Carriageway Setup and Conventions

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This article sets out the role of carriageways in defining the network in Asset & Work Manager (AWM) and how they should be used consistently for different network situations that might be encountered.

Each road is split into one or more sections and in AWM these are called Carriageways. A carriageway holds information about the given segment of road, including ownership, dimension data, pavement type, hierarchy (road classification), network type and terrain.

Need for Change of Carriageway

A road shall be broken into separate carriageways when the following characteristics change:

1. At all intersections with side roads, unless multiple intersections are within 30 metres of each other. Note under this basis, the main road going through an intersection would not require a carriageway change at each slip road.
2. Carriageway Region and Province
3. Road Hierarchy - Following the national road classifications
4. Number of Lanes - For example, from 2 to 3 (at the start of a passing lane)
5. Urban / Rural change - Usually, this is done when the speed limit changes to greater than 70km/hr when exiting an urban road.
6. Road Width - Width changes by more than 2.5m over a significant length (typically >100m)
7. Pavement Type - When the surface/pavement changes between sealed granular, unsealed, structural asphalt, concrete and bridge (significant bridges greater than 50m bridge length)
8. Pavement Use - When traffic volumes or the traffic composition changes significantly, such as at major institutions (e.g., universities) or commercial operations where the traffic volume is significantly different on either side of the entrance.
9. Asset Owner - When the owner of the road (the pavement) changes, for example, between the national and provincial governments.

After applying the above reasons to create carriageway changes, if the length of the carriageway exceeds the maximums specified below, you will need to introduce some further splits. This supports workers in the field by providing more regular known locations with a given chainage length from the start of the road.

Additional splits shall be at physical locations that won't change easily and can easily be found and identified. For example, at a bridge, intersection with a driveway to a major institution (e.g., school) or at a well-known waterway.

Watching out for situations when the location isn't clear. For example, the school you use has two entrances, or the local village calls the waterway a different name to the provincial work team.

Linear Reference Points

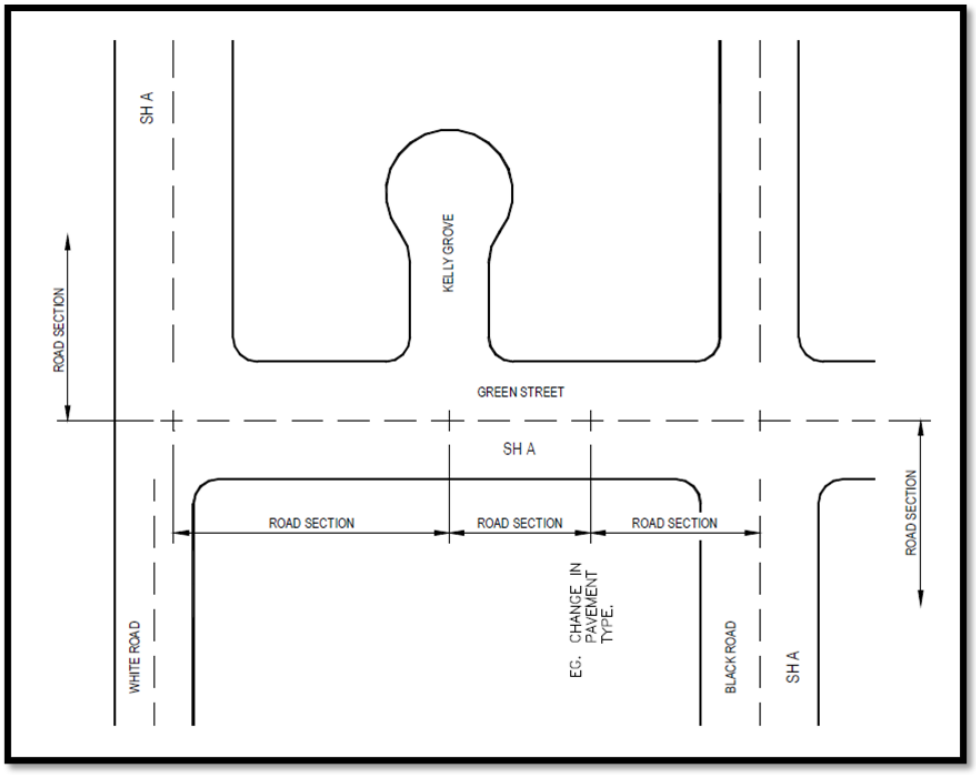
Linear Reference Points shall be created and maintained at the start and end of every carriageway section, except when intersections are close together in an urban environment.

Linear Reference Points are expected to be an interim dataset that supports the development of the carriageway dataset across the whole network. Once the carriageways have been created, then they will no longer be required.

