

20 Hazards and risk

This chapter provides an assessment of potential hazards that could arise during construction and operation of the Project related to the storage, management or transport of hazardous or dangerous goods, as well as other hazards within the Project area (such as the presence of services/utilities, hazards associated with the rail corridor, and movement of vehicles). Where potential issues are identified or where appropriate precautionary measures could be employed, these have been included as part of this assessment as management measures.

20.1 Introduction

'Hazard and risk' is listed under 'Other issues' in the SEARS, and includes reference to the commitments in the Scoping Report (TfNSW, 2019d) for the Project. **Table 20-1** presents the SEARs relevant to hazard and risk and identifies where these requirements have been addressed in this Chapter.

Table 20-1 SEARs

SEARs	Where addressed in this EIS
Other Issues	
(Address) the following issues in accordance with the commitments made in Chapter 9 of the Scoping Report: (c) <i>hazard and risk</i> The Scoping Report (TfNSW, 2019d) makes the following commitments:	
A high level, desktop hazard and risk assessment will be undertaken for the Project and appropriate management measures will be proposed.	Section 20.4 and Section 20.5
The following government guidelines will be considered as relevant during the preparation of the hazard and risk assessment: <ul style="list-style-type: none"> • <i>International Standard (ISO/IEC 31010) – Risk Assessment Technique</i> • <i>Australian Code for the Transport of Dangerous Goods by Road and Rail (Edition 7.5) (National Transport Commission, 2017)</i> • <i>Code of Practice for the Safe Removal of Asbestos 2nd Edition (National Occupational Health and Safety Commission, 2005)</i> • <i>Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005).</i> 	Section 20.2

The Redfern Station Upgrade works are not classified as 'industry' and therefore the provisions of *State Environmental Planning Policy 33 - Hazardous and Offensive Development* (SEPP 33) do not apply. Similarly, as the Project is also declared to be State Significant Infrastructure, SEPP 33 does not apply to the Project by reason of section 5.22 of the EP&A Act. Notwithstanding, the provisions of SEPP 33 have been considered as a reference guide for the assessment.

The works would involve the construction of a new services building at the Marian Street entrance. The new services building would contain two new padmount transformers, a condenser room (i.e. air-conditioning units), a store room, staff toilets, a communications room (containing computers/IT equipment) and a switch room. Diesel would also be stored in the services building. Dangerous goods would be used or handled during various activities in the services building.

There would also be a store room, condenser (air-conditioning) units, scrubber (i.e. pollution control device) and a communications room at the Little Eveleigh Street entrance. Given the limited storage, handling and use of dangerous goods and hazardous materials, and other hazards associated with the Project, a high level hazard assessment has been provided below.

20.2 Method of assessment

A qualitative desktop assessment was undertaken, which included:

- reviewing the relevant regulatory framework and applicable guidelines
- identifying construction and operational activities with the potential to cause risks to health and safety
- identifying and assessing the hazards that could be encountered during construction and operation (including hazardous materials and dangerous goods)
- identifying storage and transport screening thresholds for hazardous materials and dangerous goods that may be required during construction and operation
- qualitatively identifying and assessing potential impacts to public health and safety related to the presence of hazardous materials and dangerous goods
- providing mitigation and management measures.

The assessment focused on potential hazards with consideration of the following relevant legislation and guidelines:

- *Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace* (NSW Government, 2019b) (note that the *Storage and Handling of Dangerous Goods Code of Practice* referenced in the Scoping Report is now noted by WorkCover NSW as a former code of practice within the document itself)
- *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (Department of Planning 2011) (Applying SEPP 33)
- *Dangerous Goods (Road and Rail Transport) Act 2008* (NSW)
- *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Edition 7.5) (National Transport Commission, 2018).

The assessment focuses on those construction and operational activities with the potential to result in impacts related to the management or storage of hazardous or dangerous goods at the Project area on surrounding communities, land uses, and the environment. The assessment does not address potential health and safety risks to on-site workers associated with normal construction operations, as these are regulated by workplace health and safety legislation (including the *Work Health and Safety Act 2011* (NSW) (WHS Act)). Construction management would be the responsibility of the construction contractor/s, who would be required (under the WHS Act and applicable regulations) to manage the works in accordance with relevant regulatory requirements.

