC shifted focus to proactive management of their most critical bridge assets while also balancing pavement and treatment performance against increased traffic demand.

This is an example of fit-for-purpose effort.

Each three-year cycle allows your organisation to work on continuous improvements to your asset management planning, aligned with your strategic goals.

5.4 Structures

Bridges

Council's structures include bridges, footbridges and retaining walls. Large culvert structures with a waterway area of at least 3.5m^2 are classed as bridges. Central Otago District currently has 177 maintained bridges, with three of these being footbridges.

The number of bridges located in each ward are as follows:

- Cromwell 17
- Earnscleugh/Alexandra 16
- Manuherikia 57
- Maniototo 58
- Roxburgh 29

The bridge stock includes an extensive range of sizes from 3m long concrete box culverts to the 176m long Millers Flat Bridge.

Bridges range in age from a 12-year old contemporary "double-T" hollow core concrete structure to a 137-year old timber decked steel and concrete rail bridge.

Source: Central Otago District Council Transportation AMP 2018-2021

Condition of the Bridge Assets

Inspections and condition rating was undertaken on all of the bridges in 2014. Quality of Councils' bridges by condition as illustrated in Figure 5.13. Condition rating was undertaken to component level.

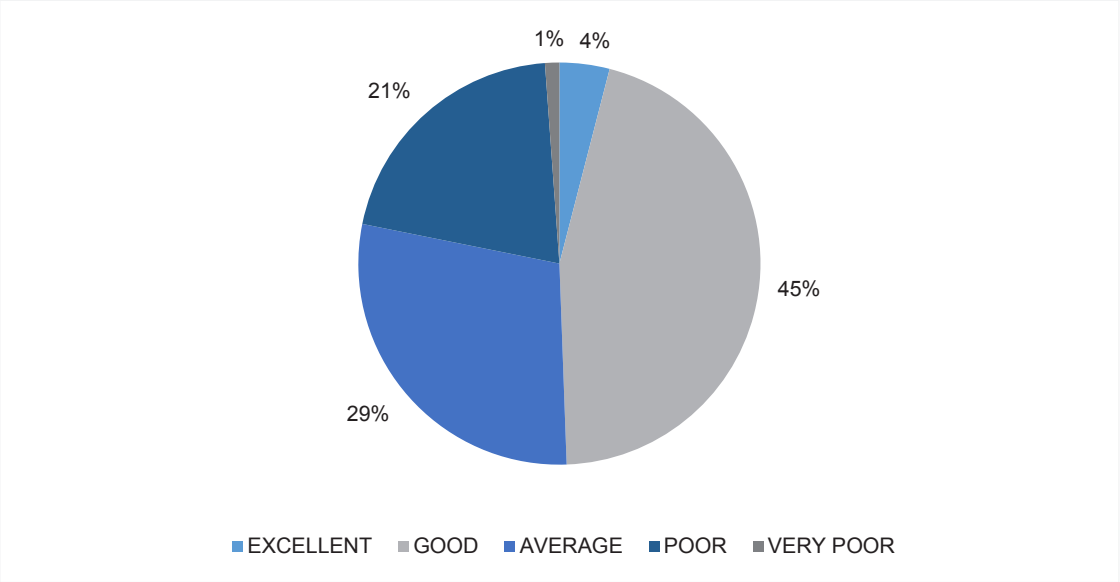


Figure 5.13 Bridge Condition 2014

The bridge assets are grouped into different types based on the construction materials of the deck and beams on Tables 5.7 to 5.13. For each type, the number of bridges with the same span configuration (single or multiple) are shown separately, along with the primary construction materials used for the abutment, pier, beams and deck. The average age of these bridges is shown, along with the oldest and estimated average total useful life for each group. The estimated total useful life is the life that is used for depreciation calculations.

A graph of the condition of the bridges in each group is provided, along with a brief summary of the condition.

A number of bridges are currently older than the estimated total useful life. This is typically because these bridges have had significant structural component renewal work undertaken which is resulting in a prolonged life. The lifecycle management strategies for bridges is provided in Section 6.

