



# **State Highway Safety Management System Manual**

*EDITION 4: March 2007*

**Sponsor:** General Manager, Network Operations  
**National Office Contact:** Traffic and Safety Manager  
**Regional Contact:** Regional Network Operations Manager

**ISBN Number:** 0-478-04703-7  
**Document Control Number:** SP/M002



# Manual Management Plan

## State Highway Safety

### Management System Manual

#### SP/M/002

**National Office**  
Level 9, Investment House II  
20-26 Balance Street  
PO Box 5084, WELLINGTON  
Phone: +64-4-499-6600  
Fax: +64-4-496-6666

#### 1. Purpose

This Manual Management Plan details updates, amendments and contact points for the State Highway Safety Management System Manual (SMS).

#### 2. Document Information

|                       |  |
|-----------------------|--|
| <b>Manual Name</b>    | State Highway Safety Management System Manual  |
| <b>Manual No.</b>     | SP/M/002   |
| <b>Availability</b>   | This manual is located in electronic, PDF format on the Transit website at:<br><a href="http://www.transit.govt.nz/technical/manuals.jsp">http://www.transit.govt.nz/technical/manuals.jsp</a> |
| <b>Manual Owner</b>   | Traffic and Safety Manager, National Office  |
| <b>Manual Sponsor</b> | Network Operations General Manager   |

#### 3. Amendment and Review Strategy

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

|                                | <b>Comments</b>  | <b>Frequency</b> |
|--------------------------------|--|------------------|
| Amendments (of a minor nature) |  | As required      |
| Review (major changes)         |  | Annually         |
| Notification                   | All users that have registered their interest by email to <a href="mailto:SPM021@transit.govt.nz">SPM021@transit.govt.nz</a> will be advised by email of amendments and updates. | Immediately      |

#### 4. Distribution

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

General Manager Network Operations    Manual Sponsor    National Office file PU1-0020

Traffic and Safety General Manager    Manual Owner



# Preface

---

Transit New Zealand's road safety goal is to provide and operate a safe state highway system.

In order to achieve this we have an established State Highway Safety Management System which is applicable throughout Transit New Zealand (Transit), its contractors and consultants.

The State Highway Safety Management System is a systematic process that has the goal of reducing the number and severity of road crashes by ensuring all opportunities to improve state highway road safety are identified, considered, implemented and evaluated as appropriate, in all phases of highway planning, design, construction, operation and maintenance.

This Manual documents the *fourth edition* of the State Highway Safety Management System.

Transit is committed to continued improvement in road safety on state highways and the State Highway Safety Management System will foster this continued improvement.

All employees are aware of the State Highway Safety Management System and understand the road safety policy and objectives of Transit. They are committed to work to the defined procedures in the State Highway Safety Management System at all times, so that Transit's road safety goals are achieved.

Rick van Barneveld  
Chief Executive  
Transit New Zealand

# Contents

---

| Section No. | Title   | See Page   |
|-------------|---|------------|
| <b>1</b>    | <b>INTRODUCTION</b>                                       | <b>1.1</b> |
| 1.1         | Corporate Profile   | 1.2        |
| 1.2         | History / Background                                      | 1.4        |
| 1.3         | Road Safety Management System Components                  | 1.6        |
| 1.4         | Summary   | 1.10       |
| <b>2</b>    | <b>MANAGEMENT</b>   | <b>2.1</b> |
| 2.1         | Safety Goals, Objectives, and Performance Targets         | 2.2        |
| 2.2         | Organisational Structure                                  | 2.3        |
| 2.3         | Reviews   | 2.4        |
| 2.4         | Independent Audit Review                                  | 2.5        |
| 2.5         | Expertise   | 2.6        |
| 2.6         | Funding   | 2.8        |
| <b>3</b>    | <b>IDENTIFYING HAZARDOUS LOCATIONS</b>                    | <b>3.1</b> |
| 3.1         | Data Collection   | 3.2        |
| 3.2         | Safety Management Strategies                              | 3.5        |
| 3.3         | Regular Routine Inspections                               | 3.6        |
| 3.4         | Special Safety Inspections                                | 3.7        |
| 3.5         | Safety Deficiency Databases                               | 3.8        |
| 3.6         | Hazard Registers  | 3.9        |
| 3.7         | Crash Reduction Studies                                   | 3.11       |
| 3.8         | Safety Retrofitting                                       | 4.1        |
| 3.9         | Road Safety Action Plans                                  | 4.2        |
| <b>4</b>    | <b>ROAD, PAVEMENT, AND BRIDGE, DESIGN AND MAINTENANCE</b> | <b>4.1</b> |
| 4.1         | Pavement Construction and Maintenance                     | 4.2        |
| 4.2         | Road and Bridge Design                                    | 4.10       |
| 4.3         | Road Safety Audits  | 4.13       |

## Contents, continued

| <b>Section No.</b> | <b>Title</b>                   | <b>See Page</b> |
|--------------------|--------------------------------|-----------------|
| <b>5</b>           | <b>TRAFFIC CONTROL DEVICES</b> | <b>5.1</b>      |
| 5.1                | Traffic Signs                  | 5.2             |
| 5.2                | Pavement Markings              | 5.4             |
| 5.3                | Delineation                    | 5.6             |
| 5.4                | Traffic Signals                | 5.9             |
| 5.5                | Speed Limits                   | 5.11            |
| 5.6                | Temporary Traffic Management   | 5.12            |
| <b>6</b>           | <b>THE ROADSIDE</b>            | <b>6.1</b>      |
| 6.1                | Access Management              | 6.2             |
| 6.2                | Roadside Clear Zones           | 6.5             |
| 6.3                | Road Lighting                  | 6.6             |
| 6.4                | Safety Barriers                | 6.8             |
| <b>7</b>           | <b>VULNERABLE ROAD USERS</b>   | <b>7.1</b>      |
| 7.1                | Pedestrians                    | 7.2             |
| 7.2                | Cyclists                       | 7.3             |
| 7.3                | Motorcyclists                  | 7.3             |
| <b>Appendix A</b>  | Feedback Form                  |                 |

| <b>Table No.</b> | <b>Title</b>                             | <b>See Page</b> |
|------------------|--|-----------------|
| 1                | Road Deaths on the State Highway Network | 1-1             |
|                  |  |                 |

| <b>Figure No.</b> | <b>Title</b>  | <b>See Page</b> |
|-------------------|---|-----------------|
| 1                 | Structure of Safety Management System                           | 1-1             |
| 2                 | Relationship Between System Components and Partnerships         | 1-2             |
| 3                 | Flow Chart for Identifying and Dealing with Safety Deficiencies | 1-3             |
|                   |   |                 |

# Section 1

## Introduction

---

**In this section**

This section contains the following sections:

| <b>Section No.</b> | <b>Topic</b>                             |
|--------------------|--|
| 1.2                | Corporate Profile                        |
| 1.3                | History / Background                     |
| 1.4                | Road Safety Management System Components |
| 1.5                | Summary                                  |

## 1.1 Corporate Profile

---

### **Transit New Zealand** 1.1.1

Transit New Zealand (Transit) is a Crown entity which was established in 1989.

The objective of Transit is to operate the State highway system in a way that contributes to an integrated, safe, responsive and sustainable land transport system.

State highways consist of 10,800 km of road which form the backbone of New Zealand's land transport system.

*Refer Corporate Profile*

---

### **Total Quality Management** 1.1.2

The State Highway Safety Management System is consistent with the philosophies of total quality management. That is, the System includes:

- Management responsibility (see section 2.2)
- The documentation of policies, guidelines, specifications, and procedures which influence State highway road safety;
- A process to ensure the System is continuously improved (see Part 2, Section 2.3 Reviews);and
- A process to measure Transit's compliance with the System (see Part 2, Section 2.4 Independent Audit).

*Refer National State Highway Strategy*

---

### **Inputs and Influences** 1.1.3

The effective delivery of the State Highway Safety Management System requires inputs from many sources. This includes good management, appropriate funding, good policy development, sound planning, consistent geometric design, forgiving roadside features, timely maintenance, good roadway lighting, targeted enforcement, understandable and consistent traffic control, reasonable traffic operations, driver and vehicle factors, driver education and community involvement.

The State Highway Safety Management System is influenced by, and influences all levels of Transit's objective to build, maintain and operate the state highway system in a way that contributes to an integrated, safe, responsive and sustainable land transport system.

*Refer State Highway Safety Plan, Statement of Intent and National State Highway Strategy*

---



**The State  
Highway  
Safety  
Management  
System  
Manual  
1.1.4**

This Manual documents the State Highway Safety Management System.

The Manual describes how Transit systematically takes into account road safety issues in the management and operation of the State highway network. The Manual references policies, standards, guidelines, specifications and standard contract documents that the user must refer to.

A full list of Transit's manuals and specifications is available through Transit's website –

[www.transit.govt.nz/technical/manuals.jsp](http://www.transit.govt.nz/technical/manuals.jsp)

The Manual also describes the process used to ensure the system is complied with, reviewed and continuously improved (See Part 2 Section 2.3 Review and Part 2 Section 2.4 Independent Audit).

---

**Benefits  
1.1.5**

The benefits of the State Highway Safety Management System and its Manual include:

- Providing a auditable framework for achieving Transit's safety objectives and measuring safety performance;
  - Providing a repository of road safety knowledge and expertise within Transit;
  - Improving consistency in the implementation of road safety procedures; thereby enabling review, audit, and development of road safety procedures and policies;
  - Providing an induction training aid for newcomers; and
  - Providing a useful communication aid.'
  - Better safety for all state highway users
- 

**Availability  
1.1.6**

This manual has been made available through Transit's website to ensure as wide a distribution to users as possible. The website address is [www.transit.govt.nz/technical/manuals.jsp](http://www.transit.govt.nz/technical/manuals.jsp)

---

**Comments  
1.1.6**

This manual is a 'live' document and comment is welcome at any time. Please forward any comments to: [Dennis.Davis@transit.govt.nz](mailto:Dennis.Davis@transit.govt.nz).

---

## 1.2

## History/Background

---

### **Need for A Systematic Approach 1.2.1**

The need for a systematic approach to highway road safety became apparent in the mid 1980's, principally as a result of the Ministry of Works and Development (MWD) introducing Crash Reduction Studies to New Zealand's State highway network. Road Management Restructuring in the late 1980's resulted in a large Government Department (MWD) being split into several entities, one of which was Transit.

Transit outsources all consultancy and physical works requirements. The presence of large numbers of consultants and contractors, all new to the Transit work ethic, resulted in some noticeable down turn in the expected road safety standard of the highway infrastructure. In assessing why this trend was emerging, Transit personnel concluded that the lack of a systematic approach, adequately documented, made it difficult for new consultants and contractors to understand and hence fulfil their roles.

Further, there has been a significant change in the legal concept of the liability of Transit to road users for the state of its roads. The obligation on a road controlling authority is to operate a reasonable, rather than a perfect road.

What needs to be recognized is that reasonableness will not in the end be determined by Transit. It will be a Court decision. Transit need not attract significant additional risk exposure if it takes appropriate steps. If it does nothing, it does increase its risk. The implementation of the Transit Safety Management System (SMS) is a positive act that will facilitate a reduction in the number and severity of road crashes and thereby manage the safety liability of operating the state highway network.

The SMS is a systematic and integrated reference to Transit safety processes. The overview processes ensure that all opportunities to improve state highway road safety are identified, considered, implemented and evaluated as appropriate, in all phases of highway planning, design, construction, operation and maintenance.

---

**Road Safety  
Awareness  
1.2.2**

In the mid 1980's, awareness that road safety should be a specific engineering discipline was gaining momentum. The most obvious sign of this was the introduction of the black spot crash programme. This programme, since 1985, has been an outstanding success and (although not well understood publicly) is one of the prime road safety packages that has contributed to a reduced road toll. However the programme is reactive and there was a strong desire to introduce additional measures which addressed road safety in a more proactive manner.

---

**Road Safety  
Culture  
1.2.3**

Central to road safety awareness and a systematic approach is the need to imprint a safety culture among Transit personnel, consultants and contractors. The development of road safety on the highway network is critically linked to the degree to which road safety culture is successfully integrated. Those with a high commitment to road safety culture will successfully identify road safety deficiencies and opportunities and take an active interest in their resolution.

Transit is committed to the “3 E’s” approach to safety, that is Engineering, Enforcement and Education and requires its staff and consultants to work in partnership with other agencies to develop and deliver coordinated programmes. However, it must always be remembered that Transit is the manager of the State Highway network and is responsible for any initiative that affects the State Highway network.

