iRAP Coding Manual

Drive on the right edition

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Because every life counts.

FIA FOUNDATION

iRAP
INTERNATIONAL ROAD ASSESSMENT PROGRAMME

ABOUT IRAP

The International Road Assessment Programme (iRAP) is a registered charity dedicated to saving lives by eliminating high risk roads throughout the world. Like many life-saving charities working in the public health arena, we use a robust, evidence-based approach to prevent unnecessary deaths and suffering.

iRAP works in partnership with governments, road authorities, mobility clubs, development banks, NGOs and research organisations to:

- inspect high-risk roads and develop Star Ratings, Risk Maps and Safer Roads Investment Plans
- provide training, technology and support that will build and sustain national, regional and local capability
- track road safety performance so that funding agencies can assess the benefits of their investments.

The programme is the umbrella organisation for EuroRAP, AusRAP, ChinaRAP, KiwiRAP, USRAP, IndiaRAP, BrazilRAP and SARAP. Road Assessment Programmes (RAP) are now active in more than 90 countries throughout Europe, Asia Pacific, the Americas and Africa.

iRAP is financially supported by the FIA Foundation for the Automobile and Society. Projects receive support from the Global Road Safety Facility, mobility clubs, regional development banks and donors. Our partners, charities, the motor industry and institutions such as the European Commission also support RAPs in the developed world and encourage the transfer of research and technology to iRAP. In addition, many individuals donate their time and expertise to support iRAP.

For more information

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To find out more about the programme, visit www.irap.org.
You can also subscribe to 'WrapUp', the iRAP e-newsletter, by signing up on the website homepage.

iRAP Coding Manual Version 5.0 – Drive on Right Edition (English)

CONTENTS

1 INTRODUCTION

iRAP was established to help tackle the devastating social and economic cost of road crashes. Without intervention, the annual number of road deaths worldwide is projected to increase to some 2.4 million by 2030. The majority of these will occur in low-income and middle-income countries, which already suffer nine out of ten of the world's road deaths. Almost half of those killed will be vulnerable road users – motorcyclists, bicyclists and pedestrians.

Large as the problem is, making roads safe is by no means an insurmountable challenge. The requisite research, technology and expertise to save lives already exists. Road safety engineering makes a direct contribution to the reduction of road death and injury. Well-designed intersections, safe roadsides and appropriate road cross-sections can significantly decrease the risk of motorised vehicle crashes occurring and the severity of crashes that do occur. Sidewalks, pedestrian crossings and bicycle paths can substantially cut the risk that pedestrians and bicyclists will be killed or injured by avoiding the need for them to mix with motorised vehicles. Motorcycle lanes can minimise the risk of death and injury for motorcyclists.

By building on the work of Road Assessment Programmes (RAP) in high-income countries (EuroRAP, AusRAP, USRAP and KiwiRAP) and with the expertise of leading road safety research organisations worldwide, including ARRB Group (Australia), TRL (United Kingdom), MRI Global (United States) and MIROS (Malaysia), iRAP has developed four globally-consistent protocols to assess and improve the safety of roads.

The iRAP Protocols

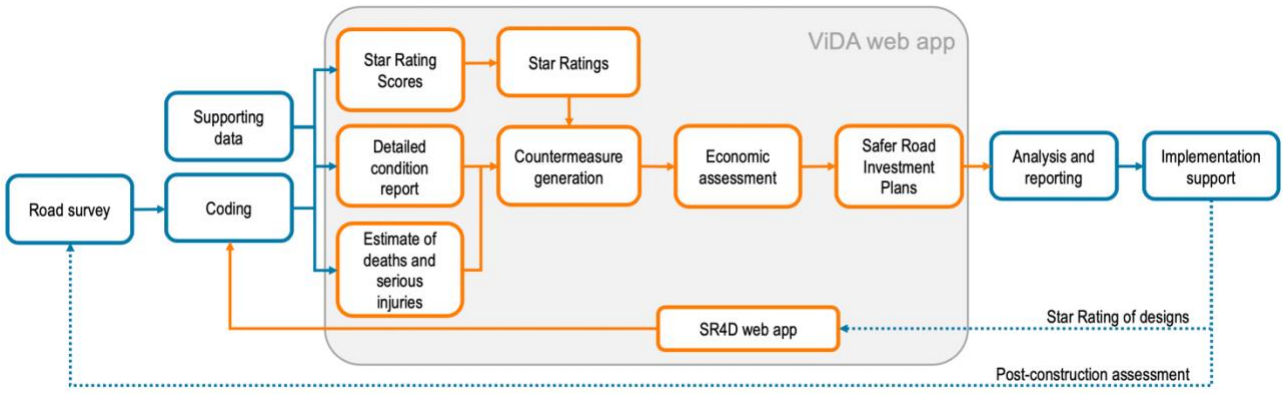
1. **Risk maps** use detailed crash data to illustrate the actual number of deaths and injuries on a road network.
2. **Star Ratings** provide a simple and objective measure of the level of safety provided by a road's design.
3. **Safer Roads Investment Plans (SRIP)** draw on approximately 90 proven road improvement options to generate affordable and economically sound infrastructure options for saving lives.
4. **Performance Tracking** enables the use of Star Ratings and Risk Maps to track road safety performance and establish policy positions.

This manual relates to Protocols 2 and 4. The *iRAP Coding Manual* is one of a number of specifications and guides provided for completing projects, accreditation and results analysis shown below.

- Project Planning Manual (includes the Standard Terms of Reference)
- Inspection System Accreditation Specification
- iRAP Survey Manual
- **iRAP Coding Manual**
- iRAP Star Rating and Investment Plan Manual
- Upload File Specification
- ViDA User Guide
- Star Rating for Designs User Guide (for users of the SR4D web app)

The figure below illustrates the process used to undertake Star Ratings and Safer Roads Investment Plans, which can be used as part of a systematic, proactive approach to road infrastructure risk assessment and renewal based on research about where severe crashes are likely to occur and how they can be prevented.

The iRAP Star Rating and Safer Roads Investment Plan process



1.1 What is iRAP 'coding'?

Road attribute coding is the heart of an iRAP project. The purpose of road attribute coding is to use geo-referenced images collected during a survey or road designs to record road attributes for each 100m segment of road. This coding data is then combined with other supporting data and uploaded in ViDA to produce Star Ratings, Safer Roads Investment Plans and, ultimately promote the implementation of road safety countermeasures that can save lives.

This manual describes the coding process and defines the road attributes that must be recorded. Throughout the manual, the following symbols are used to highlight key issues or provide additional information.

	An explanation or definition is provided.
CODES	Indicates where other codes may be affected by, or need to be consistent with, the current feature being coded.
NIGHT	To alert the coder that a road feature may perform differently during the day to at night or when visibility is poor.
CITY	When particular rules apply for coding a road feature which is in a city or urban environment.
	References, further reading or help available, and where to find it.
fx	Explanation of how this attribute influences iRAP's Star Rating and Investment Plan models.

1.2 Training and accreditation

iRAP activities require specialist skills and knowledge. iRAP strongly recommends training for people preparing to undertake an iRAP project. Information about the training courses available can be found on the iRAP website, at https://www.irap.org/training.

iRAP also manages an accredited supplier scheme. There are two categories of iRAP accreditation:

1. Activity accreditation. Suppliers that hold activity accreditation have completed training and successfully completed a test and have demonstrated experience. They have also signed the *iRAP Accredited Supplier Code of Conduct*. Activity accreditation is renewed annually based on demonstrated experience and may include refresher training and consideration of client feedback.
2. Inspection system accreditation, which relates to equipment and software used to perform surveys and coding. Inspection systems that are accredited have met the requirements described in the *iRAP Inspection System Accreditation Specification*, and their manufacturers have signed the *iRAP Accredited Supplier Code of Conduct.* Inspection system accreditation is renewed every three years and may include retesting of the system and consideration of client feedback.

It is beneficial that accredited suppliers and an accredited inspection system are used in iRAP assessments, though it is not mandatory. Information about accreditation can be found on the iRAP website, at https://www.irap.org/accreditation.

If it is decided that accredited suppliers and/or an accredited inspection system will be used in a coding project, the following information on the team members and inspection/coding system should be included in terms of references (TORs) and contracts.

Coding team members

Name	Email address	Role(s) in project	iRAP accreditation number	iRAP accredited since date	iRAP accreditation renewal due date

Inspection/coding system

System name	Manufacturer	iRAP accreditation number	iRAP accredited since date	iRAP accreditation renewal due date

2 CODING PROCESS

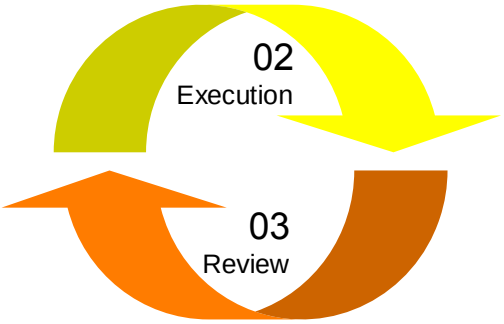
The purpose of road attribute coding is to record the road attributes that are visible in a geo-referenced image or road design.

The coding process has four key stages—preparation, execution, review and compliance—which are summarised in the diagram below and described in more detail in the following sections.

Coding process

- Review iRAP Coding Manual
- Review specific project requirements (e.g. Terms of Reference)
- Plan coding schedule including reviews
- Establish coding team, supervisor and arrange training if necessary
- Establish system and facilities
- Assign independent reviewer

- Coding in accordance with iRAP Coding Manual



- Share questions in ViDA Forum
- Peer-to-peer reviews
- Supervisor reviews
- Independent reviews
- Mapping and ViDA validation checks
- Execute corrections as necessary

- Coding output complies with iRAP Coding Manual, Upload File Specification and can be uploaded to ViDA without error
- Standard deliverables:
  - Inception report
  - Licenses of any specialised software
  - Independent quality review report
  - Final coding
  - Final report

Coding involves recording road attributes from a geo-referenced image or a design in a Microsoft Excel file that complies with the *Upload File Specification*.

2.1 Types of coding

Coding may be performed for existing roads and road designs.

Existing roads

Coding of an existing road requires the availability of geo-referenced images. Coding may be performed for a single location (i.e. a single 100m segment of road) or for a length of road (with coding performed for each 100m segment).

Designs

Coding may be performed for road designs for a single location (i.e. a single 100m segment of road) or for a length of road (with coding performed for each 100m segment). The designs should contain sufficient information to allow all road attributes listed in this manual to be recorded. Additionally, the designs should contain geo-referencing information for each 100m segment of road. On occasion, road designs will not contain all road attributes listed in this manual. For example, cross-section drawings and might describe standard roadside conditions but not include specific details like the likely presence of trees and properties. In these cases, two key options are available:

1. Reference is made to coding for the existing road (assuming the designs are for an alignment that follows an existing road alignment).
2. Reasonable assumptions are made in consultation with the coding team, designers and client.

2.2 Coding team

Coders

Coders should have some background in road engineering. It is important that they:

- have good computer skills
- display good attention to detail
- are able to focus solely on the coding task in assigned shifts. People who are expected to undertake coding in addition to their regular jobs are prone to making mistakes.

To ensure the quality and accuracy of iRAP road attribute coding, coders will require training.

Engaging people who are familiar with the road network being assessed, such as engineers, technicians or researchers from the local road authority, university or automobile association, has a distinct advantage. Apart from knowing the roads, they will often develop ownership in the study results and are eager to implement countermeasures.

For a 3,000km study, for example, the recommended size of a coding team would be four to six members. A team of this size will generally take at least one month to complete the coding process for 3,000km. A smaller team that may have to meet other work requirements will take longer to complete the task. Should a project extend to a larger network of roads, a larger coding team is likely to be required. However, larger teams may increase the possibility of having a greater number of discrepancies in their coding data. Experience suggests that a coding team should be limited to 10 coders maximum if good quality outputs are to be maintained.

A rate of approximately 15 to 25km of coding per day can be expected from an experienced individual coder using a good quality coding software and set-up.

Coding supervisor

Supervision and mentoring are an important part of ensuring that the coders produce good results. A coding supervisor should be present during the coding task so that coders are able to ask questions of them and they can manage the review processes. The coding supervisor will ideally have previously been involved in at least one coding project, have additional management skills and extra coding training. The coding supervisor will:

- manage the coding process
- perform quality checks
- have regular contact with other senior coders and management to share and work through issues.

iRAP recommends that individuals preparing to undertake iRAP-specification activities take training.

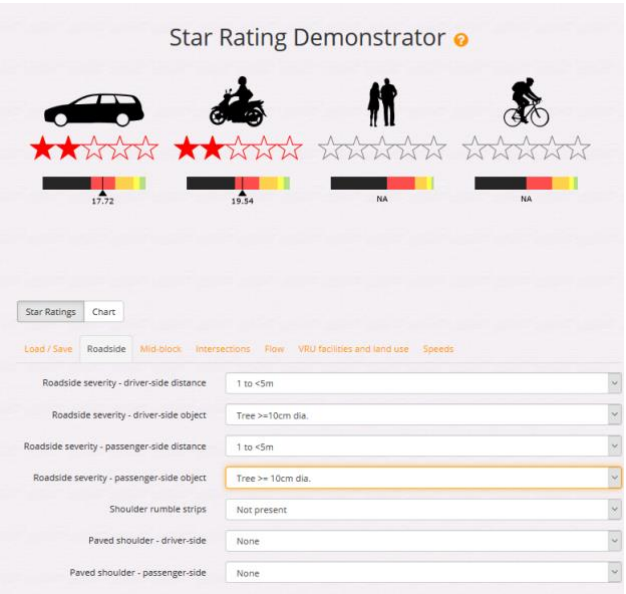
2.3 Coding system

Coders may make used use of a range of different systems to perform the coding. iRAP does not specify requirements for coding systems, however the following includes examples of systems that are currently available and good practice.

Coding of single locations and short lengths of road

For very short lengths of road, or single locations (that is, a single 100m segment), it is feasible for coding to be performed using the Star Rating Demonstrator, which is freely available in ViDA (http://vida.irap.org). With Demonstrator road attributes can be recorded and downloaded into Microsoft Excel .csv. Because of the Demonstrator's limited data management functionality (for example, it does not automatically link georeferenced image data to the coding), it is not good practice to use the Demonstrator for assessments of long roads or networks.

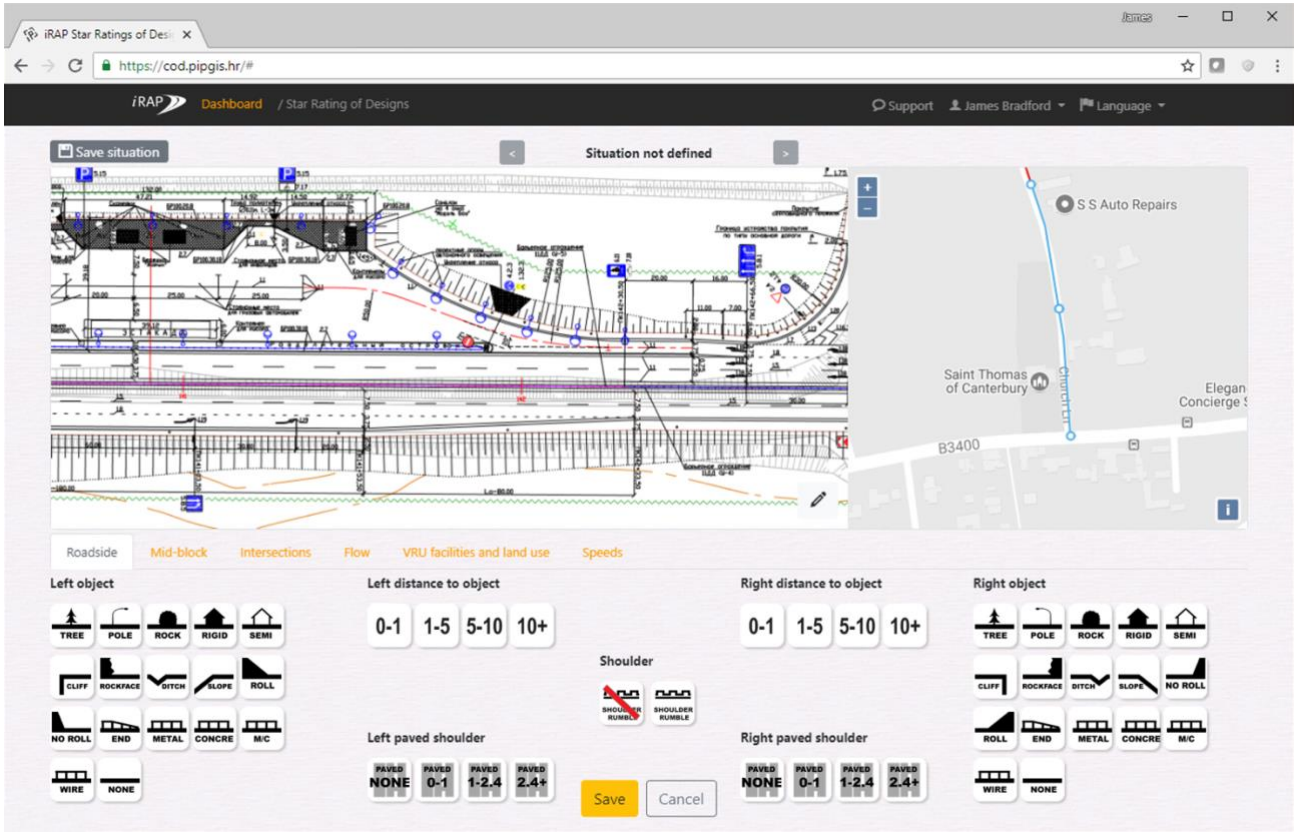
Star Rating Demonstrator in ViDA (left) and an example road image



Star Rating for Designs (SR4D) web app

The Star Rating for Designs (SR4D) web application provides an easy to use tool for coding road designs. Both the SR4D web app and ViDA are publicly available and free-to-use.

SR4D web app



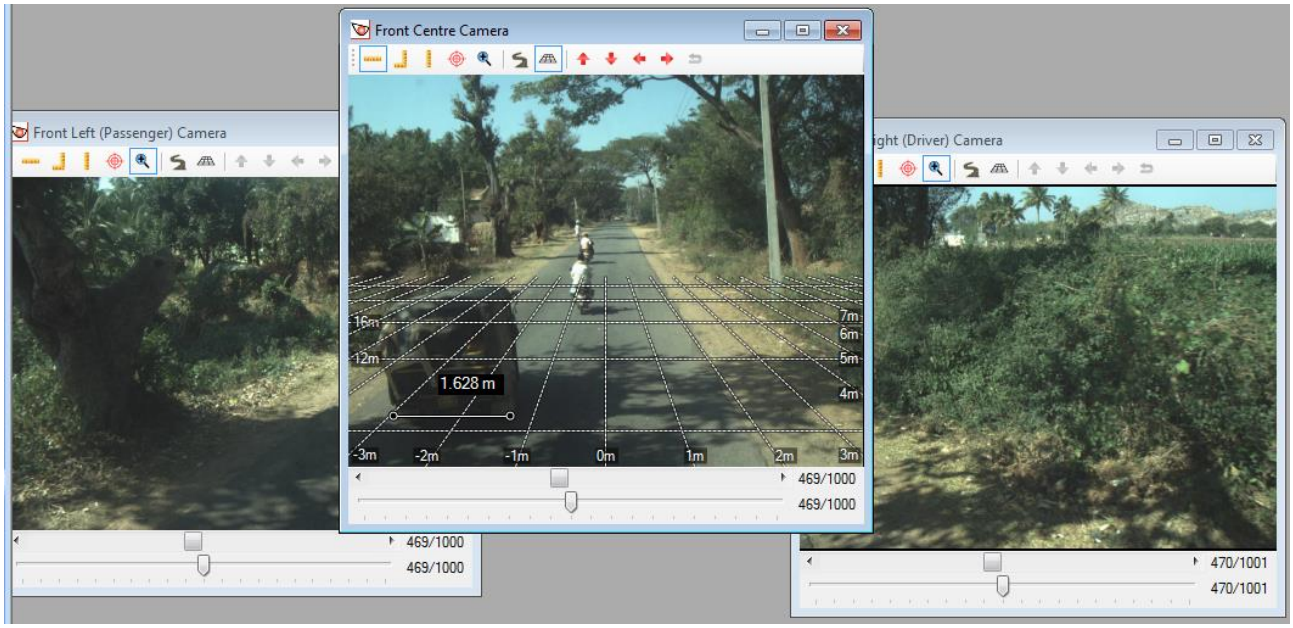
Coding of longer roads and networks

When coding is being performed for longer lengths of road and road networks, it is good practice to make use of a system that has the following capabilities and characteristics:

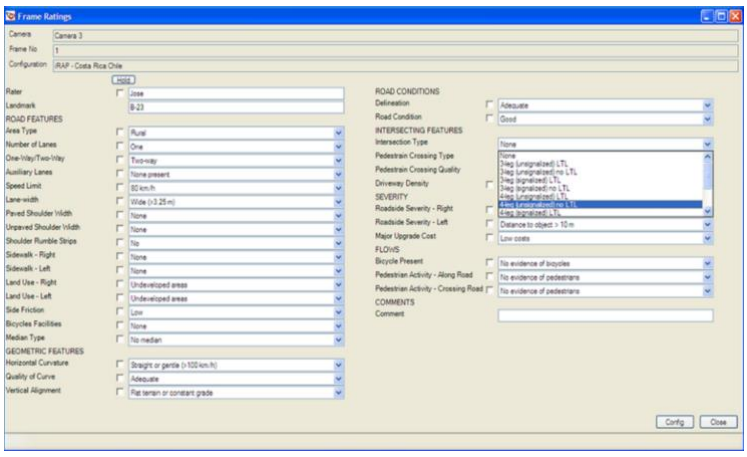
1. Able to simultaneously display to the coder an image for a particular location and a coding form.
2. A coding form that includes the all the road attributes listed in this manual and allows coders to select attribute categories by entry of numeric or alphanumeric data, drop-down menus or attribute buttons.
3. Able to display images at no greater than 20m intervals and able to store coding data for images at 100m intervals.
4. Able to automatically advance 100m to the next location in a convenient fashion, preferably with a single mouse click or hot key.
5. Able to display both the image and coding form in a size large enough for effective use by a coder. This may require display across two monitors to obtain displays of suitable size, clarity and resolution.
6. Where multiple cameras were used to achieve a wide field of view during the survey, be able to align the separate images on the screen to obtain a continuous view of the roadway and roadside at each location.

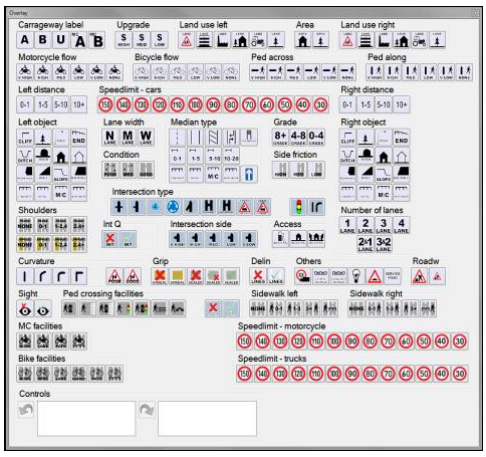
7. Allow the coder to easily review coding data for all images at any time with and without making amendments to the coding data.
8. Able to automatically incorporate the geo-referencing data collected during the survey and associated with each image into the stored coding data, without the need for the coder to manually rekey the geo-referencing data.
9. Able to retain the values entered in selected fields of the coding form from one 100m data set to the next, so that coders only need to modify coding for those attributes that have changed.
10. Able to convert the stored coding data to a .csv file that complies with the *Upload File Specification*.
11. Allows the coders to make accurate measurements of attributes such lane width and offset to roadside hazards.
12. Able to be shared with others, including the client and others nominated by the client.

Example of coding system that uses multiple images for each location, allows coders to make measurements and automatically includes georeferencing data into coding



Example of a drop-down menu coding form (left) and a icon button coding form (right)





2.4 Managing quality

High quality coding requires good management of coder fatigue, quality reviews and data. To help manage the coding process, it is good practice for the coding supervisor to keep a record of:

- which road sections have been coded
- who they were coded by
- when they were coded, and
- details and results of quality reviews and other similar details relating to the coding process.

This record helps to track the progress of individual coders and the team and can also help in finding and rectifying errors.

Fatigue

Tiredness and mental fatigue can affect concentration and performance. Tired eyes and inattention can lead to distraction and carelessness whereby important information may be missed and coding errors occur. To ensure the highest quality of coding and to maintain a happy and healthy coding team, it is good practice that a 5 to 10 minute break from the coding task is taken every hour or two. However, during these breaks—and during the coding—coders should avoid returning to their regular work, since this may reduce the effectiveness of the break.

To minimise errors, it is good practice that shifts for each coder is limited to 4 hours. Thus, a maximum of 8 hours of coding per day will be possible using 2 shifts.

ViDA forum

The ViDA Forum is a source of knowledge for the ViDA community. It can be accessed from the ViDA Dashboard or directly at https://forum.irap.org. It is good practice to post coding questions on the forum and also scan through existing threads for information about coding issues.

