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# Technical Note – TN 002:2019

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## Subject: Superseded Appendix C – Guidance for sustainability requirements

This technical note is issued by the Asset Standards Authority (ASA) as an update to T MU AM 04001 PL *TfNSW Configuration Management Plan*.

T MU AM 04001 PL is partly superseded with the publication of T MU EN 00008 ST *Sustainability Assurance Requirements*.

Appendix C Guidance for sustainability requirements has been superseded and incorporated in its entirety into T MU EN 00008 ST. To this effect, any references to Appendix C within T MU AM 04001 PL shall now be read as T MU EN 00008 ST *Sustainability Assurance Requirements*.

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Transport  
for NSW

T MU AM 04001 PL

Plan

# TfNSW Configuration Management Plan

Version 6.0

Issued date: 26 October 2017

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## Standard governance

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**Approver:** Executive Director, Asset Standards Authority on behalf of the ASA Configuration Control Board

## Document history

Version	Summary of changes
1.0	5 September 2014 – first issue
2.0	25 September 2014 – minor update to configuration management authority delegation structure figure
3.0	19 December 2014 – minor update to asset life cycle diagram and clarifications
4.0	14 August 2015 – minor update to remove rail focused statements, clarify a term, and update the asset life cycle diagram
5.0	12 September 2017 - inclusion of technical notes issued since version 4.0, changes in name of CMAAC to TNAC, explicit identification requirements for environment and sustainability assurance and other minor amendments and clarifications
6.0	Clarity of figures improved, minor amendments to text for clarification including alignment with Figures 2 and 3

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## Preface

The Asset Standards Authority (ASA) is a key strategic branch of Transport for NSW (TfNSW). As the network design and standards authority for NSW Transport Assets, as specified in the *ASA Charter*, the ASA identifies, selects, develops, publishes, maintains and controls a suite of requirements documents on behalf of TfNSW, the asset owner.

The ASA deploys TfNSW requirements for asset and safety assurance by creating and managing TfNSW's governance models, documents and processes. To achieve this, the ASA focuses on four primary tasks:

- publishing and managing TfNSW's process and requirements documents including TfNSW plans, standards, manuals and guides
- deploying TfNSW's Authorised Engineering Organisation (AEO) framework
- continuously improving TfNSW's Asset Management Framework
- collaborating with the Transport cluster and industry through open engagement

The AEO framework authorises engineering organisations to supply and provide asset related products and services to TfNSW. It works to assure the safety, quality and fitness for purpose of those products and services over the asset's whole-of-life. AEOs are expected to demonstrate how they have applied the requirements of ASA documents, including TfNSW plans, standards and guides, when delivering assets and related services for TfNSW.

Compliance with ASA requirements by itself is not sufficient to ensure satisfactory outcomes for NSW Transport Assets. The ASA expects that professional judgement be used by competent personnel when using ASA requirements to produce those outcomes.

### About this document

The requirements of this plan form part of the ASA configuration management framework and are consistent with the TfNSW CP14005 *Transport Asset Management Policy*. The ASA is the owner of the configuration management framework for TfNSW and sets the standards for configuration management of TNSW transport assets throughout the asset life cycle.

Since version 4.0 a substantial number of clarifications have been included in addition to a change in the focus of the Transport Network Assurance Committee (TNAC) from assurance prior to handover to assurance of the final designed solution. Approved configuration management plans related to delegated network configuration control authority continue to be recognised as approved subject to any other relevant compliance requirements. This version includes minor corrections identified in version 5.0.

This plan is the sixth issue.

## Table of contents

<b>1. Introduction</b>	<b>7</b>
<b>2. Purpose</b>	<b>7</b>
2.1. Scope	7
2.2. Application	7
<b>3. Reference documents</b>	<b>8</b>
<b>4. Terms and definitions</b>	<b>8</b>
<b>5. Scope of configuration management responsibilities of TfNSW</b>	<b>11</b>
<b>6. Governance arrangements</b>	<b>12</b>
6.1. Process ownership and decision making	12
6.2. Asset information	14
6.3. Scope of the ASA CCB	14
6.4. Delegation of network configuration control and asset assurance authority	14
6.5. Reporting to the TfNSW Executive	16
<b>7. Configuration management responsibilities</b>	<b>16</b>
7.1. Transport Network Assurance Committee (TNAC)	17
7.2. Authority of the ASA in support of the TNAC	18
7.3. Configuration control board responsibilities	19
7.4. Asset acceptance	20
7.5. Responsibilities of client agents or organisations engaged to integrate new or altered transport assets	20
7.6. Configuration change managers	21
7.7. Configuration change stakeholders	22
7.8. Organisations with responsibility for network configuration control	22
<b>8. Configuration management plans</b>	<b>23</b>
8.1. Approval of configuration management plans	23
8.2. Minimum system requirements	23
<b>9. Configuration baselines</b>	<b>27</b>
9.1. Requirements baseline	27
9.2. Final design baseline	27
9.3. Product baseline	27
<b>10. Type approved products and standard designs</b>	<b>28</b>
<b>11. Categorisation of configuration changes</b>	<b>28</b>
11.1. Assessment of configuration change categorisation	28
11.2. Significant configuration change categorisation	29
11.3. Moderate configuration change categorisation	29
11.4. Minor configuration change categorisation	30
11.5. Categorisation and TNAC submissions	30
<b>12. Configuration management gates</b>	<b>31</b>
12.1. Tailored application of configuration management gates	32

12.2.	Whole of system approach to gate submissions .....	32
12.3.	Application of configuration management gates to maintenance.....	33
12.4.	Application of configuration management gates to decommissioning .....	33
12.5.	Application of configuration management gates to staged commissioning.....	33
12.6.	Application of configuration management gates to third party work.....	33
12.7.	Configuration management gate 0 – strategic assessment .....	34
12.8.	Configuration management gate 1 – business case .....	36
12.9.	Configuration management gate 2 – preliminary design complete .....	37
12.10.	Configuration management gate 3 – for construction .....	38
12.11.	Configuration management gate 4 – ready for testing .....	40
12.12.	Configuration management gate 5 – asset handover .....	41
12.13.	Configuration management gate 6 – asset assurance review .....	43
12.14.	Gates relative to planning and delivery process.....	44
12.15.	Assurance updates between configuration management gates.....	46
12.16.	Changes to scope after gate 1 acceptance .....	47
<b>13.</b>	<b>Configuration identification.....</b>	<b>47</b>
<b>14.</b>	<b>Change control .....</b>	<b>48</b>
14.1.	Change control procedures .....	48
14.2.	Stakeholder identification.....	50
14.3.	Configuration change requests.....	50
14.4.	Implementation of CCB decisions .....	51
14.5.	Out of session and delegated configuration change request approvals .....	51
14.6.	Change control registration system .....	51
14.7.	Submissions to the TNAC.....	51
14.8.	Record keeping and audit trail .....	53
<b>15.</b>	<b>Configuration status accounting .....</b>	<b>54</b>
<b>16.</b>	<b>Configuration identification recovery.....</b>	<b>54</b>
<b>17.</b>	<b>Configuration surveillance .....</b>	<b>55</b>
17.1.	Configuration audits.....	55
<b>Appendix A</b>	<b>Standard configuration management gates .....</b>	<b>57</b>
<b>Appendix B</b>	<b>Typical TfNSW business unit responsibility for submissions.....</b>	<b>58</b>
<b>Appendix C</b>	<b>Guidance for sustainability requirements.....</b>	<b>59</b>
<b>Appendix D</b>	<b>Applicability of TfNSW Configuration Management Plan.....</b>	<b>62</b>
<b>Appendix E</b>	<b>Gate 0 GSN .....</b>	<b>63</b>
<b>Appendix F</b>	<b>Gate 1 GSN .....</b>	<b>64</b>
<b>Appendix G</b>	<b>Gate 3 GSN .....</b>	<b>65</b>
<b>Appendix H</b>	<b>Gate 5 GSN .....</b>	<b>66</b>

# 1. Introduction

This plan sets out the Transport for NSW (TfNSW) arrangements for managing the configuration of its transport assets and the assurance of assets.

Configuration management arrangements within TfNSW are based on *AS ISO 10007-2003 – Quality management systems – Guidelines for configuration management*. Additionally configuration management in TfNSW encompasses an asset assurance role.

Arrangements described in this plan include the governance structure for the management of configuration changes. The arrangements assure that configuration changes are appropriately managed to meet the defined technical requirements throughout an asset's life and are safe so far as is reasonably practicable (SFAIRP). The governance structure and configuration change arrangements described in this plan interfaces with the T MU MD 20001 ST *System Safety Standard for New and Altered Assets* and are consistent with the intent of TfNSW's CP14005 *Transport Asset Management Policy*, 50-ST-162/3.0 *Asset Lifecycle Safety Management Standards* and *Asset Management Framework Overview*.

## 2. Purpose

This plan operates as the highest level configuration management plan (CMP) for TfNSW transport assets and does so in conjunction with T MU MD 20001 ST. This plan facilitates a coordinated approach to configuration management within TfNSW, its agencies and service providers that perform configuration management and asset assurance activities for TfNSW.

### 2.1. Scope

This plan addresses how configuration management principles are applied to support the desire of TfNSW to manage the configuration of its transport assets. This plan applies to network configuration management. Network configuration management includes the activities, systems and documentation that form part of the integration of assets with the TfNSW Transport Network.

This plan operates in conjunction with T MU MD 20001 ST.

### 2.2. Application

This plan applies to the following entities:

- TfNSW, including work performed for Roads and Maritime Services (RMS)
- TfNSW agencies, excluding RMS but inclusive of work performed by other agencies for RMS
- parties contracted by TfNSW

This plan covers the complete life cycle of assets from demand and need through to decommissioning. Assets and interfaces within the scope of this plan are described in Section 5.

### 3. Reference documents

The following documents are cited in the text. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document applies.

#### **Australian standards**

AS ISO 10007-2003 – Quality management systems – Guidelines for configuration management

#### **Transport for NSW standards**

50-ST-162/3.0 Asset Lifecycle Safety Management Standard (available on request from standards@asa.transport.nsw.gov.au)

T MU MD 20001 ST System Safety Standard for New or Altered Assets

TS 10753: 2014 Assurance and Governance Plan Requirements

#### **Other reference documents**

20-FT-388 Initial Safety Change Assessment (only applicable to TfNSW available on request from standards@asa.transport.nsw.gov.au)

ASA Charter

CP14005 Transport Asset Management Policy (available on request from standards@asa.transport.nsw.gov.au)

#### **Legislation**

Environmental Planning and Assessment Act 1979

Protection of the Environment Administration Act 1997

Transport Administration Act 1988

### 4. Terms and definitions

The following terms and definitions apply in this document:

**AEO** Authorised Engineering Organisation

**AGP** assurance and governance plan

**ASA** Asset Standards Authority

**asset acceptance** acceptance of a new or altered asset into the transport network for operation and maintenance by a contracted body

**asset information** combined set of data (graphical and non-graphical) and documents (drawings, manuals, plans, certificates) required to support the management of assets over the life cycle

**asset information steward** person or authorised third party in control of asset information who has been given the responsibility by an information owner to oversee part of the life cycle process for an asset

**BRS** business requirements specification

**business unit** part of an organisation with a defined scope or responsibility

**CCB** configuration control board; person or a group of persons assigned responsibility and authority to make decisions on the configuration

**CCM** configuration change manager; person who has primary responsibility for a configuration change

**CCR** configuration change request; formal request to add or change a TfNSW transport asset that is subject to configuration control

**change control** activities for control of the product

**client agent** the TfNSW division or service provider delivering and assuring a service to the client representative

**client representative** division of TfNSW that represents the client, the Secretary TfNSW

**CM** configuration management

**CMP** configuration management plan

**configuration** interrelated functional and physical characteristics of a product defined in configuration information

**configuration audit** examination to determine whether a configuration item conforms to its approved configuration baseline

**configuration baseline** approved product configuration that establishes the characteristics of a product at a point in time that serves as reference for activities throughout the life cycle of the product

**configuration change** a change to a configuration item or set of configuration items

**configuration documents** product configuration information and its supporting medium

**configuration identification** activities comprising determination of the product structures, selection of configuration items, documenting the configuration item's physical and functional characteristics including interfaces and subsequent changes and allocating identification characters or numbers to the configuration items and their documents

**configuration information** requirements for product design, realisation, verification, operation and support. May also be referred to as product configuration information

**configuration item** entity within a configuration that satisfies an end use function

**configuration management** coordinated activities to direct and control configuration

**configuration status accounting** formalised recording and reporting of product configuration information, the status of proposed changes and the status of the implementation of approved changes

**GSN** goal structuring notation

**ISA** independent safety assessment

**ISCA** initial safety change assessment

**JOS** judgement of significance

**network configuration** the configuration of transport assets viewed as an overall system that is for achieving the transport objectives of TfNSW and is composed of discrete configuration items identified at a level commonly identified by TfNSW

**RAMS** reliability, availability, maintainability and safety

**RMS** Roads and Maritime Services

**service provider** operator or maintainer, designer, constructor providing services to TfNSW to manage the day to day operation and maintenance of the TfNSW assets

**SFAIRP** so far as is reasonably practicable

**SRS** system requirements specification

**TfNSW** Transport for NSW

**TfNSW transport assets** means transport assets vested in or owned, managed, controlled, commissioned or funded by TfNSW or a subsidiary NSW Government Transport Agency

**TfNSW Transport Network** transport system owned and operated by TfNSW or its operating agencies upon which TfNSW has power to exercise its functions as conferred by the Transport Administration Act or any other Act

**TNAC** Transport Network Assurance Committee

**transport assets** means assets used for or in connection with or to facilitate the movement of persons and freight by road, rail, sea, air or other mode of transport, and includes transport infrastructure (Transport Administration Act 1988)

**transport infrastructure** means infrastructure (including associated vehicles, vessels and rolling stock) used for or in connection with or to facilitate the movement of persons and freight by road, rail, sea, air or other mode of transport (including walking and cycling). It includes:

- a. railways and railway infrastructure, and
- b. roads and road infrastructure, and
- c. maritime infrastructure and ports, and
- d. transport safety infrastructure, and
- e. systems, works, structures, buildings, plant, machinery and equipment that are associated with or incidental to transport infrastructure

**transport services** include railway services (including heavy rail, metro rail and light rail services), bus services and ferry services

**transport system** the transport services and transport infrastructure of NSW for all modes of transport

## 5. Scope of configuration management responsibilities of TfNSW

TfNSW transport asset configuration management responsibilities covered by this plan encompass the following:

- existing and proposed changes to transport assets, including removal and addition of new assets, such as the following:
  - vehicles and fixed infrastructure that are used for the transportation of people or freight regardless of any transport mode
  - property, including airspace owned or controlled by TfNSW that is used for or connected to transport assets
  - information technology systems used for the control or monitoring of the operational transport network
- documentation defining the configuration of its transport assets including engineering standards
- matters arising from the interface of its transport assets with transport operations or associated TfNSW systems of or third parties, such as the following:
  - property
  - pedestrian, commuter and community
  - electrical, water and other utilities
  - information technology
- information technology systems used for managing asset information or configuration changes

Configuration management and its associated processes operate throughout the whole life cycle of assets.

The requirements of this plan do not apply where assets being changed or introduced meet all of the following requirements:

- not classified as transport assets
- not located on TfNSW premises used for transport operations
- do not interface with TfNSW transport assets physically or operationally

Figure 9 in Appendix B may be used to assist in making a determination as to whether the requirements of this configuration management plan are applicable.

## **6. Governance arrangements**

Governance arrangements for configuration management define the arrangements and parties with the authority to make decisions about the configuration of the network.

### **6.1. Process ownership and decision making**

The Secretary, TfNSW discharges accountability for configuration management by authorising the Asset Standards Authority (ASA) to set the framework for configuration management via the *ASA Charter*.

The configuration management framework includes requirements, guidance, tools and governance bodies as appropriate. The Transport Network Assurance Committee (TNAC) is a tier 1 configuration control board (CCB) established by this plan. The TNAC is the governance body responsible for making network configuration change determinations.

