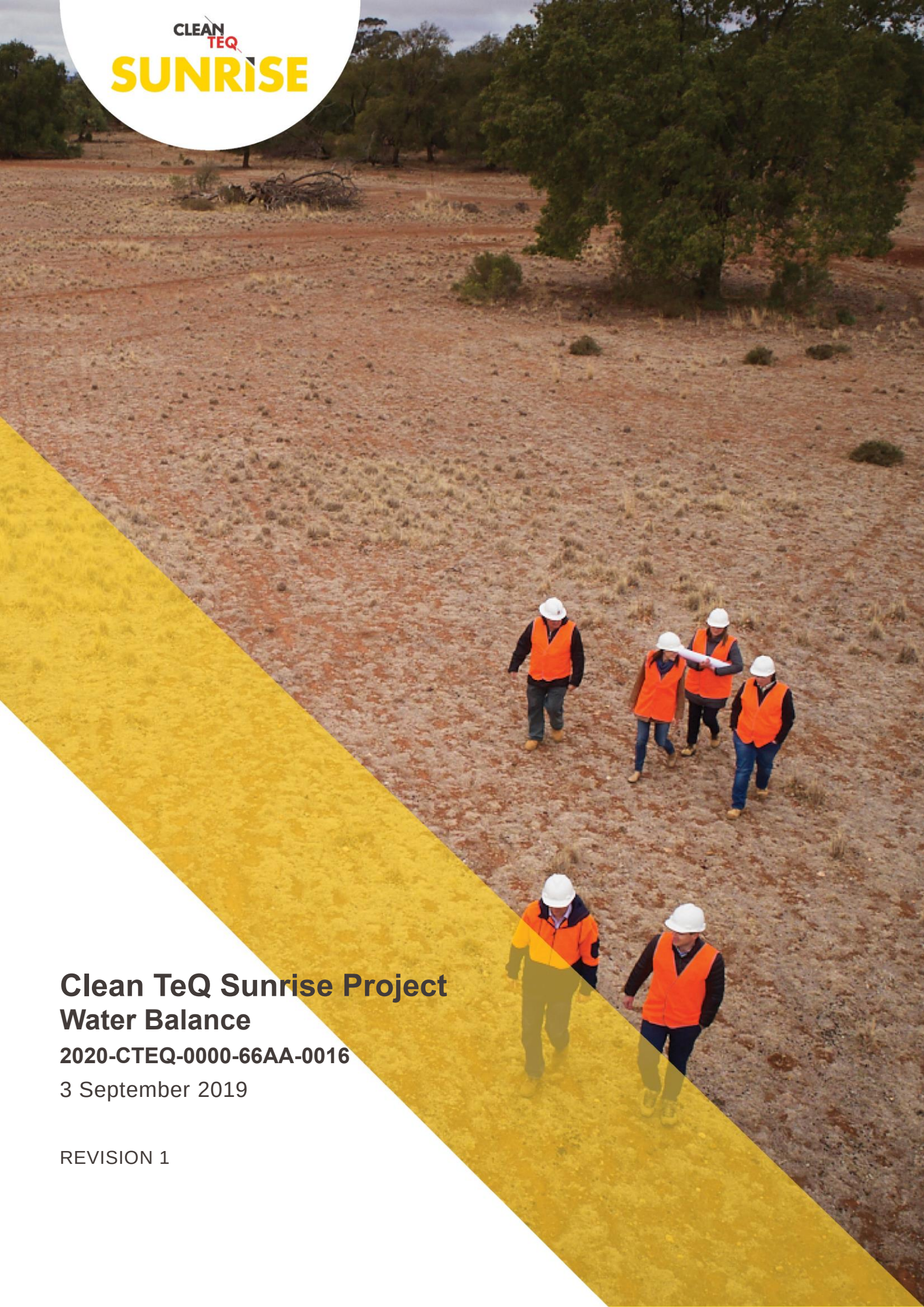


Clean TeQ Sunrise Project
Water Balance
2020-CTEQ-0000-66AA-0016

3 September 2019

REVISION 1

CONTENTS

FIGURES

TABLES

1. INTRODUCTION

The Clean TeQ Sunrise Project (the Project)[1] is a nickel cobalt scandium open cut mining project situated near the village of Fifield, approximately 350 kilometres (km) west-northwest of Sydney, in New South Wales (NSW) (Figure 1).

The Project includes the establishment and operation of the following:

- mine (including the acid leach processing facility);
- limestone quarry;
- rail siding;
- gas pipeline;
- borefields, surface water extraction infrastructure and water pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

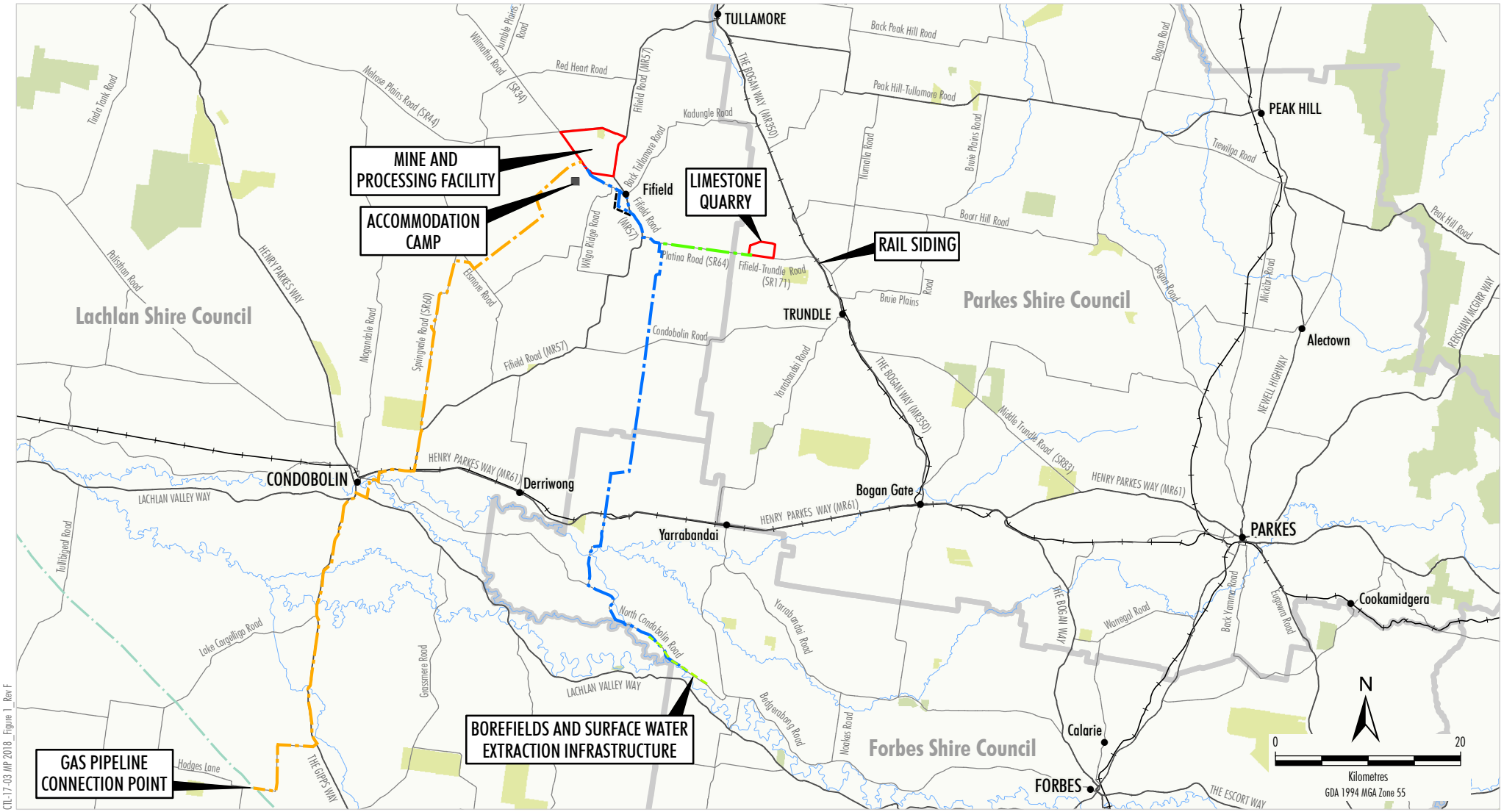
Clean TeQ Sunrise Pty Ltd owns the rights to develop the Project. Clean TeQ Sunrise Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

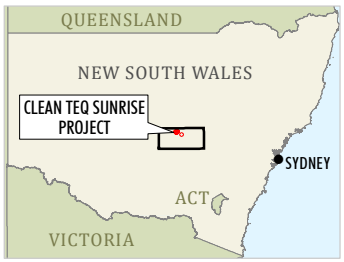
Development Consent DA 374-11-00 for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Six modifications to Development Consent DA 374-11-00 have since been granted under the EP&A Act:

- 2005 – to allow for an increase of the autoclave feed rate, limestone quarry extraction rate and adjustments to ore processing operations;
- 2006 – to allow for the reconfiguration of the borefields;
- 2017 – to allow for the production of scandium oxide;
- 2017 – to amend hazard study requirements;
- 2018 – to relocate the accommodation camp; and
- 2018 – to implement opportunities to improve the overall efficiency of the Project.

The general arrangement for the mine layout during the initial Project construction activities and full development are shown on Figures 2 and 3.

[1] The Project was previously known as the Syerston Project.