Peer to peer quality reviews

One of the best ways for new coders to learn is to ask questions to both their supervisor and to other coders. Often this will be the main way to learn some of the more difficult issues to grasp. To ensure consistency across the coding team, it is good practice to perform peer to peer reviews. Whenever a query is raised, the issue can be discussed and resolved, resulting in consensus across all coding team members.

It is also good practice to have a cross-check of coded roads. To do this, one coder will review a sample of the coding from another team member and identify the attributes that may have been incorrectly or inaccurately coded. A review of the identified issues is then undertaken with reference to this manual until both parties agree on how each identified issue should be coded. Each coder can then use what they have learned during this peer to peer review to correct any previous coding errors made and to minimise subsequent mistakes. It is good practice that the coding supervisor be present during the peer to peer reviews, initially taking a proactive role as mentor and mediator and with time simply listening and intervening only in the case of an incorrect conclusion.

It is best that the coding task should be undertaken in a single room that is capable of comfortably accommodating all coders and equipment and includes facilities for teaching (such as a digital projector). The room should be separate from the coder's normal workspace, to help minimise distractions.

An example of a coding team discussing a coding issue following peer to peer reviews

Progress quality reviews

It is good practice for the coding supervisor (and other members of the coding team as necessary) to review a sample of coded data from each member of the coding team at the end of each day. This helps to ensure that errors are identified and resolved and that the outputs are in accordance with the required level of accuracy. This type of quality review helps to identify coding errors early so that corrections can be made, and further training needs identified in order to minimise further mistakes.

In addition to checking the coding against the specifications, the following issues can be checked. Typical scenarios that can cause errors include:

- duplicate records
- missing 100m sections not coded (gaps between coded sections), and
- missing data in some attributes only.

Some general checks of the data may include:

- correct lengths
- consistent use of road names and sections, and
- that there is consistency between the two directions of a divided carriageway.

Minor, isolated coding errors and inconsistencies can be highlighted and corrected by the coding supervisor. It is important to discuss the findings of the progress review with each coder at the earliest opportunity in order to maintain quality and minimise the need for re-coding.

Where widespread, persistent errors are identified, it is good practice to arrange for training to be provided and a complete re-coding of the affected road section should be considered.

It is good practice for all errors to be recorded by the supervisor. This helps the supervisor recognise patterns in the errors for each coder, or the coding team as a whole, and any weaknesses with the coding system. It is good practice for the coding supervisor to prepare a weekly report containing details of coding progress, peer to peer reviews and the coding errors found.

Independent quality reviews

It is good practice for coding to be subject to independent quality reviews. The reviewer should have demonstrated experience in performing road attribute coding and should be independent of the coding activity for which they are conducting a review. It is good practice for independent reviews to be undertaken for at least 10% of the road or design segments that have been coded. The reviews should include segments:

- in urban areas
- in rural areas
- with intersections
- with curves
- with vulnerable road users.

It is good practice to perform the independent reviews at set stages throughout the coding process. For example, reviews could be undertaken at the completion of 25%, 50%, 75% and 100% of the overall coding task. This approach enables coding errors, inconsistencies and other quality issues to be identified and resolved early in the coding process, reducing the amount of recoding that may be required to ensure high quality results.

To complete an independent review, the reviewer must have access to the georeferenced images and/or designs, the coded data and also any specialised coding system that is in use by the coders. The coding supervisor should ensure that the relevant data is available to the independent reviewer in order that the quality checks can be successfully undertaken.

Upon completion of the independent review a formal report should be produced, summarising issues identified, recommendations and agreed rectifications.

Mapping checks

Checks can be carried out on the raw coding data and upload data files (for road attributes that are visible from above) by mapping specific attribute categories and reviewing where changes occur relative to each other when compared with aerial photography or satellite imagery.

The mapping of recorded road attribute data enables a large-scale review to be undertaken in which the accuracy and consistency of the coding task can be ascertained and corrected across large networks. The table below shows examples of several mapping checks that can be undertaken to review the quality of the data.

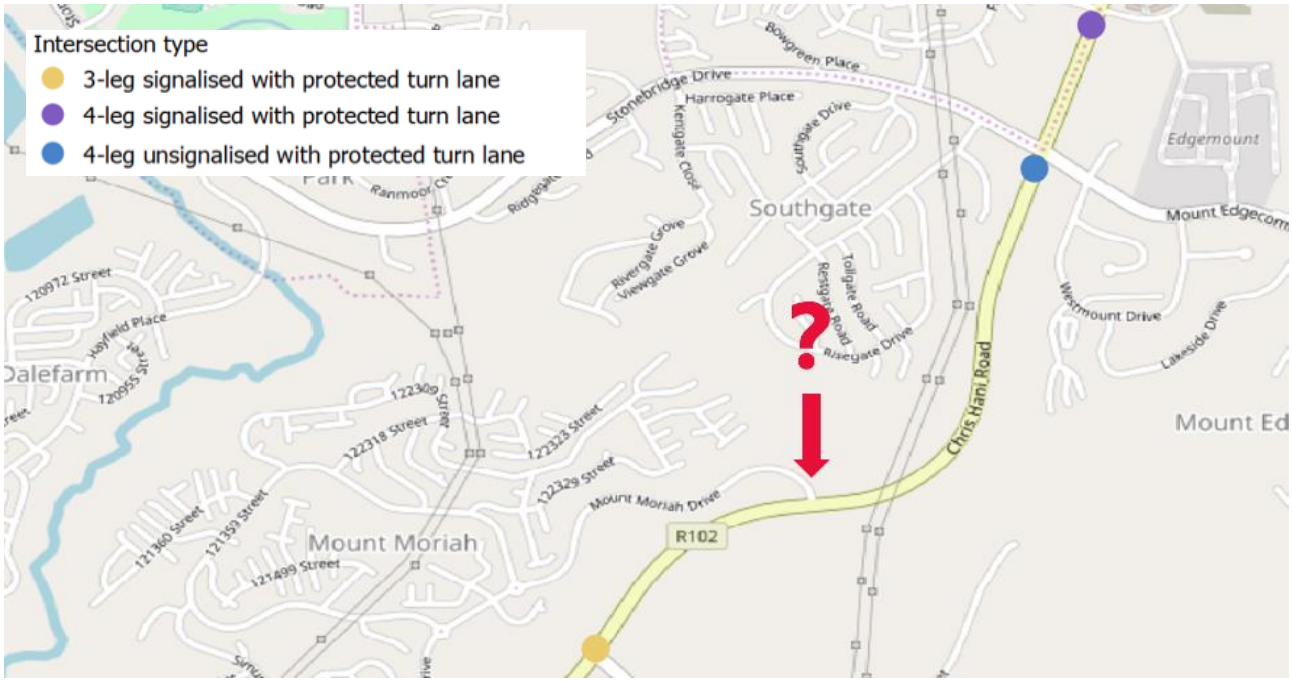
iRAP upload data file mapping checks

Item	Check
Carriageway type	Aerial photography can be used to review the correct code has been assigned to the relevant carriageway type (divided or undivided).
Area type	Aerial photography/satellite imagery can be used to review the correct code has been used for rural and urban areas.
Curvature (horizontal)	Mapping curvature codes can quickly highlight where inconsistencies have occurred.
Land use – driver-side and passenger-side	Aerial photography can be used to review the correct code has been assigned to the recording of land use type. Note: Care should be taken to ensure that the correct road side is being reviewed, i.e. the survey direction must be known.
Speed limit	Speed limits are often set according to the surrounding environment, therefore adjacent land use and area type can be useful indicators for changes to speed limits.
Median type	The median feature can often be identified using aerial mapping.
Intersection type and property access points	Aerial photography/satellite imagery can be used to identify intersections and property access points that have been missed during the coding and also to review the type of intersection recorded.

Intersecting road volume	Mapping can be used to estimate intersecting road volumes. For example traffic volumes will likely differ between a 'no through road' that leads to a small village and that of a major distributor road – which may not be easily discernable using the road survey images alone.
Pedestrian crossing facilities	Pedestrian crossings can often be seen on aerial photography and can be checked against the coding.

Note that some satellite imagery and aerial photography used by geographic information systems could be up to several years old and therefore care should be taken when relying on them for comparison with the road attribute categories recorded during the coding process.

This image shows how intersection type can be mapped to help show where intersections may have been missed or where there are errors and inconsistencies in the coding.



This image shows how horizontal curvature codes can be mapped to help highlight inconsistencies in the coding.

Although it is now possible to automatically code some road attributes such as curvature, few systems are yet able to consistently achieve the minimum level of accuracy required and therefore a detailed manual review

of any automated outputs is currently recommended. Limitations are largely due to the algorithms using GPS data at 100m intervals which can affect accuracy. The presence of roundabouts and other intersections can also distort the results.

Validation check

Coding must be recorded in a Microsoft Excel file that complies with the *Upload File Specification*. It is noted that the following supporting data attributes are not required to be completed as part of the road attribute coding activity (these are explained in the *Star Rating and Investment Plan Manual*).

1. Vehicle flow (AADT)
2. Motorcycle %
3. Pedestrian peak hour flow across the road
4. Pedestrian peak hour flow along the road driver-side
5. Pedestrian peak hour flow along the road passenger-side
6. Bicycle peak hour flow
7. Operating Speed (85th percentile)
8. Operating Speed (mean)
9. Roads that cars can read
10. Vehicle Occupant Star Rating Policy Target
11. Motorcycle Star Rating Policy Target
12. Pedestrian Star Rating Policy Target
13. Bicycle Star Rating Policy Target
14. Annual Fatality Growth Multiplier

It is good practice to regularly perform validation checks of the coding using iRAP tools:

1. The coding validation tool is an excel tool that can be used to perform logic checks on iRAP coding data files before they are uploaded to ViDA.
    a. Create an upload file in accordance with the *Upload File Specification*. In doing so, insert a value of 1 for each 100m for the 14 supporting data fields (listed above).
    b. Follow the instructions in the coding validation tool.
    c. If errors are identified, make the necessary corrections. If 'possible errors' are identified, review each possible error and, where necessary, record an explanation of why the coding is deemed to be correct.
2. ViDA performs an additional validation check for all data uploaded:
    a. Register to use the iRAP online software, ViDA (available at http://vida.irap.org) and, if necessary, apply for a Provisional Creator license.
    b. Create an upload file in accordance with the *Upload File Specification*. In doing so, insert a value of 1 for each 100m segment for the 14 supporting data fields (listed above).
    c. Create a dataset in ViDA and upload the coding to the dataset (refer to the *Star Rating and Investment Plan Manual*)
    d. If validation errors are identified, make the necessary corrections.

2.5 Standard deliverables

Standard deliverables for an iRAP coding project are:

1. An **inception report** including details on the following:
    a. Team members and roles
    b. Schedule
    c. Coding system to be used, and
    d. Plan for quality reviews including confirmation of the independent coding quality reviewer.
2. **Licensed copies of any specialised software** used for viewing and coding georeferenced images or designs and coding.
3. **Short weekly reports** summarising:
    a. Progress (measured in terms of km completed)
    b. Quality review processes completed
    c. Quality issues identified and rectifications made
    d. Photos of activities
    e. Planned activities for the next two weeks, and
    f. Any issues that may affect performance of the project.

    The weekly reports should also include coding for the sections of roads or designs where coding has been completed, in a .csv format that complies with the *Upload File Specification* and does not produce any validation errors in the coding validation tool and when uploaded in ViDA. Data that has not been subject to quality review processes should not be accepted.
4. **Final coding for all the roads/designs** in .csv format that complies with the *Upload File Specification* and does not produce any validation errors in the coding validation tool and when uploaded in ViDA.
5. An independent **coding quality review report** prepared by the independent quality reviewer and explaining the review processes completed, issues identified and recommended corrections.

It is suggested that final acceptance of road attribute coding is withheld until subsequent Star Rating and Safer Roads Investment Plan (SRIP) analyses that use the data are completed. These analyses may reveal previously unidentified issues with coding that may require correction or update.

3 ATTRIBUTE DEFINITIONS AND CODES

Coding options for each attribute are listed in order of highest to lowest risk. Therefore, if an attribute varies within a single coding segment, record the item that appears first in the list of options for that attribute.

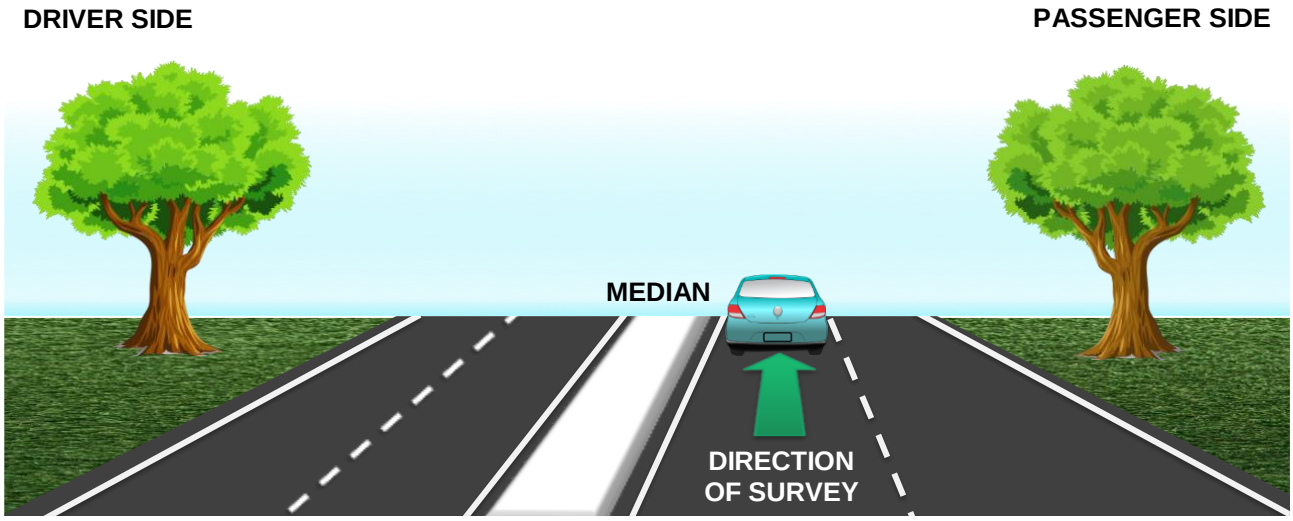
In the following sections:

- "Attribute column X / XX, Input: X" (e.g. Attribute column 1 / A, Input: Text) refers to the column number / letter in the *Upload File Specification* and the type of record to be used for each 100m segment (i.e. text, date, number or code).
- "Code X" (e.g. Code 6) refers to the code that should be entered into the corresponding field.

For each attribute, code the 'worst' case category within each 100m. For example, if a 100m segment includes a cliff for 50m and a safety barrier for the next 50m, record the cliff. To help determine which is the worst case, coding options for each attribute are listed in order of highest to lowest risk.

The terms 'driver side' and 'passenger side' are used throughout the manual. Driver side refers to the side of the road corresponding with driver of a vehicle traveling in the direction of the survey and passenger side is the other side.

Typical divided carriageway cross section illustrating driver and passenger sides of the road (drive on right)



Technically, roads in city and urban environments should be coded in exactly the same way as rural and intercity roads. However, the complexity of urban road networks and the road user mix can make this quite challenging.

Decisions on how to code roads in a particular urban environment may be required to ensure consistency in data across the coding team. Examples of such issues include:

- How to code a particular type of road attribute, such as a non-standard intersection configuration or non-standard pedestrian and bicyclist facilities.
- Notes are provided for city and urban environments in each attribute section of this manual, where relevant. Further guidance on how to code particular road attributes is available in the ViDA forum.

3.1 Road details and context

Attribute columns 1-13/A-M

For text inputs, please use only plain Latin characters without accent or tonal marks.

Coder name

Attribute column 1/A, Input: Text

Record the coder's full name per coding segment.

This will assist in the quality assurance process and enable the data to be traced.

Coding date

Attribute column 2/B, Input: Date

Record the date the coding was undertaken.

The date must be in dd/mm/yyyy format.

Road survey date

Attribute column 3/C, Input: Date

Record the date the road survey was undertaken.

Record the date as dd/mm/yyyy.

For urban road assessments, recording the day and time of the survey may assist in predicting pedestrian, bicyclist and motorcyclist flows, as well as other attributes that vary depending on the time of day, such as vehicle parking.

Image reference

Attribute column 4/D, Input: Text

Record a URL address for the first image in each 100m segment.

The first image of each 100m segment used in the road attribute coding should be hosted on the internet and a URL provided. These images shall be hosted by the coder and images should be accessible to others.

Road name

Attribute column 5/E, Input: Text

Record the road name to identify which road the data refers to.

This information will be published online in ViDA to identify the road.

Section

Attribute column 6/F, Input: Text

Record a section name or number to differentiate between sections of road.

The section name should be created to distinguish the section of road from other sections of the same road, or a road authority's own road section system should be used. It is good practice to note the direction of travel.

For example, section names should describe a 'from and to' location (Petersfield to Williamsburg) and the direction such as "eastbound". Alternatively, if the road authority has divided the network up into management or maintenance sections it may be beneficial to use these for the section names.

This information will be published online in ViDA to identify road sections.

Distance

Attribute column 7/G, Input: Number

Record the distance in 0.1km increments from the start of the inspected section of road.

The distance recorded should be from the start of each coding segment. For example, the start of the first coding segment should be recorded as 0.0, the second as 0.1, the third as 0.2 and so on.

The distance is used in the score calculation stage to order the data. This data should be provided by the inspection system or can be mapped using a KML file in Google Earth.

Length

Attribute column 8/H, Input: Number

Record the length of the coding segment in kilometres (km) that the coding applies to. The standard length 0.1km.

The segment length is used in the score calculation stage to help with smoothing. This data will be provided by the inspection system and can be mapped using a KML file in Google Earth.

Latitude and longitude

Attribute columns 9/I & 10/J, Input: Number

Record the latitude and longitude GPS coordinates in decimal degrees and WGS84 projection at the start of each segment.

Landmark

Attribute column 11/K, Input: Text

Record key landmarks and chainage markers where they occur. This allows locations on the road to be referenced relative to the landmarks and is beneficial for Star Rating analysis and reporting.

Landmarks may be any of the following or other items of interest:

- Town names
- Major intersection number
- Major bridge or toll booth
- Reference point

- Landmarks and chainage markers may either be entered during coding or added from maps or designs at a later stage.

Comments

Attribute column 12/L, Input: Text

Record key comments to highlight particular road safety issues or special features encountered during the coding process.

Comments may include issues not fully covered by the coding itself or additional location information beneficial to Star Rating analysis and reporting.

Include any supporting information or notes on assumptions made during the coding of the section. For example:

- High proportion of trucks
- Close proximity to school so pedestrian demand assumed as high
- Poles assumed as frangible
- Bus stop present so pedestrian crossing demand assumed as high.

Carriageway label

Attribute column 13/M, Input: Code

Record a carriageway label for each section of road to distinguish which carriageway is being coded.

Undivided vs. divided carriageways

Divided (dual) carriageways are surveyed in both directions, but undivided (single) carriageway roads are recorded in one direction only, even if the traffic is two-way. What is considered divided and undivided depends on the median type and its length:

Divided carriageways are those that physically separate opposing traffic flows by either a barrier or a wide physical median consistently and for a distance of 400m or more.

An undivided carriageway has no physical separation between opposing traffic flows, or physically separates traffic for a section of less than 400m.

How do I code a one-way street?

One-way roads must be coded as undivided and the ‘Median type’ set to one-way.

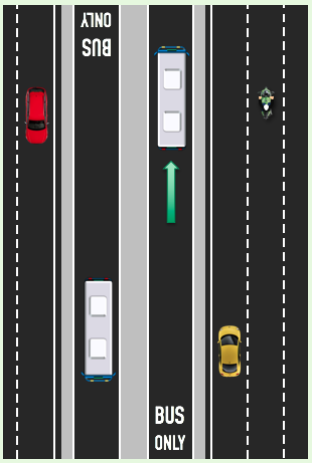
How do I code a service road?

Service roads must be coded separately to the main carriageways. Code service roads the same way as standard roads.

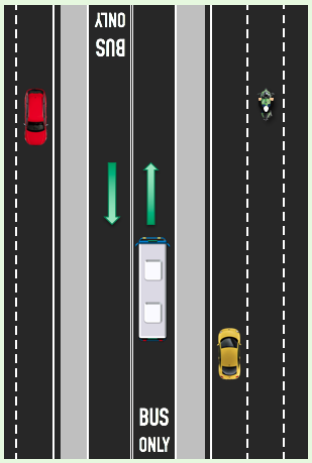
How do I code a bus or transit lane?

If a bus or transit lane is part of the main carriageway, code it as part of the carriageway (see instructions on coding transit lanes under 'Number of lanes'). Where there is a dedicated, separated carriageway for buses, these should be coded as divided or undivided carriageways separate to the main carriageway.

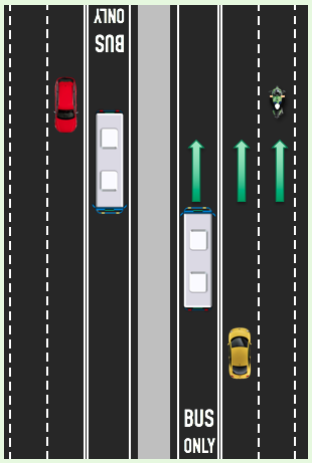
Separate bus carriageway – Divided



Separate bus carriageway – Undivided



Non-separate bus lane (part of main carriageway)



Coding options

Carriageway A

Code: 1

Divided carriageway in one direction.

Carriageway B

Code: 2

Divided carriageway in opposite direction (to carriageway A).

Undivided road

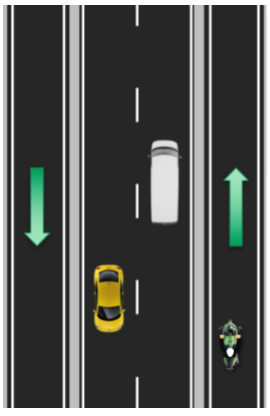
Code: 3

Undivided carriageway (in both directions or one-way).

Motorcycle facility

Code: 4-5

Segregated motorcycle paths adjacent to the main carriageway.



3.2 Observed flow

Attribute columns 15-19/O-S, Input: Code

Record the number of motorcycles, bicycles or pedestrians observed within the coding segment.

Observed flows are recorded for motorcycles, bicycles and for pedestrians. Pedestrian flows are recorded individually for along the driver-side, along the passenger-side and across the road.

Include motorcycles or pedestrians which may have been counted in previous coding segments.

About observed flow

Observed flows are not directly used in Star Ratings. They form one part of the evidence used during the Star Rating analysis in estimating flows on each road segment.

What is a…?

A motorcycle is a motorised two or three-wheeled vehicle. This typically includes mopeds, scooters and light three- and four-wheel vehicles capable of speeds over 30km/h. Motorcycles which are parked or not in use should not be recorded.

A bicycle is a two- or three-wheeled pedal, pedal-assisted or mobility vehicle limited to speeds of less than 30km/h.

Pedestrians include anyone on foot, operating a push/pull vehicle (street cleaner, pram or rickshaw) or in a wheelchair or other mobility vehicle. Do not count people involved in temporary road maintenance or construction.

Coding options

Flow type	Attribute columns	Observed flow per coding segment (number of motorcycles/people/bicycles)					
		>8	6 - 7	4 - 5	2 - 3	1	0
Motorcycle flow	15/O	6	5	4	3	2	1
Bicycle flow	16/P	6	5	4	3	2	1
Pedestrian flow: Across	17/Q	6	5	4	3	2	1
Pedestrian flow: Along driver-side	18/R	6	5	4	3	2	1
Pedestrian flow: Along passenger-side	19/S	6	5	4	3	2	1

3.3 Speed

Attribute columns 23-25/W-Y, 26/Z and 54/BB

Speed limit

Attribute columns 23-25/W-Y, Input: Code

Record the actual posted numerical speed limit for general traffic and for motorcycles and trucks.

If differential speed limits are not present for motorcycles and trucks, record these as the same as the speed limit for general traffic.

Do not attempt to record the speed of vehicles using the road.

Temporary and other speed limit signs

If no speed limit is posted, or there is a state/national limit sign, the default speed limit set by law for that type of road should be used. Do not record temporary speed limits at road works or school zones. Do not record advisory speeds.

Record

The legal speed limit applies

Do not record

The regular speed limit applies

Do not record

The regular speed limit applies

Coding options

km/h													
Code	25	23	21	19	17	15	13	11	9	7	5	3	1

mph								
Code	45	43	41	39	37	35	33	31

Differential speed limits

Attribute column 26/Z, Input: Code

Record the difference in either operating speed or speed limit between cars and trucks or cars and motorcycles where the difference exceeds 20km/h.

Coding options

Present

Code: 2

Operating speed or speed limit difference between cars and trucks or cars and motorcycles exceed 20km/h or 12mph.

Not Present

Code: 1

Operating speed or speed limit difference between cars and trucks or cars and motorcycles do not exceed 20km/h or 12mph.

Speed management

Attribute column 54/BB, Input: Code

Record the presence of road infrastructure features that will typically reduce the operating speed by 5km/h to 10km/h below the speed limit.