The previous name of the TNAC is the TfNSW Configuration Management and Asset Assurance Committee (CMAAC). The term CMAAC used in documents published before this plan shall now be read as TNAC.

#### **6.1.1. Tier structure of delegated CCBs**

CCBs may be established to facilitate the configuration management, assurance and staged configuration change determinations of transport assets. CCBs do so by receiving delegated authority from a higher level CCB over a defined scope of assets or stage of an asset life cycle.

CCBs that reside directly below a tier 1 CCB in the hierarchy are tier 2 CCBs. Additional CCBs may be established below the tier 2 CCBs and are considered tier 3 CCBs. Generally, tier 2 CCBs are only expected to be established within TfNSW or a contracted transport assets maintainer acting as the client representative.

The term CCB is applied to describe an entity which fulfils the relevant role and has associated responsibilities as stated in this plan.

The scope of authority conferred upon a delegated CCB shall be appropriate to the membership, the systems in place to support the operation of the delegated CCB and position of the CCB within the delegation structure. Both practical considerations and risk shall be considered in determining acceptable delegation arrangements.

Figure 1 provides a representation of the delegation of authority for configuration management within TfNSW.

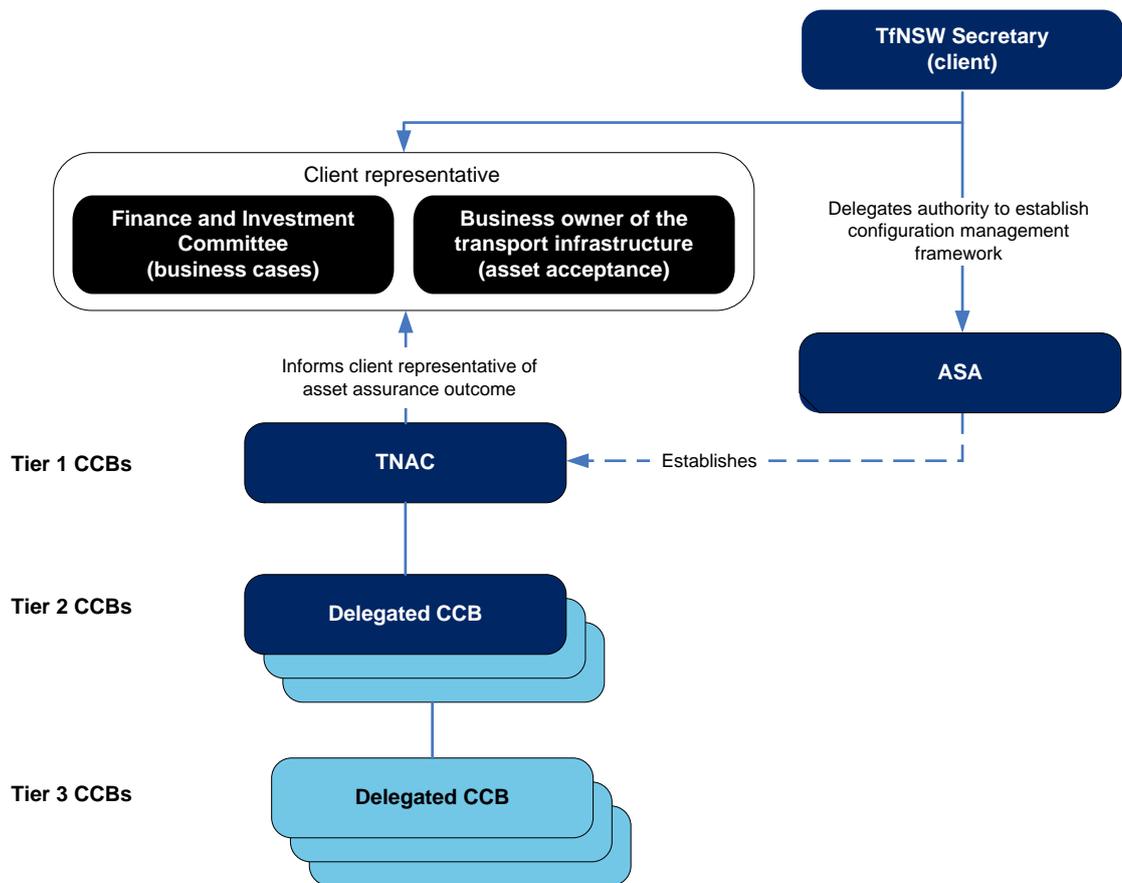


Figure 1 - Configuration management authority delegation structure

### 6.1.2. CCB naming conventions

CCB is an established term within TfNSW and many of its service and delivery partners. The term reflects the role of the CCBs in receiving assurance for the management of the configuration of TfNSW's Transport Network. The alternative term that may be adopted by bodies fulfilling the role of a CCB is network assurance committee (NAC). The NAC term may be used to emphasise the role of the body in assuring transport assets in the context of the whole transport network.

It is preferred that names applied to bodies fulfilling the role of the CCB apply one of these two naming conventions.

## 6.2. Asset information

Configuration information is a subset of asset information. The term asset information is preferred except where specifically referring only to configuration information.

The ASA sets overarching requirements for asset information and the management of such information. Where specific requirements have not been defined by the ASA or agreed with the ASA, then existing established arrangements shall apply.

## 6.3. Scope of the ASA CCB

The ASA has established the ASA CCB to manage its configuration items and its operation is governed by its own CMP. Configuration items of the ASA are predominantly ASA standards and related publications. The ASA's CMP integrates with this plan, but establishes requirements and processes tailored to the configuration management needs of the ASA.

## 6.4. Delegation of network configuration control and asset assurance authority

TfNSW business units, organisations providing engineering services to TfNSW or agencies of TfNSW may be delegated responsibility and authority to make decisions about network configuration changes on TfNSW transport assets on behalf of the TNAC.

To receive delegated network configuration control authority, an organisation shall normally have an appropriately approved CMP. Where the authority is to be delegated directly from the TNAC, the CMP shall be approved by the TNAC. The plan shall describe the configuration management arrangements and asset assurance arrangements that the organisation will apply. The CMP shall clearly identify the scope of the delegated authority, how the delegated authority will be exercised and how assurances will be provided to the TNAC that configuration decisions have been properly managed.

Approval of an organisation's CMP by the TNAC or delegate only covers aspects of the plan addressing network configuration change and asset assurance in relation to TfNSW transport assets and related interfaces. Additional information about the approval of CMPs is described in Section 8.1.

On a case-by-case basis the TNAC may delegate authority as it deems appropriate by means other than approving a CMP. This may occur where minor amendments to existing arrangements are required.

Exercise of delegated configuration control authority is subject to surveillance by the ASA, TNAC or representative of either.

### **6.4.1. Relationship of delegation of authority to AEO status**

Delegated authority for network configuration control is separate from AEO status. Holding AEO status does not mean the organisation also holds authority to make network configuration control decisions.

External service providers are required to have the capability to perform configuration management activities applicable to the asset life cycle activities that they are authorised to provide. Delegation of network configuration control to an organisation external to TfNSW will only be considered if the organisation has entered into an agreement with TfNSW to be the client agent responsible for network configuration and asset assurance on behalf of TfNSW.

### **6.4.2. Relationship between delegated CCBs**

Where a configuration change overlaps the responsibility of more than one CCB, arrangements between the affected CCBs shall be established and recorded. Arrangements may take the form of documented minutes of the affected CCBs recognising arrangements, through approved CMPs or other appropriate documents.

Where configuration changes affecting more than one particular CCB occur regularly, standing arrangements should be put in place between the affected CCBs. Consideration shall be made for any contractual arrangements where affected CCBs are not within the same organisation.

Arrangements may identify the CCB responsible for making the decision as the CCB most affected by the change. Other affected CCBs may be recognised as stakeholders whose endorsement for the configuration change request is required.

The ASA may be consulted in identifying appropriate arrangements between delegated CCBs.

### **6.4.3. Reporting to the ASA and the TNAC**

CCBs that have delegated authority for making network configuration decisions shall provide reports to the ASA demonstrating the appropriate exercise of that authority. The ASA consolidates and distribute reports to the TNAC as necessary. Reporting to the TNAC shall be documented within the organisation's CMP.

Regular reports shall provide a summary and listing of the following:

- the status of configuration change requests (CCRs), CCRs are described in Section 14.3
- any configuration changes that occurred without configuration change approval
- configuration audits performed
- forecasts of future CCRs
- any other configuration management matters that the ASA should be aware of

Reports shall be quarterly unless other arrangements are agreed with the ASA. Where only small volumes of low risk configuration changes are performed each year, less frequent reporting is likely to be considered adequate by the ASA. Reporting in some cases may occur via a TfNSW contract manager.

The TNAC or the ASA may also request specific reports, updates or presentations from project teams proposing or implementing changes that may affect the configuration of the TfNSW Transport Network or from parties exercising delegated configuration control authority.

## **6.5. Reporting to the TfNSW Executive**

The TNAC provides reports to TfNSW's Finance and Investment Committee and Executive Health, Safety and Environment Committee. Reports shall be produced to support decision making at both executive committees. Reports shall be produced following TNAC meetings that precede a corresponding TfNSW Executive Committee meeting. Information included in the report generally includes the following:

- configuration change submissions presented to the TNAC over the preceding month
- projects with outstanding conditions associated with submissions
- any other matter that the Chair of the TNAC believes the TfNSW Executive should be aware of

## **7. Configuration management responsibilities**

Configuration management responsibilities are allocated through this plan to various parties that participate in the asset life cycle. The responsibilities established in this plan may be tailored in approved subsidiary CMPs.

A summary of configuration management responsibilities defined within this plan is shown in Table 1.

**Table 1 – Summary of configuration management responsibilities**

<b>Responsibility</b>	<b>Responsible party</b>
Ownership of TfNSW configuration management processes	ASA
Applying configuration control authority to make decisions where responsibility has not been delegated	TNAC (tier 1)
Applying configuration control authority to make decisions where responsibility has not been delegated through an approved CMP	Delegated CCBs (tier 2 and tier 3)
Managing configuration changes within the scope of this plan	Configuration change manager (CCM)
Preparing and presenting submissions for configuration changes to the TNAC or delegated CCB, including demonstrating that all required assurance evidence exists	CCM
Delivery of all applicable asset information in relation to a configuration change	CCM

## 7.1. Transport Network Assurance Committee (TNAC)

The TNAC is the highest level CCB responsible for network configuration decisions about existing or proposed TfNSW transport assets. The committee is governed by its terms of reference. The activities of the TNAC are reported to TfNSW Executives through the TfNSW Executive Health and Safety Committee. The TNAC is a recognised sub-committee of the Executive Health, Safety and Environment Committee.

The role of the TNAC is to oversee the application of network configuration management and asset assurance, including assurance of system safety risk to TfNSW transport assets. The TNAC achieves this by holding the authority to make determinations on the adequacy and appropriateness of configuration management and asset assurance activities conducted in the course of developing and implementing new or altered transport assets and in the course of maintaining the configuration of existing transport assets. In exercising these authorities, the TNAC reviews evidence provided to gain confidence that appropriate assurance activities have been conducted on the following:

- development of proposed configuration changes to the transport network
- delivery of transport assets configuration changes
- maintenance of the approved transport assets configuration

TNAC responsibilities include the following:

- providing direction, guidance, recommendations and oversight for the development and implementation of configuration management and asset assurance
- reviewing and making determinations on the acceptability of configuration changes based on the following:
  - being satisfied that an appropriate assurance process and governance has been applied in managing the transport network change and the application of the process is supported by appropriate evidence
  - being confident that risks and issues are being appropriately managed
- delegating configuration management responsibility and authority at its discretion
- overseeing the application of configuration management within the scope of responsibility of the committee

As the highest level CCB for TfNSW transport assets the TNAC has the discretion to determine the applicability of configuration management requirements to particular configuration change requests and the evidence that it considers sufficient and appropriate to the circumstance.

## **7.2. Authority of the ASA in support of the TNAC**

The ASA as the business owner of the TfNSW configuration management framework for TfNSW can act as a supporting body to the TNAC. The ASA through its TNAC secretariat functions provides assistance to facilitate the efficient operation of the TNAC.

The following are the tasks that the ASA may perform in relation to supporting submissions and presentations to the TNAC:

- Vetting proposed agenda items, including submissions, and only including items on the TNAC meeting agenda if the ASA is satisfied that the item is appropriate and adequately complete for the members of the TfNSW to consider.
- Sighting or reviewing evidence provided by CCMs in relation to TNAC submissions or conditions. The ASA may accept the evidence on behalf of the TNAC with ratification at the next practical TNAC meeting if the resolution of the condition is either administrative or unlikely to be contentious.

### **7.2.1. ASA CCB as agent of the TNAC**

The ASA CCB may act as the agent for the TNAC in relation to matters of configuration management procedure, interpretation or application of the requirements of this plan and acceptance of CMPs or variations thereof.

The ASA CCB may act as the agent for the TNAC where the ASA CCB is better placed to consider the matter or if it facilitates efficient decision making. Decisions made by the ASA CCB as agent of the TNAC will be reported to the TNAC at the next practical TNAC meeting.

### 7.3. Configuration control board responsibilities

CCBs are determining authorities on configuration management issues affecting TfNSW transport infrastructure within the delegated scope of the respective CCB.

CCBs that have authority for network configuration change control shall make decisions in the interest of TfNSW. In doing so the CCB shall consider the impact to TfNSW from a whole-of-transport-network and a whole-of-life perspective.

CCB responsibilities include the following:

- providing direction, guidance, recommendations and oversight for the development and implementation of configuration management and asset assurance
- reviewing and making determinations on the acceptability of configuration changes based on the following:
  - confidence that appropriate assurance process has been applied and the application of the process is supported by adequate assurance evidence
  - evidence to assure that a proposed configuration change solution is appropriate
  - being confident that risks and issues are being appropriately managed
- overseeing the application of configuration management within the scope of responsibility of the CCB, including any delegated CCBs
- obtaining confidence that any conditions imposed by the CCB has been complied with

In reviewing and making determinations on configuration changes, CCBs shall do so in the context of any broader configuration change or interfacing configuration changes. If the CCB is not able to properly consider such aspects, then the change shall be deferred or escalated to a more appropriate CCB.

### **7.3.1. Membership composition**

The membership of a CCB shall be suitable for the decisions the CCB is required to make and the role it holds within the hierarchy of CCBs.

The composition of a CCB shall take into consideration a number of factors including the following:

- scope of delegated configuration control authority
- level of risk associated with the decisions that are likely to be made
- capability of the membership to appropriately consider configuration change requests
- independence from the party proposing or delivering the configuration change
- representation from appropriate stages of the asset life cycle

The CCB may be defined as a single person where the risk, impact and scope of matters considered by the CCB determine such arrangement to be appropriate.

### **7.4. Asset acceptance**

Asset acceptance within TfNSW is undertaken by the client representative within TfNSW. The determinations regarding configuration change requests made by the TNAC or delegated CCB informs the client representative of the asset assurance perspective when the client representative is requested to accept transport assets.

### **7.5. Responsibilities of client agents or organisations engaged to integrate new or altered transport assets**

Organisations responsible for maintenance, or integration of new or altered transport assets into the TfNSW transport network, shall have at least one CCB that is capable of applying appropriate configuration control authority delegated by the TNAC. Organisations that do not have a CCB shall have arrangements in place to operate under an existing CCB. Organisations shall have a CMP, or equivalent, accepted by the TNAC that defines the configuration management arrangements of the organisation.

Typically such organisations meet one or more of the following criteria:

- service provider, including transport agencies, directly engaged by TfNSW and managing the maintenance of transport assets
- party contracted by TfNSW as the deliverer of a major addition to the transport network, such as in the case of a build-operate-maintain scenario
- business unit of TfNSW responsible for the delivery of transport assets

Organisations involved in maintaining or delivering TfNSW transport assets that do not meet any of the criteria in the preceding bullet points would normally not be expected to have a TNAC approved CMP. Such an organisation would not have configuration control authority delegated directly by the TNAC. Exceptions to this practice may be approved by the TNAC should there be valid reasons to do so.

