Aurizon Berrimah Freight Terminal Expansion

Surface Water Assessment

Aurizon Operations Limited

Level 8, 900 Ann Street
Fortitude Valley
QLD 4006

Prepared by:

SLR Consulting NZ Ltd

Level 12, 95 Customhouse Quay, Wellington

SLR Project No.: 680.030156.00005

10 February 2024

Revision: V1.2

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V1.0	8 September 2023	Deborah Maxwell	Charlotte Lockyer	Helen Doherty
V1.1	6 November 2023	Deborah Maxwell	Jill Woodworth	Craig Smith
V1.2	10 February 2024	Craig Smith	Jill Woodworth	Craig Smith

Basis of Report

This report has been prepared by SLR Consulting NZ Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Aurizon Operations Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Table of Contents

Acronyms and Abbreviations

EPA	Environment Protection Authority
NRETAS	Department of Natural Resources, Environment, the Arts and Sport
NT	Northern Territory
PWC	Power and Water Corporation
WQO	Water Quality Objectives

1.0 Introduction

Aurizon Operations Limited (Aurizon) is investigating the extension of the existing Berrimah Freight Terminal at East Arm near Darwin to create a larger terminal with an integrated logistics focus, which provides an ability to service both bulk and containerised freight. The development would provide large container storage area and potential warehousing or colocation with incumbent freight forwarders.

The existing Berrimah Terminal is located on the East Arm, 20 km from Darwin City Centre. The terminal runs through Darwin's East Arm to Darwin Port. The existing railway and associated infrastructure divides the East Arm between north and south. The proposed extension would develop the area to the north of the existing infrastructure (**Figure 1**).

This report describes the local hydrology of the Project site and potential impacts associated with the proposed expansion of the Berrimah Freight Terminal on groundwater and surface water.

Figure 1. Project location.

1.1 Northern Territory (NT) Environmental Protection Authority (EPA) objectives relating to surface water and hydrology

When assessing a project, the NT EPA must consider how it is likely to impact the land, sea, freshwater systems and people. Environmental factors (broad divisions of the environment that may be impacted by a proposal) and associated objectives (expected outcomes) were developed by the NT EPA to provide an indicator to assess whether the impacts of a proposed action may be significant and ultimately whether a proposed action is likely to be acceptable.

The key objectives associated with inland water quality and hydrological processes are presented in **Table 1**.

Table 1. NT EPA Factors and Objectives

Factor	Objective
Hydrological Processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.
Inland Water Environmental Quality	Protect the quality of groundwater and surface water so that environmental values including ecological health, land uses and the welfare and amenity of people are maintained.

2.0 Existing environment

2.1 Climate

The Bureau of Meteorology operates several rainfall gauges in the vicinity of the Project (**Figure 2**). Historical rainfall for the gauges shown in **Table 2** was analysed to determine the climate in the vicinity of the Project. The closest station is East Arm (14260), located within 500m of the western part of the Project. This site has operated from 1992, although there are several significant gaps (53% complete). The most significant gap is from 2011 to 2021. To the north, Berrimah Research Farm rainfall station (14116) operated from 1963 to present, also with a significant gap in the record (2014-2022). The rainfall station at Darwin Airport (014015), located 5.5 km north-west of the Project, was established in 1941 and has 83 years of record, and is the only site which is 100% complete (BoM, 2019). Across the harbour toward Darwin City, the Fort Hill Wharf (14050) and Stokes Hill (14167) rainfall stations have record lengths of 20 years and 35 years, respectively.

Rainfall is highly seasonal, with dry winters and wet summers, with over 90% of the annual rainfall occurring between November and March (**Table 3** and **Figure 3**). Annual average rainfall totals for the gauges closest to the Project are 1860 mm at East Arm, 1761 mm at Berrimah Research Farm and 1726 mm at Darwin Airport (**Table 3**).

Figure 2. Location of rainfall gauges in the vicinity of the Project

Table 2. Rainfall and evaporation station information

Gauge Number	BoM Name	Open – Closed	Record length (yrs) and % completeness	Elevation (m asl)	Location (Lat/ Long)	Distance (km) / direction from site
			Rainfall			
14260	East Arm	1992 2000-2011 2021-present	16 yrs (53% complete)	10	12.48° S / 130.90° E	0.5 / S
14116	Berrimah Research Farm	1963 – 2014 2022	52 yrs (81% complete)	35	12.44° S / 130.93° E	3 / NE
14050	Fort Hill Wharf	2002 – 2022	20 yrs (66% complete)	5	12.47° S / 130.85° E	7 / W
14167	Stokes Hill	1968 – 1988 2005 – 2019	35 yrs (59% complete)	41	12.465° S / 130.85° E	6 / W
014015	Darwin Airport	1941 – present	83 yrs (100% complete)	30	12.42° S / 130.89° E	5.5 / N
			Evaporation			
014015	Darwin Airport	1957 – present	54 yrs (98% complete)	30	12.42° S / 130.89° E	5.5 / N

