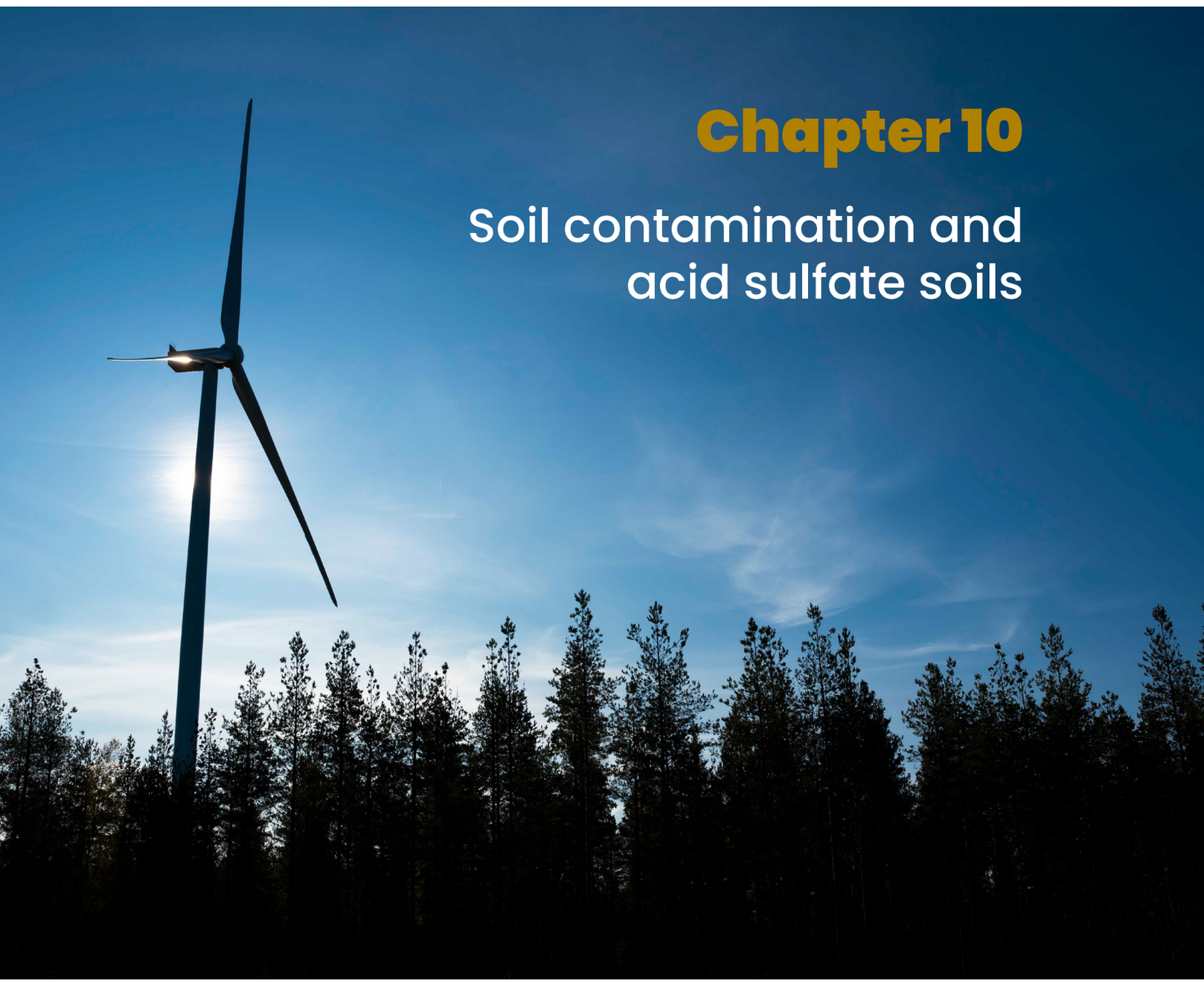


Chapter 10

Soil contamination and acid sulfate soils

Acknowledgement of Country

Neoen Australia acknowledges the traditional custodians of the land in which we live, and pays its respects to their elders, past and present. The Gunditjmara are the original custodians of the Country on which the Project is located and we acknowledge them as the original custodians. We are committed to Aboriginal engagement and reconciliation and aim to bring Aboriginal and Torres Strait Islander people, local communities and the councils along for the journey to strengthen relationships and enhance local community outcomes.

Disclaimer

10 Soil contamination and acid sulfate soils

This chapter describes the potential impacts associated with disturbance of contaminated soil, contaminated groundwater, and acid sulfate soils (ASS) during construction, operation, and decommissioning of the Project, as well as the mitigation measures proposed to avoid, minimise and manage potential adverse impacts.

This chapter summarises the outcomes of the **Environmental Site Investigation (Appendix I)** undertaken for the Project.

10.1 Overview

Construction activities have the potential to disturb contaminated soils, contaminated groundwater and/or ASS (naturally occurring sediments that can produce acid when disturbed) which could result in the mobilisation of contaminants and acid leachate, and adversely impact on the environmental values of soil, groundwater and/or groundwater users.

Contamination of soils and groundwater can occur through particular land practices that use chemicals or produce waste, such as mining, industrial and agricultural land uses. Coastal acid sulfate soils (CASS) occur naturally in many parts of Victoria's coastal zone, including Portland, and are largely benign if left undisturbed. However, if disturbed they can react with oxygen and produce sulfuric acid which can result in the acidification of water and soil, de-oxygenation of water, and reduced water quality.

Due to existing and historical land uses within the Project Area, there is a low potential for contaminated soil to be encountered during the construction works, such as through excavation of turbine foundations and the quarry. Potential impacts due to the disturbance of ASS would be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. However, would be managed through a detailed ASS management plan. Groundwater contamination is not expected to be present within majority of the study area (see **Section 10.4.1**). However, groundwater extracted near TP05 (Test Pit 05) and within the pine planation would be tested before discharging or taken off-site for disposal.