## 7.6. Configuration change managers

The person who has the responsibility for managing a configuration change and the assurance case that supports the change is referred to as the configuration change manager (CCM). As configuration changes can be delivered through various models the person holding the role of CCM may need to be defined on a case-by-case basis. Typically the CCM is the project manager within the organisation that brings together the assurance evidence over the entire scope of a project or program of infrastructure changes.

A CCM may engage other persons to carry out required tasks, but is responsible for ensuring due process. Primary responsibility for a configuration change may vary as the change process progresses.

The role of the CCM is to manage the development and implementation of a configuration change so that the asset is designed and implemented to be fit for purpose, safe, reliable, maintainable and optimised for the whole life of the asset.

CCMs are responsible for managing and confirming the following activities for their project:

- determining the level of significance of the configuration change
- registering and managing the progress of CCRs
- following due process and performing activities necessary to identify and address stakeholder issues
- maintaining a documented audit trail of a change
- providing asset information in the format required for updating asset information systems when a change is implemented
- conducting suitable and sufficient assurance activities in accordance with TfNSW and other applicable standards
- obtaining configuration change acceptance before allowing the change to occur
- meeting any additional requirements applied by a CCB holding appropriate authority over the configuration change, including appropriately addressing conditions imposed.

## 7.7. Configuration change stakeholders

The tasks of stakeholders are as follows:

- reviewing and determining whether a proposed change has any adverse effects on the responsibilities of the business unit or represented organisation
- making a decision or recommendation on the acceptability to the business unit of a proposed change
- cooperating with CCMs to identify and resolve issues and adverse effects

### 7.7.1. Stakeholder nomination

Contracted parties and managers in TfNSW that could be affected by a configuration change shall nominate appropriate stakeholders to ensure that effects of proposed changes on their business units are identified and appropriately assessed.

### 7.7.2. Technical approval

Consent to a proposed configuration change by a configuration management stakeholder does not constitute technical approval. Technical approval is a separate approval obtained where required.

## 7.8. Organisations with responsibility for network configuration control

Organisations responsible for managing the configuration of TfNSW Transport Network shall have a configuration management system appropriate to the TfNSW transport assets they control. The system shall consist of CMPs and any other appropriate documentation and tools. The CMPs shall describe arrangements for the progressive assurance and acceptance during the introduction of new and altered assets and continuous assurance of configuration of existing assets.

Systems should be scaled to be appropriate to the complexity and volume of TfNSW transport assets being managed.

Configuration management systems developed and implemented by organisations with delegated network configuration control authority are required to do the following:

- comply with this plan
- align with AS ISO 10007-2003
- comply with the requirements of T MU MD 20001 ST
- assure TfNSW, through evidence, that the configuration of current or proposed TfNSW transport assets is being managed appropriately

## 8. Configuration management plans

Business units within TfNSW that have input to the management or establishment of the configuration of the TfNSW Transport Network shall operate in accordance with the arrangements described in this plan. Subordinate CMPs, compliant to this plan, may also be developed to address specific needs of the business unit. Where the business unit intends to operate a CCB with delegated authority from the TNAC, a specific CMP accepted by the TNAC is required.

Organisations or business units that are the primary party responsible for managing the network integration of new or altered TfNSW transport assets or are the primary party responsible for maintaining the configuration of TfNSW transport assets shall have a CMP approved by the relevant CCB. The TNAC is the approval body for CMPs establishing arrangements directly subsidiary to the TNAC.

Organisations or business units operating within the remit of an existing tier 2 CCB do not require a CMP accepted by the TNAC.

### 8.1. Approval of configuration management plans

The TNAC holds authority to approve CMPs for the purpose of delegating network configuration control authority. The TNAC will normally only approve CMPs associated with tier 2 CCBs with delegation to tier 3 CCBs managed at the tier 2 CCB.

The ASA CCB may act as an agent of the TNAC in relation to approving CMPs and delegating network configuration control authority as detailed in Section 7.2.1.

Documented variations to the requirements of this plan may be accepted if the TNAC believes it addresses the intent of this plan.

Unless otherwise determined by the TNAC, approval of a CMP by the TNAC and associated delegation of configuration control authority shall be valid for four years or the duration of the related project, whichever is longer. With the agreement of the ASA the validity may be extended by one year.

### 8.2. Minimum system requirements

Configuration management systems developed and implemented by organisations with delegated network configuration control authority shall be documented in a CMP or associated supporting documentation. Configuration management systems shall include means to address the configuration management and asset assurance requirements included in this plan and facilitate interfaces with TNAC.

As a minimum, configuration management systems shall address the following in a manner appropriate to the organisation and the work being performed:

- roles and responsibilities for configuration management
- control of configuration changes
- appropriate stakeholder identification, consultation and resolution
- assurance evidence from a safety assurance process that demonstrates assets are safe SFAIRP
- whole-of-life aspects of transport assets are appropriately considered and managed
- control of asset information, including that it is accurate, appropriately documented for ongoing management of the assets and if relevant, appropriately transferred
- issues that affect or may affect the integrity of TfNSW transport assets or the asset information that describes it is reported in a timely manner to TfNSW and other responsible parties where applicable
- scope of network configuration control authority, how it is exercised and if appropriate, further delegated
- arrangements to provide the TfNSW with the following:
  - access to configuration management records
  - access to asset information held
  - configuration and configuration change reports as required

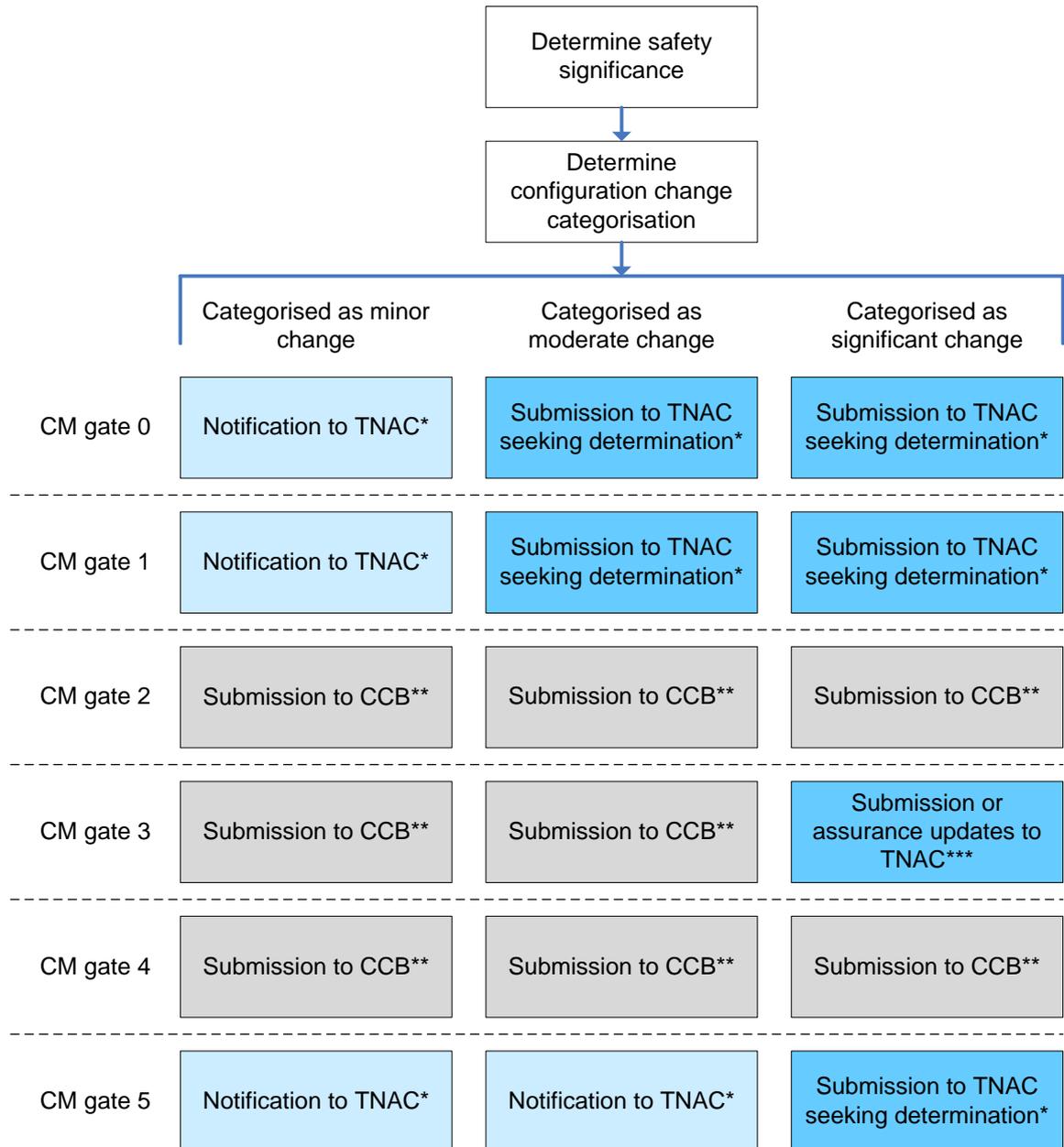
### **8.2.1. Delegated CCB gates up to plan phase**

Delegated CCBs should include processes in their CMP to vet gate 0 or 1 submissions prior to being presented to the TNAC and may propose arrangements to the TNAC within their CMP seeking delegated authority for gates 0 or 1.

Additional information about configuration management gates is provided in Section 12.

### **8.2.2. Delegated CCB gates after plan phase**

Delegated CCBs with authority to make determinations over the acquire, operate or maintain, or dispose phases of the asset life cycle are generally expected to be the determining authority for submissions at gate 2, gate 3, gate 4 and gate 5 as shown in Figure 2 and Figure 3.

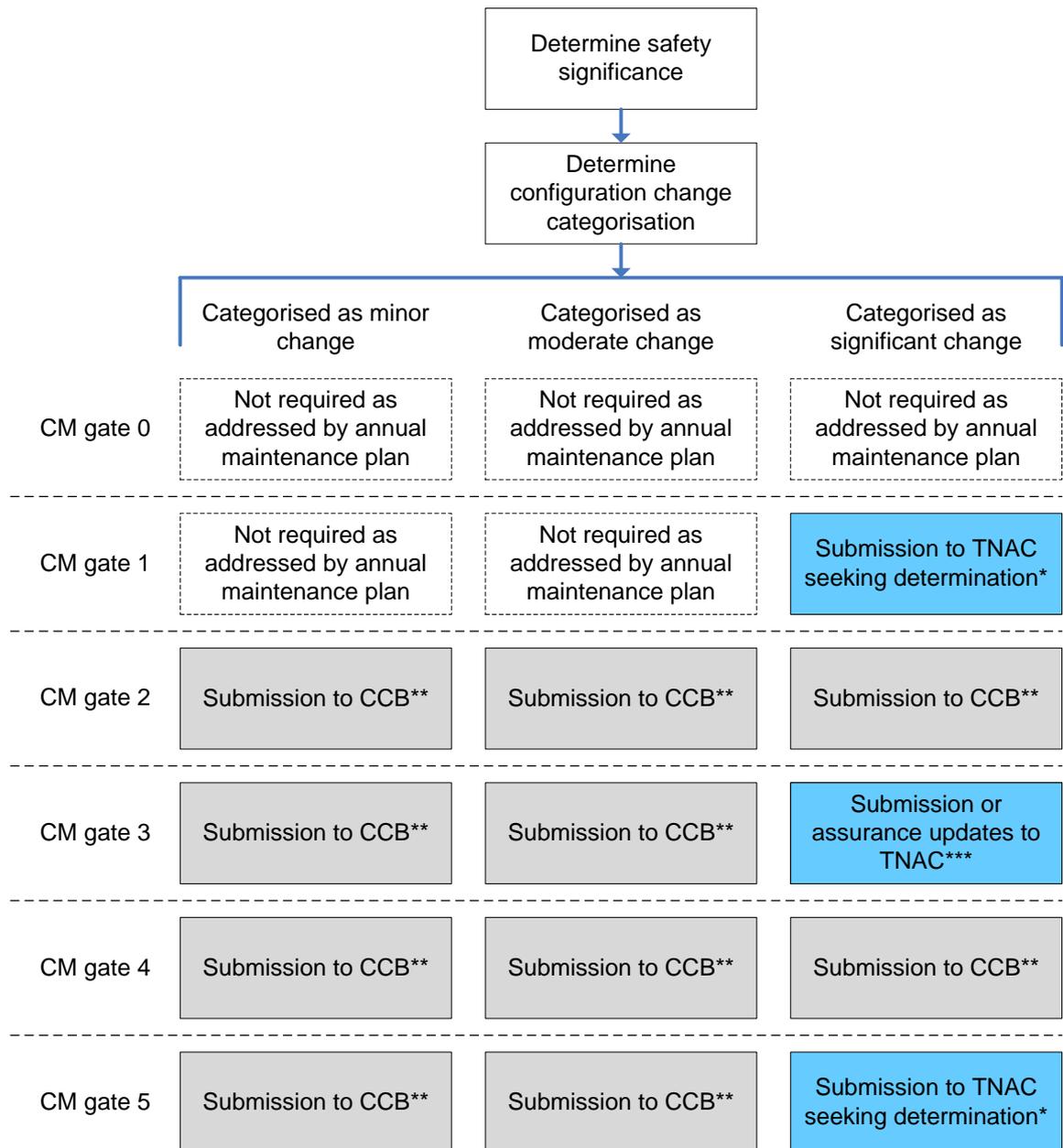


\* Endorsed by CCB before submitting to TNAC if a suitable CCB exists

\*\* TNAC informed through CCB reports

\*\*\* Submissions endorsed by CCB before submitting to TNAC, if assurance updates are provided in lieu of submissions then the determinations are to be made by a suitable CCB

**Figure 2 - Normal approach to engaging with TNAC for configuration changes not included within an approved asset maintenance plan**



\* Endorsed by CCB before submitting to TNAC if a suitable CCB exists

\*\* TNAC informed through CCB reports

\*\*\* Submissions endorsed by CCB before submitting to TNAC, if assurance updates are provided in lieu of submissions then the determinations are to be made by a suitable CCB

**Figure 3 - Normal approach to engaging with TNAC for configuration changes included within an approved asset maintenance plan**

## 9. Configuration baselines

Configuration baselines serve as the basis for defining change, for conducting verifications and for other management purposes. Acceptance at each configuration management gate establishes a baseline. The three key baselines are identified as follows:

- requirements baseline
- approved for construction baseline
- product baseline

During the process of implementing a configuration change other interim configuration baselines may be established for management purposes as determined appropriate by the party responsible for managing the change.

### 9.1. Requirements baseline

The requirements baseline is established when detailed requirements for an asset change are defined and approved. The change is generally considered as defined when a system requirements specification (SRS) is approved.

The requirements baseline is associated with gate 1 (see Section 12).

### 9.2. Final design baseline

The final design baseline is established when a design has received all necessary configuration management and technical approvals and the design is assured as safe SFAIRP. Technical approvals include concessions to standards granted by the ASA.

The final design baseline is associated with gate 3 (see Section 12).

### 9.3. Product baseline

The product baseline is established when a new or altered asset has been verified as having been delivered to an approved design, all as-built asset information lodged in appropriate information systems and all necessary CCB acceptances received.

This usually occurs at the acceptance of a new or an altered asset for normal service.

The product baseline defines the design that is introduced and used in the operational phase. This baseline is the basis for control of any future change to the asset.

The product baseline may also be referred to as the as-built baseline.

The product baseline is associated with gate 5.

## 10. Type approved products and standard designs

Type approved products and standard designs may be used as inputs in to a configuration change. Such items have been through a process of assessments to provide assurance that they are suitable for use on the TfNSW Transport Network. Categorisation as a type approved product or a standard design may be used as a supporting argument for assuring a configuration change, however assessments need to still be conducted to assure that the type approved product or standard design is appropriate for the given application.

## 11. Categorisation of configuration changes

All configuration changes to TfNSW transport assets shall demonstrate adequate assurance that the configuration change has been properly managed. To assist the management and CCB acceptance of configuration changes, changes are classified based on their complexity, risk and impact on the TfNSW Transport Network. Applying categorisations facilitates the appropriate delegation and evidence expectations associated with the acceptance of configuration changes at configuration management gates.

