STATE HIGHWAY

DATABASE OPERATIONS MANUAL

Manual Number: **SM050**
Effective From: October 1996
Revised April 2014

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FOREWORD

The NZ Transport Agency (NZTA) is committed to operating state highway systems that contribute to an integrated, safe, responsive and sustainable land transport system.

In order to achieve this objective, it is essential that the NZTA have a sound knowledge of the state highway asset. Good knowledge and data enables reliable reporting of the current status and condition of assets, as well as effective decision making on how the asset should be managed in future.

The State Highway Database Operations Manual forms the main platform for the NZTA's asset data management. It provides the fundamental starting point, which will ensure that the above reporting and decision-making will be relevant and appropriate.

This issue of the manual includes a number of changes since the previous version published in August 2007. Apart from the usual ongoing software updates, the key changes include:

- Name changing from Transit New Zealand to the New Zealand Transport Agency
- Amendments to and the moving of the Communications Policy (formerly Appendix 7) and Access Policy (formerly Appendix 8) to the main sections, now Sections 9 and 10 respectively.
- Appendix 9 (RAMM Forms) now becoming Appendix 7, due to the above.
- Various additions/deletions/amendments to:
    - Appendix 1 Lookup Codes
    - Appendix 3 Asset Register
    - Appendix 4 Maintenance Activity Codes
    - Appendix 5 Asset Information Annual Planner

The above changes represent a shift in the NZTA's focus, to ensure we maintain information on our whole asset and not just the pavement and surfacings. This will continue to be an area of increasing concern for the NZTA. They also recognise the NZTA's desire to improve data quality and specifically to introduce an improved process of industry self-regulation.

General Manager, Network and Operations Group

Manual Management Plan
State Highway Database Operations Manual SM050

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1. Purpose

This Manual Management Plan details updates, amendments and contact points for the State Highway Database Operations Manual (SHDOM).

2. Document Information

Manual Name	State Highway Database Operations Manual
Manual No.	SM050
Availability	This manual is located in electronic format on the Transit website at: http://www.transit.govt.nz/technical/view_manual.jsp?content_type=manual&=edit&primary_key=44&action=edit
Manual Owner	Philip Blagdon, Information & Systems Manager, National Office
Manual Sponsor	David Bates, National Operations Manager

3. Amendment and Review Strategy

All Corrective Action/Improvement Requests (CAIRs) suggesting changes will be acknowledged by the manual owner.

	Comments	**Frequency**
Amendments (of a minor nature)	All future amendments will be issued to manual holders in the form of dated replacement pages. A vertical line in the margin indicates changes. The record of amendment table will be updated and reprinted each time a new amendment is released.	As required
Review (major changes)	Amendments fundamentally changing the content or structure of the manual will be incorporated as soon as practicable. They may require coordinating with the DRT timetable.	Annually
Notification	All users that have registered their interest by email to SPM021@transit.govt.nz will be advised by email of amendments and updates. To register your interest, send an email to the above address and write: 'State Highway Database Operations Manual SM050' in the subject box.	Immediately

4. Other Information (at Manual Owners discretion)

There will be occasions, depending on the subject matter, when amendments will need to be worked through by the Review Team before the amendment is actioned. This may cause some variation to the above noted time frames.

5. Distribution

Copies of this Manual Management Plan are to be included on Interchange at the next opportunity and sent to:

Assurance and Compliance Manager Manual Sponsor Document Manager
Manual Owner

DOCUMENT STATUS

This document has the status of a guideline as defined in NZ Transport Agency's ***Standards and Guidelines Manual available at:***
http://www.transit.govt.nz/technical/manuals.jsp.

The objective of the manual is set out in NZTA's policies and procedures for managing the state highway network in a manner that meets NZTA's goals.

The content is based on NZTA's current practices and those developed in the past from experience in managing the network.

While all care has been taken in compiling this document, the NZTA Board accepts no responsibility for failure in any way related to the application of this guide or any reference document noted in it. There is a need to apply judgement to each particular set of circumstances.

RECORD OF AMENDMENTS

Amendment N°	Subject	Effective Date	Updated By
2	Revision	Jan 1998	
3	Re-issued – extensive rewrite	Sept 2001	
4	Re-issued – extensive rewrite	July 2004	
5	Foreword • General amendment Document Status • Amendment to name of Guidelines Manual inc. web address Amendment procedures • Page deleted and incorporated into new Manual Management Plan Amendment List registration Form • Page deleted and incorporated into new Manual Management Plan Record of Amendments • Page revised and reworded Sections 1 to 11 inc. • Minor amendments Appendix 1 • Minor additions/deletions to existing Look-up tables • Retaining walls and Street lighting tables added Appendix 2 • Minor amendments/rewording to Event Codes Appendix 3 • Minor additions/deletions (marked in red font) to existing Asset Register • Retaining Wall table added • Street Light Pole table added • Street Light Bracket table added Appendix 4 • Minor additions/deletions to Maintenance Cost, Activity and Fault Codes	08/03/06	R. Allen
6	Appendix 1 and 4 • Additions and deletions as per memo TNZ TM8001 Appendix 5 • 2007 AIAP replaces 2006 version as per memo TNZ TM8001	03/01/07	R. Allen

Amendment N°	Subject	Effective Date	Updated By
7	Various amendments to Sections 1 to 10 inc., dealing specifically with the introduction to the accreditation certificate for RAMM users, the hosting service being supplied by RAMM Software Ltd. This includes: Deletion of Section 5 – Maintenance Activities Deletion of Section 6 – NOMAD (Note: the main parts of the above 2 deleted sections have been incorporated into the newly formed Section 4). Deletion of Section 11 – Protocol for TNZ Regions 3 & 4 (RAMM2) Appendix 1 • Minor additions/deletions to existing Look-up tables • Shoulders tables added Appendix 2 • Minor amendments/rewording to Event Codes Appendix 3 • Minor additions/deletions (marked in red font) to existing Asset Register • Pavement Test Pit table added • Street Light table added Appendix 4 • Minor additions/deletions to Maintenance Cost, Activity and Fault Codes Addition of Appendix 6 – Inventory Collection Manual Addition of Appendix 7 – Communications Policy Addition of Appendix 8 – Access Policy Addition of Appendix 9 – RAMM Forms	01/08/07	R. Allen
8	Amendments to Appendix 6 Inventory as a result of industry review workshops • Surfacings section for clarification of correct data collection and updating, including examples • ITS section to reflect ITS table structure and collection and maintenance of national ITS dataset. Major update of Appendix 1 to align lookup codes with current active lookups in RAMM, incorporating extensive new ITS lookups. Addition of Section 12 – Maintenance Activities Amendments to Appendix 3 • Minor additions/deletions (marked in red font) to existing Asset Register • Amendments to Carriageway Surfacings to align with RAMM 2011a database structure and specify mandatory and conditional data requirements	1/1/2014	P Ball S.Rainsford M.Cousins A. Bevins

Amendment N^{o}	Subject	Effective Date	Updated By
9	Amendments to Appendix 4 Maintenance Activity Codes to include required units of measure and update current codes. Please note the removal of multiple 'UNKNOWN' fault cost group combination codes.	20/04/2014	P Ball

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SECTION 1

ASSET INFORMATION MANAGEMENT OVERVIEW

1.0 Introduction

Background

The NZ Transport Agency (NZTA), asset management information system is designed as a decision support system for roading managers and practitioners to assist in providing a picture of the roading network condition.

The asset management information system combines information from field surveys and office records to provide statistical data, road maintenance information, road maintenance priorities and estimates of maintenance costs.

In this Section

The topics in this section are listed below:

Topic	See Page
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1.1 Key Elements

Elements

The key elements of the core asset management information system:

- An Asset Register of the roading network, e.g lengths, widths, pavement types, traffic counts, and also inventory items,
- Condition Data, e.g. visual rating – number of potholes, scabbing, cracking and high-speed data – roughness, texture, rutting, skid resistance, etc.
- Forward Works Programme, this is the 10-year future works programme for maintenance activities (NOMAD) carried out on the road network e.g. reseals, area-wide pavement treatments, maintenance strategies, etc.
- Reporting outputs. The reporting outputs provide useful information to roading management to support maintenance strategy decisions, programming and budgeting.
- Data collection & quality system. Information must be collected and managed in accordance with a robust quality assurance system.

Factors for success

The success of any management information system is dependent on the following factors:

- Quality of data
- Completeness of data
- Usefulness of data
- Timeliness of information delivery
- Accuracy of location

The focus of this manual is on the provision of quality and timely information. These two factors in turn contribute to the usefulness of the information the system provides.

References

The current version of all standards, criteria or guidelines referred to in this manual can be determined from NZTA's *Standards, Criteria and Guidelines Manual*.

1.2 Purpose and Scope of Manual

Purpose

To provide a documented framework of operational procedures and activities to ensure the consistency of good management of NZTA's State Highway Asset Management Information System.

Scope

The manual therefore provides:

- The administration and operational structure of NZTA's State Highway asset information system database.
- Activities, responsibilities and reporting requirements.
- Timetables, see Appendix 5 – Asset Information Annual Planner
- Standard procedures and documentation for updating the database.

This manual should be used in conjunction with the relevant software user manual from the respective software vendors.

Asset systems not covered in this manual are:

- State Highway Traffic Monitoring System (TMS)
- State Highway Bridge Data System (BDS)

Quality assurance

The manual is a link in the quality assurance chain between consultants/ contractors, delegated authorities, NZTA Regional Offices and NZTA National Office.

The manual expects that all data provided by consultants and contractors complies in all respects with the quality assurance requirements for data collection of the specific contracts under which updating is required.

1.3 Overview of State Highway Asset Management Information System

Introduction

The national State Highway network asset management database is hosted by CJN Technologies. The central computer is linked to personal computers at National Office and Regional Offices via the wide-area network.

Access for NZTA staff is via the icon on their PC. Access for external suppliers will be through the CJN hosting service over the internet.

Password Access

Access to the asset management information system is restricted to authorised users with passwords.

Refer to the Access Policy (section 10) of this manual for the correct procedure in obtaining access.

Database Integrity

To ensure database security and uniformity, access to the Road Names, Carriageway and most lookup Tables for adding and/or updating purposes is restricted to the SH Assets Team at National Office only.

System Administration Services

CJN Technologies provides system administration support services. These services include:

- Database security including archiving and disaster recovery planning
- Installing RAMM program upgrades
- Server upgrades (both hardware & operating system)

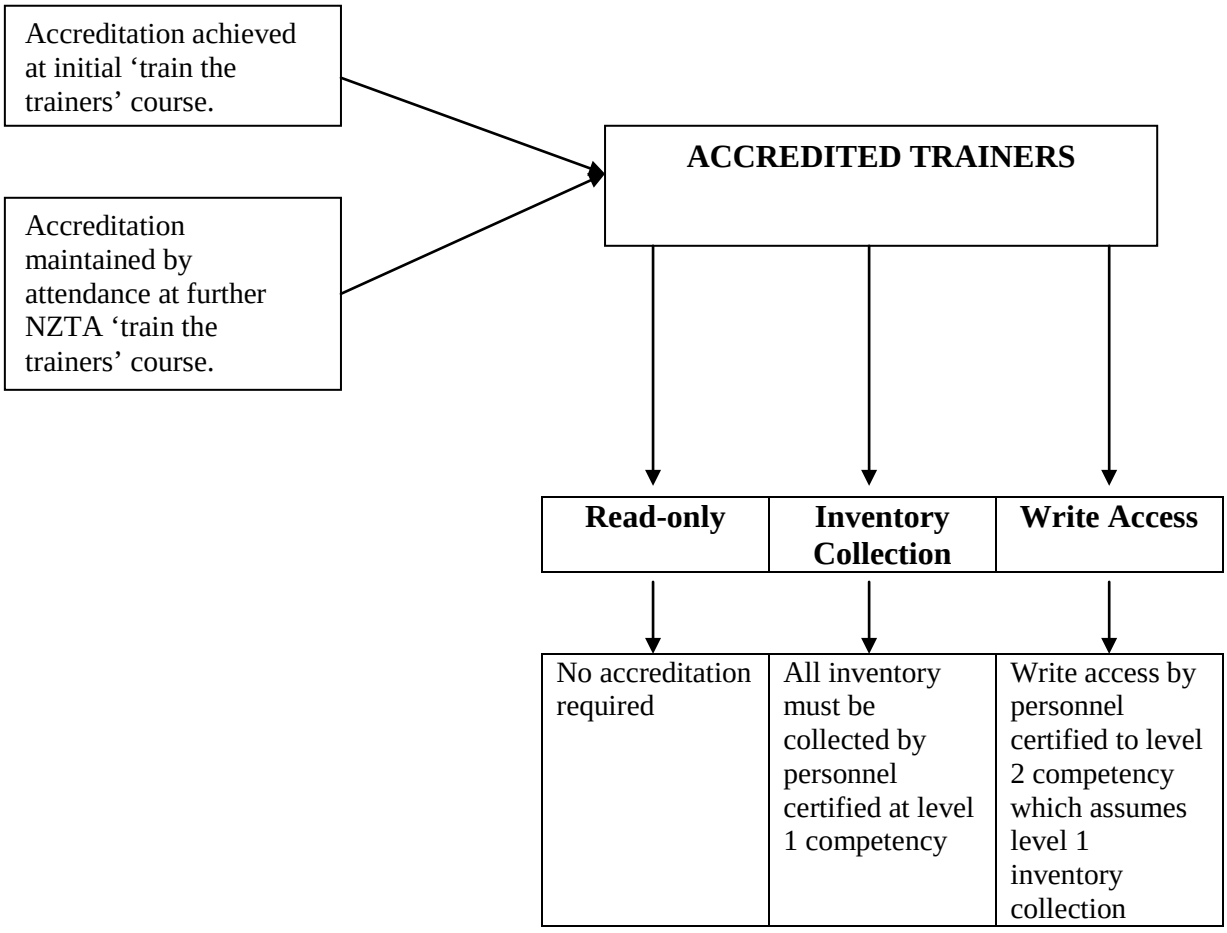
Suppliers Environment

Consultants operate the hosted Asset Information System via remote access. NZTA wishes to maintain the integrity of its RAMM data. With suppliers having direct access to the NZTA master database, NZTA is only going to allow access to users from outside organisations, who can demonstrate they are properly accredited.

1.3 Overview of State Highway Asset Management Information System, continued

Supplier Accreditation for Database Access

Training for accredited RAMM users, is based on a 'Train the Trainers' approach. Trainers will be registered following completion of a course held by NZTA at a frequency (e.g. biannual) sufficient to maintain currency of database knowledge. It is intended that, on completion of the course, the trainer attendees will attain certification, which will enable them to carry out training of others to a level of certification sufficient to allow those trainees to have 'write' access to the NZTA RAMM database. Registration of Trainers and their trainees will be maintained by NZTA on an ongoing basis to manage access privileges to the NZTA RAMM database.



Note: Various levels of 'write' access are granted based on supplier responsibility in terms both of network coverage and also asset type.

1.4 Computer Backups

Responsibility	CJN Technologies is responsible for ensuring backups are successful (the following morning etc).
Special Requests	Requests for supplementary backups, special archiving and the restoration of data from backups should be directed to the Asset Database Administrator.

SECTION 2

ASSET REGISTER

2.0 Overview

Introduction

The asset register is the record of the physical elements of the State Highway System that were created, maintained, renewed or disposed of at NZ Transport Agency's (NZTA) discretion and including:

- Location of assets
- The condition of these assets
- The maintenance effort expended
- The demand (traffic and loadings) the pavement asset is subjected to

Background

NZTA's Asset Register is contained in the Road Assessment and Maintenance Management (RAMM) database. The initial effort in data collection to establish the RAMM database took place in the late 1980s – early 1990s.

The focus at that time was on the pavement related asset components for the operation of the Treatment Selection Algorithm (TSA). Later extensions to the register included signs, street lighting, markings, railings, minor structures and features information. Some of these components have not been as well defined, or followed a nationally coordinated implementation, as the former pavement related components. Other assets e.g. bridges are recorded in other databases.

Condition data from manual surveys has been collected since 1989, along with roughness data. The current database holds this annual data from 1992. Skid resistance data is held for surveys completed in 1995 & 1998 onwards.

Maintenance activity (cost and quantity) relating to pavement works has been loaded into RAMM since 1999 and on some networks this data goes back to 1992.

In this Section

The topics in this section are listed below:

Topic	See Page
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Applying the Asset Register	2-4
Glossary of Terms used in Appendix 3, Asset Register	2-6

2.1 Extent

Functions

The business functions that the asset register supports are:

- The Asset Management Plan
- The National State Highway Strategy
- Valuation of the State Highway Asset
- Determination of Performance Measures
- Inputs to Treatment Intelligence, e.g. dTIMS
- Inputs to Contract Schedules
- Operation Management

Goals

The overall goals are:

- The asset register is complete
- The asset location is maintained
- Data collection methods are cost effective
- Data collected is fit for purpose
- The asset register is maintained to meet the annual planning timeframe.

It is accepted that there are asset types, which are missing from the national asset register. Areas that are currently being investigated by NZTA for future inclusion are: Traffic Islands, Intersections, Traffic Signals and Rest Areas.

2.1 Extent - continued

Elements

Using the definition stated in the introduction, "a record of all physical elements of a State Highway" this includes:

- Carriageway, e.g. dimensional attributes of the highway
- Carriageway surfacings
- Drainage, e.g. culverts, flume, sumps, etc
- Features (other important features not necessarily owned by the Crown)
- ITS Assets *(will need to be added to Appendix 3 if inc.)*
- Lighting, e.g. bracket, model, pole, etc.
- Minor Structures, e.g. underpasses, etc.
- Pavement Layer, depth of granular basecourse, etc
- Pavement Markings
- Pavement Test Pits and their survey header
- Railings, e.g. barriers & sight rails
- Retaining Walls
- Road names
- Shoulders
- Signs, e.g. Regulatory & Permanent Warning signs
- Surface water channels, e.g. concrete kerb and channel

There is also condition and traffic data that is managed and maintained by NZTA directly which this section does not cover.

Storage

The Asset Register is stored in the RAMM software owned by CJN Technologies.

RAMM uses a large relational database management system called Informix. Each type of element (sign, surfacing, railing, etc) is represented by a table and related to the road names tables by road_id and individual elements are measured from the road origin in metres.

Please refer to NZTA's LRMS Manual, SM051 for further information on the state highway referencing system, which is fundamentally a reference post & displacement (i.e. linear) system.

2.2 Applying the Asset Register

Overview

Applying the asset register is ensuring that the goals identified in 2.1, Extent are achieved.

Extent of data capture

Each element is represented by a table such as sign, c_surface, railings, etc and has a number of fields that are used to describe the element. An example of this is the sign_type field in the sign table, this field identifies the particular type of sign e.g. slippery when wet.

NZTA stores in RAMM the fields as defined in Appendix 3, Asset Register for each table.

If other fields are required please contact the Asset Information Engineer, NZTA National Office prior to collecting the data for approval.

2.3 Glossary of Terms used in Appendix 3, Asset Register

Field Name

This is the name of the field where the data is stored relating to a specific part of the table,

Example cway_hierarchy is the field where the National State Highway Strategy Hierarchy (NSHS) is stored, e.g. "NSHS Rural R1" identifies this road section as being "National Strategy Hierarchy Rural 1".

