Laura Bowman

From: Official Information
Sent: Wednesday, 7 December 2022 8:44 am
To: 7(2)(a) [redacted]
Cc: Official Information
Subject: Final Response (Part 2) - LGOIMA 291390 - 7(2)(a) [redacted] - copies of the specified Beca reports
Attachments: 01 Hamilton City Council Road Asset Valuation - 1 July 2013 – Beca Limited.pdf; 02 Hamilton City Council Transportation Asset Valuation 2016 – Beca Limited.pdf; 03 Hamilton City Council 2021 Fair Value Assessment of Roading Infrastructure Assets – Beca Limited.pdf

Kia Ora,

I refer to your **information request below**, Hamilton City Council is able to provide the following response.

Your Request:
Could you please provide the Beca reports of 2013, 2016 and 2021 that you refer to below.

- Hamilton City Council Road Asset Valuation - 1 July 2013 – Beca Limited
- Hamilton City Council Transportation Asset Valuation 2016 – Beca Limited
- Hamilton City Council 2021 Fair Value Assessment of Roading Infrastructure Assets – Beca Limited
-

Our Response:
Please find a copy of these reports attached.

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

Kind Regards,

Laura | Official Information Coordinator
Governance & Assurance Team | People and Organisational Performance
Email: officialinformation@hcc.govt.nz

Hamilton City Council | Private Bag 3010 | Hamilton 3240 | Hamilton City Council

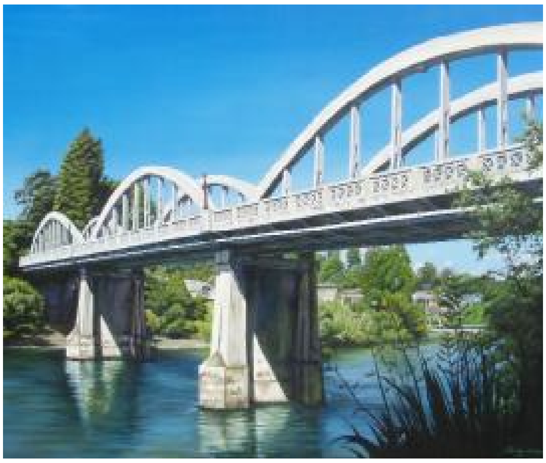
Report

Hamilton City Council Road Asset Valuation - 1 July 2013

Prepared for Hamilton City Council (Client)

By Beca Ltd (Beca)

22 October 2013



Revision History

Revision Nº	Prepared By	Description	Date
A	7(2)(a) [redacted]	Draft report for client review	3 Oct 2013
B	7(2)(a) [redacted]	Final Report for client issue	22 Oct 2013

Document Acceptance

Action	Name	Signed	Date
Prepared by	7(2)(a) [redacted]		22/10/2013
Reviewed by	7(2)(a) [redacted]		22/10/2013.
Approved by	7(2)(a) [redacted]		22/10/13
on behalf of			

Table of Contents

Appendices

1 Introduction

This report details a valuation of selected roading assets owned by Hamilton City Council (HCC) as at 1 July 2013.

Beca Ltd (Beca) has been commissioned to conduct a valuation of the assets in the road network using the RAMM Asset Valuation Module (AVM).

The valuation module was set-up in 2003 for this purpose and this year's valuation uses the same AVM set-up subject to the improvements, modifications and updates implemented since then.

There are many road assets that were managed in other HCC asset management systems in 2010 whose data has been migrated into RAMM, and these assets are valued using AVM this time.

This report details the results of the valuation and includes all the assumptions and data provided in reaching these results.

The report is set out in a similar manner to the format used in the AVM so that the reader can follow the process while accessing the information from RAMM.

2 Purpose

The purpose of this valuation is for financial reporting purposes for Hamilton City Council.

3 Effective Date of Valuation

The effective date of the valuation is 1 July 2013.

4 Declaration

Beca is an engineering consulting entity with a long history undertaking infrastructure valuations for financial reporting and insurance purposes.

Beca is aware this document will be relied on by HCC for the purposes of financial reporting and that the report shall be used by auditors relying on our knowledge of infrastructure valuations.

Information reliance is subject to the comments relating to the component assumptions and using manual assessments where insufficient data attributes renders the use of AVM unreliable e.g. the unreliable lengths method used to value traffic islands. Further to this Beca are not aware of any reason HCC should not place reliance in the information and values provided within the report.

Beca confirm that the valuation has been performed independently of HCC and without bias.

HCC supplied data on costing, structure and construction dates of the assets are assumed to be reliable. HCC and suppliers have provided specialist advice on remaining lives and replacement costs for similar roading assets where known. Where costs have been assumed, they have been checked by Beca.

Beca confirm that this valuation has been completed by employed persons sufficiently experienced to conduct a valuation of this nature.

5 Valuation Summary

An asset component summary of the replacement cost, depreciated replacement cost and annual depreciation results from AVM is shown in the following table.

Asset Type	Component	Replacement Cost	Depreciated RC	Annual Depreciation
Bridge	Culvert	$9,303,060	$4,821,075	$139,900
	Deck	$77,014,734	$53,708,410	$513,431
	Total	**$86,317,794**	**$58,529,485**	**$653,332**
Drainage	Drainage	$29,453,860	$16,796,877	$426,388
	Total	**$29,453,860**	**$16,796,877**	**$426,388**
Feature	Feature	$997,539	$421,656	$63,861
	Total	**$997,539**	**$421,656**	**$63,861**
Footpath	Footpath	$153,228,306	$90,318,637	$4,518,943
	Total	**$153,228,306**	**$90,318,637**	**$4,518,943**
Intelligent Transport Systems	ITS	$1,926,018	$1,520,183	$96,292
	Total	**$1,926,018**	**$1,520,183**	**$96,292**
Island	Island	$11,159,282	$8,197,860	$318,813
	Total	**$11,159,282**	**$8,197,860**	**$318,813**
Minor Structure	Minor Structure	$7,015,784	$6,121,110	$133,301
	Total	**$7,015,784**	**$6,121,110**	**$133,301**
Railing	Railing	$2,489,602	$1,839,021	$107,387
	Total	**$2,489,602**	**$1,839,021**	**$107,387**
Retaining Wall	Retaining Wall	$8,641,655	$5,701,437	$99,891
	Total	**$8,641,655**	**$5,701,437**	**$99,891**
Sign	Sign	$3,133,351	$965,307	$208,081
	Total	**$3,133,351**	**$965,307**	**$208,081**
Street Light	Bracket	$5,549,256	$3,072,136	$221,011
	Light	$6,595,389	$1,350,330	$78,354
	Pole	$12,578,886	$7,165,902	$502,005
	Total	**$24,723,532**	**$11,588,368**	**$801,371**
SW Channel	SW Channel	$72,303,021	$42,451,121	$1,017,979
	Total	**$72,303,021**	**$42,451,121**	**$1,017,979**
Tactiles	Tactiles	$129,830	$69,386	$25,653
	Total	**$129,830**	**$69,386**	**$25,653**
Traffic Signal	Controller	$1,622,500	$1,468,505	$108,163
	Lantern	$1,695,698	$1,138,206	$112,951
	Pole	$845,942	$532,014	$56,364
	Total	**$4,164,140**	**$3,138,725**	**$277,478**
Treatment Length	Basecourse	$217,916,973	$133,318,353	$2,391,849
	Subbase	$164,133,779	$164,133,779	$0
	Subgrade	$102,342,299	$102,342,299	$0
	Top Surface	$83,652,356	$32,883,417	$4,733,166
	Total	**$568,045,406**	**$432,677,847**	**$7,125,015**
Car Parks	Car Parks	$2,654,714	$2,107,480	$30,280
	Total	**$2,654,714**	**$2,107,480**	**$30,280**
Total	**Total**	**$976,383,835**	**$682,444,500**	**$15,904,065**

Refer document NZ1-7996994 for AVM detailed outputs for asset components (except car parks) in Excel spreadsheet format; refer document NZ1-8131733 for the car park component spreadsheets.

6 Basis of Valuation

6.1 Legislation

The Local Government Act 2002 requires that local authorities apply prudent financial management to comply with statements of "Generally Accepted Accounting Practice" (GAAP) that are prepared by the New Zealand Institute of Accountants (ICANZ) and included in the New Zealand Accounting Standards. For local government property, plant and equipment, the current standard is NZIAS 16.

The LGA requires local authorities, from the first day of July 1999, to make provision for funding the decline in the service potential of any asset. This requires local authorities to adopt a more formal system for condition monitoring and to pay attention to the concept of asset service lives.

The concept of intergenerational equity in the funding of infrastructure assets is included as one of the principles of financial management. Without accurate knowledge of the serviceability of assets, local authorities can only estimate levels of apportionment when applying the cost of infrastructure across present and future rate payers.

6.2 Accounting Standards

Financial Reporting Standard NZIAS 16, issued by the Institute of Chartered Accountants of New Zealand (ICANZ), applies to infrastructure assets.

This accounting standard applies to the general purpose financial reports of public benefit entities and groups; including the Crown, all government departments, crown entities and local authorities.

This standard allows for property, plant and equipment, defined as tangible assets, to be valued on a revaluation model and describes the process as;

"After recognition as an asset, an item of property, plant and equipment whose fair value can be measured reliably shall be carried at a revalued amount, being its fair value at the date of the revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Revaluations shall be made with sufficient regularity to ensure that the carrying amount does not differ materially from that which would be determined using fair value at the balance sheet date."

In NZIAS16, Fair Value is defined as "the amount for which an asset could be exchanged between knowledgeable, willing parties in an arm's length transaction."

The International Valuation Standards Committee (IVSC) and PINZ consider that the valuation term 'market value' is generally synonymous with 'fair value' for financial reporting purposes.

Different approaches are used to value the Fair Value of specialised and non-specialised assets for existing use as follows:

Non-specialised assets are valued on a market basis (usually by way of sales comparison or income approaches).

Specialised assets are seldom traded on an open market, so the depreciated replacement cost basis can be applied to derive this value for financial reporting purposes.

In addition to accounting standard NZIAS16, this valuation has been completed in accordance with International Valuation Standards IVS300 Valuations for Financial Reporting and with the principles in New Zealand Infrastructure Asset Valuation and Depreciation Guidelines (NZIAV).

6.3 Depreciated Replacement Cost Approach

HCC is a public benefit entity and its specialised roading assets are not tradable in the open market. Therefore its specialised roading assets are valued using a depreciated replacement cost basis.

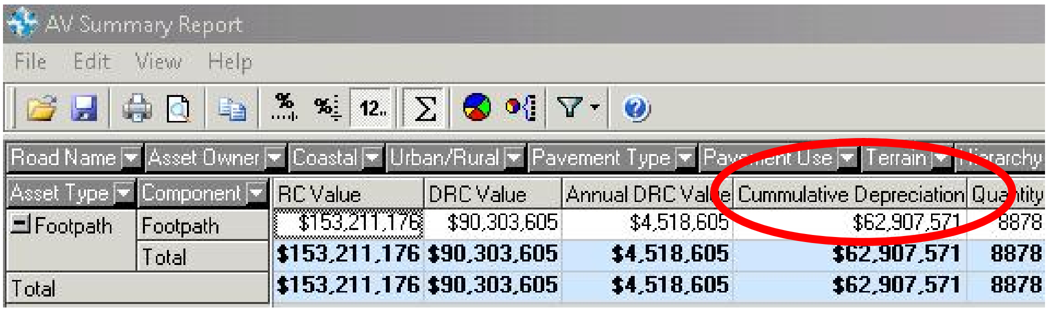
NZIAS16 defines Depreciated Replacement Cost (DRC) is a method of valuation that is based on an estimate of:

a) in the case of real property, the fair value of land plus the current gross replacement costs of improvements less allowances for physical deterioration and optimisation for obsolescence and relevant surplus capacity; and

b) in the case of plant and equipment, the current gross replacement cost less allowances for physical deterioration, and optimisation for obsolescence and relevant surplus capacity.

NZIAV provides a step by step process for performing the DRC valuation for infrastructural assets, which have been reviewed by the valuer as follows:

- DRC Method Check – Check the use of the Depreciated Replacement Cost methodology and its derivation for each component type, based on replacement cost, life and assessed remaining life of the assets.
- Asset Component Split – Check appropriate componentisation of assets having differing lives.
- Optimisation Check – Optimisation to reflect asset obsolescence or relevant surplus capacity existed was discussed with HCC. HCC confirmed that optimisation had been into account to determine whether there was scope for optimisation.
- Replacement Cost Method – The replacement costs were analysed to determine the suitability of the costing method, whether rates-based or unit-based, and to judge whether these rates or unit costs were reasonable for replacement of the assets. Costs were based on replacement costs using modern construction methods and modern materials.
- Useful or Base Lives Check – NZIAV and NZ Infrastructure Asset Management Manual (NZIAM) provide a range of lives for many road infrastructure assets. Assets not included in these lists, are compared to assets of similar construction and service, or those listed by Inland Revenue. As a range of lives is provided, factors which may influence the base life need to be considered.
- Remaining Useful Lives (RUL) Check – RULs were assessed as to whether the remaining useful life was an assessment after a condition inspection of the assets, or calculated from the base life and age of the asset. Where RUL has been determined from age, NZIAV recommends methods to assess remaining life such as predictive modeling using various impact factors. Alternatively, NZIAM describes a method based on condition and performance.
- Annual Depreciation Check – the calculation of annual depreciation from the DRC and remaining life was reviewed.
- Depreciation To Date (DTD) – NZIAS 16 requires that the accumulated depreciation charges (i.e. depreciation to date), be accounted for. This can be calculated by simple subtraction of the DRC from the Replacement Costs. RAMM AVM accounts for it in summary reporting (shown below).


AV Summary Report

File Edit View Help

Road Name | Asset Owner | Coastal | Urban/Rural | Pavement Type | Pavement Use | Terrain | Hierarchy

Asset Type	Component	RC Value	DRC Value	Annual DRC Value	Cummulative Depreciation	Quantity
Footpath	Footpath	$153,211,176	$90,303,605	$4,518,605	$62,907,571	8878
	Total	**$153,211,176**	**$90,303,605**	**$4,518,605**	**$62,907,571**	**8878**
Total		**$153,211,176**	**$90,303,605**	**$4,518,605**	**$62,907,571**	**8878**

7 General Methodology

7.1 Asset Information Source

AVM uses asset data supplied from HCC's RAMM database, which has been compiled by HCC and its contractors, including Beca. The HCC RAMM database is maintained and updated regularly for any new or updated assets.

Beca consider the overall reliability of the data used in the valuation is good and can be relied upon for valuation purposes. Where data is incomplete Beca has applied assumptions, as detailed in the following sections that deal with each component type.

Treatment lengths on state highways and unformed roads have been disabled. This excludes them from the valuation process because they are not Council owned assets.

7.2 Asset Costs and Asset Lives

Asset cost and remaining life information were provided by HCC staff. As a starting point the asset costs and lives used to undertake the 1 July 2010 valuation were reviewed and updated. Where the replacement costs and life cycles have been assumed by HCC, they have been checked by Beca. The replacement costs and life cycles are discussed in more detail under each asset type heading. In cases where insufficient contract rates were available, the Statistics NZ Civil Construction index increase of 8% (measured between 2010Q2 and 2013Q2) was applied to the 2010 unit rates.

7.3 Depreciation Method

The depreciation method applied to depreciate the assets was on a "straight line" basis over the assessed total economic life of the asset. For assets with shorter lives (i.e. less than 15 years) a "Diminishing Value" depreciating method is usually applied to reflect high depreciation early in the total life. However it is considered for infrastructure assets this sophisticated method adds little to the accuracy of the valuation and is not warranted.

Where asset types have had condition data gathered, the "CB" condition curve as described in the NZIAM Manual was used for applying condition grades used for determining asset remaining lives.

Assets that do not depreciate with time were marked accordingly.

7.4 Exclusions

The following were specifically excluded from the valuation:

- The effect of the relevant provisions of the RMA, Treaty of Waitangi or other legislation on the replacement of identified assets.
- All land under roads.

- Power and telecommunications cabling (underground or exposed), servicing HCC assets.
- Assets in the RAMM database not owned by HCC.
- Intangible Assets

7.5 Asset Types Valued

The scope of the valuation was to use the functionality of the RAMM Asset Valuation Module (AVM) to derive replacement cost, depreciated replacement cost and annual depreciation of HCC assets in the RAMM database.

Beca has previously undertaken valuations using AVM and have checked its processes. Beca are of the opinion that AVM provides the required processes to undertake a valuation.

The AVM categorises the roading asset into classes based on tables within the RAMM database. Some asset classes are complex and have been componentised in accordance with NZ IAS16 (e.g. treatment length components include top surface, basecourse, subbase and subgrade).

As AVM does not list Car Parks as an asset, they have been valued manually using RAMM data.

The table below shows the HCC AVM Roading Asset Types to be included in the asset valuation.

Asset Type in RAMM	Component Option	Condition Rating Option	Valuation Required
Berm	×	×	No
Bridge	✓	✓	Yes
Crossing	×	×	No
Cycle Way	×	×	No
Drainage	✓	×	Yes
Feature	×	×	Yes
Footpath	×	✓	Yes
HCC Other Assets	x	×	No
Intelligent Transport Systems	x	×	Yes
Island	×	×	Yes
Landscaping	x	×	No
Marking	×	×	No
Minor Structure	×	×	Yes
Railing	×	×	Yes
Retaining Wall	×	×	Yes
Shoulder	×	×	No
Sign	✓	×	Yes
Streetlight	✓	✓	Yes
SW Channel	×	✓	Yes
Tactiles	x	✓	Yes
Traffic Calming	×	×	No
Traffic Facility	×	×	No
Traffic Signal	✓	✓	Yes
Treatment Length	✓	✓	Yes
Tree	×	×	No

The valuation of assets detailed above and HCC car parks (valued outside of AVM) is discussed in the following sections.

7.6 Units of Measure

The unit of measure was defined for each asset type valued as shown in the table below.

Asset / Component	Unit	Calculation
Bridge / Deck	Each	1
Bridge / Culvert	Each	1
Drainage Lineal Assets (e.g. Culverts)	m	Drain Length
Drainage Structural Assets (e.g. Sumps)	each	1
Feature	each	1
Footpath	m^2	Footpath Length x Footpath Width
Intelligent Transport Systems	each	1
Island	m	Island Length
Minor Structure	each	1
Railing	m	Railing Length
Retaining Wall	m^2	Wall Length x Average Wall Height
Sign	each	1
Street Light	each	1
SW Channel	m	Surface Water Channel Length
Tactiles	each	1
Traffic Signal	each	1
Treatment Lengths – Top Surface	m^2	Treatment Length Area m^2
Treatment Lengths – Basecourse	m^2	Treatment Length Area m^2
Treatment Lengths – Subbase	m^2	Treatment Length Area m^2
Treatment Lengths – Subgrade	m^2	Treatment Length Area m^2

8 Recommendations

Sections 9 to 27 details the asset data integrity analysis, valuation inputs and assumptions made for the AVM valuation and a number of data improvement recommendations have been made. Along with these recommendations, the following recommendations are made:

a) Where asset data is missing, it is recommended to gather the information and populate it in RAMM. For example construction dates, bridge deck data, asset types and dimensions.

b) It is recommended to complete a cost analysis of road projects to enable updating of AVM with recent unit rates.

c) Assign confidence rating based on NZIAV guidelines to the data in RAMM for the various assets and components.

d) Review asset life cycles for all assets to ensure sufficient depreciation is calculated for their timely replacement.

9 Bridges

9.1 Data Integrity

Bridges in RAMM are multi-componentised assets. The two components considered for valuation are the deck and culvert components.

The deck component is just one of many components of a structural bridge. For simplicity, the deck component is used to represent the entire structural bridge. There are 29 decks equalling 1,480m.

If the waterway area under any roadway culvert exceeds 3.4m^2 then that culvert is classified as a bridge. All such culverts are tagged as bridges (yes or no) and are located in the RAMM drainage table for ease of identification. There are 20 bridge culverts equalling 760m drainage length.

For the valuation, all bridges are recognised as individual units by considering various attributes. There were no missing attributes noted that should affect a valuation for both the bridge types.

9.2 Looking at Condition

Bridges are condition rated however this information has yet to be translated into reliable condition scores that can be used to modify RUL. Minimum RUL is set at 2 years.

All bridges had a construction date recorded but have been assigned a default construction date of half the life cycle as the RAMM field requires one. The base life of 150 years has been adopted as per the 2010 valuation for structural bridges. However, it is considered the 2010 assumption of 150 years was optimistic for bridge culverts. Accordingly base life has been reduced to the expected life of its material; Armco (bolted galvanised steel arc plates) at 40 years and concrete at 80 years.

As there is no condition data RUL is based on the age and total useful life.

9.3 Valuing Individual Assets

As all 49 bridges have been individually valued and a full list has been provided electronically, no attempt has been made to include a full list for this report. The table below provides a summary.

Bridge Design Type	Base Life Yrs	Unit	Number	Total RC Value $
Bridge – Structural Steel	150	Each	5	20,136,156
Bridge – Structural Concrete	150	Each	24	56,878,578
Bridge - Culvert Concrete	80	Each	15	6,812,809
Bridge - Culvert Armco	40	Each	5	2,490,252

An overhead allowance of 12.5% was applied. All bridges were given a residual value of $1.

10 Drainage

10.1 Data Integrity

There are 12,106 drainage assets in the RAMM drainage table. For valuation purposes, the assets are divided into linear and structural asset with rolled-up basic types as shown in the tables below.

Linear Assets (m)

BASIC TYPE	RAMM Data Rows	Missing Attributes
ALL CULVERTS	533	24
SLOT CHANNELS	58	51
SOAK TRENCH	4	3
SUBSOIL DRAIN	126	2
TOTALS	**721**	**80**

Missing attributes for these assets include construction date, length, diameter/height and material.

Drainage culverts that have been classified as bridges are excluded. Of the above 51 missing data attributes for slot channels, 20 are a missing length, which is an essential lineal dimension, thus it has been assumed all 58 slot channels average 10m in length to be treated as a unit (temporarily). As very little is actually known about the 4 soak trenches, they have been excluded from valuation.

Structural Assets (Each)

BASIC TYPE	RAMM Data Rows	Missing Attributes
CHAMBER	13	13
GARDEN	22	22
MANHOLE	324	107
SUMP/CATCHPIT	10,977	9,210
TANK	49	0
TOTALS	**11,385**	**9,352**

Missing attributes for these assets include construction date and material.

Chamber includes drop chambers, soak pits and other. Sump/Catchpit includes Cast Iron Grates, SE with Grate, Double SE Grate and Web Grate Back Entry structures as well as all sump types and catchpits. Garden is a Rain Garden and Tank is an Atlantis Matrix Tank. The high missing attribute count noted is mostly due to the missing material, which has been assumed as concrete. Manholes (except scruffy dome types) are excluded as they have been accounted for elsewhere.

10.2 Looking at Condition

10.2.1 Expected Condition

There is no condition data and therefore RUL is based on the age and total useful life. For the 50 drainage assets with no construction date, a default construction date of half the life is assigned.

10.2.2 Effect of Condition on Remaining Useful Life

As RUL cannot be adjusted due to condition, a minimum RUL of 2 years was set for the drainage assets approaching the end of their total useful life.

10.3 Valuing Individual Assets

10.3.1 Standard Replacement Costs

Replacement costs for all drainage assets are based on the 2010 rates, cost escalated by 8% to meet 2013 values.

The costs for the sumps include the cost of placing a 4.5m long, 225mm diameter lead to the storm water system. The unit rates used in the valuation are given in the table below.

