

6.2 Soils and contaminated land

The potential impacts on soils and contaminated land during construction and operation of the proposal have been assessed as part of the REF.

6.2.1 Methodology

The methodology for this assessment included:

- a desktop review of the proposal area on 10 June 2021, including a review of:
 - historical aerial mapping sourced from the NSW Department of Customer Service and Aerometrex Pty Ltd
 - land-use zoning information
 - geology, soil, topography and registered groundwater bore maps
 - acid sulfate soil (ASS) and salinity risk maps
 - NSW Environment Protection Authority (EPA) databases on the contaminated land record and *Protection of the Environment Operations Act 1997* (POEO Act) licences for the site and the Blue Mountains LGA
 - NSW EPA priority per- and polyfluoroalkyl substances (PFAS) investigation risk sites within five kilometres of the proposal area
 - NSW Department of Primary Industries (DPI) former livestock dip locations and mapping
 - Department of Defence unexploded ordnance risk mapping
 - previous contamination reports, previous contamination registers and records, potential contamination issues and records of illegal dumping or earthworks for the proposal area
- a site inspection of the study area (a 200-metre buffer around the proposal area) on 14 July 2021 for visual assessment of surface filling, dumped wastes, land uses, contamination risks that could constrain the proposal
- development of a Conceptual Site Model (CSM) to evaluate the potential risks to human health and the environment during construction and operation of the proposal
- a preliminary risk assessment, which aims to identify risks to be minimised through design of the proposal and areas for further assessment prior to construction of the proposal
- recommendation of management measures to address identified risks.

6.2.2 Existing environment

The existing environment of topography, surface water and hydrogeology related to the assessment of soils and contamination is discussed in Section 6.1.2.

Study area

A summary of the features of the study area used the assessment of soils and contaminated land, including land zoning, transport corridors, structures and infrastructure and open spaces is outlined in Table 6-6. The surrounding land uses within a 200 metre radius of the proposal have been outlined in Table 6-7.

Table 6-6: Study area setting

Location	Land zone/s	Transport corridors	Buildings or structures	Open spaces
Katoomba to Medlow Bath section	C2 – Environmental Conservation C3 – Environmental Management C4 – Environmental Living SP2 – Infrastructure	Great Western Highway	Rural living properties Rail corridor	Vegetated and undeveloped lots
Medlow Bath to Blackheath section	SP2 – Infrastructure C2 – Environmental Conservation C4 – Environmental Living	Great Western Highway	Rural living properties Rail corridor	Blue Mountains National Park Vegetated and undeveloped lots

Table 6-7: Surrounding land uses

Location	Direction	Land use details	Land use zones
Katoomba to Medlow Bath section	North	Great Western Highway Rail Corridor Rural living properties	SP2 – Infrastructure C2 – Environmental Conservation C3 – Environmental Management C4 – Environmental Living
	East	Rail Corridor Blue Mountains National Park Vegetated and undeveloped lots Residential housing	SP2 – Infrastructure C1 – National Parks and Nature Reserves C2 – Environmental Conservation C4 – Environmental Living
	South	Rural living properties Vegetated lots	C2 – Environmental Conservation C4 – Environmental Living
	West	Vegetated lots Rural living properties Rail radio communication tower	SP2 – Infrastructure C2 – Environmental Conservation C3 – Environmental Management C4 – Environmental Living
Medlow Bath to Blackheath section	North	Vegetated lots Great Western Highway	C1 – National Parks and Nature Reserves C2 – Environmental Conservation
	East	Blue Mountains National Park Rural living properties Vegetated and/or undeveloped lots Trails and unpaved roads	C1 – National Parks and Nature Reserves C2 – Environmental Conservation C4 – Environmental Living
	South	Rail corridor Great Western Highway Residential housing Medlow Bath Station Synonymous Café Blue Mountains Mazda Medlow Bath Rural Fire Brigade Vegetated lots	C2 – Environmental Conservation C4 – Environmental Living SP2 – Infrastructure SP3 – Tourist
	West	Rural living properties Vegetated lots Rail corridor	C2 – Environmental Conservation C4 – Environmental Living SP2 – Infrastructure

Historical aerial imagery

Interpretation of historical aerial imagery from between 1943 and 2021 has identified changes in land use within and near the proposal area.

Within the Katoomba to Medlow Bath section, the Great Western Highway and the surrounding vegetated lots and Blue Mountains National Park have been present since 1943. A small number of buildings, potentially rural living properties, have been removed since 1943, while additional properties were established, especially near Medlow Bath. A Caltex depot was present to the north of Foy Avenue from before 1943 and had been removed by 2002. Geotechnical investigations along the Great Western Highway confirmed the presence of fill within the road shoulders, with fill visible in historical aerials. A site inspection confirmed the general presence of fill across the proposal area, existing stockpiles and dumped items.