Refer to [insert Article Link] for more information on Linear Reference Points best practice.

Creating Carriageway Sections

An example of sectioning of a road network:



Methods to Update the AWM Carriageway Data

- Manual updating of some data within the sections where changes are required. In AWM this is the preferred method for making those changes such as changes to start and end names)
- Use RAMM Network Manager for all manual major or significant changes to dimensional-related data, including adding new sections, splitting, joining and deletion
- Use RAMM Network Manager for unsealed to sealed changes to carriageway sections

Management of network and carriageways is quite advanced and forms the critical base information set which most other information is related to. On that basis it is essential that and changes are carried out by people with adequate training or experience.

Carriageway Direction & Lengths

Use the following guidance as a reference when carrying out activities that affect the AWM Carriageway updates.

Survey Direction

General convention for the direction of roads (increasing linear reference) are *roads should be surveyed from the major traffic end to the minor traffic end*, as follows:

- Arterial road to collector road.
- Collector road to local road.
- Local road to the end of the road or to the cul-de-sac end.

Exceptions to this are one way roads where traffic flow dictates the survey direction.

Minimum and Maximum Carriageway Lengths

To avoid short carriageway sections (such as changes to number of lanes around signalised intersections, or short bridges) the following guidelines apply:

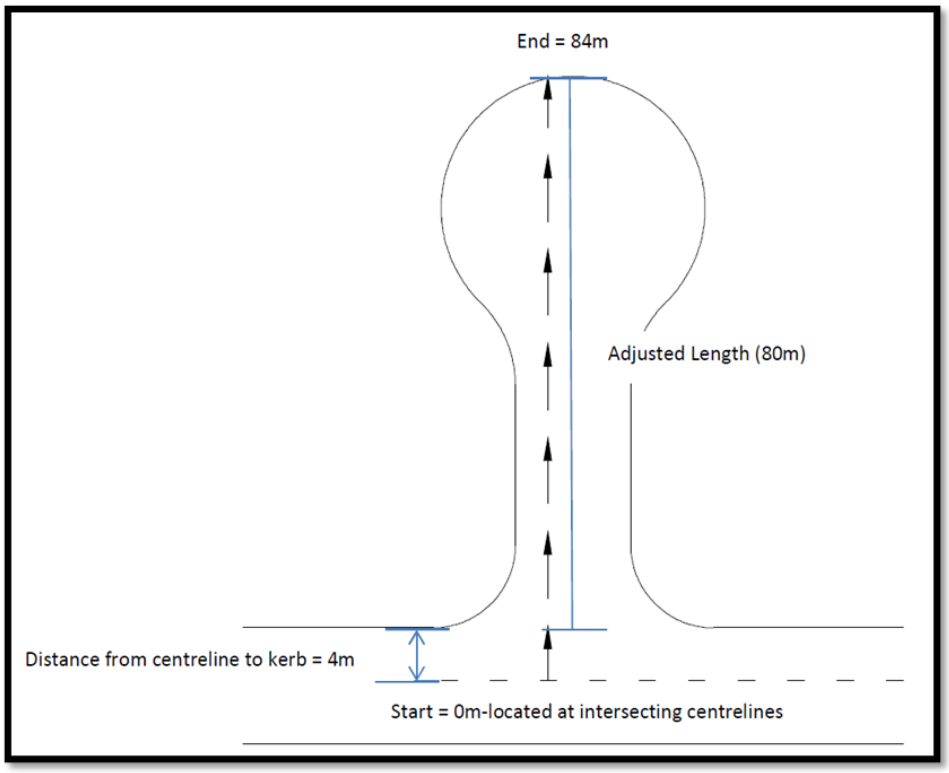
- Urban area - minimum carriageway length 30m, maximum carriageway length 1500m
- Rural area - minimum carriageway length 50m, maximum carriageway length 10,000m
- Typically, bridges longer than 50m have their own carriageway section

Exceptions to these should be avoided but will be required in certain circumstances.

Adjusted Carriageway Lengths

Generally, the length of a carriageway section is equal to the end meters minus the start meters. However, for first carriageway section of most roads starting from an intersection, the length needs to be adjusted to be the “end meters minus the start meters” less the distance between the intersecting centerline of each road to the kerbline. This length adjustment needs to be completed using the length adjustment option.

This also needs to be done for roads that end at an intersection.



Carriageway Scenarios: Divided / Dual Carriageways

Divided Carriageways (Full length)

Where a road has a physical median that separates each direction of travel over the full length of the road then each side has a separate road name and road id. The road name is suffixed in brackets with the travel direction for that road i.e. TE IRIRANGI DR (WESTBOUND) and TE IRIRANGI DR (EASTBOUND).

