EPD 0007

INTERFACE DEFINITION AND MANAGEMENT

Version 2.0

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Document control

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Summary of change</th>
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<tr>
<td>1.0</td>
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<td>First issue</td>
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<td>1.1</td>
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<td>Section numbering updated, Reference corrections and Document Control Page added</td>
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<td>1.2</td>
<td>August 2005</td>
<td>Replace reference from RIC to RailCorp, reference made to RailCorp Safety Management System</td>
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<td>2.0</td>
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<td>3 yearly review. See below for summary of changes.</td>
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Summary of changes from previous version

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<thead>
<tr>
<th>Summary of change</th>
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<tr>
<td>Re-formatted to conform to TMA 400 document formats, subsequent amendments to references to RailCorp engineering documents to reflect current naming conventions.</td>
<td>All</td>
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<tr>
<td>References to other Engineering Procedures – Design are referred to in this document using the new naming conventions (eg, EPD 0001 not EP 0001 P) although not all have been reviewed and renamed as yet.</td>
<td>Several</td>
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<tr>
<td>Minor rewording for clarification</td>
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<td>Updated referenced documents</td>
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<td>Reworded to be consistent with other Engineering Procedures – Design</td>
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<tr>
<td>Figure updated and removed ‘infrastructure’ from after ‘RailCorp’</td>
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<tr>
<td>Paragraph 2, inserted ‘and rolling stock’ after ‘infrastructure systems’ and ‘track and rolling stock’ after ‘(OHW) and track’</td>
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<td>Paragraph 4 – corrected reference to Human Factors Integration System Requirement and added reference to SMS Safety Change Management System Requirement Inserted new paragraph ‘All design tasks impacting on interfaces must comply with the SMS Safety Change Management System Requirement and should include the conduct of Interface Hazard Analysis in line with SMS-06-GD-0031. Replaced ‘infer’ with ‘imply in the first sentence of the final paragraph.</td>
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<td>Paragraph 1, first dot point ‘are’ replaced with ‘include, paragraph two second dot point removed ‘necessary’</td>
<td>5.2</td>
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<tr>
<td>Inserted ‘Rolling stock’ in heading</td>
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<td>Paragraph 1, inserted ‘The Minimum Operating Standards for Rolling Stock (RSUs) contain the interface requirements between rolling stock and infrastructure.’</td>
<td>5.3</td>
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<td>Paragraph 3, replaced ‘Network Access Division manages agreements for access to RailCorp infrastructure to external operators and shall be consulted in such instances’ with ‘The Rolling Stock Access Integrity Unit, which publishes the TOC Manual and RSUs, manages the interface between rolling stock and infrastructure.’</td>
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<td>Paragraph 4 added final sentence and deleted paragraph referring to regions</td>
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<td>Inserted third paragraph relating to rail/road interfaces</td>
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<td>Full title of SCADA inserted</td>
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<td>Paragraphs one and two replaced references to MoT with ITSRR, paragraph three</td>
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<td>inserted SMS-06-SR-oo48</td>
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<td>Paragraph two replaced ‘approval’ with ‘verification’</td>
<td>6.1</td>
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<tr>
<td>Paragraph 1, third dot point changed references to EPD 0015 to EPD 0014</td>
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1 Introduction

Many design tasks undertaken by Rail Corporation NSW (RailCorp) either affect, or will be affected by, interfaces between the item/system being modified and other systems. These interfaces may involve other hardware and/or software items or systems, operating systems and procedures, information systems or conditions of use of the infrastructure and items or systems that are outside of the direct control of RailCorp.

Management of these interfaces is critical for effective configuration management, for maintenance of the safety and integrity of RailCorp infrastructure, assets and systems and to avoid inadvertent damage to them or those of other organisations that interface with them.

2 Scope

This procedure establishes requirements for identification and management of interfaces that may impact on RailCorp design and configuration management activities.

3 Referenced documents

SMS-06-GD-0031 - RailCorp System Guide Hazard Identification and Safety Risk Assessment Guide v1.1
SMS-06-SR-0034 - RailCorp System Requirement Human Factors Integration v1.1
SMS-06-SR-0048 - RailCorp System Requirement Safety Change Management v1.1

4 Definitions and terms

Refer to the glossary in EPD 0001 for definitions and terms used in this procedure.

5 Requirements

5.1 General requirements

Interface management shall be treated as a high priority requirement within all design tasks undertaken by the RailCorp.

The most obvious of these are the physical and functional interfaces that exist between infrastructure systems and rolling stock, e.g. track and signalling, overhead wiring (OHW) and track, track and rolling stock. However, several other types of interfaces can affect or be affected by new or changed infrastructure designs.

