Appendix 6 – Inventory Collection Manual

Manual Number SM050

NZ Transport Agency Waka Kotahi

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Version 10

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More information

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Contents

Overview

Purpose

This appendix outlines the NZ Transport Agency Waka Kotahi Inventory Collection Manual for use during the collection of RAMM Inventory data.

Ownership and updating

The Asset Management team, NZTA National Office, maintains this manual.

References

The Inventory Collection Manual is to be used in accordance with SHDOM Section 3 Road, Section Definitions and Section 6 Field Validation Procedures and SM051 Location Referencing Management System Manual (LRMS).

Section 1 – Glossary of terms

Kilometre Marker Post (KMP)	A location reference sign placed at one-kilometre intervals along the road to an accuracy of ± 100 m. Previously known as a route position marker.
Linear Position	Refers to a distance (displacement) and direction from a known point e.g. +50m from RS 260 on SH 1. Applied in terms of linear vs spatial referencing.
Location Referencing	Abbreviated **LR**.
Location Reference Management System (LRMS)	The complete process to manage the location reference system. This ensures that the responsible person updates the applicable data at the correct time so that it is available to all relevant users.
Location Reference Method (LRM)	The technique used to identify a specific point (location) or segment of road, either in the field or in the office.
NMA	Network Management Area.
NMC	Network Management Consultant.
Offset	Applies to measurements taken perpendicular to the increasing road direction. For example the sign has an "offset" of 1.2 m from the seal edge or 6.2m from the centreline. Offsets to the left are often expressed as negatives if no "side" attribute is recorded.
RAMM	Road Asset Maintenance Management application used by Road Authorities in New Zealand.
RCA	Road Controlling Authority.
Route Position	Route position (RP) is the "address" format for describing a linear position e.g. 01N-0260/0.50.
Reference Station	Reference stations (RS) are "bench marks" along a highway. They generally occur at approximately 16 km intervals, at the junction of State Highways and at Territorial Regional Boundaries. They also occur at the start of ramps, at the end of highways and at large roundabouts. They are marked by reference station signs. Their true position is approximated with a spatial coordinate.
Reference Station Length	The portion of State Highway between two reference stations is referred to as the 'reference station length'.

Section 2 – Training requirements

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.

For individuals who have specialist knowledge and access to information for surfacing and/or pavement, road marking or the components of street lighting or ITS equipment, targeted accreditation is available.

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.

Section 3 – General principles of inventory collection

Overview

The general principles for the collection of inventory data are:

1. Trip meter calibration
2. Using ERP's and RS's
3. Collecting RP's
4. Updating the Database

This section also covers divided median highways and common section highways.

Trip meter calibration

It is essential that you undertake inventory surveys with calibrated and accurate equipment. Note the following when calibrating your trip meter:

- All trip meters come with calibration instructions in their associated manuals so make sure you understand how to calibrate the equipment before you commence your inventory survey,
- If you do not know how to calibrate, get someone who does know to show you how,
- All current NZTA approved calibration sites can be found in Section 8.3 Location of Sites in SHDOM (SM050),
- Current calibration forms which must be used when calibrating can be found in Appendix F of the LRMS Manual (SM051).
- Calibration Instructions can be found in Section 5.3 Guideline for Odometer Calibration (page C45) of the LRMS Manual (SM051),
- The two required calibration passes should be completed at 2 different speeds

3.1 Measuring

Overview

Database accuracy starts with accurate RP's which can only be collected with accurate equipment.

Reference stations

It is important to remember the following about Reference Stations:

- The state highway network is broken into sections called Reference Stations (RS) which are typically 15 to 20km in length,
- These RS Lengths have already been pre-determined by means of a high accuracy survey,
- Therefore, any asset data collected for any RS must fit the length of that RS, i.e.: there should be no RP's (for any given RS) greater than that of the RS length,
- RS Lengths generally only change when highway realignments occur which result in a network change,
- Contact the local RAMM Manager if you know of any RS's which have:
  - Been affected by a network change,
  - Inaccurate lengths.

Established routes positions

It is important to remember the following about Established Route Positions (ERP's):

- Each RS has intermediate ERP's. These have been accurately located to the nearest 10m,
- These should be used to accurately locate yourself within an RS length, as it is difficult to achieve the inventory survey at the RS Node (RP 0) and driving the full length of the RS,
- ERPs are now located typically at 3km intervals along the RS.

Determine route position

The best way to determine route position (RP) is to:

- drive to the nearest RS or ERP,
- drive as close as possible to the centre of the increasing lane to the start/end of the item that you are collecting the RP,
- Once you have collected the required asset RP's, continue to drive on the centre of the Increasing Lane to the next ERP and "close the survey". If the reading on your trip meter does not correspond to the ERP (say more than a 10m difference) then either:
  - Your trip meter is not calibrated,
  - You did not drive in the centre of the increasing lane,
  - One or both of the ERP's are incorrectly installed.

Note: Linear assets such as Channel have start and end RP's, but single point assets such as signs only have a single point route position.

Driving style

When using a trip meter, how you drive will affect the measured results as such when undertaking an inventory survey:

- RS Lengths have been determined by taking the average of 3 lengths determined from driving in the centre of the increasing lane,
- Drive equidistant from the lines defining the Increasing Lane as safely as possible (the increasing lane is the lane where RP is increasing,
- When you come to a passing lane, use the left hand lane (crawler lane).

Note: Do not attempt to undertake an inventory survey by driving in the centre of the Decreasing Lane with your trip meter counting backwards.

Safety

Be aware of the safety issues and work to the required Level of Traffic Management (Pilot Vehicles and Attenuators may be required on some roads).

Divided median sections

On divided median sections the RP's for assets on the decreasing sections of highway is the same direction as the Increasing section, i.e. against the Traffic Flow.

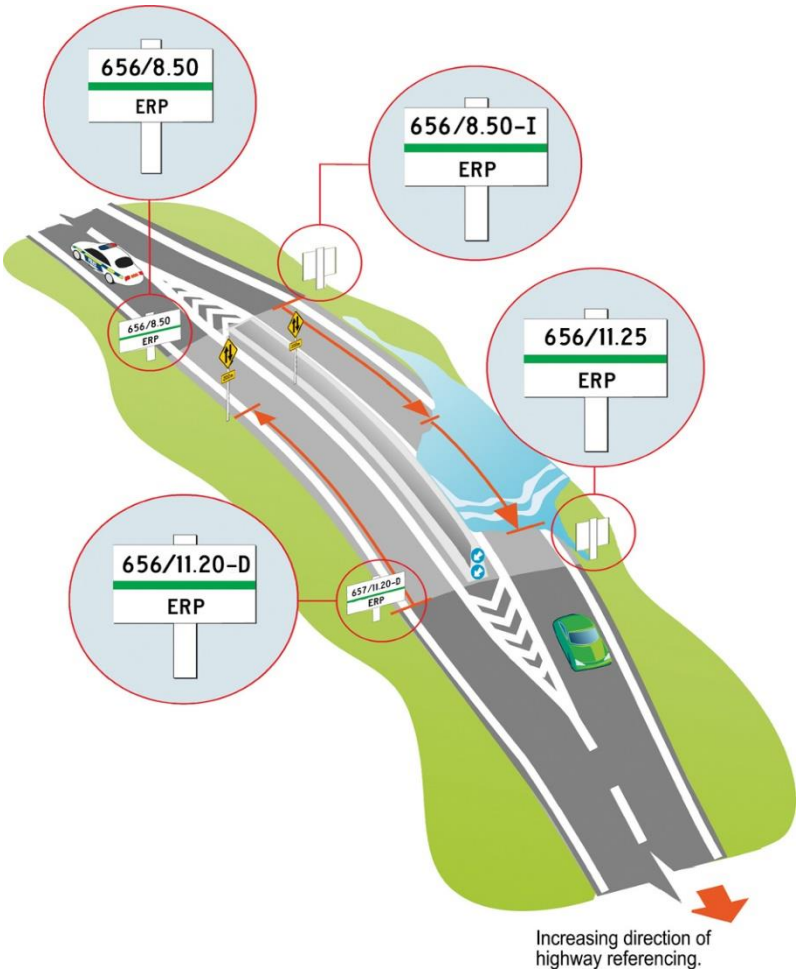
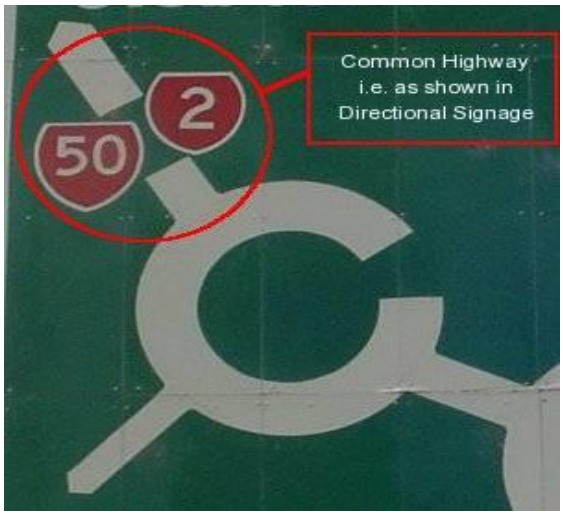