Basic Item	Description	Unit	Rate ($)
All Culverts	225 mm diameter RRJ Concrete	m	321.24
All Culverts	300 mm diameter RRJ Concrete	m	332.22
All Culverts	375 mm diameter RRJ Concrete	m	338.76
All Culverts	450 mm diameter RRJ Concrete	m	386.63
All Culverts	525 mm diameter RRJ Concrete	m	536.76
All Culverts	600 mm diameter RRJ Concrete	m	623.57
All Culverts	750 mm diameter RRJ Concrete	m	800.02
All Culverts	900 mm diameter RRJ Concrete	m	976.46
All Culverts	1200 mm diameter RRJ Concrete	m	1,329.36
All Culverts	1500 mm diameter RRJ Concrete	m	1,683.97
All Culverts	1650 mm diameter RRJ Concrete	m	1,860.42
All Culverts	1800 mm diameter RRJ Concrete	m	2,036.87
All Culverts	2100 mm diameter RRJ Concrete	m	2,463.44
Slot Channels	Slot Channel with Grate (10m unit)	each	1,949.98
Subsoil Darin	Novaflow/stripdrain	m	26.28
Chamber	Drop Chamber, Soak Pits, Other	each	1,949.98
Garden	Rain Garden	each	2,085.80
Manhole	Standard Manhole 1500dia.	each	3,289.14
Manhole	Manhole Scruffy Dome	each	3,289.14
Sump/Catchpit	Single Catchpit	each	1,949.98
Sump/Catchpit	Double Catchpit	each	3,289.14
Sump/Catchpit	Single Sump/SE with Grate	each	1,949.98
Sump/Catchpit	Double Sump/Double SE (grate)	each	3,289.14
Sump/Catchpit	Single Sump with Filter Bag	each	3,784.54
Sump/Catchpit	Double Sump with Filter Bag	each	5,636.33
Sump/Catchpit	Web Grate Back Entry	each	2,573.92
Tank	Atlantis Matrix Tank	each	3,968.35

As per the 2010 valuation, asset life cycle was set at 70 years and for lineal assets, 60 years.

An overhead allowance of 8% was applied. All assets were given a residual value of $1.

11 Features

11.1 Data Integrity

There are 2,048 assets identified as Local Authority owned in the RAMM Features table with many of the features, although either fixed to the road or located with road reserve, are not road assets in the strictest sense (i.e. of benefit to the road user). In 2010, a selection amounting to 1,182 assets today was valued by MWH (outside of RAMM) as shown in the following table.

Feature Type	Data Rows	MWH 2010	2010 Qty
Bollard All Types	300	Yes	200
Bin All Types	631	Yes	593
Concrete Block	5	Yes	5
Cycle Stand	152	Yes	152
Seat Single/Double	94	Yes	73
Mail Box	12	No	0
Parking Meter	706	No	0
Phone Box	17	No	0
Picnic Bench	3	No	0
Planter Box	11	No	0
Plaque/Historic Location	7	No	0
Power Box	88	No	0
Signal Box	17	No	0
Toilets	5	No	0
TOTAL	**2,048**	**1,182**	**1,023**

Of the 1,185 assets, 394 have no construction date assigned. Apart from this, the data appears to have sufficient attributes for valuation.

11.2 Looking at Condition

As Features are presently not condition rated, there are no condition factors to modify RUL. RUL is therefore based on the age and total useful life. A default construction date of half the life cycle for those features with no construction date recorded. A minimum RUL of 1 year is set for features.

11.3 Valuing Individual Assets

Replacement costs for Feature assets are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following table.

Feature Type	Base Life Yrs	Unit	Rate $
Bin – Decorative Fernleaf	10	Each	1314
Bin – Vandal Proof Steel	10	Each	700
Bollard – Steel/Aluminium	25	Each	656
Bollard – Steel Removable	25	Each	838
Concrete Block	100	Each	11,359
Cycle Stand	30	Each	565
Seat - Double/Single	20	Each	1,274

An overhead allowance of 8% was applied. All features were given a residual value of $1.

12 Footpaths

12.1 Data Integrity

There are 8,854 footpath records in RAMM, equating to 1,775,579m^2. The total area includes the 14 records that have zero widths resulting in a zero m^2 area that were manually updated in the outputs spreadsheet using various assumed widths. The updated areas for the 14 records are as follows:

- Harrowfield Drive – 2 records - assumed width 1.2m – result area 38m^2
- Neilsen Garden – 1 record - assumed width 1.2m – result area 35m^2
- River Road – 8 records - assumed width 1.8m – result area 615m^2
- Wairere Drive (Westbound) – 3 records - assumed width 3.0m – result area 679m^2

12.2 Looking at Condition

12.2.1 Define Condition Categories (Standards)

Condition rating surveys are carried progressively over the footpath network to gain an indication of the general condition of the footpaths calculated from the rating data using the faults recorded. The faults recorded were used to calculate a condition factor as follows:

((3 * settlement) + (30 * bumps) + (30 * depressions) + (10 * cracked) + scabbing + (30 * potholes) + (3 * patches) + (10 * extra_1))/(insp_end_m - insp_start_m)

The footpath condition categories were defined as shown in the table below.

Number	Condition Category	Footpath Condition Factor
1	Excellent	< 0.5
2	Good	>= 0.5 and < 2.5
3	Average	>= 2.5 and < 7.5
4	Poor	>= 7.5 and < 20.5
5	Very Poor	>= 20.5
6	Unknown	Catch all

The “Unknown” condition category was added for those footpaths that had either been constructed or resurfaced since the last condition rating survey (1,339 records), or have yet to be surveyed.

12.2.2 Expected Condition

The expected footpath condition was based on a logarithmic curve as shown in the table below.

% Life Expired	Expected Condition
30	Excellent
60	Good
78	Average
90	Poor
100	Very Poor

12.2.3 Effect of Condition on Remaining Useful Life

The RUL estimated from the life cycle and construction date was adjusted for the actual measured condition of the footpath compared with expected condition.

The effect on RUL of actual condition against expected condition was assessed as shown below.

Actual Condition	Expected Condition	Effect on RUL
Excellent	Excellent	0
Excellent	Good	+ 10%
Excellent	Average	+ 20%
Excellent	Poor	+ 30%
Excellent	Very Poor	+ 40%
Good	Excellent	- 10%
Good	Good	0
Good	Average	+ 10%
Good	Poor	+ 20%
Good	Very Poor	+ 30%
Average	Excellent	- 20%
Average	Good	- 10%
Average	Average	0
Average	Poor	+ 10%
Average	Very Poor	+ 20%
Poor	Excellent	- 30%
Poor	Good	- 20%
Poor	Average	- 10%
Poor	Poor	0
Poor	Very Poor	+ 10%
Very Poor	Excellent	- 40%
Very Poor	Good	- 30%
Very Poor	Average	- 20%
Very Poor	Poor	- 10%
Very Poor	Very Poor	0

A minimum RUL of 2 years was set for all footpath types.

12.3 Valuing Individual Assets

12.3.1 Standard Replacement Costs

Replacement costs for footpath assets are based on the 2010 rates, cost escalated by 8% to meet 2013 values and the asphalt and concrete rates concur with the recent contract rates as supplied.

The base life cycles and replacement costs used are shown in following table.

Footpath Surface Material	Base Life Yrs	Unit	Rate $
Asphalt	25	m^2	81.81
Concrete	50	m^2	72.84
Interlocking Blocks	60	m^2	104.10
Metal	50	m^2	19.80
Timber (1 record)	25	m^2	81.81

All seal, slurry and timber footpaths have been treated as asphalt.

An overhead allowance of 8% was applied to these costs.

All footpaths were given a residual value of $1.

13 Intelligent Transport Systems

13.1 Data Integrity

There are 178 Intelligent Transport Systems (ITS) in the RAMM as shown in the table below.

ITS Type	Rows
40k Speed limit	114
Cycle Detection Loops	13
Cycle Symbol	1
Electronic Speed Sign	1
Large Parking Space Sign	4
School Sign Controller	40
Small Parking Space Sign	5
TOTAL	**178**

There is one that does not have an installation date, 55 with no solar panel data (yes or no), 83 with no wattage data, 54 with no running time and 118 with no width/height dimensions.

The Boundary Road Electronic Cycle Warning Miscellaneous Sign (ID 27513) is no longer listed in the signs table. It is assumed the Boundary Electronic Speed Sign (ITS ID 200) is the same sign.

13.2 Looking at Condition

Although each ITS have condition ratings (53 Unknown) there is insufficient condition data available at this time to modify RUL. RUL is therefore based on the age and total useful life.

The ITS asset with no installation date is located in Anglesea Underground Carpark. This asset has been assigned a default date of 1/11/2010 to relate with the installation dates of the two ITS assets also installed on Anglesea Street. This default date was entered into AVM against all ITS assets.

13.3 Valuing Individual Assets

HCC provided unit rates based on recent contracts and advise that these ITS devices are expected to last 20 to 30 years. It is considered these ITS devices will realise obsolescence before failing on performance or condition and will decrease in MEA replacement value over time. Accordingly they have been assigned a maximum 20 year life. A minimum RUL of 2 years was set for these assets.

The replacement costs used are shown in following table. The overhead allowance applied is 8%. A residual value of $1 was applied to each asset.

Footpath Surface Material	Unit	Rate $
40k Speed Limit (2 VMS per School location)	Each	12,500
Cycle Detection Loops	Each	250
Cycle Symbol	Each	10,000
Electronic Speed Sign	Each	34,700
Parking Space Sign Large (Gantry)	Each	60,000
Parking Space Sign Small	Each	10,000
School Sign Controller	Each	510

14 Islands

14.1 Data Integrity

Traffic Islands are in-carriageway structures used for traffic guidance and road safety reasons.

The accuracy of the asset valuation process on the traffic islands is dependent on the accuracy of the data in the islands tables in RAMM. Island length calculated for the start and end displacement is not sufficient to calculate a footprint area therefore a valuation based on length is not reliable.

Of the 1,055 islands recorded in RAMM, 373 do not have a width recorded. Width is a start but not always helpful as many of the structure have odd shapes. There is a “landscaped area” field in the islands table that, if populated, gives the required footprint area directly. HCC has only 115 of these fields populated as seen in the following table of Local Authority owned island types.

Type	Count	Missing Area
Judderbar	7	7
Kerb Extension	130	115
Median	190	176
Other	24	22
Pedestrian Refuge	42	37
Rotary	41	38
Speed Cushion	151	151
Speed Hump	46	46
Splitter	138	112
Throat	286	236
Total	**1,055**	**940**

Pedestrian refuges were not valued in 2010. Although these are island structures that are located in the centre of the carriageway as a pedestrian crossing point on a signalled/controlled pedestrian crossing, it is more appropriate that these are valued as a crossing component and not as islands. However, pedestrian refuges were valued as islands at this time for HCC.

Kerb Extensions were not valued in 2010. These are kerbed structures used to restrict carriageway width for either traffic calming purposes or as a pedestrian crossing component and not true islands. However, kerb extensions were valued as islands at this time for HCC.

Also judderbars, speed cushions and speed humps are traffic calming assets, not islands. As such they have not been valued at this time. Beca understands HCC is currently populating a dedicated “Traffic Calming” table for these assets.

14.2 Looking at Condition

14.2.1 Expected Condition

Islands are presently not condition rated. There are 280 islands with no construction date recorded which have been assigned a default construction date of half the life cycle.

There is no condition data and therefore RUL was based on the age and total useful life.

14.2.2 Effect of Condition on Remaining Useful Life

A life cycle of 35 years was adopted. As RUL cannot be adjusted due to condition, a minimum RUL of 1 year was set for islands approaching the end of their total useful life.

14.3 Valuing Individual Assets

14.3.1 Standard Replacement Costs

Replacement costs for island assets are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following table.

Island Type	Description	Unit	Rate ($)
Median Conc	Concrete Median island	m	1,058
Median Land	Garden/Grass Median island	m	420
Median Pave	Block/Paver Median island	m	404
Rotary Conc	Concrete Rotary	m	5,558
Rotary Land	Garden/Grass Rotary island	m	2,732
Rotary Pave	Block/Paver Rotary island	m	2,121
Splitter Conc	Concrete Splitter island	m	1,058
Splitter Land	Garden/Grass Splitter island	m	520
Splitter Pave	Block/Paver Splitter island	m	404
Throat Concrete	Concrete Throat island	m	899
Throat Landscaped	Garden/Grass Throat island	m	442
Throat Paved	Block/Paver Throat island	m	343
Other Concrete	Concrete Other island	m	1,958
Other Landscaped	Garden/Grass Other island	m	962
Other Paved	Block/Pave Other Island	m	404

Until all landscape area fields in this table are populated, or another method to define footprint area is devised, islands are valued based on length. As discussed above, this method is not reliable.

This valuation was carried out manually. Due to a relationship error between the islands and the footpaths table, which RAMM Software are now investigating, AVM assigned SRC values to only 322 records (733 not assigned).

An overhead allowance of 10% was applied. All islands were given a residual value of $1.

15 Minor Structure

15.1 Data Integrity

There are 277 minor structure assets in the RAMM as shown in the table below. Of these only the Bus/Tram Shelters, Fences and Underpasses are relevant assets at this time.

Minor Structure Type	Data Rows
Bus/Tram Shelter	147
Fence	54
Overbridge	1
Public Art	1
Sign and Signal Support	5
Tree Pit	38
Underpass	31
TOTAL	**277**

All 232 relevant minor structures have a construction date. There is one Bus/Tram Shelter and one Underpass with a missing material attribute. Type comparison indicates that these are aluminium (Bus/Tram Shelter – Black Mini) and concrete (Underpass Pedestrian). There were 3 Underpasses with no length (m) calculation (from road start and end displacements). Type comparison indicated that the 12 underpasses with no clearance (internal height) would have a clearance of 2.5m.

All 147 Bus/Tram Shelters are valued as units using the subtype attribute for an each assessment. The 31 underpasses are valued similarly as units using length, width and clearance dimensions as a costing basis for each unit. All 56 fences have length/material attributes for a length assessment.

15.2 Looking at Condition

Apart from underpasses, minor structures are presently not condition rated. As there is insufficient condition data available at this time to modify RUL, RUL is based on the age and total useful life.

Minor structures that have no construction date recorded have been assigned a default construction date relative to the other dates for like assets. Bus/Tram Shelters and Fences have been assigned 30/06/2000; underpasses (relatively newer) 30/06/2009. Minimum RUL is set at 2 years.

15.3 Valuing Individual Assets

The unit rates used in the valuation are given in the table below. As there are various subtypes that have associated costs, the low and high rates are shown. Full rates are provided electronically.

Asset	Description	Unit	Life Cycle	Rate $ (Low)	Rate $ (High)	OH %age
Bus/Tram Shelter	Various subtypes (11)	Each	20	4,000	45,000	10
Fence	Fence (3,164m)	m	20	88	88	8
Underpasses	Various Units (31)	Each	80	51,900	946,760	12.5

AVM could not assign a default replacement cost to seven structures (including four underpasses).

Overhead allowances are as shown above. A residual value of $1 was applied to each structure.

16 Railing

16.1 Data Integrity

There are 376 railing records in RAMM, equating to 19,857m. It is noted that railing length ranges from 1m to 765m, which seems unlikely knowing that in 2010 the railing length valued was 6,828m.

There were 69 records with no construction date and 113 records with no railing material attribute. There were no other issues with the other attribute data in RAMM. Railing types are shown below:

Railing Type	Data Rows	Length (m)
Barrier All Types	40	1,735
Guardrail All Types	190	11,092
Handrail All Types	107	393
Other	24	6,102
Pool Type Fence	4	430
Sight Rail	8	95
Timber	3	10
TOTALS	**376**	**19,857**

Barriers and Pool Type Fences are new categories and have been given nominal railing values.

16.2 Looking at Condition

The railings in RAMM that do not have an installation date recorded have been assigned a default construction date of half the theoretical life cycle. Life cycles applied were also adopted from 2010.

As railings are presently not condition rated, there are no condition factors available to modify RUL. RUL is therefore based on the age and total useful life.

16.3 Valuing Individual Assets

Replacement costs for railing assets are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in the following table.

Railing Type	Base Life Yrs	Unit	Rate $
Guardrail Steel/Wood	25	m	132
Guardrail W Section (ARMCO)	25	m	132
Guardrail Post & Netting/Timber	20	m	19
Railing Hand Rail Steel/Galv.	25	m	92
Railing Other/Pool Fence	20	m	92
Railing Timber	20	m	19
Sight Rail Wood	20	m	186
Barriers – All Types	20	m	186

An overhead allowance of 8% was applied. All features were given a residual value of $1.

17 Retaining Wall

17.1 Data Integrity

There are 168 retaining wall records in RAMM, equating to a total wall area of 20,632m^2,which is reasonable considering the area valued in 2010 was 16,518m^2 (prior to ring road construction).

There are 10 records with no length and hence were not valued. Several records had no wall width; however, width is not an attribute required for this valuation. There were no other issues with other attribute data in RAMM. Retaining Wall types are shown below:

Wall Type	Rows	Area m^2
BLOCK WALL	5	301
Cantilever	2	566
Gravity	40	5,130
MiniScribe	71	10,227
Piled	9	913
Post and Rail	34	2,127
Rock	2	767
Sheet Pile	3	231
Single Crib	2	101
TOTALS	**168**	**20,363**

17.2 Looking at Condition

As retaining walls are not condition rated, there are no condition factors available to affect the RUL. RUL is therefore based on the age and total useful life. Minimum RUL is set at 2 years.

17.3 Valuing Individual Assets

For MEA purposes, retaining walls are optimised to a typical crib or block structure replacement and have therefore been assigned the same construction rate, based on 2010 rates, cost escalated by 8% to meet 2013 values. This rate is comparable to recent rates for walls built for the ring road.

The base life cycles and replacement costs used are shown in following table.

Wall Type	Base Life Yrs	Unit	Rate $
Block Wall	100	m^2	386
Cantilever	100	m^2	386
Crib Wall	100	m^2	386
Gravity/Rock	100	m^2	386
Post & Rail	30	m^2	386
Sheet Pile/Piled	50	m^2	386

As all retaining wall records had a construction date recorded, a default is not required. However as default date is a mandatory field in AVM, a default of half the theoretical life cycle has been entered.

Life cycles shown above were generally adopted from the 2010 valuation except for the Post & Rail and sheet piling. These are assessed to have shorter lives relative to crib type structures.

An overhead allowance of 8% was applied.   All features were given a residual value of $1.

18 Signs

18.1 Data Integrity

There are 13,929 signs included in the valuation as shown in the following table.

Classification	Sign Categories	Count
Guide	Guide	458
Hazard Markings	Hazard Markings	502
Information	General, Miscellaneous, Motorist, Signs	3,487
Miscellaneous	Tourist, Motorist Services, Local Authority, Unknown	111
Warning	Permanent, Miscellaneous	1,226
Regulatory	General, Parking , Heavy Vehicle	8,145
TOTAL		**13,929**

There are 11,686 signs in RAMM that do not have an installation date recorded. There were others with no sign height and width dimensions. As signs are valued by type, the missing attributes were of no consequence to the valuation. There were no other issues with other attribute data in RAMM.

18.2 Looking at Condition

18.2.1 Expected Condition

The signs that do not have an installation date recorded were assigned a default construction date of half the theoretical life cycle.

Signs are not condition rated because they are relatively low cost short life assets. Therefore there are no condition factors available to modify RUL, which is based on the age and total useful life.

18.2.2 Effect of Condition on Remaining Useful Life

As RUL cannot be modified to account for assessed condition, a minimum RUL of 1 year was set for signs approaching the end of their total useful life. This minimum was adopted because of the large percentage of signs that do not reach their total useful life due to damage and vandalism.

18.3 Valuing Individual Assets

18.3.1 Standard Replacement Costs

Replacement costs for signs are based on the 2010 rates, cost escalated to by 8% to meet 2013 values. An allowance of 10% was added to these costs for overhead expenses.

Posts have not been included in the valuation as a separate component. As RAMM data includes a post count for each sign, that count has been used to increase the signage unit rate accordingly.

A sign can be expected to last 15 years or more, if not damaged and kept maintained. Therefore for the purposes of this assignment, a life cycle of 15 years was adopted for the valuation.

A residual value of $1 was applied to each sign.

The unit rates used in the valuation are given in the following table.

Description	Sign Purpose	Rate/ sign 0 Post	Rate/ sign 1 Post	Rate/ sign 2 Post
G	Guide signs	$318.80	$444.68	$570.76
H01-H04	Chevron Boards	$72.84	$196.03	$322.11
H01-H04+	Chevron Boards with speed advisory	$112.35	$238.43	$364.51
H07	Bridge End Marker	$31.90		
I	Information signs	$200.07	$326.15	$452.23
MS	Motorist Service signs		$207.60	
PW00	Permanent Warning signs	$111.75	$229.55	
PW14	Railway Crossing sign		$127.30	
RG00	Regulatory General signs	$90.34	$220.72	
RG05	Stop signs	$128.83	$254.91	
RG06	Give Way signs	$190.97	$317.04	
RG06R	Roundabout Give Way signs	$157.06	$283.14	
RG07 – RG09	No Left/Right Turn and No Entry signs	$60.00	$188.08	
RG10 – RG15	Turn Left/Right, One Way and No U Turn	$89.41	$225.53	
RG17.1	Keep Left/Right	$73.14	$199.62	
RG24 – RG25	Pedestrian/Cycle signs	$33.74	$159.72	
RG26 – RG27	Cycle Route signs	$176.72	$302.80	
RG34.1	Keep Left/Right (2 discs)		$160.91	
RH01-RH04	Heavy Vehicle Restriction signs		$241.17	
RH06	Bridge Axle Limit signs		$175.37	
RP00	Restricted Parking signs	$26.70	$152.45	
RP01	No Stopping signs	$20.85	$146.93	
RP5.1	Bus Stop signs	$37.42	$163.50	
RP6.1	Taxi Stand signs	$50.06	$176.14	
RP10	Disabled Parking signs	$20.85	$146.93	
SNP	Street Name Plates	$128.83	$254.91	$380.99
Tourist Signs	Tourist signs	$80.25	$206.33	$334.57
WM Signs	Warning Miscellaneous	$166.89	$292.97	

19 Street Light

19.1 Data Integrity

The street lights are separated in RAMM to Pole, Bracket and Light components. In total there are 17,988 street light records in RAMM.

There are 12,388 street light records attributed to a Local Authority owner. There are 25 additional records presently attributed to a Local Authority - Metered Lighting owner, which AVM cannot value. These have been updated to Local Authority for undertaking the valuation and will be subsequently changed back.

Poles

Pole purposes include belisha beacon, feature lighting, lighting units and under verandah lighting and there are other purposes (e.g. electrical distribution, telephone aerial) that are not pertinent to this valuation. This valuation focuses on all pertinent pole purposes attributed to a Local Authority Owner (12,388 records). Feature and under verandah lighting are "no pole" "amenity light types.

Pole height is a useful attribute in determining a pole value. However, of the 10,980 Local Authority lighting unit poles 3,446 (31%) have a height and therefore AVM cannot use this attribute reliably. Therefore poles are valued this time by assumed road hierarchy pole height attributes as below:

ROAD HIERACHY	Count	Assumed Pole Heights (m)
COLLECTOR	1,456	Between 8 and 10 metres
LOCAL	6,451	Between 8 and 10 metres
MAJOR ARTERIAL	1,126	Between 11 and 12 metres
MINOR ARTERIAL	1,596	Between 10 and 11 metres
SERVICE LANE	78	Less than 8 metres
STATE HIGHWAY	65	Between 11 and 12 metres
WALK/CYCLE PATH	125	Less than 8 metres
BLANK HIERARCHY	83	AVM cannot process these
TOTAL	**10,980**	

Belisha beacon pole heights are assumed to be less than 8 metres, regardless of road hierarchy.