20.3 Existing environment

The urban setting of the Project means that there is the potential for the community to be impacted if construction and operation activities are not properly managed. A description of existing land use patterns and sensitive receivers surrounding the Project area is provided in **Chapter 10** of this EIS. Other sensitive receivers include members of the community travelling or moving in close proximity to work areas and operational areas.

Redfern Station is subject to Sydney Trains policy and requirements set out in its Safety and Environment Management System, which includes that any hazardous materials identified (or existing materials damaged so that they pose a risk) are managed, and then removed from the Station using competent and licenced contractors. Currently, no dangerous goods are stored at the Station, including diesel or transformer oil.

20.4 Impact assessment

20.4.1 Construction

On-site storage, use and transport of dangerous goods and hazardous substances

The incorrect storage, handling and transport of dangerous goods and hazardous materials has the potential to impact the Project area, the surrounding community and environment if leaks, spills or other releases occur.

An indicative list of the types of potentially hazardous materials anticipated to be used, stored and transported during construction of the Project is provided in **Table 20-2**, along with the relevant storage and transport thresholds established under Applying SEPP 33. These thresholds represent the maximum amounts of dangerous goods that can be stored or transported to and from a construction site without causing a significant risk to off-site receptors. In general, low volumes of dangerous goods would be stored at the construction ancillary facilities. The quantity of goods stored would be commensurate with the anticipated rates of consumption, with deliveries of dangerous goods coordinated to match consumption rates, so that excess goods do not unnecessarily increase the risk associated with the Project.

Construction site planning would ensure hazardous materials are stored appropriately and at a suitable distance from sensitive receivers, in accordance with the thresholds established under Applying SEPP 33. Should the minimum buffers be unable to be maintained, either due to space constraints, proximity of sensitive receivers, or a requirement to store volumes of hazardous materials in excess of storage thresholds, a risk management strategy would be developed on a case-by-case basis and accounted for in the CEMP.

Hazards and risks associated with the on-site storage, use and transport of chemicals, fuels and materials would be managed through standard mitigation measures to be developed as part of the construction environmental management documentation (refer to **Chapter 24** of this EIS). These measures would include the storage and management of all hazardous substances in accordance with the Work Health and Safety Act 2011, the Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace (NSW Government, 2019b), and Applying SEPP 33 (Department of Planning, 2011) (or updated equivalent publications).

All transport of dangerous goods to and from the Project area would be undertaken by licensed contractors, who would be responsible for operating in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail* (Edition 7.5) (National Transport Commission, 2017) (or updated equivalent).

Table 20-2 Dangerous goods volumes and thresholds for construction

Material	Australian Dangerous Goods Code Class	Storage method	Applying SEPP 33 thresholds		
			Storage volume	Minimum storage distance from sensitive receivers	Transport (weekly)
Diesel	C1 ¹ , 3 PG III ²	Construction: 5 x 20 litre drums/carry cans	Greater than 5 tonnes, if stored with other Class 3 flammable liquids	5 metres	Not applicable if not transported with Class 3 dangerous goods
Petrol	C1 ¹ , 3 PG III ²	Up to 3 x 20 litre drums stored for refuelling activities	Greater than 5 tonnes, if stored with other Class 3 flammable liquids	5 metres	Not applicable if not transported with Class 3 dangerous goods

Material	Australian Dangerous Goods Code Class	Storage method	Applying SEPP 33 thresholds		
			Storage volume	Minimum storage distance from sensitive receivers	Transport (weekly)
Lubricating and hydraulic oils and greases	C2	1 x 20 litre drum	N/A	N/A	Not applicable if not transported with Class 3 dangerous goods
Industrial grade oxygen	2.2	2 x 55 kilogram bottles in rack	N/A	N/A	Not subject to Applying SEPP 33 transport thresholds
Acetylene	2.1	2 x 55 kilogram bottles in rack	Greater than 0.1 tonnes (100 kilograms)	15 metres	2 tonnes; 30 times per week
Concrete curing compounds	3 PG III	1 x 20 litre drum	N/A	N/A	Not subject to Applying SEPP 33 transport thresholds
Concrete retardant	3 PG II	1 x 20 litre drum	Greater than 5 tonnes	5 metres	10 tonnes; 60 times per week
Epoxy glue	3 PG III	2 x 10 litre cans	Greater than 5 tonnes	5 metres	10 tonnes; 60 times per week
Acids	8 PG III	1 x 20 litre drum	Greater than 25 tonnes	N/A	2 tonnes; 30 times per week
Bases	8 PG III	1 x 20 litre drum	Greater than 25 tonnes	N/A	2 tonnes; 30 times per week
Disinfectant	8 PG III	2 x 20 litre drums	Greater than 50 tonnes	N/A	2 tonnes; 30 times per week
Paint	N/A	4 x 20 litre drums	N/A	N/A	SEPP 33 transport thresholds