Single Divided Section (Not full length of road)

If the physical median is not present for the full length, then the increasing direction carriageway sections are contiguous (with no direction suffixed in brackets after the road name), i.e. TE IRIRANGI DR and decreasing section are added as required (with the direction suffixed in brackets after the road name) i.e. TE IRIRANGI DR (EASTBOUND).

Multiple Divided Sections

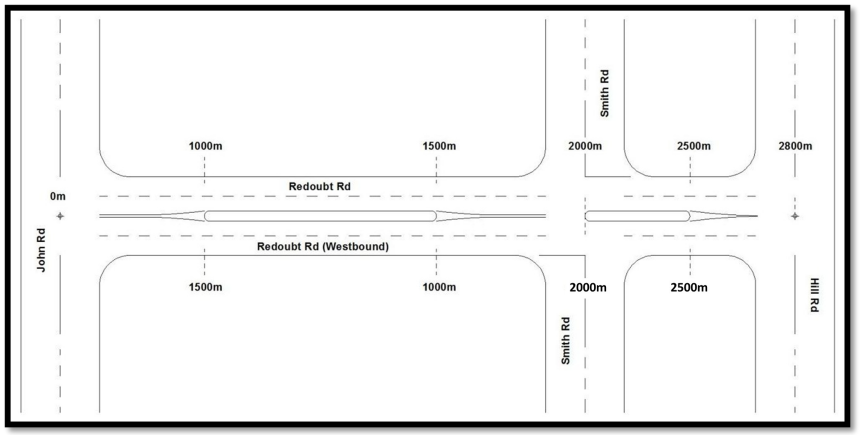
In the case where there is more than one divided section along the length of the road, then the running distance continues from the end of the first divided section through to the end of the last divided section. This will result in there being gaps between the divided sections, as the running distance is contiguous from the start of the first divided section.

Example: The table below shows an example of a road that has multiple divided sections along its length.

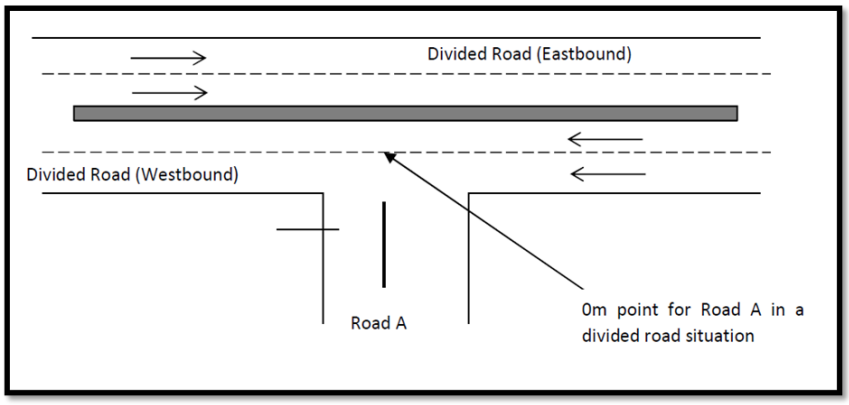
Roadname	Start m	End m	Start name	End name	No. lanes	Width
Redoubt Rd	0	1000	John Rd	Start divided median	4	20

Roadname	Start m	End m	Start name	End name	No. lanes	Width
Redoubt Rd	1000	1500	Start divided median	End divided median	2	10
Redoubt Rd	1500	2000	End divided median	Smith Rd (Start divided median)	4	20
Redoubt Rd	2000	2500	Smith Rd (Start divided median)	End divided median	2	10
Redoubt Rd	2500	2800	End divided median	Hill Rd	4	20
Redoubt Rd (Westbound)	2000	2500	Start divided median	Smith Rd (End divided median)	2	10
Redoubt Rd (Westbound)	1000	1500	Start divided median	End divided median	2	10

Note that Redoubt Rd (Westbound) is still measured in the same direction as Eastbound.



Example of Multiple Divided Sections



Zero Point for Side Road onto a Divided Road

Carriageway Scenarios: Roundabouts

All large roundabouts are surveyed as a separate road. Roundabouts are deemed large if approach islands are

present. Small roundabouts, such as small domes or roundabouts with painted traversable islands are treated like standard intersections.