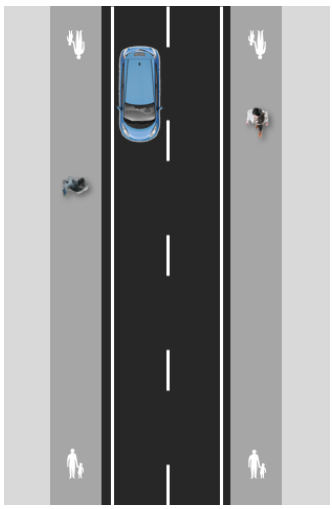
Features may include curb build-outs, speed humps, raised tables, entry treatments, speed cushions, chicanes and modified intersections. Do not record roundabouts or mini-roundabouts. Do not record speed cameras. Speed cameras are only considered effective tools for enforcing the posted speed, not reducing it to below the posted speed.

Coding options

Not present

Code: 1

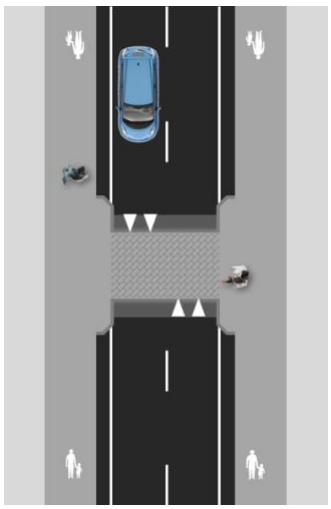
No speed management features present.



Present

Code: 2

Speed management features present and sufficient to reduce the operating speed 5-10km/h below the speed limit.



3.4 Mid-block attributes

Number of lanes

Attribute column 41/AO, Input: Code

Record the number of traffic lanes in the direction of travel.

This attribute is used to record the configuration of lanes on the carriageway being coded.

Do not code:

- Changes over short lengths of road less than 400m.
- Turning lanes at intersections.

Do code:

- Bus and transit lanes that are part of the main carriageway. See 'Carriageway label' for more information.

If no lane markings are present, the total road width should be divided by the number of traffic streams to determine the number of lanes.

The number of lanes is used to calculate both external flow risk for vehicles and pedestrian crossing risk. More information about external flow risk is provided in iRAP methodology factsheet 5 *External Flow and Median Traversability*.

Coding options

4 LANE Four or more lanes

Code: 4

Four or more lanes in direction of travel.

3 LANE Three lanes

Code: 3

Three lanes in direction of travel.

3&2 LANE Three and two lanes

Code: 6

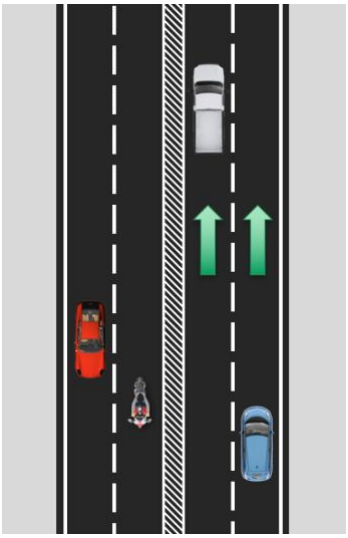
Undivided road only

Three lanes in one direction and two in the other direction.

Two lanes

Code: 2

Two lanes in direction of travel.

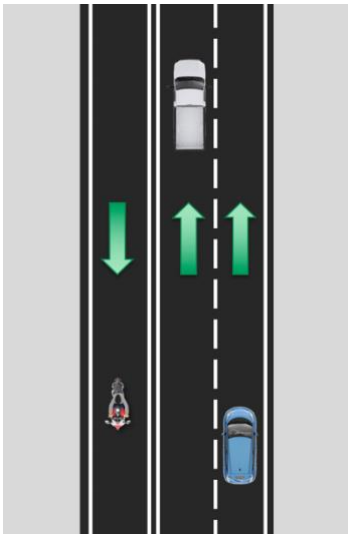


Two and one lanes

Code: 5

Undivided road only

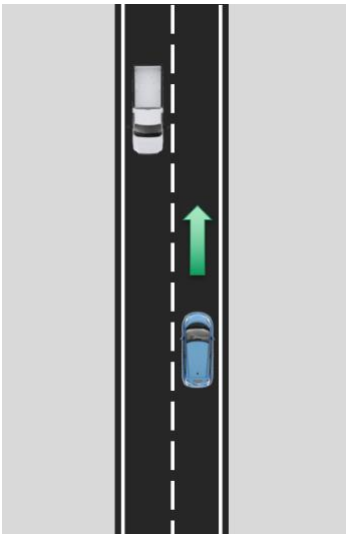
Two lanes in one direction and one in the other direction.



One lane

Code: 1

One lane in direction of travel.



Lane width

Attribute column 42/AP, Input: Number

Record the distance from the edge line to the adjacent lane marking.

If the road has no edge line, the lane width is measured from the edge of the pavement to the adjacent lane marking. For roads with one lane in each direction, the adjacent lane marking will be the centre line.

Where lane width varies, record the narrowest lane width.

If no lane markings are present, the total road width should be divided by the number of traffic streams to determine the lane width.

Lane width approximations

In the absence of exact lane measurements, lane width can be approximated using typical vehicles sizes. For the purposes of estimation, the typical widths of vehicles are as follows:

Truck or bus = 2.5m

Tractor = 2.3m

Van/minibus = 2m

Family car = 1.8m

Light 3- or 4-wheeled motorised vehicle = 1.2m.

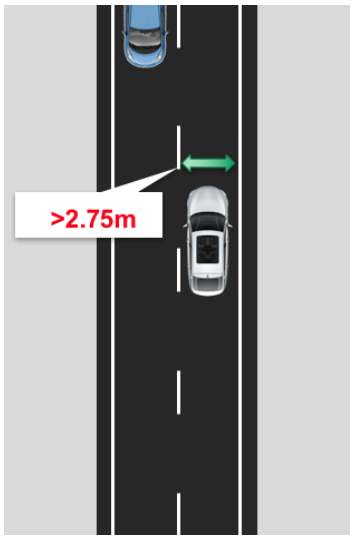
A truck or lorry would struggle to fit in a narrow lane, comfortably fit in a medium lane, and have ample space on each side in a wide lane.

Coding options

Narrow <2.75m

Code: 3

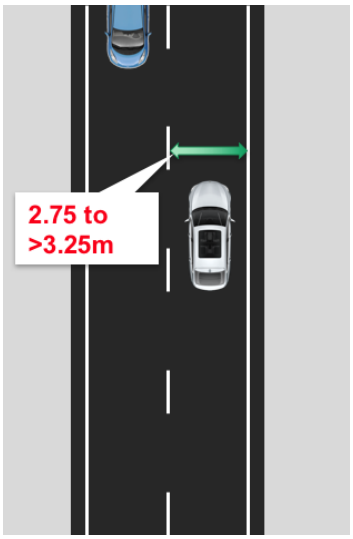
Lane width is less than 2.75m.



Medium 2.75m to <3.25m

Code: 2

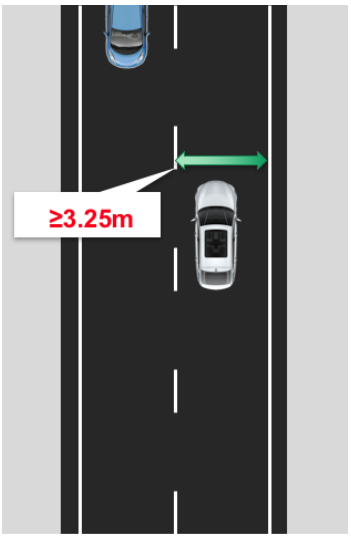
Lane width is from 2.75m to 3.25m.



Wide ≥3.25m

Code: 1

Lane width is greater than 3.25m.



Curvature

Attribute column 43/AQ, Input: Number

Record the horizontal alignment of the road.

Curvature is gauged according to approximate curve radius and the appropriate safe approach and driven speed under normal conditions. It may also be collected from sensors built into an inspection system, for example accelerometer and gyroscopic data.

Record each curve from its start point to end point, even if this spans several coding segments.

If there is an advisory speed sign, use the marked speed for rating the horizontal alignment. Do not use the speed of the inspection vehicle since this can be affected by other factors, such as traffic flow.

If the road is straight, record it as ‘straight or gently curving’.

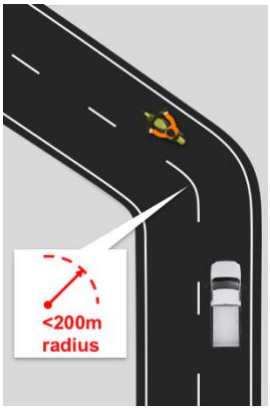
Do not code curvature associated with roundabouts, unless the curve precedes the roundabout as a traffic calming measure or as a natural characteristic of the road.

Coding options

Very sharp

Code: 4

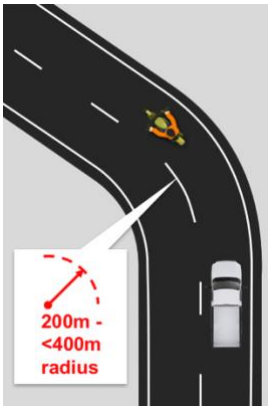
A curve that can only be driven at less than 40km/h with an approximate radius of <200m.



Sharp

Code: 3

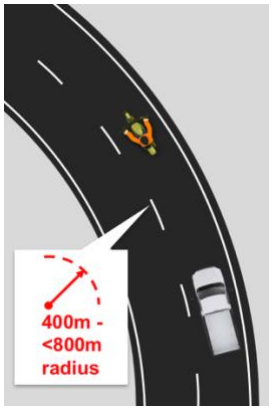
A curve that can only be driven between 40km/h and 70km/h with an approximate radius of 200m to 400m.



Moderate

Code: 2

A curve that can be driven between 70km/h and 100km/h with an approximate radius of curve 400m to 800m.



Straight or gently curving

Code: 1

A straight road or curve that can be driven at 100km/h or more with an approximate radius of curve greater than 900m.

Quality of curve

Attribute column 44/AR, Input: Code

Record how easy it is to judge how sharp a curve is and if it can be driven safely.

The quality of the curve will reflect the extent to which signs and markings help the driver to judge the correct curvature, and the sight distance in advance of, and around, the curve.

A practical indication of the quality of the curve might be whether the driver needs to adjust speed suddenly or unexpectedly on the approach to, or within the curve. This may occur even though there has been an attempt through signing to warn the driver of extra risk.

Apply the same quality of curve code to the whole curve, from its start point to its end point.

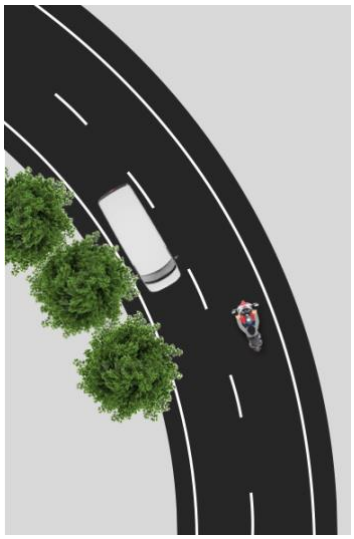
Curves can be particularly difficult to judge at night or in poor weather. The presence and quality of reflective signs and road markings and street lighting are important in gauging the quality of a curve.

Coding options

Poor

Code: 2

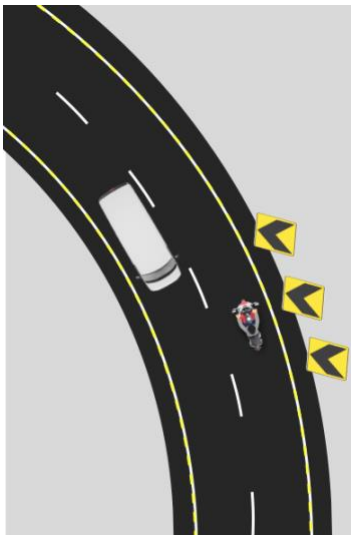
A curve where rapid or unexpected speed adjustments are needed to negotiate the curve, and there is a lack of advanced signing and/or missing or poorly maintained road markings.



Adequate

Code: 1

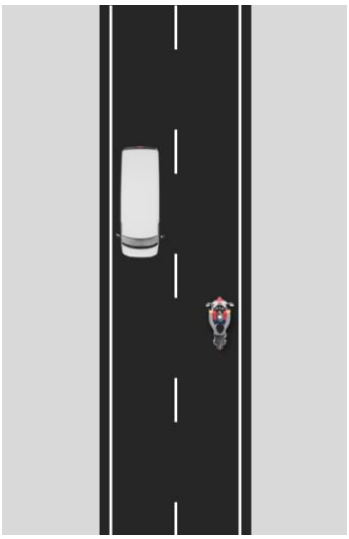
Signing, marking and sight distance enable a driver to judge curvature. Curves of adequate quality may incorporate chevron alignment markers (CAMs) or other reflective hazard markers.



Not applicable

Code: 3

The road is straight or gently curving.



Upgrade cost

Attribute column 14/N, Input: Code

Record the influence that the surrounding land-use, environment and topography will have on the cost of major works.

Upgrade Cost is based on the relative cost of acquiring additional land and the associated complexity of working on that land. Upgrade cost may be designated as:

'High' where the cost of purchasing land or developing it would be relatively expensive.

'Medium' where the cost of purchasing land or developing it would be relatively moderate.

'Low' where the cost of purchasing land or developing it would be relatively low.

Coding options

High

Code: 3

Cost of road upgrades, such as adding a lane, would be relatively high. For example:

Major earthworks will be required

Major service relocations expected

Major property or adjacent developments affected such as in urban areas.

Medium

Code: 2

Cost of road upgrades, such as adding a lane, would be relatively moderate. For example:

Moderate earthworks required

Minor adjacent developments will be affected.

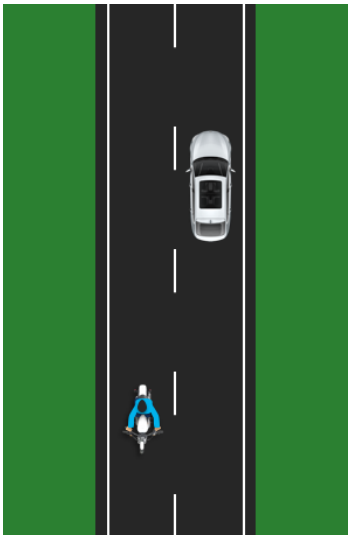
Low

Code: 1

Cost of road upgrades, such as adding a lane, would be relatively low. For example:

Minimal earthworks required

No fringe development.



Median type

Attribute column 27/AA, Input: Code

Record the road infrastructure feature that separates the two opposing traffic flows for both divided and undivided carriageways.

Do not record defective safety barriers. This includes barriers of insufficient height, made of sub-standard materials, or broken, damaged or poorly maintained barriers.

Median fencing used to control traffic and pedestrian movement, but that would not withstand vehicle impact, can be recorded as 'flexible posts'.

The role of median barriers in preventing head-on collisions

How opposing traffic flows are separated affects the likelihood of severe crashes occurring. Physical barriers restrict the movement of errant vehicles across the median. Wide medians reduce the potential for head-on impacts by reducing the likelihood an errant vehicle will reach opposing traffic before it recovers or comes to a stop.

Median types for divided and undivided roads

The 'median type' determines whether the road is considered 'divided' or 'undivided'. For example, if a road is divided by a 4m wide grassy median, it is considered a 'divided road' and each carriageway is then coded separately. However, the 'median type' is still recorded as 'physical median width 1 to <5m'. Further explanation is provided under Carriageway label and the 'median type' options listed below.

Barriers and roadside severity

Barriers or other objects present in the median must also be recorded under Roadside severity – distance and object.

If a median safety barrier has openings or gaps which do not feature impact cushioning or protection, do not record it as a median safety barrier, but do record it as a 'roadside severity – driver-side object'.

What are international standards for crash safety barriers?

International standards apply to the design, materials and installation of crash safety barriers.

Most crash barriers available on the international market are designed according to one of the major international standards, namely EN 1317 (the European standard) or NCHRP 350 (the US standard). NCHRP 350 has now been replaced by the MASH standard.

As a general guide, a crash barrier that does not meet international standards can usually be recognised by its:

- Unconventional design
- Insufficient height (see below)
- Poor or incorrect installation, or
- Poor maintenance or damage (such as vertical tears or bent posts).

What is the standard height for a safety barrier?

Safety barriers which are too low increase the risk of roll-over crashes. Recommended safety barrier heights vary from country to country and also depend on the size and speed of vehicles using the road. Please refer to local design standards in use.

As a general guide, the height of a barrier should be no less than 0.67m.

Average minimum design standard heights for new barriers by vehicle type are as follows:

Light vehicles such as cars and SUVs up to 2 tonnes	0.80m
Large SUVs, vans and small rigid trucks up to 10 tonnes	0.92m
Large articulated trucks and buses up to 36 tonnes	1.07m

Coding options

Centre line

Code: 11

Undivided two-way road only

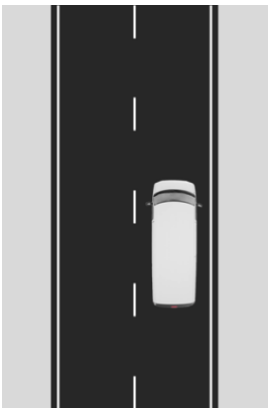
Single or double central line or marked central strip that is less than 0.3m wide.

The centre line can be either dashed or solid, and of any colour.

If the road is undivided, has two directions of travel, and has no markings, it should be recorded as:

Median type = Centre line only

Delineation = Poor



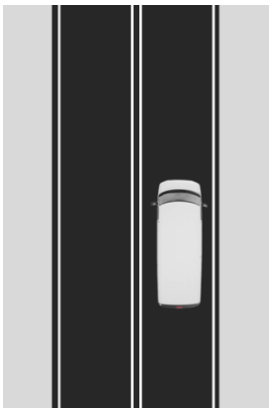
Wide centre line 0.3m to 1m

Code: 14

Undivided two-way road only

Single or double centre line, or marked central strip 0.3m to 1m wide.

The wide centre line may be dashed, solid or ladder hatching, and of any colour.



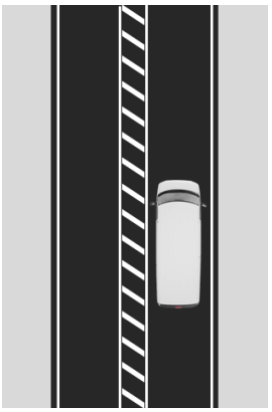
Central hatching >1m

Code: 10

Undivided two-way road only

Marked central strip greater than 1m wide.

Examples of marking are ladder hatching, stripes or coloured paving.

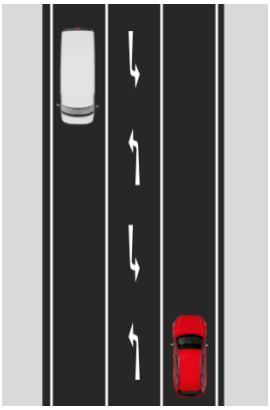


Continuous central turning lane

Code: 8

Undivided two-way road only

Continuous central lane designated as a turning lane.



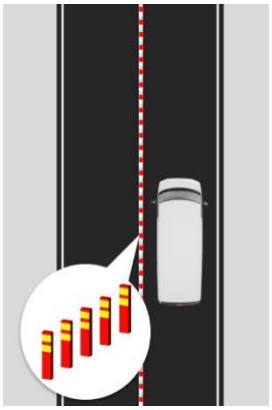
Flexible posts

Code: 9

Undivided two-way road only

Flexible posts or bollards, but that are not a continuous physical divider.

May include median fences installed for the purposes of controlling traffic and pedestrian movements, but which would not withstand vehicle impact.



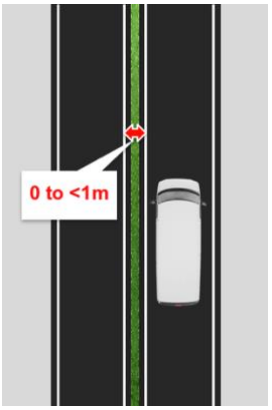
Physical median width 0m to <1m

Code: 7

Divided road only

Defined median of different material less than 1m wide.

A physical median typically includes a curb or other surface change that would slow an out-of-control vehicle.



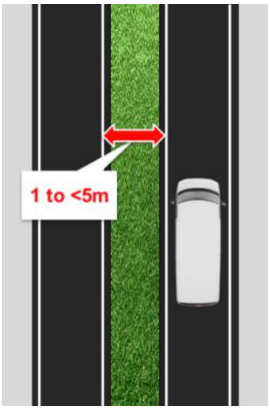
Physical median width 1m to <5m

Code: 6

Divided road only

Defined median of different material 1m to <5m wide.

A physical median typically includes a curb or other surface change that would slow an out-of-control vehicle.



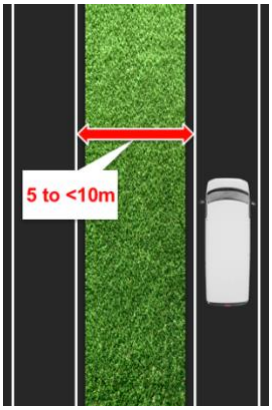
Physical median width 5m to <10m

Code: 5

Divided road only

Defined median of different material 5m to <10m wide.

A physical median typically includes a curb or other surface change that would slow an out-of-control vehicle.



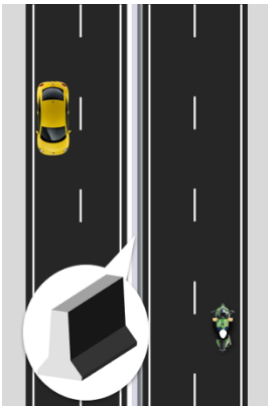
Safety barrier – concrete

Code: 2

Divided road only

Safety barrier constructed from concrete that meets international standards.

Do not record defective safety barriers.



Safety barrier – metal

Code: 1

Divided road only

Metal safety barrier that meets international standards.

Do not record defective safety barriers.

Safety barrier – motorcycle friendly

Code: 12

Divided road only

Safety barrier designed to minimise impact to motorcyclists that meets international standards.

Motorcycle friendly barriers will have some form of protection for the supporting post or legs.

Safety barrier – wire rope

Code: 15

Divided road only

Safety barrier constructed from tensioned wires that meets international standards.

Do not record defective safety barriers.

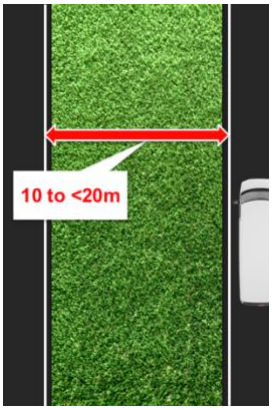
Physical median width 10m to <20m

Code: 4

Divided road only

Defined median of different material 10m to less than 20m wide.

A physical median typically includes a curb or other surface change that would slow an out-of-control vehicle.



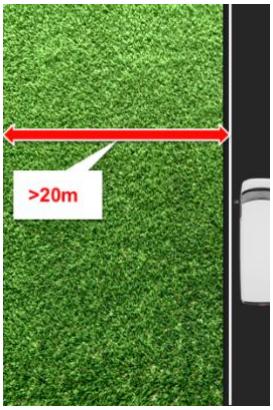
Physical median width ≥20m

Code: 3

Divided road only

Defined median of different material 20m wide or more.

A physical median typically includes a curb or other surface change that would slow an out-of-control vehicle.

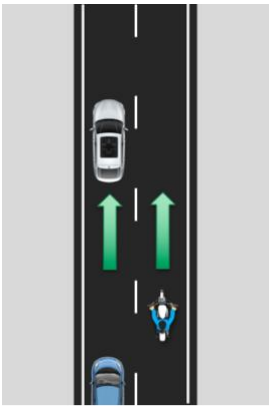


One way

Code: 13

One-way road only

Vehicles travel in a single direction with no opposing flow.



Skid resistance

Attribute column 47/AU, Input: Number

Record the skidding resistance and texture depth of the road surface.

Surface texture deficiencies includes surface friction issues such as loose gravel, flushing or stripping which could reduce traction for vehicles in wet or dry conditions.

The attribute recorded should reflect the general condition of the road for the majority of the coding segment.

Coding options

Unsealed – poor

Code: 5

The road surface is unpaved and has a low grip surface.

For example:

Surface is covered in loose gravel

Natural surface is likely to be slippery in wet conditions (e.g. silt/clay surfaces).

Unsealed – adequate

Code: 4

The road surface is unpaved with a relatively good surface grip.

For example:

The surface is compacted aggregate providing a surface that remains firm in all prevailing weather conditions.

Sealed – poor

Code: 3

The road surface is sealed but has a low grip surface.

For example:

The road surface is paved and looks smooth and shiny for more than 20% of the preferred vehicle path.

Loose gravel or other material is present for more than 20%.

Sealed – medium

Code: 2

The road surface is sealed and has a medium grip surface.

For example:

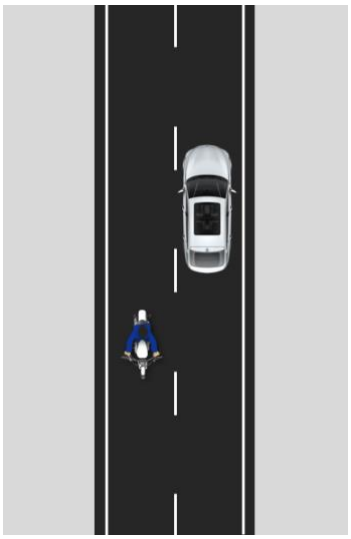
The road surface is paved and looks smooth and shiny for up to 20% of the preferred vehicle path.

