Buronga Landfill Expansion

Environmental Impact Statement

Wentworth Shire Council

SSD-10096818
25 January 2022
Ref: 202597R04

tonkin

Building exceptional
outcomes together

Document History and Status

Rev	Description	Author	Reviewed	Approved	Date
A	Issued for Internal and Client review	MRS/IN/AT			28/09/2021
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Declaration

This Environmental Impact Statement was:

prepared by: Dr Melissa Salt, BScAgr (Hons), PhD, CPSS, FSSA,

on behalf of: Mr Ken Ross, General Manager, Wentworth Shire Council

with respect to: Buronga Landfill, 258 Arumpo Road, Buronga (Lot 197 & 212 DP756946 and Lot 1 DP1037845).

I certify that I have prepared the contents of this Environmental Impact Statement, and to the best of my knowledge:

- the statement is in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (Current version in force from 12 February 2021),
- the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and
- the information contained in the statement is neither false nor misleading.

Dr Melissa SALT, BSc(Agriculture), PhD, CPSS, FSSA

DATE 25th January 2022

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Client: Wentworth Shire Council
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Glossary and Abbreviations

Abbreviation/terms	Definition
AADT	Annual Average Daily Traffic
ACHAR	Aboriginal Cultural Heritage Assessment Report
AHD	Australian Height Datum
Air NEPM	*National Environment Protection (Ambient Air Quality) Measure1998* prepared the National Environment Protection Council
APZ	Asset protection zone is the buffer zone between bushfire hazards and buildings
BAL	Bushfire Attack Level
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BHCC	Broken Hill City Council
BSC	Balranald Shire Council
CDSC	Central Darling Shire Council
Community and other stakeholders	All those with a stake in a project including community members that may be impacted by or interested in the project
Cth	Commonwealth of Australia
DPIE	NSW Department of Planning Industry and Environment
dS	deciSiemens, units of electrical conductivity
Environmental Impact Assessment (EIA)	Environmental Impact Assessment (EIA) is the process of identifying, predicting, evaluating and mitigating the environmental, social, economic and other relevant effects of development proposals. It includes scoping of the project, consultation with the community and other stakeholders, preparation and exhibition of the EIS, assessment and determination of the project
Environmental Impact Statement (EIS)	This document. The primary document prepared by the proponent which includes assessment of all relevant matters and impacts associated with a State significant project
EPA or NSW EPA	New South Wales Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPL	Environment Protection Licence
FERF	Front End Recycling Facility

Abbreviation/terms	Definition
GIA	Groundwater Impact Assessment
Landfill Guideline	Refers to the Environmental Guidelines: Solid Waste Landfills (EPA, 2016)
LEMP	Landfill Environmental Management Plan. This document details the operations of the landfill and presents the management and monitoring requirements based on the site's risk
LFG	Landfill Gas
m AHD	Metres Australian Height Datum
m bgl	Metres below ground level
meq	Milliequivalent; one thousandth of an equivalent of a chemical element, radical, or compound.
MRCC	Mildura Rural City Council
NCC	National Construction Code
NEPM	*National Environment Protection (Assessment of Site Contamination) Measure 1999*, National Environment Protection Council
Non-putrescible Waste	Waste that is not defined as other waste types (special waste, liquid, waste, restricted solid waste or putrescible). It includes glass, plastic rubber, bricks, metal, street sweepings, wood waste, soil, etc. Refer to EPA Waste Classification Guidelines for further details
OU	Odour units which represent the dilution factor required to decrease the concentration of an odorant to a predetermined detection threshold
PCT	Plant Community Types
PM10	Particulate matter less than 10 microns in diameter
PM2.5	Particulate matter less than 2.5 microns in diameter
Project	The Buronga Landfill Expansion Project which comprises the upgrade of recycling and resource recovery activities, the increase in annual waste tonnage limit from 30,000 t/yr to 100,000 tonnes/yr and expansion of the landfill footprint to the north
Proponent	The person or entity seeking approval for a State significant project or acting on an approval for a State significant project, including any associated entities that have been engaged to assist with project delivery. For this Project the Proponent is Wentworth Shire Council
Putrescible Waste	Waste characterised by materials that readily decay under standard conditions, emit offensive odours and attract vermin or other vectors . It includes household waste containing putrescible organics, food waste,

Abbreviation/terms	Definition
	animal waste, manure, etc. Refer to EPA Waste Classification Guidelines for further details
RAPs	Registered Aboriginal Parties
RMS	NSW Roads and Maritime Services
Scoping Report	A publicly available document which provides preliminary information on a project and its potential impacts to support a request for Secretary's Environmental Assessment Requirements (SEARs)
SEARs	The SEARs (Secretary's Environmental Assessment Requirements) set out clear expectations on the level of assessment required for each relevant matter which must be addressed by the proponent in the EIS
SEPP	State Environment Planning Policy
SISD	Safe intersection sight distance
State significant development (SSD)	Development projects which have State significance due to their size, economic value or potential impacts assessed and approved under part 4.1 of the EP&A Act
TfNSW	Transport for New South Wales
TIA	Traffic Impact Assessment
tpa	Tonnes per annum
Tonkin	Tonkin Consulting PTY LTD
TSP	Total Suspended Particles
V:H	Vertical (V):horizontal (H) ratio used as a measure of grade. May also be expressed as H:V
WSC	Wentworth Shire Council

1 Executive Summary

This Environmental Impact Statement (EIS) has been prepared by Tonkin on behalf of Wentworth Shire Council (WSC) in support of a proposed expansion to the Buronga Landfill (the site); owned and operated by WSC. The proposed development (the Project) is to expand the waste management services provided by WSC at the Buronga Landfill. The Project is to be staged over the next 120 years and comprises:

- upgrading the existing recycling infrastructure to provide a dedicated recycling facility, community resource recovery area and bulking up areas to improve recycling rates and economics of recycling;
- constructing new landfill cells to the north of the existing landfill area, increasing the landfill footprint from 19 ha to approximately 40 ha. The expansion is proposed to be undertaken in eleven stages with each stage providing 3-5 landfill cells;
- increasing maximum waste volumes from 30,000 tonnes per annum to 100,000 tonnes per annum over the longer term. Current waste acceptance from within WSC is nearing the limit of 30,000 tonnes per annum. It is also proposed to accept waste from the surrounding NSW local government areas (LGAs), such as Balranald, Central Darling and Murray River and from interstate councils such as Mildura and Renmark-Paringa.

The proposed activity is a State significant development as specified under Schedule 1 of the State Environmental Planning Policy (State and Regional Development) 2011 (NSW) as, if approved, it is proposed to :

- become a regional landfill by accepting waste from other LGAs;
- have the ability to accept > 75,000 tonnes per annum of putrescible waste;
- have the capacity to receive more than 650,000 tonnes of putrescible waste over its site life.

WSC operates several waste management facilities throughout its local government area but most are waste transfer stations and are located on relatively small land parcels and located close to towns. The existing Buronga landfill is the largest site and is located near to the major towns of Wentworth, Dareton, Gol Gol and Buronga. By co-locating the recycling and disposal facilities, WSC aims to increase current recycling rates to meet NSW Government targets, provide secure waste management facilities for rate payers into the future and provide better economies of scale for managing these facilities.

The expansion of the Buronga landfill meets a fundamental need for waste management facilities in the region. With the existing facility likely to consume all available airspace by 2024, the extension of the site is required regardless of the volume of material to be received at the site. WSC's investigations into local disposal alternatives has identified limited options with significant local impacts anticipated should the expansion not be approved.

In addition to the expansion of the physical footprint of the site, WSC is looking to work with surrounding councils as they face challenges with their existing disposal facilities through increased regulation or urban encroachment. The Buronga Landfill site is suitably sited to facilitate receipt of waste from the surrounding areas. Disposal of these additional tonnes requires WSC to increase approved annual tonnage limits and will help WSC in the delivery of best practice waste management practices for the region.

The landfill meets the EPA requirements for siting major landfills, as defined in the Landfill Guidelines. In addition, the design, operation and rehabilitation of the landfill is proposed to be undertaken in compliance with the best management practices within the Landfill Guideline, including:

- constructing landfill cells with geocomposite liners and leachate collection to control the movement of leachate and landfill gas;
- placing and compacting waste in small tip area with daily covering of waste;
- staging cell development to minimise the active area at any one time thereby minimising the potential impacts to the environment;

- rehabilitating using phytocap techniques which enables endemic vegetation ecosystems to be reinstated following cell closure.

The assessment of the potential impacts to the surrounding community and environment has identified that there is a low potential for impact for most aspects, with the exception of ecology, where clearing of land is required for the development to proceed (Table 1.1). The majority of the impacts can be adequately managed through standard landfill practice as contained within the POEO licence and embodied in the Landfill Environment Management Plan (LEMP) with the remainder able to be included in the LEMP or other management plans and become standard practice.

Table 1.1 Summary of Potential Impacts and Main Mitigation Measures

Aspect	Potential Impacts	Assessment	Main Mitigation
Air	Dust, odour, greenhouse gas (landfill gas)	Minor increases from background Predicted emissions from the project are not predicted to adversely impact upon the sensitive receptors Greenhouse gas requires NGERS and NPI reporting	Standard landfill practices to be embodied in LEMP
Traffic	Increased traffic resulting in inappropriate road function, geometry, condition or safety	Traffic increases on George Chaffey Bridge and Silver City Highway < 5%. Increased traffic on Arumpo Road Road improvements required	Improvements to turns into and out of landfill Consultation shoulder sealing along Arumpo Road Signage and training on restricted use on Mourquong Road
Soil and Water	Reduce quality or contamination	Soil is sand over clay or clay and currently low fertility No surface water bodies near site Groundwater is likely to be > 6 m below ground level and saline Overall risk to soil and water is low	Dedicated stockpiles for excavated soil Cell liners combine with stormwater and leachate management to maintain separation of leachate, sediment-laden stormwater, clean stormwater and groundwater Groundwater quality monitoring
Hazards	Dust, wastes, landfill gas, fuel storage	Potentially hazardous as the possibility of harm to the off-site environment in the absence of controls could not be discounted Hazard assessment did not identify any controls which could not be controlled by best management practices	Compliance with POEO Licence and LEMP

Aspect	Potential Impacts	Assessment	Main Mitigation
Bushfire	Bushfire from on-site or off-site	The site is potentially susceptible. Existing buffers exceed requirements for asset protection for BAL29	Preparation of Emergency Management and Evacuation Plan Additional measures as project progresses northward Buildings to be constructed with non-combustible cladding
Ecology	Loss of flora and fauna	No Threatened Ecological Flora communities or fauna are present. Good quality black box community in the east. Moderate to poor quality black oak-rosewood community to the north and west with areas of moderate quality chenopod sandplain mallee community and sugarwood community Regrowth and bare ground comprise 45% of Project area. An approved development consent exists for 15 ha of the remnant vegetation There are no entities at risk of serious and irreversible impact.	Protection of remnant vegetation Comply with LEMP Rehabilitation using endemic plant communities Payment of offset
Heritage	Damage to Aboriginal cultural heritage including places and objects	Three single artefacts identified Consultation with the RAPs, particularly during the field survey, did not uncover any specific information pertaining to the Project area and suggested that the Project area was unlikely to contain abundant physical remains of past Aboriginal occupation due to the past disturbance by sand quarrying The value of the objects to science was rated as low overall as the artefacts were small, few and not unique and affected by to the disturbance and erosion Aesthetic and historical values were also considered to be low	Protect remaining items Develop Heritage Management Plan, including staff training

Aspect	Potential Impacts	Assessment	Main Mitigation
Noise and vibration	Adverse impacts on sensitive receptors	The predicted noise levels comply with EPA's Noise Policy for Industry No vibration impacts at > 100 m and hence no impact to residence who are > 900 m away	Operations undertaken during standard working hours
Social and economic	Impacts to demographics or reduction in economy	Rural location with industrial neighbours. No impact to specific demographic Increased recycling and expanded operations have potential to increase employment from 6 full-time directly employed to 36 full-time direct employees and 66 full-time equivalent indirect employees, as discussed in Section 6.9.2	Project likely to be beneficial to community
Visual amenity	Low of visual amenity	Project is at distance from receptors and screened by existing vegetation and 200 m site buffer as well as topography	Use of dull-coloured exterior for recycling facilities Staged development Rehabilitation using endemic vegetation

The main aspects of the project which have been designed to avoid or minimise impacts are:

- improved recycling to reduce reliance on disposal;
- staged development to reduce impacted area at any one time. With the front-end recycling facility and resource recovery area expected to be completed within 5 years and the landfill cell development as shown in Table 1.2.

Table 1.2 Expected Life of Landfill Substages

Stage 1			Stage 2		
Substage	Life (years)	Cell number	Substage	Life (years)	Cell number
1A	14.2	3-5	2A	10.6	3
1B	11.9	3-4	2B	11.4	3
1C	11.8	3-4	2C	11.3	3
1D	11.4	3-4	2D	11.1	3
1E	11.4	3-4	2E	9.9	3
1F	11.4	3-4			
TOTAL	72.2			54.2	

- staging to start with impact to already cleared area and area within existing consent
- development moves landfill areas further away from most residents
- Project is sited to maximise use of already disturbed areas and reduce impacts to plant communities and prevent impact to aboriginal heritage items
- using best practice cell designs to minimise impacts to the environment and potentially offset impact to existing vegetation by restoring plant communities to rehabilitated landfill cells

Expansion of the Buronga Landfill poses a best solution response for WSC as other waste management facilities in the area are nearing closure due to a lack of space or are smaller and at significant distance from Buronga. Given the site is already in use as a waste management facility, expansion of Buronga Landfill represents best value for money and least impact on the community.

This EIS demonstrates that the Project has been designed to minimise impacts and in accordance with best management practices. We recommend the Project is supported to proceed.

2 Introduction

2.1 Project Overview

Wentworth Shire Council (WSC) is in the Far South West of New South Wales and covers 26,000 sq km and a population of 8,000 people. The Shire is 1075 km from Sydney and 585 km from Melbourne and bounds the border with Victoria as defined by the Murray River. The Shire Office is located in Wentworth (1437 people[1]) with other large towns being Gol Gol (1,523 people[1]), Buronga (1,212 people[1]) and Dareton (501 people[1]), which are located in the south near the Murray River (Figure 1 and Appendix A). Mildura Rural City Council (MRCC), with a population of 32,738[1], is located on the Victorian side of the Murray River, Balranald Sire Council (BSC) (2,287 people) to the east and Central Darling Shire Council (CDSC) (1,833 people) and the unincorporated area (including Broken Hill) to the north.

WSC provides waste collection and management services to its population with its waste facilities comprising the Buronga Landfill, Wentworth Transfer Station, Dareton Transfer Station and three small rural facilities at Ellerslie, Pomona and Pooncarie. The Buronga Landfill (the site) at 258 Arumpo Road, Buronga is located 4.75 km north of the town of Buronga and over 2.5 km north-west of the Murray River (Figure 2 and Appendix A). The site occupies Lot 197 and 212 of DP756946 and Lot 1 DP1037845 and is zoned SP2 (Infrastructure) for the purpose of waste or resource management facility. Environment Protection Licence 20209 (the Licence) issued by NSW Environment Protection Authority (Appendix B) for the scheduled activity of waste disposal currently allows the site to accept up to 30,000 tonnes of general solid waste per year. The site infrastructure currently consists of:

- Entrance gates and fencing;
- Weighbridge and site office;
- Community recycling centre for concrete, oil, paint, gas bottle, green waste, scrap metal, cardboard, glass, batteries, plastic bottles, fluoro globes and tubes;
- Public waste acceptance area;
- Access roads;
- Landfill;
- Leachate management ponds.

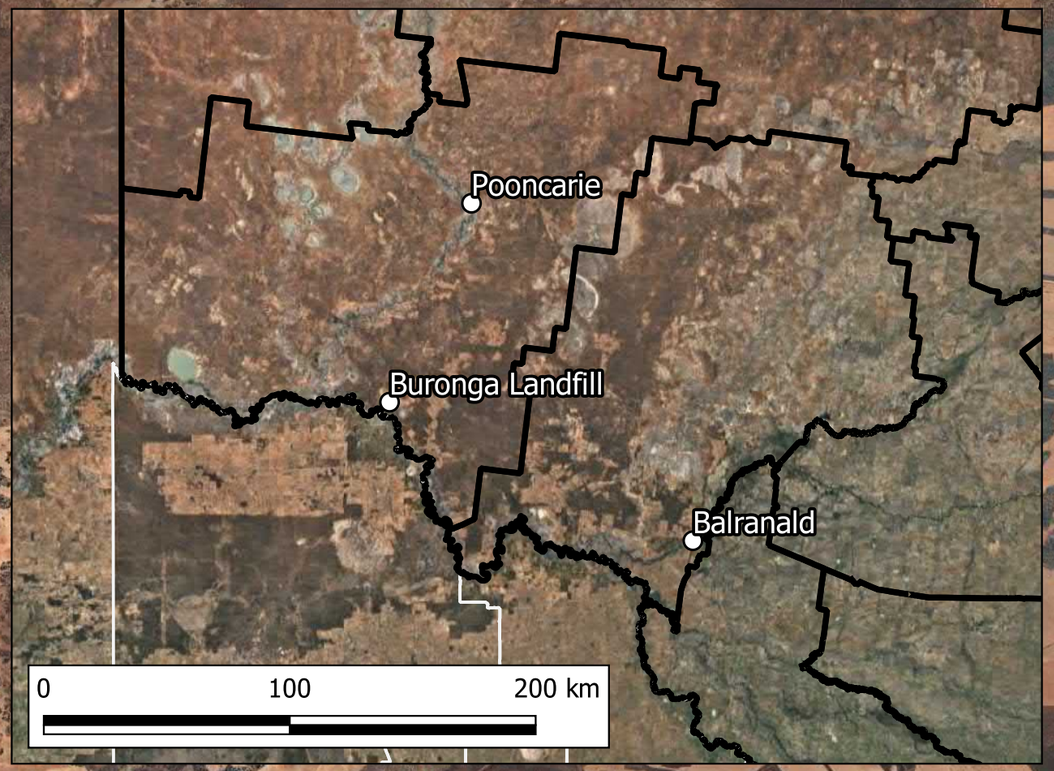
The site layout is shown in Figure 3 and in A1 format in Appendix A.

The proposed development (the Project) is to expand the waste management services provided by WSC at the Buronga Landfill. The development is proposed to include:

- upgrading the existing recycling infrastructure to provide a dedicated recycling facility, community resource recovery area and bulking up areas to improve recycling rates and economics of recycling;
- constructing new landfill cells to the north of the existing landfill area, increasing the landfill footprint from 19 ha to approximately 40 ha. The expansion is proposed to be undertaken in eleven stages with each stage providing 3-5 landfill cells;
- increasing maximum waste volumes from 30,000 tonnes per annum to 100,000 tonnes per annum. Current waste acceptance from within WSC is nearing the limit of 30,000 tonnes per annum. It is also proposed to offer these services to the surrounding local government areas, such as Balranald, Central Darling and Murray River and potentially interstate.

This Project is proposed to be staged and is anticipated to result in the life of the landfill site extending for over 100 years. Additional details of the Project can be reviewed in Section 3.

[1] Based on the 2016 Census data from Australian Bureau of Statistics



Dareton

Wentworth

Buronga Landfill

Buronga

Gol Gol

Mildura

Legend

NSW Local Gov. Boundaries

VIC Local Gov. Boundaries

0 6 12 km

N

EPSG:3857

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Job Number: 202597
Revision: A
Date: 23.07.21
Drawn: AMT

Data Acknowledgement:
Local Goverment Boundaries from data.gov.au, 2014

Wentworth Shire Council

Buronga Landfill Ex**pansion**
Location Plan

Figure 1

Lot 1 DP1195524

Lot 2 DP1195524

ARUMPO ROAD

Lot 1 DP1037845

Lot 6917 DP1000008

Lot 197 DP756946

Lot 212 DP756946

Lot 2 DP1071616

Lot 7307 DP1180864

Lot 7311 DP1180864

Lot 2 DP1121028

Lot 2 DP1033964

Lot 930 DP756961

Lot 2 DP867041

Lot 1 DP1121028

Lot 1187 DP822097

Lot 7308 DP

Legend

- Licenced Area
- Lot Boundaries
- Road Corridor

0 200 400 600 m

EPSG:3857

N

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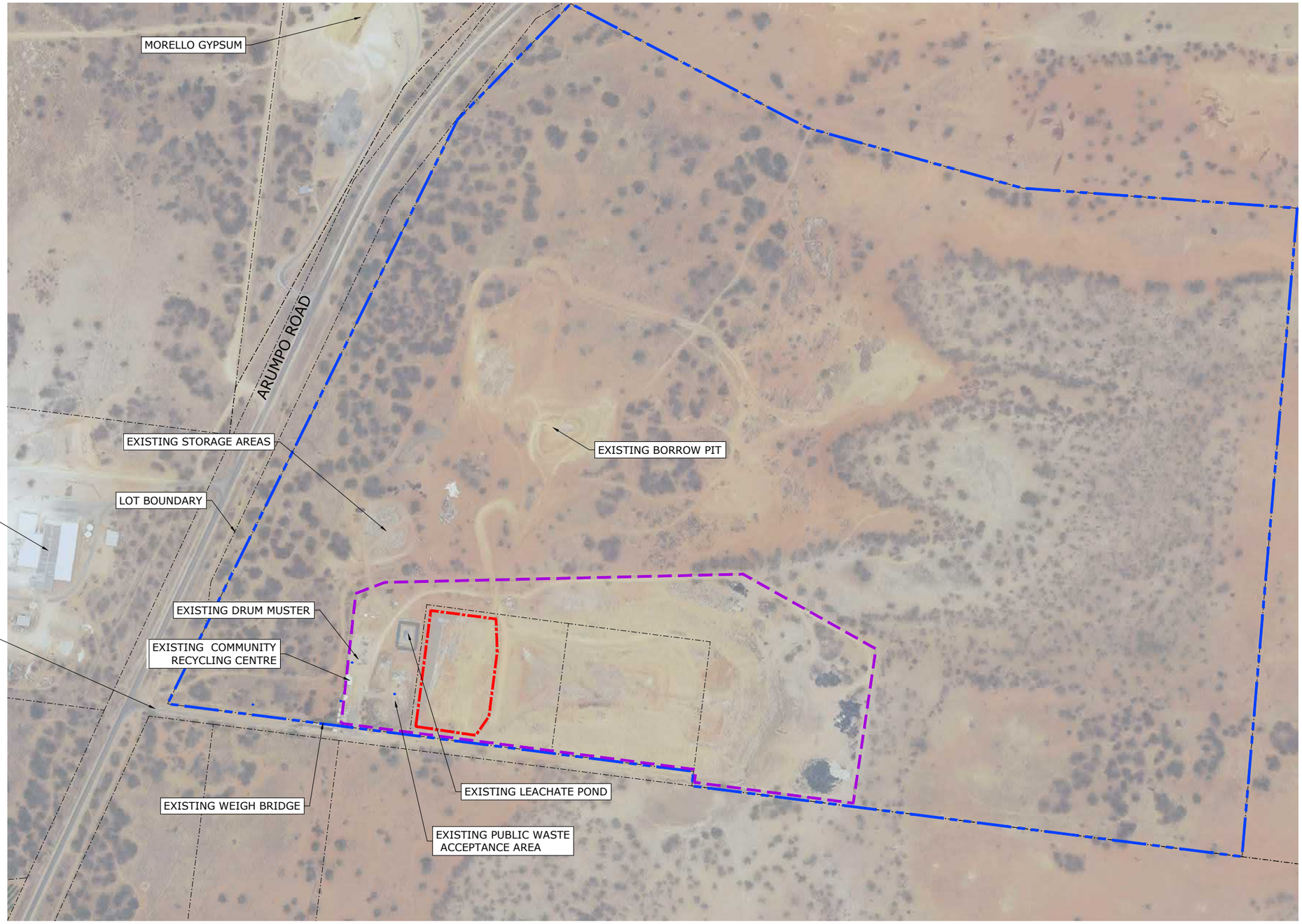
Job Number: 20180746
Filename: 20180746GQ001AGQ
Revision: Rev A
Date: 2019-07-03 16:16
Drawn: Isaac Nicholls

Data Acknowledgement:
Imagery from NSW Government Spatial Services, 2019
Cadastre from NSW Government Spatial Services, 2019
Road Data from NSW Government Spatial Services, 2019

Wentworth Shire Council

Buronga Landfill Expansion Site Plan

Figure 2



LEGEND

- LICIENCED AREA
- LANDFILL FOOTPRINT
- ACTIVE CELL

THIS DRAWING IS TO BE VIEWED IN COLOUR AS SOME FEATURES / SYMBOLS ARE DIFFERENTIATED BY COLOUR. DRAWING NOT TO BE RELIED ON IF PRINTED IN GREYSCALE.

0 30 60 120 180
1:3000 (A1); 1:6000 (A3)

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SHEET SIZE A1

COORDS: MGA94 ZONE 54
DATUM: ALL LEVELS TO A.H.D.
SCALE: 1:3000
SURVEYED:PRICEMERRET
SURVEY DATE:03.03.21
APPROVED / PROJECT LEADER

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
A	ISSUED FOR INFORMATION			

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WENTWORTH SHIRE COUNCIL

BURONGA LANDFILL EXPANSION
FIGURE 3
CURRENT SITE LAYOUT

FILENAME: 202597 CONCEPT DESIGN.DWG
PROJECT NUMBER 202597
DRAWING NUMBER 003
REVISION A

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2.2 Project Objectives

The aims of the project are to:

- Improve recycling in the region to assist in achieving the NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021) targets of 80% average recovery rate from all waste streams and tripling plastics recycling by 2030;
- Provide best practice facilities for the local residents which comply with the requirements of NSW EPA, as described in Environmental Guidelines: Solid Waste Landfills (NSW EPA, 2016) and consider the recommendations in the Handbook for Design and Operation of the Rural and Regional transfer Stations (NSW DEC, 2006);
- Safeguard provision of waste management service for the region into the future;
- Provide a service to surrounding local government areas to improve recycling and environmentally responsible waste management throughout the region.

2.3 Project History

The site was first used for waste disposal in 1934. In 1967, the Local Government Gazettal notes Reserve No. 86496 (which contains the site) was trusted to the WSC under the *Public Trusts Act 1897* (NSW) for use in landfilling. Since 2015 the facility has been operated by the WSC, from 2011-2015 the waste facility was operated by a private contractor. The site was operational for many years before the private contractor took over management of the site. The site is licenced by the NSW EPA under the *Protection of the Environment Operations Act 1997*, with WSC holding Licence number 20209. The current licence was issued 5 April 2013 and was most recently varied on 24 November 2017. The site is operated under the conditions required by this licence, as well as by the Landfill Environmental Management Plan (LEMP) (WSC, 2015). The LEMP sets out operational procedures protecting human health and the environment from impact by the operations at the Buronga Landfill.

Historically landfilling was undertaken on the eastern portion of the site, mainly above ground with waste being burnt in trenches. The first lined landfill cell was completed in 2017 and designed and constructed in accordance with the NSW EPA Environmental Guidelines for Solid Waste Landfills (NSW EPA, 2016) hereafter referred to as the NSW Landfill Guidelines. EPA approval of this cell was received in November 2017, following this approval landfilling commenced in the new lined cell. A community recycling centre (CRC) operates at the site, constructed in accordance with the NSW Environmental Trust Community Recycling Centre Grants Program.

The area of the site that is not currently used as part of the waste disposal facility consists of unused areas, areas of former quarrying activity (Landskape, 2016) or areas used as a borrow source for the landfill operation. A strategic review of the Buronga Landfill facility (Geolyse, 2015) described WSC's intentions for the future of the landfill, including high-level concept design of the proposed expansion, operations and closure of the landfill cells.

Previous investigations undertaken on site include a geotechnical investigation undertaken by GHD in 2012, with 4 boreholes drilled in the footprint of the existing waste facility. Groundwater and geotechnical data were analysed from this investigation as part of the design of the new landfill cell. An aboriginal Cultural Heritage Assessment was undertaken across the area of the site not currently occupied by the waste facility by Landskape in October 2016. This assessment found that there is one previously recorded Aboriginal object on the site, however the survey in 2016 failed to re-identify that object, and no new objects were found.

In 2018, Tonkin proposed to develop an Environmental Impact Statement for the increase in waste disposal volumes as the areas to the north of the existing footprint were likely to have existing use rights. Environment Protection Licence (EPL) 20209 limits landfilling to 30,000 tonnes per annum at the site. Varying the EPL to permit the receipt to 100,000 tonnes per annum will trigger requirements for an

Environmental Impact Assessment (EIA) and referral of the Environmental Impact Statement (EIS) to relevant government agencies for input. It has since been determined that a Development Application is required for the proposed expansion for both the increased annual volumes as well as the increased area and it has been confirmed that the landfill will include waste from areas outside the Council's local government are and hence the development is a State Significant Development.

A pre-lodgement scoping meeting between NSW Department of Planning, Industry and Environment (DPIE), WSC, Tonkin and Waste and Management Services (WAM) on 8 September 2020. Following this an application, including a Preliminary Scoping Document (Tonkin, 2020), was lodged on the Major Projects website on 13 October 2020 and on 15 October 2020, DPEI advised that the development was State Significant Development (SSD) identified as SSD-10096818. The request for the Secretary's Environmental Assessment Requirements was made on 16 October 2020 and were received on 11 November 2020 (Appendix C). The SEARS identified by DPIE are required to be addressed within this EIS.

2.4 Feasible Alternatives

2.4.1 Project Need

Waste Avoidance and Resource Recovery Act 2001 (NSW) promotes waste avoidance and resource recovery in NSW and defines a resource management hierarchy of avoidance, resource recovery and disposal. The *NSW Waste and Sustainable Material Strategy 2014 Stage 1: 2021-2027* (DPIE, 2021) supports this act by setting targets to address waste reduction, resource recovery and diversion of waste from landfill and placing the hierarchy into the circular economy (Figure 4). The targets set within the Strategy are:

- Reduce total waste generated by 10% per person by 2030;
- 80% average recovery rate from all waste streams by 2030;
- Significantly increase the use of recycled content be government and industry;
- Phase out problematic and unnecessary plastic by 2025;
- Halve the amount of organic waste sent to landfill by 2030.

WSC supports the principles of the waste hierarchy and with the operation of the Buronga landfill continuing to support and promote diversionary activities. WSC has implemented various strategies across the region to move toward these targets including:

- multiple transfer station facilities that promote the diversion and consolidation of recyclable materials (refer to Section 2.4.2);
- pricing structure that encourages diversionary activities;
- areas for waste separation at Buronga Landfill including the existing Community Recycling Centre for collection of waste oil, batteries and other problematic wastes; the drum muster for used chemical drums and the community waste drop off to separate green waste or other recyclable materials.

WSC is considering options for the introduction of multi-bin kerbside collection, community education strategies and other drivers towards sustainability. Some wastes cannot be cost-effectively diverted from landfill and WSC is committed to disposing of these materials in a manner that minimises the environmental impacts of their landfilling activities.