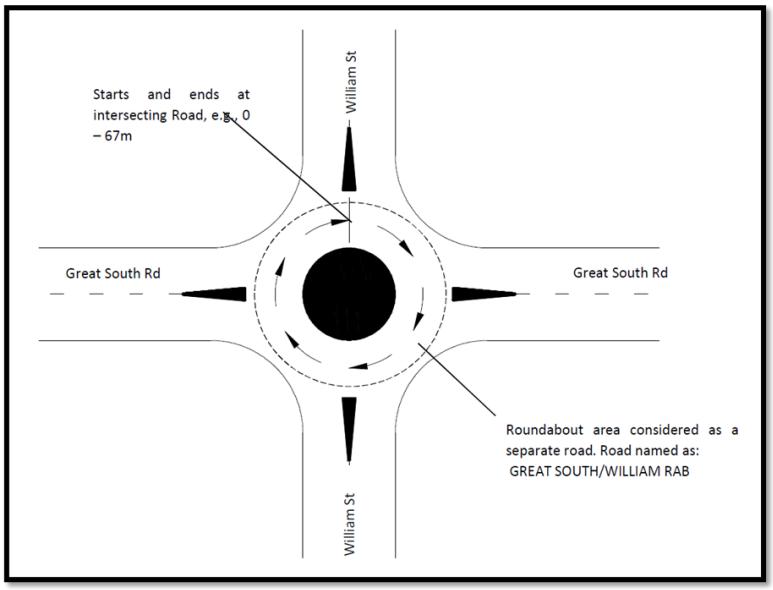
Roundabouts are named as follows:

“MAJOR ROAD NAME/MINOR ROAD NAME RAB”, e.g. “GREAT SOUTH/WILLIAM RAB Note that the street suffixes are excluded in the road name. The start and end names are e.g.: “WILLIAM ST – WILLIAM ST” and include the suffixes. For two major roads, or roads of the same hierarchy, naming is ordered alphabetically.

Number of RAB identified where only the main road has name/details - in these cases suggest using the following (in order of preference):

1) ROAD/SITE RAB - where the RAB is associated with a nearby site such as a school, shopping centre or stadium, MAGI/6 MILE MARKET RAB

2) ROAD/RP RAB - where no better way of identifying, use the route position (approximate) of the RAB - e.g. MAGI HWY/10.5 RAB if RAB ~ 10500 RP.



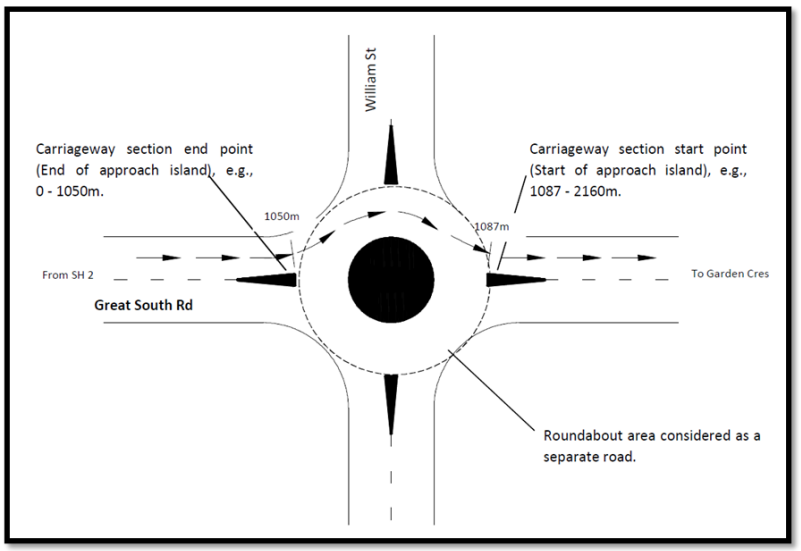
Roundabout Treated as a Separate Road

Additional Notes: Great South Road is the major road, so the naming convention is GREAT SOUTH/WILLIAM RAB, with start/end names 0 – 67, WILLIAM ST (NORTH) – WILLIAM ST (NORTH).

Roundabout Intersecting Roads:

Where roads start, end or intersect a roundabout, the carriageway sections will start/end at the roundabout approach islands. The island nose closest to the roundabout itself is used as the start/end point.

Where a road passes through the roundabout, the displacements are measured between the approach islands and a gap is in the displacements. The “gap” allows high speed data to be continuous when passing through the roundabout. This is illustrated in the diagram below:



Example of Carriageway Sectioning of a Road Through a Roundabout

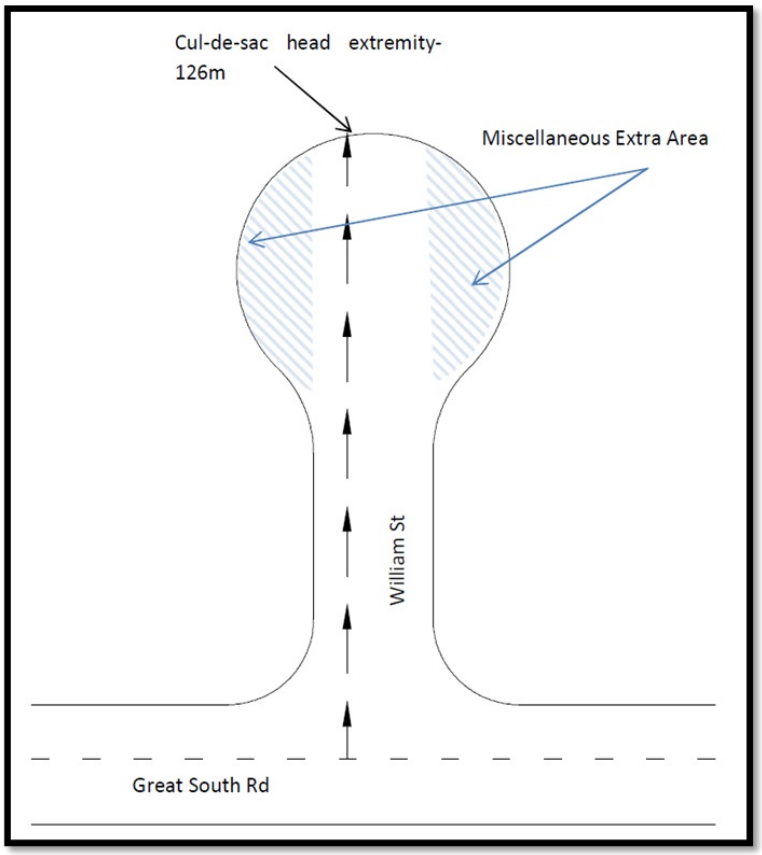
Example:

GREAT SOUTH RD, carriageways 0 – 1050m, SH 2 – WILLIAM ST and 1087 – 2160m, WILLIAM ST – GARDEN CRES. Note that a gap exists between the displacements. Any other roads that start or end at roundabouts start/end at the approach islands do not encroach on the roundabout area.

Carriageway Scenarios: Cul-De-Sacs:

The following describes how cul-de-sacs are surveyed, with respect to end position of the last carriageway section. Cul-de-sacs with small islands are treated like standard cul-de-sacs, measuring the extreme most point.

Cul-de-sacs with large islands are surveyed by splitting the carriageway at the start of the island nose when approaching the cul-de-sac, driving around the loop, and ending the carriageway at the same point when exiting the cul-de-sac head.



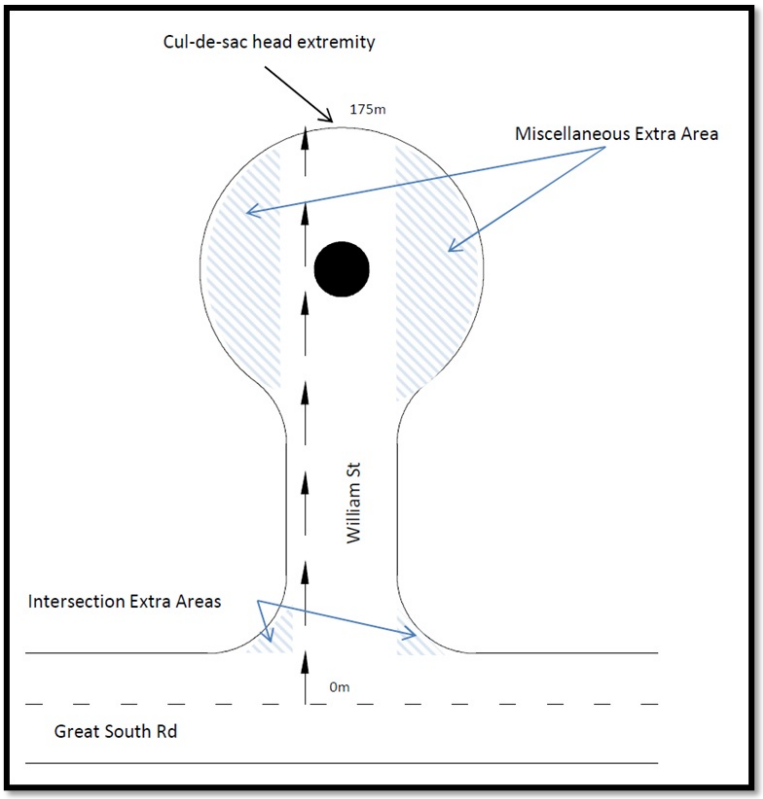
Definition of a Cul-de-sac Carriageway Section

The carriageway section for William Street will be as follows:

0 – 126m, GREAT SOUTH RD – CUL-DE-SAC

Cul-de-sac Head with Small or No Island

Cul-de-sacs with small islands that can be driven past without deviation through the cul-de-sac turning area to the end of the road will be treated like a normal cul-de sac.