Figure A6.1: Direction on Increasing/Decreasing Highway

This means that if you have your trip meter measuring in reverse and you are driving with the traffic (opposite to the Increasing Route Position) then roadside furniture seen on the left is actually recorded in the database as being on the right, and vice versa.

Common highway sections

Common highway sections are where two state highways have a common route. RS's are placed at the start and end of the common length. Attribute information is recorded against the major (lower numbered) highway only.



There are many examples of sections of Common Highway on the State Highway Network. Some examples include:

- SH1 and SH5 running through Taupo
- SH2 and SH26 running through Paeroa
- SH5 and SH30 running though Rotorua

Example

If SH 2 and SH 29 were common, collect the data in the direction of SH 2, there would be no asset data for this section of SH 29

3.2 Updating the asset register

Overview

It is important that personnel involved in updating NZTA's RAMM Database are certified to Level 1: Field Data Collection and Level 2: Database Updating. This is to ensure that those involved with this process are aware of NZTA's requirements.

Note

If you are undertaking any form of Inventory Survey, it is critical that you have a copy of existing data with you, particularly when you are updating or deleting data, or validating existing data.

General considerations

It is important that the following principles are applied so that the NZTA RAMM Database can be accurately updated:

- Adding, check for existing assets before adding new data to the database to avoid duplication,
- Updating, ensure that the asset ID and other attributes such as State Highway & RS (usually in the form of Roadname), displacement, type and side are provided to ensure that the correct data is updated,
- Deleting, ensure that the asset ID and other attributes such as State Highway & RS (usually in the form of Roadname), displacement, type and side are provided to ensure that the correct data is deleted.

Sensibility checks

Asset data needs to be briefly checked that there is not an existing item in the database that matches (or closely matches) the data you are adding.

If you do not apply this principle, you will:

- Create "Near Duplicates", where the data is a duplicate of an asset with a very slight difference in location. This happens when the data-entry operator has not recognised that there is an existing asset already in RAMM and supplies an "Add" without checking what already exists. This problem is particularly prevalent in signs.
- Create overlaps in the data,
- Create duplicates in the data,
- Delete data that shouldn't be deleted.

No appropriate lookup value

In almost all situations, there should be a suitable value to use which best describes the asset. If there are no suitable values available, contact the AMDS team to review the possibility of adding it to the lookup list.

Validation data

When validating inventory data, you should adhere to the dimensional tolerances as indicated in Section 6.5 Validating Inventory Data in SHDOM (SM050).

Section 4 – Carriageway

Purpose

The purpose of the carriageway table is to store dimensional information on homogeneous, sections of road. Homogenous means:

- Same network and sub-network,
- Same width, and no. of lanes,
- Same traffic volumes,
- Same Pavement Type,
- Same SH Classification, same NSHS Hierarchy and same Urban/Rural classification (<70 = Urban, >70km/hr = Rural),
- Therefore, carriageway section changes are required at:
- 70km/hr-100km/hr signs (urban to rural),
- Pavement Type changes (i.e.: sealed to unsealed, sealed to bridge deck, etc),
- Passing lanes (significant change of width, and change in no. of lanes)

Uses

The carriageway table allows data within the asset register to be grouped/filtered in reports, some examples that can be produced from an accurate and complete carriageway table are:

- Total Network Length,
- Network Composition (Urban/Rural Lengths, SH Classification, Hierarchy Lengths etc),
- Carriageway Tables (used in Route Data and Highway Information Sheets),
- Distance Referencing on the Network,
- Traffic Volume Analysis (VKT's).

Table updating

Changes to the carriageway table occur as a result of the following activities:

- Seal Extensions: not common on State Highways, change to from pavement type "U" to pavement type "T",
- Passing Lane Construction: change to width and numbers of lanes,
- Change in speed posting: change in urban/rural classification,
- Changes to lane width, or lane width not populated—this is important.
- Four-laning construction: requires substantial changes to the carriageway table and may involve Increase/Decrease carriageway sections,
- Area Wide Treatments: if significant widening occurs (>1.5m) over a substantial length (>100m) then the carriageway width for that carriageway section may requiring updating,
- Construction of new intersections: if this results in significant changes in traffic volumes (>1000 AADT) then a new carriageway node may be required,
- Realignments: typically result in route shortening. Refer to SHDOM for the process required when route shortening has occurred (new RS length must be derived by 3 passes, etc)
- If a road is divided into increasing/decreasing carriageway sections.

LRMS requirements

Carriageway updates must be requested using Network Update Forms (see LRMS Manual).

These are processed at NZTA National Office, and once complete, you will receive a new Carriageway Table which can be used to the collect the new Inventory Data.

4.1 Carriageway - frequently asked questions

Measuring widths

How do I measure carriageway widths?

Carriageway width is the average seal edge to seal edge distance along the length of the carriageway section. For carriageway sections where width varies significantly along the length, an average width determined from measurements taken at 100m intervals will suffice.

A general rule would be that where there is a significant carriageway width change, there should be a change in sectioning, e.g. 3m width and >150m in length. This could include slow vehicle bays and some intersection widening.

Extra area

What is carriageway extra area?

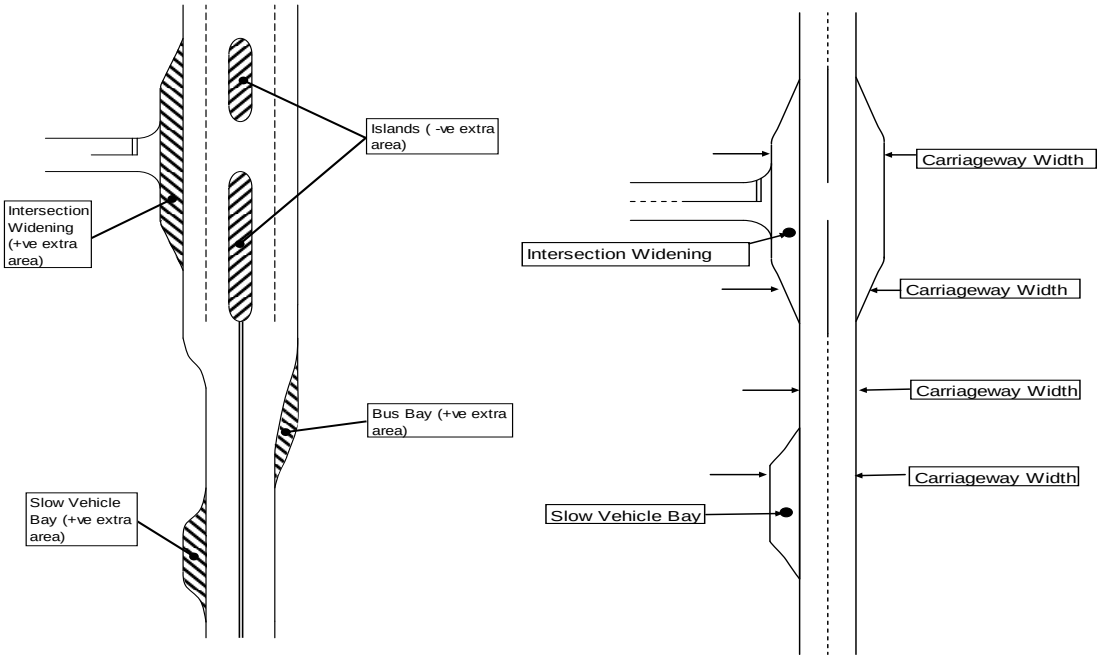
A carriageway that is well segmented should not require significant carriageway area modifications, as indicated in the diagram on the right below.