As part of the development, WSC is proposing to establish a new 'front end' facility where small and medium size vehicles can deposit their load and have the material sorted to reduce material going to landfill. In addition to this, recyclable streams received at the site (e.g. green waste) will be diverted from landfill and treated as per current operating practice. Improved separation of wastes will also assist in increasing the recovery rate and reducing the organic waste to landfill, in line with the *Waste and Sustainable Material Strategy 2048*.

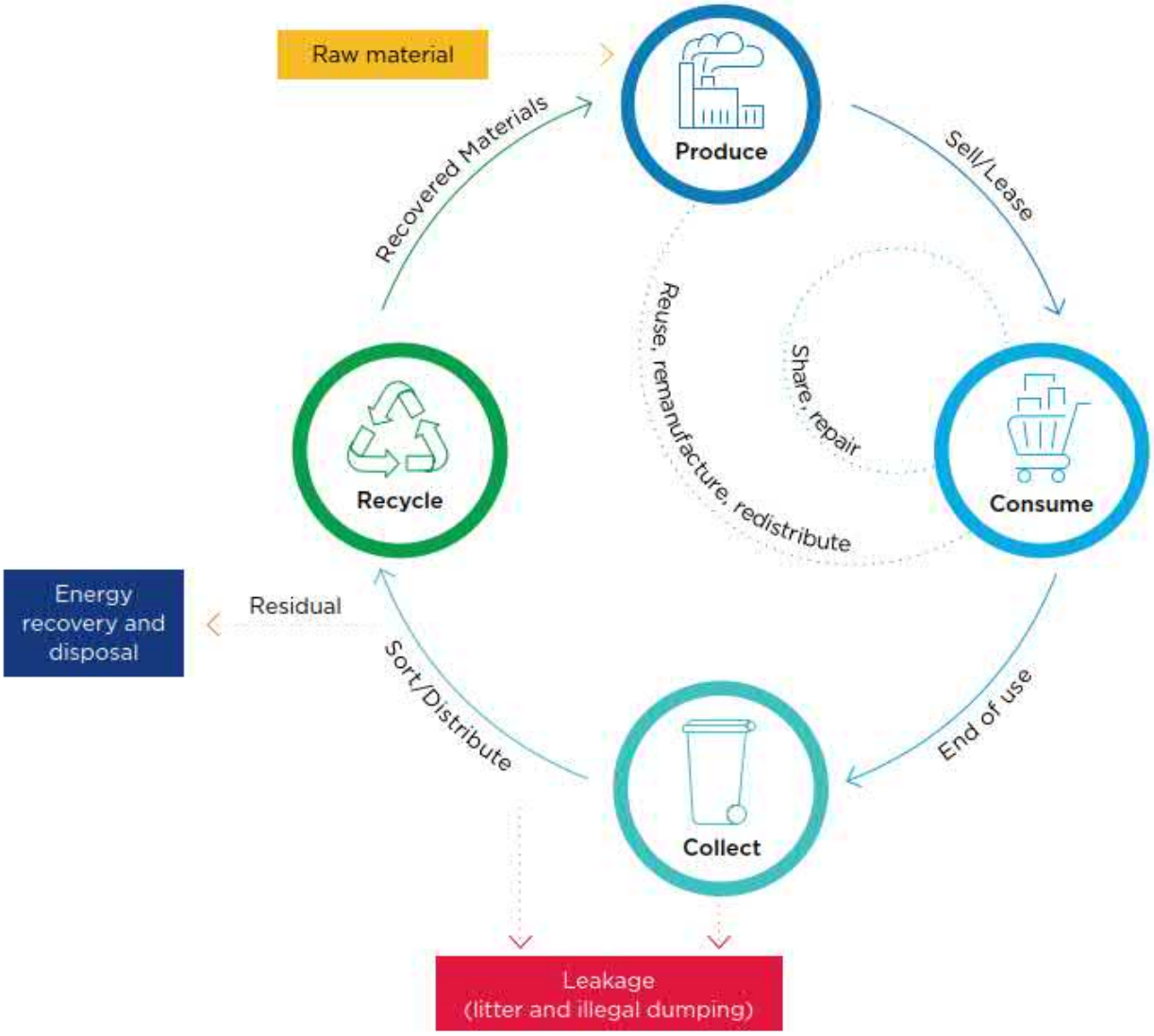

Figure 4 Circular Economy defined by NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021)

The proposed development also includes expansion of existing landfill facility and an increase in the annual tonnage of waste that WSC is licensed to accept. This increased annual tonnage allows for consolidation of waste management infrastructure, providing better monitoring and regulation through a larger facility. Consolidation of landfill facilities is supported by the NSW Government, as demonstrated by the Waste Less, Recycle More Grants Program which previously supported grants to consolidate landfills and improve waste management facilities.

The nearby NSW councils of Balranald Shire Council (BSC) and Central Darling Shire Council (CDSC) are smaller than Wentworth and produce less total annual waste, though produce more waste per capita than Wentworth (Table 2.1). BSC operates two small, unlicenced landfills at Balranald and Euston and provide s kerbside collection for residents within the village zone. CDSC collects waste from Wilcannia, Menindee and Ivanhoe and disposes waste to small, unlicensed landfills in each location. Broken Hill City Council (BHCC) has one licenced landfill and produces more waste than WSC. The declining population in these areas may exacerbate this further and with increased requirements for better waste

management, including landfill diversion, and the on-going maintenance costs, it may be advantageous for these councils to operate unmanned or small vehicle waste transfer stations and transport waste to a larger facility.

Table 2.1 Waste and Population for Selected LGAs

Local Government Area	Population at June 2020	Population Growth from 2019 to 2020	Total Residual Waste from Kerbside Collection (tonnes in 2018/19)	Residual Waste Generation Rate (kg/person/week)
Wentworth	7,090	+0.5	2,200	8.0
Balranald	2,306	-1.4	676	12.8
Broken Hill	17,269	-1.2	10,000	10.8
Central Darling	1,829	-0.5	550	15.6
Mildura	55,937	+0.3%	24,527	8.4
Notes: Waste statistics from NSW EPA (2020) and MRCC (2021) Population statics from Australian Government Centre for Population[2]				

In addition to NSW councils, the MRCC in Victoria is a close neighbour. MRCC also reports positive population growth and has a population many times greater than its neighbouring NSW towns (Table 2.1). Over 24,000 tonnes of waste was disposed to landfill in the 2020/21 financial year with a per capita tonnage similar to WSC. MRCC is challenged with their waste disposal facilities nearing the end of their operating life.

The challenges for surrounding councils, combined with increasing growth in WSC and MRCC and reducing alternatives within the region, provides WSC with an opportunity to provide improved waste management facilities for its constituents as well as providing a regional service. By developing a regional facility, WSC will potentially attract economies of scale to better facilitate recycling which can be challenging in communities at distance from capital cities.

2.4.2 Available Waste Management Facilities

WSC is committed to serving its community in a sustainable manner both financially and environmentally with several minor facilities established within the Council area that provide not only just options but also promote the diversion of recyclables from landfill. Each site provides facilities for the separation of green waste, inert construction demolition products and other recyclables such as cardboard and paper to promote sustainable activities within the region. Only residual materials are sent to landfill with other products actively managed to prevent their disposal. The facilities and their locations are as follows:

- Buronga Landfill;
- Wentworth Waste Transfer Station

[2] https://population.gov.au/data-and-forecasts/dashboards/population-local-government-areas Accessed 16/12/2021

- Dareton Waste Transfer Station;
- Pomona Tip;
- Ellerslie Tip (for local Ellerslie ratepayers and residents only);
- Pooncarie Landfill.

The Buronga Landfill is the largest facility and has no sensitive receptors within 1 km of the site with neighbours undertaking industrial activities for bentonite and gypsum supply. The site is currently used as a landfill in the south and is expected to reach capacity within the next 5 years or less. The northern area is currently part of the EPA Licence and is disturbed through previous use as a quarry and current used as a soil borrow pit for landfill operations, such as cell construction and daily cover. The semi-arid climate naturally leads to lower leachate and LFG generation than more temperate environments. The current licence as reflected in the LEMP, requires best management practices at the landfill and its ownership by a local Council authority ensures the interests of the community are well represented. The site has sufficient area to expand the current recycling facilities and provide for reuse of zero waste items and bulking of recyclables for transport to major centres.

The other landfills owned by WSC are smaller than Buronga. They are provided to service the local community, with Ellerslie Tip for local Ellerslie ratepayers and residents only and is closed to other public. Pooncarie Landfill is 120 km north of Wentworth, Buronga, Gol Gol and increases the haulage distance to the closest recycling markets in Victoria and South Australia. Pomona Tip is less 4 ha area and is within 500 m of the Darling River. As a result, the Buronga Landfill is the only available existing waste facility owned by WSC that is close to the largest population and markets for recyclables, has additional remaining capacity to expand to improve facilities and is over 900 m from surface water bodies and residents.

An alternative site in Wentworth Shire is unlikely to be found with no other areas currently appropriately zoned. The nearest landfill in Mildura (Vic) is understood to be nearing its current capacity and other nearby landfills are unlicensed or closed. The closest licenced landfills in NSW are at Broken Hill (300 km north of Buronga) or Deniliquin (350 km south east of Buronga) showing significant distances would need to be travelled to dispose of non-recyclable waste.

Should both the WSC and Mildura disposal facilities close without a clear continuation plan in place, the broader region will experience a significant level of disruption and significant financial burden. The expansion of the Buronga landfill will provide security both now and into the future for the broader region as the continued challenges in the waste management sector are managed across multiple waste and recycling streams.

2.4.3 Benefits of Buronga Landfill Expansion

Overall, the project aims to provide better solution for the environment through economies of scale allowing increased recycling opportunities and the construction, operation and closure of landfill cells in accordance with industry best practices. The expansion of Buronga Landfill is the optimal solution as:

- Aggregation of waste improves recycling opportunities;
- Large available land area safeguards waste management into the future and enable planning to maintain adequate buffers;
- Consolidation of landfill facilities improves management and utilisation of best management practices;
- The site is an existing landfill meets the siting requirements for a landfill in this region;
- No other facilities in NSW are available within economic distances from Wentworth, Gol Gol and Buronga;
- Prevents waste from leaving NSW and being transported across into neighbouring states;

- Improved economies of scale should reduce cost to current rate payers;
- The EPA licencing requirements under the POEA are rigorous and addresses off-site amenity impacts (including potential noise, dust, odour, surface water and ground water impacts).

2.5 SEARs

Table 2.2 summarises the requirements identified by DPIE to be investigated in this EIS, and where they have been addressed in the document. The complete SEARs are included as Appendix C.

Table 2.2 SEARs Environmental Impact Assessment

Required Assessment (SEARs)	Location in EIS
Statutory and Strategic Context Demonstrate that the development is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following documents must be addressed: • State Environmental Planning Policy No. 33 – Hazardous and Offensive Development; • State Environmental Planning Policy No. 55 – Remediation of Land; • State Environmental Planning Policy (Infrastructure) 2007; • State Environmental Planning Policy (State and Regional Development) 2011; • State Environmental Planning Policy (Koala Habitat Protection) 2019; • Wentworth Local Environmental Plan 2011.	Section 4
Suitability of Site - including A detailed justification the site can accommodate the proposed landfill, having regard to the scope of the operations of the existing facility and its environmental impacts and relevant mitigation measures	Section 3.3, Figure 9 Section 8
Community and Stakeholder Engagement • A community and stakeholder participation strategy identifying key community members and other stakeholders and details and justification for the proposed consultation approach(s); • clear evidence of how each stakeholder identified in the community and stakeholder participation strategy has been consulted; • issues raised by the community and surrounding landowners and occupiers; • clear details of how issues raised during consultation have been addressed and whether they have resulted in changes to the development; and • details of the proposed approach to future community and stakeholder engagement based on the results of consultation.	Section 5

Required Assessment (SEARs)	Location in EIS
Landfill Design - including • details of the consistency of the proposal with the *Environmental Guidelines: Solid Waste Landfills*, Second edition (NSW EPA, 2016); • Description of the proposed cell design and integrity; • Details around proposed leachate and gas management and monitoring; • Consideration of proposed water quality control and monitoring; • Description and justification of proposed daily waste covering; and • Justification for the proposed final capping, closure measures and rehabilitation of the site, including its final land use.	Section Proposed Landfill Design3.6 and 3.9
Waste Management - including • identification, classification and quantification of the likely waste streams that would be handled/stored/disposed of at the facility in accordance with the EPA's Waste Classification Guidelines (2014); • details of how waste would be treated, stored (including the maximum daily storage capacity of the site), used, disposed and handled on site, and transported to and from the site and the potential impacts associated with these issues. This shall include details of how the receipt of non-conforming waste would be dealt with; and • a description of all reasonable and feasible measures that have been or would be implemented to maximise resource recovery from the waste stream and reduce the disposal of waste to landfill in line with the aim, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21 and other relevant government policy.	Section 3.4
Air Quality and Odour – including: • a quantitative assessment of the potential air quality, dust and odour impacts of the development in accordance with relevant EPA guidelines; • the details of any buildings and air handling systems and justification for any material handling, processing or stockpiling external to buildings; • a greenhouse gas assessment of the operation of the development, including, but not limited to emissions generated from the waste management cells; and	Section 6.1 and Appendix G

Required Assessment (SEARs)	Location in EIS
• details of proposed mitigation, management and monitoring measures.	
Rehabilitation	Section 3.9
• A detailed description of how the site would be progressively rehabilitated, revegetated and integrated into the surrounding landscape, including measures to ensure that the final landform is free draining;	
• A justification for the proposed final landform and use, taking into consideration any relevant strategic land use planning or resource management plans or policies; and	
• A detailed description of the measures that would be put into place to ensure sufficient resources are available to implement the proposed rehabilitation measures, and the ongoing management of the site following the cessation of landfilling activities.	
Traffic and Access – including:	Section 6.2 and Appendix H
• a quantitative Traffic Impact Assessment prepared in accordance with the relevant Council, Austroads and RMS guidelines;	
• details of all daily and peak traffic and transport movements likely to be generated by the development (vehicle type, public transport) during construction and indicative operation, including cumulative impacts;	
• details and a justification of access to, from and within the site (vehicular and pedestrian);	
• impacts on the safety and capacity of the surrounding road network and access points, using SIDRA modelling or similar to assess impacts from current traffic counts and cumulative traffic from existing and proposed developments;	
• demonstrate that sufficient loading/unloading, car parking and pedestrian and cyclist facilities have been provided for the development; and	
• details of road upgrades, new roads or access points required for the development, if necessary.	
Soil and Water – including:	
• characterisation and consideration of potential, salinity and soil contamination;	Section 6.3.2.1
• a description of water demands of the development and a breakdown of water supplies;	Section 3.7.3
• identify any water licensing requirements under the Water Act 1912 or Water Management Act 2000;	
• details of proposed erosion and sediment controls during construction;	Section 6.3.4

Required Assessment (SEARs)	Location in EIS
• detailed plans and a description of the surface and stormwater management system, including on-site detention, designed in accordance with Water Sensitive Urban Design principles;	Section 3.6.5
• details of the proposed leachate management system including the capacity of the system to treat and dispose of leachate;	Section 3.6.4
• an assessment of potential surface water, flooding and groundwater impacts, including impacts on nearby waterbodies, surrounding properties, any licensed water users, landholder rights or groundwater dependent ecosystems;	Section 6.3.3.2 and Appendix J
• a detailed and contemporary hydrogeological impact assessment that documents local and regional groundwater features for all sites and includes a comprehensive description of the potential impacts and mitigation measures that will be implemented at the site to protect groundwater; and	As above
• a description and appraisal of impact mitigation, management, maintenance and monitoring measures.	Section 7
Hazards and Risks – including:	
• a preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the development is "potentially hazardous" a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011); and	Section 6.4 and Appendix K
• an assessment on the potential risk of onsite fire generation from the landfill facility and a description of management and mitigation measures to alleviate any identified risks.	Section 3.7.4.2, Section 6.5 and Appendix L
Biodiversity – including:	Section 6.6 and Appendix M
• details of the number of trees to be removed and the number of trees to be planted on the site; and	Section 3.9.2
• including an assessment of the proposal's biodiversity impacts in accordance with the Biodiversity Conservation Act 2016, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted.	
Heritage – including:	Section 6.7 and Appendix N
• consideration of heritage items within the vicinity of the site and any potential heritage impacts associated with the development; and	

Required Assessment (SEARs)	Location in EIS
• identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR).	
Noise and Vibration – including: • a quantitative noise and vibration impact assessment in accordance with the relevant EPA guidelines; • consideration of annoying characteristics of noise and prevailing meteorological conditions in the study area; • cumulative impact assessment, inclusive of impacts from other existing and proposed developments; and • details and analysis of the effectiveness of proposed mitigation measures to adequately manage identified impacts, including a clear identification of residual noise and vibration following application of mitigation measures, and monitoring measures.	Section 6.8, Section 7 and Appendix O
Social and Economic – including: • identifying and analysing the potential social impacts of the development from the point of view of the affected community and other relevant stakeholders; • assessment of the significance of positive, negative and cumulative social impacts; • mitigation measures and monitoring of likely negative social impacts; and • an analysis of potential economic impacts of the development, including a discussion of any potential economic benefits.	Section 6.9 And Section 7 And Appendix D
Visual and Design Measures to minimise the visual impacts of the development, including: • a detailed assessment of any buildings associated with the proposal including height, colour, scale, building materials and finishes, signage and lighting, particularly from nearby residential receivers; and • detailed plans showing suitable landscaping.	Section 6.10

3 Project Description

3.1 Summary

Table 3.1 Summary of Proposed Development

Project Element	Summary of Project
Site Description	Lot 197 & 212 DP756946 and Lot 1 DP1037845
Project Site Area	Total Area: 124 ha Landfill Area: 40 ha
Waste Types	As per EPA licence
Waste Receival	Waste receival will be as follows: • Residents: Front end recycling facility (FERF) for no-cost waste items; mixed wastes to resource recovery area (RRA) for sorting into recyclables and waste for disposal • Commercial: To FERF and RRA for mixed loads requiring sorting into recyclables and waste for disposal • Waste Transporters: Directly to landfill On-site operations will include: • Front End Recycling Facility (FERF) for drop-off of segregated recyclables with zero cost (e.g. cardboard, steel, non-ferrous metals) • Weigh Bridge • Resource and Recovery Area (RRA) for co-mingled wastes or materials requiring reprocessing for resource recovery • Landfill Cells • Recycling Handling and Bulking Area • Ancillary Infrastructure: including haul roads, leachate ponds, stormwater infrastructure (detention ponds and drains), LFG management system
Maximum Throughput for Disposal	100,000 tonnes per annum (tpa) of mixed waste maybe received; however this will be a gradual increase. Reduced waste generation combined with improved recycling will affect expected future volumes.
Landfill Cell Construction and Life	Construction of liner as per NSW Landfill Guideline and maintain at least 2 m separation from groundwater. Operational life for Stage 1 is estimated to be over 70 years and for Stage 2 over 50 years.
Operating Hours	All works will be conducted between: • 7 am – 7 pm Monday to Saturday • 9 am – 7 pm Sunday • CLOSED Public holidays
Cell Operations	Placement of received waste in 500 mm lifts and compacted Active tipping face minimised

Project Element	Summary of Project
	Daily cover of waste using 200 mm of soil or equivalent cover. Malodourous waste is covered immediately
Rehabilitation	Capping to be undertaken within 2 years of cell completion. Cap design to be compliant with EPA Landfill Guideline current at the time of cell completion. Soil to be sourced from upper 2 metres of natural profile excavated during cell construction and/or imported clean fill suitable for use. Vegetation is to comprise a mixture endemic grasses and forbs as a minimum. Localised areas of endemic shrubs and/or trees consistent with current vegetation type
Capital Investment	FERF and RRA: $ 1,486,894 Stage 1: $ 46,382,157 Stage 2: $ 30,988,203 Capping: $ 21,292,938 Other costs: $ 22,676,107 TOTAL: $122,826,299 Based on current rates as detailed in Appendix D

3.2 Existing Site and Surroundings

Buronga Landfill, located at 258 Arumpo Road, Buronga (Lot 1 DP 1037845, Lot 197 DP756946 and Lot 212 DP 756946), approximately 4.5 km north northeast of the township of Buronga, NSW and approximately 10 km North East of the City of Mildura, VIC. Access to the Landfill is via Arumpo Road with most landfill operations occurring in an area of approximately 19 ha, with the landfill footprint covering approximately 5 Ha. The Landfill is zoned SP2 (Waste or Resource Management Facility) and is surrounded by agricultural activities and remnant vegetation. A summary of the site details is shown in Table 3.2.

Table 3.2 Site Identification Details

Aspect	Detail
Site Name	Buronga Landfill
Site Location	258 Arumpo Road, Wentworth, NSW, 2739
Landfill Area (ha)	Currently 19 ha of a total 124 ha licenced area
Site Owner	Wentworth Shire Council
Site Occupier	Wentworth Shire Council
Certificate of Title	Lot 197 & 212 DP756946 and Lot 1 DP1037845
Current Zoning	Site - SP2 (Waste or Resource Management Facility) Surrounding Areas – RU1 (Primary Production)

Aspect	Detail
Current Use	Solid Waste Landfill / Resource Recovery Centre
EPA Licence	Environmental Protection Licence (EPL) No. 20209
Regional Setting	Rural, Industrial, Agricultural
Surrounding Land Uses	NORTH: Broadscale agriculture (grazing), Arumpo Road
	EAST: Remnant vegetation, irrigated agriculture to SE, Lake Gol Gol
	SOUTH: Remnant vegetation, irrigated agriculture to SW (grapevines, orchards)
	WEST: Arumpo Road, Industry including bentonite and gypsum suppliers, Mourquong saltwater disposal basin

3.3 Siting Restrictions

The Landfill Guideline provide a list of inappropriate locations for a landfill. Although Buronga is an existing landfill, this Project proposes to increase the footprint and extend works to the north of the existing landfill, thereby potentially impacting on the suitability of the landfill location. The suitability of the Project has been assessed against these requirements and considers the supporting information in Section 6 and the specialist studies presented in Appendices. Pending completion of the targeted fauna surveys, the Project is likely to meet all the guideline requirements and is therefore potentially a suitable site for a large putrescible waste landfill (Table 3.3).

Table 3.3 Assessment of Project Against Landfill Guideline Siting Restrictions

Guideline Requirement	Project Area	Suitable (Y/N)
Within 250 m of an area of significant environmental or conservation value identified under relevant legislation or environmental planning instruments, including national parks, historic and heritage area, conservation area, wilderness areas, wetlands, littoral rainforests, critical habitat, scenic areas, scientific and cultural area	The Project site is zone for use as a waste management facility and does not contain any significant environmental or conservation values identified under legislation. The Project incorporates a 200 m buffer of no landfilling from the boundary. The closest conservation areas are Murray River Reserve 3.7 km south; Kings Billabong Park , including Kings Billabong Wetlands, 9.8 km south.	Y
Within specially reserved drinking water catchments, such as special areas identified by the Sydney Catchment Authority, Sydney Water and local water supply authorities	The Project area is not within a drinking water catchment. There are no defined waterways on site and no direct links to Gol Gol Lake or the Murray River. On-site stormwater management will ensure stormwater is detained on-site	Y
Within 250 metres of a residential zone or dwelling, school or hospital not associated with the facility.	The closest house is over 900 m from the boundary and the closest residential zone (Buronga) is over 4 km from the southern boundary of the Site. When combined with the	Y

Guideline Requirement	Project Area	Suitable (Y/N)
For large putrescible landfills, buffers of at least 1000 metres should be provided where practicable to residential zones, schools and hospitals to protect the amenity of these land uses from odour, noise and other impacts.	200 m buffer from the proposed landfill area to the boundary, there are no sensitive receivers within 1km of the Project	
In or within 40 metres of a permanent or intermittent water body or in an area overlying an aquifer that contains drinking water quality groundwater that is vulnerable to pollution;	The closest water body is Gol Gol Lake and there are no direct waterways linking the project area with this Lake or to the Murray River. The underlying groundwater is not potable quality and likely to be saline.	Y
Within a karst region or with substrata that are prone to land slip or subsidence	The geology is not karstic. Geotechnical investigations suggest the materials encountered are likely to be stable	Y
Within a floodway that may be subject to washout during a major flood event (a 1-in-100-year event).	There are no defined waterways on-site with the nearest being the Murray River. The Project area is not located on flood prone land	Y
Land identified in an environmental planning instrument as being of high Aboriginal cultural significance or high biodiversity significance	Field investigations and consultation with local register aboriginal parties has determined the Project area is of low cultural significance. The biodiversity assessment did not identify any Commonwealth or State significant flora or fauna.	Y

3.4 Current Waste Receival and Acceptance

3.4.1 Current Waste Received

Currently the Buronga Landfill is licensed to receive the following waste types

- Municipal solid waste including:
  - domestic solid waste (putrescible & non-putrescible);
  - Council waste;
  - other domestic waste (delivered direct to the site by residents);
- Commercial and industrial solid waste;
- Building and construction solid waste;
- Contaminated soil (meeting the definition of general solid waste);
- Recyclable waste materials (separated) including:
  - garden organics;
  - wood waste;
  - glass;
  - paper and cardboard;
  - concrete;
  - scrap metal
- Tyres. Tyres are not landfilled at the premises;

- Special wastes;
- Asbestos;
- Liquid wastes, including:
  - grease trap waste;
  - waste oil.

Much of the waste generated in the WSC LGA is diverted from landfill by the waste transfer stations or by reuse/recycling via other means, e.g. composting of agricultural wastes by Morello Gypsum and Organic Manures. Only a small proportion of waste (145 tonnes in 2020/21) is diverted from the transfer stations to the Buronga Landfill. In addition to kerbside waste, currently the Buronga landfill receives several waste types which are all recorded at the weighbridge. A summary of the waste tonnages received 2020/21 is presented in Table 3.4.

Table 3.4 Waste Tonnages Received and Recycled in 2020/21

Type of Waste 2020-21	Total Quantity (tonnes)
Municipal Solid Waste	3274.46
Commercial and Industrial	20,495.60
Construction and Demolition	2,526.59
Comingled Recycling	24.28
Cardboard/Paper	61.50
Mattresses	7.70
Asbestos	217.98
Tyres	2.85
TOTAL WASTE RECEIVED	**26,610.96**
Waste Oil	2405.60
Scrap Metal	40.98
Clean Fill -All Areas of Tip Total	5,723.00
Garden Organics/Municipal	476.70
Plastic Recycle In	63.58
Batteries	0.80
COMMUNITY FACILITY WASTE RECEIVED	**6,329.12**
Scrap Metal Out	140.20
Waste Oil Out	5,360.00
Cardboard Out	63.91
Plastic Out	63.58

Type of Waste 2020-21	Total Quantity (tonnes)
Comingle Out	24.28
TOTAL WASTE OUT	**5,651.97**

3.4.2 Current Waste Acceptance

The main features of the existing landfill site include the following:

- Gate house
- Site office;
- Lunch room/ first aid room
- Toilet block with septic tank underneath
- 40 m long permanent weighbridge
- Public drop off area;
- Maintenance area/sheds;
- Recycling area, encompassing public drop off area, garden waste storage and processing area, concrete storage and processing area, and scrap metal and tyre storage areas;
- Rural fence to prevent access by unauthorized personnel;
- The landfilling area;
- Community Recycling Centre (CRC);
- Leachate storage pond;
- Existing stormwater pond.

All vehicles that access the site are required to enter over the site weighbridge where details are recorded. From there they are directed on to the appropriate disposal location based upon the type of vehicle and material to be disposed.

3.4.2.1 Public drop off area and Community Recycling Centre

The area for public drop-off is located near the site entrance. Cars with waste for landfilling are directed to a bunker where waste is consolidated for periodic removal to the landfill. The public drop off area also contains collection bins for collection of separated recyclables, including:

- Tyres;
- Polystyrene;
- Scrap metal;
- Green waste/wood;
- Plastic bottles; and
- Triple rinsed chemical drums.

This area also includes a Community Recycling Centre which caters for the disposal of various hazardous types of material such as batteries, oils and fluorescent tubes.

3.4.2.2 Garden Waste Stockpile and Processing Area

The garden waste drop-off area is located to the north of the existing landfilling area and comprises an open area where garden waste is stockpiled. This waste is then shredded using contracted shredding equipment and used as landfill cover (either daily or in the final capping).

3.4.2.3 Scrap Metal Storage Area

The scrap metal recycling area to the north east of the site consolidates metal items for subsequent collection by recycling contractors. The stockpile is periodically pushed up into heaps to reduce the stockpile footprint.

3.4.2.4 Concrete Stockpile and Processing Area

Concrete is stockpiled in an area at the east of the site. This waste is subsequently crushed by a contractor or WSC's operational staff and reused by WSC's operations.

3.4.2.5 Tyre Stockpile Area

Tyres are stockpiled to the south east of the site for subsequent collection by recycling contractors.

3.4.2.6 Landfill Area

Located in the southern portion of the site, current disposal activities are undertaken in a fully lined and approved landfill cell. Vehicles access the area from the south, manoeuvring on covered waste and backing up to the active face where material is then deposited and vehicle then exit the site. Waste placement methods currently used at the site are in line with those discussed in Table 3.1.

3.5 Proposed Waste Receival and Acceptance

3.5.1 Proposed Waste Received

It is not proposed to change the types of waste received at the Buronga Landfill.

In the future, waste tonnages accepted at the landfill will increase as it becomes a regional waste facility. WSC currently accepts over 30,000 tonnes at the Buronga Facility and recycles almost 6,000 tonnes. Neighbouring councils generate a total of around 40,000 tpa (Table 2.1) of kerbside waste; recyclables would be transported directly to recyclers while the remaining waste for disposal may be transported to Buronga for disposal. It is considered unlikely that BSC will transport waste to Buronga in the short term due to its size and haulage distances; however MRCC landfill is nearing capacity and BSC and CDSC have small unlicensed landfills which equating to a total of 26,000 tpa.

Over the next 30 years, the waste received at Buronga Landfill is likely to reach 60,000 tpa based on receiving waste from MRCC, BSC and CDSC, the population growth of 0.5% and the 10% target for reducing waste generation. Beyond this timeframe, it is likely that waste quantity will increase as population increases but decrease due to waste reduction initiatives and hence the actual volumes are difficult to predict. Over the expected landfill life of over 100 years, it is estimated that up to 100,000 tpa could be received for sorting, recycling and reprocessing as well as disposal in approximately 130 years. So, the maximum throughout for the Site is estimated to be 100,000 tpa; however in the foreseeable future, the waste quantities are likely to be around 60,000 tpa. The majority of this waste (estimated to be 45,000 to 55,000 tpa) would be disposed to landfill due to sorting and recycling occurring at waste transfer stations prior to receipt at Buronga. For the purpose of this impact assessment, a representative value of 60,000 tpa has been adopted has been adopted for total waste and for waste for disposal.