There would be limited potential for contamination to occur during Project activities. Material with the potential to cause contamination would be limited to fuels for vehicles and plant (used for construction, maintenance and decommissioning activities), and oil in transformers at the electrical substations. All machinery and vehicles would be refuelled from mobile, vehicle-mounted compliant fuel tanks rather than stationary tanks. It is not currently anticipated that any fuels or chemicals would be stored on-site for any component of the Project (wind farm, quarry or transmission line). However, if detailed design determines that on-site storage of these materials is required, they will be stored in suitable containers and on hardstand floors (e.g. shipping containers, concrete), within a bunded area that is protected from stormwater incursion. Spill kits will also be located with the mobile refuelling tanks and at any storage sites.

Construction of the transmission line through Cobboboonee National Park would aim to minimise the amount of spoil created and removed, and re-use spoil where possible to minimise waste. Spoil management and control measures will be implemented and included in the Project's Construction Environmental Management Plan (CEMP), to manage duties and obligations associated with waste/spoils under the *Environment Protection Act 2017* (Vic) (EP Act) to minimise risk of harm.

10.2 EES evaluation objective

The specific environmental matters to be investigated and documented in the Project's EES are set out in the *Scoping Requirements for Kentbruck Green Power Hub Environment Effects Statement* (Scoping Requirements). The Scoping Requirements provide evaluation objectives that describe the desired outcomes to be achieved for each of the matters being addressed in this EES.

The following draft evaluation objective is relevant for the contamination and ASS impact assessment:

> ***Catchment values and hydrology –*** *To maintain the functions and values of aquatic environments, surface water and groundwater quality and stream flows and prevent adverse effects on protected beneficial uses.*

This chapter and **Environmental Site Investigation** (**Appendix I**) address the Project's specific contamination and ASS matters in response to the Scoping Requirements. Groundwater quality is addressed in **Chapter 9** ***Surface water, groundwater and groundwater dependent ecosystems.***

10.3 Assessment methodology

The following approach was undertaken for the contamination and ASS impact assessment:

- Established the study area and characterised the existing conditions relevant to contamination and ASS across the study area, including current and previous land uses.
- Conducted a Preliminary Site Investigation (PSI) involving:
    - A preliminary assessment of the potential for ASS in general accordance with the *'Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils'* (Department of Sustainability and Environment, October 2010) including:
        - A desktop review of relevant baseline reports, publicly available information and databases including the Australian Soil Resource Information System (ASRIS); geological maps; the Victorian Coastal Acid Sulfate Soils Strategy and information provided by landowners.
        - A site walkover to assess visible signs of ASS, including jarostic material, water-logged areas, rotten egg gas, swampy vegetation and scalded land.
    - Conducted a preliminary assessment of the potential for contamination of land including:
        - A desktop review of current and recent land use by reviewing historical aerial photographs (approximately one photo per 10–15 years, 1960s to present).
        - Interviews with landowners/land managers to discuss historic and current usage, including chemical storage and application, landfilling, etc.
        - A site walkover to identify potential sources of contamination and potential contaminants, such as from herbicide or pesticide use, sheep dips, or waste burial.
- Conducted a Detailed Site Investigation (DSI) comprising the following field investigation program in May and October 2021:
    - Excavation of 16 test pits across the study area and collection of samples from each test pit. Test pits were advanced down to a maximum depth of 5 m below ground surface (mbgs) in turbine locations and 2 mbgs along the transmission line corridor. No test pits were excavated within the proposed quarry work area.
    - Samples were generally collected at the surface and 0.5 m intervals to the depth of test pit. Test pits were developed across the study area in a grid pattern within the wind farm site and at a density of approximately one test pit per 2-6 km along the transmission line corridor, to assess the potential for widespread/regional contamination of soil, based on the largely rural setting. Assessment of ASS was completed at a density of one test pit per 10 km.
    - Groundwater samples were collected from seven monitoring wells installed as part of the Groundwater Impact Assessment (MW02, MW04, MW06, MW08 and MW10-MW12) (see **Chapter 9** ***Surface water, groundwater and groundwater dependent ecosystems).***
- Analysed soil and groundwater samples for the presence of contamination and ASS.
- Identification and assessment of potential impacts from disturbance of contamination and ASS due to construction and operation of the Project.
- Development of measures to avoid, minimise and manage potential impacts.
- Assessment of residual impacts from contamination and ASS with the implementation of mitigation measures.

10.4 Existing conditions

10.4.1 Study area

The study area for the contamination and ASS impact assessment includes the wind farm site boundary plus 100 m buffer zone and the underground transmission line to Heywood Terminal Station plus 100 m buffer zone (see **Figure 10.1**). This buffer is considered adequate to capture existing conditions that may affect and be affected by Project activities and infrastructure.

It should be noted that the study area in the **Environmental Site Investigation (Appendix I**) was based on the original Project layout which comprised 157 turbines. As discussed in **Chapter 4** ***Project development,*** the Project Area and design have been progressively updated throughout the EES process to minimise potential environmental and social impacts of the Project. The Project Area now covers a smaller area and comprises 105 turbines, as described in **Chapter 3** (**Volume 1**). The contamination and ASS impact assessment study area includes this Project Area.

10.4.2 Topography and local geology

Ground elevation within the wind farm study area mostly ranges from approximately 20 m (Australian Height Datum) AHD to 60 mAHD from south to north, while the eastern portion of the wind farm study area (within the farmland) rises to a higher elevation of approximately 130 mAHD. Elevation within the transmission line study area is generally within 80 and 100 mAHD.