The following diagrams compare:

- Regular carriageway width with extra area (LHS)
- Irregular carriageway width with no extra area (RHS)

With regard to the diagram on the left, when the length of dual carriageway is >150m, it is treated as an increasing and decreasing road and the central median island is not considered as a negative extra area.

Note that the diagram on the left also shows how extra is treated, particularly traffic islands.



Figures A6.2: Regular Carriageway Width with Extra Area compared with Irregular Carriageway Width with No Extra Area.

Pavement type

When do I change pavement types?

The most common form of pavement type changed on State Highways is from Pavement Type "T" to Pavement Type "B" (Bridge Deck). Typically, only bridges that are greater than 50m in length are separated out into carriageway sections.

Carriageway nodes

How accurate should Carriageway nodes be?

It is important to choose easily definable and safe points as carriageway nodes and locate these nodes using accurately calibrated measuring equipment. Carriageway nodes need to fit Reference Stations (RS) whose lengths have been pre-determined by taking the average of three passes of the RS. Easily definable carriageway nodes include:

- Bridge Abutments,
- Right Angled Intersections,
- Start and end of Approach Islands,
- Start and end of Divided Median Islands,

For passing lanes it is recommended to use the end of taper (full lane width) as the node to locate the carriageway section change.

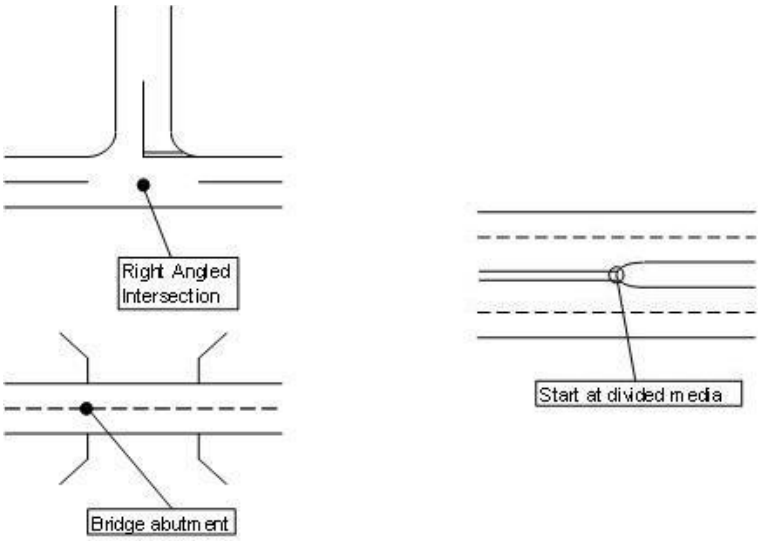


Figure A6.3: Suitable carriageway nodes

Large roundabouts

How do I deal with large roundabouts?

Roundabouts are now separated out as separate roads where there is a vertical displacement i.e. not painted. Refer to the LRMS Manual, which illustrates how these affect the carriageway table.

Where there was originally one carriageway node at Roundabout there are now two nodes (one as you enter and one as you exit), AND a separate road section (which represents the actual roundabout) and is assigned another Road ID.

The best place to stop and start roundabouts is the end and start of the Roundabout approach islands respectively. This ensures that the Roundabout section can be relocated even if the ERP signage is removed or the yellow square is sealed over.

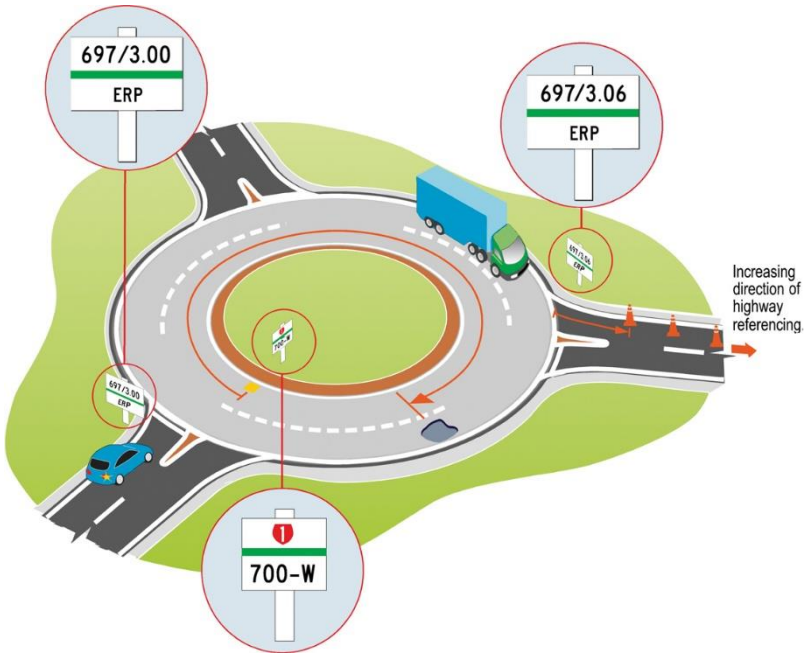


Figure A6.4: Roundabout on State Highway section > 150m

Section 5 – Surface layer

5.1 Surface layer - frequently asked questions

Removal date

What does "removal date" mean? And when do I populate it?

Do not delete the surface records from the database.

The Removal date is a flag that differentiates between surfaces that are currently on the network from those that have been removed as part of Pavement Renewal activity or milling during resurfacing. This does not apply to partial key-in milling (at start / end and edges), but it does apply to full lane or road width milling.

Removal date must be populated for surfaces that are physically removed from the Network or become part of the pavement structure during Pavement Renewal Activity.

Be aware that most removed surfaces do not coincide exactly with the area of pavement renewal, so you may have to get your database manager to split historical records into two or more records and apply removal date only to that part of the surface which has been removed due to Pavement Renewal Activity. This also applies to the extent of milled areas that do not coincide with the extent of the existing surface layers (length and width).

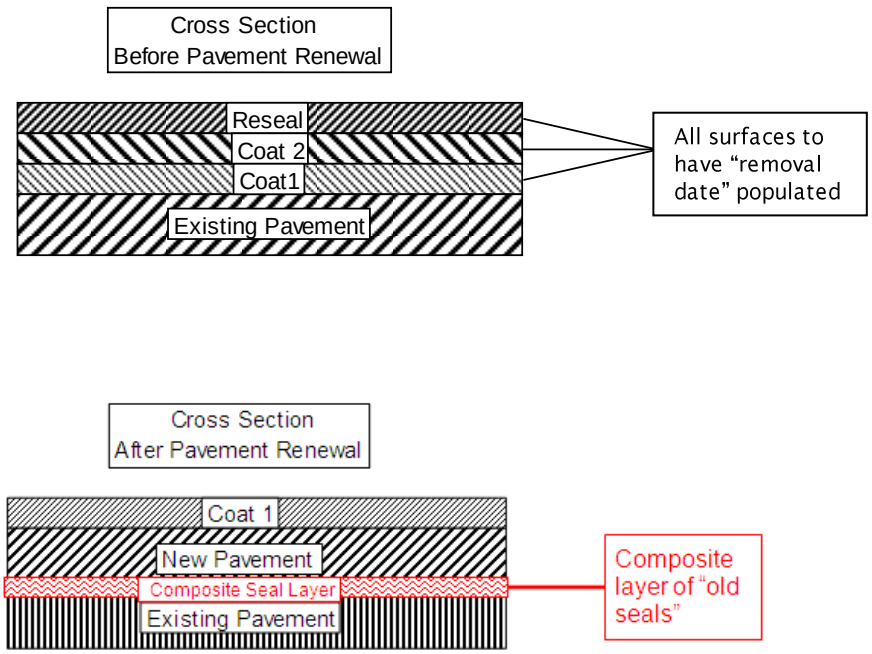


Figure A6.5: Cross-sections of Pavement and Top Surface before and after Pavement Renewal

When milling of existing surfaces occurs, the number of existing surface layers that require the removal date to be populated is dependent on the depth that was milled. The surface records will be removed in date order (newest to oldest), until the depth is achieved. For example, if 30mm of existing surface layers have been milled prior to resurfacing and RAMM has an existing top surface of 25mm depth (layer 1), followed by another 30mm layer (layer 2), only layer 1 is flagged as removed. Even though the milling record indicates 5mm of layer 2 has been removed, splitting the record to remove 5mm is not practical or sensible. The record for this layer (layer 2) is not updated.