Loose gravel or other material is present for up to 20%.

Sealed – adequate

Code: 1

The road surface is sealed and is expected to have adequate skid resistance performance. There are no visible smooth and shiny sections in the preferred vehicle path.



Road condition

Attribute column 46/AT, Input: Number

Record the condition of the road surface.

This includes the ability of the road to provide a level, even running surface that is free from major surface defects that may adversely affect the vehicle path.

Record a ‘poor’ or ‘medium’ road condition if defects are present for 10m or more at any point on a coding segment.

Defects that should be considered to include anything that would cause an impact on vehicle control or path, some examples are:

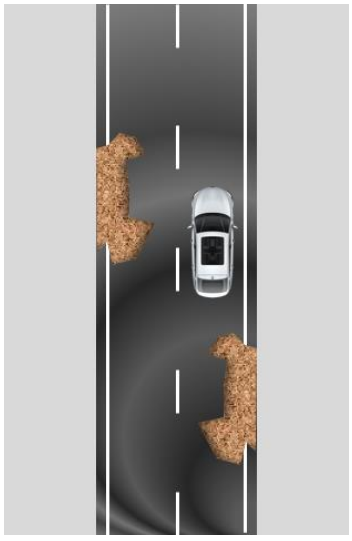
- Deformation of the tarmac, including rutting or uneven surface.
- Holes in the road surface due to loss of material which is sufficiently wide or deep enough to cause a severe jolt or loss of control to the vehicle.
- Edge defects including any road shoulder seal problems which encroach on the driven lane or that would require small vehicles using the road shoulder to enter regular traffic lanes.

Coding options

Poor

Code: 3

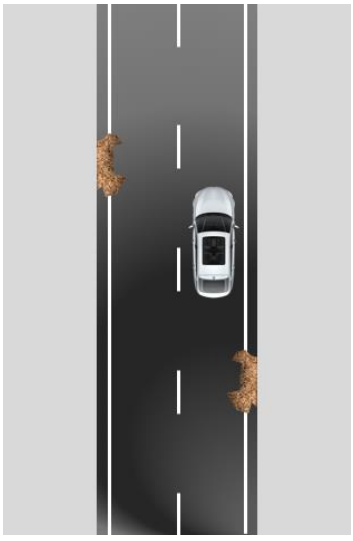
Road has serious defects which are likely to result in frequent or unpredictable impact on vehicle control or on motorcyclists and bicyclists.



Medium

Code: 2

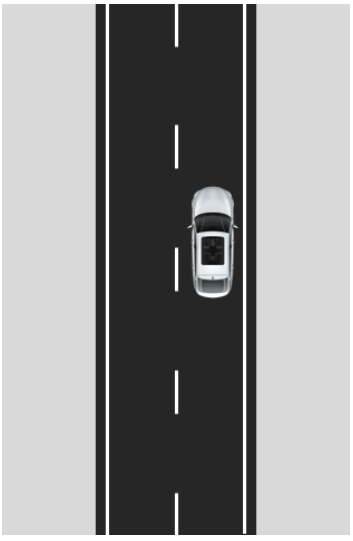
Road has a number of minor defects which may result in occasional impact on vehicle control or path or on motorcyclists and bicyclists.



Good

Code: 1

Road has very few or no defects and is adequate for all road users. There is no potential impact on vehicle control or path or on motorcyclists and bicyclists.



Vehicle parking

Attribute column 55/BC, Input: Number

Record the extent of vehicle parking along the side of the road.

Vehicle parking includes parked vehicles and on-street parking spaces (even if no vehicles are present), bus stop bays, taxi ranks, and any other places where vehicles can stop on the side of the road (such as emergency stopping lanes) within 2m of the outside edge of the driveable lane.

This attribute informs how a paved shoulder is treated within the iRAP Pedestrian and Bicyclist Star Rating and Safer Road Investment Plan models.

Paved shoulders (without vehicle parking) provide some benefit to bicyclists and pedestrians where facilities are inadequate or not present. However, this benefit is not taken into account where a paved shoulder is being used for vehicle parking or similar.

For cities and urban environments, on-street parking may be assumed if space is available and where parking restrictions are either not present or present but not enforced.

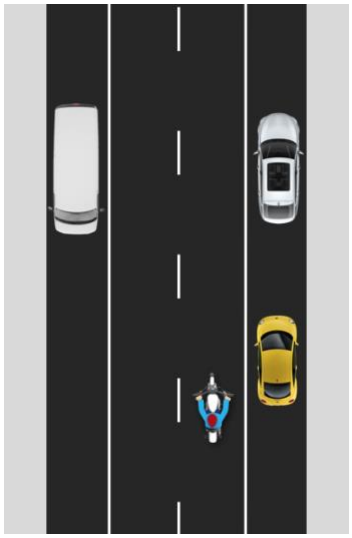
Vehicle parking can also vary significantly depending on the time of day and on the surrounding land-use and road functions. Land-use data and local knowledge may be used to record vehicle parking.

Coding options

Two sides

Code: 3

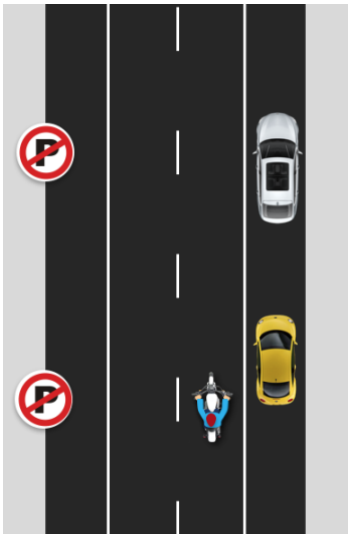
Vehicles park on both sides of the road.



One side

Code: 2

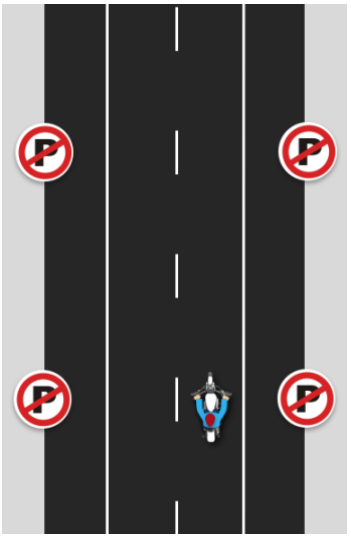
Vehicles park on one side of the road.



None

Code: 1

No vehicle parking present.



Grade

Attribute column 45/AS, Input: Code

Record the gradient of the road along its length.

Grade refers to both upward and downward slopes.

Coding options

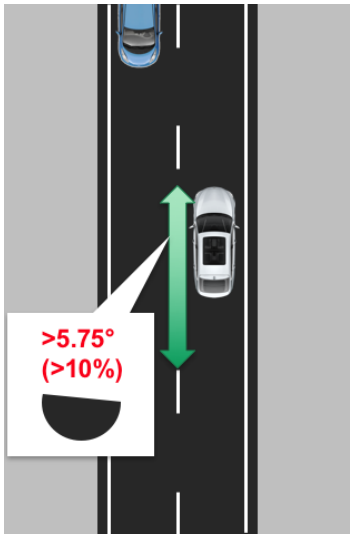
10+ GRADE

≥10%

Code: 5

A steep rise of 10m or more over a 100m length, or an angle of 5.75 degrees or above.

This grade would typically be encountered in mountainous terrain or short, steep sections in rolling terrain.



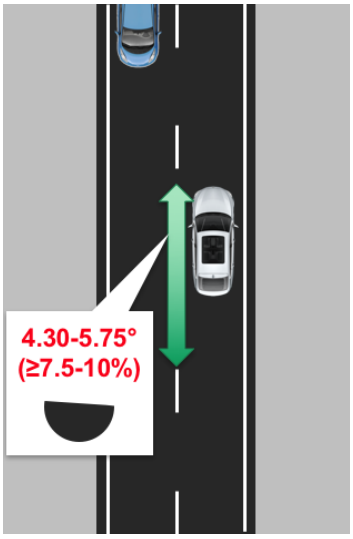
7-10 GRADE

7.5% to <10%

Code: 4

A moderate rise of 7.5m to <10m over a 100m length, or an angle of 4.3 to <5.75 degrees.

This grade would typically be encountered in rolling, hill or foothill terrain, and in moderately sloping sections of mountainous terrain.



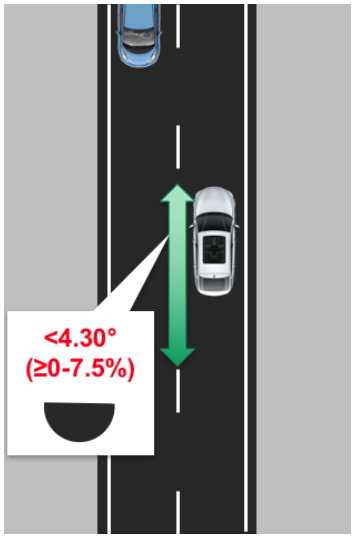
0-7 GRADE

0% to <7.5%

Code: 1

Flat or gentle rise of 0m to <7.5m over a 100m length, or an angle of 0 to <4.3 degrees.

This grade would typically be encountered in level or gently rolling terrain.



Roadworks

Attribute column 61/BI, Input: Code

Record the presence of major road construction or road works in progress.

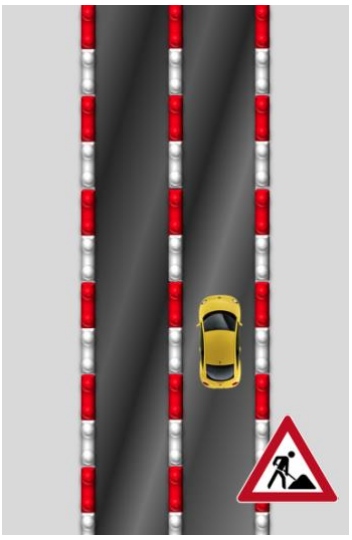
Record any construction activities in the vicinity of the road that impacts on its normal operation, such as temporary speed limits or lane closures.

Coding options

Major road works

Code: 3

Major road works are when the road is being significantly changed and the attribute cannot be coded accurately. Star ratings will not be generated for these segments.

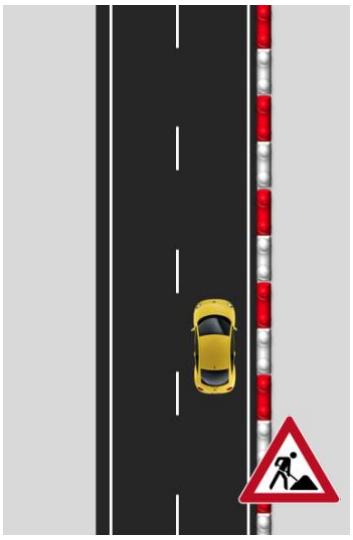


Minor road works

Code: 2

Minor road works are when all the attributes can be coded accurately even though there are road works.

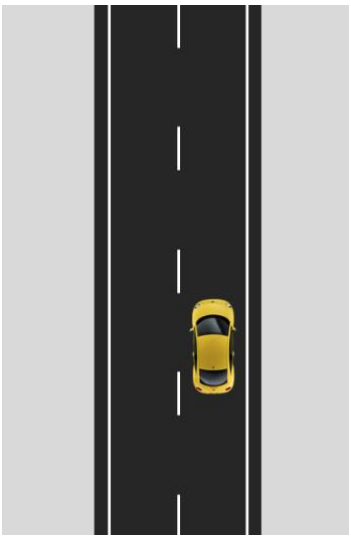
Road works and temporary traffic management may affect the speed of passing traffic.



No road works

Code: 1

No construction or road works in progress.



Sight distance

Attribute column 62/BJ, Input: Code

Record the ability of a driver to see and/or anticipate road conditions and other road users ahead.

This includes seeing pedestrians or bicyclists on the roadway or about to cross the road ahead, or other vehicles at an intersection. Horizontal and vertical alignment or physical obstructions such as roadside objects and vegetation may reduce sight distance.

As a general guide, sight distance is considered poor if it is:

- Less than 50m for speeds of 70km/h or less, or
- Less than 80m for speeds above 70km/h.

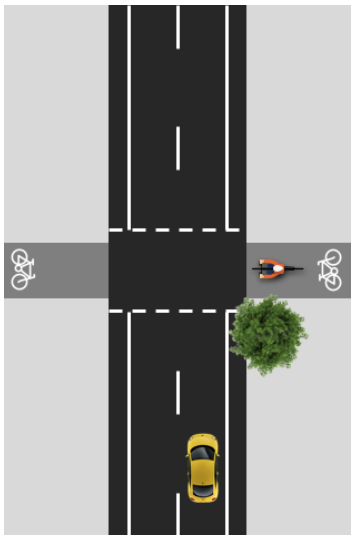
Sight distance requirements are typically defined in local design standards and relate to the speed at the location and the specific sight distance requirements (e.g. stopping, overtaking and intersection related). For all design applications, local standards should be adhered to.

Coding options

Poor

Code: 2

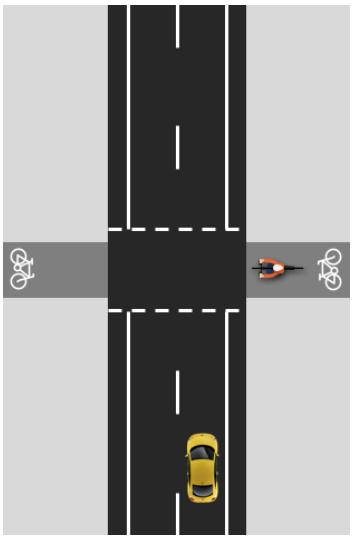
Sight distance is limited or restricted.



Adequate

Code: 1

Sight distance is not limited or restricted.



Delineation

Attribute column 48/AV, Input: Code

Record the adequacy of road lines and markings.

Delineation should inform drivers of road conditions to keep them within the driven lane, aware of road and intersection conditions in advance and in location and provide clear visible indications of the presence and path of motorcyclists and bicyclists where appropriate.

The delineation is based on a combination of the following factors:

- Centre lines, lane markers and edge lines
- Guideposts and delineators, road studs and hazard markers
- Signage (on road and posted)

Warning signs must be present to warn drivers of any sudden change in the road conditions, such as lane narrowing.

CITY For urban road assessments, curbs and channelization may be considered in place of edge lines where vehicle parking, paved shoulder or on road bicycle or motorcycle lanes are not present.

NIGHT Delineation, particularly the presence and quality of reflective signs and markers, is important for safety at night.

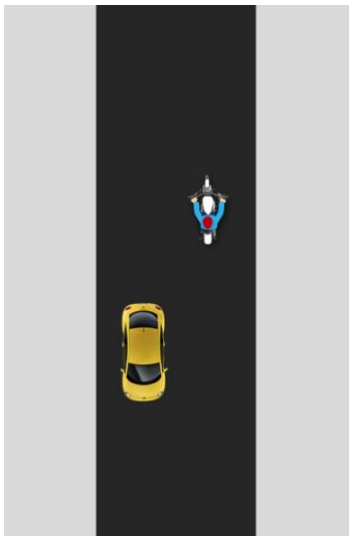
CODES ‘Poor’ or ‘adequate’ delineation should be consistent with that recorded as part of quality of curve, intersections and pedestrian crossings.

Coding options

LINES Poor

Code: 2

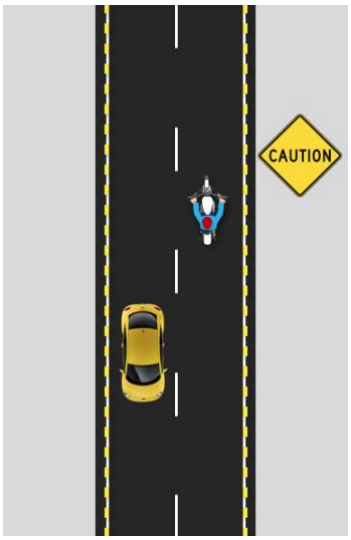
Signing of hazards, or centre and edge markings are generally absent or in poor condition.



LINES Adequate

Code: 1

Signs warning of severe hazards, and centre and edge markings are generally present and visible.



Street lighting

Attribute column 49/AW, Input: Code

Record the presence of street lighting.

A street light or street lamp is a raised source of light often mounted on a lamp column or pole either on the side of the road or within the median or suspended on a wire above the road to provide illumination.

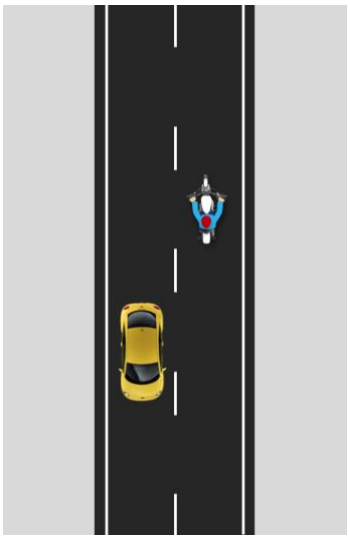
Street lighting should be sufficient enough to provide illumination of and for pedestrians and bicyclists.

Coding options

Not Present

Code: 1

Street lighting is not present or is insufficient.



Present

Code: 2

Street light is present that is sufficient to illuminate pedestrians and bicyclists.

Service road

Attribute column 58/BF, Input: Code

Record the presence of a service road running parallel with the main carriageway.

If the carriageway being coded is the service road, record the service road as being ‘Not present’.

The purpose of a service road is to link the property accesses and minor intersections together and then join them to the main carriageway at a single point.

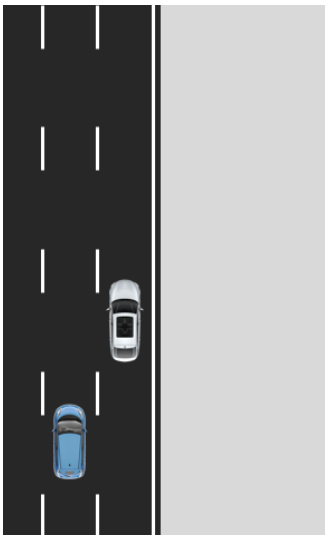
For undivided roads, record service roads which appear on either one side or both sides of the road.

Coding Options

Not present

Code: 1

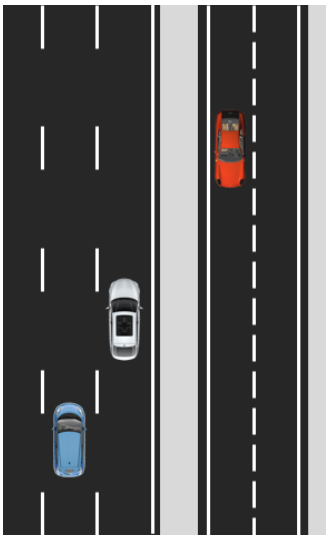
Service road is not present (or carriageway being coded is the service road).



Present

Code: 2

Service road is present.



Centre line rumble strips

Attribute column 28/AB, Input: Code

Record any textured markings running along the centre of a road which function to warn drivers crossing the median.

Only record centre line rumble strips where they are present for the whole coding segment.

Do not record shoulder rumble strips here.

Centre line rumble strips are also known as raised profile markings. This feature provides an audio-vibratory warning to the driver. They may be a solid line or placed intermittently (similar to a dashed line).

Rumble strips may be either grooves cut into the pavement surface or raised ribs added to the road marking. Raised markers that are spaced between 10-20 cm and serve a similar purpose may also be recorded.

CODES

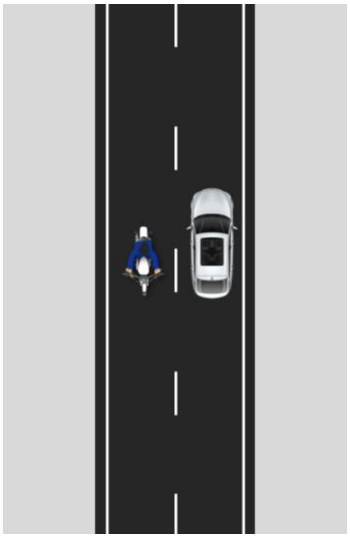
Centre line rumble strips should only be recorded where delineation is present.

Coding options

Not Present

Code: 1

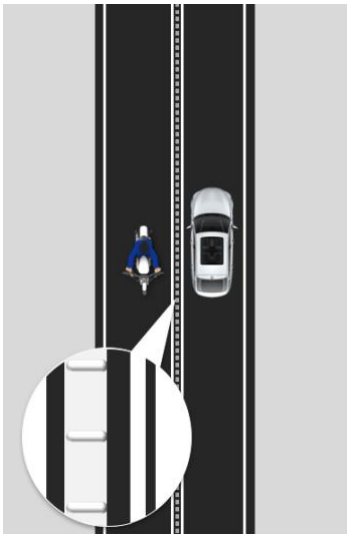
Rumble strip is not present in the centre of the road.



Present

Code: 2

Rumble strip is present in the centre of the road.



3.5 Roadside attributes

Roadside severity – distance and object

Attribute columns 29-31/AC-AE, Input: Code

Record the roadside object which has the highest risk.

To work out which roadside object is of the highest risk, refer to Roadside hazards – listed from highest to lowest risk below.

Code each side of the road separately.

Record the distance from the edge line of the nearest driving lane to the hazardous roadside object. If no edge line is present, record the distance from pavement edge.

When there is no object present on the roadside, record the distance as ≥10m.

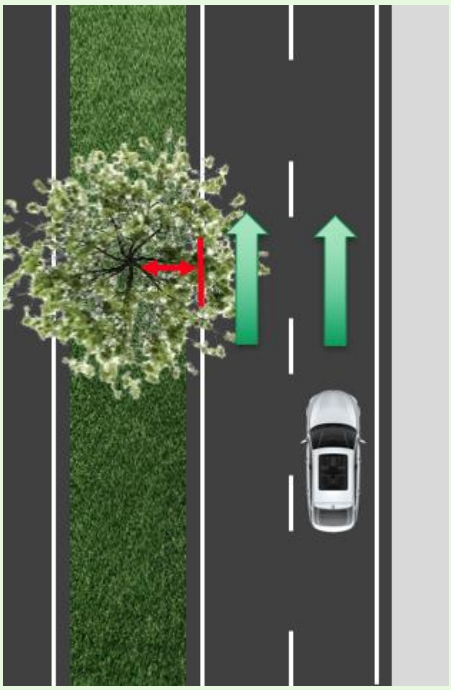
Driver-side object and distance on divided and undivided roads

For a divided carriageway, the 'driver-side object' is a hazardous object present in the median. Record the distance from the edge line on the driver's side of the carriageway to the object in the median.

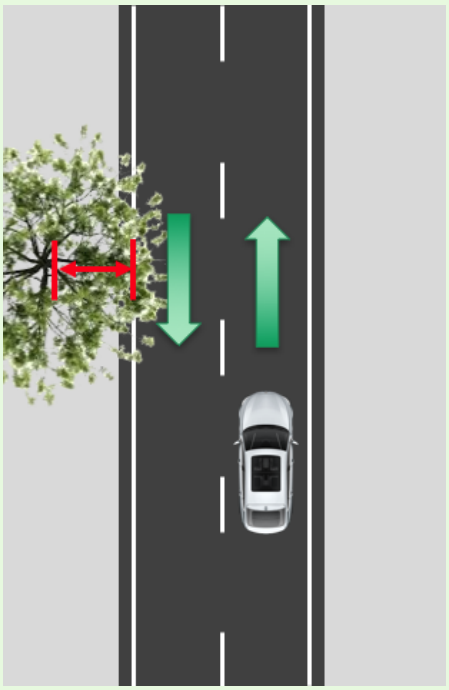
If there is no object in the median, code the most hazardous object on the other side of the adjacent carriageway. If this is not clear in the survey footage, code it as No object ≥10m.

For an undivided carriageway, 'driver-side object' is a hazardous object on the other side of the road. Record the distance from the edge line on the other side of the road to the object.

Driver-side distance and object
Divided carriageway



Driver-side distance and object
Undivided carriageway



How do I know which roadside object is the highest risk?

There may be more than one type of roadside object present on a section of road. The risk a roadside object poses to a road user varies depending on how far it is located from the road.

The list below shows the relative risk of roadside object and distance combinations. If presented with two or more roadside objects, record the first object (and its distance) that appears in this list.

Safety barriers may be coded first only if they provide adequate protection from a roadside hazard and no other hazard is present (such as a pole in front of the barrier or an unprotected barrier end).

