



PN 261G

Guideline: Planning road infrastructure upgrades at railway crossings

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SECTION 1

Introduction

Background

There are more than 3000 railway crossings (RC) in NSW and around 1400 of them are on public roads. Management of an RC involves the road component (managed by the roads authority) and the rail component (managed by the rail infrastructure manager). Roads and Maritime Services (RMS) is involved in managing the road component of RCs on State roads, exercising the powers of a roads authority outlined in sections 62 and 64 of the *Roads Act 1992*. RMS may also be involved as a stakeholder or funding contributor for Regional and Local roads.

Many factors make it necessary to improve RCs. These include changes to rail or road operations, identified risks to safety, non-compliance with standards, road or rail infrastructure manager strategy and other stakeholder interests. Improvements are managed through one of many programs initiated by RMS or other agencies.

Purpose of this guideline

Upgrade projects differ in scope (including inputs and outputs), stakeholder interests and complexity. This guideline provides a robust planning process to ensure consistent delivery of positive outcomes for upgrades of RCs.

This guideline supports the RMS policy PN261 *Planning road infrastructure upgrades at railway crossings*.

Using this guideline

Application of this guideline

Type of railway crossing

This guideline applies to any at-grade State road crossing of a public or private railway, including associated pedestrian, cyclist and disabled road user railway crossing components.

This guideline does not apply to:

- RCs for pedestrians or cyclists only (eg pedestrian only RCs at the end of a station).
- Service access RCs.
- RCs where the road is privately owned.
- Parallel running.

Type of treatment

This guideline applies to the upgrading of existing railway crossings only. It does not apply to other RC works such as:

- Closure of RCs.
- Creation of new RCs.
- Other treatment including grade separation.
- Maintenance of existing RCs.

Typical upgrades of existing RCs that may be addressed using this guideline include:

- Introducing or improving passive control measures.
- Changing from passive controls to active controls.
- Improving visibility.
- Improving road pavements over tracks.
- Improving road approaches.

These upgrades may take the form of:

- Installing flashing lights and warning bells (with or without boom barriers).
- Clearing of sight obstructions.
- Widening of road pavement over tracks.
- Widening and sealing of approaches to crossings.
- Providing vehicle-escape bays.
- Modifying or improving signposting, including replacing signs, providing pavement markings and erecting hazard markers.
- Ensuring compliance with Standards Australia AS 1742.7 Railway crossings.
- Installing traffic management devices (including traffic management systems) at an adjacent intersection.
- Installing new traffic control signals at an adjacent intersection.
- Linking existing traffic control signals at an adjacent intersection to flashing lights, warning bells and boom barriers at the RC.
- Installing active advance-warning signs.
- Closing and removing redundant or non-compliant road infrastructure at, and in advance of, an RC on an operational railway (but not closing the RC) – such as removing a non-compliant guard fence.
- Removing road infrastructure at, and in advance of, an RC on a non-operational railway (but not closing the RC).
- Providing pedestrian facilities at existing active control RCs.

- Upgrading road and pedestrian lighting.
- Reviewing road and train speed limits.

Other limitations on application

This guideline applies when options for RC treatment are still being developed. It does not apply when the recommended treatment is:

- RC closure.
- Creation of a new RC.
- Grade separation.
- Maintenance of the existing RC.

In these circumstances other RMS guidelines should be followed.

This guideline only applies to the road component of an RC upgrade.

Compatibility with RMS project management system

Most RMS railway crossing upgrades will follow the RMS project management system. Therefore this guideline is structured to conform with, and permit easy incorporation of information into, the documentation requirements for each phase of the RMS project management system, which include:

- Initiation phase.
- Concept phase.
- Implementation phase.
- Finalisation phase.

Documentation requirements for each phase are specified in a shaded box such as this.

Internal stakeholders

The RMS internal stakeholders for works at a railway crossing may include:

- Network Efficiency Section.
- Regional Road Safety & Traffic Management Sections.
- Regional Asset Management Sections.
- Infrastructure Asset Management Branch.
- Traffic and Safety Management Branch.

- Regional Manager.
- Regional Communications.
- Customer and Compliance Branch.
- Freight Liaison Officer.
- Sustainable Transport Section.
- Environment Branch.
- Legal Branch.

External stakeholders

Parties external to RMS who may hold an interest include:

- Transport Management Centre.
- TfNSW Planning and Programs.
- Centre for Road Safety.
- Local councils.
- Rail infrastructure managers.
- Level Crossing Strategy Council.
- Local bus operators.
- Local heavy vehicle operators.
- NSW Police.
- Community and special interest/user groups.

Review of this guideline

This guideline should be reviewed 12 months after first release and then every five years.

