Appendix K

Preliminary Site Investigation

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Preliminary Site Investigation

May 2024

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Preliminary Site Investigation

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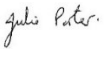
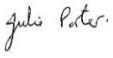
Reviewed by:	Julie Porter	04/04/2024	
Approved by:	Julie Porter	08/05/2024	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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1 Introduction

1.1 Project overview

The Hunter Transmission Project (HTP) involves the construction and operation of a new 500 kilovolt (kV) double circuit transmission line between the new Bayswater and Olney substations. The nominal distance of the new transmission line will be approximately 100 kilometres (km).

From Bayswater substation, the line will maximise use of existing disturbed mining areas to run south-easterly to Lemington before crossing the Hunter River to pass through the Hunter Valley Operations (HVO) coal mine between the HVO North and HVO South operational areas. The line then heads south-east crossing Wollombi Brook and avoiding vegetation constraints in Gouldsville. The line continues southward through Mount Thorley, keeping east of Jerrys Plains Road, and into Broke, crossing Putty Road, a rail corridor, and Broke Road. The line navigates around Bulga Coal mine operations and enters the very western portion of Singleton Military Area (SMA), continuing south to cross over the existing 330 kV lines – Lines 81 and 82, and then co-locates for approximately 4.5 km.

The line then continues south to maximise the use of public land into Pokolbin State Forest, emerging just east of Cedar Creek. It then traverses the Corrabare State Forest, Watagan State Forest, and Olney State Forest, to terminate at the new Olney substation which will connect into an existing double circuit 500 kV transmission line.

The HTP corridor has been developed to avoid and/or minimise impacts on important environmental, land use and social values. The final alignment of the transmission line within the HTP corridor will be confirmed during detailed design with a view to further minimising environmental impacts.

The HTP corridor can be generally separated into three zones:

- HTP North: This is the northern zone running from Bayswater to Broke
- HTP Central: This is the central zone running from Pokolbin to Corrabare
- HTP South: The southern zone that extends from Olney to Eraring.

The HTP corridor is shown on Figure 1 in Appendix A.

1.2 Purpose of this report

The purpose of this Preliminary Site Investigation (PSI) is to identify potential areas of environmental interest (AEI) which will assist in identifying construction limitations/constraints with respect to contamination. The specific objectives of the PSI are to:

- identify and document current and historical land uses with the aim of identifying potential sources of contamination and associated contaminants of concern, potentially affected media and potential human and ecological receptors
- prepare a report in general accordance with NSW Environmental Protection Agency (EPA), *2020 Consultants reporting on contaminated land: Contaminated land guidelines*
- identify any contamination issues and provide recommendation for further investigations (if required).

2 Methodology

2.1 Approach

The following scope of works was completed for this PSI:

- a desktop review of the regional environmental setting and historical information, including:
  - physical site setting information such as topography, geology, hydrology, hydrogeology, and potential sensitive receptors in the HTP corridor
  - regulatory notices or records relating to potential contamination within the HTP corridor issued by the NSW EPA
  - historical aerial photographs for the HTP corridor and surrounds
  - historical investigation reports for the HTP corridor (where available)
  - an online search of NSW EPA PFAS investigation database
  - an online search of Department of Primary Industries Cattle Dip Site Locator
  - an online search of NSW EPA Location of former gasworks sites
  - an overview of neighbouring properties to identify the presence and proximity of sensitive receptors which could be significantly impacted upon by the project
  - online search of the Department of Defence unexploded ordnance (UXO) database.
- identification and assessment of potential sources of contamination
- preparation of this PSI report.

2.2 Contamination search area

As part of the contamination desktop searches, different buffers/boundaries have been applied depending on the type of contaminant potential associated with the dataset. These buffers are outlined in Table 2.1 and are referred to as the contamination search area in respective sections of this PSI.

Table 2.1 Contamination search buffers (relating to contamination search area)

Search type	Rationale	Buffer (m) from the centreline of the HTP corridor.
Site setting information (topography, geology, hydrology, hydrogeology and sensitive receptors.	To establish the potential for contaminants of concern (COC) to mobilise both locally and regionally.	HTP corridor only
NSW EPA Searches, Contaminated Sites, Current Licenses.	To establish the potential for historic and on-going contamination from operational activities.	2,000m
NSW PFAS Investigations	Due to the highly mobile nature of PFAS, a larger buffer has been allowed for.	5,000m

Search type	Rationale	Buffer (m) from the centreline of the HTP corridor.
Department of Defence - UXO	To ensure the works do not occur on land impacted by UXO's.	1,000m
Former Gasworks / Landfill sites	To assess the potential for illegal dumping / leachability of contaminants from nearby landfills.	1,000m
Cattle Dips	To assess the potential for the project to interact with contaminated land. Contamination associated with cattle dips generally localised in nature.	1,000m

2.3 Risks identification

- The methodology includes identification of potential environmental risks, and rating the potential risks according to likelihood, consequence and overall level of risk, in general accordance with AS/NZS ISO 31000:2009 Risk management – Principles and guidelines.
- Potential impacts associated with contamination identified by the environmental risk assessment, include:
- interaction with potentially contaminated soils and groundwater as a result of sub-surface disturbance including disturbance and potential migration/mobilisation of contaminants.
- release of potentially contaminated groundwater where construction activities such as piling intercept groundwater and de-watering is required.
- de-watering, management and disposal or discharge of contaminated groundwater and managing the disposal of contaminated soils encountered during construction in areas where existing contamination is present.
- contamination of soils due to disturbance of buildings structures / materials containing hazardous substances (including asbestos).
- direct contact and inhalation of contaminated soil and groundwater by site workers where construction activities result in the exposure of existing contamination.

The risk of disturbing or encountering contaminated material during construction varies depending on the extent and type of contamination and the work undertaken. Categories and definitions for the likelihood of contamination to be present based on the assessment of current regulated activities, and historical land uses/activities at the identified areas of environmental interest (AEI) is described in Table 2.2.