Logical interconnections exist between the pole purpose, pole owner, pole material and pole shape fields. Some of these interconnections are illogical, such as Telecom and the Power Board listed as owning steel octagonal shaped street lighting units where the entities do not provide street lighting. Therefore Beca recommends that HCC review these four fields and amend the data as appropriate.

Apart from Winchester, for lighting units, the data in the Pole Model field mirrors data in Use Height field and includes , "REFU", RFGE" and "PEDX" descriptions. Beca recommends that HCC amend this pole model field and repopulate it with contractor recognised pole models, including Kendelier, Heritage, Oclyte and Spunlite. These reviews/amendments will improve future valuation outputs.

Brackets

Brackets are light support units that are fixed either to a pole or a structure (e.g. underpass) and all belong to the light owner. Pertaining to Local Authority there are 16,918 bracket records in RAMM and 786 of these are identified as "no bracket" types (a pole top light mount or amenity light types).

A check of HCC contract records show modular poles, particularly Kendelier, Oclyte and Heritage, include the outreach (listed in RAMM as a bracket). For costing consistency it is assumed that 25% of any pole cost is attributed to its “bracket component”. Other attribute data is found to be reliable.

Lights

There are 16,918 light records attributed to Local Authority in RAMM. These include 51 belishas, 120 feature lights and 1,054 under verandah lights. Underpass lights, identified as lighting units, amounts to 60 records. Type, make and wattage attribute data in RAMM appears fairly reliable. Currently there are 74 Local Authority lighting units that do not have their lighting details recorded.

19.2 Looking at Condition

Lighting components are condition rated however there is no information that has been translated from these surveys into reasonable condition scores that can be used to modify RUL at this time.

For 12,388 Local Authority lighting units, 7,347 (59%) had a construction date recorded. Accordingly those that have no construction have been assigned a default construction date of half the life cycle. The base life of 25 years for all components has been adopted as per the 2010 valuation. As there is no condition data RUL is based on the age and total useful life.

19.3 Valuing Individual Assets

Replacement costs for street lights are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following table.

Component	Life Cycle	Rate $
Bracket Collector/Local	25	319.25
Bracket Service Lane and Walk/Cycle Path	25	289.75
Bracket Major Arterial/State Highway	25	479.75
Bracket Pole Minor Arterial	25	442.75
Light 000 – 050 Watts	25	328.00
Light 050 – 070 Watts	25	337.00
Light 070 – 150 Watts	25	400.00
Light 150 – 400 Watts	25	438.00
Pole Collector/Local	25	957.75
Pole Service Lane and Walk/Cycle Path	25	869.25
Pole Major Arterial/State Highway	25	1,439.25
Pole Minor Arterial	25	1,328.25

The above rates were applied (Yes or No) in accordance with the following Boolean algorithm.

HCC POLE PURPOSE	Bracket	Light	Pole
Belisha Beacon	Yes	Yes	Yes
Electrical distribution	Yes	Yes	No
Feature Lighting	No	Yes	No
Lighting unit	Yes	Yes	Yes
Under Verandah Lighting	No	Yes	No
Unknown	Yes	Yes	Yes

The Boolean formula used for all pole purpose component records is [If ("YES", Rate $, Nil Cost)]. As AVM technical issues arose affecting the outputs, this valuation was carried out manually.

An overhead allowance of 8% was applied. All components were given a residual value of $1.

20 Surface Water Channels

20.1 Data Integrity

There are 9,641 surface water channel records in RAMM totalling 1,113,946 metres. There are 28 channel records with no construction date recorded which have been given a default construction date of half their theoretical life.

20.2 Looking at Condition

Condition rating surveys that were completed for the channels network were discontinued in 2006. As condition factors cannot be applied to modify RUL. RUL is based on the age and total useful life.

20.3 Valuing Individual Assets

Replacement costs for surface water channels are based on the 2010 rates, cost escalated by 8% to meet 2013 values. Costs include removal of existing channel and the installation of new channel.

The replacement unit cost rates and overhead used in the valuation are given in the table below.

Surface Water Channel Type	Unit	Life Cycle (Yrs)	Rate ($)
Concrete Edge Beam	m	60	55.62
Depressed Kerb & Channel	m	70	56.00
Dished Channel (Asphalt) / (Sealed)	m	70	91.00
Dished Channel (Concrete) / (Half Pipe)	m	70	91.00
Heritage Pre-Cast Kerb & Channel	m	70	72.80
Kerb & Channel (Concrete) / Other Type	m	70	56.00
Kerb & Dished Channel (Concrete)	m	70	56.00
Kerb Only (Concrete)	m	70	56.00
Mountable Kerb & Channel (Concrete)	m	70	56.00
Mountable Kerb Only (Concrete)	m	70	56.00
Slot Channel (Concrete)	m	70	91.00
Stormwater Soakage Trench	m	60	85.00
Swale Drains	m	70	112.00
Earth Surface Water Channel Deep / Shallow	m	Indefinite	0.00

Asphalt, sealed dish channels and slot channels assigned modern equivalent assets are concrete dish channels.

Kerb and dish channels, depressed kerb and channels and other type channels have been valued as concrete kerb and channel. Heritage pre-cast channel has been assigned a 30% over-rate to standard allow for stone recovery and treatment needed to prepare them for reuse.

Swale Drains are a recent addition to this asset. The linear rate has been assessed from various items to construct a typical river stone lined three metre wide drain over a 200mm GAP40 bed.

An overhead allowance of 8% was applied. All components were given a residual value of $1.

21 Tactiles

21.1 Data Integrity

Tactiles (aka Tactile Ground Surface Indicators) is a system of textured ground surface indicators found on footpaths, stairs and train station platforms to assist pedestrians who are blind or visually impaired. Tactile warnings provide a distinctive surface pattern of truncated domes detectable by long cane or underfoot which are used to alert people with visual impairment of their approach to streets and hazardous drop-offs.

There are 346 tactiles records in RAMM. The location data is good but there are 146 locations that do not have a tactiles quantity. Tactiles quantities range between 1 and 66 for the other locations.

The earliest tactiles installation date in RAMM is 30/08/2007. There are 33 tactile records with no installation date. These have been given a default installation date of half their theoretical life.

21.2 Looking at Condition

The tactiles in RAMM have been condition rated, however, this has not yet (or intended yet) to be translated into condition factors to affect RUL. RUL is therefore based on the age and total useful life. Minimum RUL is set at 1 year. A lifecycle of 5 years is set, as tactiles are constantly abraded.

21.3 Valuing Individual Assets

The replacement costs for tactiles provided by HCC of $212.60 per m^2 cannot be used, as such, in AVM as there are no tactile area dimension attribute per location in RAMM available.

A rate of $19.00 per tactile pad measuring 300mm by 300mm has been provided as an alternative means and there are several locations in RAMM where this rate can be used. However, due to the number of locations with zero tactiles, this rate cannot be reliably applied either.

Dividing the area rate by the pad rate indicates 11 pads per square metre. However, from locations that have a quantity, the resulting average tactiles quantity of 18.5 per location is considered to be more reliable. Therefore a location rate of $351.50 has been adopted for this valuation.

An overhead allowance of 8% was applied. All tactiles locations were given a residual value of $1.

22 Traffic Signals

22.1 Data Integrity

Signals in RAMM are multi-componentised assets. The three components considered for valuation are the controller, pole and lantern. Minor components include detection loops, pedestrian boxes, cables, pressure pads, communications, logic boards and signal back boards to name but a few. There is no need to value these minor components as their costs can be integrated into the above.

Signal components do not have a grid-accessible table in RAMM. Instead they are componentised as part of an intersection, which is tagged whether it is controlled or not (yes or no). Signal data is then extracted by SQL to reveal component attributes. Data extracted revealed there are 65 signal controlled intersections (up from 48 in 2010) of varying pole number and lantern type configurations.

One RAMM record has a missing lantern type. About 60% of the signal components did not have a construction date. Otherwise there appeared to be no other missing signal component attributes.

22.2 Looking at Condition

This is the first time signals have been valued in RAMM. Signals are condition rated however this information has yet to be translated into reliable condition scores that can be used to modify RUL. About 86% of the assets did not have a condition rating at this time.

The signals that did not have a construction date have been assigned a default construction date of half the life cycle as the RAMM field requires one. The base life of 15 years has been adopted as per the 2010 valuation. As there is no condition data RUL is based on the age and total useful life.

22.3 Valuing Individual Assets

Replacement costs for signals are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following table.

Traffic Signal Component	Base Life Yrs	Unit	Rate $
Controller All Makes and Models	15	each	25,000
Lantern 1 Aspect LED (MEA)	15	each	500
Lantern 2 Aspect LED (MEA)	15	each	868
Lantern 3 Aspect LED (MEA)	15	each	1,257
Lantern 4 Aspect LED (MEA)	15	each	1,596
Pole Standard (STD4, STD5, JUSP, JUSPA)	15	each	723
Pole Mast Arm (MAST, JUM and OM)	15	each	6,582
Pole Combination COMB)	15	each	7,305

The controller rate allows for all associated traffic detection equipment, loops, cables and comms.

For MEA purposes, lantern aspects are optimised from Quartz Halogen and the other incandescent types to LED (light emitting diode) types. Although they cost more to install, LEDs have advantages over incandescent types that include power costs, brighter output and continuing to function despite many individual diode failures within the LED array. Currently 65% of HCC lanterns are LED types.

An overhead allowance of 10% was applied. All components were given a residual value of $1.

23 Treatment Length (Basecourse Component)

23.1 Data Integrity

Most of the data stored in the pavement layer table was added to RAMM to assist dTIMS modelling in producing more accurate results. For the purpose of the asset valuation, the pavement has been divided into basecourse and subbase as follows:

- Pavement depth <175mm - basecourse depth = 75mm
- Pavement depth 175 – 350mm - basecourse depth = 120mm
- Pavement depth >350mm - basecourse depth = 150mm

There are 3,588 treatment length records attributed to Local Authority with one (ID 6362) attributed to "Hamilton City Council". There are 67 records that currently have no pavement total depth data. These have been assigned the average pavement depth for the network.

23.2 Looking at Condition

23.2.1 Define Condition Categories (Standards)

The basecourse is the top layer of the pavement that is subjected to deterioration. The condition of this layer can be characterised by the roughness (ride) on the pavement. Roughness is a measured characteristic with surveys conducted every two years, at the same time as the road rating surveys.

Roughness is expressed as NAASRA counts/km and different levels of roughness can be accepted for the same condition category dependent upon the road use category of the pavement. There are 7 use categories dependent on various vehicles per day (vpd) loadings (<100 - > 20000) as below.

The basecourse condition categories vs. NAASRA were established as shown in the following table.

Category	Use 1 – <100 vpd	Use 2 – 100-500 vpd	Use 3 - 500-2000 vpd	Use 4 – 2000-4000 vpd	Use 5 – 4000-10000 vpd	Use 6 – 10000-20000 vpd	Use 7 - >20000 vpd
Excellent	< 70	< 70	< 70	< 70	< 70	< 70	< 70
Good	70 - 102	70 - 99	70 - 96	70 - 89	70 - 86	70 - 82	70 - 79
Average	103 - 136	100 - 129	97 - 122	90 - 109	87 - 102	83 - 99	80 - 92
Poor	137 - 169	130 - 159	123 - 149	110 - 129	103 - 119	100 - 109	93 - 99
Very Poor	>= 170	>= 160	>= 150	>= 130	>= 120	>= 110	>= 100

23.2.2 Expected Condition

The expected basecourse condition as used in the asset valuation is shown in the table below.

% Life Expired	Expected Condition
0 – 30	Excellent
30 – 60	Good
60 – 78	Average
78 – 90	Poor
90 - 100	Very Poor

23.2.3 Effect of Condition on Remaining Useful Life

The RUL was estimated from the life cycle and construction date adjusted for the actual measured condition of the pavement compared with the expected condition.

The method used was to adjust the RUL based on a comparison with the expected useful life with a minimum RUL of two years.

The effect on RUL of measured condition against expected condition for basecourse was assessed is as a percentage change as shown in the table below.

Actual Condition	Expected Condition	Effect on RUL
Excellent	Excellent	0
Excellent	Good	+ 10%
Excellent	Average	+ 20%
Excellent	Poor	+ 30%
Excellent	Very Poor	+ 40%
Good	Excellent	- 10%
Good	Good	0
Good	Average	+ 10%
Good	Poor	+ 20%
Good	Very Poor	+ 30%
Average	Excellent	- 20%
Average	Good	- 10%
Average	Average	0
Average	Poor	+ 10%
Average	Very Poor	+ 20%
Poor	Excellent	- 30%
Poor	Good	- 20%
Poor	Average	- 10%
Poor	Poor	0
Poor	Very Poor	+ 10%
Very Poor	Excellent	- 40%
Very Poor	Good	- 30%
Very Poor	Average	- 20%
Very Poor	Poor	- 10%
Very Poor	Very Poor	0

23.3 Valuing Individual Assets

23.3.1 Standard Replacement Costs

The replacement cost of the basecourse layer approximately equates to the average cost of both smoothing and strengthening treatments on the Hamilton City road network.

For the 2010 valuation HCC provided construction price schedules that included a rate of $86.83/m^3 for M4/AP40 material and $4.50/m^2 for the first coat seal. To these rates, $6/m^2 was added to allow for ripping and removing the existing basecourse material, $1.50/m^2 added for stabilising (assuming half the sites are stabilised), $1.60/m^2 for service cover adjustment and $7.50/m^2 for traffic control.

Then working with the average treatment length width of 8.7m for Hamilton City roads plus 0.6m for the extra formation width, the figures above were used to calculate basecourse replacement costs.

Replacement costs for basecourse assets are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following tables.

Total Pavement Depth	Assessed Basecourse Depth	Cost $/m^2
< 175mm	75mm	$30.84
175 – 350mm	120mm	$35.23
> 350mm	150mm	$38.12

A 10% overhead was applied to the replacement cost for engineering and administration.

The base life cycles used for the basecourse are shown in the following table.

Pavement Type	Use Code	Use Code ADT Vehicles / Day	Basecourse Life Cycle (Years)
Thin Surfaced Flexible	1	< 100	140
Thin Surfaced Flexible	2	100 – 500	125
Thin Surfaced Flexible	3	500 – 2,000	110
Thin Surfaced Flexible	4	2,000 – 4,000	95
Thin Surfaced Flexible	5	4,000 – 10,000	80
Thin Surfaced Flexible	6	10,000 – 20,000	65
Thin Surfaced Flexible	7	> 20,000	50

Basecourse layers were given a residual value of $1.

24 Treatment Length (Subbase Component)

24.1 Data Integrity

As stated in the previous section, most of the data stored in the pavement layer table was added to RAMM to assist dTIMS in producing more accurate results.

24.2 Looking at Condition

As this pavement layer is protected by the basecourse, it does not deteriorate and thus depreciate. The subbase condition cannot be measured and was therefore set to “Unknown”.

24.3 Valuing Individual Assets

24.3.1 Standard Replacement Costs

Replacement costs for subbase layers are based on the 2010 rates, cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following table.

In 2010 the replacement cost used to construct the subbase layer was also taken from the schedule of construction work provided by HCC. From this schedule the average rate as assessed for GAP40 material placement was $64.18/m^3 and GAP65 was $71.06/m^3, giving an average rate of $68/m^3.

Then using the average treatment length width of 8.7m (urban network with channel) and adding $7.50/m^2 for traffic control, this translated to the subbase replacement costs as listed in the 2010 valuation. A civil construction cost index of 8% was applied to the 2010 costs to account for the increase the replacement costs for the 2013 valuation. These costs are shown in the table below:

Total Pavement Depth	Assessed Subbase Depth	Cost $/m^2
< 175mm	75mm	$14.60
175 – 200mm	80mm	$14.99
200 – 250mm	130mm	$18.95
250 – 300mm	180mm	$22.91
300 – 350mm	230mm	$26.87
350 – 450mm	300mm	$32.41
450 – 550mm	400mm	$40.32
550 – 650mm	500mm	$48.23
650 – 750mm	600mm	$56.15
> 750mm	700mm	$64.07

A 10% allowance has been added to these costs for overheads.

A 100 years life was entered into AVM because it is a mandatory field. However, the depreciation method that was selected for this asset is “Does Not Depreciate”.

25 Treatment Length (Subgrade Component)

25.1 Data Integrity

The subgrade is the bottom most pavement layer associated with original construction formation of the road foundation. It has been created to account for its construction cost for valuation purposes and added to RAMM to assist in the dTIMS process.

25.2 Looking at Condition

This is the natural material on which all pavements have been constructed and does not depreciate.

25.3 Valuing Individual Assets

25.3.1 Standard Replacement Costs

Replacement costs for subgrade layers are based on the 2010 rates, cost escalated by 8% to meet 2013 values.

In 2010 the replacement cost used for the subgrade layer was assessed at $15.45/m^2$ with a 10% allowance added for overheads. A civil construction cost index of 8% was applied to the 2010 cost to increase the replacement cost used for the 2013 valuation to $16.87/m^2$.

A 100 years life was entered into AVM because it is a mandatory field. However, the depreciation method that was selected for this asset is “Does Not Depreciate”.

26 Treatment Length (Top Surface Component)

26.1 Data Integrity

The top surface valuation included 3,587 treatment lengths with a total length of 610.368km. There are 8 treatment lengths with no top surface type or surface date. These 8 treatment lengths have been assigned a default treatment of a grade 4/6 racked in seal as it is the most common surface type in use on the network. There appeared to be no other issues with top surface data in RAMM.

26.2 Looking at Condition

26.2.1 Define Condition Categories (Standards)

The top surface is defined as the surface treatment currently on the top of the road pavement.

The condition of the top surface is measured during road rating surveys carried out every two years with the latest survey carried out in 2013. The condition categories for the top surface were based on the condition of the surface treatment as indicated by the Surface Integrity Index (SII). This is an index that uses a combination of surface faults measured during the road rating survey to indicate the health of the pavement surface. The formula used to calculate SII can be found in Appendix A.

The top surface condition categories were defined as shown in the following table.

Number	Condition Category	SII Values
1	Excellent	SII <1
2	Good	SII >=1 and <2
3	Average	SII >=2 and <3
4	Poor	SII >=3 and <5
5	Very Poor	SII >=5

Any treatment length in RAMM that does have condition data has been assigned an SII of zero.

26.2.2 Expected Condition

Pavement surface treatments generally perform well for an extended period and then deteriorate at an accelerated rate towards the end of the surface life.

The expected condition of a surface treatment was therefore based on a logarithmic curve as set out in the following table.

% Life Expired	Expected Condition
0 - 30	Excellent
30 - 60	Good
60 - 78	Average
78 - 90	Fair
90 - 100	Poor

26.2.3 Effect of Condition on Remaining Useful Life

The RUL was estimated from the life cycle and construction date adjusted for the actual measured condition of the pavement compared with the expected condition.

The method used was to adjust the RUL based on a comparison with the expected useful life with a minimum RUL of 2 years.

The effect on RUL of measured condition against expected condition for basecourse was assessed is as a percentage change as shown in the table below.

Actual Condition	Expected Condition	Effect on RUL
Excellent	Excellent	0
Excellent	Good	+ 10%
Excellent	Average	+ 20%
Excellent	Poor	+ 30%
Excellent	Very Poor	+ 40%
Good	Excellent	- 10%
Good	Good	0
Good	Average	+ 10%
Good	Poor	+ 20%
Good	Very Poor	+ 30%
Average	Excellent	- 20%
Average	Good	- 10%
Average	Average	0
Average	Poor	+ 10%
Average	Very Poor	+ 20%
Poor	Excellent	- 30%
Poor	Good	- 20%
Poor	Average	- 10%
Poor	Poor	0
Poor	Very Poor	+ 10%
Very Poor	Excellent	- 40%
Very Poor	Good	- 30%
Very Poor	Average	- 20%
Very Poor	Poor	- 10%
Very Poor	Very Poor	0

26.3 Valuing Individual Assets

26.3.1 Standard Replacement Costs

The default seal life cycles in RAMM are those adopted by HCC from the Seal Life Analysis carried out by Beca in 2003. These seal lives reflect that HCC were predominately using two coat seals on problem sites, therefore the seal life achieved was shorter. Because this is no longer the case, the seal lives have been amended in RAMM and it is believed that the seal lives currently used in the valuation more accurately reflect the actual seal lives achieved on the HCC road network.

The replacement costs supplied by HCC staff include costs for the first sweep and remarking. An allowance of 10% has also been made for overheads and a residual value of $1 has been applied to each top surface as per the request from HCC.

Treatment lengths carrying >10,000 vehicles per day (vpd) (pavement uses 6 and 7) were assumed to be resurfaced with AC at the end of their theoretical life. Each treatment length was assigned a theoretical life based on the road use carrying number of (vpd).

Replacement costs for top surface layers are based on the 2010 rates as cost escalated by 8% to meet 2013 values. The base life cycles and replacement costs used are shown in following tables.

The life cycles used for the top surface are shown in the following table.

	Use 1	Use 2	Use 3	Use 4	Use 5	Use 6	Use 7
Surfacing Type	<100 vpd	100-500 vpd	500-2000 vpd	2000-4000 vpd	4000-10000 vpd	10000-20000 vpd	>20000 vpd
OGPA	18	16	14	12	12	10	8
AC	18	16	16	16	14	14	12
SMA	12	12	12	10	10	10	10
Slurry	10	10	8	8	8	6	6
1CHIP Grade 3	16	16	14	14	10	10	10
1CHIP Grade 4	16	14	14	12	12	8	8
1CHIP Grade 5	14	14	13	12	9	9	3
1CHIP Grade 6	12	12	10	10	10	6	3
2CHIP Grade 2/4	20	18	16	14	12	10	10
2CHIP Grade 3/5	18	16	14	12	12	10	8
2CHIP Grade 4/6	12	12	12	12	10	8	6
Racked Grade 3/5	16	14	12	11	10	9	8
Racked Grade 4/6	14	12	10	9	8	7	6
1st Coat Grade 4	6	6	4	2	1	1	1
1st Coat Grade 5	7	7	2	1	1	1	1
1st Coat Grade 3/5	6	6	5	5	4	2	1
1st Coat Grade 4/6	8	8	6	6	6	2	1
Concrete	60	60	60	60	60	60	60
Interlocking Blocks	30	30	30	30	30	30	30

Standard and optimised replacement costs used for top surface are shown in the following table.