Type

This is the field data type. An explanation of each data type is shown in the table below:

Type	Type Description	Example
char(15)	User definable up to 15 letters or numbers (note: spaces are also characters)	"HEADS ROAD" is 10 characters long
serial(5)	Generated by software and allows up to 5 numbers	11599
integer(4)	User definable and allows up to 4 whole numbers (no decimals)	4590
smallint(3)	User definable and allows up to 3 whole numbers (no decimals), like integer	235
decimal(5,2)	User definable and allows up to a total of 5 digits with 2 of those digits coming after the decimal point.	543.29
date	All dates are stored as "dd/mm/yyyy"	10/10/2001
Money(12,2)	Similar to decimal, however stores number with a "$" symbol	$49852.63

2.3 Glossary of Terms used in Appendix 3, Asset Register - continued

Required by Software	States if required by the software. "Y" - Yes
Generated Value	The default value the software will insert unless altered by the user. "G" indicates that the software generates this field.
Required by NZTA	If "T", this field is required by NZTA. If such data is not supplied then the deliverable will be rejected.
Description	The description of the field.
Allowed Values	This shows the lookup or the relevant table where the lookup is stored for defined fields.
Not required	There are a number of fields not required by NZTA. Although these fields are not to be populated when delivering data to NZTA, a null or empty space is required to represent these empty fields. This is so that when loading the data electronically the software will easily load the data without NZTA having to manipulate the data. The delivery of data to NZTA is described in section 4, Data Delivery Procedures. For completeness all the fields have been supplied in Appendix 3, Asset Register.

SECTION 3

ROAD AND SECTION DEFINITIONS

3.0 Introduction

Overview

State Highways are identified by a number, across Regional and Local Authority boundaries, and in some instances are hundreds of kilometres long. It is necessary to break the network down into convenient lengths for management purposes; these are known as reference stations and carriageway sections.

Definition of a "road"

A Reference Station Length (RSL) has been chosen as a convenient length in most cases. Hence, for the purposes of NZ Transport Agency's (NZTA) Asset Management System, each RSL will usually become a unique road, although divided highways, a one-way pair system, roundabouts and motorway ramps are also unique roads.

References

State Highway Control Manual, Chapter 4 Section 1, specifies the distance marking system to be maintained in accordance with the *Location Referencing Management System Manual SM051*.

Refer to the *Location Referencing Management System Manual SM051* for details regarding ramps referencing

In this Section

The topics in this section are listed below:

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3.1 Road Name Conventions

Overview

A unique State Highway reference name is generated by NZTA's LRMS, for each road in the database based on the information that is entered about that road.

Elements of the road name

The road name elements are described in the following example:

Example: Road name 01N-0979/05.45-X985-R1-OFF

Element Description	Required	Example
State Highway Number	Always	01N
Reference **S**tation number at the start of the RS length.	Always	0979
Displacement of **E**stablished **R**oute **P**osition (if the road does not begin at a reference station)	When required	05.45
Station Type (i.e. RSL for Reference Station, RMP for ramp/interchange or RND for roundabout)	Always	RSL
Direction (if the road is a divided carriageway)	When required	I
Common State Highway number (if road is common with another state highway)	When required	
Roundabout or interchange number.	When required	985
Ramp number	When required	R1
Ramp Type (i.e. On or off) and Hierarchy	When required	OFF

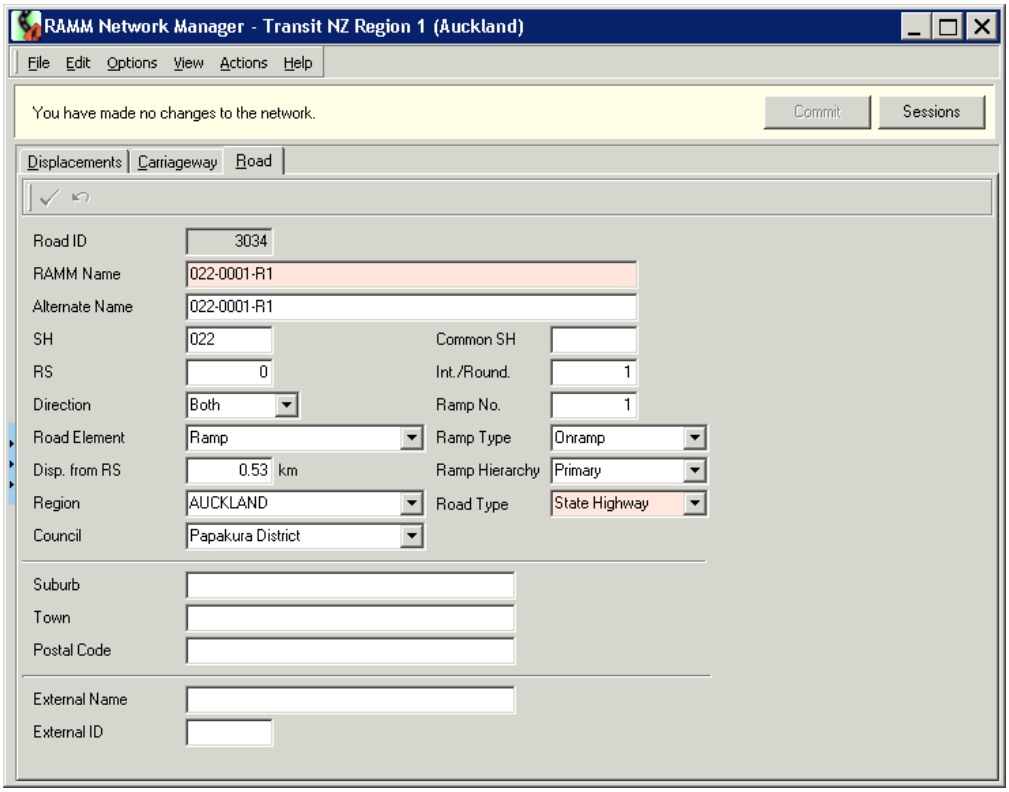
Separators

The elements are separated by the characters '-' and '/' and the identifier 'C' for common or "W" for roundabouts or "X" for interchanges. The program adds them when the name is generated. They are real characters in the concatenated name.

3.1 Road Name Conventions, continued

Example

Below is an example of a completed road name screen for an On-Ramp in Auckland, which joins SH22 at 0.53km:



Note that the "Alternate" name is the name given to the road under the LRMS Software package "*Highways by Exor*".

3.2 Single Carriageway

Overview

The simplest case is a single carriageway road, which requires basic data for implementation.

Criteria

Single carriageway sections typically start/end at Reference Stations. Some single carriageway sections start/end at Established Route Positions and this could be the case where Local Authority Boundaries exist within the RS or they start or end at divided carriageway sections' boundaries.

Data Requirements

The information required to generate a road name for a single carriageway is:

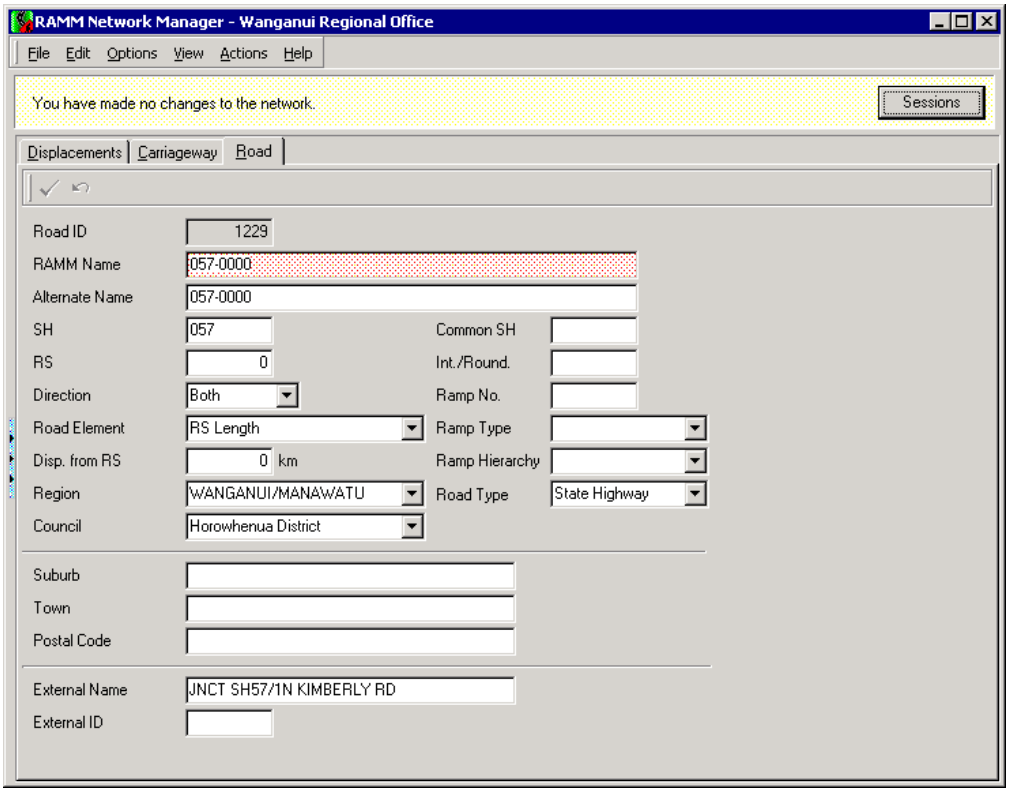
Element Description	Required
State Highway Number	Yes
Reference **S**tation number at the start of the RS length.	Yes
Displacement of **E**stablished **R**oute **P**osition (if the road does not begin at a reference station)	When required
Station Type	RSL
Direction (if the road is a divided carriageway)	No
Common State Highway number (if road is common with another state highway)	When required
Roundabout or interchange number.	No
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

Additional Fields

Additional fields such as Local Name, Suburb, Town are also available in the Road Name Table.

3.2 Single Carriageway, continued

Example SH 57 has a single RSL between RS 0 and 21 and is recorded as follows:



3.3 Divided Carriageways

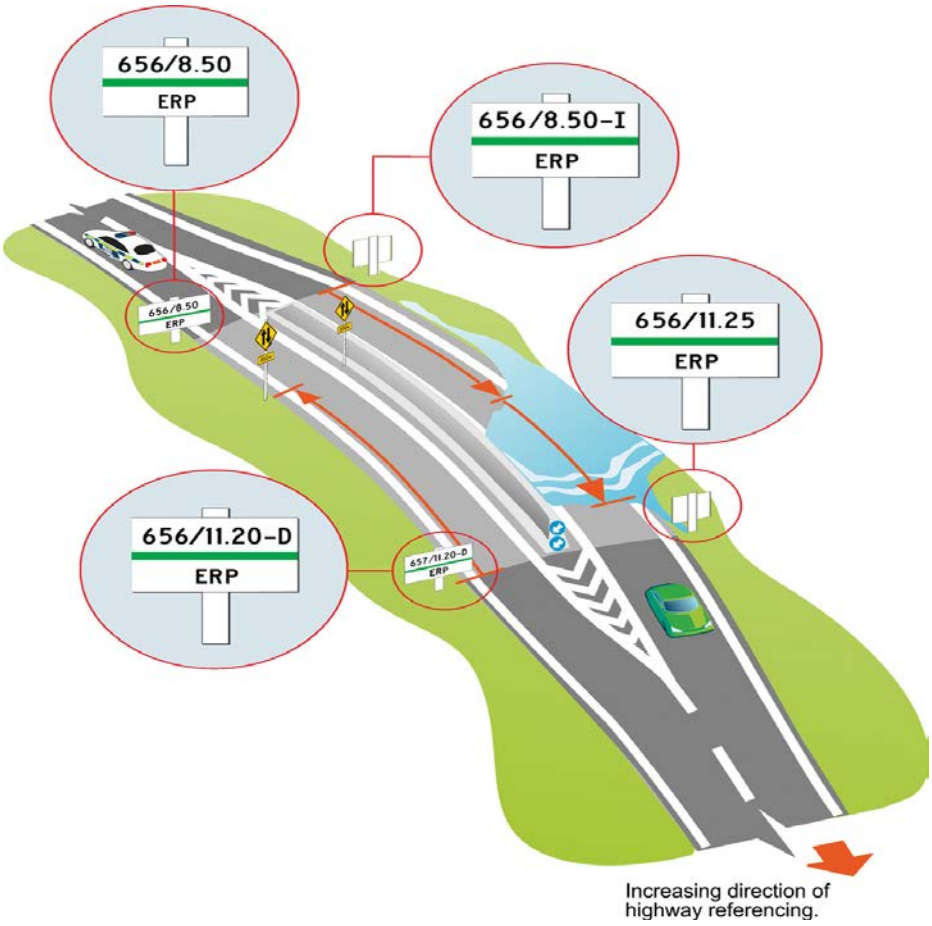
Overview

Roads on each side of the median of a divided carriageway are given a unique name (refer to section 2.5 of LRMS Manual).

Criteria

A divided carriageway section can exist in two situations, as follows:

1. Where carriageway sections are separated by a median barrier, with a length greater than 300 m, or two carriageways exist on separate alignments



The *Location Referencing Management System Manual (SM051)* requires an ERP or RS sign to be placed at the start and end of the road-section. Note that the use of RS points is at the NZTA Regional Office discretion.

The letter I for Increasing or D for Decreasing is added to the road name.

3.3 Divided Carriageways, continued

Medians at Intersections

A divided carriageway section can be implemented, if the distance between the start of the median on one side of the intersection and the end of the median on the other side of the intersection is greater than 300 m.

Since a Reference Station is required at the intersection of two highways, the two sides are dealt with separately, i.e. the distance between the start and end of the median on each side of the intersection needs to be greater than 300 m.

Exception

In any case where insufficient length means it is not required to give the section a unique name, the divided or dual carriageway section could be recorded as a divided section, should there be a need to treat them as two separate roads. For example, a dual carriageway section, which is only 265 m in length, could be entered and named as a divided carriageway. This is at the Regional Office's discretion.

Data Requirements

The information required to generate a road name for a divided carriageway is:

Element Description	Required
State Highway Number	Yes
Reference **S**tation number at the start of the RS length.	Yes
Displacement of **E**stablished **R**oute **P**osition (if the road does not begin at a reference station)	When required
Station Type	RSL
Direction (if the road is a divided carriageway)	Yes
Common State Highway number (if road is common with another state highway)	When required
Roundabout or interchange number.	No
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

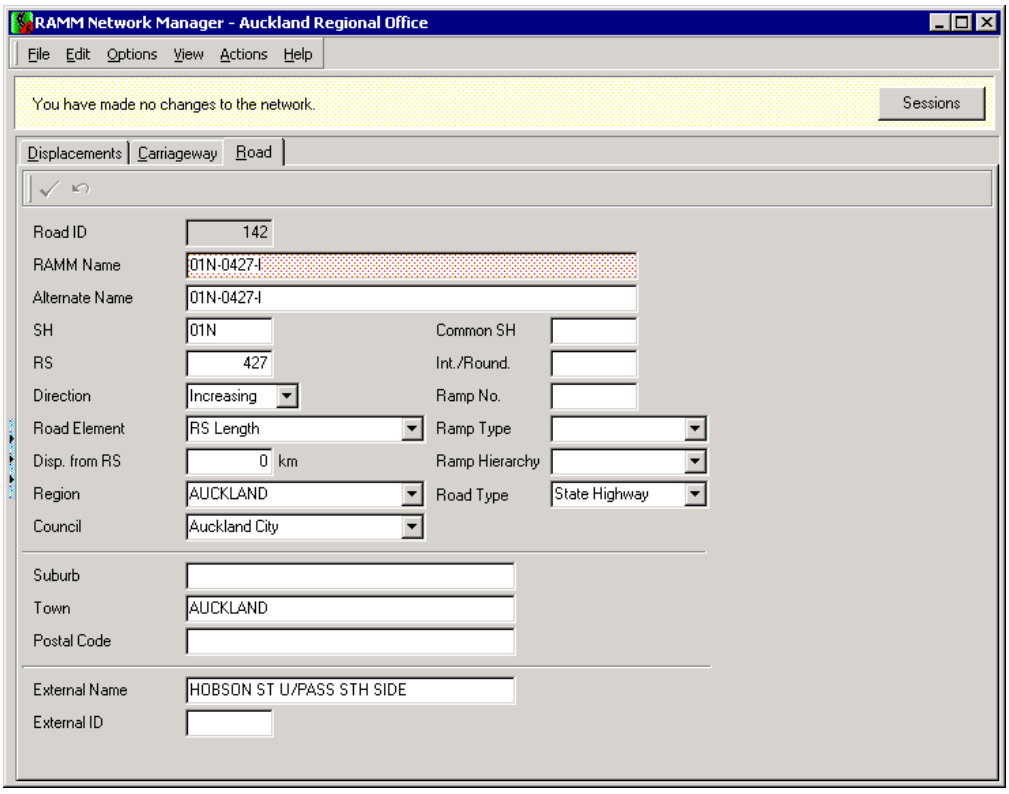
3.3 Divided Carriageways, continued

Additional Fields

Additional fields such as Local Name, Suburb, Town are also available in the Road Name Table.

Example

State highway 01N has a divided section between RS 335 and RS 338. For the increasing direction, the road name is recorded as follows:



A second road called *01N-0335-D* runs between the same points in the decreasing direction.

3.4 Common Highways

Overview

To avoid double counting it is necessary to identify common routes.

Criteria

Where two State Highways have a common route, RS are placed at the start and end of the common length. All road asset information will be recorded against the **lower numbered** State Highway.

Data Requirements

The information required to generate a road name for a common highway is:

Element Description	Required
State Highway Number	Yes
Reference **S**tation number at the start of the RS length.	Yes
Displacement of **E**stablished **R**oute **P**osition (if the road does not begin at a reference station)	When required
Station Type	RSL
Direction (if the road is a divided carriageway)	When required
Common State Highway number (if road is common with another state highway)	Yes
Roundabout or interchange number.	No
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

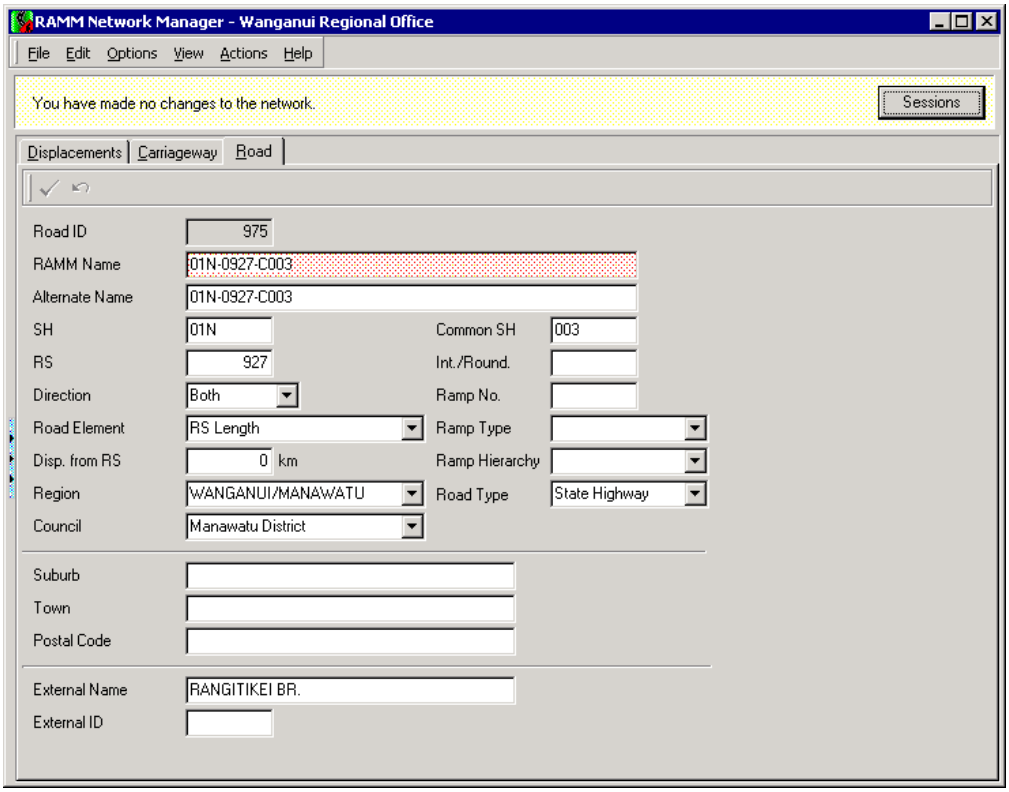
Additional Fields

Additional fields such as Local Name, Suburb, Town are also available in the Road Name Table.