Notes:¹ Classified as C1 if not stored with other Class 3 flammable liquids² Classified as 3PGIII if stored with other Class 3 flammable liquids.**Utilities**

As described in **Chapter 5** of this EIS, a number of utilities would need to be adjusted, relocated, and/or protected to enable construction. The potential rupture of underground utilities during excavation or collision of plant and equipment with aboveground services could pose risks to public safety. Rupture or contact with services during works could also result in releases and/or short-term outages, as could relocation of utilities and services.

If inadequately managed, works in the vicinity of utilities which are not protected or relocated (such as high voltage electricity transmission lines or gas pipelines) could result in increased risks to the workforce and/or surrounding environment/community.

Specifically, risks associated with these hazards would be minimised by carrying out utility checks (such as 'dial before you dig' searches and non-destructive digging), consulting with relevant utility providers and, if required, relocating and/or protecting utilities in and around the Project prior to construction. Consultation with utility providers would commence during detailed design and continue during construction to mitigate the risk of unplanned and unexpected disturbance of utilities (refer to **Section 20.5**).

Removal of buildings and structures

The Project requires the removal of structures at and around Redfern Station including the relocation of the building on Platform 1 and modification of 125-127 Little Eveleigh Street. Hazards associated with building demolition include:

- unplanned structure collapse
- falls from one level to another
- falling objects
- the location of above and underground services
- exposure to hazardous chemicals and materials (such as asbestos fibres, lead dust, and biological material)
- noise from plant used during demolition work
- proximity of the building or structure being demolished to other buildings or structures.

To minimise exposure to these hazards, a risk assessment would be carried out prior to works commencing. The risk assessment would include:

- an assessment of the structural integrity of the structure to be demolished
- an assessment of the method of demolition, including sequencing, scheduling, plant and equipment to be used, and the layout of work areas
- a hazardous material survey for those buildings and structures suspected of containing hazardous materials (including asbestos, lead paint and polychlorinated biphenyl containing materials (e.g. in electrical equipment)).

Demolition would be carried out by licensed demolition contractors, in accordance with relevant regulatory requirements (refer to **Section 20.5**).

Potential contamination

Contaminants of potential concern that could be exposed during excavation, demolition and clear out of the structures and buildings include hydrocarbons, heavy metals, herbicides, and asbestos. Exposure to these contaminants could cause health and safety impacts to the community through inhalation and/or direct contact or impacts to the environment due to contamination of land.

Demolition waste which could contain contaminated material would be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014a), handled by licensed operators and directed to a waste management facility that is lawfully permitted to accept contaminated material. Asbestos removal would be undertaken by qualified and licensed asbestos removalists in accordance with the *Work Health and Safety Act 2011* and supporting *Work Health and Safety Regulations 2014*, and relevant SafeWork NSW and SafeWork Australia guidelines/codes of practice.

Health and safety impacts associated with potential exposure to contaminated and hazardous materials would be minimised through implementation of an unexpected finds protocol and waste management plan. Further information on contamination and waste, and associated mitigation measures is provided in **Chapter 17** and **Chapter 21** of this EIS.

Risk of subsidence

As described in **Chapter 17**, the potential for changes to groundwater levels as a result of construction is low, due to the lack of groundwater and generally shallow depth and limited extent of excavation. The Project would also not involve the excavation of any tunnels or other subsurface cavities. Based on the nature of the works being undertaken and the existing environment, the risk of subsidence as a result of construction is considered negligible.

Other health and safety risks

Other construction activities could result in impacts to the health and safety of site workers, users, visitors, and the local community if improperly managed. These include:

- working within an operating rail environment
- the operation of vehicles and construction equipment within the Project area
- the transportation of equipment, excavated spoil, and material to and from the Project area
- construction failures or incidents resulting in flooding, inundation, or excavation collapse.

In addition to the above, there is the potential for risks to pedestrians/public safety resulting from unauthorised access to construction work areas.