Surface Type	Chip	Replacement Cost $/m^2	Optimised Replacement Cost $/m^2
Chip Seal	3	$4.88	Grade 4/6 Racked in Seal
Chip Seal	4	$4.45	Grade 3/5 Racked in Seal
Chip Seal	5	$3.45	Grade 4/6 Racked in Seal
Chip Seal	6	$3.23	Grade 4/6 Racked in Seal
Chip Seal	2/4	$7.25	Grade 3/5 Racked in Seal
Chip Seal	3/5	$5.89	Grade 4/6 Racked in Seal
Chip Seal	4/6	$5.31	Grade 3/5 Racked in Seal
Racked in Seal	3/5	$5.56	
Racked in Seal	4/6	$5.02	
Fabric	3/5	$6.57	
Slurry		$7.03	
Asphaltic Con	10mm	$20.16	
SMA		$23.25	
OGPA		$18.54	
Interlocking Block		$104.30	
First Coat	All	$0.00	Grade 4/6 Racked in Seal

The following assumptions have been made when applying the costs to each treatment length:

- Asphalt first coat top surface – assumed that it is the second coat (1 treatment length)
- Grade 5 first coat top surface – assumed to be membrane seals (4 treatment lengths)
- Membrane seal top surface – assumed to have an asphalt top surface (2 treatment lengths)
- Concrete top surface – nil cost applied as they do not have a top surface (6 treatment lengths)

27 Car Park

There are 12 car parks, listed under their own CARPARK hierarchy in RAMM, as shown below:

Road Name	Pavement Type	Area m^2
ANGLESEA UNDERGROUND CARPARK	Thin Surfaced Flexible	495
CARO STREET COUNCIL CARPARK	Thin Surfaced Flexible	625
CARO STREET PUBLIC CARPARK	Thin Surfaced Flexible	1,134
CARRINGTON AVENUE (SOUTH) PARKING	Thin Surfaced Flexible	1,152
FOUNDERS THEATRE CARPARK	Thin Surfaced Flexible	2,700
KENT STREET CARPARK	Thin Surfaced Flexible	2,080
KNOX ST CARPARK	Concrete	481
MASTERS AVE CARPARK	Thin Surfaced Flexible	1,445
MUSEUM CARPARK	Thin Surfaced Flexible	3,200
RIVER ROAD (SONNINGS) CARPARK	Thin Surfaced Flexible	9,720
THE METEOR CARPARK	Thin Surfaced Flexible	1,750
VICTORIA ST CAR PARK	Thin Surfaced Flexible	4,180
	TOTAL AREA	**28,962**

The 2010 car parks valuation is located in Appendix D. This valuation was based on Maximo data and did not state the number of car parks valued, however, RAMM construction date data indicates that all 12 existed at that time. The 2010 pavement and surfacing information in the schedule show that a total area of 18,199m^2 was valued. This is low compared to the RAMM total area above.

Car park data in RAMM is limited to mainly car park area and pavement surfacing data. However there are drainage, surface water table and features assets listed in these tables that are identified as car park assets and, for the purposes of accountability, the asset costs have been transferred.

As car park surfacing description is the same as that detailed in the surfacing table in RAMM, it is assumed that surfacing rates conform to surfacing rates, as detailed in Section 26 of the report.

Replacement costs for flexible pavement layers (includes basecourse, subbase and subgrade) are assumed to conform to similar layers for Treatment Lengths with life cycles aligning to Road Use 3 category roads due to traffic inflow and outflow commodity parking restriction and turnaround times.

It is assumed concrete car parks are 200mm deep with steel mesh reinforcement as compared with 75mm deep non-reinforced footpaths. Therefore they are estimated to have life cycles conforming to Use 3 Concrete Top Surfaces for Treatment Lengths and a replacement cost of \$145.68/m^2.

In respect to the above assumptions, replacement cost rates and life cycles are shown below:

Layer Type	Assumed Material	Depth (mm)	Replacement Cost $/$m^2$	Life Cycle (Years)
Basecourse	AP40	75	$30.84	110
Subbase	AP65	75	$14.60	Indefinite
Subgrade	In-Situ	-	$16.87	Indefinite
Top Surface	Asphaltic Cement	20 - 25	$20.16	16
Top Surface	2 Chip Seal G3/5	-	$5.89	14
Concrete	Concrete	200	$145.68	60

A 10% allowance added for overheads. The minimum remaining useful life assigned is one year.

28 Comparisons with 2010 Valuation

The 1 July 2013 valuation summary for all selected assets is provided in Section 5 of this report.

The 1 July 2010 valuation summaries are provided in the appendices as follows:

1. Appendix B – Beca Valuation (selected assets valued using RAMM data)
2. Appendix C – MWH Valuation (selected assets valued using Maximo data)

Apart from Intelligent Transport Systems and Tactiles introduced for the 2013 valuation, all the other assets are represented in both valuations.

The 2010 and 2013 valuation summaries for comparison purposes are shown in the following table:

Description	Replacement Cost	Depreciated RC	Annual Depreciation
YEAR 2013	$976,383,835	$682,444,500	$15,904,065
YEAR 2010	$824,182,818	$600,090,717	$13,223,884
Diff $	$152,201,017	$82,353,783	$2,680,181
Diff %	18%	14%	20%

The percentage differences between the 2010 and the 2013 valuations have been attributed to:

- Increases in road infrastructure asset quantities during the three-year period due to growth
- Development of new ring roads associated with connectivity to the State Highway Network.
- Increases in construction rates due to inflation and contract work during the three-year period
- Data inconsistencies and asset quantity mismatches between the Maximo and RAMM systems

For road asset management, HCC is abandoning the Maximo system and improving RAMM as the sole database for roading assets. These improvements include developing user-defined tables for traffic calming assets, tactiles and intelligent transport systems and populating the tables with data.

HCC accepts that the 2010 valuations based on Maximo data are not as reliable as the valuations undertaken in RAMM due to inconsistences and mismatches between the databases. Hence HCC are refining data so that future road asset valuations will be undertaken reliably using RAMM AVM.

29 Restrictions

The valuation is limited by the disclosures listed below which include:

- This valuation is for HCC financial purposes only and is not for any third parties.
- The valuation assessment relies upon data prepared and entered into RAMM by HCC staff and management and its outside contractors for the valuation. Beca do not guarantee or otherwise warrant the lengths, areas, materials, condition, performance and age of any of the assets nor the achievability of projections of future lives, the estimated cost of replacement or the suitability of the existing assets for their purpose.
- The projections of remaining lives used in the valuation are inherently uncertain because they are predictions of future circumstances, which cannot be assured. Actual results may vary from the projections and these variations may be significantly more or less favourable than assumed.
- Beca have reviewed the data and the rationale of the underlying assumptions on which the valuation is based. However, these assumptions are ultimately the responsibility of HCC. Whilst Beca have taken due care in our enquiries; neither Beca nor any of its directors or staff takes any responsibility for errors or omissions contained in this information.
- The valuation report should not be reproduced or used for any purpose other than outlined without our prior written permission in each instance.
- Beca do not assume any responsibility or liability for losses to HCC, rate payers or to any other parties as a result of the circulation, publication, reproduction or use of our report contrary to the provisions of this paragraph. In any event, our total liability for any reasons whatsoever is limited to five times our fee for this assignment.
- Beca reserve the right, but not the obligation, to review all calculations included or referred to in this report and, if Beca consider it necessary, to revise our opinion in the light of any information existing at the valuation date which becomes known to us after the date of this report.
- In preparing this report Beca has not audited any financial statements, management accounts, engineering or other records of the HCC.
- This valuation report is prepared only for the purposes referred herein and will not necessarily be appropriate for assessing the value of the assets of the HCC for any other purposes or at any point in time other than the date of this valuation.

Appendix A

SII Calculation

SII Calculation

Because the dTIMS SII has not been developed with any reference to the RAMM related trigger values for resurfacing, the calculation of the SII was modified to include all of the faults used in RAMM to trigger a resurfacing. The weightings applied were calculated such that any single fault recorded would trigger a reseal based on the RAMM trigger values and a target SII value of 2.0. The formula became as follows:

1.18*ACRA + 0.67*ASH + 0.08*ARV + 28*APOT + 11*APH + 0.1*AFL + 0.05*AGE2

Where

ACRA	=	Area of alligator cracking as a % of inspection area
ASH	=	Length of WP shoving as a % of inspection length WP
ARV	=	Area of scabbing (ravelling) as a % of inspection area.
APOT	=	Area of pot holes as a % of inspection area.
APH	=	Area of pot hole patches as a % of inspection area.
AFL	=	Area of flushing as a % of inspection area.
AGE2	=	Design life exceeded as a % of the design life of the surfacing.
		(This is set to 0 if design life has not been exceeded.)

The basis of the weightings to achieve an SII of 2.0 are as follows:

Alligator Cracking

RAMM Trigger: = 3% of WP, = 6 m of WP cracked in 50 m insp_length

From Report DT/99/5: ACRA = 0.0004 (LWC*50/insp_length)^2 + 0.28 (LWC*50/insp_length)

Where ACRA = % area of all cracking

LWC = length of wheelpath cracking in m

6 m LWC = 1.69% of insp_area cracked

For SII = 2, the weighting for cracking = 2 / 1.69 = **1.18**

Shoving

RAMM Trigger: = 3% of WP, = 6 m of WP cracked in 50 m insp_length

From Report DT/99/5: ASH = (shoving / insp_wheelpath) * 100

For SII = 2, the weighting for shoving = 2 / 3 = **0.67**

Scabbing (Ravelling)

RAMM Trigger: = 25% of insp_area

From Report DT/99/5: ARV = (scabbing / insp_area) * 100

For SII = 2, the weighting for scabbing = 2 / 25 = **0.08**

Pot Holes

RAMM Trigger: = 100 pot holes/km = 5 pot holes per 50 m insp_length

From Report DT/99/5: APOT = (holes * 0.05 / insp_area) * 100

5 holes = 100*5*0.05/350 = 0.07 % (for 7 m wide road)

For SII = 2, the weighting for pot holes = 2 / 0.07 = **28**

Pot Holes Patches

RAMM Trigger: = 100 pot hole patches/km = 5 pot holes patches per 50 m insp_length

From Report DT/99/5: APH = (pot hole patches * 0.125 / insp_area) * 100

5 patches = 100*5*0.125/350 = 0.18 % (for 7 m wide road)

For SII = 2, the weighting for pot hole patches = 2 / 0.18 = **11**

Flushing

RAMM Trigger: = 30 % of WP, = 60 m of WP flushed in 50 m insp_length

From Report DT/99/5: AFL = (flushing * 1.2 / insp_area) * 100

60m of flushing = (60 * 1.2 / 350) * 100 = 20.57 % (for 7 m wide road)

For SII = 2, the weighting for flushing = 2 / 20.57 = **0.10**

Age

RAMM Trigger: There is no defined trigger in RAMM for the % of design life exceeded. This is set at user discretion. Many RCA's use a figure of 40% which we suggest is intuitively sound.

AGE2 = (seal age - design life) / design life

where seal age > design life

where seal age < design life then AGE2 = 0

For SII = 2, the weighting for age = 2 / 40 = **0.05**

Triggers

We consider that it is more appropriate to use the loading on the road as part of the SII, rather than to have different trigger values at different traffic loadings. This also makes it easier to test against an existing reseal programme, which has the traffic loading taken into consideration by the roading engineer.

The RAMM system uses 7 categories of traffic loading (see table below), and these seem appropriate to use when raised to the power of 0.1. It seemed to be more appropriate to use the traffic factor as a multiplier in the SII calculation rather than an addition. Otherwise a very sound, but heavily loaded pavement would have an SII > 0 which does not seem appropriate. The use of the power function allowed a significant increase in SII (20% for heavily trafficked roads) without it becoming too dominant.

Pavement Use	Traffic Loading
1	<100 vpd
2	100 - 500 vpd
3	500 - 2,000 vpd
4	2,000 - 4,000 vpd
5	4,000 - 10,000 vpd
6	10,000 - 20,000 vpd
7	> 20,000 vpd

The Final formula for SII therefore becomes:

$$(1.18*ACRA + 0.67*ASH + 0.08*ARV + 28*APOT + 11*APH + 0.1*AFL + 0.05*AGE2) * pavement\_use^{0.1}$$

This formula does not require the use of different trigger levels, for different traffic loadings and an intuitive figure to use is in the range of 4 - 6.

Appendix B

Valuation Summary 1 July 2010 - Beca

2 Executive Summary

2.1 Results

A summary of the replacement cost, depreciated replacement cost and annual depreciation is shown in table 1 below.

Table 1 - Summary of Results of AVM

Asset Type	Component	Replacement Cost	Depreciated RC	Annual Depreciation
Drainage	Drainage	$26,165,239	$15,477,402	$379,991
	Total	**$26,165,239**	**$15,477,402**	**$379,991**
Footpath	Footpath	$134,924,245	$82,961,274	$3,975,674
	Total	**$134,924,245**	**$82,961,274**	**$3,975,674**
Islands	Islands	$1,824,221	$969,698	$52,030
	Total	**$1,824,221**	**$969,698**	**$52,030**
Signs	Signs	$2,776,966	$1,334,318	$184,325
	Total	**$2,776,966**	**$1,334,318**	**$184,325**
SW Channel	SW Channel	$64,464,827	$41,433,278	$850,585
	Total	**$64,464,827**	**$41,433,278**	**$850,585**
Treatment Length	Basecourse	$195,984,484	$124,128,236	$2,142,636
	Sub-base	$150,350,222	$150,350,222	$0
	Subgrade	$91,000,791	$91,000,791	$0
	Top Surface	$60,146,312	$31,006,378	$3,785,137
	Total	**$497,481,809**	**$396,485,627**	**$5,927,774**
Total		**$727,637,307**	**$538,661,597**	**$11,370,379**

The detailed reports for each asset type and component have been provided electronically.

2.2 Purpose of Valuation

The purpose of this valuation is for financial reporting purposes for Hamilton City Council.

2.3 Effective Date of Valuation

The effective date of the valuation is 1 July 2010.

Appendix C

Valuation Summary 1 July 2010 - MWH

5 Minor Transportation Valuation

5.1 Summary

Table 5-1: Summary of Minor Transportation Valuation

Asset Description	Replacement Cost	Total Accumulated Depreciation	Depreciated Replacement Cost	Annual Depreciation
Bollards	$124,429	$5,583	$118,846	$5,009
Bridge Culverts	$8,613,947	$2,342,012	$6,271,935	$107,674
Bridges	$49,690,448	$14,189,128	$35,501,321	$331,270
Bus Shelters	Now included in the RAMM valuation			
Car parks	$602,985	$206,343	$396,642	$24,685
Concrete Blocks	$56,796	$1,704	$55,092	$568
Cycle Parking Racks	$85,839	$27,341	$58,498	$2,861
Fixed Traffic counters	Now included in the RAMM valuation			
Guardrails	$781,241	$428,842	$352,399	$29,960
Litter bins	$466,456	$217,268	$249,188	$46,272
Manholes	$33,521	$2,234	$31,286	$559
Railings	$20,917	$1,627	$19,291	$1,046
Retaining structures	$6,377,181	$2,677,036	$3,700,144	$63,772
Seats	$93,025	$17,253	$75,772	$4,651
Signs	Now included in the RAMM valuation			
Streetlights	$26,151,139	$13,725,735	$12,425,404	$1,023,669
Traffic Features (Raised Pedestrian Crossings)	$181,912	$17,885	$164,027	$9,096
Traffic Features - Islands	Now included in the RAMM valuation			
Traffic Features - Calming	$406,219	$83,761	$322,458	$16,248
Traffic signals	$2,796,452	$1,152,293	$1,644,159	$183,015
Transportation Fence Assets	$63,004	$20,346	$42,658	$3,150
Totals	**$96,545,511**	**$35,116,392**	**$61,429,120**	**$1,853,505**

5.2 General Minor Transportation Assumptions

Where installation or construction dates are missing the age of the asset is assumed to be half of its total useful life. The exception to this is where estimated ages or remaining useful lives have been supplied in these cases the instillation date has been back calculated based on these figures.

Appendix D

Car Park 1 July 2010 Schedule - MWH

5.6 Car Parks

Each rate includes an allowance for engineering fees (8%), supply and installation.

Table 5-5: Car Parks Valuation

Asset Type	Unit	Quantity	Unit Cost	Total Useful Life	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Carparks							
Catchpits - Double	ea	3	$3,035	70	$9,104	$7,674	$130
Catchpits - Single	ea	13	$1,705	70	$22,169	$17,446	$317
Kerb and Channel	m	660	$86	70	$56,905	$34,017	$813
Pavement - Concrete	m2	449	$47	15	$21,063	$17,431	$726
Pavement - Pavement	m2	17,750	$16	28	$292,444	$240,260	$10,437
Pay and Display Machines	ea	8	$8,685	20	$69,478	$36,480	$3,474
Surfacing - 2 Coat Reseal	m2	8,100	$4	15	$30,742	$18,445	$2,049
Surfacing - Chip/AC Mix	m2	4,900	$17	15	$81,515	$20,186	$5,434
Surfacing - Single Coat Chip	m2	4,526	$3	15	$15,524	$4,432	$1,035
Surfacing - Slurry	m2	673	$6	15	$4,041	$270	$269
TOTAL		**37,082**			**$602,985**	**$396,642**	**$24,685**

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Report

Hamilton City Council Transportation Asset Valuation 2016

Prepared for Hamilton City Council

Prepared by Beca Ltd (Beca)

31 August 2016

Revision History

Revision N°	Prepared By	Description	Date
A	7(2)(a) [redacted]	Draft issue for client comments	08/07/2016
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Approved by	7(2)(a) [redacted]		30/9/16
on behalf of	Beca Ltd		

Contents

Appendices

1 Introduction

This report details a valuation of selected roading assets owned by Hamilton City Council (HCC) as at 1 July 2016.

Beca Ltd (Beca) has been commissioned to conduct a valuation of the assets in the road network using the RAMM Asset Valuation Module (AVM).

The valuation module was set-up in 2003 for this purpose and this year's valuation uses the same AVM set-up subject to the improvements, modifications and updates implemented since then.

This report details the results of the valuation and includes all the assumptions and data provided in reaching these results.

The report is set out in a similar manner to the format used in the AVM so that the reader can follow the process while accessing the information from RAMM.

The HCC road network is approximately 665km in length and distributed as shown in the following table.

Table 1.1: HCC Road Network Distribution (km)

Hierarchy	Length (km)
COLLECTOR	78.26
LOCAL	460.64
MAJOR ARTERIAL	57.41
MINOR ARTERIAL	60.11
SERVICE LANE	9.01
Total	**665.42**

2 Purpose

The purpose of this valuation is for financial reporting purposes for Hamilton City Council.

3 Effective Date of Valuation

The effective date of the valuation is 1 July 2016.

4 Valuation Summary

An asset component summary of the replacement cost, depreciated replacement cost and annual depreciation results from AVM is shown in the following table.

Table 4.1: 2016 Valuation Summary

Asset Type	Component	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation	Quantity
Bridge	Bridge (Culvert)	$12,238,023	$5,595,140	$194,657	24
	Bridge (Deck)	$80,334,781	$51,665,413	$536,421	30
	Total	$92,572,804	$57,260,553	$731,079	54
Drainage	Drainage	$35,748,494	$20,391,965	$526,628	13,067
	Total	$35,748,494	$20,391,965	$526,628	13,067
Feature	Feature	$1,300,772	$619,354	$74,594	2,241
	Total	$1,300,772	$619,354	$74,594	2,241
Footpath	Footpath	$212,404,812	$114,639,508	$5,395,829	9,247
	Total	$212,404,812	$114,639,508	$5,395,829	9,247
ITS	ITS	$2,171,769	$1,473,562	$108,579	174
	Total	$2,171,769	$1,473,562	$108,579	174
Island	Island	$13,103,573	$10,031,772	$377,224	1,291
	Total	$13,103,573	$10,031,772	$377,224	1,291
Minor Structure	Minor Structure	$8,776,989	$6,795,689	$211,867	402
	Total	$8,776,989	$6,795,689	$211,867	402
Railing	Railing	$2,614,242	$1,447,639	$105,214	660
	Total	$2,614,242	$1,447,639	$105,214	660
Retaining Wall	Retaining Wall	$9,235,221	$5,872,498	$109,010	169
	Total	$9,235,221	$5,872,498	$109,010	169
SW Channel	SW Channel	$72,191,102	$45,469,228	$967,778	10,297
	Total	$72,191,102	$45,469,228	$967,778	10,297
Sign	Sign	$3,646,031	$830,966	$241,645	15,443
	Total	$3,646,031	$830,966	$241,645	15,443
Street Light	Street Light (Bracket)	$6,222,064	$2,857,832	$249,498	17,029
	Street Light (Light)	$7,306,421	$3,696,759	$293,517	17,207
	Street Light (Pole)	$13,368,952	$6,039,902	$502,895	12,539
	Total	$26,897,437	$12,594,493	$1,045,910	46,775
Tactiles	Tactiles	$253,183	$120,705	$45,508	618
	Total	$253,183	$120,705	$45,508	618
Traffic Signal	Traffic Signal (Controller)	$1,678,029	$1,242,048	$111,863	78
	Traffic Signal (Lantern)	$2,163,816	$1,435,080	$144,133	1,821
	Traffic Signal (Pole)	$855,521	$462,825	$56,990	597
	Traffic Signal (Attachment)	$91,692	$83,268	$6,112	20
	Total	$4,789,058	$3,223,221	$319,098	2,516
Treatment Length	Basecourse	$234,633,367	$152,667,453	$2,266,309	3,823
	Subbase	$175,983,779	$175,983,779	$0	3,824
	Subgrade	$111,157,705	$111,157,705	$0	3,770
	Top Surface	$64,952,963	$30,126,615	$4,274,439	3,838
	Total	$586,727,815	$469,935,552	$6,540,748	15,255
Car Parks	Car Parks	$2,701,506	$2,012,017	$36,955	12
	Total	$2,701,506	$2,012,017	$36,955	12
Total		$1,075,134,806	$752,718,722	$16,837,666	118,221

Refer document NZ1-13035130 for AVM detailed outputs for asset components (except car parks) in Excel spreadsheet format; refer document NZ1-13035116 for the car park component spreadsheets.

5 Comparisons with 2013 Valuation

The below table provides a summary comparison of the 2013 and 2016 valuation results.

Table 5.1: Summary Comparison of 2013 and 2016 Valuations

Description	Replacement Cost	Depreciated RC	Annual Depreciation
Year 2016	$1,075,134,806	$752,718,722	$16,837,666
Year 2013	$976,383,835	$684,734,683	$16,088,469
Difference ($)	$98,750,971	$67,984,039	$749,197
Difference %	10%	10%	5%

The differences between the 2013 and the 2016 valuations have been attributed to:

- Increases in road infrastructure asset quantities during the three-year period due to growth
- Increases in construction rates due to inflation and contract work during the three-year period
- Updated top surface base life cycles as a result of analysis work undertaken by the HCC's Infrastructure Alliance since the 2013 valuation
- Valuation of top surfacing assets based on their replacement treatment for roads that are currently an asphalt surface but will be resurfaced with a chip seal
- Inclusion of asset components previously not valued including raised platforms, traffic signal attachments, sign and signal supports
- Improvements in the inventory register data

6 Basis of Valuation

6.1 Public Benefit Entity International Public Sector Accounting Standard 17 (PBE IPSAS 17)

To meet statutory reporting requirements, HCC carries out revaluations triennially for their transport activity. This period aligns with HCC's asset management planning processes while ensuring carrying values do not differ materially from that which would be determined using fair value at reporting date. Accordingly this revaluation is completed in accordance with Public Benefit Entity Sector Accounting Standard 17 Property, Plant and Equipment (PBE IPSAS 17), that was enacted on 1 July 2014, for financial reporting purposes.

PBE IPSAS 17 applies to the general purpose financial reports of all public benefit and groups, including all government departments, crown entities and local authorities.

PBE IPSAS 17 prescribes the principles for the initial and subsequent accounting for property, plant and equipment to ensure the financial statements reported to stakeholders, can discern information about its investment in its assets and changes in such investment at the end of the reporting period.

It is understood that PBE IPSAS 17 applies to HCC's assets considered in the scope of this valuation review. Property, Plant and Equipment are defined in PBE IPSAS 17 as tangible items that:

1. Are held by an entity for use in the production or supply of goods and services, for rental to others or for administrative purposes; and
2. Are expected to be used during more than one period.

PBE IPSAS 17 allows for property, plant and equipment to be valued on a revaluation model and describes the process as;

"After recognition as an asset, an item of property, plant and equipment whose fair value can be measured reliably shall be carried at a revalued amount, being its fair value at the date of the revaluation, less any subsequent accumulated depreciation, and subsequent accumulated impairment losses.

Revaluations shall be made with sufficient regularity to ensure that the carrying amount does not differ materially from that which would be determined using fair value at the reporting date."

