APPENDIX 6

INVENTORY COLLECTION MANUAL

Overview

Purpose	This appendix outlines NZ Transport Agency's (NZTA) 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. Refer to the Asset Information Engineer, Highways and Network Operations Group, NZTA National Office for any proposed modifications.
References	The Inventory Collection Manual is to be used in accordance with the Location Referencing Management System Manual (LRMS), SM051 and Section 3, Road and Section Definitions and Section 6, Field Validation Procedures.

In this Appendix

This appendix covers the following topics:

1.0 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 all the 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'.
SH Classification	State Highway Classification, 'classifies' each highway according to core functions e.g. National Strategic, Regional Strategic.

2.0 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, roadmarking or the components of street lighting or ITS equipment, targeted accreditation is available. Refer to SM050 Section 4 Data Delivery Procedures, 4.2 General Requirements\Certification.

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 1 July 2007 and all existing contracts by 30 June 2009.

3.0 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 8.4 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 or NZTA RAMM Champion 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,
- ERP's are now located typically at 3km intervals along the RS.

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3.1 Measuring, Continued

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 Surface Water 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).

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3.1 Measuring, Continued

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.

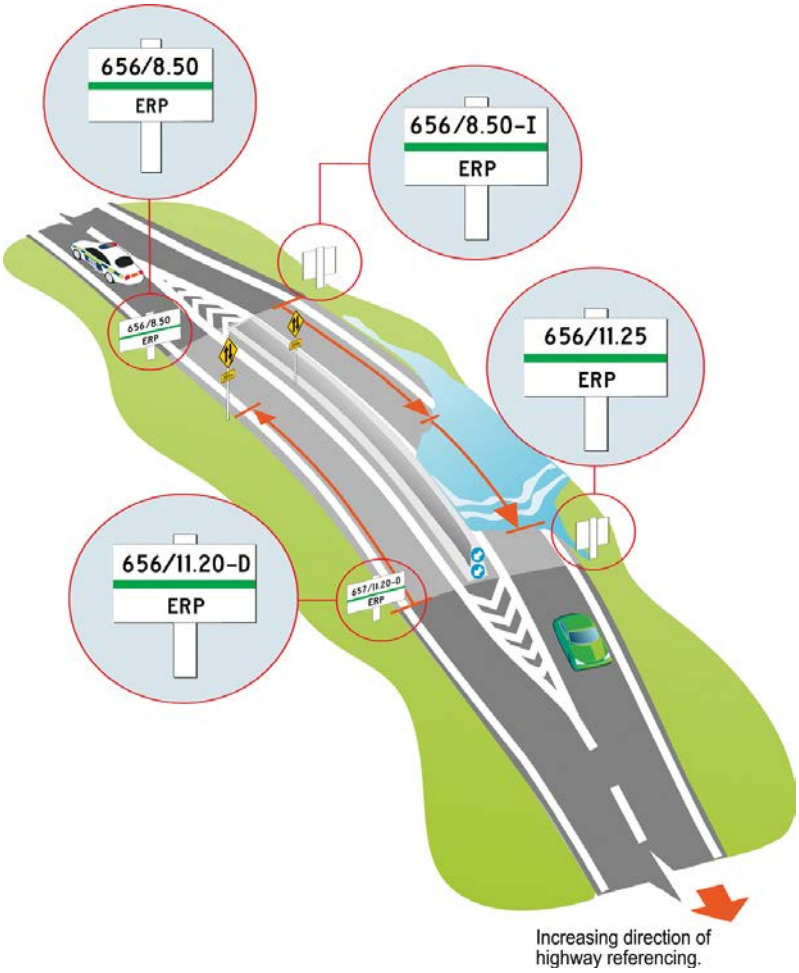

Figure A6.1: Direction on Increasing/Decreasing Highway

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.

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3.1 Measuring, Continued

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

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3.1 Measuring, Continued

Mobile Computing

Mobile computing tools are increasingly being used for the collection and editing of inventory data in the field. These can come in a range of sophistication and complexity. Residing on PDA's, Tablets or Laptops and can consist of relatively simple forms for recording or editing data to sophisticated applications that are GPS enabled.

The GPS enabled tools are able to automatically record location and time, though confined locations (e.g. between the steep sides of a gorge) can affect the ability to receive the necessary satellite transmissions.

For tools that are not equipped with GPS, location information can be entered either manually or via a direct link to a vehicle based trip meter.

Once all required information has been entered, it may then be transferred electronically to a database from the field via a mobile phone connection or downloaded after the field inspection has been completed. Some organisations will operate their own in house developed mobile tools for the management of inventory data in the field, while others will operate commercially available tools of which there is currently a variety available.

While there is a range of available mobile computing options for the collection of inventory data in the field, the primary need is to ensure that the process of data management ensures the collected data meets the specified quality requirements.

Validation procedures built into the coding of mobile tools can assist in meeting data quality requirements, but ultimately it is the responsibility of individual organisations managing data to ensure that their processes produce the required quality outcomes.

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.

"Length" Assets

Some assets are "length" assets and have start and end metres. Therefore new data must be incorporated with existing data to ensure there is no overlapping of assets.
The following tables are "length" assets:

- Carriageway Surfacings,
- Markings,
- Pavement Layer,
- Railings,
- Surface Water Channels.

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3.2 Updating the Asset Register, Continued

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.

Use of the lookup code "UNK"

Avoid the use of this "UNK", unknown lookup code. In almost all situations, there should be a suitable code to use which best describes the asset. For assets without codes, chose the closest matching code, and use the comments field to describe the asset.

NZTA National Office can also add new codes to the database if deemed necessary.

Validation Data

When validating inventory data, you should adhere to the dimensional tolerances as indicated in Section 6.4 and 6.5 Validating Inventory Data (page 6-5) in SHDOM (SM050).

4.0 Carriageway Table

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).

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4.0 Carriageway Table, Continued

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?

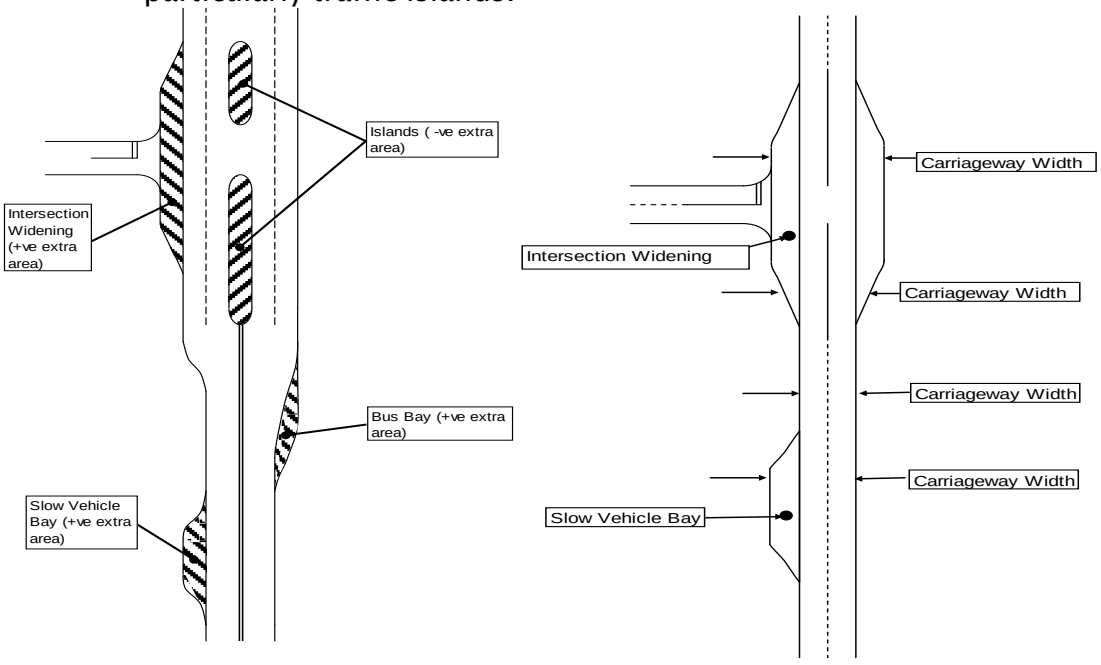
A carriageway that is well segmented should not require significant carriageway area modifications, as indicated in the diagram on the right below.

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.

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4.1 Carriageway - Frequently Asked Questions, Continued

Pavement Type

When I do 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.

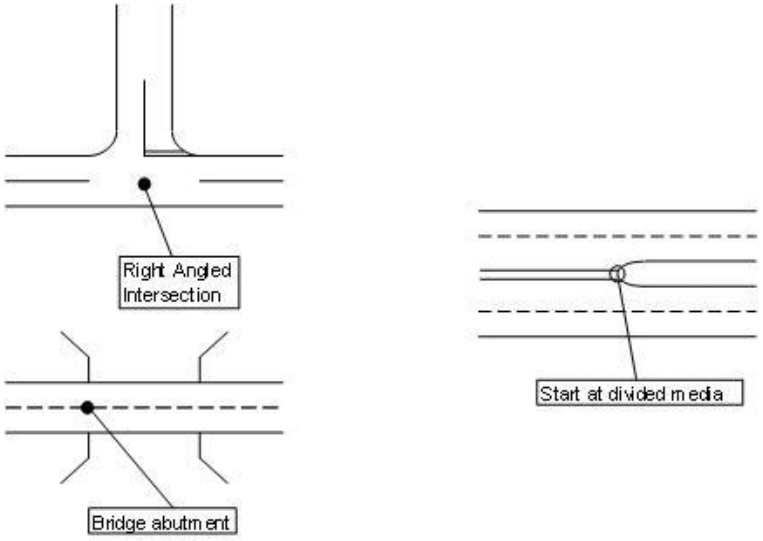

Figure A6.3: Suitable carriageway nodes

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4.1 Carriageway - Frequently Asked Questions, Continued

Large Roundabouts

How do I deal with Large Roundabouts?

Roundabouts (>150m) are now separated out as separate roads. 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.

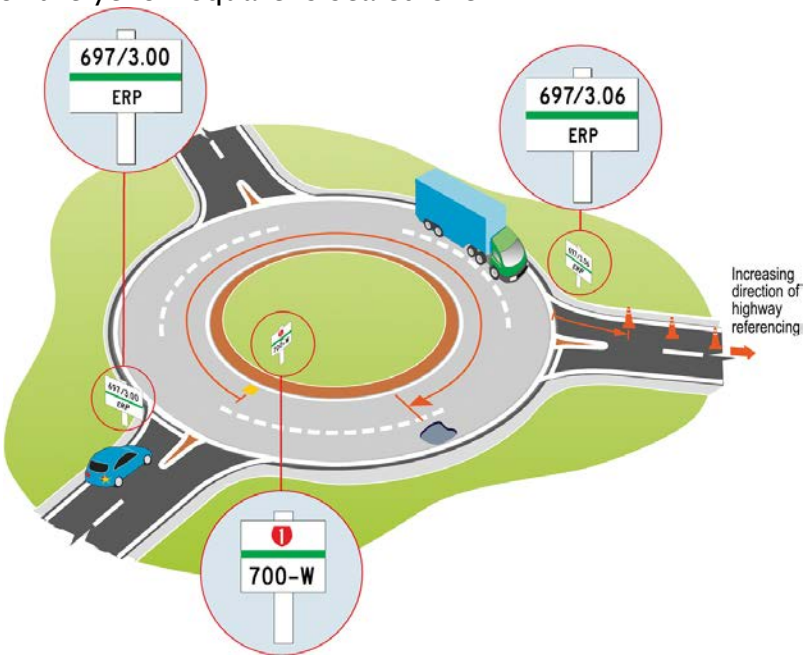

Figure A6.4: Roundabout on State Highway section > 150m

Intersections

What about intersections that are not in the carriageway table?