NSW workplace safety laws require construction sites to have adequate site security, which includes appropriate fencing. All construction work would be isolated from the general public. The construction contractor/s would need to ensure that construction sites are secure at all times, and take all possible actions to prevent entry by unauthorised persons.

Health and safety risks during construction would be managed by the implementation of standard workplace health and safety requirements. A work health and safety management plan, and safe work method statements would be developed in accordance with regulatory requirements. The management approach outlined in **Section 20.5** would be implemented to minimise and avoid the potential for health and safety impacts during construction.

There are also interactions between the mitigation and management measures for the hazards and safety matters discussed in this Chapter, and traffic and transport, noise and vibration, flooding, hydrology and water quality, air quality, soils and contamination and waste impacts. **Chapter 24** of this EIS provides a consolidated list of environmental mitigation measures for the Project. Together, these measures would serve to minimise the potential community and environment impacts that could arise from the hazards identified above.

20.4.2 Operation

Storage, handling and transport of dangerous goods and hazardous materials

The volumes of hazardous materials and dangerous goods that would be used for maintenance activities during operation would be much smaller than the volumes required during construction. However, the incorrect storage and handling of dangerous goods and hazardous materials has the potential to impact the Project area, the surrounding community and environment if leaks, spills or other releases occur.

An indicative list of the types of potentially hazardous materials anticipated to be used, stored and transported during operation of the Project is provided in **Table 20-3**, along with the relevant storage and transport thresholds established under Applying SEPP 33. These thresholds represent the maximum amounts of dangerous goods that can be stored or transported to and from the Project area without causing a significant risk to off-site receptors. In general, low volumes of dangerous goods would be stored during operation. The quantity of goods stored would be commensurate with the anticipated rates of consumption, with deliveries of dangerous goods coordinated to match consumptions rates, so that excess goods are not unnecessary increasing the risk associated with a potential hazard.

Hazards and risks associated with the on-site storage, use and transport of chemicals, fuels and materials would be managed through standard mitigation measures to be developed as part of the construction environmental management documentation (refer to **Chapter 24** of this EIS). These measures would include the storage and management of all hazardous substances in accordance with

the *Work Health and Safety Act 2011*, the *Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace* (NSW Government, 2019b) and Applying SEPP 33 (Department of Planning, 2011) (or updated equivalent publications). All transport of dangerous goods to and from the Project area would be undertaken by licensed contractors, who would be responsible for operating in accordance with the *Australian Code for the Transport of Dangerous Goods by Road and Rail (Edition 7.5)* (National Transport Commission, 2017) (or updated equivalent).

Table 20-3 Dangerous goods volumes and thresholds for operation

Material	Australian Dangerous Goods Code Class	Storage method	Applying SEPP 33 thresholds		
			Storage volume	Minimum storage distance from sensitive receivers	Transport (weekly)
Diesel	C1 ¹ , 3 PG III ²	Operation: up to 100 litres stored for the diesel pump (in case of emergency)	Greater than 5 tonnes, if stored with other Class 3 flammable liquids	5 metres	Not applicable if not transported with Class 3 dangerous goods

Notes:

¹ Classified as C1 if not stored with other Class 3 flammable liquids

² Classified as 3PGIII if stored with other Class 3 flammable liquids.

Electro-magnetic fields

The Project includes the augmentation of existing power supplies, including transformers feeders and overhead wiring. The possibility of adverse health effects due to the electro-magnetic fields associated with electrical equipment, including has been the subject of considerable worldwide research, however to date, the current evidence does not confirm the existence of any health consequences from exposure to low level EMF, and further research is required (WHO, 2020).

It is considered that a precautionary approach continues to be the most appropriate response to minimise EMF impacts. The design, construction, and operation of the Project's power supply would therefore be undertaken in accordance with relevant industry guidelines and standards/codes of practice, including the International Commission on Non-Ionizing Radiation Protection's (ICNIRP) *Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1Hz – 100kHz)* (which have been adopted by the Australian Radiation Protection and Nuclear Safety Agency). This would result in conductive and semi-conductive materials effectively shielding electrical fields.

The Project would be designed to comply with appropriate Australian and international standards, to minimise the risk associated with electro-magnetic field exposure.

Other health and safety risks

Potential impacts to the health and safety of the community and customers during operation include:

- safety risks (e.g. unauthorised access)
- general worker health and safety issues for drivers and maintenance staff.