Configuration changes are classified as significant, moderate or minor.

### 11.1. Assessment of configuration change categorisation

Categorisation of configuration changes shall be conducted as early as practical in the development of a proposed configuration change by the CCM. The outcome of a safety change assessment is an input to, but not the same as the configuration change categorisation.

If a series of projects form part of a program, then the categorisation should initially be conducted at the top level program and the identified categorisation shall normally apply to all constituent projects. If it is determined that the constituent projects should be separately classified, then this may be done in addition to the program level assessment. A justification of the appropriateness for the approach shall be included when the program is presented to the TNAC or delegated CCB.

The program level submission is generally expected to be presented to the TNAC at gate 0 and gate 1. The categorisation of program level configuration change or any project level categorisations shall be articulated in the submission and associated assurance and governance plan (AGP).

The ASA, or delegated CCBs, shall be consulted to determine an appropriate approach if the configuration change project was initiated prior to the establishment of the requirement to classify configuration changes.

The TNAC may change the categorisation of a configuration change or on a case-by-case basis if the TNAC believes the categorisation to be inappropriate. The ASA may review categorisations determined by projects and suggest to the CCM that they amend the categorisation or suggest to the TNAC that they consider changing the categorisation.

## 11.2. Significant configuration change categorisation

A configuration change is considered significant if the proposed change poses a relatively high risk to TfNSW. In determining the categorisation of a configuration change a risk based approach shall be applied. Where relevant, the use of an organisational risk management framework and risk matrix shall be used to aid categorisation.

A configuration change is generally considered to be significant if it meets any of the following criteria:

- Safety significant – assessments of safety significance conducted by TfNSW shall apply 20-FT-388 *Initial Safety Change Assessment*. Other organisations should apply suitable criteria to determine if the proposed change is safety significant.
- High public profile or significant direct impact to customers or community.
- Introduces potentially significant operational or maintenance impacts such as costs, unique resources, logistics and scheduling.
- Significant transport network risks related to the delivery of the proposed change or resulting solution.

## 11.3. Moderate configuration change categorisation

A configuration change is considered moderate if the proposed change poses more than a minimal risk to the TfNSW Transport Network but less than that would place it in the significant categorisation. In determining the categorisation of a configuration change a risk based approach shall be applied. Where relevant the use of an organisational risk management framework and risk matrix should be used to aid categorisation.

A configuration change is generally considered to be moderate if it meets all of the following criteria but does not meet the criteria for categorisation as a minor configuration change:

- Not safety significant – assessments of safety significance conducted by TfNSW shall apply 20-FT-388. Other organisations should apply suitable criteria to determine if the proposed change is safety significant.
- Modest direct impact to customers or community.
- May introduce limited operational or maintenance impacts.
- No significant transport network risks related to the delivery of the proposed change or resulting solution.

## 11.4. Minor configuration change categorisation

A configuration change is considered minor if the proposed change poses a minimal risk to TfNSW. In determining the categorisation of a configuration change a risk based approach shall be applied. Where relevant the use of an organisational risk management framework and risk matrix should be used to aid categorisation.

A configuration change is generally considered to be minor if it meets all of the following criteria:

- Not safety significant – assessments of safety significance conducted by TfNSW shall apply 20-FT-388. Other organisations should apply suitable criteria to determine if the proposed change is safety significant.
- Minor or no direct impact to customers or community.
- Minor and well understood operational or maintenance impacts.
- Minimal transport network risks related to the delivery of the proposed change or resulting solution.
- A configuration change that commonly occurs to the TfNSW Transport Network including the application of similar arrangements.

## 11.5. Categorisation and TNAC submissions

The level of engagement required with the TNAC is largely determined by the categorisation of a configuration change. Variations to the engagement with the TNAC may occur where there is a TNAC approved AGP or approved CMP documenting the alternate approach or specific agreement from the TNAC or the ASA.

The normal approach for engaging with the TNAC for a configuration change that is not part of an asset maintenance plan accepted by the TNAC as part of a configuration management gate 6 submission is shown in Figure 2. Typically such configuration change projects are classified by TfNSW as capital expenditure.

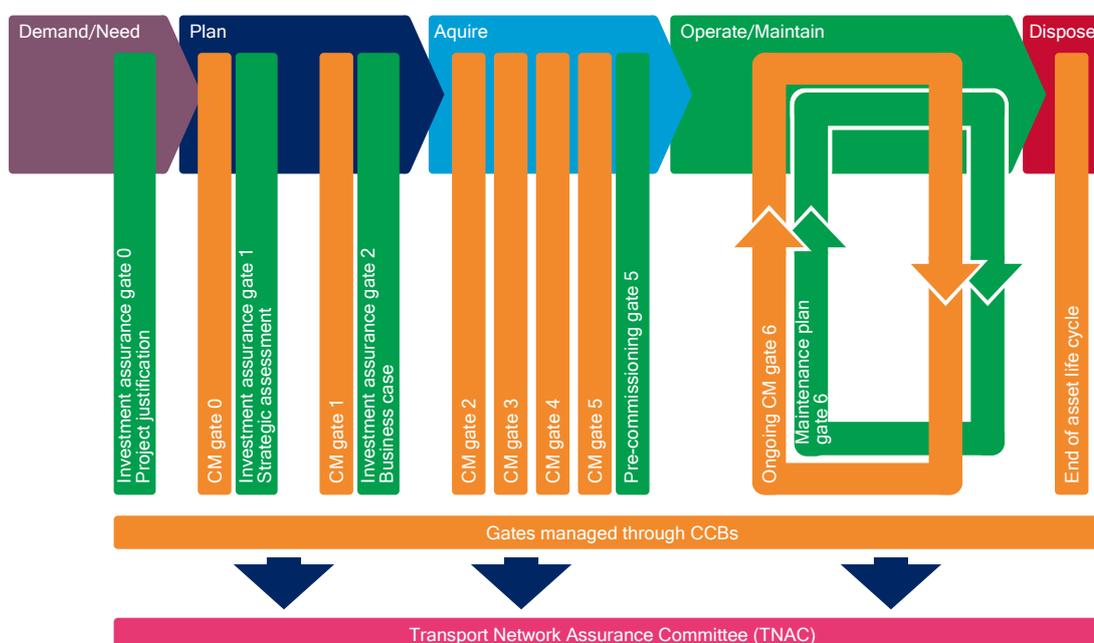
The normal approach for engaging with the TNAC for configuration changes that are included within an asset maintenance plan that has been accepted by the TNAC at configuration management gate 6 is shown in Figure 3. Typically such configuration changes include routine or major maintenance activities.

Submissions to the TNAC result in an explicit determination made by the TNAC. Submissions to the TNAC are expected to be endorsed by a delegated CCB prior to being presented to the TNAC if an appropriate CCB exists.

Notifications presented to the TNAC are tabled to the TNAC members for noting and do not require an explicit determination from the TNAC, though the TNAC may make a specific determination or raise an action if they deem appropriate. Notifications are expected to be accepted by a delegated CCB prior to being presented to the TNAC where an appropriate delegated CCB exists.

## 12. Configuration management gates

Seven defined configuration gates have been established for the management of configuration changes. The gates are identified numerically from gate 0 to gate 6. All stages of an asset life cycle are covered by the defined gates. Responsibility for gates may vary during the life of an asset. The configuration management gates are shown relative to the asset life cycle in Figure 4. A representation of configuration management gates relative to asset life cycle activities is included in Appendix A.



**Figure 4 - Assurance gates throughout asset life cycle**

Assurance evidence shall be provided to the TNAC or its delegate by the accountable party at nominated gates through the course of the life of an asset. The progressive and continuous assurance of configuration changes throughout the life cycle provides continuous assurance to

TfNSW that new, altered and existing assets are in a known state and condition and delivering expected outcomes. The decisions of the TNAC at gate 0, gate 1, gate 3 and gate 5 are based on goal structuring notations (GSNs) presented in Appendix E, Appendix F, Appendix G and Appendix H respectively. GSNs are a graphical representation of a structured argument. These GSNs are not intended to be a template for the assurance argument a project may develop its own for assurance purposes.

While the business unit within TfNSW responsible for preparing submissions is not defined by this plan, typical arrangements are described in Appendix B.

## **12.1. Tailored application of configuration management gates**

The configuration management gates described in this plan are standard requirements applicable to configuration changes to TfNSW transport assets. The nature and risk associated with configuration changes can however vary substantially; thus it may be appropriate for arrangements applicable to specific situations to vary from the standard requirements either to improve efficiency or provide adequate governance. Variations shall be documented and shall be approved by the TNAC or appropriately delegated body. Variations to the application of configuration management gates, that are to be adopted as standard practice, shall generally be described within the applicable CMP or otherwise documented, approved and associated with the applicable CMP. Variations for specific cases may be documented as decisions of the TNAC or delegated body.

Variations to the application of gates are to meet the risk based assurance intent of this plan. It is expected that arrangements other than those described in this plan are able to be mapped against the configuration management gates described here.

## **12.2. Whole of system approach to gate submissions**

Although it is normal for projects to be divided into separately delivered packages, both in the design and construction context, the acceptance of configuration changes at the various configuration management gates in the process shall be considered as part of an overall system.

Restricting the consideration of assurance activities to that within discrete work packages without the context of the overall system is unlikely to provide TfNSW with the assurance that the system as a whole is appropriately and sufficiently assured.

Submissions to the TNAC or delegated CCB shall be presented in the context of the whole system and be assessed as such. Arrangements for delegated CCBs should facilitate the consideration of proposed changes in the context of any broader configuration change.

### **12.3. Application of configuration management gates to maintenance**

Maintainers of TfNSW transport assets directly engaged by TfNSW are expected to develop a CMP, including arrangements for the application of configuration management gates and have it accepted by the TNAC.

As maintenance activities can vary greatly in scale, complexity and risk, the application of gates to maintenance configuration changes may need be defined and adjusted based on these factors.

The normal approach to applying configuration management gates to maintenance activities is shown in Figure 3.

### **12.4. Application of configuration management gates to decommissioning**

Decommissioning of TfNSW transport assets or assets that integrate with TfNSW transport assets is a configuration change and the requirements of this plan apply. Decommissioning that occurs as part of a project that also introduces new or altered assets should be managed as part of the change the overall project introduces.

Decommissioning activities are of low complexity and risk and allow for the consolidation of configuration management gates in accordance to Section 12.1.

### **12.5. Application of configuration management gates to staged commissioning**

Staged commissioning in the context of this plan is where a single work package that has otherwise been treated as a single configuration change event is commissioned in stages. Staged commissioning may be addressed by presenting separate configuration management gate 5 submissions to a CCB for each stage or consist of consolidated gate 5 submission. In either of these cases the scope of work being commissioned at each staged commissioning event shall have received appropriate CCB acceptance before proceeding. Similar requirements apply to gate 4 where it forms part of the staged commissioning arrangements.

### **12.6. Application of configuration management gates to third party work**

Configuration management processes shall be applied to changes initiated and predominately managed by third parties. Third party work includes work on third party assets interfacing with TfNSW transport assets or work initiated and managed by a third party resulting in new or changed TfNSW transport assets.

Common examples of changes predominantly involving third party assets include the placement of third party infrastructure on or adjacent TfNSW transport property, or services crossing TfNSW transport property. Third party configuration changes are generally initiated, designed and delivered by a third party and as such appropriate requirements for configuration management gates could vary from the standard arrangements depending on the nature of the change. The risk and impact to TfNSW shall be considered in tailoring the application of configuration management gates to third party work.

As third party changes occur on TfNSW transport assets managed by a TfNSW contracted maintainer, the contracted maintainer is generally responsible for documenting and managing appropriate configuration change process addressing minor and moderate classified configuration changes.

Expected assurance evidence shall be considered in the context of the nature of the third party proposal and any other processes that apply. The TNAC or delegate shall still seek assurance evidence that demonstrate that the proposal satisfactorily meets TfNSW needs and obligations.

Third party configuration changes classified as significant shall be presented to the TNAC as early as possible, for determination and further guidance.

Appendix B may be used to assist in determining the configuration management requirements to be applied.

The CCM for third party work is typically the person within TfNSW or transport agency responsible for managing the relationship between TfNSW or transport agency and the third party.

## **12.7. Configuration management gate 0 – strategic assessment**

Gate 0 occurs after the purpose of a configuration change is defined and initial business requirements are developed. For projects seeking capital funding this gate is associated with the strategic business case.

The purpose of this gate is to seek assurance that the initial concepts that direct a potential solution have been assured and that the assurance and governance arrangements that lead to a defined solution are appropriate and defined. Included with this is that the potential solution aligns with the overall TfNSW network strategy.

This gate aligns to investment assurance gate 1, described as strategic assessment by Infrastructure NSW or strategic business case by TfNSW. For projects subsequently progressing to investment assurance, it is the responsibility of the CCM to ensure their project receives configuration management gate 0 acceptance and that necessary conditions are addressed before progressing.

Where an investment assurance gate 0 submission is required by TfNSW processes, the completion of such submission is a pre-requisite for presenting a configuration management gate 0 submission.

### 12.7.1. Submission for gate 0

Configuration changes shall be submitted in accordance with arrangements shown in Figure 2 and Figure 3.

When submissions are presented to the TNAC, a representative from the sponsoring business unit should attend irrespective of the team that has produced the submission.

### 12.7.2. Minimum requirements for gate 0

The CCM for a gate 0 submission shall include the following evidence:

- relevant stakeholder identification and adequate consultation
- compliance with the *Environmental Planning and Assessment Act 1979*
- whole-of-life sustainability outcomes appropriately addressed (see Appendix C for guidance)
- consideration of safety in any decisions that affect the final solution
- appropriately completed safety change assessment, for TfNSW managed projects an approved initial safety change assessment (ISCA) shall be acceptable evidence
- initial high level business requirements including an analysis of need and demand
- demonstration of alignment with TfNSW Transport Network strategies and interfacing projects
- high level expectations of the solution from the perspective of the user is understood, such as a concept of operations (ConOps)
- initial AGP that demonstrates a systems approach to defining a solution and producing the assurance evidence required for gate 1 - the plan shall include demonstration that the following aspects will be addressed:
  - whole-of-life considerations, including operations and maintenance
  - effects on reliability, availability, maintainability and safety (RAMS) of the network
  - development of solutions that are justifiable as safe SFAIRP
  - governance and assurance arrangements as to how the development of the solution will be progressively assured over the plan phase of the asset life cycle, including at the point when a preferred solution is identified

- alignment with network strategy
- risk based decision making

## 12.8. Configuration management gate 1 – business case

Gate 1 occurs after the requirements of the preferred option have been defined and are ready to progress to a design. For projects seeking capital funding this gate is associated with the final business case.

The purpose of this gate is to seek assurance that the process of developing an asset solution has been appropriate, that TfNSW understands the outcome it is seeking and that appropriate assurance and governance arrangements are in place for the remainder of the project. A configuration management gate 1 should represent the requirements baseline.

This gate aligns to investment assurance gate 2, described as business case by Infrastructure NSW or final business case by TfNSW. For projects subsequently progressing to investment assurance, it is the responsibility of the CCM to ensure their project receives configuration management gate 1 acceptance and that necessary conditions are addressed before progressing.

Where an investment assurance gate 1 submission is required by TfNSW processes, the completion of such submission is a pre-requisite for presenting a configuration management gate 1 submission.

### 12.8.1. Submission for gate 1

Configuration changes shall be submitted in accordance with arrangements shown in Figure 2 and Figure 3.

When submissions are presented to the TNAC, a representative from the sponsoring business unit should attend irrespective of the team that has produced the submission.