These intersections are recorded in the Features Table using Feature Type "INT".

5.0 Carriageway Surfacing Table

Purpose

The purpose of the Carriageway Surfacings Table is to provide a logical place to store current and historic surfacing data.

The accuracy of this table is absolutely critical as it represents significant investment by the RCA, and is used extensively in conjunction with high-speed data to undertake high-level analysis.

Uses

The Surfacings Table contains all of the current and historical information on Sealing Activity. A complete and accurate Surfacings Table is necessary to:

- Create an accurate Top Surface Profile,
- Provide accurate annual reporting,
- Provide accurate Treatment Selection Reporting,
- Provide accurate resurfacing reporting,
- Provide input to research projects.

Table Detail

The key elements to this table are dimensional aspects, such as:

- Start and End locations,
- Width,
- Sealed Area.

The table also contains material aspects including:

- Chip Size,
- Surfacing Material (Seal Type, i.e. AC, 2CHIP, etc),
- Surface Function (First Coat, Second Coat, and Reseals),
- Surface Date,
- Surfacing additives (flux, cutter, adhesion),
- Binder type and application rates,
- Surface Reason - the primary reason for undertaking the surfacing,
- Design Life

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5.0 Carriageway Surfacing Table, Continued

Table Updating

The table needs to be updated on completion of the following activities:

- ***Area Wide Treatments:*** ensure that Surface Function is set to "1", and that all underlying surfacings have "removed date" populated,
- ***Rehabilitations:*** ensure that Surface Function is set to "1", and that all underlying surfacings have "removed date" populated,
- ***Construction Projects including realignments:*** ensure that Surface Function is set to "1" and that all underlying surfaces have "removed date" populated,
- ***Resealing:*** ensure that Surface Function is set to "2" for 2nd Coat or "R" for Reseal, High Friction Surfacing details are populated for safety reasons
- ***Widening:*** ensure that "Offset" and "Width" are populated,
- ***Milling:*** ensure that the milled surface has "removed date" populated,
- ***Resurfacing with Mix Seals:*** ensure that the correct surface material is used i.e.: OGPA, OGEM, AC.

5.1 Surfacings - Frequently Asked Questions

Removed Date

What does "Removed Date" mean? And when do I populate it?

Do not delete the surface records from the database

The Removed 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.

Removed 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 removed 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).

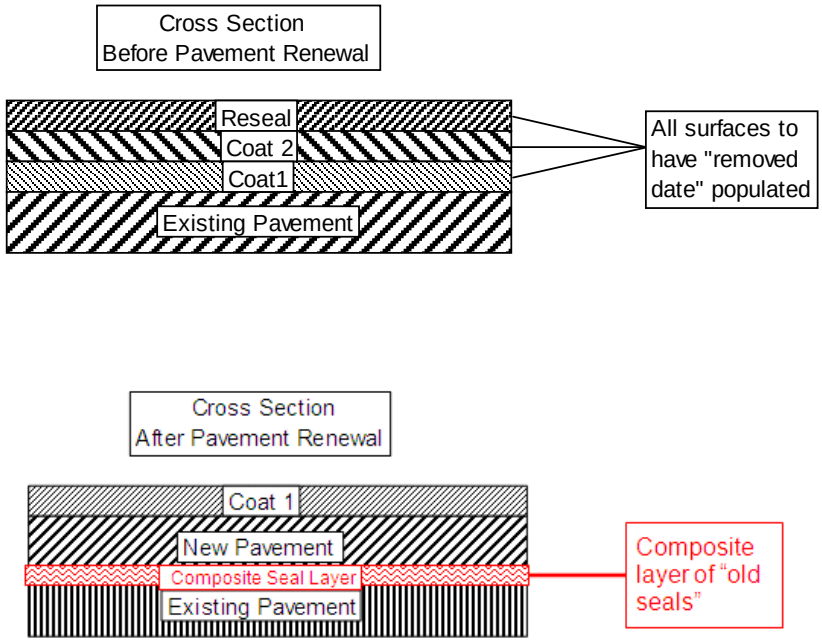

Figure A6.5: Cross-sections of Pavement and Top Surface before and after Pavement Renewal

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5.1 Surfacings - Frequently Asked Questions, Continued

Removed Date, cont.

What does "Removed Date" mean? And when do I populate it?

When milling of existing surfaces occurs, the number of existing surface layers that require the removed 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 removed date populated.

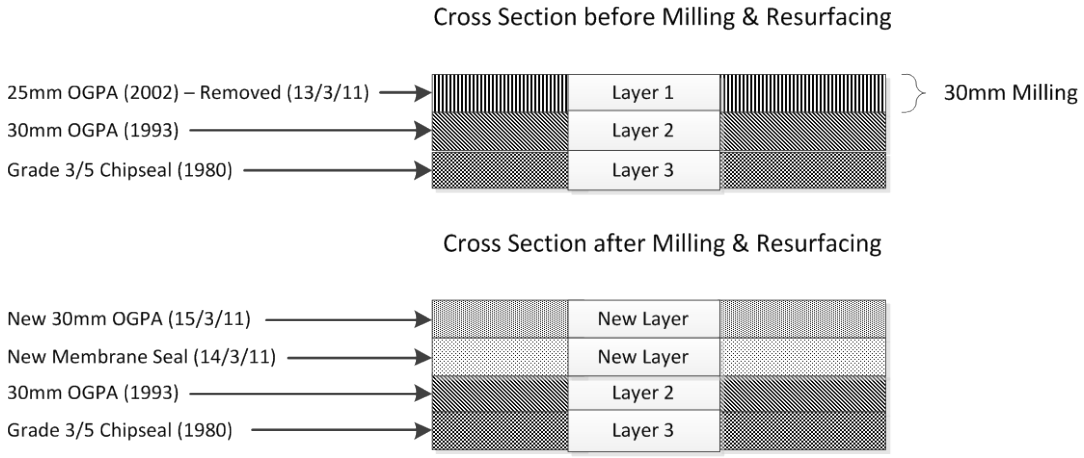

Figure A6.6: Cross-sections of Surface Structure before and after milling prior to resurfacing

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5.1 Surfacings - Frequently Asked Questions, Continued

Surface Width

What is the definition of Surface Width?

Surface 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.

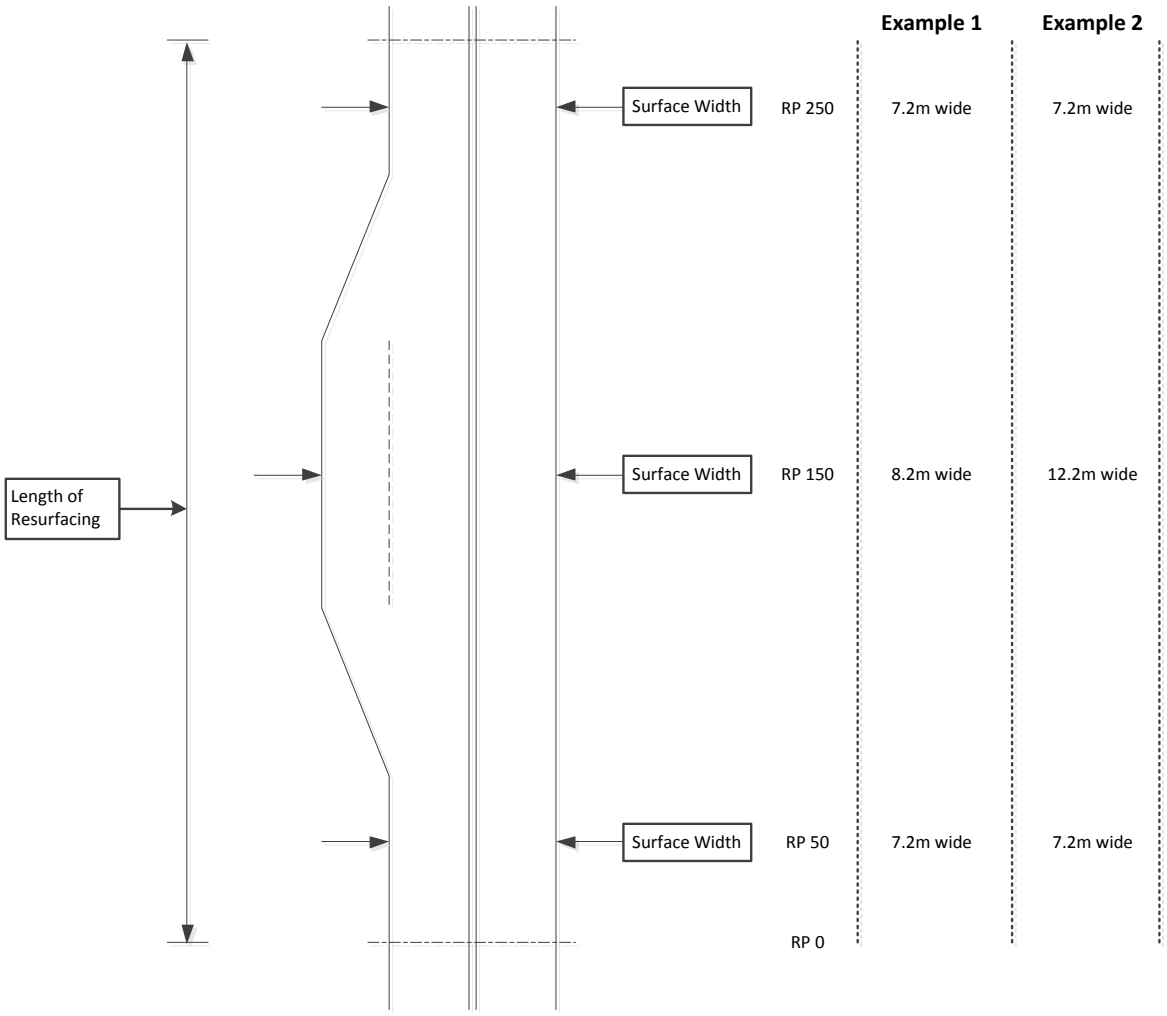

Figure A6.7: Surface Width definition for varying width seals

Details	Surface Record	RP's	Surface 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.

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5.1 Surfacings - Frequently Asked Questions, Continued

Surface Width… cont.

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

Follow the procedure detailed above. Surface 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 sealed_area is the correct place to store the sum of the detailed areas.

Offsets

How does "offset" work?

The offset of a surfacing 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.

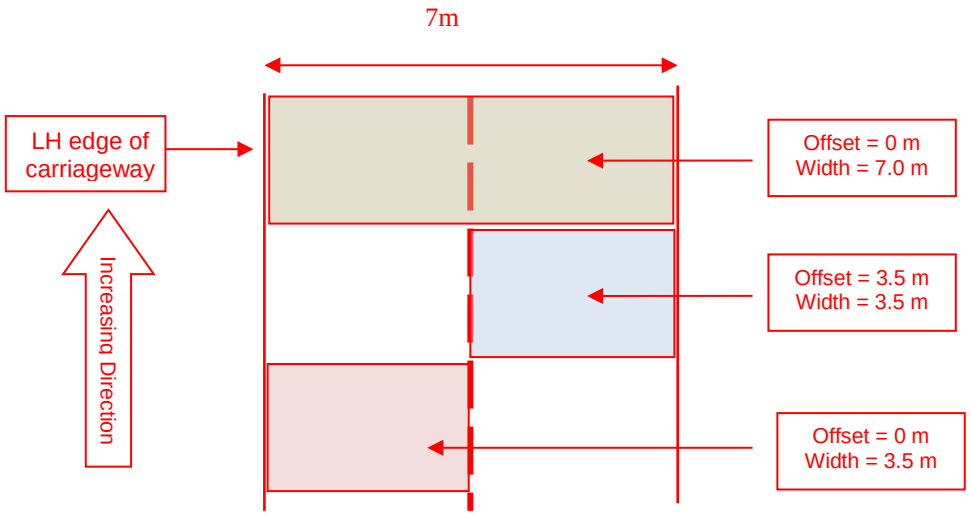

Figure A6.8: Offset & seal width indicate location of surfacing

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5.1 Surfacings - Frequently Asked Questions, Continued

Offsets… cont.