Within the Medlow Bath to Blackheath section, the Great Western Highway, rail corridor and the surrounding vegetated lots and Blue Mountains National Park have been present since 1943. Some earthworks and fill were present at the northern end of the proposal in 1943. A small number of buildings, potentially rural living properties, have been removed over the years. Geotechnical investigations along the Great Western Highway have confirmed the presence of fill within nature strips, the road reserve and road shoulders. A site inspection confirmed the general presence of fill across the proposal area and existing stockpiles.

Regulatory database searches

As part of the desktop review outlined in Section 6.2.1, the following databases were searched, and returned no results of contamination within the specified distances of the proposal:

- NSW EPA public register (notified sites and contaminated land record) – 500 metres
- NSW Government PFAS Investigation Program – five kilometres
- Department of Defence Unexploded Ordnance – five kilometres
- NSW DPI livestock dip site locator – five kilometres.

A review of the Environmental Protection Licences (EPL) issued by the EPA under the POEO Act within 500 metres of the proposal identified the EPLs outlined in Table 6-8. The Katoomba Waste Management Facility was issued a clean-up notice in 2017 and has received a number of non-compliance notices.

Table 6-8: EPLs within 500 metres of the proposal

Licence Number	Licensee	Premises	Status	Scheduled activities	Location to proposal areas
211228	CPB Contractors Pty Limited	Blue Mountains Route Clearance, referring to "all railway stations between Falconbridge and Newnes Junction except Mt Victoria"	Surrendered	<ul style="list-style-type: none"> • Railway system activities 	Medlow Bath Station, located about 80 m south of the Medlow Bath to Blackheath section
1436	Metromix Pty Limited	19 Twynham Street, Katoomba, NSW 2780	No longer in force	<ul style="list-style-type: none"> • Concrete work 	250 m south of the Woodlands Road, Katoomba ancillary facility
5481	Ventia Utility Services Pty Limited	Katoomba Waste Management Facility 49-89 Woodlands	Surrendered	<ul style="list-style-type: none"> • Waste disposal by application to land 	60 m north-east of the Woodlands Road, Katoomba ancillary facility

Licence Number	Licensee	Premises	Status	Scheduled activities	Location to proposal areas
		Road, Katoomba, NSW 2789			
10034	Blue Mountains City Council	Katoomba Waste Management Facility 49-89 and 70-78 Woodlands Road, Katoomba, NSW 2789	Issued	<ul style="list-style-type: none"> Waste storage - other types of waste Waste disposal by application to land 	60 m north-east of the Woodlands Road, Katoomba ancillary facility
13089	Blue Mountains City Council	Katoomba Waste Management Facility 49-89 and 70-78 Woodlands Road, Katoomba, NSW 2789	Issued	<ul style="list-style-type: none"> Waste storage - waste tyres Waste Storage, Transfer, Separating or Processing Waste storage - other types of waste Non-thermal treatment of general waste Composting 	60 m north-east of the Woodlands Road, Katoomba ancillary facility

Site inspection

A preliminary Conceptual Site Model (CSM) was prepared to identify areas of potential environmental concern (APECs) within the proposal area. A summary of the findings of the CSM are outlined in Table 6-9.

Table 6-9: Areas of potential environmental concern within the proposal area

Location	APEC
Katoomba to Medlow Bath section	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments from the Great Western Highway and adjoining rail corridor Filling and incidental renovations within rural living properties and road reserves Historical and existing stockpiles, including those adjacent to the rail corridor Historical Caltex fuel depot located to the north of Foy Avenue which was established prior to 1943 and removed by 2002, with fill and stockpiles present on site. Illegal dumping, which has been identified throughout the proposal area including on private property and adjacent to the rail corridor.
Medlow Bath to Blackheath section	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments from the Great Western Highway and adjoining rail corridor Filling and incidental renovations within rural living properties, road reserves and nature strips Four known stockpiles present adjacent to 12 Coachhouse Lane, Medlow Bath
Woodlands Road, Katoomba ancillary facility	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments from Woodlands Road Historical development of the site Proximity of three EPLs and one clean-up noticed issued to the Katoomba Waste Management Facility, 127 metres to the north. One EPL issued to Metromix Concrete, 245 metres to the south.
Great Western Highway, Medlow Bath ancillary facility	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments from the Great Western Highway and adjoining rail corridor The United Petroleum Medlow Bath service station at 90-92 Great Western Highway, Medlow Bath, located directly north of the site Historical and existing filling and stockpiles on the site

6.2.3 Potential impacts

Construction

The preliminary risk assessment conducted for the proposal is outlined in Table 6-10. This assessment considered the potential risk factors, pathways and receptors for contaminants near the proposal and the potential exposure to contaminants of potential concern (CoPCs) during construction. The risk ratings applied in the assessment are defined as:

- **Negligible** – the presence of the identified source does not give rise to the potential to cause significant harm.
- **Low** – it is possible that harm could arise to a designated receptor from an identified source though this is likely to be mild.
- **Moderate** – it is possible that harm could arise to a specific receptor, but it is unlikely that such harm would be significant.
- **High** – a designated receptor is likely to experience significant harm from an identified source without remedial action.
- **Very high** – there is a high probability that severe harm could arise to a designated receptor from an identified source without appropriate remedial action.