### 12.8.2. Minimum requirements for gate 1

The CCM for a gate 1 submission shall include the following evidence:

- relevant stakeholder identification and adequate consultation
- compliance with the *Environmental Planning and Assessment Act 1979*
- whole-of-life sustainability outcomes appropriately addressed (see Appendix C for guidance)
- whole-of-life risk identification and appropriate management
- whole-of-life costing assessments conducted, including operations and maintenance
- RAMS considerations appropriately addressed

- independent safety assessment (ISA) report for safety significant changes
- the specified system is one that ensures it is safe SFAIRP
- appropriately completed safety change assessment, for TfNSW managed projects an approved ISCA shall be acceptable evidence
- AGP covering the configuration change project through to completion, this should include the approach to gate 3 submissions as described in Section 12.10.1 - it should also include the approach to gate 2 submissions where appropriate
- approved business requirements specification (BRS)
- approved SRS
- operations concept definition (OCD)
- risk based decision making in optioneering
- human factors considerations as appropriate

Requirements for AGPs are described in TS 10753: 2014 *Assurance and Governance Plan Requirements*.

## **12.9. Configuration management gate 2 – preliminary design complete**

Gate 2 occurs at the point when a preliminary design has been completed.

The purpose of this gate is to assure that a project is demonstrating adequate assurance in developing the design so as to provide confidence that the final design will meet the expectations.

Factors such as the risks that may result from the configuration change, nature of the assets involved, project governance arrangements and procurement strategy may affect the appropriate application of this gate. For configuration changes that are of low risk and low complexity it may be appropriate to combine the gate 2 submission with the gate 3 submission. Arrangements to be applied shall be documented as one of the following:

- standard practice within relevant approved CMPs or supporting processes
- a project specific case through a project AGP agreeable to the responsible CCB
- recorded agreement with the responsible CCB

### **12.9.1. Submission for gate 2**

Configuration changes shall be submitted in accordance with arrangements shown in Figure 2 and Figure 3.

Configuration changes for gate 2 are generally expected to be managed by delegated CCBs with suitable delegated authority and in accordance with the CMP and supporting processes applicable to the delegated CCB.

### **12.9.2. Minimum requirements for gate 2**

The CCM for a gate 2 submission shall include the following evidence:

- relevant stakeholder identification and adequate consultation
- compliance with *Environmental Planning and Assessment Act 1979*
- whole-of-life sustainability outcomes appropriately addressed (see Appendix C for guidance)
- whole-of-life risk identification and appropriate management
- whole-of-life costing assessments conducted to a level appropriate to the significance of the proposed change
- RAMS considerations appropriately addressed
- hazard log and appropriate management of identified hazards
- compliance with approved assurance and governance arrangements
- ISA report for significant configuration changes
- demonstration that a safe SFAIRP outcome will be achieved
- all appropriate technical approvals identified and obtained
- approved preliminary design, inclusive of design drawings where appropriate
- proposed solution meets and is traceable to approved requirements presented at gate 1

## **12.10. Configuration management gate 3 – for construction**

Gate 3 occurs at the point when the detailed design has been developed and prior to progressing to construction unless the CCB has agreed to alternative arrangements.

The purpose of this gate is to provide confidence that the designed solution is appropriate, safe SFAIRP and that the resulting risks are understood and acceptable to TfNSW. This gate is important from a risk perspective as the desired outcome and resulting risks are largely determined. Content representing the final design baseline is expected to be presented at configuration management gate 3.

Where multiple gate 3 submissions relating to a configuration change are presented, the submissions shall be considered in the context of the overall configuration change in order to provide confidence that the system as a whole is appropriately and sufficiently assured.

### 12.10.1. Submission for gate 3

Configuration changes shall be submitted in accordance with arrangements shown in Figure 2 and Figure 3.

Projects classified as significant shall provide visibility to the TNAC of their gate 3 submissions. As significant projects often have multiple gate 3 submissions the approach to providing gate 3 visibility to the TNAC should be defined and accepted by the TNAC at gate 1 as stated in Section 12.8.2.

Projects that introduce significant configuration changes should consider the following when planning to provide gate 3 visibility to the TNAC:

- assurance update of the consolidated designed configuration change may provide a better overall view to the impact of the change especially where there are many small gate 3 submissions planned
- multiple assurance updates to the TNAC may be appropriate, particularly for long running projects or programs with multiple major work packages
- assurance updates shall be arranged so as to provide the TNAC with a view of the consolidated proposed configuration change and demonstrate that the project has and will continue to meet the minimum requirements for gate 3 from a whole of project or program perspective
- the ASA and where possible, the future delegated CCB, should be consulted to determine the most appropriate approach to gate 3

### 12.10.2. Minimum requirements for gate 3

The CCM for a gate 3 submission shall include the following evidence:

- relevant stakeholder identification and adequate consultation
- compliance with the *Environmental Planning and Assessment Act 1979*
- whole-of-life sustainability outcomes appropriately addressed (see Appendix C for guidance)
- whole-of-life risk identification and appropriate management
- whole-of-life costs have been considered and conducted where appropriate
- RAMS considerations appropriately addressed
- hazard log and appropriate management of identified hazards
- compliance with approved assurance and governance arrangements
- identification of outstanding issues and assurances with resolution strategies in place

- ISA report for safety significant changes
- design safety assurance argument including SFAIRP demonstration from a whole of system perspective
- assessment and documentation of safety risk from a whole of system perspective including identification of residual safety risk, appropriate management of and obtainment of agreement from relevant stakeholders such as risk owners and risk control owners
- technical approvals have been identified and obtained, including concessions to ASA standards or equivalent if required, and final designs have been approved
- solution meets, and is traceable to, approved requirements presented at gate 1
- human factors considerations as appropriate
- maintenance requirements identified and understood, including appropriate addressing of any additional or new maintenance equipment or arrangements
- verification and validation (VAV) strategies during construction in place
- identification of asset information that shall be delivered
- approved for construction (AFC) drawings have been delivered or there is a plan in place for their delivery

## 12.11. Configuration management gate 4 – ready for testing

Gate 4 occurs at the point when a transport asset has been altered or added and is ready to progress to testing.

The purpose of this gate is to assure that an asset is ready to be tested as an integral part of the TfNSW Transport Network. It is particularly relevant where testing introduces an elevated or novel risk to the transport network, such as testing vehicles within the operating transport network or connecting systems to the operational network for testing.

Factors such as the risk of the configuration change, nature of the assets involved, project governance arrangements and procurement strategy may affect the appropriate application of this gate. For configuration changes that are of low risk and low complexity it may be appropriate to combine the gate 4 submission with either or both the gate 3 and gate 5 submissions. Arrangements to be applied shall be documented in either of the following:

- standard practice within relevant approved CMPs
- a project specific case through a project AGP agreeable to the relevant responsible CCB
- recorded agreement with the responsible CCB

### 12.11.1. Submission for gate 4

Configuration changes shall be submitted in accordance with arrangements shown in Figure 2 and Figure 3.

Configuration changes for gate 4 are generally expected to be managed by delegated CCBs with suitable delegated authority and in accordance with the CMP and supporting processes applicable to the delegated CCB.

### 12.11.2. Minimum requirements for gate 4

The CCM for a gate 4 submission shall include the following evidence:

- relevant stakeholder identification and adequate consultation
- whole-of-life sustainability outcomes appropriately addressed (see Appendix C for guidance)
- compliance with the *Environmental Planning and Assessment Act 1979*
- hazard log and appropriate management of identified hazards
- compliance with approved assurance and governance arrangements
- identification of outstanding issues and assurances with resolution strategies in place
- assessment of safety risk for the given scope
- safety assurance argument including SFAIRP demonstration
- identification and obtainment of technical approvals, including concessions to ASA standards or equivalent if required
- inspection and test plans and strategy to a level appropriate to the significance of the proposed change

## 12.12. Configuration management gate 5 – asset handover

Gate 5 occurs prior to the commissioning and handover of the asset from the party responsible for delivering the completed asset to the next responsible party within the asset life cycle. This applies even if both parties are from the same organisation.

The purpose of this gate is to seek assurance that the configuration change has been properly managed so as to be ready to be commissioned as an operating asset in the transport network and handed over along with necessary asset information. The submission should represent the expected product baseline and demonstrate that the necessary asset information describing the product baseline has been or will be delivered.

As commissioning and handover arrangements may vary depending on circumstances, arrangements specific to a project or organisation may be documented in AGPs or CMPs respectively where necessary.

### 12.12.1. Submission for gate 5

Configuration changes shall be submitted in accordance with the arrangements shown in Figure 2 and Figure 3.

For significant configuration changes, TfNSW contract managers responsible for contracts with the party receiving the assets and representatives from affected operators and maintainers shall be invited by the CCM to attend the presentation of the submission to TNAC.

Delegated CCBs shall also consider the initiation of operators and maintainers to meetings where determinations are made on gate 5 submissions.

Where commissioning and asset handover activities are not aligned, the arrangement for managing gate 5 submissions should be documented in the AGP and planned in consultation with responsible delegated CCBs or the ASA. Arrangements shall be based on a practical and risk based approach.

For configuration changes that are of low risk and low impact it is may be appropriate to combine the gate 4 submission with the gate 3 or gate 5 submissions. Such arrangements shall be documented as one of the following:

- standard practice within relevant approved CMPs
- a project specific case through a project AGP agreeable to the relevant responsible CCB
- recorded agreement with the responsible CCB

### 12.12.2. Minimum requirements for gate 5

The CCM for a gate 5 submission shall include the following evidence:

- relevant stakeholders have been identified and adequately consulted
- compliance with the *Environmental Planning and Assessment Act, 1979*
- whole-of-life sustainability outcomes appropriately addressed (see Appendix C for guidance)
- whole-of-life cost assessments have been prepared for handover where appropriate
- RAMS considerations have been appropriately addressed
- hazard log and appropriate management of identified hazards
- compliance with approved assurance and governance arrangements
- identification of outstanding issues and assurances with resolution strategies in place

- ISA, that includes operational safety, for safety significant changes
- asset and operational safety argument demonstrating that the asset ensures safety SFAIRP in its intended operational context
- assessment of safety risk for the given scope, generally a safety assurance report (SAR)
- technical approvals have been identified and obtained, including concessions to ASA requirements or equivalent if required
- operational and maintenance readiness arrangements have been appropriately managed
- risk register including identification of residual risks
- suitable and sufficient reliability, availability and maintenance performance has been assured
- demonstration that solution meets approved requirements
- all asset information has been delivered, inclusive of design drawings (conditional acceptance may be granted where there is an appropriate schedule for delivery of any outstanding asset information)
- the client representative agreed that the service provider is ready to operate and maintain the asset where the submission relates to a handover to a service provider

### **12.13. Configuration management gate 6 – asset assurance review**

The asset assurance review gate occurs annually as a single whole of transport network submission, unless otherwise determined appropriate by the ASA or TNAC. This gate is a demonstration that TfNSW transport assets are being appropriately managed. The evidence of assurance shall cover the management of the configuration, safety risks, reliability, maintainability, availability and whole-of-life costs to deliver the service objectives for TfNSW.

Infrastructure and Service Division is accountable for the gate 6 submission. The Director Asset Management, Service Delivery and Performance Branch is normally the CCM in the context of gate 6 submissions to the TNAC.

### **12.13.1. Submission for gate 6**

All gate 6 submissions shall be presented to the TNAC.

### **12.13.2. Minimum requirements for gate 6**

The CCM for a gate 6 submission shall include the following:

- evidence that a risk based approach has been applied in developing the asset maintenance plan and annual works plan
- assurance argument that the asset maintenance plan and annual works plan provided maintains the integrity of the transport network balanced against TfNSW objectives and the maintenance requirements
- demonstration that the previous asset maintenance plan and annual works plan has been achieved and that resulting network configuration and continues to deliver the transport objectives
- demonstration of an appropriate level of surveillance of service providers

## **12.14. Gates relative to planning and delivery process**

Configuration management gates described in this plan apply throughout the life cycle of TfNSW transport assets. Examples of how the gates generally apply relative to the planning and delivery stages of projects are provided in Figure 5 and Figure 6. Although the diagrams represent typical arrangements each project may tailor arrangements appropriately in accordance with applicable AGPs or applicable subsidiary.

The example shown in Figure 5 represents a typical arrangement for a major project with multiple work packages, handover events and configuration management gates.

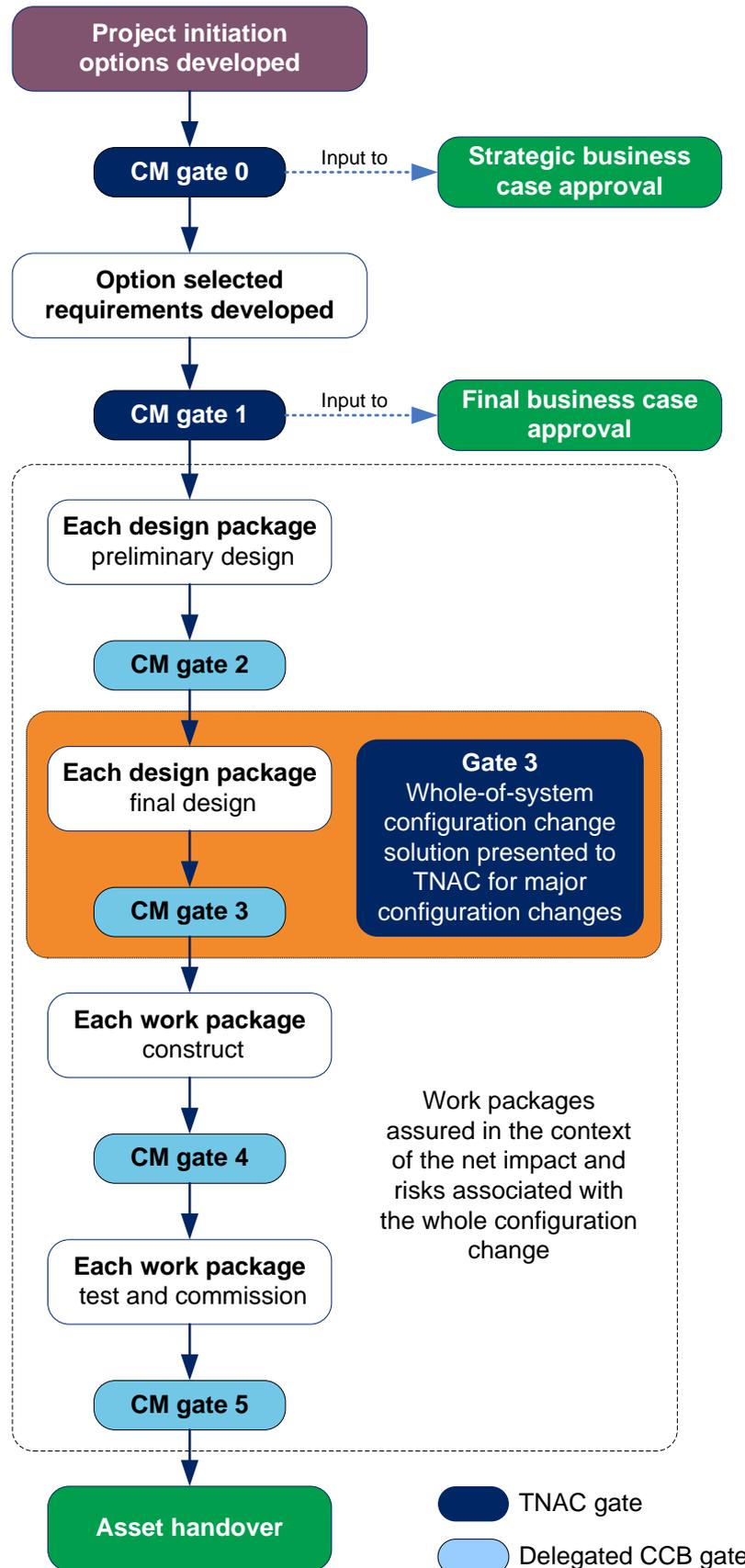


Figure 5 - Example of gates relative to activities of a typical major project

The example shown in Figure 6 represents a typical arrangement for minor projects with a single work package and handover event.