Where the remaining depth of the existing surface layer is less than 15mm, due to the milling treatment depth, the surface record will have the removal date populated.

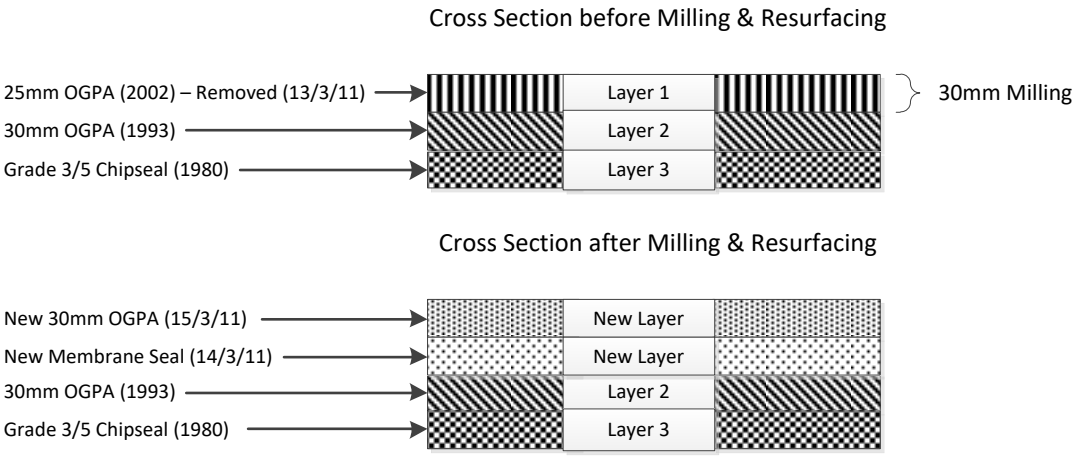


Figure A6.6: Cross-sections of Surface Structure before and after milling prior to resurfacing

Layer average width

What is the definition of layer average width?

Surface Layer Average Width is the average of several measurements from LH edge of seal to RH edge of seal. Surfaces that span one or more intersection can have a greater nominal width than the surrounding carriageway sections as intersection, are typically wider.

Note that, if a surfacing width varies by more than 1.5m over a length greater than 100m, then a separate surfacing record should be created for that length.

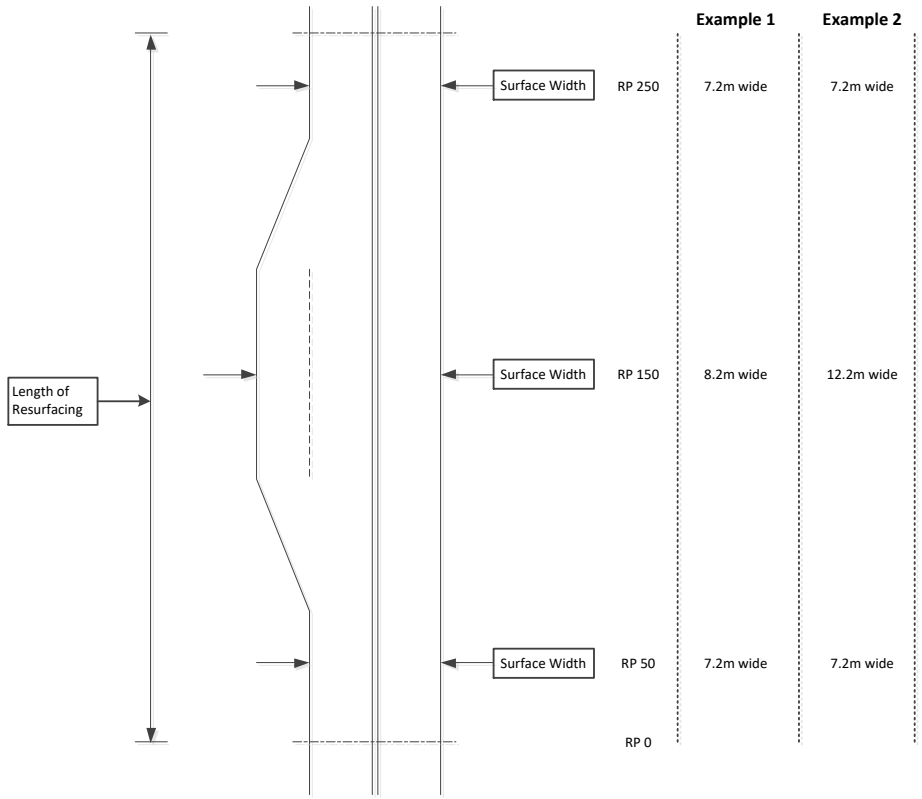


Figure A6.7: Layer Average Width definition for varying width seals

Details	Surface Record	RP's	Layer Average Width
Example Site 1	1	0 - 300	7.53m
Example Site 2	2A	0 - 75	7.2m
	2B	75 - 225	12.2m
	2C	225 - 300	7.2m

Note that in example 2, the surface width has varied greater than 1.5m over 100m in length, therefore 3 records are required to be captured.

What should I put in layer_average_width when the sealed area has a mixture of widths?

Follow the procedure detailed above. Layer Average Width is the average surface width only, regardless of smaller shape changes. These are captured as part of the extra area and total sealed area details.

The field Total Area is the correct place to store the sum of the detailed areas.

Offsets

How does "Left Hand Side Offset" work?

The Left Hand Side Offset of a surface is simply the distance from the left hand edge of the carriageway to the left hand edge of the surfacing. The offset, combined with the seal width, is used to define the location of the surface on the carriageway and indicate what portion of the carriageway has been covered, as shown below.

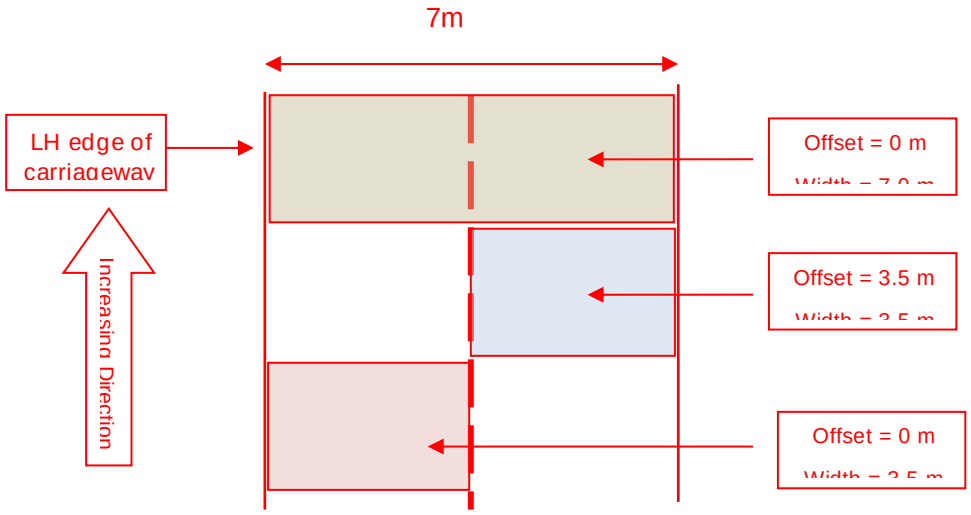


Figure A6.8: Offset & seal width indicate location of surfacing

How do I record Left Hand Side Offset when there has been a widening activity?

The Left Hand Side Offset of the existing surface records may need to be updated when there has been some sort of widening activity. For example, if you construct a new 3.5m wide Left Hand (Increasing Direction) Passing Lane on an existing 7m wide road, then the passing lane surface layer will have:

- Left Hand Side Offset = 0m,

- Layer Average Width = 3.5m.