How do I record offset when there has been a widening activity?

The 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 Surfacing will have:

- Offset = 0m,
- Width = 3.5m.

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

- Offset = 3.5m,
- 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:

- Offset = 7m,
- Width = 3.5m.

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

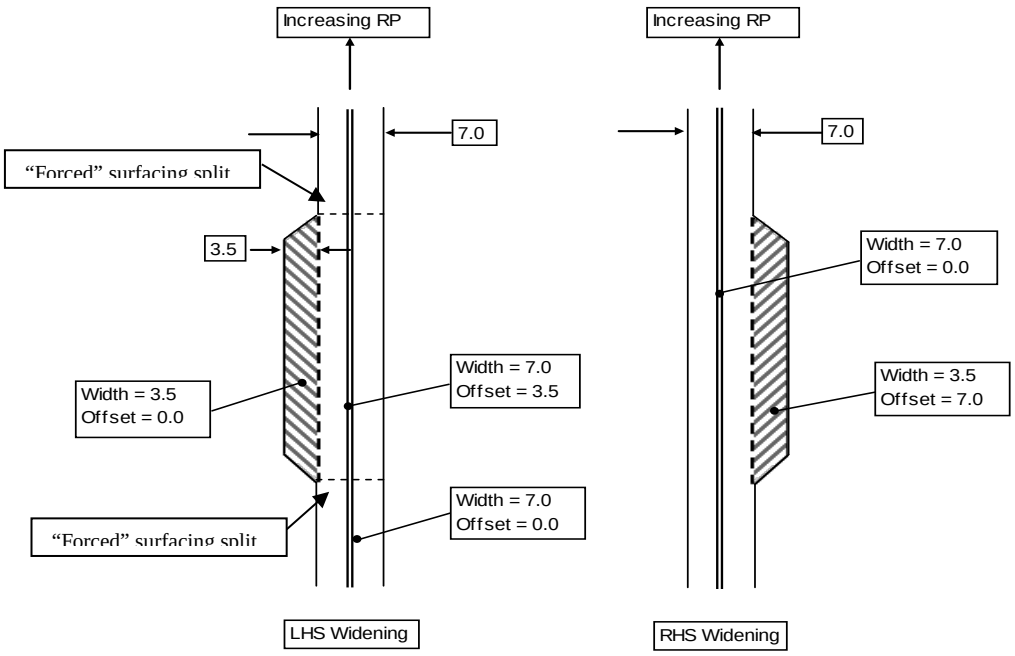

Figure A6.9: Offset Seals for LHS and RHS Seal Widening

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5.1 Surfacings - Frequently Asked Questions, Continued

Design Life

What do the different surface design life columns mean?

Design Life
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.

Default life
This is the original NZ Transport Agency Default Life (in years) at the time of entry of the surfacing record. This will never be updated.

Modified default life
If the NZ Transport Agency updates the default life in the surface life table then the modified default life for any surfacing records will be updated by the asset management software. You cannot update this value.

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 size

What if I put down chips of three different sizes?

Record the first two sealing chips as per a two coat seal, and then record the third chip in the notes field and use 3CHIP in the surface material field surf_material.

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5.1 Surfacings - Frequently Asked Questions, Continued

Inventory collection examples of various chip seal types.

Field Description	RAMM Req.	Default	NZTA Req.	Combination Seal Example	Sandwich Seal Example	Multiple Chip Example
Road Name				*As per Normal*	*As per Normal*	*As per Normal*
Road ID	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Start (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
End (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Width (m)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Full width (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Offset (LHS) (m)	Y	0	T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Sealed Area (m2)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Removed Date			T(C)			
Surfacing Date	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Design Life (yrs)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Function	Y		T(M)	R	R	R
Material	Y		T(M)	COMB	B/S	3CHIP
Grade of 1st Chip	Y		T(M)	3	2	3
Grade of 2nd Chip			T(C)	5	4	5
Depth	Y	0	T(M)	0	0	0
Calculated Depth	Y	Y	T(M)	Y	Y	Y
Reason			T(M)	FL	FL	CR
ALD 2dec.pl.			T(C)	8.95	9.8	8.95
PSV			T(C)	58	60	56
Source			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Binder Type	Y		T(M)	B130	B180	B180
Cutter Quantity (pph)	Y	0	T(C)	3	3	3
Cutter Type			T(C)	Kero	Kero	Kero
Adhesion Quantity (pph)	Y	0	T(C)	0.5	0.5	0.5
Adhesion Type			T(C)	AG75	AG75	AG75
Flux (pph)	Y	0	T(C)	0	0	0
Additive Quantity (pph)	Y	0	T(C)	0	0	0
Additive Type			T(C)			
Torsional Recovery (%)			T(C)	19	52	0
Softening Point (°C)			T(C)	51.8	63.6	0
Polymer Type			T(C)	SXL	RSS1	
Polymer (%)			T(C)	3	3	0
Residual Rate (l/m²)			T(C)	1.35	1.81	1.75
Contract Number			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Specification Type			T(M)	P/17	P/17	P/17
Surfaced By			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Recycling	Y	F	T(M)	F	F	F
Component %			T(C)	0	0	0
Component			T(C)	0	0	0
Comments			T(C)	Combination Seal, G3 in wheeltracks, G5 over full width	Sandwich seal	2 coat seal with G6 over full width

Continued on next page

5.1 Surfacings - Frequently Asked Questions, Continued

Surface Function

What is Surface Function?

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

- 1: First Coat Seal,
- 2: Second Coat Seal,
- M: Membrane Seal,
- R: Reseal

An accurate surfacing 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 surfacing table as surface function "2", this is incorrect (unless the two coat is a second coat). Record reseals with surface function "R" 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 "2" and the next waterproofing layer will be a reseal "R".

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 M should be used as the Surface Function for the membrane seal and the asphalt surface has a Surface Function of 2(Second Coat Seal), for new pavement and area wide treatments only.

Surface depth

How do I populate surface depth and use calc depth fields?

The software can be used to calculate the surface depth automatically by setting the use_calc_depth flag to Y. If set to N, then you need to enter the surface depth manually as follows:

- When there is a chip seal, enter 0 into surface_depth and set use_calc_depth to Y.
- When the surface is Thin Ashaltic Surfacing, Slurry or Cape Seal, enter a surface depth greater than 0 and set use_calc_depth to N.

PSV

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

The PSV value to be entered is the value for the largest chip grade used in the seal layers, or the PSV value for the largest aggregate used in asphalt mix designs and is the top trafficked wearing course record. PSV values are not entered for membrane or prime coat seal records

Continued on next page

5.1 Surfacings - Frequently Asked Questions, Continued

Recycling

How do I record recycling?

If a surfacing includes a recycled product (as either an additive, aggregate or polymer) enter a T (True) in the recycling field. The recycled component refers to the type of product used e.g. recycled asphalt product (RAP) is used in asphalt mixes. Melter slag aggregate is a product used in asphalt mixes and as a sealing chip. 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. Other recycled components can be recorded in the notes field.

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 before you shouldn't add it to RAMM?

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 AC 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.

Binder

How do I record the binder type?

The field surf_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 type 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) and the detail of the binder is added to the Notes field.

Continued on next page

5.1 Surfacings - Frequently Asked Questions, Continued

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 notes field. A geotextile fabric used beneath an asphalt surface would be recorded in the same manner.

Polymer Modification

How do I record a polymer modified binder?

When a binder is polymer modified, additional information is required to capture the details of the polymer modification. The type of polymer used in the binder is defined in the polymer type field. The percentage of polymer used is also required in the polymer % field.

The additional information required for a polymer modified binder only (not applicable to base binders):

- **Torsional Recovery:** The minimum torsional recovery (%) in accordance with test method AG:PT/T122.
- **Softening Point:** Minimum softening point (in degrees Celsius) in accordance with test method ASTM D36.

The reason for torsional recovery and softening point being captured, is to differentiate between different polymer types. This is required until polymer specifications are developed.

For non-polymer additives used in the binder, the additive type is required to be captured in the surface additive field. The amount of additive used (pph) is also required in the additive field.

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. For any additional additives or polymers, use the notes field to provide details on the types and amounts for future reference.

Surface Record Examples

What details are required for surface types such as slurries and cape seals, and others?

The following page contains some examples of surface records populated for common surface treatments that can be confusing to capture.

Continued on next page

5.1 Surfacings - Frequently Asked Questions, Continued

Inventory collection examples of various mix types.

Field Description	RAMM Req.	Default	NZTA Req.	SMA Example	UTA Example	DGA Example
Road Name				*As per Normal*	*As per Normal*	*As per Normal*
Road ID	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Start (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
End (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Width (m)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Full width (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Offset (LHS) (m)	Y	0	T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Sealed Area (m2)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Removed Date			T(C)			
Surfacing Date	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Design Life (yrs)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Function	Y		T(M)	R	R	R
Material	Y		T(M)	SMA	UTA	AC
Grade of 1st Chip	Y		T(M)	12	8	14
Grade of 2nd Chip			T(C)			
Depth	Y	0	T(M)	35	20	50
Calculated Depth	Y	Y	T(M)	N	N	N
Reason			T(M)	CR	RA	SS
ALD 2dec.pl.			T(C)			
PSV			T(C)	58	62	56
Source			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Binder Type	Y		T(M)	B60	B80	B80
Cutter Quantity (pph)	Y	0	T(C)	0	0	0
Cutter Type			T(C)			
Adhesion Quantity (pph)	Y	0	T(C)	0	0	0
Adhesion Type			T(C)			
Flux (pph)	Y	0	T(C)	0	0	0
Additive Quantity (pph)	Y	0	T(C)	1	1	0
Additive Type			T(C)	CF	CF	
Torsional Recovery (%)			T(C)	19	19	0
Softening Point (°C)			T(C)	52	52	0
Polymer Type			T(C)	AXM	AXM	
Polymer (%)			T(C)	2	2	0
Residual Rate (l/m²)			T(C)			
Contract Number			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Specification Type			T(M)	FHSMA	PAVETEK	P23P
Surfaced By			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Recycling	Y	F	T(M)	F	F	F
Component %			T(C)	0	0	0
Component			T(C)	0	0	0
Comments			T(C)	SMA12 Mix with AXM PMB	PaveTex8 Mix with AXM PMB	DG Asphalt

Continued on next page

5.1 Surfacings - Frequently Asked Questions, Continued

Inventory collection examples of various mix types, slurry and cape seal.