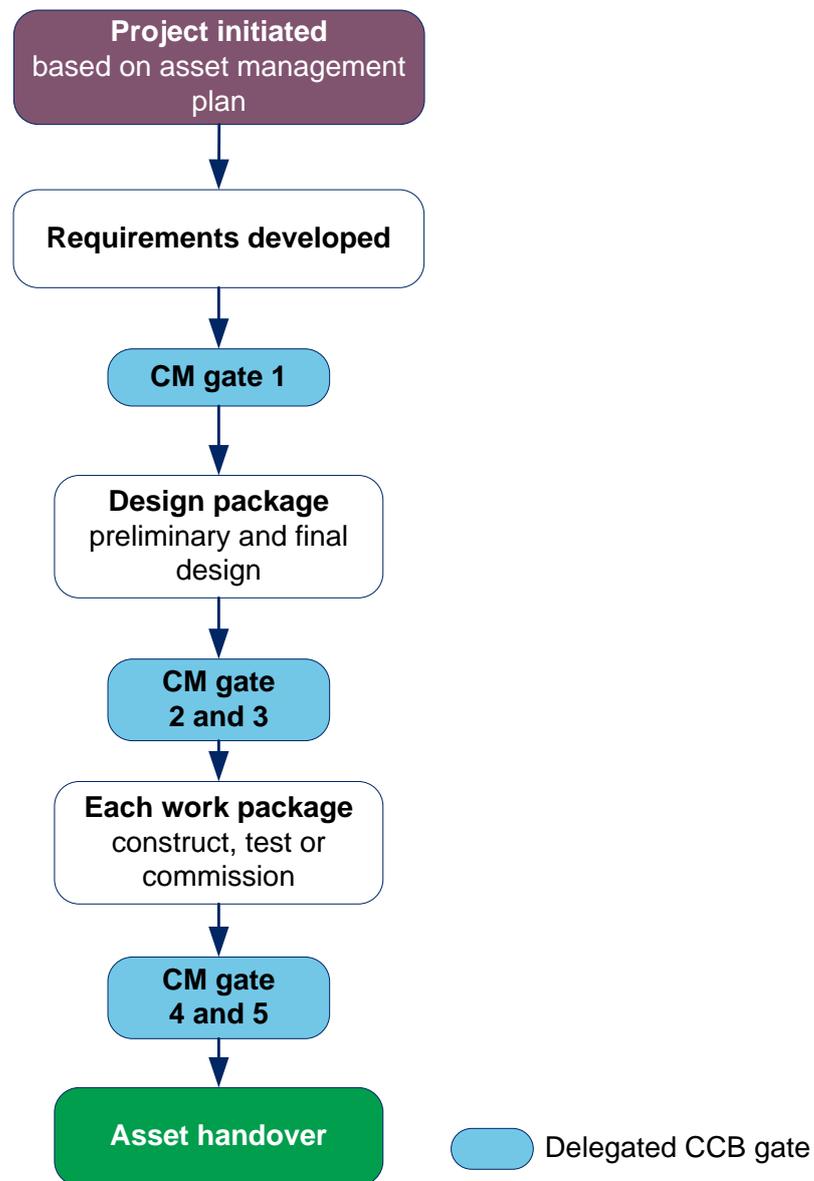


Figure 6 - Example of gates relative to activities of a typical minor project undertaken as part of maintenance

## 12.15. Assurance updates between configuration management gates

If a configuration change project or program is complex or continues over an extended period of time it may be appropriate for assurance updates to be presented to the TNAC or a delegated CCB as the project progresses.

Where such arrangements are considered appropriate by the CCM it should be defined within the AGP of the project. The TNAC or a delegated CCB may also request such arrangements be put in place.

Assurance updates should be tailored to suit the project and the needs of TNAC or delegated CCB.

Assurance presentations are not submissions; however the TNAC or delegated CCB may still impose actions.

## 12.16. Changes to scope after gate 1 acceptance

Appropriate change control processes shall be applied by a project to manage changes to requirements as the project evolves; however if individual or cumulative changes result in a proposed solution that is substantially different in concept, intent, impact or risk from a previously accepted gate 1 submission, an assurance update shall be provided to the TNAC or delegated CCB as appropriate. In some cases the TNAC or the ASA may consider it appropriate for a revised gate 1 submission to be made. The ASA should be consulted to determine if a progress update or a re-submission is required.

## 13. Configuration identification

Configuration identification shall occur progressively throughout the design process as functional and physical characteristics are documented in successively greater levels of detail.

Configuration identification consists of the following:

- determining asset structure and selecting items to which configuration management activities will be applied
- documenting configuration items
- assigning unique codes to configuration items and their documents
- establishing configuration baselines

Configuration items are selected by defining the system to a level of detail that is adequate by considering the following:

- the maintenance activities to be performed
- a configuration item's criticality to system performance and safety
- interfaces to other elements

Asset information shall set out all necessary functional and physical characteristics of the configuration items and their interfaces to a level of detail relevant to the functionality, reliability and maintainability of the TfNSW transport assets.

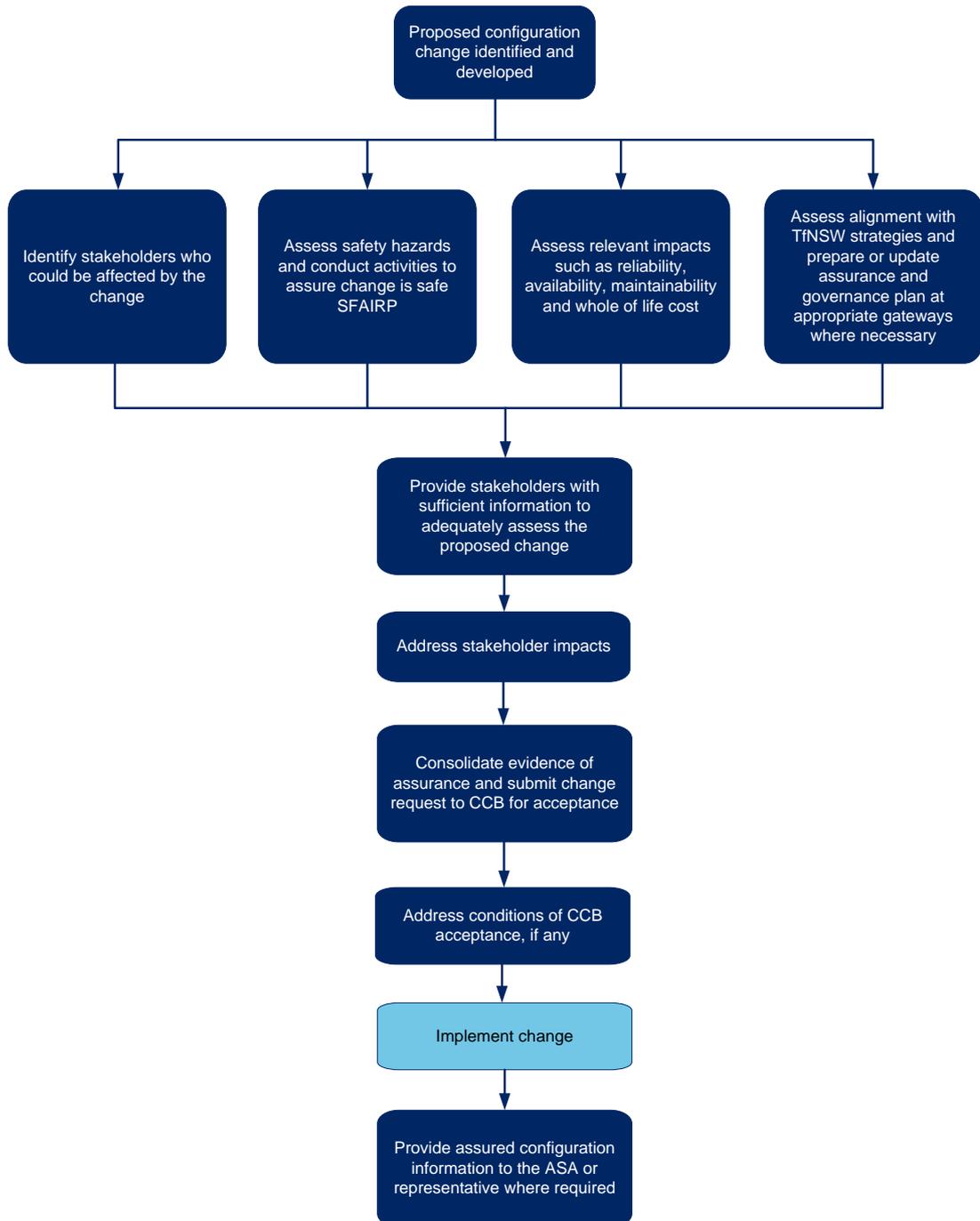
All software that forms part of the configuration shall be identified by a formal version number.

## **14. Change control**

Change control is the process applied to the management of a change to a configuration baseline. Change control should be managed throughout the development and implementation of a change. CCRs are used to facilitate the change control process within TfNSW. CCRs shall be raised for changes to the transport network as defined in this plan.

### **14.1. Change control procedures**

All change control shall comply with the basic procedures shown in Figure 7.



**Figure 7 - Basic change control procedure applicable at each configuration management gate**

The basic change control procedures are intended to apply at each submission gate but should be adapted and documented to suit specific situations.

All change control procedures shall achieve the following:

- earliest control of changes
- effective consultation with stakeholders
- change control decisions at the appropriate management level

- assurance that an audit trail of stakeholder consultation, impact resolution and configuration control decisions are maintained
- asset information that is appropriately and efficiently updated in the required format and appropriate system

## 14.2. Stakeholder identification

A process of stakeholder identification and management is required for all CCRs. Stakeholders or their nominated representatives shall be consulted for a CCR whenever there is a possibility that their area of responsibility may be potentially affected either positively or adversely.

In identifying stakeholders to a proposed change, consideration shall be given to the following effects:

- TfNSW strategy, including other proposed or current projects
- safety
- solution development and delivery
- operation and maintenance of the asset throughout the whole asset life
- interfacing TfNSW transport operations or assets
- third party operations, assets or other areas of responsibility, (such as local governments, utilities and transport providers)
- environment and heritage
- customers, businesses, commuters and community
- the party responsible for managing the configuration change or the resultant assets beyond the following configuration management gates

## 14.3. Configuration change requests

All additions or changes to or deletions from existing TfNSW transport assets that are not exactly identical replacements or otherwise change the performance of TfNSW transport assets are considered configuration changes.

CCRs shall be submitted to an appropriately delegated CCB.

Each proposed network configuration change that progresses towards the requirement for CCR approval, shall be registered as a CCR and be assigned a unique number for traceability. A configuration change is not considered complete until the configuration change has been implemented including all conditions applied as part of the CCR approval and all current asset information relevant to the configuration change provided to asset information stewards or their representatives in the correct format.

## 14.4. Implementation of CCB decisions

CCB decisions shall be appropriately implemented for effective change control.

CCB decisions shall meet the following criteria:

- fully and accurately recorded and documented
- communicated by the CCB as soon as practicable to the CCM or representative and then by the CCM to parties responsible for implementation if necessary
- implemented strictly in accordance with the CCB decision, including any conditions of approval
- reported to a higher level CCB within the configuration management delegation hierarchy, generally through established reporting arrangements

The CCM shall ensure that a complete audit trail of the implementation process is kept by all responsible parties for the implementation and that the record is made available to auditors, investigators and other authorised persons.

## 14.5. Out of session and delegated configuration change request approvals

Where arrangements for the approval of CCRs outside a regular CCB meeting are to be made available, such arrangements shall be documented and be appropriately approved.

## 14.6. Change control registration system

A system for recording CCRs for network configuration changes shall be applied by parties managing configuration changes. Responsibility for managing the system will generally reside with parties supporting the operation of a CCB.

All CCRs shall be assigned a number registered in a change control recording system that shall be unique across all parties involved in network configuration management of TfNSW transport assets.

The ASA is the owner of the number and numbering system but may delegate assignment and management of numbers. The configuration management team of the ASA shall be consulted prior to applying a numbering system.

## 14.7. Submissions to the TNAC

The ASA provides secretariat services to the TNAC. The ASA shall be notified as early as possible of any upcoming CCRs that are to be presented to the TNAC so as to facilitate the management of TNAC support activities.

CCR submissions to the TNAC shall be provided to the ASA as secretariat and support body to the TNAC. Submissions shall be on a template provided by the TNAC secretary. CCMs shall meet the following schedule requirements when intending to present to the TNAC:

- draft CCR submission to be provided to the ASA at least six weeks prior to expected TNAC presentation for review by the ASA
- final CCR submission to be provided to the ASA at least two weeks prior to expected TNAC presentation for the submission to be included on the TNAC agenda

Early engagement with the ASA is strongly recommended to facilitate the submission process. Additional information relating to TNAC submissions is available in guidance published on the ASA website.

### **14.7.1. Requirements for draft configuration change request submission**

For a configuration change submission to be accepted for progress through the submission process the TNAC secretariat will conduct an initial check to confirm that the quality and completeness of the submission is adequate.

As each configuration change may have unique circumstances the adequacy of a draft submission is subject to the discretion of the TNAC secretary.

Draft submission documents should be supplied with content mostly complete, in particular detailing how the following have been addressed:

- configuration change categorisation identified
- safety argument
- stakeholder identification and consultation
- key risks and outstanding issues stated
- applicable conditions from previous gates have been met

Draft submissions for gate 0 shall include the following attachments with evidence that approval has been obtained or is imminent:

- initial business requirements
- operational concept
- ISCA
- AGP (unless included in submission document)

Draft submissions for gate 1 shall include the following attachments with evidence that approval has been obtained or is imminent:

- BRS or final business requirements
- AGP

Draft submissions for gate 3 shall include the following attachments with evidence, where appropriate, that approval has been obtained or is imminent:

- prior relevant delegated configuration management gate acceptances or endorsements
- safety assurance report
- evidence to show design meets approved requirements

Draft submissions for gate 5 shall include a safety assurance report with evidence, where appropriate, that approval has been obtained or is imminent.

### **14.7.2. Minimum requirements for inclusion of a configuration change request submission on the agenda**

Subject to the discretion of the TNAC secretary, CCR submissions will only be included on the agenda of the TNAC if the CCR submission is complete and of satisfactory quality to allow the TNAC to make a reasonable assessment of the submission. Key supporting documentation is generally expected to be approved prior to the final submission being provided to the ASA.

### **14.7.3. Representation from RMS**

RMS is an agency of TfNSW and is the responsible party for a significant portion of the NSW Transport Network.

Any configuration change that has more than a trivial impact on RMS operations, maintenance activities or assets shall have a suitable RMS representative attend when configuration change submissions are presented to the TNAC. The RMS representative shall be capable of supporting the case that RMS has been suitably consulted and confirm that any impacts affecting RMS have been suitably addressed by the project. The CCM representing the submission to the TNAC is responsible for arranging the attendance of the appropriate RMS representative.

The ASA should be consulted if it is not clear if the impact to RMS is considered trivial.

## **14.8. Record keeping and audit trail**

Sufficient records shall be retained by CCMs to demonstrate clearly that due process has been followed in obtaining sign-off from stakeholders, implementation of CCB decisions and any other configuration management activity.

## 15. Configuration status accounting

Configuration status accounting is the recording and reporting of the asset information, the status of proposed or in-progress changes to provide a traceable record of activities. It is applied in conjunction with configuration identification and change control.

Configuration status accounting includes the following:

- storage and control of asset information, including the receipt and transfer of asset information
- maintaining records of configuration documents and identification codes
- maintaining records of the implementation status of proposed and approved configuration changes

CCMs are responsible for providing updated asset information for configuration items affected by the configuration change.

Asset information shall be provided without delay to the relevant asset information steward. All required asset information that accurately reflects the as-built configuration baseline shall be provided prior to the completion of a project. The information provided shall be in accordance with published ASA requirements and requirements provided by asset information stewards as the party managing the information on behalf of TfNSW.

Parties responsible for the delivery of asset information to asset information stewards shall assure that the information is correct and presented in the required format. Arrangements to provide this assurance shall be documented.

Configuration identification recovery shall be used if inconsistencies or deficiencies are identified during configuration status accounting.

## 16. Configuration identification recovery

Configuration identification recovery is the correction of inconsistencies between the physical asset and its asset information when an inconsistency is detected.

