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Chapter 4 – Terrestrial Environmental Quality

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00	Mark Branson Chief Development Officer		10 Nov 2022
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Document Preparation

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A	For Review	02 Nov 2022	Charlotte Baker	Environmental Scientist	Mellissa Winfield-Lesk	Development Integration Lead
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B	For Approval	08 Nov 2022	Charlotte Baker	Environmental Scientist	Jessica Miller	SEIS Coordinator
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Contents

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4 Terrestrial Environmental Quality

4.1 Introduction

The NT EPA's objective for the Terrestrial Environmental Quality (TEQ) factor is:

> *Protect the quality and integrity of land and soils so that environmental values are supported and maintained.*

This chapter assesses the potential impacts to the quality and integrity of land and soils associated with the Project. The potential impacts to land and soils considered in this chapter were identified with reference to the NT EPA Direction (Appendix 1.1), the EIS TOR issued by the NT EPA, issues raised by stakeholders and project responses (Appendix 1.3), and professional judgement of the EIS team (Appendix 1.5) based on their knowledge and understanding of the Project's components and activities described in Chapter 2 Project Refinements. Potential impacts were assessed using the EIA methods described in Chapter 3 Impact Assessment of the Draft EIS. This chapter presents the findings of the EIA process undertaken for the TEQ factor.

4.2 Information Sources

Since the Draft EIS was lodged, the following reports have been prepared which deal with TEQ:

- Constraints Planning and Field Development Procedure (Appendix 4.1)
- Environmental Design Criteria and Standards (Appendix 2.1)
- Land Based Electrode Technical Report (Appendix 12.1).

4.3 Project Amendments since Draft EIS

No additional site-specific studies have been undertaken which relate solely to TEQ. Project refinements presented in this SEIS (Chapter 2) which require additional footprint and have been assessed in this section for their potential to impact TEQ include:

- Solar Precinct AI, (located beyond previous footprint in the draft EIS, including Electrode) (see Figure 2-1)
- Preferred OHTL Corridor (note: the temporary clearance corridor during construction remains as previously assessed at 22 m, which includes a permanently cleared Access Track of 6 m during operations (see Appendix 2.2)
- DCS Electrode (see Figure 2-12).

4.4 Existing Environment and Values

Chapter 4 of the Draft EIS details all soil types and environmental values within the footprint and Area of Interest (AOI) for each project element. A high-level summary has been included below to provide context. Where the SEIS changes the footprint from the Draft EIS, e.g., Electrodes, Solar Precinct AI, and selected OHTL Corridor, the environmental values for this footprint and AOI are included below.

4.4.1 Solar Precinct AI Footprint

The Solar Precinct and surrounds occur mainly on the Redsan land system, characterised by level to gently undulating plains with deep sandy soils, moderate erodibility, and low likelihood of PASS (Draft EIS, Chapter 4). The soils are typically well drained with small patches of heavier soils occurring in lower areas which are more likely to become inundated.

The Electrode and additional AI footprint are shown in Figure 4-1. The soil types in this area are Rudosol, Tenosol, Vertosol and Kandosol, all of which were identified and assessed in the Draft EIS for disturbance either at the Solar Precinct or within the proposed site Access Track. PASS Mapping (CSIRO, 2013) indicates that there is a very low probability of PASS at the Solar Precinct and surrounds.

4.4.2 OHTL

The OHTL intersects several soil types including alluvial floodplains, coastal floodplains, clay plains, desert sandplains, granite hills, granite plains and rises, lateritic plains and rises, lateritic plateaux, limestone plains and rises, sandstone hills, and sandstone plains and rises. As there was no change in the construction methodology or new soil units for the selected OHTL Corridor, the soil loss and erosion hazard assessment conducted for the OHTL and presented in Chapter 4 of the Draft EIS has not been updated.

For the majority of the OHTL Corridor, there is a low probability of encountering PASS with higher probability of occurrence near permanent watercourses. In particular, the OHTL Corridor will pass the town of Katherine and will involve crossing both Tindal Creek and Katherine River. The use of substances containing PFAS at the RAAF Base Tindal, specifically AFFF used for firefighting, has resulted in the groundwater, surface water, and soil contamination of the area. A PFAS Management Area has been declared for the Katherine region with known contamination of groundwater, surface water, soil, and sediments (see Figure 4-2 for soils PFAS sampling results). Impacts associated with surface and groundwater are addressed in Chapter 6 Hydrology).

Extensive investigations have been undertaken by the Department of Defence since 2016 to determine the extent of contamination. Studies include a Detailed Site Investigation, Human Health Risk Assessment, Ecological Risk Assessment, and ongoing monitoring (see Department of Defence, 2022). Previous investigations and ongoing monitoring and reporting were undertaken in accordance with relevant guidelines, including:

- PFAS National Environmental Management Plan (NEMP), as updated from time to time (HEPA, 2020); ‘PFAS NEMP’
- National Environment Protection (NEPM), (Assessment of Site Contamination) Measure (NEPC 2013); ‘NEPM Guidelines’
- Australian and New Zealand Water Quality (WQ) Guidelines (ANZG 2018); ‘ANZG 2018’.

Groundwater and surface water monitoring is ongoing by the Department of Defence to monitor the level and extent of PFAS contamination within the Katherine region. A PFAS Management Area Plan developed by the Department of Defence for the RAAF Base Tindal details the ongoing management and monitoring activities to be undertaken within the Katherine PFAS Management Area to mitigate risks associated with PFAS contamination. The PFAS Management Area Plan is consistent with the PFAS NEMP (see Department of Defence, 2019).