Field Description	RAMM Req.	Default	NZTA Req.	OPGA HS SLAG Example	Membrane Seal Example	OGPA2 Example
Road Name				*As per Normal*	*As per Normal*	*As per Normal*
Road ID	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Start (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
End (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Width (m)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Full width (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Offset (LHS) (m)	Y	0	T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Sealed Area (m2)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Removed Date			T(C)			
Surfacing Date	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Design Life (yrs)			T(M)	*As per Normal*	***As per Top Surface***	*As per Normal*
Function	Y		T(M)	R	M	R
Material	Y		T(M)	OGPAH	1CHIP	OGPA2
Grade of 1st Chip	Y		T(M)	14	4	14
Grade of 2nd Chip			T(C)			20
Depth	Y	0	T(M)	35	0	85
Calculated Depth	Y	Y	T(M)	N	Y	N
Reason			T(M)	RA	RA	SS
ALD 2dec.pl.			T(C)			
PSV			T(C)	60		60
Source			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Binder Type	Y		T(M)	B60	E180	B80
Cutter Quantity (pph)	Y	0	T(C)	0	2	0
Cutter Type			T(C)		Kero	
Adhesion Quantity (pph)	Y	0	T(C)	0	0.5	0
Adhesion Type			T(C)		AG75	
Flux (pph)	Y	0	T(C)	0	0	0
Additive Quantity (pph)	Y	0	T(C)	0	0	0
Additive Type			T(C)			
Torsional Recovery (%)			T(C)		75	50
Softening Point (°C)			T(C)		45	75
Polymer Type			T(C)		SXL	RSQR
Polymer (%)			T(C)		2	2
Residual Rate (l/m²)			T(C)		1.7	
Contract Number			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Specification Type			T(M)	P11HS	P17	P11
Surfaced By			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Recycling	Y	F	T(M)	Y	F	F
Component %			T(C)	50	0	0
Component			T(C)	SLAG	0	0
Comments			T(C)	OGPA HS Mix with SLAG on Cat 1 site	PMB Membrane seal under OGPA	Twin layer OGPA for Noise suppression, PMB in top OGPA layer

Continued on next page

5.1 Surfacings - Frequently Asked Questions, Continued

Inventory collection examples of various mix types, slurry and cape seal.

Field Description	RAMM Req.	Default	NZTA Req.	Slurry Type 2 Example	Slurry Type 3 Example	Cape Seal Example
Road Name				*As per Normal*	*As per Normal*	*As per Normal*
Road ID	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Start (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
End (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Width (m)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Full width (m)	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Offset (LHS) (m)	Y	0	T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Sealed Area (m2)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Removed Date			T(C)			
Surfacing Date	Y		T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Design Life (yrs)			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Function	Y		T(M)	R	R	R
Material	Y		T(M)	SLRY	SLRY	CAPE
Grade of 1st Chip	Y		T(M)	2	3	3
Grade of 2nd Chip			T(C)			2
Depth	Y	0	T(M)	9	12	20
Calculated Depth	Y	Y	T(M)	N	N	N
Reason			T(M)	HS	RA	CR
ALD 2dec.pl.			T(C)			10.15
PSV			T(C)	57	57	57
Source			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Binder Type	Y		T(M)	E130	E130	E130
Cutter Quantity (pph)	Y	0	T(C)	0	0	2
Cutter Type			T(C)			Kero
Adhesion Quantity (pph)	Y	0	T(C)	0	0	0.5
Adhesion Type			T(C)			AG75
Flux (pph)	Y	0	T(C)	0	0	0
Additive Quantity (pph)	Y	0	T(C)	0	0	0
Additive Type			T(C)			
Torsional Recovery (%)			T(C)	19	19	75
Softening Point (°C)			T(C)	52	52	45
Polymer Type			T(C)	TMEH	TMEH	EFXC
Polymer (%)			T(C)	1	1	3
Residual Rate (l/m²)			T(C)			1.6
Contract Number			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Specification Type			T(M)	PSS	PSS	PSS
Surfaced By			T(M)	*As per Normal*	*As per Normal*	*As per Normal*
Recycling	Y	F	T(M)	Y	F	F
Component %			T(C)	50	0	0
Component			T(C)	SLAG	0	0
Comments			T(C)	Type 2 Slurry with PME per ISSA:A143	Type 3 Slurry with PME per ISSA:A143	G2 Chip Seal per M6, Type 3 PME Slurry per ISSA:A143

6.0 Drainage Table

Purpose

The purpose of the drainage table is to store details about any drainage assets owned by and that are the responsibility of NZTA. This excludes permanent roadside drainage channels that move surface water parallel to the roadside (see section 16 Surface Water Channel), with the exception of side culverts which are stored in the drainage table.

Examples of drainage table are:

- Culverts,
- Side Culverts (under driveways),
- Sub-soil drains,
- Catch-pits,
- Flumes.

If the drainage feature has any end-treatments (Manholes, Drop chambers, Headwalls) then details about these are also stored with the drainage asset record.

Uses

The drainage table contains information on the location, quantity and dimensions of all permanent drainage and provides contributing data towards the following:

- Programming of routine drainage maintenance,
- Development of drainage replacement programmes,
- Production of Route Data Sheets,
- Determination of the asset valuation,
- Specification and scope of road maintenance contracts.

Table Detail

The key elements to this table are the dimensional and descriptive aspects, such as, the:

- Start and end locations of the drainage feature,
- Length and offset, from road-centreline, of the drainage feature,
- Side of the road that the drainage feature is located on,
- Type of drainage feature and its end-treatments (including material and any other physical characteristics), if any,
- Dimensions, waterway-area, and any identification of culverts.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of new drainage features,
- Any maintenance work on existing drainage features that results in a change in the location, dimension, or type of drainage feature, or is a renewal,
- The removal of drainage features.

6.1 Drainage - Frequently Asked Questions

Determining Difficult RP's

How do I determine the Route Position of a culvert that crosses the road on an angle?

The reason for assigning an asset an RP is to ensure that it can be easily located using its RP in subsequent inspections, Inventory Surveys, etc.

The true definition of RP for a culvert that passes under the road on an angle is where the centreline of the road passes through the centreline of the culvert (see below). However, this can make it difficult to locate the inlet and outlet as they can occur some distance either side of this RP (most culvert inspections focus on condition of inlet and outlet).

Use the RP of the LHS inlet/outlet. This ensures that the culvert LHS inlet can be easily located without crossing the road. The location of the RHS Inlet can be determined once the LHS Inlet is located.

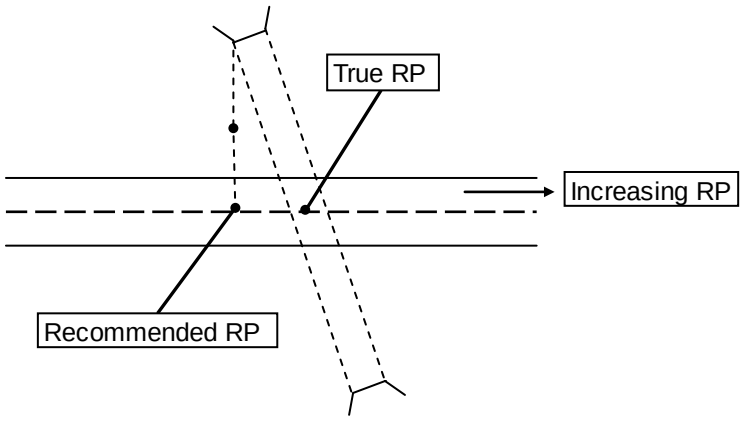

Figure A6.10: Measuring RP for Angled Culverts

Sump Offsets

What if the offset of a sump located on a median island on an Increase/Decrease section of highway?

The offset for sumps (or any single point displacement asset) located on the island of a Divided Median Highway are measured from the centre of the increasing or decreasing section, not the centre of the island. Therefore if the increasing direction is 7m wide (2 lanes) and there is a sump on the RHS (i.e.: on the island) then the offset is 3.5m and the side is right.
However, the offset for a sump (or any single point displacement asset) located on the island of a decreasing section of Divided Median Highway has an offset of 3.5m and is on the left.

Continued on next page

6.1 Drainage - Frequently Asked Questions, Continued

Offset Accuracy

How accurate should I be with recording offset?

Offset should be measured to the nearest 0.1m. As long as the drainage asset can easily be located using the offset provided then that is adequate. For offset drainage items that move water away from the road (i.e.: flumes and side culverts), the offset should be the distance from the centre of the road to the nearest point of the asset to the road centreline.

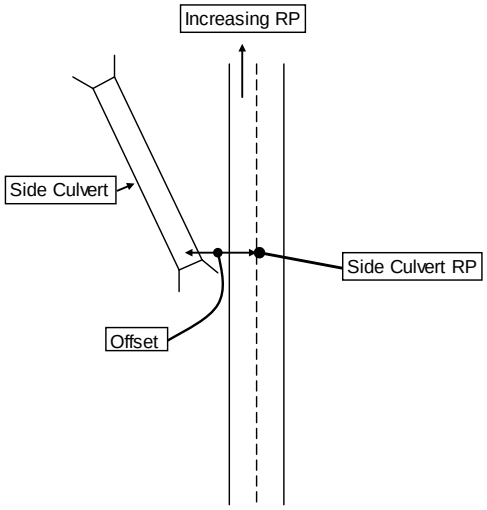

Figure A6.11: Culverts with differing offset

Complex Systems

Complex drainage systems like the example below can be captured by recording 3 culvert assets at the same displacement. There will be one culvert and two side culverts (one on either side of the road). This way you can record the lengths and diameters of each culvert individually, as they are most likely to be different. Use a similar method for recording culverts with flumes, slot channels etc at culvert ends.

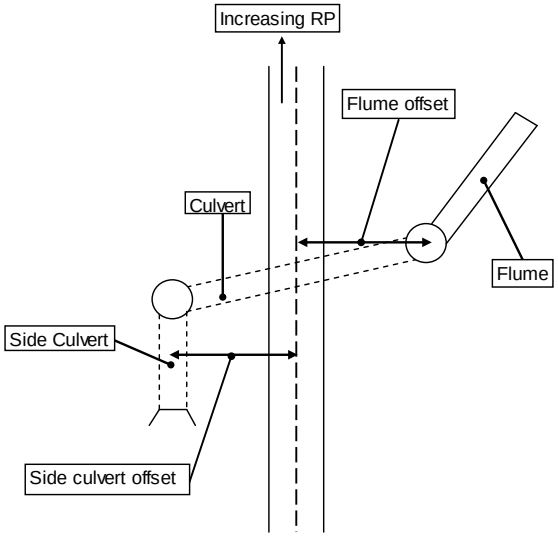

Figure A6.12: Recording Multiple Drainage Facilities

7.0 Features Table

Purpose

The purpose of the features table is to provide a place to store the location and general information on any miscellaneous features that are either seen from the road, or are associated with the particular section of road. Examples of features include intersections and rail crossings, light-poles, traffic-signal controlled intersections, emergency phones, stockpile sites, rest-areas, historic sites and monuments. The features table is also used to record sections of road that are being, or have been, used for calibration or testing purposes.

When approved by NZTA data for Intersections, Islands and Traffic Signals may be stored in their own tables.

Uses

Information contained in the Features Table is used to produce Route Data Sheets, and can also be queried to determine the location of any of the assets contained within it.

Table Detail

The key elements to this table are the positional and descriptive aspects, such as, the

- Start and end locations of the feature,
- Offset, from road-centreline, of the feature,
- Side of the road that the feature is located on, and
- Type of feature.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation or determination of new features,
- Any maintenance to existing features that results in a change in the location, dimension

Table Updating

The table needs to be updated on completion of the following activities:

- Installation or determination of new features,
- Any maintenance to existing features that results in a change in the location, dimension, or type of feature, and
- The removal of features.

Frequently Asked Questions

What if there is a feature I would like to add but there is currently no lookup code for it?

You can contact the Asset Information Engineer, at NZTA National Office, if you wish to have a new lookup code added to the features table.

8.0 Intelligent Transportations Systems(ITS) Table

Purpose

The purpose of the Intelligent Transportation Systems (ITS) table is to store basic inventory, technical and location information about ITS assets owned or maintained by the NZ Transport Agency.

However, assets not owned by NZ Transport Agency, but which have been identified as having a significant effect on or used to manage State Highway traffic, can also be included if deemed necessary (e.g. Local Authority (LA) cameras, private variable message signs (VMS) etc.). Lighting or mechanical components (such as fans), installed in conjunction with ITS assets (e.g. in tunnels) are not considered to be ITS assets and should be captured elsewhere.

Uses

Essentially, the ITS Table is a repository for the location and types of all ITS assets on the roading network; thus, it provides accurate contributing data towards the

- Programming of routine ITS maintenance,
- Development of ITS upgrading / renewal programmes,
- Determination of the asset valuation, and
- Specification and scope of physical works and maintenance contracts.