---

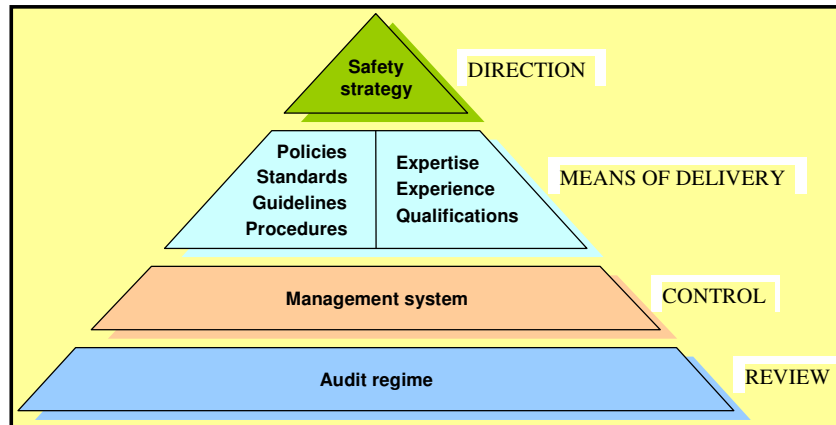
**Safety  
Management  
System  
1.2.4**

In the early 1990's Transit developed a systematic approach to road safety engineering, arguably the first of its kind in New Zealand. Section One of this manual describes the components of the system, both primary and secondary, how this links with Transit's goals and objectives and the partnerships that exist with other stakeholders. Section Two lists and briefly describes the various components, the documents they can be found in and elaborates on the key interactions Transit has with stakeholders.

- **Primary Components** of the system are those where a specific road safety initiative has been developed.
  - **Secondary Components** of the system are those where road safety is implicated in the outcome of work programmes, e.g. reseal, digouts.
-

**Structure**  
**1.2.5**

This system is based on a simple structure as shown below:



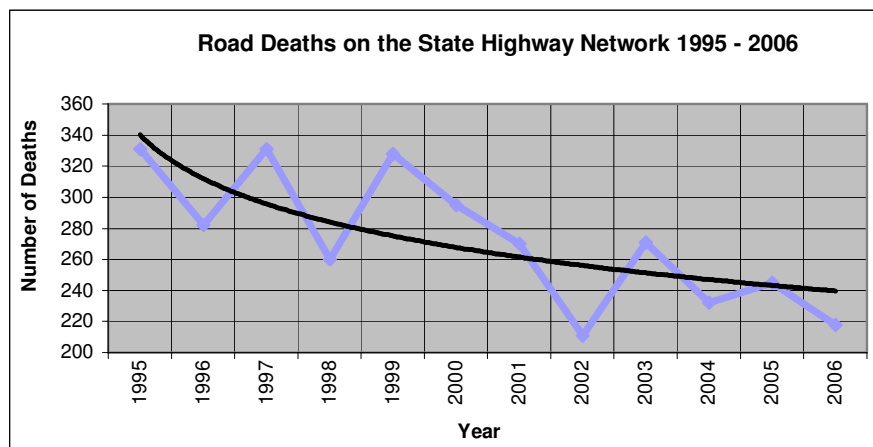
**Figure 1. Structure of Safety Management System**

**Safety**  
**Engineering**  
**1.2.6**

As road safety engineering has developed over the years an increasing number of engineers and technicians are specialising in this role. Road safety is now seen as a key engineering service to society. The lead is taken by road and traffic safety engineers and technicians who raise road safety issues and spread the culture. However, road safety culture must be embraced by all, especially those constructing and maintaining highways.

**State**  
**Highway**  
**Safety**  
**Performance**  
**1.2.7**

Fatalities on the State Highway Network have, since 1995, decreased from 330 to around 240 by 2006. Although this is encouraging, it is not acceptable that so many lives are lost and Transit is committed to reducing fatalities and injuries to contribute to the objectives of the Government’s Road Safety to 2010 Strategy.



**Table 1: Road Deaths on the State Highway Network**

## 1.3

# Road Safety Management System Components

---

### Primary Components 1.3.1

- Highway Safety Inspections
  - Network of Crash Reporters
  - Grey Spot Process
  - Crash Reduction Studies
  - Route Analysis and Action
  - Safety Audit (Projects)
  - Mass Actions
  - Minor Safety Programme
  - Construction Programme (Safety Emphasis)
  - Recurring Hazard Register
  - Temporary Traffic Management (COPTTM)
  - Monitoring, Trend and Performance Measurement
  - Safety Intervention Strategy (Plan)
  - Safety Deficiency Database
  - Skid Resistance Analysis and Monitoring
  - Fatal and High Profile Serious Injury Crash Investigation
  - Road Safety and user Education
  - Enforcement
- 

### Secondary Components 1.3.2

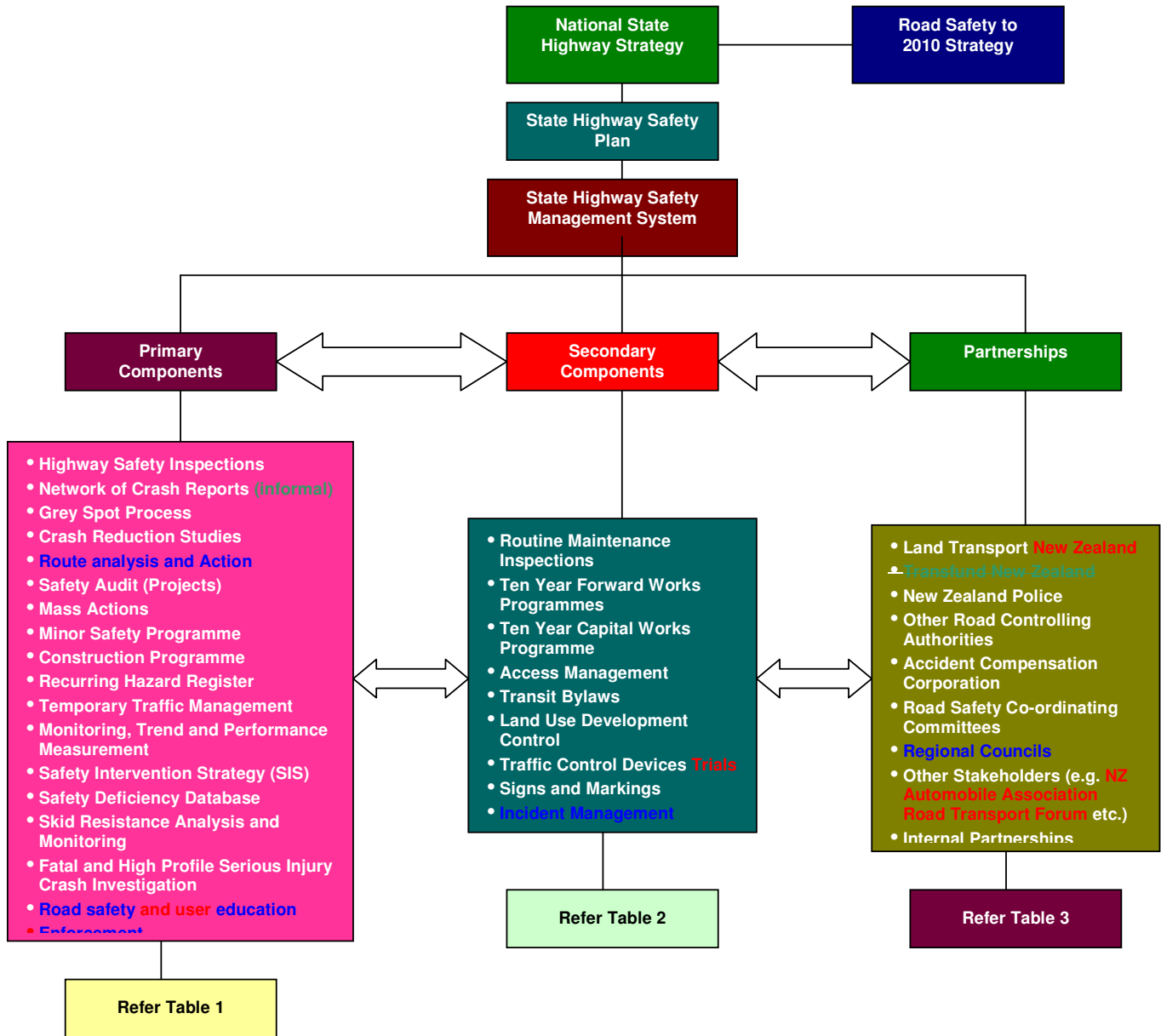
- Routine Maintenance Inspections (Safety Focus)
  - Ten Year Maintenance Forward Work Programmes
  - Ten Year Capital Works Programme
  - Access Management
  - Transit Bylaws
  - Land Use Development Control
  - Traffic Control Devices
  - Incident Management
- 

### Road Safety Partnerships 1.3.3

- Land Transport New Zealand
  - New Zealand Police
  - Road Safety Coordinating Committees
  - Other Stakeholders (e.g. AA, Road Transport Forum (RTF), etc)
  - Other Road Controlling Authorities
  - Accident Compensation Corporation
  - Regional Councils
-

**Relationship  
Between  
System  
Components  
and  
Partnerships  
1.3.4**

Virtually all of Transit's business has road safety as a fundamental consideration. This is clearly visible in its Mission Statement, Statement of Intent, Goals and Objectives. The **Primary Components** of the system are those where road safety is a clear key focus. **Secondary Components** have an alternative key focus but will have strong road safety requirements. **Partnerships** are developed to forge strong links, ensure a consistent and united approach, understand each others respective roles and responsibilities, provide a forum for discussion, raise awareness and consider public opinion or concern. To capture how this inter-relates, refer to Figure 2 below:



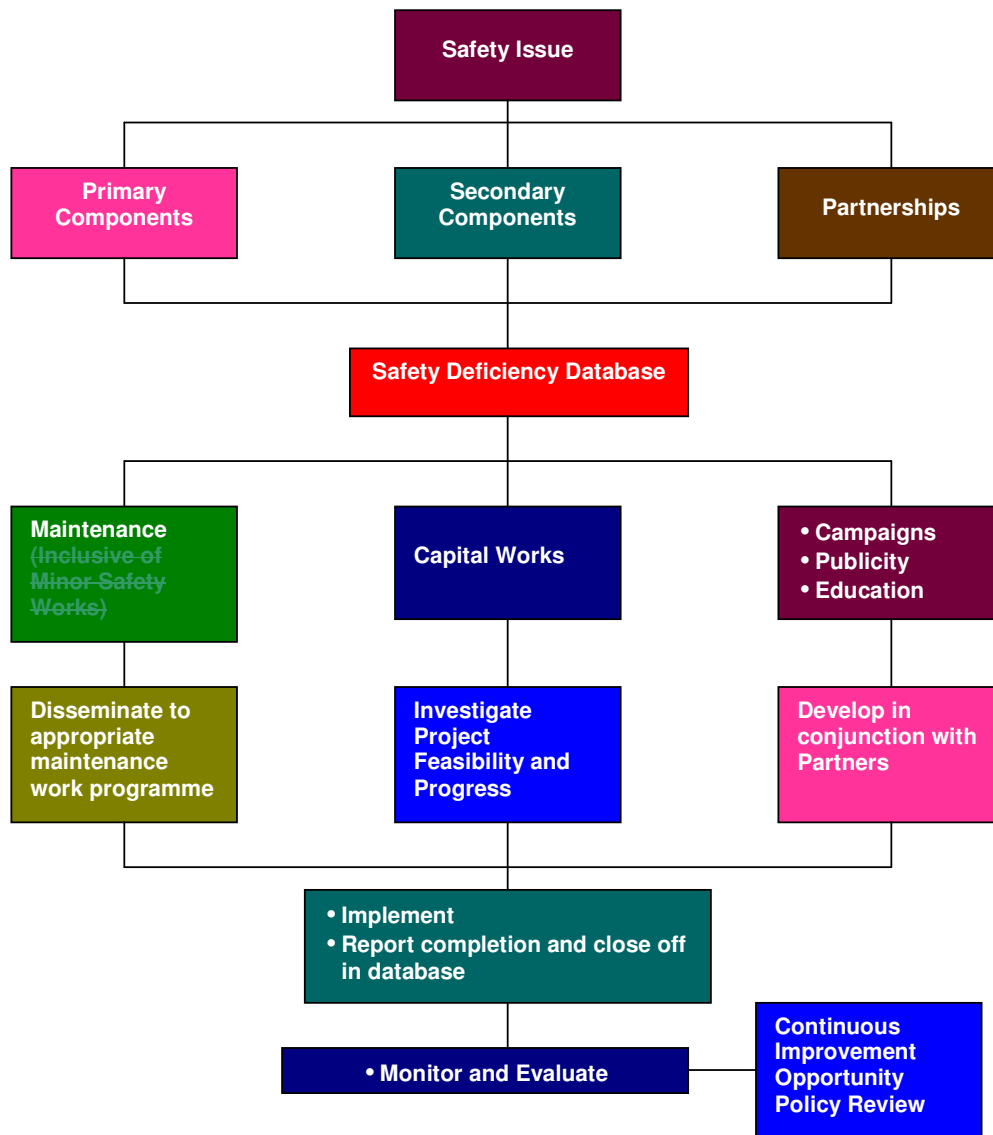
**Figure 2 Relationship Between System Components and Partnerships**

**What Does "System" Mean?**  
**1.3.5**

There are two definitions which apply;

1. The system comprises all goals, objectives, philosophies and components (i.e. primary, secondary and partnerships).
2. The system identifies and deals with road safety deficiencies or, how the systematic approach is taken.