3.5.2 Proposed Waste Acceptance

Recent improvements have increased the recycling from the facility but further improvements are required to increase recycling to achieve higher diversion rates. In order to promote the waste hierarchy, WSC has integrated several key elements into the material receival and handling process covering both design and operational elements that aim to reduce the quantity of material going to landfill. A concept design of these upgrades is shown in Figure 5 and include:

- Dedicated car and trailer area established at the Front End Recycling Facility, including drum muster recycling compound, located at the start of site for all cars and trailers where, under the guidance of WSC staff, customers can dispose of the following targeted recyclable materials at no cost:
  - Scrap metal;
  - Cardboard;
  - Container Deposit items
  - Batteries;
  - Plastic bottles; and
  - Other materials that may be determined by WSC.
- Pricing mechanisms at the weighbridge whereby customers who sort their loads and remove recyclable pay less for the disposal of residual waste;
- Resource Recovery Area with:
  - Provision of recycling bins for cars and trailers for further recycling to occur;
  - Dedicated area for green waste recycling
  - Dedicated area for concrete and brick recycling
  - Waste oil recycling facility
  - E-waste disposal area
  - Detox facility for the receipt of household hazardous waste
  - Room within the transfer station building to remove recyclables from the residual waste stream.
- Residual Drop off Area with bins for further recycling and space for WSC staff to further sort wastes prior to transport to landfill. A 4-bay drop off area with undercover area for cars with trailers is proposed as the final point for domestic drop off. Waste will be disposed to the rear of the trailers and well-labelled recycling bins provided separating the bays to facilitate further sorting by residents;
- Storage and bulking up areas to provide economies of scale for transport of recyclables to markets in Adelaide/Melbourne

3.5.2.1 Front End Recycling Facility

Prior to entry into the site, site customers will be able to divert into the Front End Recycling Facility (FERF) - double bay shed structure that is dedicated for the disposal, temporary storage/handling and out loading of household recyclable items that typically do not incur a disposal charge or fee. The proposed layout is shown in Figure 5 and details in Figure 6; larger format drawings are provided in Appendix A. The materials include items such as:

- Steel
- Cardboard
- Container deposit scheme materials
- Any other items, other than e-waste, that may be resold or have value, e.g. furniture in working order, bicycles, etc.

The FERF is to be designed as an enclosed, flat floor shed structure, which is located and/or accessed before the weighbridge and gatehouse infrastructure on-site. This will incentivise customers to sort loads and divert materials from landfill as much as practicable. Vehicles diving through the FERF will be able to deposit materials in stillages with these materials then unloaded into 'bulk containers' (e.g. 30 m^3 RORO bins for steel or cardboard) prior to transport off site. Materials will be stored within the enclosed portion of the building with the intent to re-purpose as much of these materials possible.

A rainwater tank will collect roof runoff for use in site activities, including firefighting within the shed. A fire and smoke alarm will be installed within the shed.

Adjacent to this area, a drum muster compound of minimum 12 m x 12 m x 2.4 m will provide capacity for approximately 6,000 containers. All containers received at the site will be required to be triple washed and follow the procedures required as per the drum muster program.

PROPOSED STORMWATER BASIN

PROPOSED SCRAP METAL STORAGE (20m x 15m)

PROPOSED SUMP

PROPOSED GREEN WASTE UNPROCESSED & PROCESSED (40m x 30m). STOCKPILES 23m x 8m WITH A 10m BUFFER ON AT LEAST ONE SIDE OF EACH STOCKPILE FOR FIRE ACCESS. MAXIMUM HEIGHT OF STOCKPILES 4m

EXISTING STORMWATER POND

PROPOSED LFG MANAGEMENT AREA (FUTURE) (30m x 30m)

EXISTING LEACHATE POND

PROPOSED RESOURCE RECOVERY SHED (42m x 10m) CANOPY OVER CONCRETE SLAB WITH DEDICATED AREAS FOR GREEN WASTE, C&D, TYRES.

EXISTING SHED TO BE USED FOR BATTERIES, WASTE OIL, DRUMS, HOUSEHOLD HAZARD WASTE, E-WASTE

LOT BOUNDARY

PROPOSED SITE OFFICE, LUNCH ROOM & AMENITIES (30m X 6m)

PROPOSED RORO BIN STORAGE (8x15m RUBBLE HARDSTAND)

EXISTING SITE ENTRANCE

PROPOSED DRUM MUSTER DROP OFF (12x12m RUBBLE HARDSTAND)

PROPOSED CAR PARK

EXISTING WEIGH BRIDGE

EXISTING GATE HOUSE

PROPOSED FRONT END RECYCLING FACILITY (FERF) DROP OFF FOR ZERO COST ITEMS. CARPORT FRONT WITH ENCLOSED REAR. (30x20m)

PROPOSED RESIDUAL DROP OFF AREA. 4 BAYS WITH STILLAGES FOR ANY FURTHER RECYCLING (15m x 20m)

PROPOSED TYRES (20m x 5m) MINIMUM BUFFER 23m FROM GREEN WASTE AND LANDFILL

PROPOSED INERT C&D STORAGE UNPROCESSED & PROCESSED (40m x 15m)

STOCKPILE

STOCKPILE

STOCKPILE

ARUMPO ROAD

TO LANDFILL

LEGEND

- PROPOSED TRUCK MOVEMENTS
- PROPOSED CAR MOVEMENTS
- PROPOSED STORMWATER
- PROPOSED SERVICE ALIGNMENT
- PROPOSED CAP BOUNDARY
- PROPOSED RAINWATER TANK
- PROPOSED BUILDING OR SHED
- PROPOSED HARDSTAND AREA
- PROPOSED LFG AREA (FUTURE)

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BURONGA LANDFILL EXPANSION

FIGURE 5 - CONCEPT DESIGN OF UPGRADED RECYCLING & RESOURCE RECOVERY AREAS

FILENAME: 202597 CONCEPT DESIGN.DWG

PROJECT NUMBER	DRAWING NUMBER	REVISION
202597	010	B

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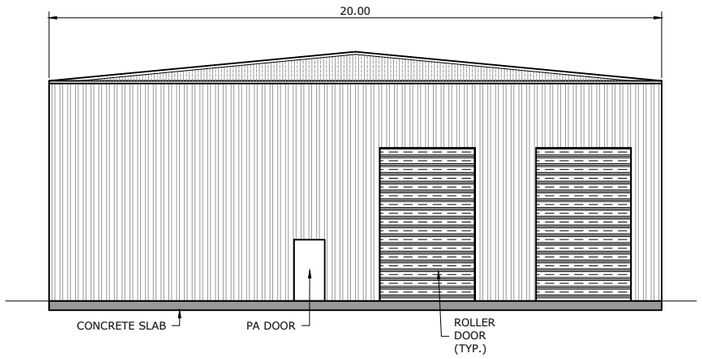
NOTE:

FERF SHED TO BE COLOURBOND STEEL WITH DULL FINISH IN GREEN OR GREY



VIEW A

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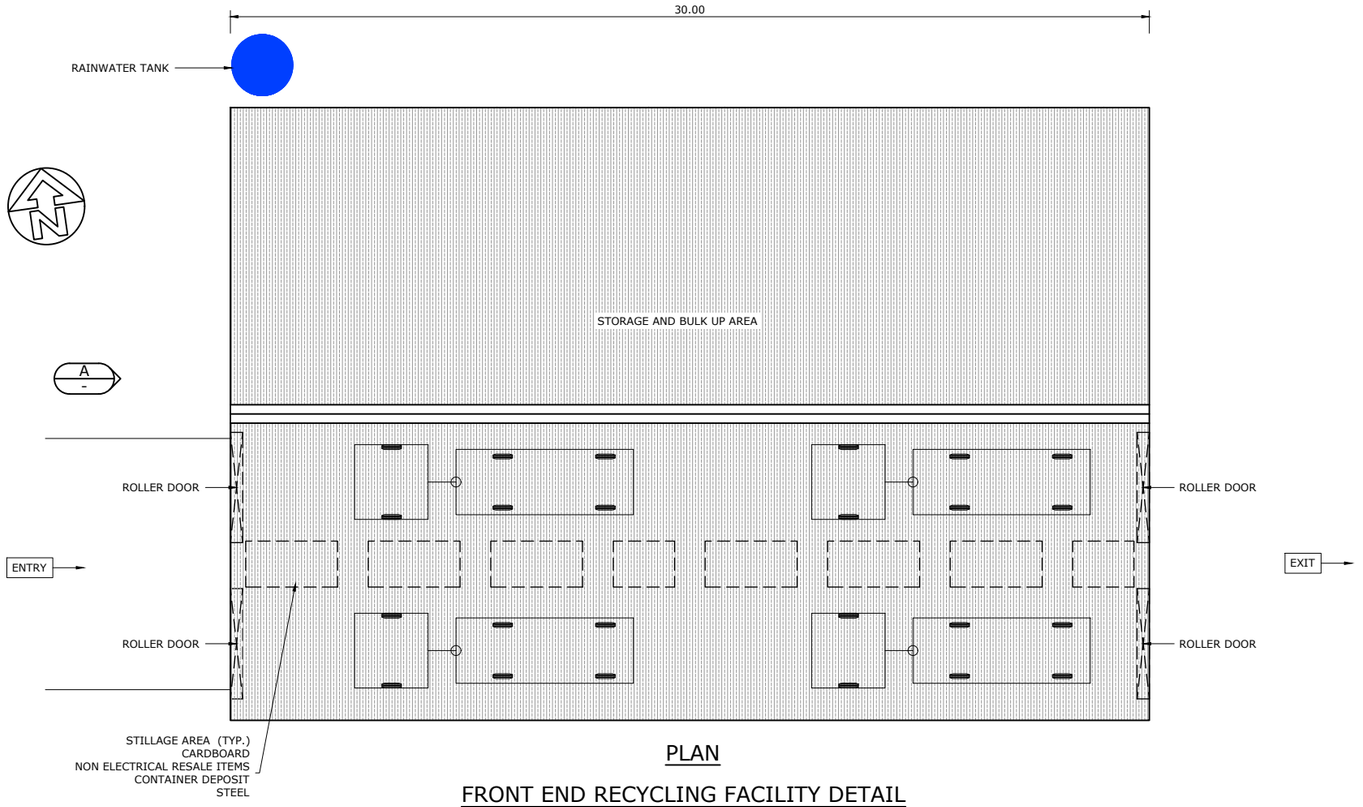
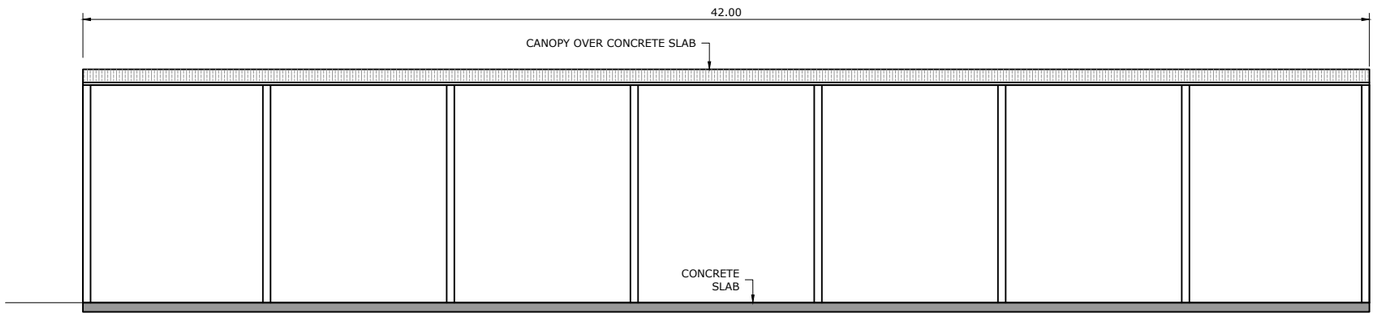


PLAN

FRONT END RECYCLING FACILITY DETAIL

NTS



VIEW

RESOURCE RECOVERY SHED DETAIL

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BURONGA LANDFILL EXPANSION
FIGURE 6
FERF & RESOURCE RECOVERY SHED DETAILS

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PROJECT NUMBER 202597 | DRAWING NUMBER 015 | REVISION

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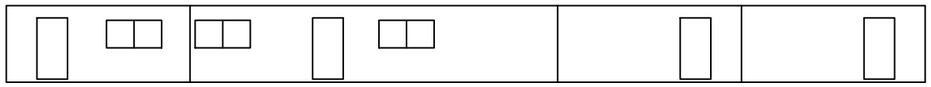

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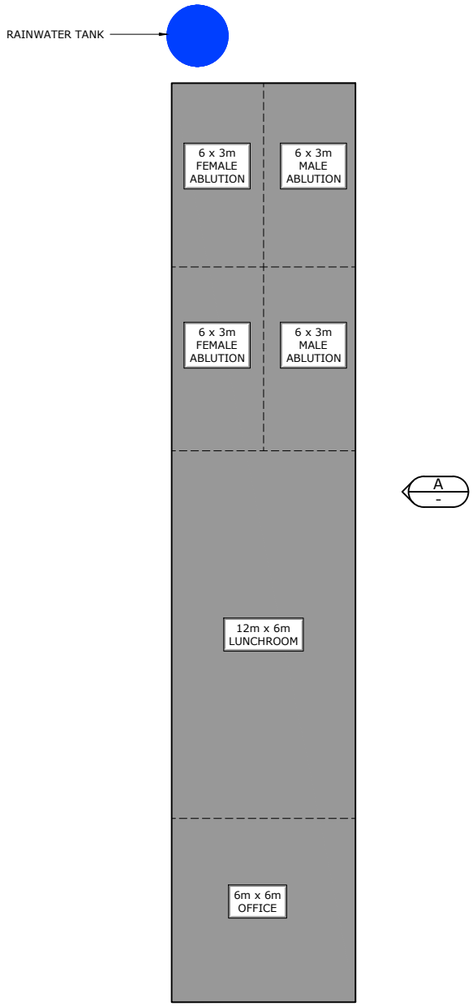

OFFICE & AMENITIES PLAN
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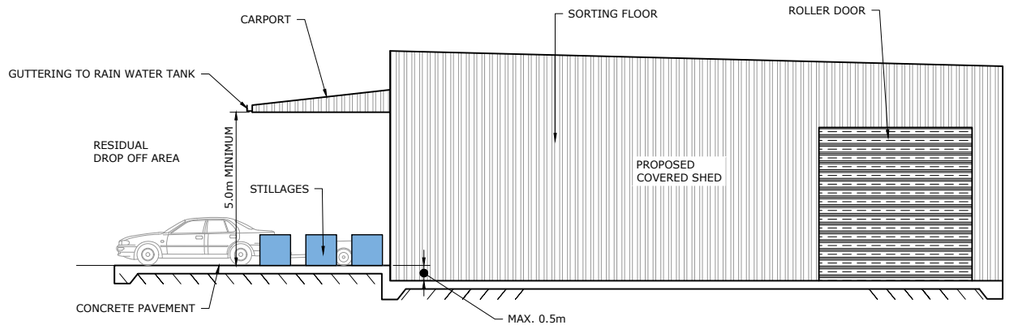

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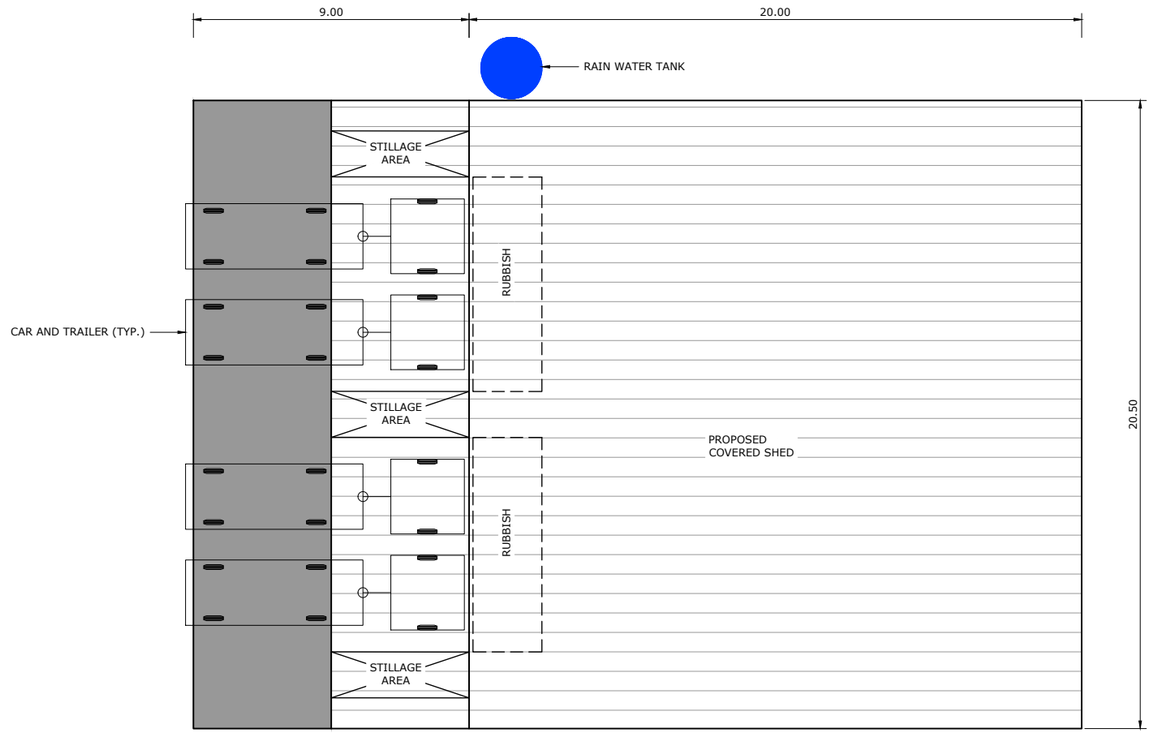

RESIDUAL DROP OFF PLAN
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BURONGA LANDFILL EXPANSION
FIGURE 7 OFFICE, AMENITIES & RESIDUAL DROP OFF DETAILS

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PROJECT NUMBER 202597
DRAWING NUMBER 016
REVISION

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3.5.2.2 Gatehouse Area

After passing the FERF, all vehicles will be required to enter the site over the site weighbridge. At this location, various details of the vehicle including registration, time of entry, weight and material type will be recorded. From here the residential and commercial vehicles will be split and directed to the appropriate location of the site. Cars and trailers and other small vehicles will turn left as soon as they come off the weighbridge and drop of materials at the general public drop-off area. Larger commercial vehicles will be directed to the bulk storage areas located on site.

No amendments are proposed to the gatehouse or weighbridge; however a new amenities building will be required to accommodate increased staffing numbers as the volumes of recyclables and waste increases over time. Details of the new office and amenities is shown in Figure 7.

3.5.2.3 General Public Drop-Off Area

A primary design consideration for the operation of the general public drop-off area is the segregation of larger commercial vehicles from smaller general public vehicles. This has been achieved through the establishment of discrete areas for these different vehicle types to access.

Following the entry into the general public drop-off area, cars and trailers are directed past specific material type drop-offs to encourage the deposition of recyclable materials prior to giving customers the opportunity to dispose of any residual waste material.

As can be seen in Figure 5, a loop has been created to direct customers past Resource Recovery Area, which includes the existing Community Recycling Centre and a new shed (with details shown in Figure 6 and Appendix A) where they can deposit:

- Hazardous materials;
- Batteries;
- Oils;
- Green waste;
- Inert materials (e.g. soils, concrete, bricks);
- Tyres;
- Steels and other metals;

After this, a residual drop of shed which is an undercover and enclosed building is provided where customers can deposit residual waste materials in a pit area prior to their departure from site (refer to Figure 7 and Appendix A for details). WSC staff will push this material up and then sort to remove further recyclables, where possible. By this stage, minimal recyclables remain within the waste stream; however it provides a final opportunity for diversionary activities prior to sending this material to landfill.

Once it has been determined that the residual material is suitable only for landfill, a loader will consolidate this material and place it into the back of an on-site haulage vehicle. This vehicle will then transfer the material from the transfer station shed to the active face where it will be disposed.

Rainwater tanks will be installed for all buildings to collect roof runoff for use in on-site activities. Dedicated fire water supplies are available on-site, as discussed in Appendix L.

With respect to recyclables that are collected in the general public drop-off area, these will be loaded into the on-site haulage vehicle and then taken to the larger material storage areas utilised by commercial vehicles as discussed in section 3.5.2.4 below.

3.5.2.4 Commercial Vehicles Drop Off Areas

After passing over the site weighbridge, commercial vehicles will travel in an easterly direction until after they pass the general public drop off area. From there they will head north, travelling up the western side of the landfill perimeter. This northern access road will act as a primary transport rout to access various parts of the site where materials can be deposited. These areas are discussed below.

Scrap Metal Storage Area

The scrap metal recycling area is to be located in the northwest of the site and consolidates metal items for subsequent collection by recycling contractors. The stockpile will be periodically pushed up into heaps to reduce the stockpile footprint. This material will be regularly cleared when volumes stockpiled approach 200 tonnes. This enables efficiencies with material handling equipment and transport to occur.

Concrete Stockpile and Processing Area

Concrete is stockpiled in an area at the east of the site. This material is subsequently crushed by a contractor approximately once a month and is either used for on-site purposes (primarily site roads) or sold off site.

Garden Waste and Wood Waste Stockpile and Processing Area

The garden waste area is located to the north of the existing landfilling area and comprises an open area upon which garden waste and associated woody material is stockpiled. This material is currently shredded by a contractor and removed from site approximately once a month. In future, the green waste is proposed to be shredded and used in landfill final capping. The dimensions of each stockpile of shredded green waste will be:

- Maximum heigh: 4 m
- Maximum length: 23 m
- Maximum base width: 8 m
- Minimum width between stockpiles: 2-10 m, with a 10 m buffer provided on at least one side of the stockpile as required by *Fire Safety Guidelines* (Fire Safety Branch, 2020). Refer to Figure 5 for details.

This material is regularly shredded when volumes stockpiled approach 200 tonnes.

Tyre Stockpile Area

Tyres are stockpiled to the south east of the site for subsequent collection by recycling contractors or shredding prior to disposal. Dimensions of each tyre stockpile must not exceed:

- 4 metres as the maximum base width;
- 18 metres as the maximum base length;
- 3 metres as the maximum stockpile height
- A 23 m buffer has been included between the tyre stockpile and the green waste stockpile as recommended for loose piles of high fire risk materials (Fire Safety Branch, 2020)

Less than 50 tonnes of tyres are proposed to be stored on site at any time.

Stormwater Controls

All the areas above will be placed on hardstand area to limit leaching and control runoff. The green waste pad will have a 2 m wide lined sump on the northern end to collect any runoff from stockpiles and allow for sediment deposition prior to directing into a swale which will direct runoff from all areas into a newly constructed stormwater pond to the north west of the stockpile areas (Figure 5). An emergency overflow from the stormwater pond will be directed into the site stormwater system.

3.5.2.5 Landfill Area

The final place for materials to go is the landfill itself. All -weather roads will be provided to the active disposal area to ensure site vehicles and commercial customers can access this area at all times throughout the year. A pad will be created adjacent the active face where commercials can deposit loads with minimal fuss. From there a bulldozer/landfill compactor will push the material out across the active face where it will be placed in 500 mm lifts and compacted into position. Following the deposition of the load vehicles will use the same access route in to exit the facility.

Further details on the landfill itself are provided in Section 3.6.

3.5.3 Waste Control Program

All materials to be disposed at the landfill or recycled shall be inspected, weighed and identified at the site weighbridge by WSC personnel. This information will be recorded in the site weighbridge software system and used to supply information for any reporting requirements. All staff members that monitor the site entrance shall be trained in the identification and classification of waste. Vehicles with unacceptable loads of waste will be refused entry to the site.

WSC shall facilitate the implementation of a Waste Control Program to ensure that only permitted wastes are accepted for disposal or processing at the site. The Waste Control Program shall comprise the following:

- Prominent signage at the entrance to the landfill defining acceptable wastes and directing users to contact the weighbridge for information regarding disposal of other wastes;
- Random daily inspection of vehicles entering the landfill. All vehicles suspected of containing unacceptable waste are refused permission to deposit waste until the waste is verified as being acceptable. WSC shall require and collect appropriate evidence from the driver of the vehicle, e.g. test certificate, approvals, etc, as appropriate, as verification that the waste is acceptable;
- Directing vehicles with unacceptable wastes to an appropriate disposal facility;
- Random monitoring and inspection of wastes as they are discharged from vehicles at the waste disposal areas by WSC personnel. All waste suspected of being unacceptable will be segregated and checked as to its acceptability, e.g. by detailed inspection and/or testing, as deemed appropriate by WSC;
- Monitoring of the deposited waste during spreading, compaction and covering at the landfill. All waste suspected of being unacceptable will be segregated and checked to determine its acceptability e.g. by detailed inspection and/or testing, as deemed appropriate by WSC; and
- Recording of all incidences of identification of unacceptable wastes in the site's daily log. The record will include:
  - Details of the waste e.g. type;
  - Source of the waste e.g. vehicle identification, driver identification and generator of the waste;
  - Recommended waste management facility(s);
  - Result(s) of contacting the waste management facility; and
  - Date contacted EPA.

In the event that unacceptable waste is identified in an incoming vehicle, the vehicle will be refused entry, re-directed, and details of the incident recorded as described above. WSC personnel will advise the driver of the vehicle of appropriate waste management facilities, or to contact the EPA for advice on appropriate management of the unacceptable waste.

In the event that unacceptable waste is identified during deposition by a vehicle, WSC will immediately segregate and contain the waste away from the active tipping face or processing area. WSC personnel will record the details of the waste, such as type, the source, and the vehicle and driver identification. WSC personnel will advise the driver of the vehicle that the waste is not acceptable and may load the waste back onto the vehicle where practical and safe to do so. The vehicle will then be escorted from the landfill by WSC personnel. WSC personnel will advise the driver of the vehicle to contact the EPA for advice on the appropriate management of the unacceptable waste.

In the event that unacceptable waste is identified during the spreading and compaction of deposited waste, WSC personnel will segregate and contain the waste away from the active waste disposal or processing areas. WSC personnel will make all practical efforts to identify the source of the waste, including:

- Inspecting the waste for possible identification labels on containers; and
- Identifying the type of waste and consequently the possible sources.

WSC personnel will contact the EPA to confirm appropriate management options and will document the final disposition of the unacceptable waste in accordance with the EPA's requirements. Further discussion on site practices associated with the receipt of unauthorised waste streams is included in Section 3.7.

3.6 Proposed Landfill Design

3.6.1 Basis of Design

A concept design for the landfill facility has been produced. This design includes a conceptual layout for the landfill cells and associated infrastructure including stormwater and leachate controls. The concept design has been prepared in accordance with the *Environmental Guidelines: Solid Waste Landfills,* Second Edition (NSW EPA, 2016) (the Landfill Guideline) and the design basis set out in *Buronga Landfill Concept Design – Basis of Design Report* (Appendix E).

3.6.2 Landfill Extent

The landfill extent has been designed to ensure that 200 m minimum separation will be provided from the proposed landfill cells to the site boundary to attenuate noise, odour and dust impacts from surrounding receptors. This separation distance also allows for supporting infrastructure to be located outside of the landfill footprint. This supporting infrastructure includes waste drop off facilities, stormwater management infrastructure and leachate management infrastructure. The separation also allows for existing vegetation around the perimeter of the site to be retained, including vegetation along Arumpo Road to provide a visual screen between the road and the site. A services alignment has been provided along the edges of the landfill extent to allow for pipework to transfer leachate and landfill gas from the cells to the leachate ponds or landfill gas flare.

3.6.3 Landfill Cell Layout

All landfill cells will be constructed with an engineered lining and leachate collection system consistent with the requirements of the Landfill Guideline and as represented in Figure 8. This lining system is provided to contain the waste and prevent environmental harm from occurring due to the landfill operation by forming a barrier between the waste and the environment. The specific lining system profile will be determined during detailed design of the landfill cells prior to construction. It is anticipated that the first landfill cells and the basal liner will "piggyback" over the northern batter of the existing waste mass to allow for a continuous final landform to be developed sympathetic with other regional landforms. Utilising a "piggyback" lining system over the existing waste mass also allows the existing landfill footprint to be further utilised, minimising the footprint of the new landfill areas.

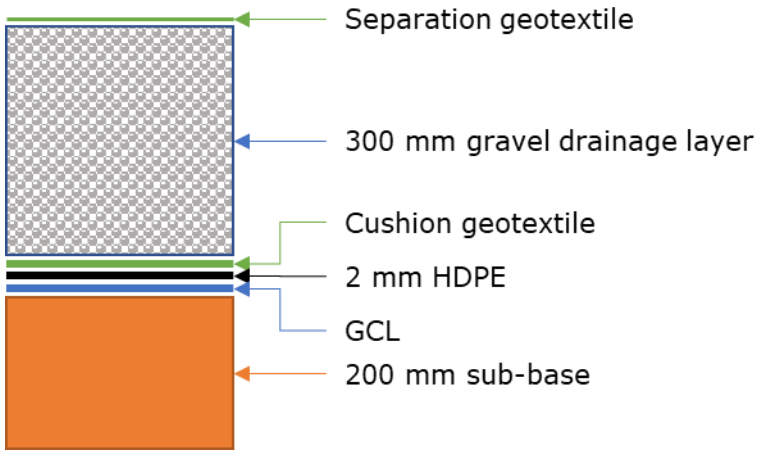

Figure 8 Schematic of Cell Liner System (NSW EPA, 2016)

Cells extend to approximately 5 to 8 m below ground level (m bgl), with final baseliner levels to be determined during detailed design of each cell. This cell depth has been selected to provide a minimum of 2 m separation between the groundwater levels recorded at the site and the lowest point of the cell floor. Groundwater levels were set as the highest groundwater levels observed in monitoring wells BH02 and BH04 located to the west and east of the existing landfill respectively. These wells were installed in 2010 and 2012 respectively (GHD, 2012) and have been monitored regularly since, with the highest observed groundwater levels being 30.2 m AHD in BH02 and 32.7 m AHD in BH04 based upon data provided by WSC. These groundwater levels are consistent with those as described in the Groundwater Impact Assessment (Section 6.3). This separation is provided to ensure there is an unsaturated zone between the base liner to prevent contaminants reaching groundwater and to prevent groundwater impacting on the stability of the liner. Leachate sumps will be 300 mm below the lowest point of the floor to facilitate collection.

Best practice management is that each landfill cell should be designed for a short filling life to ensure that waste can be safely filled and promptly covered and rehabilitated. This minimises the exposed footprint at any one time, allows for progressive rehabilitation and minimises the potential environmental impacts from leachate and landfill gas. The project has been divided into two main Stages, being Stage 1 in the west and Stage 2 in the east with each stage divided into several sub-stages, with 6 sub-stages in Stage 1 and 5 sub-stages in Stage 2 (Figure 9). Sub-stages will progress from south to north on the western side of the site (Stage 1), followed by progress from west to east on the eastern side of the site (Stage 2). Each sub-stage will be developed into individual landfill cells each with approximately 4 to 5 year filling lives; this results in one to four cells per sub-stage and depending on the rate of waste receival.