Roadside hazards – listed from highest (#1) to lowest risk (#62)

#	Distance	Roadside object
1	Any	Cliff
2	0 to <1m	Tree ≥10cm
3	0 to <1m	Rigid sign, post or pole ≥10cm
4	0 to <1m	Rigid structure or building
5	0 to <1m	Unprotected safety barrier end
6	0 to <1m	Low rigid object ≥20cm high
7	0 to <1m	Aggressive vertical face
8	0 to <1m	Deep drainage ditch
9	1 to <5m	Tree ≥10cm
10	1 to <5m	Rigid sign, post or pole ≥10cm
11	1 to <5m	Rigid structure or building
12	1 to <5m	Unprotected safety barrier end
13	1 to <5m	Low rigid object ≥20cm high
14	0 to <1m	Upwards slope – roll over
15	0 to <1m	Downwards slope
16	1 to <5m	Aggressive vertical face
17	1 to <5m	Deep drainage ditch
18	0 to <1m	Upwards slope – no roll over
19	1 to <5m	Upwards slope – roll over
20	1 to <5m	Downwards slope
21	1 to <5m	Upwards slope – no roll over
22	0 to <1m	Semi-rigid structure or building
23	1 to <5m	Semi-rigid structure or building
24	5 to <10m	Tree ≥10cm
25	5 to <10m	Rigid sign, post or pole ≥10cm
26	5 to <10m	Rigid structure or building
27	5 to <10m	Unprotected safety barrier end
28	5 to <10m	Low rigid object ≥20cm high
29	5 to <10m	Aggressive vertical face
30	5 to <10m	Upwards slope – roll over
31	5 to <10m	Deep drainage ditch
32	5 to <10m	Downwards slope
33	0 to <1m	Safety barrier – concrete
34	5 to <10m	Upwards slope – no roll over
35	0 to <1m	Safety barrier – metal
36	0 to <1m	Safety barrier – motorcycle friendly
37	1 to <5m	Safety barrier – concrete
38	5 to <10m	Semi-rigid structure or building
39	1 to <5m	Safety barrier – metal
40	1 to <5m	Safety barrier – motorcycle friendly
41	0 to <1m	Safety barrier – wire rope
42	1 to <5m	Safety barrier – wire rope
43	≥10m	Tree ≥10cm
44	≥10m	Rigid sign, post or pole ≥10cm
45	≥10m	Rigid structure or building
46	≥10m	Unprotected safety barrier end
47	≥10m	Low rigid object ≥20cm high
48	≥10m	Aggressive vertical face
49	≥10m	Deep drainage ditch
50	5 to <10m	Safety barrier – concrete
51	≥10m	Upwards slope – roll over
52	≥10m	Downwards slope
53	5 to <10m	Safety barrier – metal
54	5 to <10m	Safety barrier – motorcycle friendly
55	≥10m	Upwards slope – no roll over
56	≥10m	No object
57	5 to <10m	Safety barrier – wire rope
58	≥10m	Semi-rigid structure or building
59	≥10m	Safety barrier – concrete
60	≥10m	Safety barrier – metal
61	≥10m	Safety barrier – motorcycle friendly
62	≥10m	Safety barrier – wire rope

How do I code non-standard barriers?

Roadside barriers which do not meet international standards or are damaged present a safety risk to road users and must be coded correctly. These barriers may be of insufficient height, have an irregular or aggressive surface or are spaced at intervals.

For more information on how to identify non-standard barriers, see 'Median type'.

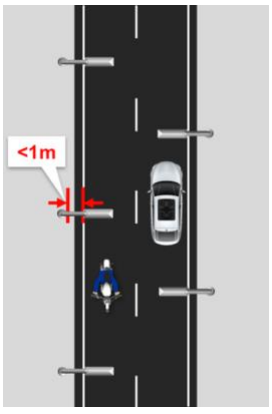
The following codes may be used:

Non-standard barrier characteristic	Recommended attribute code
Concrete curb ≥20cm or low barrier less than 67cm high	Low rigid object ≥20cm high
Concrete blocks spaced at intervals	Unprotected safety barrier end/Aggressive vertical face (if closely spaced)
Damaged safety barrier	Unprotected safety barrier end/ Aggressive vertical face
Concrete or brick wall	Rigid structure or building
Large posts >10cm in diameter	Rigid sign, post or pole ≥10cm
Steel fence (fixed)	Semi-rigid structure or building
Narrow non-flexible posts (<10cm diameter) or a continuous fence or traffic divider not fixed to roadway	Semi-rigid structure or building

Coding options (Roadside severity – distance)

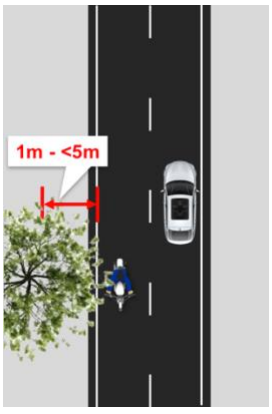
0-1 0m to <1m
Code: 1

Objects with effective distance of 0m to less than 1m from the edge line.



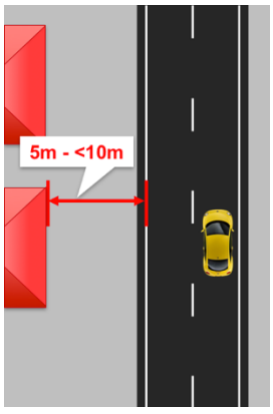
1-5 1m to <5m
Code: 2

Object with effective distance of 1m to less than 5m from the edge line.



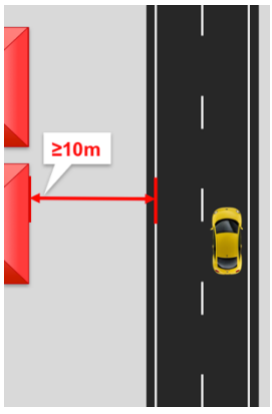
5-10 5 to <10m
Code: 3

Object with effective distance of 5m to less than 10m from the edge line.



10+ ≥10m
Code: 4

Object with effective distance equal or greater than 10m.



Coding options (Roadside severity – object)

Cliff

Code: 10

Cliff or equivalent hazard, such as the edge of a high bridge, that will result in certain fatality regardless of speed.

Tree ≥10cm

Code: 11

Tree trunk greater than 10cm in diameter.

Rigid sign, post or pole ≥10cm

Code: 12

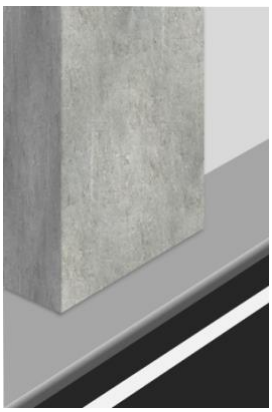
Examples are lighting columns, metal or wood sign posts greater than 10cm diameter, rigid traffic signal posts greater than 10cm diameter or fence or other posts greater than 10cm diameter.

Rigid structure or building

Code: 13

Solid structures that will cause a rapid deceleration when hit.

Examples are reinforced concrete bridge supports, culvert headwalls, retaining walls or stone and concrete buildings.



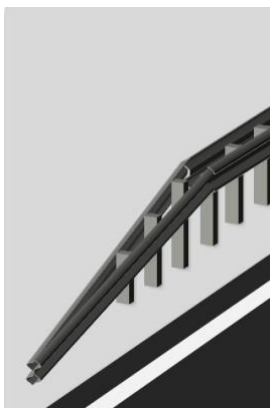
Unprotected safety barrier end

Code: 15

Aggressive ends to safety barriers.

Examples are ramped ends, unprotected ends, sharp ends or fish-tail terminals.

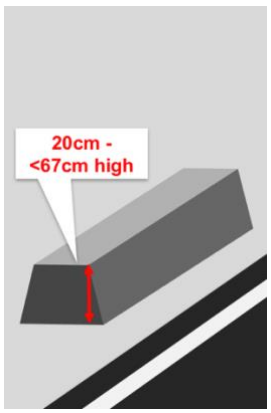
This category should also be used to record damaged sections of safety barrier.



Low rigid object ≥20cm high

Code: 16

Low rigid objects which are higher than a standard curb and may cause a vehicle to rollover if hit. Includes objects such as large rock or boulders, non-standard curbs (≥20cm high) or low barriers and walls (less than 67cm high).



Aggressive vertical face

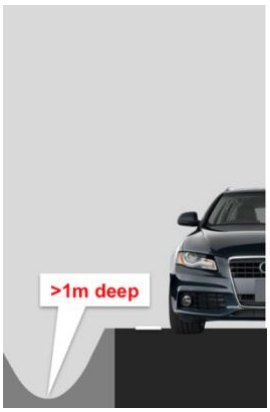
Code: 5

Irregular rock face, wall or non-standard barrier.

Deep drainage ditch

Code: 8

Ditch or culvert more than 1m deep.



Upwards slope – rollover

Code: 6

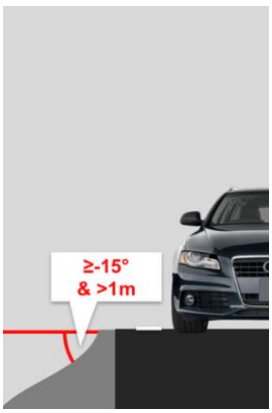
Cut face of at least 2m height that is likely to cause a vehicle to roll over (15° to 75°), such as earth bound banks or grass banks.

If an upwards slope has an irregular rock faces, code it as an 'aggressive vertical face'.

Downwards slope

Code: 9

Downwards slope from the roadway with an angle ratio greater than a 1:4 (equivalent to 25% gradient and 15°) and a drop of >1m.



Upwards slope – no rollover

Code: 7

Cut face of at least 2m height at a gradient of 75° or above, which a vehicle is likely to slide along when struck.

Irregular rock faces should not be recorded.

Semi-rigid structure or building

Code: 14

Solid structures that will likely deform slightly when hit.

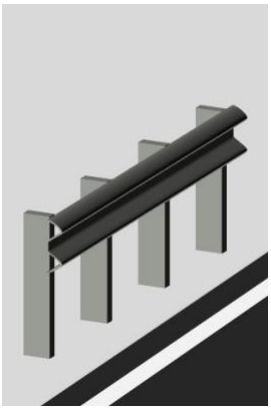
Examples include houses and other similar buildings, street furniture such as bus shelters, communications cabinets or stone, masonry or brick boundary walls or fences.

Safety barrier – metal

Code: 1

Metal safety barrier sufficient to restrain most cars and small vehicles (not wire rope safety barrier).

Should be a continuous length of unbroken, undamaged safety barrier.

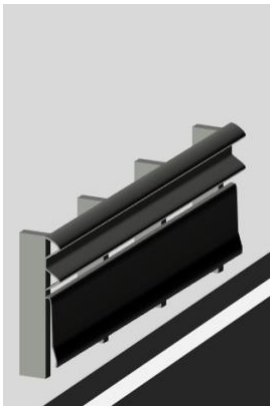


Safety barrier – motorcycle friendly

Code: 3

Safety barrier designed specifically to restrain motorcycles. Should be a continuous length of unbroken, undamaged safety barrier.

Motorcycle friendly barriers will have some form of protection for the supporting posts or legs to minimise risk of injury to the rider.

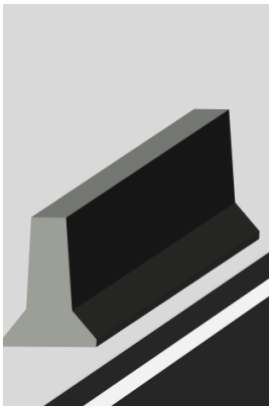


Safety barrier – concrete

Code: 2

Concrete safety barrier sufficient to restrain most cars and small vehicles.

Should be a continuous length of unbroken, undamaged safety barrier.

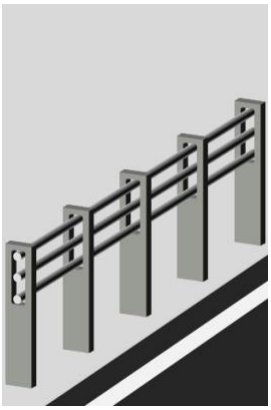


Safety barrier – wire rope

Code: 4

Wire rope safety barrier sufficient to restrain most cars and small vehicles.

Should be a continuous length of unbroken, undamaged safety barrier.



No object

Code: 17

No object within 20m of the road.

Shoulder rumble strips

Attribute column 33/AG, Input: Code

Record any textured markings running along a road which function to warn drivers leaving the lane on the passenger-side of the roadway.

Shoulder rumble strips are also known as raised profile markings. This feature provides an audio-vibratory warning to the driver.

Shoulder rumble strips will only be found on paved shoulders and should be a continuous, unbroken line.

Rumble strips may be either grooves cut into the pavement surface or raised ribs added to the road marking. Raised markers that are spaced between 10-20 cm and serve a similar purpose may also be recorded.

Do not record centre line rumble strips here.

Shoulder rumble strips are also known as raised profile markings. This feature provides an audio-vibratory warning to the driver. They may be a solid line or placed intermittently (similar to a dashed line).

Rumble strips may be either grooves cut into the pavement surface or raised ribs added to the road marking. Raised markers that are spaced between 10-20 cm and serve a similar purpose may also be recorded.

CODES

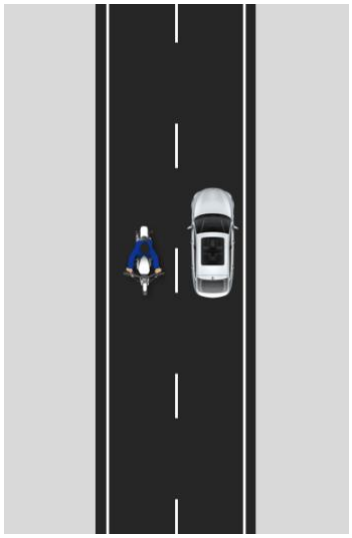
Shoulder rumble strips should only be recorded where delineation is present.

Coding options

Not Present

Code: 1

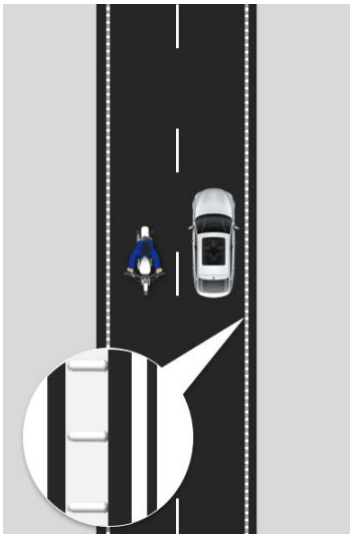
No shoulder rumble strip present.



Present

Code: 2

Shoulder rumble strip present.



Paved shoulder

Attribute columns 34/AH & 35/AI, Input: Code

Record the width of the safe and drivable section of road from the edge line to the edge of the paving.

Code each side of the road separately.

A narrow paved shoulder shall be recorded wherever an edge marking is present even if the edge line is very close to the pavement edge.

If paving begins to break up on a shoulder, the paved shoulder width should be measured up to where the edge break occurs.

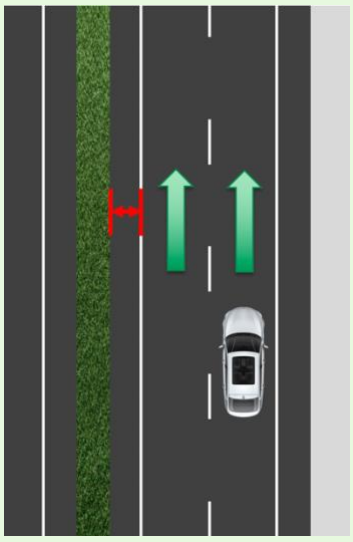
If a road has no markings for a shoulder (no edge line), then no paved shoulder should be recorded, since a vehicle can be considered to be able to travel to the edge of the sealed surface.

Paved shoulder width on divided and undivided roads

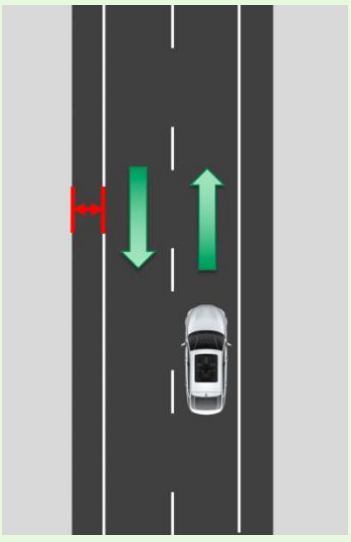
For a divided carriageway, driver-side paved shoulder width is the distance from the edge line to the edge of the median.

For an undivided carriageway, driver-side paved shoulder width is the distance from the edge line to the edge of the paving on the other side of the road.

Driver-side paved shoulder – Divided carriageway



Driver-side paved shoulder – Undivided carriageway

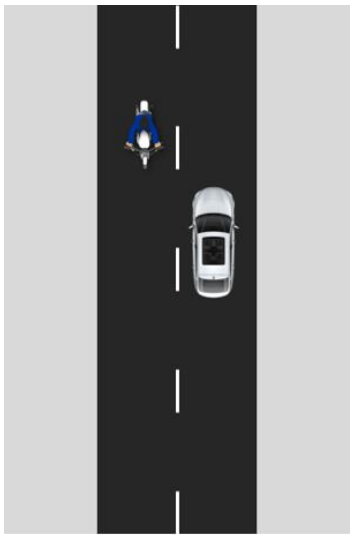


Coding options

None

Code: 4

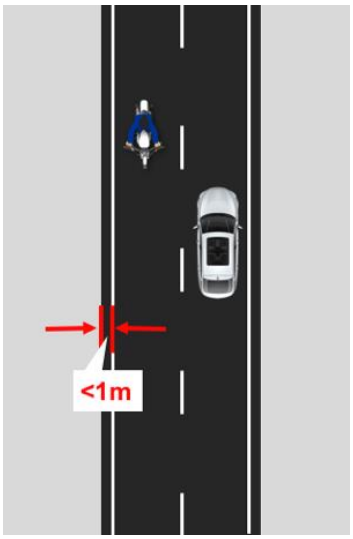
There is no paved shoulder (no edge line present).



Narrow 0m to <1m

Code: 3

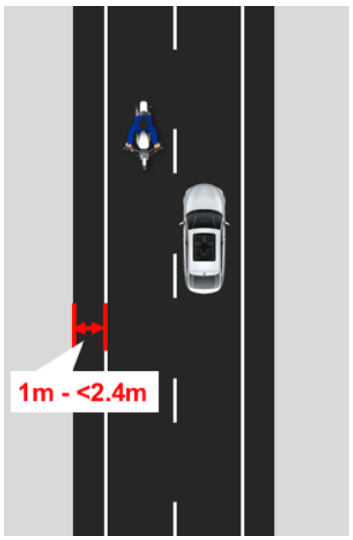
Paved shoulder is 0m to less than 1.0m (edge line is present).



Medium 1m to <2.4m

Code: 2

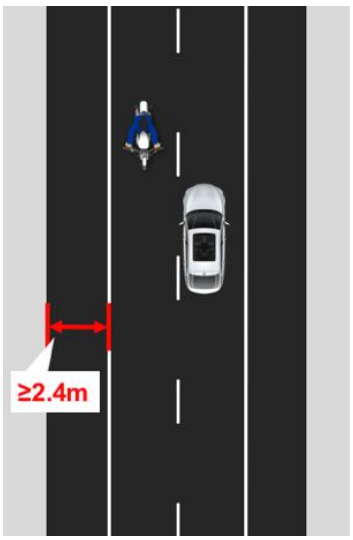
Paved shoulder is 1m to less than 2.4m (edge line is present).



Wide ≥2.4m

Code: 1

Paved shoulder is greater than 2.4m (edge line is present).



3.6 Intersections

For each intersection, a number of attributes are recorded. These attributes are combined to evaluate the risk of the intersection. If no intersection is present in a coding segment, the following coding applies:

Attribute	*Attribute column*	*Option*	*Code*
Intersection type	36/AJ	None	12
Intersection channelization	37/AK	Not present	1
Intersecting road volume	38/AL	Not applicable	7
Intersection quality	39/AM	Not applicable	3

Intersection type

Attribute column 36/AJ, Input: Code

Record the presence and type of intersections.

Intersections should only be recorded once – even if they span two coding segments.

Do not record property access points, unless they are large enough that turning bays or traffic signals are present. For more information on how to code urban laneways, see 'Property access points'.

How do I code very complex intersections?

Intersections, particularly in cities and urban areas, can take many different forms. In reality, intersections may have as many as 6- or 8-legs, and be a combinations of slip lanes, on and off ramps to overpasses, and staged traffic signals.

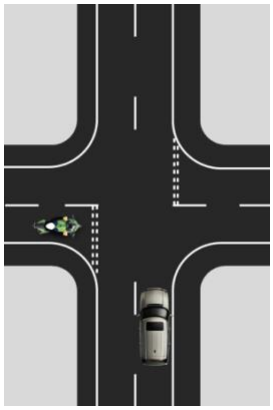
When coding an intersection, consider how many points of potential conflict exist between traffic flows and the highest risk points. The attribute options below are listed in order of risk from highest to lowest. If unsure between two options, select the one that comes first.

Coding options

4+ leg

Code: 8

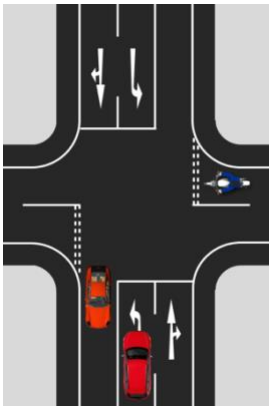
Four or more leg intersection or crossroads with no signals or a protected turn lane (crossing opposing traffic).



4+ leg with protected turn lane

Code: 7

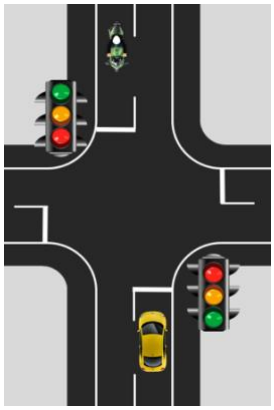
Four or more leg intersection or crossroads with a protected turn lane (crossing opposing traffic) but no signals.



4+ leg signalised

Code: 10

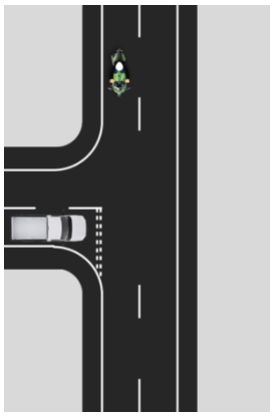
Four or more intersection or crossroads with signals but no protected turn lane (crossing opposing traffic).



3 leg

Code: 4

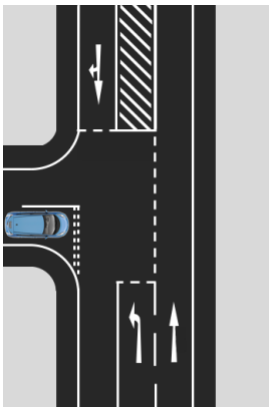
Three leg intersection or T-junction with no protected turn lane (crossing opposing traffic) or signals.



3 leg with protected turn lane

Code: 3

Three leg intersection or T-junction with a protected turn lane (crossing opposing traffic) but no signals.



Mini roundabout

Code: 17

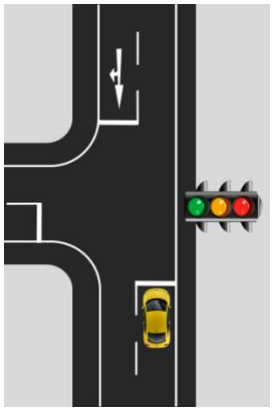
Small roundabout with a radius of less than 4m typically found in low speed urban areas.

Mini-roundabouts have a central circular island that is flush with the road surface (or slightly raised) and are commonly constructed using a white road marking or other coloured surface.

3 leg signalised

Code: 6

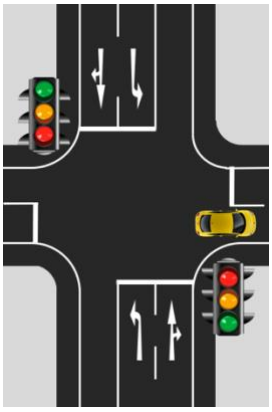
Three leg intersection with signals but no protected turn lane (crossing opposing traffic).



4+ leg signalised with protected turn lane

Code: 9

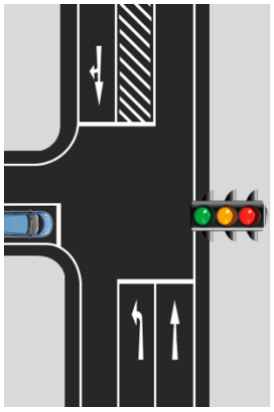
Four or more leg intersection or crossroads with a protected turn lane (crossing opposing traffic) and signals.



3 leg signalised with protected turn lane

Code: 5

Three leg intersection or T-junction with a protected turn lane (crossing opposing traffic) and signals.



Roundabout

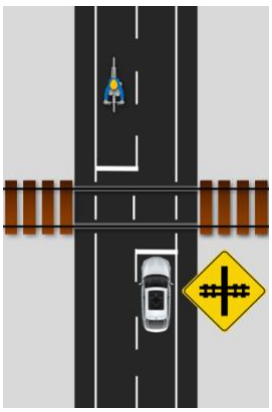
Code: 2

Circular intersection that flows in a single direction about a central island of 4m radius or more.

Railway Crossing – passive

Code: 13

An at-grade railway crossing with give way or stop signage only (or no signage).



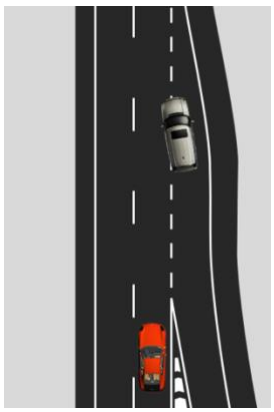
Merge Lane

Code: 1

Merge lane for traffic entering the road. Merge lanes typically occur at grade separated intersections.