Definitions

The following definitions apply to terms used in this guideline:

Accommodation crossing	A railway crossing that qualifies as 'accommodation works' as defined in Section 91 of the <i>Public Works Act</i> . The crossing was provided by the constructing authority at the time of construction of a new railway line to maintain existing road access. Where a railway line cuts access to a road or property the rail authority was, and still is, obliged to provide and maintain access.
Active control	Flashing lights only, or flashing lights with boom barriers, to warn motorists that a train is approaching or occupying a railway crossing.
Interface	The area where a rail corridor and a road intersect, whether at grade or grade separated.
Interface agreement	A written agreement between the parties responsible for managing safety at an interface for the purpose of cooperatively managing safety at the interface.
Licensed crossing	A railway crossing that does not qualify as an 'accommodation crossing'. Access via this crossing was provided after a railway line was constructed and requires a licence agreement between the track owner and the entity requesting usage.
Passive control	Signs ('stop' or 'give way') only, to warn motorists of the presence of a railway crossing and to regulate access.
Public road	Any road that is opened or dedicated as a public road, whether under the <i>Roads Act 1993</i> or any other Act or law; and any road that is declared to be a public road for the purposes of the <i>Roads Act 1993</i> .
Rail infrastructure manager	The person who has effective management and control of the rail infrastructure of a railway, whether or not the person owns the rail infrastructure, or has a statutory or contractual right to use the rail infrastructure or to control, or provide, access to it.
Railway crossing	An area where a road and a railway meet at substantially the same level (at grade).

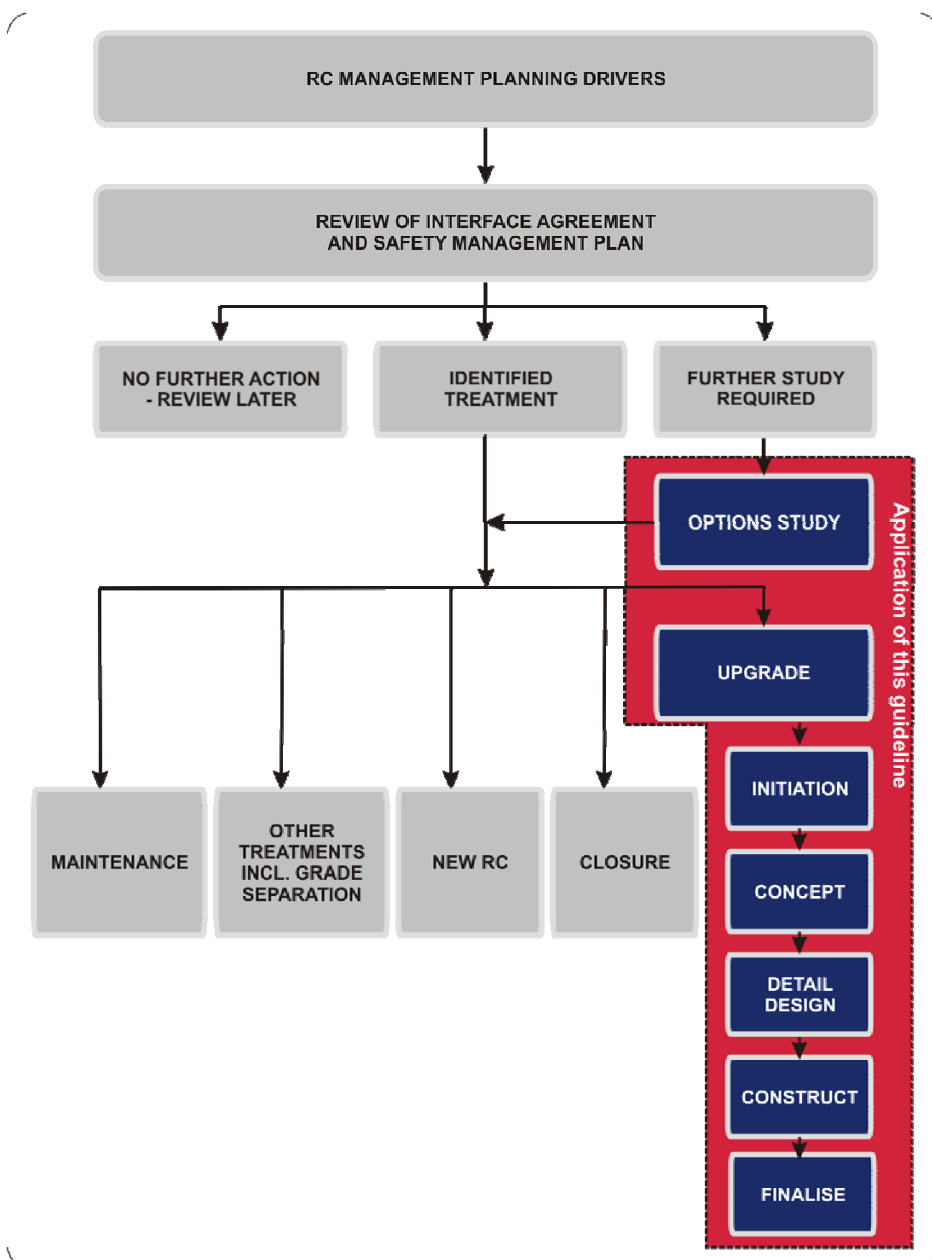
Restricted access vehicle (RAV)	<p>A single motor vehicle or a combination which alone, or together with any load, exceeds one or more of the following limits:</p> <ul style="list-style-type: none">a) a mass limit prescribed in the <i>Road Transport (Mass, Loading and Access) Regulation 1996</i>;b) one or more of the following dimension limits:<ul style="list-style-type: none">i. a width of 2.5mii. a height of 4.3miii. a length of 12.5m in the case of a single motor vehicle or 19m in the case of a combinationc) any other dimension limit prescribed in the <i>Road Transport (Mass, Loading and Access) Regulation 1996</i> or the <i>Road Transport (Vehicle Registration) Regulation 1998</i>.
Roads authority	<p>A person or body that is, under the <i>Roads Act 1993</i>, declared to be a roads authority. In relation to a particular public road it means the roads authority for that road.</p>
Safety management plan (SMP)	<p>A plan that is based on risks identified and assessed through the RMS 'Railway crossing safety series 2011' process, which outlines risks, safety management measures, and parties responsible. Each railway crossing has an SMP which provides the mechanism for the parties to meet obligations of the <i>Rail Safety National Law (NSW)</i>.</p>
Service crossing	<p>Owned and maintained by rail authorities to allow authorised personnel to cross the track. They may be located in depots and station yards, or in field situations for maintenance access.</p>