Table 2.2 Likelihood for land contamination to be present

Likelihood	Description	Basis for ranking
High	Contamination potentially present at concentrations above the relevant guideline criteria and widespread.	The available information indicates that the location within the construction area: — is currently identified as being contaminated on a public register of contaminated sites maintained by a regulator or has been the subject of an activity which is frequently associated with contamination.
Medium	Contamination potentially present at concentrations above the	The available information indicates that the location within the construction area:

Likelihood	Description	Basis for ranking
	relevant guideline criteria and limited in extent.	— is or has been the subject of an activity which in some circumstances is known to be associated with contamination — has been historically filled with imported material, the origin of which is unknown; and/or — has groundwater records indicating the potential for contamination. The available information indicates that land within 500 m of the construction area: — is currently identified as being contaminated on a public register of contaminated sites maintained by a regulator — is or has been the subject of an activity which is frequently associated with contamination — has groundwater records indicating the potential for contamination — is identified as land that may be affected by naturally occurring asbestos or serpentine minerals.
Low	Contamination unlikely to be present above relevant guideline criteria and limited in extent.	The location within the construction area has been partially cleared for agricultural and/or infrastructure (including roads) purposes, however no distinct contamination sources have been identified. The available information does not indicate that land within 500 m of the construction area: — is currently identified as being contaminated on a public register of contaminated sites maintained by a regulator — is or has been the subject of an activity which is frequently associated with contamination — has groundwater records indicating the potential for contamination — is identified as land that may be affected by Naturally occurring asbestos or serpentine minerals.
Insignificant	No contamination sources identified	— The available information indicates that the location within the construction area, or land within 500 m of the construction area is generally undisturbed bushland.

3 Desktop investigation

3.1 Site setting and land use

A summary of the site setting and land use within the HTP corridor is provided in Table 3.1.

Table 3.1 Site details

Item	Details
HTP corridor	The HTP corridor runs from the Olney substation (in the south) to the Bayswater substation (in the north) through a mixture of dense bushland (including State forest), rural properties (farmland), Defence land (Singleton Military Area), traversing around the township of Mount Thorley and running through existing disturbed mining areas (including HVO). The corridor also crosses several major roads, including Lemington Road, Archerfield Road, Long Point Road, Gouldsville Road, Putty Road, Broke/Cessnock Road and Wollombi Road.
Local government area	The project crosses several local government areas (LGA's), including (from south to north, respectively) Lake Macquarie, Central Coast, Cessnock, Singleton and Muswellbrook LGA's.
Zoning	The Muswellbrook Local Environmental Plan 2009, Singleton Local Environmental Plan 2013, Cessnock Local Environmental Plan 2011, Central Coast Local Environmental Plan 2022 and the Lake Macquarie Local Environmental Plan 2014 identifies that the current zoning of land neighbouring the corridor includes: — C1 – National Parks and Nature Reserve — C2 – Environmental Conservation — C3 – Environmental Management — E1 – National Parks and Nature Reserves. — E5 – Heavy Industrial (Mount Thorley township) — R5 – Large Lot Residential — RE1 – Public Recreation. — RU1 – Primary Production — RU2 – Rural Landscape — RU3 – Forestry — RU4 – Primary Production (Small Lots) — SP2 – Defence — SP2 – Infrastructure (Road: Golden Highway, Putty Road) — SP2 – Power Station (Liddell Power Station). — Overall, HTP South and HTP Central is dominated by RU2 Rural Landscape and RU3 Forestry. Whereas HTP North is dominated by RU1 Primary Production.
Current land use	The HTP corridor passes through several State forest's, including Olney State Forest in HTP South, then Watagan State Forest, Corrabare State Forest and the Pokolbin State Forest in HTP Central. The corridor then passes through a mixture of rural farmland, Defence land (Singleton Military Area), a general industrial area at Mount Thorley and several mining lease zones in HTP

Item	Details
	North. The following mining lease zones are located within and in the vicinity of the HTP corridor: — ML1547 – Bulga Coal Management Pty Ltd (2004-2025) — CL224 – Saxonvale Coal Pty Ltd (2004) — ML171 – Bulga Coal Management Pty Ltd (2015–2036) — ML1828 – Mount Thorley Coal Loading Ltd (2022) — CCL753 – Warkworth Mining Ltd (1990-2023) — ML1634 – Coal & Allied Operations Pty Ltd (2009-2030) — ML1324 - Coal & Allied Operations Pty Ltd (1993-2035) — CCL755 - Coal & Allied Operations Pty Ltd (1990-2030) — ML1428 - Coal & Allied Operations Pty Ltd (1998-2019) The HTP corridor terminates in the north adjacent to the Bayswater Power Station, just south of the New England Highway.
Proposed land uses	Energy Infrastructure
Surrounding land uses	— The land use adjacent to the HTP corridor varies from the south to the north. State and National Parks border the HTP corridor from the proposed Onley substation in the south until the corridor passes through the Singleton Military Area. The surrounding land use then shifts to a mixture of rural farmland, mining lease land and light-heavy industrial land entering the existing Bayswater Power Station site.
Sensitive environmental areas	The HTP corridor crosses the Hunter River, Wollombi Brook and several unnamed creeks and tributaries. Groundwater across the HTP corridor is used for beneficial uses including water supply (domestic), irrigation, livestock water supply and recreation purposes.

3.2 Environmental setting

The environmental setting of the contamination search area (the HTP corridor) is summarised Table 3.2.

Table 3.2 Environmental site setting

Item	Details
Topography	The HTP corridor transverses several mountain ranges and National Parks, and as such, topography ranges significantly, particularly through the southern sections of the HTP corridor. Topography varies between 200 and 400 metres Australian Height Datum (mAHD) throughout HTP South. The topography then falls to approximately 50 to 150 m AHD through HTP North (through the existing mine sites).
Hydrology	The HTP corridor crosses the Hunter River (east of Lemington and at a location further south) and crosses Wollombi Brook south-east of the HVO. The corridor is intersected by several known and un-named creeks and tributaries, flowing east towards the Hunter River which then drains into the Pacific Ocean.