Table details

The key elements to this table are the dimensional and descriptive aspects, such as, the

- Location of the ITS asset (GPS or Road location details, Network Management Area (NMA) details),
- Type details for the ITS asset (type, sub-type etc.),
- State and descriptive aspects (state, location, support etc.),
- Technical information for each asset (manufacturer, supplier, model, communications etc.),
- Installation details (date, design life, purchase cost etc.),
- Contract details (defects liability periods, contract numbers) and
- Criticality and condition related details (criticality rating, condition assessment etc.).

Table updating

The table needs to be updated upon completion of the following activities:

- Installation (or acquisition) of a new ITS Asset (in the field or store),
- Maintenance of an existing ITS Asset that results in a change to any captured attribute (replacing parts, removal for repair etc.)
- Rotation of assets which results in locations changes (including rotation of assets between the field and the store),
- The disposal of an ITS asset.

8.1 ITS Frequently Asked Questions

Recording Location Details on the State Highway

How do I record the location of an ITS asset on the State Highway?

Location details are mandatory for all assets and must as a minimum be provided in one of the two available formats. A full set of location details is preferred and may be required in some instances.

The two location formats are defined as:

1. **Spatial (GPS)** – This must be provided as a Northing and Easting value in NZ Map Grid (NZMG) format.
2. **Road location details**– This must include valid data for Road ID (Road Name), Route Position (RP), Side and Offset.

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.

If the details provided for either of the location formats is accurate and complete, the other can be determined by RAMM (e.g. if the NZMG northing & easting is accurate, RAMM can determine the road location details in most cases).

There may be some issues around complex road alignments (such as interchanges) or assets not along the State Highway corridor, where the road location details may need to be confirmed manually (e.g. an asset on a ramp within a busy interchange may be close enough to the State Highway or another ramp to be assigned to the wrong road or RAMM may be unable to assign the appropriate details on an asset outside a certain range of the State Highway).

Additional location descriptions can be entered in “Street Address” and “Location Description”, to assist with accurately locating an asset.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

Offset accuracy

How accurate should I be with the Offset?

Offset should be measured to the nearest 0.1m, but if the ITS asset can easily be located using the offset provided, then that is adequate. As with all the other assets, the offset should be the distance from the closest part of the asset to the road centreline (e.g. to the inside post for a dual post VMS or the edge of the cabinet closest to the State Highway).

Due to the location of some assets it may not be possible to determine all location details safely or accurately. The following rules should be applied:

- **Default offsets** can be used in cases where it is too dangerous / costly to measure (e.g. on the Motorway) or the asset is located where an offset cannot be easily determined:
  - **0m** (centre of road / overhead),
  - **6m** (directly adjacent to the State Highway / edge of the road),
  - **15m** (further away from the State Highway or down side road) and
  - **999** (for assets located more than 1000m from the State Highway). In this case the actual map measured offset should be noted in "Location Description", if available. A spatial location must be provided, if possible, when 999 is used as an offset.
- An offset derived from maps or aerial photography is also acceptable.

Side

When can I use "both" as side?

"Both" is meant to be used for an asset which is installed across multiple lanes or stretches across the full width of the road.

When assets are located on opposite sides of the road (such as overhead detection devices), each asset is collected as a separate record and the side indicated as "Left" or "Right". In this situation, recording a single entry with "Both" is incorrect, as the assets should not be grouped into one entry.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

Non State Highway located assets

How do I record the location of an ITS Asset located away from the State Highway?

All NZTA owned ITS assets are to be collected, whether on or off the State Highway corridor. This includes assets still under Defects Liability Period (DLP), any mobile devices and assets in store within a Region or the NZTA national stock.
The location of the asset needs to be defined in terms of the section of the State Highway it manages / is operationally related to or the point that will assist with locating the asset in relation to the State Highway, as shown in the figure below:

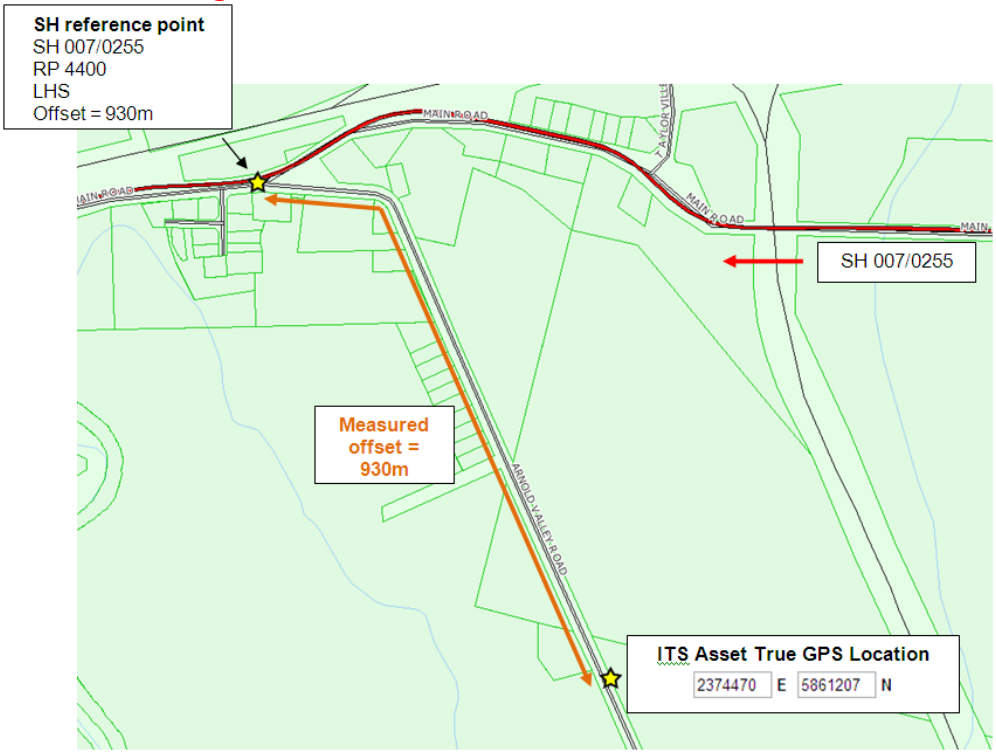

Figure A6.13: Recording the location of NZTA assets not on the State Highway

The location of the asset is captured as follows:

- The spatial location (GPS) must be provided.
- Provide the Road ID & Route Position for:
  - the portion of State Highway managed by asset (e.g. intersection location for VMS along a local road or a tunnel), or
  - the closest point to the State Highway where the asset is located, in cases where the asset isn't operationally related to a specific State Highway section (e.g. a cabinet in NZTA control room managing various sections of the NZTA network).
- The offset and side are related to the asset's location in relation to a State Highway reference point (as described above).

The assets location can be summarised as:

- GPS and Location Description = Asset's true location, and
- Road ID, Route Position, Side and Offset = State Highway reference point description.

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8.1 ITS Frequently Asked Questions, Continued

Mobile assets

How do I record mobile assets?

All mobile assets (such as portable VMS signs) owned by NZ Transport Agency, irrespective of their state or location, need to be location referenced as follows:

- Road ID = 3177 (this is SH0/RS0)
- Route Position = 0
- Offset, Side or NZMG remains blank (null)

Any location type details that are considered to be important or of value can be completed in the other available fields (e.g. contact person, trailer license plate number etc.)

Assets in store

Do I record assets purchased as spares or assets not deployed in the field?

All assets owned by NZ Transport Agency, whether installed in the field or kept in store as spares, needs to be entered in the ITS table. These assets can easily be identified through their state of "In Store".
Assets in store need to be location referenced as follows:

- Road ID = 3177 (this is SH0/RS0)
- Route Position = 0
- Offset, Side or NZMG remains blank (null)

The location of the store needs to be noted in the "Location General" field to assist with locating the asset if required (e.g. TYCO Petone Depot).

New assets

At what stage of a project should the data for a new ITS asset be provided?

Once construction of the asset is completed (i.e. physical works are complete), the as-built and asset data need to be provided. The trigger point for the supply of this data should be the successful completion of the site acceptance test (SAT) or earlier. Even if an asset is not yet activated or on-line, it can be still be added to the database with the state indicated as "Unavailable". The state is merely updated to "In Service" once it is activated.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

State

When and how do I update "State"?

The "State" and "State Date" always refers to the current status of the asset and needs to be updated as soon as the state changes, i.e. due to maintenance replacement and rotation or breakdown etc. The "State Date" does not refer to the date the data was collected, but when the assets state changed.

Whether the asset is active or not, does not determine if the asset data is required. An asset's "State" is updated to indicate this. For example, a new camera will be added as soon as all the physical works have been completed and will have a state of "Unavailable" until it is activated / operational, at which time, the state is updated to "In Service".

For existing assets, where the start date of the current state cannot be determined, the following default values can be applied:

- "Unavailable" assets: State date = Installation Date
- "In Service" assets: State Date = Installation Date + 3 months
- If above rules cannot be applied, as a result of various maintenance activities, changes since the initial installation or unknown original installation (older assets), the following can be applied:
    - If the year is known (construction or change of state), an estimated date of 25/12/YYYY can be used.
    - 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.

Assets not owned by the NZ Transport Agency

Do I need to collect all mandatory fields for assets not owned by NZTA?

Assets not owned by the NZ Transport Agency are included for information and planning purposes only, but are excluded from NZ Transport Agency valuation or renewal programming, therefore they do not require all mandatory fields to be populated. ROSA sensors (Metservice owned assets) are an example of this. They are very expensive to replace and are located in the State Highway road surface, and therefore impact on State Highway operations and planning.

The minimum fields required to be populated for these assets are:

- Location details (e.g. Road ID, route position, side, offset and GPS)
- Asset details (Asset Type, Sub-Type and Asset Description – include basic asset description and relevant technical details)
- Owner: It is important to indicate ownership as "Local Authority" or "Other" (e.g. Police) and not as "NZ Transport Agency" owned.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

Asset types

How do select the correct asset type and sub-type?

The ITS assets have been grouped into eight main ITS asset groups, with specific sub-types listed under each (as described in more detail in Section 11.0). It is important to ensure that the main and sub-type selected match, as the software currently does not facilitate this.

Use the codes as listed in the main groups in Appendix 1 of this manual. The main and sub-types are linked based on the same prefix number.

Separate asset components

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

All components need to be separately recorded as listed in the asset type and sub-type list, 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 nine separate records are required to indicate the three cameras and their components at this location:

- 3 x CCTV Camera,
- 3 x CCTV Fixed Lens, and
- 3 x CCTV Housing records

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, indicating the number of assets in the “Asset Description” field and including the cost of all the assets under “Purchase 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”.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

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. These changes should be captured through updating the "State" and "State Date" details.

The installation date is more related to the date the asset was "acquired" and the asset age. The design life, expected replacement date 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.

Design life

When is 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. If a shorter or longer life is expected due to the repair or environmental changes, this should be captured through the "Expected Replacement Date" and "Condition" field.

"Unknown" codes

When can I use the "Unknown" code for technical information?

The "Unknown" code has been provided in the lookup for the mandatory fields "Manufacturer" and "Supplier". This is a temporary code to allow the capture of older assets (installed before 2006), where this information cannot be determined post installation. "Unknown" cannot be used for assets installed after 01/01/2006.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

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.

The following maintenance activities and resultant updates occur:
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.

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8.1 ITS Frequently Asked Questions, Continued

Purchase cost

What does purchase 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.

Model

How do I select the correct model code?

Model is an optional field and only needs to be populated in cases where it is known (e.g. from as-built information or as indicated on the asset). The list of lookup codes has been generated from existing data and is not complete. If a model code is not listed in the provided lookup list, a new code needs to be requested from and approved by the NZ Transport Agency. This is to prevent duplication of codes.

Supports

Should I include the ITS support as an asset?