The estimated airspace and life based on 60,000 t/annum receival for each sub-stage is provided in Table 3.5. As discussed in Section 3.5.1, 60,000 tpa has been adopted as a realistic estimate of waste receival at the site. This has also been used to calculate the expected life of the substages, as a significant proportion of waste received at the site has already been sorted at community waste transfer stations within WSC or the surrounding LGAs. The size of each cell within the substages will be adjusted during detailed design based upon waste receival rates expected during each cells operation to limit the size of the active cell and facilitate faster rehabilitation, which in turn limits the LFG emission and leachate generation.

Table 3.5 Estimated Airspace for Each Substage and Expected Life

Stage 1			Stage 2		
Substage	Airspace (m^3)	Life (years)	Substage	Airspace (m^3)	Life (years)
1A	1,001,600	14.2	2A	746,200	10.6
1B	840,700	11.9	2B	805,800	11.4
1C	832,600	11.8	2C	795,300	11.3
1D	807,900	11.4	2D	782,900	11.1
1E	802,700	11.4	2E	698,100	9.9
1F	807,700	11.4			
TOTAL	5,093,200	72.2		3,828,300	54.2

Notes: Life is based on 60,000 t waste/annum at a density of 0.85 t/m^3

AREA 7
807700m³
TOC TO FLOOR

STAGE 1F

AREA 6
802700m³
TOC TO FLOOR

STAGE 1E

AREA 5
807900m³
TOC TO FLOOR

STAGE 1D

AREA 4
832600m³
TOC TO FLOOR

STAGE 1C

AREA 3
840700m³
TOC TO FLOOR

STAGE 1B

AREA 2
1001600m³
TOC TO FLOOR

STAGE 1A

AREA 1
617585m³
TOC TO EXISTING

EXISTING
LANDFILL

AREA 8
746200m³
TOC TO
FLOOR

AREA 9
805800m³
TOC TO
FLOOR

AREA 10
795300m³
TOC TO
FLOOR

AREA 11
782900m³
TOC TO
FLOOR

AREA 12
698100m³
TOC TO
FLOOR

STAGE 2A

STAGE 2B

STAGE 2C

STAGE 2D

STAGE 2E

35.0

34.0

33.0

32.0

ARUMPO ROAD

LOT BOUNDARY

PROPOSED LFG
FLARE LOCATION

EXISTING LEACHTE POND

EXISTING SITE
ENTRANCE

LEGEND

- EXISTING CONTOUR (0.5m INTERVAL) (40.0)
- PROPOSED STAGE BOUNDARY
- PROPOSED CELL BOUNDARY
- PROPOSED STAGE 1 SERVICE ALIGNMENT
- PROPOSED STAGE 2 SERVICE ALIGNMENT
- PROPOSED FLOOR CONTOURS (33.0)
- PROPOSED LEACHATE POND
- ABORIGINAL ARTIFACT SITE
- PROPOSED BUILDING OR SHED
- PROPOSED HARDSTAND AREA
- PROPOSED LFG AREA (FUTURE)

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BURONGA LANDFILL EXPANSION
FIGURE 9
PROPOSED STAGES AND SUBSTAGES LAYOUT

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PROJECT NUMBER 202597
DRAWING NUMBER 011
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3.6.4 Leachate Management

As identified in Section 3.6.3 all landfill cells will be constructed with engineered lining and leachate containment systems. Landfill leachate can cause environment harm if allowed to infiltrate to groundwater. Each cell will drain to a leachate collection sump which will contain a leachate pump and riser to facilitate the extraction of leachate from the landfill cells. It is proposed that leachate will be extracted from the cells and pumped to a leachate pond or ponds where the leachate will be disposed of via evaporation. Minor accumulation of salts from the leachate remains within the ponds and does not affect its operation over the longer term. Leachate will be transferred from the landfill cells to the leachate pond/s by a site leachate ring main that will be progressively extended as the landfill operation extends.

The existing leachate evaporation basin at the site is lined and is used for disposal of leachate from the existing lined landfill cell. This pond will initially be retained to dispose of leachate during the early period of the landfill operation. Once additional leachate ponds are required, new leachate evaporation ponds will be designed and constructed to dispose of leachate from both the new and existing landfill cells. The leachate ponds will be progressively constructed as the landfill expands and the volume of leachate generated increases.

A high-level leachate balance has been undertaken to establish a footprint for the leachate basin area. This leachate balance model was developed using leachate generation volumes established using the *Hydrologic Evaluation of Landfill Performance* (HELP) model (Berger & Schroeder, 2013). The modelling was undertaken using the following inputs:

- Climate data obtained from SILO.
- Clayey sand daily and interim cover soils with an assumed cap infiltration of 1% of rainfall.
- Pond evaporation is equal to 80% of the daily pan evaporation.
- Waste absorptive capacity of 0.057 m^3/t with a filling rate of 60,000 tpa.
- Landfill sub-stages are capped during the operation of the following sub-stage, being under interim cover until that time.

A maximum area of 13,000 m^2 was estimated for leachate evaporation during Stage 2 (Appendix E). Provision for leachate ponds of this surface area has been provided in the south eastern corner of the site (Figure 10 and Figure 11); however these sizes will be recalculated during site operations as an uncalibrated HELP model provides indicative sizing only, particularly in semi-arid environments where it is likely to overestimate leachate generation. The location for the ponds was selected following the vegetation survey to minimise vegetation clearance whilst maintaining separation from public areas and offices.

Leachate ponds will be progressively constructed as the site is developed. Leachate basins will be designed in accordance with the requirements of the Landfill Guideline and will be sized with adequate freeboard to accept rainfall from a 1 in 25-year average recurrence interval, 24-hour rainfall event to prevent overtopping. Ponds shall be lined with an engineered lining system of a similar standard to the landfill cells (Figure 8) to prevent leachate causing contamination.

3.6.5 Stormwater Management

Stormwater runoff from disturbed areas is detained on site to prevent the discharge of any sediment laden water from site. Stormwater shall only be released from site once the water quality is suitable for discharge. Sediment basins and associated grass-lined swales are used to treat sediment-laden water and are required for both Stages of landfill development. It is assumed that diversion swales for clean water will be developed as part of the detailed design for cell construction. The basin sizes required for the development are described in Table 3.6 with detailed calculations based on "The Blue Book" (Landcom, 2004) provided in Appendix E.

The location of the basins for Stage 1 are shown in Figure 10 and for Stage 2 in Figure 11. The locations have been selected to allow for gravity flow to the basins whilst minimising the potential impact on vegetation by selecting already cleared areas and/or minimising the footprint as far as practical for the north-eastern basins where higher quality vegetation was found (Section 6.6.2).

Table 3.6 Stormwater Basins for Buronga Landfill

Basin	Area (ha)	Settling Zone Volume (m^3)	Sediment Storage Volume (m^3)	Total Basin Volume (m^3)
Stage 1 North Western	17.1	1493	746	2239
Stage 1 North Eastern	4.3	376	188	564
Stage 1 Southern	20.0	1743	872	2615
Stage 2 North Eastern	11.8	1031	516	1547
Stage 2 Southern	9.7	850	425	1275

3.6.6 Landfill Gas Management

Putrescible waste produces landfill gas as it decomposes following filling. Landfill gas consists of a mixture of gases, primarily methane and carbon dioxide with several other trace gases. The design of the facility has been developed to manage landfill gas to prevent environmental harm in accordance with the Landfill Guideline.

As previously identified all cells will be lined with engineered lining systems, these lining systems contain the landfill gas within the cells and prevent gas migration to the surrounding geology and encourages gas to migrate vertically instead of horizontally. To manage atmospheric emissions of landfill gas an active extraction system will be installed to draw landfill gas from the waste mass and burn landfill gas in a flare. The potential location of the flare is shown in Figure 5. The burning of landfill gas destroys the methane in the gas, reducing the potential greenhouse effect of the gas. In addition to the active extraction of landfill gas the waste will be regularly covered with soil, with completed cells capped as discussed in Section 3.9. Covering and capping of the waste encourages landfill gas to leave the landfill via the active extraction system instead of via emissions to the atmosphere.

ARUMPO ROAD

LOT BOUNDARY

EXISTING LEACHTE POND

EXISTING SITE ENTRANCE

LEGEND

- EXISTING CONTOUR (0.5m INTERVAL)
- DESIGN CONTOUR MAJ (5.0m INTERVAL)
- DESIGN CONTOUR MIN (1.0m INTERVAL)
- PROPOSED STAGE BOUNDARY
- PROPOSED CAP CROWN
- PROPOSED CAP DRAIN
- PROPOSED STORMWATER DRAIN
- PROPOSED STAGE 1 SERVICE ALIGNMENT
- PROPOSED STORMWATER POND
- PROPOSED LEACHATE POND
- ABORIGINAL ARTIFACT SITE
- PROPOSED BUILDING OR SHED
- PROPOSED HARDSTAND AREA
- PROPOSED LFG AREA (FUTURE)

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REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
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SCALE: 1:2500
SURVEYED:PRICEMERRET
SURVEY DATE:03.03.21
APPROVED / PROJECT LEADER

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BURONGA LANDFILL EXPANSION
FIGURE 10
STORMWATER MANAGEMENT STAGE 1

FILENAME: 202597 CONCEPT DESIGN.DWG
PROJECT NUMBER 202597
DRAWING NUMBER 013
REVISION B

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LEGEND

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- DESIGN CONTOUR MIN (1.0m INTERVAL)
- PROPOSED STAGE BOUNDARY
- PROPOSED CAP CROWN
- PROPOSED CAP DRAIN
- PROPOSED STORMWATER DRAIN
- PROPOSED STAGE 1 SERVICE ALIGNMENT
- PROPOSED STAGE 2 SERVICE ALIGNMENT
- PROPOSED STORMWATER POND
- PROPOSED LEACHATE POND
- ABORIGINAL ARTIFACT SITE
- PROPOSED BUILDING OR SHED
- PROPOSED HARDSTAND AREA
- PROPOSED LFG AREA (FUTURE)

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REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
B	ISSUED FOR INFORMATION			
A	FOR INFORMATION	14.09.21		

COORDS: MGA94 ZONE 54
DATUM: ALL LEVELS TO A.H.D.
SCALE: 1:2500
SURVEYED:PRICEMERRET
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BURONGA LANDFILL EXPANSION
FIGURE 11
STORMWATER MANAGEMENT STAGE 2

FILENAME: 202597 CONCEPT DESIGN.DWG
PROJECT NUMBER 202597
DRAWING NUMBER 014
REVISION B

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3.7 Operations

3.7.1 Typical Operations

Buronga Landfill currently accepts building and demolition waste, general exempted waste, waste mineral oils, tyres, asbestos and general solid waste (both putrescible and non-putrescible) as permitted under EPL 20209 (Appendix B). The facility is licenced to receive:

- recovered aggregate (building & demolition waste): up to 10,000 tonnes per annum (tpa) and store a maximum of 20,000 tonnes;
- waste mineral oil: store up to 4,000 litres;
- tyres: store maximum of 50 tonnes at any one time and dispose of 500 tpa;
- asbestos: dispose 500 tpa;
- general solid waste: 30,000 tpa.

Building and demolition waste and waste oils are received for resource recovery. WSC personnel take all reasonable steps to ensure that recyclable and reusable items received are diverted from landfill. Where possible building and demolition waste (concrete, bricks and tiles) is mixed with soil to be used as daily cover. Clean fill accepted at the landfill is stockpiled as appropriate on site for use as cover material or for rehabilitation. Garden waste (apart from noxious weeds which are disposed of in the landfill) is stockpiled until the volumes reach a sufficient size for a contractor to shred and remove the mulch created from site.

WSC has constructed a Community Recycling Centre (CRC) on site in accordance with the NSW Environmental Trust Community Recycling Centre Grants Program. The CRC on site accepts recyclables and hazardous waste from the public. Materials accepted at the CRC include paints, motor oils, cooking, hydraulic and transmission oils, household single use batteries, car batteries, fluorescent and compact fluorescent lighting, gas cylinders and smoke detectors. Other recyclable materials accepted at the facility include scrap metal, mineral oils, glass and plastic containers, garden waste and cardboard and paper. The CRC facilitates the diversion of these recyclables away from landfill for reuse and this facility is to continue under the proposed development.

Remaining wastes, i.e. general waste, tyres and asbestos, are disposed of through landfilling. The site currently accepts bonded asbestos materials which are disposed of in accordance with the procedure set out in the LEMP requiring asbestos materials to be appropriately wrapped and sealed and immediately covered when placed. Waste disposed in the landfill is placed and compacted to achieve a maximum practical *in situ* density in accordance with the site licence. The waste is covered daily with a minimum of 150 mm of material in accordance with the LEMP to maintain sanitary conditions on site and minimise environmental impact.

Environmental monitoring is required by the site licence, including monitoring of leachate, stormwater and groundwater. Leachate generated in the lined cell is managed through a formal leachate capture system and pumped to the leachate basin and disposed of via evaporation. The LEMP permits storage of excess leachate in the landfill cell during very wet weather and disposal off site via tanker to a sewage treatment plant or similar, if required. The legacy cell has no formal leachate management system. Surface water from the site is directed to a sedimentation basin in the south eastern corner of the site. As noted in the LEMP, cells are graded to direct clean stormwater away from the waste mass and prevent contamination of stormwater. No landfill gas (LFG) management system exists on site, nor is LFG monitored at the site. The low rainfall is likely to result in limited leachate or gas generation due to relatively dry and aerobic landfill conditions.

The operations of the proposed expansion are to continue to be in accordance with the best management practices of the time, as defined by the EPA Licence and Landfill Guidelines. Facilities for the public to separate recyclables and disposal of waste will continue to be provided.

3.7.2 Power Requirements

Electricity is used for on-site facilities; the expansion of the site is unlikely to change power requirements in comparison to the existing facility. The operating hours are not proposed to be expanded as part of this proposal.

3.7.3 Water Requirements

Water for the offices, toilets, shower and gatehouse are supplied by water from the local Mourquong Irrigation Pipeline on Arumpo Ave. The water is non-potable and stored in a 5000 L Poly tank. Potable water for drinking is supplied by Neverfail in 10 L bottles. Site water is also stored in a 50,000 L poly tank for site use and supplied from the same metered pipeline. The expansion of the site is unlikely to change water requirements in comparison to the existing facility. Water is required for compaction during construction and dust suppression during construction and operations. Alternative sources of water will be used when available, including:

- Roof water from sheds to be collected and used for general wash down and/or firefighting
- leachate for dust suppression at the tipping face;
- stormwater for construction and general dust suppression on-site.

3.7.4 Emergency Response

3.7.4.1 Management of Spills

At the Buronga Landfill, there are two distinct areas in the form of the public drop off area and the landfill. The approach to the management of spills is similar across both areas.

Control measures and procedures will be established to counter spills if and when they occur. Dry sand or other absorbents may be used for such purposes. WSC will have appropriate materials stored on site that are needed to clean up potential spills as identified above. WSC will ensure that staff will be adequately trained in spill management techniques. Areas where items such as oils, batteries, etc., are stored will be bunded and placed undercover to minimise the potential for impacts on the site. Any spillage of waste outside of the landfill cells will be removed as soon as it is practical.

Equipment will be available for removing large spillage of solid waste material at the site including a front-end loader and site truck. To supplement this equipment, hand operated equipment such as brushes and shovels are also provided for small spillages.

Emergency situations involving the spillage of unauthorised waste, including hazardous wastes, or other materials will be avoided by the following provisions:

- control of vehicles entering the facility,
- inspection of waste prior to, and during, discharge and
- training of staff.

WSC will develop a spill control plan as part of the emergency response plans for the facility. The spill control plan will identify the following:

- a list of materials of concern which may be encountered, including materials which can be contained in incoming waste, such as non-permitted waste,
- guidance on toxic spill response actions, including control, clean up, evacuation procedures and lines of reporting,
- guidance on personal protection measures,
- a list of resources provided for the control and clean-up of spillage with details of their location and

- staff training in response procedures.

3.7.4.2 Fire Response

A detailed plan for fire control will be prepared for the site. It will include traffic control, notification requirements, and steps to be taken to extinguish the fire. In the event of a fire, individuals are required to:

- Immediately notify the Site Supervisor;
- State the location, type and size of the fire; and
- Extinguish the fire if possible and safe to do so by the procedures given below.
- Notify the relevant authorities

Landfill Fire

If the fire is a Landfill fire, the following methods are to be used;

- Smother the material with soil;
- Use dry powder or CO2 extinguishers in the first instance; and
- Seek advice from the Site Manager before using water (some materials are not compatible with water).

Only trained operators with appropriate PPE would be utilised. Extreme care must be taken when fighting a landfill fire as smoke and fumes may be toxic.

Equipment Fire

If the fire is an Equipment fire, the following methods are to be used;

- Activate fire suppression system (where fitted); or
- Extinguish with dry powder or CO2 extinguisher; and
- Do not use water. Isolate batteries at earliest convenience.

Another cause of equipment fire is litter, which can build up on exhaust and manifold. To avoid this possibility, staff must ensure that machinery is cleaned and inspected regularly.

Fuel Storage Fire

If the fire is a Fuel Storage fire, the following methods are to be used;

- Always treat fuel storage fires with dry powder or CO2 extinguishers, as water will tend to spread the fire; and
- Endeavour to turn off the valve or stop leak, to stop the supply of fuel to the fire.

Bush and Grass Fire

If the fire is a Bush or Grass fire, the following methods are to be used;

- Extinguish using water or fire beaters.

Fire breaks will be established inside the perimeters of the site to assist in controlling bush fires from entering the facility.

Building Fire

If the fire is a Building fire, the following methods are to be used:

- The nominated fire warden will ensure all staff are evacuated;
- The main power isolation switch will be turned off;
- The fire can be extinguished using dry chemical or CO2 extinguishers;
- Once the power is turned off the fire can be extinguished with water;
- If the fire cannot be extinguished readily, call the local fire brigade.

Any significant fire event will require an investigation and written report that will be supplied to the regulator. If required, the local fire brigade or suitably qualified consultant should be consulted to advise on further risk mitigation measures. The report will include information detailing the date, time, location and suspected cause of the fire, and when and how it was extinguished.

3.7.4.3 Breach of Cell Liner

Staff members believing they have detected or inadvertently caused a breach of the cell liner on-site will contact the Site Supervisor immediately. The following procedure should then be followed:

- The Site Supervisor will investigate the report immediately and advise the Site Manager of their findings.
- The relevant consultants will be contacted to inspect and assess the suspected damage.
- The Site Manager upon advice from the site engineering consultants will initiate all required temporary works necessary to minimise the escape of leachate or landfill gas.
- The Site Manager will notify the EPA.
- The Site Manager, in consultation with the site-engineering consultants and the EPA will devise and implement all necessary repairs.
- The Site Manager will submit a report to the B'A outlining the incident, its repair and measures taken to prevent a re-occurrence.

3.7.4.4 Delivery of Illegal Waste

In the event that wastes not permitted for disposal are delivered to the site, the person who detects the prohibited substance will notify the Site Manager immediately. The prohibited substance will be kept separate from the tipping face arrangements will be made for the collection and proper disposal of the waste. The EPA will be notified and procedures checked in relation to the collection system to ensure it does not occur again.

WSC policies and procedures are designed to keep known hazardous wastes from ever being received at a disposal facility; however, hazardous or "questionable" waste may be transported to a site inadvertently at any time. It is the responsibility of every site employee to be aware and to ensure that questionable wastes are recognised, identified and that the proper appropriate action is taken.

WSC will train their staff in the identification and appropriate procedure to follow when a questionable waste is identified.

In the event that illegal waste is detected, the following procedures will be implemented:

- Secure area, notify the dispatcher and Site Supervisor;
- Put on the personal protective equipment if not already being worn;
- Secure and/or seal the leaking container to prevent any further escape of asbestos fibres;
- Spray the spilled asbestos with the wetting agent (i.e. water);
- Using a hand broom and shovel or similar equipment, collect all visible signs of wetted asbestos and place it in the 6mm polyethylene bag provided for spills. For spills on soil, it is advisable to also scoop up a small layer of soil that may have been contaminated;
- Seal the bag and affix an asbestos warning label if it is not already marked;
- Liaise with the EPA on the transport and disposal of the illegal waste.

3.7.4.5 Landfill Gas Leak or Accumulation

All personnel will be made aware of the possible dangers of landfill gas, which are highlighted as follows:

- Ignition/explosion from methane gas when at concentrations of between 5% and 15% (vol/vol);
- Asphyxiation; and
- Poisoning from carbon dioxide, hydrogen sulphide and trace components.

Asphyxiation risk is always present when persons enter a confined space. Certified gas detection equipment will be used at all times. No one will enter a confined space where the oxygen content of air is below 18% by volume unless authorised by the manager in writing and all PPE equipment is supplied. OH&S Regulations on confined space entry will be followed at all times and only personnel trained in confined space entry will be allowed to enter confined spaces.

3.8 Environmental Monitoring

Environmental monitoring occurs at the existing landfill operation in accordance with site licencing conditions. The environmental monitoring regime will be extended as the landfill expansion occurs, with ongoing monitoring of groundwater, surface water, leachate and landfill gas occurring during operation in accordance with the requirements of the Landfill Guideline. Proposed monitoring measures have been discussed below and will be reported on an annual basis will interpretation of potential trends discussed and recommended actions, if required.

All environmental monitoring shall continue into the post-closure phase of site operation until it can be demonstrated that the landfill is stable and non-polluting. The Landfill Guideline sets out the requirements for demonstrating this and requires that a certified statement of completion is submitted to EPA.

3.8.1 Groundwater Monitoring

Monitoring of groundwater shall be undertaken to detect any pollution of groundwater by the landfill operation. Groundwater monitoring shall be undertaken by sampling a network of groundwater monitoring wells on a six-monthly basis. The existing well network consist of four monitoring wells at the site (BH01-BH04). As recommended in the GIA (Appendix J), two of the wells (BH01 and BH04) are located up hydraulic gradient of the landfill and BH02 and BH03 are located down hydraulic gradient. As the landfill moves north and east, the well network will be progressively extended to maintain upgradient, cross-gradient and down-gradient monitoring wells.

Samples from the monitoring wells will be recovered using low-flow or other approved techniques by trained and experienced personnel. Six-monthly samples recovered for *in situ* analysis will be analysed in the field using hand-held equipment. Annual grab samples will be immediately placed in chilled cooler boxes and transferred under Chain of Custody to a NATA-accredited laboratory for the analyses shown in Table 3.7. Quality assurance and quality control procedures will be undertaken, including the analysis of duplicate and triplicate samples. Results of analyses will be compared with upgradient well concentrations, historical concentrations and the ANZECC guidelines for aquatic ecosystems where relevant trigger levels exist.

Table 3.7 Groundwater, Leachate Quality Monitoring Parameters

Analyte	Sampling method	Groundwater Frequency	Leachate Frequency	Stormwater
pH, EC, Temperature	*In situ*	6-monthly	3-monthly	3-monthly
Redox potential	*In situ*			3-monthly
Standing Water Level/Leachate Head	*In situ*	6-monthly	3-monthly	3-monthly
Alkalinity	Grab sample	Annually	Annually	N/A
Total dissolved solids	Grab sample	Annually	Annually	N/A

Analyte	Sampling method	Groundwater Frequency	Leachate Frequency	Stormwater
Total suspended solids	Grab sample			3-monthly
Cations and Anions (Ca, Cl, F, Mg, K, Na, SO_4)	Grab sample	Annually	Annually	Annually
Metals and metalloids (Al, As, Ba, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Zn)	Grab sample	Annually	Annually	Annually
Nitrogen (NO_x, NH_3, TOC)	Grab sample	Annually	Annually	3-monthly
Total Organic Carbon	Grab sample	Annually	Annually	N/A
Pesticides (OCP, OPP)	Grab sample	Annually	Annually	Annually
Phenolics – total	Grab sample	Annually	Annually	Annually
Hydrocarbons (BTEX, TRH, PAH)	Grab sample	Annually	Annually	Annually

3.8.2 Leachate Monitoring

Leachate monitoring shall be undertaken to quantify the composition, height levels and volumes of leachate produced in the landfill cells. This information informs the performance of landfill capping and assists in assessing leachate impact to surface water or groundwater.

Leachate pumping volumes will be recorded by recording the daily volume extracted from each leachate sump. Leachate samples will be collected from one leachate sump within each substage. Quarterly samples recovered for *in situ* analysis will be analysed in the field using hand-held equipment. Annual grab samples will be immediately placed in chilled cooler boxes and transferred under Chain of Custody to a NATA-accredited laboratory for the analyses shown in Table 3.7. Quality assurance and quality control procedures will be undertaken, including the analysis of duplicate and triplicate samples. Results of analyses will be compared with historical data.

3.8.3 Stormwater Monitoring

Stormwater monitoring shall be undertaken in the proposed stormwater ponds to detect any pollution of surface water by the landfill operation and prevent any pollution from moving off site. There are no ambient surface water bodies within the immediate vicinity of the site, however monitoring of stormwater should be undertaken at the site.

Stormwater samples will be collected from each stormwater pond. Quarterly samples recovered for *in situ* analysis will be analysed in the field using hand-held equipment. Annual grab samples will be immediately placed in chilled cooler boxes and transferred under Chain of Custody to a NATA-accredited laboratory for the analyses shown in Table 3.7. Quality assurance and quality control procedures will be undertaken, including the analysis of duplicate and triplicate samples. Results of analyses will be compared with historical concentrations and the ANZECC guidelines for aquatic ecosystems where relevant trigger levels exist.

3.8.4 Landfill Gas Monitoring

Landfill gas (LFG) monitoring shall be undertaken to assess if the required outcomes of the Landfill Guideline for LFG management are being achieved. LFG monitoring will be undertaken across areas of intermediate and final cover on a six-monthly basis and inside on-site buildings and structures on a quarterly basis; given the sheds will be well-ventilated and offices are not located over previously placed waste, this will provide adequate screening.

The surface emissions monitoring will be conducted using a flame ionisation detector, or similar. On the capped surface, methane concentrations at 5 cm above the landfill cap will be recorded, preferably during low wind speed conditions. Testing should be conducted in a grid pattern across the landfill surface at 25-metre spacings with additional tests conducted near cap penetrations. Any readings greater than 500 ppm on a volumetric basis will be further investigated and corrective action undertaken. Within buildings or other enclosed structures, methane will be measured within the building with specific attention to areas where gases may accumulate, e.g. cupboards, roof cavities. Any readings greater than 1% by volume will be further investigated, reported to EPA within 24 hours and corrective actions undertaken.

3.8.5 Landfill Cap Condition and Integrity Monitoring

Monitoring of the condition and integrity of the landfill cap shall be undertaken on a six-monthly basis in combination with the surface emissions monitoring. Cap condition monitoring shall include visual assessment of the condition of the landfill cap and vegetation for indications of defects that could cause excessive rainfall infiltration or landfill gas emissions, e.g. scours > 0.2 m deep, depressions > 1 m diameter and > 0.2 m deep. Leachate level and volume monitoring shall also be used to assess cap condition as increased leachate production can indicate a defect in the cap.

3.9 Final Landform and Rehabilitation

3.9.1 Final Landform

The final landform has been designed in accordance with the requirements of The Landfill Guideline to facilitate the rehabilitation of the site following closure. The final landform extends to a height of approximately 59 m AHD, slightly higher than the landform of the existing waste disposal operation in the southern area of the site. The final landform has been designed with grades no steeper than 1V:5H (20%) and no flatter than 5% to facilitate the drainage of stormwater and minimise the risk of erosion and scour of cover materials in accordance with The Landfill Guideline. This will assist in minimising long-term maintenance requirements for the closed landfill. The landform has been designed to be similar to parallel dunes in an east-west orientation to be sympathetic to other regional landforms. The Top of Cap design is shown in Figure 13.

The landform has been separated into two stages divided by a water management corridor running north-south to allow for final heights to remain below approximately 59 m AHD. This approach also allows for the first stage of the landfill cells and landform to be fully developed with minimal impacts to the remnant vegetation present in the eastern area of the site.

3.9.2 Landfill Rehabilitation

The final landform has been designed to facilitate the progressive capping and rehabilitation of each cell throughout operation. The final capping is proposed to use a phytocap, which is a cap that reduces rainfall infiltration into the waste through natural storage and evapotranspiration processes (Figure 12). Phytocaps also manage emission of fugitive landfill gas through natural microbial activity in the soil. The use of a phytocap allows for revegetation of the capped landfill with trees and shrubs to maximise the

visual amenity and environmental values of the landform following rehabilitation. Trees and shrubs can be planted on a phytocap as unlike a conventional or composite landfill cap. no barrier layer is used that can be damaged by deep-rooted vegetation.