RC upgrade planning context

Relationship to railway crossing management framework

The location of this guideline within the RMS railway crossing management framework is illustrated in Figure 1. When the review of the safety management plan (SMP) for an RC indicates the need for further study, this guideline applies to the planning, development, and works for the upgrade of the RC. The 'Railway crossing safety series 2011' can assist users to identify, assess and determine measures to manage safety at the RC. This guideline will assist users to plan, develop and implement those measures.

Figure 1: Application of this guideline within the RMS railway crossing management framework



This guideline applies where the identified safety management measures include an upgrade of the RC.

The components of the RC management framework are described below.

RC management planning drivers

The RC management planning drivers are the triggers that lead to the need to change an existing RC or to create a new RC. The RMS 'Railway crossing safety series 2011' describes these planning drivers in detail. Planning drivers that trigger the need to upgrade an existing RC include:

- Internal (RMS) drivers such as
 - minor works program.
 - road projects.
 - road corridor strategies.
 - RMS-initiated SMP reviews.

- External planning drivers such as
 - Australian Level Crossing Assessment Model (ALCAM) recommendations.
 - Level Crossing Strategy Council (LCSC) recommendations.
 - rail corridor strategies.
 - regulatory requirements.
 - changes to standards.
 - community, council and other stakeholder requests.
 - rail infrastructure manager initiated SMP reviews.

The RMS guideline *PLAN: Establishing a railway crossing safety management plan* recognises that with the identification of any planning driver, the existing safety management plan for the relevant RC should be reviewed and updated prior to any treatment planning.

The reviewed and updated safety management plan will be the key input document for the upgrade planning process that follows.

Relationship of safety management plans to an RC upgrade

The *Rail Safety National Law (NSW)* requires that the rail infrastructure manager and the roads authority enter into agreements to manage safety at the rail–road interface. This 'interface agreement' identifies the parties to the interface and specifies how they will cooperate to achieve safety at the interface. The management of risks to safety at an RC is contained within a safety management plan (SMP). Each SMP identifies and assesses (so far as is reasonably practicable) any risks to safety at the interface.

The SMP for a particular RC contains information about the geographical boundaries, maintenance responsibilities, existing risk profile, any relevant studies or requests, and other information relevant to that RC. These will be reviewed (and updated where necessary) in response to a planning driver. Depending on the planning driver and the arrangement with the rail infrastructure manager, this may be carried out internally by the RMS or jointly with the rail infrastructure manager. This process is described in detail in the RMS guideline *PLAN: Establishing a railway crossing safety management plan*.

A safety management plan for a particular RC can produce one of the following recommended actions as illustrated in Figure 1:

- No further action – review later.
- Identified treatment. In some straightforward circumstances the review may identify the appropriate treatment. If this identified treatment is to:
 - upgrade (as defined in this guideline): follow this guideline.
 - close the RC: follow the ‘Closure of a railway crossing guideline’.
 - create a new RC: follow the ‘New railway crossing planning guideline’.
 - continue maintenance: follow relevant maintenance procedures and guidelines.
 - other treatments (including grade separation): follow relevant procedures and guidelines.
- Further study. If further study is recommended before an appropriate treatment is finalised, this guideline should be followed. If the finalised treatment is to:
 - upgrade as defined in this guideline: follow this guideline.
 - close the RC: follow the ‘Closure of a railway crossing guideline’.
 - create new RC: follow the ‘New railway crossing planning guideline’.
 - continue maintenance: follow relevant maintenance procedures and guidelines.
 - other treatments (including grade separation): follow relevant procedures and guidelines.