3.4 Common Highways, continued

Example The road section on SH 3 between RS 445 and 450 has a common route with SH 01N between RS 845 and 850.

For SH 01N the road is recorded as follows:



3.5 Ramps

Overview

ON and OFF Ramps are components of the State Highway network, mostly on motorways. Ramps can be of considerable length and are therefore recognised as unique roads. All On or Off Ramps connecting the highway are grouped and referenced to a unique interchange number. Ramps are generally numbered in a clockwise direction around the interchange, based on the location of the start of the ramp.

Ramps are referenced as a separate road with positive displacements measured in the direction of traffic flow. Therefore, measurements on an on ramp will start at the RS on the boundary of the local road and end where it intersects with the highway.

Note: Refer to Section 2.6 of the LRMS Manual for more details.

Criteria

For an ON or OFF Ramp to qualify as an unique road, its length from beginning to end will **generally** be greater than 100 metres and have a significant median barrier separating it from the main state highway.

Note that the start of a ramp is where the full lane width starts, if an OFF ramp, or the maintenance boundary if an ON ramp.

Data Requirements

The information required to generate a road name for the ramp is:

Element Description	Required
State Highway Number	Yes
Reference **S**tation number at the start of the RS length.	Yes
Displacement where the ramp intersects the main SH	Yes
Station Type	RMP
Direction (if the road is a divided carriageway)	When required
Common State Highway number	When required
Roundabout or interchange number.	Yes
Ramp number	Yes
Ramp Type (i.e. On or off) and Hierarchy	Yes
Territorial Local Authority	Yes
Regional Council	Yes

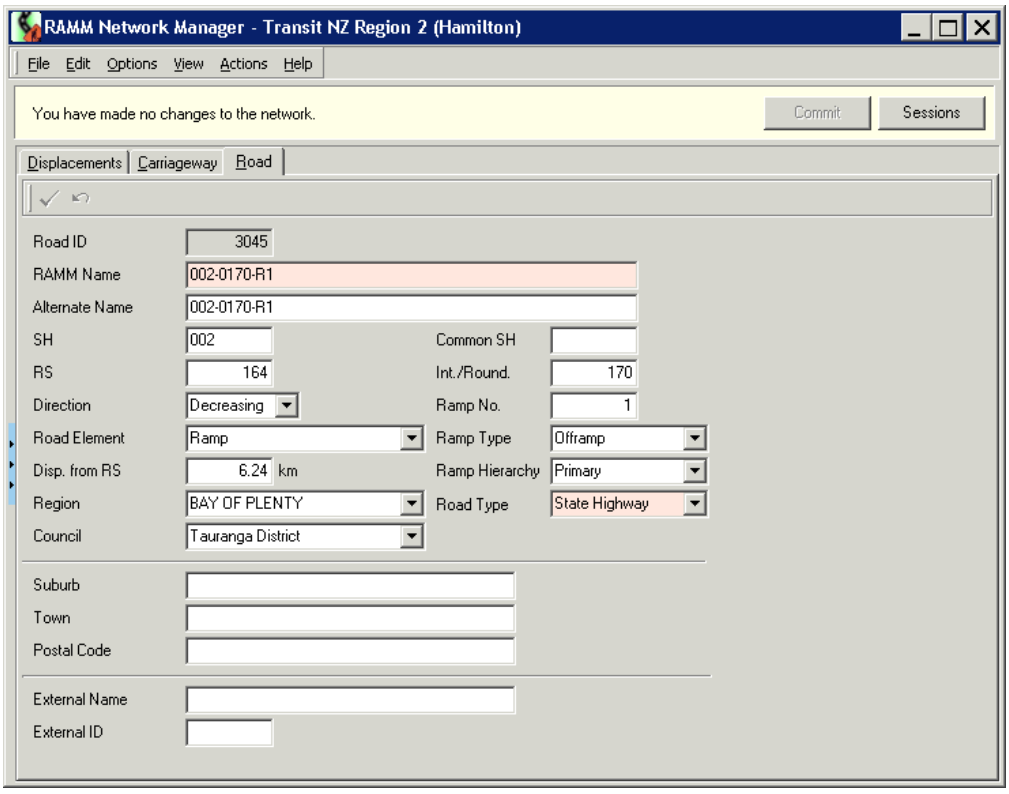
3.5 Ramps, continued

Additional Fields

Additional fields such as Local Name, Suburb, Town and Postal Code are also available in the Road Name Table.

Example

SH 02 has a ramp, which joins the state highway at 6.24 km from RS 164. The road name is recorded as follows:



Complex Layouts

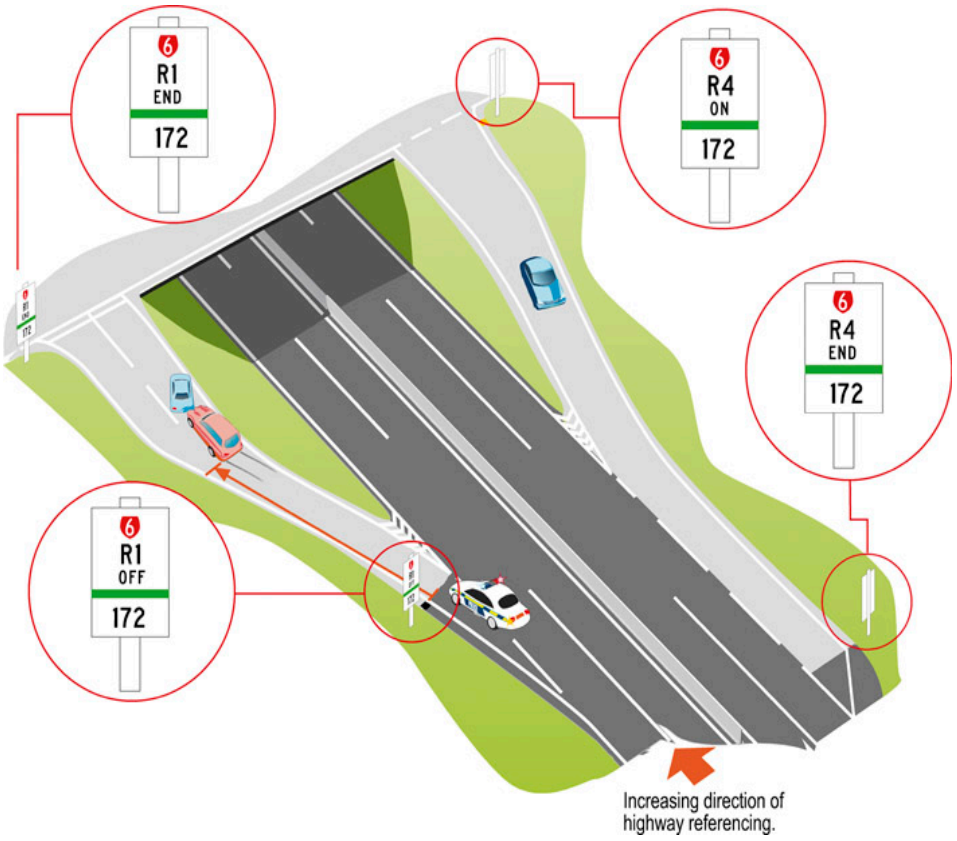
Refer to the *Location Referencing Management System Manual SM051* for the numbering of ramps/interchanges at complex interchanges.

A Reference Station Locality Diagram, showing traffic direction, state highway, named ramps and boundaries shall be forwarded to the Asset Information Engineer, Highways and Network Operations Group, NZTA National Office.

3.5 Ramps, continued

Motorway Interchanges

The following motorway diamond interchange figure illustrates the correct direction and numbering for the associated ramps. Overall dimensions are determined by the agreed limits of responsibility. Diagram:



3.6 Large Roundabouts

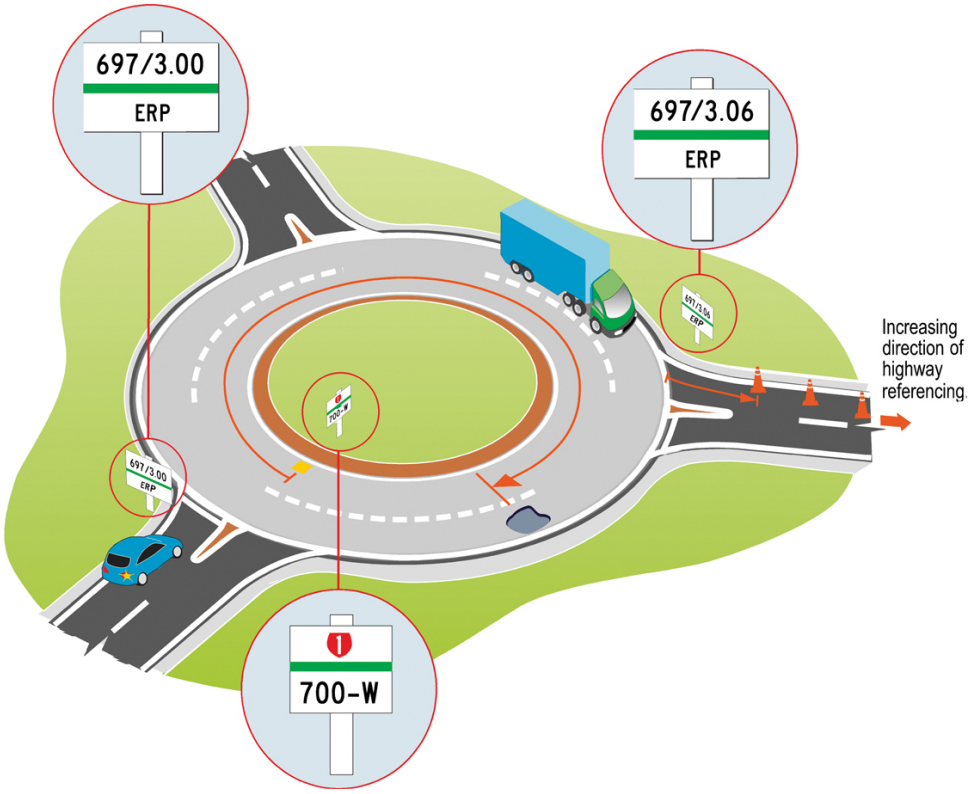
Overview

Large Roundabouts are recorded as a separate road section due to the need for pavement condition data requirements on these high demand road sections (refer to LRMS Manual section 2.4).

Criteria

Roundabouts where the circumference of the live lane closest to the centre island is longer than 150 m are to be treated as separate road sections (similar to ramps).

ERP signs shall be installed at the entrance and exit of the roundabout, since this road section will be treated as a survey distance break in the main state highway.



Exceptions

In any case where a roundabout has an inner circumference of less than 150m, it can be separated as a roundabout section for management purposes. This is at the NZTA Regional Office discretion. The installation of location referencing signs should not compromise safety.

3.6 Large Roundabouts, continued

Data Requirements

The information required to generate a road name for a roundabout is:

Element Description	Required
State Highway Number	Yes
Reference **S**tation number at the start of the RS length.	Yes
Displacement where the roundabout intersects the main state highway	Yes
Station Type	RND
Direction. This will always be "I" for increasing, where the roundabout lies on a divided highway	When required
Common State Highway number (if road is common with another state highway)	When required
Roundabout or interchange number.	Yes
Ramp number	No
Ramp Type (i.e. On or off) and Hierarchy	No
Territorial Local Authority	Yes
Regional Council	Yes

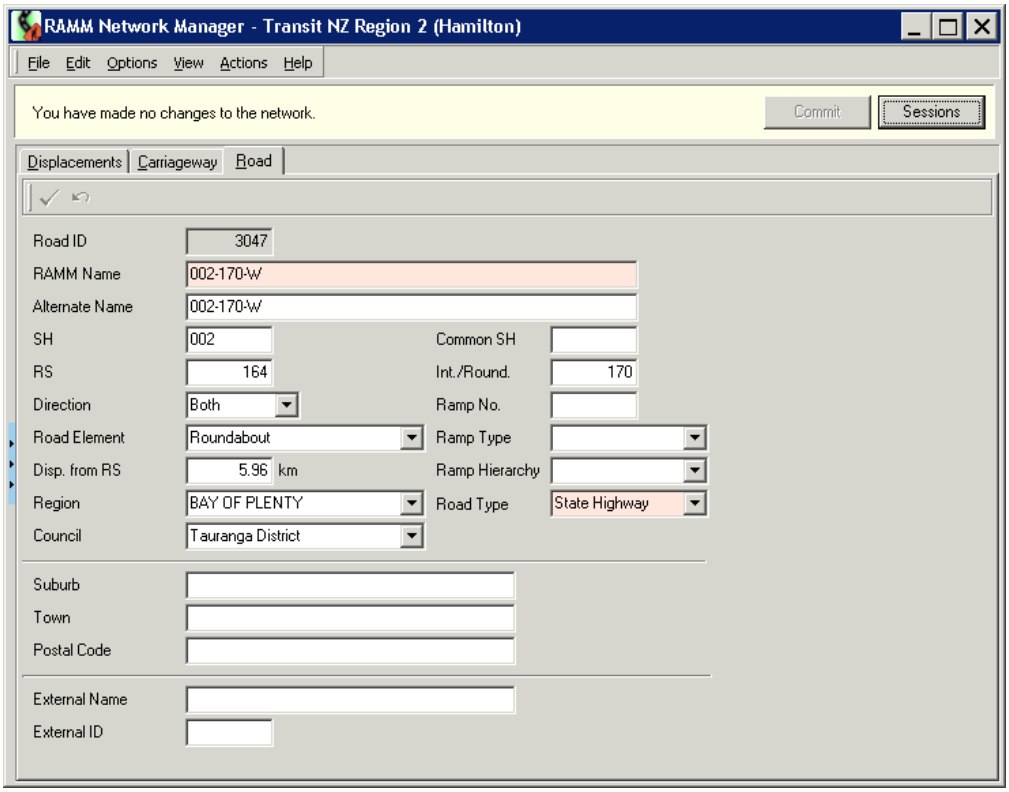
Additional Fields

Additional fields such as Local Name, Suburb, Town and Postal Code are also available in the Road Name Table.

3.6 Large Roundabouts, continued

Example

State Highway 02 RS 170 has a road name 002-170-W. The roundabout will be recorded as follows:



3.7 Carriageway Sections

Overview

Carriageways are the smallest divisions of the network. They are a fundamental element of the NZTA's asset management system. Changes to carriageway section displacements necessitate data manipulation in other tables by complex inventory updating, which can only be done by NZTA National Office, or data manipulation tools found in NZTA's asset management system.

Carriageway section changes are potentially hazardous to data integrity therefore only essential changes to carriageway sections should be contemplated. The original carriageway section concepts must be adhered to when updating.

Carriageway Sections

The following established guidelines apply when selecting carriageway sections:

- Change of pavement type, such as chipseal to structural asphalt concrete, sealed to unsealed, bridge (only bridges>50m in length).
- Significant change in traffic volumes including at nodes as defined by Traffic Monitoring System (TMS).
- Significant change in width, such as additional traffic lane or 2 m or more over a length of 100 m or more (approximately one lane width.)
- Change from rural to urban (<= 70kph), other changes in speed limit and policy changes in National State Highway Strategy (NSHS).
- Change to/from a legally-declared section of motorway.

Lengths of Sections

The longer the carriageway section the more averaging of dimensional data and other values will occur which may obscure various outputs. Conversely, very short carriageway sections (<50 m) are a nuisance value. It is difficult to comprehend the need for carriageway sections less than 50 m. The following guidelines should be applied:

- Urban carriageway sections, > 50m and < 500m
- Rural carriageway sections, > 500m and < 5000m

Common State Highways

Carriageway sections of common State Highways are not duplicated. All inventory data (including carriageway data) is to be recorded against the **lowest-numbered** State Highway only. For example where SH 1N and SH 2 are common, the data is recorded for SH 1N only.

3.7 Carriageway Sections, continued

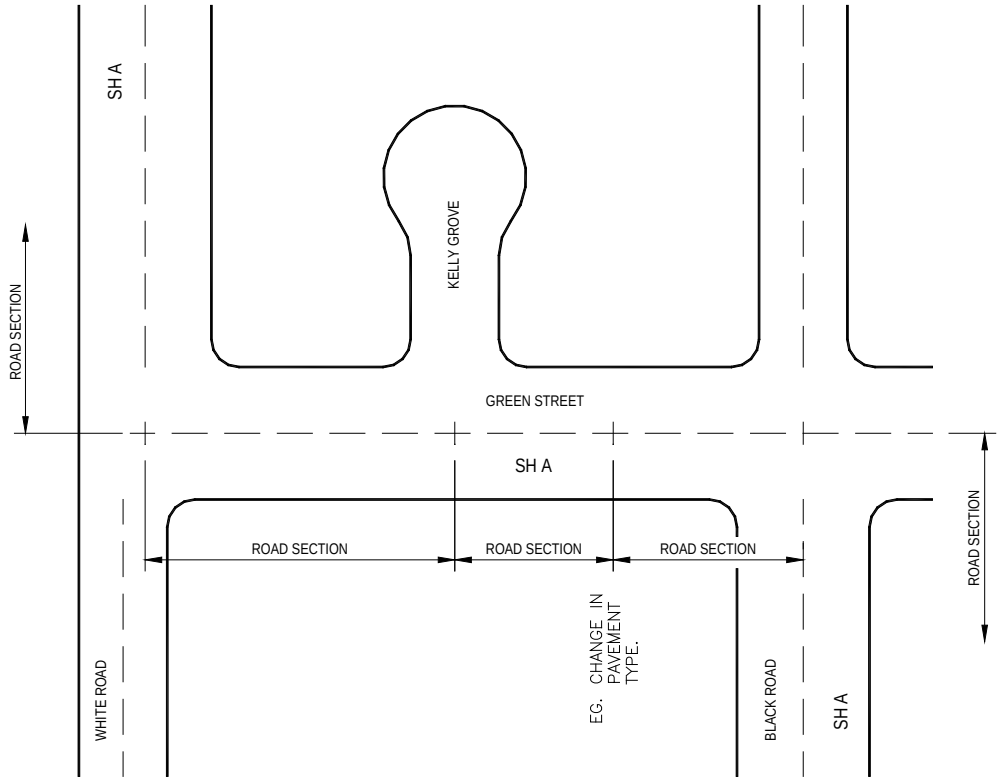
Passing Lanes

The start of a passing lane should be taken as where the 2 lanes both become full width and the end of the passing lane should be taken as where the centre line marking of the passing lanes finishes. Note: Care should be taken when road markings are replaced/repainted.