Geological characteristics of the study area predominantly consist of various quaternary age sediments, extrusive basalts and minor scoria (see **Figure 10.1).** Largely present within the wind farm site are aeolian (wind blown), calcareous dunes and dune limestone which overly upper mid-tertiary limestone. Some coastal dunes and minor swamp deposits are present directly to the south of the wind farm study area. In the east of the study area, surface geology comprises mostly extrusive basalts of the Quaternary (Holocene) Newer Volcanics, with some inland dunal sands and swamp deposits.

10.4.3 Land uses

Aerial imagery of the study area indicates that land use within the study area has been consistent with existing land uses for decades. The commercial pine plantation has been under operation since at least 1972, with the western section (west of the existing quarry) used for plantation since at least 1967. Farmland within the eastern section of the wind farm study area (east of Portland-Nelson Road) has been cleared since at least 1967. Cobboboonee National Park and Cobboboonee Forest Park (the Parks) have been much the same since 1967, as has the farmland east of Cobboboonee Forest Park near Heywood Terminal Station. Clearing had commenced within the Heywood Terminal Station area by 1972, with the Terminal Station and connecting transmission lines constructed by 1992.

Existing land uses within the study area include agriculture for grazing purposes, plantation and commercial forestry, and public reserves (the Parks). Land uses surrounding the study area include commercial forestry, agriculture, and public reserves including Discovery Bay Coastal Park, Lower Glenelg National Park, and the Parks.

Agricultural land uses (grazing or forestry) are generally considered to represent a low risk of contamination but may include point sources such as burial of wastes and sheep dips or broadacre contamination sources such as fertiliser, herbicide or pesticide use. Discussions with landowners revealed that waste burial and sheep dips are unlikely to represent a risk to the Project, except for the former sheep dip located near TP05 (see **Figure 10.1**). This area was assessed further in the DSI, as discussed in **Section 10.4.4**.

Broadacre application of fertilisers, pesticides or herbicides may result in contamination of soil and groundwater, although in general are low risk given that the compounds would already be present within surface soil and be available to leach. This has been addressed further in the DSI in **Section 10.4.4**.

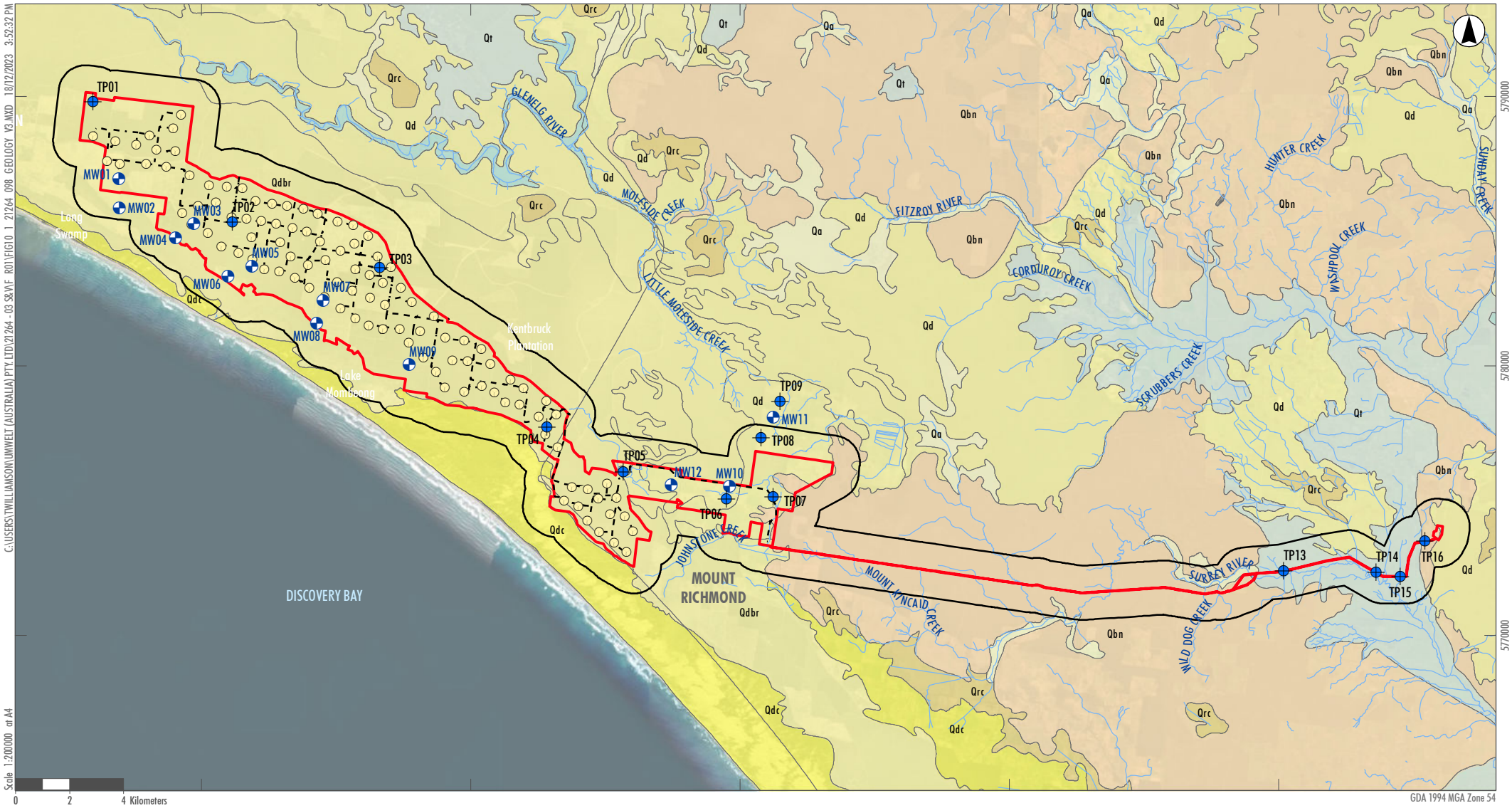
10.4.4 Contamination

As discussed in **Section 10.4.3**, the overall potential for contamination within the study area is considered to be limited. However, analysis of soil and groundwater was undertaken as part of a DSI to confirm whether any contamination is present in the study area from existing and/or historical land uses.