Soil and sediment monitoring was not undertaken and reported in the Interpretative Report 2020. Results from the Detailed Site Investigation Report (Coffey, 2018), indicate:

- The concentration of PFAS in Katherine River sediments exceeded the ecological guideline value applied (Maintenance of Ecosystem – Areas of Ecological Significance) at two locations (see Figure 4-2)
- The concentration of PFAS within Tindal Creek (off-base) sediments exceeded the ecological guideline value (Maintenance of Ecosystem – Areas of Ecological Significance) at one location (see Figure 4-2)
- PFAS concentrations in soil samples undertaken in proximity of the OHTL Corridor were generally below the laboratory detection limit, or below the guideline value for both ecological and human health receptors. There were, however, some exceedances of the most conservative guideline values for ecological exposure and residential land uses with homegrown vegetables (see Figure 4-2 - the OHTL Corridor roughly follows railway infrastructure in this map).

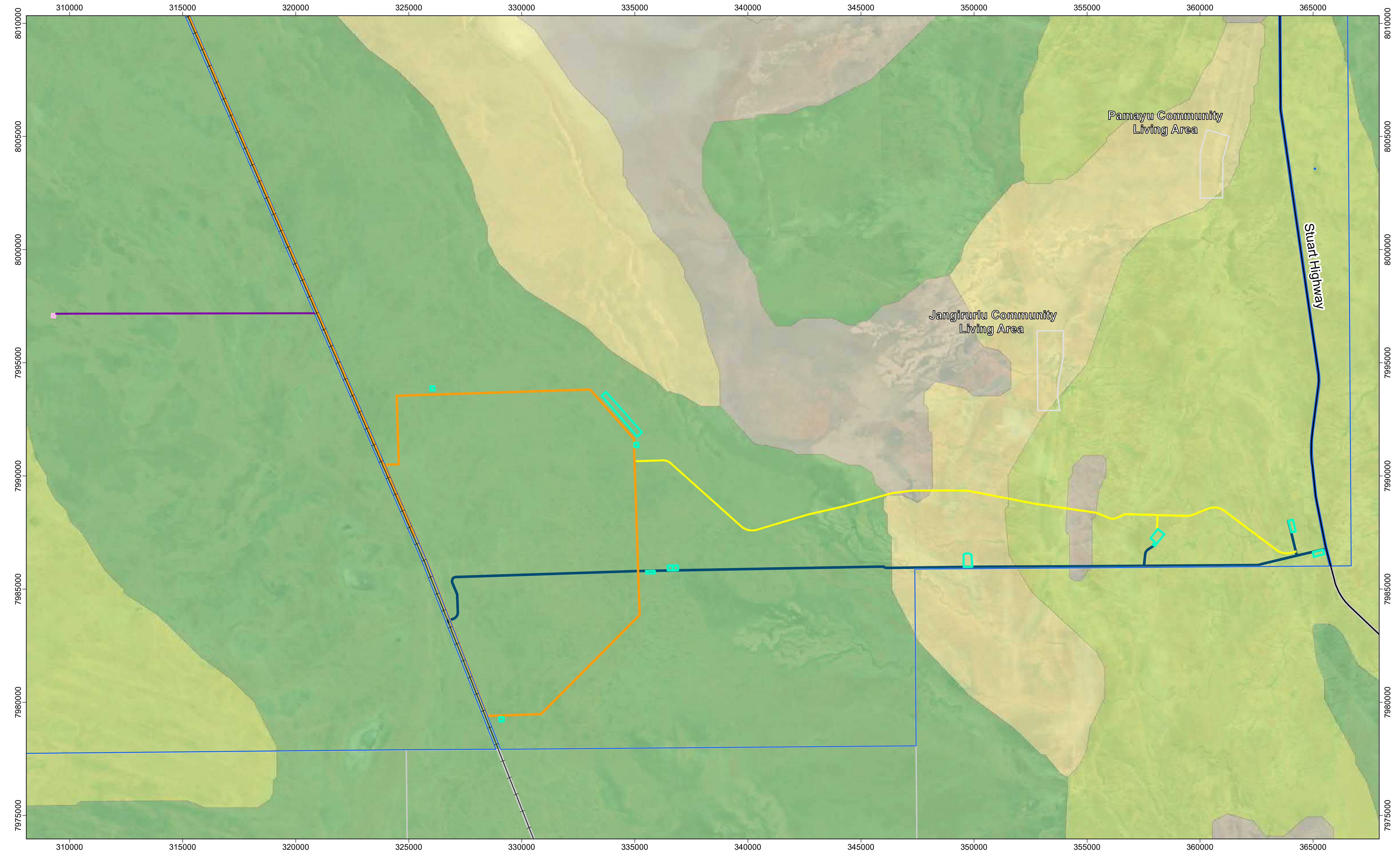
Impacts related to contaminated groundwater are assessed in Chapter 6 Hydrology. Soils within proximity to the OHTL Corridor were generally below the laboratory detection limit and only a few samples exceeded the most conservative guideline values. In the absence of specific soil management areas, it is assumed the surface water management areas (see Chapter 6 Hydrology) represents the area requiring additional management of PFAS.

4.4.3 DCS Electrode

The DCS occurs on Kandosols and Hydrosols for sands and gravelly soils. There are no areas of PASS within the DCS footprint. The soil erosion hazard is assessed as 'high' during construction, reducing to 'very low' once the groundcover has been re-established during the operations phase.