Upgrade process

Project types

Railway crossing upgrade projects (upgrades) may be grouped into one of four types according to which stakeholder leads the development and delivery of the project; and the level of interdependency and collaboration required between stakeholders.

The four types are:

Type 1

RMS-led projects where interaction with the rail infrastructure manager is limited to notifications due to very limited changes to rail infrastructure.

Type 2 :

RMS-led projects requiring joint planning and delivery with the rail infrastructure manager due to changes required to both road and rail infrastructure.

Type 3 :

Projects led by other agencies (rail or council) with joint planning and delivery required due to changes to both road and rail infrastructure and substantial impact on RMS interests.

Type 4 :

Projects led by other agencies (rail or council) where RMS involvement is limited to comments or approvals due to limited impact on RMS interests.

The different project types require different levels of involvement by RMS in planning and delivery due to the differences in scope, complexity, programs, or impacts on RMS interests. Regardless of the upgrade type, it is important to record details of all activities and considerations. All the key activities identified in this guideline should be followed for all upgrade types. The level of detail of the outputs recorded for each action may vary according to the scope and complexity of the upgrade so that the documentation reflects the scale and scope of the upgrade.

SECTION 2

Upgrade activities

The activities involved in the planning, development and delivery of an RC upgrade are detailed in this section and summarised in Figure 2 overleaf. Upgrade activities align with the RMS ProjectPack project management life cycle phases.

The five phases of an upgrade are:

1. Initiation.
2. Concept.
3. Implementation – Detailed design.
4. Implementation – Construction.
5. Finalisation.

Note

RMS project management system project plan documentation

Documentation requirements for each phase are specified in a shaded box like this.

Requirements for approval to proceed

Key approvals required before an upgrade can proceed to the next phase are denoted as 'hold points' as follows.

HOLD POINT #

Figure 2: Summary of railway crossing upgrade activities

PHASE	KEY ACTIVITIES	KEY DELIVERABLES	RMS APPROVALS	RAIL INFRASTRUCTURE MANAGER INVOLVEMENT	COUNCIL INVOLVEMENT
INITIATION	<ul style="list-style-type: none"> • Identify planning need • Complete preliminary approvals & notifications • Appoint project team • Conduct initial site assessment • Define project 	<ul style="list-style-type: none"> • Sketch definition • Project team nominated • Initial site assessment • Project description • Treatment options identified • Road safety audit (concept) 	<ul style="list-style-type: none"> • Approval by RMS program manager (Stage 1) • RMS program manager approval to start project development (Stage 2) • Compliance with interface agreement & safety management plan (SMP) 	<ul style="list-style-type: none"> • As appropriate, rail infrastructure manager concurrence • LCSC advice • Compliance with interface agreement & SMP 	<ul style="list-style-type: none"> • As appropriate, Council concurrence • Land Use Development Assessment • Compliance with interface agreement & SMP
CONCEPT	<ul style="list-style-type: none"> • Consult stakeholders • Assess risks for options • Assess construction methodology • Complete concept design 	<ul style="list-style-type: none"> • Joint risk workshop • Prepare preliminary budget estimates • Preferred option (in Concept Report) • Joint construction methodology workshop • Final Concept Report • Operation protocols developed 	<ul style="list-style-type: none"> • Concept approval of total project and agreed funding for further work, by RMS program manager (Stage 3) • Consult Transport Management Centre • Consult asset managers 	<ul style="list-style-type: none"> • Rail infrastructure manager consultations • Joint construction methodology workshop as necessary • Concurrence of total project by rail infrastructure manager 	<ul style="list-style-type: none"> • Council consultations • Joint construction methodology workshop as necessary • Roads authority concurrence • Local facility and connectivity planning