Item	Details
	Several farm dams and other man-made ponds associated with Bayswater Power Station and active mine area are present along the HTP corridor.
Soil landscapes	The HTP corridor is dominated by the Watagan Soil Landscape throughout the State/National Park extent in HTP South and HTP Central, but also includes the Sydney Town, Jerry's Plains, Three Ways, Wollombi, Branxton, Hunter, Lidell and Bayswater Soil Landscapes in HTP North. ***HTP South and HTP Central*** — Characterised by rolling to very steep hills and slopes, often containing sandstone boulders. — Although soils in this landscape are located on steep slopes in areas with high rainfall, soils are stabilised by good groundcover. Access tracks, fire trails or areas exposed to bushfire experience rill erosion and/or sheet erosion. — ***HTP North*** — Characterised by low undulating hills and creek flats overtopping sandstone, mud/siltstone, shale, tuff, coal and conglomerate. — Much of this landscape type would have regular drainage lines (farming) and has been extensively cleared to enable livestock grazing.
Acid sulfate soils	Acid sulfate soils (ASS) and potential acid sulfate soils (PASS) are naturally occurring soils containing iron sulphides. On exposure to air, iron sulphides oxidise and create sulfuric acid. This increase in acidity can result in the mobilisation of aluminium, iron, and manganese from the soils. The published digital geographical information system (GIS) and the CSIRO Australian Soil Resource Information System indicates that there is a low or extremely low probability of acid sulfate soils being present within the HTP corridor. There is a potential for localised areas of acid sulfate soils in low lying waterlogged areas i.e., surrounding creeks or dams.
Salinity	Salinity includes dryland salinity, irrigation and river salinity, and urban salinity. A search conducted on the NSW Government eSpade online tool 28 March 2024, generally indicates a low likelihood of salinity within the HTP corridor. However, evidence of salting has been mapped within the Bulga Mining Operation (Mount Thorley Warkworth Mine site), HVO mine area and Bayswater Power Station.
Geology	The project is located within the Singleton 1: 250,000 Geological Series Sheet (Soil Conservation Service of NSW, Sydney 1991). The HTP corridor encompasses multiple geological sequences, with the following dominating geology units: — Narrabeen Group - characterised by quartz-lithic to quartzose sandstone, conglomerate, mudstone, siltstone and rare coal — Alluvium – Channel and flood plain alluvium, gravel, sand, silt and clay — Newcastle/Whittingham Coal Measures – characterised by coal seems, claystone, siltstone, sandstone, conglomerate and medium-coarse grained sandstone.
Hydrogeology	There are two groundwater sources throughout the HTP corridor, Downstream Glennies Creek management Zone and the Sydney Basin-North Coast Groundwater source. The HTP corridor is defined by porous, extensive aquifers of low to moderate productivity. Groundwater dependant ecosystems are located to the east / south-east of the HTP corridor. Available groundwater level information from registered works approvals based on a search of the WaterNSW real-time water data website provide an indication of the groundwater levels

Item	Details
	across the HTP corridor (presented in Table 3.3). Groundwater levels were generally in the range 2 to 10 metres below ground level (mbgl).
Mine Subsidence	The NSW Government's Subsidence Advisor NSW has published mapping showing mine subsidence districts. Parts of the HTP corridor are located in the Patrick Plains Subsidence District and West Lakes Mine Subsidence District and require the approval of Subsidence Advisory NSW under part 3 of the Coal Mine Subsidence Compensation Act 2017 (refer to Figure 2 in Appendix A).
Naturally Occurring Asbestos Potential	The NSW Government's Heads of Asbestos Coordination Authorities (HACA) has published digital GIS data on naturally occurring asbestos. Depending on the probability of naturally occurring asbestos being present, NSW has been mapped into low, medium, or high potential regions. There are no known occurrences of naturally occurring asbestos within the HTP corridor.

3.3 Groundwater database search

Groundwater monitoring wells that are present within the HTP corridor which are listed for beneficial use (i.e., excludes monitoring/exploration bores) are shown in Table 3.3. Most of the bores are listed for household water supply (domestic), irrigation, livestock water supply and recreation purposes.

Table 3-3 Groundwater bores within the HTP corridor

Bore ID	Depth to water (if known)	Usage type (if known)
GW051511	Bore depth 30 mbgl	Water Supply (Private)
GW051512	Bore depth 45.7 mbgl	Water Supply (Private)
GW058500	Bore depth 11 mbgl	Stock and Domestic
GW060014	Bore depth 6 mbgl	Water Supply (Private)
GW018986	Bore depth 8 mbgl	Irrigation
GW018549	Bore depth 10 mbgl	Unknown
GW056696	Bore depth 11 mbgl	Water Supply
GW053932	Bore depth 8 mbgl	Irrigation
GW053931	Bore depth 11 mbgl	Irrigation
GW045122	Bore depth 13 mbgl	Water Supply (Private)
GW045123	Bore depth 13 mbgl	Water Supply (Private)
GW200802	Bore depth 11.9 mbgl	Irrigation
GW042993	Bore depth 8.9 mbgl	Irrigation
GW047240	Bore depth 12.7 mbgl	Irrigation
GW042364	Bore depth 13.3 mbgl	Irrigation
GW034568	Bore depth 12.2 mbgl	Commercial/Industrial
GW034569	Bore depth 12.2 mbgl	Commercial/Industrial

Bore ID	Depth to water (if known)	Usage type (if known)
GW203415	Bore depth 58 mbgl	Unknown
GW053690	Bore depth 12 mbgl	Irrigation

3.4 Database search of potential current and former contaminant sources

A database search of potential current and former contaminant sources within the contamination search area surrounding the HTP corridor is presented in Table 3.3.