The Cable Transition Facilities will be located on Hydrosols, Kandosols and Rudosols. There is a high probability of PASS within the footprint for the Land Sea Joint Station and trenching for the shore crossing. In general, the soil erosion hazard is 'very low,' with the exception of rises which have an 'extreme' erosion risk during construction and which reduce to 'high' following establishment of groundcover in operations.

The Electrode area and associated HVDC Electrode Line are shown in Figure 4-3. The soil type in this area is Kandosol (which is the same as at the DCS and in sections of the OHTL). ASS mapping has identified this area as having ASS present in inland lakes, waterways, wetlands, and riparian zones (Figure 4-4). Following the design criteria, the site for the DCS Electrode was selected to avoid environmental and social constraints, including lakes, waterways, wetlands and riparian zones to decrease the risk of ASS. However, there remains potential for ASS at the electrode site. The final site will be selected following the Constraints Planning and Field Development Procedure (refer to Appendix 4.1).



Legend

- OHTL Corridor
- Gravel Access Track
- Main Access Track
- Existing railway line
- Cadastre
- Powell Creek Station
- HVDC Electrode Line Corridor
- Solar Precinct
- Ancillary Infrastructure
- Powell Creek Electrode

Soil Classification

- Kandosol
- Rudosol
- Tenosol
- Vertosol

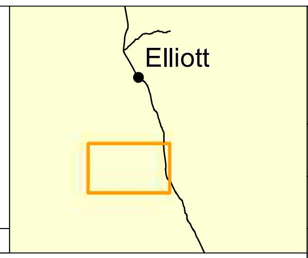


Figure 4-1: Powell Creek Ancillary Infrastructure and Electrode Soil Map

Project: Australia-Asia PowerLink	Reference #: AAPL_GNR_CTA_GEN_MAP_0314	Figure: 1 of 1	Revision: B
Coordinate System: MGA Zone 53	Datum: GDA2020	Date: 06/11/2022	
0 2 4 6 8 10 Kilometre		Scale: 1:150,000	A4

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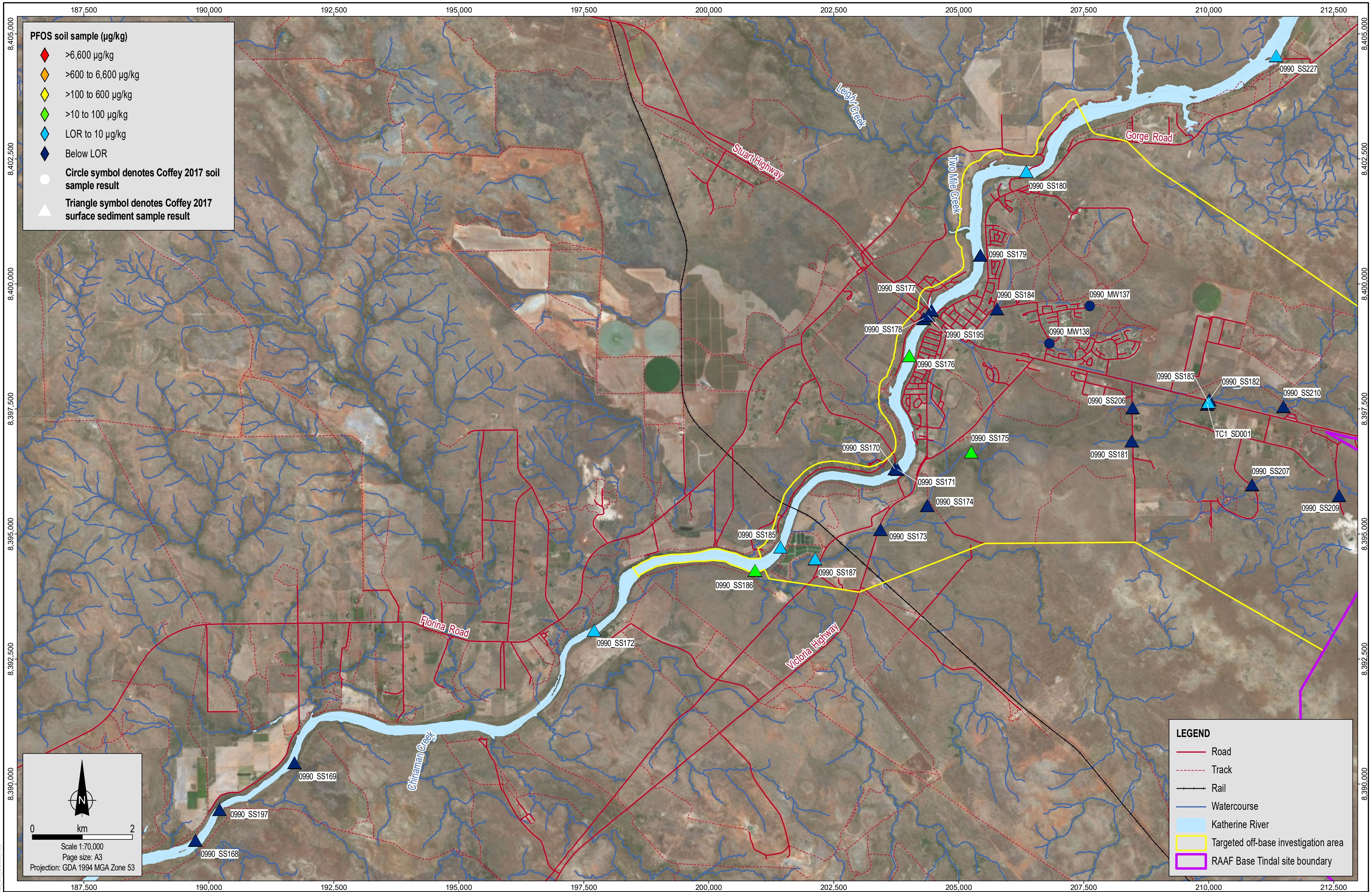
Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Off-Base - Soil and Sediment Analytical Results - PFOS