No visual, olfactory (odorous) or gaseous indicators of contamination were observed during excavation of the 16 test pits. A total of 111 samples were collected from the test pits for further analysis in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM). Below is a summary of the test results which exceeded the adopted criteria:

- The concentration of total recoverable hydrocarbons (TRH) in TP09 (pine plantation) was 330 mg/kg and exceeded the adopted criteria of 300 mg/kg. However, no point sources of contamination were identified in proximity to TP09. Laboratory analysis of the sample determined that the TRH was from weathered fuels or naturally occurring organic matter. Based on the lower risk profile associated with these materials, the IL was adjusted by a factor of two, and the TRH concentration was well below the criteria and is therefore not considered likely to present a risk to the ecology of the area.
- Soil samples from across the study area had a pH 7 on average in sandy areas and pH 6 in clay areas, both within the adopted background investigation level of pH 6-8. However, the pH did vary within samples (e.g. a pH of 3.4 was measured at TP05 and pH of 4.8 at TP14), but this was considered to relate to ASS or naturally occurring background conditions and is therefore not considered contamination.
    - A pH value of 4 or less is considered to be a Prescribed Industrial Waste under the (EP Act). The pH of 3.4 at TP05 is outside this range and could therefore be classified as Priority Waste Category C material (for offside disposal). However, these low pH values are considered to be naturally occurring in soils which would not alter the disposal category of the material, although it must be disposed of in accordance with ASS guidelines (see **Section 10.8**).

- Arsenic was encountered in three test pits above the EPA Victoria Publication 1828.2 upper limit for fill material (TP03, TP14 and TP15). The three samples were from three different parcels of land, including one within pine plantation and two within farmland east of Cobboboonee Forest Park in the transmission line corridor. It is unlikely that the arsenic would relate to herbicide or pesticides which are used on a limited basis only (and were not reported by the plantation manager to be arsenic based). The arsenic is therefore considered to be naturally occurring but may require further testing prior to off-site disposal.
- Within the Parks, some concentrations of heavy metals (nickel and total chromium) were found to exceed the adopted criteria. Nickel and chromium were identified within all test pit locations within the reserves, in both surficial and natural undisturbed soil. There are no known potential sources of metals within the reserves and the measured concentrations are therefore likely to be naturally occurring. Nickel and chromium are known to be naturally present in soils generated from the Newer Volcanics formation.
    - The concentration of nickel exceeds the upper fill material criteria of EPA Victoria Publication 1828.2 *Waste disposal categories – characteristics and thresholds* (EPA Victoria, 2021) and may be classified as Category C for off-site disposal. It is considered that soils should be able to be reclassified by Environment Protection Authority Victoria (EPA) Victoria as fill material given the natural background nature of the nickel. This would require a designation application to be made to EPA Victoria.



Legend

- Wind Farm Site
- Contamination and ASS Study Area
- Turbines
- Test Pits
- Monitoring Well
- Internal Access Roads
- Watercourses

Surface Lithology

Cainozoic

- Czipc - Port Campbell Limestone, Marine calcarenite, marl

Quaternary

- Qa - Alluvium 38485, Channel and flood plain alluvium; gravel, sand, silt, day
- Qdbr - Bridgewater Formation, Poorly consolidated yellow pinkish-brown fine to coarse fossiliferous calcareous sand, calcarenite. Locally capped by calcrete. As coastal beach and associated aeolian dune. Forms stranded series of elongated beach ridges, subpar
- Qd - Dunes 38496, Dunes, sandplain with dunes; may include numerous interdune claypans
- Qbn - Cinder cones - scoria, minor ash and agglutinates; Lava flows - tholeiitic to minor alkaline and basanitic lavas
- Qdc - Coastal Dunes 38488, Quaternary coastal dunes, beach ridge, barrier beach, foredune and shoreface sands
- Qrc - Colluvium 38491, Colluvium and/or residual deposits, talus, scree, sheet wash; boulder, gravel, sand; may include minor alluvial or sand plain deposits
- Qt - Lake deposits 38492, Lake and swamp deposits; mud, silt, evaporites, limestone, minor sand

Image Source: ESRI Basemap (2023) Data source: DELWP (2023); Geoscience Australia (2023)

FIGURE 10.1

Surface Geology, Contamination and ASS IA Study Area and Test Pit and Groundwater Monitoring Well Locations

10.4.5 Acid sulfate soils

10.4.5.1 Preliminary site investigation

A desktop review of the Victorian Coastal Acid Sulfate Soil (VCASS) maps for Nelson and Portland shows that CASS has the potential to occur in land extending east of Nelson towards Cape Bridgewater. The mapping indicates that the entire study area intersects the CASS risk area and is mapped as land where there is a potential or prospect of encountering sulfidic or sulfuric material.

A site walkover was undertaken throughout the study area to identify signs of actual ASS (AASS) or potential ASS (PASS), such as swamps, low lying areas, scalded land, damage to concrete or in situ infrastructure, jarositic material, clear or milky blue water, or waterlogged soils. The site walkover did not include every turbine location within the pine plantation (most of which are not accessible by vehicle) but did cover the internal roads to allow an assessment of different landforms and conditions. As not all farm properties were accessible for this investigation, observations were made from public access ways where no access was granted during the site visit.

No signs of AASS or PASS were found in pine plantation within the wind farm study area, but land within the farmland in the eastern portion of the wind farm study area was swampy with a very shallow groundwater table. Drains have been installed in this area to lower the water table. No swampy vegetation or scalded areas were observed.