Uncontrolled or unintentional changes to any of these interfaces have the potential to cause major problems with the operation, integrity or supportability of RailCorp infrastructure, or to the safety and operability of the NSW rail system. Failure to recognise interfaces can also lead to unnecessary damage, delays and costs during construction.

All design tasks impacting on interfaces must comply with the SMS Safety Change Management System Requirement and should include the conduct of Interface Hazard Analysis in line with SMS-06-GD-0031.

Eight categories of interfaces are identified within this procedure. These are illustrated in Figure 1 and are further explained in the following paragraphs. Bound within the majority
of these 8 categories is the interface between systems and humans. A mandatory activity of every design process will be compliance with SMS-06-SR0034 and SMS-06-SR-0048. These requirements provide guidelines to ensure human elements and human interaction within the system are considered in a structured and systematic way through the design process.

The order in which the different types of interfaces are presented does not imply any precedence or relative level of importance. Uncontrolled changes to any type of interface can create significant problems and the types of interfaces are considered to be of equal significance within the design management environment. All types of interfaces must be considered during the design of all changes to the configuration of RailCorp infrastructure.

![Diagram of types of interfaces within RailCorp]

**Figure 1- Types of interfaces within RailCorp**

### 5.2 Physical and functional interfaces

Physical and functional interface requirements shall be defined where:

- The input to one item or system from another must meet specific criteria or where specific limitations exist on input conditions within the design of the system receiving the input. Examples include minimum/maximum voltage, data formats, maximum/minimum pressure/flow and situations where there is a specific human interface with the system or item being considered.

- Outputs from a system provide inputs to another system and must meet specific input criteria. Note that this is the other side of a common interface in the preceding requirement.
- Items must conform to specific space/weight or mounting requirements for attachment or installation in standard designs.
- Equipment installed in or using the infrastructure must be designed to operate within a specific physical space, e.g. conformance with the kinematic envelope or within a defined space or envelope within a tunnel.
- A design includes both hardware and software elements or there is a requirement for a new software design to interface with existing hardware or software.

Interface requirements can be defined in one of several ways. Methods include:

- As separate interface specifications. This approach should be considered where systems or sub-systems are to be designed by different organisations e.g. under separate sub-contracts. In this case the interface requirements are defined in a separate document (specification or drawing) and form mandatory design input requirements for both design groups.
- Within a drawing. Interfaces may be defined as part of any other drawing (detail or assembly) or as separate interface drawings where appropriate. Interface requirements shown on concept drawings provided as part of a design brief must be specified as a contractual/design interface within the engineering specification. Drawings provided for reference are exactly that and have no legal or binding effect.
- Within specifications. The requirement for the design of a system item to meet a specific interface must be included in the engineering specification for the system. This may be by reference to a separate drawing or specification, or by inclusion of detailed interface requirements within the specification.

Irrespective of the method adopted interfaces must be clearly specified and be capable of ready identification from the configuration documentation. The preferred method is for any applicable interface documents to be identified on the relevant drawing or plan to minimize the possibility of it being overlooked during configuration change action.

### 5.2.1 Standard or common interfaces

Several interfaces exist throughout the RailCorp infrastructure that are standard or common to the complete system and may not be defined by specific interface documentation. These include transit space standards, wheel/rail, track/drainage, track/OHW interfaces which are defined within RailCorp standards and which must be taken into account in all design tasks.

RailCorp design staff are responsible for verifying whether a section of the infrastructure affected by a proposed change conforms to standard interface definitions or is governed by a specific definition e.g. a special drainage design applying only to that application.

### 5.3 Rolling stock operational conditions of use

Operational conditions of use are normally contained in access agreements between RailCorp and the operator concerned. These cover details such as the type of rolling stock to be used, maximum loading and usage factors such as numbers of trains and gross loading as well as the standard of the infrastructure to be provided by RailCorp. The Train Operating Conditions Manual (TOC Manual) is a derived document (ie not a primary configuration document) that includes details of the operational conditions of use. The Minimum Operating Standards for Rolling Stock (RSUs) contain the interface requirements between rolling stock and infrastructure.

Proposed changes to the operational conditions of use may originate from the operator, to vary the conditions of access, or RailCorp, if the standard of the infrastructure is varied from that contained in the agreement.
The operational conditions of use form a primary input to any new design or proposal to change the configuration of existing infrastructure. Current requirements and any proposed changes to these requirements, together with any limitations and constraints imposed by the relevant access agreements must be established before any change is developed and approved. The Rolling Stock Access Integrity Unit, which publishes the TOC Manual and RSUs, manages the interface between rolling stock and infrastructure.

RailCorp design staff who are responsible for the development of any configuration change that may have an impact on any operational conditions of use shall ensure that the effect of a change is clearly identified and referred to all relevant stakeholders before proceeding.