Figure 4-2: RAAF Base Tindal - PFAS Soil Sampling

coffey
A TETRA TECH COMPANY

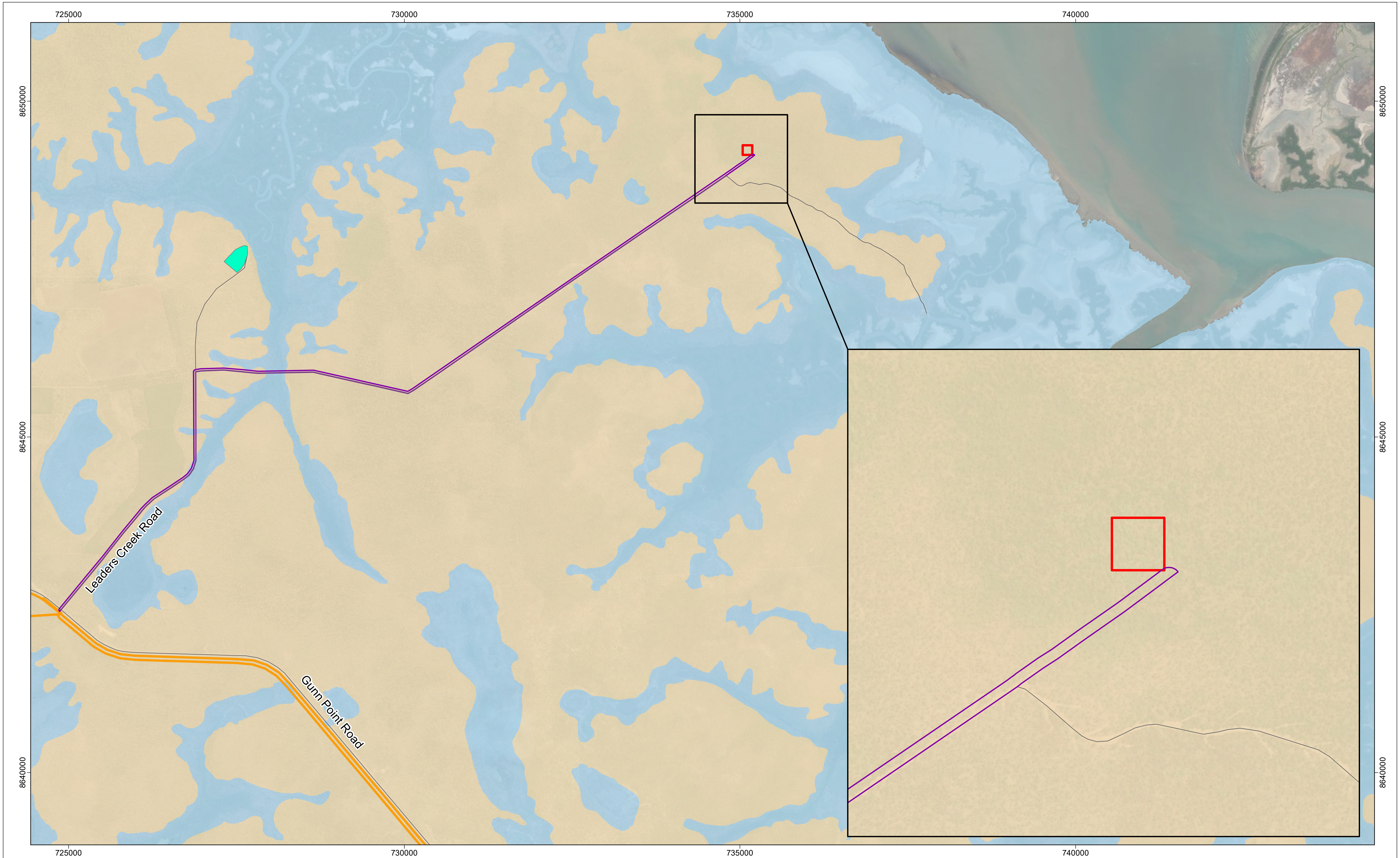
Date: 06.02.2018
Project: 754-MELEN199420
File Name: 199420_DSI_F022a_GIS

Department of Defence

PFAS Assessment

Source:
Sampling results and investigation area from Coffey.
Roads, tracks, rail, watercourses and site boundary from DoD.
Imagery from ArcGIS Online (capture date unknown).

Figure No: 4-2



Legend

- Road
- HVDC Electrode Line Corridor
- AAPowerLink Infrastructure
- Darwin Converter Site Electrode
- Leaders Creek Fishing Base

Dominant Soil Order

- Hydrosols
- Kandosols

Figure 4-3: Darwin Converter Site Electrode Footprint and Soil Classification

Project: Australia-Asia PowerLink	Reference #: AAPL_GNR_CTA_GEN_MAP_0312	Figure: 1 of 1	Revision: A
Coordinate System: MGA Zone 52	Datum: GDA2020	Date: 06/11/2022	
0 1 2 3 Km	Scale: 1:50,000	A4	