Do not code filter lanes (intersection channelization) or exit (diverge) lanes where vehicles are exiting the road.

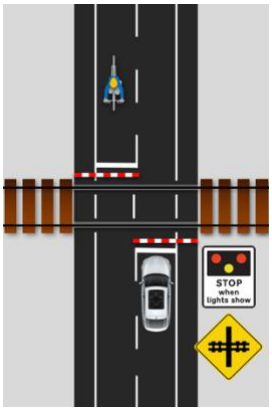
Only record the merge lane once – even if it spans two coding segments.



Railway Crossing – active

Code: 14

An at-grade railway crossing with a physical device to warn of an approaching train (flashing lights and/or boom gates).

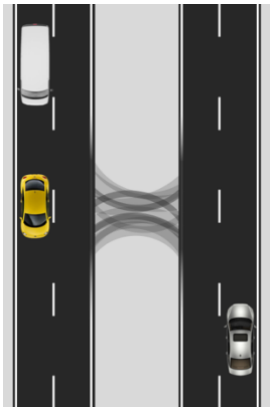


Median crossing point – informal

Code: 15

An informal U-turn location without acceleration or deceleration lanes and/or with poor condition pavement surface.

These median crossings have not been formally designed but rather developed informally overtime through regular local use.

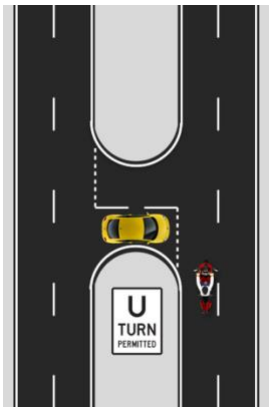


Median crossing point – formal

Code: 16

A formal (designed) U-turn location.

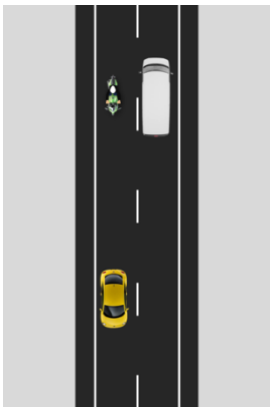
Appropriate acceleration and deceleration lanes may or may not be present. Record this detail plus condition of median pavement surface under ‘intersection quality’.



None

Code: 12

No intersection present.



Intersection quality

Attribute column 39/AM, Input: Code

Record the quality of the intersection design, advance warning, signing, and markings.

Intersection quality is an indication of how well a driver can anticipate intersection conditions and prepare accordingly. Factors that contribute to 'poor' intersection quality may include:

- Very short merge lanes
- Poor deflection angles at roundabouts (where the approach means roundabout can be entered at high speeds)
- Lack of advance signing and marking on an intersection approach where the intersection is not clearly visible to approaching drivers (i.e. where approach sight distance is limited)
- Lack of facilities for motorcycles, pedestrians and bicycles.

CODES

Where delineation, sight distance or lack of facilities for motorcyclists, pedestrians or bicyclists contributes to the poor quality of an intersection, code each of these attributes accordingly.

As a general guide, sight distance is considered poor if it is:

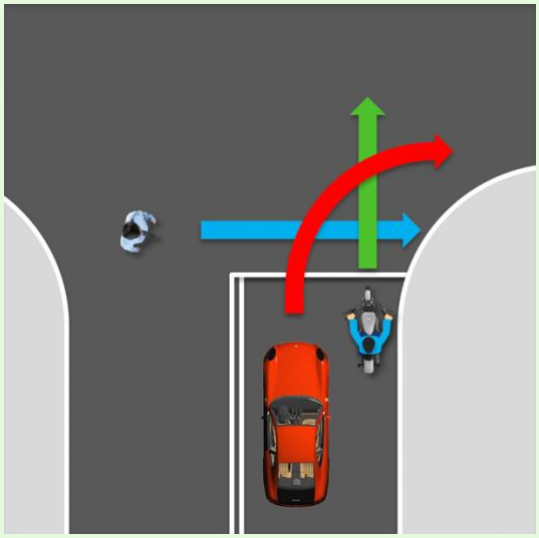
- Less than 50m for speeds of 70km/h or less, or
- Less than 80m for speeds above 70km/h.

CITY

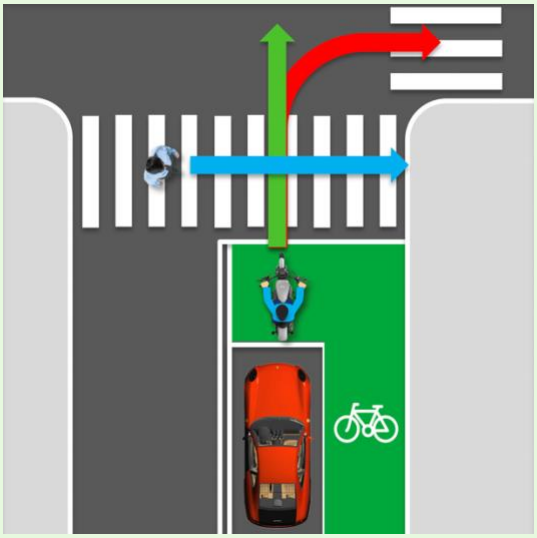
Coding intersection quality in cities and urban areas

Intersection quality is factored into motorcycle, pedestrian and bicycle Star Ratings. For an intersection to be considered adequate, vehicle drivers must also be able to anticipate the presence and movements of other road user groups and vice versa. The examples below demonstrate the difference between a 'poor quality' intersection and an intersection of 'adequate quality' where on-road markings improve visibility and turning movements for motorcycles and bicycles.

Example 1: Poor urban intersection quality



Example 2: Adequate urban intersection quality (in direction of travel)



Coding options

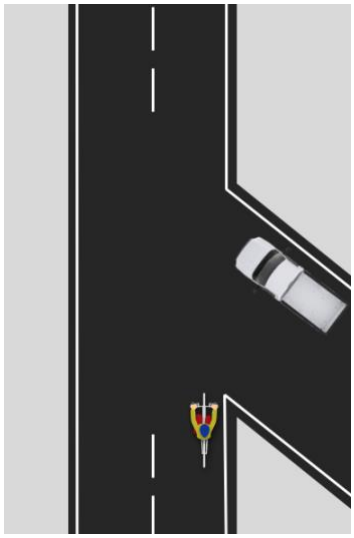
Poor

Code: 2

Intersection design is poor.

Necessary signs and markings are absent, sight distance is limited or obstructed, and/or roads and conflicting traffic flows do not intersect at right angles.

Has inadequate facilities for motorcyclists, pedestrians and bicyclists.



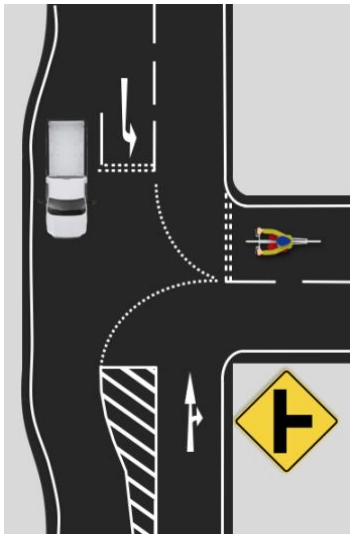
Adequate

Code: 1

Intersection design is adequate.

Necessary signing and markings are present.

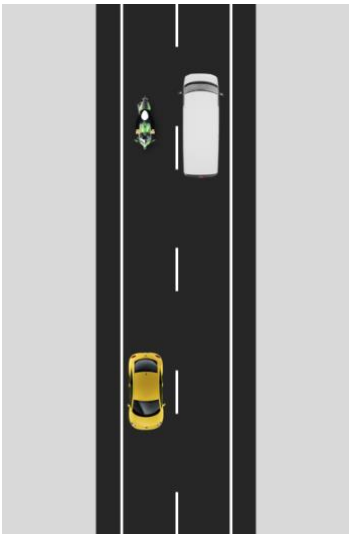
Has adequate facilities for motorcyclists, pedestrians and bicyclists.



Not applicable

Code: 3

No intersection present.



Intersection channelization

Attribute column 37, Input: Code

Record if there are raised islands or coloured hatching present at an intersection that designate intended vehicle paths.

Do not code informal channelization, for example, where vehicles regularly cut a corner or there is more than one entry to a side road.

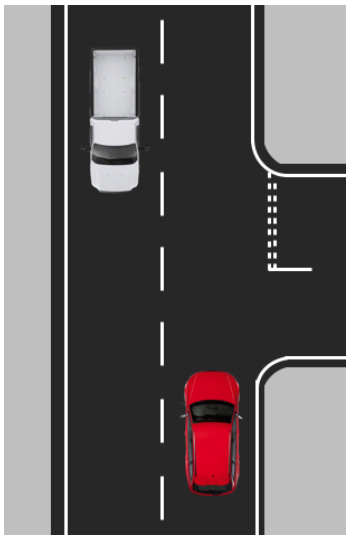
Channelization is the separation or regulation of conflicting traffic movements into defined paths of travel. Traffic islands or pavement markings are used to facilitate the safe and orderly movements of both vehicles and pedestrians. Channelization is primarily used to separate turning movements from through movements.

Coding options

Not present

Code: 1

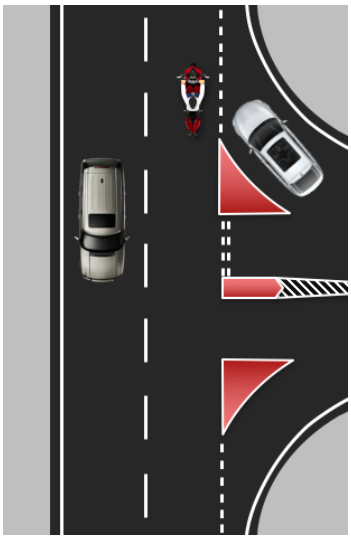
No channelization present at an intersection.



Present

Code: 2

Channelization present with either raised or coloured islands that designate the intended vehicle path.



Property access points

Attribute column 40/AN, Input: Code

Record the number of commercial and residential driveways and minor access lanes.

This includes any points where vehicles can enter or exit the roadway other than public roads. This may include entries to large carparks, parkland, rest areas and laneways.

Do not record a property access point which is large enough that turning bays or traffic signals are present. In this case, it should be coded as an intersection under Section 6: Intersections.

Do not record temporary entries, such as for construction, or controlled entries where gates are present.

How do I code urban laneways?

Some cities have extra large city blocks that feature extensive laneway networks, which provide access to local residences and businesses.

Entries to these laneways may be considered a property access point or an intersecting street, depending on a number of characteristics. The table below gives a general guide on when a laneway is a property access point and when it is considered an intersecting road. Characteristics are listed in priority order.

Laneway characteristic	Record as an intersecting road	Record as a property access point
Intersection with surveyed road	If the intersection has regular features, such as turning bays or traffic signals, or intersecting traffic has access to both directions of travel.	No intersection features; access to side road only or only one direction of travel.
Access	Laneway provides through access, serves as a trunk route for other laneways, or provides access to a large area of residential and commercial development.	Laneway provides limited access to residential and commercial establishments.
Size	Two cars can pass or traffic is more than 100 vehicles per day.	Two cars would be unable to pass or traffic is less than 100 vehicles per day.

Coding options

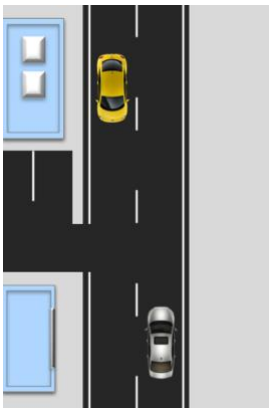
Commercial Access 1+

Code: 1

One or more commercial access points within the coding segment.

Includes service stations, shops and roadside cafes, small carparks and rest stops.

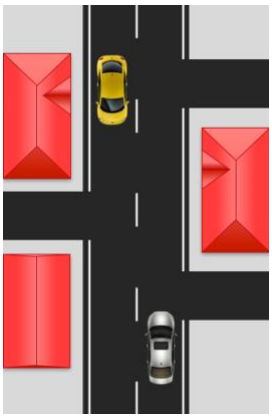
May also include entrances to industrial sites such as quarries or mining sites.



Residential Access 3+

Code: 2

Three or more residential access points or an access point that serves three or more residential properties.

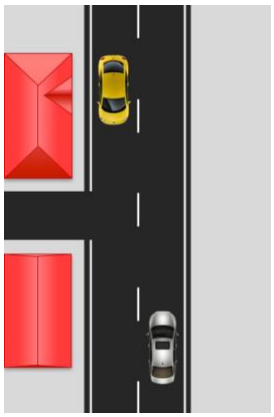


Residential Access 1 to 2

Code: 3

Less than three residential access points or an access point that serves three or less residential properties.

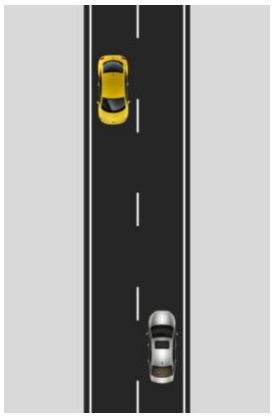
May also include minor farm accesses and other minor tracks used by motor vehicles to gain occasional access to the main carriageway.



None

Code: 4

No residential or commercial access points.



Intersecting road volume

Attribute column 38/AL, Input: Number

Record an estimate of the AADT of the intersecting road.

Where volume data or local knowledge is not available, estimates of the intersecting road volume can be made using aerial photo maps (within the inspection system software or software like Google Earth). The estimate should consider what towns, villages, or cities the intersecting road connects to, and development along the intersecting road.

For railway crossings an estimate of the number of trains running through the crossing per day is required.

Annual average daily traffic, abbreviated AADT, is a measure used primarily in transportation planning and transportation engineering. Traditionally, it is the total volume of vehicle traffic of a highway or road for a year divided by 365 days.

Coding options

≥15,000 vehicles

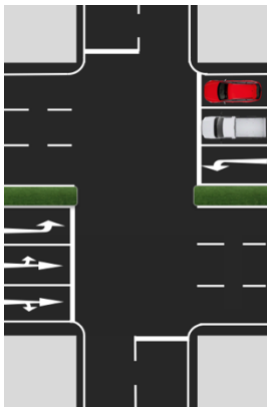
Code: 1

Over 15,000 vehicles per day (vpd).

Where volume data or local knowledge is not available, assume over 15,000 vpd where the intersecting road is:

Divided with three or more lanes provided for side road traffic in each direction; or

Multi-lane merge lanes associated with grade separated intersections.

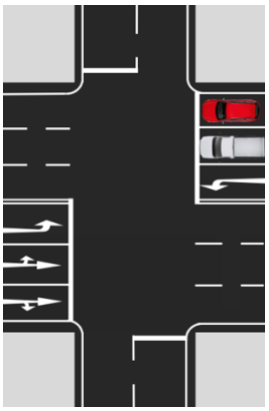


10,000 to 15,000 vehicles

Code: 2

10,000 to 15,000 vehicles per day (vpd).

Where volume data or local knowledge is not available, assume 10,000 to 15,000 vpd where the intersecting road is undivided with three or more lanes provided for side road traffic in each direction, or single lane merge lanes associated with grade separated intersections.

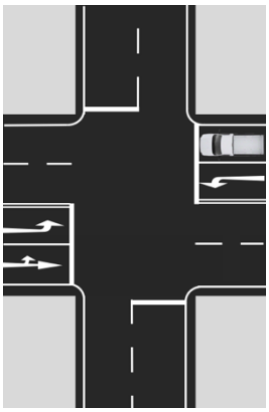


5,000 to 10,000 vehicles

Code: 3

5,000 to 10,000 vehicles per day (vpd).

Where volume data or local knowledge is not available, assume 5,000 to 10,000 vpd where the intersecting road is undivided with two lanes provided for side road traffic in each direction.

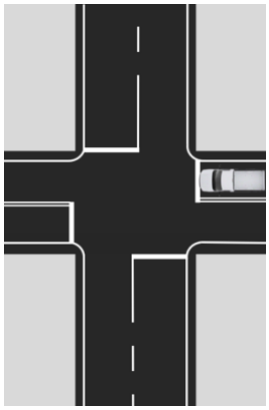


1,000 to 5,000 vehicles

Code: 4

1,000 to 5,000 vehicles per day (vpd).

Where volume data or local knowledge is not available, assume 1,000 to 5,000 vpd where the intersecting road is undivided with one lane provided for side road traffic in each direction.

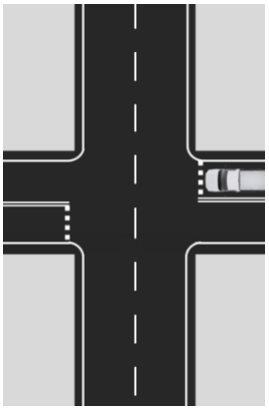


100 to 1,000 vehicles

Code: 5

100 to 1,000 vehicles per day (vpd).

Where volume data or local knowledge is not available, assume 100 to 1,000 vpd where the intersecting road is a single-track (one-lane) undivided road.

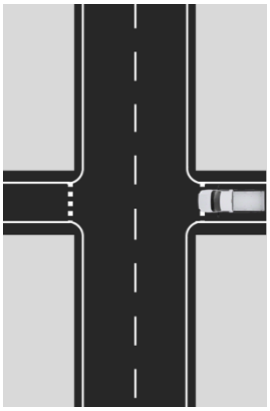


1 to 100 vehicles

Code: 6

Up to 100 vehicles per day (vpd).

Where volume data or local knowledge is not available, assume 1 to 100 vpd where the intersecting road is a single-track (one-lane) undivided, unpaved road. Can also be used for very low flow intersections in remote rural areas.



Not applicable

Code: 7

No intersecting road.

3.7 Vulnerable road user (VRU) facilities and land use

Land use

Attribute columns 20-21/T-U, Input: Code

Record the type of roadside development that is observed on both the driver-side and passenger-side of the road.

Only record land use types if they continue for at least 400m, except where there are clearly identifiable shorter lengths of high intensity activity, such as schools, short lengths of village environment, or localised market sites on rural roads.

Any areas of obvious potential high intensity pedestrian activity should be coded as 'commercial' even if commercial activity is not immediately obvious.

If in doubt between two land use categories, select the one that appears first in the list of coding options.

Land use attributes are used to indicate likely roadside pedestrian activity.

Land uses that typically induce pedestrian activity are used to predict whether pedestrian activity is likely to occur along and across the road.

In determining which is the most appropriate land use, it is important to consider the distance and accessibility of the road to the pedestrian-inducing land use.

If a road, such as a motorway overpass, cannot be accessed by pedestrians, code it as 'undeveloped areas'. However, if pedestrians are present or are known to use the overpass, code it according to its surrounding land use.

Coding options

Educational

Code: 6

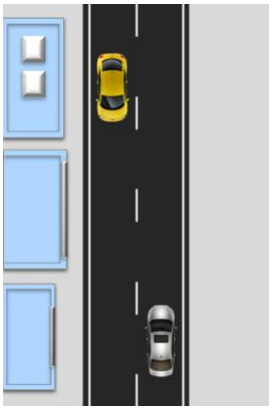
Schools, colleges, universities or other facilities that generate high pedestrian flows, such as hospitals or sporting arenas, are present.

Commercial

Code: 4

Shops or other commercial activity, parks and recreation spaces (such as sporting fields) or areas where high intensity pedestrian activity is evident.

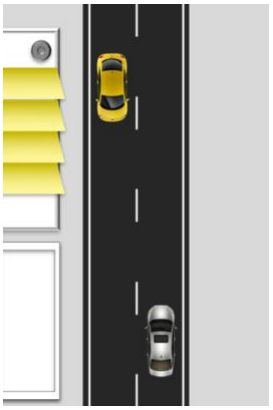
Include all types of shopping precincts.



Industrial and manufacturing

Code: 7

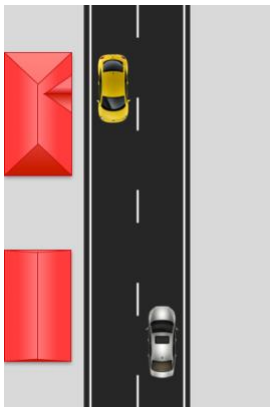
Industrial units, factories and/or manufacturing sites are present.



Residential

Code: 3

Residential housing area is present.

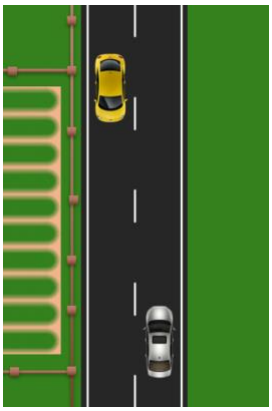


Farming and agricultural

Code: 2

Land used for farming or agricultural activities is present.

Do not include open pasture with very low or no activity around it.

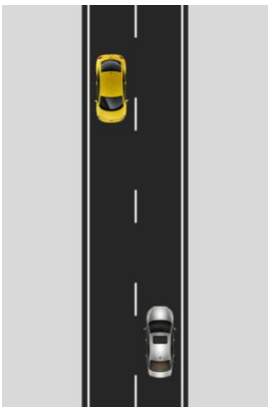


Undeveloped areas

Code: 1

Open land without shops, housing, industry or farming or where there is no land adjacent to the road.

For example, bridges across water, elevated highways (without pedestrian access), overpasses and tunnels.



Area type

Attribute column 22/V, Input: Code

Record the type of area surrounding the road.

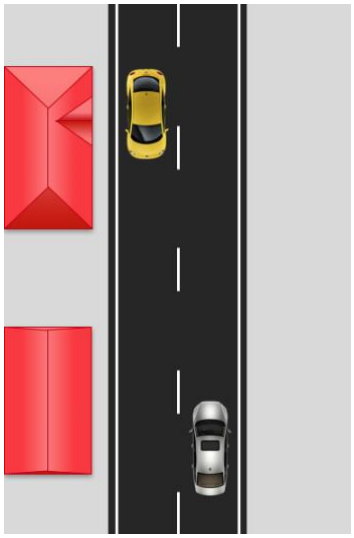
Area type is coded as being either ‘urban’ or ‘rural’ depending on the level surrounding development. Town limit signs may be used as a guide.

Coding options

Urban

Code: 2

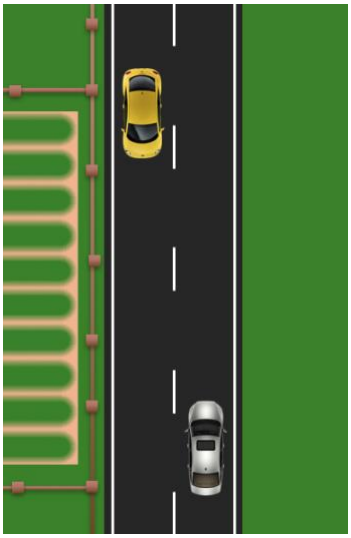
Development spanning at least 400 metres along the road. Small, isolated settlements of less than 400m may be coded as changes to land use where they are sites of high intensity activity, such as schools, short lengths of village environment, or localised market sites.



Rural

Code: 1

Area outside of an urban area or rural town or village, or where roadside development does not impact the road or where it is separated by a large fence or wall.



Pedestrian crossing facilities

Attribute columns 50/AX & 52/AZ, Input: Code

Record the presence of purpose-built pedestrian crossing facilities on the inspected road and on the side (intersecting) road.

Record pedestrian crossing facilities regardless of whether they are at an intersection or not. If located at an intersection, record the facility in the same segment as the intersection – even if it spans two coding segments.

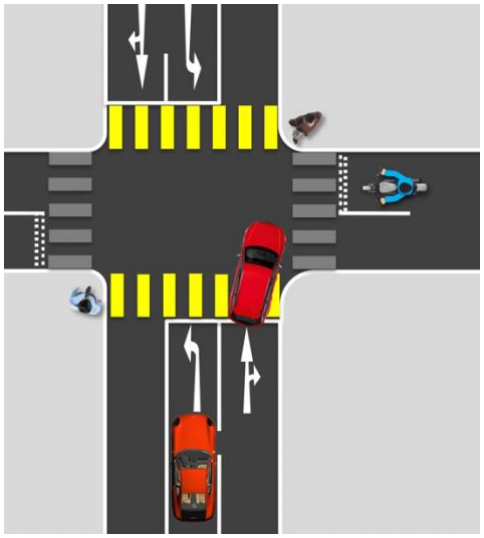
Record pedestrian crossing facilities at intersections on the inspected road and side road as per the examples below. If there are two or more pedestrian crossing facilities at an intersection of the inspected road (or more than one intersection), record the one with highest risk.

Example 1: Pedestrian crossing facility: Inspected road

Attribute column 50/AX

Pedestrian crossing facility – inspected road

Record the one which presents higher risk (or first in the direction of travel if both the same).