The support type for an ITS asset is recorded under the "Support" field against each record in the ITS table. No other details for the support are collected within the ITS table and a separate record for the support is not required. However, apart from indicating the support type in the ITS table, some supports (e.g. masts, gantries etc.) need to be captured in the Minor Structures table (as described in section "10.0 Minor Structures Table" below). Minor supports such as walkway bracket, emergency phone pedestal etc. are not recorded separately.

Maintenance Contract Number and Maintained by

What do I do if assets are not covered by a NZ Transport Agency maintenance contract?

The following scenarios apply:

- Assets not covered by a current maintenance contract (including assets "in store" outside of a maintenance contract e.g. National Office stock), should be noted as "N/A" (Not applicable) in the "Maintenance Contract No." field and "UKN" (Unknown) in the "Maintained by" field.
- In cases where assets are being maintained on an "ad hoc" basis by a known maintenance contractor on a need only basis (but the work is not completed under an existing / specific NZ Transport Agency ITS maintenance contract), "None" should be noted in the "Maintenance Contract No." field and the name of the Contractor noted in the "Maintained by" field.

Continued on next page

8.1 ITS Frequently Asked Questions, Continued

Defects Liability Period (DLP)

How do I record maintenance details for assets in terms of DLP?

Maintenance details for assets are completed as follows:

1. Maintained by:
   - The organisation responsible for installation / construction of the asset is the DLP Contractor during the defects liability period (DLP).
   - This is updated with the ITS or Network Maintenance Contractor at the end of the DLP period (the organisation responsible for ongoing maintenance).
2. Maintenance Contract Number:
   - The DLP contract number is entered in this field until the end of DLP.
   - At the end of the DLP, the contract number is updated to the maintenance contract number.
3. DLP Start / End Date:
   - DLP start and end dates are required for all assets currently under DLP or under DLP at the time of entry. It is not required for assets not under DLP (e.g. under normal maintenance). The asset's DLP start and end date in the database does not have to be removed at the end of the DLP.
   - If the DLP date has not been defined / finalised or is currently open ended due to unresolved technical issues, at the time of data entry, the default date of "*01/01/1900*" is used to populate the DLP start or end date. Once the final DLP dates have been agreed, the default date must be updated to the agreed date.
4. The Construction Contract Number remains unchanged for all situations.

Contract Managed by

Who is included under "Contract Managed by"?

The organization who manages the installation of the ITS asset or the subsequent maintenance contract needs to be identified in this field. "Contract managed by" usually indicates whether the NZTA National Office or Regional Office manages the ITS contract.

However, it may also include other organizations outside of the NZ Transport Agency (e.g. local authorities). Metservice also manages NZ Transport Agency owned weather stations on behalf of the NZ Transport Agency. This does not include the Network Management Consultant (NMC) operating under a NZ Transport Agency Maintenance contract. NZ Transport Agency Regional or National Office would still be responsible for the management of the contract.

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8.1 ITS Frequently Asked Questions, Continued

Weigh station

Should I include Weigh Station assets in the ITS table?

Only assets such as cameras, electronic signs, weigh in motion, weigh station sensors etc. used in the operation of the Weigh Station are included as ITS assets. Any other non ITS assets such as building facilities, lighting, drainage, weigh pit etc. are collected under other appropriate asset tables.

Traffic Signals

Should standard intersection traffic signals be included as an ITS asset?

The asset sub-type "Traffic Signals" only includes signals relating to ramp signalling and other special or non-standard intersection signals such as bridge signals, queuing signals etc. Intersection Traffic Signals are to be excluded as these should already be covered by Traffic Signals Maintenance C25 and entered in the Traffic Signal module if required.

Weather stations

Do Weather Stations need to be collected for ITS?

All NZ Transport Agency owned weather stations need to be included in the ITS table (as Asset Type "Environmental Monitoring"). Each component of the weather station is collected as a separate record, such as rainfall meter, wind monitor etc.

Metservice owned weather stations are not included as an ITS asset. However, any in-road sensors for forecast and non-forecast weather stations which are installed within the State Highway corridor, should be added to the ITS table (e.g. include ROSA sensors ($15,000 if damaged) for automatic weather stations. YSI sensors are low cost and can be excluded.). Due to the risk of damage during road maintenance works and the high cost to NZ Transport Agency of replacing these assets, it is pertinent to identify these locations. These assets are collected as Asset Type "Other" and Sub-type "Miscellaneous Non NZTA Asset". The owner type for these assets is "Other".

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8.1 ITS Frequently Asked Questions, Continued

Speed Indication Device ("SAWS")

Is the housing and speed device collected as separate assets for SIDs?

No, these are considered to be a single asset. The 3M signs are rotatable (compared to most others which are permanent), which allows the activation device to be moved between housings. These devices are still collected as a single asset and the rotation managed through:

- entering all the locations where the device can be rotated between ;
- update the state of the sites where the speed activation device is not present (empty housing) to "unavailable" on the date it is moved;
- update the state of the site where the speed activation device is present to "in service" on the date it is placed in the housing;
- add a comment in the "notes" field for all sites that indicates the device is rotated between sites "X" or "Y".

Asset identification

How do I uniquely identify or name ITS assets?

ITS assets can be identified through a unique name. This assists with easy identification on other NZ Transport Agency systems and can differentiate assets at a single location.
Identification of ITS assets can be done through the following fields:

- **Fieldname:** The unique identification of the asset can be stored. This is not managed through a fixed list (lookup), but through a free text field. The NZ Transport Agency currently does not have a standard national naming guideline. This needs to be managed at a regional level to match other local operational systems / procedures, until a national guideline is available.
  For example, regional VMS signs are currently named through the combination of interchange or location code and asset number (e.g. MGT01). If there are multiple assets direction may also be included (e.g. MGT01N)
- **Site Name:** The name that groups assets together operationally. This is managed through a fixed list (lookup) which needs to be populated for each region.
  For example all the cameras, cabinets and other ITS equipment along Centennial Highway in Wellington (SH01N-RS1035-RP 1.0 – 6.0) are operationally linked and managed. These assets are grouped through the site name "Coast Road".
- **Location General:** The unique name an asset is known by can be captured in this field. Some assets may have a fieldname, but also a location related name, e.g. VMS sign OMA02 is also known as "OMARAMA (N)" sign.
- **Notes:** Assets can also be identified through other unique details, such as the IP Address of a VMS sign or the cellular number of a reboot device. These details can be captured in the "Notes" field as required.

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8.1 ITS Frequently Asked Questions, Continued

Loops

How do I include loop information in the ITS table?

Loop data is captured in the ITS table, but only loops operationally related to ITS assets such as cycle signs, cameras etc. are included. Loops related to other assets (such as telemetry sites or SCATS loops) are excluded from the ITS table. Each independently operating set of loops is captured as a separate record, as described previously in this section for other ITS asset components.

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 ITS table. Some ITS 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. The set of spare (non-operational) loops are also captured and managed through updating the "State" and "State Date".

The second site, with four sets of loops connected to the traffic counting unit (Traffic Monitoring System (TMS) Unit), are not captured in the ITS table.

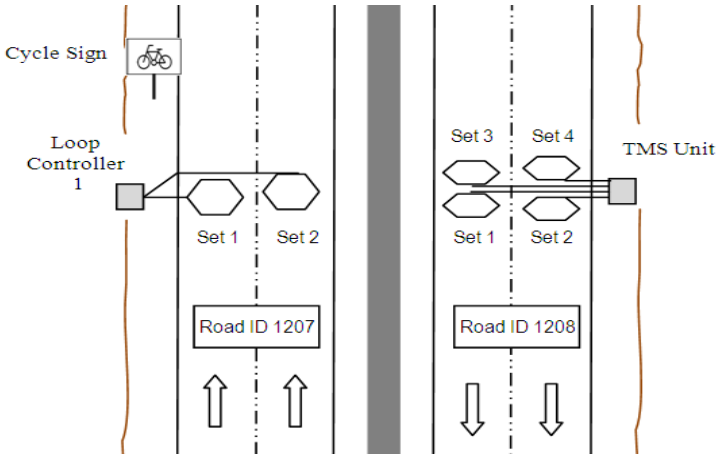

Figure A6.14: Capturing loop records

9.0 Markings Table

Purpose

The purpose of the markings table is to store details of the dimensions and type of the road-surface markings. Markings can be painted directly onto the road-surface or attached by some form of adhesive, for example, thermoplastic that is melted onto the road surface, or raised pavement markers that are bonded to the road-surface.

Uses

As the Markings Table contains information on the location, quantity and dimensions of all road-surface markings, it provides accurate contributing data towards the

- Programming of routine maintenance of road-markings,
- Development of road-marking renewal programmes,
- Production of Route Data Sheets,
- Determination of the asset valuation, and
- Specification and scope of road maintenance contracts.

Table Details

This table contains the dimensional and descriptive data, e.g.:

- Start and end locations,
- Offset, from road-centreline,
- Side of the road that the road-marking is located on, and
- Type of road marking.

Table Updating

The table needs to be updated on completion of the following activities:

- Application of new road-markings,
- Any maintenance work on existing road-markings that results in a change in the location, dimension, or type of road-marking, and
- The removal of existing road markings.

9.1 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.

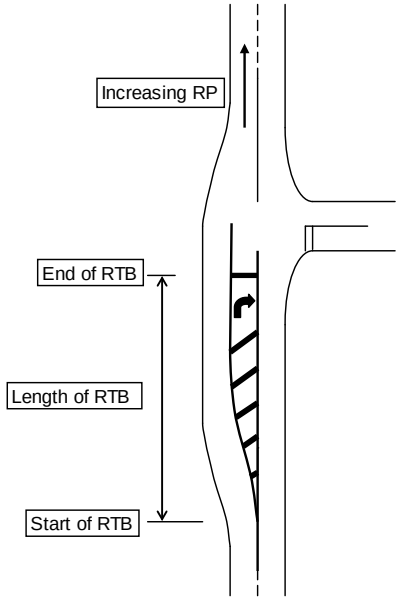

Figure A6.15: Measuring a Right Turn Bay

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

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9.1 Markings - Frequently Asked Questions, Continued

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. To ensure that RRPM's can be collected efficiently and without cluttering the database, use M08 as the only code. 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.

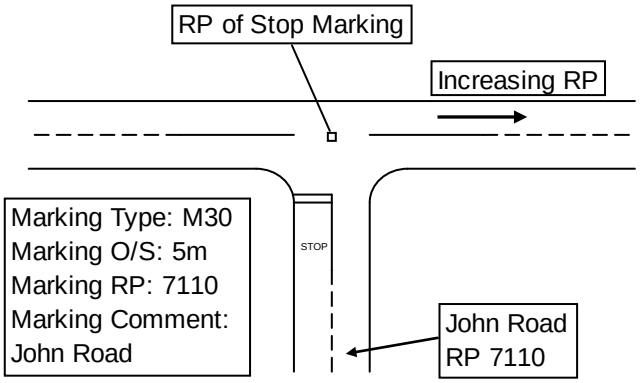


Figure A6.16: Measuring a Stop Marking on an intersecting side road

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 "Quantity" field of the Markings Table.

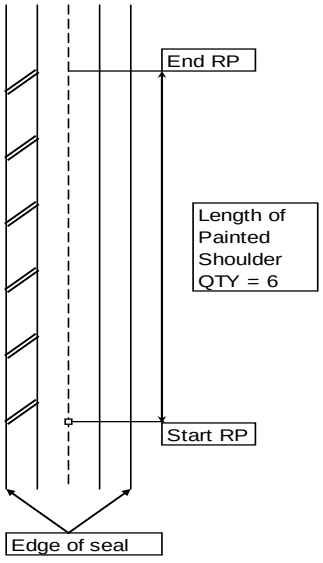


Figure A6.17: Recording Painted Shoulders

10.0 Minor Structures Table

Purpose

The purpose of the Minor-Structures Table is to provide a place to store the dimensions and general information on road-side structures, such as fencing, groynes, variable-message signage structures, and weigh-stations; as well as structures that cross above or below the road, such as, over-bridges, overhead sign-gantries, tunnels, and underpasses.