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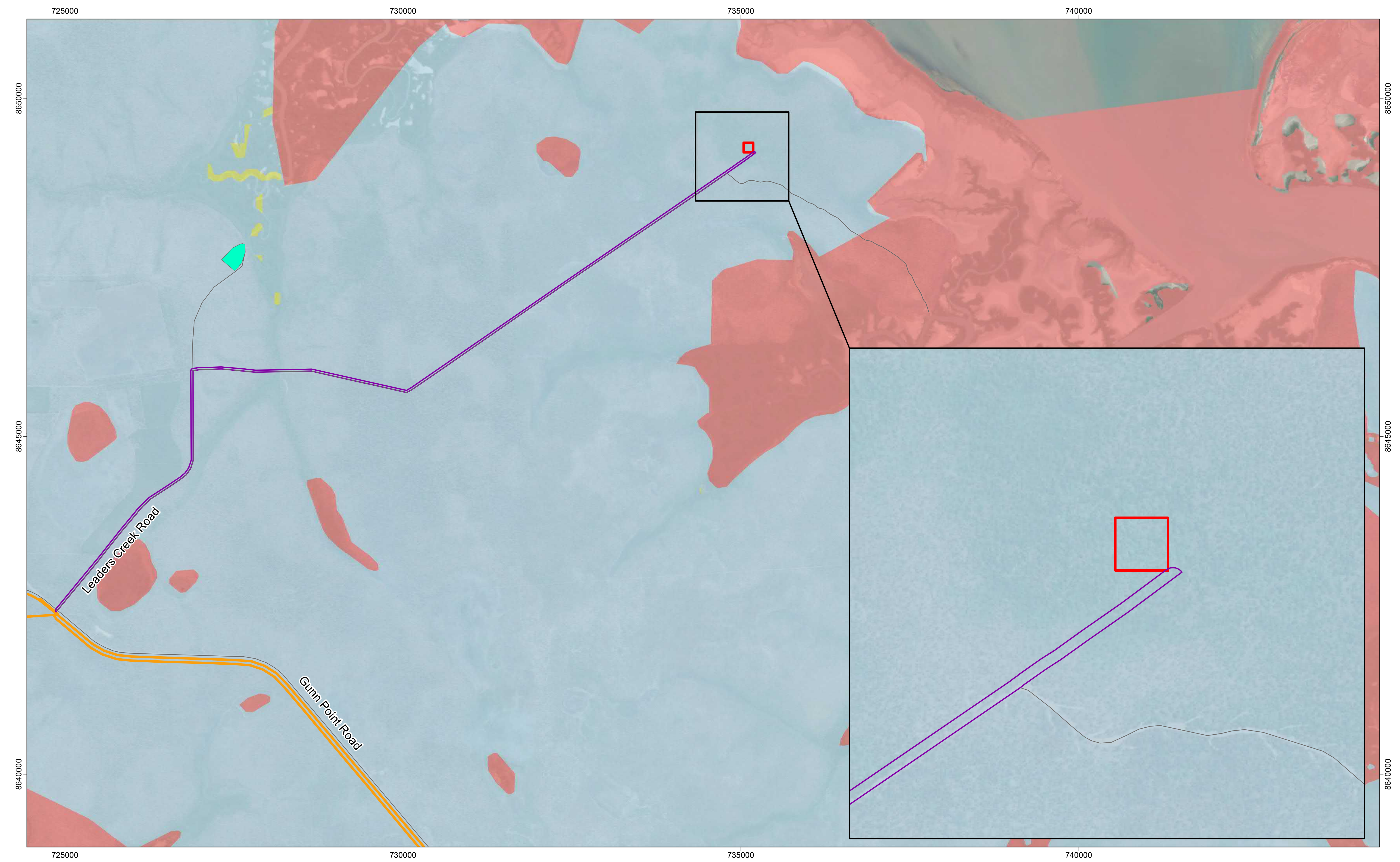
Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



Legend

- Road
- HVDC Electrode Line Corridor
- AAPowerLink Infrastructure
- Darwin Converter Site Electrode
- Leaders Creek Fishing Base

Probability of occurence of Acid Sulfate Soils

- High Probability of occurence - >70% chance of occurrence in mapping unit
- Low Probability of occurrence - 6-70% chance of occurrence in mapping unit
- Extremely low probability of occurrence - 1-5% chance of occurrence in mapping unit with any occurrences in small localised areas

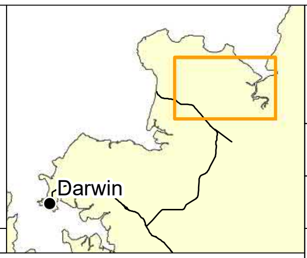


Figure 4-4: Darwin Converter Site Electrode - Acid Sulphate Soils

Project: Australia-Asia PowerLink	Reference #: AAPL_GNR_CTA_GEN_MAP_0313	Figure: 1 of 1	Revision: A
Coordinate System: MGA Zone 52	Datum: GDA2020	Date: 06/11/2022	

0 1 2 3 Km

Scale: 1:50,000 A4

N

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Source: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

4.5 Potential Impacts

The potential impacts to land and soils, and associated environmental values caused by the Electrodes have been assessed using the EIA methodology described in Chapter 3 of the Draft EIS and the Land Based Electrode Technical Report (Appendix 12.1). The following impacts were identified and assessed as possibly occurring during construction and/or operations:

- Contamination of soils from accidental spills or uncontrolled release of chemicals and/or fuel
- Contamination of soils due to the disturbance of PASS during site preparation and earthwork construction activities
- Spread of contaminated PFAS soil or sediment outside of PFAS Management Area during site preparation and earthwork construction activities
- Soil erosion and topsoil migration resulting from physical disturbance during construction phase
- Soil drying during the limited operational periods of the Electrode.