PHASE	KEY ACTIVITIES	KEY DELIVERABLES	RMS APPROVALS	RAIL INFRASTRUCTURE MANAGER INVOLVEMENT	COUNCIL INVOLVEMENT
DETAILED DESIGN	<ul style="list-style-type: none"> • Carry out resource planning • Complete detailed design • Plan for procurement and delivery 	<ul style="list-style-type: none"> • Road safety audit (design) • Environmental assessment • Completed and approved detailed design • Coordinated road and rail designs 	<ul style="list-style-type: none"> • Road detailed design • RMS approval of detailed design 	<ul style="list-style-type: none"> • Rail signalling and electrical detailed design • Coordination of road and rail designs • RIM internal approval of detailed design • Follow up joint agency construction methodology workshop • Formal rail infrastructure manager agreement to proceed to construction 	<ul style="list-style-type: none"> • Local facility and connectivity plan • Land use development plan • Roads authority agreement to proceed to construction (refer to <i>Roads Act 1993 s138</i>)
CONSTRUCTION	<ul style="list-style-type: none"> • Construct physical works • Test and commission 	<ul style="list-style-type: none"> • Completed physical works • RC tested and commissioned • Coordinated road and rail works as executed design • Road safety audit (pre-opening) 	<ul style="list-style-type: none"> • Commissioning or opening • Non-conformance rectification • RMS and RIM operational agreements, eg TCS interface 	<ul style="list-style-type: none"> • Commissioning or opening • Non-conformance rectification 	<ul style="list-style-type: none"> • Commissioning or opening • Non-conformance rectification
FINALISATION	<ul style="list-style-type: none"> • Complete post-implementation evaluation • Monitor and review 	<ul style="list-style-type: none"> • Asset ownership transferred • Completed operational review • Fund documentation to relevant agencies • Evaluate project process and outcomes 	<ul style="list-style-type: none"> • Communicate final documentation within RMS • Asset handover • Safety management plan update • Project evaluation 	<ul style="list-style-type: none"> • Functional testing and evaluation • ALCAM update 	<ul style="list-style-type: none"> • Asset handover

Phase 1: Initiation

The purpose of the Initiation Phase is to define the project and to identify treatment options. This is done by assembling resources and collating all existing information, assessing current conditions and presenting possible solutions in sketch form. The following steps are required.

Identify planning need

The planning need is identified and assessed during the review of the safety management plan. A revisit of the risk management need and an understanding of the project type help to define the documentation levels and RMS involvement for the activities to follow.

As part of need identification a 'sketch definition' may be developed. This is an initial sketch of the RC, the existing control measures and risks to be managed, together with proposed options to address the risks. This sketch definition will be useful when consulting the other parties to the interface agreement, particularly in seeking initial agreement from the other parties to proceed.

Complete preliminary approvals and notifications

Depending on the planning driver and upgrade type, different notifications or approvals may be necessary to progress the planning activities.

For RMS-initiated projects (Type 1), the following actions should be taken:

- Obtain site information from RMS Program Manager.
- Obtain Transport for NSW (TfNSW) approval if the project is within the Level Crossing Improvement Program (LCIP).
- Notify the rail infrastructure manager and obtain agreement to proceed.
- Notify the local council and obtain agreement to proceed.
- Notify RMS internal functional areas for initial inputs where necessary.

For other agency-initiated projects, the following actions are required:

- Obtain RMS Program Manager approval for project initiation.
- Notify RMS internal functional areas for input where necessary.
- Notify rail (or other agency) with progress, comments and/or approval.

Appoint project team

When appointing the RMS project team consider:

- RMS's role in the project.
- Need for a joint project team with the rail infrastructure manager.

- Minimum representation required within RMS.
- Any resources familiar with the RC, particularly those involved in the SMP review.

The nominated project manager, RMS project team, other resources, rail infrastructure manager representatives, and local government representatives, their contact details and roles must be entered into MinorProject – Project Plan.

Conduct initial site assessment

The initial site assessment aims to identify the current status of the RC in its surroundings. This requires:

- A road safety audit – to identify and document the current safety profile, undertaken through the guidance provided in the ‘Railway crossing safety series 2011’.
- A road and rail study in the vicinity of the project – to understand the relationship with any nearby RCs and the road network. This will indicate if more than one RC needs to be considered during upgrade planning and the geographical extent of the affected road network due to the planned upgrade.
- Identification of stakeholders and assessment of any work they have planned in the vicinity of the RC.
- Identification of any work planned by other agencies (eg water, gas, electricity, telecommunication or council) and of any other RCs to be upgraded in the region requiring staged construction and planned service upgrades.
- Collation of relevant documents including incident data, ALCAM assessment results, the current safety management plan and the interface agreement.

Update the MinorProject – Project Plan or produce separate project definition reports as suitable to the scale and scope of the project.
Provide reference in MinorProject – Project Plan if separate reports are produced eg precinct study report, site assessment report.

Define project

The following details should be documented during project definition:

- Road and rail objectives.
- Project objectives.
- Responsibility for managing community interactions.
- Required design standards.
- Funding arrangements and initial budget estimate.

- Project scope.
- Funding, planning and delivery timelines, commitments and constraints.
- Inter-agency communication protocols and responsibilities.
- Identified options.
- Information about stakeholder project managers (where applicable) and the project manager responsible for inter-agency coordination and reporting (the coordination manager).