Urban Sections

In urban situations a block length is taken as a convenient carriageway section for compatibility with Local Authorities and urban maintenance strategies as shown below.

Diagram:



3.7 Carriageway Sections, continued

Updating of Carriageway Sections

In April 2006, a comprehensive review of the rural road classifications was undertaken. This review, which was some 3 years after the previous one, found approximately 18% of the classifications incorrectly classified. These changes were implemented in RAMM in September 2006 after further consultation with NZTA's Regional Offices. A process has now been established for annual updating of road classifications and June 30th as the date for all these changes to be implemented in RAMM. The Data Analyst at NZTA National Office will conduct these changes. To this aim it is important that the carriageway sections are checked and amended due to the above and also to the guidelines mentioned in 'Road sections' on page 3-17.

Network Updates

The need to maintain an accurate and up to date network is vital to NZTA's business.

Primary Information

It is NZTA's objective to update the base network model for new alignments within 10 days of these being open to traffic.

NZTA National Office implements network changes, and asset data cannot be added until the network change has been completed.

To achieve this timeframe the following minimum must be provided on a Network Update Form to the NZTA regional office for approval:

1. A clear diagram of the network before and after the network change
2. The start points and end points* of any new construction
3. The new measured lengths of any reference station lengths, which have changed, and the new measured lengths of any roads, which have changed.

*To avoid data loss it is important that only sections following an entirely new alignment or which have been totally reconstructed are marked for deletion. The start and end of construction should therefore be identified using both the original and new route positions. Refer to the Network Update Form in the LRMS Manual for more detail.

3.7 Carriageway Sections, continued

Secondary Information

At the same time, or within 8 weeks of the opening of the above minimum, NZTA requires the following data:

4. New RS diagrams with measured geographic coordinates
5. A spatial representation of the centreline of the new alignment

NOTE: Prior to the start of the High Speed Data (HSD) survey for each Network Management Area, (the programme for which is available on the NZTA website), ALL items 1 to 4 inclusive needs to be collected at least 1 month earlier.

SECTION 4

DATA DELIVERY PROCEDURES

4.0 Introduction

Introduction

This section details the process of delivering RAMM data to NZ Transport Agency's (NZTA) Master RAMM database.

References

Location Reference Management System Manual, SM051 (LRMS)

The SHDOM manual is to be used in association with the SM051.

The SM051 details the requirements of the current location referencing system and includes the following forms:

- Network Update Form
- Reference Station Locality Diagram
- Route Position Nomenclature
- Location reference sign schedule example
- Log of Electronic Tripmeter Calibration
- Spatial data specification

In this plan

This plan covers the following topics.

Topic	See Page
NZTA's Quality Process	4-2
General Requirements	4-3
Field Data Suppliers	4-4
RAMM Managers Responsibilities	4-4
Regional Office Responsibilities	4-5
National Office Responsibilities	4-6
Activity Reporting	4-7
Milestone Activity Reporting	4-8

4.1 NZTA's Quality Process

Introduction All data delivered to NZTA will go through a quality audit prior to loading. This is best shown by the flow chart below.

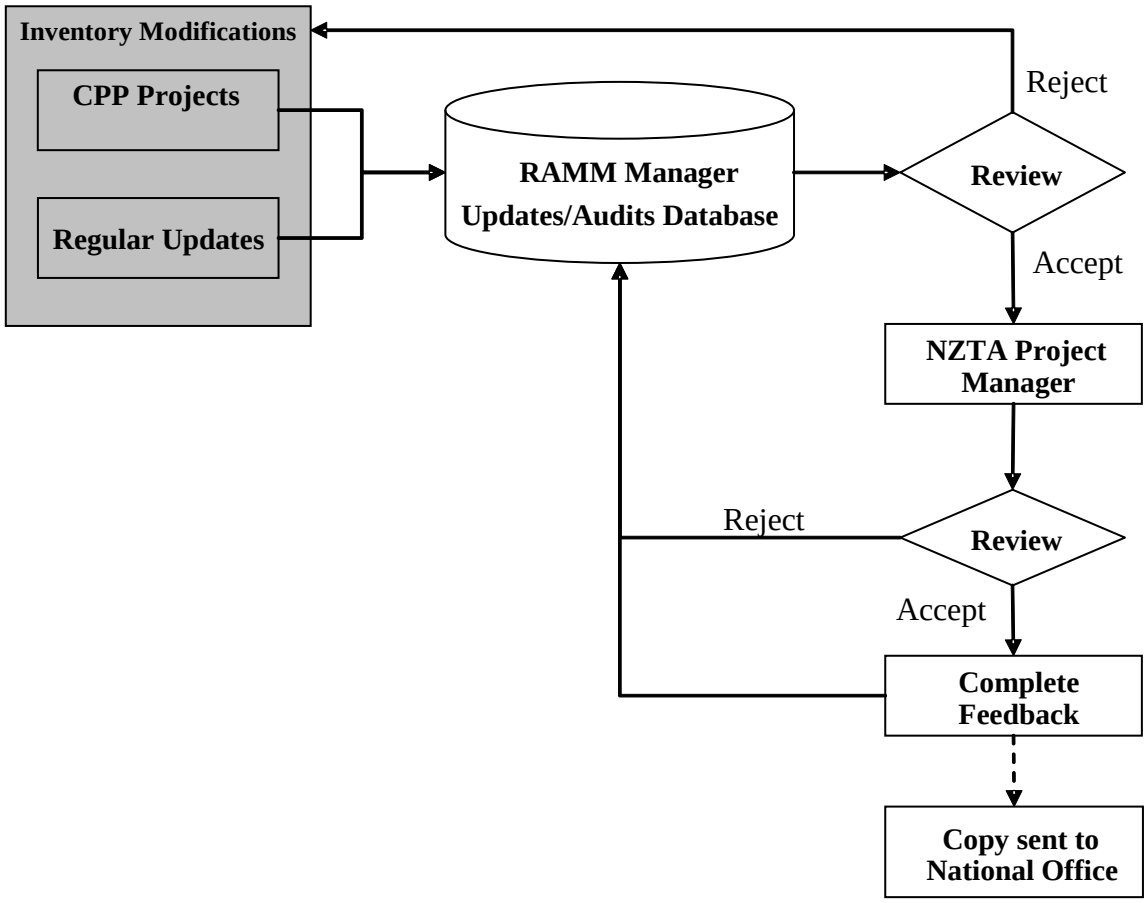


Figure1: NZTA's Quality Process

4.1 NZTA's Quality Process, continued

Glossary

RAMM Manager

The RAMM Manager is usually the Network Management Consultant (NMC), however, in areas that are managed under a PSMC contract the PSMC contractor is to be taken as the RAMM Manager.

NZTA Project Manager

The NZTA project manager for the state highway asset maintenance, also known as the Area Engineer, whose responsibility is to manage the consultant as defined above (either the NMC, or PSMC contractor).

RAMM Champion

Asset Database Administrator

Asset Information Engineer

4.2 General Requirements

Introduction

This section discusses requirements that affect all parties involved in the collection and maintenance of asset information data, including:

- NZTA Staff, those at a regional and/or national role involved in asset information quality
- RAMM Manager, responsible for updating and auditing the database
- Field Data Suppliers of asset information collected in the field.

Quality Assurance

NZTA requires all suppliers working on the state highway network to have an internal Quality Assurance (QA) system. This QA system must involve a process to handle non-conformances with corrective actions.

Certification

NZTA has introduced a two tier certification requirement for individuals involved with the collection of asset information data and the updating of the NZTA master database, these being:

Level 1 – Field Data Collection

All individuals that collect data in the field are required to have been certified to this level.

Level 2 – Database Updating

All individuals that add/update or delete data to the NZTA master database must be certified to Level 2.

As a prerequisite for being certified to Level 2 the individual must be certified to Level 1 – Field Data Collection.

These certification levels are required on all new contracts as of 1st July 2007 and all existing contracts by 30th June 2009.

4.3 Field Data Suppliers

Introduction

The collection of quality data in the field by suppliers is critical to the overall value of an asset information system, 'garbage in garbage out'.

Certification

All individuals that collect data in the field are required to have been certified to Level 1 – Field Data Collection. Note: It is possible for collectors of specialised data (e.g. Signs contractors) to be certified to collect only their 'specialised' type of data.

4.4 RAMM Managers Responsibilities

Introduction

Confidence in the data accuracy being delivered is important. The outputs from the Asset Register (currently stored in RAMM) are used in the development of Asset Management Plans, Asset Valuation, Contract Schedules, etc. The most efficient method of ensuring quality data is through a Quality Assurance (QA) system during data delivery.

Certification

Data Collection and Auditing

RAMM Managers are required to collect and audit data collected in the field, and to update the NZTA RAMM database. It is therefore, required that staff that collect and audit field data are certified to Level 1 – Field Data collection.

Database Updating

Staff that update the NZTA RAMM Database are required to be certified to Level 2 – Database Updating (which requires Level 1 – Field Data Collection as a prerequisite).

Responsibilities

RAMM Managers are required to collect, update and audit data on behalf of NZTA and as in accordance with the Asset Information Annual Planner (AIAP) in Appendix 5. This involves:

- Ensuring NZTA standards are met (see section 5, Auditing Procedures)
- Receiving inventory information, maintenance activity and RAMM visual condition rating data as necessary
- Carry out audits on data captured in the field
- Updating the NZTA master database based on changes to the network.

4.5 Regional Office Responsibilities

Introduction

NZTA's Regional Offices project manage the network management contracts & capital works projects.

Quality Assurance

It is responsibility of the NZTA Area Engineer to ensure that the following data are delivered in accordance with the Asset Information Annual Planner (AIAP) and that the documentation is correct. This includes deliverables associated to the following:

- Inventory Updates
- Visual Condition Rating
- Forward Works Programme
- Maintenance Activities

Certification

All NZTA RAMM Champions and additional staff that are involved in the collection and auditing of asset information data must be certified to Level 2 – Database Updating.

Audits

The Project Manager shall undertake audits of the consultant, deliverables prior to loading, this can either be an independent party or internally.

Acceptance of data

The project manager is required to ensure that the deliverables are complete and correct prior to either loading into RAMM by regional office staff or prior to the data deliverable forms being completed.

At which time they send copies to the RAMM Database Administrator at National Office and a copy returned to the RAMM Manager.

Additional Responsibilities

Additional to the responsibilities identified above the Regional Offices are responsible for:

- Management of the Traffic & Loading tables.

4.6 National Office Responsibilities

Role

In the area of data delivery National Office provide technical support to the regional offices.

National office manages the bulk loading of:

- Traffic data

National Office maintains the following tables:

- Road names
- Carriageway
- Lookup codes
- High-speed data (roughness, rutting, texture, geometry, etc.)
- SCRIM
- Falling Weight Deflectometer
- CAS data

National Office also maintains the network model (LRMS system) held within RAMM.

Responsibility

National Office staff will review documentation and may carry out audit checks as required and provide feedback to the Regional Office.

4.7 Activity Reporting

Overview

In 2007 a significant change to the loading and maintenance of the NZTA RAMM Database transferred from NZTA National Office to the RAMM Manager. As such the historical batch delivery method of data delivery is being replaced by reporting on the level of activity.

There are two types of activity reporting:

- Monthly Activity Report
- Milestone Activity Report

Monthly Activity Report

RAMM Managers are required to provide a Monthly Activity report on the activity carried out for the month, this to be carried out on the Asset Data Activity Form and provide comments that maybe of interest including an explanation where there is no update due to 'no activity'. These reports should be delivered by the dates shown on the Asset Information Annual Planner (AIAP) in Appendix 5 of this manual. Please refer to the Asset Information Engineer for any further clarification.

Milestone Activity Report

The Milestone Activity Report is to provide documentation that the database is up to date at key times in the year. The periods ending:

- 31st December
- 31st March
- 30th June

and should be delivered by the dates shown on the Asset Information Annual Planner (AIAP) in Appendix 5 of this manual. Please refer to the Asset Information Engineer for any further clarification.

The Milestone Activity Report will include the following components:

- Asset Data Producer Statement
- Asset Data Activity Form
- Pavement and Surfacing Reconciliation Form
- Maintenance Activity Form

4.8 Milestone Activity Reporting

Asset Producer Statement Form

The Asset Producer Statement Form is required to be completed for milestone deliverables.

The purpose of this form is to:

- Contact details of the RAMM Manager providing the producer statement
- Demonstration of ownership
- Give an opportunity for feedback

Unique Transfer ID

The RAMM Manager is required to enter a "Unique Transfer ID" i.e. Bay of Plenty East could use BOPE3, to identify the 3rd data deliverable to NZTA. Each additional attached form (such as the Data Activity Form) should have the Transfer ID box populated with the same code.

The code is to identify which forms belong to which deliverable.

Example: "WWG05"

"WWG" relates to West Wanganui as per Appendix 1, Network Management Area codes.

"05" relates to the sequential number of the deliverable.

Documentation

The following documentation shall be supplied with the Milestone Activity Report (Note: email copies will not be acceptable):

- Asset Data Producer Statement Form
- Asset Data Activity Form
- Pavement and Surfacing Reconciliation Form
- Maintenance Activity Form

4.8 Milestone Activity Reporting, continued

Pavement and Surfacing Reconciliation

Pavement and Surfacing data is critical to many aspects of NZTA's business, including forward works programming, pavement performance modelling and research.

The primary purpose of this form is to ensure that all pavement and surfacing data is captured and stored in the asset register and that NOMAD has been updated.

NOMAD (National Optimisation of Maintenance Allocation by Decade) is the repository of the 10-year Forward Works Programme (FWP). The principal functionality of NOMAD is described in Section 4 (Forward Work Programme) of the State Highway Asset Maintenance Manual, SM020 (SHAMM).

End of Year (30th June)
A final reconciliation of the quantities of surfacing and pavement works must be provided with the inventory deliverable due at the end of June each year.

Maintenance Activity

Maintenance activity is used in a number of analyses, such as investigating for Area Wide Treatments (AWT) and as an input into the pavement deterioration modelling process to produce the maintenance cost index (MCI). The MCI is used to predict future maintenance costs and assist in the optimisation of treatments over the analysis period (20 years).

The primary purpose of this form is to ensure that all maintenance activity data is captured and stored in the asset register.

Checks carried out

Provide copies of checks that were carried out on the data being delivered e.g.:

- Appropriate desktop audit reports
- Other database integrity reports

Quality Assurance

Provide hardcopy outputs of the items that were field validated by the Consultant.

Attach any non-conformance and corrective actions that were produced as part of this deliverable.

Support

The RAMM Manager initially contacts the local NZTA regional RAMM champion. The regional champion may direct you to the National Office Database Administrator.

4.8 Milestone Activity Reporting, continued

Asset Data Producer Statement (Example)

RAMM Manager

Producer Statement ID: EC04

NMA: Chatham Island

RAMM Manager: Easterly Consultants Ltd

Contact Person: Joe Bloggs

Phone No.: 03 465 7963

Typical Printouts attached Y / ~~N~~

Attached Forms

- ☑ Asset Data Activity
- ☑ Pavement and Surfacing
- ☑ Maintenance Activity

Purpose: This is the end of year inventory update and surfacing/pavement achievement deliverable.

Signed: *Joe Bloggs* Date: *5/7/2007*

NZTA Regional Office (completed by regional staff)

Associated documentation satisfactory Y / ~~N~~

Forwarded to ~~RAMM Manager~~ / NZTA head office (delete as reqd)

Reviewed by Signed: *L Croft* Date: *16/7/2007*

Comments:

NZTA National Office (completed by national office staff)

Documentation supplied as indicated Y / ~~N~~

Received Signed: *T Moore* Date: *20/7/2007*

Copy of completed form sent to: ☑ Regional Office
☑ Consultant

Comments:

4.8 Milestone Activity Reporting, continued

Maintenance Activity Update Form (Example)

RAMM Manager Name: Easterly Consultants Ltd **Transfer ID**: EC04

Network Management Area: Chatham Islands

RP related maintenance costs	$ 356,150.52	(Included in chatham.mcb file)
Cyclic Item	$ 76,230.00	(Not included in chatham.mcb file)
Non Cat 1 related items (i.e. minor safety works carried out as an additional service in the HM contract)	$ 12,000.00	(Not included in chatham.mcb file)
Off Pavement Work (i.e. rest areas)	$ 456.08	(Not included in chatham.mcb file)
Total Maintenance Costs	**$** 444,836.60	(from HM Contracts)

The certified for this period is $ 444,841.60 , with a difference of $5.00.

Signed: *Joe Bloggs* Date: 16 / 7 / 2007

Physical Works Contract	Date		Row Count	Total $	Comments
	From	To			
Highway Maintenance Contract					
HM3/01	1/04/07	30/6/07	762	356,150.52	
Signs					
Vegetation					
Other					

4.8 Milestone Activity Reporting, continued

Asset Data Activity Form (Example)

RAMM Manager Name: ……...

Network Management Area: ……

Reference Station Locality form attached Y/N
Reference Station Modification Form attached Y/N
Route Modification Form attached Y/N
Lookup table amendments Y/N

Delivery ID:

Comments: ……

……

……

……

RAMM Table	Row Counts			Table Statistics			
	End of Previous Period	End of Current Period	Sum of Changes	New Records	Updated Records	Deleted Records	Sum of Changes
Roadnames	43	20	23	28	6	5	23
C_surface							
Carr_way							
Drainage							
Features							
Islands							
Loading							
Markings							
Minor structure							
Pavement Layer							
Railings							
Retaining Wall							
Shoulders							
Signs							
Street Lighting							
Surface Water Channel							
Traffic							
Rating							
Loading							
Roughness							

4.8 Milestone Activity Reporting, continued

Pavement & Surfacing Reconciliation Form (Example)

RAMM Manager Name: Easterly Consultants Limited…….

Network Management Area: Chatham……

Lookup table amendments ~~Y~~/N

ID:

EC04

Comments
……..

……

Description	RAMM			Reconciliation			Comments
	Current Deliverable (metres)	Previously Reported (metres)	Total to date (metres)	Current Physical Works Target (metres)	Proman Target Length (metres)	NOMAD Reported (metres)	
Chip Sealing							
1st Coat Seals Maintenance Chip Seals Other Chip Sealing Sub-total Chip Sealing							
Thin Asphaltic Surfacings							
Thin Asphaltic Surfacings							
Pavement Renewals							
Rehabilitations Road Reconstructions Area-wide Pavement Treatments Structural Asphaltic Concrete Maintenance Overlays Sub-total Pavement Renewals							

SECTION 5

AUDITING PROCEDURES

5.0 Introduction

Background

The accuracy and completeness of all tables in the Asset Register is vital to NZ Transport Agency (NZTA) for the following key functions:

- An accurate reliable inventory and valuation of the roading asset can be obtained
- Reliable reporting at the network or project level
- Credible treatment length summaries and the production of multi-year forward works programmes based on the Asset Register
- Statistical comparisons between the regions can be made where databases are consistent and accurate data is provided
- Credibility of the asset information system is important for end users
- Enable accurate inputs for contracts that rely on this data during the tendering and performance monitoring processes.

Timing

A desktop validation should be carried out 8 months prior to the completion of an existing network management/PSMC contract. This is to allow tenders for the upcoming contract to be made aware of any possible issues.