The additional footprint associated with AI outside of the Solar Precinct will not result in additional impacts to those assessed in the Draft EIS, except for the Solar Precinct Electrode. Environmental values identified for the new footprint described in Chapter 2, Project Refinements, are consistent with those identified in the Draft EIS.

4.5.1 Areas of Potential Impact (Direct and Indirect)

The area of direct soil and land disturbance has not changed from the Draft EIS with the following exceptions:

- Electrode sites are constrained to 2 ha with the selection of the deep well electrode type
- Corridor of 30 m width to install the HVDC Electrode Line Corridor from the OHTL to the Electrodes including Access Track
- Selected OHTL preferred routes at Katherine, Pine Creek and Adelaide River will replace the original OHTL Corridor used in the Draft EIS.

The Access Track and HVDC Electrode Line Corridor have been located to follow existing disturbances and make use of pre-disturbed land where possible. At the DCS the existing Access Track is 20 m width and thus will only require an additional 10 m clearance. The Access Track to the Solar Precinct Electrode follows an existing fence line. However, the Access Track along the fence has been overgrown and the full 30 m would require clearance.

Indirect disturbance related to construction includes land and soils in surrounding areas that may experience increased erosion resulting from the changes in surface water management (refer Chapter 6 Hydrology for further details) during the construction phase. The area of influence is predicted to be limited and impacts are not expected to extend far beyond the boundary of the project footprint. Downstream WQ impacts associated with exposure to potentially contaminated topsoil is discussed in Chapter 6 Hydrology.

During operations, area no longer required to be open will be rehabilitated. However, a fenced area surrounding the Electrode, the HVDC Electrode Line Corridor and the Access Track will remain open as working areas and/or dirt track. Indirect disturbance related to operational activities includes the potential area of soil drying resulting from electro-osmotic flow of water (refer to Appendix 12.2 Land Based Electrode Technical Report) which could reduce the amount of water available for plant growth and soil microbial activity.

Table 4-2 and Table 4-3 assess impacts resulting from the project refinements described in Chapter 2. This includes potential impacts associated with areas of the footprint that were not assessed in the Draft EIS, and the additional impact of soil drying during the operation of Electrodes.

4.5.2 Contamination of Soils from Accidental Spills or Uncontrolled Release of Chemicals and/or Fuel

The project refinements (see Chapter 2) will result in aviation fuel being stored off the Solar Precinct footprint, at the Aerodrome immediately to the northwest. While there is additional footprint where this impact may occur, the impact is still limited to localised impacts surrounding the potential hydrocarbon spill site. As such, the proposed mitigation measures are consistent with the Draft EIS.

4.5.3 Contamination of Soils due to the Disturbance of ASS During Site Preparation and Earthwork Construction Activities

PASS has the potential to generate sulphuric acid if exposed to oxygen. PASS mapping identified the area of the DCS Electrode as having PASS present in inland lakes, waterways, wetlands, and riparian zones (Figure 4-4). While the DCS is located away from lakes, waterways, wetlands, and riparian zones, prior to construction a PASS Management Plan will be developed for the Project, including visual monitoring of soil during excavation to identify any PASS and appropriate management strategies should it be identified. Monitoring and reporting against the PASS Management Plan will be undertaken in accordance with the CEMP, (framework in Draft EIS Chapter 17).

4.5.4 Spread of Contaminated PFAS Soil or Sediment Outside of PFAS Management Area During Site Preparation and Earthwork Construction Activities

The Detailed Site Investigation undertaken by Department of Defence has identified some areas of sediment that have PFAS levels greater than guidance values (Coffey, 2018). While the site contamination is existing, the Project has the potential to move this soil to new, uncontaminated areas. The Constraints Planning and Field Development Procedure (Appendix 4.1) provides a process to identify higher risk areas (such as those containing PFAS) and requires sediment and erosion control management plans and soil hygiene stations to prevent any contaminated soil from leaving site, either in eroded sediments or on the wheels of vehicles. Monitoring and reporting against these plans will be undertaken in accordance with the CEMP (framework in Draft EIS Chapter 17).

4.5.5 Soil Erosion and Topsoil Migration as a Result of Physical Disturbance During Construction Phase

While there is additional footprint where this impact may occur, the impact is still limited to temporary, localised impacts in the drainage paths surrounding the construction site and the mitigation measures are consistent with the Draft EIS.

4.5.6 Soil Drying from Electro-osmosis

During the operations phase, operation of Electrodes may result in soil drying from two mechanisms: heating of soil; and transport of water away from the Electrodes resulting from electro-osmosis. These impacts will only occur during periods when the Electrodes are operational. As described in Chapter 2 the Electrodes will only be operated to dissipate loads during faults or planned maintenance. Operational times will be likely two hours and no longer than 48 hours to a maximum of 500 hours per year. Monitoring and maintenance requirements for Electrodes, set out in General Guidelines for HVDC Electrode Design (CIGRE, 2017) have stated that decreases in humidity may take weeks or months of continuous Electrode operation. The Electrodes associated with the Project are not expected to be operated for longer than 48 hours at a time and thus soil drying is not expected to occur in the time periods operational.

To address any uncertainty, mitigation measures and monitoring have been proposed to prevent soil drying occurring outside the Electrode AOI.