And the existing surface layer that runs concurrently with the passing lane will have a revised:

- Left Hand Side Offset = 3.5m,
- Layer Average Width = 7.0m.

Do not use negative offsets to indicate the widening, but ensure that all underlying surfaces are manipulated to match the new offsets resulting from the construction of the passing lane.

If a new 3.5m wide Right Hand (Decreasing Direction) Passing Lane is to be constructed on the right hand side of a 7m wide road then the passing lane will have:

- Left Hand Side Offset = 7m,
- Layer Average Width = 3.5m.

All of the other surface records will remain unchanged, see diagram below:

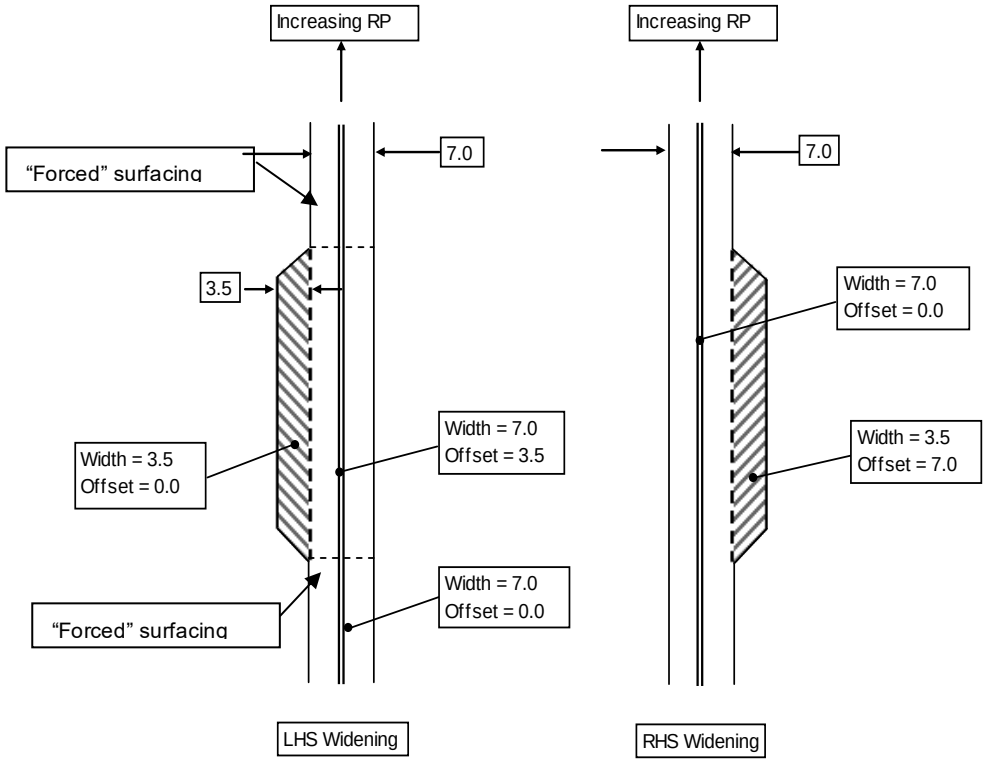


Figure A6.9: Offset Seals for LHS and RHS Seal Widening

Asset design life

What do the different surface design life columns mean?

This is the expected life (in years) of the surface at the time of design and is site specific. It is determined by the surfacing designer (it is not the default life). This should not be changed during the life of surface.

Surface material

What's the difference between a sandwich seal and a combination seal?

Refer to the examples at the end of this section for specific details on data requirements for these types of treatments. Ensure the notes field of the surface record provides details on the method used for the treatment applied.

Sandwich seal

A sandwich seal is used to absorb excess binder on a flushed seal. It is a two layer chipseal where the 1st sealing chip is applied to the existing surface without a binder, then followed by a binder coat and a second coat of a smaller sealing chip. It is used to treat existing flushed pavement surfacing.

Combination seal

A combination chipseal uses a sandwich seal in the wheel paths and a voidfill seal outside the wheel paths in the un-trafficked areas.

Another option for combination seal is a two coat seal applied full width as the second layer, or when various chip aggregate grades are applied in a single application.

Combination seals are used in areas of flushing and/or rutting in the wheel paths as a result of heavy traffic loading.

Chip grade

What if I put down chips of three different sizes?

There are three different attributes to record chip grade:

Largest or Only Chip Grade – to record the grade of the largest chip size used

Second Chip Grade - grade of smaller chip used on multiple chip seals, including cape seals

Third Chip Grade - grade of 3rd (smallest) chip used on multiple coat seals

Surface function

What is surface function?

Surface function defines a surfacing into one of the following categories:

- First Coat,
- Second Coat,
- Enrichment
- Membrane Seal,
- Reseal
- Not Applicable

An accurate surface layer table will have First Coat seals for all corresponding pavement data (1-15 days older than the pavement date) and, for chip sealed surfaces, have a corresponding Second Coat Seal (6-36 months older than the First Coat Data).

Two coat chip seals are commonly entered into the surface layer table as surface function “Second Coat”, this is incorrect (unless the second coat is a second coat). Record reseals with surface function “Reseal” and use the field surf_material to correctly code 1CHIP and 2CHIP seals.

How do I deal with Surface Function when I apply a voidfill to a first coat?

The voidfill is recorded as the second coat "Second Coat" and the next waterproofing layer will be a reseal "Reseal".

How do I deal with Surface Function when I put a membrane seal down?

Membrane seals are a chip seal waterproofing layer, covered by an asphalt surfacing. In this situation "Membrane Seal" should be used as the Surface Function for the membrane seal and the asphalt surface has Surface Function "Second Coat", for new pavement and area wide treatments only.

Polished stone value (PSV)

How do I populate PSV for multiple chip or mix grades?

The PSV value to be entered is the value (PSV) of largest grade chip or uppermost layer. PSV values are not entered for membrane seal records.

Recycling

How do I record recycling?

If a surfacing includes a recycled product (as either an additive, aggregate or polymer) enter True in the "Includes Recycled Aggregate?" field. The Recycled Aggregate refers to the type of product used e.g. Reclaimed Asphaltic Pavement (RAP) is used in asphalt mixes. When recycled components are used as additives (eg. plastic milk bottles, PET) these are entered as the additive and the recycled component. If more than one recycled component is used, enter the major component.

RS square

What about when we seal over an RS Square, or change in Road ID?

This situation occurs frequently, as many RS nodes fall at busy intersections and on bridge abutments, which are frequently resurfaced and the surfacing spans across the RS node. For these sites you must submit two surfacing records (one record for the surfacing before the RS, and one for the surfacing after), despite only having sealed one site.

Minimum length

How short should a Resurfacing be for it to be added to the system?

Do not add reseal lengths that are shorter than 50m UNLESS they are valid surfacing lengths. A reseal this length can be considered a patch unless it is an expensive treatment (say AC, OGPA etc), or the road section itself is <50m (Ramp, Roundabout etc).

AC thickness

When is AC no longer thin asphaltic surfacing?

When Asphaltic Concrete layers are greater than 80mm or designed as a structural layer, they are recorded in the pavement table. However asphalt wearing course surfaces up to 80mm that are not designed to be structural would have to be recorded in the surfacing table. Refer to NZTA M/10 for typical layer thicknesses for wearing course surfacing.

Surface binder

How do I record the surface binder type?

The field Surface Binder only refers to the base bitumen used in the surfacing. This will include the ranges of standard emulsion and bitumen grades (e.g. E180, E80, B180, B60 etc). It also includes epoxy resin and polyurethane used as base binders in high skid surfacing types.

Modified binders, such as polymer (PMB) or epoxy modified (EPM), should still be entered with their base bitumen and the modification details should be indicated in the Polymer field. The quantity and type of polymer is recorded in the appropriate fields.

Multi grade binders, as allowed in the M1 specification, are captured as base binder type "Multi Grade Binder" (MGB).

Geotextile seals

How do I record a geotextile seal?

A geotextile seal is a surfacing where a geotextile fabric is applied on top of the first layer of binder, and a conventional seal coat is placed over the fabric.

Chipseal surfacing should be recorded as chipseal, with the geotextile fabric recorded in the Surface Material field. A geotextile fabric used beneath an asphalt surface would be recorded in the same manner.