A follow-up desktop validation should be carried out in Year 2 of an NMC/PSMC contract. This is to measure the impact of the NMC to correct any issues identified in the pre-tender validation and identify areas for improvement prior to the completion of the contract.

In this Section

The topics in this section are listed below:

Topic	See Page
Desktop Audit Overview	5-2
Desktop Audit Methodology	5-3
Reporting	5-5

5.1 Desktop Audit Overview

Purpose

The desktop audit process is a relatively inexpensive means of providing a measure of the overall quality and integrity of the database information, when used in conjunction with an understanding of the roading network.

The desktop audit looks at the following aspects:

- Identify obvious errors in the data
- Check the completeness of the data
- Highlight any possible areas of concern for further investigation
- Indicate the level of confidence that can be assigned to the current system outputs
- Determine a strategy to reinstate the database to an acceptable standard if significant errors are found.

Scope

The desktop audit process involves checking all tables currently maintained by NZTA in accordance with the section 2, Asset Register.

Through the desktop audit process, any inconsistencies or errors will be reported recommendations regarding the impact inaccuracies have on the database and a strategy for the reinstatement of the database information.

Each table shall be checked in detail to ensure:

- Columns that are critical to the operation and use of the database are complete; this is all columns identified with a 'T' in the asset register.
- Displacements of the various features are within the correct carriageway sections or lie within the total length of the road.
- Columns that access other tables are correctly joined to those tables,
- The data is free of duplicates,
- The data in all columns is valid. This refers to the data satisfying the software criteria. The check does not necessarily mean the data is correct in the field.

5.2 Desktop Audit Methodology

Overview

The desktop audit templates are divided into two sections or audit schedules for each asset type or table, these being:

- Table Statistics Check
- Column Validation Checks

Table Statistics Check

This audit schedule contains basic statistics from each table, e.g., the number of culverts per kilometre of rural road or the number of rating sections per year. These checks are broad "sanity" checks that may indicate gross incompleteness, inconsistencies or duplicates in the data.

Therefore it is expected that personnel with a good knowledge of the road network and Asset Information System will carry out these checks so that any anomalies can be identified.

Column Validation Checks

This section of the spreadsheet is used to check the validity and completeness of the data for all columns that are considered important to the operation and outputs from the AIMS.

A description of each column in the tables follows;

Column(s) Checked
The column on which the checks were carried out,

Check Carried Out
A description of the check carried out on the data,

Audit Method
The method used to check the data, i.e., standard RAMM audit/validation report or visual screen check. The path to locate and run the report is also provided.

Number of Rows in Error
The number of rows found with missing, incomplete or erroneous data.

Percentage of Total in Error
The number of rows in error expressed as a percentage of the total number of rows in the table.

5.2 Desktop Audit Methodology, continued

Column Validation Checks

Action Required to Correct Errors or Incompleteness
The course of action required to update each individual table and column to correct any errors found.

Office/Field
An indicator showing if the errors can be corrected in the office or if a field check is required.

Responsibility
The organisation responsible for correcting the errors or incompleteness. This may include:

- NZTA National Office (NO)
- NZTA Regional Office (RO)
- NMM Consultant (NMC)
- Other (OTH)

Appendix Reference:
A reference to the relevant appendix in the report so that any incorrect data that is considered difficult to locate can be identified and easily updated in the office. It is not necessary to provide appendices for any incorrect data that can be easily located by carrying out a simple screen enquiry.

5.3 Reporting

Overview

The audit and validation work completed shall be reported to NZTA together with recommendations for action/improvements.

Report Structure

The desktop audit report shall contain the following components:

- An executive summary
- A summary of the audit results
- Discussion of the audit results
- Recommendations for action/improvements to the database. This could include:
    - Field checks required (minimum 10% sample)
    - Collection and entry of missing data
    - Deletion of duplicate or obsolete data
    - Update table for obvious errors that could be corrected in the office
    - A request for NZTA to confirm their policy regarding the collection of some data, etc.
    - Responsibility for actions, e.g. NZTA National Office, NZTA Regional Office, Network Maintenance Management Consultant.
- It should be noted that some data elements have recently been introduced to RAMM over time and are only recorded from the effective date. These exceptions should be considered when making recommendations for action and improvement to the database, i.e. PSV of sealing chip was introduced in 1999, therefore it is usually only practical to ensure that as of the 1999/00 sealing season the PSV is recorded.

Timing of Deliverable

The deliverable of the Desktop Audit, is initiated as specified by the NZTA Regional Office and shall be delivered in accordance with the Asset Information Annual Planner (AIAP) as part of the regular inventory updates, see Appendix 5 of this manual or refer to the Asset Information Engineer for further clarification.

SECTION 6

FIELD VALIDATION PROCEDURES

6.0 Introduction

Background

The accuracy and completeness of all tables in the Asset Register is vital to NZ Transport Agency (NZTA) for the following key functions:

- An accurate reliable inventory and valuation of the roading asset can be obtained
- Reliable reporting at the network or project level
- Credible treatment length summaries and the production of multi-year forward works programmes based on the Asset Register
- Statistical comparisons between the regions can be made where databases are consistent and accurate data is provided
- Credibility of the asset information system is important for end users
- Enable accurate inputs for contracts that rely on this data during the tendering and performance monitoring processes.

In this Section

The topics in this section are listed below:

Topic	See Page
Overview	6-2
Reference Station Length Checks	6-3
Validating the Carriageway Table	6-4
Validating Inventory Data	6-5
Database Updates	6-7
Supporting Documentation	6-8

6.1 Overview

Purpose

The purpose of the field validation is to:

- Check the longitudinal accuracy of LR signs in accordance with Part B of the Location Referencing Management System (LRMS) Manual, SM051.
- Check the completeness and integrity of all data that can be physically checked
- Correct any errors or omissions
- Highlight any possible areas of concern for further investigation
- Indicate the level of confidence that can be assigned to the current system outputs
- Determine a strategy to reinstate the database to an acceptable standard if significant errors are found
- Make recommendations regarding:
  - The impact any incompleteness has had on the database
  - Improvements to the management of routine data collection
  - Possible changes to NZTA policy

Scope

The field validation work involves extracting the existing data from the Asset Register and checking all road elements that can be physically inspected in the field. A schedule of LR signs that require update shall be supplied to the Maintenance Contractor for field adjustments, while the RAMM operator shall be supplied with details of any other road asset requiring updates on the Asset Register.

Procedure

An overview of the procedure is show below:

Step	Action
1	Confirm the reference station (RS) locations and lengths according to Part B of the LRMS Manual, SM051.
2	Confirm location, accuracy and layout of Location Referencing signs in accordance with Part B of the LRMS Manual, SM051.
3	Review the carriageway section locations and displacements.
4	Validating the inventory data based on the confirmed location reference points.
5	Database updates.
6	Co-ordination of validation work with routine RAMM updates.

6.2 Reference Station Length Checks

Overview

Prior to the commencement of any validation work, the overall Reference Station lengths shall be checked for accuracy in accordance with the following NZTA's publication:

- *Location Referencing Management System Manual* SM051.

Procedure

The procedure for checking the length of a reference station for the purposes of asset register validation is as follow:

Step	Action
1	The vehicle odometer is calibrated and checked on a NZTA approved calibration strip in accordance with SM051.
2	Single continuous pass is made over the RS length at a normal safe driving speed, staying as close to the centre of the increasing lane as possible. The distance achieved shall be recorded to the nearest 1m.
3	The originally recorded RS length is considered acceptable if the measurement is within 0.15% $\pm$ 1.0m. If the RS length is outside tolerance further measurements are required in accordance with the *Location Referencing Management System Manual*, SM051.
4	Produce a table showing the RS checks carried out.

Example

Below is an example of the RS check report:

SH	RS	Existing R/S Length (m)	Measured Length (m)	Diff (%)	Diff (m)	Allow Tol. (m)	Accept (Yes/No)
1N	1	14,686	14,671	-0.10%	-15	+/- 23	Yes
1N	16	15,890	15,892	0.01%	2	+/- 25	Yes
1N	32	14,840	14,872	0.22%	32	+/- 23	No
1N	47	14,790	14,794	0.03%	4	+/- 23	Yes
1N	62	20,670	20,700	0.15%	30	+/- 32	Yes
1N	83	5,700	5,696	-0.07%	-4	+/- 10	Yes
1N	88	7,660	7,674	0.18%	14	+/- 13	No
1N	96	13,337	13,347	0.08%	10	+/- 21	Yes

6.3 Validating the Carriageway Table

Overview

In validating the state highway data, it maybe necessary to review and change the carriageway section locations and displacements.

Try to place the splits at the following intervals:

Urban	50 – 500m	(ideally approximately 150-250m)
Rural	500 – 5000m	(ideally 1500 – 2500m).

Criteria

The following criteria controls the location of carriageway sections:

A change in traffic lanes, such as what occurs at a passing lane. Where possible avoid using start/end of the passing lane line to define these points. Try to use a permanent feature within 50m, such at an intersection, bridge, sump, or manhole etc.

A change from urban to rural. Use speed restriction signs, <70km is defined as urban.

A change in pavement type, such as sealed to unsealed, change from thin surface flexible to structural asphaltic concrete or bridge (only where bridges are > 50m in length).

A significant change in width of carriageway. A suggested minimum width change is approximately 3m for a minimum of 150m long, occurring at an obvious location. Avoid poorly defined splits such as short widths, or seal widening at intersections.

A change in traffic volume. This would occur at major intersections and would be a major node in NZTA Traffic Monitoring System (TMS).

A change to/from legally declared Motorway. This would occur when a legally declared' motorway reverts to a NSHS R1, R2, R3, R4 or NSHS Urban or vice versa.

Updating

All carriageway section changes shall be submitted in hardcopy form unless otherwise agreed with NZTA so that these changes can be approved and the database updated.

6.4 Validating Inventory Data

Overview

After confirmation of the location referencing system, the detail table data can be validated in accordance with Section 2, Asset Register that defines the extent of data requirements for each asset type.

It is recommended that the existing data be extracted to spreadsheets for editing either in hardcopy format or laptops.

Validation of the data shall include:

- Checking the completeness of the data and if necessary collecting any missing information
- Collecting any new information required by NZTA
- Correcting any errors in the existing data.

Displacement of Inventory Items

The location referencing signage shall be used for opening and closing surveys. The electronic distance meter shall be reset to the recorded displacements at the start of each new location reference sign.

Ideally any small misclose evident at each location referencing sign should be distributed proportionally (rubber banded) over the displacement measurements. This is perhaps more easily achieved where the data is in electronic form.

Errors of less than 0.1% can be ignored and between 0.1 – 0.3% should be adjusted out. Major misclose shall be thoroughly investigated and the information resurveyed.

Surfacing Widths

If road width variations are significant their effect should be incorporated into the recorded dimensions. Calculate the relevant area and use the area divided by the length to estimate the average width over the surfacing length.

Where there are significant changes in width in a surfacing length > 1.5 for a length > 100m (i.e. crawler lane) a separate record should be created.

Lane Widths

At sites where there is a passing lane, the lane width should assume to be the average of the two lanes.

Surfacing Design Life

Chipseal design life should be similar to that assumed in the FWP (NOMAD). The design life default values for various chip seals as set in RAMM can be found in RAMM Manager – Maintenance/Lookups/Surface/Materials.

6.4 Validating Inventory Data, continued

Shoulder Widths

Shoulders will usually be of variable width, which will be affected by maintenance methods, blurring at feather edges and seal edge breaks. The "parking rule" can be used as guide to what constitutes as the shoulder. That is, if it is road formation and its slope is not so steep as to make parking uncomfortable, it can be considered as shoulder.

It is considered only necessary to remeasure widths when there is a difference between the recorded and measured distance by more than 0.5m over a consistently long length (>100m).

Distance to Seal from SWC

This need only be remeasured when there is a difference between the recorded and measured distance by more than 0.5m over a consistently long length (>100m).

Offsets

Should be remeasured when there is a difference between the recorded and measured distance by more than 0.5m.

The exception to this rule is signs, which may have a default of 6m for signs on the main carriageway and 15m for signs on side roads.

Culvert Sizes

Culverts should be measured and recorded to the appropriate "nominal" size. Almost all pipes will have a diameter as a multiple of 75mm and they should be recorded accordingly. Thus a 590 or 620mm diameter pipe should be recorded as 600mm diameter pipe. The next size up would be 675mm diameter and the next size down 525mm diameter.

For box culverts a greater flexibility may be used but dimensions should be recorded to the nearest 0.1m. For example a culvert 2.05m wide x 1.25m deep would be recorded as 2.0m x 1.2m.

Barriers

Barriers between a divided carriageway should be recorded against the increasing direction of the road.

Partial replacement or an extension to an existing barrier should be a separate record; however, the minimum length for such a record is 5m.

6.5 Database Updates

Overview

All data delivery shall be in accordance with Section 4, Data Delivery Procedures.

Survey and Batch Headers

Survey header information shall be preserved for all condition and high-speed tables. Batch header numbers shall be preserved for the Maintenance Cost table.

Carriageway Table

Any new carriageway sections shall be set up first. Any necessary changes to existing carriageway sections should then be made (refer to Section 3.7 of this manual for reasons to update carriageway sections).

Inventory Tables

At the conclusion of entering inventory data, the RAMM audit fields "Added On" and "Added By" shall be set to the "current date" and an identifier for the consultant completing the work respectively.

Consultant	Code
Beca Carter Hollings & Ferner Ltd	BCHF
MWH Ltd	MWH
Opus International Consultants Ltd	OPUS
Inroads	INROADS
Transfield	TFLD
Downer EDI Works	WORKS
Other	Contact NZTA

Data Manipulation

All data shall be manipulated into appropriate roads and road sections.

Instructions for deletion of the existing data and loading of the new data shall be supplied. This will include proposed changes to the lookup tables.

Coordination with Routine Updates

The Asset Register validation data delivery work shall be coordinated with routine updates that are required as part of NZTA's contracts.

In carrying out the validation work, there is a potential to introduce errors or duplicates in the validated data if these routine updates are not managed efficiently.

6.6 Supporting Documentation

Overview

Additional to the standard documentation required with data delivery, Section 4, Data Delivery Procedures, a field validation report is required.

Report Requirements

The field validation report shall contain the following components:

- An executive summary
- A summary of the audit results
- Scope of work
- Method
- Discussion of the audit results
- A brief statement describing the reasons for the changes made to each table
- Recommendations for action/improvements to the database.

Example

An example of the recommendations could include:

- Field checks required for larger sample of the network
- An assessment of the impact any incompleteness has had on the database
- A request for NZTA to confirm their policy regarding the collection of some data
- Responsibility for actions, for example NZTA National Office, NZTA Regional Office, Network Management Consultant (NMC).

SECTION 7

TRAFFIC DATA

7.0 Introduction

Overview

The use of traffic data and its importance for traffic profiling has increased dramatically in recent years due to pavement modelling (dTIMS analysis) and also as supportive data for the National State Highway Strategy and Asset Management Plan.

This section details the processes in place to update traffic data for the State Highway network.

References

Traffic Monitoring System (TMS)

A user manual for the software is distributed with the electronic help file, which is accessible to registered users through the TMS website.

http://tms.transit.govt.nz

Traffic Monitoring for State Highways (SM052)

In this Section

The topics in this section are listed below:

Topic	See Page
Overview of Process	7-2
Responsibilities	7-4
Notification	7-5

7.1 Overview of Process

Process

The Annual Average Daily Traffic (AADT) and Loading data from TMS is transferred to RAMM via the TMS / RAMM interface within February.

The up-to-date Traffic and Loading data is loaded into RAMM.

Traffic and loading estimates for each RAMM carriageway section is created. These estimates are given a reading date of 31/12/20## (latest year)

TMS and RAMM

Data from TMS is transferred to RAMM. The link between the two systems is established in several ways:

- TMS Count site located by Reference Station and Route Position (RSRP)
- TMS site id
- Upper node (RSRP) defining start displacement of Traffic Link
- Lower node (RSRP) defining end displacement of Traffic Link

Site Ids

The site ID is merely a unique reference for each site, which happens to be generated using site location information. True location is established from the RSRP.

Site ID format

Each site recorded by the system must have a unique identifier in the format “sssdnnnn” where:

sss = State Highway reference - alphanumeric, case sensitive, i.e. use upper case only
d = Direction
nnnn = Running distance to site from start of the State Highway

7.1 Overview of Process, continued

Site ID Direction Codes

The direction (d) must be one of the following values**:**
0 – Both Directions
1 - Increasing
2 - Decreasing
3 - Increasing ON ramp, number in a clockwise direction from the increasing lane.
4 - Decreasing OFF ramp
5 - Decreasing ON ramp
6 - Increasing OFF ramp
7 – Spare
8 - Roundabaouts
9 is used where there is more than one monitoring site within a kilometre

Example

The site ID "00250937" represents:

- Site on State Highway 2
- Decreasing On Ramp
- 937 kilometres from the SH origin

7.2 Responsibilities

Actions

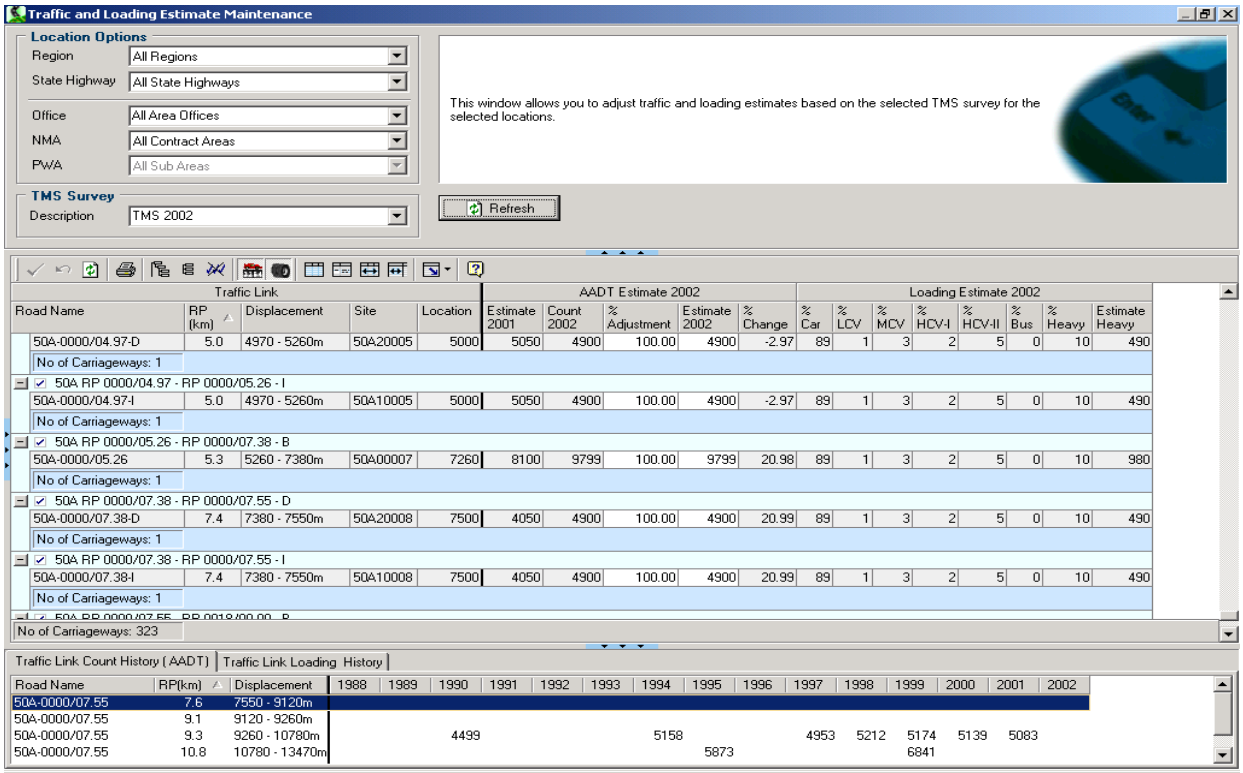
NZ Transport Agency (NZTA) National Office

National Office staff will load the TMS/RAMM interface traffic file and notify the Regional Office once completed. It is also the responsibility of National Office to update the Traffic and Loading Tables in consultation/conjunction with Regional Office at other times throughout the year.