The first definition has been documented in preceding clauses. The second definition and its applicability to the overall management of safety is captured in Figure 3 below;



**Figure 3 Flow Chart for Identifying and Dealing with Safety Deficiencies**



**Responsibilities  
of Transit,  
Consultant  
and  
Contractor  
1.3.6**

Whilst Transit is the manager of the state highway network, it recognises that the success of reaching its goals and objectives is closely linked to the level of ownership taken by Network Management Consultants (NMC) and contractors engaged on the network.

In respect of road safety, Transit has developed the Safety Management System (SMS) framework, but the system will only be successful if embraced by consultants and contractors. The safety culture, that is vital to a successful outcome, needs to be all-embracing (adopted and practiced) from management right through all of the personnel within the organisations, companies and individuals involved. Extension of the safety culture to other stakeholders such as service agencies and neighbours adjoining the highway network will result in improved safety performance.

An example of this is the development, by consultants, of a specific safety management strategy (or plan) for each network maintenance management contract, using the Transit National State Highway Strategy and the generic document (State Highway Asset Management Manual [SHAMM August 2000] Chapter 2) as a base. This ensures that the safety requirements of each of the network contracts are specifically targeted to the area or network. The system therefore should be seen as having flexibility so that managers can tailor the components of the system to best suit their networks.

Similarly contractors are encouraged to develop a Safety Intervention Strategy (SIS) that can be comprehended, and hence implemented, by all personnel, especially those travelling the network on a frequent basis.

It should be noted that the SHAMM implies that the consultant as part of the safety team develops the SIS... *"the SIS shall be supplied to all the appropriate physical works contractors and used as a guide by those contractors as to how safety- related matters should be addressed and assigned priority in the programming and execution of their contract works"*. This is not to say that contractors could not develop their own SIS but this is unlikely to occur in practice unless it is part of their contract.

---

## 1.4

### Summary

---

The following tables list the road safety management components, outcomes and action, implementation method, monitoring, trend or evaluation process.

---

1  
2  
3

| <b>Table 2 Primary Components</b>          |   |   |   |   |
|--|---|---|---|---|
| <b>Component</b>                           | <b>Source</b>   | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>  |
| <b>Highway Safety Inspections</b>          | SHAMM Section 2 subsections 4.4 to 4.6 and Safety Management Strategy (Plan)  | Views road through the “eyes of the road user” and includes day, night and side road inspection. Captures all safety deficiencies that are noted by the engineer whilst travelling at the environment speed. Part of Safety Management Strategy (Plan) developed by Consultant in Network Contracts. Objective is to provide a consistent road environment thus lessening the road as a burden on the driving task. | Safety deficiencies entered into database (safety deficiency database) and actioned under appropriate programme where funding is available e.g. Maintenance, Minor Safety, Capital Works.   | Selected highway features are monitored and trends graphed e.g. vegetation obstructing signs, edge Marker Posts missing or damaged in critical locations, faded signs and missing markings etc. |
| <b>Network of Crash Reports (informal)</b> | SHAMM Section 2 subsections 3.2 and 3.3 and Safety Management Strategy (Plan) | Voluntary reliable members of the community report crashes via a standard format. Supplementary to CAS database. Part of Safety Management Strategy (Plan) developed by Consultant in Network Contracts. Mainly effective in rural areas. Also allows forward works sites to be monitored.  | Database of locally gathered crashes which is linked to CAS. (Sometimes able to use data for justifying projects when CAS data is scarce).  | Monitor level of crash reports received. Compare with CAS database.   |
| <b>Grey Spot Process</b>                   | SHAMM Section 2 and Safety Management Strategy (Plan)                         | Semi proactive process to identify crash trends and intervene before ‘black spots’ develop. Uses both CAS and locally gathered databases. Predominantly a rural treatment. Part of Safety Management Strategy (Plan) developed by Consultant in Network Contracts. Particularly important in areas where annual CRS is not undertaken.  | <ul style="list-style-type: none"> <li>• Desktop study to assess roading factors and commonality.</li> <li>• Field inspection to determine sites to be treated and treatment details.</li> <li>• Database of sites, listing treatments and/or decisions.</li> </ul> | Monitor treated sites to assess success of treatment in conjunction with Land Transport New Zealand.  |

4  
5  
6

1 @  
2

| <b>Table 2 Primary Components</b>    |   |  |  |  |
|--------------------------------------|---|--|--|--|
| <b>Component</b>                     | <b>Source</b>   | <b>Brief Description and Function within System</b>  | <b>Outcomes</b>  | <b>Monitoring, Trend, Evaluation</b>   |
| <b>Crash Reduction Studies (CRS)</b> | Transit/Land Transport NZ AI Procedures; SHCM Section 3.7                                 | Reactive process which seeks to eliminate black spots. Can be part of a network contract or contracted separately. Where the Grey Spot (trend) process is in place it acts as a second tier (i.e. sieve). In urban areas it is the main process to control crash problem sites.  | <ul style="list-style-type: none"> <li>• Desktop study identifies sites with roading factors and commonality.</li> <li>• Field inspection to assess treatment.</li> <li>• Implement treatments and record in database.</li> </ul>          | Monitor sites to assess success of treatment in conjunction with Land Transport New Zealand either as sites of interest or official crash sites. |
| <b>Route analysis and Action</b>     | Network Safety Coordination (NSC) projects and safety retrofit programmes etc             | Reactive process to identify and prioritise the worst routes for intensive response.   | <ul style="list-style-type: none"> <li>• Regional analysis to identify worst trends and routes.</li> <li>• Detailed analysis to identify factors.</li> <li>• 3 E's approval</li> </ul>   | Crash trend analysis ongoing on treated sections with ongoing education campaigns.   |
| <b>afety Audit (Projects)</b>        | Safety Audit Policy and Procedures 2004<br>Road Safety Audit Austroads 2002               | An audit process of capital works and minor safety projects undertaken by independent safety auditors at various stages of the project. It is a stand alone component of the system and is considered on a project by project basis. Objective is to eliminate, isolate, minimise safety deficiencies before a project is constructed. | Recommendations received by the client in the form of a safety audit report are considered for inclusion in the project. Any recommendations not approved are documented by the client. Feedback to auditors and consultants is important. | No formal process except long-term trend monitoring but safety audits are required.  |
| <b>Mass Actions</b>                  | SHAMM Section 2 subsection 5.3 and Safety Management Strategy (Plan) or Specific Contract | Targets at risk features on the highway network which if removed, relocated or protected will provide safety benefit. Examples are safety barriers for structures and embankments. Priority is determined by a weighting methodology. Can be part of a network contract or contracted separately.                                      | <ul style="list-style-type: none"> <li>• Use the safety deficiency database to identify all at risk highway features.</li> <li>• Assess for priority order and list.</li> <li>• Implement based on funding availability.</li> </ul>        | Monitor implementation against total list. Graph percentage on an annual basis.  |

3

| <b>Table 2 Primary Components</b> |   |   |   |   |
|-----------------------------------|---|---|---|---|
| <b>Component</b>                  | <b>Source</b>   | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>  |
| <b>Minor Safety Programme</b>     | SHAMM Section 2 subsection 5.5 and Safety Management Strategy (Plan)  | List of projects which are not economically justifiable or small in dollar value. Subject to funding constraints both individually and as an annual programme. Important programme as frequently addresses safety concerns expressed by road users. Part of the network contract.   | Active list is in priority order, updated annually. Projects constructed are those consistent with the policy adopted by the client for dealing with safety deficiencies. | Monitor implementation against total list. Graph percentage complete on an annual basis.  |
| <b>Construction Programme</b>     | Annual Forecast, Ten Year Forward Works Programme, NRP                | Projects identified through the annual plan process which can be economically justified in the case of the annual plan, or are likely to be necessary in the next ten years to meet user/safety expectations. Projects are identified as part of the annual plan preparation which is part of the network contract. Once funded, projects are normally tendered out under CPP. Links to Safety Audit.   | All projects meeting the BCR cut off are promoted through the I&R, D&PD and Construction phases. Each phase is required to meet the funding cut off BCR.                  | Monitor success of work by comparing before and after crash history of projects with primary safety focus. This can be done in conjunction with Land Transport New Zealand. |
| <b>Recurring Hazard Register</b>  | SHAMM, Section 2 subsection 6.4 and Safety Management Strategy (Plan) | Those sites on the network which are subject to recurring risk to road users are identified on a register. These sites will normally be uneconomic to remedy permanently e.g. slips, flooding, etc. Suitable protection, either temporary or permanent, warn road users that the hazard is active. The register maintains the awareness of all partners. Part of Safety Management Strategy (Plan) in network contract. Should form part of the Safety Interventional Strategy (SIS). | Maintain an updated register as part of the Network Contract.   | Existence of up to date register.   |

| <b>Table 2 Primary Components</b>                    |   |   |   |  |
|--|---|---|---|--|
| <b>Component</b>                                     | <b>Source</b>   | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>   |
| <b>Temporary Traffic Management</b>                  | Code of Practice for Temporary Traffic Management (CoPTTM).         | Provides guidance and best practice for managing work sites on the network. Part of the network contract (monitoring and approval) and specific project contract requirements.  | Approved Traffic Management Plans (TMP) for all work sites.   | Monitor work sites and measure non compliances against total TMPs approved. Also specific audits conducted by NMC and/or Transit.  |
| <b>Monitoring, Trend and Performance Measurement</b> | N/A   | A large number of road safety packages delivered by many stakeholders have an influence on the safety record of the highway network. To gauge the effectiveness of various parts of the road Safety Management System, monitoring, establishing trends and measuring performance against set targets will give Transit confidence that the components of the system are cost effective. Some components can be measured in direct crash savings e.g. grey spots, black spots, capital works.                            | <ul style="list-style-type: none"> <li>• Trend graphs.</li> <li>• Performance measurements against agreed targets.</li> <li>• Before and after monitoring of crash history</li> <li>• Information on performance provided to Land Transport NZ</li> </ul> | N/A but note examples; <ul style="list-style-type: none"> <li>• Land Transport New Zealand annual trend graphs.</li> <li>• Land Transport New Zealand road toll statistics.</li> <li>• Land Transport New Zealand driver compliance audits (speed, seatbelt wearing etc).</li> </ul> |
| <b>Safety Intervention Strategy (SIS)</b>            | SHAMM Section 2, subsection 6 and Safety Management Strategy (Plan) | This strategy is a vital component of the system. It is aimed at the contractor and seeks to have them intervene before or just after safety deficiencies emerge. It is noted that most maintenance safety deficiencies are the contractor's responsibility and the raising of safety awareness and culture will see a significant reduction in the number of deficiencies identified by consultants. The Contractor is encouraged to develop an Intervention Strategy (Plan) that will be embraced by their workforce. | Intervention Strategy developed and maintained for each Physical Works contract.  | <ul style="list-style-type: none"> <li>• Measure trends of selected features for which contractors are responsible.</li> <li>• Measure number of safety deficiencies reported by contractors for which others have responsibility.</li> </ul>  |

1

| <b>Table 2 Primary Components</b>                 |   |   |   |   |
|---|---|---|---|---|
| <b>Component</b>                                  | <b>Source</b>   | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>  |
| <b>Safety Deficiency Database (SDD)</b>           | SHAMM Section 2, subsection 4.6                                       | Database records deficiencies noted on Day/Night safety inspections, side road safety inspections and other sources such as CRS studies, justified public complaints, network supervisors and so on.  | Safety deficiencies are considered and addressed (e.g. through Minor Safety Programme and maintenance programmes) within available funding. | <ul style="list-style-type: none"> <li>• Measure number of deficiencies eliminated, isolated, minimised.</li> </ul>   |
| <b>Skid Resistance Analysis and Programming</b>   | SHAMM, section 2, subsections 3.5,5.3,7.7, Transit T/10 Specification | SCRIM data is used to identify sections of road that require investigation and or programming of surfacing treatment from a safety perspective (i.e. restore skid resistance) rather than an asset perspective (maintain pavement integrity). | Identify sites that require treatment and programme.  | <ul style="list-style-type: none"> <li>• Monitor SCRIM data over time for various sections of road for various types of surfacing.</li> </ul>   |
| <b>Fatal and High Profile Crash Investigation</b> | SHAMM Section 2, subsection 3.3                                       | Network Management Consultant is required to investigate all fatal crashes to determine the extent of Road Engineering factors. High profile serious injury and worksite crashes are investigated upon Transit request.                       | Roading factors identified, scheduled and actioned if funding and policies permit. Copy of report submitted to Traffic and Safety Manager   | <ul style="list-style-type: none"> <li>• Monitor extent to which Road Engineering and other factors are present and extent to which these factors can be addressed by Policy, Procedures and Programmes.</li> </ul> |
| <b>Road Safety and Road User Education</b>        | Initial policy in place.  | Emphasis of particularly identified road use issues.  | Reinforcement of safety issues at particular sites or routes  | Incorporation in user/stakeholder surveys for effectiveness.  |
| <b>Enforcement</b>                                | Road Safety Action Plans.   | Liaison with Police through RSAP process and regular communication.   | Enforcement of safety issues at particular sites or along routes.   | Through RSAP process  |