LEGEND

- National Park/Conservation Area
- State Forest
- Local Government Boundary
- Railway
- Existing Gas Pipeline
- Mining Lease Boundary (ML)
- Fifield Bypass
- Gas Pipeline
- Water Pipeline
- Limestone Quarry Water Pipeline
- Borefield Infrastructure Corridor

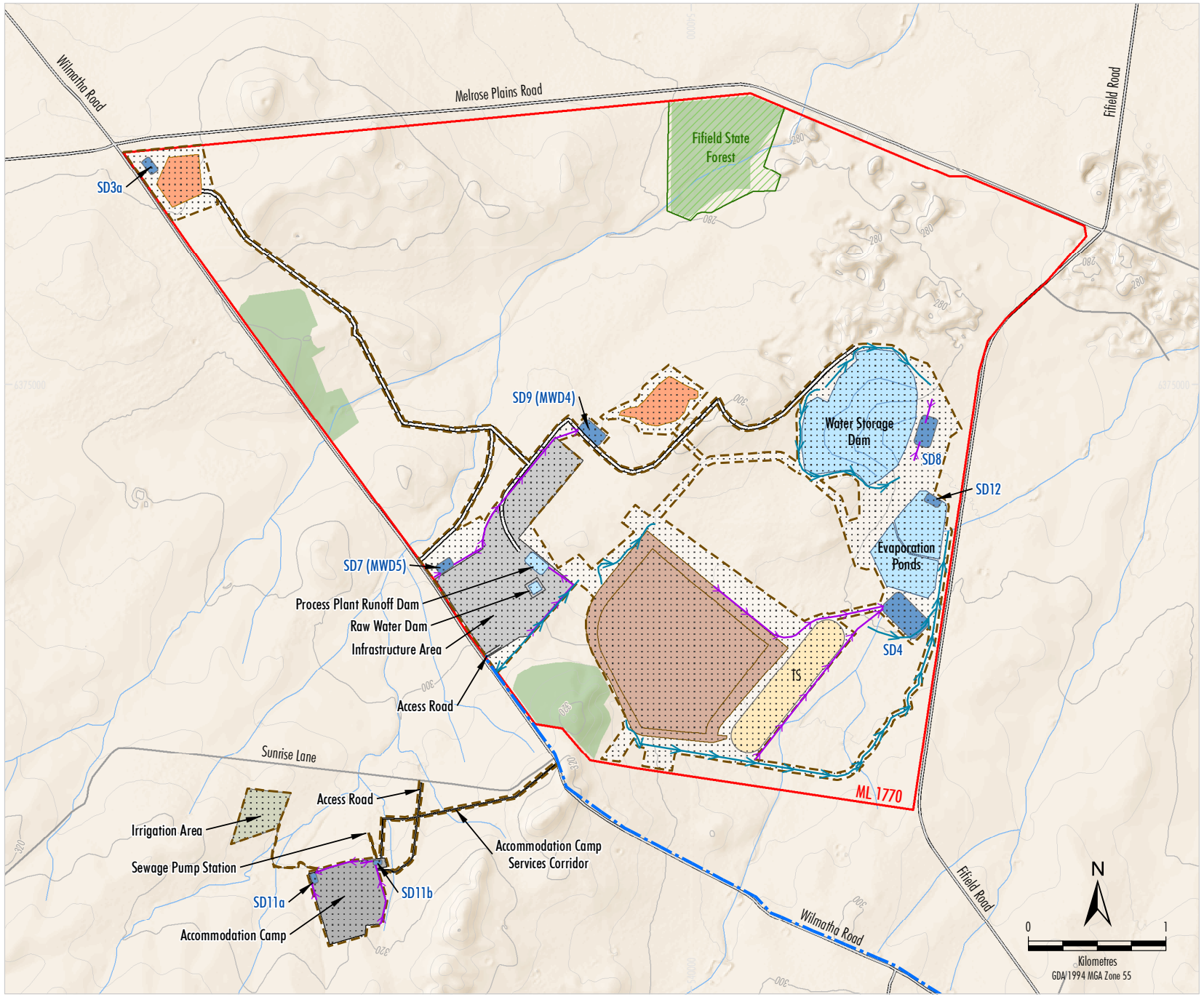
Source: Black Range Minerals (2000); Clean TeQ (2017, 2018); NSW Department of Industry (2018); NSW Land & Property Information (2017); Office of Environment and Heritage NSW (2017)

CLEAN TEQ SUNRISE PROJECT

Regional Location

Figure 1

CTL-17-03 MP 2018_Figure 1_Rev F



LEGEND

- State Forest
- Mining Lease Boundary (ML)
- Initial Construction Activities
- Surface Development Area
- Tailings Storage Facility
- Borrow Pit
- TS Topsoil Stockpile
- Infrastructure Area
- Water Storage (Mine Water)
- Sediment Dam (Mine Water)
- Existing Open Woodland to be Maintained
- Water Pipeline
- Collection Drain (Sediment Water) #
- Diversion Channel (Clean Water)

No 'mine water' would be generated during the initial construction activities and therefore no 'mine water' collection drains are shown.

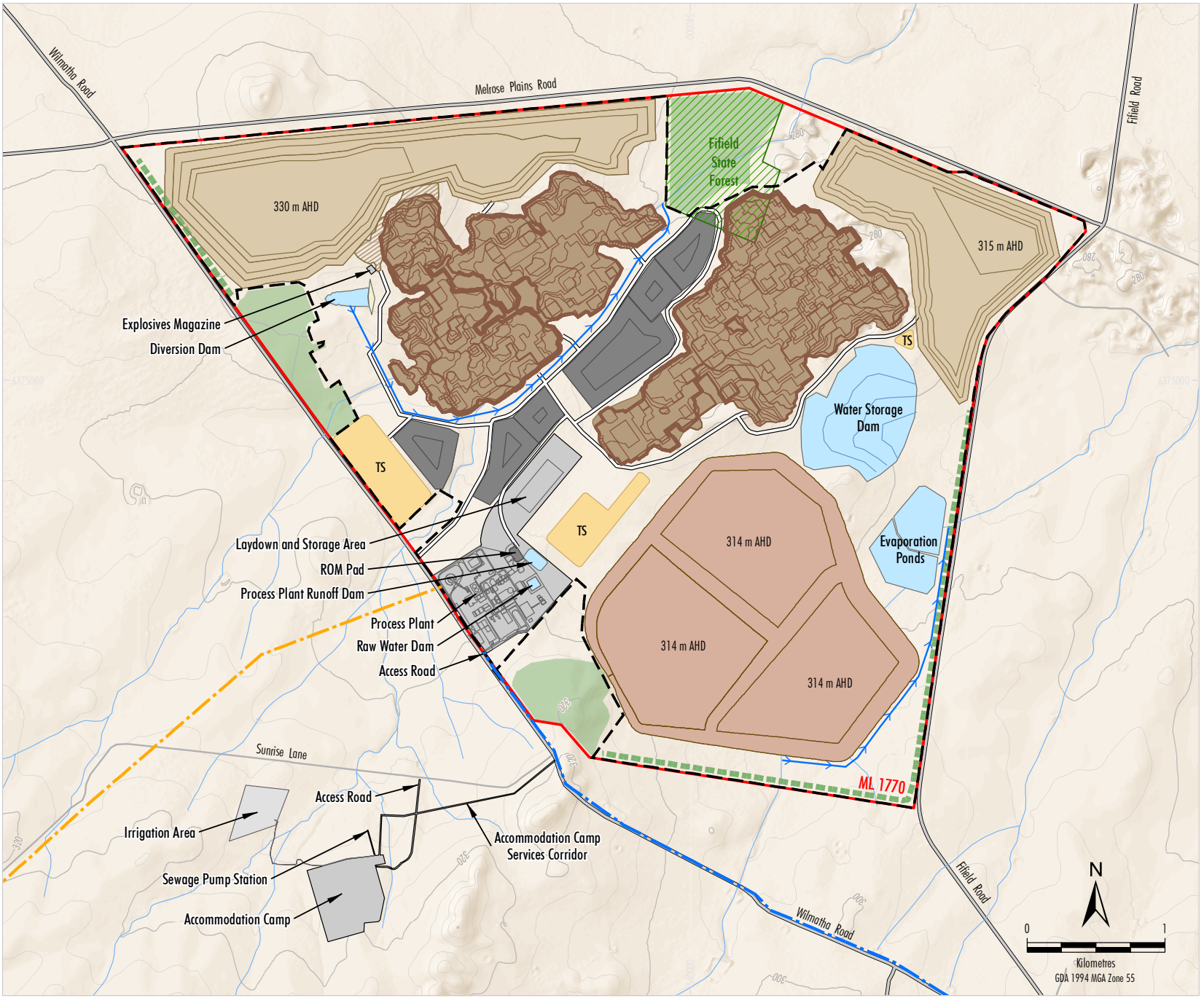
Source: Black Range Minerals (2000); Clean TeQ (2017, 2019); NSW Department of Industry (2018); NSW Land & Property Information (2017)

CLEAN TEQ SUNRISE PROJECT

Mine and Processing Facility General Arrangement (Initial Construction Activities)

Figure 2

CTL-17-03 MP 2018_WMP_202D



LEGEND

- State Forest
- Mining Lease Boundary (ML)
- Approved Surface Development Area
- Open Cut Pit (Scandium Oxide)
- Open Cut Pit
- Waste Rock Emplacement
- Tailings Storage Facility
- TS Topsoil Stockpile
- Ore Stockpile
- Mine Infrastructure Area
- Diversion Structure
- Vegetation Screening
- Existing Open Woodland to be Maintained
- Gas Pipeline
- Water Pipeline

Source: Black Range Minerals (2000); Clean TeQ (2017, 2019); NSW Department of Industry (2018); NSW Land & Property Information (2017)

CLEAN TEQ SUNRISE PROJECT

Mine and Processing Facility Conceptual General Arrangement

Figure 3

CTL-17-03 MP 2018_MOD4_Figure 3_Rev C

1.1 Purpose and Scope

This Water Balance been prepared by Clean TeQ in accordance with the requirements of Condition 30(a), Schedule 3 of Development Consent DA 374-11-00 (Table 1) and is a component of the Water Management Plan (WMP) (Appendix A of the WMP).

Table 1 – Water Balance Requirements in Development Consent DA 374-11-00

Development Consent DA 374-11-00 Schedule 3	**Section Where Addressed in this Water Balance**
30. Prior to carrying out any development after 6 May 2017, the Applicant must prepare a Water Management Plan for the development in consultation with DoI Lands & Water and the EPA, and to the satisfaction of the Secretary. This plan must include:	The WMP
(a) a Water Balance that: • *includes details of:* – *sources and security of water supply, including contingency planning for future reporting periods;* – *water use and management on site;* – *measures to prioritise the use of water in the following order:* ○ *recycled water from the water treatment plant;* ○ *other on-site sources (in accordance with harvestable rights provisions); and* ○ *water extracted from the borefields and Lachlan River;* – *reporting procedures, including the preparation of a site water balance for each calendar year; and* • *describes the reasonable and feasible measures that would be implemented to minimise clean water use on site and maximise the reuse of recovered tailings water at the facility;*	This Water Balance Sections 6.2, 7.1 & 9 Sections 6.1 and 6.3 Section 6.2 Sections 2.1 & 11 Section 6

On 5 July 2018, the Secretary of the Department of Planning, and Environment (now the Department Planning, Industry and Environment [DPIE]) (the Secretary) approved the progressive submission of environmental management plans for the Project in accordance with Condition 12, Schedule 2 of Development Consent DA 374-11-00. The scope of this Water Balance is specifically related to the following initial Project construction activities:

- development of the mine, including:
  - site establishment and earthworks;
  - construction of site access roads and haul roads;
  - processing facility earthworks;
  - establishment of temporary facilities required for construction activities (e.g. offices, lay down areas, communications infrastructure);
  - construction of the mine infrastructure area including the offices, workshops, warehouse, laboratory and amenities buildings, fuel storage areas, potable water treatment plant and car parking facilities;
  - construction of the tailings storage facility and evaporation pond;
  - construction of water management infrastructure including the raw water dam, water storage dam and sediment dams;
  - construction and operation of the concrete batch plant;
  - development of gravel and clay borrow pits (including blasting and crushing);

  - installation of appropriate fencing and barriers for public safety and security for mining and construction; and
  - other associated minor infrastructure, plant, equipment and activities;
- development and operation of the accommodation camp;
- development and operation of the borefields, surface water extraction infrastructure and water pipeline[2]; and
- road upgrades.