NZTA Regional Office

Upon confirmation that the TMS data has been successfully loaded into the RAMM database, the Regional Office staff check the accuracy of the traffic and loading estimates.
This can be done by accessing:
RAMM Manager/Projects/TMS/Create Traffic and Loading Estimates.
Once the estimates are generated they can now be checked against the previous years estimates and/or the traffic growth established from the historic traffic and loading counts. All estimated data can be adjusted to match variances between road sections over the traffic link.

Note: The RAMM Champion and Traffic Champion should meet regularly to ensure any changes to each network are amended and both networks match.



7.3 Notification

Notification

Once the Regional staff has confidence that the traffic data within RAMM (inc. the estimates) is acceptable, notification via email shall be sent to NZTA National Office, Asset Database Administrator.

Expected completion date for the Traffic profile data shall be in accordance with the Asset Information Annual Planner (Appendix 5 of SHDOM).

SECTION 8

Transit LTPP - Site Maintenance Database

8.0 Introduction

Overview

To understand pavement performance the NZ Transport Agency (NZTA) has established a number of Long-term-Pavement Performance (LTPP) calibration sections in order to monitor the deterioration of pavements. These 300m long sections are established across New Zealand. Data from the LTPP sections are used to calibrate the pavement models used in dTIMS by showing the affect of maintenance activities that have been carried out over the life of the calibration section. Accurate models will enable an accurate forward works programme to be developed and maintained.

LTPP Site Maintenance Database is a front-end application to store and deliver maintenance recorded on the NZTA calibration sections (LTPP Sites) to NZTA National Office

The functionality of the LTPP-Site Maintenance Database is described in the *LTTP-Site Maintenance Database User Manual* provided with the application.

This section documents the process of delivering the calibration maintenance data to NZTA.

References

A user manual for the software is distributed with the application

In this Section

The topics in this section are listed below:

Topic	See Page
Overview of process	8-2
Responsibilities	8-3
Supply of Data	8-4
Location of Sites	8-5

8.1 Overview of Process

Definitions

The following definitions are applicable to the LTPP sections:

Benchmark Sections (1km long) – Some LTPP sections overlap or sit within the Benchmark sections. Benchmark sections are used to validate the annual HSD survey.

Sterilised LTPP Sections (300m) long) – Sterilised sections are indicted with a red marker post and a Calibration section sign and numbering starting with CS. On these sections only, maintenance to remove hazards (such as pothole filling) are permitted subject to approval from the Asset Information Engineer, NZTA National Office, Highways and Network Operations Group.

Non Sterilised LTPP Sections (300m long) – These sections are indicted with blue marker post and numbering of these sections start with CAL. Any maintenance required on these sections may be scheduled in consultation with the Asset Information Engineer, NZTA National Office, Highways and Network Operations Group.

Purpose

Maintenance activities recorded for this database are in essence the same as required for the maintenance activity reporting described in section 4, Maintenance Activities. The only difference is that there is allowance for more accurate and complete storage of all the data items collected during the site investigation/maintenance design. No additional data requirements are specified for this database.

The purpose of the database includes:

- Most Network Maintenance Areas (NMA) has between two to five sections within their area. This database is used to capture, store and provide the maintenance information in a consistent format.
- The database facilitates the collation and integration of data with the NZTA master asset system database (currently RAMM) in National Office.
- Through the database and the data delivering process the awareness of the LTPP sections, its purpose and importance is increased.

8.2 Responsibilities

NMM Consultant

The Network Management Consultant is responsible to ensure:

- No unauthorised work.
- All maintenance activity work is discussed and agreed with the Regional Office and NZTA's Asset Information Engineer prior to the commencement of any maintenance activities.
- Full and accurate data, investigation and design data for any work carried out is provided to NZTA.

Regional Office

The Regional Office is responsible to ensure:

- No unauthorised work.
- All maintenance activity work is discussed and agreed with NZTA's Asset Information Engineer prior to the commencement of any maintenance activities.
- Safety.
- Approval of all Traffic Management Plans for the safe working on the site, including the LTPP Data Collection Contractor's TMP.

Data Collection Contractor

The LTPP Data Collection Contractor is responsible for carrying out ***Detailed Condition Surveys***.

NZTA National Office

The National Office is responsible to ensure:

- ***Integrated Management***, management of data collection and LTPP database.

8.3 Supply of Data

Overview

NMM Consultant enters all the maintenance data for LTPP Calibration sections within their region into the TNZ-LTPP maintenance database or provide the data on the LTPP Site Maintenance reporting template, both available from NZTA's National Asset Information Engineer, even though it is also loaded into RAMM according to Section 4, Data Delivery Procedures. The mandatory fields are limited since the data collected will vary on a case-by-case basis. These fields are indicated in the appropriate input screens.

Delivery

Data shall be delivered annually prior to the 1st August.

Disks

Maintenance data delivered by the Consultant to NZTA shall be on CD or DVD and shall include:

- A copy of the database (MDB) or completed template.
- Related electronic files such as photos images and other files.

The naming convention of the database and files are described in the user manual.

8.4 Location of Sites

Overview Below is the location of the benchmarking and calibration sites:

	Existing Benchmark Site				Calibration Section / Site				
Region/NMA	SH	RS	BM Number	RP(km)	Section Number	Start (km)	End (km)	Sterilised (Y/N)	Texture Measure Required Y/N
Northland	01N	292	1	0.1 to 1.1	CS 1	0.7	1	Y	N
Northland	01N	319	2	13.0 to 14.0	CS 2	13.3	13.6	Y	N
Northland	01N	245	3	6.1 to 6.8	CS 3	6.35	6.65	Y	N
Northland	12	17	4	7.0 to 8.0	CAL 4	14.39	14.69	No	N
Northland	12	185	5	7.95 to 10.75	CAL 5	10.45	10.75	No	N
Northland	01N	20	6	9.37 to 10.44	CAL 6	10.5	10.8	No	N
Northland	15A	0	To be Established		CS 62	0.68	0.98	Y	N
Auckland	01N - Inc.	431	7	1.0 to 2.0	CS 7a	1	1.3	Y	N
Auckland	01N - Inc.	431	7	1.0 to 2.0	CS 7b	1.95	2.25	Y	N
Auckland	01N - Inc.	461	8	3.0 to 4.0	CS 8a	3.1	3.4	Y	N
Auckland	01N - Inc.	461	8	3.0 to 4.0	CS 8b	3.7	4	Y	N
Central Waikato	01N	625	11	6.63 to 7.70	CS 11	7.2	7.5	Y	Y
Central Waikato	5	169	12	6.82 to 7.82	CAL 12	7.2	7.5	No	Y
Central Waikato	01N	777	13	2.32 to 4.18	CS 13a	3.2	3.5	Y	N
Central Waikato	01N	777	13	2.32 to 4.18	CAL 13b	3.88	4.18	No	N
East Waikato	29	50	14	0.02 to 1.20	CS 14	0.55	0.85	Y	Y
West Waikato	01N - Inc.	574	16	4.00 to 5.00	CS 16	4	4.3	Y	N
West Waikato	2	0	17	4.80 to 5.60	CAL 17	5	5.3	No	N
PSMC	3	36	18	1.20 to 2.20	CAL 18	1.6	1.9	No	N
PSMC	3	16	19	13.00 to 14.00	CAL 19	13.5	13.8	No	N
PSMC	31	0	20	5.50 to 6.50	CS 20	5.4	5.7	Y	Y
Gisborne	35	250	21	9.57 to 10.50	CS 21	10.15	10.45	Y	Y
Gisborne	2	375	22	0.68 to 1.56	CS 22	1.16	1.56	Y	Y
Gisborne	2	474	23	5.24 to 5.96	CAL 23	5.3	5.6	No	Y
Hawkes Bay	2	544	24	12.47 to 13.20	CS 24	12.6	13.1	Y	Y
Hawkes Bay	2	729	25	8.56 to 9.60	CAL 25a	8.8	9.1	No	Y
Hawkes Bay	2	729	25	8.56 to 9.60	CAL 25b	9.1	9.4	No	Y
Hawkes Bay	5	204	26	13.63 to 14.82	CS 26	14.2	14.5	Y	Y
Hawkes Bay	5	233	27	10.0 to 11.0	CAL 27a	10	10.3	No	Y
Hawkes Bay	5	233	27	10.0 to 11.0	CAL 27b	10.3	10.6	No	Y
West Wanganui	01N	815	28	11.71 to 12.90	CS 28	11.8	12.1	Y	Y
West Wanganui	4	127	29	8.42 to 9.42	CS 29	8.4	8.7	Y	Y
West Wanganui	4	223	30	3.05 to 4.05	CAL 30	3.1	3.4	No	Y
East Wanganui	01N	985	31	0.50 to 1.50	CS 31	0.6	0.9	Y	Y
East Wanganui	2	751	32	4.52 to 5.52	CAL 32	4.52	4.82	No	Y
West Wanganui	3	258	33	0.55 to 1.75	CS 33	4.1	4.4	Y	Y
West Wanganui	45	97	34	4.49 to 5.97	CAL 34	5.1	5.5	No	Y
Wellington	01N	995	35	14.4 to 15.4	CAL 35	14.4	14.8	No	Y
Wellington	2	858	36	9.0 to 10.0	CS 36	9	9.3	Y	Y
Rotorua DC	5	29	R1	No Benchmark	CAL 53	1.4	1.7	No	Y
Rotorua DC	5	77	R3	11.7-12.7	CS 55	11.7	12	Y	N
Rotorua DC	30	131	R4	4.4-5.4	CS 56	4.4	4.7	Y	N
Rotorua DC	30	170	R5	9.1-10.1	CS 57	9.1	9.4	Y	N
Rotorua DC	30	147	R6	No Benchmark	CAL 54	8.06	8.36	No	Y
Rotorua DC	38	0	R8	14.4-15.4	CAL 58	16.83	17.13	No	N
Rotorua DC	5	47	R11	0.8-1.8	CAL 59	1.22	1.52	No	N

North Island

8.4 Location of Sites, continued

	Existing Benchmark Site				Calibration Section / Site				
Region	SH	RS	BM Number	RP(km)	Section Number	Start (km)	End (km)	Sterilised (Y/N)	Texture Measure Required Y/N
Marlborough	63	46	**37**	4.586 to 6.000	**CAL 37a**	4.7	5	No	N
Marlborough	63	46	**37**	4.586 to 6.000	**CS 37b**	5.5	5.8	**Y**	N
Marlborough	01S	18	**38**	1.405 to 2.028	**CAL 38**	1.5	1.8	No	N
Nelson	6	131	**39**	16.0 to 17.0	**CS 39**	16.15	16.45	**Y**	N
Nelson	6	225	**40**	10.0 to 11.0	**CS 40**	10	10.3	**Y**	N
North Canterbury	01S	284	**41**	7.5 to 8.5	**CAL 41**	7.8	8.1	No	N
North Canterbury	73	90	**42**	2.0 to 3.0	**CS 42**	2.5	2.8	**Y**	N
South Canterbury	01S	447	**43**	4.0 to 5.0	**CAL 43**	4.5	4.8	No	N
South Canterbury	8	99	**44**	3.5 to 4.5	**CS 44**	4	4.3	**Y**	N
West Coast	6	445	**45**	12.5 to 13.5	**CAL 45a**	12.7	13	No	N
West Coast	6	445	**45**	12.5 to 13.5	**CS 45b**	13.1	13.4	**Y**	N
West Coast	7	239	**46**	1.5 to 2.5	**CS 46**	3	3.3	**Y**	N
Coastal Otago	01S	618	**48**	8.5 to 9.5	**CAL 48**	9.1	9.4	No	N
Coastal Otago	01S	729	**49**	11.5 to 12.5	**CS 49**	12	12.3	**Y**	N
Coastal Otago	8	417	**51**	2.0 to 3.0	**CAL 51**	2.5	2.8	No	N
Coastal Otago	83	0	**52**	4.0 to 5.0	**CAL 52a**	4	4.3	No	N
Coastal Otago	83	0	**52**	4.0 to 5.0	**CS 52b**	4.6	4.9	**Y**	N
Southland	01S	872	**53**	8.02 to 9.02	**N/A N/A**	N/A	N/A	N/A	N
Southland	6	1111	**54**	0.35 to 1.35	**N/A N/A**	N/A	N/A	N/A	N
Southland	01S	933	**55**	0.56 to 1.56	**N/A N/A**	N/A	N/A	N/A	N
Nelson	6	196	**56**	8.0 to 9.0	**N/A N/A**	N/A	N/A	N/A	N/A
Coastal Otago	83	96	**To be Established**		**CS 50a**	7.5	7.8	**Y**	N

South Island

SECTION 9

COMMUNICATIONS POLICY

9.0 Overview

Purpose

This policy outlines how people should communicate in relation to the operation of RAMM for the NZ Transport Agency (NZTA).

In this Section

The topics in this section are listed below:

Topic	See Page
Data Updates	9-2
Outages	9-4
User Requests	9-6
User Queries and Problems	9-7
Changes to the System	9-8
Other Situations	9-9

General Guidelines

In general:

- Communications relating to NZTA RAMM databases and the use of RAMM on NZTA databases should occur with the Asset Database Administrator (or deputy) in the first instance;
- Communications on day-to-day issues with RAMM data for a Network Management Area should occur through the local NZTA Area Engineer or RAMM Champion; and
- The Asset Database Administrator liaises between NZTA and CJN Technologies Ltd.

9.1 Data Updates

Scope

This covers notification of RAMM data being updated.
Updating data includes adding, deleting or altering records.
Classes of data affected include:

- Road names
- Inventory data
- Forward Works programmes
- High Speed data
- Traffic data
- Falling Weight Deflectometer data
- Maintenance Activity data
- Condition Rating data

Purpose

Data users need to know when data that they may want to use has been updated. For example, a consultant may wish to know when the traffic data for his or her area has been loaded so that they can proceed with a dTIMS model run, or NZTA National Office staff may want to know when all the reseal data for an area has been loaded so that they can run performance reports.

Advance Notice of Network Changes

Prior to performing a network change the Location Referencing Management System Administrator (or someone he/she delegates) should contact the Network Management Consultant or Contractor (in the case of a Performance-Specified Maintenance Contract) to arrange a convenient time to perform this change.

Data Updated by Consultants or Contractors

When a contractor or consultant has performed changes to a NZTA database, he/she should inform the local NZTA Regional or sub-office as specified in the State Highway Database Operations Manual. The local RAMM Champion should then forward this information to a suitable staff member of the Asset Information Group at National Office.

9.1 Data Updates, continued

Data Updated by NZTA National Office

Within 24 hours of data being updated by NZTA National Office, a member of the Asset Information Group or a deputy will inform the relevant RAMM Champion(s) or Area Engineer(s). This includes but is not necessarily limited to:

- Network changes
- Rolling-over of the Forward Works programme
- High Speed data
- Traffic volume and loading data
- Falling Weight Deflectometer data

9.2 Outages

Scope

For the purpose of this policy an outage is an interruption to service normally expected by users of NZTA's RAMM system. An outage can have a number of causes including:

- A problem with communications (e.g., a break in the network or a Citrix problem);
- A problem with the database (e.g., grossly corrupt data or a problem with the database engine);
- A problem with the RAMM server (i.e., a hardware failure);
- An upgrade of software or hardware; or
- An interruption to the power supply at NZTA.

Outages fall into two categories:

- **planned outages** for activities such as upgrades or tests of power supplies; and
- **unplanned outages**, which occur as a result of a problem.

This section covers notification of planned outages and communication on unplanned outages.

Purpose

Users need to know about outages so that they can plan their work.

Planned Outages

If the outage is due to a database change or upgrade, on an upgrade to the operating system, the database engine or to RAMM, the Asset Database Administrator or deputy should inform all users of:

- When the outage will occur;
- The reason for the outage; and
- When the users could reasonably expect to be able to use the system again.

This message will be sent by email and at least 48 hours prior to the outage occurring. The Asset Database Administrator may also inform the RAMM Champions by telephone and/or let users know in a written circular such as *A Message to the Flock.*

9.2 Outages, continued

Unplanned Outages

When an unplanned outage occurs, the Asset Database Administrator will inform all affected users as soon as possible, by email, of:

- The cause of the outage; and
- An estimate of when the problem may be fixed.

If email is unavailable but telephones are working, the Asset Database Administrator will phone this message to those users considered best to be informed under the circumstances. This will generally be:

- The NZTA RAMM Champions in affected Offices; and
- The National RAMM Contacts for affected Network Management Consultants or Contractors.

In the event of a major disaster such as an earthquake, neither of the above courses of action may be available.

9.3 User Requests

Scope	This covers requests for new users or changes to existing users.
Purpose	The Asset Database Administrator needs to be informed when there is a new RAMM user or an existing user needs authorities or details changed, so that the user can be set up or changes made. Once this has been done the new user needs to know that he or she can use RAMM.
Making the Request	People, who want to become NZTA RAMM users or change their user details, should make their request in the first instance to their local NZTA Regional RAMM Champion or Area Engineer if they are: • NZTA Regional staff • NMC's • Contractors All others should contact the Asset Database Administrator directly. The Access Policy (Section 10 of this manual) outlines levels of access.
Informing the User	When a request for a new or changed user has been satisfied the Asset Database Administrator will let the user who made the request know that he or she can now use RAMM or that his or her permissions have been changed.

9.4 User Queries and Problems

Scope	This covers possible bugs, questions of procedure, codes etc and how-to type questions.
Purpose	Users need to know how to obtain assistance. NZTA also needs to avoid undue disruption to its activities.
Faults	A user who cannot log in to RAMM should contact the Asset Database Administrator or the Asset Information Engineer unless the problem is obviously a connection problem (e.g. a Citrix problem). In this case the user should contact CJN Technologies.
Possible Bugs	NZTA needs to know of possible problems with the software it is using so users should report possible bugs encountered while using NZTA's RAMM system to the Asset Database Administrator.
Questions of Procedure	Users who have a query about procedures should contact the Asset Database Administrator or the Asset Information Engineer.
Lookup Codes	For enquiries about new inventory lookup codes, contact the Asset Information Engineer at NZTA's National Office. .
Application Help	NZTA staff may contact the Asset Database Administrator if they need help with RAMM. Staff of Network Maintenance Consultants or Contractors should contact their company RAMM Champions for assistance. The Asset Database Administrator will advise other users of whom to contact for assistance, when they are notified that they have access to NZTA's RAMM system.

9.5 Changes to the System

Scope

This covers system upgrades to:

- Hardware;
- The operating system;
- The database server software; and
- RAMM.

Purpose

Users need to know if and how changes will affect how they operate the system. For example, there may be a change in performance or a change in the user interface.

Also, upgrades may involve an outage. Users therefore need to be informed so that they can plan their work (see Outages).