2  
3  
4  
5

@la

1  
2

| <b>Table 3 Secondary Components</b>                 |   |  |   |   |
|---|---|--|---|---|
| <b>Component</b>                                    | <b>Source</b>   | <b>Brief Description and Function within System</b>  | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>  |
| <b>Routine Maintenance Inspections</b>              | SHAMM Section 1 and Network Management Proforma.                | Consultants with responsibility for asset management are regular inspectors of the highway network. While primarily having an asset management focus, these inspections are addressing defects which have a safety component (potholes, vegetation control etc), however a safety culture shift ensures that a safety deficiency focus is also a key role. | Maintenance issues are addressed before they cause safety problems.   | Decreasing trend in the level of deficiency identified e.g. potholes, poor sign quality etc.                      |
| <b>Ten Year Maintenance Forward Works Programme</b> | SHAMM Section 1 and Network Management Proforma.                | Maintenance Forward Works Programme is cross-referenced with safety improvement projects/opportunities. This ensures maintenance works do not proceed without considering any safety projects or opportunities. It also identifies safety maintenance.   | Maintenance Forward Works Programme has all safety projects/opportunities listed. Safety maintenance is a focus of the programme. | Monitor update of safety project/opportunity within a completed maintenance activity.                             |
| <b>Ten Year Capital Works Programme</b>             | 10 Year Forward Works Programme, Annual Plan, Strategy Studies. | Most capital works projects will contain safety benefits. For all projects the highest level of safety will be strived for. Assessed on a project by project basis. Strategy studies identify a 25 year blueprint of strategic safety issues such as narrow lane/shoulder width, narrow bridges, substandard alignment etc.                                | All safety (road factor) deficiencies within the project length are considered and eliminated subject to economic constraints.    | In conjunction with Land Transport New Zealand monitor the before and after crash history of individual projects. |

3  
4  
5  
6  
7  
8  
9



| <b>Table 3 Secondary Components</b> |  |   |  |  |
|-------------------------------------|--|---|--|--|
| <b>Component</b>                    | <b>Source</b>  | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>  | <b>Monitoring, Trend, Evaluation</b>   |
| <b>Access Management</b>            | SHCM, subsection 3, Standard Professional Services specification, Planning Policy Manual December 1999, Strategic studies. | The level of access control will have a direct bearing on the safety performance of a highway (or length of highway). Transit has a number of access management tools including motorway declaration, regeneration strips, limited access roads, and input into District Plans and the control of development under the Resource Management Act 1991. | Level of access control is appropriate to each highway.  | Monitor and graph the number of crashes on the network that are access related. Distinguish between legal road intersections and access to adjoining property. |
| <b>Transit Bylaws</b>               | SHCM, Planning Policy Manual   | Activities on the highway reserve can lead to unsafe practice. Examples of activities which can compromise road safety if not controlled are: <ul style="list-style-type: none"> <li>• roadside vendors</li> <li>• movement of stock</li> <li>• stopping and parking of vehicles</li> <li>• fishing off bridges</li> </ul>                            | Bylaw requirements in place in all appropriate locations.  | Monitor level of compliance with bylaws.   |
| <b>Land Use Development Control</b> | Planning Policy Manual December 1999. (To be updated in 2006/2007)   | Traffic generated from new development can have a detrimental effect on road safety whether or not they are adjacent to the state highway. All proposed changes to land use therefore, need to be screened through the planning process.  | Evaluate all land use development proposals and ensure safety issues are avoided, remedied or mitigated. | Monitor the crash history associated with land use development proposals that proceed.   |

1

| <b>Table 3 Secondary Components</b>   |  |  |   |  |
|---------------------------------------|--|--|---|--|
| <b>Component</b>                      | <b>Source</b>  | <b>Brief Description and Function within System</b>  | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>   |
| <b>Traffic Control Devices Trials</b> | SHCM, Traffic Regulations, Traffic Control Devices (Land Transport New Zealand Rule) | Frequently new initiatives are promoted which have the potential to enhance road safety. To control these initiatives, Transit has policy in place which sets out the procedure to be followed. Where the Traffic Regulations / Rules are implicated, Land Transport New Zealand are actively involved in the process. | All traffic controls device trials are approved and implemented in accordance with policy.                | Monitor and evaluate in accordance with policy.                              |
| <b>Signs and Markings</b>             | Manual of Traffic Signs and Markings (MOTSAM) (Land Transport New Zealand Rule)      | All signs and markings must conform to established standards to minimise driver error.   | All signs and markings used are to comply with MOTSAM unless exemption granted in accordance with policy. | Monitor and evaluate in accordance with policy.                              |
| <b>Incident Management</b>            | CIMS, Board Policy   | Fulfil the contract with Police to provide traffic management at crashes and redirect traffic onto agreed routes to prevent secondary incidents.   | Prevention of secondary effects from effects of traffic redirection.                                      | Reporting back of incidents resulting from traffic redirection and debriefs. |

2

3

| <b>Table 4 Road Safety Partnerships</b>   |   |  |  |
|---|---|--|--|
| <b>Component</b>                          | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>  | <b>Monitoring, Trend, Evaluation</b>   |
| <b>Land Transport New Zealand</b>         | <p>Land Transport New Zealand is the key Government Department charged with promoting land transport safety. Transit has a partnership arrangement with Land Transport New Zealand which operates at both National and Regional levels. A key objective is to act in a co-operative manner ensuring that all mutual activities undertaken are co-ordinated and duplication is avoided wherever possible. Land Transport New Zealand provides Transit with annual Road Safety Reports.</p> <ul style="list-style-type: none"> <li>• As the funding agency Land Transport New Zealand is a key partner. Close relationships ensure that programmes are developed where road safety is a key focus. This is reflected in the NRP.</li> <li>• New initiatives to address safety concerns outside the current rules need to be agreed by Land Transport New Zealand before they can be implemented.</li> </ul> | <ul style="list-style-type: none"> <li>• Participate at Head Office and Regional level to ensure all mutually beneficial initiatives are co-ordinated and implemented.</li> <li>• Maintain regular contact through informal and formal avenues.</li> <li>• Annual Road Safety Report received, assessed and actions listed in appropriate programme.</li> <li>• NRP programmes continue to maximise the level of service to road users in respect of road safety.</li> </ul> | <p>Monitor trends in Road Safety Reports.</p> <p>Monitor consistency of standards between network contract areas and Regions. Monitor number of NRP projects implemented.</p> <p>Monitor effectiveness of interventions.</p>   |
| <b>New Zealand Police</b>                 | <ul style="list-style-type: none"> <li>• Important partner and provider of all official crash data (via MoT database)</li> <li>• Important partner and provider of all Police hours (via Land Transport New Zealand funded road safety programmes).</li> <li>• Alignment through formal and informal avenues such as rural police stations, road safety co-ordinating committees. Police campaigns can be specifically targeted to highway safety if warranted.</li> <li>• Important partner with ability to enforce changes in driver behaviour to improve safety e.g. Highway Patrol.</li> </ul>  | <ul style="list-style-type: none"> <li>• Robust crash data.</li> <li>• Police outcomes negotiated with Transit.</li> <li>• Co-operative campaigns.</li> </ul>  | <ul style="list-style-type: none"> <li>• Monitor crash data quality (typically through CRS consultant).</li> <li>• Monitor Police target outcomes.</li> <li>• Receive evaluation of all campaigns which are mutually beneficial.</li> <li>• Encourage improvements in Police crash reporting.</li> </ul> |
| <b>Other Road Controlling Authorities</b> | <p>Formal contact is made through various forums (such as Road Safety Co-ordinating committees, Liaison Groups, etc). However very important day to day contact is also strongly evident on all aspects of road safety, but particularly the highway/Local Road interface and through participation of partners in Transit safety initiatives.</p>  | <p>Issues raised are actioned via the safety deficiency database. Joint initiatives and partnership approaches.</p>  |  |

1

| <b>Table 4 Road Safety Partnerships</b>   |   |   |  |
|---|---|---|--|
| <b>Component</b>  | <b>Brief Description and Function within System</b>   | <b>Outcomes</b>   | <b>Monitoring, Trend, Evaluation</b>   |
| <b>Accident Compensation Corporation</b>  | On an increasing basis ACC are seeking proactive means to avoid trauma resulting from road crashes. For the highway network Transit is keen to co-operate with ACC where mutual gains will result.  | Co-operative campaigns and initiatives.   | Receive/prepare/contribute to evaluation and all campaigns and initiatives which are mutually beneficial.              |
| <b>Road Safety Co-ordinating Committees</b>   | Transit is a member of all Road Safety Co-ordinating Committees which are centred on one or more Local Authorities. Objective of committees is to co-ordinate road safety campaigns, communicate on road safety issues, avoid duplication, and provide a forum for public input.  | <ul style="list-style-type: none"> <li>• Combined campaigns.</li> <li>• Informed road safety stakeholders.</li> <li>• Road Safety Action Plans</li> </ul> | <ul style="list-style-type: none"> <li>• Receive evaluation of all campaigns which are mutually beneficial.</li> </ul> |
| <b>Regional Councils</b>  | Joint initiatives through regional funding of safety projects and directly through regional safety co-ordinators participation in Transit projects.   | Co-operative campaigns and initiatives.   | Receive evaluation of all campaigns which are mutually initiated.  |
| <b>Other Stakeholders e.g. RTF (Road Transport Forum), AA (NZ Automobile Association)</b> | Important feedback is received from a number of stakeholders, which allows Transit to improve the safety performance of its network. This feedback is received both formally and informally. The formal process is the Road Safety Action Plan groups and regular liaison meetings. Informally Transit receives feedback on a day to day basis on specific issues or concerns. This latter approach is encouraged so that a more proactive response can be initiated. Involvement of core groups in Transit safety initiatives. | Issues and concerns raised by other stakeholders are actioned via the safety deficiency database. Promulgation of safety programmes through campaigns.    | Monitoring of behaviour changes by core user groups. Feedback on effectiveness of safety messages.                     |
| <b>Internal Partnerships</b>  | <ul style="list-style-type: none"> <li>• Best Practice Groups. (BPGs)</li> <li>• Working parties.</li> <li>• Project teams.</li> </ul>  | <ul style="list-style-type: none"> <li>• Greater consistency of delivery.</li> <li>• Knowledge transfer.</li> <li>• New initiatives.</li> </ul>           | Review and debate effectiveness of adopted measures.   |

2  
3  
4  
5

## Section 2 Management

---

**In this  
section**

This section contains the following sections:

| <b>Section No.</b> | <b>Topic</b>                                      |
|--------------------|---|
| 2.1                | Safety Goals, Objectives, and Performance Targets |
| 2.2                | Organisational Structure                          |
| 2.3                | Reviews   |
| 2.4                | Independent Audit Review                          |
| 2.5                | Expertise   |
| 2.6                | Funding   |

---

## 2.1 Safety Goals, Objectives, and Performance Targets

---

### **National Road Safety Goals and Targets** 2.1.1

National road safety goals and targets are established by the Ministry of Transport (MoT) in consultation with road controlling authorities, police, Land Transport New Zealand and other interest groups.

*Refer Road Safety Strategy 2010 (MOT)*

---

### **Transit's Safety Goals, Objectives, and Performance Indicators** 2.1.2

Transit has a crucial role to play in the achievement of the national road safety goals and targets. Accordingly Transit has established road safety goals, objectives, and performance indicators.

*Refer National State Highway Strategy  
Refer State Highway Safety Plan*

---

### **Reviews** 2.1.3

Periodically Transit's safety goals, objectives, and performance indicators are reviewed by the General Management Team, taking into consideration the results of:

- Customer surveys;
  - Data analysis, e.g. crash data, SCRIM data, RGDAS data;
  - An analysis of the items in Transit's safety deficiency databases and hazard registers; and
  - Transit's comparative contribution to national safety goals and objectives.
-

## 2.2 Organisational Structure

---

### **Organisation Chart** 2.2.1

Transit's organisational chart is included in the Corporate Services Manual

*Refer Corporate Services Manual, Section 4.*

---

### **Staff Contributions and Influences** 2.2.2

The Network Operations Division, the Capital Projects Division, the Transport Planning Division, the seven Regional Offices, and Transit's consultants and contractors and other stakeholders all directly contribute to the achievement of Transit's road safety goals.

All engineering, policy, planning, and project management staff and Transit's consultants and contractors and other stakeholders are able to influence the frequency and severity of a large proportion of road crashes on state highways.