5.4 Operations control and Safeworking

Many interfaces exist between design of the infrastructure, operational and train control systems and the Safeworking rules in use within the NSW rail system. The interfaces are particularly important for signalling and communications systems but have the potential to affect the design of all infrastructure.

Close coordination is necessary between RailCorp design sections and the divisions responsible for operational control and Safeworking systems. This can be of critical importance when changes are to be made to either the infrastructure design or the design of other systems that have an interface with the infrastructure.

This should be accomplished through the configuration control process defined in EPD 0014, with the responsible division or section being required to submit a CCR for consideration of the impacts by all stakeholders when an interface is affected. Significant changes would be considered and approved by the RailCorp Configuration Control Board.

Pending agreement to such a process RailCorp design staff shall monitor changes in operational control systems or Safeworking rules to identify changes that are likely to impact on infrastructure design and to initiate action to resolve any issues that arise.

5.5 External service providers

Interfaces with service providers, such as electricity suppliers, are normally defined in service agreements. These cover both the commercial terms and the nominal specification for the supply, which does not normally impose any specific interface limitations or constraints on RailCorp designs.

The physical/functional characteristics of connections between RailCorp infrastructure and service provider installations shall be clearly specified within RailCorp configuration documents in a form that meets the requirements of RailCorp, the service provider and any relevant legislation and regulations.

5.6 Physical interfaces with other property owners

Numerous physical interfaces exist between RailCorp infrastructure and equipment/installations owned by other individuals or agencies. Equipment or installations in this category may be located within the rail corridor or may adjoin the corridor. Examples include road crossings, including private crossings, installations such as pipelines laid within the corridor, shared poles, private sidings and bridges.

Interfaces in this category shall be clearly defined within RailCorp configuration documentation and the impact of any changes on other stakeholders shall be assessed as part of any configuration change action that may affect other property owners.
Designers undertaking design tasks that have a rail/road interface shall refer to the interface agreements between RailCorp and the respective roads authority with regard to identified risks and the management responsibility of those risks.

5.7 Management systems interfaces

Management systems interfaces may need to be considered within infrastructure design tasks under two main sets of circumstances.

The first covers situations where changes to the design of a system or subsystem can affect data collection for input to systems designed for management or monitoring of the infrastructure concerned. The operation or range of information collected within supervisory control and data acquisition (SCADA) systems is a prime example. However, similar circumstances can arise with interfaces between signalling and operational control systems or where changes in infrastructure design affects the collection of data by equipment designed to monitor condition e.g. the use of the track recording car.

The second case involves interfaces between management systems where one or both systems is used to monitor asset condition or integrity. This is particularly important where the monitoring involves parameters that are needed to monitor safe life or that otherwise contribute to monitoring the safety or integrity of infrastructure assets.

Management of such interfaces can only be achieved through cooperation between all responsible divisions, sections and stakeholders. RailCorp engineering staff shall ensure that any proposed changes within their area of responsibility are properly managed to preserve the integrity of management systems data.

5.8 Regulatory agencies

Interfaces with regulatory agencies include several different types of arrangements.

The interface with the Independent Transport Safety and Reliability Regulator (ITSRR) is effectively a management interface where ITSRR has a responsibility to ensure that configuration changes introduced by RailCorp do not impact on the terms of the RailCorp accreditation as an infrastructure owner and operator.

For design tasks this interface is managed by provision of information on proposed and actual changes to the ITSRR, in accordance with SMS-06-SR-0048 and the general requirements of EPD 0014. Any follow up action will then occur through established management processes.

Other more specific interfaces exist with a number of agencies whereby specific permits and/or licenses are required prior to the implementation of certain configuration changes. These include Environmental Protection Agency, the NSW Roads & Traffic Authority and the relevant water authorities.

Prior consultation is often necessary or advisable before proceeding with the development of a change, e.g. with the relevant water authority to establish flood and drainage levels and impacts prior to the construction or alteration of a bridge.

Confirmation that the relevant regulatory agencies have been consulted and that necessary licences and permits have been obtained is required as part of the verification for design tasks. Refer to EPD 0011.

5.9 Verification/validation of interfaces

Verification and validation of interfaces shall be included as a mandatory element for all new or altered designs.
6 Responsibilities

6.1 Design engineers and supervisors

Engineers responsible for developing or modifying infrastructure designs shall ensure that the requirements of all defined or common interfaces are taken into account as part of the design process.

Engineers having delegated design verification authority shall ensure that all interface requirements have been taken into account in the design and shall verify conformance.

6.2 Asset managers

Asset managers are responsible for:

- Identifying changes in the conditions of operational use and for ensuring that these are subject to engineering assessment before they are introduced.
- Ensuring that the requirements of all stakeholders, including external agencies having some form of interface with RailCorp infrastructure or operation are identified when submitting configuration change requests. EPD 0014 refers.