Table 3. Mean monthly rainfall and evaporation in the vicinity of the Project

Site	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Rainfall													
East Arm	422	441	298	82	12	3	1	4	10	76	150	361	1860
Berrimah Research Farm	455	342	342	96	18	3	1	4	18	82	141	259	1761
Darwin Airport	430	371	309	102	20	2	1	5	17	71	143	255	1726
Stokes Hill	427	323	287	84	19	0	1	3	24	60	132	236	1596
Fort Hill Wharf	439	309	244	67	18	8	0	1	21	44	100	229	1480
Evaporation													
Darwin Airport	183	160	177	189	208	201	211	223	228	245	219	202	2444

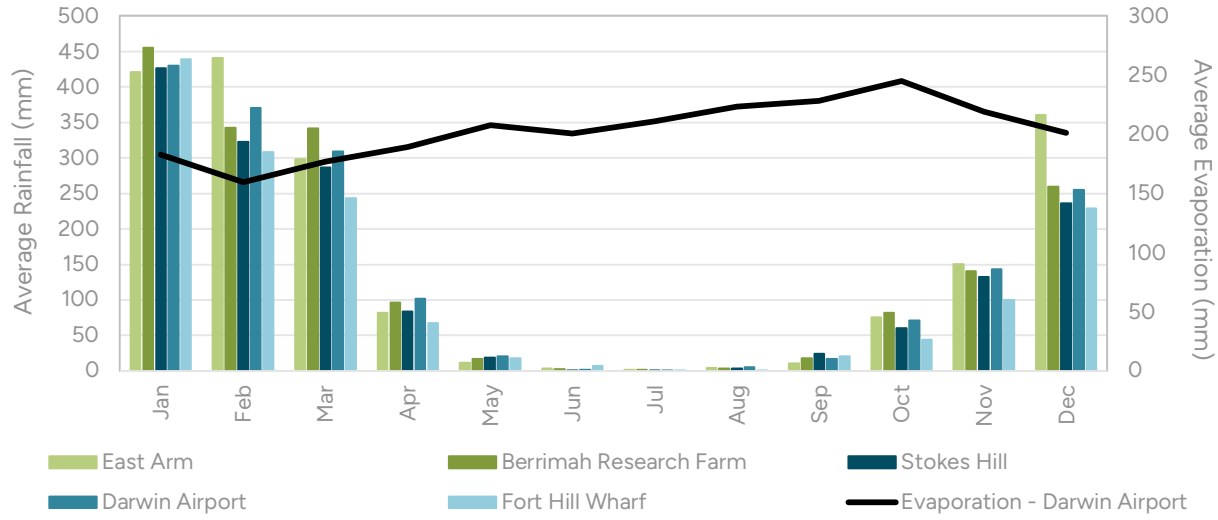


Figure 3. Average monthly rainfall and evaporation.

2.2 Surface water

Darwin is located within the Timor Sea Drainage Division within the Van Diemen region. Darwin Harbour and its surrounding catchment has a total area of 3230 km^2 and a land area of 2010 km^2. Berrimah is located on the East Arm within Darwin Harbour, immediately north-east of the port of Darwin and 6 km east of Darwin City. Hudson Creek is to the south of East Arm and Bleesers Creek to the north (**Figure 4**). Both Bleesers Creek and Hudson Creek are short tidal creeks within the large Darwin Harbour macrotidal estuary. These creeks collect runoff from urbanised areas in portions of Darwin, Berrimah, and Palmerston and discharge into the harbour.

Figure 4. Surface water features in vicinity of the Project.

The Project extends to the north of the existing infrastructure. No major rivers or creeks traverse the Project site and there are no surface water observations within the catchment.

Surface water runoff from the existing freight terminal is discharged to adjacent harbour waters. A site stormwater management system will be constructed as part of the Project.

Any water required for construction will likely be extracted by a licensed contractor from an existing Power and Water Corporation (PWC) watermain. The volume of water required for the construction of the Berrimah Terminal Expansion Project is yet to be determined. At this stage, no significant impact is anticipated due to drawing from PWC's existing water supply. There will be no extraction of water from groundwater or Darwin Harbour for construction of the Project.