No signs of jarositic material or iron staining were observed within the Parks. Groundwater was found to be relatively shallow (approximately 2–3 mbgs), becoming swampy towards the eastern end of the reserves. Land within the transmission line corridor in farmland east of Cobboboonee Forest Park is low-lying, particularly near the Surrey River, with drains visible in the area for lowering the water table. Shallow groundwater was less evident east of the Princes Highway in proximity to the Heywood Terminal Station where the land rises.

Most of the turbines would be located on land consisting of aeolian calcarenite deposits and not within the low-lying swamp deposits located closer to the coast. Calcarenite deposits are not considered to represent a risk of ASS given their capacity for neutralising any acid generation. Any aeolian deposits would likely have also been oxidised during placement. Site observations supported these assumptions.

Similarly, the residual basaltic soils which have been generated from weathering of the Newer Volcanics basalt within the Parks, are neither a CASS nor are they considered to be high in pyrite or other sulfides.

The organic alluvial soils located within the low-lying farmland areas in the eastern section of the wind farm study area and the transmission line corridor east of Cobboboonee Forest Park (near the Surrey River) are considered to represent a higher risk of ASS, although no direct evidence of ASS was observed during the site walkover.

10.4.5.2 Detailed site investigation

Samples were collected for ASS analysis targeting major geological units within the wind farm and transmission line study areas which are considered to have the potential to generate acid leachate, including Quaternary aged dunes, alluvium, and aeolian and swamp deposits. Samples were collected at a frequency sufficient to identify whether ASS is likely to be encountered in the study area and if management is required.

Field pH testing determined that 34 % of the 96 tested samples contained AASS and 24 % contained PASS, while the remaining 42 % of samples had a limited ability to generate acid or were uncertain ASS. Further laboratory analysis was undertaken using 23 samples from ten sampling locations. A total of 14 samples across nine locations had net acidity concentrations above the action criteria for ASS management and of the 14 samples six of the samples were classified as AASS and four were classified as PASS.

The remaining four samples were classified as ‘acidic soils’ where the acidity is unlikely to be sulfidic in nature. The source of this acidity was unclear with no visual evidence of reportable jarosite and very low levels of reportable acidity. These materials should not be treated as if they were ASS materials, as the liming of naturally acidic ecosystems could lead to alkaline environments resulting in severe ecological damage to the organisms that rely on the naturally occurring acidity.

As such, ASS management is needed for 10 of the 14 samples. These samples were taken from TP05-09 and TP13 within the eastern farmland sections of the wind farm study area and the transmission line study area (see **Figure 10.1**). Groundwater in the measuring wells within the eastern area of the wind farm study area (MW10-MW12) were found to have a low pH (pH 4–5) that may be representative of impacts associated with ASS (see **Chapter 9** ***Surface water, groundwater and groundwater dependent ecosystems*** for further information).

10.4.6 Peat

Peat is the surface organic layer of a soil that comprises partially decomposed organic matter. This organic matter is usually derived from plant material that has accumulated under conditions of waterlogging, oxygen deficiency, high acidity and nutrient deficiency.

Due to its high organic matter content, peat has a high carbon content and is naturally porous. When dry, peat areas are highly vulnerable to ignition and the resulting fires are extremely difficult to extinguish without re-establishing natural groundwater levels.

Peaty material was observed in TP07 in the north-eastern corner of the wind farm site, in the low-lying areas of farmland east of Portland-Nelson Road (see **Figure 10.1).** This area may therefore have specific fire mitigation requirements depending upon the proximity of excavation activities to peat deposits. Bushfire risk is discussed further in **Chapter 18** ***Safety, hazard and risk****,* with mitigation measures provided in **Section 10.8** (see mitigation measure MM-CA06).

10.4.7 Environmental values

Under Section 93 of the EP Act, the Environment Reference Standard (ERS) identifies environmental values that need to be achieved and maintained and provides a method to assess those environmental values in locations across Victoria.

The ERS divides the land environment across Victoria into five different environmental values, each of which are applicable to different land use categories as defined in the ERS. The relevant land use categories to the study area are parks and reserves, agricultural and industrial. The environmental values applicable to these land use categories are identified in **Table 10.1**.

The groundwater environmental values relevant to the Project Area are outlined in Section 9.5.5 of **Chapter 9** ***Surface water, groundwater, and groundwater dependent ecosystems*****.**

Table 10.1: Land environmental values

Environmental value		Land use category		
		Parks and reserves	Agricultural	Industrial
Land dependent ecosystems and species	Natural ecosystems	✓		
	Modified ecosystems	✓	✓	
	Highly modified ecosystems		✓	✓
Human health		✓	✓	✓
Buildings and structures		✓	✓	✓
Aesthetics		✓		
Production of food, flora and fibre		✓	✓	

10.5 Construction impacts

10.5.1 Contamination

Due to existing and historical land uses within the Project Area, there is a low potential for contaminated soil to be encountered during the construction works, such as through excavation of turbine foundations or the quarry. There are also no specific contamination risks associated with the quarry. Detailed field investigations found no soil contaminants above laboratory limits of reporting or relevant guidelines. No human health or environmental protective measures are therefore required.

Soil sampling density for the field investigation did not comply with EPA Victoria Publication IWRG702 *Soil Sampling* as the site investigation was undertaken to indicate the potential for soil contamination to be present within the study area, and not for the purpose of determining off-site soil reuse, treatment, or disposal measures. If soils are to be transported offsite for reuse, treatment or disposal, soil sampling will be undertaken in accordance with IWRG702 *Soil Sampling* to ensure the appropriate hazard categorisation is applied (see mitigation measure MM-CA01).