4.6 Avoidance, Mitigation and Monitoring

Impact mitigation was undertaken in accordance with the environmental decision-making hierarchy consistent with Section 26 of the *EP Act*. The decision-making hierarchy sets the following priorities when addressing impacts which have been considered in developing Table 4-1:

1. Avoid – ensure that actions are designed to avoid adverse impacts on the environment
2. Mitigate – identify management options to mitigate adverse impacts on the environment to the greatest extent practicable
3. Offset – if appropriate, provide for environmental offsets for residual adverse impacts on the environment that cannot be avoided or mitigated.

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Table 4-1: Terrestrial Environmental Quality - Commitments

Impact	Avoidance	Mitigation	Monitoring
Contamination of soils from accidental spills	Consistent with Draft EIS measures.	Consistent with Draft EIS measures.	Consistent with Draft EIS measures.
ASS disturbance	Consistent with Draft EIS measures.	Consistent with Draft EIS measures.	Consistent with Draft EIS measures.
Spread of contaminated soil or sediment outside of PFAS Management Area	No sediment will be removed from Tindal Creek or Katherine River. OHTL lines will span the Tindal Creek and Katherine River, avoiding works within the watercourses. The OHTL Access Track will not be constructed through Tindal Creek or Katherine River – those watercourses will be accessed from either side, via existing tracks where available. No trenching will occur along the OHTL, including within the PFAS Management Area.	The OHTL construction corridor will be as narrow as possible within the PFAS Management Area, to minimise the disturbance footprint. AI (e.g., Temporary Construction Accommodation) will not be located within the PFAS Management Area. Soil hygiene stations will be established at the boundary of the PFAS Management Area (see Figure 4-2). All machinery and equipment will be cleaned at these hygiene stations to avoid spreading contaminated soil along the OHTL. Site specific measures to address PFAS will be included in the Erosion and Sediment Control Plan (ESCP), (see CEMP framework in Draft EIS Chapter 17).	Visual monitoring of the construction footprint within the PFAS Management Area, to ensure clearing is minimal. Visual inspections of machinery and equipment at soil hygiene stations, to ensure all soil is removed prior to leaving the PFAS Management Area.
Erosion and topsoil migration resulting from physical disturbance during construction phase	Consistent with Draft EIS measures.	Consistent with Draft EIS measures.	Consistent with Draft EIS measures.
Soil drying from electro-osmosis resulting from Electrode operation	Increase surface area of Electrode to reduce the current density and thus potential for impact.	If monitoring identifies soil drying during periods of electrode operations soil wetting will occur to mitigate this impact.	Soil probes around Electrode Site to identify if soil drying occurs during operations compared to baseline data (collected when electrode is not in use ~95% of the time).

Impact	Avoidance	Mitigation	Monitoring
	Electrode operational for under 48 hours during a single event. However, impacts usually develop over period of weeks to months. The shallow groundwater table at the DCS Electrode will prevent soil drying due to the excess of soil moisture.		

4.7 Residual Impact

All residual impacts have a rating of ‘minor,’ and ‘moderate’ showing no change to the residual impact conclusions reached in the Draft EIS. Any identified uncertainties are addressed with monitoring and mitigation measures. All residual impacts are considered not significant.

Table 4-2: Summary of SEIS Results – Terrestrial Environmental Quality Factor - Construction

Impact	Location	Likelihood	Scale	Duration	Magnitude	Value rating	Certainty	Residual Impact
Contamination of soils from accidental spills	Entire project footprint.	**Possible** Storage and handling of fuels and hazardous materials will take place onsite.	**Limited** Contamination will be limited to small area around site of spill.	**Short Term** Spills will occur intermittently. Spills will be detected and remediated immediately.	**Minor** No impact to surface water or groundwater due to small volumes and mitigation measures.	**High** Water courses and groundwater aquifers are sensitive to contamination impacts.	**High** AS/NZS are established and proven effective for mitigating risk. ESMS and implementation of mitigation measures are common and proven at minimising risk of accidental spills.	**Minor**
ASS disturbance	DCS Electrode and HVDC Electrode Line Corridor.	**Possible** PASS could occur at specific locations especially within the DCS Electrode and HVDC Electrode Line Corridor.	**Limited** Area of potential disturbance will be limited to pole foundations or occurrences of ASS.	**Short Term** ASS would be exposed for a matter of days prior to reburial.	**Minor** Oxidation unlikely to occur during short period of exposure with appropriate precautions taken.	**High** Water courses and groundwater aquifers are sensitive to contamination impacts.	**High** Guidelines for identification and management of ASS are established and proven effective.	**Minor**
Spread of contaminated soil or sediment outside of PFAS	OHTL near RAAF Base Tindal, Katherine.	**Possible** PFAS contaminated soils do occur in this area and could be exposed during	**Limited** Area of potential disturbance will be limited to pole foundations or	**Short Term** Construction of each pad would only occur for a short time.	**Minor** The PFAS levels currently exceed guideline values, soil management	**Medium** There are several sensitive receptors in the area. However, the contamination is	**High** Detailed site investigations of the contaminated area have been undertaken by	**Minor**

Impact	Location	Likelihood	Scale	Duration	Magnitude	Value rating	Certainty	Residual Impact
Management Area		OHTL construction.	access disturbance in locations of contaminated soils.		strategies will prevent this being spread further, noting groundwater contamination is over a larger extent.	pre-existing in the area.	Department of Defence and mitigation strategies are well known and documented.	
Erosion and topsoil migration resulting from physical disturbance during construction phase	Entire project footprint.	**Likely** Construction involves soil disturbance which could lead to erosion.	**Limited** Erosion will affect isolated areas where run off is concentrated.	**Medium Term** Intermittently during construction (greater risk during wet season).	**Minor** Unlikely to impact on adjacent land uses. Loss of topsoil would only impact soil fertility over a small footprint.	**Low** No sensitive land uses or values present.	**Medium** No erosion hazard assessment has been conducted over the new footprints. However, they occur on the same land units and soil types as those previously assessed and are assumed to experience similar hazard ratings.	**Minor**
Soil drying from electro-osmosis resulting from electrode operation	Electrode areas.	n/a – impact only occurs during operation of Electrode (no source during construction).						