Additives

How do I record a multiple Additives or Polymers?

If the mix design or binder contains multiple additives or polymers (eg SMA), the largest component is to be entered.

Section 6 – Drainage

6.1 Drainage pipe - frequently asked questions

Large culverts

Where should large culverts be captured?

Large culverts (those with cross-sectional area greater than 3.4m^2) should be captured by the structures contract in the Highway Structures Information Management System (HSIMS) database.

6.2 Drainage channel - frequently asked questions

Purpose

The purpose of the Channel table is to provide a place to store details about any permanent roadside drainage channels.

Common examples of permanent road-side drainage channels include concrete kerbs, kerb and channels, dished channels, and slotted drains, as well as earth drainage channels that run parallel to the road-side, basically drains that move water along the edges of the road-pavement.

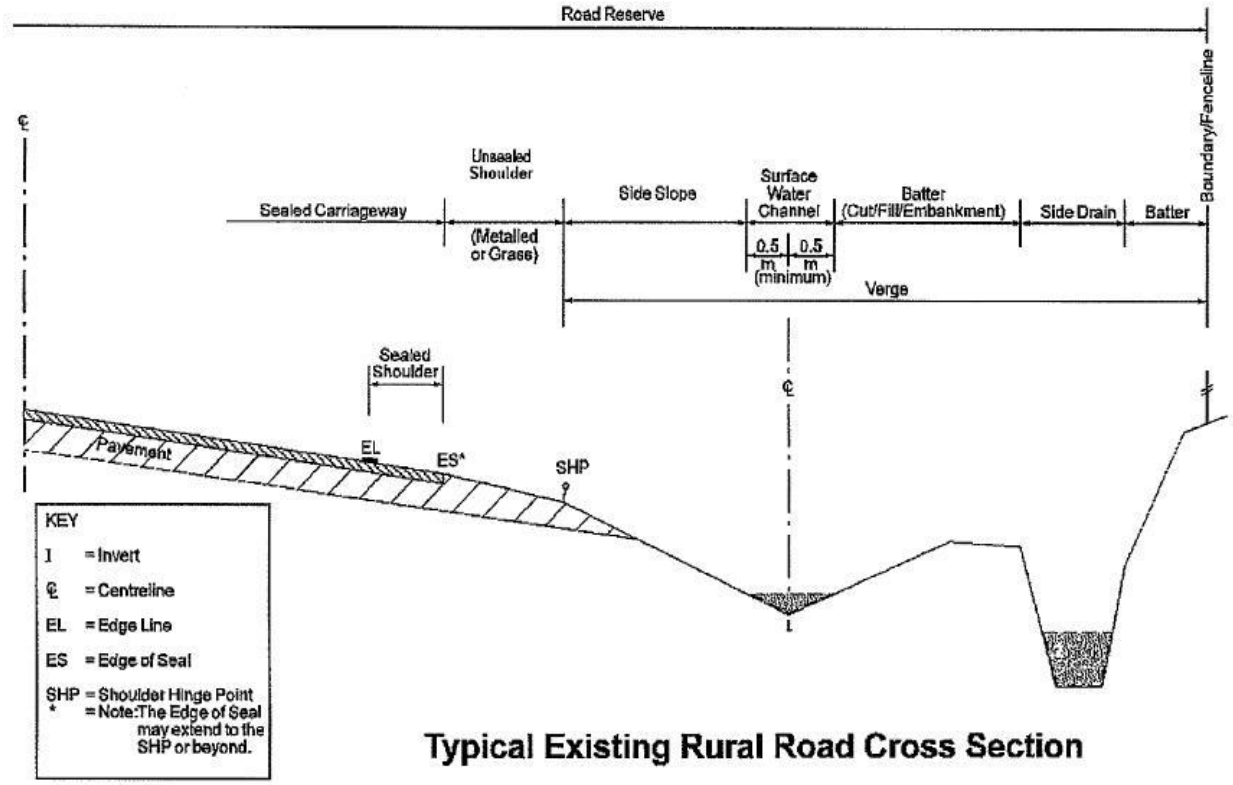


Figure A6.20: Definition of Channel

Multiple channels

What do I do when I have multiple channels running beside the road?

Use the geometry to determine channels that are close to the road and those that are further away from the road, in the unlikely event when there are two channels running beside the road.

Accuracy

How accurate should I be recording Earth Channel?

Collecting the data for Earth Channels is very subjective (note that this does not include lined Channels). Apply the following limits of variation:

- Geometry: +/- 10m,
- Widths: +/-0.5m.

Traffic Islands

Should I record Channel on Traffic Islands?

Record lined channels on major islands only, e.g. where there are sumps. Typically there is no channel associated with lined channel on islands so ensure you use the correct code (MKC, KC etc).

Section 7 – Mechanical and electrical

7.1 Mechanical and electrical - frequently asked questions

Recording location details on the State Highway

How do I record the location of a M&E asset on the State Highway?

Location details are mandatory for all assets. This data should be provided as a Northing and Easting value in NZ Transverse Mercator (NZTM) format.

An accurate spatial location (GPS) is the primary location format required and should be collected whenever possible. The spatial location (GPS) must be provided within 5 meter accuracy.

If it is not possible to capture the spatial location due to the asset location preventing the use of GPS or other working restrictions (e.g. safety), then an accurate road location is required (eg. identified from a geo-referenced aerial photo location).

Separate asset components

Can I group similar assets or components at the same location?

All components need to be separately recorded, i.e. a VMS site will require a record for the sign, cabinet and main components within the cabinet such as uninterrupted power supply (UPS), batteries and modem.

Only one record per asset or component is allowed. Do not group similar assets at the same location. For example, if three closed circuit television (CCTV) Cameras are attached the same pole (same location), then six separate records are required to indicate the three cameras and their components at this location:

- 3 x CCTV Camera,
- 3 x CCTV Housing records(enclosures)

The cabinet and contents would also be required as separate records.

The only exception to this would be for multiple assets installed as a single unit, such that they cannot be replaced / maintained independently of each other and are considered to be acting as a single unit (e.g. batteries in a VMS cabinet). The batteries are generally installed as a set and when one fails, the entire set is replaced (e.g. all 3 batteries installed in the cabinet will be replaced due to a single failure).

These types of assets should be entered as a single record including the cost of all the assets under "Original Cost" (e.g. if the cost of a battery is $500, then the cost for a set of three should be entered as $1,500).

Components critical to the operation of the asset, but not located nearby or on the State Highway, also need to be captured. For example, the radio gear for electronic school zone signs is located at the sign and within the school office. Both need to be captured. The radio gear in the school will be captured as explained under "Non-State Highway located assets".

Installation date

How do I manage installation date?

The age of an asset is determined from the installation date, therefore the installation date refers to the date an asset was:

- first installed: e.g. a project where new assets are installed, or
- purchased: e.g. assets purchased and kept in storage as stock.

The installation date should not be changed when an asset is moved to another location, installed on the network from “in store” or rotated to replace a failed asset.

The installation date is more related to the date the asset was “acquired” and the asset age. The Asset Design Life or condition assessment can be updated to compensate for differential performance / ageing of assets in the field versus those in store for several years.

If the installation date is unknown, the following can be applied:

- If the year is known use an estimated date of 25/12/YYYY
- If no information is available, a date of 01/01/1900 can be used. This will indicate “unknown information”, but should only be used as a last resort.

Asset design life

When is the asset design life updated?

The provided design life of an asset at the time of installation or purchase should be used and remain unchanged. The design life should be site and asset specific. For example, cameras installed inland in mild environmental conditions, may have longer expected lives than those installed in harsh coastal conditions. The design life assigned to the asset should be based on this.

If an asset is repaired or components replaced during the asset’s lifetime, the design life should remain unchanged.

Updating due to maintenance activities

Example: Changes to assets due to maintenance.

Camera X at location 1 is faulty and the lens for Camera Y at location 2 has reached the end of its life (not repairable). Camera Z at location 3 is no longer required at this location.

<u>The following maintenance activities and resultant updates occur:</u>

1. Camera Z from location 3 is rotated to location 1 to replace Camera X, which is sent away for repairs (on 01/05/2012).