Database Server Software Upgrades

The Asset Database Administrator should inform NZTA RAMM Champions and Network Maintenance Consultant/Contractor contacts of any expected outage.

Upgrades to RAMM

1. The Asset Database Administrator should inform NZTA RAMM Champions and Network Maintenance Consultant/Contractor Contacts of a general plan of how and when a major upgrade (i.e. an upgrade involving a change in the database structure) will be implemented for NZTA databases, including when and if, any outage will occur.
2. The Asset Database Administrator should describe major changes contained in the upgrade in *A Message to the Flock* and also describe these changes to NZTA RAMM Champions and Network Maintenance Consultant/Contractor contacts by email or telephone.

9.6 Other Situations

Scope

This section covers:

- A Message to the Flock
- The annual schedule of NZTA asset information activities
- Standing Instructions
- Consultation with consultants and contractors
- Guiding principle

A Message to the Flock

The Asset Information Team issues a newsletter from time-to-time to:

- Remind users of data deliverables that are due,
- Remind users of procedures,
- Advise users of changes,
- Provide tips in the use of RAMM,
- Notifying users of any changes to SHDOM and,
- Notification of SHDOM version updates

Although 'A Message to the Flock' mainly covers RAMM matters, it also provides information about other NZTA asset information systems relevant to RAMM users.

Standing Instructions

Standing instructions are usually contained in manuals. The principal manuals relating to the use of RAMM at NZTA are:

- State Highway Database Operations Manual – SM050;
- Location Referencing Management System Manual – SM051;
- Annual Plan Instructions Manual – SM018;
- State Highway Professional Services Contract Proforma Manual – SM030; and
- RAMM Road Condition Rating and Roughness Manual.

Standing instructions are sometimes issued in Network Operations Memoranda and later incorporated into relevant manuals.

9.6 Other Situations, continued

Annual Schedule of Asset Information Activities	Every year the Asset Information Team issues the Asset Information Annual Planner. Its purpose is to advise users of NZTA's RAMM system and suppliers of the principal asset information system activities throughout the year, including deadlines for the delivery of data. The Asset Information Annual Planner is an Appendix (currently Appendix 5) of the State Highway Database Operations Manual and is in the format of a wall planner.
Consultation with Consultants and Contractors	NZTA will consult with consultants and contractors on matters related to asset information both formally and informally as needed.

SECTION 10

ACCESS POLICY

10.0 Overview

Purpose

To outline the access policy to NZ Transport Agency (NZTA) RAMM databases.

In this section

The topics in this section are listed below:

Topic	See page
Obtaining Access	10-2
Efficient Use of RAMM	10-3
New Zealand Transport Agency Users	10-5
Consultant Users	10-6
Contractor Users	10-8
Other Organisations	10-10
Public	10-11
Roles	10-12

General Statement

The NZTA will generally grant read access to most data on its RAMM databases to anyone who has a RAMM licence. The NZTA will grant read access to all tables except:

- The skid resistance table, and
- Any table containing data which at that time is deemed to be commercially sensitive.

For information on restrictions on access to skid resistance data please refer to Section 4.6.7 and Appendix 4A of the State Highway Control Manual (SM012).

Users often require access to data for part of the network so the NZTA will often restrict the area a user can access to assist the user to find data more quickly.

10.1 Obtaining Access

Method	The access method for clients will be through the Internet onto NZTA's RAMM databases hosted by RAMM Software.
Read Only Logins	All read only access logins for users should be approved by the NZTA Regional Office or the Asset Database Administrator (or his/her deputy) and activated by the Asset Database Administrator. Logins of this type of access may have a start date and end date associated with them.
Update Logins	All update access logins shall be approved by the NZTA Regional Office or the Asset Database Administrator (or his/her deputy) and activated by the Asset Database Administrator at NZTA's National Office. Users will need to have obtained Level 2 accreditation to be allowed write access to NZTA's production database except for those with the role Regional RAMM Champions (Traffic). These are obtained from attending and passing a NZTA approved accreditation course. Please refer to Section 1.3 of this manual for further information on accreditation and obtaining a password to access the database.
Setting Up Access	The Asset Database Administrator will grant a user, permissions by assigning the user a **role** for a **security zone**. A security zone is a set of roads (e.g. a network management area or sub-area). A role is a set of permissions. Some users will have access to multiple zones and their roles may vary from zone to zone.

10.2 Efficient Use of RAMM

Purpose

This section describes how users are expected to make optimal use of the hosted RAMM system so that costs of access are minimised. It sets out the principles by which NZTA will decide if inefficient use is being made of the system, such that the cost of access should be passed on to that user.

NZTA will cover the costs of appropriate use of its own RAMM database

NZTA wants to promote excellence in asset information management by:

- Ensuring that asset data is robust and reliable
- Encouraging incisive analyses of such data for decision making

For these reasons, NZTA will cover the costs of all reasonable access by users to its RAMM database. NZTA will monitor use of the system by individual users to satisfy itself that such access meets these criteria. NZTA will not pay for user access to any users working copies of the database, should users wish to establish such working copies on the hosted service.

The following sections set out guidance on access to NZTA's RAMM database for read only, or read and write access.

Read only access

All costs of viewing and extracting data are covered by NZTA. Users should note the following:

- The 'Disconnect' function should be used when users are not actively using the system. This enables users to log back into the system to the same place in the database as when they 'Disconnected';

- Access costs whilst running SQL scripts are covered, assuming they are well-structured queries.

Poorly defined queries

Poorly defined SQL scripts might take excessive system time which could be reduced by revising the scripts. Users will be expected to follow best practice in writing scripts. If a script takes longer to run than 10 minutes, users must contact the Asset Database Administrator to report the problem and seek advice on appropriate action.

10.2 Efficient Use of RAMM, continued

Read and write access

Costs for access to users with read and write access are covered by NZTA. NZTA (and RAMM Software where appropriate) reserve the right to:

- Consider passing on charges to users, for work associated with fixing any database errors, which they introduced.

- Disallow system access until a user undertake further training/instruction and can demonstrate appropriate skill in system use. While system access is disallowed, the user's organisation will be expected to continue to fulfil its contractual obligations with alternative users as appropriate.

10.3 New Zealand Transport Agency Users

Reasons for Access	As asset owner NZTA needs to have access to ensure all their suppliers are maintaining the database to the standards as prescribed in their contracts as well as adding to the database the data that they are responsible for. NZTA staff also requires access for management and reporting purposes.
Access Levels	All NZTA staff may have read only access to the database and may have the role of full viewer. NZTA staff who require write access to the database will have to obtain the necessary accreditation certificate as outlined in Section 1.3 of this manual. This requirement may be waived by the Asset Database Administrator for staff involved in the update of traffic and loading data.

10.4 Consultant Users

Reasons for Access	The following are the reasons why consultants need access to RAMM:
NMM/Hybrid Consultant and PSMC Contractor	The network maintenance manager has ultimate contractual responsibility for the RAMM data in his/her area. As such he/she shall have a RAMM Level 2 accredited person who are able to update the database with any changes that happen on his/her Network in accordance with the specific inventory and condition data tables described in SHDOM (SM050)
Network Bridge Consultant	In some cases bridges may be stored in the asset database. The NMA Bridge Consultant is the person responsible for updating bridge data for a network management area As such he/she shall be a RAMM Level 2 accredited person.
Design/ Supervision Consultant	The Design/Supervision Consultant has the responsibility of providing updated data to NZTA following the construction of any new piece of highway or off-road structure. He/she should have a RAMM expert or employ one as a sub-consultant to supply records to the network maintenance manager.
Scheme Consultant	The Scheme Consultant is the Consultant who needs access to RAMM data to help them put a scheme plan together and does the necessary project evaluation work.
Management Support Quality Assurance Consultant	The Management Support Quality Assurance Consultant has the responsibility of loading high quality, high speed, skid resistance and falling weight deflectometer data into NZTA's databases. He/she needs to be able to view and update these data for the entire country as well as update survey header data.
Valuation Consultant	The Valuation Consultant has the responsibility of providing an annual valuation of State Highway assets to the NZTA. He/she needs the ability to view all assets, and update data pertaining to valuation.

10.4 Consultant Users, continued

Access Rights Requirements for NMM/Hybrid Consultant & PSMC Contractor	The network maintenance manager needs read and write access rights to all major inventory tables as well as the forward work programme, maintenance cost and rating tables. He/she should also have Import, Export and SQL rights to these tables. Employees of consultants will have full viewer, NMC or NMC super-user roles assigned to them depending on their level of accreditation (refer to section 1.3). These permissions should be for the area he/she is responsible for and only for the duration of that contract. In certain proven cases, it will be possible for some users to have 'write' access to other network areas apart from their own. E.g. where the consultant is acting as MSQA for another NMA.
Access Requirements for Network Bridge Consultant	The network bridge consultant needs read and write access rights to the bridge tables. He/she should also have Import, Export and SQL read rights to these tables.
Access Rights Requirements for Design and or Supervision Consultant	The Design/Supervision Consultant shall have read only access to the database for the area that the work he/she is responsible for is included in. The Design/Supervision Consultant will also need export rights to the major inventory tables to enable him/her to download to external systems. Therefore, he/she will have a viewer role.
Access Rights Requirements for Scheme Consultant	The Scheme Consultant shall have read only access to the database for the area that the work he/she is responsible for is included in. The Scheme Consultant will also need export rights to the major inventory & condition tables to enable him/her to download to external systems. Therefore, he/she will have a full viewer role.
Access Rights for Management Support Quality Assurance Consultant	The Management Support Quality Assurance Consultant shall have read access to all operational databases and write access to high speed, skid resistance and falling weight deflectometer data. He/she will be given an MSQA role in most if not all areas.
Access Rights Valuation Consultant	The Valuation Consultant needs to be able to update the valuation fields of all inventory tables and to update valuation snapshots. He/she will be given the valuation consultant role.

10.5 Contractor Users

Reasons for Access	The following are the reasons for contractors to have access to RAMM.
Pavement Maintenance Contractor	The Pavement, Drainage and Emergency Works Contractor is responsible for delivering updated RAMM data relating to maintenance works as well as scheduling preventative maintenance. The contractor needs access to existing RAMM records along with the Forward Work Program and historical maintenance costs. Some contractors may be contracted to maintain inventory data for their area. Some may also use RAMM Contractor.
Traffic Services Contractor	The Traffic Services Contractor is responsible for the provision of updated sign data to the Consultant or the PSMC Contractor. He/she needs to have access to existing signs information to achieve this. Some traffic services contractors may be contracted to maintain data in the database for signs in their area.
Lighting Contractor	The Lighting Contractor may be responsible for the provision of updated lighting data to the Consultant or the PSMC Contractor or may be responsible for maintaining this data in the database for their area. He/she needs to have access to existing lighting information to achieve this.
Road Marking Contractor	The Road Marking Contractor may be responsible for the provision of updated road marking data to the Consultant or the PSMC Contractor or may be responsible for maintaining this data in the database for their area. He/she needs to have access to existing road marking information to achieve this.
Surfacing Contractor	The surfacing contractor needs access to previous surfacing data to determine surface thickness when doing seal designs and hsd_texture to assess current texture variability. He/she also needs access to lookup tables so he/she can deliver the correct data back to the NMM consultant.
Project Contractor	The project contractor needs access to lookup table information and existing inventory information so he/she can provide data back to the consultant who is responsible for updating of the database.

10.5 Contractor Users, continued

Access Rights Requirements for NMM Contractor	Each Contractor has read only rights and will have the approval granted through their NZTA Regional Office before the Asset Database Administrator sets up access. This contractor needs read only rights for his/her area only and for the duration of the contract. Where the contractor is responsible for updating inventory data, Level 2 accredited employees of the contractor will be granted write access with the role of general contractor.
Traffic Services Contractor	Each Contractor has read only rights and will have the approval granted through their NZTA Regional Office before the Asset Database Administrator sets up access. If accredited to Level 2, this contractor should have read and write access rights to the signs table for his/her area only and for the duration of the contract and will be given the role of signs contractor.
Lighting Contractor	Each Contractor has read only rights and will have the approval granted through their NZTA Regional Office before the Asset Database Administrator sets up access. If accredited to Level 2, this contractor should have read and write access rights to the street lighting tables for his/her area only and for the duration of the contract and will be given the role of lighting contractor.
Road Marking Contractor	Each Contractor has read only rights and will have the approval granted through their NZTA Regional Office before the Asset Database Administrator sets up access. If accredited to Level 2, this contractor should have read and write access rights to the markings table for his/her area only and for the duration of the contract and will be given the role of markings contractor.
Surfacing Contractor	Each Contractor has read only rights and will have the approval granted through their NZTA Regional Office before the Asset Database Administrator sets up access. The surfacing contractor needs read only rights to the hsd_texture, c_surface table and the surface_structure table only so will be granted access with a viewer role. This should be limited to his/her contract area only. If accredited to Level 2, this contractor should have read and write access rights to the c_surface table for his/her area only and for the duration of the contract and will be given the role of markings contractor.
Project Contractor	The project contractor needs read access to all inventory information for the area he/she is working in and for the duration of his project contract. He/she will be granted access with a viewer role.

10.6 Other Organisations

Government Agencies	From time to time government agencies like Police and Statistics departments may require read access. These should be dealt with on a case-by-case basis with access role of viewer.
Educational Institutes	From time to time educational institutes may wish to have access to the RAMM database for research projects. This should be read only access and be approved through the NZTA Regional Offices or National Office on a project-by-project basis.
Other Commercial Entities	This should be read only access with a viewer or full viewer role (in the case of a specialist consultant) and be approved by NZTA Regional Office or National Office on a case-by-case basis. The regional office should be aware of what the data is being used for so that it doesn't bring a claim back on NZTA e.g. Insurance Companies.

10.7 Public

Access for Information

It is envisaged in the future that members of the public may well have a need for information held in the RAMM database. This should be dealt with on a case-by-case basis and approval given through the appropriate NZTA Regional Office.

10.8 Roles

Explanation	A role is a collection of permissions and is given a name. For instance, most users will have a viewer role, which means that they will be able to have read access in RAMM (except skid resistance) plus the ability to export databases and tables. Below are different roles that a user may have when using a NZTA RAMM database.
Viewer	Read-only access to all condition and inventory tables except the skid resistance table, the road names table and maintenance cost data using RAMM and RAMM SQL, ability to export files except the skid resistance table or a database.
Full Viewer	As for viewer but with the ability to view and export the skid resistance table.
NMC (Network Management Consultant)	As for viewer plus the ability to add (either row-by-row in RAMM or using the import facility in RAMM Manager) or update using RAMM, the following tables: • rating • c_surface • pave_layer • drainage • sw_channel • railings • shoulder • markings • sign • minor_structure • retaining_walls • mc_cost • features • intersection • intersection_loc • island • island_loc • lighting tables (using RAMM Contractor) plus the ability to export, update, copy, create and delete forward works programmes, plus the ability to invoke status check processing for surfacing, pavement, treatment length summarisation and forward works programme calculation.

10.8 Roles, continued

NMC (Network Management Consultant) Super User	An NMC super-user is an accredited RAMM inventory collection and entry trainer. His or her permissions are as for the NMC plus the ability to delete asset or maintenance cost data using system query language (SQL).
Network Bridge Consultant	A network bridge consultant has the ability to view and update the bridge tables, either row-by-row in RAMM or using the import facility in RAMM Manager.
National Office Consultant	As for NMC Super-User plus the ability to use RAMM Network Manager to alter carriageway and roadnames tables.
General Contractor	An accredited general contractor will have the same permissions as for full viewer plus the ability to add (either by row-by-row in RAMM or using the import facility in RAMM Manager) or update using RAMM, the following tables: • c_surface • pave_layer • drainage • sw_channel • railings • shoulder • markings • sign • minor_structure • retaining_walls • mc_cost • features • intersection • intersection_loc • island • island_loc A General Contractor will also be able map his or her own staff.
Surfacing Contractor	This role is for accredited users only and has the permissions as for viewer plus the ability to add surfacing data either using RAMM or the import facility of RAMM Manager, plus the ability to update surfacing data row-by-row using RAMM.

Lighting Contractor	This role is for accredited users only and has the permissions as for viewer plus the ability to maintain lighting data using RAMM Contractor.

10.8 Roles, continued

Signs Contractor	This role is for accredited users only and has the permissions as for viewer plus the ability to add signs data either using RAMM or the import facility of RAMM Manager, plus the ability to update or delete signs row-by-row using RAMM.
Markings Contractor	This role is for accredited users only and has the permissions as for viewer plus the ability to add markings data either using RAMM or the import facility of RAMM Manager, plus the ability to update or delete markings row-by-row using RAMM.
MSQA (Management Support Quality Assurance Consultant)	As for full viewer plus the ability to import the following tables using RAMM Manager: • rough • hsd_rough • hsd_rutting • hsd_texture • hsd_geometry • skid_resistance plus the abilty to add to, update and delete from • rough_hdr • hsd_rough_hdr • hsd_rutting_hdr • hsd_texture_hdr • hsd_geometry_hdr • skid_resistance_hdr • falling_weight • falling_weight_hdr plus the ability to update and delete from the above tables using RAMM SQL, plus the ability to invoke status check processing for the above condition data tables.
DBA (Database Administrator)	"Full Control" user abilities. This does not include the ability to update the staff permissions table using SQL.

Regional RAMM Champion (Traffic)	As for full viewer plus the ability to update traffic and loading data.

10.8 Roles, continued

Regional RAMM Champion (Accredited)	As for full viewer plus the ability to add (either row-by-row in RAMM or using the import facility in RAMM Manager) or update using RAMM, the following tables: • rating • c_surface • pave_layer • drainage • sw_channel • railings • shoulder • markings • sign • minor_structure • retaining_walls • mc_cost • features • intersection • intersection_loc • island • island_loc • lighting tables (using RAMM Contractor) plus the ability to update traffic and loading data.
Valuation Consultant	As for viewer plus the ability to update the valuation attributes of all inventory tables, and the ability to alter and export valuation snapshots.

SECTION 11

Intelligent Transportation Systems (ITS)

11.0 Overview

Purpose

This section is intended as a guide to using the NZ Transport Agency asset management system to manage ITS assets, not as a guide to asset management. The concepts outlined below are presented as they may be specific to ITS assets within RAMM.

Please refer to the NZ Transport Agency, ITS Asset Management – Guide for detailed instructions on the use of RAMM for the management of ITS assets.

Refer to Appendix 6 - Section 8.0 Intelligent Transportation Systems (ITS) in this manual for more detailed instructions on ITS data collection.

In this Section

This publication contains the following topics:

Topic	See Page
11.1 Asset Types and Register	2
11.2 Rotatable Assets	5
11.3 Criticality	6
11.4 Data Capture Process and Responsibility	7
11.5 Activities	9

Certification

Due to the complexity of these assets, NZ Transport Agency has developed ITS specific certification training for individuals involved with the collection of asset information data or the updating of the NZ Transport Agency master database, these being:

Level 1 – ITS Field Data Collection

All individuals that collect ITS data in the field are required to have been certified to this level.

Level 2 – ITS Database Updating

All individuals that add/update or delete ITS data to the NZ Transport Agency master database must be certified to Level 2 (with Level 1 as a pre-requisite).

Individuals with general certification will also need to complete the ITS specific certification to be able to collect or process data, as the general certification does not apply to ITS.