The initial construction activities would not include any development of the limestone quarry, rail siding or gas pipeline.

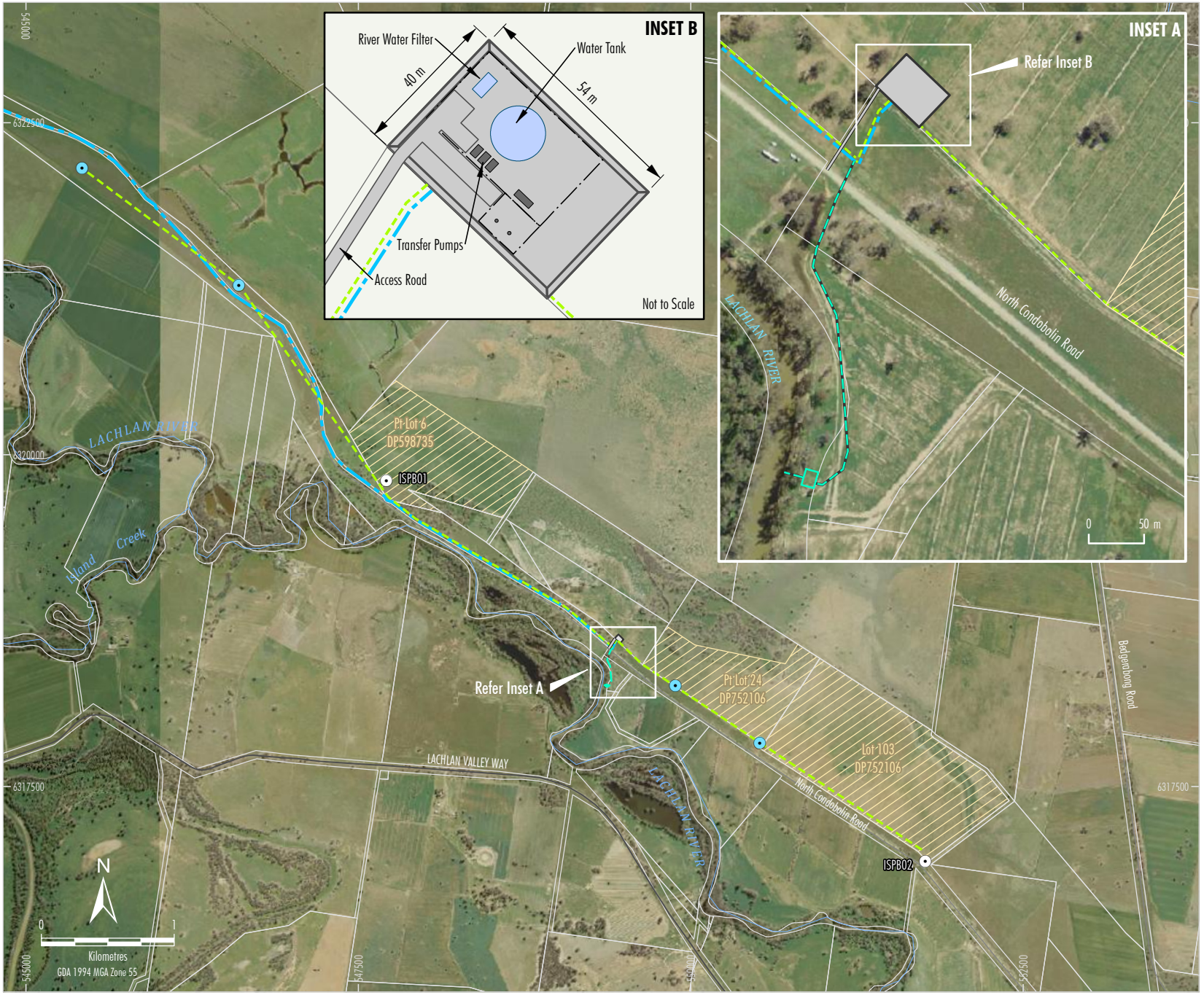
The approximate extent of the initial Project construction activities at the mine site and accommodation camp is shown on Figure 2. The approved water pipeline alignment and borefields and surface water extraction general arrangement is shown on Figures 1 and 4 respectively.

1.2 Structure of the Water Balance

The remainder of this Water Balance is structured as follows:

Section 2: Describes the review and update of the Water Balance.
Section 3: Outlines the statutory requirements applicable to the Water Balance.
Section 4: Provides the baseline data.
Section 5: Details the performance measures and performance indicators that will be used to assess the Project.
Section 6: Provides a description of the Project water management system including details of the water sources, water use and water management at the Project.
Section 7: Describes the Project water balance and presents the reliability and security of water supply, including contingency planning for future reporting periods.
Section 8: Details the Water Balance monitoring program.
Section 9: Provides a contingency plan to manage any unpredicted impacts and their consequences.
Section 10: Describes the program to review and report on the effectiveness of management measures and improvement of environmental performance.
Section 11: Describes the protocol for management and reporting of incidents, complaints and non-compliances with statutory requirements.
Section 12: Lists the references cited in this Water Balance.

[2] The water pipeline includes the Fifield Bypass and Alternative Pipeline Route alignments.



LEGEND

- Property Boundary
- Borefield Location
- Water Pipeline
- Borefield Infrastructure Corridor *
- Surface Water Infrastructure Corridor *
- Pump Station
- Transfer Station
- Access Road
- Production Bore (constructed)
- Production Bore (not constructed)

* Infrastructure Corridor includes linking pipline, access road and electricity transmission line.

Source: Clean TeQ (2017, 2019); Ivanplats Syerston (2005); NSW Land & Property Information (2018)
NSW Imagery: © Department of Finance, Services & Innovation (2018)

CLEAN TEQ SUNRISE PROJECT

Borefields and Surface Water Extraction General Arrangement

Figure 4

2. WATER BALANCE REVIEW AND UPDATE

This Water Balance has been provided to the NSW Environment Protection Authority (EPA) and the Department of Industry – Lands & Water (now the Natural Resources Access Regulator [NRAR]) for the purposes of consultation on 20 June 2018 and 25 June 2018, respectively, in accordance with Condition 30, Schedule 3 of Development Consent DA 374-11-00.

The NRAR provided comments on 27 September 2018 and 12 June 2019. These comments have been incorporated into this Water Balance. The EPA indicated on 19 October 2018 that it had no comments on the Water Balance.

Consistent with the Secretary's approval for the progressive submission of environmental management plans, this Water Balance would be re-submitted and approved prior to the commencement of activities not included in the scope of this Water Balance.

In accordance with Condition 6, Schedule 5 of Development Consent DA 374-11-00, this Water Balance will be reviewed, and if necessary revised (to the satisfaction of the Secretary), within three months of the submission of:

- an Annual Review (Condition 5, Schedule 5);
- an incident report (Condition 8, Schedule 5);
- an independent environmental audit (Condition 10, Schedule 5); or
- any modification to the conditions of Development Consent DA 374-11-00 (unless the conditions require otherwise).

The reviews would be undertaken to ensure the Water Balance is updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the Project.

Within 4 weeks of conducting a review of the Water Balance, the Secretary will be advised of the outcomes of the review and any revised documents submitted to the Secretary for approval.

If agreed with the Secretary, a revision to the Water Balance required under Development Consent DA 374-11-00 may be prepared without undertaking consultation with all parties nominated under the relevant condition of Development Consent DA 374-11-00.

The revision status of this Water Balance is indicated on the title page of each copy.

The approved Water Balance will be made publicly available on the Clean TeQ website, in accordance with Condition 12, Schedule 5 of Development Consent DA 374-11-00.

2.1 Site Water Balance – Calendar Year Review

In accordance with Condition 30(a), Schedule 3 of Development Consent DA 374-11-00, a revised water balance will be prepared for each calendar year. The revised water balance will incorporate the latest site layout and water inventory and recent monitoring data (e.g. water demand, open pit inflows) to update the water balance model predictions. The water balance review will include a comparison of monitoring data against previous model predictions. The results of the annual water balance reviews will be reported in the Annual Review (Section 10.1).

3. STATUTORY REQUIREMENTS

Clean TeQ's statutory obligations relevant to the site water balance are contained in:

- the conditions of Development Consent DA 374-11-00;
- relevant licences and permits, including conditions attached to mining leases; and
- other relevant legislation.

Obligations relevant to this Water Balance are described below.

3.1 Development Consent DA 374-11-00

3.1.1 Water Balance Requirements

Condition 30(a), Schedule 3 of Development Consent DA 374-11-00 requires the preparation of a Water Balance. Table 1 presents these requirements and indicates where they are addressed in this Water Balance.

In accordance with the requirements of Condition 30, Schedule 3 of Development Consent DA 374-11-00 (Table 1), this Water Balance is included as a component of the WMP (Appendix A of the WMP).

In accordance with Condition 31, Schedule 3 of Development Consent DA 374-11-00, Clean TeQ will implement the Water Management Plan (including the Water Balance).

3.1.2 Management Plan (General) Requirements

In addition to the Water Balance requirements prescribed in Condition 30(a), Schedule 3, Condition 4, Schedule 5 of Development Consent DA 374-11-00 outlines the management plan (general) requirements that are also applicable to the preparation of this Water Balance.

Table 2 presents these requirements and indicates where each is addressed within this Water Balance.

Table 2 – Management Plan (General) Requirements

Development Consent DA 374-11-00 Schedule 5	Water Balance Section
Management Plan Requirements *4. The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, are consistent with other plans prepared for other stakeholders, and include:*	
a) detailed baseline data;	Section 4
b) a description of: • *the relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *any relevant limits or performance measures/criteria;* • *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	 Section 3 Section 5 Section 5
c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 6
d) a program to monitor and report on the: • *impacts and environmental performance of the development;* • *effectiveness of any management measures (see c above);*	Sections 8, 10 & 12
e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 9
f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 10
g) a protocol for managing and reporting any: • *incidents;* • *complaints;* • *non-compliances with statutory requirements; and* • *exceedances of the impact assessment criteria and/or performance criteria; and*	 Section 11.1 Section 11.2 Section 11.3 Sections 8 to 10
h) a protocol for periodic review of the plan.	Section 2
Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	

3.2 Licences, Permits and Leases

In addition to the requirements of Development Consent DA 374-11-00, all activities at or in association with the Project will be undertaken in accordance with the following licences, permits and leases which have been issued or are pending issue:

- Mining Lease 1770 sought and issued by the NSW Minister for Resources under the NSW *Mining Act 1992*.
- Mining Operations Plan(s) submitted and approved by the NSW Division of Resources and Geoscience.
- Environment Protection Licence (EPL) 21146 issued by the EPA under the NSW *Protection of the Environment Operations Act 1997* (POEO Act).
- Water supply works, water use approvals and water access licences (WALs) issued by NRAR under the NSW *Water Management Act 2000* including:
  - Water Supply Works Approval 70CA614098 for the Project borefields.