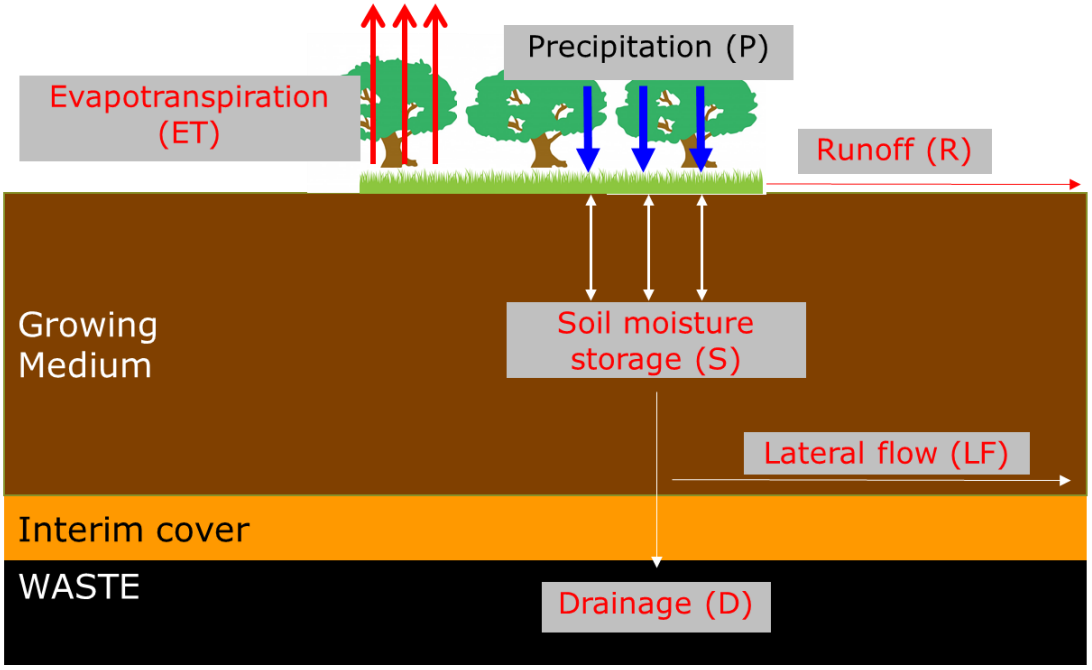


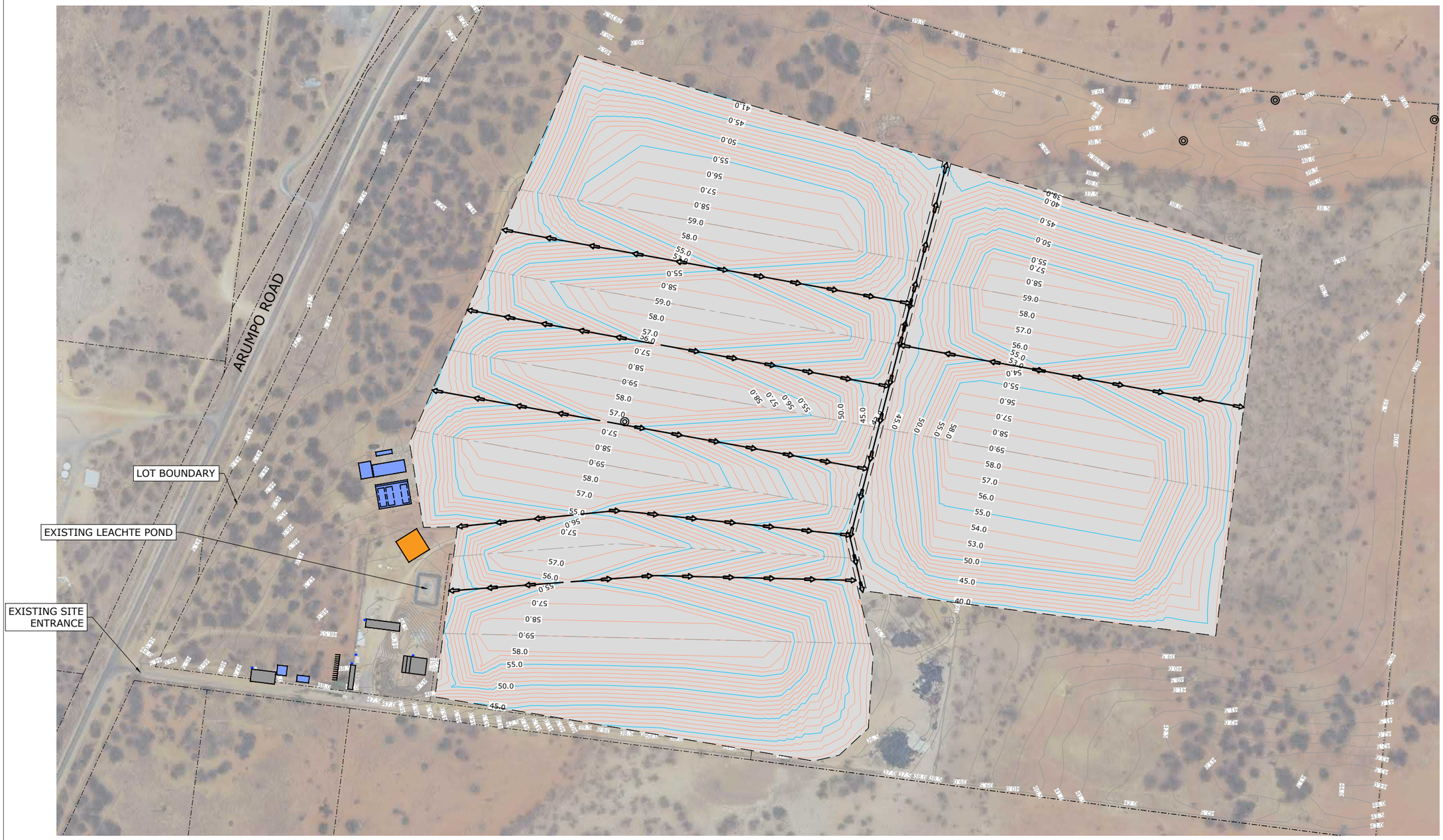
Figure 12 Schematic of water balance in a phytocap showing inputs (blue arrows) and losses (red arrows). Arrow thickness indicates relative percentage.

The Landfill Guideline allows for the use of a phytocap for landfill capping where it can be demonstrated through modelling and a field trial that the cap can meet the required performance objectives. The design of the phytocap is based on the specific soil hydraulic properties, the local climate and suitable vegetation. The climate in Buronga is favourable to the use of a phytocap due to the relatively low rainfall and high evaporation. The design details will be determined prior to capping commencing based on the soil material identified for use. The phytocap design will be prepared in accordance with The Landfill Guideline and the *Guidelines for the Assessment, Design, Construction and Maintenance of Phytocaps as Final Covers for Landfills* (WMAA, 2011).

The design of the phytocap will include consideration of profile depth, soil selection and vegetation selection. An estimate of the profile depth can be obtained by determining the moisture surplus, i.e. the amount of moisture that needs to be stored to minimise or prevent drainage into the waste from occurring. Moisture surplus is defined as:

Moisture surplus = Sum (rainfall – 0.8*evaporation) for wet months

Using the historical climate from 1970 until 2020, and calculating the moisture surplus for each year, results in a maximum moisture surplus of 106 mm. Clay soil, as found on site, can typically hold 120-130 mm/m of soil (Hazelton & Murphy, 2007) suggesting a profile of 0.9 m will prevent drainage into the waste mass occurring; however, to provide adequate soil depth for plants the minimum profile would be > 1 m with a recommended profile minimum of 1.2 m thick to provide additional moisture storage for planted vegetation in this semi-arid environment. The actual profile depth will be determined from water balance modelling based on the soil and vegetation characteristics proposed for the cap. The vegetation planted will be representative of the endemic vegetation to provide a rehabilitated surface that is sympathetic to the surrounding environment.



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- DESIGN CONTOUR MIN (1.0m INTERVAL)
- PROPOSED STAGE BOUNDARY
- PROPOSED CAP CROWN
- PROPOSED CAP DRAIN
- ABORIGINAL ARTIFACT SITE
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SHEET SIZE
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REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
B	ISSUED FOR INFORMATION			
A	FOR INFORMATION	14.09.21		

COORDS: MGA94 ZONE 54
DATUM: ALL LEVELS TO A.H.D.
SCALE: 1:2500
SURVEYED:PRICEMERRET
SURVEY DATE:03.03.21
APPROVED / PROJECT LEADER

PUBLIC UTILITIES:
THE SERVICES SHOWN ARE DERIVED FROM PLANS OBTAINED FROM THE RELEVANT SERVICE AUTHORITIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE WITH THE RELEVANT SERVICE AUTHORITIES FOR CONFIRMATION OF SERVICES AND THEIR LOCATION BEFORE EXCAVATION WORK COMMENCES.

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NOT FOR CONSTRUCTION

WENTWORTH SHIRE COUNCIL

BURONGA LANDFILL EXPANSION
FIGURE 13
PROPOSED TOP OF CAP CONTOURS

FILENAME: 202597 CONCEPT DESIGN.DWG
PROJECT NUMBER 202597
DRAWING NUMBER 012
REVISION B

C:\USERS\JASONT~1\APPDATA\LOCAL\TEMP\ACPUBLISH_1588\202597 CONCEPT DESIGN.DWG -C012- (16-12-21 11:51:37AM)

A landfill closure plan will be developed in accordance with the requirements of the Landfill Guideline prior to the closure of the facility. The closure plan will identify controls and steps required to ensure that the landfill remains non-polluting and does not cause environmental harm after the site closure.

3.9.3 Financial Assurance

Being an existing landfill operation, WCC already has internal provisions to act as a financial assurance for the Buronga landfill. These funds are set aside to cover the costs of:

- Decommissioning;
- Rehabilitation; and
- Long-term costs such as monitoring and rectification works should they be required.

With the expansion of the Buronga landfill, a review of these costs will be undertaken and the appropriateness of the amounts allocated reassessed. Should additional funds be required, WSC will increase the internal provisions accordingly.

3.10 Estimation of Capital Investment Value

The capital investment required for the proposed expansion to the Buronga Landfill is summarised in Table 3.8 with details and assumptions provided in Appendix D. Based upon the concept layout developed by Tonkin (Figure 5 and Figure 9), the capital expenditure cost for the future landfill cells is estimated to range from $111 million – $135 million for the Project in present value terms. This capital investment value is based upon the total footprint of the development being constructed as a series of discrete cells over the life of the site. The operating costs were estimated at approximately $19 million in present value terms (Geolyse, 2015).

Table 3.8 Estimated Capital Costs Excluding Vegetation Offsets

Item	Present Value Cost
FERF and RRA	$1,486,894
Stage 1	$46,382,157
Stage 2	$30,988,203
Final Capping	$21,292,938
Design, Preliminaries and margins	$16,876,235
Contingency	$5,848,871
TOTAL	**$122,826,299**

Due to the timeframe proposed for construction, changes in best-practice, technology or material costs could have a substantial impact upon the costs of the proposed development. These costs provided are estimates only and are subject to change during detailed design.

4 Strategic and Statutory Context

4.1 Strategic Context

4.1.1 Policy Direction

There are several high-level policies which are relevant for this project, including State policy relating to waste and resource recovery through to WSC's vision for Buronga and Gol Gol. The key policies are summarised below.

4.1.1.1 State policy

NSW Waste and Sustainable Materials Strategy 2041

The current NSW Waste and Sustainable Materials Strategy 2041 outlines actions required over the next 6 years (phase 1) to transition to a circular economy by 2041.

The principles of a circular economy include:

- Valuing resources by keeping products and materials in use for as long as possible;
- Maximising the use and value of resources brings major economic, social and environmental benefits.

Focus areas of the strategy include:

- Meeting future infrastructure and service needs, including planning for critical waste infrastructure with a focus on co-locating businesses in precincts that support circular economy;
- Reducing carbon emissions through better waste and materials management, including a requirement for gas capture at landfills over a certain site and exploring a waste level rebate for landfills with such an installation;
- Protecting the environment and human health from waste pollution, including management of illegal dumping.

4.1.1.2 Regional policy

Far West Regional Plan 2036

Under the *Environmental Planning and Assessment (regions) Order 2020*, the declared region of Far West comprises the LGAs, of Wentworth, Balranald, Central Darling, Broken Hill City, Bourke, Brewarrina, Cobar, Walgett and the Unincorporated Area. The Far West Regional Plan 2036 is a 20-year blueprint for the future of Western NSW.

There are three main goals in the plan, with the first being "A diverse economy with efficient transport and infrastructure networks. Direction 2 of this goal seeks to increase the value adding opportunities in the manufacturing and processing industries, including the processing of grapes, pistachios and almonds with significant investment also in vegetable production near the large Mildura market. These industries will require support from best practice waste management services which can assist in the recycling and disposal of waste and as they grow, the demand for waste management services is also likely to grow.

The third goal is for strong and connected communities. Direction 23 seeks to manage rural residential development, including an action to locate rural residential areas close to existing settlements to make efficient use of infrastructure and services (including waste services). Direction 26 seeks to enhance planning between cross-border communities, such as Mildura, and proposes an action to consider cross-border strategies, including infrastructure, when planning for the region. WSC's proposed expansion of the Buronga Landfill, fulfills this action by considering the future waste management requirements of Mildura as well as the surrounding LGAs.

Western Murray Regional Economic Development Strategy (2018-2022)

The Western Murray Regional Economic Development Strategy (2018-2022) has been developed to identify economic development opportunities in the Western Murray Region. The plan recognises that the region (in which the project is located) spans the NSW and Victorian border, encompassing several local government areas including WSC and MRCC.

4.1.1.3 Local policy

Wentworth Development Control Plan (2011)

The Wentworth Development Control Plan sets out the expectations for the shire. The DCP must be taken into consideration during the development assessment process, but it is not an environmental planning instrument. The DCP identifies the vision for Buronga and Gol Gol, which is to encourage balanced development for the area, ensuring appropriate infrastructure for a thriving and vibrant community.

Buronga / Gol Gol Structure Plan 2020

The Buronga Gol Gol Structure Plan was originally adopted by WSC in 2005 and updated in 2020 to provide a vision for the Buronga – Gol Gol area and the planning guidance necessary to ensure that future development meets the expectations of the local community and the wider regional community.

The structure plan proposed:

- Logical containment of future residential expansion on non-flood prone land to the north east and east of Buronga and to the north and west of Gol Gol;
- Focusing urban development toward the Midway Centre as the main community and commercial centre; and
- Concentration of industrial activities to northwest Buronga.

It contains background information to support future detailed assessment of Local Development Plans and Development Control Plans. Relevantly for this EIS, Figure 6.5 in the report (extracted below as Figure 14) identifies several proposed developments, concepts and planning proposals. This allows the consideration of the interaction of this project with future development proposals.

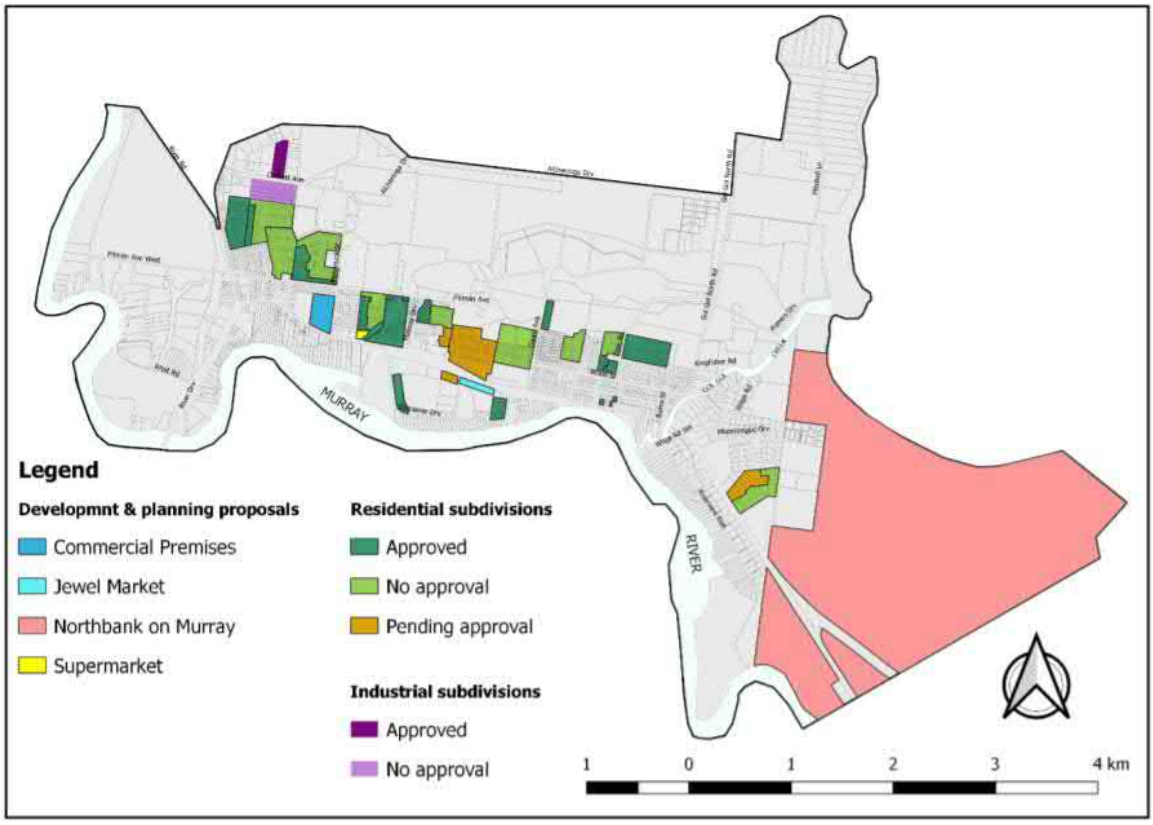

Figure 14 Proposed Developments, Concepts and Planning Proposal (Source: Buronga Gol Gol Structure Plan Report 2020)

4.1.2 Environmental Planning Instruments

Relevant NSW Planning Instruments include:

- State Environmental Planning Policy (State and Regional Development) 2011 No 511;
- State Environmental Planning Policy (Infrastructure) 2007 No 641;
- State Environmental Planning Policy No. 33 – Hazardous and Offensive Development 2011;
- State Environmental Planning Policy No. 55 – Remediation of Land;
- State Environmental Planning Policy (Koala Habitat Protection) 2019;
- Wentworth Local Environment Plan 2011.

These environmental planning instruments are outlined below, including an explanation of how the project responds to each instrument.

Table 4.1 Summary of Planning Instrument Requirements

Regulatory Requirements	Considerations	Location in EIS
State Environmental Planning Policy (State and Regional Development) 2011	Identifies the facility as State Significant Development	Section 4.1.2.1
State Environmental Planning Policy (Infrastructure) 2007	Waste recovery and minimisation Adoption of landfill best practices	Section 4.1.2.2, Section 4.1

Regulatory Requirements	Considerations	Location in EIS
	Reduction in long term impacts of landfill Land use conflicts Transportation of waste	
State Environmental Planning Policy No. 33 – Hazardous and Offensive Development	Requires a proponent to prepare preliminary hazard analysis	Section 4.1.2.3
State Environmental Planning Policy No. 55 – Remediation of Land	Suitability of site and future remediation of contaminated land	Section 4.1.2.4
State Environmental Planning Policy (Koala Habitat Protection) 2019	Conservation and management of koala habitat	Section 4.1.2.5
Wentworth Local Environmental Plan 2011	Land use conflicts Impact on terrestrial biodiversity	Section 4.1.2.6

4.1.2.1 State Environmental Planning Policy (State and Regional Development) 2011

The *State Environmental Planning Policy (State and Regional Development) 2011* (NSW) identifies which projects are State Significant Development. It contains a definition of waste and resource management facilities that are declared to be State Significant Development at Clause 23(1)(b), Schedule 1.

> *23 Waste and resource management facilities*
>
> *(1) Development for the purpose of regional putrescible landfills or an extension to a regional putrescible landfill that:*
>
> > *(a) has a capacity to receive more than 75,000 tonnes per year of putrescible waste, or*
> >
> > *(b) has a capacity to receive more than 650,000 tonnes of putrescible waste over the life of the site, or*
> >
> > *(c) is located in an environmentally sensitive area of State significance.*
>
> *(2) Development for the purpose of waste or resource transfer stations in metropolitan areas of the Sydney region that handle more than 100,000 tonnes per year of waste.*
>
> *(3) Development for the purpose of resource recovery or recycling facilities that handle more than 100,000 tonnes per year of waste.*
>
> *(4) Development for the purpose of waste incineration that handles more than 1,000 tonnes per year of waste.*
>
> *(5) Development for the purpose of hazardous waste facilities that transfer, store or dispose of solid or liquid waste classified in the Australian Dangerous Goods Code or medical, cytotoxic or quarantine waste that handles more than 1,000 tonnes per year of waste.*
>
> *(6) Development for the purpose of any other liquid waste depot that treats, stores or disposes of industrial liquid waste and:*
>
> > *(a) handles more than 10,000 tonnes per year of liquid food or grease trap waste, or*
> >
> > *(b) handles more than 1,000 tonnes per year of other aqueous or non-aqueous liquid industrial waste.*

DPIE has provided verbal advice that for the purposes of 23(1), for a landfill to be considered "regional" it must be proposed to receive or receive waste from more than one LGA.

Under clause 23(1)(a) and (b), the proposed development is a State Significant Development. Accordingly, Section 4.36, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (NSW) applies. Under Section 4.12, Division 4.3 of the Act, an Environmental Impact Statement, in the form prescribed by the regulations, must accompany the development application.

4.1.2.2 State Environmental Planning Policy (Infrastructure) 2007

Under the infrastructure SEPP, a 'waste disposal facility' is defined as

…a building or place used for the disposal of waste by landfill, incineration or other means, including such works or activities as recycling, resource recovery and other resource management activities, energy generation from gases, leachate management, odour control and the winning of extractive material to generate a void for disposal of waste or to cover waste after its disposal.

Hence, the proposed development is permitted with consent under Section 121 of the *State Environmental Planning Policy (Infrastructure)* 2007.

Note, under section 123 of the Infrastructure SEPP:

(1) In determining a development application for development for the purpose of the construction, operation or maintenance of a landfill for the disposal of waste, including putrescible waste, the consent authority must take the following matters into consideration:

> *(a) whether there is a suitable level of recovery of waste, such as by using alternative waste treatment or the composting of food and garden waste, so that the amount of waste is minimised before it is placed in the landfill, and*
>
> *(b) whether the development:*
>
> > *(i) adopts best practice landfill design and operation, and*
> >
> > *(ii) reduces the long-term impacts of the disposal of waste, such as greenhouse gas emissions or the offsite impact of odours, by maximising landfill gas capture and energy recovery, and*
>
> *(c) if the development relates to a new or expanded landfill:*
>
> > *(i) whether the land on which the development is located is degraded land such as a disused mine site, and*
> >
> > *(ii) whether the development is located so as to avoid land use conflicts, including whether it is consistent with any regional planning strategies or locational principles included in the publication EIS Guideline: Landfilling (Department of Planning, 1996), as in force from time to time, and*
>
> *(d) whether transport links to the landfill are optimised to reduce the environmental and social impacts associated with transporting waste to the landfill.*

It is proposed to expand an existing facility which is already operating under an EPA licence (Appendix B). The current licence as reflected in the LEMP, requires best management practices at the landfill and its ownership by a local WSC authority ensures the interests of the community are well represented. The licence will need to be varied; however, there will be an ongoing requirement to adopt best practice landfill design and operation principles.

Land use conflicts are avoided but utilising the existing site which is located 4.5 km from the township of Buronga. As discussed in more detail below, there are no strategic plans in place to grow Buronga

settlement boundary closer to the north-west (e.g. towards the landfill facility). It is concluded that land use conflicts can continue to be avoided.

4.1.2.3 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

The *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP33) applies to a proposal for potentially hazardous or offensive industries. The Policy requires a proponent to prepare preliminary hazard analysis.

A preliminary hazard analysis has been prepared in consideration of the extended landfill proposal (Section 6.4). Based upon the landfill being operational many of the hazards/risks associated with the facility are known and controls are in place and have been tested. Following consideration of the management/design controls to be implemented the preliminary hazard assessment concludes the residual risk of the identified items carry a low rating.

4.1.2.4 State Environmental Planning Policy No. 55 – Remediation of Land

The *State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP 55) aims to provide a State-wide planning approach to the remediation of contaminated land. SEPP 55 requires a planning authority to consider the suitability of land for a proposed development. Ultimately, a planning authority needs to be satisfied that a site is suitable for its proposed use or can and will be made suitable, based on what they know of the site. The site is already licensed so SEPP 55 is only relevant in the context of ensuring the site can be feasibly rehabilitated in the future.

The rehabilitation of the site will occur in accordance with the EPA's *Environment Guidelines: Solid Waste Landfill.* Cells will be constructed sequentially as needed (approximately every 2-3 years) and will be rehabilitated within 2 years of closure. Capping will utilise excavated soil materials or locally suitable materials and will be vegetated with endemic vegetation using a technique known as phytocapping, to restore the native vegetation, including trees, similar to that which occurs following mining.

4.1.2.5 State Environmental Planning Policy (Koala Habitat Protection) 2019

The *State Environmental Planning Policy (Koala Habitat Protection) 2019* (Koala Habitat SEPP) provides the framework for conservation and management of natural areas that provide habitat of koalas to ensure permanent free-living populations over the present range. The policy applies to the WSC area; however, the site is not located within the mapped Koala Development Application Plan in the Koala Habitat SEPP.

WSC has not published a Koala Management Plan, but the Wentworth Development Control Plan states that the sole vegetation species for koala habitat is the River Red Gum. The ecology assessment (Appendix M) did not identify any River Red Gums on the site.

4.1.2.6 Wentworth Local Environment Plan

The Local Environment Plan relevant to the site is the *Wentworth Local Environmental Plan 2011* (LEP). The Land Zoning Map shown in Figure 15 shows that the Buronga site is zoned SP2 (Infrastructure) for the purpose of "Waste or Resource Management Facilities". The objectives of the SP2 zone are:

- To provide for infrastructure and related uses;
- To prevent development that is not compatible with or may detract from the provision of infrastructure.

Under Part 2 of the LEP, roads and water reticulation systems are permitted without consent in Zone SP2 Infrastructure. Other uses, as shown on the Land zoning Map, are permitted with consent. The proposed development of a waste disposal facility is permitted with consent on the site. It is understood that Buronga Landfill did not require approval at the time of landfill activity commencing and hence there is no current Development Application or other approval.

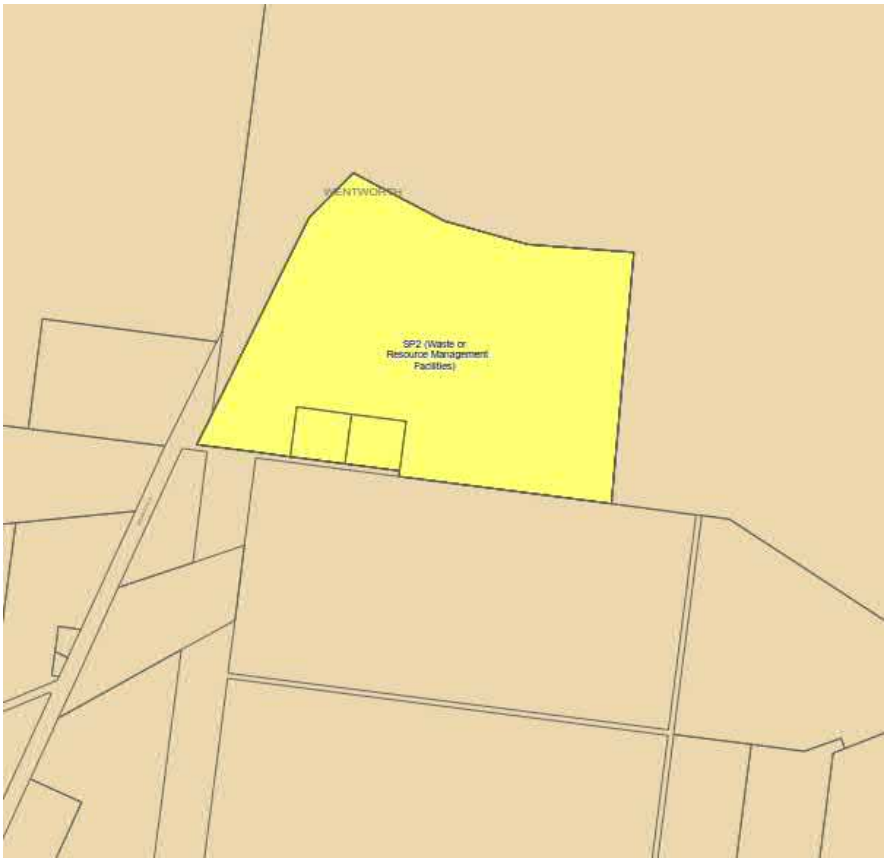

Figure 15 Land Zoning Map (Source: NSW Government)

The Wentworth LEP, defines area where complying development may still require development consent, being areas of special or unique environmental aspects. The Buronga Landfill is not located within 100 m of an environmentally sensitive area, including the wetlands located to the east and west of the site, and is not within the Flood Planning Area or a heritage conservation area (including heritage and archaeological sites. Buronga Landfill is within the area designated for terrestrial biodiversity and under S7.4 of the LEP, the consent authority must consider whether the development:

(a) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and

(b) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and

(c) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and

(d) is likely to have any adverse impact on the habitat elements providing connectivity on the land.

The development has been designed, sited and managed to avoid, minimise or mitigate the impact. The concept plan, presented in the Preliminary Scoping Report (Tonkin, 2020), has considered the findings oof the Biodiversity Development Assessment Report (BDAR, Appendix M) and amended this plan to minimise impacts on biodiversity, as far as practicable. Notably the areas to the north of the current landfill cells have previously been quarried and consent has been given for the use of these areas as a borrow source for landfill cover soil.

The BDAR has identified that there is approximately 45.75 ha of native vegetation occurring within the subject land. Construction and operational works will be managed to minimise the impacts on native flora

and fauna. Various controls have been identified to minimise and manage these impacts which will be adopted and implemented through the various stages of the development. Where impacts cannot be avoided mitigation measures will be implemented through securing offsets for losses (refer to Section 6.6.4 for further details).

4.2 Statutory Context

4.2.1 Project Approval

Under Section 4.36, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (NSW) and Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* (NSW), the proposed development constitutes a State Significant Development. In accordance with the legislation and pursuant to Part 2, Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW), WSC, has commissioned the preparation of this EIS to support decision-making and enable the community and other stakeholders to understand the project and its impacts.

WSC is seeking to obtain development consent for the site to receive up to 100,000 tonnes of mixed waste per annum. The site is currently licenced under the Protection of the Environment Operations Act 1997 (NSW), holding NSW EPA Licence No. 20209. As part of the development process the proponent will apply to the EPA for a variation to the existing licence. Due to the staged nature of the proposed development, the licence will likely require several variations over the lifetime of the landfill site.

4.2.2 NSW Statutory Legislation

The relevant NSW planning legislation includes:

- Environmental Planning and Assessment Act 1979;
- Environmental Planning and Assessment Regulation 2000;
- Protection of the Environment Operations Act 1997.

4.2.2.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the statutory framework for planning and environmental assessment in New South Wales, including allowing for the preparation of environmental planning instruments, being State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). Part 4 of the EP&A Act generally provides for the control of local development that requires development consent under an environmental planning instrument.

Under Section 4.36, Division 4.7 of the EP&A Act and Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* (NSW), the proposed development constitutes a State Significant Development. Section 4.10(2) states that designated development does not include State significant development despite any such declaration. Further Section 4.12(8) requires *a development application for State significant development or designated development is to be accompanied by an environmental impact statement prepared by or on behalf of the application in the form prescribed by the regulations*.

4.2.2.2 Environmental Planning and Assessment Regulation 2000

Schedule 2 defines the requirements for environmental impact statements. Part 3 of the Schedule specifies the form and content of the environmental impact statement and notes that for State significant development regard must be taken of the State Significant Development Guidelines; this EIS has been prepared with reference to these guidelines.

4.2.2.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act* (POEO Act) 1997 defines scheduled activities which require an Environment Protection Licence. Waste disposal by application to land is a scheduled activity unless the activity involves the following:

(f) sites that are outside the regulated area, but only if:

(i) the site is owned by and operated by or on behalf of a local council, and

(ii) the site was in existence immediately before 28 April 2008 and was not required to be licensed before that date, and

(iii) details required under clause 47 of the Protection of the Environment Operations (Waste) Regulation 2005 were provided, in relation to the site, before 28 April 2008, and

(iv) the site receives from off-site less than 5,000 tonnes per year of waste, and

(v) that waste has been generated outside the regulated area and consists only of general solid waste (putrescible), general solid waste (non-putrescible), clinical and related waste, asbestos waste, grease trap waste or waste tyres (or any combination of them). the waste received is <5,000 tonnes/yr.

As Buronga Landfill receives over 5,000 t/yr of general solid waste it is a scheduled activity and required to hold an Environment Protection Licence. This requirement is current for the existing operation and does not change for the proposed development; however, the licence will require amendment if the proposed development is approved. The current Licence requires adherence to the Landfill Guidelines and development of site-specific plans which will also require updating if approval is granted.

4.2.3 Commonwealth Policy and Legislation

Relevant Commonwealth Policy includes:

- *The National Waste Policy 2009.*

Relevant Commonwealth Legislation includes:

- *National Greenhouse and Energy Reporting Act 2007;*
- *Environmental Protection and Biodiversity Conservation Act 1999.*

4.2.3.1 The National Waste Policy 2009

The response of the project to waste policy is discussed in Section 3.4 of this document.