---

### **Responsibilities** 2.2.3

Regional management teams are responsible for the safety of the state highways in their areas. The State Highway Safety Management System is therefore seen as having flexibility so that each Transit office can target the system/s that best fits their area. Each Regional Division Manager is required to obtain agreement from their Division management on the methodology they wish to adopt. However the goals and objectives must remain consistent between divisions and an integrated approach is expected.

---

### **Reporting** 2.2.4

Regional Division Managers will provide an annual assurance statement to their General Managers confirming implementation and compliance with the Safety Management System.

---

## 2.3 Reviews

---

### **Annual Review** 2.3.1

The State Highway Safety Management System is reviewed on a regular basis to ensure it is relevant, up to date, and effective. A rolling programme of formal audits is carried out to ensure that the requirements of Transit's quality system are met, in particular the requirements for continuous improvement.

---

### **Process for Review** 2.3.2

The Traffic and Safety Manager leads and administers each annual review.

As part of the review and audit process, the Network Operations, Capital Projects and Transport Planning Divisions, are asked to comment on:

- Aspects of the State Highway Safety Management System manual which need updating;
  - Aspects of the State Highway Safety Management System Manual which are no longer relevant or are not practical;
  - Policies, standards, guidelines, manuals, and specifications that influence state highway safety which need updating;
  - New policies, standards, guidelines, manuals, and specifications which are required to improve state highway safety.
- 

### **Results** 2.3.3

The results of the review and audit process are used to:

- Update the Highway Safety Management System Manual;
  - Suggest / recommend changes to policy and procedures;
  - Develop the future work programmes ; and
  - Initiate appropriate projects.
-



## 2.4 Independent Audit Review

---

**Annual Audit  
2.4.1** Each year Transit is audited for its compliance with the State Highway Safety Management System (on a sample basis).

Transit is audited against selected components of the State Highway Safety Management System at least once every three years.

---

**Independent Auditor  
2.4.2** The audits are conducted by independent internal or external auditors contracted by the Traffic and Safety Manager.

---

**Establishing the Audit Programme  
2.4.3** Each year the Traffic and Safety Manager, in consultation with the General Management Team, determines those aspects of the State Highway Safety Management System which will be audited in the next independent audit.

---

**Results  
2.4.4** Each year a report summarising the results of the independent audits is submitted to the Chief Executive.

The report includes:

- A summary of those areas where there was high compliance with the System;
  - A summary of those areas where there was high non-compliance with the System;
  - A summary of the actions being taken to address the areas with high non-compliance; and
  - Recommendations for the development of new or updated policies, standards, guidelines, or specifications.
-

## 2.5 Expertise

---

**Roles**  
**2.5.1** All those involved in managing State Highways will have expertise requirements in relation to their roles.

---

**Transit Staff**  
**2.5.2** All Transit staff will have a job description that describes the requirements of the post, not necessarily the skills of the person appointed. Where the requirements exceed the skills of the person appointed there should be a training plan established to address any issues that may, in particular, affect safety activity. E.g. need for:

- STMS training as per CoPTTM which is a requirement for all Transit staff who ‘work’ on site
- Safety Audit training
- CAS training
- Crash investigation

---

**2.5.3**  
**Consultants and Contractors** Transit’s consultants and contractors must have the experience and expertise to deliver what is required and paid for under Transit’s contracts. This means that consultant/contractor staff involved in safety must:

- be familiar with this manual
- have a thorough understanding of MOTSAM/TCD rule if involved with sign inspection, design and installation.
- have a thorough understanding of M/23 if involved with barrier inspection, design and installation
- have a thorough understanding of CoPTTM if involved in temporary traffic management (i.e. be STMS trained)
- have a thorough understanding of relevant design standards e.g. Austroads guides.

---

**2.5.4**  
**Staff Expertise Evaluation** Regional Operations Managers should request sight of consultant job descriptions and C.V.s to satisfy themselves that nominated consultant staff have appropriate expertise.

---

## 2.6

## Funding

---

### **National Roads Account 2.6.1**

The National Roads Account is administered by Land Transport New Zealand.

The National Roads Account receives its funds from the National Roads Fund.

All of Transit's outputs are currently funded from the National Roads Account. Land Transport New Zealand allocates this funding according to the procedures in Land Transport New Zealand's Programme & Funding Manual.

*Refer Programme & Funding Manual, Land Transport New Zealand*

A large proportion of this expenditure targets safety related outcomes and as from 07/08, Transit will, as an approved organisation, be able to bid for additional funding for road user education programmes. It is important that Transit uses such opportunities to ensure that a “3 E’s” approach is taken to highway safety problems and that education funding is co-ordinated with engineering and enforcement.

---

## Section 3

# Identifying Hazardous Locations

---

**In this section**

This section contains the following sections:

| Section No. | Topic                        |
|-------------|------------------------------|
| 3.1         | Data Collection              |
| 3.2         | Safety Management Strategies |
| 3.3         | Regular Routine Inspections  |
| 3.4         | Safety Inspections           |
| 3.5         | Safety Deficiency Databases  |
| 3.6         | Hazard Registers             |
| 3.7         | Crash Reduction Studies      |
| 3.8         | Safety Retrofitting          |
| 3.9         | Road Safety Action Plans     |

---

## 3.1 Data Collection

---

### Introduction 3.1.1

Central to an effective safety management system is the collection and use of accurate and comprehensive data related to road crashes. The interpretation of this data allows Transit to:

- define and understand the road safety problems on state highways;
  - determine appropriate countermeasures;
  - prioritise road safety projects;
  - monitor road safety performance; and
  - evaluate the effectiveness of various road safety initiatives.
- 

### Crash Data 3.1.2

The Network Operations Division, all the regional offices, and network management consultants have access to MOT's Crash Analysis System (CAS). The data within CAS includes all crashes reported by the NZ Police.

---

### Alternative Crash Data 3.1.3

Network Management Consultants are required to establish a network of local contacts in order to collect data on crashes which may not be reported to the NZ Police. A database is used to collect and maintain this data and is able to be merged with the CAS database by using a different number prefix code.

*Refer State Highway Asset Management Manual, Chapter 2, Section 3.2 Crash Data.*

---

### Pavement Data 3.1.4

Each year, skid resistance, texture, rutting, crossfall, curvature, and road roughness data is collected and entered into the Road Assessment and Maintenance Management System (RAMM).

*Refer State Highway Control Manual, Chapter 4, Section 4.6 Road Assessment and Maintenance Management Systems.*

*Refer Network Management Proforma.*

*Refer State Highway Asset Management Manual, Section 7.  
See also section 4.1.4 of this document.*

---

**Traffic Data**  
**3.1.5**

All Transit regions maintain a network of sites and equipment for monitoring traffic characteristics, including traffic volumes, speeds, composition, and axle loadings.

Each year the data is collated by the Network Operations Division to produce the National Traffic Volume Booklet

*Refer State Highway Control Manual, Chapter 4, Section 4.1.7, Inventory Information and 4.1.8 Traffic Characteristics.*

---

**Highway**  
**Information**  
**Sheets, Route**  
**Data Sheets,**  
**and Aerial**  
**Photographs**  
**3.1.6**

All Transit regions maintain highway information sheets, route data in RAMM and aerial photographs of all their state highways.

Highway information sheets give a pictorial and tabular description of state highways.

Route data sheets give a tabular distance listing of significant features.

*Refer State Highway Control Manual, Chapter 4, Sections 4.1.5 to 4.1.7*

---

**Other**  
**Inventory**  
**Data**  
**3.1.7**

In addition to the data explained above, all Transit regions maintain inventories of the key state highway assets including the following:

- Traffic Control Devices
- Road Safety barriers
- Lighting installations;
- Traffic signal installations;
- Railway level crossings; and
- Bridges.

*Refer State Highway Control Manual, Chapter 4, Sections 4.1.7 Inventory Information, and 4.2 Descriptive Inventory of Bridges*

---

## 3.2

# Safety Management Strategies

---

Network Management Consultants are required to prepare safety management strategies at the beginning of each network management contract period. The safety management strategies document the way in which the consultant will conduct the activities described in Chapter 2 of the SHAMM. These strategies will be consistent with the methodology adopted by each Regional Network Operations Manager (refer Section 2.2).

*Refer Chapter 2, State Highway Asset Management Manual.*

---

### 3.3

## Regular Routine Inspections

---

Regular routine inspections (including day, night and side roads) of the state highway network are conducted at specified intervals by network management consultants and contractors. These inspections ensure that Transit's maintenance suppliers are familiar with the current condition of the network. The inspections also allow safety problems to be identified.

*Refer State Highway Asset Management Manual, Chapter 2, Section 4.3 Regular Inspections*

*Refer Network Management Proforma, Hybrid Management Proforma and Performance Specified Maintenance Contract (PSMC) Proforma.*

---



## 3.4 Safety Inspections

---

In addition to regular routine inspections, safety inspections are conducted by network management consultants and PSMC Contractors. The objective of the ~~special~~ safety inspections is to identify existing and potential safety problems.

The inspections include daytime, night time, and side road inspections.

Before safety inspections are undertaken, the network management consultant or PSMC Contractor analyses crash data to identify:

- sites or routes where there are clusters of road crashes;
- groups of crashes of a similar type, occurring across several sites;
- any series of crashes that have common features, such as road features (e.g. bridges), vehicle features (e.g. heavy vehicles), road user features (e.g. pedestrians), environmental features (e.g. wet road) or contributory features (e.g. skidding) ;
- any series of 'high profile' crashes (e.g. crashes at railway crossings).

*Refer State Highway Asset Management Manual, Chapter 2, Section 4.4 Special Inspections*

*Refer Network Management Proforma, Hybrid Management Proforma and PSMC Proforma*

---

## 3.5 Safety Deficiency Databases

---

All safety problems identified during regular inspections, crash reports, safety inspections or as a result of Crash Reduction Studies (CRSs) are recorded by network management consultants or PSMC Contractors in safety deficiency databases (SDDs).

The databases include recommended remedial treatments and priorities for each safety problem listed.

Work programmes within maintenance and minor safety activities are developed to address items on the safety deficiency database as funding allows. Proposed construction projects are cross-referenced with the database to ensure opportunities for improved safety are recognised at an early stage.

*Refer State Highway Asset Management Manual, Chapter 2, Section 4.6 Safety Deficiency Database*

---

## 3.6 Hazard Registers

---

Network Management Consultants and PSMC Contractors are required to maintain a hazard register which includes a list of sites with possible recurring hazards.

The hazard register is used by contractors to ensure any maintenance work effectively targets identified hazards.

This is one of Transit's primary tools for risk management on the state highway networks.

*Refer State Highway Asset Management Manual, Chapter 2, Section 6.4, Hazard Register*

*Refer State Highway Maintenance Contract Proforma Manual (SM032) Traffic Services Proforma.*

---

## 3.7

# Crash Reduction Studies

---

Crash Reduction Studies (CRSs) have proven to be cost-beneficial worldwide. CRSs are reactive and complement Transit's proactive ~~special~~ safety inspections and grey spot trend analysis procedures.

All urban state highways are included in a CRS at least once every five years, in recognition of the sometimes complex problems and solutions that arise. Rural highways shall be subjected to CRSs where the proactive safety inspections and grey spot analysis have not reduced the incidence or trend of crashes.

CRSs are conducted according to the Transit/Land Transport New Zealand Accident Investigation Procedures.

*Refer State Highway Control Manual, Chapter 3, Section 3.7 Crash Reduction, Prevention and Safety Audits*

*Refer Land Transport New Zealand, A New Zealand Guide to the Treatment of Crash Locations (2005)*

---

## 3.8

# Safety Retrofitting

---

Transit's Safety Retrofitting project targets hazards within the clear zone on a risk basis. Hazards such as trees, columns and culverts are removed, relocated or protected.

The programme is managed by the Traffic and Safety Manager.

Prioritisation is based on single-vehicle loss of control crash rates across the network and with special attention to sections of highway identified in Road Safety Action Plans and other network safety initiatives that target the causes in a three "E's" approach.

---

## 3.9

# Road Safety Action Plans

---

The intention of regional based Road Safety Action Plans is to provide a co-ordinated approach to dealing with safety problems. These plans are developed by a partnership of agencies and organisations concerned about a particular geographical area. Such areas may be a large city council or a cluster of smaller rural councils. Transit is committed to supporting this process. Projects that are incorporated in Road Safety Action Plans more easily qualify for funding in the NLTP. Therefore it is appropriate for Transit to be a party to the development of such plans as it will enhance the ability to advance safety issues regionally and ensure highway issues are addressed.

*Refer Land Transport New Zealand notes on developing RSAPs*

---

## Section 4

# Road, Pavement, and Bridge, Design and Maintenance

---

**In this section**

This section contains the following sections:

| Section No. | Topic                                 |
|-------------|---------------------------------------|
| 4.1         | Pavement Construction and Maintenance |
| 4.2         | Road and Bridge Design                |
| 4.3         | Road Safety Audit                     |

---

## 4.1 Pavement Construction and Maintenance

---

### Introduction 4.1.1

The following pavement conditions affect road safety:

- skid resistance/texture;
- rutting;
- loose chip;
- drainage;
- pavement edge drops; and
- loss of pavement shape.