Fair Value is defined as "the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction."

A different approach is used to value specialised and non-specialised assets for their existing use. Non-specialised assets are valued on a market basis, usually by way of sales comparison or income approaches. Specialised assets are seldom traded on an open market, so a depreciated replacement cost basis is applied.

This valuation has been completed in accordance with Financial Reporting Standard PBE IPSAS 17 'Property, Plant and Equipment', International Valuation Standard IV5300 'Valuations for Financial Reporting' and New Zealand Infrastructure Asset Valuation and Depreciation Guidelines (NZIAVD).

HCC is a public benefit entity and therefore the specialised roading assets are valued using a depreciated replacement cost basis as per PBE IPSAS 17.

On the basis of the information provided, and the assumptions and methodology used, the valuation would be typical for one carried out for a New Zealand Road Controlling Authority and would be acceptable to the NZ Office of the Auditor General.

Where minor improvements to the data are required this is noted under each asset type.

6.2 Depreciated Replacement Cost

While not directly defining Depreciated Replacement cost, PBE IPSAS 17 states "The term depreciated replacement cost is often used to describe the application of the cost approach to property, plant and equipment. In the case of PBE IPSAS 17, depreciated replacement cost may be used to estimate the fair value of an asset."

The standard continues: "if depreciated replacement cost is used to estimate the fair value of property, plant and equipment:

(a) The value of land shall reflect the fair value of the actual land held, in terms of both its size and location; and
(b) The value of improvements to property, plant and equipment shall be estimated as the current replacement cost of the asset less deductions for all relevant forms of obsolescence, including physical deterioration."

Depreciation was applied to depreciate assets on a "straight line" basis over the assessed total economic life of the asset

7 General Methodology

7.1 Approach

The New Zealand Infrastructure Asset Valuation and Depreciation Guidelines provide a basis for performing the DRC valuation for infrastructural assets. The following step by step process was applied to each asset component;

- Asset Component Split – Component split of assets was completed to account for differing useful lives.
- Optimisation (Adjustment for obsolescence) – Adjustment may be identified for various forms of obsolescence in accordance with PBE IPSAS 17. This was discussed with HCC for each asset component.
- Replacement Cost – The replacement costs were assessed based on unit rates or lump sum amounts. Costs were based on present day replacement costs using modern construction methods and modern materials.
- Useful or Base Lives – The Guidelines provide lives for many infrastructure assets. Those not included are likely to be contained in the NZ Infrastructure Asset Management Manual. As a range of lives is provided by the Guidelines, the reviewer considered the factors which may influence the appropriate base life.
- Remaining Useful Lives – These were assessed as to whether the remaining life was an assessment after a site inspection of the assets, or calculated from the base life and age of the asset. Where the remaining life has been determined from age, the Guidelines recommend predictive modelling of the remaining life and describe a method using impact factors. Alternatively, the NZ Infrastructure Asset Management Manual describes a method based on condition and performance.
- DRC Method – The use of the Depreciated Replacement Cost methodology and its derivation were used for each component type, based on the replacement cost, total life and assessed remaining life of the assets.
- Annual Depreciation – calculation of annual depreciation from the DRC and remaining life was completed.
- Depreciation to date – PBE IPSAS 17 requires that the accumulated depreciation, (the depreciation to date), be shown. This was calculated by subtraction of the DRC from the Replacement Costs.

7.2 Asset Types Valued

The scope of the valuation was to use the functionality of the RAMM Asset Valuation Module (AVM) to derive replacement cost, depreciated replacement cost and annual depreciation of HCC assets in the RAMM database.

Beca has previously undertaken valuations using AVM and have checked its processes. Beca are of the opinion that AVM provides the required processes to undertake a valuation.

The AVM categorises the roading asset into classes based on tables within the RAMM database. Some asset classes are complex and have been componentised in accordance with PBE IPSAS 17 (e.g. treatment length components include top surface, basecourse, sub-base and subgrade).

As AVM does not list Car Parks as an asset, they have been valued manually using RAMM data.

The table below shows the HCC AVM Roading Asset Types to be included in the asset valuation.

Table 7.1: Summary of Asset Types Included in the Valuation

Asset Type in RAMM	Component Option	Condition Option	Valuation Required
Berm	×	×	No
Bridge	✓	×	Yes
Crossing	×	×	No
Cycle Way	×	×	No
Drainage	✓	×	Yes
Feature	×	×	Yes
Footpath	×	×	Yes
HCC Other Assets	x	×	No
Intelligent Transport Systems	x	×	Yes
Island	×	×	Yes
Landscaping	x	×	No
Marking	×	×	No
Minor Structure	×	×	Yes
Railing	×	×	Yes
Retaining Wall	×	×	Yes
Shoulder	×	×	No
Sign	✓	×	Yes
Streetlight	✓	×	Yes
SW Channel	×	✓	Yes
Tactiles	x	×	Yes
Traffic Calming	×	×	No
Traffic Facility	×	×	No
Traffic Signal	✓	×	Yes
Treatment Length	✓	✓	Yes
Tree	×	×	No

The valuation of assets detailed above and HCC car parks (valued outside of AVM) are discussed in the following sections.

7.3 Asset Information Source

AVM uses asset data supplied from HCC's RAMM database, which has been compiled by HCC and its contractors. The HCC RAMM database is maintained and updated regularly for any new or updated assets.

Beca consider the overall reliability of the data used in the valuation is good and can be relied upon for valuation purposes. Where data is incomplete Beca has applied assumptions, as detailed in the following sections that deal with each component type. Section 8 discussed the data confidence level for each asset type.

Treatment lengths on state highways and unformed roads have been disabled. This excludes them from the valuation process because they are not Council owned assets.

7.4 Asset Component Split

Valuation of an asset has been applied at component level. In most cases the assets in the spreadsheets provided comprise of a single component (railing for example).

For road sections additional levels were defined for formation (subgrade), sub-base, basecourse and top surface components. These levels are appropriate considering these layers have differing lives.

7.5 Asset Component Units of Measure (UOM)

The unit of measure was defined for each asset type valued as shown in the table below.

Table 7.2: Asset Component Units of Measure

Asset / Component	Unit	Calculation
Bridge / Deck	Each	1
Bridge / Culvert	Each	1
Drainage Linear Assets (e.g. Culverts)	m	Drain Length
Drainage Structural Assets (e.g. Sumps)	each	1
Feature	each	1
Footpath	m^2	(Length * Width) + Extra Area
Intelligent Transport Systems	each	1
Island	m	Island Length
Minor Structure	each	1
Railing	m	Railing Length
Retaining Wall	m^2	Wall Length * Average Wall Height
Sign	each	1
Street Light	each	1
SW Channel	m	Surface Water Channel Length
Tactiles	each	Quantity
Traffic Signal	each	1
Treatment Lengths / Top Surface	m^2	Treatment Length Area m^2
Treatment Lengths / Basecourse	m^2	Treatment Length Area m^2
Treatment Lengths / Subbase	m^2	Treatment Length Area m^2
Treatment Lengths / Subgrade	m^2	Treatment Length Area m^2

7.6 Unit Replacement Costs, Replacement Cost and On-cost

Asset cost and remaining life information were provided by HCC staff. As a starting point the asset costs and lives used to undertake the 1 July 2013 valuation were reviewed and updated. Where the replacement costs and life cycles have been assumed by HCC, they have been checked by Beca. The replacement costs and life cycles are discussed in more detail under each asset type heading. In cases where insufficient contract rates were available, the 2013 unit rates have been indexed up by 3% based on the NZ Transport Agency's Infrastructure Cost Indices in their procurement manual tools.

Replacement Cost (RC) = (Unit Replacement Cost + On-cost) x Quantity

7.7 Optimisation and Residual Value

Adjustment for obsolescence (Optimisation) can be applied to the replacement and depreciated replacement costs to reflect asset obsolescence or relevant surplus capacity in accordance with PBE IPSAS 17. Signs are the only asset type identified to have some degree of optimisation. No other optimisation opportunities are evident.

As there are virtually no opportunities for component resale, the residual value (RV) is set at $1 as requested by HCC.

7.8 Total Useful Life (TUL) and Remaining Useful Lives (RUL)

Total useful lives (base life cycles) have been estimated based on local knowledge or based on assumption for use in this valuation by Beca and have been reviewed by HCC. These have been checked and compared to lives for many infrastructure assets contained within various valuation guidelines. As a range of lives is provided by the guidelines, factors that may influence TUL are considered in order to come up with an appropriate singular TUL figure.

For depreciable assets RUL has been calculated by deducting asset age from TUL. Where the RUL has been determined from age, the guidelines recommend predicative modelling of RUL and describe a method using impact factors. Also the NZ Infrastructure Asset Management Manual describes a method based on condition and performance. For non-depreciable assets RUL is not calculated.

The effect of condition on RUL has been used in the valuation where available. Planned renewal works in the current forward works programme (FWP) and the available roughness survey have been used for surfacing and basecourse. And, priority and an RUL assessment have been used for bridges (including bridge culverts) and jetties respectively.

Minimum RUL for most assets has been set to 2 years. Signs and top surfaces have a 1 year minimum RUL.

Where an asset exceeds its TUL, the TUL is reset, by using the formula TUL = Asset Age + RUL

7.9 Annual Depreciation (AD)

AD was applied to depreciable assets on a “straight line” basis over the assessed total useful life of the asset.

AD = (RC – RV) / (RUL + Asset Age) or (DRC – RV) / RUL

The term is also described as Annual Financial Depreciation, as it is financial type depreciation.

Where asset types have had condition data gathered, the “CB” condition curve as described in the NZIAM Manual was used for applying condition grades used for determining asset remaining lives.

Assets that do not depreciate with time were marked accordingly.

7.10 Depreciated Replacement Cost (DRC)

Depreciated Replacement Cost (DRC) = ((RC – RV) * RUL / (RUL + Asset Age) + RV) where RUL is subjected to adjustment, as explained above. This is the method used to derive “Fair Value”.

PBE IPSAS 17 requires that the accumulated depreciation be calculated for financial reporting. This can be calculated by subtraction where Accumulated Depreciation = RC - DRC.

7.11 Exclusions

The following were specifically excluded from the valuation:

- The effect of the relevant provisions of the RMA, Treaty of Waitangi or other legislation on the replacement of identified assets
- All land under roads
- Power and telecommunications cabling (underground or exposed), servicing HCC assets
- Assets in the RAMM database not owned by HCC
- Intangible Assets

Assets on the following road sections were excluded from the valuation on the request of HCC.

Table 7.3: Road Sections Excluded for the Valuation

Road ID	Road Name	Start	End
5663	BATTEN DRIVE	0	44
5558	CORUM PLACE	0	179
5559	EPPING PLACE	0	65
5665	FALCON COURT	0	74
5666	HARRIER COURT	0	63
5664	SENTINEL COURT	0	55

8 Data Quality

The quality of the data used for each asset type in the valuation has been assessed in accordance with the data confidence grading system in the NZ Infrastructure Asset Valuation and Depreciation Guidelines. The grading system is shown in Table 7.1 below and the Confidence Assessment is provided in Table 7.2.

Table 7.1: Data Confidence Grading System

Confidence Grade	General Meaning
A	**Highly Reliable** Data based on sound records, procedure, investigations and analysis which is properly documented and recognised as the best method of assessment.
B	**Reliable** Data based on sound records, procedure, investigations and analysis which is properly documented but has minor short comings; for example the data is old, some documentation is missing and reliance is placed on unconfirmed reports of some extrapolation.
C	**Uncertain** Data based on sound records, procedure, investigations and analysis which are incomplete or unsupported, or extrapolation from a limited sample for which grade A or B data is available.
D	**Very Uncertain** Data Based on unconfirmed verbal reports and/or cursory inspection and analysis.

Table 7.2: Data Confidence Assessment

Asset/Component	Confidence	Reason
Bridge	A	Well populated asset inventory data with no missing physical attribute information
Drainage	B	A large number of structural assets have no recorded material. There are also a few assets with missing dimension data
Feature	B	A large number of assets have no recorded construction date
Footpath	A	A few asset records are missing dimensional data
Intelligent Transport Systems	A	A few assets are missing recorded installation dates
Islands	B	A large number of records are missing a construction date and/or width
Minor Structures	B	A number of records are missing a material and/or construction date
Railing	B	A number of records are missing a material and/or installation date
Retaining Wall	B	A few records are missing a recorded length, average height, type or construction date
Surface Water Channel	A	A few assets are missing recorded construction dates
Sign	B	Most signs are missing a recorded installation date

Asset/Component	Confidence	Reason
Tactiles	B	A number of records are missing a construction date
Traffic Signals	B	There are a few missing makes and models for the cabinets, lanterns and poles
Streetlight (pole)	B	The pole height attribute is poorly populated and some are missing an installation date
Streetlight (bracket)	B	Attribute data well populated with some missing installation dates
Streetlight (bracket)	B	Attribute data well populated with some missing installation dates and a few missing makes/models
Surfacing	A	Well populated attribute data. Only a few treatment lengths missing a top surface record
Basecourse	B	Data based on typical cross sections based on the overall pavement depth
Sub-base	B	Data based on typical cross sections based on the overall pavement depth
Formation	C	Very little data. Valuation based on a standard unit rate across the network
Car Parks	C	Top surfacing data well populated, however, very little pavement layer data which has been assumed

9 Recommendations

Specific recommendation relating to each asset type are detailed in sections 12 to 30. In addition to these the following overarching recommendations are made to improve the quality of future valuations:

- Where asset data is missing, it is recommended to gather the information and populate it in RAMM. For example construction dates, bridge deck data, asset types and dimensions.
- It is recommended to complete a cost analysis of road projects to enable updating of AVM with recent unit rates.
- Review asset life cycles for all assets to ensure sufficient depreciation is calculated for their timely replacement.
- Condition data to be used where available to modify the RUL

10 Restrictions

The valuation is limited by the disclosures listed below which include:

- This valuation is for HCC financial reporting purposes only and is not for any third parties.
- The valuation assessment relies upon data prepared and entered into RAMM by HCC staff and management and its outside contractors for the valuation. Beca do not guarantee or otherwise warrant the lengths, areas, materials, condition, performance and age of any of the assets nor the achievability of projections of future lives, the estimated cost of replacement or the suitability of the existing assets for their purpose.
- The projections of remaining lives used in the valuation are inherently uncertain because they are predictions of future circumstances, which cannot be assured. Actual results may vary from the projections and these variations may be significantly more or less favourable than assumed.
- Beca have reviewed the data and the rationale of the underlying assumptions on which the valuation is based. However, these assumptions are ultimately the responsibility of HCC. Whilst Beca have taken due care in our enquiries; neither Beca nor any of its directors or staff takes any responsibility for errors or omissions contained in this information.
- The valuation report should not be reproduced or used for any purpose other than outlined without our prior written permission in each instance.
- Beca do not assume any responsibility or liability for losses to HCC, rate payers or to any other parties as a result of the circulation, publication, reproduction or use of our report contrary to the provisions of this paragraph. In any event, our total liability for any reasons whatsoever is limited to five times our fee for this assignment.
- Beca reserve the right, but not the obligation, to review all calculations included or referred to in this report and, if Beca consider it necessary, to revise our opinion in the light of any information existing at the valuation date which becomes known to us after the date of this report.
- In preparing this report Beca has not audited any financial statements, management accounts, engineering or other records of the HCC.
- This valuation report is prepared only for the purposes referred herein and will not necessarily be appropriate for assessing the value of the assets of the HCC for any other purposes or at any point in time other than the date of this valuation

11 Declaration

Beca is an engineering consulting entity with a long history undertaking infrastructure valuations for financial reporting and insurance purposes.

Beca is aware this document will be relied on by HCC for the purposes of financial reporting and that the report shall be used by auditors relying on our knowledge of infrastructure valuations.

Information reliance is subject to the comments relating to the component assumptions and using manual assessments where insufficient data attributes renders the use of AVM unreliable e.g. the unreliable lengths method used to value traffic islands. Further to this Beca are not aware of any reason HCC should not place reliance in the information and values provided within the report.

Beca confirm that the valuation has been performed independently of HCC and without bias.

HCC supplied data on costing, structure and construction dates of the assets are assumed to be reliable. HCC and suppliers have provided specialist advice on remaining lives and replacement costs for similar roading assets where known. Where costs have been assumed, they have been checked by Beca.

Beca confirm that this valuation has been completed by employed persons sufficiently experienced to conduct a valuation of this nature.

12 Bridges

12.1 Data Integrity

Bridges in RAMM are multi-componentised assets. The two components considered for valuation are the deck and culvert components.

The deck component is just one of many components of a structural bridge. For simplicity, the deck component is used to represent the entire structural bridge. There are 30 decks equalling 1,735m.

If the waterway area under any roadway culvert exceeds 3.4m^2 then that culvert is classified as a bridge. All such culverts are tagged as bridges (yes or no) and are located in the RAMM drainage table for ease of identification. There are 24 bridge culverts equalling 969m drainage length.

For the valuation, all bridges are recognised as individual units by considering various attributes. There were no missing attributes noted that should affect a valuation for both the bridge types.

12.2 Looking at Condition

Bridges are condition rated however this information has yet to be translated into reliable condition scores that can be used to modify RUL. Minimum RUL is set at 2 years.

All bridges had a construction date recorded but have been assigned a default construction date of half the life cycle as the RAMM field requires one. The base life of 150 years has been adopted as per the 2010 and 2013 valuations for structural bridges. For bridge culverts the base life has been based on the expected life of its material; Armco (bolted galvanised steel arc plates) at 40 years and concrete at 80 years as per the 2013 valuation.

As there is no condition data RUL is based on the age and total useful life.

12.3 Valuing Individual Assets

As all 54 bridges have been individually valued and a full list has been provided electronically, no attempt has been made to include a full list for this report. The table below provides a summary.

Table 12.1: Bridge Base Lives and Total Replacement Costs by Type

Bridge Design Type	Base Life Yrs	Unit	Number	Total RC Value ($)
Bridge – Structural Steel	150	Each	6	21,799,283
Bridge – Structural Concrete	150	Each	24	58,535,498
Bridge - Culvert Concrete	80	Each	18	7,862,579
Bridge - Culvert Armco/Steel	40	Each	6	4,375,444

An overhead allowance of 12.5% was applied. All bridges were given a residual value of $1.

12.4 Recommendations

The following recommendations are made for this asset type:

- Recording a condition against each bridge in RAMM should be considered based on the bridge inspection reports. This could then be used to modify RUL.

13 Drainage

13.1 Data Integrity

There are 13,068 drainage assets in the RAMM drainage table. For valuation purposes, the assets are divided into linear and structural asset with rolled-up basic types as shown in the tables below.

Table 13.1: Summary of Linear Assets (m)

Basic Type	RAMM Data Rows	Missing Attributes
ALL CULVERTS	566	52
SLOT CHANNELS	70	62
SOAK TRENCH	4	3
SUBSOIL DRAIN	369	0
TOTALS	**1,009**	**117**

Missing attributes for these assets include construction date, length, diameter/height and material.

Drainage culverts that have been classified as bridges are excluded.

Table 13.2: Summary of Structural Assets (Each)

Basic Type	RAMM Data Rows	Missing Attributes
CHAMBER	18	14
GARDEN	22	22
MANHOLE	322	113
SUMP/CATCHPIT	11,648	9,479
TANK	49	0
TOTALS	**12,059**	**9,628**

Missing attributes for these assets include construction date and material.

Chamber includes drop chambers, soak pits and other. Sump/Catchpit includes Cast Iron Grates, SE with Grate, Double SE Grate and Web Grate Back Entry structures as well as all sump types and catchpits. Garden is a Rain Garden and Tank is an Atlantis Matrix Tank.

13.2 Assumptions

Only 159 drainage assets have no recorded construction date. A default construction date of half the life has been assigned.

Of the above 62 missing data attributes for slot channels, 30 are a missing length, which is an essential lineal dimension, these have been assumed to be on average 10m in length and are treated as a unit.

The high missing attribute count noted is mostly due to the missing material, which has been assumed as concrete.

Only manholes located on Arthur Porter Rotary(Midblock) and Resolution Drive Northbound and all except scruffy dome types have been included in the valuation. The remaining manholes are excluded as they have been accounted for elsewhere.

13.3 Looking at Condition

There is no condition data and therefore RUL is based on the age and total useful life.

As RUL cannot be adjusted due to condition, a minimum RUL of 2 years was set for the drainage assets approaching the end of their total useful life.

13.4 Valuing Individual Assets

13.4.1 Standard Replacement Costs

Replacement costs for all drainage assets are based on the 2013 rates, cost escalated by 3% to meet 2016 values.

The costs for the sumps include the cost of placing a 4.5m long, 225mm diameter lead to the storm water system. The unit rates used in the valuation are given in the table below.

Table 13.3: Drainage Replacement Cost Unit Rates

Basic Item	Description	Unit	Rate ($)
All Culverts	225 mm diameter RRJ Concrete	m	330.88
All Culverts	300 mm diameter RRJ Concrete	m	342.19
All Culverts	375 mm diameter RRJ Concrete	m	348.92
All Culverts	450 mm diameter RRJ Concrete	m	398.23
All Culverts	525 mm diameter RRJ Concrete	m	552.86
All Culverts	600 mm diameter RRJ Concrete	m	642.28
All Culverts	750 mm diameter RRJ Concrete	m	824.02
All Culverts	900 mm diameter RRJ Concrete	m	1005.75
All Culverts	1200 mm diameter RRJ Concrete	m	1369.24
All Culverts	1500 mm diameter RRJ Concrete	m	1734.49
All Culverts	1650 mm diameter RRJ Concrete	m	1916.23
All Culverts	1800 mm diameter RRJ Concrete	m	2097.98
All Culverts	2100 mm diameter RRJ Concrete	m	2537.34
Slot Channels	Slot Channel with Grate	M	200.85
Slot Channels	Slot Channel with Grate (10m unit)	each	2008.48
Subsoil Drain	Novaflow/stripdrain	m	27.07
Chamber	Drop Chamber, Soak Pits, Other	each	2008.48
Garden	Rain Garden	each	2148.37
Manhole	Standard Manhole 1500dia.	each	3762.34
Manhole	Manhole Scruffy Dome	each	3762.34
Sump/Catchpit	Single Catchpit	each	2008.48
Sump/Catchpit	Double Catchpit	each	3387.81
Sump/Catchpit	Single Sump/SE with Grate	each	2008.48
Sump/Catchpit	Double Sump/Double SE (grate)	each	3387.81
Sump/Catchpit	Single Sump with Filter Bag	each	3898.08
Sump/Catchpit	Double Sump with Filter Bag	each	5805.42
Sump/Catchpit	Web Grate Back Entry	each	2651.14
Tank	Atlantis Matrix Tank	each	4087.40

Asset life cycle was set at 70 years and for lineal assets, 60 years.

An overhead allowance of 8% was applied. All assets were given a residual value of $1.

13.5 Recommendations

The following recommendations are made for this asset type:

- The missing slot channel dimensions should be collected and recorded

14 Features

14.1 Data Integrity

There are 2,241 assets identified as Local Authority owned in the RAMM Features table with many of the features, although either fixed to the road or located with road reserve, are not road assets in the strictest sense (i.e. of benefit to the road user). Table 14.1 provides the quantity by type and which have been included in the valuation.

Table 14.1: Features Included in Valuation

Feature Type	Quantity	Included in Valuation
Bollard All Types	501	Yes
Bin All Types	575	Yes
Amenity/Public Information Sign	11	Yes
Phone Box	16	No
Other	14	No
Convex Mirror	1	No
Cycle Stand	162	Yes
Power Box	87	No
Signal Box	16	No
Mail Box	11	No
Seat Single/Double	131	Yes
Parking Meter	701	No
Toilets	5	No
Concrete Block	5	Yes
Plaque/Historic Location	5	No
Total	**2,241**	

Of the 1,374 valued assets, 626 have no construction date assigned. Apart from this, the data appears to have sufficient attributes for valuation.