4.2.3.2 Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires a project to be referred to the Commonwealth if it is likely to have a significance impact on matters of national environmental significance. These matters include certain listed species, heritage places and wetlands of international importance.

The subject site is not listed as a World or National Heritage Place, nor will the development impact upon any World or National Heritage Places. The site is not located near a Commonwealth Heritage Place. The closest protected areas are located approximately 5.5 km away adjacent to the Murray River. There are several Wetlands of International Importance located along the Murray River, with the closest being the Riverland Complex 100km downstream. The targeted survey identified no further matter of national significance.

4.2.3.3 National Greenhouse and Energy Reporting Act 2007

Reporting requirements under the *National Greenhouse and Energy Reporting Act 2007* are unlike to apply as annual greenhouse gas rates are intended to be maintained below 25,000 t $CO_{2\text{-}e}$ with the construction of the LFG management system once the expansion is progressed and generation rates increase to economic levels.

4.3 Interaction with Existing and Future development

The site is located approximately 4.5 km north north-east of the township of Buronga, is zoned SP2 (Infrastructure) and has been used as a landfill for many years. There are no sensitive receptors within 1 km of the landfill site. The site's neighbours are industrial activities for bentonite and gypsum supply.

The Buronga / Gol Gol Structure Plan (2005) seeks to limit future residential growth to the north-east and east of Buronga. The structure plan directs future urban development towards the Midway Centre. The more recent Buronga Gol Gol Structure Plan Report 2020 identifies recent and proposed developments in Buronga. The closest future development proposals are industrial subdivisions located towards the northern part of the township.

It is not considered that the expanded landfill facility will conflict with existing or planned developments in Buronga. There is clear policy direction to avoid residential development to the north-east, reducing the chance of sensitive receptors being located closer to the site in the future. Furthermore, the site is already in operation and given the zoning of the land there is a reasonable expectation that the use (along with nearby industrial activities for bentonite and gypsum supply) will continue to operate.

There is a potential for additional traffic on the road network according to the Traffic Assessment. However, such impacts can reasonably be managed through Traffic Management Plans. The hours of operation will remain the same and it is therefore concluded that any cumulative impacts on the road network can be managed.

The EPA licence addresses other off-site impacts (e.g. noise, dust and odour). If these potential impacts are managed it is not considered that there will be unreasonable cumulative impacts, taking account of other industrial activities to the north east of Buronga.

4.4 Summary of Project Approval Requirements

4.4.1 State legislation

- Development consent - *Environmental Planning and Assessment Act 1979* (NSW). Under Section 4.12, Division 4.3 of the Act, an Environmental Impact Statement, in the form prescribed by the regulations, must accompany the development application.
- Variation to existing NSW EPA Licence No. 20209 - *Protection of the Environment Operations Act 1997* (NSW). Due to the staged nature of the proposed development, the licence will likely require several variations over the lifetime of the landfill site.
- Consent may be required under Section 138 of the *Roads Act 1993* for any road upgrade works identified through a Traffic Management Plan (e.g. altered access with the landfill facility) - *Roads Act 1993*

4.4.2 Commonwealth legislation

- Referral under the *Environmental Protection and Biodiversity Conservation Act 1999* is required only required if the project is likely to have a significant impact on matters of national environmental significance. The BDAR (Appendix M) has identified no possible impacts on matters of national environmental significance, and hence there is no referral trigger under the EPBC Act.

- Reporting requirements under the *National Greenhouse and Energy Reporting Act 2007* are unlikely to apply as annual greenhouse gas rates are expected to be below 25,000 t $CO_{2\text{-}e}$ with the inclusion of an LFG management system.

5 Engagement

5.1 Community Engagement

Community and stakeholder engagement was undertaken by PlanCom (Appendix F). A "Community and Stakeholder Participation Strategy" was prepared initially and endorsed by WSC to identify key community members and other stakeholder and the appropriate method of communication. The Strategy drew on WSC's Community Engagement Strategy 2016-2020 and Community participation Plan which requires WSC to Inform, Consult and Consider.

The objective of community and stakeholder engagement during this phase was to

- create broad awareness of the planned expansion and the planning process
- identify particular issues and impacts which can be addressed by changes or provision of additional information within the EIS.

The consultation led by PlanCom focussed on identifying and consulting:

- Surrounding landowners/neighbours. An area of approximately 3 km from the Landfill was selected as an appropriate distance from the boundary, noting that residents in Victoria were not included though marginally inside the 3 km radius;
- Businesses in the vicinity and especially those likely to be impacted along Arumpo Road;
- Community service providers;
- Advocacy groups;
- Previous complainants.

Consultation was initiated by posting or emailing a letter from WSC's General Manager presenting the proposed development, introducing PlanCom and inviting recipients to contact PlanCom to discuss the proposal. No responses were received via this method.

Direct contact (phone, on-line interview and/or email) was made with stakeholders in close proximity to the landfill, being residents and businesses along Arumpo Road and to the north of the landfill. Responses were gained from all identified parties with the exception of Morello Gypsum on Arumpo Road who did not respond to phone calls or messages.

5.2 Regulator Engagement

Regulator engagement was undertaken by specialist consultants as required to refine and understand issues raised within the SEARs. This engagement is documented within the individual reports and where additional issues were raised have been included in relevant sections in Section 6.

5.3 Potential Issues Raised

Issues have been grouped to facilitate responses and are summarised in Table 5.1. Detailed responses from each stakeholder are provided in Appendix F.

Table 5.1 Summary of Stakeholder Issues and Proponent Responses

Issues Raised	Response
Need for local waste management services – improved capacity for recycling, increased pick-up	The project proposes to improve community recycling facilities by providing additional drop off facilities aimed at improving diversion of recyclables from the waste stream. We note the request for additional

Issues Raised	Response
services have resulted in less illegal dumping, want to retain local services	drum muster storage and have accommodated this into the concept design The project will also provide surety of local community services into the future. Current projection has the site closing in approximately 5 years' time with no alternative disposal facilities identified. Approval of the project site will provide security for diversionary and disposal options for the community for many years to come
Nature of the material to be accepted by the landfill and need to control what is accepted in the interest of other industry including agriculture	The same waste streams are proposed to be accepted as are part of the current licence. There is no plan to change this as part of this project All quarantine waste, regardless of its origin, is handled and immediately buried in accordance with Commonwealth and State guidelines to minimise any potential to impact the surrounding agricultural industry All waste able to be accepted at Buronga that cannot be reused or recycled, is placed within engineered landfill cells designed in accordance with NSW EPA Solid Waste Landfill Guidelines. The cell is lined with bentonite clay (known as geosynthetic clay liner, GCL) and high-density polyethylene (HDPE) which is under the constant supervision of an independent geotechnical inspection and testing authority to provide quality control. This encapsulates the waste and prevents contaminants entering the surrounding environment
Need for control over the operations	Site operations are strictly controlled through EPA licence conditions and a detailed Landfill Environmental Management Plan (LEMP). WSC carefully manages site operations to achieve compliance with these requirements and will continue to do so moving into the future
Traffic increase and need for improvement to roads as part of the project - Arumpo Road being one in the interest of shared use and safety	A traffic assessment has been undertaken which has recommended improvements to Arumpo Road at the entrance to the Buronga Landfill to maintain a safe environment for local residents and waste transporters. It is noted that widening of shoulders has also been requested to improve residents' safety and it is noted that although the road width meets current standards, the sealed shoulder width can be improved. Further consultation will be held with local residents to discuss timeframes for completion of shoulder sealing
Access to the site and in appropriate use of certain roads	Mourquong Road was noted to be used by large trucks. It is unclear if these trucks are related to the landfill or to other industries. WSC will undertake further consultation on this matter to determine an appropriate response, which may include options such as load limits. Improvement made to Arumpo Road should also assist in encouraging large trucks to use this road rather than smaller roads
Dust from traffic, landfill, and other existing industry	Dust from construction and during operations is minimised as required by the licence. The LEMP identifies the following measures to assist in minimising dust: • Immediate burial of dusty loads

Issues Raised	Response
	• Entrance and site access roads to be maintained and watered if required; • Speed limits enforced on site; • Earthworks avoided on days with moderate winds or stronger where practical; • Soil dampened during excavation; • Water truck used as required for operations likely to cause dust, e.g. crushing concrete, chipping green waste. The project proposes to retain the vegetation along Arumpo Road and set back the landfill operations over 200 m from the boundaries to assist in minimises the impact of dust generated on road users and surrounding residents
Odour	As described in the LEMP, odour from the landfill is controlled by compacting the waste as it is received, minimising the size of the waste placement area, immediately covering malodorous waste and covering the exposed waste surface with daily cover (soil) at the end of each day As stated, the project proposes to keep a minimum 200 m buffer from the boundary to further minimise the potential for odour to be a nuisance to neighbours
Litter	Litter is managed in accordance with the licence with the control measures specified in the LEMP, including: • Maintaining a small active waste placement area; • Compacting and covering the waste; • Deploying litter fences around the active tipping area as required; • Fencing the site. The project proposes a 200 m buffer from the landfill, bulking up areas and waste transfer station to the site boundary and will retain and protect existing vegetation along Arumpo Road
Fires in the landfill and resulting impact on air quality and odour	Landfill fires may occur due to the inappropriate disposal of spontaneously combustible waste, such as batteries, in the municipal solid waste. They are controlled as far as practical by limiting the acceptance of flammable wastes The project proposes to improve the handling and sorting of recyclable waste such as green waste. Improved handling and limitations on the volume of potential flammable wastes retained on-site will assist in reducing the frequency of fires
Land use - potential for conflicts with agricultural land use	No rezoning of land is proposed as part of this project. The site is currently appropriately zoned and the surrounding areas are zoned rural. This project does not propose to rezone surrounding land
Visual impact as result of the height of the filled area	The existing height of the landfill is 56 m AHD with the expanded landfill proposed to reach a maximum height of 59 m AHD. The landform has been designed as a series of rolling dunes to replicate

Issues Raised	Response
	similar east-west dunes in this area. In addition, it is proposed to revegetate the final landform with endemic native species which includes a range of grasses, forbs, shrubs and potentially trees to soften the landform outline and match in with the local colour palette
Commercial interest - supply to the landfill, use of the service, expansion of nearby industrial development	WSC will undertake further discussion with the specific parties in relation to their interests that were expressed through the consultation
Future consultation and desire to be informed about the release of the EIS	WSC has undertaken to continue to inform, consult and consider feedback from the community in accordance with the Community Engagement Plan. All parties contacted during this EIS development phase will be provided these responses and will be notified when the EIS has been submitted and the public exhibition commences. They will be provided with information about how to make a submission to Department of Planning, Industry and Environment

5.4 Further Consultation Proposed

Recommendations for future consultation include:

- Ensuring that all those contacted as part of this stage are provided WSC's responses and notified by email when the EIS is submitted and on exhibition.
- Information about the proposal should be provided through WSC newsletters and communication and via the website.
- Further meetings or information session should be offered during the EIS exhibition period. This may be just an advertised time when people can attend at WSC Offices, view maps and have any questions answered with WSC personnel available. This will be particularly important for resolving the issues raised around Arumpo Road and the use of smaller roads.
- Ensuring that all near neighbours have a contact name and number for a person in WSC who can address any operational concerns on site or incidents such as illegal dumping.
- Information should be provided to the agricultural community but available to all stakeholders about the operations and controls. This is to reassure those with concerns about the impact on local activities including food production.

6 Environment Impact Assessment

6.1 Air Quality and Odour

6.1.1 Methodology

The air quality and odour assessment was undertaken by Vipac Engineers & Scientists (Vipac) and is presented in Appendix G. A summary of this report is presented in this section. Vipac employs suitably qualified staff, including their Principal Air Quality Scientist who has a doctorate related to the characterisation of urban particulate matter, and has relevant experience which includes numerous air quality assessment for landfills, mines in New South Wales.

The air quality impact assessment was conducted according to the *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* and the *Optimum CALPUFF modelling guidance for NSW*. Modelling tools, TAPM, CALMET, CALPUFF and CALPOST, were used in series to provide atmospheric dispersion modelling. The models use local meteorological data, air quality records and factors accounting for land use practices and emission mitigation measures to predict ground level concentrations of pollutants over a specific time period. The ground level concentrations can be estimated at different locations – for example, at the locations of different sensitive receptors. In this way, the effect of landfill operations on the quality of air near sensitive receptors can be estimated.

6.1.1.1 Particulate Matter

Air quality assessment and methodology criteria are detailed in the *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* which are derived from the *National Environment Protection (Ambient Air Quality) Measure 1998* (referred to as the Air NEPM) which establishes national standards. Due to the type of industry and proximity of sensitive receptors, the NSW requirements for a Level 2 assessment have been adopted, with selected pollutants and criteria defined in Table 6.1.

Table 6.1 Adopted Air Quality Goals for Particulate Matter

Pollutant	Description	Basis	Criteria	Averaging Time
Total Suspended Particles (TSP)	Particulate matter (PM) with diameter ≤ 50 microns (µm);	Human health	90 µg/m^3	Annual
PM10	PM with diameter ≤ 10 µm);	Human health	50 µg/m^3	24-hour
		Human health	25 µg/m^3	Annual
PM2.5	particulate matter with diameter ≤ 2.5 µm);	Human health	25 µg/m^3	24-hour
		Human health	8 µg/m^3	Annual
Dust deposition	deposited matter that falls out of the atmosphere	Amenity	Max. incremental increase of 2 g/m^3/month	Annual
		Amenity	Max. total of 4 g/m^3/month	Annual

6.1.1.2 Odour Emissions

Odour is expressed in Odour Units (OU), which represents the dilution factor required to decrease the concentration of an odorant to a predetermined detection threshold. For example, a 1-second OU value of 1 indicates an odorant is just detectible within 1 second of exposure – meaning the concentration of the

odour is at the detection level. Furthermore, a 1-second OU value of 2 indicates the concentration of the odorant is double the concentration required to detect the odour within 1 second of exposure. Finally, air quality assessment criteria employ a 99th Percentile 1-second OU – meaning 99% of people exposed to 1 OU of an odour will be able to detect that odour within 1 second. *The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* include odour assessment criteria as shown in Table 6.2. An odour assessment criterion of 7 OU is appropriate to assess the performance of the project.

Table 6.2 Assessment Criteria for Odour (1 second average, 99th percentile)

Population of Affected Community	Assessment Criteria (OU) for Complex Mixture of Odours
Urban (>2000 people) and/or schools and hospitals	2
500	3
125	4
30	5
10	6
Single rural residence (<2)	**7**

Odour emissions from the landfill activities were derived from a web-based research of measured data from similar facilities.

6.1.1.3 Greenhouse gas emissions

The assessment of greenhouse gas emissions was conducted according to the national framework set out in the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). The NGER Act requires corporations to submit an annual report in energy consumption, energy production and greenhouse gas emission, if any of the following conditions are met:

- The facility consumes more than 100 terajoules of energy in a financial year or emits more than 25,000 tonnes of CO_2 equivalents ($CO_{2\text{-}e}$).
- All Australian facilities collectively consume more than 200 terajoules of energy in a financial year or emits more than 50,000 tonnes of $CO_{2\text{-}e}$.

A local council is not a corporation, as it is a body politic of the State and hence annual reporting is not required. A facility is defined as an activity, or series of activities (including ancillary activities), if it involves the production of greenhouse gas emissions.

Greenhouse gas emissions were estimated using the *National Greenhouse Accounts Factors Workbook* (NGA Workbook), which is published and regularly updated by the Department of Industry, Science, Energy and Resources. The scope of the emission assessment is related to source/type of direct and indirect emissions.

6.1.2 Existing Environment

6.1.2.1 Local Setting and Topography

The location of sensitive receptors in relation to the odour source(s) and the local topography are key aspects of assessing air quality impacts. The nearest sensitive receptors are residential dwellings associated with agricultural activities, the nearest of which is located approximately 1 km southwest, and Lake Gol Gol located 1.8 km east of the expansion area. Industrial (mining) operations are located 400 m

west and 50 m north west of the project. The NSW 1:50,000 Topographic Map indicates that the site rises above the surrounding landscape, which is generally flat.

The sensitive receptor locations adopted for modelling were:

- Receptor 1: Residential property near 178 Arumpo Road, approx. 1 km south of project;
- Receptor 2: Residential property at 664 Arumpo Road, 1.9 km north-east of project;
- Receptor 3: Shed/crops at 222 alcheringa Drive Gol Gol, approx. 1 km south-south-east of project;
- Receptor 4: Residential property at 173 Mourquong Road, 1.1 km south-south-west of project.

6.1.2.2 Dispersion Meteorology

The Mildura climate (as recorded at Mildura Airport (BOM Site No. 076031)) is characterised by:

- Mean temperature range 4 °C to 33 °C with the coldest month in July and hottest in December to March
- Mean rainfall of 285.4 mm/yr is consistent across the year and higher in late winter/spring. On average, 43.6 days/year receive rainfall ≥ 1 mm with the highest number of rain days in July. Summer rainfall occurs over a smaller number of high intensity events.
- Winds are primarily from the south and south east at 9 am and from the south, southwest and west at 3 pm. Stronger winds (> 40 km/hr) occur infrequently but most often from the west.

Air dispersion modelling requires detailed information about meteorological factors such as wind speed and direction, atmospheric stability and mixing height. Two modelling suites (TAPM and CALMET) were used to derive a continuous hourly dataset for 12 months. Wind rose diagrams generated using TAPM-CALMET derived datasets were consistent with those obtained from the nearest Bureau of Meteorology (BOM) weather station at Mildura Airport (Station Number 076031).

Atmospheric stability classification schemes provide an indication of the tendency of the atmosphere to resist or enhance vertical motion of pollutants. There are six stability classes (A-F), ranging from very unstable (Class A), to neutral (Class D), to stable (Class F). The TAPM-CALMET-derived datasets indicate the local atmospheric stability is generally neutral to stable.

Mixing height refers to the height above the ground at which particulate matter and other pollutants may be dispersed. During stable conditions, the mixing height is often lower and particulate dispersion is limited to this layer. The mixing height increases following sunrise and continues to increase during the morning reaching maximum mixing heights in the mid to late afternoon due to the dissipation of ground-based temperature inversions and the growth of convective mixing layer.

6.1.2.3 Existing Air Quality

NSW EPA operates a network of air quality monitoring stations with the closest station to the project at Wagga Wagga North, approximately 500 km east of the project. Although the monitoring site is located at distance from the Buronga, it provides a reasonable reference as it is a regional site with rural sources of air emissions (e.g. primarily dust from farming activities and wind erosion). Available and adopted data for the project are shown in Table 6.3. The maximum measured 24-hour average PM_{10} (114 µg/m^3) was greater than the relevant criteria of 50 µg/m^3.

Table 6.3 Assigned Background Concentrations

Parameter	Unit	Air Quality Criteria	Period	Maximum Measured	Adopted Background	Comments
TSP	µg/m^3	90	Annual	51.5	51.5	Conservative Assumption
PM10	µg/m^3	50	24 hour	114	Varies	NSW EPA Measurement
PM10	µg/m^3	25	Annual	20.6	20.6	

Parameter	Unit	Air Quality Criteria	Period	Maximum Measured	Adopted Background	Comments
PM2.5	µg/m^3	25	24 hour	28.1	Varies	
PM2.5	µg/m^3	8	Annual	7.4	7.4	
Dust Deposition	g/m^2/month	4	Month	2	2	Conservative Assumption

6.1.3 Assessment

6.1.3.1 Emission Inventory, Controls and Source Locations

Dust and particulate matter are most likely to be generated from on-site activities of unloading trucks, equipment operation, wind erosion from disturbed areas, materials handling and vehicle movements. Odour is likely to be generated by putrescible waste within the accepted waste stream at the tip face and under interim cover and generated from leachate stored in ponds with little contribution expected from non-putrescible waste. Emission controls based on typical landfill practices as describe in the Landfill Guideline. The emission data for particulates and odour are shown in Table 6.4 and Table 6.5, respectively.

Table 6.4 Particulate Emission Rates

Activity	Emission Rate			Control applied
	TSP (g/s)	PM10 (g/s)	PM2.5 (g/s)	
Landfill Area				
Machinery on waste	0.486	0.233	0.051	
Trucks dumping waste	0.233	0.084	0.025	
Wind Erosion				
Active landfill	0.311	0.156	0.033	Watering and windbreaks
Inactive landfill	0.036	0.018	0.004	Revegetation
Historical landfill	0.021	0.011	0.002	Revegetation
Haulage				
Wheel-generated dust – heavy vehicles	3.290	0.972	0.056	Watering and limiting vehicle speed to < 50 km/hr
Wheel-generated dust – light vehicles	0.183	0.064	0.007	
TOTAL	**4.56**	**1.54**	**0.18**	

Table 6.5 Odour Emission Rates

Source	Area (m^2)	Specific Odour Emission Rate ($OU/m^2/s$)	Peak to Mean Ratio	Modelled Odour Emission Rate ($OU/m^2/s$)
Active tip face	600	3.2	2.5	4,950
Interim cover	400,000	0.16	2.5	55,760
Leachate pond	12,828	0.459	2.5	1,205

Greenhouse gas emissions were estimated for combustion for transport (general) and municipal solid waste disposal (assuming no LFG capture). The emissions which have not been included are: emissions arising by the leachate; emissions arising from waste transport to the site; the use of electricity from the grid. The main greenhouse gas emission is related to waste disposal (Table 6.6).

Table 6.6 Greenhouse Gas Emission Rates with No Mitigation

Source	Scope	Emission Factor	Annual Emission (t CO_2-e/yr)
Waste disposal	Direct	1.6 t CO_2-e/ t waste	160,000
Equipment – combustion	Direct	2.69 t CO_2-e/ t kWh	1664
On-site haulage - combustion	Direct	2.69 t CO_2-e/ t kWh	16
TOTAL			**161,680**

6.1.3.2 Impact Assessment

The predicted concentration of particulate matter and odour were assessed in relation to four sensitive receptors (all greater than 900 m from the proposed expansion footprint). For the majority of parameters, emission concentrations are all predicted to be below relevant air quality criteria (Table 6.7). The exceptions are the predicted 24-hour average PM10 and PM2.5 concentrations. For both these parameters, the background concentration exceeds the criteria. Further investigation found that sixteen (16) exceedances for PM10 and two (2) exceedances for PM2.5 were above background occur at the receptors over the year. All exceedances correspond to high background concentrations, with the landfill predicted to increase the cumulative concentration by a maximum of 0.81 $\mu g/m^3$ for PM10 and 0 $\mu g/m^3$ for PM2.5. These increments provide a negligible contribution to the exceedance and hence the Approved Methods do not require additional assessment. For all particulates and odour, the predicted emissions from the project are not predicted to adversely impact upon the sensitive receptors.

Table 6.7 Predicted Particulate and Odour Concentrations at Receptors

Parameter (units)		Background Concentration	Predicted Concentration at Receptors			
			Receptor 1	Receptor 2	Receptor 3	Receptor 4
TSP – annual average ($\mu g/m^3$)	Incremental	51.5	1.68	0.09	0.25	0.55
	Cumulative		53.18	51.59	51.75	52.05
	Criteria			90		
	Incremental	114.7	13.12	0.51	1.09	4.08

Parameter (units)		Background Concentration	Predicted Concentration at Receptors			
			Receptor 1	Receptor 2	Receptor 3	Receptor 4
PM10 – 24-hour average (µg/m^3)	Cumulative		127.12	114.51	115.09	118.08
	Criteria		50			
PM10 – annual average (µg/m^3)	Incremental	20.6	0.62	0.04	0.10	0.21
	Cumulative		21.22	20.64	20.70	20.81
	Criteria		25			
PM2.5 – 24-hour average (µg/m^3)	Incremental	28.1	2.11	0.09	0.30	0.70
	Cumulative		30.21	28.19	28.40	28.8
	Criteria		25			
PM2.5 – annual average (µg/m^3)	Incremental	7.4	0.09	0.01	0.02	0.04
	Cumulative		7.49	7.41	7.42	7.44
	Criteria		8			
Dust deposition (g/m^3/month)	Incremental	2	0.36	0.02	0.04	0.1
	Cumulative		2.36	2.02	2.04	2.10
	Criteria		Incremental = 2 Cumulative = 4			
1-second Odour (OU)	Incremental		2.76	0.43	1.11	1.45
	Criteria		7			

Greenhouse gas emissions based on acceptance of 100,000 tonnes/annum of waste is estimated to be around 161,680 tonnes CO_2-e per year. This potential maximum emission represents approximately 0.3% of Australia's 2019 greenhouse inventory estimate. If capping of the active cells and LFG capture in the management system is accounted for a reduction of at least 90% can be expected, most likely more, resulting in greenhouse gas emissions of less than 16,000 tonnes CO_2-e per year.

6.1.4 Mitigation Measures

The Air Quality Assessment concluded that air quality should not be a constraint to the proposal. This was based on the site undertaking typical air pollution mitigation measures, as follows:

- Particulate matter
  - Watering and windbreaks for the active landfill cell;
  - Revegetation of inactive landfill cells;
  - Watering of unsealed roads; and
  - Limiting vehicle speeds on unsealed roads to 50 km/h.
- Odour
  - Restriction of the active tip face to 600 m^2;
  - Placement of daily cover on the active tip face at a depth of 150 mm at the close of business each day;

- The use of intermediate cover on areas awaiting final capping.

No mitigation measures related to greenhouse emissions were specified in the assessment; however significant further reductions can be achieved by:

- Interim and final capping of completed cells;
- LFG passive or active extraction.

The reduction in greenhouse gas emissions from these measures could reduce emissions by over 90%.

The potential air quality mitigation measures will be a requirement of the POEO licence and will be embodied in the LEMP. The 200 m buffer around the site boundary has assisted in ensuring that the project will not impact air quality.

6.2 Traffic and Access

The Traffic Impact Assessment (TIA) was prepared by Tonkin and is presented in Appendix H.

6.2.1 Methodology

6.2.1.1 Aim, Scope and Relevant Guidelines

A TIA is a technical appraisal of the traffic and safety implications relating to a specific development. The principal aim of the TIA is to assess the existing road network's suitability to adequately support traffic generated by the landfill expansion and the methods, management and mitigation proposed to avoid or minimise traffic impacts. The assessment is conducted in compliance with the NSW Roads and Maritime Services (RMS) *Guide to Traffic Generating Developments*, which sets out the scope of issues to be addressed in the TIA. Key issues to be addressed by a TIA include:

- the existing locality and surrounding land uses;
- the existing road network and intersections;
- traffic generation characteristics of the project;
- traffic impacts of the project; and
- a summary of the assessed traffic impacts and any traffic management or mitigation measures.

The scope also included issues/requirements raised during consultation with key stakeholders, namely: WSC's Roads and Engineering Department and Transport for NSW (TfNSW). WSC personnel indicated that the access with the landfill should be upgraded to suit the largest vehicle required to access the landfill. TfNSW indicated that the TIA should address where the additional waste is expected to come from and any potential impact on George Chaffey Bridge; how the waste is expected to be processed on site; and the regional impacts on the state road network.

The design, construction, maintenance and operation of road networks in Australia and New Zealand are described in standardised guides published by Austroads. The following Austroads Guides, including the RMS Supplements, were used in assessing the adequacy and potential upgrades of the existing roads:

- Austroads Guide to Road Design Part 3 – Geometric Design
- Austroads Guide to Road Design Part 4 – Intersections and Crossings - General
- Austroads Guide to Road Design Part 4A – Unsignalised intersections and signalised intersections
- Austroads Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings
- Austroads Guide to Pavement Technology Part 5 – Evaluation Treatment Design

The National Heavy Vehicle Regulator (NHVR) Performance Based Scheme (PBS) - Network Classification Guidelines have also been referred to in the preparation of the assessment.

6.2.1.2 Methodology

On 24 March 2021, Tonkin conducted a site inspection of the current landfill entrance and the junction of Arumpo Road and Silver City Highway. The aim of the inspection was to assess the existing road arrangements, geometry, sight distances and pavement conditions to identify any constraints these factors may place on the proposed development.

The existing roads and the future requirements were compared with the Austroads Guidelines to determine potential upgrades or management and mitigation to avoid or minimise impacts. A broad range of methods, primarily derived from the Austroads Guides, were employed for the assessment of the following:

- Function and Geometry
  - The layout or geometry of a road network, the technical specifications of a road (e.g. width, seal type, load capacity, speed limits), and the types of vehicles permitted to use a road can be determined using maps and state and government records/databases.
- Road Condition
  - The physical condition of key stretches of the roads were assessed via visual inspection.
- Traffic and Safety
  - Daily traffic volumes were obtained from Austraffic traffic surveys undertaken in March 2021. Crash data (e.g. crash frequency, type, and resulting injuries or fatalities) was obtained from the Centre for Road Safety.
- Intersection Sight Distance
  - The Safe Intersection Sight Distance (SISD) of an intersection was assessed using Austroads Guide to Road Design Part 4A.
- Intersection Upgrade Warrants
  - Conditions warranting/prompting the upgrade of intersections are outlined in Austroads Guide to Traffic Management Part 6; and are primarily based on speed limits, peak hourly traffic rates and turning traffic movements.
- Landfill Traffic Volumes
  - Traffic to and from the landfill was primarily assessed using landfill weighbridge records.
- Traffic Projections
  - Future traffic projections for multiple traffic generation scenarios were based on assumptions of the usage of surrounding areas and traffic engineering experience. See Section 6.3 of the TIA for the specific assumptions used in the traffic projection calculations.

6.2.2 Existing Environment

6.2.2.1 Silver City Highway

Function and Geometry

The Silver City Highway (maintained by TfNSW) is the primary route for transport between Buronga/Mildura and Broken Hill. It is a designated heavy vehicle route and has approval for travel by B-double, Type (1) A-double, Modular B-triple, B-triple and AB-triple vehicles. Between Buronga and Arumpo Road, it is two-lane and two-way, sealed (with sealed shoulders) and edge lined, with marked lane widths of 3.5 m and sealed shoulder widths of 1.0 m and a speed limit of 100k/h from 1.5 km north of Buronga.

Road Condition

The condition of the Silver City Highway appears satisfactory with minimal rutting or surface defects suggesting the underlying pavement is in good condition.

Traffic and Safety

The volume of two-way traffic to the north and south of the Arumpo Road -Silver City Highway intersection is 2,501 and 2,999 vehicles/day, respectively, with peak traffic occurring at 6 am northbound and 2 pm southbound. Heavy vehicles comprise 19-24% of the traffic volume, making this a designated heavy vehicle route, and resulting in recommended minimum 7 m seal (Austroads Part 3 Table 4.5).

Crash records indicate that there were 5 crashes within 2.5 km of the Arumpo Rd-Silver City Highway intersection between 2015 and 2019. There do not appear to be trends in the nature/cause of the crashes. All crashes resulted in minor injuries.

6.2.2.2 Arumpo Road

Function and Geometry

Arumpo Road (maintained by WSC) is the primary route for transport between Buronga and Mungo National Park (World Heritage listed) and Mungo State Recreation Area, approximately 120 km north-east of the Project. The road has approval for travel by B-double, Type (1) A-double and Modular B-triple vehicles. The speed limit is 80 km/h for 2 km from the Silver City Highway and then increases to a 100 km/h posted speed zone.