2.3 Groundwater

The 1:100,000 scale 'Darwin' (1983) Geological Survey of Northern Territory Map, Sheet No. 5073, indicates that the geology underlying the site is likely to include lithologies related to the Burrell Creek Formation (BCF), which is typically described as shale, siltstone, phyllite with fine to very coarse sandstone and conglomerate, quartz-mica-schist and gneiss. The coastal fringes of the area are underlain by Quaternary intertidal marine deposits of mud, clay and silt.

The groundwater resources in the East Arm area are classified as minor, with generally low yields of less than 0.5 L/s. This yield may be enhanced within fractures of the BCF.

There is no historical groundwater level data from the project locality. Groundwater beneath East Arm is likely to flow in approximately a northern direction toward Timor Sea. Near-shore groundwater levels are likely to be influenced by tides. Groundwater levels are likely to fluctuate seasonally and to within a few metres of the surface.

The hydrogeological map of Darwin classifies the groundwater in the vicinity as saline. There is little other groundwater quality data for the East Arm area.

2.4 Water quality

Under the Water Act 1992, beneficial uses for Darwin Harbour have been identified as:

- Aquaculture – to provide water for commercial production of aquatic animals;
- Environment – to provide water to maintain the health of aquatic ecosystems; and
- Cultural – to provide water to meet aesthetic, recreational and cultural needs.

Water Quality Objectives (WQO) have been determined by the NT Government (NRETAS, 2010) for Darwin Harbour and describe the water quality needed to protect and sustain each of the environmental values and beneficial uses identified. Depending on physical setting, there are WQOs for the outer, middle and upper estuary. The waters in which the Project is located are defined as upper estuary. WQOs for the upper estuary are presented in **Table 4**. Water quality in this zone is naturally different to the wider estuary as a result of limited flushing. Comparison of water quality in these upstream zones would often fail guideline values appropriate to the main body of the estuary (NRETAS, 2010).

In the absence of site-specific guidelines for Darwin Harbour, toxicant concentrations are referred to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000). **Table 5** presents the ANZECC guideline values of copper and zinc which are not included in NRETAS (2010).

Table 4. Guideline Values for the Protection of Aquatic Ecosystems – Upper Estuary Water Quality objectives (NRETAS, 2010)†

Indicator for Environmental Use	Objective
Dissolved Oxygen (DO) % saturation	80-100
pH	6.0-8.5
Turbidity (NTU)	<4
Conductivity (µs/cm)	-
Total Suspended Sediments (TSS) (mg/L)	<10
Chlorophyll *a* (µg/L)	<4
Total Nitrogen (µg/L)	<300

Indicator for Environmental Use	Objective
Oxidised Nitrogen (NOx) (µg/L)	<20
Ammonia as N (µg/L)	<20
Total Phosphorus (µg/L)	<30
Filterable Reactive Phosphorus (FRP) (µg/L)	<10
Enterococci (per 100 mL)	<50
E. coli (per 100 mL)	<200
Pathogenic Protozoans	<10

ǂ Refer to NRETAS (2010) for more detailed notes and information on these water quality objectives.

Table 5. ANZECC Guideline Values for the Protection of Aquatic Ecosystems (for Indicators not included in Table 4).

Indicator for Environmental Use	Objective
Copper Filtered (µg/L)	<1.3
Zinc Filtered (µg/L)	<15

2.4.1 Assessment methodology

The assessment methodology applied in this Environmental Impact Statement comprises a number of components to provide baseline conditions against which the Project can be assessed. There is little data and information specific to the Project available. Consequently, the description of the existing state of water quality in Darwin Harbour in the vicinity of the Project is based on water quality monitoring completed for the NT Government and PWC.

Annually the water quality of the harbour is assessed against the guidelines of the Darwin Harbour WQO. Water quality data for the Darwin Harbour was collected by the Aquatic Group of the Department of Environment, Parks and Water Security, and supplemented by monitoring data collected by PWC and another non-governmental commercial entity, INPEX, in 2021.

Water quality data for four monitoring sites in the vicinity of East Arm were provided by the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) for the period 2016-2021 (**Figure 5**). Two sites (G8150344 and G8155139) are located south of the East Arm peninsula. The other two are located in Hudson Creek (G8155548) to the south-east of the Project and Bleesers Creek (G8155547) north of the project.

Regular monitoring in the vicinity of Bleesers Creek has also been undertaken by PWC since 2011. They monitor several sites in receiving environments for treated wastewater from the Berrimah Wastewater Treatment Plant. These receiving environments feed directly into Bleesers Creek. Sampling is undertaken at least monthly (consistent with frequencies specified in their water discharge license) and is timed to always be on neap ebb tides to

capture as near to worst-case that can be measured (i.e., low tidal ranges, minimal dilution and flushing). Two monitoring locations (SBEBL04 and SBEBL06) are located within Bleesers Creek (**Figure 5**). The results for these two monitoring sites for the period 2011 to 2022 are summarised in the following section. Their assessment presents timeseries of observations for each indicator and provides summary information for each wet season (October to April) and dry season (May to September), i.e., 12 wet seasons and 11 dry seasons.