Depending on the nature of the inconsistency either the asset information or the physical asset will need to be changed.

The need for configuration identification recovery may be determined from configuration identification, change control, configuration status accounting or surveillance activities such as audits.

Parties responsible for the network configuration of TfNSW transport assets should be pro-active about configuration identification recovery for assets they are responsible for and have procedures in place to restore the integrity of the system when discrepancies are detected.

If the inconsistency is caused by a project in progress, responsibility for conducting the configuration identification recovery lies with the party in control of the project.

Configuration identification recovery requires identifying the approved baseline relating to the inconsistency and rectifying the inconsistency to the approved baseline by one or more of the following:

- altering the configuration item
- altering the asset information
- obtaining business, technical and configuration management approval for a new baseline

## **17. Configuration surveillance**

Surveillance of configuration management includes any activity that forms part of an assessment of the status of the application of configuration management. Where surveillance activities identify potential failures in the process or errors in information, activities shall be implemented by the responsible entity to manage the identified issue.

As part of configuration management surveillance, the ASA, contracted transport asset maintainers and asset information stewards shall plan and perform surveillance activities appropriate to their role. Surveillance shall be conducted on the application of configuration management including the process, quality of asset information and its relationship to actual and approved baselines as appropriate.

### **17.1. Configuration audits**

Configuration audits are used to determine whether configuration items conform to approved asset information. A functional configuration audit is conducted to determine whether a configuration item has the performance and functional characteristics specified in its functional baseline. A physical configuration audit is conducted to determine whether the as-built product conforms to its physical baseline.

Parties in control of TfNSW transport assets or asset information shall establish and implement configuration audit plans as part of surveillance activities.

Audit activities shall include the following:

- developing an audit plan showing activities scheduled and responsibilities assigned
- performing audits including any reviews, tests and inspections necessary
- specifying the actions arising from the audit
- keeping records and preparing the audit report

Audit plans shall address the validation of assets to be handed over at the completion of a change against the asset information and requirements.

# Appendix A Standard configuration management gates

An indicative view of the configuration management gates relative to asset life cycle stages and project activities is shown in Figure 8.

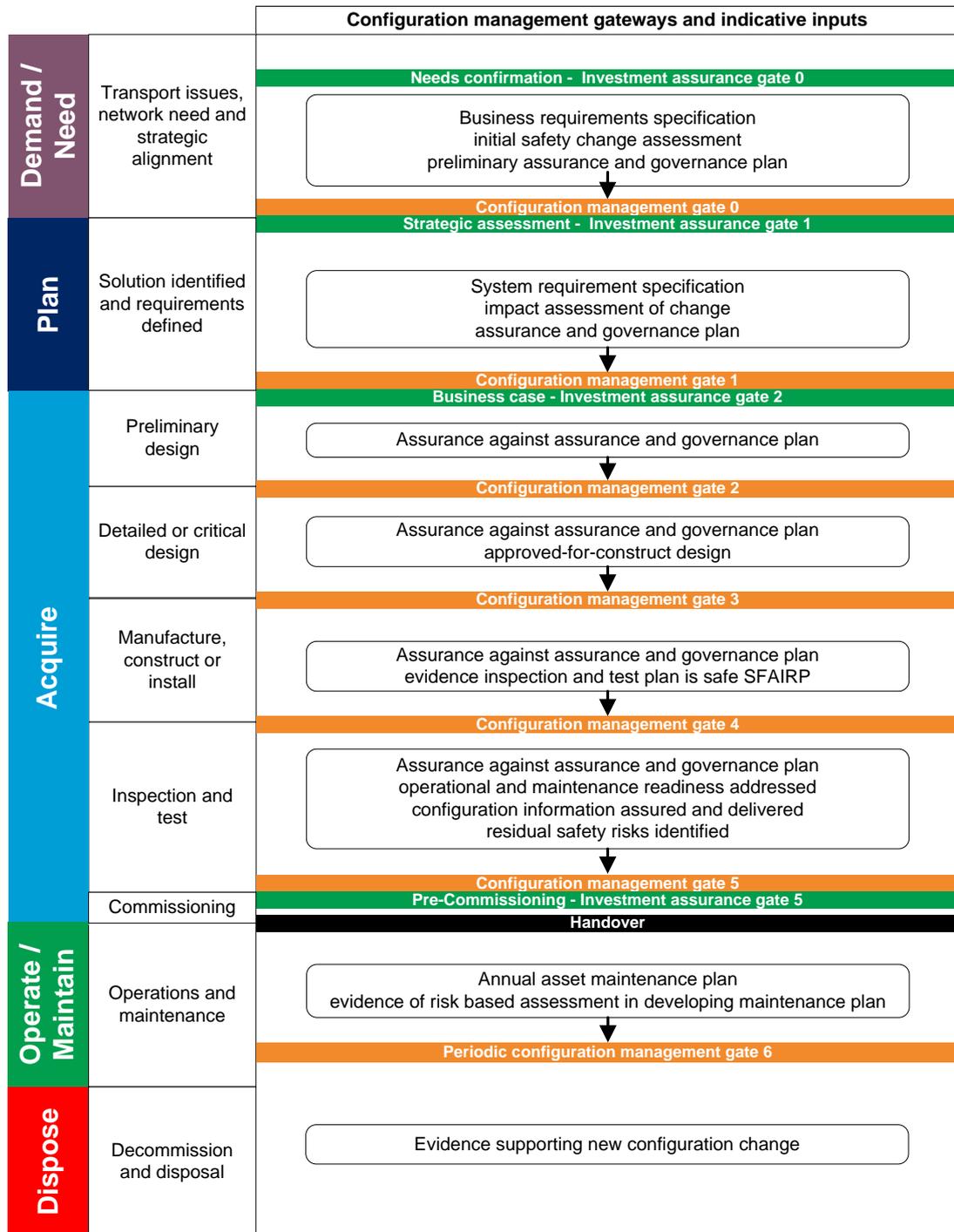
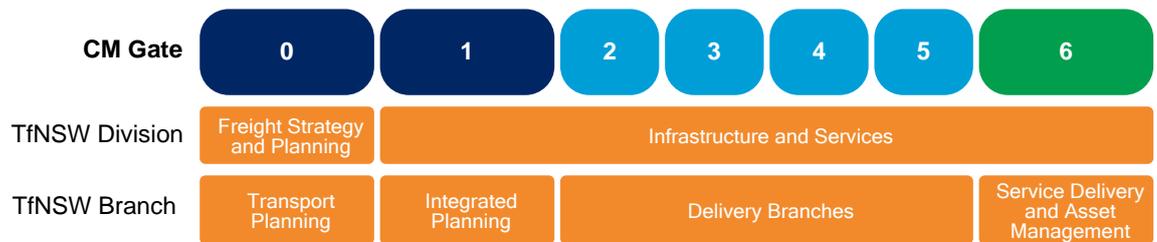


Figure 8 - Standard configuration management gates for full asset life cycle

## Appendix B Typical TfNSW business unit responsibility for submissions

The arrangements shown in Figure 9 show the TfNSW business unit that is typically responsible for preparing most TfNSW led configuration management gate submissions. Significant projects with dedicated delivery offices and regional projects are likely to have different arrangements.



**Figure 9 - Typical TfNSW branch responsibilities for managing CM gate submissions**

## Appendix C Guidance for sustainability requirements

Sustainability in TfNSW is inclusive of 'ecologically sustainable development' (ESD) as defined in section 6(2) of the *Protection of the Environment Administration Act 1997*.

The requirement to consider sustainability in the delivery of transport services is underpinned by a number of pieces of federal and state legislation. In particular, the *Transport Administration Act 1988* states as one of its objectives 'to promote the delivery of transport services in an environmentally sustainable manner'.

In addressing the sustainability requirement at configuration management gates the following sustainability issues should be considered and appropriately addressed where relevant:

- adapting to changing climate, such as the following:
  - climate change risk assessments
  - adaptation and planning to mitigate impact of climate change
- energy and greenhouse gas emission, such as the following:
  - reducing demand through design (passive design)
  - energy efficiency
  - embedding energy conscious behaviour
  - reducing carbon footprint
- water management, such as the following:
  - reducing demand
  - conserving water
  - water run-off management
- waste, such as the following:
  - reducing waste
  - reusing, recycling and repurposing assets
- materials and procurement, such as the following:
  - avoiding use of hazardous materials
  - using sustainable materials
  - using sustainable packaging (minimal use of packaging, high recycled content, recyclable)

- future availability of materials parts for operations and maintenance
- availability of necessary skills to maintain materials and assets
- sustainable transport planning, such as the following:
  - whole-of-life cycle costs versus benefits
  - provision for affordable and appropriate future growth needs of the transport network
  - integrating land use
  - walkability
  - visual amenity
  - availability of contingency arrangements for operations and maintenance
- conservation and biodiversity, such as the following:
  - avoiding and minimising fragmentation
  - nature connectivity
  - enhancing biodiversity
- pollution control, such as avoiding and minimising the following:
  - water pollution
  - air pollution
  - noise pollution
  - light pollution
  - land contamination
- society, such as the following:
  - Aboriginal representation
  - local community involvement
- accessibility, such as the following:
  - effort, resources and available time for maintenance
  - accessibility to assets that require maintenance

At each configuration management gate evidence that sustainability has been addressed should be demonstrated. Generally that evidence should align with the approach described in Table 2.

**Table 2 – Sustainability guidance for each CM gate**

<b>Gate</b>	<b>Expectations</b>
0	Identify and commit to a suitable sustainable goal for the whole of the asset life.
1	Review and commit to a refined and suitable sustainable goal for the whole of the asset life. Align requirements in SRS to sustainability goals in a traceable manner. Integrate sustainability goals into project risk management.
2	Demonstrate traceability of sustainability targets through to proposed solution.
3	Demonstrate traceability of sustainability targets through to proposed solution.
4	Demonstrate traceability of sustainability targets through to delivered solution.
5	Demonstrate traceability and verification of sustainability targets through to proposed solution. Transfer committed sustainability goals to operator and maintainers.
6	Continued sustainability demonstrated through evidence provided of appropriate ongoing management of TfNSW transport assets.

## Appendix D Applicability of TfNSW Configuration Management Plan

The flow chart in Figure 10 may be used to identify the applicability of the TfNSW Configuration Management Plan, particularly in relation to third party work.

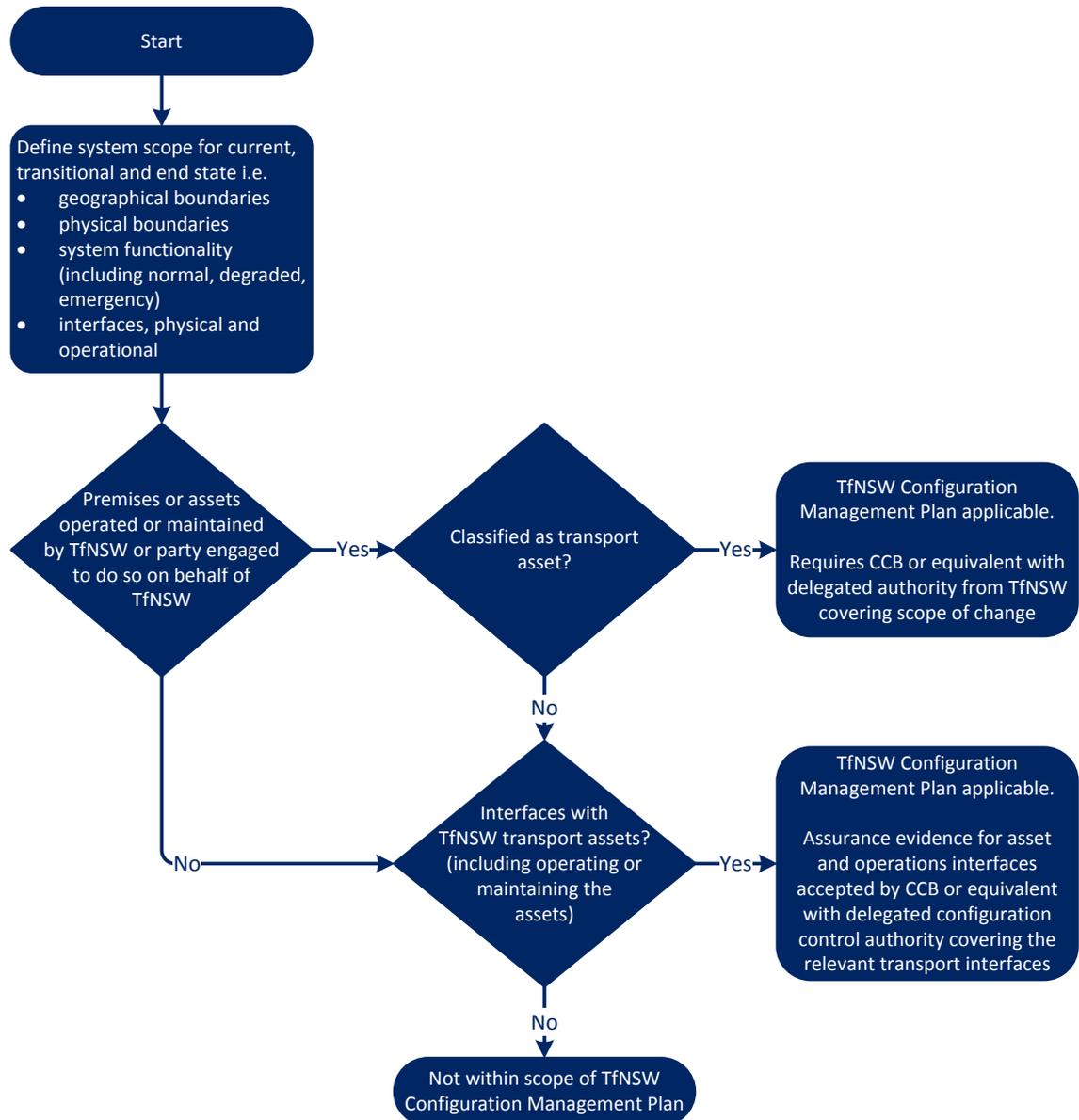


Figure 10 - Applicability of TfNSW Configuration Management Plan

# Appendix E Gate 0 GSN

ABBREVIATIONS	
AEO	Authorised Engineering Organisation
AGP	assurance and governance plan
BRS	business requirements specification
CCB	configuration control board
CMP	configuration management plan
FRACAS	failure recording analysis and corrective action system
ISA	independent safety assessment
JOS	judgment of significance
RAM	reliability, availability and maintainability
RATM	requirements analysis, allocation and traceability matrix so far as is reasonably possible
SFAIRP	safety integrity level
SIL	safety integrity level
SRS	system requirements specification
TfNSW	Transport for NSW
TMP	technical maintenance plan
TNAC	Transport Network Assurance Committee
VAV	verification and validation