Table 3.3 Search of potential current and former contaminant sources

Item	Details
List of contaminated sites regulated by or notified to the NSW EPA	A total of 4 sites within the contamination search area have been notified to the EPA under the *Contaminated Land Management Act 1997* (CLM Act): Mine Sites / Mine Operations — Bulga Surface Operations (Other Industry) – approx. 1,100m west of the HTP corridor. — Lowes Petroleum (Former BP) Depot Mount Thorley – approx. 740m west of the HTP corridor. — Emulsion Plant, Dyno Nobel Asia Pacific Pty Ltd (Chemical Industry) – approx. 430m west of the HTP corridor. — Other — Bayswater Power Station (Other Industry) – approx. 300m north of the new Bayswater substation site. No additional information is available on the nature of the contamination of the four reported sites, however, the contamination is listed as not requiring regulation under the CLM Act. *Source: NSW EPA List of NSW contaminated sites notified to EPA – Accessed March 2024*
Current NSW EPA licensed activities	There are several licensed activities within the contamination search area under the *Protection of the Environment Operations Act 1997* (POEO Act): Mine Sites / Mine Operations — Centennial Mandalong Pty Ltd, Rutley's Road (Coal Mining), Lake Macquarie (EPL 365) – Approx 4km south-east of the new Onley substation site. — Austar Coal Mine Pty Ltd, Wollombi Road, Cessnock (EPL 416) – Approx 100m east of the HTP corridor — Bulga Coal Management Pty Ltd, Broke Road, Singleton (EPL 563) – intersecting with the HTP corridor. — Mount Thorley Operations Pty Ltd, Mount Thorley Road, Singleton (EPL 1976) – Approx 100m west of HTP corridor. — Mount Thorley Coal loading Ltd, Mount Thorley Road, Singleton (EPL 24) – intersecting the HTP corridor. — Warkworth Mining Ltd, Putty Road, Singleton (EPL 1376) – intersecting the HTP corridor.

Item	Details
	— Verdant Earth Technologies Ltd, 112 Longpoint Road, Singleton (EPL 11262) – Approx 500m south-west of HTP corridor. — HV Operations Pty Ltd (Coal Mining), Lemington Road, Singleton (EPL 640) – intersecting the HTP corridor. — AGL Macquarie Pty Ltd (Bayswater Power Station), New England Highway, Muswellbrook (EPL779) – intersecting the HTP corridor. — <u>Other</u> — Mushroom Composters Pty Ltd (Organics recycling facility), 333 Broke Road, Mount Thorley (EPL 10620) – Approx 400 m west of the HTP corridor. — Dyno Nobel Asia Pacific Pty Ltd (Chemical Production - Explosives Production), 5 Woodlands Road, Mount Thorley (EPL 12159) - intersecting the HTP corridor. — Dyno Nobel Asia Pacific Pty Ltd (Chemical Production - Dangerous Goods Production), 186 Long Point Road West, Warwick (EPL 12158) - intersecting/within the HTP corridor. — Enaex Australia Pty Ltd (Chemical Production - Dangerous Goods Production), 8 Melva Place, Mount Thorley (EPL 12325) – Approx 200m west of HTP corridor. *Source: NSW EPA POEO Act Licensed Activity Register – Accessed March 2024* It is understood from consultation with landowners and SafeWork NSW that the Dyno Nobel Warkworth site and the Enaex site are major hazard facilities.
Former gasworks	There are no nearby former gas works noted within the contamination search area. *Source: NSW EPA Location of former gasworks sites – Accessed March 2024*
National waste management site / National Liquid Fuel Facilities data base	There is one property on the National Waste Management Site Database located within the contamination search area: — Mushroom Composters Pty Ltd (Organics recycling facility), 333 Broke Road, Mount Thorley (EPL 10620) – Approx 400m west of the HTP corridor. — One property is listed under the National Liquid Fuel Facilities database: — Lowes Petroleum (Former BP) Depot Mount Thorley – Approx. 740m west of the HTP corridor. *Source: Geoscience Australia, Waste Management Facilities – Accessed March 2024*
NSW EPA PFAS investigation program	<u>Singleton Military Area</u> This PFAS investigation area intersects/is within the HTP corridor. The Department of Defence has undertaken detailed site investigations (including PFAS assessment) following historical use of fire-fighting foams at Singleton Military Area. Investigations have determined that PFAS is present both on and off-site. The EPA is currently working with the Department of Defence on a Human Health and Ecological Risk Assessment (HHERA) to further assess the potential impact to the community and the environment. *Source: PFAS investigation program, New South Wales Environment Protection Authority – Accessed March 2024*
UXO database review	The HTP corridor passes alongside/through a section of the Singleton Military Area – A Defence Controlled Area / known UXO site. *Source: Department of Defence Unexploded Ordnance database - Accessed March 2024.*

Item	Details
Cattle dips	No cattle dips were identified within the contamination search area. *Source: Department of Primary Industries Cattle Dip Site Locator - Accessed March 2024.*

3.5 Review of historical aerial photographs

3.5.1 HTP South

The HTP corridor in HTP South generally consists of undisturbed dense bushland (making up the present-day Olney and Watagan State forests). No evidence of significant ground disturbance or land use is observed on the historic aerial images.

3.5.2 HTP Central

The HTP corridor in HTP Central generally consists of undisturbed dense bushland (making up the present day Corrabare and Pokolbin State forests). No evidence of significant ground disturbance or land use is observed on the historic aerial images.

3.5.3 HTP North

Land clearing and industrial activity can be seen beginning in the 1961 aerial photograph at the Warkworth mining area (including mining operations such as Hunter Valley Operations, United Collieries, Wambo Coal and Warkworth Mining) in HTP North. This activity is approximately 3km south-west of the HTP corridor. Increased mining activities can be seen in the 1974 aerial photograph, namely the Wambo Coal site. The Bulga Coal Complex and Mount Thorley Operations (intersecting/adjacent to the HTP corridor) can be seen operating in the 1984 aerial photograph, however the footprint of operations is limited (localised mining only).

Mining activity is visible in the 1974 aerial photograph (present day Ravensworth/Hunter Valley Operations), however operations are localised. Mining expansion continues throughout the 1970's and 80's surrounding the HTP corridor. The Bayswater Power Station is not yet present in the 1974 aerial photograph (first generator constructed in 1985).

4 Areas of environmental interest

A number of AEIs have been identified during the desktop information review. Table 4.1 outlines the potential AEIs located in the contamination search area. Additional detail for AEIs associated with mining activities are discussed in Section 5.