Council is undertaking further structural, investigations to enable community consultation regarding affordability and need for retaining the bridge network in its current form. This will include options for route and bridge optimisation and will evaluate options for replacing essential bridges, installation of wash over culverts, and retiring some bridges

Source: Central Otago District Council Transportation AMP 2018-2021

Spans	Abutment	Piers	Beams	Deck	No. of Bridges	Average Age	Single Oldest	Total Useful Life
Multiple	Concrete	Concrete	Concrete	Concrete	17	52	80	115
Single	Concrete		Concrete	Concrete	44	53	107	115

Generally the concrete bridge stock is in good condition. In most cases the issues with concrete bridges involve bed degradation and scour causing undermining of the piers or abutments. This in turn creates instability, settlement and cracking. This is monitored in the short term however if it continues, can result expensive long term remedial work.

An example of this is the 80 year old Omakau Bridge. While the bridge itself may appear robust and in good condition and robust, it has previously had issues with pier settlement and remedial work was carried out in the 1990's.

A submission to the 2009/19 LTCCP requested that the Omakau Bridge be upgraded to a double-lane bridge and equipped with pedestrian/cyclist facilities on either side. A feasibility report has been prepared and has again highlighted some deficiencies with the foundations when the bridge is subjected to further scour, eccentric loading and seismic activity.

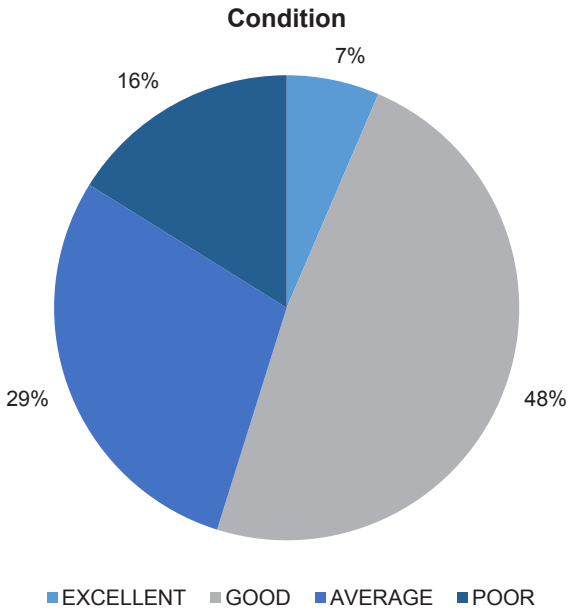


Table 5.7 Concrete Bridges (single and multiple span)

Source: Central Otago District Council Transportation AMP 2018-2021

Spans	Abutment	Piers	Beams	Deck	No. of Bridges	Average Age	Single Oldest	Total Useful Life
Multiple	Concrete/ Masonry	Concrete/ Masonry	Steel	Concrete	11	63	119	100
Single	Concrete		Steel	Concrete	9	51	62	100

The multiple span bridges in this category fare worse than the single span types.

Issues include concrete spalling, deck joint issues and undermining of piers and abutments.

Almost all of the multiple span bridges exhibit at least one of these issues. In contrast, the single span bridges appear to be in very good condition with the only expensive maintenance requirement being painting of the steel beams.

However, due to the dry inland climate of Central Otago, most of the steel painting previously identified has been deferred to beyond 2023.

The Millers Flat Bridge is 119 years old and has had significant component renewals work undertaken which is resulting in a prolonged life.