Figure 5. Location of water quality monitoring sites.

2.4.2 Existing environmental values

The water quality in Darwin Harbour is regarded as being in a near-pristine or slightly modified condition. The waters downstream of the Project fall within the upper reaches of the estuary where hypersaline conditions may persist for short periods during the dry season and significant freshwater pulses prevail during the wet season where stratification (or saltwater wedges) may occur (NRETAS, 2010). Significant flushing occurs during the wet season and during tidal movement.

The data collected by NRETAS shows that there has been little change since 2012 in overall water quality of the East Arm area of the harbour which has been categorised as having good to very good water quality (**Figure 6**). This is despite receiving urban stormwater runoff from Darwin City and the discharge of treated wastewater from the Berrimah plant into Bleesers Creek.

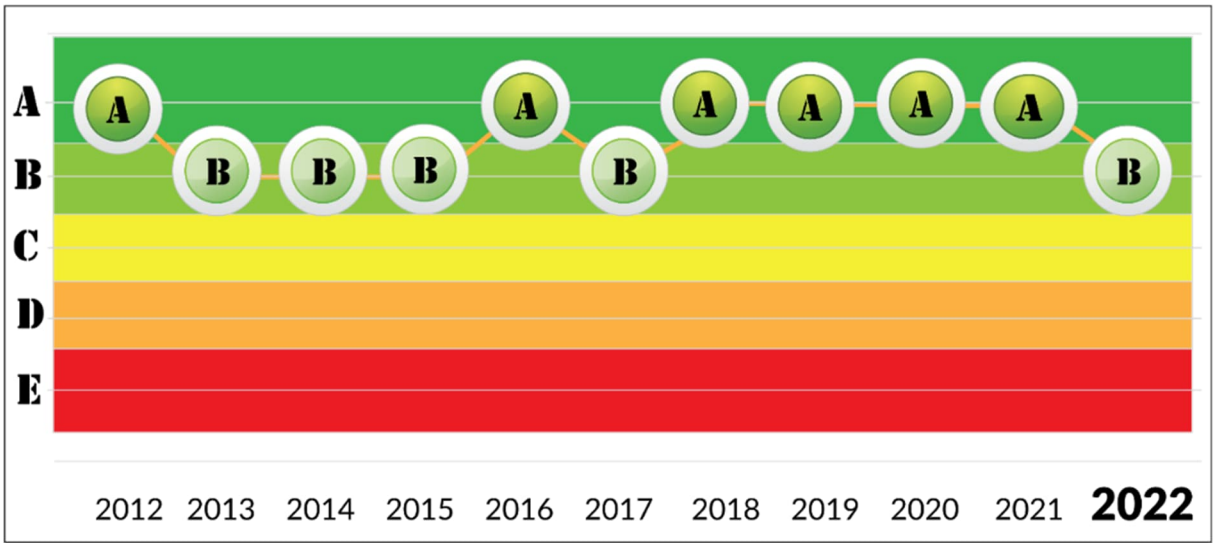


Figure 6. Long term water quality trend for East Arm, Darwin Harbour (taken from NRETAS, 2022).

Median water quality values at each monitoring site were compared to the WQOs for the upper estuary presented in **Table 4**. The results are summarised in the following sections.

Physiochemical and biological indicators

The results for the physiochemical water quality indicators for baseline conditions are provided in **Table 6**. There are a limited number of measurements for some parameters (i.e., pH, dissolved oxygen). Values for pH and dissolved oxygen are generally within their respective WQO range. Total suspended solids was measured at just one site, which had a median above the WQO. This site is south of Darwin Port to the south-west of the Project.

There is no WQO for turbidity specified. However, turbidity at these sites were generally low with median values below 10 NTU.

The WQO objective for Chlorophyll-a is 4 µg/L. All values are below the WQO across all sites.

Table 6. Physiochemical and biological water quality indicators (NRETAS data).