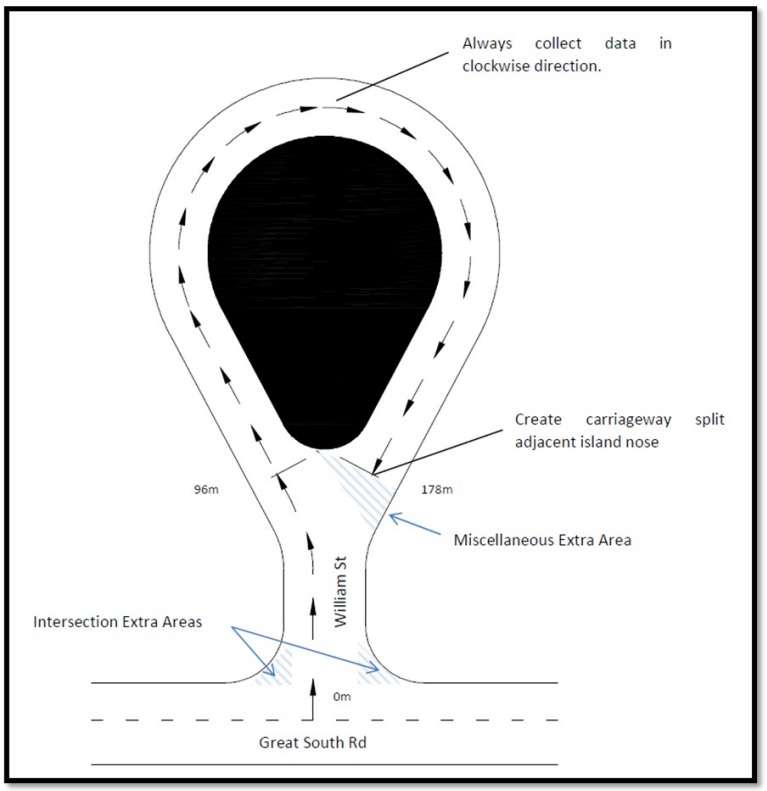


Definition of a Cul-de-sac With Small Head Island Carriageway Section

The carriageway section for Williams Street will be as follows:

0 – 175m, GREAT SOUTH RD – CUL-DE-SAC.

Cul-de-sac Head with Large Island



Definition of a Cul-de-sac With Large Head Island Carriageway Section

The carriageway section for Williams St will be as follows:

0 – 96m, GREAT SOUTH RD – START ISLAND RHS

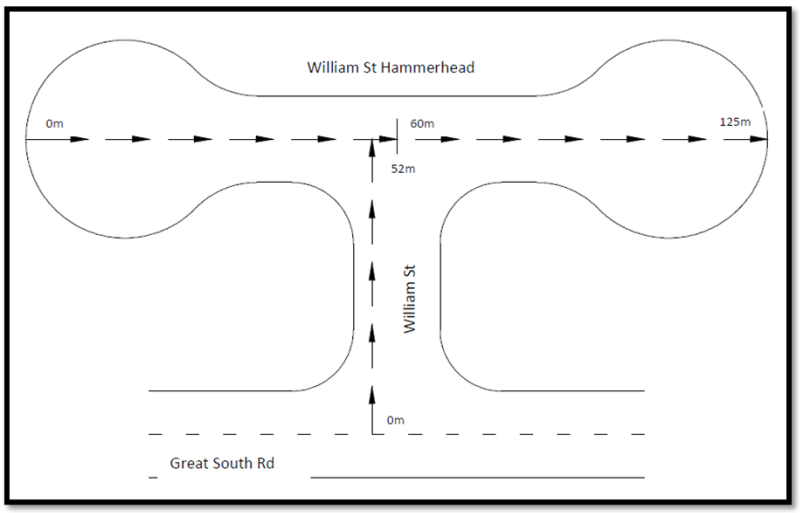
96 – 178m, START ISLAND RHS – END ISLAND RHS

Note: The last carriageway section is usually only one lane.

Hammerheads

For roads with hammerheads, set the main access road and hammerhead up as separate roads, e.g., WILLIAM ST and WILLIAM ST HAMMERHEAD. Survey the main access road from the road origin to the centreline of the hammerhead. Survey the hammer head from one cul-de-sac through to the other, describing the start and end points, e.g., CUL-DE-SAC (SOUTH). It is also desirable to create a carriageway split where the main road intersects to avoid any confusion regarding which end to start the survey. This is shown in the diagram below.

If the orientation of the hammerhead section is not obvious (i.e.: hammerhead does not run from east to west or north to south) then house numbers may be used to describe the start end and name fields of the hammerhead.