14.2 Assumptions

The following assumptions have been made in valuing this asset group:

- 19 recycle bins have been valued as Bin – Vandal Proof Steel
- 17 timber bollards have been valued as Bollard – Steel/Aluminium
- Assets with no construction date are assumed to be half way through their expected life

14.3 Looking at Condition

As features are presently not condition rated, there are no condition factors to modify RUL. RUL is therefore based on the age and total useful life. A minimum RUL of 1 year is set for features.

14.4 Valuing Individual Assets

Replacement costs for Feature assets are based on the 2013 rates, cost escalated by 3% to meet 2016 values. The base life cycles and replacement costs used are shown in following table.

Amenity/Public Information Signs have been included in the valuation for the first time in 2016. The replacement cost unit rate for these was provided by HCC based on typical contract rates.

Table 14.2: Features Replacement Cost Unit Rates and Base Lives

Feature Type	Base Life Yrs	Unit	Rate ($)
Bin – Decorative Fernleaf	10	Each	1,353.42
Bin – Vandal Proof Steel	10	Each	721.00
Bollard – Steel/Aluminium	25	Each	675.68
Bollard – Steel Removable	25	Each	863.14
Concrete Block	100	Each	11,699.77
Cycle Stand	30	Each	581.95
Seat - Double/Single	20	Each	1,312.22
Amenity/Public Information Sign	20	Each	4,629.63

An overhead allowance of 8% was applied. All features were given a residual value of $1.

14.5 Recommendations

There are no recommendations for this asset type

15 Footpaths

15.1 Data Integrity

There are 9,247 footpath records in RAMM, equating to 1,870,968m^2. There is one record missing a length and width resulting in a zero m^2 area. As a result this has not valued. This record is not associated with a road (footpath id 10111).

15.2 Assumptions

The following assumptions have been made in valuing this asset group:

- The two records with no material record has been assumed as concrete
- Timber and slurry seal footpaths have been valued as asphalt

15.3 Looking at Condition

There is no recent condition data within RAMM that can be reliably used to modify the RUL. As a result RUL is based on the expected base life cycle less the asset age.

A minimum RUL of 2 years was set for all footpath types.

15.4 Valuing Individual Assets

15.4.1 Standard Replacement Costs

Replacement costs for footpath assets are based on the 2013 rates, cost escalated by 3% to meet 2016 values and the asphalt and concrete rates concur with the recent contract rates as supplied.

The base life cycles have been reviewed as part of the 2016 valuation. Recent renewal rates average at about 3.5% of asphalt and 1% of concrete footpaths annually for the last 2.5 years. This equates to an average life of approximately 28 years for AC and 100 years for concrete. A base life of 100 years for a concrete footpath is expected to be too long and not reflective of the longer term renewal need as the network ages. As a result the base life for concrete has been updated from 50 years to 75 years which is anticipated to better reflect the long term renewal cycle.

The base life cycles and replacement costs used are shown in following table.

Table 15.1: Footpaths Replacement Cost Unit Rates and Base Lives

Footpath Surface Material	Base Life Yrs	Unit	Rate ($)
Asphalt	25	m^2	89.52
Concrete	75	m^2	126.32
Interlocking Blocks	60	m^2	144.72
Metal	50	m^2	20.39
Timber (1 record)	25	m^2	89.52

An overhead allowance of 8% was applied to these costs. All footpaths were given a residual value of $1.

15.5 Recommendations

It is recommended the footpath not associated with a road is reviewed and updated as necessary.

16 Intelligent Transport Systems

16.1 Data Integrity

There are 174 Intelligent Transport Systems (ITS) in the RAMM as shown in the table below.

Table 16.1: Summary of ITS Assets by Type

ITS Type	Quantity
40k Speed limit	109
Activation Button	2
Advance Cycle Warning	1
Cycle Detection Loops	13
Cycle Symbol	1
Electronic Speed Sign	1
Large Parking Space Sign	4
School Sign Controller	38
Small Parking Space Sign	5
Total	**174**

There is one that does not have an installation date, 53 with no solar panel data (yes or no), 83 with no wattage data.

16.2 Assumptions

The ITS asset with no installation date is located in Anglesea Underground Carpark. This asset has been assigned a default date of 1/11/2010 to relate with the installation dates of the two ITS assets also installed on Anglesea Street. This default date was entered into AVM against all ITS assets.

16.3 Looking at Condition

Although each ITS have condition ratings (50 Unknown) there is insufficient condition data available at this time to modify RUL. RUL is therefore based on the age and total useful life.

16.4 Valuing Individual Assets

HCC provided unit rates based on recent contracts and advise that these ITS devices are expected to last 20 to 30 years. It is considered these ITS devices will realise obsolescence before failing on performance or condition and will decrease in MEA replacement value over time. Accordingly they have been assigned a maximum 20 year life. A minimum RUL of 2 years was set for these assets.

The replacement costs used are shown in following table. The overhead allowance applied is 8%. A residual value of $1 was applied to each asset.

Table 16.2: ITS Assets Replacement Cost Unit Rates

ITS Type	Unit	Rate $
40k Speed Limit (2 VMS per School location)	Each	15,180.00
Cycle Detection Loops	Each	257.50
Cycle Symbol	Each	10,300.00
Electronic Speed Sign	Each	35,741.00
Parking Space Sign Large (Gantry)	Each	56,856.00
Parking Space Sign Small	Each	9,476.00
School Sign Controller	Each	525.30
Activation Button	Each	525.30
Advance Cycle Warning	Each	10,300.00

16.5 Recommendations

There are no recommendations proposed for this asset type.

17 Islands

17.1 Data Integrity

Traffic Islands are in-carriageway structures used for traffic guidance and road safety reasons.

The accuracy of the asset valuation process on the traffic islands is dependent on the accuracy of the data in the islands tables in RAMM. Island length calculated for the start and end displacement is not sufficient to calculate a footprint area therefore a valuation based on length is not reliable.

Of the 1,291 islands recorded in RAMM, 364 do not have a width recorded. Width is a start but not always helpful as many of the structure have odd shapes. There is a “landscaped area” field in the islands table that, if populated, gives the required footprint area directly. HCC has only 177 of these fields populated.

Table 17.1: Summary of Islands by Type

Type	Count	Valued
Judderbar	7	No
Kerb Extension	179	Yes
Median	202	Yes
Other	21	Yes
Pedestrian Refuge	67	Yes
Raised Platform	23	Yes
Rotary	42	Yes
Special Island Infilled	26	Yes
Speed Cushion	148	No
Speed Hump	46	No
Splitter	168	Yes
Throat	362	Yes
Total	**1,291**	

Kerb Extensions were valued in 2013 and have been included in 2016. These are kerbed structures used to restrict carriageway width for either traffic calming purposes or as a pedestrian crossing component and not true islands. However, kerb extensions were valued as islands at this time for HCC.

Raised platforms have been included in the 2016 valuation for the first time. Although they are not a true island.

Also judderbars, speed cushions and speed humps are traffic calming assets, not islands. As such they have not been valued at this time. Beca understands HCC is currently populating a dedicated “Traffic Calming” table for these assets.

17.2 Assumptions

There are 241 islands with no construction date recorded which were assigned a default construction date of half the life cycle in 2013. These dates have been retained for this valuation.

17.3 Looking at Condition

Islands are presently not condition rated. There is no condition data and therefore RUL was based on the age and total useful life.

As RUL cannot be adjusted due to condition, a minimum RUL of 1 year was set for islands approaching the end of their total useful life.

17.4 Valuing Individual Assets

17.4.1 Standard Replacement Costs

Replacement costs for island assets are based on the 2013 rates, cost escalated by 3% to meet 2016 values. The base life cycles and replacement costs used are shown in following table.

A replacement cost rate for the raised platforms was provided by HCC. This rate is an average rate built up from recent contract rates.

Table 17.2: Islands Replacement Cost Unit Rates and Base Lives

Island Type	Description	Base Life	Unit	Rate ($)
Median Conc	Concrete Median island	35	m	1,089.74
Median Land	Garden/Grass Median island	35	m	432.60
Median Pave	Block/Paver Median island	35	m	416.12
Other Concrete	Concrete Other island	35	m	2,016.74
Other Landscaped	Garden/Grass Other island	35	m	990.86
Other Paved	Block/Pave Other Island	35	m	416.12
Rotary Conc	Concrete Rotary	35	m	5,724.74
Rotary Land	Garden/Grass Rotary island	35	m	2,813.96
Rotary Pave	Block/Paver Rotary island	35	m	2,184.63
Splitter Conc	Concrete Splitter island	35	m	1,089.74
Splitter Land	Garden/Grass Splitter island	35	m	433.04
Splitter Pave	Block/Paver Splitter island	35	m	416.12
Throat Concrete	Concrete Throat island	35	m	925.97
Throat Landscaped	Garden/Grass Throat island	35	m	455.26
Throat Paved	Block/Paver Throat island	35	m	353.29
Special Island Infilled	Concrete Special Island	35	m	2,016.74
Kerb Extension	Kerb Extension	35	Each	2,060.00
Pedestrian Refuge	Pedestrian Refuge	35	Each	3,914.00
Raised Platform - Printed	Raised Platform with a printed surface	20	Each	15,000.00
Raised Platform – Paved	Raised Platform with a paved/block surface	60	Each	15,000.00

Until all landscape area fields in this table are populated, or another method to define footprint area is devised, islands are valued based on length. As discussed above, this method is not reliable.

An overhead allowance of 10% was applied. All islands were given a residual value of $1.

17.5 Recommendation

The following recommendations are made for this asset type:

- Capturing and recording the area of each island would improve the quality of the valuation result

18 Minor Structure

18.1 Data Integrity

There are 402 minor structure assets recorded in RAMM as shown in the table below. Of these only the Access Stairs, Bus/Tram Shelters, Fences, Sign and Signal Supports and Underpasses are relevant assets included in the valuation at this time.

Table 18.1: Summary of Minor Structure Assets by Type

Minor Structure Type	No. of Records	Valued
Access Stairs	1	Yes
Bus/Tram Shelter	171	Yes
Fence	99	Yes
Monument/Memorial	1	No
Public Art	1	No
Sign and Signal Support	45	Yes
Tree Pit	53	No
Underpass	31	Yes
Total	**402**	

53 of the 347 minor structures included in the valuation have no construction date. There are 68 records with a missing material attribute. 15 of these are fences and have the material recorded in the sub-type. The remainder are bus/tram shelters and all but three can be determined from the sub-type. The remaining three have an unknown sub-type.

All 171 Bus/Tram Shelters are valued as units using the subtype attribute for an each assessment. The 31 underpasses are valued similarly as units using length, width and clearance dimensions as a costing basis for each unit. One underpass (on Burbush Rd) is missing the length. All 59 fences have a length recorded.

18.2 Assumptions

Minor structures that have no construction date recorded have been assigned a default construction date relative to the other dates for like assets. Bus/Tram Shelters and Fences have been assigned 30/06/2000; underpasses (relatively newer) 30/06/2009.

The three bus/tram shelters with no recorded sub-type have been assumed to be type Black Mini.

18.3 Looking at Condition

Apart from underpasses, minor structures are presently not condition rated. As there is insufficient condition data available at this time to modify RUL, RUL is based on the age and total useful life.

Minimum RUL is set at 2 years.

18.4 Valuing Individual Assets

The unit rates used in the valuation are given in the table below. As there are various subtypes that have associated costs, the low and high rates are shown. Full rates are provided electronically.

The Pukete Stairway and Sign and Signal Support assets have been included in the 2016 for the first time. Replacement cost unit rates for these were provided by HCC based on typical recent contract rates.

Table 18.2: Minor Structures Replacement Cost Unit Rates and Base Lives

Asset	Description	Unit	Life Cycle	Rate $ (Low)	Rate $ (High)	Overhead %age
Bus/Tram Shelter	Various subtypes	Each	20	4,120	46,350	10
Fence	Fence	m	20	90.64	90.64	8
Underpasses	Various Units	Each	80	53,457	975,060	12.5
Access Stairs	Pukete Stairway	Each	50	103,625	103,625	10
Sign and Signal Support	Various subtypes	Each	20	9,091	9,091	10

Overhead allowances are as shown above. A residual value of $1 was applied to each structure.

18.5 Recommendations

The following recommendations are made for this asset type:

- The missing material attributes should be collected and recorded

19 Railing

19.1 Data Integrity

There are 660 railing records in RAMM, equating to 17,148m.

All records have a recorded construction date, however, 237 records have no railing material attribute. There were no other issues with the other attribute data in RAMM. Railing types are shown below:

Table 19.1: Summary of Railings by Type

Railing Type	No Records	Railing Length (m)
Cycle Handrail	255	499
Guard rail	79	5,019
Hand rail	115	293
New Jersey Barrier	4	490
Other	2	56
Pedestrian Barrier	64	652
Pool type fence	3	244
Sight rail	25	1,140
Steel Tube and Post barrier	1	78
THRIE Beam Steel Guard rail	11	486
Timber	1	1
TRIC Block Concrete barrier	5	190
W Section Guard rail	95	8,000
Total	**660**	**17,148**

19.2 Assumptions

The railings in RAMM that do not have an installation date recorded were assigned a default construction date of half the theoretical life cycle in 2013. This has been retained for this valuation.

19.3 Looking at Condition

As railings are presently not condition rated, there are no condition factors available to modify RUL. RUL is therefore based on the age and total useful life. A minimum remaining life of 1 year was applied to all assets.

19.4 Valuing Individual Assets

Replacement costs for railing assets are based on the 2013 rates, cost escalated by 3% to meet 2016 values. The base life cycles and replacement costs used are shown in the following table.

Table 19.2: Railings Replacement Cost Unit Rates and Base Lives

SRC Description	Base Life	Rate
Guardrail W Section (ARMCO)	25	$135.96
Guardrail Steel/Wood	25	$135.96
Guardrail Post & Netting/Timber	20	$19.57
Railing Hand Rail Steel/Galv	25	$94.76
Railing Other/Pool Fence	20	$94.76

SRC Description	Base Life	Rate
Railing Timber	20	$19.57
Sight Rail Wood	20	$191.58
Barriers All Types	20	$191.58

An overhead allowance of 8% was applied. All features were given a residual value of $1.

19.5 Recommendations

That are no recommendations proposed for this asset type.

20 Retaining Wall

20.1 Data Integrity

There are 169 retaining wall records in RAMM, equating to a total wall area of 21,508m^2.

The below table summarises the quantity by retaining wall type.

All records have a length and average height recorded. Only two records are missing construction dates. Several records had no wall width; however, width is not an attribute required for this valuation.

There were no other issues with other attribute data in RAMM. Retaining Wall types are shown below:

Table 20.1: Summary of Retaining Wall Quantity by Type

Wall Type	No Records	Area (m^2)
Block Wall	2	120
Cantilever	4	796
Gravity	40	5,215
Minicrib	75	10,518
Piled	6	1578
Post and Rail	34	2,177
Rock	2	767
Sheet Pile	3	231
Single Crib	2	101
Timber Edging	1	5
Total	**169**	**21,508**

20.2 Assumptions

The retaining walls with no constructed date recorded were assumed to be half way through their expected life, with the exception of the one on Wairere Drive Ring Road Northbound which was given an estimated date of 24/05/2014 based on local knowledge.

20.3 Looking at Condition

As retaining walls are not condition rated, there are no condition factors available to affect the RUL. RUL is therefore based on the age and total useful life. Minimum RUL is set at 2 years.

20.4 Valuing Individual Assets

For MEA purposes, retaining walls are optimised to a typical crib or block structure replacement and have therefore been assigned the same construction rate, based on 2013 rates, cost escalated by 3% to meet 2016 values.

The base life cycles and replacement costs used are shown in following table.

Table 20.2: Retaining Wall Replacement Cost Unit Rates and Base Lives

Wall Type	Base Life Yrs	Unit	Rate ($)
Block Wall	100	m^2	397.58
Cantilever	100	m^2	397.58
Crib Wall	100	m^2	397.58
Gravity/Rock	100	m^2	397.58
Post & Rail	50	m^2	397.58
Sheet Pile/Piled	50	m^2	397.58

An overhead allowance of 8% was applied. All features were given a residual value of $1.

20.5 Recommendations

The following recommendations are made for this asset type:

- The missing length and average height dimensions should be validated and populated in the database
- The record missing a wall type should be populated

21 Signs

21.1 Data Integrity

There are 15,443 signs included in the valuation as shown in the following table.

Table 21.1: Signs Quantity by Type

Sign Type	No. of Records
Guide	385
Hazard Markings	490
Information General	47
Information Miscellaneous	844
Information Motorway	10
Information signs	3,097
Local Authority	3
Miscellaneous	19
Motorist Services	3
Permanent Warning	1,335
Regulatory General	6,030
Regulatory Heavy Vehicle	25
Regulatory Parking	3,017
Tourist	21
Unknown	73
Warning Miscellaneous	44
Total	**15,443**

There are 11,469 signs in RAMM that do not have an installation date recorded. There were others with no sign height and width dimensions. As signs are valued by type, the missing attributes were of no consequence to the valuation. There were no other issues with other attribute data in RAMM.

21.2 Assumptions

The signs with no constructed date recorded were assumed to be half way through their expected life in the 2013 valuation. These default installation dates have been retained for this valuation.

21.3 Looking at Condition

Signs are not condition rated because they are relatively low cost short life assets. Therefore there are no condition factors available to modify RUL, which is based on the age and total useful life.

As RUL cannot be modified to account for assessed condition, a minimum RUL of 1 year was set for signs approaching the end of their total useful life. This minimum was adopted because of the large percentage of signs that do not reach their total useful life due to damage and vandalism.

21.4 Valuing Individual Assets

Replacement costs for signs are based on the 2013 rates, cost escalated to by 3% to meet 2016 values. An allowance of 10% was added to these costs for overhead expenses.

Posts have not been included in the valuation as a separate component. As RAMM data includes a post count for each sign, that count has been used to increase the signage unit rate accordingly.

A sign can be expected to last 15 years or more, if not damaged and kept maintained. Therefore for the purposes of this assignment, a life cycle of 15 years was adopted for the valuation.

A residual value of $1 was applied to each sign.

The unit rates used in the valuation are given in the following table.

Table 21.2: Signs Replacement Cost Unit Rates

Description	Sign Purpose	Rate/ sign 0 Post	Rate/ sign 1 Post	Rate/ sign 2 Post
G	Guide signs	$328.36	$458.02	$587.88
H01-H04	Chevron Boards	$75.03	$201.91	$331.77
H01-H04+	Chevron Boards with speed advisory	$115.72	$245.58	$375.45
H07	Bridge End Marker	$32.86		
I	Information signs	$206.07	$335.93	$465.80
MS	Motorist Service signs		$213.83	
PW00	Permanent Warning signs	$115.10	$236.44	
PW14	Railway Crossing sign	$131.12		
RG00	Regulatory General signs	$93.05	$227.34	
RG05	Stop signs	$132.69	$262.56	
RG06	Give Way signs	$196.70	$326.55	
RG06R	Roundabout Give Way signs	$161.77	$291.63	
RG07 – RG09	No Left/Right Turn and No Entry signs	$61.80	$193.72	
RG10 – RG15	Turn Left/Right, One Way and No U Turn	$92.09	$232.30	
RG17.1	Keep Left/Right	$75.33	$205.61	
RG24 – RG25	Pedestrian/Cycle signs	$34.75	$164.51	
RG26 – RG27	Cycle Route signs	$182.02	$311.88	
RG34.1	Keep Left/Right (2 discs)		$165.74	
RH01-RH04	Heavy Vehicle Restriction signs		$248.41	
RH06	Bridge Axle Limit signs		$180.63	
RP00	Restricted Parking signs	$27.50	$157.02	
RP01	No Stopping signs	$21.48	$151.34	
RP5.1	Bus Stop signs	$38.54	$168.41	
RP6.1	Taxi Stand signs	$51.56	$181.42	
RP10	Disabled Parking signs	$21.48	$151.34	
SNP	Street Name Plates	$132.69	$262.56	$392.42
Tourist Signs	Tourist signs	$82.66	$212.52	$344.61
WM Signs	Warning Miscellaneous	$171.90	$301.76	

21.5 Recommendations

The following recommendations are made for this asset type:

- Investigate/analyse likely installed dates, and populate the RAMM database

22 Street Light

22.1 Data Integrity

The street lights are separated in RAMM to Pole, Bracket and Light components.

There are 12,515 street light records attributed to a Local Authority owner. There are 24 additional records presently attributed to a Local Authority - Metered Lighting owner, which AVM cannot value. These have been updated to Local Authority for undertaking the valuation and will be subsequently changed back.

Poles

Pole purposes include belisha beacon, feature lighting, lighting units and under verandah lighting and there are other purposes (e.g. electrical distribution, telephone aerial) that are not pertinent to this valuation. This valuation focuses on all pertinent pole purposes attributed to a Local Authority Owner (12,539 records). Feature and under verandah lighting are “no pole” “amenity light types.

Pole height is a useful attribute in determining a pole value. However, of the 12,539 Local Authority lighting unit poles 66% have no height recorded and therefore AVM cannot use this attribute reliably. Therefore poles are valued this time by assumed road hierarchy pole height attributes as below:

Table 22.1: Distribution of Streetlight Poles by Hierarchy

ROAD HIERACHY	Count	Assumed Pole Heights (m)
COLLECTOR	1,993	Between 8 and 10 metres
LOCAL	7,112	Between 8 and 10 metres
MAJOR ARTERIAL	1,352	Between 11 and 12 metres
MINOR ARTERIAL	1,753	Between 10 and 11 metres
SERVICE LANE	136	Less than 8 metres
STATE HIGHWAY	66	Between 11 and 12 metres
WALK/CYCLE PATH	114	Less than 8 metres
BLANK HIERARCHY	15	AVM cannot process these
TOTAL	**12,539**	

Belisha beacon pole heights are assumed to be less than 8 metres, regardless of road hierarchy.

Logical interconnections exist between the pole purpose, pole owner, pole material and pole shape fields. Some of these interconnections are illogical, such as Telecom and the Power Board listed as owning steel octagonal shaped street lighting units where the entities do not provide street lighting. Beca continues to recommend that HCC review these four fields and amend the data as appropriate.

Apart from Winchester, for lighting units, the data in the Pole Model field mirrors data in Use Height field and includes , “REFU”, RFGE” and “PEDX” descriptions. Beca recommends that HCC amend this pole model field and repopulate it with contractor recognised pole models, including Kendelier, Heritage, Oclyte and Spunlite. These reviews/amendments will improve future valuation outputs.

Brackets

Brackets are light support units that are fixed either to a pole or a structure (e.g. underpass) and all belong to the light owner. Pertaining to Local Authority there are 17,029 bracket records in RAMM and 756 of these are identified as "no bracket" types (a pole top light mount or amenity light types).

A check of HCC contract records show modular poles, particularly Kendelier, Oclyte and Heritage, include the outreach (listed in RAMM as a bracket). For costing consistency it is assumed that 25% of any pole cost is attributed to its "bracket component". Other attribute data is found to be reliable.

Lights

There are 17,215 light records attributed to Local Authority in RAMM.

22.2 Assumptions

For 12,539 Local Authority lighting units, 11,188 (89%) poles had an installation date recorded. Accordingly those that have no construction have been assigned a default construction date of half the life cycle. The base life of 25 years for all components has been adopted as per the 2013 valuation with the exception of LED lights which have a base life of 50 years. It is assumed that these LED lights will be taken down and reinstalled as the pole and/or bracket are replaced.