Constituent	WQO	Statistic	G8150344	G8155139	G8155547	G8155548
Dissolved Oxygen (% Saturation)	80-100	Median	94.3	94.7	87.5	90.6
		Minimum	86.7	85.2	77.8	77.4
		Maximum	96.1	96.0	94.7	99.4
		No. samples	4	7	4	4
pH	6-8.5	Median	8.1	7.9	7.9	7.9
		Minimum	7.9	7.9	7.7	7.5
		Maximum	8.2	8.2	8.0	8.1
		No. samples	4	7	4	4

Constituent	WQO	Statistic	G8150344	G8155139	G8155547	G8155548
Turbidity (NTU)	-	Median	2.4	3.2	6.3	5.7
		Minimum	0.8	1.3	4.1	3.9
		Maximum	15.2	17.4	11.1	9.1
		No. samples	77	44	7	6
Total Suspended Solids (mg/L)	<10	Median	16			
		Minimum	2.5			
		Maximum	29			
		No. samples	15			
Chlorophyll-a (µg/L)	<4	Median	0.7	1.1	1.6	1.4
		Minimum	0.4	0.4	0.7	0.8
		Maximum	3.4	3.5	3.3	2.7
		No. samples	123	52	9	8

Summary statistics for the two sites within Bleesers Creek monitored by PWC show median pH and chlorophyll-a values were within WQOs between 2011 and 2021. Median dissolved oxygen was typically within WQOs across wet and dry seasons in all but three of the 23 periods when it was below 80% (i.e., 2011-2012, 2014-2015 and 2020-2021 wet seasons). TSS was below WQOs across all monitoring periods except the 2011-2012 wet period when the median reached 11 mg/L. There were several exceedances during this period.

Nutrient indicators

Water quality results for nutrients are displayed in **Table 7**. Median values for nutrients were generally below the limit of reporting for ammonia, total nitrogen, oxidised forms of nitrogen (NOx) and total phosphorus. FRP was above the WQO at two of the three sites for which data was collected (i.e., south of the East Arm, sites G8150344 and G8155139). Maximum observations were also well above relevant WQOs for these two sites. Maximum values at sites within Bleesers Creek (G8155547) and Hudson Creek (G8155548) were below WQOs for all nutrients, except for ammonia in Bleesers Creek which had a maximum observation of 60 µg/L. It should be noted that there were limited samples at the Bleesers Creek and Hudson Creek monitoring sites.

PWCs monitoring indicates NOx and ammonia as N are below WQOs over the 2011-2021 reporting period. However, contrary to NRETAS data, median total nitrogen and total phosphorus exceeded WQOs over several periods. Although total nitrogen has been decreasing since 2020 at both sites, it exceeded WQOs in six and five periods (of the 23 periods presented) at SBEBL04 and SBEBL06, respectively. Total phosphorus exceeded WQOs in 11 and 14 periods at SBEBL04 and SBEBL06, respectively. Median FRP exceeded WQOs at both sites in 2018 (dry period), and at SBEBL06 in 2019 (dry period), but was otherwise within WQOs.

Table 7. Water quality indicators for nutrients (NRETAS data).

Parameter	WQO	Statistic	G8150344	G8155139	G8155547	G8155548
Ammonia as N (µg/L)	<20	Median	9	12	15	15
		Minimum	1*	1*	8	3*
		Maximum	100	34	60	16
		No. samples	82	31	6	4
Total Nitrogen (µg/L)	<300	Median	100	100	210	180
		Minimum	10	21	20	60
		Maximum	320	310	260	230
		No. samples	164	39	3	3
NOx (µg/L)	<20	Median	5	9	2*	1*
		Minimum	1*	2*	1*	1*
		Maximum	41	66	10	19
		No. samples	119	40	3	3
Total Phosphorus (µg/L)	<30	Median	18	14	21	10
		Minimum	5	6	15	9
		Maximum	56	82	27	23
		No. samples	133	17	2	3
FRP (µg/L)	<10	Median	18	15	-	8
		Minimum	5	6	-	8
		Maximum	530	460	-	8
		No. samples	112	21	-	1

** The limit of reporting for is 5 µg/L for Ammonia as N, 3 µg/L for NOx, 5 µg/L for Total Phosphorus and 3 µg/L for FRP.*

Metals

Filtered copper and zinc were not observed as part of NT's Darwin Harbour water monitoring programme. However, observations from PWCs annual monitoring in the vicinity of Bleesers Creek shows that the 95th percentile for both filtered copper and filtered zinc are typically below respective WQOs. There were some individual exceedances at both sites in 2014 and 2016.

Pathogen Indicators

There is no increasing trend in Enterococci and generally below reporting limits. However, there have been exceedances at both sites during wet periods. The largest was 4,000 coliforms per 100 mL within Bleesers Creek in November 2011.

2.5 Existing surface or ground water users

There are 11 groundwater extraction licences and one surface water extraction licence within the wider Darwin area (**Figure 7**). All are at least 4 km away from the Project and none are immediately upstream or downstream of the Project area. The Project will draw water from an existing PWC watermain. There will be no extraction of water from groundwater or Darwin Harbour for construction of the Project.