  - WAL 32068 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 3,154 share components under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.
  - WAL 39837 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 766 share components under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.
  - WAL 28681 in the Lachlan Fold Belt Murray-Darling Basin (MDB) Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011*.
  - WAL 6679 in the Lachlan Regulated River Water Source, for 123 share components (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016*.
  - WAL 1798 in the Lachlan Regulated River Water Source, for 300 share components (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016*.
  - WAL 42370 in the Lachlan Regulated River Water Source, for zero share components (High Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016*.
- Groundwater licences for monitoring bores under the *Water Management Act 2000.*
- Aboriginal Heritage Impact Permits (AHIPs) (AHIP #C0003049 and AHIP #C0003887) issued by the Office of Environment and Heritage under the NSW *National Parks and Wildlife Act 1974*.
- Mining and workplace health and safety related approvals granted by the NSW Department of Industry and SafeWork NSW.
- Permits under the *Roads Act 1993*.
- Heavy Vehicle Authorisation Permit 119039 issued by the National Heavy Vehicle Regulator under the *Heavy Vehicle National Law NSW.*
- Crown Land Licences issued under the *Crown Land Management Act 2016*.

3.3 Other Legislation, Policies and Guidance

Clean TeQ will conduct the Project consistent with the requirements of Development Consent DA 374-11-00 and any other legislation that is applicable to an approved Part 4 project under the EP&A Act.

In addition to the statutory obligations described in Sections 3.1 and 3.2, the following NSW Acts (and their Regulations) may be applicable to the conduct of the Project:

- *Aboriginal Land Rights Act 1983*;
- *Biodiversity Conservation Act 2016*;

- *Biosecurity Act 2015*;
- *Crown Land Management Act 2016*;
- *Contaminated Land Management Act 1997*;
- *Dams Safety Act 2015*;
- *Dangerous Goods (Road and Rail Transport) Act 2008*;
- *Energy and Utilities Administration Act 1987*;
- EP&A Act;
- *Fisheries Management Act 1994*;
- *Forestry Act 2012*;
- *Mining Act 1992*;
- *National Parks and Wildlife Act 1974*;
- *Pipelines Act 1967*;
- POEO Act;
- *Rail Safety (Adoption of National Law) Act 2012*;
- *Roads Act 1993*;
- *Soil Conservation Act, 1938;*
- *Water Act 1912*;
- *Water Management Act 2000*;
- *Work Health and Safety Act 2011*; and
- *Work Health and Safety (Mines and Petroleum Sites) Act 2013*.

Commonwealth Acts which may also be applicable to the conduct of the Project include:

- *Environment Protection and Biodiversity Conservation Act 1999*; and
- *Native Title Act 1993.*

Relevant licences or approvals required under these Acts will be obtained as required.

3.3.1 Water Management Act 2000

As water sharing plans have commenced under the *Water Management Act 2000* for all surface and groundwater systems within which the Project lies, the *Water Management Act 2000* is relevant to water licensing considerations for the Project. The following water sharing plans have been commenced under the *Water Management Act, 2000* for all groundwater and surface water systems within which the Project lies, including:

Mine

- *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012*.

- *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011*.

Lachlan River Surface Water Extraction

- *Water Sharing Plan for the Lachlan Regulated River Water Source 2016*.

Borefields

- *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.

3.3.2 Water Act 1912

As water sharing plans have commenced under the *Water Management Act 2000* for all surface water systems within which the Project lies (Section 3.3.1), the *Water Act 1912* is not relevant to licensing considerations for the Project.

3.3.3 Protection of the Environment Operations Act 1997

Clean TeQ holds EPL 21146 for the Project.

In accordance with Condition 27, Schedule 3 of Development Consent DA 374-11-00, unless EPL 21146 authorises otherwise, the Project will be carried out to comply with Section 120 of the POEO Act.

4. BASELINE DATA

4.1 Meteorology Information

The Project is located in the central southern region of the Macquarie-Bogan catchment with an average annual rainfall in the order of 500 millimetres (mm).

Pan evaporation in the Macquarie-Bogan catchment has a strong east-westerly gradient and varies from 900 millimetres per year (mm/year) in the south-east to 2,200 mm/year in the north-west. The Project is located in the region of approximately 1,800 mm/year pan evaporation (Golder Associates, 2017).

The nearest regional rainfall gauging station maintained by the Australian Bureau of Meteorology (BoM) is located at Murrumbogie (#050028), approximately 17 km south-east of the Project. This regional station has 134 years of near complete rainfall records between the years 1883 to 2018 with few data gaps.

The nearest regional pan evaporation station is located at the Condobolin Agricultural Research Station (#050052), approximately 40 km to the south-west of the Project with evaporation data from 1975 to present.

SILO Data Drill

Rainfall and evaporation data records were obtained from the Department of Science, Information Technology and Innovation's SILO Data Drill (SILO) for the Project. SILO accesses grids of data interpolated from point observations by the BoM. SILO data formats are available for any location in Australia and are suitable for statistical and modelling applications as data records are long and continuous (without data gaps).

A data set comprising 130 years of rainfall and pan evaporation data (1889 to 2018 inclusive) was obtained for the site location from SILO Data Drill and is provided in Table 3.

Table 3 – Monthly Average Rainfall and Pan Evaporation (SILO Data Drill Data)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average Rainfall (mm)	49	43	42	37	38	40	35	35	32	41	40	41	475
Average Pan Evaporation (mm)	293	232	199	122	73	46	49	75	112	171	225	283	1,880

Source: Hydro Engineering & Consulting (HEC) (2019)

Based on the SILO rainfall and evaporation records, the Project is located in an area with an average annual rainfall of 475 mm/year and annual evaporation of 1,880 mm/year (HEC, 2019). The average monthly rainfall indicates rainfall is distributed evenly throughout the year with a slight summer maximum and higher rainfall variability between the months of December and March.

Rainfall records are indicative of a dry (borderline semi-arid) climate which is confirmed by the location of the Project on the Köppen climate classification system as borderline semi-arid with a hot summer (Golder Associates, 2017).

Pan evaporation is seasonally dependent, with average annual variations from 46 millimetres per month (mm/month) in the winter months to 293 mm/month in summer months (HEC, 2019).

Project Meteorological Station

In accordance with Condition 25, Schedule 3 of Development Consent DA 374-11-00, prior to carrying out any development under Development Consent DA 374-11-00 after 6 May 2017, Clean TeQ will operate a suitable meteorological station in the vicinity of the mine that complies with the requirements in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2007).

The meteorological station was installed in November 2018, prior to carrying out any development under Development Consent DA 374-11-00 after 6 May 2017.

4.2 Topographical Information

The mine site is situated to the northern side of a low-lying ridgeline which separates the Macquarie-Bogan catchment from the Lachlan catchment to the south. The topography of the mine site and surrounds consists of gentle to moderate sloping grazing and farming land which generally slopes towards the north-east. Elevations vary from 326 metres Australian Height Datum (m AHD) in the south to 274 m AHD to the north-east.

Remnant magnesite mining features are present in the north-east corner of the Project site, altering the natural topography with spoil piles and shallow pits.

A number of runoff-harvesting and in-stream dams exist at the Project location and in the nearby surrounding farming area.

4.3 Hydrological Information

Baseline data for streamflow, surface water quality and surface water users are presented in detail in the Surface Water Management Plan (SWMP) (included as Appendix B of the WMP).

4.4 Hydrogeological Information

Baseline data for geology, groundwater resources, groundwater levels and quality, groundwater dependent ecosystems and groundwater users are presented in detail in the Groundwater Management Plan (included as Appendix C of the WMP).

5. PERFORMANCE MEASURES AND PERFORMANCE INDICATORS

Table 9 in Development Consent DA 374-11-00 prescribes the water management performance measures for the Project, as follows:

- **Water Management – General**
  - Maintain separation between clean and mine water management systems.
  - Minimise the use of clean water on-site.
- **Construction and Operation of Infrastructure**
  - Design, install and maintain erosion and sediment controls generally in accordance with the series *Managing Urban Stormwater: Soils and Construction including Volume 1* (Landcom, 2004)*, Volume 2A – Installation of Services* (Department of Environment and Climate Change [DECC], 2008a) and *Volume 2C – Unsealed Roads* (DECC 2008b)*.*
  - Design, install and maintain infrastructure within 40 metres (m) of watercourses generally in accordance with the *Guidelines for Controlled Activities on Waterfront Land* (Department of Primary Industries [DPI], 2012), or its latest version.
  - Design, install and maintain any creek crossings generally in accordance with the Policy and *Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull, S. and Witheridge, G., 2003), or their latest versions.
- **Clean Water Diversion Infrastructure**
  - Maximise the diversion of clean water around disturbed areas on-site.
  - Design, construct and maintain the clean water diversions to capture and convey the 100 year, peak flow rainfall event.
- **Sediment Dams (Mine and Limestone Quarry)**
  - Design, install and/or maintain the dams generally in accordance with the series *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004) and *Volume 2E Mines and Quarries* (DECC, 2008c).
- **Mine and Limestone Quarry Water Storages**
  - Design, install and/or maintain mine and limestone water storage infrastructure to ensure no discharge of mine or limestone quarry water off-site (except in accordance with an EPL).
  - On-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and/or maintained to minimise permeability.

- Ensure that the floor and side walls of the tailings storage facility, Evaporation Basin and Surge Dam are designed with a minimum of a 900 mm clay or modified soil liner with a permeability of no more than 1 x 10^{-9} metres per second (m/s), or a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1 x 10^{-14} m/s (or equivalent).
- Design, install and maintain a seepage interception system in the Tailings Storage Facility embankments in accordance with Dams Safety Committee (DSC) guidelines.
- Design, install and maintain the water storages to capture and convey the 100 year, 72-hour Average Recurrence Interval (ARI) rainfall event.
- Design, install and/or maintain the facilities to meet the requirements of the DSC.
- The design of the tailings storage facility should conform to:
  - DSC3A – Consequence Categories for Dams (DSC, 2015); and
  - DSC3F – Tailings Dams (DSC, 2012).

- **Chemical and Hydrocarbon Storage**
  - Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standards.
- **Irrigation Area**
  - Manage the irrigation area in accordance with the EPA's *Environmental Guidelines: Use of Effluent by Irrigation* (Department of Environment and Conservation [DEC], 2004).