22.3 Looking at Condition

Define Condition Categories (Standards)

Lighting components are condition rated and most pole and light assets have a condition recorded in RAMM during 2014 and 2015. This data has been used to modify the RUL.

Expected Condition

The expected condition of the street light assets was based on a logarithmic curve as set out in the table below.

Table 22.2: Expected Street Light Condition

% Life Expired	Expected Condition
0 – 30	Excellent
30 – 60	Good
60 – 78	Average
78 – 90	Poor
90 - 100	Very Poor

Effect of Condition on Remaining Useful Life

The RUL was estimated from the life cycle and construction date adjusted for the actual measured condition of the street light components compared with the expected condition. The effect of actual condition on the remaining useful life was then applied as shown in the table below.

A minimum RUL of 2 years was set for street light component assets approaching the end of their total useful life.

Table 22.3: Effect of Condition on RUL of Street Lights

		Actual Condition				
		Excellent	Good	Average	Poor	Very Poor
Expected Condition	Excellent	0	-10%	-20%	-30%	-40%
	Good	+10%	0	-10%	-20%	-30%
	Average	+20%	+10%	0	-10%	-20%
	Poor	+30%	+20%	+10%	0	-10%
	Very Poor	+40%	+30%	+20%	+10%	0

22.4 Valuing Individual Assets

Replacement costs for street lights are based on the 2013 rates, cost escalated by 3% to meet 2016 values. The base life cycles and replacement costs used are shown in following table.

Table 22.4: Streetlight Replacement Cost Unit Rates and Base Lives

Component	Life Cycle	Rate $
Bracket Collector/Local	25	328.83
Bracket Service Lane and Walk/Cycle Path	25	298.44
Bracket Major Arterial/State Highway	25	494.14
Bracket Pole Minor Arterial	25	456.03
Light 000 – 050 Watts	25	231.78
Light 050 – 070 Watts	25	231.78
Light 070 – 150 Watts	25	447.12
Light 150 – 400 Watts	25	994.98
Light 000 – 050 Watts LED	50	525.00
Light 050 – 150 Watts LED	50	603.70
Pole Collector/Local	25	986.48
Pole Service Lane and Walk/Cycle Path	25	895.33
Pole Major Arterial/State Highway	25	1,482.43
Pole Minor Arterial	25	1,368.10

The above rates were applied (Yes or No) in accordance with the following Boolean algorithm.

Table 22.5: Streetlight Valuation Approach

HCC POLE PURPOSE	Bracket	Light	Pole
Belisha Beacon	Yes	Yes	Yes
Electrical distribution	Yes	Yes	No
Feature Lighting	No	Yes	No
Lighting unit	Yes	Yes	Yes
Under Verandah Lighting	No	Yes	No
Unknown	Yes	Yes	Yes

The Boolean formula used for all pole purpose component records is [If (“YES”, Rate $, Nil Cost)]. As AVM technical issues arose affecting the outputs, this valuation was carried out manually.

An overhead allowance of 8% was applied. All components were given a residual value of $1.

22.5 Recommendations

There are no recommendations made for this asset type.

23 Surface Water Channels

23.1 Data Integrity

There are 10,297 surface water channel records in RAMM totalling 1,167,113m.

There are no records missing a recorded length.

23.2 Assumptions

There are 29 channel records with no construction date recorded which have been given a default construction date of half their theoretical life.

23.3 Looking at Condition

Define Condition Categories (Standards)

An indication of the general condition was calculated from the condition rating data using the faults “broken channel” and “uphill channel”. This was from the latest rating of surface water channels undertaken in as part of the 2015 and 2016 road rating surveys. Each surfaced surface water channel was given a condition rating based on the percentage of the channel length that was either broken or uphill.

The surface water channel condition categories were defined as shown in the table below.

Table 23.1: Surface Water Channel Condition Categories

Condition Category	% of Length Broken/Uphill
Excellent	< 5
Good	>= 5 and < 10
Average	>= 10 and < 20
Poor	>= 20 and < 30
Very Poor	>= 30
Unknown	Catch all

All channels without condition information have been assigned a condition of “unknown”.

Expected Condition

The expected condition of the surface water channels was based on a logarithmic curve as set out in the table below.

Table 23.2: Expected Surface Water Channel Condition

% Life Expired	Expected Condition
0 – 30	Excellent
30 – 60	Good
60 – 78	Average
78 – 90	Poor
90 - 100	Very Poor

Effect of Condition on Remaining Useful Life

The RUL was estimated from the life cycle and construction date adjusted for the actual measured condition of the channel compared with the expected condition. The effect of actual condition on the remaining useful life was then applied as shown in the table below.

A minimum RUL of 2 years was set for surface water channel assets approaching the end of their total useful life.

Table 34.3: Effect of Condition on RUL of Surface Water Channels

		Actual Condition				
		Excellent	Good	Average	Poor	Very Poor
Expected Condition	Excellent	0	-10%	-20%	-30%	-40%
	Good	+10%	0	-10%	-20%	-30%
	Average	+20%	+10%	0	-10%	-20%
	Poor	+30%	+20%	+10%	0	-10%
	Very Poor	+40%	+30%	+20%	+10%	0

23.4 Valuing Individual Assets

Replacement costs for surface water channels are based on the 2013 rates, cost escalated by 3% to meet 2016 values. Costs include removal of existing channel and the installation of new channel.

The replacement unit cost rates and overhead used in the valuation are given in the table below.

Table 23.4: SWC Replacement Cost Unit Rates and Base Lives

Surface Water Channel Type	Unit	Life Cycle (Yrs)	Rate ($)
Concrete Edge Beam	m	60	57.29
Depressed Kerb & Channel	m	70	57.68
Dished Channel (Asphalt) / (Sealed)	m	70	93.73
Dished Channel (Concrete) / (Half Pipe)	m	70	93.73
Heritage Pre-Cast Kerb & Channel	m	70	74.98
Kerb & Channel (Concrete) / Other Type	m	70	57.68
Kerb & Dished Channel (Concrete)	m	70	57.68
Kerb Only (Concrete)	m	70	57.68
Mountable Kerb & Channel (Concrete)	m	70	57.68
Mountable Kerb Only (Concrete)	m	70	57.68
Slot Channel (Concrete)	m	70	93.73
Stormwater Soakage Trench	m	60	87.55
Swale Drains	m	70	115.36
Heavy Duty Reinforced Kerb & Channel	m	70	57.68
Kassel Kerb (Bus Stop Kerb)	m	70	57.68
Earth Surface Water Channel Deep / Shallow	m	Indefinite	0.00

Asphalt, sealed dish channels and slot channels assigned modern equivalent assets are concrete dish channels.

Kerb and dish channels, depressed kerb and channels and other type channels have been valued as concrete kerb and channel. Heritage pre-cast channel has been assigned a 30% over-rate to standard allow for stone recovery and treatment needed to prepare them for reuse.

Swale Drains were included from 2013. The linear rate was assessed from various items to construct a typical river stone lined three metre wide drain over a 200mm GAP40 bed.

An overhead allowance of 8% was applied.   All components were given a residual value of $1.

23.5 Recommendations

There are no recommendations proposed for this asset type.

24 Tactiles

24.1 Data Integrity

Tactiles (aka Tactile Ground Surface Indicators) is a system of textured ground surface indicators found on footpaths, stairs and train station platforms to assist pedestrians who are blind or visually impaired. Tactile warnings provide a distinctive surface pattern of truncated domes detectable by long cane or underfoot which are used to alert people with visual impairment of their approach to streets and hazardous drop-offs.

There are 618 tactiles records in RAMM. The location data is good and HCC have updated the inventory data such that all locations have a tactiles quantity. Tactiles quantities range between 5 and 368 tiles per locations.

The earliest tactiles installation date in RAMM is 30/08/2007.

All tactile records have a recorded installation date.

24.2 Assumptions

Material type is not recorded therefore all tactiles have been valued based on the same base life.

24.3 Looking at Condition

There is no reliable available condition in RAMM associated with the tactiles that could be used to affect RUL. RUL is therefore based on the age and total useful life. Minimum RUL is set at 1 year. A lifecycle of 5 years is set, as tactiles are constantly abraded.

24.4 Valuing Individual Assets

The replacement costs for tactiles provided by HCC of $212.60 per m^2 cannot be used, as such, in AVM as there are no tactile area dimension attribute per location in RAMM available.

A rate of $19.00 per tactile pad measuring 300mm by 300mm was provided in 2013 as an alternative means. This rate has been indexed up by 3% to $19.57 per pad for use in the 2016 valuation.

An overhead allowance of 8% was applied. All tactiles locations were given a residual value of $1.

24.5 Recommendations

The following recommendations are made for this asset type:

- A material or type should be recorded to allow for better allocation of replacement cost unit rates and base lives
- The locations missing the quantity of tiles should be validated and recorded.

25 Traffic Signals

25.1 Data Integrity

Signals in RAMM are multi-componentised assets. The three components considered for valuation are the controller, pole, lantern and attachments. Minor components include detection loops, pedestrian boxes, cables, pressure pads, communications, logic boards and signal back boards to name but a few. There is no need to value these minor components as their costs can be integrated into the above.

Signal components do not have a grid-accessible table in RAMM. Instead they are componentised as part of an intersection, which is tagged whether it is controlled or not (yes or no). Signal data is then extracted by SQL to reveal component attributes. Data extracted revealed there are 78 signal controlled intersections recorded with asset owner of Local Authority (up from 65 in 2013) of varying pole number and lantern type configurations. There is one intersection, a pedestrian crossing on Discovery Drive, with no owner recorded.

All controller have a make recorded but 16 records are missing the model. All lanterns have a type recorded. 13 lanterns recorded with an asset owner of Local Authority have no recorded make. All traffic signal poles have the type recorded however are large proportion are missing the make. All attachments have the type recorded.

25.2 Assumptions

Six controllers, 544 lanterns and 347 pole and one attachment records have no recorded installation date. These were assigned a default construction date of half their expected life in the 2013 valuation. These dates have been retained in this valuation.

25.3 Looking at Condition

There is no reliable condition data within RAMM that could be used to modify remaining useful life. The remaining life has been calculated from the expected life less current age. All traffic signal assets were given a minimum remaining life of 1 year.

25.4 Valuing Individual Assets

Replacement costs for signals were provided by HCC for the 2016 valuation. The base life cycles and replacement costs used are shown in following table. The controller rate allows for all associated traffic detection equipment, loops, cables and comms with the exceptions of those valued as attachments. For MEA purposes, lantern aspects are optimised from Quartz Halogen and the other incandescent types to LED (light emitting diode) types.

Table 25.1: Traffic Signals Replacement Cost Unit Rates and Base Lives

Traffic Signal Component	Base Life Yrs	Unit	Rate ($)
Controller All Makes and Models	15	Each	19,557.45
Lantern 1 Aspect LED (MEA)	15	Each	515.00
Lantern 2 Aspect LED (MEA)	15	Each	597.71
Lantern 3 Aspect LED (MEA)	15	Each	1,248.23
Lantern 4 Aspect LED (MEA)	15	Each	1,349.64
Pole Standard (STD4, STD5, JUSP, JUSPA)	15	Each	692.01
Pole Mast Arm (MAST, JUM and OM)	15	Each	4,032.78
Pole Combination COMB)	15	Each	4,032.78
Pole Joint Use	15	Each	2,315.45

Traffic Signal Component	Base Life Yrs	Unit	Rate ($)
Pedestrian Infrared Sensor	15	Each	1,818.18
Traffic Control Camera	15	Each	4,975.45
Video Detection	15	Each	5,181.82
WiMAX Network Connection	15	Each	4,545.45

An overhead allowance of 10% was applied. All components were given a residual value of $1.

25.5 Recommendations

The following recommendations are made for this asset type:

- The missing make and/or models should be populated

26 Treatment Length (Basecourse Component)

26.1 Data Integrity

Most of the data stored in the pavement layer table was added to RAMM to assist dTIMS modelling in producing more accurate results.

There are 3,824 treatment length records attributed to Local Authority.

26.2 Assumptions

For the purpose of the asset valuation, the pavement has been divided into basecourse and subbase as follows:

- Pavement depth <175mm - basecourse depth = 75mm
- Pavement depth 175–350mm - basecourse depth = 120mm
- Pavement depth >350mm - basecourse depth = 150mm

There are 86 records that currently have no pavement total depth data. 8 of these have a pavement type of bridge and have been given a zero value. The remaining 78 have been assigned the average pavement depth for the network.

26.3 Looking at Condition

26.3.1 Define Condition Categories (Standards)

The basecourse is the top layer of the pavement that is subjected to deterioration. The condition of this layer can be characterised by the roughness (ride) on the pavement. Roughness is a measured characteristic with surveys conducted every two years.

Roughness is expressed as NAASRA counts/km and different levels of roughness can be accepted for the same condition category dependent upon the pavement use category of the pavement. There are seven pavement use categories dependent on various vehicles per day (vpd) loadings as below.

The basecourse condition categories vs. NAASRA were established as shown in the following table.

Table 26.1: Basecourse Condition Categories by Roughness Level

Category	Use 1 – <100 vpd	Use 2 – 100-500 vpd	Use 3 - 500-2000 vpd	Use 4 – 2000-4000 vpd	Use 5 – 4000-10000 vpd	Use 6 – 10000-20000 vpd	Use 7 - >20000 vpd
Excellent	< 70	< 70	< 70	< 70	< 70	< 70	< 70
Good	70 - 102	70 - 99	70 - 96	70 - 89	70 - 86	70 - 82	70 - 79
Average	103 - 136	100 - 129	97 - 122	90 - 109	87 - 102	83 - 99	80 - 92
Poor	137 - 169	130 - 159	123 - 149	110 - 129	103 - 119	100 - 109	93 - 99
Very Poor	>= 170	>= 160	>= 150	>= 130	>= 120	>= 110	>= 100

26.3.2 Expected Condition

The expected basecourse condition as used in the asset valuation is shown in the table below.

Table 26.2: Basecourse Expected Condition

% Life Expired	Expected Condition
0 – 30	Excellent
30 – 60	Good
60 – 78	Average
78 – 90	Poor
90 - 100	Very Poor

26.3.3 Effect of Condition on Remaining Useful Life

The RUL was estimated from the life cycle and construction date adjusted for the actual measured condition of the pavement compared with the expected condition.

The method used was to adjust the RUL based on a comparison with the expected useful life with a minimum RUL of two years.

The effect on RUL of measured condition against expected condition for basecourse was assessed is as a percentage change as shown in the table below.

Table 26.3: RUL Adjustment Based on Actual vs. Expected Condition

		Actual Condition				
		Excellent	Good	Average	Poor	Very Poor
Expected Condition	Excellent	0	-10%	-20%	-30%	-40%
	Good	+10%	0	-10%	-20%	-30%
	Average	+20%	+10%	0	-10%	-20%
	Poor	+30%	+20%	+10%	0	-10%
	Very Poor	+40%	+30%	+20%	+10%	0

26.4 Valuing Individual Assets

Replacement costs for surface water channels are based on the 2013 rates, cost escalated by 3% to meet 2016 values. The base life cycles and replacement costs used are shown in following tables.

Table 26.4: Basecourse Base Lives

Pavement Type	Use Code	Use Code ADT Vehicles / Day	Basecourse Life Cycle (Years)
Thin Surfaced Flexible	1	<100	140
Thin Surfaced Flexible	2	100 – 500	125
Thin Surfaced Flexible	3	500 – 2,000	110
Thin Surfaced Flexible	4	2,000 – 4,000	95
Thin Surfaced Flexible	5	4,000 – 10,000	80
Thin Surfaced Flexible	6	10,000 – 20,000	65
Thin Surfaced Flexible	7	>20,000	50

Table 26.5: Basecourse Replacement Cost Unit Rates

Total Pavement Depth	Assessed Basecourse Depth	Cost $/m2
<175mm	75mm	$31.80
175–350mm	120mm	$36.29
>350mm	150mm	$39.26

A 10% overhead was applied to the replacement cost for engineering and administration.

Basecourse layers were given a residual value of $1.

26.5 Recommendations

There are no recommendations made for this asset type.

27 Treatment Length (Sub-base Component)

27.1 Data Integrity

As stated in the previous section, most of the data stored in the pavement layer table was added to RAMM to assist dTIMS in producing more accurate results.

27.2 Looking at Condition

As this pavement layer is protected by the basecourse, it does not deteriorate and thus depreciate. The sub-base condition cannot be measured and was therefore set to “Unknown”.

27.3 Valuing Individual Assets

In 2010 the replacement cost used to construct the sub-base layer was also taken from the schedule of construction work provided by HCC. From this schedule the average rate as assessed for GAP40 material placement was $64.18/m^3 and GAP65 was $71.06/m^3, giving an average rate of $68/m^3.

Then using the average treatment length width of 8.7m (urban network with channel) and adding $7.50/m^2 for traffic control, this translated to the sub-base replacement costs as listed in the 2010 valuation. These rates have been cost escalated in each subsequent valuation.

Replacement costs for sub-base layers are based on the 2013 rates, cost escalated by 3% to meet 2016 values. The base life cycles and replacement costs used are shown in following table.

Table 27.1: Sub-base Replacement Cost Unit Rates

Total Pavement Depth	Assessed Sub-base Depth	Cost $/m^2
< 175mm	75mm	$15.04
175 – 200mm	80mm	$15.44
200 – 250mm	130mm	$19.52
250 – 300mm	180mm	$23.60
300 – 350mm	230mm	$27.68
350 – 450mm	300mm	$33.38
450 – 550mm	400mm	$41.53
550 – 650mm	500mm	$49.68
650 – 750mm	600mm	$57.83
> 750mm	700mm	$65.99

A 10% allowance has been added to these costs for overheads.

A 100 years life was entered into AVM because it is a mandatory field. However, the depreciation method that was selected for this asset is “Does Not Depreciate”.

27.4 Recommendations

There are no recommendations made for this asset type.

28 Treatment Length (Subgrade Component)

28.1 Data Integrity

The subgrade is the bottom most pavement layer associated with original construction formation of the road foundation. It has been created to account for its construction cost for valuation purposes and added to RAMM to assist in the dTIMS process.

28.2 Looking at Condition

This is the natural material on which all pavements have been constructed and does not depreciate.

28.3 Valuing Individual Assets

28.3.1 Standard Replacement Costs

In 2013 the replacement cost used for the subgrade layer was assessed at $16.87/m^2 with a 10% allowance added for overheads. A civil construction cost index of 3% was applied to the 2013 cost to increase the replacement cost used for the 2016 valuation to $17.38/m^2.

A 100 years life was entered into AVM because it is a mandatory field. However, the depreciation method that was selected for this asset is “Does Not Depreciate”.

28.4 Recommendations

There are no recommendations made for this asset type.

29 Treatment Length (Top Surface Component)

29.1 Data Integrity

The top surface valuation included 3,838 treatment lengths with a total length of 639.95km. There are 5 treatment lengths with no top surface type or surface date. These treatment lengths have been assigned a default treatment of a grade 3/5 two coat seal as it is the most common surface type in use on the network. There appeared to be no other issues with top surface data in RAMM.

29.2 Assumptions

The following assumptions have been made when valuing the top surface:

- Treatment lengths carrying >10,000 vehicles per day (vpd) (pavement uses 6 and 7) were assumed to be resurfaced with AC at the end of their theoretical life.
- 1st coats have been valued with a zero rate as the cost is included in the pavement renewal treatment included in the basecourse valuation.
- Asphalt first coat top surface – assumed that it is the second coat (1 treatment length)
- Grade 5 first coat top surface – assumed to be membrane seals (4 treatment lengths)
- Membrane seal top surface – assumed to have an asphalt top surface (2 treatment lengths)

29.3 Looking at Condition

29.3.1 Define Condition Categories (Standards)

The top surface is defined as the surface treatment currently on the top of the road pavement.

The condition of the top surface is measured during road rating surveys. These are carried out every on a varying frequency depending on traffic volume. Most of the network has a latest survey date of 2015 or 2016.

The condition categories for the top surface were based on the condition of the surface treatment as indicated by the Surface Integrity Index (SII). This is an index that uses a combination of surface faults measured during the road rating survey to indicate the health of the pavement surface. The formula used to calculate SII can be found in Appendix A.

The top surface condition categories were defined as shown in the following table.

Table 29.1: Top Surface Condition Categories

Condition Category	SII Values
Excellent	SII <1
Good	SII >=1 and <2
Average	SII >=2 and <3
Poor	SII >=3 and <5
Very Poor	SII >=5

Any treatment length in RAMM that does have condition data has been assigned an SII of zero.

29.3.2 Expected Condition

Pavement surface treatments generally perform well for an extended period and then deteriorate at an accelerated rate towards the end of the surface life.

The expected condition of a surface treatment was therefore based on a logarithmic curve as set out in the following table.

Table 29.2: Top Surface Expected Condition

% Life Expired	Expected Condition
0 - 30	Excellent
30 - 60	Good
60 - 78	Average
78 - 90	Fair
90 - 100	Poor

29.3.3 Effect of Condition on Remaining Useful Life

The RUL was estimated from the life cycle and construction date adjusted for the actual measured condition of the pavement compared with the expected condition.

The method used was to adjust the RUL based on a comparison with the expected useful life with a minimum RUL of 2 years (1 year for 1st coats).

The effect on RUL of measured condition against expected condition for basecourse was assessed is as a percentage change as shown in the table below.

Table 29.3: RUL Adjustment Based on Actual vs. Expected Condition

		Actual Condition				
		Excellent	Good	Average	Poor	Very Poor
Expected Condition	Excellent	0	-10%	-20%	-30%	-40%
	Good	+10%	0	-10%	-20%	-30%
	Average	+20%	+10%	0	-10%	-20%
	Poor	+30%	+20%	+10%	0	-10%
	Very Poor	+40%	+30%	+20%	+10%	0

29.4 Valuing Individual Assets

29.4.1 Standard Replacement Costs

The replacement costs supplied by HCC staff include costs for the first sweep and remarking. An allowance of 10% has also been made for overheads and a residual value of $1 has been applied to each top surface as per the request from HCC.

Replacement costs for top surface layers are based on the 2013 rates as cost escalated by 3% to meet 2016 values.

The default seal life cycles in RAMM are those adopted by HCC from analysis carried out by the Infrastructure Alliance. Each treatment length was assigned a theoretical life based on the pavement use (vpd). These reflect the default lives in the RAMM Surface Material table.

Lower volume urban residential streets are being resurfaced with chip seal surfaces when they are due for treatment including those that are currently an asphalt surface. These treatment lengths have been valued with a replacement cost unit rate of a racked in grade 4/6 chip seal, but with the base life of the existing asphalt until they are resurfaced. These sites have been identified using the "Residential Amenity" type recorded in the carriageway table and where the treatment length is a minimum of 50m in length. Those less than 50m have been valued as being resurfaced on a like for like basis. This accounts for where asphalt is used in higher stress areas such as cul-de-sac heads and intersections where this material is likely to be used for the next treatment.

The life cycles used for the top surface are shown in the following table.