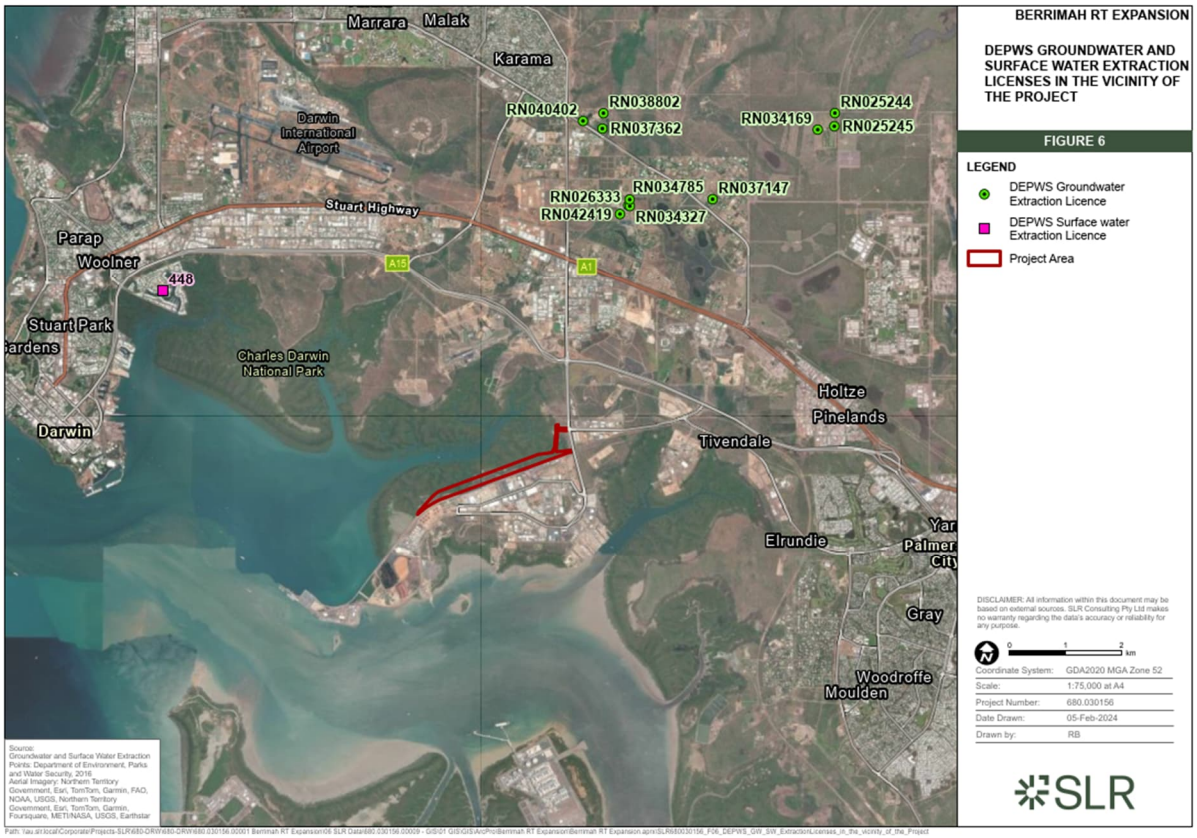


Figure 7. Groundwater and surface water extraction licenses in the vicinity of the Project.

3.0 Potential Impacts

Potential impacts to surface water and groundwater have been identified as a result of the proposed freight terminal expansion in relation to activities such as land reclamation, construction of a sea wall and development of the stormwater management system.

3.1 Surface water

Potential impacts to surface water from the proposed freight terminal expansion are:

- Changes to the natural catchment from the creation of hardstand surfaces through construction and operation of the project. These areas cover 0.6 km^2, which is 14% of the catchment area. The existing development covers 32% of the catchment area.

This would result in the interruption to, or reduction of, natural drainage flows. It may also redirect and/or concentrate flows in these areas;

- Increase in flood conditions through conversion of natural vegetation to hardstand, with more stormwater runoff generated from the Project;
- Discharge of pollutants via the stormwater systems into Bleesers Creek. A site stormwater management system will be constructed as part of the Project;
- Erosion and sedimentation during construction could result in the contamination of soils and surface waters. This could impact water quality in surface water systems and/or marine environment;
- Disturbance of acid sulfate soils or potential acid sulfate soils during construction could lead to reduced pH, decreased oxygen concentration in water and the release of heavy metals and nutrients;
- Leaks or spills during construction and operation may impact soils and surface waters;
- Increased peak flow rate of stormwater discharges due to increase in impervious areas resulting in erosion around stormwater outfalls; and
- Reduction of surface water infiltration to groundwater.