Table 4.1: Potential areas of environmental interest

Potential AEI	Approximate distance from HTP corridor or substations	Potential contamination Source	Contaminant of concern	Likelihood for Contamination	Notes / recommendations
Access tracks	Intersecting/within the HTP corridor (multiple locations)	Illegal dumping	Hazardous building materials including asbestos, lead and PCBs.	Low	Contamination expected to be localised in nature. Review of investigation from combined geotechnical/ contamination investigation (when available) will identify any widespread impacts. Good housekeeping practices and unexpected finds procedures.
Existing roadways and rail corridors	Intersecting/within the HTP corridor (multiple locations)	Spills from vehicles, and maintenance activities on site	— BTEXN — TRH — PAH — Asbestos — Pesticides.	Low	Contamination expected to be localised in nature. Review findings of geotechnical/contamination investigations (when available) to identify any widespread impacts. Good housekeeping practices and unexpected finds procedures.
Existing towers and transmission line infrastructure	Intersecting/within the HTP corridor (multiple locations).	Spills from maintenance activities on site, asbestos paints on tower infrastructure.	— BTEXN — TRH — Lead — Asbestos — Pesticides.	Low	Contamination expected to be localised in nature. Review findings of geotechnical/contamination investigations (when available) to identify any widespread impacts. Good housekeeping practices and unexpected finds procedures.
Farm structures	Intersecting/within the HTP corridor (multiple locations)	Historical uncontrolled earthworks/filling and building structures previously demolished/ degraded. Storage of agricultural chemicals and potential leaks.	— Heavy metals — Asbestos — PAH — Pesticides — TRH.	Medium	Additional intrusive investigations recommended within 50 metres of farm structures or farm dams which may be disturbed during the construction of the project to confirm the presence/absence of the contaminants of concern.

Potential AEI	Approximate distance from HTP corridor or substations	Potential contamination Source	Contaminant of concern	Likelihood for Contamination	Notes / recommendations
Farm dams	Intersecting/within the HTP corridor (multiple locations)	Historical uncontrolled earthworks/filling. Accumulation of nutrients and pesticides from adjacent cropping activities.	— Heavy metals — BTEX — Pesticides — TRH — Nutrients — E. coli (and faecal bacteria).	Medium	Additional intrusive investigations recommended within 50 metres of farm structures or farm dams which may be disturbed during the construction of the project to confirm the presence/absence of the contaminants of concern.
Areas of active cropping/ cleared agriculture land	Intersecting/within the HTP corridor (multiple locations)	Historical uncontrolled earthworks/filling. Potential leaks associated with nutrients and pesticides from cropping activities.	— Heavy metals — Pesticides — TRH — PAH — Nutrients.	Low	Contamination expected to be localised in nature. Review findings of geotechnical/contamination investigations (when available) to identify any widespread impacts. Good housekeeping practices and unexpected finds procedures.

Potential AEI	Approximate distance from HTP corridor or substations	Potential contamination Source	Contaminant of concern	Likelihood for Contamination	Notes / recommendations
Bayswater Power Station (AEI 01)	Inside/bordering the HTP corridor	Spillage/runoff of hydrocarbons and oils / other chemicals. Historical importation of fill.	— Heavy Metals — Asbestos — TRH/BTEXN — Heavy metals — PAH's — PCB's — Pesticides — PFAS.	High	Notified to the EPA under the *Contaminated Land Management Act 1997* (CLM Act) Power station infrastructure within the HTP corridor includes substation switch yard, cooling water reservoir, brine concentrator (contaminated water), effluent ponds and water waste decanting basin. The eastern part of the HTP corridor borders the Pikes Gully ash dam. The main Bayswater Power Station building is located outside the HTP corridor to the north. Intrusive investigation recommended to inform final design location.

Potential AEI	Approximate distance from HTP corridor or substations	Potential contamination Source	Contaminant of concern	Likelihood for Contamination	Notes / recommendations
Dyno Nobel Warkworth (AEI 02)	Intersecting the HTP corridor	Explosives production. Chemical leaks or spills, poor waste management practices.	— Explosives — Heavy metals — Nutrients (incl ammonia/nitrate) — TRH — SVOCs — Pesticides	High	In 2011 the NSW EPA imposed a license condition under the site EPL requiring the Russian ammonia nitrate prill to be removed from the site by 20 December 2011. The following additional license conditions relating to contamination have also been imposed: — Develop Remediation Action Plan (RAP) 2012 — Implement and Validate RAP (2018) — Develop Contaminated Soil Management Strategy — Develop Sampling, Analysis Quality Plan (SAQP) for annual ground water and surface water monitoring programme. The associated reports are not available on the NSW EPA public register. Remedial actions required under the RAP included re-direction of surface water flow, construct a new lined dam and installation of a water treatment plant to recycle impacted surface water. Additional assessment is recommended to inform final design location.

Potential AEI	Approximate distance from HTP corridor or substations	Potential contamination Source	Contaminant of concern	Likelihood for Contamination	Notes / recommendations
Enaex Australia, Mount Thorley (AEI 03)	Approximately 200m west of the HTP corridor	Chemical leaks or spills, poor waste management practices.	— Explosives — Heavy metals — Nutrients (incl ammonia/nitrate) — TRH — SVOCs — Pesticides	High	In 2017 the NSW EPA imposed a license condition under the site EPL requiring a site contamination assessment including groundwater investigation. The following additional license conditions relating to contamination have been imposed: — Additional groundwater impact studies – to north and northeast of premises The associated reports are not available on the NSW EPA public register. The objectives for the additional groundwater study include "*Additional on and offsite investigations in order to further characterise the likely sources of groundwater impacts identified in ground water monitoring bore MW10, as well as further delineate these impacts to the north and northeast of the premises*". Additional assessment is recommended to inform final design location.
Dyno Nobel Mount Thorley (AEI 04)	Within the HTP corridor	Explosives production. Chemical leaks or spills, poor waste management practices.	— Explosives — Heavy metals — Nutrients (incl ammonia/nitrate) — TRH — SVOCs — Pesticides	High	No records of contamination on the NSW EPA CLM or POEO registers. However, explosive production is an activity frequently associated with contamination. Intrusive investigation recommended to inform final design location.