Uses

The Minor Structure Table contains information on the location, quantity and dimensions of all Minor Structures, and provides accurate contributing data towards the

- Programming of routine maintenance of Minor Structures,
- Development of Minor Structure replacement and inspection programmes,
- Production of Route Data Sheets,
- Determination of the asset valuation, and
- Specification and scope of physical works and road maintenance contracts.

Table Details

The key elements to this table are the positional and descriptive aspects, such as, the

- Start location and dimensions of the minor-structure,
- Offset, from road-centreline, of the minor-structure, and
- Side of the road that the minor-structure is located on, and
- Type of minor-structure.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of new minor-structures,
- Any maintenance to existing minor-structures that results in a change in the location, dimension, or type of minor-structure, and
- The removal of minor-structures.

Frequently Asked Question

What is the best offset to use for a minor structure?

This is a very relevant question when the minor structure does not parallel the road. The best offset is the offset that which assists future users of the data to easily locate the asset. Typically, the distance from the centreline to the part of the asset that is closest to the road is the offset that will allow the asset to be easily located.

11.0 Pavement Layer Table

Purpose

The purpose of the Pavement Layer Table is to store information, both historical and current, on the structural pavement layers, including the sub-grade—beneath the pavement.

Since it is impossible to verify the composition of the structural layers beneath a pavement once it has been sealed, it is critical that this information is provided or recorded at the time of construction.

A further source of valuable information on pavement strength is the information obtained when test-pits are carried out.

Uses

Its primary use for providing accurate contributing data towards

- An accurate Pavement Structure Table,
- Comparing with Annual National Achievement Reporting for AWPTs,
- The development of the pavement deterioration model (dTIMS)

Table Details

The key elements to this table are the positional and descriptive aspects, such as, the

- Start and end locations of the pavement layer,
- Length, width, thickness, and offset of the pavement layer,
- Type, composition, source, and strength of the pavement layer,
- Date the layer was constructed, reconstructed, or removed, and
- Stabilisation agents that may have been used to strengthen the pavement layer.

Table Updating

The table needs to be updated on completion of the following activities:

- Construction of new pavement layers,
- Reconstruction of existing pavement layers, and
- The removal of existing pavement layers.

Construction Knowledge

It is important that a clear understanding and knowledge of how the pavement was built, including the sequence of activities is known prior to updating the pavement layer table.

11.1 Pavement Layers - 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 "Removed 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 "removed date" populated.

Recording Stablisation

How do I record Stabilisation of an existing pavement?

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

- Stabilisation Material (Cement, Lime, Kiln Dust),
- Stabilisation Percentage (typically between 2 and 10),
- Reconstructed (must be set to yes),
- Pavement Date (set this to the date that the pavement was stabilised).

Affect of Widenings

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

Pavement Data is treated the same as Surfacings 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.

Continued on next page

11.1 Pavement Layers - Frequently Asked Questions, Continued

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).

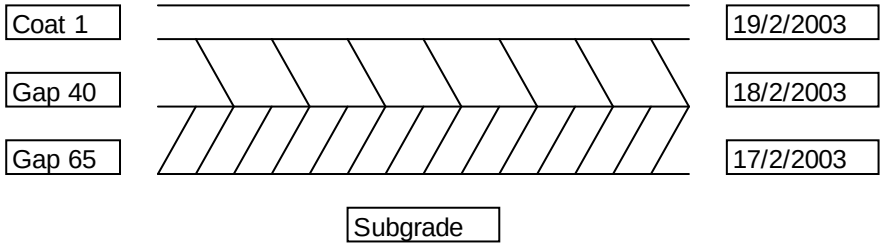


Figure A6.18: Pavement with Multiple Layers

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).

Continued on next page

11.1 Pavement Layers - Frequently Asked Questions, Continued

Removed Date

When do I populate the "removed_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 "removed_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. Set the "Estimated/Known" field to E to show that the record is estimated; use "25/12/xxxx" as the pavement layer date.

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.

Continued on next page

11.1 Pavement Layers - Frequently Asked Questions, Continued

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	Estimated /Known	Material	Depth	Reconstructed	Stabilised %	Width	Offset
0	1000	15/02/1990	K	GAP65	150	N		10	0
0	1000	17/02/1990	K	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	Estimated /Known	Material	Depth	Reconstructed	Stabilised %	Width	Offset
0	300	15/02/1990	K	GAP65	150	N		10	0
0	300	17/02/1990	K	GAP40	100	N		10	0
300	600	15/02/2005	K	GAP65	150	N		3.5	0
300	600	16/02/2005	K	GAP40	100	N		3.5	0
300	600	15/02/1990	K	GAP65	150	N		10	3.5
300	600	17/02/1990	K	GAP40	100	N		10	3.5
600	1000	15/02/1990	K	GAP65	150	N		10	0
600	1000	17/02/1990	K	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.

12.0 Railings Table

Purpose

The purpose of the railings table is to provide a separate place to store details about any railings located on the sides of roads and bridges. Common examples of railings include barriers, guard-rails, sight-rails, and hand-rails. If the railing has an end-treatment, then details about this are also stored with the railing record.

Uses

As the Railings Table contains information on the quantity and dimensions of all road- and bridge-side railings, its primary use for providing accurate contributing data towards:

- Production of Route Data Sheets,
- Determination of the asset valuation, and
- Specification and scope of physical works and road maintenance contracts.

Table Detail

The key elements to this table are dimensional aspects, such as:

- Start and end locations of the railing,
- Length and offset of the railing,
- The height of the railing, above ground level,
- Side of the road that the railing is located on,
- Type of railing, and
- Terminal End type and manufacturer.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of a new railing,
- Maintenance of an existing railing that results in a change in the location, dimension, or type of railing and/or its end-treatment(s), and
- The removal of an existing railing.

12.1 Railings - Frequently Asked Questions

Recording Offsets

How do I record offset?

As with all the other RAMM Tables, the offset should be the distance from the closest part of the railing to the road centreline. This also enables people who are using the data to determine the clearance from the railing to the road (especially for over-dimensional loads).

Extending a railing

What do I do when I extend an existing railing?

You need to have the RAMM Record for the existing railing and UPDATE it. All you will need to do is alter the start (and end) RP (s), as well as make any necessary changes to the length and terminal treatments. 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 were historically stored in the signs table (as this is how they were maintained) but now have to be stored in the Railings Table.

Bridge Rails

Should I include Bridge Rails in the Railings table?

Railings that form part of the bridge are not entered into the railings table. They are entered into the Bridge Table (this table is not discussed in this Manual as it is maintained by other parties). Railings on either side of the Bridge ARE stored in the Railings Table.

Recording Height of Rail

What height do I record in RAMM?

The ground_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 rail 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 railings 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 railings 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.

13.0 Retaining Walls

Purpose

The purpose of the Retaining Wall Table is to provide a place to store the dimensions and general information on roadside retaining walls.

Uses

The Retaining Wall Table contains information on the location, quantity and dimensions of all retaining walls, and provides accurate contributing data towards the

- Programming of routine maintenance of retaining walls,
- Development of Retaining Wall replacement and inspection programmes,
- Production of Route Data Sheets,
- Determination of the asset valuation, and
- Specification and scope of physical works and road maintenance contracts.

Table Detail

The key elements to this table are the positional and descriptive aspects, such as, the

- Start location and dimensions of the retaining wall,
- Offset, from road-centreline, of the retaining wall,
- Side of the road that the minor-structure is located on,
- Type of retaining wall, and
- Retaining wall material.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of new retaining walls,
- Any maintenance to existing retaining walls that results in a change in the location, dimension, material or type of retaining wall, and
- The removal of retaining walls.

Frequently Asked Question

What is the best offset to use for a retaining wall?

This is a very relevant question when the retaining wall does not parallel the road. The best offset is the offset that which assists future users of the data to easily locate the asset. Typically, the distance from the centreline to the part of the asset that is closest to the road is the offset that will allow the asset to be easily located.

14.0 Shoulder Table

Purpose

The purpose of the shoulder table is to provide a place to store details about the roadside shoulders.

The Shoulder is that part of the road formation that runs from the edge of seal to that part of the formation that is too steep to safely park. The side slope can have a gradient steeper than 1:12, but no steeper than 1:5.

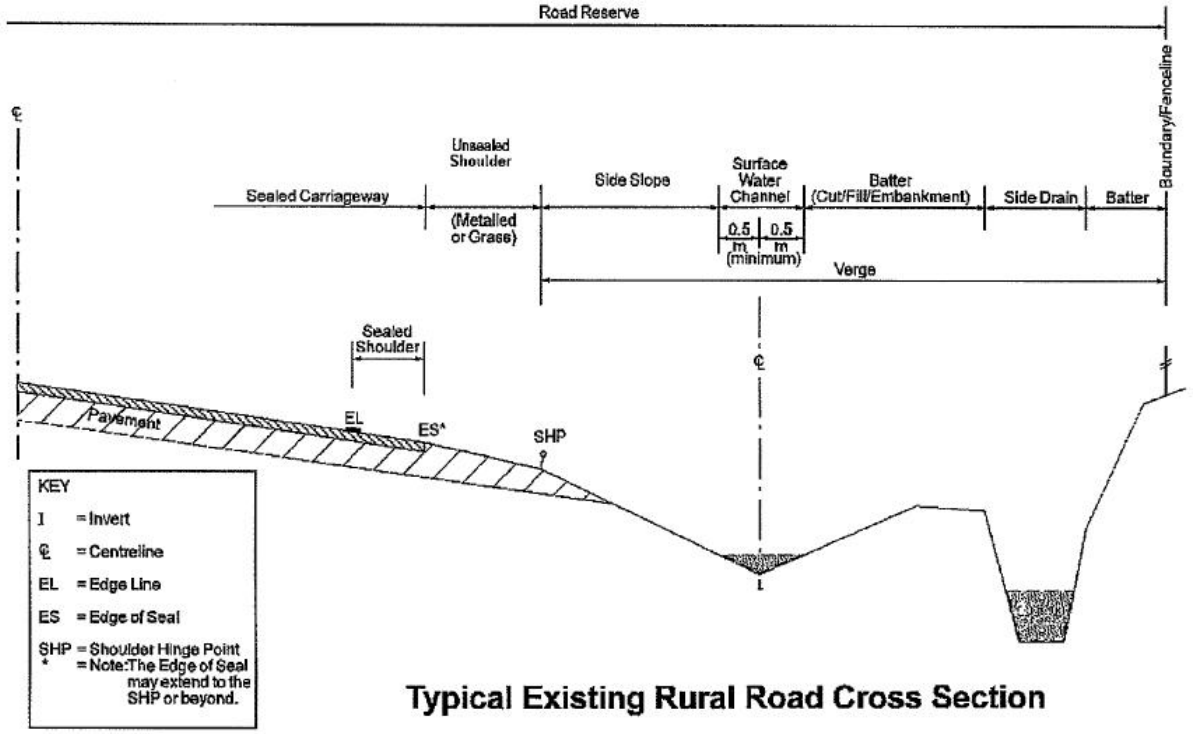


Figure A6.19: Definition of Shoulders

Uses

Essentially, the Shoulder Table is a repository for the dimensions and type of road-side shoulders in the roading network; thus, it provides accurate contributing data towards the

- Programming of routine shoulder maintenance,
- Development of shoulder upgrading programmes,
- Development of Route Data Sheets,
- Determination of the asset valuation, and
- Specification and scope of physical works contracts.

Note that the collection of this information is very subjective.