During construction activities, Clean TeQ will assess the Project against the specific water management performance indicators outlined in Table 4.

Table 4 – Water Management Performance Indicators – Construction

Performance Measure	Performance Indicators
Water Management - General	
• Maintain separation between clean and mine water management systems.	The water management system is constructed and maintained generally in accordance with the design described in the SWMP.
• Minimise the use of clean water on-site.	Water use is consistent with the water use priority described in the Water Balance and in accordance with relevant Water Management Act 2000 approvals.
Construction and Operation of Infrastructure	
• Design, install and maintain erosion and sediment controls generally in accordance with the series *Managing Urban Stormwater: Soils and Construction* including *Volume 1, Volume 2A – Installation of Services and Volume 2C – Unsealed Roads.*	Suitably qualified person documents that erosion and sediment controls have been designed and installed generally in accordance with the series *Managing Urban Stormwater: Soils and Construction* including *Volume 1*, *Volume 2A – Installation of Services* and *Volume 2C – Unsealed Roads.*
• Design, install and maintain infrastructure within 40 m of watercourses generally in accordance with the *Guidelines for Controlled Activities on Waterfront Land* (DPI 2012), or its latest version.	Suitably qualified person documents that key infrastructure within 40 m of watercourses is designed and installed generally in accordance with the *Guidelines for Controlled Activities on Waterfront Land* (DPI 2012), or its latest version.
• Design, install and maintain any creek crossings generally in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries 2003), or their latest versions.	Suitably qualified person documents that creek crossings have been designed generally in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries 2003), or their latest versions.
Clean Water Diversion Infrastructure	
• Maximise the diversion of clean water around disturbed areas on-site.	Suitably qualified person documents that clean water diversions are designed to maximise the diversion of clean water around disturbance areas.
• Design, construct and maintain the clean water diversions to capture and convey the 100-year, peak flow rainfall event.	Suitably qualified person documents that clean water diversions are designed and constructed to capture and convey the 100-year, peak flow rainfall event.
Sediment Dams (Mine and Limestone Quarry)	
• Design, install and/or maintain the dams generally in accordance with the series *Managing Urban Stormwater: Soils and Construction – Volume 1* and *Volume 2E Mines and Quarries*.	Suitably qualified person documents that sediment dams have been designed and installed generally in accordance with the series *Managing Urban Stormwater: Soils and Construction* including *Volume 1* and *Volume 2A – Installation of Services and 2E Mines and Quarries.*
Mine and Limestone Quarry Water Storages	
• Design, install and/or maintain mine and limestone water storage infrastructure to ensure no discharge of mine or limestone quarry water off-site (except in accordance with an EPL).	Suitably qualified person documents that the water management infrastructure is constructed and maintained generally in accordance with the design described in the Water Balance and SWMP.
• On-site storages (including mine infrastructure dams, groundwater storage and treatment dams) are suitably designed, installed and/or maintained to minimise permeability.	Mine water storages are constructed and maintained to minimise seepage.
• Ensure that the floor and side walls of the tailings storage facility, evaporation basin and surge dam are designed with a minimum of a 900 mm clay or modified soil liner with a permeability of no more than 1×10^{-9} m/s, or a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1×10^{-14} m/s (or equivalent).	Suitably qualified person documents that the tailings storage facility, evaporation basin and surge dam mine water storages are designed and constructed to capture and convey the 100 year, 72-hour ARI rainfall event.
• Design, install and maintain a seepage interception system in the Tailings Storage Facility embankments in accordance with the DSC guidelines.	The Dam Safety Committee approves the tailings storage facility design.
• Design, install and maintain the water storages to capture and convey the 100 year, 72-hour ARI rainfall event.	Suitably qualified person documents that the mine water storages are designed and constructed to capture and convey the 100 year, 72-hour ARI rainfall event.
• Design, install and/or maintain the facilities to meet the requirements of the DSC.	The Dam Safety Committee approves the design of relevant water storages (i.e. prescribed structures).
• The design of the tailings storage facility should conform to: – DSC3A – Consequence Categories for Dams (DSC); and – DSC3F – Tailings Dams (DSC).	The Dam Safety Committee approves the tailings storage facility design.

Table 4 (Continued) – Water Management Performance Indicators – Construction

Performance Measure	Performance Indicators
Chemical and Hydrocarbon Storage • Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standards.	Suitably qualified person documents that chemical and hydrocarbon storages are designed and constructed in accordance with the relevant Australian Standards.
Irrigation Area • Manage the irrigation area in accordance with the *EPA's Environmental Guidelines: Use of Effluent by Irrigation*.	The irrigation area is designed and maintained so as not to cause irrigation water runoff from the irrigation area.

6. WATER MANAGEMENT SYSTEM

Consistent with the general water management and clean water diversion infrastructure performance measures for the Project (Section 5), the key objectives of the water management system are to control runoff from the development/construction areas and the operational areas, while diverting up-catchment water around these areas, and to minimise the use of clean water on-site.

The water management system will include both permanent features that will continue to operate post-closure (e.g. northern and southern diversion channels) and temporary structures during mining operations (e.g. sediment dams).

An internal drainage system will be constructed to collect and contain water generated within the development/construction areas and operation areas.

Sediment control structures such as sediment dams and sediment fences will be employed where necessary within and downstream of disturbance areas. Consistent with the relevant performance measures (Section 5), the erosion and sediment controls will be designed, installed and maintained generally in accordance with the series *Managing Urban Stormwater: Soils and Construction* including *Volume 1* (Landcom, 2004), *Volume 2A – Installation of Services* (DECC, 2008a) and *Volume 2C – Unsealed Roads* (DECC, 2008b).

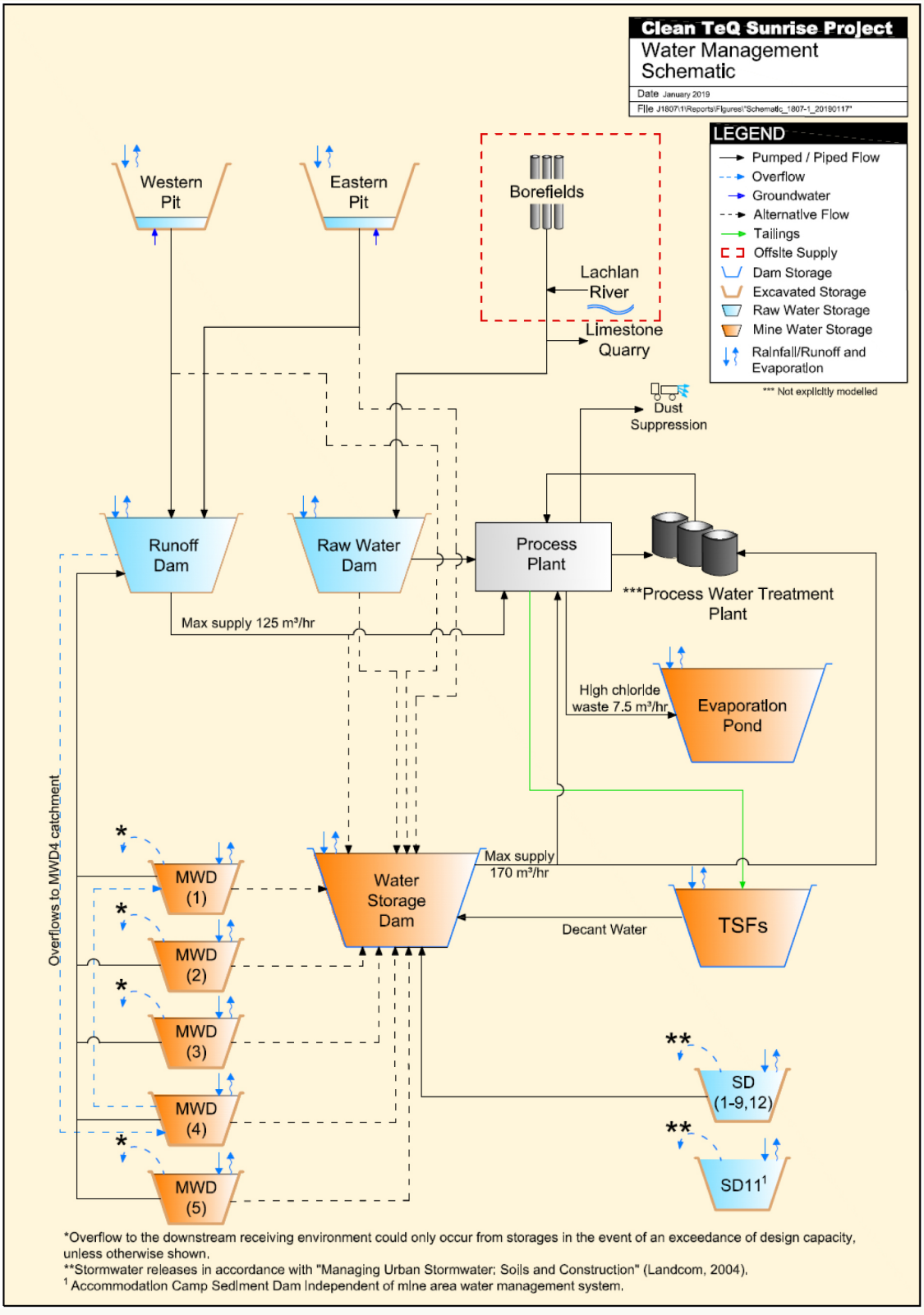
The water management system will be progressively developed during the construction and operation phases as diversion and containment requirements change. The water management schematic is shown on Figure 5 and a summary of the water management system is provided in Section 6.1.

6.1 Water Management and Related Infrastructure

6.1.1 Mine Water Storages

The following mine water storages will be constructed during the initial construction activities (Figure 2):

- tailings storage facility;
- evaporation pond;
- water storage dam;
- mine water dams and runoff dam; and
- raw water dam.



CTL-17-03 MP 2018_WBMP_001C

Source: HEC (2019)

CLEAN TEQ SUNRISE PROJECT

Water Management Schematic

Figure 5

Tailings Storage Facility

Consistent with the relevant performance measures (Section 5):

- the tailings storage facility will be designed, installed and maintained to ensure no discharge of mine water off-site (except in accordance with an EPL);
- the floor and side walls of the tailings storage facility will be designed with a minimum of a 900 mm clay or modified soil liner with a permeability of no more than 1 x 10^{-9} m/s, or a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1 x 10^{-14} m/s (or equivalent);
- a seepage interception system will be designed, installed and maintained in the tailings storage facility embankments in accordance with DSC guidelines;
- the tailings storage facility will be designed, installed and maintained to meet the requirements of the DSC; and
- the tailings storage facility design will conform with:
    - DSC3A – Consequence Categories for Dams (DSC, 2015); and
    - DSC3F – Tailings Dams (DSC, 2012).