Arumpo Road has lane widths of 3.6 m each way with an unsealed shoulder width of 1.0 m on approach to Silver City Highway. On the approach to the Buronga Landfill, the lane widths are approximately 3.25 m, with an unsealed shoulder width of 1.5 m.

Road Condition

The condition of Arumpo Road appears satisfactory with minimal rutting or surface defects suggesting the underlying pavement is in good condition.

Traffic and Safety

The volume of two-way traffic for Arumpo Road is 478 vehicles per day with peak traffic at 6 am eastbound (i.e. toward Buronga Landfill and Mungo) and at 2 pm westbound (toward Buronga). Heavy vehicles comprise 23-26% of the two-way traffic volume is attributable to heavy traffic, making this a designated heavy vehicle route, and resulting in recommended minimum 7 m seal (Austroads Part 3 Table 4.5).

Crash records indicate there were no crashes within 15 km of the intersection between Arumpo Road and Buronga Landfill access road.

6.2.2.3 Silver City Highway/Arumpo Road Junction

A deceleration and acceleration exist on Silver City Highway for vehicles turning left onto and from Arumpo Road and an auxiliary right-turn treatment on Silver City Highway allows vehicles to pass right-turning vehicles via a short, left lane. This results in a seal width of up to 14 m in the vicinity of the intersection, which meets the Austroads Guide Part 4A minimum width of 6 m to allow passing. A truck rest area is located directly opposite the intersection, on the western side of Silver City Highway. The entrance and exit to the rest area are located approximately 100 m south and 150 m north of the intersection, respectively.

The minimum required SISD was determined to be 262 m (Austroads Guide Part 4A). Based on a site visit, sight distances were deemed to be acceptable, with sight distance deemed to be ≥ 300 m, despite horizontal curves existing on either side of the intersection.

The number and types of turning lane warranted at a major intersection are based on the sum of traffic volume for the major roads at an intersection and the number of vehicles turning at the intersection per hour. The traffic assessment indicates that a basic left turn is adequate whilst a channelised right turn lane is required. Changing the existing auxiliary right turn to a channelised right turn may limit the ability of heavy vehicles to turn into and out of a truck parking area west of the intersection. As a result, the existing design is the most appropriate design and should not be changed.

6.2.2.4 Arumpo Road/Buronga Landfill Junction

At the intersection to Buronga Landfill, a widened sealed shoulder is present, likely designed to allow vehicles travelling straight to pass vehicles turning into the landfill. Austroads Guideline Part 4A recommends a minimum 6 m width between the edge of the widened shoulder to the centreline be implemented to allow vehicles to pass, which does not currently exist. Road conditions upon entrance to Buronga Landfill are poor with deformed areas and small potholes. There is widespread evidence of stripping, with some areas of the base exposed.

The SISD at the intersection was determined to be 262 m (Austroads Guide Part 4A). Sight distances at the intersection appear to be > 700 m with negligible changes to the horizontal alignment.

The assessment indicates basic left and right turns are adequate for the intersection between Arumpo Road and Buronga Landfill.

6.2.2.5 Landfill Traffic Volumes

On average, 50 vehicles pass over the weighbridge each day: 24 light vehicles (e.g. cars and utes with or without trailers), 21 heavy rigid trucks and 1 articulated truck. An additional 6 vehicles, belonging to employees, are expected to visit the site each day. An average of 56 vehicles per day turn into the Buronga Landfill.

6.2.3 Assessment

6.2.3.1 Traffic Generation and Distribution

Traffic generation was considered for four scenarios: (1) current operation; (2) current operation and initial construction; (3) future operation; and (4) future operation and top-up construction. Light vehicles are anticipated to be the dominant vehicle type, followed by heavy rigid trucks, light rigid trucks and articulated trucks with the largest vehicle expected to be a B-Double.

Site traffic is anticipated to increase over time as the landfill capacity increases and as waste is taken in from surrounding areas, including Mildura once the Mildura landfill is closed (Table 6.8). Peak site traffic is expected to reach 261 vehicles per day during future operations and cell construction.

Table 6.8 Daily Traffic Types Generated by the Project

Vehicle Type	Daily Traffic (vehicles/day) for Each Scenario							
	Current Operation		Current Operation + Construction		Future Operation		Future Operation + Construction	
	Average	Peak	Average	Peak	Average	Peak	Average	Peak
Light Vehicles	30	48	45	72	46	74	61	98
Light Rigid Trucks	4	6	5	8	15	24	16	26
Heavy Rigid Trucks	21	34	22	35	81	130	82	131
Articulated Trucks	1	2	3	5	2	3	4	6
TOTAL	**56**	**90**	**75**	**120**	**144**	**230**	**163**	**261**

Under current operations, vehicles are likely to be predominantly from the WSC area as the Mildura Landfill is close to the township and can receive a variety of wastes (Table 6.9). In the future, the distribution of vehicles is expected to be predominantly from Victoria/Mildura, given Mildura is the major service centre and combined with the likely closure of the Mildura Landfill, it has the largest nearby population generating waste. The number of light vehicles is not expected to increase in the future as the Mildura Waste Transfer Centre will continue to operate and residual waste for landfilling will transported by rigid trucks.

Table 6.9 Daily Traffic from Regions Generated by the Project

Region	Daily Traffic (vehicles/day) for Each Scenario					
	Current Operation + Construction		Future Operation		Future Operation + Construction	
	Average	Peak	Average	Peak	Average	Peak
Mildura	17	27	66	106	83	133
Buronga/ Gol Gol	1	2	13	21	14	23
Wentworth	1	2	9	14	10	16
TOTAL	19	30	88	141	107	171

6.2.3.2 Traffic Impacts on the Road Network

The roadway Design Annual Average Daily Traffic (AADT) represent a measure of the acceptable traffic capacity of a road. The Design ADDT for Silver City Highway and Arumpo Road were determined using existing road cross sections:

- Silver City Highway North: >3000 vehicles per day
- Silver City Highway South: >3000 vehicles per day
- Arumpo Road: 500-1000 vehicles per day

Vehicles from Mildura must cross the George Chaffey Bridge and then combine with traffic from Buronga and Gol Gol to use the Silver City Highway south of Arumpo Road to travel to the Buronga Landfill.

The projected AADT for George Chaffey Bridge and the Silver City Highway shows a minor increase in the expected traffic (Table 6.10). The largest relative increase is predicted on Arumpo Road but this remains within the design AADT for this road. Overall, the results indicate that additional traffic generated by the Project is within the design capacity of the roads so no road upgrades or modifications are required.

Table 6.10 Current and projected construction and operational traffic (vehicles/day).

Road Name	Current AADT	Additional Vehicles	Traffic Increase	New AADT
George Chaffey Bridge	18,000	83	0.46%	18,083
Silver City Highway (South of Arumpo Road)	2,999	97	3.24%	3,096
Silver City Highway (North of Arumpo Road)	2,501	10	0.39%	2,511
Arumpo Road	478	107	22.38%	585

6.2.3.3 Traffic Impacts on Road Geometry

Silver City Highway meets the recommended requirements and does not require any geometry or condition improvements as it meets the Austroads recommendations based on traffic volumes and the NHVR PBS for heavy vehicles routes.

Arumpo Road is in good condition and has sufficient lane and shoulder widths for a single lane rural road. For single carriageway rural roads with 500-1,000 average annual daily traffic, recommended total lanes widths (edge-line to edge-line) are 6.2-7 m with 1.5 m total shoulder including 0.5 m sealed shoulder and, where >15% are heavy vehicles a minimum 7.0 m seal should be provided (Austroads Guide Part 3 Table 4.5). Arumpo Road has sufficient lane and shoulder width but, on approach to the landfill, the shoulder is unsealed and does not meet the recommended width for heavy vehicles routes. An additional 0.35 m seal on each shoulder to meet this recommendation.

It is noted that the seal widths are guidelines and not mandatory. The overall road width is compliant and the road is not dangerous, as further evidenced by the lack of crashes. From the community consultation it is evident that there is community concern over the lack of sealed shoulder and hence WSC will consult with the community and TfNSW to develop a plan to improve the road as construction works will impact transport to and from surrounding industrial and agricultural enterprises as well as tourist traffic to Mungo National Park.

6.2.3.4 Traffic Impacts at Intersections

The current and projected major road traffic volumes and intersection turn volumes are shown in Table 6.11. As for the current traffic volumes, future traffic volumes suggest a channel right turn should be provided at the intersection of Silver City Highway and Arumpo Road; however, as noted in Section 6.2.2.3, this change may limit the ability of heavy vehicles to turn into and out of a truck parking area and hence is not recommended. The existing intersection layout, which includes a 500 m auxiliary lane, does not limit access to the truck parking bay and hence it is recommended that the current intersection layout is retained.

Table 6.11 Future Daily Intersection Volumes

Road	Current Major Road Volume	Current Turn Volume	Peak Additional AADT	New Major Road Volume	New Turn Volume
Silver City Highway (North of Arumpo Road)	130	24	16	132	26
Silver City Highway (South of Arumpo Road)	252	24	156	268	40
Arumpo Road	47	6	171	64	22

At the intersection with Arumpo Road and the Buronga Landfill entrance, the current width is < 6 m from shoulder to centreline and hence requires upgrading. It is recommended that the pavement is widened and basic left and right turns are constructed to allow B-doubles and A-triple vehicles safe entry and exit and for vehicles to safely pass.

6.2.3.5 Site Access and Parking Demands

Local users (civilian vehicles and commercial waste trucks) are expected to drop off their waste at designated points around the site and leave. As such, parking demand is principally associated with landfill staff. There are currently 6 staff members that require on-site parking. The proposed landfill expansion is anticipated to require an additional 4 staff members. Current parking facilities (located in front of the site offices) should provide an adequate amount of permanent parking space for 10 employees, with the

proposed parking facilities being the same size as existing. An upgrade of the current parking facilities is not necessitated by projected increases in the number of employees or site traffic.

6.2.3.6 Traffic and Transport Management

Implementing the proposed treatments would require preparation of a Construction Traffic Management Plan which utilises the Austroads and TfNSW guidelines for major intersection operations and worksite traffic control. Additional traffic management will not be required during operational and cell construction phases, except if oversize and/or over mass vehicles are required whereby a Transport Management Plan will need to be prepared and submitted to TfNSW to obtain appropriate permits.

6.2.4 Mitigation Measures

To appropriately manage traffic, both currently and in the future, some improvements to the existing roads and intersection are recommended. These improvements are:

- Basic right turn from Arumpo Road into the Buronga Landfill and Basic left turn into Arumpo Road from the Buronga Landfill. Concept designs are provided in the TIA (Appendix H);
- Additional shoulder sealing along Arumpo Road where the recommended seal width is not met.

6.3 Soil and Water

A geotechnical assessment report and groundwater impact assessment are presented as Appendix I and Appendix J, respectively. Additional interpretation of soil test results has been provided by Dr Melissa Salt who is a Certified Professional Soil Scientist.

6.3.1 Methodology

The soil and water at the site were assessed by interrogation of publicly available desktop sources and an intrusive investigation.

6.3.1.1 Site Investigations

Tonkin conducted a field investigation from 16-18 February 2021 to describe the geological features, identify impediments to excavation, estimate the likelihood of encountering contamination and record the depth to groundwater. Twelve boreholes were drilled in an approximate grid pattern (Figure 16) within the proposed expansion area to a maximum of 10 m below ground level (m bgl). Groundwater elevation in the boreholes was measured where possible on the first and second day of the investigation.

Bulk samples taken at random locations and depths from the borehole cores and sent to CivilTest for geotechnical laboratory analysis. The results of the tests were primarily used to suitability of the subsurface material for reuse on site (e.g. as cell capping or base liner material). The following parameters were tested:

- Particle Size Distribution (PSD)
  - Describes the composition of soil in terms of the relative proportion of sand (2.00-0.02mm diameter particles), silt (0.02-0.002mm) and clay (< 0.002mm).
- Atterberg Limits
  - Provides a measure of the moisture content at which the physical consistency or behaviour of the soil changes from solid (brittle/non-malleable), to plastic (malleable), to liquid (flows under its own weight).
  - A high 'plasticity index' suggests a soil will display plastic properties under a broad range of moisture contents. The plasticity index typically increases with increasing clay content. Soils with a low plasticity index are not typically suitable for use in the construction of cell base liners.

H12
H11
H10
H09
H05
H06
H07
H08
H01
H02
H03
H04
ARUMPO ROAD

Legend

Borehole Locations

tonkin

0 100 200 300 400 m

N

Job Number: 202597
Filename: 202597GQ00
Revision: Rev 0
Date: 2021-03-31
Drawn: WG

Data Acknowledgement:
Primary Imagery from ESRI, 2021

Wentworth Shire Council

Buronga Landfill Expansion
Hydrogeological Investigations
Borehole Location Plan

Figure 16

- Emerson Class
  - Provides a measure of the soil's tendency to disperse (i.e. break apart without physical agitation) upon wetting.
  - Dispersive soils (e.g. Emmerson Class 1, 3 and 5) are undesirable for use in both construction and agriculture.

Environmental Testing

Representative soil samples, primarily surface samples, were taken from the borehole cores and sent to Australian Laboratory Services (ALS) for environmental laboratory testing. The scope of testing was intended to provide a broad classification of the potential contamination status of the soils on site and included a broad range of metals (e.g. arsenic, cadmium, chromium, and lead) and Organochlorine Pesticides (OCPs) and Organophosphorus Pesticides (OPPs).

NSW EPA Excavated Natural Material (ENM) assessment criteria were used to determine if the soil met the definition of Virgin Excavated Natural Material (VENM) (i.e. uncontaminated natural material that has been excavated), which is classified as general solid waste (non-putrescible). The ENM assessment criteria used were:

- NSW 2014 ENM (Absolute Max)
- NSW 2014 ENM (Max Average)

The laboratory results were also assessed against the following *National Environment Protection (Assessment of Site Contamination) Measure 1999* (ASC NEPM) commercial/industrial investigation levels to account for the soils remaining or being reused on site:

- ASC NEPM Health Investigation Level (HIL) Level D – Commercial/ Industrial;
- ASC NEPM Ecological Screening Level (ESL) – Commercial/ Industrial;
- ASC NEPM Ecological Investigation Level (EIL) – Commercial/ Industrial;
- ASC NEPM Management Levels for TPH Fractions – Commercial/ Industrial.

6.3.2 Existing Environment

6.3.2.1 Geology and Soil

The surface layers are

- aeolian Woorinen Formation which include windblown sands, silts and calcareous clays from Quaternary deposits;
- alluvial Coonambidgal Formation which includes alluvial deposits and channel sands from the Holocene Era.

The soil types were reported to comprise Vertosols of the Huntingfield Land System to the west and Rudosols of the Canally Landscape to the east associated with the change in vegetation. Vertosols are cracking clay soil that display significant shrink and swell during wetting and drying cycles and associated with lake deposits in the Mallee region. Rudosols have little pedological organisation and are likely to be comprised of shallow red texture contrast soil or sandy solonized brown soil.

The site investigation identified two main soil types, being a sand over clay to the west (H1 – H6, H10-H12) and a clay profile to the east (H7-H9) with a sand unit below 6 m across the site. The soil description conforms with expectations; however the clayey vertosols were expected in the west and not the east and the sandy soil was expected in the east and not the west. The clayey soil in the east does coincide with the Black Box Open woodland wetlands on outer floodplains and to the west the sandy soil coincides with the Black-oak rosewood open woodland on deep sandy loams (see Section 6.6.2).

The following soil units were identified:

- Unit 1: Surface to red-brown to pale brown, fine to coarse grained sand. The upper unit at the sand over clay profile with the exception of H5, where it was absent. Lower depth 0.4-1.7 m
- Unit 2A: pale orange/brown to pale brown and white clayey gravelly sand/ clayey sand. Present for sand over clay profiles. Lower depth 2.0-6.4 m depth.
- Unit 2B: pale brown, orange/brown and orange sand/ clayey sand. Present for sand over clay profiles but was absent in H4. Lower depth 4-10 m depth.
- Unit 3A: grey-brown, clayey sand. Present in H4 and H5 overlying clay (3.5 – 4.6 m depth) and as a thin surface layer in H9.
- Unit 3B: grey, grey/brown, yellow/brown or red sandy clay/clay of medium plasticity. Present in all profiles ranging from 1 m to 9m thick. The exception is H1 where it was not encountered in the upper 10 m; however it is considered likely to be present at lower depths
- Unit 4A: yellow-brown to grey clayey sand to silty sand underlying clay and encountered in most profiles
- Unit 4B: grey sand only encountered in H8 and H9.

The soil was moderately to strongly alkaline throughout (Table 6.12). The surface soil was non-saline to slightly saline. The profile to at least 1 m depth is non-saline to slightly saline in the clay and sand units. Below 2 m depth, the sand unit was highly saline. A similar change was noted for sodicity with the upper soil being non or slightly sodic but the deeper soil being highly sodic; however Emerson Aggregate tests indicate the soil is typically well-aggregated and unlikely to be dispersive. Organic matter is very low and corresponds to the observed lack of topsoil. Contaminant testing noted that there were no reported exceedances of the relevant ENM or ASC NEMP assessment criteria.

6.3.2.2 Surface Water

The closest surface water bodies are Gol Gol Lake, approximately 1.5 km east, and the Murray River, over 5 km south. There is no direct waterway or pathway from the Project area to either water body. Th Project Area is outside the flood planning area defined in the Wentworth LEP 2011. The lack of surface water bodies and defined drainage is not unexpected given the gently undulating to flat topography and low rainfall (274 mm average annual rainfall).

6.3.2.3 Regional Hydrogeological and Geological Setting

The site is situated within the southern part of the Western Porous Rock resource unit. Significant aquifers in this resource unit include:

- the Renmark Group Aquifer (deep, confined). The Renmark Group Aquifer is a major confined aquifer that begins 100-200 m below ground level and is up to 400 m thick. The aquifer underlies most of the Murray Basin and is primarily composed of riverine sediments deposited 30-50 million years ago. Salinity ranges from 2,000 mg/L (moderately saline) to 36,000 mg/L (brine).
- Pliocene Sands Aquifer (shallow, unconfined). The Pliocene Sands Aquifer is a major unconfined/semiconfined aquifer that begins close to the surface (typically < 50 m bgl) and is around 100-150 m thick. The Pliocene Sands Aquifer is often conceptualised in two parts: the Loxton Sands to the west (including Buronga) – characterised by marine sands – and the Cavil Formation to the east – characterised by riverine sands and gravels. Groundwater salinity ranges from 1,000 mg/L (slightly saline) to 82,000 mg/L (brine) and near salt lakes can locally increase to 160,000 mg/L.

The Western Porous Rock SDL is governed by the *Water Sharing Plan for the NSW Murray-Darling Basin Porous Rock Groundwater Sources* (NSW Office of Water 2011). The on-line database indicates that are 20 groundwater bores within a 2 km radius of the project area of which 5 are within 1 km of the site. The boreholes vary from 10.5 – 61 m below ground level (bgl) with water levels reported as 1.5 – 7.54 m bgl. During site investigations groundwater was intercepted in most boreholes, at ranging from 9.5 m below ground level in the south west to 7-8 m in the east. In boreholes H7 and H9 the groundwater level rose by approximately 1 m when left overnight suggesting the clay may be partially confining the aquifer.

Table 6.12 Select Soil Properties

Parameter (unit)	Soil Concentration for Boreholes at Differing Depth Intervals (m)											
	H3 0-0.15	H1 0-0.15	H4 0-0.15	H6 0-0.15	H11 0-0.15	H12 0-0.15	H7 0-0.15	H8 0-0.15	H10 0.4-0.55	H9 0.7-0.85	H2 0.8-0.95	H5 2-2.15
Unit Number	Fill	1	1	1	1	1	3B	3B	2A	3B	2A	2B
pH ($CaCl_2$, units)	7.8	7.7	7.5	8.1	8	7.7	7.5	6.7	7.6	7.7	8	8.1
pH (units)	8.9	9	8.6	9.2	8.8	8.5	8.5	8	8.6	8.6	8.9	9
Electrical Conductivity (dS/m)	0.096	0.085	0.074	0.17	0.218	0.085	0.231	0.059	0.17	0.247	0.173	1.01
ECe (estimated)	1.2	1.1	1.0	2.2	2.8	1.1	2.1	0.4	1.9	1.5	1.9	13
Exch. Calcium (meq/100 g)	5.1	4.3	6.5	5.2	5.4	6.3	10.2	9.2	9.2	11.3	4.8	2.1
Exch. Magnesium (meq/100 g)	1.1	0.8	1.4	2.2	1.1	0.7	3.7	3.2	3.1	4	2.9	3
Exch. Potassium (meq/100 g)	1	1.1	1.7	1.3	0.7	0.6	1.6	1	1.2	1.1	0.4	0.6
Exch. Sodium (meq/100 g)	<0.2	<0.2	0.2	0.6	0.7	<0.2	0.9	0.4	0.4	0.5	0.2	1
Cation Exchange Capacity (meq/100 g)	7.2	6.1	9.8	9.4	8	7.6	16.4	13.8	13.9	16.8	8.3	6.8
Exch. Sodium %	<0.2	<0.2	2.6	6.9	9	<0.2	5.6	3	2.8	2.8	3.1	15.6
Calcium/ Magnesium Ratio	4.4	5.6	4.7	2.3	4.7	8.7	2.8	2.9	2.9	2.8	1.7	0.7
Organic Matter (%)	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.5	0.7	<0.5	<0.5	<0.5	<0.5

6.3.2.4 Groundwater Use

A search of the Water NSDW Real Time Data website[3] identified several groundwater bores within 3 km of the centre of the Project. Two bores are located within the site boundaries with many to the east and south east located around Laker Gol Gol. It is expected that the wells to the north may be used for stock watering and the ones to the south may be used for irrigation, though it is noted that the salinity is unlikely to be suited to these uses given the proximity to Lake Gol Gol to the east and Mourquong Disposal Basin to the west. A previous investigation noted that the water level in the on-site wells was 9.29 m and 7.37 m bgl for on-site wells GW087083 and GW088479, respectively and that all wells within 1-2 km of the site were registered for monitoring purposes (GHD, 2012).

Bore ID	Status	Distance (km)	Date completed	Total depth (m)	Ground level (m AHD)
GW087083	Manual Observations	0.4 (on site)	1/03/1972	20	40.54
GW088479	Unknown	0.6 (on site)	21/03/2007	61	37.89
GW087644	Unknown	1.3 west	5/03/1991	17.2	36.12
GW088478	Unknown	1.7 north	16/05/2007	52	36.74
GW088168	Unknown	1.8 south	2/02/2000	10.5	-0.5
GW088169	Unknown	2.0 south	3/02/2000	10.5	-0.05
GW088170	Unknown	2.0 south	7/02/2000	13.5	-0.5
GW087038	Unknown	2.0 south	12/10/1977	10.97	-0.11
GW087073	Unknown	2.1 east	12/10/1972	12.19	-0.12
GW087812	Unknown	2.3 south east	10/12/1996	5.5	-0.5
GW273072	Equipped	2.4 east	12/03/2009	24	-0.6
GW273069	Supply Obtained	2.4 east	11/02/2009	20	-1
GW087081	Unknown	2.4 north	12/10/1972	12.5	-0.2
GW600409	Equipped	2.6 south	6/09/2012	15	39
GW087039	Unknown	2.6 south	12/03/1972	10.97	-0.1
GW273071	Equipped	2.6 east	6/03/2009	25.5	-0.6
GW087811	Unknown	2.7 south east	5/12/1996	11.5	-0.5
GW087074	Unknown	2.7 south	12/10/1972	14.02	-0.13
GW087328	Filled	2.7 south east	21/10/1977	16	-0.14
GW087813	Unknown	2.7 south east	11/12/1996	6.5	-0.5

[3] https://realtimedata.waternsw.com.au/

Bore ID	Status	Distance (km)	Date completed	Total depth (m)	Ground level (m AHD)
GW088473	Unknown	2.8	26/02/2007	47	35.08
GW088305	Unknown	2.8	14/09/2005	20.56	32.39
GW087529	Unknown	2.8	4/04/1987	15	-0.48
GW273068	Supply Obtained	2.8	9/02/2009		-1
GW273074	Equipped	2.8	30/03/2009	25	-0.4
GW088167	Unknown	2.9	28/01/2000	3.08	-0.5
GW087814	Unknown	3.0	12/12/1996	8	-0.5
GW087331	Unknown	3.1 west	19/10/1977	12	-0.11

6.3.2.5 Salt Interception Scheme

The Buronga Salt Interception Scheme collects highly saline water from eight locations in the deeper Parilla Sands aquifer to reduce the pressure from extensive irrigation which is forcing the saline water into the Murray River. The saline water is pumped to the Mourquong Disposal complex which is over 1 km west of the Project area. Salt crystallisation ponds are used to evapo-concentrate the salt for commercial harvesting.

6.3.3 Impact Summary

6.3.3.1 Soil Impacts

Soil across the site is expected to be readily excavated with machinery typically used during similar construction projects, such as an excavator of notional 20 tonne capacity. Additionally, the soil is expected to be self-supporting for short periods (e.g. 2-3 days) after excavation (in dry weather). Although the existing borrow pit contains benched walls (of approximately 2 m height and 2 m width) that appear stable, slopes should be maintained at a gradient no steeper than 1 vertical to 2.5 horizontal (1V:2.5H).

It is expected that the majority of excavated materials will be suitable for use as general engineered fill for bulk earthworks (subject to appropriate moisture conditioning). The upper 1.5 m of the soil profile should be reserved for final capping with the remaining depth used for daily and interim cover. Stockpile the sand and clay separately. The deep sandy 4A and 4B units are not suitable for engineered fill or bulk earthworks; however, given they are > 6 m below ground level, it is not expected that construction works would intercept these layers. Based on the geotechnical laboratory results, soils from Unit 3B are considered suitable for use in water retaining structures if placed and compacted at a suitable standard. Conversely, none of the soil materials are suitable for use as pipe embedment material or pavement materials for sheeting internal roads.

The soil does not contain any contaminants in concentrations which are likely to result in any potential impact to the surrounding environment. The exception is the salinity of the soil >2 m below ground level, which may impact the surrounding environment if it not appropriately stored prior to use as daily or interim cover in the landfill cell.

6.3.3.2 Groundwater Impacts

During the field investigations, the groundwater was predominantly intercepted in the clay layer and was intersected at around 7 to 9 m below ground level; however the potential confinement of the aquifer by the clay layer may result in higher groundwater levels. Based on the conceptual site model, the groundwater appears to flow toward the east; towards Lake Gol Gol. Given the relatively flat topography the hydraulic gradient is likely to be slow with velocities of 1.8×10^{-5} m/day to 3.3×10^{-10} m/day, i.e. the groundwater would take 153 years to travel 1 m.

The groundwater appears to be use locally with groundwater wells within 2 km, suggesting shallow groundwater of variable salinity and quality. There are no soaks or other water features onsite that suggest importance as an Aboriginal area, which is further discussed in Section 6.7. There are likely to be groundwater dependent ecosystems within proximity of the site given the wetlands and terrestrial vegetation.

Groundwater is relatively shallow and essentially unconfined so are, theoretically able to rise with recharge; however the low rainfall and clay units would limit this and it is unlikely that groundwater levels would significantly rise. As a result, the overall risk to groundwater from the Project is low; however, given the limited information and potentially shallow groundwater, monitoring f upgradient and downgradient wells should be undertaken to provide early detection of any potential groundwater impacts from the Project.

6.3.4 Mitigation Measures

The assessment of the soil and groundwater results in the following recommendations:

- The upper 1.5 m of the soil will be prioritised for final capping. It is expected that three stockpiles will be required being: topsoil (nominally 0-10 cm); sandy overburden; clay overburden. As far as practical, the stockpiles will be located on or near the next area to be rehabilitated.
- Overburden excavated from below 1.5 m will be stockpiled away from the final capping soil in an area which has been cleared and topsoil removed to prevent any salts from leaching into the topsoil.
- Slopes should be maintained at a ratio of 1V to 2.5H to ensure suitable slope stability.
- Excavations should be limited to 2 m above the groundwater level (~ 5-9 m bgl) to avoid the softening of subgrade material.
- It is recommended that groundwater monitoring wells are installed up and down hydraulic gradient of the site to enable temporal groundwater data and water quality data to be monitored prior to construction and during operation of the site.

6.4 Hazard Analysis

6.4.1 Method

The objective of this preliminary hazard analysis (PHA) is to identify the off-site risks posed by the Project to people, their property and the environment and assess the identified risks using applicable qualitative criteria. In accordance with Multi-level Risk Assessment (DPIE, 2011), this assessment specifically covers risks from fixed installations and does not encompass transportation by pipeline, road, rail or sea. This PHA therefore considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events), with a specific focus on fixed installations on-site. The on-site environmental risks are assessed in the Environmental Risk Assessment (ERA).

The methodology employed during the preparation of this PHA was as follows:

1. Identify the hazards associated with the Project.

2. Analyse the consequence of identified hazardous events.
3. Qualitatively estimate the likelihood of hazardous events.
4. Propose risk treatment measures.
5. Qualitatively assess risks to the environment, members of the public and their property arising from atypical and abnormal events and compare these to the risk criteria outlined in HIPAP No. 4: Risk Criteria for Land Use Safety Planning (DoP, 2011).
6. Recommend further risk treatment measures, if necessary.
7. Qualitatively determine the residual risk assuming the implementation of the risk treatment measures.