There is potential for construction works to encounter unknown contamination (including asbestos); however, based on the site history and field investigation results, it is considered unlikely that unknown contamination would be encountered that could result in a long-term and irreversible impacts on human health and the environment. In the event that unknown contamination is uncovered during Project construction, ground disturbing works at the identified location and within the immediate vicinity would cease and the area would be isolated. An experienced environmental or health and safety practitioner would assess the unknown material and dispose of, or treat, the material appropriately. The degree of site contamination would then be assessed in accordance with EPA guidelines and the need for appropriate remedial action would be determined and implemented if required (see mitigation measure MM-CA02).

The potential impact on human health and the environment from existing contaminated soils is considered to be minor.

There would be limited potential for contamination to occur during Project construction activities. No hazardous materials would be involved in Project construction. Material with the potential to cause contamination would be limited to fuels for vehicles and plant, and oil in transformers at the electrical substations. All machinery and vehicles would be refuelled from mobile, vehicle-mounted compliant fuel tanks (see mitigation measure MM-CA05). All refuelling vehicles will carry spill kits to manage any accidental spills. It is not currently anticipated that any fuels or chemicals would be stored on site for any component of the Project (wind farm, quarry or transmission line). However, if detailed design determines that on-site storage of these materials is required, they will be stored in suitable containers and on hardstand floors (e.g. shipping containers, concrete), within a bunded area that is protected from stormwater incursion (see mitigation measure MM-CA05). Spill kits would be located at these storage sites.

10.5.2 Acid sulfate soils

Potential impacts due to the disturbance of ASS would be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Construction works may result in the excavation of significant volumes (greater than 1,000 m^3) of ASS, the exposure of ASS through drilling, and the release of metals and acidity into the surrounding environment. The exposure of PASS during excavation could also allow oxidation to occur and create ASS. Long-term open excavations and stockpiling of the ASS without any treatment where it is exposed to rainfall and surface water run off can cause acidic run-off to leach into the surrounding environment.

A detailed ASS Management Plan (ASSMP) will be developed and implemented to manage ASS and any associated waters (perched, seepage, stormwater etc.) during construction in the eastern section of the wind farm site (east of Portland-Nelson Road) and in the vicinity of TP13, towards the eastern extent of the transmission line corridor. ASS management strategies to minimise impacts include avoiding or minimising disturbance of ASS and preventing oxidation, planned treatment or neutralisation of ASS and any run-off or acid leachate that might be generated, as well as potential reuse of treated ASS or disposal of ASS. Water management strategies include on-site and off-site water table management before, during, and after disturbance and the containment of any ASS run-off or acid leachates (see mitigation measure MM-CA03).

10.5.3 Spoil management

Construction of the underground transmission line through the Parks will aim to minimise the amount of spoil created and removed, and reuse spoil where possible to minimise waste. The majority of the excavated material would be reused as backfill during the cable installation process, with minor amounts of excess spoil to be spread and rolled back into the road surface where appropriate to do so, noting any excess material that would need to be removed will be taken off-site. The spoil management approach is generally consistent with Project objectives to minimise the generation of waste and off-site disposal. However, spoil management and control measures will be implemented and included in the Project CEMP, to manage duties and obligations associated with waste/spoils under the EP Act to minimise risk of harm (see mitigation measure MM-CA04).

Potential management control measures relate to the handling and stockpiling of spoil, movement and transport of spoil, as well as reuse or disposal of spoil materials. These include dust control measures during excavation and land disturbance activities, managing surface water run-off during rain events, and stockpiling of excavated material in a stable area, as far from waterways as possible and covered if necessary. In the event that off-site disposal of excavated spoil is planned, vehicles transporting waste material on-site would operate in a manner to prevent loss of materials during loading transport and unloading, and contaminated spoil would be collected and transported by an authorised/licenced waste contractor utilising the waste transport certificate scheme (see mitigation measure MM-CA04).

10.6 Operation impacts

No impacts associated with contaminated soil or ASS are expected to occur during operation of the Project.

The potential for contamination to occur during Project operation would be limited to accidental spills or leaks from fuels used in maintenance vehicles or machinery, or of oil from transformers at the electrical substations. Preventative controls will be implemented at all times, with machinery and vehicles to be refuelled from mobile, vehicle-mounted compliant fuel tanks (see mitigation measure MM-CA05). All refuelling vehicles will carry spill kits to manage any accidental spills. It is not currently anticipated that any fuels or chemicals would be stored on site for any component of the Project (wind farm, quarry or transmission line). However, if detailed design determines that on-site storage of these materials is required, they will be stored in suitable containers and on hardstand floors (e.g. shipping containers, concrete), within a bunded area that is protected from stormwater incursion (see mitigation measure MM-CA05). Spill kits would be located at these storage sites.

10.7 Decommissioning impacts

Impacts associated with the decommissioning phase of the Project would be the same as those anticipated for the construction phase of the Project and are discussed in **Section 10.5.**

10.8 Mitigation measures

Table 10.2 outlines the mitigation measures developed to avoid, minimise, and manage potential impacts from disturbance of contaminated soils and ASS from construction and operation of the Project.

Table 10.2: Contamination and ASS mitigation measures

ID	Mitigation measure	Works area	Project phase
MM-CA01	**Management of contaminated soil** If soils are to be moved offsite for reuse, treatment or disposal, soil sampling will be undertaken in accordance with the Environment Protection Authority (EPA) Victoria Publication IWRG702 *Soil Sampling* to ensure the appropriate hazard categorisation is applied. A designated application will be made to EPA Victoria to reclassify soils within Cobboboonee National Park and Forest Park where the concentration of nickel exceeds the upper fill material criteria of EPA Victoria Publication 1828.8 *Waste disposal categories – characteristics and thresholds,* as the nickel is considered to be naturally occurring background levels.	All areas	Construction and Decommissioning
MM-CA02	**Management of unknown contamination** In the event that unknown contamination is uncovered during Project construction works, the following measures will be undertaken: • Cessation of ground disturbance at the unknown contamination location and within the immediate vicinity, and isolation of the area (if required). • Assessment of the unknown material by an experienced environmental or health and safety practitioner (depending on the nature of the material) and appropriate disposal or treatment of the material. • Assessment of the site contamination in accordance with Environment Protection Authority Victoria (EPA Victoria)guidelines and determination and implementation of appropriate remedial action (if required). • Where potentially impacted waste soils are encountered they must be sampled and categorised in accordance with EPA Victoria Publications IWRG702 and 1828.2 and managed in accordance with regulations. • These measures will be outlined in the Project's Construction Environmental Management Plan.	All areas	Construction and Decommissioning