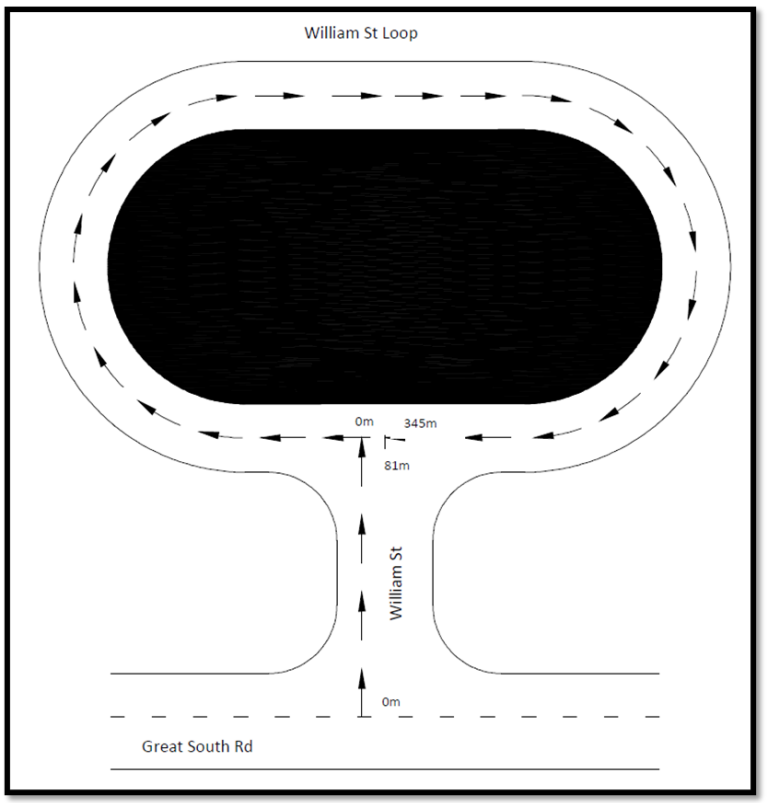
Definition of a Hammerhead Carriageway Section

The carriageway section for Williams Street will be as follows:

> Road 1: WILLIAM ST 0 – 52m, GREAT SOUTH RD – WILLIAM ST HAMMERHEAD
>
> Road 2: WILLIAM ST HAMMERHEAD, 0 – 60m, CUL-DE-SAC (WEST) – WILLIAM ST and 60 – 125m, WILLIAM ST – CUL-DE-SAC (EAST).

Loops

This case is similar to hammerheads with the loop section being set up as a separate road, e.g., WILLIAM ST LOOP. Separating these elements into individual roads allows clear identification of each element, and the start and end locations for each section.



Definition of a Loop Carriageway Section

The carriageway section for Williams Street will be as follows:

Road 1: WILLIAM ST 0 – 81m, GREAT SOUTH RD – WILLIAM ST LOOP

Road 2: WILLIAM ST LOOP 0 – 345m, WILLIAM ST – WILLIAM ST

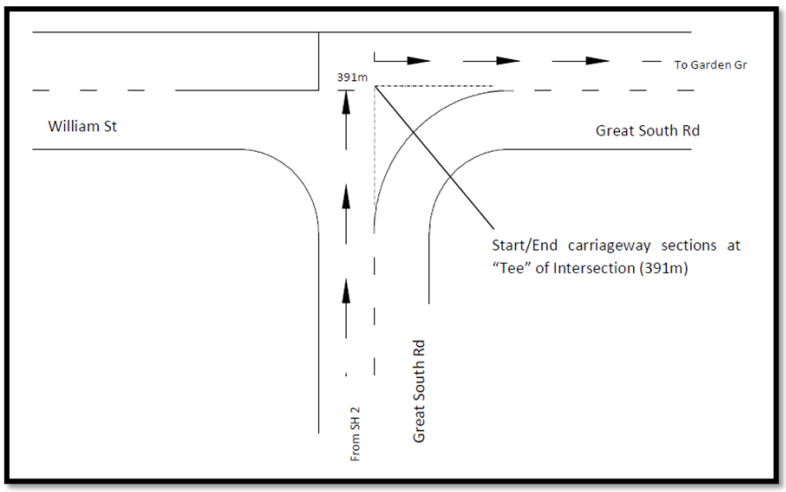
Defining Carriageways Start and End Points: Intersections

Use the following rules when determining carriageway start/end points:

- For both marked and unmarked intersections approaching at a right angle, the centre of the intersection is used
- For both marked and unmarked intersections approaching at a small angle, the centre of the intersection is used
- For marked intersections approaching at an acute angle, the point of the marking (or middle of the median island) will be projected at a right angle to the road being measured
- For unmarked intersections approaching at an acute angle, the middle of the intersection will be projected at a right angle to the road being measured.
- At all poorly defined intersections, well defined and easily locatable features such as sumps or power poles may also be used to further define the node, e.g. SMITH ST (SUMP LHS) – means that the node is located at Smith St adjacent a sump on the left hand side.