- Camera Z: Update location details to match location 1 (Road ID, RP, side, offset, GPS, location description etc.). Field and site name are updated to match location 1. No other technical details have changed due to the rotation. The state and state date are also unchanged.
- Camera X: The state is changed to “Unavailable” and the state date to 01/05/2012. No other details change until the repair outcome is known.
  If the repair is successful:
  1. Camera X is reinstated at location 1: State and state date updated / possibly expected replacement date and condition (dependant on level of repair and expected performance). Camera Z is returned to the store (as no longer required) and state and state date updated / location details updated to match store (Road ID 3177 etc.) / field and site name are removed.
  2. Camera X is returned to store: State and state date updated / location details updated to match store (Road ID 3177 etc.) / field and site name are removed / possibly expected replacement date and condition updated (as above),
  3. Camera X is installed at another location on the network (location 4): State and state date updated / location details updated to match location 4 / field and site name are updated to match location 4 / possibly expected replacement date and condition updated (as above)

If the repair is unsuccessful the asset will be disposed: State will be updated to "Disposed" and state date to 01/05/2012. A note regarding the reason for disposal can be added to the notes field.

2. Camera Y at location 2 is repaired by replacing the faulty Lens Y (not repairable) with Lens A from the NZ Transport Agency store on 03/05/2012.

- Lens Y: State will be updated to "Disposed" and state date to 03/05/2012. A note regarding the reason for disposal can be added to the notes field.
- Lens A: Update location details to match location 2 (Road ID, RP, side, offset, GPS, location description etc.). The state and state date are updated to "In service" and 03/05/2012. Field and site name are updated to match location 2. No other technical details have changed due to the rotation.

Note that the installation date for all the above assets remained unchanged and that the changes were managed through the state and state date, including assets in store.

Original cost

What does original cost include?

The original cost of purchasing the asset at time of installation (the total asset purchase cost: value of the asset including transport). This does not include the additional costs related to installation or construction, such as traffic management, physical works related costs etc.

Loops

How do I include loop information in the M&E table?

Loop data is captured in the Sensor table. Each independently operating set of loops is captured as a separate record.

For example, the diagram below shows two different loop set-ups. Loop Controller 1 is related to the cycle sign down the road. The two sets of loops are captured as two separate records in the Sensor table. Some M&E loop set-ups include an additional set of loops installed parallel to the active set of loops, to be used as back-up during a failure of the main loops.

In the second site, there are 4 sets of loops connected to the traffic counting unit that should be accounted for as assets in the Sensor table.

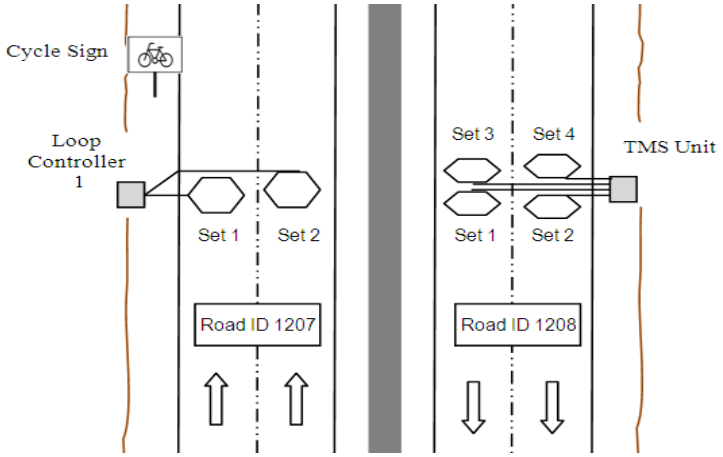


Figure A6.14: Capturing loop records

Section 8 – Markings

8.1 Markings - frequently asked questions

Recording right turn bays

How do I record a Right Turn Bay (RTB)?

The Right Turn Bay is a composed flush median, arrow, centrelines and limit lines. However, there is a RTB code, which includes all of these individual markings as a complete unit. Measure the RTB from start of flush median marking to the give-way limit line, and vice versa for RTB's in the Decreasing Lane.

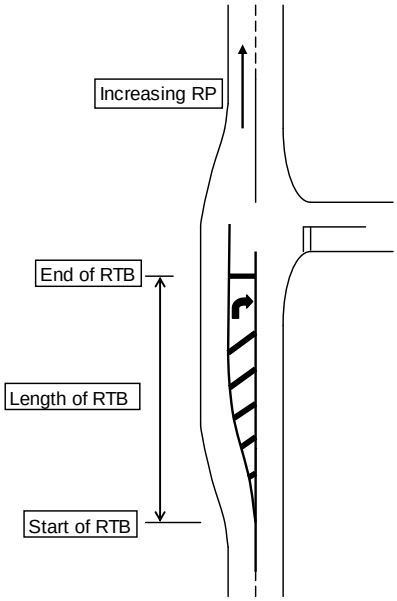


Figure A6.15: Measuring a Right Turn Bay

Offset accuracy

How accurate should I be with the offset?

The offsets of markings tend to vary along there length. As the road width varies the offset will also change. However, it is pointless to stop and start marking records for small changes in offset. As a general rule, use the following default offsets for the following marking types:

Marking Type	Side	Typical Offset	Comments
M15-Edgeline	L or R	3.5m	3.5m is the standard lane width for State Highways
M15 Edgeline on a Passing Lane	L or R	7.0m	7.0m is 2x 3.5 (standard lane width for State Highways)
M03-No Passing Line	L or R	0.2m	
M04-No Passing Advance	L or R	0.2m	
M12-Lane Line	L or R	3.5m	This is the line used to delineate the crawler lane and fast
Arrows	L or R	1.5m	Arrows are typically located in the centre of the lane

Recording RRPM's

How are raised reflectorised pavement markers (RRPM) (Cateyes) recorded?

RRPM's are generally present on all State Highways. They are numerous in type and colour. Use the marking group "Raised Pavement Markers" and is reflective "true" or "false" as appropriate. Do not stop and start the RRPM's at intersections.

Integrating new and old markings

How do I integrate new markings data with old Markings data?

The only way to do this properly is to take existing Markings Data with you on site and integrate the new markings with the existing markings.

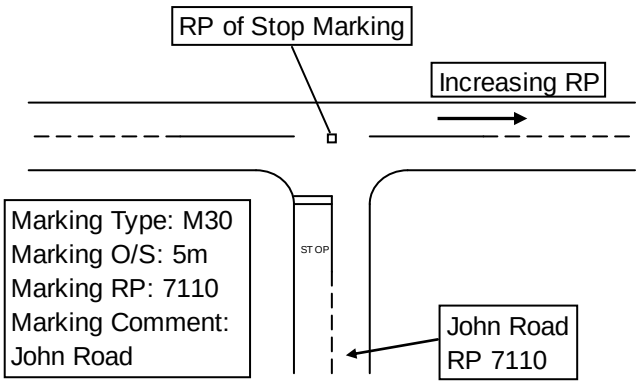


Figure A6.16: Measuring a Stop Marking on an intersecting side road

Painted shoulders

How do I record painted shoulders?

The following diagram shows how Painted Shoulders should be collected. Enter the numbers of "bars" in the "Marking Count" field of the Marking Table.

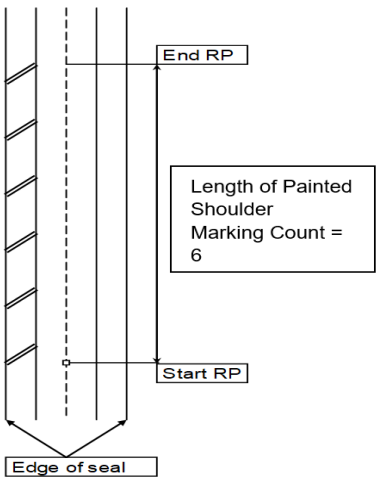


Figure A6.17: Recording Painted Shoulders

Section 9 – Pavement and subgrade

9.1 Pavement and subgrade - frequently asked questions

Recording overlays

How do I record an Overlay?

An overlay is simply new pavement material placed over the top of an existing road surface. In this situation, the pavement layer data can be simply added to the database.

As the surfacings data has not been removed, there is no need to tag the surface_removed date for the corresponding surface; however there should be a new layer added to the pavement layer table indicating the length of composite material, representing the surfacing layers that now form part of the pavement.