Potential AEI	Approximate distance from HTP corridor or substations	Potential contamination Source	Contaminant of concern	Likelihood for Contamination	Notes / recommendations
Mushroom Composters (AEI 05)	Approximately 400m west of HTP corridor	Potential uncontrolled filling. Poor waste management practices. Leaching of nutrients into groundwater/ surface water.	— Nutrients, — TRH, — Asbestos, — Microbes — Methane.	Medium	No records of contamination on the NSW EPA CLM or POEO registers. Intrusive investigation recommended to inform final design location.
Singleton Military Area (AEI 06)	Intersecting the HTP corridor	Historical use of fire-fighting foams. Storage of fuels and other chemicals. Munitions testing activities. Historical importation of fill.	— Heavy — Metals, asbestos, — TRH/BTEXN, — Unexploded ordnance — PFAS	High	Known contamination exists at the site (identified NSW EPA PFAS Investigation area). Intrusive investigation recommended to inform final design location.
Mining lease areas	Intersecting/within the HTP corridor (multiple locations)	Uncontrolled earthworks, spills from activities on-site, dumping of wastes, mine tailings. Bulk storage of fuels.	— Acid mine drainage — Heavy metals — PAH — TRH/BTEXN — Methane — High carbon material (HCM) — Salinity.	Medium to High	Extensive mining activity along the northern alignment, for additional detail relating to the mining lease areas refer to Section 5.

TRH – total recoverable hydrocarbon; BTEXN – collectively referred to as benzene, toluene, ethylbenzene, xylene and naphthalene, PAHs – polycyclic aromatic hydrocarbons, PCB – polychlorinated biphenyl, PFAS - per- and polyfluoroalkyl substances, SVOC – semi-volatile organic compounds

5 Mining Information

The project, particularly HTP North, passes through areas that have been subject to recent and historical intensive mining activities. This section summarises the areas where specific mining infrastructure that has relatively higher risk for contamination were identified within the HTP corridor (notable mine infrastructure within the HTP corridor is presented in Appendix A, Figure 3).

The HTP corridor overlaps with Parnell Creek's dam of the Hunter Valley Operations (HVO) North Site. From the EPL 640, it is understood south of this dam is a designated saline discharge point under the Hunter River Salinity Trading Scheme (HRSTS). This dam is noted as a surface water dam in the HVO Environmental Strategy document (dated: 08/01/2019, version: 4).

The HTP corridor passes through the northern section of the Existing North Void Tailing Storage Facility (TSF), which is part of the HVO (HVO Fine Reject Management Strategy, dated: 01/08/2023, version: 4).

Further south, there are also several closed TSF that fall within the HTP corridor (HVO Fine Reject Management Strategy, dated: 01/08/2023, version: 4), see Figure 5.1.

Figure 5.1 Closed No1. TSF Cell A (sourced from HVO Fine Reject Management Strategy, dated: 01/08/2023, version: 4)

The HTP corridor touches the eastern side of a water management area within the Mount Thorley Warkworth mine (refer to Figure 5.2). From a review of the Mining Operations Plan of the Mount Thorley Warkworth Mine (Yancoal Australia, November 2020), this dam could potentially be a pre-mining sediment control and stock water dam; mine water dam, waste-water storage area or similar.

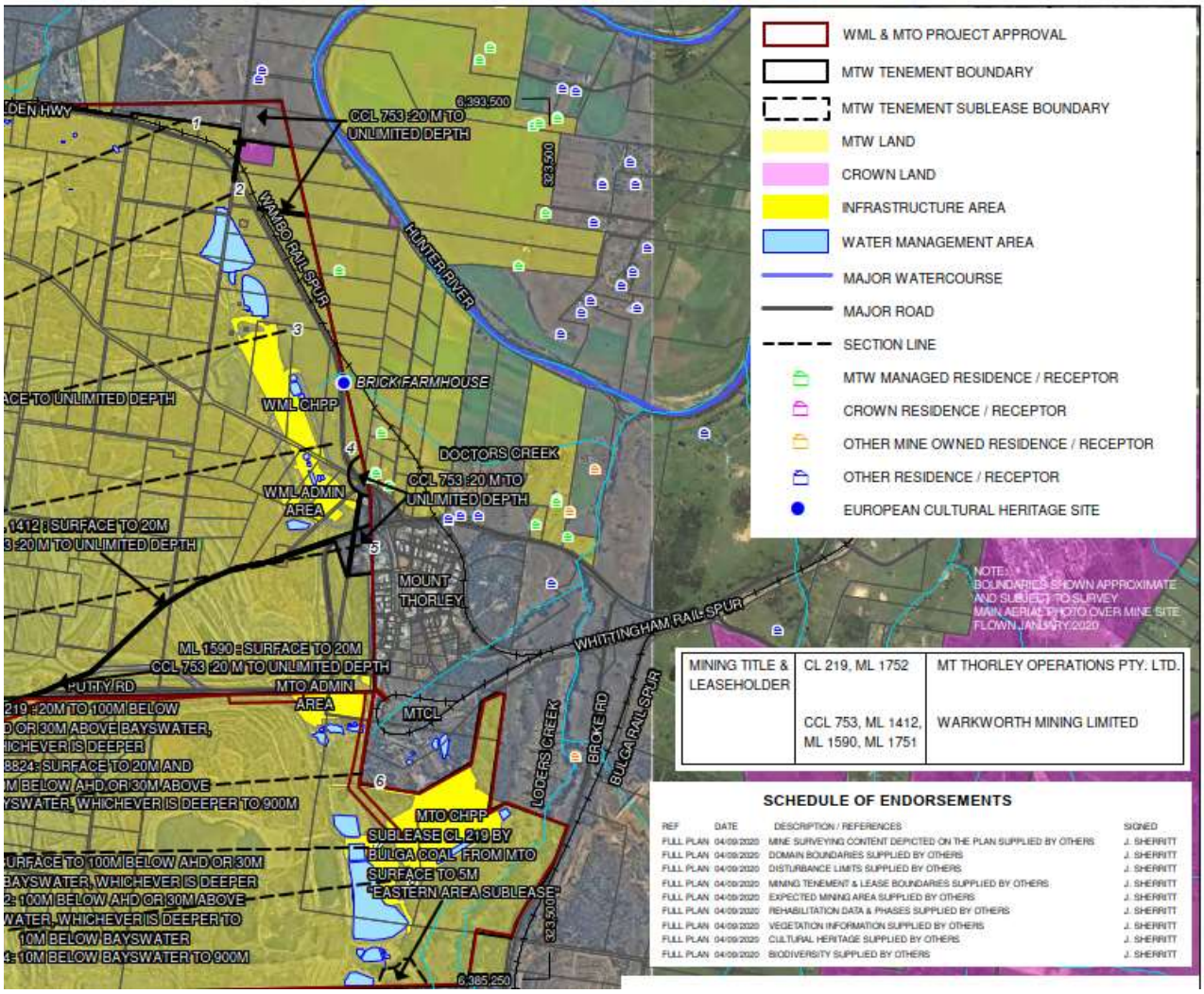

Figure 5.2 Water management area within the Mount Thorley Warkworth mine (sourced from Yancoal Australia, November 2020)

The Northern Dam of the Bulga Coal Mine falls within the HTP corridor. The HTP corridor passes through the upgradient streams that join into the Northern Dam. The HTP corridor passes by the Coal Handling and Preparation Plant (CHPP) Surge Dam further east. Furthermore, part of the Bulga Underground Project area appears to overlap with the HTP corridor.