All tailings generated in the processing facility will be pumped to and stored in the tailings storage facility. The tailings slurry will be deposited through a series of spigots located at the perimeter of the cells and a decant pond will be maintained in the centre of each cell. Decant water will be piped to the water storage dam for reuse in the processing facility.

The capacity of the tailings storage facility will progressively increase over the Project life as lifts are completed and the cells are developed.

The tailings storage facility will not be used to harvest runoff from land as it will be used to contain tailings and mine water or effluent in accordance with best management practice.

Evaporation Pond

Consistent with the relevant performance measures (Section 5):

- the evaporation pond will be designed, installed and maintained to ensure no discharge of mine water off-site (except in accordance with an EPL); and
- the floor and side walls of the evaporation pond will be designed with a minimum of a 900 mm clay or modified soil liner with a permeability of no more than 1 x 10^{-9} m/s, or a synthetic (plastic) liner of 1.5 mm minimum thickness with a permeability of no more than 1 x 10^{-14} m/s (or equivalent).

It is noted that return water would not be used from the chloride waste inflow contained separately in the evaporation pond.

The evaporation pond will have a capacity of approximately 281 million litres (ML) at full development.

The evaporation pond will be a 'turkeys nest' dam and will not be used to harvest runoff from land as it will be used to contain mine water or effluent in accordance with best management practice.

Water Storage Dam

Consistent with the relevant performance measures (Section 5):

- the water storage dam will be designed, installed and maintained to ensure no discharge of mine water off-site (except in accordance with an EPL);
- the water storage dam will be suitably designed, installed and/or maintained to minimise seepage; and
- the water storage dam will be designed, installed and maintained to meet the requirements of the DSC (if required under the provisions of the *Dams Safety Act 1978*).

The water storage dam will have a capacity of approximately 1,230 ML.

The water storage dam will be a 'turkeys nest' dam and will not be used to harvest runoff from land as it will be used to contain mine water or effluent in accordance with best management practice.

Mine Water Dams and Runoff Dam

Consistent with the relevant performance measures (Section 5):

- the mine water dams and runoff dam will be suitably designed, installed and/or maintained to minimise seepage; and
- the runoff dam will be designed, installed and maintained to capture and convey the 100 year, 72-hour ARI rainfall event.

Water collected from the disturbance footprint of the ore stockpile areas will be temporarily contained in mine water dams. Water collected from the disturbance footprint of the processing facility area will be temporarily contained in the runoff dam. Water collected in the mine water dams and runoff dam will be reused in the mine site water system.

It is noted that MWD4 and MWD5 will initially be used as sediment dams during the construction of the processing plant infrastructure area (i.e. SD9 and SD7 – Figure 2). They will become mine water dams once ore stockpiling commences.

Based the requirement for the mine water dams to be designed, installed and maintained to capture and convey the 100 year, 72-hour ARI rainfall event, the preliminary design capacities for the mine water dams will range from approximately 19 ML to 116 ML. Based on the same design requirement, the preliminary design capacity for the runoff dam will be approximately 34 ML. Although the mine water dam capacities may vary from those listed above based on final design, they will however be sized in accordance with the design criteria outlined above (i.e. 100 year, 72-hour ARI rainfall event).

Raw Water Dam

Consistent with the relevant performance measures (Section 5):

- the raw water dam will be suitably designed, installed and/or maintained to minimise seepage; and
- the raw water dam will be designed, installed and maintained to capture and convey the 100 year, 72-hour ARI rainfall event.

The raw water dam will have a capacity of approximately 15 ML.

The raw water dam will be used as buffer storage for water supplied to the site from the external sources (e.g. borefields). The raw water dam will be a 'turkeys nest' dam and will not be used to harvest runoff from land.

6.1.2 Sediment Dams

Consistent with the relevant performance measures (Section 5), the sediment dams will be designed, installed and maintained generally in accordance with the series *Managing Urban Stormwater: Soils and Construction* including *Volume 1* (Landcom, 2004) and *Volume 2E Mines and Quarries* (DECC, 2008c).

Water collected from the disturbance footprint (e.g. internal haul roads and waste dumps) will be temporarily contained in the sediment dams to minimise potential water quality impacts. Where opportunities arise, water will be recycled for dust suppression or use in the processing facility, or otherwise released in accordance with the requirements of EPL 21146.

A summary of the capacity of the sediment dams is provided in Table 5 based on preliminary designs. Although the sediment dam capacities may vary from those in Table 5 based on final design, they will however be sized in accordance with the design criteria outlined in Table 5.

Table 5 – Sediment Dam Design Criteria and Capacities

Sediment Dam	Design Criteria[1]	Approximate Capacity
SD3a	• Type F sediment basin. • 95th percentile 5 day duration rainfall event of 50.7 mm (Dubbo 5 day rainfall depth in Table 6.3a of Landcom [2004]). • A volumetric runoff coefficient of 0.74 assuming soil hydrologic Group D (Table F2 of Landcom [2004]). • Allowance for sediment storage zone capacity equal to 50% of calculated settling zone capacity.	1 ML
SD4		118 ML
SD7		32 ML[2]
SD8		23 ML
SD9		91 ML[2]
SD11a		7 ML
SD11b		5 ML
SD12		5 ML

Source: HEC (2019)

1 In accordance with *Managing Urban Stormwater: Soils and Construction including Volume 1* (Landcom, 2004) and *Volume 2E Mines and Quarries* (DECC, 2008c).

2 Sizing based on mine water dam design criteria (Section 6.1.1) as the sediment dam would eventually be used as a mine water dam.

6.1.3 Diversion Systems

The diversion system consists of clean water diversions and collection drains. The clean water diversions will collect and divert clean water around disturbed areas. The collection drains will collect and convey runoff from disturbed areas to mine water dams ("mine water") (Section 6.1.1) or sediment dams ("sediment water") (Section 6.1.2). Consistent with the relevant performance measures (Section 5), the diversion system will:

- maintain separation between clean and mine water management systems; and
- maximise the diversion of clean water around disturbed areas on site.

A summary of the diversion system design criteria is provided in Table 6.

Table 6 – Diversion System Design Criteria

Diversion System Component	Design Criteria
Clean Water Diversions	1 in 100 year, peak flow rainfall event[1]
Collection Drains	1 in 5 year, peak flow rainfall event (less than 1 year duration)[2]
	1 in 20 year, peak flow rainfall event (greater than 3 years duration)[2]

1 In accordance with Table 9 of Development Consent DA 374-11-00.

2 In accordance with *Volume 2E Mines and Quarries* (DECC, 2008c).

The permanent clean water diversions (i.e. the southern and northern diversions) will be designed, constructed and rehabilitated to be safe, stable and non-polluting. The design would consider long term stability and compatibility with existing hydrological features, landforms and vegetation. The NRAR's (2018) *Guidelines for controlled activities on waterfront land – Riparian corridors* will also be considered during the design and construction of the permanent clean water diversions. In particular, the principles of natural stream design outlined in the NRAR's (2018) *Guidelines for controlled activities on waterfront land – Riparian corridors* will be considered in the design and construction of the permanent clean water diversions.

6.1.4 Chemical and Hydrocarbon Storages

Consistent with the relevant performance measures (Section 5), chemical and hydrocarbon products will be stored in bunded areas in accordance with the relevant Australian Standards, including AS 1940-2017 *The Storage and Handling of Flammable and Combustible Liquids*.

6.1.5 Other Infrastructure

Consistent with the relevant performance measures (Section 5):

- any infrastructure within 40 m of watercourses will be designed, installed and maintained generally in accordance with the *Guidelines for controlled activities on waterfront land – Riparian corridors* (NRAR, 2012), or its latest version; and
- any creek crossings will be designed, installed and maintained generally in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013) and *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull, S. and Witheridge, G., 2003), or their latest versions.

6.1.6 Irrigation Area

Wastewater generated at the accommodation camp will be collected and treated at an on-site wastewater treatment plant. The wastewater treatment plant will consist of anaerobic and aerobic treatment and final disinfection of treated effluent. The wastewater treatment plant would be installed and operated in accordance with Lachlan Shire Council requirements.

The treated wastewater produced from the wastewater treatment plant will be pumped to the irrigation area via the irrigation water pipeline (Figure 2).

The irrigation application area will be approximately 3.5 hectares (ha) and will be divided into irrigation zones. Up to 100,000 litres per day of treated wastewater will be pumped to the irrigation area. Sprinklers will be used to evenly distribute the treated wastewater at a maximum rate of approximately 3 millimetres per square metre per day. This application rate is conservative and will minimise risk of surface pooling and runoff (True Water Australia, 2018).

True Water Australia (2018) conducted a nutrient balance for the irrigation area and concluded that the irrigation area is of sufficient size for the expected nutrient load (i.e. nutrient loading will not be a limiting factor to irrigation).

Consistent with the relevant performance measure (Section 5), the accommodation camp irrigation area would be managed in accordance with the *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004) and the irrigation rate would be controlled so as not to:

- cause irrigation water runoff from the irrigation area; or
- exceed the capacity of the soil in the irrigation area to effectively absorb the applied nutrient, salt, organic material and hydraulic loads.

6.2 Water Sources

Water will be supplied at the mine from a number of, and varying, sources during the life of the Project, including the following in order of priority (when available):

- recycled water from the processing facility and tailings storage facility;
- mine dewatering (in-pit and advance);
- internal runoff collection at the mine site (including harvestable rights); and
- off-site supply (i.e. borefields and surface water extraction from the Lachlan River).

Clean TeQ will source water from the Project borefields and surface water extraction from the Lachlan River in accordance with relevant *Water Management Act 2000* approvals to meet the off-site water demand.

Prior to the commissioning of the water pipeline, water for construction activities will be sourced from runoff collected in existing farm dams (in accordance with harvestable rights) and from the short-term road transport of water to the mine site (e.g. from a bulk water supplier or an alternative water source with appropriate licences under the *Water Management Act 2000*).

In accordance with Condition 26, Schedule 3 of the Development Consent DA 374-11-00, Clean TeQ will ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of Project to match its available water supply.

6.2.2 Recycled Water

All tailings generated in the processing facility will be pumped to and stored in the tailings storage facility. The tailings slurry will be deposited through a series of spigots located at the perimeter of the cells and a decant pond will be maintained in the centre of each cell. Decant water will be piped to the water storage dam.

Water stored in the water storage dam (including tailings storage facility decant water) will be pumped to the processing facility for reuse. Some of this water will be treated in a water treatment plant before being reused in the processing facility.

The water treatment plant will allow for the maximisation of the reuse of recovered decant water (tailings water) at the processing facility.

6.2.3 Mine Dewatering

In-pit dewatering associated with groundwater inflows is expected to be negligible (less than 0.2 million litres per year [ML/year]) over the life of the Project (Golder Associates, 2017). Notwithstanding, any groundwater inflows collected in the open pits will be transferred to the runoff dam for reuse in the processing facility.