Furthermore, maintenance activities which manage snow and ice also improve road safety.

Potholes are perceived as a safety hazard especially for cyclists and motorcyclists. The level of hazard is a function of location and size therefore the repair of potholes according to road hierarchy and stated performance measures should ensure that potholes do not pose, or develop into, a safety hazard.

---

### General 4.1.2

Transit has standard specifications to cover a range of maintenance and construction activities on state highways. The specifications apply to all construction and maintenance on state highways, and many requirements in these relate to maintaining safety standards.

*Refer State Highway Maintenance Contract Proforma Manual (SM032) and P-series specifications.*

*Refer Transit's M (Material) specifications, P (Paving and Surfacing and Construction) specifications, C (Maintenance) and HM (Highway Maintenance) specifications.*

---



## ***EXPLANATORY NOTE***

### ***Pavement Maintenance***

The primary focus of Transit's pavement management strategies is to protect the massive investment in pavements. However, these pavement management strategies also provide opportunities for improvements in road safety. The following is an extract from the Institute of Transportation Engineers Traffic Safety Toolbox:

*The mission of a highway agency is to provide safe and efficient transportation to the motoring public at a reasonable cost. A component of this mission is to maintain the system. The condition of the transportation system has garnered increasing attention over the years as a result of the infrastructure crisis which taught highway agencies and their governing bodies an important lesson. That is, the highway system must be adequately maintained to protect the taxpayers' massive investment in its construction. It is now well understood that pavement maintenance, particularly preventive, pays future dividends by slowing and in some cases arresting the pavement deterioration process. What is less understood is that these same pavement maintenance strategies can also benefit highway safety.....*

*Highway agencies should not pass up the opportunity to include minor safety improvements that could have a safety payoff when conducting pavement maintenance related activities. To do this, the engineer must be able to identify those pavement locations where accident experience is high. Often, minor treatments such as improved signing and delineation are all that is needed to correct the problem and it is generally easy to incorporate these countermeasures into a typical maintenance project. Thus, the relationship between pavement maintenance and highway safety is an essential consideration as highway agencies endeavour to integrate maintenance, pavement and safety management systems.*

**Maintenance  
Forward  
Work  
Programmes  
4.1.3**

Maintenance forward work programmes are summaries of the maintenance and improvement treatments required (e.g. routine maintenance, reseal, pavement rehabilitation) for all sections of State highway. Maintenance forward work programmes are prepared by network management consultants, hybrid and PSMC Contractors.

In preparing the maintenance forward work programmes network management consultants, hybrid and PSMC Contractors:

- use RAMM to obtain pavement maintenance treatment recommendations;
- visit state highway sections to determine if the pavement maintenance treatments recommended by RAMM are appropriate. The visits also allow safety deficiencies to be identified;
- consider crash histories for each state highway section to determine if any road safety problems could be addressed by pavement maintenance activities; and
- consider the recommendations of relevant CRSs and special safety inspections to determine if any of the recommendations can be incorporated into maintenance forward work programmes.

In summary, the procedure used for preparing maintenance forward work programmes allows road safety improvements to be incorporated into maintenance activities.

*Refer State Highway Asset Management Manual, Chapter 1, Section 4, Forward Work Programme*

---

**Skid  
Resistance  
4.1.4**

1. Low skid resistance has been found to increase the rate of wet road crashes in New Zealand and internationally. (See TNZ T/10 Skid Resistance Investigation and Treatment Selection).
2. For a given water film thickness skid resistance reduces above a speed of 30km/hr. The rate of loss of skid resistance can be minimised by ensuring adequate macrotexture in the pavement surface. See Technical Memoranda TM 5003 (NetO 1/05 Macrotexture Requirements for Surfacing.)
3. Low skid resistance can be caused by polishing of the pavement aggregate, or by contamination of the surface by other materials. Examples are;
  - animal droppings
  - silt, clay etc
  - frozen water (ice, snow etc) This is covered in section 4.1.11
  - bitumen
4. Transit's Statement of Intent includes performance targets for both macro and microtexture.

Transit undertakes an annual survey of the skid resistance in each wheel path. The results are compared to requirements in Transit specification T/10 and appropriate treatment undertaken. To enable early treatment the "Exception Report" instructions and data are normally issued, as soon as skid resistance survey is completed in a particular area.

*See also State Highway Maintenance Contract Proforma Manual (SM032) Highway Maintenance, Method Resurfacing and Output Resurfacing and Output Resurfacing Proformas.*

---

**Rutting**  
**4.1.5**

Rutting is longitudinal surface depressions in the wheel tracks of vehicles. Rutting can affect driver control in the following ways:

- when wheel-path rutting is very severe, vehicle tires will tend to track in the ruts;
- rutting may cause ponding of water, reducing skid resistance at higher speeds (over 30kph) and increasing the chance of hydroplaning or ice-related crashes; and
- ponding can increase the splash and spray from heavy vehicles. Note that the splash and spray from heavy vehicles may be reduced by the use of open-graded asphalt or vehicle devices.

Transit's Statement of Intent includes performance targets for rutting.

*Refer Transit's Statement of Intent*

---

**Loose Chip**  
**4.1.6**

Loose chip is a recognised safety problem on state highways.

Transit's specifications for new pavements, reseals, and maintenance include requirements to ensure loose chip does not create a safety hazard.

*Refer P/17 Performance Based Specification for Bituminous Reseals*

*Refer P/4 Specification for Chipsealing*

*Refer SM032 State Highway Maintenance Contract Pro-forma, Highway Maintenance, Method Resurfacing and Output Resurfacing.*

---

**Pavement  
Edge Drops  
4.1.7**

Pavement edge drops are vertical discontinuities at the edge of the paved surface.

Research has shown that pavement edge drops can affect the controllability of a vehicle.

Transit's specification for shoulder maintenance of unsealed shoulders includes criteria for assessment and maintenance of pavement edge drops.

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Highway Maintenance Proforma*

Pavement edge drops must be repaired within specified response times.

*Refer HM 16 Shoulder Maintenance Specification.*

---

**Potholes  
4.1.8**

Transit's specification for the repair of potholes, and maintenance contracts, require all potholes to be rectified within specified response times. These documents objectively define a pothole.

*Refer State Highway Maintenance Contract Proforma Manual (SM032)  
Refer HM/19 Potholes Specification*

---

**Splash and  
Spray  
4.1.9**

Open-graded porous asphalt (OGPA) can be used to reduce the splash and spray from heavy vehicles. However, note that the use must be appropriate to the site as there are cost issues. Providing the correct PSV aggregate is used, OGPA has excellent skid resistance and texture properties.

The Transit specification for open-graded porous asphalt includes guidelines for the construction of such asphalts.

*Refer P/11: Specification for Open Graded Porous Asphalt*

---

**Drainage**  
**4.1.10**

Good drainage is essential to avoid regular or occasional flooding which can be a serious safety hazard. Locations where flooding occurs regularly should be signed as per MOTSAM and recorded in the Hazard Register (refer section 3)

*Refer Highway Surface Drainage: A Design Guide for Highways with a Positive Collection, Manual of Traffic Signs and Markings (MOTSAM), State Highway Maintenance Contract Proforma (SM032)*

---

**Winter**  
**Maintenance**  
**Strategies**  
**4.1.11**

Transit's specification for winter maintenance requires maintenance contractors to monitor weather conditions in order to determine the requirement for ice chemical treatment, gritting, snow clearance and, if necessary, road closure to protect the public. Maintenance contracts specify response rates within which gritting and snow clearance must be commenced.

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Refer HM10 Winter Maintenance Specification*

---

## 4.2 Road and Bridge Design

---

### **Introduction** 4.2.1

In the design of new roads and bridges, and the reconstruction of existing roads and bridges, safety must be a prime design criterion.

Road design features affect safety by:

- influencing the ability of the driver to maintain vehicle control and identify hazards. Significant features include lane width, alignment, sight distance, and superelevation;
  - influencing the number and types of opportunities that exist for conflicts between vehicles. Significant features include, intersection design, number of lanes, and medians;
  - affecting the consequences of an out-of-control vehicle leaving the travel lanes. Significant features include shoulder width and types, and side slopes; and
  - Considering the needs of vulnerable road users such as pedestrians and cyclists.
- 

### **Geometric Design** 4.2.2

The geometric designs of new or reconstructed state highways are in accordance with Australian/New Zealand best practice.

*Refer Austroads Traffic Management and Road Design guides, State Highway draft Geometric Design Manual; State Highway Control Manual, Chapter 3, Section 3.1 Highway Design Details.*

---

### **Intersection Design** 4.2.3

New state highway intersections are designed in accordance with Australian/New Zealand best practice.

*Refer Austroads Traffic Management and Road Design guides, State Highway draft Geometric Design Manual, State Highway Control Manual, Chapter 3, Section 3.1.4 Intersection Design.*

---

**Seal Width  
and Side  
Slopes  
4.2.4**

For rural state highways Transit has a policy for determining the appropriate seal width and for the design of side slopes.

The side slope is the piece of roadway between the shoulder edge to the base of the adjacent drainage channel or the top of the fill batter.

Target seal widths are documented in State Highway Performance Indicators and Targets, 2001 and subsequent updates.

*Refer Appendix 3A State Highway Control Manual (SM012: ISSUE 4, September 2004)*

*Refer State Highway Geometric Design Manual.*

---

**Bridge  
Design and  
Maintenance  
4.2.5**

All new or replacement bridges on state highways are designed in accordance with the Bridge Manual.

*Refer Bridge Manual Second Edition, Transit New Zealand, June 2003 (SP/M/022 including subsequent amendments).*

State highway bridges are maintained in accordance with the bridge inspection policy and the Bridge Inspection & Maintenance Manual.

*Refer S6: 2000, Bridge Inspection Policy*

*Refer Bridge Inspection & Maintenance Manual, Transit New Zealand, (SP/M/016: July 2001)*

---



## 4.3 Road Safety Audits

---

### Introduction 4.3.1

A road safety audit is a formal examination of an existing road or future road project in which an independent qualified examiner looks at the project's crash potential and safety performance.

The objectives of a road safety audit are to identify potential and actual safety problems for road users, and to ensure that measures to eliminate or mitigate the problems are considered.

---

### Criteria 4.3.2

Transit has committed to auditing all projects at appropriate stages unless the Project Manager has good reasons not to do so and completes a Road Safety Audit Exception Declaration Form in accordance with Land Transport New Zealand guidelines.

*Refer Safety Audit Policy and Procedures, Land Transport New Zealand Road Safety Audit Procedures for Projects Guidelines 2004. Refer BPG 9.11 of Project Management Manual.*

---

### Procedures 4.3.3

Safety audit procedures are based on a series of checklists. Checklists have been prepared for ~~each of the five~~ following stages of safety audits:

- Feasibility or Scope
- Draft Design or Project Assessment
- Detailed Design or Final Design
- Pre-Opening
- Existing Roads

The stage selected for audit is based on an assessment of risk, the type of project, project progress, and the complexity of the project.

Within each stage, separate checklists are used to evaluate a number of elements and features.

*Refer Road Safety Audit Policy and Procedures, Land Transport New Zealand 2004;*

*Safety Audit Policy and Procedures, Transit New Zealand 1993; Road Safety Audit, Austroads, 2002; Road Safety Audits, RTA 1995, Safety Audit Procedures For Existing Roads, Transfund New Zealand, 1998.*

---

**Implementation**  
**4.3.4**

---

Each regional office must have procedures in place to evaluate and implement, as appropriate, the outcomes of Safety Audit reports. Final implementation decisions for each project must be recorded on the project files.

---

## Section 5

# Traffic Control Devices

---

**In this section**

This section contains the following sections:

| Section No. | Topic                        |
|-------------|------------------------------|
| 5.1         | Traffic Signs                |
| 5.2         | Pavement Markings            |
| 5.3         | Delineation                  |
| 5.4         | Traffic Signals              |
| 5.5         | Speed Limits                 |
| 5.6         | Temporary Traffic Management |

---

## 5.1 Traffic Signs

---

### Introduction 5.1.1

Road users depend on traffic signs to guide, warn, and regulate them during daylight, darkness, and inclement weather. Deficiencies in traffic signing can have detrimental impacts on road safety. A missing, improper, or poorly maintained sign can be a direct cause of a road crash.

It is essential that signs are installed and maintained in accordance with relevant standards and guides, in particular those concerning shape, colour, size, location and application. This ensures traffic sign consistency. Consistency means treating the same situation in the same way. Consistency aids motorist understanding and recognition.