Update the MinorProject – Project Plan or produce separate project definition reports suitable to the scale and scope of the project.
Provide references in MinorProject – Project Plan if separate reports are produced.

Following completion of the project definition, obtain:

- Rail infrastructure manager agreement where necessary.
- Council (roads authority) agreement where necessary.
- RMS regional management approval, for example Road Safety & Traffic Management (RSTM) and Infrastructure Asset Management.
- RMS program manager approval to proceed to the Concept phase.

Outcomes of Initiation phase

The outcomes required of the Initiation phase are a complete project description, identification of all stakeholders and confirmation of the need to proceed by the stakeholders.

HOLD POINT 1

The approval of the RMS program manager and agreement of the rail infrastructure manager and the council are required to proceed to Phase 2: Concept. The outputs of the Initiation phase will be assessed on:

- Meeting the objectives of the project.
- Impact on rail and road networks, safety and efficiency.
- Value for money.

Phase 2: Concept

During the Concept phase, risk and construction assessments are made and comments from other interested parties are considered. A preferred treatment is determined on the basis of what is deemed to be 'so far as is reasonably practicable'. The concept designs for the preferred treatment are then completed.

The concept designs are used to:

- Disclose known issues to guide selection of a preferred option.
- Permit further consultation. They may be produced in a form appropriate for ensuring understanding of the proposal by stakeholders or interested parties.
- Guide detailed design to reduce the risk of 'scope creep' and ensure the desired outcomes are achieved.
- Record stakeholder requirements and potential risks to the project, such as utility adjustments, land acquisition and environmental impacts.

A 'good' concept design will guide surveyors and designers in identifying and mitigating obstacles; and assist them in taking advantage of opportunities in the design, construction and operation of the project.

Consult stakeholders

Identify stakeholders

The key external stakeholders in most RC upgrade projects will be the rail infrastructure manager and the relevant council. Therefore RMS will focus on coordinating and consulting relevant personnel from these agencies. For some project types there may be other stakeholders who need to be consulted. These stakeholders may include:

- Community – general public, business community, special interest and user groups.
- Other government agencies – such as Transport for NSW (TfNSW) Planning & Programs Transport Services, Centre for Road Safety, Transport Management Centre, Department of Lands.

Internal stakeholders who may need to be consulted at this stage include:

- Customer and Compliance Branch.
- Traffic & Safety Management Branch.
- Infrastructure Asset Management Branch.
- Infrastructure Contracts Branch.
- Environment Branch.
- Strategy and Engagement Branch.
- Legal Branch.

These internal stakeholders may be separate directorates or functional areas within RMS.

What to consult on

Consultations with stakeholders may be aimed at:

- Obtaining existing input documentation.
- Obtaining details related to planned or possible upgrades, changes or strategies for the RC or the region.
- Conducting risk assessment.
- Assessing options and preferences.
- Discussing roles and responsibilities, staging needs etc.
- Determining requirements.
- Understanding interface agreement requirements.

The objectives of the consultations may vary between the project types; however, consultations must be carried out with the stakeholders for all project types.

It is important to appreciate the lead times for the approval and concurrence processes within the rail infrastructure manager. These relate to:

- Different configuration change request (CCR) management procedures followed by different rail infrastructure managers.
- Concurrence periods for concept design, detail design, construction approval etc.
- Rail infrastructure manager variation approval process and lead times.
- Safety change assessment and reporting determination (SCARD).
- Timing of track possessions for construction works.

The rail infrastructure manager should provide the probable lead times required during various phases of the project.

How to consult

The consultation process will vary depending on the project type, characteristics and objectives of the consultations. It can take the form of a simple notification letter asking for comments through to formal workshops and meetings with other stakeholders.

Reports produced during the consultation process may include:

- Stakeholder information reports – produced prior to consultations. These contain initial options for distribution to identified stakeholders for comment or discussion in individual consultations.
- Options and impacts reports – produced following community workshops or meetings. These contain the assessment of options.

Record the identified stakeholders, the consultation process and outcomes, or the relevant report reference in the MinorProject – Project Plan.

Assess risks for options

Risks may be identified during any of the following:

- Planning need identification.
- Safety management plan review.
- Stakeholder consultations.
- Project team meetings.

A risk assessment is conducted to guide selection of a preferred option. This risk assessment will typically be a workshop jointly with the rail infrastructure manager, and the council where necessary. The risk assessment shall address both road and rail components for each option under consideration; and employ the 'so far as is reasonably practicable' principle.

The risk assessment should consider safety risks, planning risks, environmental risks, construction and operational risks, and property and easement requirements, financial risks, public and community risks, and political and reputation risks to ensure a broad perspective on risk is adopted. It is important that the effect of the proposed treatment is assessed for its impact on the surrounding road network and all road users, and that the project does not transfer risk to other road users or stakeholders.