Clean TeQ currently holds WAL 28681 in the Lachlan Fold Belt MDB Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011* for the mine pit should the deepest areas intercept any groundwater.

6.2.4 Internal Runoff Collection (Harvestable Rights)

None of the main water storages proposed on-site (i.e. tailings storage facility, water storage dam, or evaporation pond) or the raw water dam will be used to harvest runoff from land.

Water collected from the disturbance footprint of the ore stockpile areas will be temporarily contained in mine water dams. Water collected from the disturbance footprint of the processing facility area will be temporarily contained in the runoff dam. In addition, water collected from the disturbance footprint (e.g. internal haul roads and waste dumps) will be temporarily contained in the sediment dams to minimise potential water quality impacts. Where opportunities arise, water will be recycled for use in the mine water system (e.g. reuse in the processing facility).

A number of runoff-harvesting and in-stream dams exist on-site and in the nearby surrounding lands owned by Clean TeQ. Clean TeQ will also use water from these dams where opportunities arise in accordance with Clean TeQ's maximum harvestable right (refer below).

The mine and accommodation camp are located within the mapped extent of the Upper Bogan River Water Source under the *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012*. Small sections of Clean TeQ owned land are also located in the Gunningbland and Yarrabandai Water Source under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.

Clean TeQ would not require licensing for surface waters at the mine as (1) exemptions under the *Water Management (General) Regulation 2018* would apply; and (2) the runoff water captured by undisturbed areas between the clean water diversions and the ultimate extent of the Project disturbance boundary would be within the estimated harvestable right available to Clean TeQ (based on total contiguous landholdings) (refer below).

Clean TeQ's maximum harvestable right dam capacity (MHRDC) based on the ownership of contiguous Clean TeQ-owned lands in the vicinity of the mine site is presented in Table 7 for both of these Water Sharing Plans. The runoff-harvesting and in-stream dams on-site and in the nearby surrounding lands owned by Clean TeQ are also summarised in Table 7.

Table 7 – Maximum Harvestable Right Dam Capacity

Water Sharing Plan	Clean TeQ Owned Land Area (ha)	Maximum Harvestable Right Dam Capacity (ML)	Existing Clean TeQ Dams	
			Number	Volume (ML)
Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012	3,730	205	51	21
Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012	746	41	6	2

The mine water storages (Section 6.1.1) and sediment dams (Section 6.1.2) are not required to be considered under harvestable rights as they will be used to contain mine water or effluent in accordance with best management practice in accordance with the *Water Management (General) Regulation 2018*.

Based on Table 7, Clean TeQ's existing dam capacity is well within the MHRDC for both Water Sharing Plans. For the mine and accommodation camp (both located in the *Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012*), subtracting the capacity of dams (21 ML) from the harvestable right (205 ML) leaves an available harvestable rights volume of 184 ML.

Any runoff from disturbed mine areas that is captured on-site is not required to be considered under harvestable rights in accordance with the *Water Management (General) Regulation 2018*. Water that falls on undisturbed areas of the site and is not diverted around the site water management system but captured and used for operational purposes, cannot cumulatively exceed the available harvestable rights volume of 184 ML.

6.2.5 Borefield

The borefield will be a key water source for the Project. The borefields layout is shown on Figure 4.

The borefield will extract groundwater from within Zone 5 of the Upper Lachlan Alluvial Groundwater Source which is administered by the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012* under the *Water Management Act 2000*.

Clean TeQ currently holds WAL 32068 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 3,154 share components under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012* for the borefields. The borefields will be operated in accordance with the conditions of WAL 32068.

A second WAL 39837 is also held by Clean TeQ for an additional 766 share components in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone).

6.2.6 Lachlan River Surface Water Extraction

The surface water extraction from the Lachlan River will be a key water source for the Project. The surface water extraction infrastructure layout is shown on Figure 4.

For the extraction from the Lachlan River, Clean TeQ currently holds WAL 6679 and WAL 1798 in the Lachlan Regulated River Water Source, for 123 and 300 share components (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016*, respectively. In addition, Clean TeQ currently holds WAL 42370 (zero High Security share components) in the Lachlan River Regulated River Source, for subsequent trading of water on the open market under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016.*

Based on the available share components in the Lachlan Regulated River Water Source, history of available water determinations orders and recent water trading statistics, while the water market is variable (availability subject to significant rainfall events), it is mature (administered since 2004) and has significant depth of available shares for trading (Clean TeQ, 2017).

6.3Water Use

The main water demand (usage) at the mine will be associated with the processing facility once commissioned and operating. Other water demand requirements include water for construction activities (e.g. moisture for compaction control), dust suppression, cooling water and other potable and non-potable uses. The water demand (usage) will fluctuate with climatic conditions and as the extent of the mining operation changes over time. Fluctuations in water consumption have been accounted for in the water balance model (Section 7).

Approximately 900 ML/year will be required during the approximate two-year construction phase of the Project.

7. WATER BALANCE

A predictive model of the performance of the Project water management system has been developed by HEC (2019).

The water balance model simulates a 23 year period (i.e. 2 year construction period and 21 year operations period). The model simulates 130, 23 year "realizations", derived using a climatic data set from 1889 to 2018[3]. The first realization uses climatic data from 1889 to 1911, the second 1890 to 1912, the third 1891 to 1913, and so on. This method effectively includes all historical climatic events in the water balance model, including high, low and median rainfall periods. The results from all realizations were used to generate water storage volume estimates and other relevant water balance statistics.

Key results from the water balance are provided in this section.

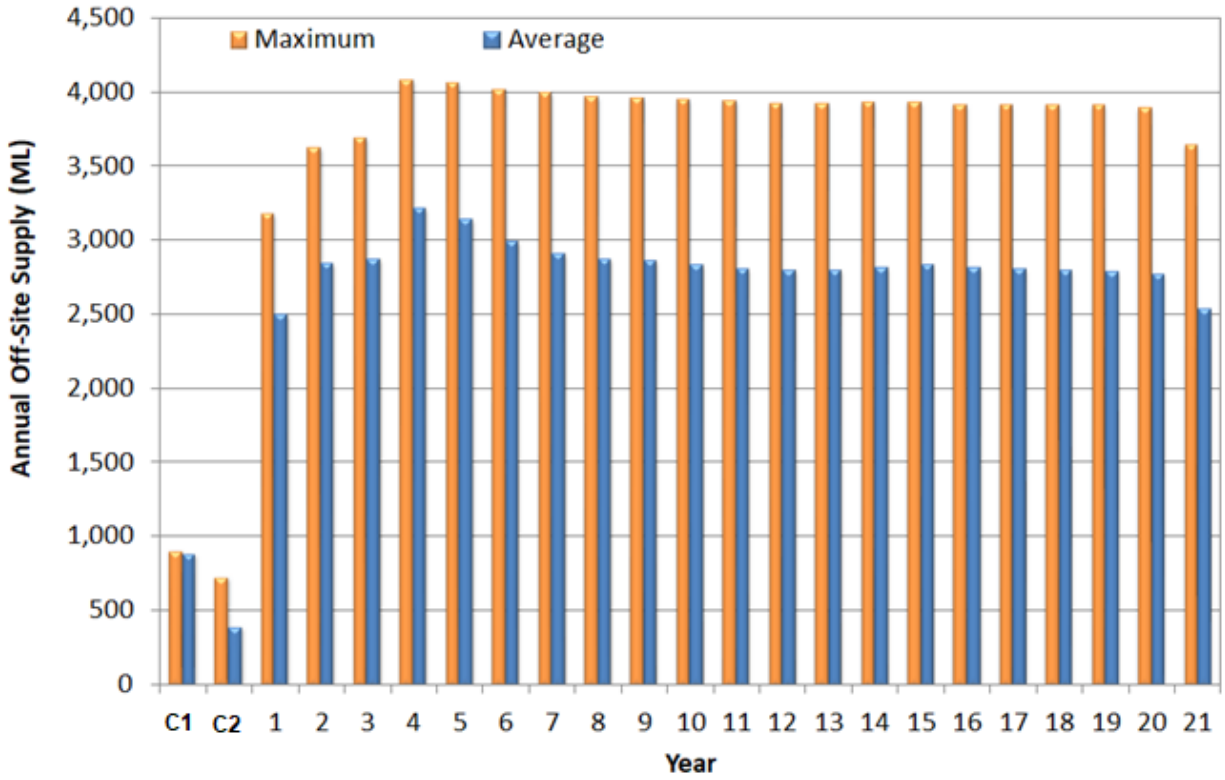
7.1 Water Supply Reliability

Construction and Operations Phases

The predicted average and maximum total off-site water demand (i.e. water required from the borefields and/or Lachlan River) over the life of the Project is presented in Figure 6.

The predicted average and maximum annual off-site water demand during the construction phase is approximately 640 ML/year and 900 ML/year, respectively. Clean TeQ currently holds groundwater and surface water entitlements (Sections 6.2.5 and 6.2.6) greater than the predicted average and maximum annual off-site water demand during the construction phase.

[3] Additional climate data after 2018 was generated by "wrapping" data from the beginning of the climate data set to after 2018. In this way, data from the beginning and end of the data set was used in the same number of realizations as all other data.



Source: HEC (2019)

Figure 6 – Simulated Annual Off-site Water Demand

The predicted average and maximum annual off-site water demand during the operations phase is approximately 2,800 ML/year and 4,080 ML/year, respectively. Clean TeQ currently holds groundwater and surface water entitlements (Sections 6.2.5 and 6.2.6) greater than the predicted average annual off-site water demand during the operations phase based on the results of the simulated 130 realizations (HEC, 2019). Clean TeQ will obtain additional surface water entitlements so that it has sufficient water entitlements for the maximum annual off-site water demand during the operations phase. The Lachlan River surface water extraction required to meet the predicted maximum annual off-site water demand is approximately 930 ML/year (HEC, 2019).

Clean TeQ currently holds WAL 42370 (zero High Security share components) in the Lachlan River Regulated River Source, for subsequent trading of water on the open market under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016.* In accordance with Condition 26, Schedule 3 of Development Consent DA 374-11-00, Clean TeQ will obtain sufficient water entitlements for the Project, and if necessary, adjust the scale of the Project to match its available water supply.

A summary of the predicted annual off-site water demand and current and required entitlements is provided in Table 8.