Continued on next page

14.0 Shoulder Table, Continued

Table Detail

The key elements to this table are the dimensional and descriptive aspects, such as, the

- Start and end locations of the shoulder,
- Length and width of the shoulder,
- Side of the road that the shoulder is located on, and
- Type of shoulder.

Table Updating

The table needs to be updated on completion of the following activities:

- Construction of new shoulders,
- Any maintenance activity that results in a change to either the dimension or type of existing shoulders, and
- The removal of existing shoulders.

14.1 Shoulder - Frequently Asked Questions

Frequency of records

How frequently should I stop and start a shoulder due to width or material change?

To prevent cluttering the database with thousands of short shoulders it is advisable that shoulder records should change where there is a change of > 100m in length and >0.5m in width.

Avoid short sections of shoulders due to width changes and material changes.

Accuracy

How accurate do I need to be?

Collecting the data for this table is very subjective. Apply the following limits of variation:

- Start and end RP's: +/- 10m
- Widths: +/-0.5m

Note: that you shouldn't have a shoulder running concurrently with a Lined Surface Water Channel.

15.0 Signs

Purpose

The purpose of the signs table is to provide a place to store details, both historical and current, on all permanent traffic signage located inside the road-reserve. Most common examples include regulatory, warning, and directional signage. It is not the intention of the signs table to be a repository for temporary traffic signage and those signs that are transitory in nature, such as hazard-markers.

It is important to note that before deleting a sign from the RAMM database, the reason why it is missing needs to be investigated. This will result in an action of either replacing the sign in the field or removing the record from RAMM.

Uses

Essentially, the Signs Table is a repository for the location and type of all permanent traffic signage in the roading network; thus, it provides accurate contributing data towards the

- Programming of routine sign maintenance,
- Development of sign upgrading programmes,
- Determination of the asset valuation, and
- Specification and scope of physical works and road maintenance contracts.

Table Detail

The key elements to this table are the location and descriptive aspects, such as, the

- Location and offset, from road-centreline, of the sign,
- Side of the road that the sign is located on,
- Type of sign, and
- Information provided by the sign.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of new signs,
- Any maintenance activity that results in a change to either the location or type of existing signs, and
- The removal of existing signs.

15.1 Signs - Frequently Asked Questions

Post Counts

How do I record Post Count?

Post count is simply the number of posts that the sign is on. Typically, Chevrons have 2 posts, (as with most large or long signs like directional signage) most other signs have 1 post and signs that are attached to lamp poles have no post. For posts with multiple signs, record the post only on one sign. Bridge End Markers and KPegs have a post count of 0.

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 Regional RAMM Champion and 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 signs 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). Hazard Markers and Edge Markers are not recorded due to their dynamic nature and sheer volume.

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.

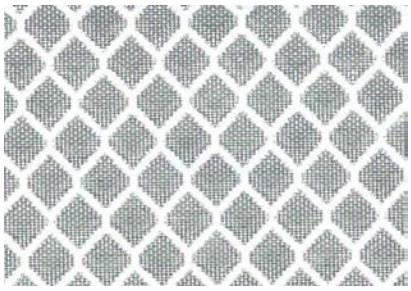
Continued on next page

15.1 Signs - Frequently Asked Questions, Continued

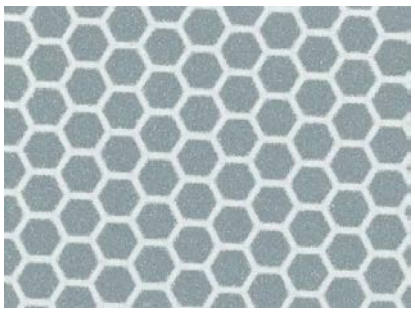
Reflectivity

What are the three types of Reflectivity?

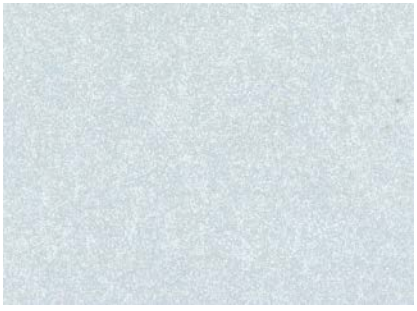
There are three types of reflectivity, and they are easily identified, as shown below:



Diamond Grade-Diamond pattern appearance



High Intensity-Honeycomb/hexagonal pattern appearance



Engineering Grade-not very common, no apparent pattern but reflective

Side Road Signage

How do I record 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.

Continued on next page

15.1 Signs - Frequently Asked Questions, Continued

Reverse Legend

When do I use the reverse legend?

The reverse legend is used when the sign has a legend on both sides. 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.

16.0 Street Lighting Table

Purpose

The purpose of the street lighting table is to provide a place to store details on all permanent streetlights located inside the road-reserve.

Uses

As the Street Lighting Table contains information on the location, types, quantity and dimensions of all permanent street lights, it provides accurate contributing data towards the

- Programming of routine street light maintenance,
- Production of Route Data Sheets,
- Development of street light replacement programmes,
- Determination of the asset valuation, and
- Specification and scope of physical works and road maintenance contracts.
- Crash analysis

Table Detail

The key elements to this table are the dimensional and descriptive aspects, such as, the

- Location of the street light,
- Pole details for the street light (type, material, make etc.),
- Pole ID for the street light,
- Bracket details for the street light (type, etc.),
- Light details for the street light type, make, model, etc.),
- Gear details for the street light (make etc.),
- Lamp details for the street light (make, model etc.), and
- Rating details for the street light

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of new permanent street lights,
- Any maintenance work on existing street light that results in a change in the location, dimension, or type of street light or other parts, and
- The removal of permanent streetlights.

17.0 Surface Water Channel (SWC) Table

Purpose

The purpose of the surface water 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.

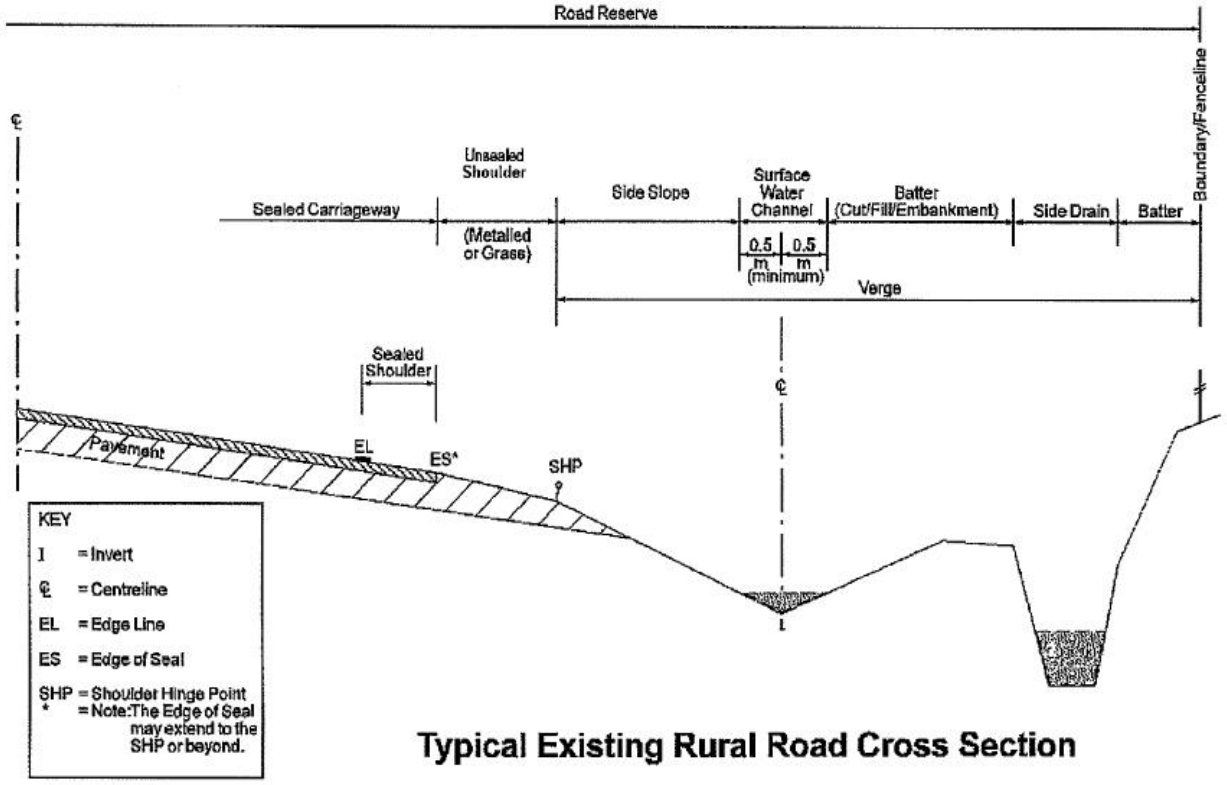


Figure A6.20: Definition of SWC

Uses

As the Surface Water Channel Table contains information on the location, quantity and dimensions of all permanent road-side drainage channels, it provides accurate contributing data towards the

- Programming of routine drainage maintenance,
- Production of Route Data Sheets,
- Development of drainage replacement programmes,
- Determination of the asset valuation, and
- Specification and scope of physical works and road maintenance contracts.

Continued on next page

17.0 Surface Water Channel (SWC) Table, Continued

Table Detail

The key elements to this table are the dimensional and descriptive aspects, such as, the

- Start and end locations of the road-side drain,
- Length and offset distance, from seal-edge, of the road-side drain,
- Side of the road that the road-side drain is located on, and
- Type of roadside drain.

Table Updating

The table needs to be updated on completion of the following activities:

- Installation of new permanent road-side drainage,
- Any maintenance work on existing road-side drainage that results in a change in the location, dimension, or type of road-side drainage, and
- The removal of permanent road-side drainage.

17.1 SWC – Frequently Asked Questions

Offsets

How does offset work for SWC?

SWC offset is the distance from the edge of seal to the invert of the Surface Water Channel. Lined SWC (e.g. Kerb and Channel) has an offset of 0, and Earth Surface Water Channel can have an offset ranging from 0.5m to 10.0m, with the exception of kerb and channel.

Multiple Channels

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

Use the "Offset" field to determine SWC's 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 Surface Water Channel?

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

- Start and end RP's: +/- 10m,
- Widths: +/-0.5m.

Traffic Islands

Should I record Surface Water Channel on Traffic Islands?

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

Length Adjust

How do I use the "Length Adjust" and "Length Adjust Reason" Field?

"Length Adjust" and "Length Adjust Reason" are only used when the length of the SWC asset is not equal to the End RP less the Start RP. The following diagram shows a SWC requiring length adjustment.

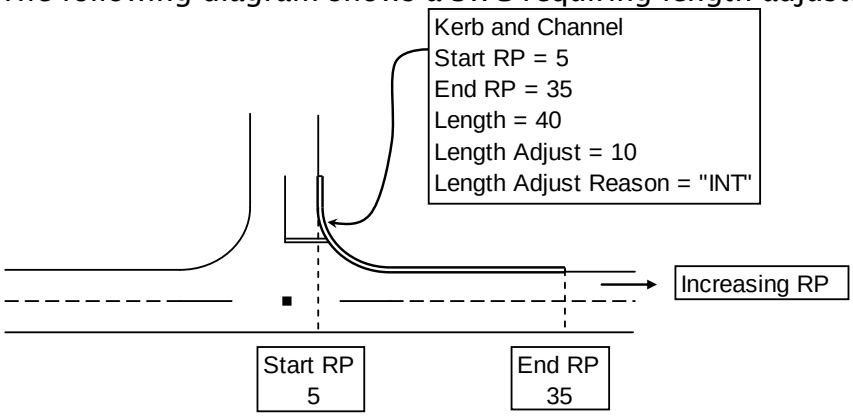


Figure A6.21: Length Adjustment for Kerb and Channel