ID	Mitigation measure	Works area	Project phase

MM-CA03	**Acid Sulfate Soil Management Plan**
	A detailed Acid Sulfate Soil Management Plan (ASSMP) will be developed in conjunction with the Construction Environmental Management Plan to manage Acid sulfate soils (ASS) and any associated waters. Development of the ASSMP will be guided by the *Victorian Best Practice Guidelines for Assessing and Managing Coastal Acid Sulfate Soils* (DSE, 2010) and the National Acid Sulfate soils guidance (https://www.waterquality.gov.au/issues/acid-sulfate-soils) The ASSMP will include (but not be limited to) the following:
	• Project overview, including overview of proposed disturbance works.
	• Description of the site and environmental setting, including topography, hydrology and geology, groundwater characteristics, land use and presence of sensitive receptors.
	• Summary of the ASS investigations and assessment undertaken in the Project Area, including spatial distribution and expected occurrence of ASS associated with the Project, and potential impacts.
	• Timing of planned Project works and environmental management activities.
	• Description of the ASS management strategies that will be used to minimise impacts from the Project works, including strategies for:
	  ○ Avoiding or minimising disturbance of ASS and preventing oxidation of metal sulfides.
	  ○ Planned treatment or neutralisation of ASS and any run-off or acidic leachate that might be generated, and potential reuse of treated ASS or disposal of ASS.
	  ○ Water management, including onsite and offsite water table management before, during and after disturbance, and containment of run-off or acidic leachates.
	  ○ Treatment for reduction or neutralisation of acidity, spoil management including offsite reuse or disposal, water management, monitoring, record keeping, reporting and Environment Protection Authority Victoria (EPA Victoria) consultations and approvals.
	• Soil and water monitoring requirements, and treatment validation.
	• Reporting requirements and record keeping relating to excavation/backfill locations and volumes, treatment methods and volumes, monitoring, laboratory analysis monitoring and incidents.
	• Contingency procedures to manage potential impacts/incidents, including trigger levels, and remedial and restorative actions.
	• Consultation with relevant stakeholders and authorities and approval process associated with the ASSMP.
	• Further assessment of ASS to permit calculation of limiting rates.
	If removing and disposing of ASS offsite, either an EMP will be prepared addressing ASS and submitted to EPA Victoria for approval, or ASS will be disposed of at a lawful place that already has an EPA-approved EMP for managing ASS.
		All areas	Construction and Decommissioning

MM-CA04	**Spoil management** Management control measures relating to handling and stockpiling of spoil, movement and transport of spoil, and the reuse or disposal of spoil materials will include: • Implementation of dust control measures during excavation and land disturbance activities. These may involve minimising excavation and movement of soils in windy conditions, minimising movement of vehicles on exposed areas, and dampening down stockpile soils and vehicle tracks.	All areas	Construction

ID	Mitigation measure	Works area	Project phase

	• Managing surface run-off during or after rain events and preventing potentially contaminated stormwater or run-off from entering waterways through construction of silt fences and other measures. If generation of water is expected as part of the control measures implemented (e.g. run-off or dewatering of excavations) a Sediment, Erosion and Water Quality Management Plan (SEWQMP) will be implemented as part of the Construction Environmental Management Plan.
	• Management of unknown or unexpected contaminated wastes that may be uncovered during excavation works (see mitigation measure MM-CA02).
	• The stockpiling area for placement of excavated material will be in a stable area, as far from waterways as possible or areas subject to waterlogging or ponding. Stockpiles will be appropriately managed to prevent dust generation (via wind erosion) or stormwater run-off, in accordance with EPA Publication 1895 *Managing stockpiles.*. This will involve:
	  ○ Covering (if necessary) or spraying the stockpiles to keep the soil damp to mitigate wind erosion (dust generation).
	  ○ Construction of silt fences and other measures to capture and prevent run-off from the area.
	  ○ Establishment of exclusion zones or barriers to prevent access and contact with soil by unauthorised people.
	• Specifically in relation to spoil management associated with construction of the underground transmission line beneath Boiler Swamp Road, excess spoil that needs to be removed would initially be laid on tarpaulins at existing road intersections within the Parks (where no impact to native vegetation would occur), then transported at the end of each day to either an agreed location within the Parks (identified in consultation with DEECA and Parks Victoria), or if no location within the Parks is identified, to an offsite laydown areas to be reused elsewhere for wind farm construction or offsite disposal at an appropriate licensed facility. Disposal locations would be identified in the CEMP to be prepared in consultation with relevant authorities.
	• Stockpiling of excavated materials in designated areas until the material is reinstated to the excavation as backfill (if appropriate to do so).
	• Stockpiling for an extended period of time will be avoided in order to mitigate potential environmental impacts such as dust and odour generation and stormwater and sediment run-off. The timing and methodology of backfill will be carefully considered. Subsequent compaction of backfill will reinstate a finished trafficable surface.
	• Contaminated or potentially contaminated soil and excavated materials will be stockpiled separately to non-odorous and visibly 'clean' soils, on hardstand or high-density polyethylene sheeting, and considered as contaminated until the contamination status is assessed by sampling and analysis of the stockpiled material for offsite disposal. Contamination assessment will be undertaken by a suitably experienced environmental practitioner. Exposure to contaminated spoils will be minimised as described above (e.g. covering, exclusion zones, and silt fences).
	• In the event that offsite disposal of excavated spoils is planned (e.g. spoils are not considered appropriate for reuse, or surplus spoils remain):
	  ○ Stockpiles will be sampled and analysed for waste characterisation and categorisation purposes in accordance with EPA Victoria IWRG702 *Soil Sampling* prior to removal from site.
	  ○ Contaminated spoil must be collected and transported by an authorised/licenced waste contractor utilising the Waste Tracker scheme.		