11.1 Asset Types and Register

Asset Types

ITS Assets are very different from the traditional assets stored within the NZ Transport Agency asset register. The ITS assets have been grouped into eight main ITS asset groups, with specific sub-types listed under each.

Appendix 1 of this manual contains a more detailed list of all ITS asset types and sub-types. This will also include ITS assets located in Tunnels or Operations Centers.

The main and sub-type codes provided should be used as a guide to determine which components should be collected and data provided for (e.g. Variable Message Signs (VMS) including any cabinets, communication or control devices associated with the sign).

If there are any assets or details not catered for in the provided lookup codes, NZ Transport Agency National Office is to determine if an additional code is required. This should be minimal. The asset codes were based on main ITS asset types and any components critical to the operation of an asset or components over $500 in value

The ITS assets table includes:

Asset Type	Description
CAMERA	This includes all camera units or standalone camera types (e.g. closed circuit television (CCTV) fixed cameras & components, Pan Tilt Zoom (PTZ) cameras, integrated dome cameras, etc.) This will also include components used to convert / transmit video data from the cameras (e.g. video encoder, analogue video transmitter etc.)
EMERGENCY PHONES	This includes all types of emergency phone types used on the State Highways (old types or new Global System for Mobile communication (GSM) / Voice over Internet Protocol (VoIP) types). It also includes some separate components of the phones (e.g. battery and other hardware such as modems etc.)
ELECTRONIC SIGNS	This includes all types of electronic signs (message & symbol types), as well as portable VMS and changeable message signs. Some examples of electronic signs are Variable and Fixed Message, Rural School, Curve warning, Speed Indication Devices and Lane Signal Units (lane & speed message).
ENVIRON-MENTAL MONITORING	This mainly includes environmental and weather monitoring devices adjacent to the State Highway used to collect data or devices used to manage conditions on the State Highway. This can include assets not owned or maintained by NZ Transport Agency, but considered critical to State Highway operations. Some examples include wind monitor, rainfall meter, sound device and environmental station (measures exhaust fumes).

Continued on next page

Asset Type	Description
BARRIERS	This includes automated barriers or barrier arms used to access the State Highway from local roads, close the State Highway during incidents or used to for delineation / route deviation. This does not include manual road open / closed gates. Examples include automated barrier arms, swift gates and sliding gate systems.
CABINET & EQUIPMENT	This includes the infrastructure used to manage / communicate with the ITS assets (such as ATMS Node cabinet, Regional VMS cabinet, Lane Signal Unit (LSU) Power Enclosure etc.). It also includes critical cabinet components and components over $500 in value. Therefore, not all standard components of a cabinet are captured (e.g. circuit boards, wiring etc.). Some examples of components are batteries, remote reboot device, modems, VMS controller etc.
DETECTION DEVICES (NON CAMERA)	This includes all non camera detection devices used to activate or communicate with other ITS assets (excludes automatic number plate recognition (ANPR), virtual cameras etc.). Examples include over-height detection beam sensors, ice detection systems, side mounted radars, cycle trigger arms, loops etc.
OTHER	This group is used for all other ITS assets that do not fit into the above groups. This includes weight sensors, wireless tracking systems and signals (advance warning, wig wags and other non standard intersection type traffic signals). This also includes a general miscellaneous "non NTZA asset" code to be used for assets not owned by NZ Transport Agency (or listed in other groups), but within the State Highway corridor which may affect NZ Transport Agency operations (e.g. Metservice sensors in road - ROSA, effluent control assets etc.). These assets are captured, but the owner field is set as "Other" or "Local Authority" (not NZ Transport Agency).

Continued on next page

Asset Register

Appendix 3 of this manual contains a detailed list of the ITS Asset Register, which indicates all the data fields required for an ITS asset. Details of the NZ Transport Agency required fields, purpose of each field, allowable values and other notes to assist with compiling the correct data, are also included in Appendix 3.

The required fields are identified as three possible conditions:

- Mandatory (M) - Fields always need to be populated (for all asset types and situations).
- Conditional Mandatory (CM) - Fields which are only mandatory for some assets or situations as described by the conditions in the "Notes" (if not applicable to an asset, use the available "None" or "N/A" code or leave
- Optional (O) - Fields which are populated as required or as information becomes available. These fields are also important and should be completed where possible, but are not mandatory.

11.2 Rotatable Assets

Overview

ITS Assets are rotatable assets. Rotatable assets may be taken out of service, kept in storage, repaired and returned to service at the same or a different location, i.e. a CCTV camera that needs servicing may be taken from location A, serviced and then reinstalled in location B.

It is therefore important to not only manage the location of the asset, but also to know its current state as defined in the table below:

State	Description
In Store	The asset is in a functional state, but not being used. It has not been deployed. It may be in store as it is not required at this point, or being held as a spare.
In Service	The asset is currently in use on the field and is operational.
Unavailable	The asset is not available for use. This may mean the asset is in need of repair, has been sent away for repair, or a dependant asset is unavailable.
Disposed	The asset has zero value to Transit; it has been disposed of / scrapped.

Life Cycle

The diagram below show the typically life cycle of a rotatable asset.

11.3 Criticality

Purpose

ITS assets are rated in terms of criticality. The purpose of this is to allow routine maintenance to be scheduled on the higher priority / critical assets and prioritise renewals / upgrades of existing assets.

Rating System

The following rating system has been developed specifically for managing ITS risk. The sub-components of the main assets listed below, will have the same criticality rating as the main asset (e.g. the battery of a VMS sign is Rating 1 - High).

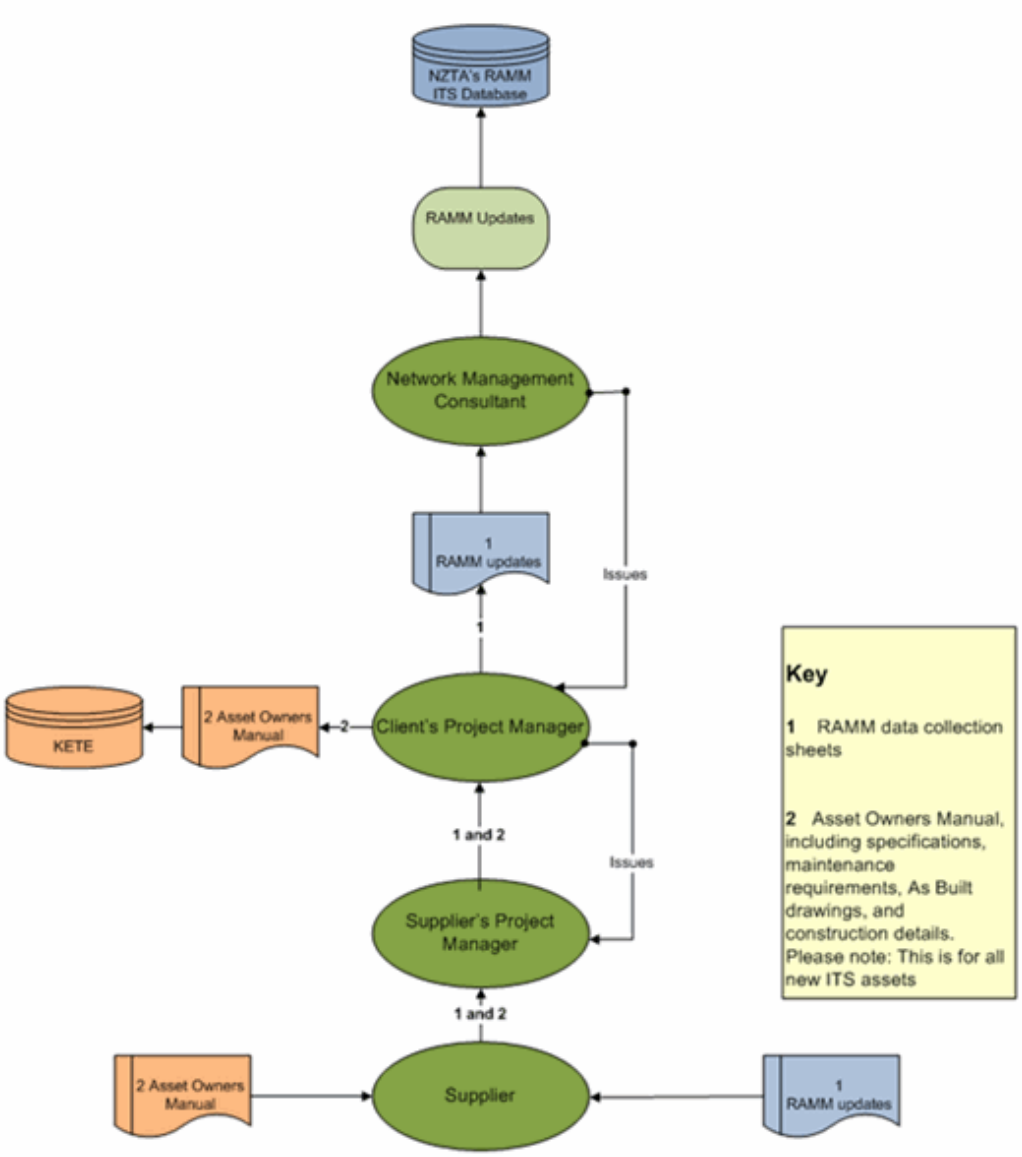
Rating	Description	*Examples* of ITS Assets in this Rating Category
High (1)	Strategically important at a regional level, or high potential for liability issues. Loss of function requires urgent fault attendance.	• Traffic Signals • VMS & Advanced Warning Sign (AWS) • Motorway & Tunnel CCTV • Critical Tunnel Systems • Lane Control Signals • Variable Mandatory Speed Signs (VMSS) • Avalanche Monitoring Equipment • Ice Warning Signs • Barriers
Medium (2)	Important contribution to network management, or moderate potential for liability issues. Loss of function requires fault attendance within say 3-4 working days.	• Regional CCTV and Webcams • School Warning Signs
Low (3)	Contributes to local safety management, AND has low potential for liability issues. Loss of function requires fault attendance within say 2-3 weeks.	• Curve Advisory Signs • Cycle Signs • Speed Indication Device (SID) • Changeable Message Signs (CMS)

11.4 Data Capture Process and Responsibility

Process

The typical ITS data transfer process is as follows:

ITS data process flow



Responsibility

The responsibility for the collection and loading of ITS data is described below in terms of projects and general maintenance:

Data Collection and Verification

- ITS Projects
  - The contractor / consultant responsible for completing the as-built information for the project, is responsible for collating the required ITS data in the correct format. Level 1 certification is required.

Continued on next page

Responsibility - continued

- The NZ Transport Agency appointed project manager is responsible for ensuring the data is accurate / complete (matches completed works) and has been verified to be in the correct format by a Level 1 certified person. The project Manager is also responsible for the supply of asset data and as-built drawings to the Network Management Consultant (NMC).

- **Maintenance & Support: Moves, Additions & Changes (MACs)**
- The maintenance contractor is responsible for the capture of changes to the asset base, including spares (in store) and deployed assets.
  - Data changes are to be communicated to the NZ Transport Agency appointed Engineer to Contract or Engineers representative within a pre-defined period, by a Level 1 certified person and in the appropriate format (e.g. via an electronic version of the data collection sheet).
- The Engineer is responsible for verifying the data is in the correct format and is accurate / complete (matches completed works / claims) before passing it to the NMC. The Engineer requires Level 1 certification or needs to engage a suitably qualified person to complete the review.

Data processing

The Network Management Consultant (NMC) receives all ITS data updates (as described above). The NMC needs to perform data checking to ensure that data supplied is in the correct format and meets the SHDOM requirements:

- Data incomplete or not in the correct format: NMC to send back to the data provider for rework.
- Data is correct and acceptable: Upload into the database by a Level 2 certified person.
- Send an email to the engineer to contract or project manager confirming data updates have been completed.

All persons involved in collecting or uploading data in the above process will need to be ITS Level 1 (collection and review) or Level 2 certified (upload to the database), to ensure data quality. Individuals completing high level project reviews are not required to be certified, but should ensure the data was collected by a certified person and the information provided matches the project works.

11.5 Activities

Typical activities

Updating the ITS table may be due to a variety of activities, resulting in a change to the asset, such as:

New installations: New assets installed as part of Capital or minor projects (where no existing assets are currently installed). The new asset is added to the database with a state of "In Service" or "Unavailable" (not online / activated yet).

General Maintenance: The replacement of components in the field or swapping components between asset locations and stores as required in maintaining the operation of existing ITS assets. This will result in a number of possible actions:

- A new asset added to the database with a state of "In Service".
- An existing asset being replaced and the state updated to "Disposed" (if not repairable) or "Unavailable" (sent for repair).
- An asset from the store being deployed into the field and the state updated from "In Store" to "In Service" with the location details updated to the deployed location.
- Asset components in the field being rotated to more critical locations with failures, which results in a location update for the rotated asset and a state change for the failed asset ("Disposed" or "Unavailable")

Renewals and upgrades: Replacing assets or upgrading components of active ITS assets as part of a planned forward work plan. This will result in the addition of new assets ("In Service"), as well as the change in location details (swapped to another location or store) and the state of the existing assets to "Disposed" or "In Store" (some usable components).

Removal / Disposal: Assets can be removed from the network or disposed of as a result of:

- Failed components (not repairable) or obsolete assets being disposed;
- Assets removed from a location where it is no longer required and put in store.

These assets will be updated with a state of "Disposed" or "In Store", with the locations updated to the new store location (disposals do not need a location change).

Continued on next page

Typical activities continued

Relocation: Assets or components can be rotated between locations on the network for various reasons. This may include rotating working assets / components in the field from less critical locations to replace failed assets at critical locations. The location details and state could be updated depending on the status of the failing asset.
Assets are rotated between the store and the field to allow components to be sent for repair (without returning to a location to re-install a repaired component). This will result in a location update for both assets, as well as a state change to "In Service" (for asset from store) and "Unavailable" or "In Store" (for the asset being repaired).

Purchase new stock / existing stock: New assets are purchased as spares and kept in storage. Their location details will be specific to the store location and their state will remain "In Store" until they are deployed onto the network. Existing stock in store may be previously purchased stock or working / repaired assets from the field to be used as spares. Their location details are changed to fit their current location and state will change from "In Service" or "Unavailable" to "In store" and vice versa as they are rotated between the field and the store.

Maintenance Costs

Some activities related to the general maintenance of ITS assets (e.g. graffiti cleaning etc) and the replacement of minor components not captured as an individual ITS asset (e.g. circuit boards, wiring etc.), will not result in an update to any ITS assets captured.

These activities are captured as maintenance cost records, in the normal way maintenance activities are recorded for other assets.

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General

If any maintenance or project activities (as described above), results in a change of an asset's state, location or other details (e.g. maintenance contractor), the ITS table needs to be updated.

Maintenance activities may result in assets or components being temporarily removed to be repaired, before being re-installed at the same location. If removal / reinstatement is still current at the time of the data delivery, then the database is updated to reflect the asset as "unavailable". This will minimise unnecessary repetitive changes to the database, which may not result in a permanent change. If the repair is unsuccessful and the component requires replacement or removal, the database will need to be updated to indicate the replacement of the failed asset / components.

Monthly data submission for updates is recommended as best practice to ensure asset data is kept up to date.

Assets are never deleted from the database, even if disposed, but are rather managed through updating the state.

Assets located in or rotated to the store may be difficult to differentiate and track, as they do not have a unique location. To ensure the correct asset information is captured and updated when rotating assets between the store and the field, it is critical that a unique and visible form of identification is captured for each asset. This may include the visible serial number or a unique name labelled on the asset (noted in the "Field Name" of asset data). A suitable identification system or process needs to be agreed for a maintenance contract before work commences.

12

MAINTENANCE ACTIVITIES

12.0 Introduction

Overview

The capture of an electronic data record for each routine maintenance activity that is undertaken on state highways assets is critical to understand how the asset is performing, and assists in:

- Understanding the total cost of ownership of state highway assets;
- Quantifying historical repairs, types, faults and locations;
- Determining the optimal time to intervene with renewal/replacement treatments as the cost of maintaining the asset changes;
- Monitoring of the application of the maintenance intervention strategy;
- Identify assets that are not performing as expected in the forward works programme, i.e. the extent of failures exceeds what is expected for the remaining asset's life expectations;
- Cross-checking that the underlying asset registers are being updated correctly, i.e. often where there is a maintenance activity record there should be a corresponding change to the asset register record, and vice versa, such as work carried out on signs and culverts.

Historical maintenance activities are important inputs into justification of major treatments, such as surfacing and pavement renewal treatments and as an input for tenderers on maintenance contracts to understand historical network performance.

In this Section

The topics in this section are listed below:

Topic	See Page
12.1 Overview of Process	40
12.2 Delivery Requirements	41

12.1 Overview of Process

Data delivery

Maintenance activity data will be loaded into the maintenance cost module of the NZTA asset information management system, currently being the RAMM database, in accordance with the contract document deliverable requirements.

The maintenance cost module for RAMM is designed to accept data from as many source formats as possible. The most likely source of maintenance activity data is an electronic download from a contractor's maintenance management system following the appropriate quality checks.

Maintenance Cost Module

It is assumed that contractors will already be using a maintenance management system. For this reason the Maintenance Costs module is not designed to replace a contractor's maintenance management system. The purposes of the maintenance cost module are to:

- Allow input from different cost/activity recording systems
- Convert maintenance costs from a variety of suppliers to consistent terms
- Provide a repository of historical maintenance achievement for data analysis.

Training and Support

Please refer to RAMM Software Ltd for training and their online RAMM User Guide.

Definitions

The following terminology is used to describe the delivery process:

Maintenance Activity Data Source, this is the raw data loaded from the contractor's maintenance management system.

Maintenance Cost Table, this is the converted data. This associates the location of the repair to the appropriate carriageway section.

Maintenance Cost Batch, unique identifier for each loading session.

Producer Statement, this is a statement within the contractor's monthly report, confirming that the quantities of work being delivered to NZTA's asset information system represent the actual quantities of work carried out on the network.

12.2 Delivery Requirements

Data requirements

This document is to be used in conjunction with Appendix 4: Maintenance Activities, which details the specific coding structures for the data. In 2013 two significant changes to the data requirements of maintenance activities occurred:

Standardised units of measures, Appendix 4: Maintenance Activities prescribes for each activity what the required unit of measure is to be captured in the contractor's maintenance management system and delivered to NZTA,

Quantity based data. The quantity of the maintenance activity is important as it is the primary element for analysis which is not affected by commercial or risk based pricing influences. The unit cost attributed to each activity shall be agreed with NZTA.

Importing Process

The following steps are an overview of the process to load maintenance activity data into the Maintenance Cost Module in NZTA's asset information management system:

Step	Action
1	The contractor unloads the data from the maintenance activity data source.
2	Ensure that the data is correct, i.e. locations, dimensions of activity, rate, units of measure and codes are in accordance with Appendix 4: Maintenance Activities.
3	Create a maintenance cost batch header in RAMM Manager detailing the period that the maintenance activity data represents.
4	Import maintenance activity data into the maintenance cost table via RAMM Manager's import wizard, validating and ensuring no errors.
5	Print summary report from RAMM Manager and include as part of the contract monthly report producer statement.

Producer Statement

The contractor will provide a producer statement indicating that the maintenance activity monthly deliverable represents the actual quantities of work carried out on the network.

The producer statement is confirmation by the contractor that they have carried out the maintenance activities in accordance with the contract specifications. Work covered by this statement should have been supervised and checked by suitably qualified persons as per the Quality Management Plan.