The assessment found that there may be CoPCs present within fill and stockpiles across the proposal area. Potential risks to the local environment would be managed through implementation of a Construction and Environmental Management Plan (CEMP) during construction as well as other safeguards and management measures outlined in Section 6.2.4.

The surface and groundwater quality impacts related to soils and contamination are discussed in Section 6.1.3.

Table 6-10: Preliminary risk assessment

Location	Potential sources	Potential receptors	Assessment of potential impact	Risk rating
Katoomba to Medlow Bath section	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments Filling and incidental renovations within rural living properties and road reserves Historical and existing stockpiles Historical fuel depot Illegal dumping 	<p>Human</p> <ul style="list-style-type: none"> Future construction workers Residents during construction Workers and visitors to the nearby businesses <p>Environmental</p> <ul style="list-style-type: none"> Surface water Groundwater 	<p>There may be CoPCs present within fill, stockpiles and dumped present across the section. There may be impacts to the soil and groundwater from the historical Caltex depot, located near Foy Avenue. Given the age of the depot and that it has been removed, it is unlikely that there are elevated CoPC concentrations in the study area near the former depot location. CoPCs may be encountered in soil and groundwater during construction phase</p> <p>As intrusive investigations have not been undertaken along the section, it is possible that CoPCs at concentrations above the applicable Tier I screening guidelines and/or waste classification criteria are present in the study area. Areas of cut and / or any spoil produced should be assessed to inform necessary waste management practices.</p>	Low – Moderate (due to known fill and historical fuel depot)
Medlow Bath to Blackheath section	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments Filling and incidental renovations within rural living properties, road reserves and nature strips. Stockpiles 	<p>Human</p> <ul style="list-style-type: none"> Future construction workers Residents during construction Workers and visitors to the nearby businesses <p>Environmental</p> <ul style="list-style-type: none"> Surface water Groundwater 	<p>There may be CoPCs present within fill and stockpiles present across the proposal which may be encountered during excavations and construction.</p> <p>As contamination investigations have not been undertaken along the proposal, it is possible that CoPCs at concentrations above the Tier I screening guidelines and/or waste classification criteria are present in the study area. Areas of cut and / or any spoil produced should be assessed to inform necessary waste management practices.</p>	Low – Moderate (due to known fill)
Woodlands Road, Katoomba ancillary facility	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments Historical development of the site EPL facilities 	<p>Human</p> <ul style="list-style-type: none"> Future construction workers Residents during construction 	<p>There may be CoPCs present within fill and stockpiles present across the ancillary facility which may be encountered during excavations and construction. However, previous studies of this ancillary facility have not investigated the full extent of the site. As such, further investigations are required to identify any unknown CoPCs and the potential risks to the local environment should be carried out if the compound site is to be used.</p> <p>There is also a risk that potential impacts from the EPL licenced Katoomba Resource Recovery and Waste Management Facility have mobilised into soils,</p>	Risk rating subject to further investigation

Location	Potential sources	Potential receptors	Assessment of potential impact	Risk rating
		<ul style="list-style-type: none"> Workers and visitors to the nearby businesses <p>Environmental</p> <ul style="list-style-type: none"> Surface water Groundwater 	<p>surface water and groundwater. However, given the distance and local topography, there is a low risk that the ancillary facility would be impacted by the facility.</p>	
Great Western Highway, Medlow Bath ancillary facility	<ul style="list-style-type: none"> Roads and associated emissions from vehicle exhausts and runoff sediments Service stations Historical and existing filling and stockpiles 	<p>Human</p> <ul style="list-style-type: none"> Future construction workers Residents during construction Workers and visitors to the nearby businesses <p>Environmental</p> <ul style="list-style-type: none"> Surface water Groundwater 	<p>There may be CoPCs present within fill and stockpiles present across the ancillary facility which may be encountered during excavations and construction.</p> <p>There may be impacts to the soil and groundwater from the United petrol station located adjacent to the ancillary facility from historical surficial leaks and spills. There is also a risk of underground storage tanks, which store petrol and other fuels, to have potentially leaked and impacted the surrounding soils and groundwater. These could pose a risk to construction workers and the environment should any spills or leaks be encountered during construction work.</p> <p>As contamination investigations have not been undertaken at the ancillary facility, it is possible that CoPCs at concentrations above the Tier I screening guidelines and/or waste classification criteria are present in the study area. Areas of cut and / or any spoil produced should be assessed to inform necessary waste management practices.</p>	<p>Low – Moderate (due to known fill on site and the nearby service station)</p>