3.2 Groundwater

Potential impacts to groundwater from the proposed freight terminal expansion are:

- Reduction in groundwater recharge to aquifers because of an increase in impervious areas including buildings, hardstands, roads and railways. This may lead to a reduction in groundwater levels, flow and discharge mechanisms;
- Groundwater levels may be affected because of reduced permeability and recharge potential from increased impermeable surfaces;
- Changes to the groundwater-marine interface;
- Potential contamination of groundwater from disturbance of acid sulfate soils or potential acid sulfate soils during land reclamation and construction of the sea wall. This could lead to acidification of groundwater, release of heavy metals and nutrients; and
- Contamination of groundwater systems from chemicals and hydrocarbon spills on soil surfaces or discharges of contaminants such as heavy metals and organic compounds.
- As there will be no extraction of water from groundwater or Darwin Harbour for construction of the Project, and existing groundwater licenses are some distance from the Project, any affects to existing users are likely to be negligible.

4.0 Mitigation measures

Potential groundwater and surface water impacts will be managed in accordance with relevant standards, including as set out in the following:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000);
- Darwin Harbour Strategy (DHAC, 2010);
- DPC Environmental Management Plan;
- Draft Stormwater Management Strategy for the Darwin Harbour Catchment;
- Marine Pollution Act;
- Waste Management and Pollution Control Act;
- Water Quality Objectives for the Darwin Harbour Region; and
- Water Act.

4.1 Surface water

The clearing of land will be restricted to the construction footprint only. The design of the road, railway and associated infrastructure will include drainage and compaction in accordance with Australian Standards.

During detailed design, the Project will be refined with the aim of not worsening existing flood conditions. Post-construction, the local water flow will be altered slightly where hardstand areas are constructed.

The reclaimed area is likely to be constructed by first establishing a seawall. The area inside the constructed seawall will then be backfilled with care taken to avoid / minimise mud waving, exposure of acid sulfate soils, erosion and sedimentation.

Stormwater runoff from the Project site will be treated in accordance with the relevant NT Government requirements including environmental approval commitments and conditions. A key priority is to ensure that the design includes features which will provide the appropriate management of any contaminants which may be mobilised in runoff from hardstand areas and internal roads during operations. The effective management of this issue will be addressed in the design, and accepted techniques (such as swale drains and bio-retention basins) implemented to ensure no adverse impact on receiving waters occurs. No stormwater will leave the site without appropriate treatment consistent with the principles of water-sensitive urban design.

An Erosion and Sediment Control Plan will be developed to identify specific measures to address the risk of sediment entering Bleesers Creek and Darwin Harbour. The Erosion and Sediment Control Plan will be developed with due regard to the 2008 IECA Best Practice Erosion and Sediment Control guidelines and the Darwin Harbour Strategy 2020-2025.

The final design of the Project will ensure sufficient containment and disposal systems for potential contaminants. Dangerous goods will be stored in designated locations with specific measures to prevent leakage and will be compliant with the requirements of the NT Dangerous Goods Act 1998, the NT Dangerous Goods Regulations 1985, the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code) and Australian Standard AS 3846:2005 - The Handling and Transport of Dangerous Goods in Port Areas (which stipulates segregation requirements).

4.2 Groundwater

The clearing of land will be restricted to the construction footprint only. The design of the road, railway and associated infrastructure will include drainage and compaction in accordance with Australian Standards.

The construction of the seawall will require backfilling in an engineered fill sequence using appropriate material. This backfilling will be undertaken to ensure exposure of acid sulfate soils and erosion and sedimentation is avoided / minimised.

On-site activities will be carried out by such practicable means necessary to minimise the contact of incidental rainfall and stormwater runoff with wastes or other contaminants. Spill and leak prevention and control techniques will be implemented to minimise risk of groundwater contamination.

As per surface water, dangerous goods will be stored in designated locations with specific measures to prevent leakage and will be compliant with the requirements of the NT Dangerous Goods Act 1998, the NT Dangerous Goods Regulations 1985, the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code) and Australian Standard AS 3846:2005 – The Handling and Transport of Dangerous Goods in Port Areas (which stipulates segregation requirements).