Traffic signs should be subject to regular maintenance and inspection (including night time inspection) to ensure each sign:

- is not obscured by foliage or other roadside installations;
  - is in good physical condition;
  - conveys the correct message both in daylight and night time conditions;
  - conforms to current policy, is still relevant and necessary, and that there is not a need to update or replace it;
  - is cleaned sufficiently often; and
  - is supported by a structure in sound physical condition.
-

**Uniformity**  
**5.1.2**

To ensure the uniform shape, colour, size, location and application of traffic signs, all traffic signs on state highways comply with the Manual of Traffic Signs and Markings and the Land Transport Rule Traffic Control Devices, unless otherwise approved according to the procedure for traffic control device trials.

*Refer Manual of Traffic Signs and Markings, Part I: Traffic Signs, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

*Refer Traffic Regulations 1976*

*Refer Land Transport Rule, Traffic Control Devices (2003/2004) and Land Transport Rule, Traffic Control Devices Amendment (2005) and Land Transport Rule Traffic Control Devices Amendment (2006)*

*Refer State Highway Control Manual, Chapter 3, Section 3.8, Traffic Control Device Trials*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Service Proforma.*

---

**Materials and Installation**  
**5.1.3**

The Transit specification for the erection and maintenance of traffic signs, chevrons, markers, and sight rails, and the Manual of Traffic Signs and Markings, include requirements for traffic sign material and traffic sign installation.

*Refer C20: Specification for the Erection and Maintenance of Traffic Signs, Chevrons, Markers and Sight Rails; to be incorporated in the State Highway Maintenance Contract Proforma Manual (SM032) in 2006/07*

*Refer State Highway Maintenance Contract Proforma Manual (SM032) "Traffic Services" Proforma*

*Refer Manual of Traffic Signs and Markings, Part I: Traffic Signs and in due course, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

*Refer RSMA Compliance Standard for Traffic Signs*

---

**Reflectorisation  
5.1.4**

The Manual of Traffic Signs and Markings includes reflectorisation requirements.

*Refer Manual of Traffic Signs and Markings, Part I: Traffic Signs and in due course, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

---

**Maintenance  
5.1.5**

The Transit specification for the erection and maintenance of traffic signs, chevrons, markers, and sight rails includes requirements for the maintenance of traffic signs to ensure the signs remain ‘fit-for-purpose’.

*Refer C20: Specification for the Erection and Maintenance of Traffic Signs, Chevrons, Markers and Sight Rail; to be incorporated in the State Highway Maintenance Contract Proforma Manual (SM032) in 2006/07*

Transit’s maintenance contract documents include requirements for regular inspections of traffic signs and response rates to rectify defects.

*Refer Contract Documents for Traffic Services*

*Refer Standard for the Manufacturer and Maintenance of Traffic Signs, Posts and Fittings 1995.*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Services Proforma.*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Vegetation Control Proforma.*

---

## 5.2 Pavement Markings

---

### **Introduction** 5.2.1

Road users make use of pavement markings to guide and warn them during daylight, darkness, and inclement weather. Because pavement markings are required to operate during daylight and night time, they should be reflectorised. Pavement markings also need to be skid-resistant and durable. The message they convey should be clear, consistent, and not lead to confusion.

---

### **Uniformity** 5.2.2

To ensure the uniform shape, colour, size, and location of pavement markings, all pavement markings on state highways comply with the Manual of Traffic Signs and Markings, and the Land Transport Rule, Traffic Control Devices Road User Rule, unless otherwise approved according to the procedure for traffic control device trials.

*Refer Manual of Traffic Signs and Markings, Part II: Markings and in due course, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

*Refer State Highway Control Manual, Chapter 3, Section 3.8, Traffic Control Device Trials*

---

### **Equipment, Materials, and Application** 5.2.3

To control pavement marking equipment, pavement marking materials, and the application of pavement marking, Transit has established specifications.

*Refer M/7: Specification for Roadmarking Paints*

*Refer M/20: Specification for Long-Life Roadmarking Materials*

*Refer M/24: Specification for Audiotactile Profiled Roadmarkings*

*Refer P/22: Specification for Reflectorised Pavement Marking*

*Refer T/8: Specification for Roadmarking Paint Applicator Testing*

*Refer T/12: Specification for Long-Life Roadmarking Materials Applicator Testing*

*Refer P/20P: Performance Based Specification for Road Marking*

---

**Skid  
Resistance**  
**5.2.4**

Transit's specifications for road marking paints include skid resistance requirements.

*Refer M/7: Specification for Road marking Paints*

*Refer M/20: Specification for Thermoplastic Roadmarking Materials*

---

**Reflectorisation**  
**5.2.5**

Transit's specifications for road markings include requirements for reflectivity.

*Refer M/7: Specification for Road Marking Paints*

*Refer M/20: Specification for Thermoplastic Road Marking Materials*

*Refer P/22: Specification for Reflectorised Pavement Marking*

*Refer P/20P: Performance Based Specification for Road Marking*

The Manual of Traffic Signs and Markings requires the use of retro-reflectorised material for all road markings.

*Refer Manual of Traffic Signs and Markings, Part II: Markings and in due course, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

---



## 5.3 Delineation

---

### Introduction 5.3.1

Delineation devices include pavement markings, profiled markings, raised pavement markers, edge marker posts, chevrons, and bridge end markers.

Delineation is used by drivers to assist them make navigation and control decisions. Adequate delineation allows the driver to keep the vehicle within the traffic lane, and plan the immediate forward driving task. Delineation should be consistent and continuous.

Delineation is likely to become even more important as the driving population ages. Older drivers have reduced visual capabilities and rely to a greater extent on correct delineation of the road ahead.

---

### Raised Pavement Markers 5.3.2

Transit has specifications for the manufacture, installation, and maintenance, of raised pavement markers.

*Refer M/12: Specification for Raised Pavement Markers*

*Refer P/14: Specification for Installation of Raised Pavement Markers*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Services Proforma.*

The Manual of Traffic Signs and Markings also includes guidance on the installation of raised pavement markers.

*Refer Manual of Traffic Signs and Markings, Part II: Markings and in due course, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

---

### Edge Marker Posts 5.3.3

Transit has specifications for the manufacture, installation, and maintenance, of edge marker posts.

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Services Proforma*

*Refer M/14: Specification for Edge Marker Posts*

*Refer P/16: Specification for the Installation of Edge Marker Posts*

---

**Edge Marker Posts**  
**5.3.3,**  
continued

The Manual of Traffic Signs and Markings also includes guidance on the placement of edge marker posts.

*Refer Manual of Traffic Signs and Markings, Part II: Markings and in due course, Land Transport New Zealand Traffic Control Devices Specifications.*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Services Proforma.*

---

**Chevrons and Bridge End Markers**  
**5.3.4**

The Transit specification for the erection and maintenance of traffic signs, chevrons, markers, and sight rails includes requirements for the manufacturer, installation, and maintenance of chevrons and bridge end marker posts.

*Refer TNZ C20: Specification for the Erection and Maintenance of Traffic Signs, Chevrons, Markers and Sight Rails; to be incorporated in the State Highway Maintenance Contract Proforma Manual (SM032) in 2006/07*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Services Proforma.*

The Manual of Traffic Signs and Markings also includes guidance on the placement of chevrons and bridge end marker posts.

*Refer Manual of Traffic Signs and Markings, Part II: Markings and in due course, Land Transport New Zealand Traffic Control Devices Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

---

## 5.4 Traffic Signals

---

### Introduction 5.4.1

Traffic signals are generally intersection control devices used in urban areas, and occasionally in rural areas. By separating in time the use of road space across major traffic flows, traffic signals have the potential to significantly reduce conflicts. Traffic signals can also provide for pedestrians and cyclists.

Research indicates that warranted traffic signals reduce the number of right angle crashes, although probably at the expense of an increase in less severe crashes involving vehicles turning from opposite directions and rear end crashes.

Transit also supports the use of traffic signal systems such as SCATS (Sydney Coordinated Adaptive Traffic System) in urban areas to manage traffic demand.

---

### Design 5.4.2

All traffic signals on state highways should comply with the Land Transport Rule, Traffic Control Devices ~~and Road User Rule~~. New and upgraded installations are designed in accordance with the Austroads guide for traffic signals. Regular reviews of installation standards should be done and opportunities to upgrade installations should be used, particularly at identified problem intersections.

*Refer Manual of Traffic Signs and Markings, Part I: Traffic Signs and in due course, Land Transport New Zealand Traffic Control Devices Specifications.*

*Refer Austroads Guide to Traffic Engineering Practice, Part 7, Traffic Signals and successor Austroads documents.*

---

### Maintenance 5.4.3

The Transit specification for the maintenance and repair of traffic signal installations includes requirements for the maintenance of traffic signals.

*Refer C25: Specification for the Maintenance and Repair of Traffic Signal Installations; to be incorporated in the State Highway Maintenance Contract Proforma Manual (SM032) in 2006/07*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Traffic Services Proforma.*

---

## 5.5 Speed Limits

---

### **Introduction** 5.5.1

International research shows clearly that lower vehicle speeds reduce the severity and number of road crashes. It follows from this that if speed limits affect travel speeds they should also affect crash rates. However, speed limits can only affect safety if they actually affect travel speeds. The influence of speed limit on vehicle speeds relies on, firstly a speed limit being regarded as reasonable, and secondly on enforcement.

---

### **Reasonable Speed Limits** 5.5.2

To ensure speed limits on state highways are regarded as reasonable, all speed limits are, after consultation with stakeholders and road users, set in accordance with the Land Transport Rule, Setting of Speed Limits. All permanent speed limit proposals are independently reviewed by Transit's Traffic and Safety Team before being placed before the Board.

*Refer Land Transport Rule, Setting of Speed Limits (MOT 2003),  
Schedule 1: Speed Limits New Zealand.*

---

### **Enforcement** 5.5.3

Each year, Transit's regional offices are given the opportunity to have input into the development of the National Road Safety Programme which includes allocations for speed enforcement by the Police.

---

## 5.6 Temporary Traffic Management

---

### Introduction 5.6.1

Construction and maintenance activities often result in increased road safety risks, reduced traffic capacities, delays, and loss of access to abutting properties and businesses.

To ensure acceptable levels of safety and traffic service, effective management of traffic through work zones is essential. This can be achieved by the application of the following principles:

- temporary traffic management must be consistent throughout the state highway network;
  - traffic safety should be an integral and high priority element of every construction job and maintenance project, from planning, through design, to construction.
  - construction and maintenance operations should inhibit traffic flow and speeds as little as possible;
  - the length, width and duration of TTM should be restricted to the minimum required for the safe operation of the activity currently under way.;
  - clear and positive guidance must be provided to drivers approaching and traversing work zones;
  - routine inspection of traffic management elements is essential to ensure acceptable levels of traffic safety, traffic flow and operations are maintained during the work;
  - roadside safety must be given sufficient attention because of the potential increase in hazards associated with the work activities;
  - full training of all relevant staff is compulsory and essential;
  - adequate legislative authority is necessary for the implementation and enforcement of traffic regulations applicable to work zones; and
  - maintaining good public relations, and keeping the motoring public informed, is essential.
-

**Health and  
Safety in  
Employment  
Act 1993  
5.6.2**

The provisions of the Health and Safety in Employment Act 1993 apply to all Transit activities. Under the Act, Transit and its consultants and contractors, have a legal responsibility to ensure that employees and others entering the work site are protected from risk of injury or illness in the workplace. Transit needs to be proactive dealing with temporary traffic management safety issues on worksites.

---

**Standard  
Procedures  
and  
Contracts  
5.6.3**

To meet the obligations of the Health and Safety in Employment Act 1993, Transit has standard procedures and contract documents to ensure the safe management of traffic at work zones.

*Refer Code of Practice for Temporary Traffic Management (COPTTM)*

*Refer Transit's State Highway Maintenance Contract Proforma Manual (SM032), State Highway Construction Contract Proforma Manual (SM031) and State Highway Professional Services Contract Proforma Manual (SM030).*

---

## Section 6

### The Roadside

---

**In this section**

This section contains the following sections:

| Section No. | Topic                   |
|-------------|-------------------------|
| 6.1         | Access Management       |
| 6.2         | Roadside Clear Zones    |
| 6.3         | Road Lighting           |
| 6.4         | Safety Barriers         |
| 6.5         | Highway Stopping Places |
| 6.6         | Vegetation Control      |

---

## 6.1 Access Management

---

### Introduction 6.1.1

Access management is the control of traffic (including pedestrians and cyclists) entering from other roads, including intersections, driveways, and median crossovers. Access control reduces the variety and spacing of events to which a driver must respond.

Safety can be improved by reducing the frequency of intersections and median openings, preventing direct access from abutting property, and the use of devices such as frontage roads, by-passes, and turning lanes. However these can be expensive options for stand-alone treatments. They should be considered when carrying out highway upgrading.

---

### Motorways 6.1.2

Under the Transit New Zealand Act 1989, motorways can be declared.

The direct access from abutting properties, pedestrian, cycle, and equestrian traffic, and the stopping and parking of vehicles is prohibited on Motorways unless approved by the Transit Authority.