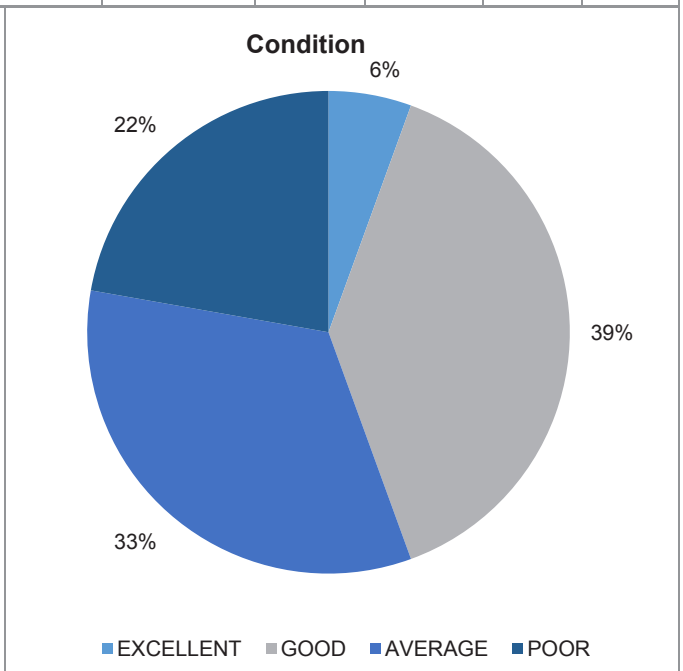


Table 5.8 Concrete Deck and Steel Beam Bridges

Source: Central Otago District Council Transportation AMP 2018-2021

Spans	Abutment	Piers	Beams	Deck	No. of Bridges	Average Age	Single Oldest	Total Useful Life
Multiple	Concrete	Concrete	Steel	Timber	8	86	137	90
Multiple	Concrete	Steel	Steel	Timber	1	57	57	90
Multiple	Steel	Steel	Steel	Timber	2	104	111	90
Single	Concrete		Steel	Timber	9	78	117	90
Single	Timber		Steel	Timber	2	107	107	100
Single	Masonry		Steel	Timber	2	102	117	90
Single	Masonry	Suspension bridge	Steel	Timber	1	137	137	170

Council maintains a total of 25 bridges where the structure is made up of both timber and steel. The multiple span bridges in this category are generally in good to average condition. Three have recently had major works upgrading beams from timber to steel and replacing decks etc.

Most of the single span bridges have issues with cracking or undermining to abutments or poor stonework to wing walls.

The multiple span bridge which is 137 years old is Kearneys Bridge which is on a road that is not maintained by Council and is at the end of its life.

The single span suspension bridge is the Daniel O'Connell suspension bridge at Ophir.

A number of these bridges have had significant structural component replacements undertaken which is resulting in prolonged lives.

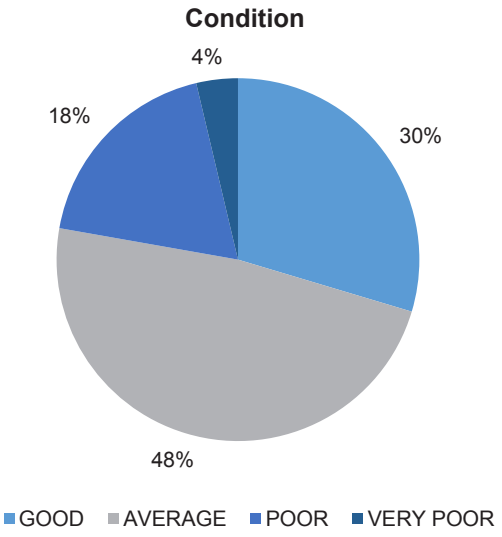


Table 5.9 Timber Deck and Steel Beam Bridges

Source: Central Otago District Council Transportation AMP 2018-2021

> In addition to the extracts above, the CODC's AMP also includes details on timber bridges, concrete, timber and Armco culverts, and footbridges.
>
> This example from the WDC's AMP talks about their pavements and surfacing.

7.3 Pavements & Surfacing

7.3.1 Introduction

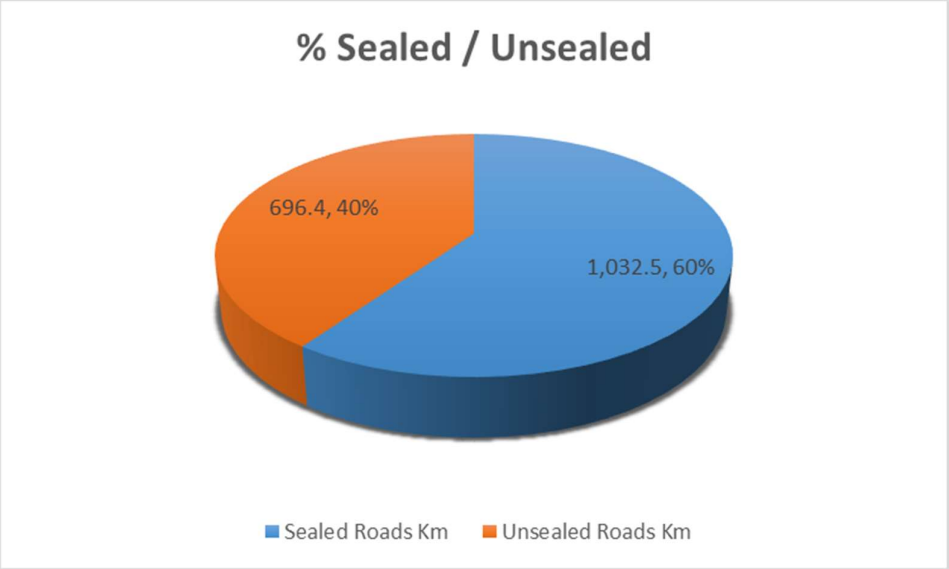
Pavements and surfacing make up the core of Whangarei District Council's road network. They are critical for providing road access throughout the district.