5.0 Predicted outcomes and commitments

The following commitments are proposed for the Project:

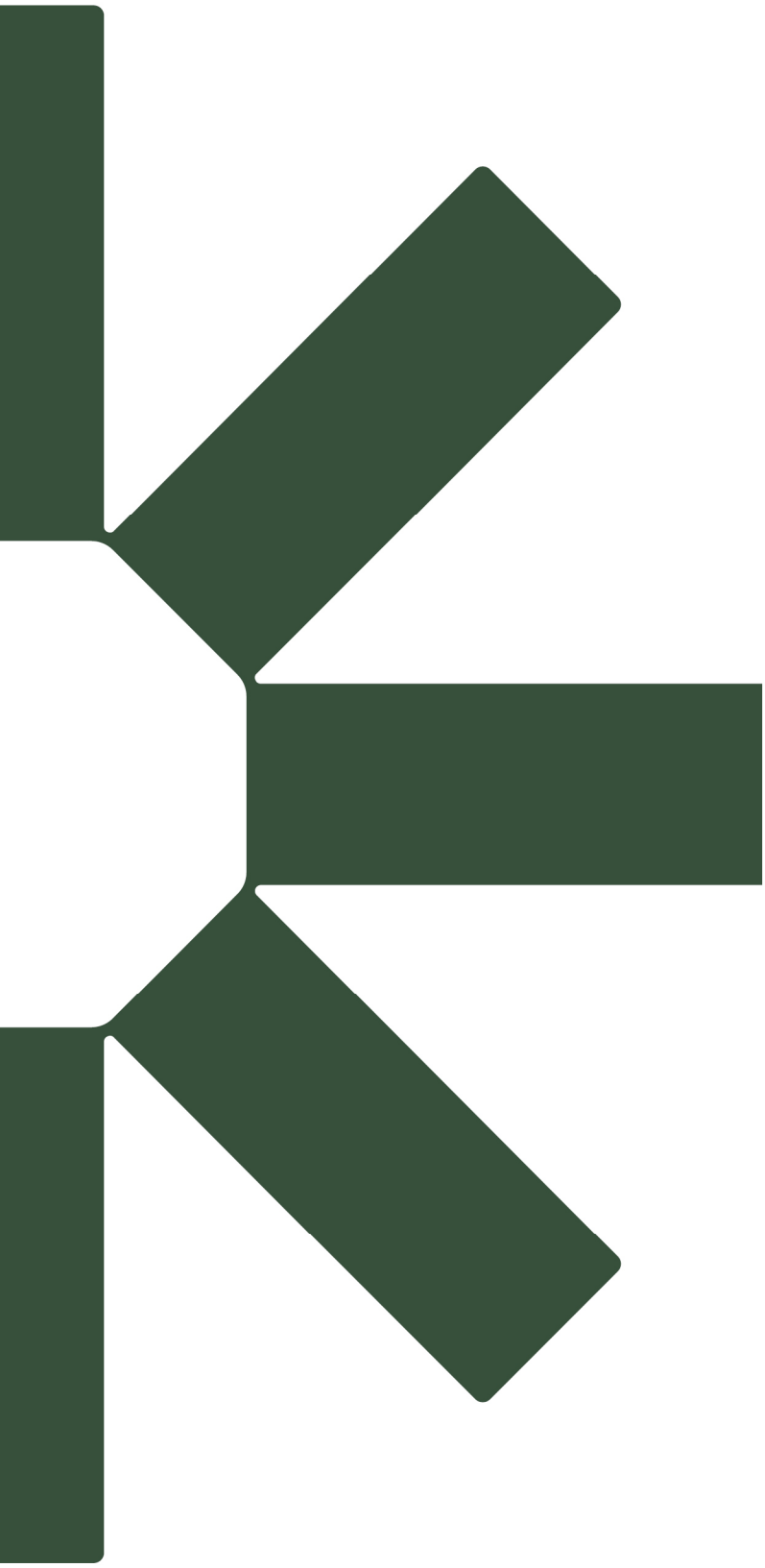
- Mitigation and control measures would be implemented as required to ensure that relevant surface water and groundwater standards are met. These would be designed in accordance with relevant standards and guidelines.
- A surface and groundwater management programme would be implemented with results reported annually to NRETAS.
- Stormwater runoff from the Project site will be treated in accordance with the relevant Northern Territory Government requirements including environmental approval commitments and conditions. No stormwater will leave the site without appropriate treatment consistent with the principles of water sensitive urban design.

6.0 References

ANZECC and ARMCANZ (2000) Australian and New Zealand guidelines for fresh and marine water quality. National Water Quality Management Strategy. Australian and New Zealand Environment and Conservation Council and Agriculture Resource Management Council of Australia and New Zealand.

NRETAS (2010) Water quality objectives for the Darwin Harbour region – Background documentation. Aquatic Health Unit, Department of Natural Resources, Environment, The Arts and Sport, Northern Territory Government.

Power & Water Corporations (2021) Waste Discharge Licence 146-09, Berrimah Waste Stabilisation Ponds to Bleesers Creek in Darwin Harbour. 2021 Monitoring Report.



Making Sustainability Happen