*Refer State Highway Control Manual, Chapter 1, Section 1.3 Motorways*

---

### Expressways 6.1.3

Transit's state highway hierarchy includes Expressways.

Expressways are high speed roads with minimal direct property access, and generally at grade intersections. Pedestrians and cyclists are usually permitted.

---

### Limited Access Roads 6.1.4

Under the Transit New Zealand Act 1989, Transit has the power to create Limited Access Roads.

Limited Access Roads allow Transit to manage access from abutting property. Transit ~~can~~ has increased control over the number, design, and location of accesses on Limited Access Roads, ~~provided~~ although each property has legal right to one access to either the state highway or a district road.

*Refer State Highway Control Manual, Chapter 1, Section 1:8.2 Limited Access Road Control*

---



**Limited  
Access Roads  
6.1.4,**  
continued

Network management consultants are required to monitor all accesses to ensure no illegal accesses are constructed, and review and report on requests for the installation of new or upgraded accesses.

*Refer Standard Professional Services Specification, State Highway Network Management*

It is important that divisions communicate regularly over Limited Access Road Management as it is a very long-term tool providing only slow change to the roadside environment.

---

**Transit  
Bylaws  
6.1.5**

Under the Transit New Zealand Act 1989, Transit has the power to make bylaws to regulate the use of, and access, to state highways. Transit has made bylaws on the following subjects:

- unofficial signs;
- roadside vendors;
- roadside vehicle sales;
- movement of stock (often delegated to LA);
- stopping and parking of vehicles;
- movement including turning of vehicles;
- fishing from bridges;
- Speed limits;
- heavy vehicle bypasses; and
- use of lanes by public transport
- “Transit” (High Occupancy Vehicle) lanes
- Cyclelanes

*Refer State Highway Control Manual*

---

**Land Use  
Development  
Control  
6.1.6**

Transit has policies and methods to manage the transport effects of subdivisions and development. This includes development proposals which are not directly adjacent to state highways, but which still have an adverse affect due to the traffic generated.

*Refer Planning Policy Manual*

---

## 6.2 Roadside Clear Zones

---

### Introduction 6.2.1

There will always be instances when vehicles leave the roadway. Roadside clear zones are areas adjacent to the carriageway which:

- have slopes which are flat enough to allow vehicles at moderate or high speeds to traverse the slope without being overturned; and
- are free of roadside hazards to allow vehicles to safely stop before hitting an obstacle.

Where obstacles cannot be removed they must be made frangible or shielded by safety barriers.

Transit's regular maintenance and safety inspections should ensure that hazards within the roadside clear zone are identified, and where funding allows, are progressively either eliminated or mitigated.

As complete treatment of the roadside is an expensive option, the first priority is to deal with roadside hazards located within nine metres of the white edge line.

It is also important to ensure opportunities are not lost to relocate at risk utility poles when utility companies renovate or repair lines and poles.

*Refer State Highway draft Geometric Design Manual; TNZ P/24: Performance Based Specification for Traffic Signs.*

---

## 6.3 Road Lighting

---

### Introduction 6.3.1

Road lighting improves forward visibility at night and leads to an improvement in road safety. Road lighting is particularly important where there are pedestrians or cyclists. Road lighting should aim to provide a uniformly lit road surface with higher lighting intensities at conflict points such as major intersections and pedestrian crossings.

The safety benefits of improved lighting can, however, be reduced if lighting poles are poorly located, since a high proportion of urban single vehicle crashes involve utility poles. Lighting layouts must aim to minimise the number of poles, ensure correctly selected frangible poles are located appropriately and correctly installed and maintained. In particular, current unsatisfactory installations should be targeted for upgrading to current standards of lighting and/ or layout.

Transit also supports local programmes of ‘undergrounding’ services, where funding allows, so that non-frangible lighting and /or service utility poles are removed from the roadside.

---

### Design and Installation 6.3.2

All new or upgraded traffic route lighting installations comply with the joint Australian and New Zealand Standard for road lighting.

*Refer AS/NZS 1158.1.1:2005 Road Lighting Series*

*Refer Austroads Guide Part 12 Road lighting 2004*

---

### Frangible Poles 6.3.3

As appropriate, new lighting poles shall be frangible in exposed, high speed locations and comply with the relevant Transit specifications.

*Refer M/18P: Specification for Fibreglass reinforced Plastic Highway Lighting Columns*

*Refer M/19: Specification for Tubular Steel Lighting Column*

---

**Maintenance**  
**6.3.4**

The Transit specification for the maintenance of highway lighting includes maintenance requirements for road lighting.

*Refer C/24: Specification for the Maintenance of Highway Lighting; to be incorporated in the State Highway Maintenance Contract Proforma Manual (SM032) in 2006/07*

*Refer State Highway Maintenance Contract Proforma Manual (SM032), Highway Lighting Proforma.*

---

## 6.4

# Barriers

---

### Introduction 6.4.1

Barriers can be effective in reducing the severity of road crashes where head-on crashes are common or where vehicles regularly leave the carriageway, provided they are properly installed and are placed at warranted locations.

Barriers include:

- guard fences and median barriers which are safety barriers on the edge of the road or in the road centre respectively. These can be flexible (e.g. cable barriers), rigid (e.g. concrete barriers) or semi-rigid (e.g. steel guard railing).
- crash cushions or impact attenuators; and
- bridge barriers

---

### Installation and Design 6.4.2

The installation and design of safety barriers on state highways are to be provided in accordance with the Road Safety Barrier Systems specification (M/23) and the State Highway Geometric Design Manual. This specification adopts AS/NZS 3845: Road Safety Barrier Systems, which is based on the NCHRP Report 350. The NCHRP Report 350 provides the basis for evaluating the performance of barriers.

*Refer M/23 Road Safety Barrier Systems; State Highway Geometric Design Manual; State Highway Control Manual, Chapter 3, Section 3.4.7.*

*Refer Safety Barriers: Considerations for the Provisions of Safety Barriers on Rural Roads, NAASRA; TNZ Bridge Manual; M/17P Specification for W-Section Bridge Guard Rail.*

---

## **6.5 Highway Stopping Places**

---

**Strategy**  
**6.5.1** Transit has a strategy for the provision and maintenance of highway stopping places.

---

**Benefits**  
**6.5.2** Fatigue is a major cause of fatal and serious crashes and the provision of reasonable facilities at regular intervals is critical to minimising the risk.

*Refer Highway Stopping Places Strategy*

---

## 6.6 Vegetation Control

---

### Strategy 6.6.1

Vegetation can be a safety concern as it can affect both forward visibility and visibility of hazards. If left unchecked, trees ~~will~~ can grow from minor hazards into major hazards. Vegetation, planted correctly, can enhance route guidance by day.

---

### Action 6.5.2

Vegetation should be dealt with proactively e.g. trees with a trunk diameter around 100mm or greater measured at 400mm above the ground, located on the outside of bends, within the state highway corridor or in the clear zone, should be ~~removed~~ protected (if identified as a significant tree by a regulatory authority) or removed and, if appropriate, replaced with a frangible alternative. Others should be considered by risk.

*Refer Transit New Zealand Guidelines for Highway Landscaping 2002*

*Transit New Zealand Environmental Plan*

*Refer Land Transport New Zealand RSS15 Roadside Hazard Management 2002*

*Refer Transit New Zealand Planning for a safe and efficient highway network 1994*

*Refer SM032 – General Maintenance Specification*

---

# Section 7

## Vulnerable Road Users

---

**In this section**

This section contains the following sections:

| Section No. | Topic         |
|-------------|---------------|
| 7.1         | Pedestrians   |
| 7.2         | Cyclists      |
| 7.3         | Motorcyclists |

---



## 7.1 Pedestrians

### Introduction 7.1.1

Pedestrians, especially the very young, the elderly, and people with disabilities, or under the influence of drugs or alcohol, are vulnerable when placed in a situation of potential conflict with a motor vehicle.

There are a range of traffic engineering treatments which, when installed appropriately, have the potential to reduce crashes involving pedestrians, for example:

- provision of sufficient walking time at signalised intersections for pedestrians to cross safely;
- special types of traffic control measures at locations with a substantial number of young children, the elderly, or the disabled;
- adequate traffic control for pedestrians at the intersection of motorway off-ramps and local streets;
- ensuring roads near pedestrian generators have adequate provision for pedestrians, such as a footpath or a least a shoulder suitable for walking; and
- adequate control of pedestrians at construction sites.

The Land Transport Management Act 2003 requires that pedestrian requirements are considered as part of any project being developed.

---

### Pedestrian Crossings 7.1.2

All pedestrian crossings and school patrols on state highways shall comply with the Land Transport Rule, Traffic Control Devices ~~Road User Rule~~.

Traffic signs and markings at pedestrian crossings are to be in accordance with the Manual of Traffic Signs and Markings, Land Transport New Zealand Traffic Control Devices Specifications. *Specifications currently under preparation at [www.landtransport.govt.nz/roads/tcd/index.html](http://www.landtransport.govt.nz/roads/tcd/index.html).*

*Refer Land Transport Rule, Traffic Control Devices 2004.*

*Refer Manual of Traffic Signs and Markings, Part I: Traffic Signs, and Part II: Markings.*

All pedestrian crossings on state highways which are used at night are illuminated and have either belisha beacons or fluorescent discs installed.

Road lighting at new or upgraded pedestrian crossings complies with the New Zealand standard for road lighting.

*Refer AS/NZS 1158.3.1:2005 Series*

---

**Design of  
Pedestrian  
Facilities**  
**7.1.3**

Pedestrian demand and safety is considered during the course of project development. Where appropriate, pedestrian facilities are incorporated as part of the overall project.

*Refer Austroads Part 13 1995*

*Refer Land Transport New Zealand Fact Sheet 26 Kea Crossings – School Crossing points*

*Refer NRB TR11 Recommended practice for Pedestrian Crossings*

*Refer Trafanz Draft guide to Pedestrian Crossing facilities 1991*

---

**Temporary  
facilities**  
**7.1.4**

Maintenance and construction works require Traffic Management Plans which cater for pedestrian safety as part of the overall traffic arrangement.

*Refer Code of Practice for Temporary Traffic Management (CoPTTM)*

---

## 7.2 Cyclists

---

### **Introduction** **7.2.1**

Providing for cycling can improve the safety and perceived security of cycling to the extent that cycling becomes a more accepted and widely used mode of transport. There is a range of facilities, including exclusive cycle facilities, and facilities which may be shared with either pedestrians or motor vehicles, for example, wide shoulders. Careful attention to the safety of cyclists on routes, intersections, and where cycle paths cross roads is essential.

Successful facilities for cyclists need to:

- provide a space to ride with adequate lateral clearances;
- provide a smooth surface;
- minimise the need for cyclists to stop or slow;
- ensure route connectivity and continuity; and
- easy to maintain (poor maintenance is a hazard for cyclists).

The Land Transport Management Act 2003 requires that cycle facilities are considered as part of any project being developed.

---

### **Design of Cycle Facilities** **7.2.2**

New cycle facilities on state highways are designed in accordance with the Cycle Design Guide and Austroads.

*Refer Cycle Design Guide, 2003 and Guide To Traffic Engineering Practice, Part 14, Bicycles, Austroads, 1999, to be superseded in due course by Austroads Traffic Management Guides.*

*Refer Land Transport New Zealand, Cycle Network and Route Planning Guide, 2004.*

---

### **Temporary facilities** **7.2.3**

The needs and safety of cyclists must be considered during road works.

*Refer Code of Practice for Temporary Traffic Management (CoPTTM)*

---

## 7.3 Motorcyclists

---

### Introduction 7.3.1

On average, the risk of being involved in a fatal or injury crash is **18 times as high** for a motorcyclist as for a car driver.

There are many risks for motorcyclists that do not affect car drivers: key factors are decreased stability and much lower level of protection than is given by a car. In addition, a motorcycle is less visible to other road users than a car or truck.

While the number of motorcycle crashes has fallen over the past decade, the statistics are still too high. In 2005, 36 motorcyclists or their passengers were killed, representing 9% of all deaths on New Zealand's roads.

---

### Key issues for motorcycles 7.3.2

Surface condition is a particular concern for motorcyclists. Motorcyclists, more so than any other road user, benefit greatly from the provision of a clear zone. This is simply because a motorcyclist will almost certainly suffer a serious injury if they strike any kind of obstacle such as a post, tree or barrier.

Motorcyclist safety must be considered when positioning any kind of roadside feature including posts or safety barriers and in the case of road safety barriers the need for them must be critically reviewed in accordance with the State Highway Geometric Design Manual.

*Refer M/23 Road Safety Barrier System, State Highway Geometric Design Manual*

---

## State Highway Safety Management System Feedback Form

---

|                                  |
|----------------------------------|
| Name:                            |
| Contact details:                 |
| Comment and reference to manual: |
| Justification for change:        |

Please send to:  
Traffic and Safety Manager  
Transit New Zealand  
National Office  
PO Box 5084  
WELLINGTON