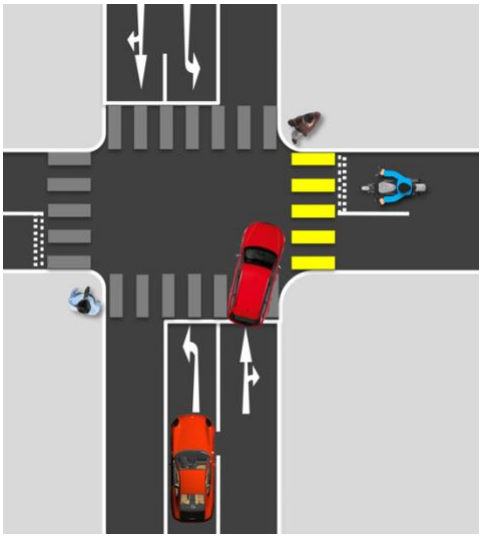


Example 2: Pedestrian crossing facility: Side road

Attribute column 52/AZ

Pedestrian crossing facility – side road

Record the one in the direction of travel.



What if pedestrians do not have right-of-way?

Do not code marked crossings in locations where pedestrians do not have right-of-way. Only record crossing facilities which provide some safety benefit to pedestrians such as:

- Pedestrian-specific signalisation (if adhered to)
- Physical protection by things such as refuge islands, and curb build-outs (narrowed crossing points), or
- Traffic calming measures, such as raised crossings or shared zones (where vehicle speeds are limited to ≤10km/h).

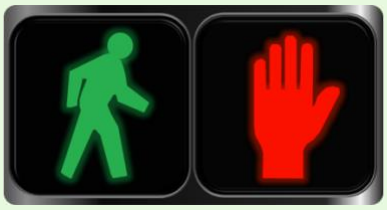
When is a pedestrian crossing signalised?

Signalised pedestrian crossings require pedestrian-specific signals, similar to this example.

Where a pedestrian crossing is at a signalised intersection, the pedestrian crossing is only considered signalised if:

- Pedestrian-specific signals are present, and
- A pedestrian signal phase provides pedestrians effective right-of-way for all or part of the walk signal.

Example of pedestrian-specific signals (designs will vary according to location)



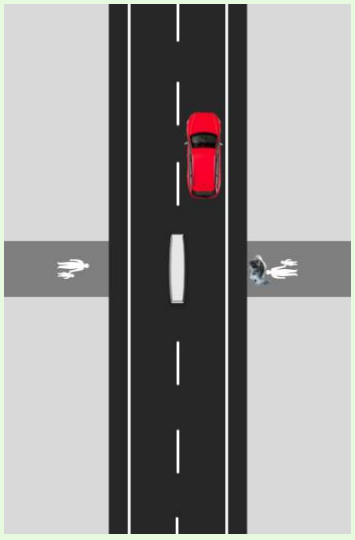
What is a refuge island?

A refuge island must a purpose-built, safe mid-way stopping point for pedestrians. It must provide adequate space and protection from passing vehicles, and be seen by drivers.

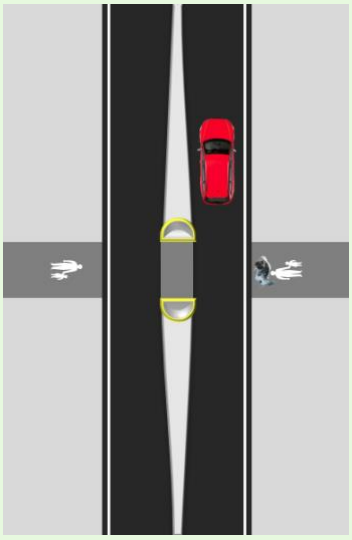
Do not code poorly designed refuge islands of insufficient width or protection, as shown in Example A.

Do not code medians that are used as refuge islands, unless the median refuge has additional protective features such as additional width, signage or railings.

Example A: Poorly designed refuge island (Do not code)



Example B: Median with additional protective features (Code as refuge island)

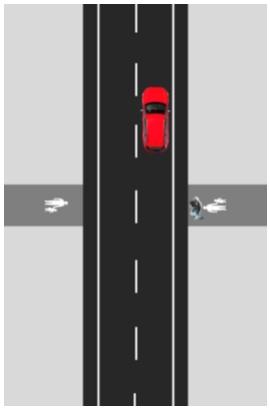


Coding options

No facility

Code: 7

No provision for pedestrians crossing.

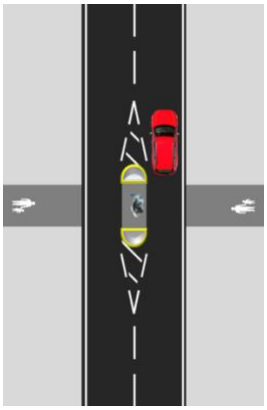


Refuge only

Code: 6

Pedestrian central refuge island is provided.

Do not code poorly designed refuge islands or medians of insufficient width or protection.

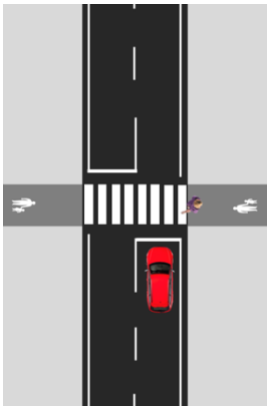


Marked crossing only

Code: 5

Clearly-marked pedestrian crossing without a refuge island.

Not signalised.

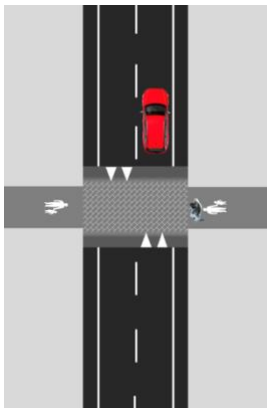


Raised unmarked crossing

Code: 17

Unmarked crossing with a raised (speed reducing) platform without a refuge island.

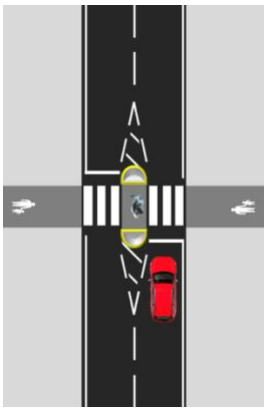
Pedestrians typically give way to cars on this type of crossing.



Marked crossing with refuge

Code: 4

Clearly-marked pedestrian crossing with refuge island.

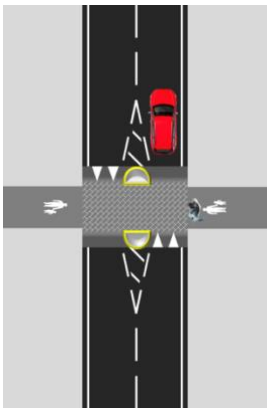


Raised unmarked crossing with refuge

Code: 16

Unmarked crossing with a raised (speed reducing) platform and refuge island.

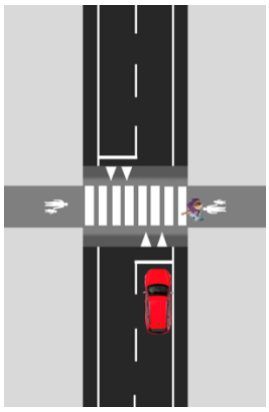
Pedestrians typically give way to cars on this type of crossing.



Raised marked crossing

Code:15

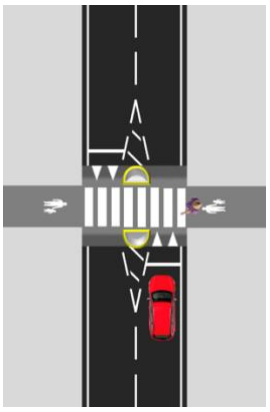
Clearly-marked pedestrian crossing with a raised (speed reducing) platform without a refuge island.



Raised marked crossing with refuge

Code: 14

Clearly-marked pedestrian crossing with a raised (speed reducing) platform and refuge island.

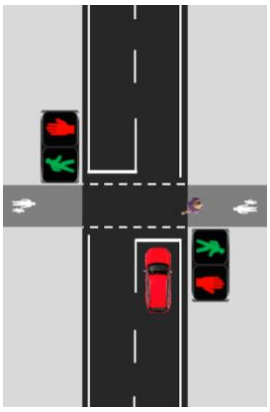


Signalised crossing

Code: 3

Designated pedestrian crossing with traffic signals that control pedestrian and vehicle movements.

Only record a signalised crossing facility where pedestrian-specific signals are present and provide a pedestrian phase.

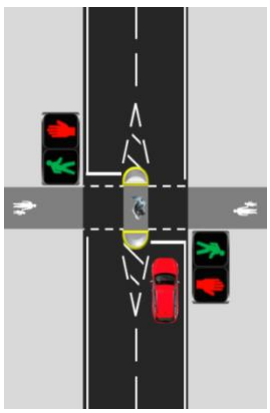


Signalised crossing with refuge

Code: 2

Designated pedestrian crossing with refuge island and traffic signals that control pedestrian and vehicle movements.

Only record a signalised crossing facility where pedestrian-specific signals are present and provide a pedestrian phase.

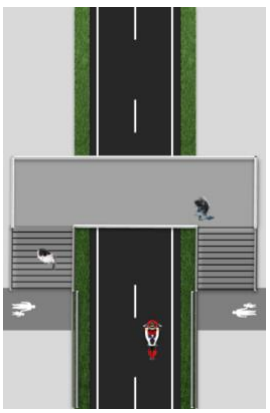


Grade separated facility

Code: 1

A physically separated pedestrian crossing that does not bring pedestrians into conflict with road traffic flows. May include pedestrian overbridges or underpasses (subways).

Do note code grade separated facilities if pedestrians cross at street level.



Pedestrian crossing quality

Attribute column 51/AY, Input: Number

Record effectiveness of the pedestrian crossing on the inspected road or side road.

If two pedestrian crossings are recorded within one coding segment and are of different standard, record the one of lower quality. If quality of side road crossings cannot be ascertained from survey footage, record the quality for crossings on the inspected road only.

How effective a pedestrian crossing facility is depends on local laws, driver behaviour and other conditions.

An effective pedestrian crossing is one where:

- Vehicle drivers are required to stop and give pedestrian right-of-way (and do so)
- The facility is clearly visible and can be anticipated by vehicle drivers, and
- The facility is not obstructed by parked vehicles, street furniture or other items.

A pedestrian crossing is ineffective where, for example:

- Drivers may brake suddenly or fail to see the facility due to the road's curvature, speed, downward gradient, poor sight distance or other factor
- Pedestrians are entering the facility between parked cars and cannot be seen by approaching drivers or
- Green pedestrian signals do not provide right-of-way to pedestrians.

Record pedestrian crossing quality wherever a pedestrian crossing facility is recorded on the inspected road. 'Poor' or 'adequate' pedestrian crossing quality should consider other relevant attributes such as delineation, street lighting, sight distance, and intersection quality (where it is located at an intersection).

The presence and quality of street lighting and reflective signs and markers is important for pedestrian safety at night.

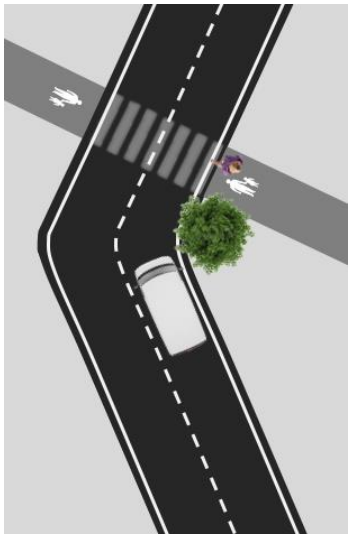
Coding options

Poor

Code: 2

The pedestrian crossing facility is ineffective.

Vehicle drivers do not stop or give pedestrian right-of-way, the facility is not clearly visible or cannot be anticipated by vehicle drivers, and/or the facility is obstructed.

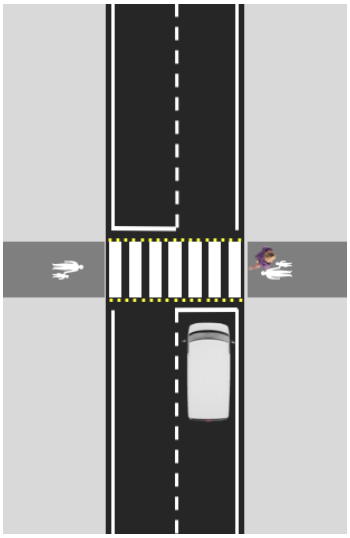


Adequate

Code: 1

The pedestrian crossing is effective.

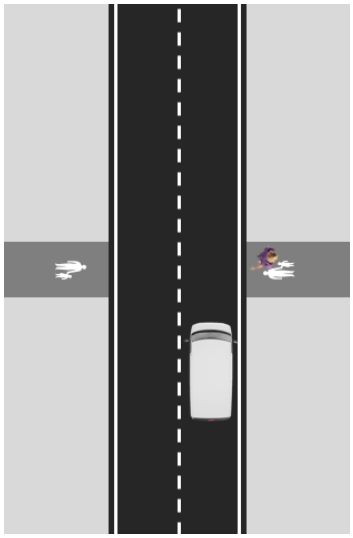
Vehicle drivers stop and give pedestrians right-of-way, the facility is clearly visible and can be anticipated by vehicle drivers, and the facility is not obstructed.



Not applicable

Code: 3

No pedestrian crossing facility is present.



Pedestrian fencing

Attribute columns 53/BA, Input: Code

Record the presence pedestrian fencing or other barriers which effectively control pedestrian crossing flow.

Pedestrian fencing may be in the form of safety barriers, regular fences (non-safety barrier) or other forms of barriers such as shrubs and hedges.

Pedestrian fencing/barriers can be on one or both sides or the middle of a road.

Do not code pedestrian fencing where there is evidence that pedestrians traverse through or over the fence/barrier.

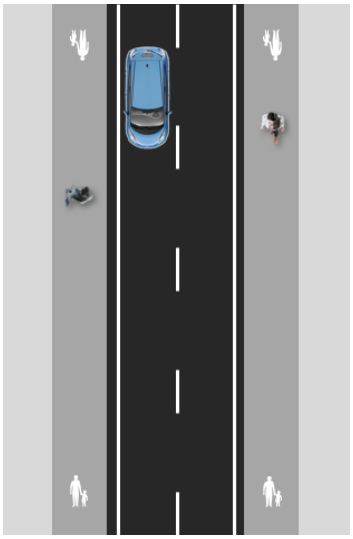
Pedestrian fencing should be present for the whole coding segment except where an at-grade pedestrian crossing is present.

Coding options

Not present

Code: 1

Pedestrian fencing/barriers are incomplete or ineffective.



Present

Code: 2

Pedestrian fencing is complete and effective.

Pedestrian fencing can be on one or two sides or in the centre of the road.

Sidewalk provision

Attribute columns 56/BD & 57/BE, Input: Code

Record the presence of pedestrian sidewalks on the driver-side and passenger-side of the road.

A sidewalk is a purpose-built facility for pedestrians that has an all-weather surface (sealed or unsealed) and which provides a reliable surface and space for pedestrians to walk.

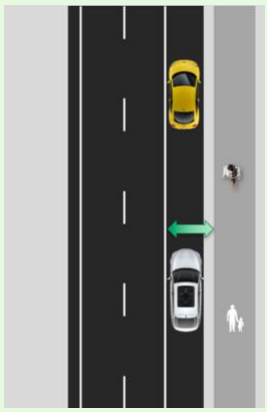
Do not code paved shoulders or pedestrian crossing facilities here.

Do not code a sidewalk that is not continuous over the entire length of the coding segment.

Measuring sidewalk distance

Sidewalk provision is based on the sidewalk's distance from the nearest driving lane, and if there is a vertical barrier separating moving vehicles and pedestrians.

This distance is measured from the edge-line of the nearest driving lane to the edge of the sidewalk, including the paved shoulder and vehicle parking (if present).



What is an informal path?

Informal paths include:

- Observed or evidence of pedestrian flow along the side of the road where there is no purpose-built sidewalk; or
- Where a sidewalk is partially blocked by vehicles or other obstructions, but where pedestrians are not forced to walk on the roadway.

CODES

Where pedestrians are using a separated (off-road) bicycle path or designated shared-use path, record it as both a sidewalk and a bicycle facility.

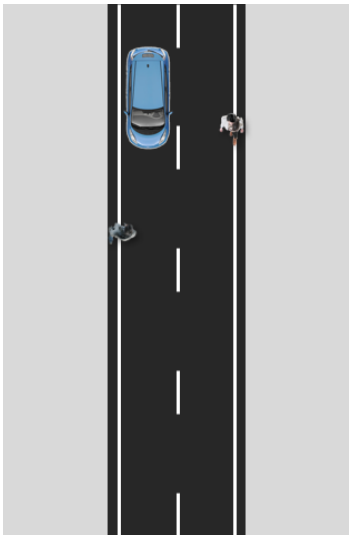
The aim of this attribute is to record pedestrian infrastructure. The paved shoulder (if present) is also taken into account in the Star Rating and Safer Road Investment Plan models, even if no sidewalk is recorded.

Coding options

None

Code: 5

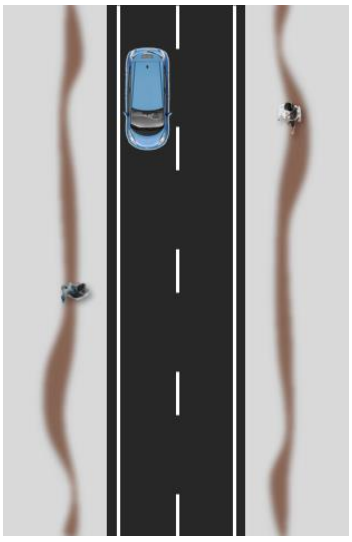
Pedestrian access not possible, restricted or pedestrians are forced to walk on the roadway; no discernible sidewalk is provided, sidewalk is not usable or sufficient to cater for demand; and/or pedestrians are using road lanes, paved shoulder, motorcycle facilities or on-road bicycle facilities.



Informal path – ≥1m from road

Code: 6

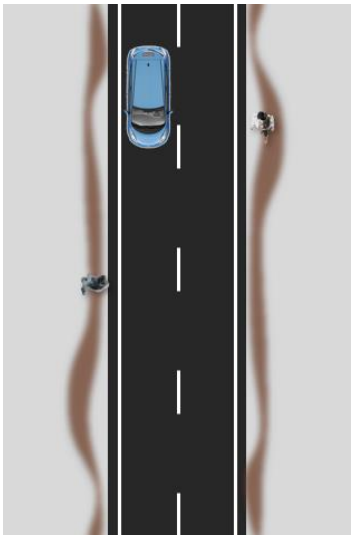
An informal path only, with a distance of 1m or more from the nearest driving lane (no barrier).



Informal path – 0m to <1m from road

Code: 7

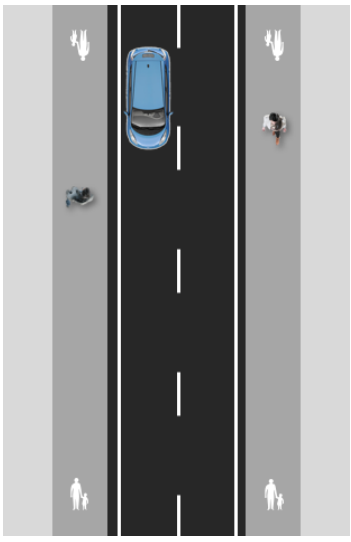
An informal path only, with a distance of less than 1m from the nearest driving lane (no barrier).



Sidewalk – 0m to <1m from road

Code: 4

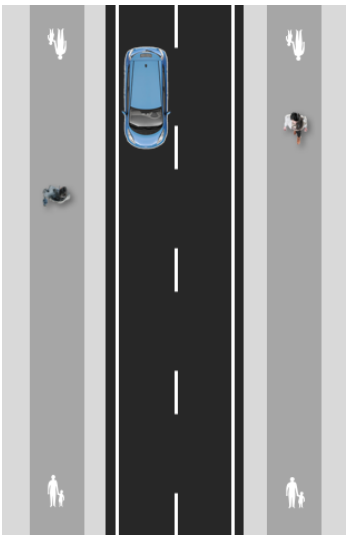
Sidewalk is present and free of obstruction, with a distance of less than 1m from the nearest driving lane (no barrier).



Sidewalk – 1m to <3m from road

Code: 3

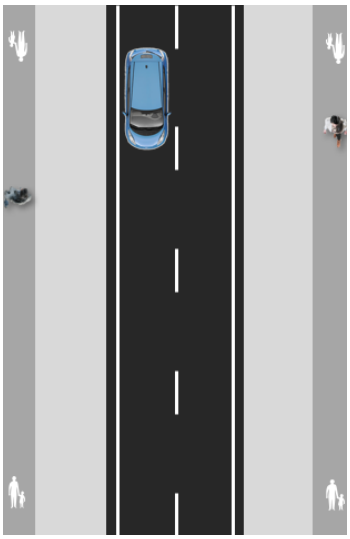
Sidewalk is present and free of obstruction, with a distance of 1m to 3m from the nearest driving lane (no barrier).



Sidewalk – ≥3m from road

Code: 2

Sidewalk is present and free of obstruction, with a distance of 3m or more from the nearest driving lane (no barrier).



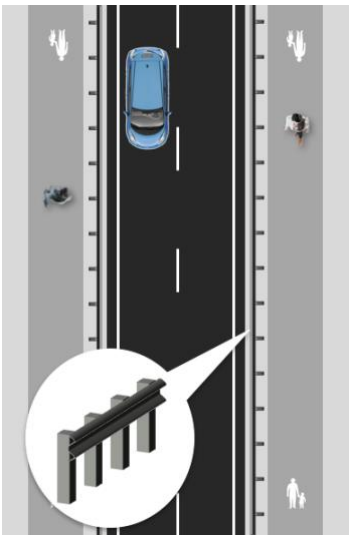
Sidewalk – physical barrier

Code: 1

Sidewalk is present and free of obstruction, with a physical barrier separating it from the nearest driving lane.

A physical barrier must be sufficient to restrain a vehicle from entering the pedestrian facility at the posted speed limit. Depending on the posted speed, this may include hedges and small shrubs, bollards, fences, walls, and safety barriers.

Curbs are not considered a physical barrier.



Facilities for motorcycles

Attribute column 59/BG, Input: Code

Record the presence of purpose-built facilities for motorcycles, mopeds and other light motorised vehicles capable of speeds of 30km/h or more.

For undivided roads, record motorcycle facilities which appear on either one side or both sides of the road.

Is a service road a motorcycle facility?

No. Service roads can be used by all road users. If use of a side road is restricted (by design or enforcement) to two- or three-wheeled motorised vehicles and bicycles, it should be coded as a motorcycle facility.

Even where a service road is used primarily by two- and three-wheelers, only record a motorcycle facility where one of the following attributes is present.

Coding options

None

Code: 6

No specific provisions for motorised two- and three-wheelers.

Motorcycle lane on roadway

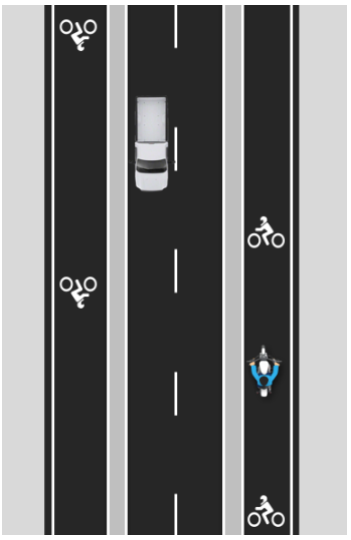
Code: 5

Dedicated motorcycle lane separated from the nearest driving lane by road markings.

Motorcycle path – one-way

Code: 2

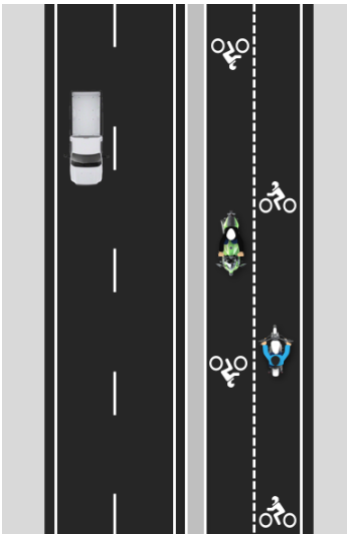
Motorcycle path separated from the nearest driving lane by at least a 1m wide curb or equivalent raised surface (no barrier).



Motorcycle path – two-way

Code: 4

Two-way motorcycle path separated from traffic by at least a 1m wide curb or equivalent raised surface (no barrier).

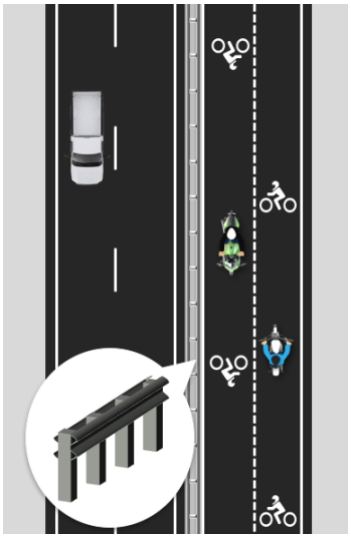


Motorcycle path – two-way with barrier

Code: 3

Two-way segregated motorcycle path separated by a physical barrier or located at least 10m from the nearest driving lane.

A physical barrier must be sufficient enough to fully restrict vehicles from entering the dedicated path at the posted speed.