The 'Railway crossing safety series 2011' must be used throughout the safety management plan development process. It is envisaged that the same procedures will be used during the risk assessment described herein.

The ALCAM model may be used to understand the effect of alternative treatment options. It should be noted that ALCAM is a tool that may be used in risk assessment however it should not be relied upon to provide definitive conclusions.

In complex situations, traffic modelling tools may be used to model the effect of alternative treatment options on traffic operations.

Following the risk assessment of all options, a preferred option is selected. This shall be communicated to the rail infrastructure manager or any other stakeholders where necessary. However, final approval or concurrence for the preferred option is sought at the completion of the concept design.

Community feedback may be sought on the preferred treatment option.

Assess construction methodology

For some projects, particularly those involving joint planning (Types 2 and 3), a joint construction methodology workshop may be undertaken. This should resolve design details, roles and responsibilities for project progression, interdependencies, and timing of physical works for both road and rail components.

For Type 1 projects, RMS may choose to conduct a construction methodology workshop or meeting internally.

Record the construction methodology workshop outcomes or the relevant report reference in the MinorProject – Project Plan.

Complete concept design

Following risk assessment and selection of the preferred option, and consideration of construction methodology, the concept design for the preferred option is completed. A concept report should be produced at the completion of concept design. This report should contain:

- Concept drawings.
- Schedules.
- Budget estimate.
- Preliminary environmental and work health and safety (WHS) assessment.
- Property and easement requirements.
- Utility adjustments.
- Updated risk assessment.
- Road safety audit (of complex sites).

Following the completion of the concept report obtain:

- RMS program manager approval for the concept.
- Approval for the agreed treatment by the rail infrastructure manager and local council.
- Concurrence or comment from other government agencies such as TfNSW and the LCSC, as deemed necessary.

Record concept report reference in the MinorProject – Project Plan.

Following completion of the Concept phase, obtain RMS program manager approval and funding to commence detailed design.

The concept report will be subjected to a 'reality check' to ensure it meets RC and project objectives, and 'so far as is reasonably practicable' principles.

HOLD POINT 2

The approval of the RMS program manager and concurrence of the rail infrastructure manager and the council are required to proceed to Phase 3: Detailed design. The outputs of the concept design phase will be assessed on:

- Meeting the objectives of the project.
- Impact on rail and road networks, safety and efficiency.
- Value for money.
- Risk.
- Constructability.
- Environmental impact.

Phase 3: Detailed design

Communicate to the rail infrastructure manager the start of detailed design and the estimated timeline for completion. Obtain rail infrastructure manager agreement as necessary and arrange road and rail design coordination.

Resource planning

Resource planning during the detailed design phase requires identification of:

- Long lead time procurement items.
- Lead times for potential track possessions.
- Delivery process for the road component.
- Hold points or interdependencies with rail works.
- Necessary permits, licences, consents, approvals to proceed.
- Resource capability.
- Inter-agency design requirements and coordination.
- Standards, guidelines, policies, and reference documents.
- Integration with other RMS operations systems such as SCATS and GIS.
- Maintenance plans and practices.

Update the Project Plan.

Complete detailed design

RMS should undertake the detailed design of the road component. A stage 3 road safety design audit should be undertaken during detailed design.

It is important to understand the rail infrastructure manager design process, in particular the rail signalling and electrical detailed design. This can take several months to complete covering detailed design, rail infrastructure manager internal design approval, and variations to approval procedures. Sufficient time must be allowed in planning and the ongoing coordination of road and rail design.

Following completion of the detailed design:

- Obtain RMS approval of detailed design.
- Obtain rail infrastructure manager approval of the detailed design.
- Obtain council approval of the detailed design.
- Complete environmental assessment as necessary.
- Obtain detailed estimate of construction costs and time.

Record detailed design details and references in the MinorProject – Project Plan.

The detailed design will be subjected to a ‘reality check’ to ensure it meets objectives so far as is reasonably practicable.

Complete operations plans

Plans associated with operating the road network should be updated or completed detailing the upgrade of the RC. Operations plans include:

- Incident response plan.
- Maintenance plan.
- SCATS integration and operation plans where TCS are coordinated with railway crossing active controls.

Record operational plan details and references in the MinorProject – Project Plan.

HOLD POINT 3

The approval of the RMS program manager and the rail infrastructure manager, and consent of the council, are required to proceed to Phase 4: Construction. The outputs of the detailed design phase will be assessed on:

- Meeting the objectives of the project.
- Impact on rail and road networks, safety and efficiency.
- Value for money.
- Risk.
- Constructability.
- Environmental impact.

Phase 4: Construction

During the second stage of the Implementation phase construction works are carried out.