The HTP corridor touches the southeastern edge of the Deep Pit Tailings Dam and the Bayswater Pit of the Bulga Coal Mine (Bulga Open Cut Mining Operations Plan, SLR 2020).

5.1 Contaminants of Potential Concern

The main contaminants of potential concern associated with coal mining activities in HTP North are identified as follows:

- Salinity
- Metals and heavy metals: Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), zinc (Zn), nickel (Ni), mercury (Hg), iron (Fe), manganese (Mn), and aluminium (Al)
- High carbon material (HCM)
- Acid mine drainage

- Coal mine methane
- Petroleum hydrocarbons – Total recoverable hydrocarbons (TRH), benzene, toluene, ethyl-benzene, xylene, naphthalene (BTEXN), and poly-cyclic aromatic hydrocarbons (PAH).

The mining sites that overlap with the HTP corridor are regulated under the associated EPLs (refer to Table 5.1) where relevant environmental performance indicators are monitored regularly. Additional monitoring and environmental management will be required for the project, primarily targeting areas of planned disturbance and relevant sensitive receptors.

5.1.1 Salinity

Parnell Creek's dam of the Hunter Valley Operations (HVO) North Site was noted to be a saline water dam. Salinity may present a construction risk to building materials if not managed appropriately. Saline waters, when introduced to the environment can have impacts to the flora and fauna in the receiving environments, particularly on sensitive freshwater ecosystems.

5.1.2 Metals and heavy metals

Mine sites may have elevated levels of naturally occurring metals or heavy metals. When these materials are disturbed and processed, the risk of leachability and associated health or environmental impacts may increase associated with toxicity (based on their concentrations) and, for some metals, bioaccumulation. The HTP corridor passes through various areas where legacy and current tailing dams, pits or overburden areas are located. Materials with elevated levels of metals and heavy metals will require management (where disturbed) during the construction of the project.

5.1.3 HCM

There is a higher likelihood of encountering HCM at areas of coal mining operations and TSF areas noted throughout the HTP corridor. HCM has the potential for combustion. When combustion occurs, it can be difficult to control and remediate and the combustion may extend to larger areas. Therefore, careful management will be required to avoid combustion of HCM. It should be noted the combustion may occur spontaneously in HCM (when HCM is exposed to oxygen during earthworks). Potential HCM cannot be used as fill material at the surface level and needs to be appropriately capped. A specific survey is required to delineate areas were potential HCM are likely to be present.

5.1.4 Acid mine drainage

Acid rock drainage occurs naturally within some environments as part of the rock weathering process but is exacerbated by large-scale earth disturbances characteristic of mining. In some mines, the liquid that drains from coal stocks, coal handling facilities, coal washeries, and coal waste tips can be highly acidic, and in such cases needs to be treated as acid rock drainage. This liquid often contains highly toxic metals, such as copper or iron. These, combined with reduced pH, can have a detrimental impact on the aquatic environment.

5.1.5 Coal mine methane

Coal mine methane refers to methane released from the coal and surrounding rock strata due to mining activities. In underground mines, coal mine methane can create an explosion hazard for miners, so it is actively removed by ventilation systems. Underground mining operations were identified within the HTP corridor, where it overlaps with the Bulga Underground Project area.

5.1.6 Petroleum hydrocarbons

Mining facilities, workshop areas, and equipment are sources of potential petroleum hydrocarbon related pollution. The likelihood of encountering petroleum hydrocarbon impacted soils is higher where equipment storage, petroleum storage or workshops are encountered within the HTP corridor.

Table 5.1: Mining and Exploration Titles within the vicinity of the contamination study area

Mining and Exploration Title	Type of Title	Area of operation	EPL
ML 1674	Mining Lease	Bulga Coal Management Pty Ltd	-
ML 1494	Mining Lease	SAXONVALE COAL PTY. LIMITED; NIPPON STEEL AUSTRALIA PTY. LIMITED	-
ML 1547	Mining Lease	Bulga Coal Management Pty Ltd	EPL 563 - BCC
CL 224	Coal Lease	SAXONVALE COAL PTY. LIMITED; NIPPON STEEL AUSTRALIA PTY. LIMITED	EPL 563 - BCC
ML 1788	Mining Lease	Bulga Coal Management Pty Ltd	EPL 563 - BCC
ML 1717	Mining Lease	Bulga Coal Management Pty Ltd	EPL 563 - BCC
CL 219	Coal Lease	MOUNT THORLEY OPERATIONS PTY LIMITED	EPL 1976 - MTO
ML 1828	Mining Lease	MOUNT THORLEY OPERATIONS PTY LIMITED	-
CCL 753	Consolidation Coal Lease	WARKWORTH MINING LTD	EPL 1376 - WCM
ML 1412	Mining Lease	WARKWORTH MINING LTD	EPL 1376 - WCM
ML 1734	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	-
CCL 714	Consolidation Coal Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	-
ML 1634	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
CCL 755	Consolidation Coal Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
ML 1706	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
ML 1705	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
ML 1474	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
CCL 755	Consolidation Coal Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
ML 1428	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	EPL 640 - HVO
CL 360	Coal Lease	COAL & ALLIED OPERATIONS PTY LTD;	EPL 640 - HVO

Mining and Exploration Title	Type of Title	Area of operation	EPL
		ANOTERO PTY LIMITED	
CCL 746	Consolidation Coal Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	-
ML 1452	Mining Lease	COAL & ALLIED OPERATIONS PTY LTD; ANOTERO PTY LIMITED	-

6 Conclusions

A preliminary site investigation (PSI) has been prepared for the HTP. The PSA was completed to determine potential contamination sources, historical or current, which may impact the development of the HTP.