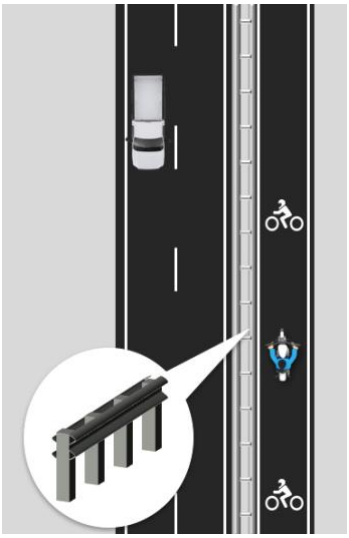


Motorcycle path – one-way with barrier

Code: 1

Segregated motorcycle path separated by a physical barrier or located at least 10m from the nearest driving lane.

A physical barrier must be sufficient enough to fully restrict vehicles from entering the dedicated path at the posted speed.



Facilities for bicycles

Attribute column 60/BH, Input: Code

Record purpose-built facilities for bicyclists.

Only record facilities which are specifically for bicycles (and in some cases, also for pedestrians) that are present for the whole coding segment.

Do not code facilities which are being used by motorised or electric powered two- or three-wheeled vehicles travelling at or above 30km/h.

For undivided roads, code bicycle facilities which appear on either one side or both sides of the road.

Do not code bicycle facilities that are of poor standard. This may include facilities that are:

- Inappropriate to a high speed environment
- Of inadequate width (for example, where a bicycle is painted onto a narrow and poorly maintained paved shoulder or the existing facility cannot cater for peak hour flows)
- Not continuous for the entire coding segment or have localised pinch points of less than 1.2m in width, or
- In conflict with other uses, such as merge lanes, parked vehicles or bus stops.

How wide should a bicycle facility be?

The recommended width of bicycle facilities depends on traffic speeds and local conditions.

Generally, the minimum width of a bicycle facility is 1.5m and not less than 1.2m at any given point. There should be an additional 0.3m width if the lane is adjacent to vehicle parking.

This table shows the range of minimum widths recommended for traffic speeds and local conditions.

	Speed limit ≤50km/h (or where a barrier is present or is a segregated path)	Speed limit >50-70km/h	Speed limit ≥100km/h
Recommended minimum width for bicycling facilities	1.5m (but not <1.2m at any given point)	1.9m	2.5m
Adjacent to vehicle parking, loading/stopping bays or layovers	+0.3m	+0.3m	+0.3m

Bicycle facilities may be provided alongside pedestrian sidewalks. Where a bicycle facility is shared with pedestrians, code it as a shared use path.

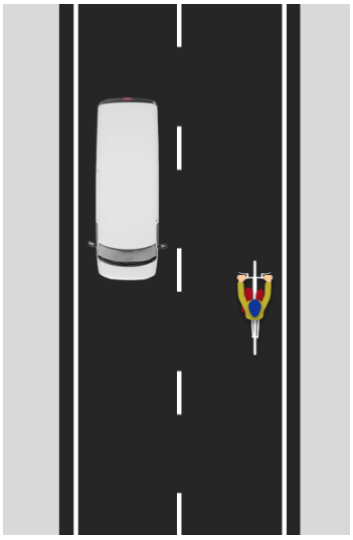
The aim of this attribute is to record on- and off-road bicycling infrastructure. The paved shoulder (if present) is also taken into account, even if no bicycle facility is recorded.

Coding options

None

Code: 4

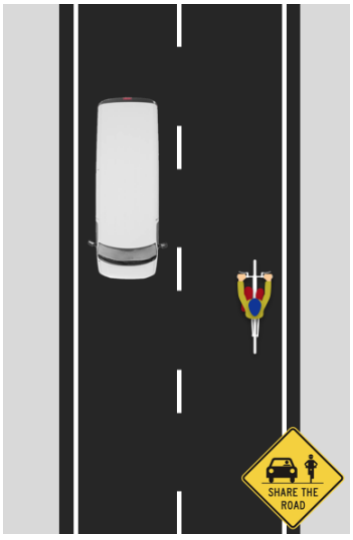
No specific provision for bicycles, or existing facilities are of poor standard.



Signed shared roadway

Code: 6

No specific provision for bicycles, but which is signed as preferred bicycle route.



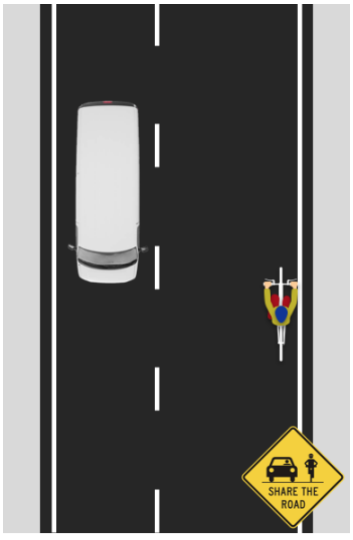
Extra wide outside ≥4.2m

Code: 5

The outer most lane is equal or greater than 4.2m in width.

The lane may or may not have bicycle markings or signage.

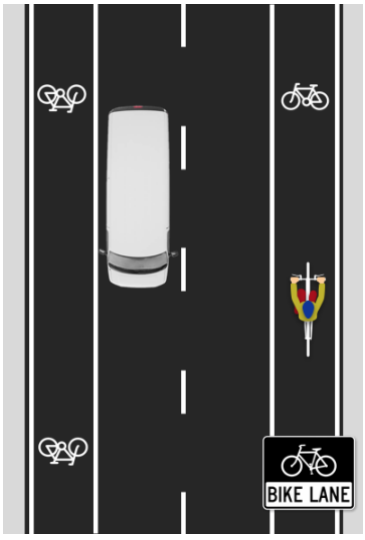
Do not code the road shoulder or where traffic speeds are 50km/h or more.



Dedicated bicycle lane on roadway

Code: 3

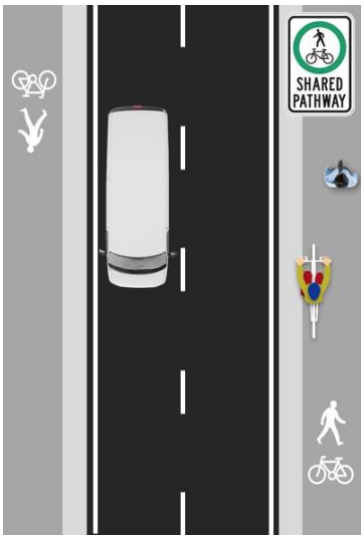
A dedicated bicycle lane separated from traffic by lane markings on the roadway or by <1m of raised or paved surface. An on-road lane should be appropriate to the traffic speed environment; be of adequate width, well maintained surface, and have little or no conflict with other uses, such as merge lanes, parked vehicles or bus stops.



Shared use path

Code: 7

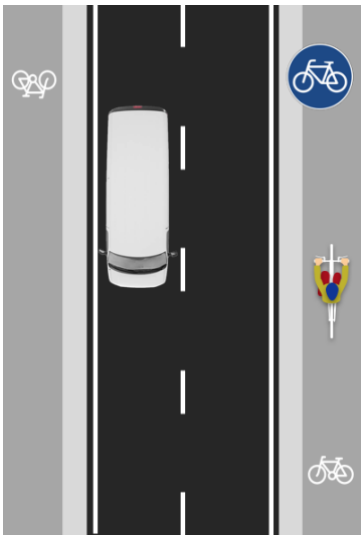
Bicycles have access to a path shared with pedestrians, which is separated from traffic by ≥1m raised or paved surface.



Segregated bicycle path

Code: 2

A dedicated bicycle path separated from traffic by ≥1m raised or paved surface.

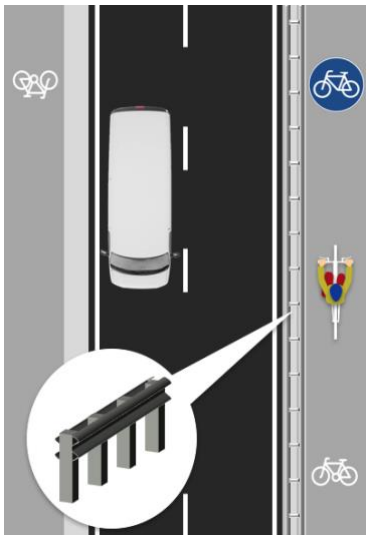


Segregated bicycle path with barrier

Code: 1

A dedicated bicycle path separated from traffic by a physical barrier or is located ≥10m from the road.

A physical barrier must be sufficient to restrain a vehicle from entering the bicycle facility at the posted speed limit.



School zone warning

Attribute column 77/BY, Input: Code

Record the presence of a school zone.

Record the school zone from it start point to end point, as designated by the signs on both approaches to the school, even if this spans several coding segments.

What is a school zone?

School zones are areas within the vicinity of schools and other educational establishments where school children and young pedestrians are likely to be present in high numbers. School zones are likely to have reduced speed limits for certain times of the day.

School zones are likely to have appropriate road signs and markings to make motorists aware of the presence of vulnerable road users such as young pedestrians and bicyclists. Parking restrictions may also apply in school zones.

Coding options

No school zone warning (school present)

Code: 3

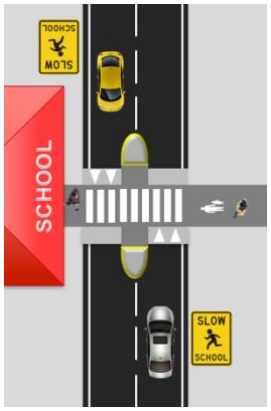
School is present but without school zone warning signs or markings.

School zone – static signs or road markings

Code: 2

A school zone is present with appropriate warning signs.

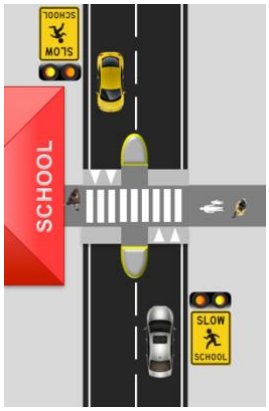
Road markings and speed limit signs may also be present.



School zone – flashing beacons

Code: 1

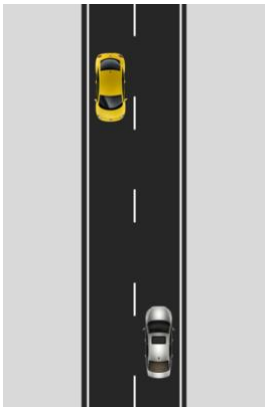
A school zone is present and incorporates flashing beacons to give emphasis to the warning signs and appropriate speed limit.



Not applicable

Code: 4

No school at the location.



School zone crossing supervisor

Attribute column 78/BZ, Input: Code

Record the presence of a crossing supervisor or warden.

A crossing supervisor/patrol assists children in safely crossing roads on their way to and from school. School crossing supervisors often operate during the school community's peak demand period both in the morning and in the afternoon.

Actual operating times depend on a number of factors that include school start times, pedestrian access and traffic volumes.

If crossing is supervised on an ad hoc or irregular basis, record as ‘not present’.

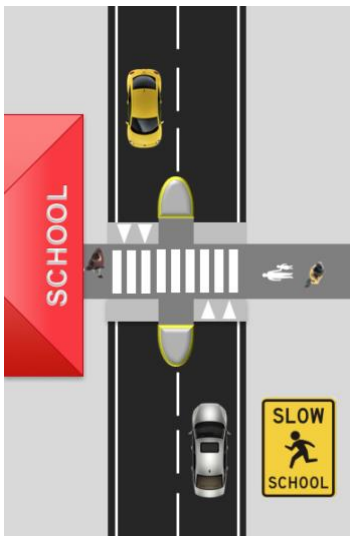
Local knowledge or site observations may be required.

Coding options

Not present

Code: 2

A crossing supervisor/patrol is not present or only present on an irregular basis.

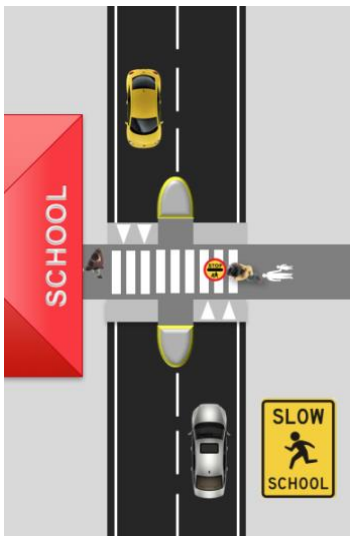


Present

Code: 1

A crossing supervisor/patrol is present.

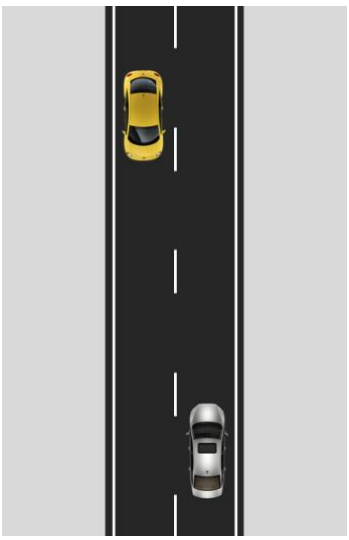
The crossing supervisor may be present throughout the school day or during periods of high pedestrian activity only, for example at school start and finish times.



Not applicable

Code: 3

No school pedestrian crossing facility at the location.



4 QUICK CODING GUIDE

Section	Item	Col No.		Type	Cat ID	Category
Road details and context	Coder name	1	A	text	NA	NA
	Coding date	2	B	text	NA	NA
	Road survey date	3	C	text	NA	NA
	Image reference	4	D	text	NA	NA
	Road name	5	E	text	NA	NA
	Section	6	F	text	NA	NA
	Distance	7	G	no.	NA	NA
	Length	8	H	no.	NA	NA
	Latitude	9	I	no.	NA	NA
	Longitude	10	J	no.	NA	NA
	Landmark	11	K	text	NA	NA
	Comments	12	L	text	NA	NA
	Carriageway label	13	M	code	1	Carriageway A of a divided road
					2	Carriageway B of a divided road
					3	Undivided road
					4	Carriageway A of a motorcycle facility
					5	Carriageway B of a motorcycle facility
Observed Flow	Motorcycle observed flow	15	O	code	1	None
					2	1 motorcycle
					3	2 to 3 motorcycles
					4	4 to 5 motorcycles
					5	6 to 7 motorcycles
					6	8+ motorcycles
	Bicycle observed flow	16	P	code	6	8+ bicycles
					5	6 to 7 bicycles
					4	4 to 5 bicycles
					3	2 to 3 bicycles
					2	1 bicycle
					1	None
	Ped observed flow across	17	Q	code	6	8+ pedestrians
					5	6 to 7 pedestrians
					4	4 to 5 pedestrians
					3	2 to 3 pedestrians
					2	1 pedestrian
					1	None
	Ped observed flow along – driver-side	18	R	code	6	8+ pedestrians
					5	6 to 7 pedestrians
					4	4 to 5 pedestrians
					3	2 to 3 pedestrians

					2	1 pedestrian
					1	None
	Ped observed flow along – passenger-side	19	S	code	6	8+ pedestrians
					5	6 to 7 pedestrians
					4	4 to 5 pedestrians
					3	2 to 3 pedestrians
					2	1 pedestrian
					1	None
Speed Limits	Speed limit	23	W	code	25	≥150km/h
					23	140km/h
					21	130km/h
					19	120km/h
					17	110km/h
					15	100km/h
					13	90km/h
					11	80km/h
					9	70km/h
					7	60km/h
					5	50km/h
					3	40km/h
					1	<30km/h
					45	≥90mph
					43	80mph
					41	70mph
					39	60mph
					37	50mph
					35	40mph
					33	30mph
					31	<20mph
	Motorcycle speed limit	24	X	code	25	≥150km/h
					23	140km/h
					21	130km/h
					19	120km/h
					17	110km/h
					15	100km/h
					13	90km/h
					11	80km/h
					9	70km/h
					7	60km/h
					5	50km/h
					3	40km/h
					1	<30km/h
					45	≥90mph
					43	80mph
					41	70mph

					39	60mph
					37	50mph
					35	40mph
					33	30mph
					31	<20mph
	Truck speed limit	25	Y	code	25	≥150km/h
					23	140km/h
					21	130km/h
					19	120km/h
					17	110km/h
					15	100km/h
					13	90km/h
					11	80km/h
					9	70km/h
					7	60km/h
					5	50km/h
					3	40km/h
					1	<30km/h
					45	≥90mph
					43	80mph
					41	70mph
					39	60mph
					37	50mph
					35	40mph
					33	30mph
					31	<20mph
	Differential speed limits	26	Z	code	2	Present
					1	Not present
	Speed management	54	BB	code	1	Not present
					2	Present
Mid-block attributes	Number of lanes	41	AO	code	4	Four or more
					3	Three
					6	Three and two
					2	Two
					5	Two and one
					1	One
	Lane width	42	AP	code	3	Narrow 0m to <2.75m
					2	Medium 2.75m to <3.25m
					1	Wide ≥3.25m
	Curvature	43	AQ	code	4	Very sharp
					3	Sharp
					2	Moderate
					1	Straight or gently curving
	Quality of curve	44	AR	code	2	Poor
					3	Not applicable

					1	Adequate
	Upgrade cost	14	N	code	3	High
					2	Medium
					1	Low
	Median type	27	AA	code	11	Centre line
					14	Wide centre line 0.3m to 1m
					10	Central hatching >1m
					8	Continuous central turning lane
					9	Flexible posts
					7	Physical median width 0 to <1m
					6	Physical median width 1 to <5m
					5	Physical median width 5 to <10m
					2	Safety barrier – concrete
					1	Safety barrier – metal
					12	Safety barrier – motorcycle friendly
					15	Safety barrier – wire rope
					4	Physical median width 10 to <20m
					3	Physical median width ≥20m
					13	One way
	Skid resistance	47	AU	code	5	Unsealed – poor
					4	Unsealed – adequate
					3	Sealed – poor
					2	Sealed – medium
					1	Sealed – adequate
	Road condition	46	AT	code	3	Poor
					2	Medium
					1	Good
	Vehicle parking	55	BC	code	3	Two side
					2	One side
					1	None
	Grade	45	AS	code	5	≥10%
					4	7.5% to <10%
					1	0% to <7.5%
	Roadworks	61	BI	code	3	Major road works
					2	Minor road works
					1	No road works
	Sight distance	62	BJ	code	2	Poor
					1	Adequate
	Delineation	48	AV	code	2	Poor
					1	Adequate
	Street lighting	49	AW	code	1	Not present
					2	Present
	Service road	58	BF	code	1	Not present
					2	Present
	Centre line rumble strips	28	AB	code	1	Not present

					2	Present
Roadside attributes	Roadside severity – driver-side distance	29	AC	code	1	0 to <1m
					2	1 to <5m
					3	5 to <10m
					4	≥10m
	Roadside severity – driver-side object	30	AD	code	10	Cliff
					11	Tree ≥10cm
					12	Rigid sign, post or pole ≥10cm
					15	Unprotected safety barrier end
					5	Aggressive vertical face
					6	Upwards slope – roll over
					8	Deep drainage ditch
					9	Downwards slope
					16	Low rigid object ≥20cm high
					13	Rigid structure or building
					7	Upwards slope – no roll over
					14	Semi-rigid structure or building
					2	Safety barrier – concrete
					1	Safety barrier – metal
					4	Safety barrier – wire rope
					3	Safety barrier – motorcycle friendly
					17	No object
	Roadside severity – passenger-side distance	31	AE	code	1	0 to <1m
					2	1 to <5m
					3	5 to <10m
					4	≥ 10m
	Roadside severity – passenger-side object	32	AF	code	10	Cliff
					11	Tree ≥10cm
					12	Rigid sign, post or pole ≥10cm
					15	Unprotected safety barrier end
					5	Aggressive vertical face
					6	Upwards slope – roll over
					8	Deep drainage ditch
					9	Downwards slope
					16	Low rigid object ≥20cm high
					13	Rigid structure or building
					7	Upwards slope – no roll over
					14	Semi-rigid structure or building
					2	Safety barrier – concrete
					1	Safety barrier – metal
					4	Safety barrier – wire rope
					3	Safety barrier – motorcycle friendly
					17	No object

	Shoulder rumble strips	33	AG	code	1	Not present
					2	Present
	Paved shoulder – driver-side	34	AH	code	4	None
					3	Narrow 0m to <1m
					2	Medium 1m to <2.4m
					1	Wide ≥2.4m
	Paved shoulder – passenger-side	35	AI	code	4	None
					3	Narrow 0m to <1m
					2	Medium 1m to <2.4m
					1	Wide ≥2.4m
Intersections	Intersection type	36	AJ	code	8	4-leg
					7	4-leg with protected turn lane
					10	4-leg signalised
					4	3-leg
					3	3-leg with protected turn lane
					17	Mini roundabout
					6	3-leg signalised
					9	4-leg signalised with protected turn lane
					5	3-leg signalised with protected turn lane
					2	Roundabout
					13	Railway Crossing – passive
					1	Merge lane
					14	Railway Crossing – active
					15	Median crossing point – informal
					16	Median crossing point – formal
					12	None
	Intersection quality	39	AM	code	2	Poor
					1	Adequate
					3	Not applicable
	Intersection channelization	37	AK	code	2	Present
					1	Not present
	Property access points	40	AN	code	1	Commercial access ≥1
					2	Residential access ≥3
					3	Residential access <3
					4	None
	Intersecting road volume	38	AL	code	1	≥15,000 vehicles
					2	10,000 to 15,000 vehicles
					3	5,000 to 10,000 vehicles
					4	1,000 to 5,000 vehicles
					5	100 to 1,000 vehicles
					6	1 to 100 vehicles
					7	Not applicable
VRU features	Land use – driver-side	20	T	code	6	Educational
					4	Commercial

					7	Industrial and manufacturing
					3	Residential
					2	Farming and agricultural
					1	Undeveloped areas
					5	Not Recorded
	Land use – passenger-side	21	U	code	6	Educational
					4	Commercial
					7	Industrial and manufacturing
					3	Residential
					2	Farming and agricultural
					1	Undeveloped areas
					5	Not Recorded
	Area type	22	V	code	2	Urban
					1	Rural
	Pedestrian crossing facilities – inspected road	50	AX	code	7	No facility
					6	Refuge only
					5	Marked crossing only
					17	Raised unmarked crossing
					4	Marked crossing with refuge
					16	Raised unmarked crossing with refuge
					15	Raised marked crossing
					14	Raised marked crossing with refuge
					3	Signalised crossing
					2	Signalised crossing with refuge
					1	Grade separated facility
	Pedestrian crossing facilities quality	51	AY	code	2	Poor
					1	Adequate
					3	Not applicable
	Pedestrian crossing facilities – side road	52	AZ	code	7	No facility
					6	Refuge only
					5	Marked crossing only
					17	Raised unmarked crossing
					4	Marked crossing with refuge
					16	Raised unmarked crossing with refuge
					15	Raised marked crossing
					14	Raised marked crossing with refuge
					3	Signalised crossing
					2	Signalised crossing with refuge
					1	Grade separated facility
	Pedestrian fencing	53	BA	code	1	Not present
					2	Present
	Sidewalk – driver-side	56	BD	code	5	None
					7	Informal path 0m to <1m

					6	Informal path ≥1m
					4	Sidewalk 0m to <1m from road
					3	Sidewalk 1m to <3m from road
					2	Sidewalk ≥3m from road
					1	Sidewalk with barrier
	Sidewalk – passenger-side	57	BE	code	5	None
					7	Informal path 0m to <1m
					6	Informal path ≥1m
					4	Sidewalk 0m to <1m from road
					3	Sidewalk 1m to <3m from road
					2	Sidewalk ≥3 from road
					1	Sidewalk with barrier
	Facilities for motorcycles	59	BG	code	6	None
					5	Motorcycle lane on roadway
					2	Motorcycle path – one way
					4	Motorcycle path – two way
					3	Motorcycle path – one way with barrier
					1	Motorcycle path – two way with barrier
	Facilities for bicycles	60	BH	code	4	None
					6	Signed shared roadway
					5	Extra wide outside ≥4.2m
					3	Dedicated bicycle lane on roadway
					7	Shared use path
					2	Segregated bicycle path
					1	Segregated bicycle path with barrier
	School zone warning	77	BY	code	3	No school zone warning (school present)
					2	School zone static signs or road markings
					1	School zone flashing beacons
					4	Not applicable (no school at the location)
	School zone crossing supervisor	78	BZ	code	2	School zone crossing supervisor not present
					1	School zone crossing supervisor present at school start and finish times
					3	Not applicable (no school at the location)

Version	Update
January 2013	First edition RAP-SR document series: Star Rating Coding Manual Drive on Right and Drive on Left editions.
May 2013	Added new pedestrian crossing categories and school zone attributes.
June 2014	Attribute and category names updated and other minor amendments.
August 2014	Added descriptions for intersecting road volumes and minor changes to descriptions for roadside severity – object.
May 2019	*iRAP Coding Manual Version 5.0* released as part of a full update to iRAP specifications, user guides and manuals. The new *iRAP Coding Manual* combines information from the following existing documents: *Road Survey and Coding Specification*, *Coding Manual* and *Quality Assurance Guide*. The update provides more guidance for coding and clarifies issues that coders commonly identify, particularly for cities.