Plan for procurement and delivery

Procurement and delivery planning should include the following activities:

- Confirm construction funding.
- Obtain quotes for road components (include rail components where necessary).
- Update budget estimate.
- Update construction schedule.
- Prepare contract documentation.
- Engage service providers.
- Conduct pre-construction 'construction methodology' workshop.
- Obtain rail infrastructure manager agreement to proceed to construction.
- Obtain access to rail corridor.
- Obtain Road Occupancy Licence, if necessary.

Testing and commissioning

Establish testing and commissioning requirements at this stage. Any need for joint testing must be identified and procedures developed to execute testing without delay to the project.

Construct physical works

Attention to the following is required during the execution of construction works:

- Identification of plans that require joint effort (project management plans, construction safety interface agreement, etc).
- Identification of areas, times and processes that require coordinated effort or access (such as works during track possession).
- Notifications to other service providers.
- Notifications to community.
- Ongoing coordination and communication with other agencies (rail infrastructure manager and council).
- Testing and commissioning to the satisfaction of all agencies.

Phase 5: Finalisation

This phase details the post-construction activities including handover, post-implementation evaluation and operational review.

Opening and handover

RMS should undertake opening planning using the 'Planning the opening of a road project' guideline.

RMS should establish handover requirements to asset owners. Any maintenance responsibility or transfer of assets between agencies must be consistent with the interface agreement.

Complete post-implementation evaluation

A post-implementation evaluation may be carried out with both external and internal stakeholders.

The safety management plan and interface agreement (if necessary) should be updated. In particular, the risk profile, and asset maintenance and operations arrangements of the RC following the upgrade should be reviewed.

'As built' drawings should be prepared and all documents provided to relevant stakeholders and archived as necessary.

Formal reassessment of the site for ALCAM data and risk-ranking purposes should be included in the project evaluation and forwarded to TfNSW and the rail infrastructure manager to update their ALCAM database.

Advise the RMS Program Manager of the finalisation of the project.

Monitor and review

An operational review should be undertaken approximately three months after commissioning.

SECTION 3

References

RMS documents

- Railway crossing fact sheet.
- Railway crossing safety series 2011.
- Restricted access vehicles (RAV) route assessment guidelines.
- Freight route investigation levels for RAV.
- Developing a project plan or brief for minor projects ILC-MP-TP0-102.
- Information and planning manual ILC-MP-M-001.
- Guideline for lighting of railway crossings.
- Policy for road safety audits of construction and reconstruction projects TD 2003/RS03.
- RMS supplements to the Australian standards and Austroads documents.

Rail infrastructure manager documents

Each rail infrastructure manager will have specific requirements and documents applicable to their network. These should be sourced directly from the rail infrastructure manager.

Other references

- Interface agreement and safety management plan applicable to the RC.
- Wigglesworth E.C., *Crashes at Railway Level Crossings: ad-hoc suggestions or evidence based solutions?*
- Rail Infrastructure Australia (2008) white paper – *Learnings and lessons from deploying ALCAM in Victoria.*
- AS 1742. 7 – 2007, *Manual of uniform traffic control devices, Part 7: Railway crossings.*

This provides specifications of uniform traffic control devices at railway crossings. It does not provide warrant-based guidance on when a crossing should progress from one type of control to the next (ie, from passive to active) however, suitability of control type is provided based on available sight distance.

- AS 1743 – 1992, Road signs — Specification.
- Austroads Guide to road design.
- Austroads Road Safety Audits.

- Rail Safety National Law (NSW)

To obtain a copy of the interface agreement and safety management plan applicable to a railway crossing on a State road, contact Policy Manager, Road User Priority & Access, Network Efficiency section, Traffic and Safety Management Branch.

Rail infrastructure managers in NSW

There are a number of public and private rail infrastructure managers that interface with State roads. RMS has interface agreements with all these organisations and reference to the appropriate interface agreement should be made during the Initiation phase.

Public rail infrastructure managers

Rail Corporation	http://www.railcorp.info/
Australian Rail Track Corporation	http://www.artc.com.au/
John Holland Rail	http://www.jhrcrn.com.au/index.asp
V/Line	http://www.vline.com.au/about/infrastructure/intro.html

Private rail infrastructure managers interfacing with State roads

Bloomfield Collieries	Blue Scope Steel
Boral Cement	Boral Quarries
Cargill Pty Ltd	Illawarra Coal
Port Kembla Port Corp	South Maitland Railways
Sydney Tramway Museum	Veolia Transport Sydney

Acronyms and abbreviations

ALCAM	Australian Level Crossing Assessment Model
CCR	Configuration change request
ITSR	Independent Transport Safety Regulator
LCSC	Level Crossing Strategy Council
RAV	Restricted access vehicle
RC	Railway crossing
RIM	Rail infrastructure manager
RSTM	Road Safety & Traffic Management
SCARD	Safety change assessment and reporting determination
SCATS	Sydney Coordinated Adaptive Traffic System
SMP	Safety management plan
TCS	Traffic control signal
WHS	Work health and safety