WSP has identified several general and specific areas of environmental interest (AEIs) within and adjacent to the HTP corridor. General AEI's which intersect the HTP corridor in multiple locations include:

- access tracks
- existing roadways and rail corridors
- existing transmission line infrastructure
- farm structures
- farm dams
- areas of active cropping / cleared agricultural land.

Specific AEIs are illustrated in Figure 3, Appendix A and all are within HTP North. These include (but are not limited to):

- Bayswater Power station (AEI 01) to the north of the HTP corridor
- Dyno Nobel Warkworth (AEI 02) intersecting the HTP corridor
- Enaex Australia, Mount Thorley (AEI 03) 200m west of the HTP corridor
- Dyno Nobel Mount Thorley (AEI 04) within the HTP corridor
- Mushroom Composter (AEI 05) approximately 400m west of the HTP corridor
- Singleton Military Area (AEI 06) intersecting the HTP corridor
- Mining lease areas (several) intersecting/within the HTP corridor.

Based on the findings of this PSI, WSP conclude that contamination is likely present within the HTP corridor in HTP North and intrusive investigations (including site inspections) of potential AEI's is needed to inform the detailed design of the HTP.

Mitigation and managements measures will be outlined in the Environmental Impact Statement which will include:

- detailed inspections of properties (particularly for hazardous materials), and further management where structures will need to be demolished and decommissioning of any tanks (UST/AST) ahead of construction (where identified)
- protocols for the effective management of contaminated soil and water (where identified)
- implementation of an unexpected finds protocol during construction.

7 References

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- NSW Government, SIX Maps, https://maps.six.nsw.gov.au/ (accessed March 2024).

Appendix A

Site Figure

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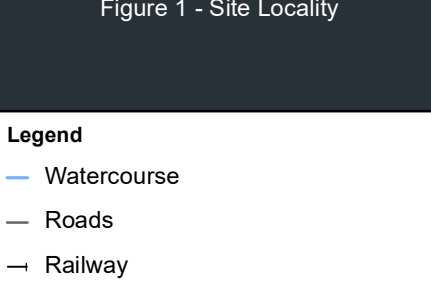
Hunter Transmission Project

Figure 1 - Site Locality

Legend

- Watercourse
- Roads
- Railway
- Watercourse
- HTP Scoping Report Corridor
- Waterbody



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Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

GDA 2020

1:330,000 Date: 19/04/2024

Data sources: DELWP, Geoscience Australia

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Hunter Transmission Project

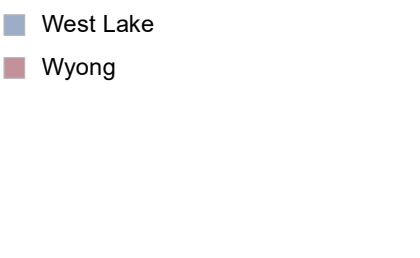
FIgure 2 - Mine Subsidence

Legend

- Roads
- Watercourse
- Railway
- HTP Scoping Report Corridor
- Waterbody

Mine Subsidence Districts

- Bellbird-Millfield
- Black Hill
- Branxton
- East Maitland
- Greta
- Hue Hue
- Killingworth-Wallsend
- Lake Macquarie
- Lake Macquaire No 1 Extension
- Louth Park
- Maitland West
- Mandalong
- Mitchells Flat
- Muswell Brook
- Patrick Plains
- Swansea North Entrance
- Tomalpin
- West Lake
- Wyong



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Data sources: DELWP, Geoscience Australia

AEI 01 - Bayswater Power Station

AEI 02 - Dyno Nobel Warkworth

AEI 03 - Enaex Australia, Mount Thorley

AEI 04 - Dyno Nobel, Mount Thorley

AEI 05 - Mushroom Composters Pty Ltd

AEI 06 - Singleton Military Area

Hunter Valley Operations (HVO) North Site Tailings Storage Facility

Bulga Coal Mine Deep Pit tailings dam and Bayswater Pit

Mount Thorley Warwick Mine Water Management Area

EDDERTON
MERRIWA ROAD
DENMAN ROAD
LIDDELL
NEW ENGLAND HIGHWAY
RAVENSWORTH STATE FOREST
HOWICK
RAVENSWORTH
GRESFORD
GOLDEN HIGHWAY
PAGAN STREET
LEMINGTON
VACY
JERRYS PLAINS ROAD
SINGLETON
PUTTY ROAD
UFFINGTON STATE FOREST
TOCAL
NEW ENGLAND HIGHWAY
WOLLEMI NATIONAL PARK
BULGA
SINGLETON MILITARY AREA
BRANXTON
HIGH STREET
ROTHBURY
BROKE
MAITLAND
HUNTER EXPRESSWAY
PUTTY STATE FOREST
KURRI KURRI
POKOLBIN STATE FOREST
ABERDARE STATE FOREST
PAYNES CROSSING
PACIFIC MOTORWAY
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HEATON STATE FOREST
YANGO STATE FOREST
CORRABARE STATE FOREST
WOLLOMBI
WAKEFIELD
CITY ROAD
CORRABARE
AWABA STATE FOREST
YANGO NATIONAL PARK
WATAGANS NATIONAL PARK
OLNEY STATE FOREST
YENGO
AWABA
WATAGAN STATE FOREST
MARTINSVILLE
ERARING
OLNEY
DORA CREEK
MORISSET
F3 FREEWAY
PACIFIC HIGHWAY
MANDALONG
PACIFIC HIGHWAY

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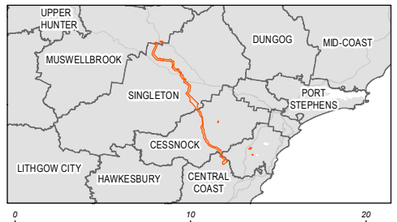
Hunter Transmission Project

Figure 3 - Areas of Environmental Interest

Legend

- Notable Mine Infrastructure within HTP Corridor
- Area of Environmental Interest
- Watercourse
- Roads
- Railway
- HTP Scoping Report Corridor
- Construction Support Site
- State Forest
- NPWS Estate



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Data sources: DELWP, Geoscience Australia, NSWSS