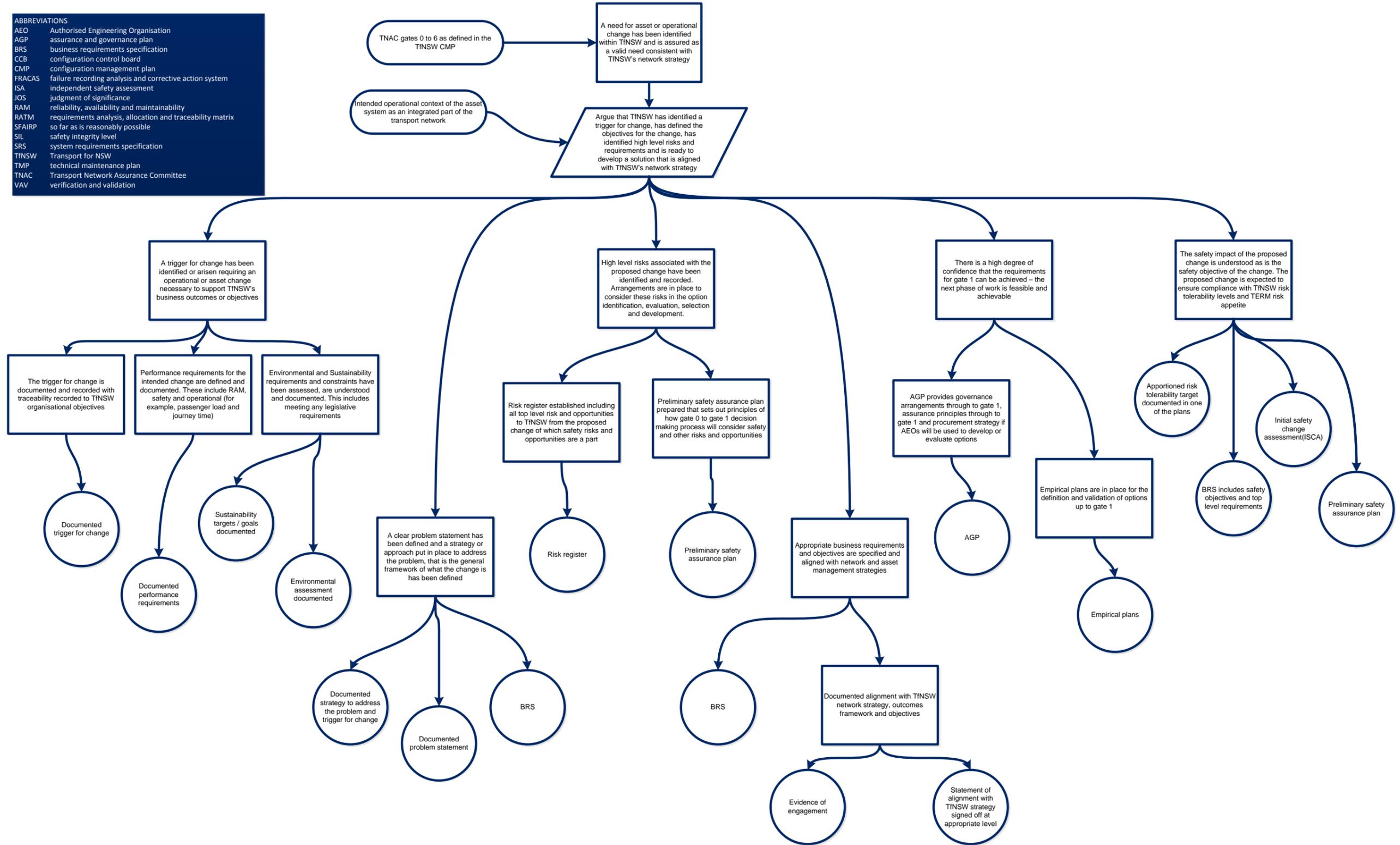


Figure 11 - GSN for configuration management gate 0

# Appendix F Gate 1 GSN

ABBREVIATIONS	
AEO	Authorised Engineering Organisation
AGP	assurance and governance plan
BRS	business requirements specification
CCB	configuration control board
CMP	configuration management plan
FRACAS	failure recording analysis and corrective action system
ISA	independent safety assessment
JOS	judgment of significance
RAM	reliability, availability and maintainability
RATM	requirements analysis, allocation and traceability matrix so far as is reasonably possible
SFAIRP	safety integrity level
SIL	safety integrity level
SRS	system requirements specification
TfNSW	Transport for NSW
TMP	technical maintenance plan
TNAC	Transport Network Assurance Committee
VAV	verification and validation

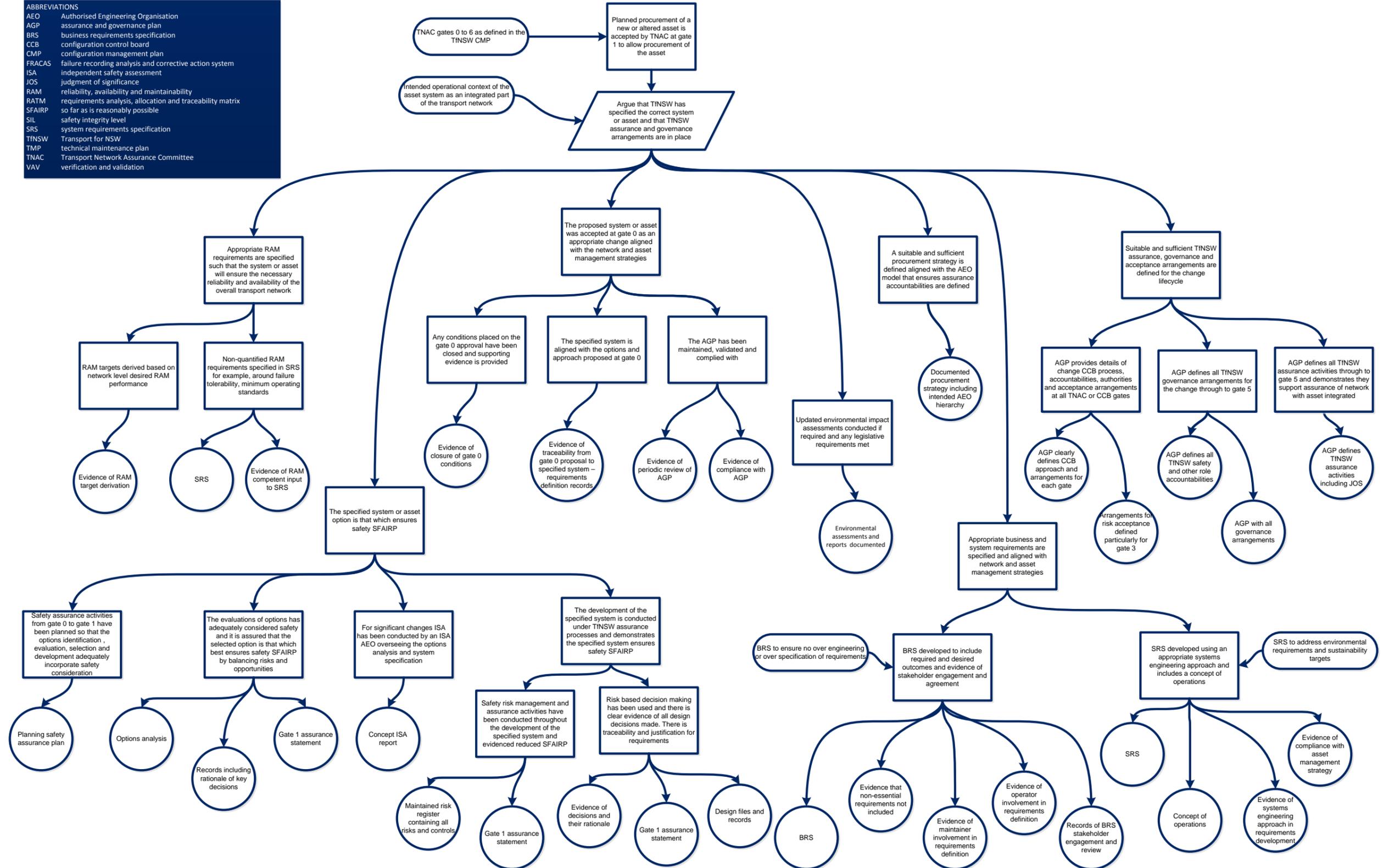


Figure 12 - GSN for configuration management gate 1

# Appendix G Gate 3 GSN

ABBREVIATIONS	
AEO	Authorised Engineering Organisation
AGP	assurance and governance plan
BRS	business requirements specification
CCB	configuration control board
CMP	configuration management plan
FRACAS	failure recording analysis and corrective action system
ISA	independent safety assessment
JOS	judgment of significance
RAM	reliability, availability and maintainability
RATM	requirements analysis, allocation and traceability matrix so far as is reasonably possible
SFAIRP	safety integrity level
SIL	safety integrity level
SRS	system requirements specification
TfNSW	Transport for NSW
TMP	technical maintenance plan
TNAC	Transport Network Assurance Committee
VAV	verification and validation

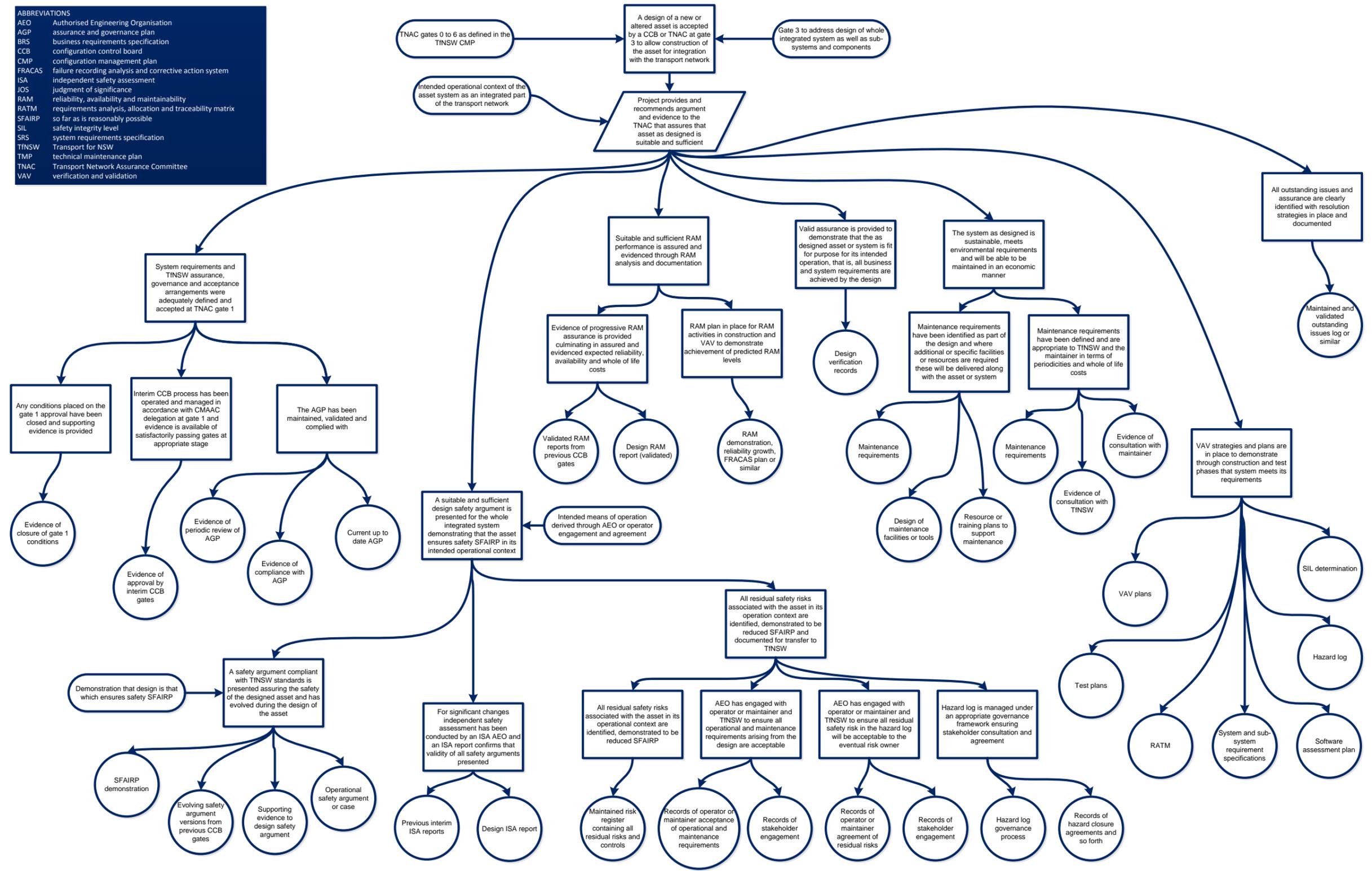


Figure 13 - GSN for configuration management gate 3

# Appendix H Gate 5 GSN

ABBREVIATIONS	
AEO	Authorised Engineering Organisation
AGP	assurance and governance plan
BRS	business requirements specification
CCB	configuration control board
CMP	configuration management plan
FRACAS	failure recording analysis and corrective action system
ISA	independent safety assessment
JOS	judgment of significance
RAM	reliability, availability and maintainability
RATM	requirements analysis, allocation and traceability matrix
SFAIRP	so far as is reasonably possible
SIL	safety integrity level
SRS	system requirements specification
TfNSW	Transport for NSW
TMP	technical maintenance plan
TNAC	Transport Network Assurance Committee
VAV	verification and validation

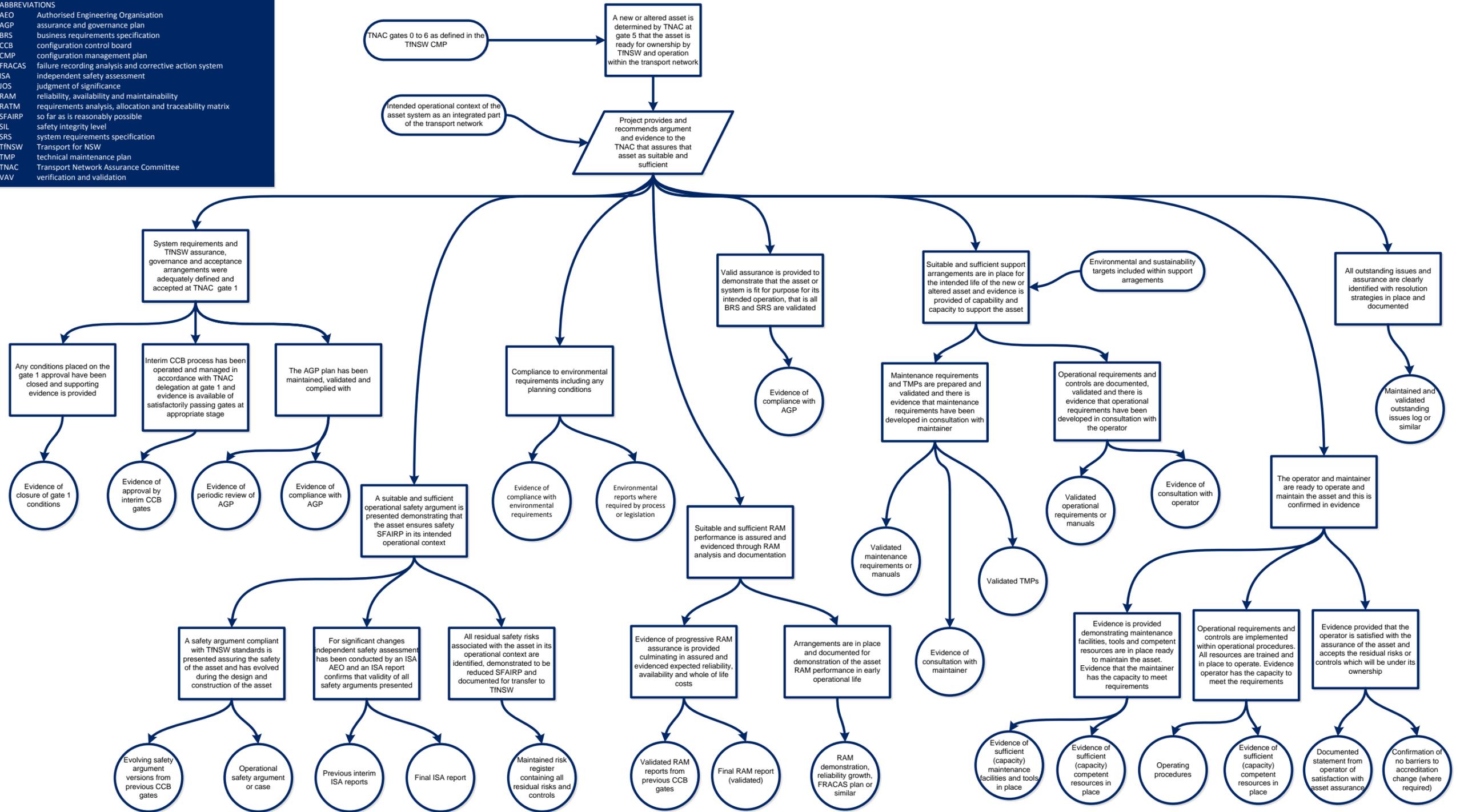


Figure 14 - GSN for configuration management gate 5