These risks would be mitigated through the design process which would include an appropriate emphasis on safety according to relevant design standards and requirements. The Project has been designed to incorporate features which would ensure sufficient levels of safety specific to train and railway station operations, for example security fencing, CCTV. Further information is provided in **Chapter 5** of this EIS.

Maintenance activities and other works within the rail corridor would be undertaken in accordance with TfNSW standing operating procedures, reducing the potential for impacts to the health and safety of workers, visitors, and customers.

20.5 Management and mitigation

20.5.1 Overview

A CEMF (**Appendix D** of this EIS) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the CEMP, sub-plans, and other supporting documentation for each specific environmental aspect, including 'hazard and risk' aspects.

The chapter includes a compilation of the performance outcomes as well as mitigation measures, including those that would be included in the CEMP for issues related to 'hazard and risk'.

20.5.2 Performance outcomes

The performance outcome for the Project in relation to hazard and risk is as follows:

- during construction and operation, dangerous goods in the Project area are stored at least the minimum storage distance from sensitive receivers as defined by Applying SEPP 33.

The Project would be designed, constructed and operated to achieve this performance outcome.

20.5.3 Mitigation measures

The mitigation measures that would be implemented to minimise the hazards identified in this assessment are listed in **Table 20-4**.

Table 20-4 Mitigation measures

ID	Mitigation measure	Applicable location(s)
Construction		
HRS1	A hazard analysis would be undertaken during the detailed design stage to identify risks to public safety from the project, and how these can be mitigated through safety in design (with reference to the <i>International Standard (ISO/IEC 31010) - Risk Assessment Technique and Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace</i> (NSW Government, 2019b) (or updated equivalent) where relevant).	Project area
HRS2	Relevant standards and guidelines will be applied during detailed design to ensure that EMF emissions comply with relevant limits for all receivers (including the International Commission on Non-Ionizing Radiation Protection's (ICNIRP) <i>Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1Hz – 100kHz)</i> , as adopted by the Australian Radiation Protection and Nuclear Safety Agency.	Project area (and area of potential EMF emission exposure)
HRS3	All hazardous substances that may be required for construction and operation would be stored and managed in accordance with the <i>Work Health and Safety Act 2011, Code of Practice - Managing Risks of Hazardous Chemicals in the Workplace</i> (NSW Government, 2019b) and the <i>Hazardous and Offensive Development Application Guidelines: Applying SEPP 33</i> (Department of Planning, 2011) (or updated equivalent publications).	Project area
HRS4	The CEMP would include emergency and incident response procedures, as specified by the CEMP. The procedures would specify: <ul style="list-style-type: none"> roles and responsibilities notification and reporting protocols action and investigation requirements training programs to ensure that all staff are familiar with the plan design and management measures to address the potential environmental impacts of an emergency situation. 	Project area

ID	Mitigation measure	Applicable location(s)
HRS5	<p>To minimise hazards related to the demolition or removal of buildings and structures, a risk assessment would be carried out prior to these works commencing. The risk assessment would include:</p> <ul style="list-style-type: none"> an assessment of the structural integrity of the structure to be demolished an assessment of the method of demolition, including sequencing, scheduling, plant and equipment, and the layout of work areas a hazardous material survey for those buildings and structures suspected of containing hazardous materials (particularly asbestos). <p>Demolition would be carried out by licensed demolition contractors.</p> <p>Asbestos removal would be undertaken by qualified and licensed asbestos removalists in accordance with the <i>Work Health and Safety Act 2011</i> and supporting <i>Work Health and Safety Regulations 2014</i>, and relevant SafeWork NSW and SafeWork Australia guidelines/codes of practice.</p>	Project area
HRS6	'Dial before you dig' searches would be carried prior to excavation work taking place.	Project area

Following the implementation of the standard management measure above, residual impacts from the Project in relation to Hazard and Risk would be limited to dangerous goods storage, accidental utility strike, demolition noise and potential health and safety issues (e.g. from construction traffic generated) during construction; and diesel storage and production of EMF emissions during operation. These potential impacts are not expected to contribute to cumulative impacts, except in the case of noise and traffic, which are addressed in **Chapter 23** of this EIS. Therefore, there are no cumulative impacts are expected. Further consideration of cumulative impacts with regard to other environmental aspects of the Project is discussed in **Chapter 23** of this EIS.