They have a current combined value of $567M which constitutes 77% of WDC's total transportation asset value (excluding land value).

This asset group includes:

- Sealed pavements
- Sealed road surfacing
- Unsealed pavements

The breakdown between sealed and unsealed roads is shown in



> The following sections describe the background and issues affecting WDC's pavements and surfacing.

7.3.2 Background

7.3.2.1 Method of Contracting

Pavement and surfacing maintenance and operations are undertaken through Council's *Road Maintenance Contracts*.

Reseals are currently undertaken through Council's *Reseal Contract*.

Source: Whangarei District Council Transportation AMP 2018-2048

Pavement rehabilitations are normally packaged together into contracts of around $1M each. These are currently tendered using separate professional service contracts (for design) and physical works contracts (for construction).

A new *Road Maintenance Contract* is currently being prepared which will include reseals and most simple pavement rehabilitations in the one contract. This is described further in Section 6.15.

7.3.3 Geology

The geology of the Whangarei District consists generally of poor clay soils with some pockets of volcanic soils and sandy soils on the coast. In general, the common clay subgrades are weak and form a poor foundation for pavements. They are often highly sensitive to moisture and are not free draining which results in pavements failing during periods of wet weather. Ensuring adequate drainage in these soils is a priority.

The weak subgrades also require thicker pavements to support the design loads over the life of the pavement. This results in more expensive pavements.

Some soils within the Whangarei District, and in particular the Northland Alocthon (otherwise known as Onerahi Chaos), are subject to ongoing subsidence. This often results in deformation of pavements and ongoing remedial repairs. Where possible these areas of subsidence are addressed through preventative maintenance or repaired when associated with an emergency event.

7.3.4 Aggregate Sources & Stabilisation

Due to the poor geology, there are relatively few sources of aggregate suitable for road maintenance and construction activities within the Whangarei District. The following quarries are currently used by the Whangarei District Council for the supply of roading aggregates:

- Winstones (Otaika)
- Atlas Quarries (Piroa)
- Dickson Road Quarry (Whareora)
- Brewer Road (Poroti)
- Wood Road (Kara)
- Elliots Quarry (Whangaruru – is this Far north) used occasionally
- Mountfield Quarry
- Ruarangi Quarry
- Blue Chip Quarry (Houtu Road)
- Drinnon Road Quarry
- Clements Quarry (Westwood – Maunu)
- Kokopu Road Quarry
- A&S Quarries (Lower Port Road)
- Puhipuhi Quarry
- Millbrook Road Quarry

There is a reasonable spread of quarries throughout the District, although some quarries are not suitable for basecourse materials and only two quarries (Winstones and Atlas Quarry at Piroa) are suitable for sealing chip. This can lead to long cartage runs to truck in metal and hence increased costs for constructing and maintaining roads.

Source: Whangarei District Council Transportation AMP 2018-2048

There are few quarries that can produce aggregate to the NZTA M/4 specification. The cost of producing this M/4 material is high and for this reason, most basecourses within the Whangarei District and indeed within Northland are constructed using inferior GAP40 aggregate which is then either lime or cement stabilized to bind up the fines. This has been the traditional approach for constructing pavements in Northland for the past 15-20 years and generally results in a stiff top pavement layer. However, on routes with high heavy vehicle volumes these stabilized pavements can suffer from block cracking of the bound pavement layer and this is starting to become evident on some forestry and arterial roads within the Whangarei District.

7.3.5 Ownership & Responsibilities

The Whangarei District Council is responsible for maintaining the road network within the Whangarei District. The Council is not responsible for any pavements or surfacing on the State Highway network.

As part of the Council's Memorandum of Understanding (MOU) with NZTA, NZTA will maintain the pavements on district roads up to 10m from the intersection with a State Highway. Any costs involved with the maintenance of defects that straddle the 10m distance will be apportioned to each authority by agreement.

NZTA subsidise pavement related activities for maintenance, renewal, and capital improvement where this meets with NZTA funding rules.

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Source: Whangarei District Council Transportation AMP 2018-2048