Table 29.4: Top Surface Expected Life by Material and Pavement Use

Surfacing Type	Use 1 <100 vpd	Use 2 100-500 vpd	Use 3 500-2000 vpd	Use 4 2000-4000 vpd	Use 5 4000-10000 vpd	Use 6 10000-20000 vpd	Use 7 >20000 vpd
OGPA	15	13	12	11	10	9	8
M/10 Spec Asphalt	22	20	18	16	14	12	10
M/10 Dense Grade Asphalt	22	20	18	16	14	12	10
SMA	16	15	14	13	12	11	10
Slurry	10	9	8	8	7	6	6
1CHIP Grade 3	16	14	12	10	9	8	7
1CHIP Grade 4	16	14	12	10	9	8	7
1CHIP Grade 5	9	7	7	7	6	6	6
1CHIP Grade 6	9	7	7	7	6	6	6
2CHIP Grade 2/4	20	18	16	14	12	10	10
2CHIP Grade 3/5	13	13	12	11	10	8	8
2CHIP Grade 4/6	12	11	10	8	6	5	5
Racked Grade 3/5	13	12	11	10	9	8	7
Racked Grade 4/6	12	11	10	9	8	7	6
1st Coat Grade 4	6	6	4	2	1	1	1
1st Coat Grade 5	3	3	2	1	1	1	1
1st Coat Grade 3/5	6	6	5	5	4	2	1
1st Coat Grade 4/6	8	8	6	6	6	2	1
Concrete	60	60	60	60	60	60	60
Interlocking Blocks	30	30	30	30	30	30	30

The standard and optimised replacement costs used for top surface are shown in the following table.

Table 29.5: Top Surface Replacement Cost Unit Rates

Surface Type	Chip	Replacement Cost $/m^2	Optimised Replacement Cost $/m^2
Chip Seal	3	$5.03	Grade 4/6 Racked in Seal
Chip Seal	4	$4.58	Grade 3/5 Racked in Seal
Chip Seal	5	$3.55	Grade 4/6 Racked in Seal
Chip Seal	6	$3.33	Grade 4/6 Racked in Seal
Chip Seal	2/4	$7.47	Grade 3/5 Racked in Seal
Chip Seal	3/5	$6.07	Grade 4/6 Racked in Seal
Chip Seal	4/6	$5.47	Grade 3/5 Racked in Seal
Racked in Seal	3/5	$5.73	
Racked in Seal	4/6	$5.17	
Fabric	3/5	$6.77	
Slurry	All	$7.24	
Asphaltic Con	All	$20.76	
SMA	All	$23.95	

Surface Type	Chip	Replacement Cost $/m^2	Optimised Replacement Cost $/m^2
OGPA	All	$19.10	
Interlocking Block	All	$107.43	
First Coat	All	$0.00	Grade 4/6 Racked in Seal
Concrete	All	$107.43	

29.5 Recommendations

The following recommendations are made for this asset type:

- The 23 treatment lengths missing a top surface should be validated and the database updated as required.

30 Car Parks

30.1 Data Integrity

There are twelve car parks, listed under their own CARPARK hierarchy in RAMM, as shown below:

Table 30.1: Summary of Car Parks

Road Name	Pavement Type	Area m^2
ANGLESEA UNDERGROUND CARPARK	Thin Surfaced Flexible	495
CARO STREET COUNCIL CARPARK	Thin Surfaced Flexible	625
CARO STREET PUBLIC CARPARK	Thin Surfaced Flexible	1,134
CARRINGTON AVENUE (SOUTH) PARKING	Thin Surfaced Flexible	1,152.4
FOUNDERS THEATRE CARPARK	Thin Surfaced Flexible	2,700
KENT STREET CARPARK	Thin Surfaced Flexible	2,080
KNOX ST CARPARK	Concrete	481
MASTERS AVE CARPARK	Thin Surfaced Flexible	1,445
MUSEUM CARPARK	Thin Surfaced Flexible	3,200
RIVER ROAD (SONNINGS) CARPARK	Thin Surfaced Flexible	9,720
THE METEOR CARPARK	Thin Surfaced Flexible	1,750
VICTORIA ST CAR PARK	Thin Surfaced Flexible	4,180
	TOTAL AREA	**28,962.4**

Car park data in RAMM is limited to mainly car park area and pavement surfacing data. However there are drainage, surface water table and features assets listed in these tables that are identified as car park assets. These are excluded from the car parks valuation as they are already accounted for under their specific asset types.

30.2 Assumptions

As car park surfacing description is the same as that detailed in the surfacing table in RAMM, it is assumed that surfacing rates conform to surfacing rates, as detailed in Section 30 of the report.

Replacement costs for flexible pavement layers (includes basecourse, sub-base and subgrade) are assumed to conform to similar layers for Treatment Lengths with life cycles aligning to Pavement Use 3 category roads due to traffic inflow and outflow commodity parking restriction and turnaround times.

It is assumed concrete car parks are 200mm deep with steel mesh reinforcement. Therefore they are estimated to have life cycles conforming to Use 3 Concrete Top Surfaces for Treatment Lengths.

30.3 Looking at Condition

There is no reliable condition data within RAMM that could be used to modify remaining useful life. The remaining life has been calculated from the expected life less current age.

Victoria Street Car Park is to be removed in October 2016. A RUL of 4 months has been set for the assets associated with this car park.

30.4 Valuing Individual Assets

30.4.1 Standard Replacement Costs

In respect to the above assumptions, replacement cost rates and life cycles are shown below:

Table 30.2: Car Parks Replacement Cost Unit Rates and Base Lives

Layer Type	Assumed Material	Depth (mm)	Replacement Cost $/m^2	Life Cycle (Years)
Basecourse	AP40	75	$31.77	110
Subbase	AP65	75	$15.04	Indefinite
Subgrade	In-Situ	-	$17.38	Indefinite
Top Surface	Asphaltic Concrete	20 - 25	$20.76	18
Top Surface	2 Chip Seal G3/5	-	$6.07	12
Top Surface	2 Chip Seal G4/6	-	$5.47	10
Concrete	Concrete	200	$145.68	60

A 10% allowance added for overheads. The minimum remaining useful life assigned is one year.

30.5 Recommendations

There are no recommendation made for this asset type.

Appendix A

SII Calculation

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28 July 2021

Attention: Martin Gould

Dear Martin

Hamilton City Council 2021 Fair Value Assessment of Roading Infrastructure Assets

1 Introduction

Beca has been commissioned to undertake a desktop fair value assessment of Hamilton City Council's (HCC) roading infrastructure assets as at 30 June 2021. This exercise has been completed by assessing movements in asset values since the draft 2020 valuation conducted by Beca.

2 Methodology

The following step by step process was applied to each asset component:

- Waka Kotahi NZ Transport Agency's infrastructure cost indices were applied to the standard replacement cost unit rates for each asset type. The indices used were the Reseal Index, Structures Index, Network Outcomes Index, and Construction Index As data was only available for the quarter ending March 2021, a trendline was created to provide an estimate in roading infrastructure costs as at 30 June 2021.
- The movements in indices described above were applied to the 2020 valuation figures to provide new estimated replacement costs as at 30 June 2021.
- Replacement costs, depreciated replacement costs and annual depreciations have been calculated using the RAMM Asset Valuation Module (RAVM). This was undertaken on a snap shot of the database on 18 July 2021.

3 Indices Trends

The Reseal Index, Structures Index, Network Outcomes Index, and Construction Index provided by Waka Kotahi were used as part of this fair value assessment. The Reseal Index was used for the pavement surface assets, the Structures Index was used for the bridge assets (including major culverts), the Network Outcomes Index was used for the sign assets, and the Construction Index was used for all other assets.

As the current Waka Kotahi data is only available to the quarter ending March 2021, a trend line was created to estimate the indices values as at assessment date. Figures 1 to 4 outline the change in indices over time and show the projected values of each index as at 30 June 2021.

The trend line is based on the last five years' index values to determine the June 2021 value. A percentage change to the 2020 unit rates was then applied based on this value compared to that used in 2020. All four indices show a 'dip' in June 2020 which wasn't available at the time of the 2020 valuation. As a result, the change in the last 12 months is less than the historic trend, and in the case of the structures is a decrease.

Figure 1: Waka Kotahi Reseal Index

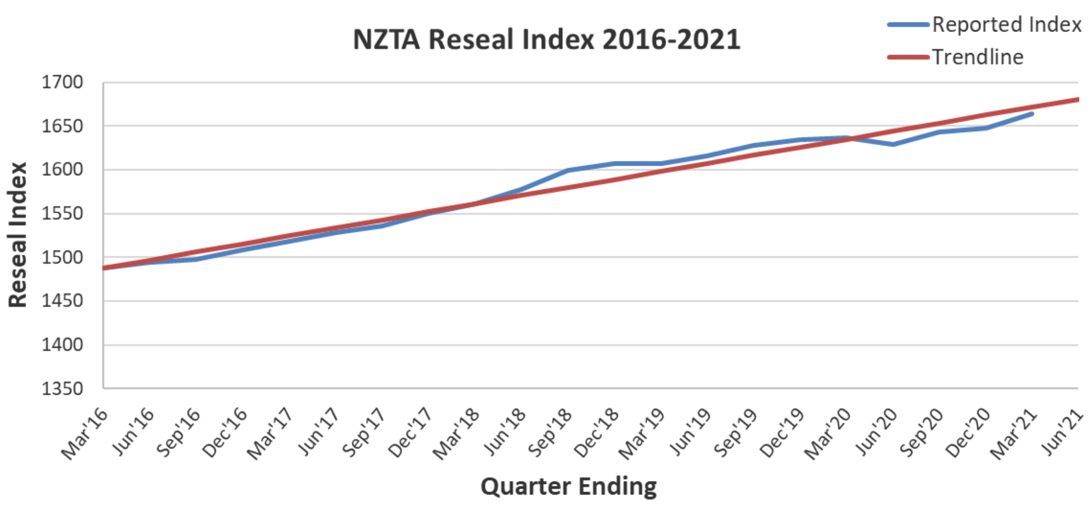

Figure 1 above illustrates that the Reseal Index is projected to reach 1681 in June 2021. This represents a **2.18%** increase on June 2020 values. This factor has been applied to increase the replacement costs of all surfacing assets.

Figure 2 – Waka Kotahi Structures Index

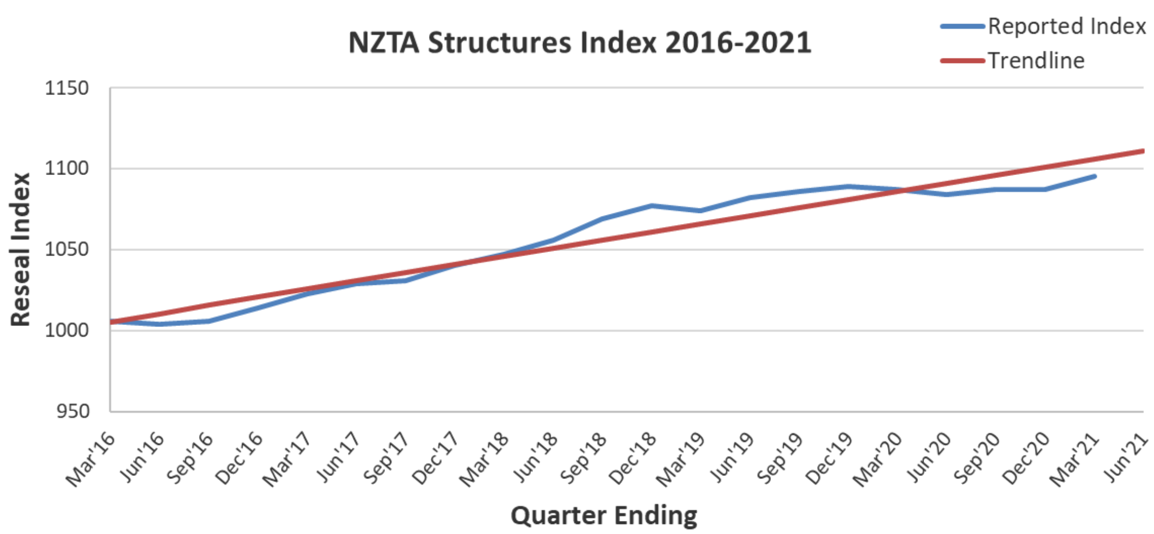

Figure 2 above illustrates that the Structures Index is projected to reach 1111 in June 2021. This represents a **0.53%** increase on June 2020 values. This factor has been applied to increase the replacement costs of all bridge assets.

Figure 3 – Waka Kotahi Network Outcomes Index

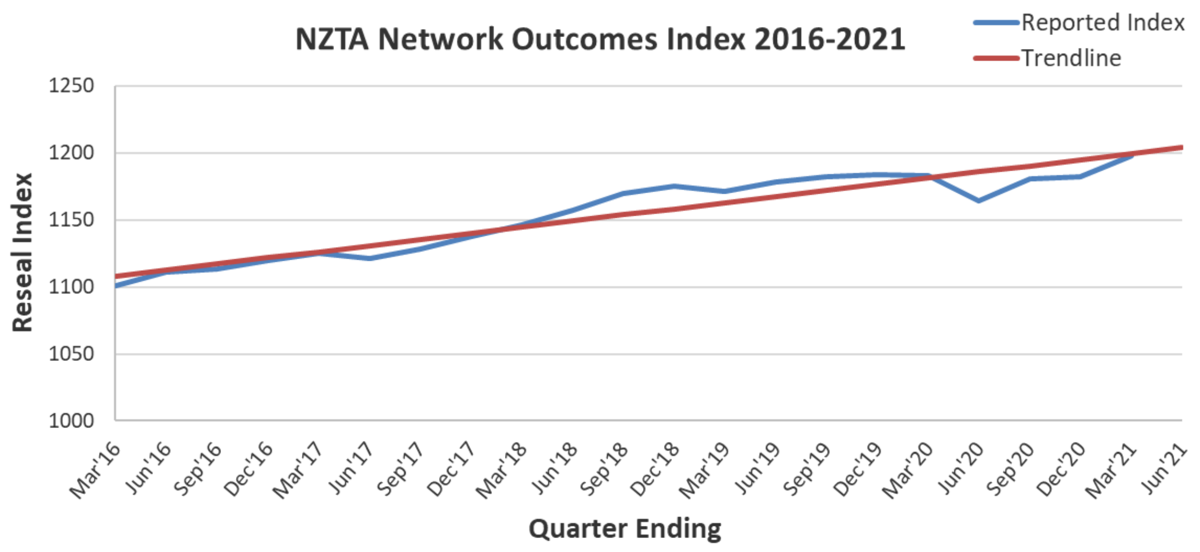

Figure 3 above illustrates that the Network Outcomes Index is projected to reach 1204 in June 2021. This represents a **1.56%** decrease on June 2020 values. This factor has been applied to increase the replacement costs of all sign assets.

Figure 4 – Waka Kotahi Construction Index

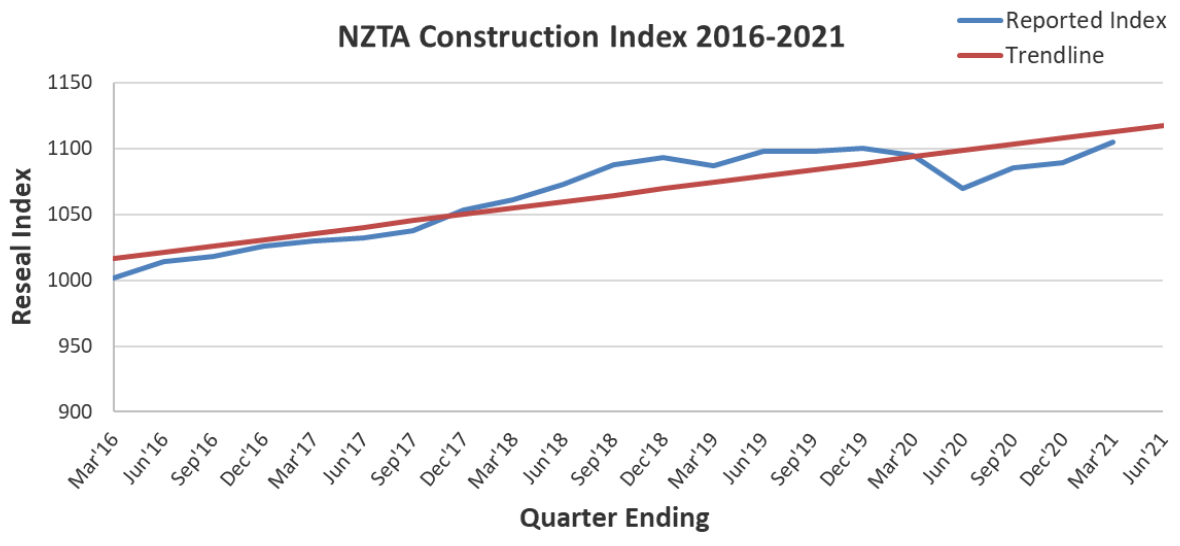

Figure 4 above illustrates that the Construction Index is projected to reach 1118 in June 2021. This represents a **0.12%** increase on June 2020 values. This factor has been applied to increase the replacement costs of all remaining assets.

4 Covid-19 Impact

The restrictions imposed by the New Zealand government in response to the Covid-19 pandemic have resulted in uncertainty in many markets including the construction market. Knock on impacts from the imposed restrictions includes increased financial pressures on many businesses, rising unemployment rates, a drop in consumer sentiment and continued uncertainty of future restrictions both nationally and internationally.

Construction costs are expected to be impacted differently depending on the forms of construction. It is expected that due to the impacts on business and decrease in consumer sentiment, increased competition from construction businesses will result in reductions of construction costs for residential and non-specialised commercial assets. The opposite is expected in the complex and specialised construction projects including multi-level construction where costs are expected to increase due to the lack of materials and specialised labour forces. The timeframe and extent of these changes will be largely dependent on international responses to the pandemic and associated recovery time for increasing economic activity and trade.

The outbreak of the Novel Coronavirus (COVID-19) was declared as a 'Global Pandemic' by the World Health Organisation on 11 March 2020. We have seen global financial markets impacted, travel restrictions and further recommendations being implemented by many countries. The greater market is being impacted by the uncertainty that the COVID-19 outbreak has caused. Market conditions are changing daily at present. As at the date of valuation we consider that there is a significant market uncertainty. While this valuation is current at the date of valuation, the value assessed herein may change significantly and unexpectedly over a relatively short period of time as a result of factors that are outside of the valuer's control. Given the valuation uncertainty noted, we recommend that the user(s) of this report review this valuation periodically. We are unable to accept responsibility or liability for any losses arising from subsequent changes in value in the future.

While this is the case, it is expected that the impact of Covid-19 will be minimal on the value of horizontal infrastructure assets. It is therefore expected that the level of risk when assessing the valuation of roading assets is low. It is possible that replacement cost rates may be subject to short-term changes due to shortages of materials or specialist labour. However, the replacement costs that are used in Optimised Depreciated Replacement Costs (DRC) calculations should reflect typical and sustainable market conditions. Beca are therefore comfortable that at the time of writing this report, the valuation is a reasonable estimate of the roading infrastructure asset values.

5 Results

Overall results between the draft 2020 and 2021 RAVM valuations are shown in the table below.

Table 1 – 2021 Roading Asset Valuation Summary

	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
2021	$1,282,402,083	$873,652,136	$19,889,358
2020	$1,241,987,578	$857,517,333	$19,057,328
% Change	3.3%	1.9%	4.4%

The previous table shows that, since the previous valuation carried out in 2020, there have been increases in RC, DRC and ADR of 3.3%, 1.9% and 4.4% respectively for the roading assets. A summary by asset type is included in table 3.

With this being a fair value assessment the existing setup of the RAVM was used. This resulted in a small quantity of assets not being included in the valuation due to the 'rules' applied in the module for assigning standard replacement cost unit rates. Table 2 below is a summary of how many assets were included for each asset category.

Table 2 – Number of records valued per asset category

Asset Category	Number Valued	Number Not Valued	Total
Bridge	54	0	54
Drainage	14,950	0	14,950
Feature	2,365	0	2,365
Footpath	9,916	0	9,916
Intelligent Transport Systems	182	102	284
Island	2,133	128	2,261
Minor Structure	439	6	445
Railings	942	0	942
Retaining Wall	182	0	182
Surface Water Channel	11,905	0	11,905
Signs	17,169	0	17,169
Street Light (Bracket)	18,622	929	19,551
Street Light (Light)	18,778	12	18,790
Street Light (Pole)	13,630	0	13,630
Tactiles	1,170	0	1,170
Traffic Signal Attachment	32	108	140
Traffic Signal Controller	92	1	93
Traffic Signal Lantern	2089	0	2089
Traffic Signal Pole	660	35	695
Basecourse	3,966	0	3,966
Subbase	3,966	0	3,966
Subgrade	3,966	0	3,966
Top Surface	3,966	0	3,966

The results of the desktop fair value assessment of HCC's roading assets are shown in Table 3 below. This shows a comparison against the 2020 draft valuation results.

Table 3 – Fair Value Assessment Summary Comparison

Asset Category	Component	Replacement Cost (2020)	Depreciated Replacement Cost (2020)	Annual Depreciation (2020)	Replacement Cost (2021)	Depreciated Replacement Cost (2021)	Annual Depreciation (2021)
Bridge	Deck	$88,448,594	$54,443,590	$589,657	$88,917,371	$54,139,359	$592,782
	Culvert	$13,474,064	$5,625,985	$211,979	$13,490,232	$5,486,917	$210,942
Drainage		$44,235,936	$24,972,145	$650,125	$45,093,633	$25,435,905	$662,837
Feature		$1,588,844	$573,799	$83,339	$1,639,166	$559,122	$83,029
Footpath		$251,615,961	$136,747,688	$6,337,675	$257,521,877	$139,429,038	$6,423,837
ITS		$3,378,841	$1,716,039	$181,571	$2,548,966	$1,181,788	$127,439
Island		$17,995,521	$12,596,079	$523,407	$32,064,474	$16,648,302	$863,147
Minor Structure		$9,327,272	$7,140,445	$203,453	$9,127,750	$6,984,052	$207,323
Railings		$4,313,180	$2,160,089	$184,970	$9,444,751	$4,617,395	$387,494
Retaining Walls		$10,304,345	$6,163,111	$122,408	$9,020,760	$5,633,237	$90,017
Signs		$3,340,291	$1,650,214	$198,851	$3,398,758	$1,608,793	$201,839
Street Light	Bracket	$6,955,059	$2,671,783	$260,950	$6,728,553	$1,992,482	$226,651
	Light	$11,348,133	$10,363,979	$275,718	$13,884,743	$12,893,014	$291,056
	Pole	$15,621,196	$6,160,434	$560,502	$15,817,054	$6,021,450	$559,282
Surface Water Channel		$85,017,471	$48,422,998	$1,251,960	$86,179,964	$48,971,702	$1,260,370
Tactiles		$445,323	$141,104	$65,797	$582,294	$171,056	$82,392
Traffic Signals	Attachment	$176,104	$125,813	$11,738	$176,836	$114,548	$11,789
	Controller	$2,131,743	$1,288,555	$142,110	$2,181,729	$1,177,818	$145,449
	Lantern	$2,669,695	$1,313,094	$177,838	$2,752,848	$1,274,003	$183,523
	Pole	$1,056,562	$445,557	$70,340	$1,116,552	$579,890	$74,437
Treatment Length	Top Surface	$74,287,079	$34,462,288	$4,383,273	$78,628,596	$35,704,663	$4,572,715
	Basecourse	$267,942,377	$173,027,757	$2,519,967	$272,229,761	$174,197,597	$2,580,479
	Subbase	$196,155,892	$196,155,892	$0	$198,256,972	$198,256,972	$0
	Subgrade	$126,445,632	$126,445,632	$0	$127,856,725	$127,856,725	$0
Car Parks		$3,712,464	$2,703,263	$49,700	$3,741,716	$2,716,310	$50,529
Total		**$1,241,987,578**	**$857,517,333**	**$19,057,328**	**$1,282,402,083**	**$873,652,136**	**$19,889,358**

From the above table it is evident that most asset categories have increased only slightly, due to the increase in unit rates and asset quantities. Islands in particular however have increased significantly, likely due to newly built high-value islands.

Yours sincerely

[redacted]

Senior Associate - Asset Management

on behalf of

Beca Limited

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