If however, the existing surfacing is removed (e.g. by milling) before the overlay is added, follow the advice in section 5.1 about "Removal Date" and update the surface_removed date for the existing surfacing record. Then add the overlay in the pavement layer table and add the new surfacing in the carriageway surfacing table.

Recording rip & remakes

How do I record a rip and remake?

A rip and remake will not affect the pavement layer data but will require seals in the Surfacing Table to have "removal date" populated.

Recording stabilisation

How do I record Stabilisation of an existing pavement?

The following fields must be populated if you have stabilised an existing pavement:

- Stabilising Agent Details (Cement, Lime, Kiln Dust),
- Stabilising Agent Percentage (typically between 2 and 10)

Affect of widenings

How do I record Pavement Details where I have done widening?

Pavement Data is treated the same as Surface Layer Data where widening is concerned. Refer to section 3 for further details. Note that the existing pavement record that runs through the area of widening may need to be split into three records when LHS widening occurs.

Multiple layers

How do I differentiate between a pavement with more than 1 Layer?

Typically most pavements are comprise of more than one layer, e.g. prepared subgrade, GAP65 (Subbase) and GAP40 (Basecourse). The subgrade is obviously on the bottom, the GAP65 is on top of the subgrade and the GAP40 is between the GAP65 and the 1st Coat Seal. RAMM determines the order of Layers by their dates, so the older a layer the lower the layer sits relative to surrounding layers. The youngest layer sits on top. Even if you place both GAP40 and GAP65 on the same day, you can nominate the GAP40 to be the top layer by assigning it a younger date in relation to the GAP65 (one day younger will suffice).

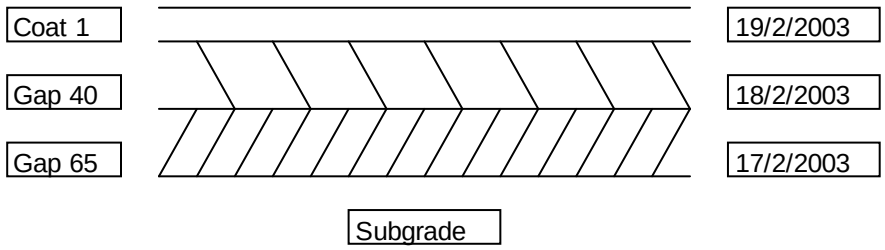


Figure A6.18: Pavement with Multiple Layers

Minimum length

How short does a pavement Length need to be before I don't put it into RAMM?

Any pavement renewal shorter than 50m should loaded and as a Pavement Repair in the Maintenance Cost Table and not loaded into the Pavement Layer Table (unless the road section is a Ramp; or Roundabout and is less than 50m long-refer to section 3, Carriageway Surfacings).

Existing data

Do I need to change existing pavement layer data when I load new data?

New Pavement Layer Data (with exception to overlays) must be "integrated" into existing Pavement Layer records. This is mandatory when you have stabilised an existing layer, or are undertaking LHS widening (refer to offsets pavement layers described above).

Removed date

When do I populate the "removal date" in the pavement layer table?

If the pavement material has been removed during Pavement Construction then it will need to be tagged as removed in the Database. This is done by populating the "Removal Date" field.

Do not delete records from the Pavement Layer table.

Missing historical data

What do I do when I stabilise a pavement layer but there is no data in RAMM that I can add the stabilising details to?

In this situation, you will need to add an estimated layer to the Pavement Layer Table, which you can then add the stabilised details.

Example 1: AWPT with stabilisation from RP0 to RP1000

You have ripped up and removed the existing surface, adding 100mm of new Pavement Material (GAP40) and stabilised to a depth of 200mm using Cement at 2%. There is no existing Pavement Layer data in RAMM. Your Pavement Layer Table was originally blank, but will look like:

Start m	End m	Date	Estimated/Known	Material	Depth	Reconstructed	Stabilised %	Stabilised Agent
0	1000	15/02/2005	E	UNK	100	Y	2	Cement
0	1000	17/02/2005	K	GAP40	100	N	2	Cement

Note: that you will also have to remove the surfacing(s) that runs concurrently with the AWPT.

Example 2: LHS seal widening from RP300 to RP600.

You are seal widening from RP300 to RP600 at an average width of 3.5m using 150mm of GAP65 and 100mm of GAP40. There is currently a pavement layer record from RP0 to RP1000 as shown in the following table:

Start m	End m	Date		Material	Depth	Reconstructed	Stabilised %	Width	Offset
0	1000	15/02/1990		GAP65	150	N		10	0
0	1000	17/02/1990		GAP40	100	N		10	0

Once you have added the widening layer to RAMM your Layer data should now look like this:

Start m	End m	Date		Material	Depth	Reconstructed	Stabilised %	Width	Offset
0	300	15/02/1990		GAP65	150	N		10	0
0	300	17/02/1990		GAP40	100	N		10	0
300	600	15/02/2005		GAP65	150	N		3.5	0
300	600	16/02/2005		GAP40	100	N		3.5	0
300	600	15/02/1990		GAP65	150	N		10	3.5
300	600	17/02/1990		GAP40	100	N		10	3.5
600	1000	15/02/1990		GAP65	150	N		10	0
600	1000	17/02/1990		GAP40	100	N		10	0

Note that there is now 8 rows of data where there was originally 2. As you will also be sealing the widening, the same propagation of data must take place in the surfacings table.

Section 10 – Barrier

10.1 Barrier – frequently asked questions

Extending a barrier

What do I do when I extend an existing barrier?

You need to have the RAMM Record for the existing barrier and update it. All you will need to do is alter the geometry any necessary changes to the length and terminal crash cushions. It is also important to update the changed on and changed by attributes.

Sight rails

Do sight rails need to be recorded as well?

Sight rails are to be stored in the Rail Table.

Bridge rails

Should I include bridge rails in the barrier table?

Barriers on either side of the bridge (bridge safety rails) are stored in the barrier table.

Recording height of rail

What height do I record in RAMM?

The Height measurement recorded in RAMM relates to the height of the rail from the ground. This measurement is extremely important from a safety perspective. Where you measure from and to varies slightly on the type of rail and on where the railing is (i.e. centre of road or off the road along the edge of the carriageway).

With regards to where you should be measuring from, if the barrier is on a kerbed island, then the rule is to measure from the top of seal, whereas for example a rail set a few metres away (on the other side of a footpath for example) from the side of carriageway, then it should be from the actual ground level where the rail is.

With regards to where you should be measuring to, for some barriers like the concrete barrier type, the obvious answer is to measure to the top. The confusion is probably with the thrie beam type or similar. With these barrier I suggest the measure should also go to the top of the rail, but a measure to the centre of the rail should be put in the 'comments' field along with any other relevant information.

Section 11 – Non-electronic signs

11.1 Non-electronic signs - frequently asked questions

Non-standard signs

What do I do for non-standard signs?

Non-standard signs typically should not be used on the state highway network.

Where there is a special local reason to use non-standard signs discuss with the NZTA Asset Information Engineer on what codes to use.

Bridge end markers

Do I record bridge end markers?

Bridge end markers are considered sign Inventory and are recorded in the non-electronic sign table.

Other markers

Do I record hazard markers, culvert markers and edge markers?

None of these signs are recorded in the signs table. Culvert Marker post details are recorded in the Drainage Table (in the Culvert Number Field).

Urban signage

What do I do with signs in town? Are these NZTA or Local Authority?

The general rule for state highways in an urban environment is that all signs along the state highway urban corridor are to be collected.

Sign size

What information is required when I change a 600mm sign to a 750mm sign?

You need to provide the physical sign details and the sign id so that the correct sign is identified and updated in the RAMM Database.

Side road signage

How do I record non-electronic signs on side roads that intersect with the State Highways?

Refer to the Markings section, which shows how markings on intersecting side roads are collected. Signs are collected in a similar fashion.

Reverse legend

When do I use the reverse legend?

The "Reverse Legend Note" is used when the sign has a legend on both sides. "Has Reverse Legend" should be populated as "True". The reverse side is always the legend that faces road users travelling against the Increasing RP direction.

Offset Accuracy

How accurate do I need to be with offset?

There are only 3 offsets you can use. They are 0, 6 and 15m. Choose the offset that best represents the true offsets of the sign.