Operation

During operation of the proposal, contamination would be expected to mainly occur due to exhaust particles and discharges from vehicle engines, litter and vehicle waste or accidental spills. These potential contamination sources are already present in the area due to the existing highway. The proposal would not result in a change to the existing situation.

6.2.4 Safeguards and management measures

Safeguards and management measures for soils and contamination are outlined in Table 6-11. Other safeguards and management measures that would address soils and contamination impacts are identified in Section 6.1.4.

Table 6-11: Safeguards and management measures – soils and contamination

Impact	Environmental safeguards	Responsibility	Timing	Reference
Contaminated land	<p>A Contaminated Land Management Plan will be prepared in accordance with the <i>Guideline for the Management of Contamination</i> (Transport, 2013a) and implemented as part of the CEMP. The plan will include, but not be limited to:</p> <ul style="list-style-type: none"> capture and management of any surface runoff contaminated by exposure to the contaminated land further investigations required to determine the extent, concentration and type of contamination management of the remediation and subsequent validation of the contaminated land, including any certification required an unexpected finds protocol for incidental potential contamination finds during earthworks (such as illegally dumped wastes and stockpiles) the work methodology to identify, manage, handle and dispose of any contaminated materials or wastes as part of the work measures to ensure the safety of site personnel and local communities during construction. 	Contractor	Detailed design / Pre-construction / Construction	Section 4.2 of QA G36 <i>Environment Protection</i>
Accidental spill	<p>A site-specific emergency spill plan will be developed and include spill management measures in accordance with the Transport for NSW <i>Code of Practice for Water Management</i> (Roads and Traffic Authority, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport for NSW and EPA officers).</p>	Contractor	Detailed design / Pre-construction	Section 4.3 of QA G36 <i>Environment Protection</i>
Contaminated land	<p>Ancillary facility sites that have been historically developed should be subject to intrusive investigations to identify any contaminants of potential concern on the site to assess the suitability of the site and whether activities that would be undertaken on the site will warrant additional controls.</p>	Contractor	Pre-construction / Construction	Additional safeguard
Contaminated land	<p>Areas of cut material in the proposal area will be assessed through an intrusive investigation to inform a likely waste classification of materials to be excavated (if required), suitability for reuse and/or if offsite disposal is required.</p>	Contractor	Pre-construction / Construction	Additional safeguard
Waste management	<p>Any spoil produced during the construction phase will be assessed in accordance with the NSW EPA (2014) <i>Waste Classification Guidelines and Resource Recovery Order / Exemption under the Protection of Environment (Waste) Operations Act 2000</i> to determine necessary waste management practices.</p>	Contractor	Pre-construction / Construction	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Reference
	<p>The CEMP will include the following hierarchy for reuse, recycling or disposal of spoil produced during construction:</p> <ul style="list-style-type: none"> • If spoil produced during construction will remain within the Lot and DP from which it was produced, it can be reused if CoPC concentrations are below the applicable NEPM 2013 Tier I screening values for evaluation of potential risk to human health and the environment. • Spoil produced during construction can be reused within the Lot and DP boundaries from which it was produced or on another Transport or third party site if it meets the definition of virgin excavated natural material / excavated natural material in accordance with the applicable <i>Resource Recovery Order / Exemption under the Protection of Environment (Waste) Operations Act 2000</i>. • Spoil that does not meet either of the above definitions should be transported to an appropriately licenced facility for recycling if all CoPC concentrations are below the NSW EPA (2014) Waste Classification Guidelines contaminant threshold 1 (CT1) values for General Solid Waste. The soil can be recycled at an appropriately licenced facility in accordance with any current Transport contractual arrangements. • If CoPC concentrations are above the CT1 values, the soil waste should be classified per the Waste Classification Guidelines and disposed at an appropriately licenced facility 			
Contaminated land	<p>The risk of potentially impacted soil migrating from the future upgrade work including dust generation and runoff will be minimised utilising standard practices such as dust suppression, and erosion and sedimentation control. These measures along with other measures will be included in the CEMP. Other controls will include proper use of work health and safety equipment and monitoring of work where asbestos or other contamination is identified.</p>	Contractor	Pre-construction / Construction	Additional safeguard