The following diagrams show methodologies for dealing with typical carriageway start and end point situations

Right Angle Intersection



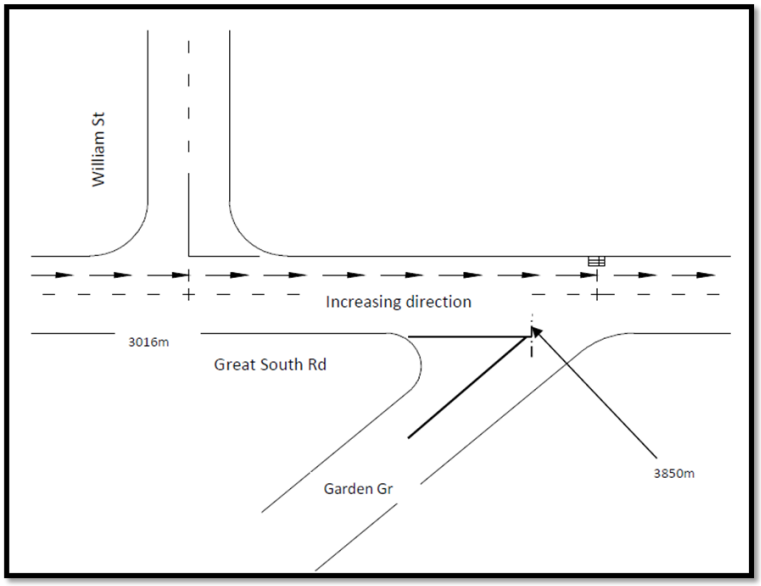
Carriageway Section Definitions for a Through Road Making a Right Angle Turn in an Intersection

The carriageway sections for Great South Road will be as follows:

0 – 391m, SH 2 – WILLIAM ST (AT TEE)

391 – 689m WILLIAM ST (AT TEE) – GARDEN GR

Acute Angled Intersection

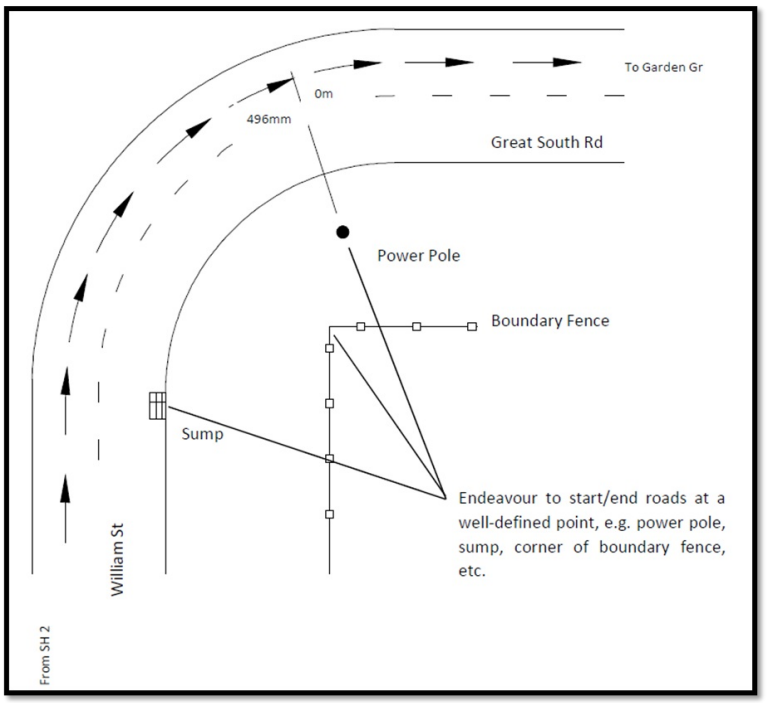


Carriageway Section Definitions for Intersections at an Acute Angle

The carriageway sections for Great South Road will be as follows:

3016 – 3850m, WILLIAM ST – GARDEN GR

Two Roads Starting/Ending on Curve



Carriageway Section Definitions for Two Roads Starting and Ending on a Curve

The carriageway sections for both roads will be as follows:

Road 1: WILLIAM ST, carriageways 0 – 496m, SH 2 – GREAT SOUTH RD (POWERPOLE RHS)

Road 2: GREAT SOUTH RD, carriageways 0 – 1065m, WILLIAM ST (POWERPOLE RHS) – GARDEN GR