Table 8 – Summary of Predicted Annual Off-Site Water Demand and Current and Required Entitlements

Project Phase	Predicted Annual Off-Site Water Demand	Current Entitlements	Additional Entitlements Required
Construction	Average = 640 ML/year Maximum = 900 ML/year	• Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012* – **3,154 share components**. • Lachlan Regulated River Water Source (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016* – **423 share components**. • Lachlan Regulated River Water Source (High Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016* – **0 share components for trading**.	• **No additional entitlements required** for the predicted average or maximum annual off-site water demand.
Operations	Average = 2,800 ML/year Maximum = 4,080 ML/year		• **No additional entitlements required** for the predicted average annual off-site water demand. • **Sufficient entitlements to supply 930 ML** from the Lachlan Regulated River Water Source under the Water Sharing *Plan for the Lachlan Regulated River Water Source 2016* required.

Post-Closure Phase

Water demand during the post-closure phase is expected to be primarily related to groundwater inflows into the final voids which is expected to be less than 0.2 ML/year (Golder Associates, 2017). As described in Section 6.2.3, Clean TeQ currently holds WAL 28681 in the Lachlan Fold Belt MDB Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011*.

7.2 On-Site Containment

The risk of overflow from the mine site was evaluated as part of the water balance.

No overflows were predicted from the tailings storage facility, evaporation pond and water storage dam over the 23 year simulation period for all of the 130 realizations (HEC, 2019) consistent with the water management performance measures.

8. MONITORING PROGRAMS

During the initial construction activities, construction water demands will be monitored and available water supply sources utilised as necessary.

Upon completion of construction and commissioning of water management infrastructure, Clean TeQ will monitor the following aspects of the water management system:

- mine water storage and raw water dam levels and volumes (stored and freeboard), including development of storage curves;
- mine pit dewatering (groundwater inflows) (where measurable from pumping records) to prepare a water balance of the mine pits;
- water received at the mine from the borefields and/or surface water extraction;
- potable water supply;
- dust suppression water demands; and
- processing water inputs and outputs including:
    - feed tonnage and moisture contents;
    - product tonnages and moisture contents;
    - high chloride stream to the evaporation ponds; and
    - tailings tonnages and solid:water ratios.

The appropriate monitoring frequencies and methods will be determined by Clean TeQ as required.

In addition, Clean TeQ will continue to undertake meteorological monitoring at the mine site in accordance with Condition 25, Schedule 3 of Development Consent DA 374-11-00.

A summary of the water management system monitoring information will be provided in the Annual Review (Section 10.1).

9. CONTINGENCY PLAN

In the event a water management performance measure for the Project (detailed in Section 5) has not have been met or a performance indicator is considered to have been exceeded, Clean TeQ will implement the following Contingency Plan:

- The Clean TeQ Environmental Superintendent will report the incident in accordance with Section 11.1.
- Clean TeQ will identify an appropriate course of action with respect to the identified potential impacts or environmental consequences (if any), in consultation with specialists and relevant government agencies, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 9.2.
- Clean TeQ will submit the proposed course of action to the DPIE for approval.
- Clean TeQ will implement the approved course of action to the satisfaction of the DPIE.

9.1 Adaptive Management

In accordance with Condition 3, Schedule 5 of Development Consent DA 374-11-00, where any exceedance of the criteria and/or performance measures outlined in Schedule 3 of Development Consent DA 374-11-00 occurs, at the earliest opportunity Clean TeQ will:

- take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation and submit a report to the DPIE describing these options and preferred remediation measures; and
- implement remediation measures as directed by the Secretary of the DPIE.

9.2 Specific Contingency Measures

Specific contingency measures for an exceedance of the water management performance measures would include:

- The conduct of additional monitoring (e.g. increase in monitoring frequency or additional sampling), which would inform further specific contingency measures.
- Implementation of adaptive management strategies (e.g. on-site reconfiguration) to better maintain separation of clean and mine waters, diversion of clean waters, storage ‘as-built’ designs and avoid discharge of mine waters (except in accordance with EPL 21146).
- The provision of a suitable offset (e.g. improvement works) if there was an environmental consequence and/or adverse surface water impacts were to result.

Clean TeQ will also implement any preferred contingency measures identified to address an incident as directed by the Secretary (Sections 9.1 and 11.1).

10. REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

10.1 Annual Review

In accordance with Condition 5, Schedule 5 of Development Consent DA 374-11-00, Clean TeQ will review the environmental performance of the Project by the end of March each year (for the previous calendar year) to the satisfaction of the Secretary.

In relation to water management, the Annual Review will (where relevant):

- describe the development that was carried out in the relevant calendar year, and the development that is proposed to be carried out during the following calendar year;
- include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the:
  - relevant statutory requirements, limits or performance measures/criteria;
  - monitoring results of previous years; and
  - relevant predictions in the Syerston Nickel Cobalt Project Environmental Impact Statement (Black Range Minerals, 2000) and subsequent environmental assessments;
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the development;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the development.

The Annual Review will be made publicly available on the Clean TeQ website.

10.2 Independent Environmental Audit

In accordance with Condition 10, Schedule 5 of Development Consent DA 374-11-00, an independent environmental audit of the Project will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary.

The independent environmental audit will assess the environmental performance of the Project and review the adequacy of this SWMP. If necessary, appropriate measures or actions to improve the environmental performance of the Project or this SWMP will be recommended.

An independent environmental audit will be conducted within one year of the commencement of the development under this consent, after 6 May 2017. The independent environmental audit, and Clean TeQ's response to the recommendations in the audit, will be made publicly available on the Clean TeQ website, in accordance with Condition 12, Schedule 5 of Development Consent DA 374-11-00.

11. REPORTING PROTOCOLS

In accordance with Condition 4(g), Schedule 5 of Development Consent DA 374-11-00, Clean TeQ has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in detail in Clean TeQ's Environmental Management Strategy.

In accordance with Condition 9, Schedule 5 of Development Consent DA 374-11-00, Clean TeQ will provide regular reporting on the environmental performance of the Project on the Clean TeQ website. The Annual Review will be made publicly available on the Clean TeQ website to address this requirement.

11.1 Incident Reporting

An incident is defined as a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent DA 374-11-00.

In the event that review of surface or ground water monitoring data indicates an incident has occurred, the incident will be reported in accordance with Condition 8, Schedule 5 of Development Consent DA 374-11-00. Clean TeQ will notify the Secretary and any other relevant agencies including the relevant Council immediately after it becomes aware of the incident. Clean TeQ will also notify any affected landholders of any incident that has caused, or threatens to cause, material harm to the environment.

Within seven days of the date of the incident, Clean TeQ will provide the Secretary and any other relevant agencies with a detailed report on the incident and such further reports as may be requested. The report will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe reasonable and feasible options to address the incident and identify the preferred option to address the incident (Section 11.1).

11.2 Complaints

Clean TeQ will maintain a Community Complaints Line (tel: 1800 952 277) and email address (community@cleanteq.com) for the sole purpose of receiving community contacts and complaints. The Community Complaints Line number will be available on the website and included in Clean TeQ's advertising and community communication tools. The Community Complaints Line will be staffed 24 hours a day, seven days a week during construction and operations. Clean TeQ will respond to callers on the next business day. If the issue is urgent a member of the leadership team will be contacted immediately.

Clean TeQ has developed a procedure that outlines its commitment to receiving, resolving and recording complaints received from the community. Detailed records of each complaint resolution are kept in Clean TeQ's record management systems.

Complaints will be investigated within 24 hours of receipt. The cause of the complaint will be analysed and actions to resolve the complaint taken as soon as possible. In complex cases where resolution will take more than 48 hours, Clean TeQ will commit to update the community member regularly until the complaint is resolved.

In accordance with Condition 12(a), Schedule 5 of Development Consent DA 374-11-00, a complaints register will be made available on the Clean TeQ website and updated monthly.

11.3 Non-Compliances with Statutory Requirements

A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of Clean TeQ's Environmental Management Strategy and is described below.

Compliance with all approvals plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with Clean TeQ and the Project.

The Clean TeQ Environmental Superintendent will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 11.1, Clean TeQ will report incidents in accordance with Condition 8, Schedule 5 of Development Consent DA 374-11-00 and in accordance with the protocol for industry notification of pollution incidents under Part 5.7 of the POEO Act.

Clean TeQ will notify the Secretary and any other relevant agencies including the relevant Council immediately after the authorised person becomes aware of the incident which causes or threatens to cause material harm to the environment. Within seven days of the date of the incident, Clean TeQ will provide the Secretary and any other relevant agencies with a detailed report on the incident and such further reports as may be requested.

A review of compliance with all conditions in Development Consent DA 374-11-00, Mining Lease 1770 and all other approvals and licences will be undertaken prior to (and included within) each Annual Review (Section 10.1).

Additionally, in accordance with Condition 10, Schedule 5 of Development Consent DA 374-11-00, an independent environmental audit (Section 10.2) would be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary to assess whether Clean TeQ is complying with the requirements in Development Consent DA 374-11-00, and any other relevant approvals, EPLs, and/or mining leases.

11.4 Exceedances of Impact Assessment Criteria and/or Performance

A protocol for managing and reporting exceedances of impact assessment criteria and/or performance criteria is provided is Section 5.

12. REFERENCES

Black Range Minerals (2000) *Syerston Nickel-Cobalt Project Environmental Impact Statement.* October 2000.

Clean TeQ (2017) *Syerston Project Modification 4 Environmental Assessment*.

Dams Safety Committee (DSC) (2012) *DSC3F – Tailings Dams.* Dated June 2012.

Dams Safety Committee (DSC) (2015) *DSC3A – Consequence Categories for Dams.* Dated June 2010 and updated in November 2015.

Department of Environment and Climate Change (DECC) (2008a) *Managing Urban Stormwater: Soils and Construction Volume 2A – Installation of Services*. January 2008.

Department of Environment and Climate Change (DECC) (2008b*) Managing Urban Stormwater: Soils and Construction Volume 2C – Unsealed Roads.* January 2008.

Department of Environment and Climate Change (DECC) (2008c) *Managing Urban Stormwater: Soils and Construction Volume 2E – Mines and Quarries*. June 2008.

Department of Environment and Conservation (2004) E*nvironmental Guidelines: Use of Effluent by Irrigation.* October 2004.

Department of Primary Industries (DPI) Fisheries NSW (2013) *Policy and Guidelines for Fish Habitat Conservation and Management*. June 2013.

Department of Primary Industries (DPI) Office of Water (2012) *Controlled Activities on Waterfront Land*. July 2012.

Environment Protection Authority (2007) *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.*

Fairfull, S. and Witheridge, G. (2003) *Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings.* NSW Fisheries, January 2003.

Golder Associates (2017) *Syerston – Modification 4 Water Management Assessment.* November 2017.

Hydro Engineering & Consulting (2019) *Clean TeQ Sunrise Project Water Balance Review*.

Landcom (2004) *Managing Urban Stormwater: Soils and Construction Volume 1*. March 2004.

Natural Resources Access Regulator (2018) *Guidelines for controlled activities on waterfront land – Riparian corridors*.

True Water Australia (2018) *Effluent Management Report Clean TeQ Sunrise*. March 2018.