ID	Mitigation measure	Works area	Project phase
	○ Vehicles transporting waste material onsite will operate in a manner to prevent loss of materials during loading, transport and unloading activities. Odorous waste must be covered during transportation. Records of excavated soil and stockpile movements, including (but not limited to) the location of materials excavated, quantities, descriptions of materials encountered, laboratory test certificates, waste assessment and categorisation reports, disposal location, and waste receipts (from the waste transporter), will be maintained by the site owner and operator through the Waste Tracker system.		
MM-CA05	**Contamination management** The Construction Environmental Management Plan will set out the controls for the transportation, storage and management of fuels and any chemicals to be used during construction, maintenance and decommissioning of the Project. This will include but not be limited to: • Maintenance of oil leaks and servicing of operational fluid will take place prior to equipment delivery to site. Any greasing of machinery or minor or emergency servicing that cannot be undertaken off-site will be carried out in a designated area that has an impermeable drained and bunded floor which can collect hydrocarbons/solvents, wastewater or other liquids, preventing soil and water contamination on and off site. • Any spillage or leakage and resultant contaminated soil (if any) will be removed and disposed of using approved waste management providers as soon as practicable. • Any fuel, oil and other chemicals that are to be stored on site will be stored in suitable containers and on hardstand floors (e.g. shipping containers, concrete) contained within a bunded area, protected from stormwater incursion. Spill kits will be located in accessible areas near where any hazardous substances or chemicals are securely stored and/or used, and in mobile fuel refuelling vehicles.	All areas	Construction
MM-CA06	**Pre-construction peat-assessment** Once locations of the turbines and other infrastructure have been finalised, a pre-construction peat assessment will be undertaken to determine whether peat exists in proposed excavation areas (e.g. for turbines, substations and underground reticulation) and whether specific fire mitigation measures are required. This peat assessment will be limited to low-lying high risk areas of the Project Area where excavation is required, in farmland in the wind farm site east of Portland-Nelson, and within farmland in the transmission line corridor east of Cobboboonee Forest Park. These high risk areas have been identified through the **Environmental Site Investigation (Appendix** I) and are summarised in **Chapter 10 *Soil contamination and acid sulfate soils.*** The peat assessment will build upon the work already done to confirm the low-lying areas that would be of higher risk of peat occurrence. Test pitting will be done in areas where infrastructure is proposed within these high risk areas to confirm the presence of peat. If peat is found in areas to be excavated, this will trigger implementation of the Peat Management Plan, which will be developed as part of the Construction Environmental Management Plan. The Peat Management Plan will detail the safe work practices to be implemented when working in areas with peat and the remediation works required if these areas are to be disturbed.	All areas	Construction

10.9 Conclusion

Detailed field investigations, involving broadly spaced intrusive investigations, did not find any soil contaminant concentrations above laboratory limits of reporting or relevant guidelines. This is supported by the low potential for soil contamination associated with existing and historical land uses within the Project Area. It is considered unlikely that unknown contamination would be encountered during Project construction that could result in a long-term and irreversible impacts on human health and the environment. The potential impact on human health and the environment from contaminated soils is therefore not considered to be significant. The CEMP will include an unexpected finds protocol that details the procedures to be implemented if any unexpected contamination is found during construction.

Potential impacts due to the disturbance of ASS would be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Construction works may result in the excavation of significant volumes (greater than 1,000 m^3) of ASS, the exposure of ASS through drilling, and the release of metals and acidity into the surrounding environment. The exposure of PASS during excavation could also allow oxidation to occur and create ASS. A detailed ASSMP will be developed and implemented to manage ASS and any associated waters.

There would be limited potential for contamination to occur during Project activities. No hazardous materials would be involved in Project construction. Material with the potential to cause contamination would be limited to fuels for vehicles and plant, and oil in transformers at the electrical substations. All machinery and vehicles would be refuelled from mobile, vehicle-mounted compliant fuel tanks rather than stationary tanks. It is not currently anticipated that any fuels or chemicals would be stored on site for any component of the Project (wind farm, quarry or transmission line). However, if detailed design determines that on-site storage of these materials is required, they will be stored in suitable containers and on hardstand floors (e.g. shipping containers, concrete), within a bunded area that is protected from stormwater incursion (see mitigation measure MM-CA05). Spill kits will be located with the mobile refuelling tanks and at any storage sites.

Peat is known to occur in low-lying areas of the wind farm site, east of Portland-Nelson Road. When dry, peat areas are highly vulnerable to ignition and the resulting fires are extremely difficult to extinguish without re-establishing natural groundwater levels. A peat assessment will be undertaken in low-lying high risk areas of the Project Area to determine whether peat would be impacted by excavation activities. A Peat Management Plan will be developed that details the safe work practices to be implemented when working in areas with peat and the remediation works required if these areas are disturbed.

Construction of the underground transmission line through the Parks will aim to minimise the amount of spoil created and removed, and reuse spoil where possible to minimise waste. Spoil management and control measures will be implemented and included in the CEMP to manage duties and obligations associated with waste/spoils under the EP Act to minimise risk of harm.

Overall, disturbance of contaminated soils or ASS during construction of the Project would not result in significant residual impacts with the implementation of mitigation measures.

It is therefore considered that the Project satisfies the relevant contamination and ASS evaluation objective specified in the EES Scoping Requirements, to avoid or minimise adverse effects on land and water values.

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