Table 4-3: Summary of SEIS Results – Terrestrial Environmental Quality Factor - Operation

Impact	Location	Likelihood	Scale	Duration	Magnitude	Value rating	Certainty	Residual Impact
Contamination of soils from accidental spills	Electrode areas and AI footprint.	**Possible** Spills or leaks could occur at fuel storage areas.	**Limited** Contamination will be limited to small area around site of spill.	**Short Term** Spills will occur intermittently. Spills will be detected and remediated immediately.	**Minor** No impact to surface water or groundwater due to small volumes and mitigation measures.	**High** Water courses and groundwater aquifers are sensitive to contamination impacts.	**High** AS/NZS are established and proven effective for mitigating risk.	**Minor**
Soil drying from electro-osmosis resulting from electrode operation	Electrode areas.	**Unlikely** The Electrodes are designed to be operated only during faults and planned maintenance and the length of time expected during these faults and maintenance will not be long enough to trigger this impact (usually requiring weeks to months of continuous operations).	**Limited** Area of disturbance will not go past electrode area especially with proposed mitigation measures in place.	**Short Term** Electrode will only operate intermittently and monitoring of soil moisture during these times will allow mitigation measures to be undertaken immediately should an impact be identified.	**Minor** Impact is measurable with soil monitoring probes. However, no impact to vegetation at the size and scale required for this Project.	**Medium** Proposed future land use at Gunn Point includes agriculture which could be sensitive to soil drying.	**Low** There is limited information available in the literature on this impact, to address uncertainty monitoring and mitigation measures are planned.	**Moderate**

4.8 Cumulative Impact Assessment

Due to the low level of residual impacts to land and soils associated with the Project's refinements combined with no change in assessment conclusion ratings from the Draft EIS, there is limited potential for new cumulative impacts not previously considered to occur. Potential cumulative impacts associated with the Project's refinements for the other major projects identified in the Draft EIS (agriculture, mining, gas developments, railway corridor, Sea Dragon Hatchery, and future development of residential areas) are consistent with that described in the Draft EIS.

4.9 Conclusion

No public submissions were received relating to TEQ. Proximity of the Project to existing soil and groundwater PFAS contamination was identified by NT EPA in its direction (refer to Section 4.11). Potential to disturb or migrate PFAS contaminated soil is possible within the OHTL. However, with the proposed mitigation measures to manage erosion and soil hygiene stations, the residual risk is minor and moderate. The Project can achieve the objective of protect the quality and integrity of land and soils so that environmental values are supported and maintained.

4.10 Submission Responses

During the Draft EIS public submissions period, no public comments were received which purely relate to TEQ. Submissions were received regarding potential impacts to TEQ. However, these have been categorised into the other chapters of this SEIS to support the Proponent's response.

4.11 NT EPA Direction Responses

4.11.1 PFAS Risk (Groundwater, Surface Water and Sediments) – Comment 24

The Draft EIS identifies that water is to be sourced from groundwater at the Solar Precinct and DCS and finalisation of the water source is reliant on the completion of a detailed water balance.

Impact on nearby receptors at the DCS considered low due to no nearby receptors; however, this may change during the 5-year construction period and subsequent years post construction required for groundwater to recharge.

The draft EIS (Chapter 7) recognises that poly-fluoroalkyl substances (PFAS) occurs near Katherine without assessing the potential for impacts arising from sourcing water, land clearing and construction activities where PFAS may occur.

Relevant material to be considered when addressing potential for PFAS contamination includes:

ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine WQ – superseded by the revised WQ Guidelines ANZG (2019) https://www.waterquality.gov.au/anz- guidelines

National Environmental Protection (NEPC, as amended 2013) Assessment of Site contamination http://www.nepc.gov.au/nepms/assessment-site-contamination

NHMRC (2011) Australian Drinking Water Guidelines https://www.nhmrc.gov.au/aboutus/publications/australian-drinking- water-guidelines

PFAS NEMP (HEPA 2018) health based guidelines for drinking water and recreational water https://www.epa.vic.gov.au/your-environment/land- and-groundwater/pfas-invictoria/pfas-national-environmental- management-plan

4.11.2 Information Required in the Supplement

Provide a detailed water balance for the proposed action that includes although is not limited to:

- *Modelling to be included in hydrogeological investigations at the Solar Precinct and the Darwin Converter Site*
- *Demonstrate that groundwater extraction for water supply will have no impact on groundwater levels at nearby receptors including future land use during the construction and operation stages as relevant*
- *Groundwater monitoring programs for construction and operational stages of the proposed action.*

Provide further information to inform avoidance and mitigation measures as well as contamination management of water and soil disturbing activities in areas where PFAS may occur, including although not limited to:

- *Previous contaminating activities in the railway corridor and alternative routes about Katherine*
- *Describe existing levels in context of guideline values*
- *Source and quality of water and land fill to avoid PFAS*
- *Extent and location of excavation works*
- *Assessment of potential impacts.*

4.11.3 Response

The NT EPA direction did not contain any comments relating directly to TEQ however, the comments relating to PFAS in Chapter 6 Hydrology have also resulted in updates to the TEQ impact assessment, above.

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