This PHA has been undertaken using the risk management process described in AS/NZS ISO 31000:2018 Risk Management – Guidelines. The risk management process is shown schematically on Figure 17 below and includes the following components:

- Establish the context
- Identify risks
- Analyse risks
- Evaluate risks
- Treat risks

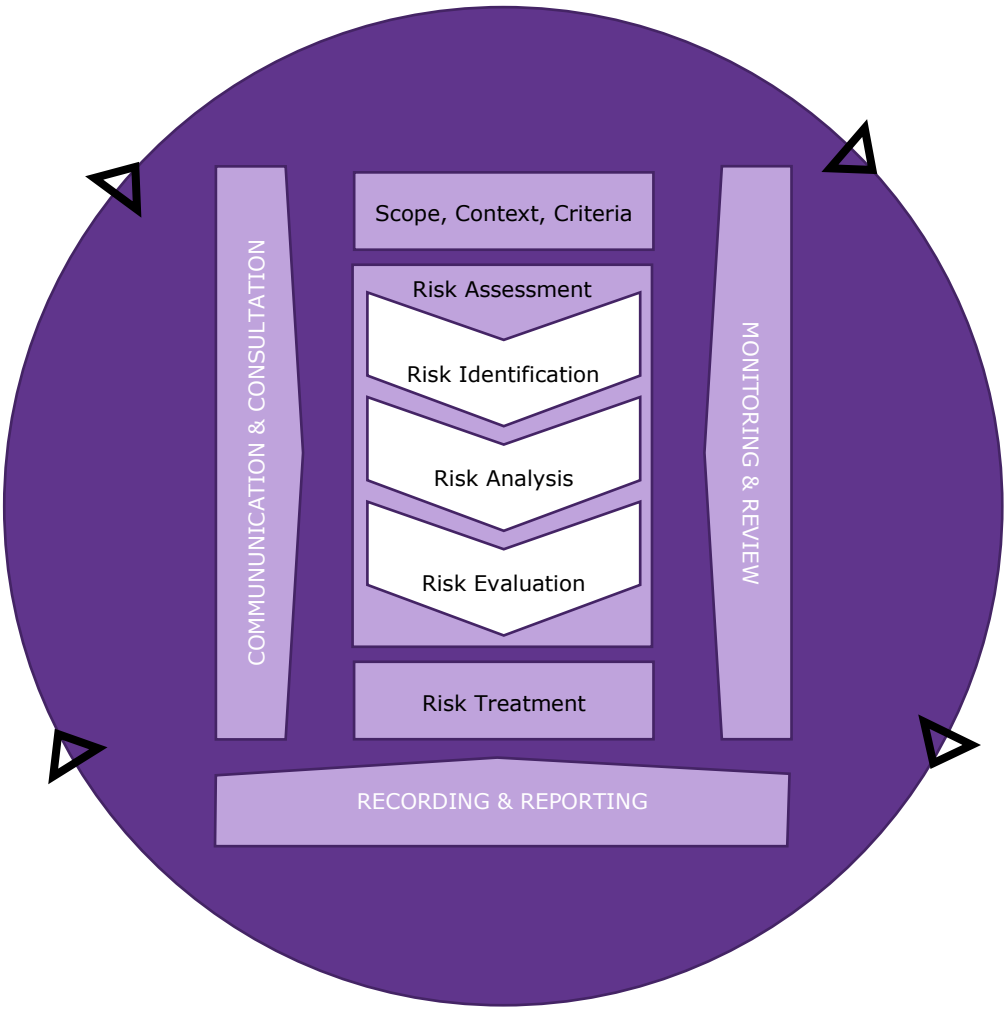

Figure 17 Preliminary Hazard Analysis Process from AS/NZ ISO 31000:2018 Risk Management – Guidelines.

This PHA considered the following qualitative criteria:

1. All 'avoidable' risks should be avoided. This necessitates investigation of alternative locations and technologies, wherever applicable, to ensure that risks are not introduced in an area where feasible alternatives are possible and justified.
2. The risks from a major hazard should be reduced wherever practicable, irrespective of the value of the cumulative risk level from the whole installation. In all cases, if the consequences (effects) of an identified hazardous incident are significant to people and the environment, then all feasible measures (including alternative locations) should be adopted so that the likelihood of such an incident occurring is made very low. This necessitates the identification of all contributors to the resultant risk and the consequences of each potentially hazardous incident. The assessment process should address the adequacy and relevance of safeguards (both technical and locational) as they relate to each risk contributor.
3. The consequences (effects) of the more likely hazardous events (i.e. those of high probability of occurrence) should, wherever possible, be contained within the boundaries of the installation.
4. Where there is an existing high risk from a hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.

To undertake a qualitative risk assessment it is useful to define (in a descriptive sense) the various levels of consequence of a particular event, and the likelihood (or probability) of such an event occurring. Risk assessment criteria were developed during the 'Establish the Context' phase of the Risk Management Process. In accordance with AS/NZS ISO 31000:2018, the tables below were reviewed and considered to be consistent with the specific objectives and context of this PHA.

Table 6.13 Qualitative Measures of Probability of the Event Occurring

Likelihood	Description
Almost Certain	Is expected to occur with a probability of multiple occurrences within a year. Is expected to occur almost all the time
Likely	Will probably occur within a 1 - 5-year period. Is expected to occur most of the time. Known to occur, or "it has happened"
Possible	Might or should be expected to occur within a 5 - 10-year period. Could occur or "I've heard of it happening"
Unlikely	Could occur within 10-20 years or in unusual circumstances. Not likely to occur. Not expected
Rare	May occur only in exceptional circumstances. May occur once in 100 years. Practically impossible. 1 in 100 years

Table 6.14 Qualitative Measures of Credible Consequence of Unwanted Event

Consequence	People	Environment	Production delay, loss or damage
Catastrophic	Death. Permanent disabling injury Major impact for large population. Death	Potentially lethal to regional ecosystem or threatened species; widespread on-site and off-site impacts; Extensive clean-up required; complete failure of environmental controls	Huge financial loss, more than $5m delay/loss

Consequence	People	Environment	Production delay, loss or damage
Major	Extensive permanent injury Major impact for small population Hospitalisation required. Extensive injuries or illness	Potentially lethal to ecosystem; predominant local but potential off-site impacts. Medium to long term impact, potentially reversible over several years. Possible cessation of use; off-site clean-up required; breach of environmental legislation	Major financial loss $1m to $5m delay/loss
Moderate	Minor impact for large population Medical Treatment Required	Potentially harmful to regional ecosystem with local impacts primarily contained on-site. Moderate on-site impacts, temporary impacts, some off-site impacts	High financial loss $0.5m to $1m delay/loss
Minor	Minor impact for small population First Aid Treatment	Potentially harmful to local ecosystem with local impacts confined to site. Minimal onsite impacts no discernible offsite impacts, immediately contained, no external complaints received	Medium financial loss $50k to $500k delay/loss
Insignificant	Insignificant impact or not detectable No injuries or illness	Insignificant impact or not detectable. Negligible on-site impacts and no off-site impact	Low financial loss. Less than $50,000 delay/loss

Combining the probability (Table 6.13) and consequence (Table 6.14), Table 6.15 provides a qualitative risk analysis to assess risk levels.

Table 6.15 Risk Ranking Table

Consequence	Probability				
	Almost Certain	Likely	Possible	Unlikely	Rare
Insignificant	M - 18	M - 19	L - 22	L - 24	L - 25
Minor	M - 14	M – 15	M - 17	L - 21	L - 23
Moderate	H - 8	H - 9	H - 12	M – 16	L - 20
Major	E - 3	E - 5	E - 7	H - 11	H - 13
Catastrophic	E - 1	E – 2	E – 4	E – 6	H - 10

NOTES:

L: Low risk, manage by routine procedures
M: Moderate risk, management responsibility required
H: High risk, senior management attention required
E:Extreme risk, immediate action required

The lower the risk rating number, the higher the risk. For example E-3 would have priority over E-7 or M-17

6.4.2 Existing Environment

The major potential hazards are associated with:

- Dust from various sources, as discussed in Section 6.1 Air Quality and Odour
- waste, including unknown material receipt (discussed in Section 3.5.3 Waste Control Program) and fire, (discussed in 3.7.4.2 Fire Response and 6.5 Bushfire);
- landfill gas, discussed in 3.6.6Landfill Gas Management, 3.7.4.5 Landfill Gas Leak or Accumulation and 3.8.4 Landfill Gas Monitoring;
- leachate, discussed in 3.6.4Leachate Management and 3.8.2 Leachate Monitoring;
- storage of fuel, discussed below.

6.4.2.1 Dust

Dust can is typically generated from dry, fine particles subject to wind or other movement resulting in their dispersion in air. Dust can irritate the respiratory tract casing coughing, wheezing, etc. but increased response is associated with finer particles. Dust particles less than 2.5 µm diameter (PM2.5) pose the greatest risk of causing human health problems such as respiratory and cardiovascular health problems, whilst particles less than 10 µm diameter (PM10) pose a serious risk to susceptible individuals.

Dust may be generated from on-site activities and includes particulate matter raised from bare areas by wind or traffic as well as from the unloading, sorting or processing of waste. The site experiences stronger westerly winds which may raise dust from unvegetated, dry areas across the landfill area. Dust may also be generated within the FERF and RRA whilst handling, sorting or processing wastes.

6.4.2.2 Unknown Wastes

Unknown wastes are those that are not declared and may have an impact to human health or the environment. The majority of waste received on-site is declared and, although has the potential to impact human health, can be appropriately handled based on its known properties, e.g. asbestos can be handled safely with specified, controlled practices but if now known to be present, these management practices may not be utilised resulting in an increased risk to staff health.

In addition to impacts on human health, the inclusion of unknown wastes can also lead to landfill fires. Inappropriate disposal of batteries in kerbside collection can result in fires when large earthmoving machinery compacts the waste into the cell and a spark results.

Unknown wastes may be received comingled with other wastes accepted at the Buronga landfill. Currently most waste received at the site is destined for the landfill; however the proposed upgrades to materials recycling areas may increase the risk of staff encountering unknown wastes.

6.4.2.3 Landfill Gas

Landfill gas (LFG) is a mixture of methane and carbon dioxide with minor concentrations of other gases, sch as sulfur dioxide and carbon monoxide. It is produced by the anaerobic decomposition of waste in the landfill. The landfill cell liners to be deployed at Buronga Landfill prevent the movement of gas horizontally through the soil and hence most LFG is released through the surface. The final cap proposed for Buronga Landfill is a phytocap, which is known to promote the natural destruction of methane by microorganisms which live naturally in the soil.

Poorly managed LFG systems can result in fire when oxygen is drawn into the collection system, which at worst can lead to explosions. LFG may also accumulate in buildings or enclosed spaces which can cause personal injury or asphyxiation.

6.4.2.4 Leachate

Water is generated during the decomposition of waste. This water also contains soluble contaminants and hence is referred to as leachate. Leachate may contain a variety of contaminants and the volume and

concentrations may vary over time depending on the composition of waste deposited in the cell, the prevailing weather conditions, waste compaction, cell capping status and recirculation of leachate in the cells. The leachate is likely to contain high concentrations of salt which, at best, may result in minor skin irritation and also may release gases which can lead to asphyxiation.

Contact with leachate is most likely to occur at the leachate ponds where staff, public or fauna may fall into the ponds or may be from a failure of the leachate collection system resulting in the release of leachate into the environment.

6.4.2.5 Storage of Fuel

Hydrocarbons used at the Buronga Landfill include fuels (diesel), petrol, oils (including waste oil), greases and degreaser.

Diesel

Diesel is classified as a combustible liquid by Australian Standard (AS) 1940:2004 The Storage and Handling of Flammable and Combustible Liquids (AS 1940:2004) (Class C1) for the purpose of storage and handling but is not classified as a dangerous good by the criteria of the Australian Dangerous Goods (ADG) Code (National Transport Commission, 2007). In the event of a spill, diesel is damaging to soils and aquatic ecosystems and fires can occur if ignited (flash point 61 to 150 degrees Celsius).

The risks associated with the Project include diesel storage and usage. The use of diesel at the Project and the construction and operation of all fuel storages would be undertaken in accordance with the appropriate Australian Standard. This would include the use of self-bunded diesel fuel storage systems.

Petrol

Petrol is classified as a flammable liquid (Class 3) by AS 1940:2004 and as such is classified as a dangerous good by the criteria of the ADG Code. On-site petrol usage would be minor and held in approved jerry cans. Petrol engine vehicles would be fuelled off-site at local service stations.

Oils, Greases and Degreaser

Oil is classified as a combustible liquid and as such needs to be managed accordingly. Procedures have been developed at the Buronga Landfill for the handling, storage, containment and disposal of workshop hydrocarbons (i.e. oils, greases and degreaser). Waste oil is stored within a bunded area and collected by a licensed contractor.

The Project hazard identification table (Attachment A) provides a summary of the potential on-site hazards identified for the Project and a qualitative assessment of the risks posed.

6.4.3 Impact Assessment

Preliminary screening to determine the requirement for a PHA was undertaken for the Project, taking into account broad estimates of the possible off-site effects or consequences from hazardous materials present on-site and their locations. Potentially hazardous industry is defined as having "potential for significant injury, fatality, property damage or harm to the environment in the absence of controls" (DPIE, 2011). The Project was determined to be potentially hazardous as the possibility of harm to the off-site environment in the absence of controls could not be discounted. A Level 1 assessment can be justified if the analysis of the facility demonstrates that there are no major off-site risks, if the technical and management controls are well understood and where there are no sensitive surrounding land uses. The PHA review team reviewed this screening process and concluded that there is limited potential for scenarios with significant off-site consequences, existing controls are in place at the existing Buronga landfill and that there are no sensitive surrounding land uses. Accordingly, the team implemented a Level 1 assessment (Qualitative analysis) for this PHA.

The hazard identification was undertaken as a desktop assessment with the hazards shown in Appendix K. Bushfire has been assessed separately and hence was not include as a hazard, though waste fire was included.

The hazard assessment has not identified any hazards which cannot be controlled by best management practices as contained with the current site Landfill Environmental Management Plan, prepared in accordance with the licence and the Landfill Guideline.

6.4.4 Mitigation Measures

Several hazard control and mitigation measures are described in the existing site Landfill Environmental Management Plan however additional hazard control and mitigation measures would be incorporated into this document as required to suit the needs of the Project. In particular, the following hazard treatment measures would be adopted:

- Engineering Structures – civil engineering structures would be constructed in accordance with applicable codes, guidelines and Australian Standards. Where applicable, WSC would obtain the necessary licences and permits for engineering structures.
- Contractor Management – All contractors employed by WSC would be required to operate in accordance with the relevant Australian Standards and NSW legislation.
- Storage Facilities – Storage and usage procedures for potentially hazardous materials (i.e. fuels and lubricants) would be developed in accordance with Australian Standards and relevant legislation.
- Emergency Response – Emergency response procedures manuals and systems would continue to be implemented.
- PPE: In addition to standard PPE, (long shirts, pants, steel-capped boots) other PPE such as hard hats should be mandatory when working around equipment and gloves mandatory for any manual work, particularly in the FERF. Appropriate respiratory equipment should be available to all staff for specific tasks and should be easily available in the FERF and RRA

Various mitigation measures can be employed to reduce the potential impact of these hazards. These measures are typically management techniques employed at landfill sites and are able to reduce the potential risk to low. These measures will be included in the LEMP to maintain a low risk of the site becoming a hazardous or offensive facility.

6.5 Bushfire Assessment

The Bushfire Assessment has been completed by Building Code & Bushfire Hazard Solutions Pty Ltd and is presented as Appendix L.

6.5.1 Methodology

A site inspection was undertaken on 5 April 2021 by an accredited bushfire assessor.

The Project area and surrounds have been assessed against the relevant specifications and requirements of *Planning for Bush Fire Protection - 2019* (PBP) in relation to the proposed relocation or construction of office and amenity buildings.

The *Bushfire Prone Land* (BFPL) map (available through NSW ePlanning Spatial Viewer) was used to assess the potential for bushfires to occur in the development area. BFPL maps are prepared by local councils and certified by the Commissioner of the Rural Fire Service (RFS).

6.5.2 Existing Environment

The site is susceptible to bushfire from vegetation contained within the site or surrounds. The vegetation within the site is classified as "semi-arid woodland" with central and easterly areas more open and supporting less vegetation than to the west. The central and eastern portion of the Project area are not recognised as being bushfire prone whilst the western area contains Category 2 Vegetation, which is described by the NSW RFS *Guide for Bush Fire Prone Land Mapping* as having a lower combustibility and/or limited potential fire size when compared to Vegetation Categories 1 and 3.

There have been no wildfires recorded within 5 km of the Buronga Landfill. The closest fires were over 7 km from the Site and were recorded in 1975 and 1977 to the east of the site. As a result the site is not within a known fire path and the likelihood of a bushfire occurring in the immediate area is considered unlikely. Anecdotally, fires have occurred within the landfill due to the inappropriate disposal of batteries in municipal solid waste but were quickly extinguished by smothering with soil.

The existing site assets comprise non-habitable on-site buildings (office, amenities) and fuel store with one access road servicing the site. The National Construction Code (NCC) Class of the office and amenity buildings are Class 5 and 10, respectively. To provide adequate asset protection, a 16 m zone around buildings has been adopted. The existing buildings all comply with this buffer. The bushfire attack level (BAL) was determined to be BAL29 and, although the National Construction Code has no specific requirements for the office buildings, requirements for access, water supply and services and emergency and evacuation planning are still required.

6.5.3 Assessment

6.5.3.1 Bushfire Assessment

Due to the occurrence of Category 2 Vegetation, the whole site (including Lot 212 DP756946) is considered to be bushfire prone. Consequently, proposed developments must comply with AS 3959-2018 (*Construction of Buildings in Bushfire Prone Areas*).

6.5.3.2 Asset Protection Zone Compliance and Construction Level Compliance

An Asset Protection Zone (APZ) is a buffer zone between bushfire hazards and buildings. The minimum APZ distance is based on the vegetation formation type, slope (0-5°, 5-10°, 10-15°, or 15-20°) and nature of the development (e.g. residential development or special fire protection purpose developments).

In light of the NCC Classes, a 'residential' development type was used to determine APZ distance. Table A1.12.2 in the PBP indicates that a APZ distance of 16 m is appropriate for the proposed relocation of the office and amenity buildings. The area nominated for the relocations is ~ 40 m x 20 m and is considered to suitably accommodate the APZ when combined with the access road and managed surrounding vegetation.

6.5.3.3 Construction Level Compliance

A Bushfire Attack Level (BAL) is a measure of level of exposure of a building to bushfire hazards; and the basis for establishing requirements for construction under AS 3959-2018.

The Bushfire Attack Level was determined using Table A1.12.5 in the PBP, which requires the vegetation formation type and the distance from the proposed building locations to the nearest vegetation. The proposed developments have a BAL of 29 (increasing levels of ember attack and ignition of debris with a heat flux of up to 29 W/m^2). The PBP indicates that NCC Class 5 to 8 buildings, such as the office buildings, do not require any bushfire specific performance requirements. The specific objectives for residential developments have been adopted to assess compliance of the Project with *Planning for Bushfire Protection* and is summarised in Table 6.16.

Table 6.16 Compliance with Aims and Objectives of Planning for Bushfire Protection

Aim/Objective	Project Area Assessment
Asset protection zones are provided commensurate with the construction of the building and a defendable space is provided	Limited low risk vegetation found on site. The proposed buildings to be > 16 m from Category 2 vegetation. Buildings to afford BAL29 rating and comply with AS3959-2018 Multiple internal access roads will reduce or prevent fire spread Sufficient defendable space will be provided and the protection zone will be maintained
Fire-fighting vehicles are provided with safe all-weather access roads to structures and hazard vegetation	All-weather access road is existing from Arumpo Road to the site and its width exceeds requirements. An additional emergency access gate from Arumpo Road will be required. Internal access roads capable of supporting fire fighting vehicles have been provided around the site to facilitate operations if required. Future construction of access roads will require access by B-doubles and will easily accommodate firefighting vehicles which are equivalent to heavy rigid trucks. Access for fire-fighting vehicles is considered satisfactory
There is appropriate access to water supply	Suitable access and hardstand areas have been provided to existing firefighting water draw off points Hard stand areas for new static water draw off points recommended
Adequate water supplies are provided for firefighting purposes	Reticulated water is not available at the site. No reticulated gas services are available on-site. An existing 45,000 L static water supply is available complete with hardstand and several water draw off points. NSW Rural Fire Service couplings have been provided at all water draw off points. An additional static water supply has been recommended The proposed firefighting water supply will be satisfactory
On-going management and maintenance of bush fire protection measures	All APZs to be maintained in accordance with the NSW Rural Fire Service "Standard for Asset Protection Zones" and Appendix 4 of "Planning for Bush Fire Protection 2019" Any new landscaping around buildings to comply with the provisions of Appendix 4 of "Planning for Bush Fire Protection 2019"

6.5.4 Mitigation Measures

Several recommendations were listed as being necessary for compliance with Planning for Bushfire Protection – 2019. These include:

- A 16 m Asset Protection Zone (APZ) be provided around the Office and Amenities buildings.

- Office buildings are constructed of non-combustible cladding with metal mesh screening on openable windows and doors and door weather strips. Where compressed timber is used for flooring, the underside of the building will require protection such as metal mesh screening
- That any new landscaping around buildings is to comply with Appendix 4 of Planning for Bush Fire Protection 2019.
- That a Bushfire Emergency Management and Evacuation Plan be prepared (if already not done so) consistent with the NSW Rural Fire Service Guidelines.
- That an additional 45,000 L static water supply (minimum) is provided to supplement the existing water tank or is to be positioned further north with respect to the proposed new landfill expansion area.
  - That a suitable number of new pillar type fire hydrants or fixed water draw off points including suitable RFS 'storz' couplings be provided for fire service use.
  - The new static water supply location and water draw off points are to be provided with hard stand areas in compliance with Table 7.4a of PBP "Water Supplies".
  - Static water tanks are provided with mechanical water level devices to indicate available water.
- Any new internal service roads comply with the requirements for Access Roads as detailed in Table 7.4a of PBP, specifically:
  - property access roads are two-wheel drive, all-weather roads;
  - the capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges and causeways are to clearly indicate load rating.
  - there is suitable access for Category 1 fire appliances to within 4.0m of a static water draw off point hard stand area.
  - access is provided to all structures;
  - access roads must provide suitable turning areas in accordance with Appendix 3; and
  - a minimum 4.0m carriageway width kerb to kerb;
  - Passing bays are provided at 200m intervals that are 20m long by 2m wide making a minimum trafficable width of 6.0m at the passing bay.
  - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches;
  - turning areas are to accord with Appendix 3 of PBP;
  - curves of roads have a minimum inner radius of 6m;
  - the crossfall is not more than 10 degrees;
  - maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads.
- Provide an addition emergency vehicle access gate off Arumpo Road near the north-western corner of the site. A key for the gate lock should be provided to the Rural Fire Service. A dedicated access road from this new gate to the new water supply should be provided

In accordance with the bushfire safety measures listed above, and consideration of the site-specific bushfire risk assessment it is BCBHS's opinion that when combined, they will provide a reasonable and satisfactory level of bushfire protection to the subject development. Finally, as the proposal satisfies all relevant specifications and requirements of Planning for Bush Fire Protection 2019, the development should be supported.

6.6 Biodiversity

The Biodiversity Development Assessment Report (BDAR) was completed by Pinion Advisory and is presented as Appendix M. The assessment was led by Troy Muster who is accredited under Section 6.10 of the *Biodiversity Conservation Act 2016* (NSW).

6.6.1 Methodology

The BDAR to assess the impacts of the Project has been carried out according to the NSW Biodiversity Assessment Method (BAM) (DPIE, 2020) as required by the SEARs. The BAM is used to characterise ecological communities and assess the impact on biodiversity values from proposed developments. The BAM employs biodiversity credits to measure: the residual impacts of a proposal on biodiversity values; and gains in biodiversity values at biodiversity stewardship sites. There are two broad credit classes: ecosystem credits and species credits. Credits are principally a function of the size, density and diversity of

the ecological community (e.g. the vegetation area and the number and species richness of fauna/flora potentially impacted by the proposed development), the integrity or condition of the habitat (e.g. undisturbed vs heavily cleared) and the vulnerability or sensitivity of the ecological community to risk (e.g. abundance of threatened species). These factors were determined by Pinion using a desktop study and field survey.

Fieldwork to survey vegetation and observe any evidence of fauna was initially conducted on 29 March 2021. Following these findings, the concept design was modified and further assessments were completed on 31 March, 6-8 April, 4 May and 6 May and 20 July to better inform the Project design and then targeted threatened species surveys conducted in October 2021.

The four plant community types (PCTs) were divided into six zones based on overall health, overstorey composition, understorey condition and land management. Zone 2 was located in the south west corner of the site and was identified as consisting of good quality vegetation, so the Project was redesigned to move the resource recovery activities to existing cleared areas and avoid clearing. Sixteen vegetation integrity plots were assessed across the Site, evenly representative of the zone size and randomly distributed across the five remaining individual zones. The BAM was used for each lot and the composition, structure, function and vegetation integrity scores were obtained from the BAM calculator.

For the targeted threatened species survey the following was undertaken:

- A community survey was undertaken to engage with local birdlife and naturalist groups and access knowledge of targeted threatened species. A Threatened Species Community Survey Document was published for comment between 21-31 October 2021.
- Transect surveys were performed with 10-m parallel field traverses, based on the most limiting required rate to identify a species, which was for *Austrostipa metatoris*;
- Spot count surveys were undertaken over three days comprising a total of 51 quadrat surveys to cover the entire development footprint and all sightings and bird calls recorded;
- Opportunistic flushing of organic litter for Bush Stone-curlew and hollow recording for Barking Owl were also undertaken during transect and quadrat surveys;
- Nocturnal surveys over 5 separate days. Spotlighting areas of interest, hollow searches and callbacks were used. Callbacks were performed using a 360-degree speaker and any responses or observations were recorded

An existing development consent for the establishment of borrow pits (DA15/154) exists over the western part of the Project area (Figure 18). During consultation, DPIE requested the impacts and offset requirements within this area and the remaining Project area be accounted for separately.

6.6.2 Existing Environment

Pinion Advisory completed a biodiversity assessment of the site using the NSW Biodiversity Assessment Method (BAM). Of the 68 ha within Lot 1, approximately 46 ha is native vegetation with the remaining 22 comprised of no vegetation or vegetation which is not native (Figure 18). Clearing of native vegetation was noted due to the development of borrow pits (in accordance with DA15/154) and historical sand mining which now has some regrowth that is Category 1 exempt land as per Part 60H(1) of the *Local Land Services Act 2013*.

The Project is within the Robinvale Plains IBRA Sub-region of the Riverina IBRA bioregion. To the north and within the buffer zone it is classified as the South Olary Plain IBRA subregion of the Murray Darling Depression IBRA bioregion. The Mitchell Landscapes present include Murray lakes, swamps and lunettes (approx. 60% of area), Murray channels and floodplains (approx. 35%) and Mallee cliffs sandplains (approx. 5%). The plant community types (PCTs) and other areas described within the Project area is summarised in Table 6.17.

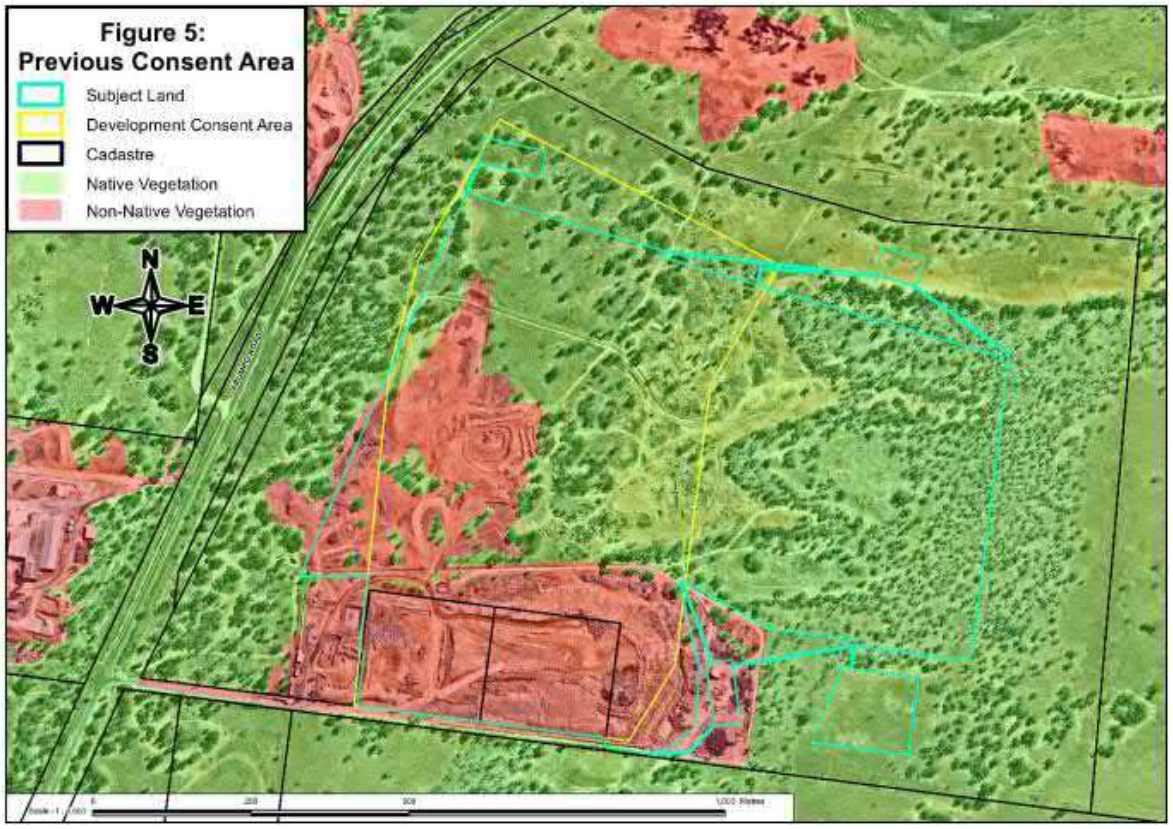

Figure 18 Development Consent and Subject Areas Native and Non-Native Vegetation (extracted from Pinion, 2021)

Table 6.17 Plant Communities Types (PCT) Described in Project Area

PCT	Description	Area (ha)	Main species	Notes	Threatened Ecological Community
15	Black Box open woodland wetland with chenopod understory mainly on the outer floodplains in south-western NSW	19.76	*Eucalyptus largiflorens*, *Rhagodia spinescens*, *Marieana pyramidata*, *Atriplex vesicaria*	Most *E. largiflorens* (black box) appears to have grown in a single episodic event Evidence of past logging	No
58	Black Oak – Western Rosewood open woodland on deep sandy loams mainly in the Murray Darling Depression Region	10.5	*Sclerolaena patenticuspis, Dissocarpus paradoxus, Casuarina pauper, Alectryon oleifolius subsp. canescens*	*C. pauper* (Black oak) is dominant and varies in height and form *A. oleifolius* (rosewood) is scattered in stands across the area	No

PCT	Description	Area (ha)	Main species	Notes	Threatened Ecological Community
170	Chenopod sandplain mallee woodland/shrubland of the arid and semi-arid (warm) zones	4.54	*D. biflorus, E. dumosa. E. oleosa, Pittosporum angustifolium*	Eucalypts are dominant overstory with diverse shrubby sub-formation. A range of tree forms present Overall vegetation density higher than other PCTs surveyed	No
252	Sugarwood open woodland of the inland plains mainly Murray Darling Depression Bioregion	1.7	*Myporum platycarpum, S. pentatropis, D. biflorus, Enchylaena tomentosa*	*M platycarpum* (Sugarwood) is dominant overstory species, sparse and age varies. Understory is almost totally comprised of *S. pentatropis* and *D. biflorus*	No
N/A	Regrowth	8.93	Young regrowth of early colonising species	Evidence of excavation, lack of topsoil, large bare areas and exotic plant cover	N/A
	Bare ground or exotic	22.05		Includes current operational areas	N/A
	TOTAL	**67.48**			

There are no rivers, streams, estuaries or wetlands within the Site. The nearest surface water bodies are the Murray River (3.7 km southwest), Gol Gol Creek North (2 km east), the Mourquong Saltwater Disposal Basin (3.5 km west) and Gol Gol Swamp (4.3 km east).

6.6.3 Assessment

6.6.3.1 Vegetation Integrity

The vegetation has been divided into vegetation zones to allow assessment of its condition. The location of the zones is shown in Figure 19 and described in Table 6.18.

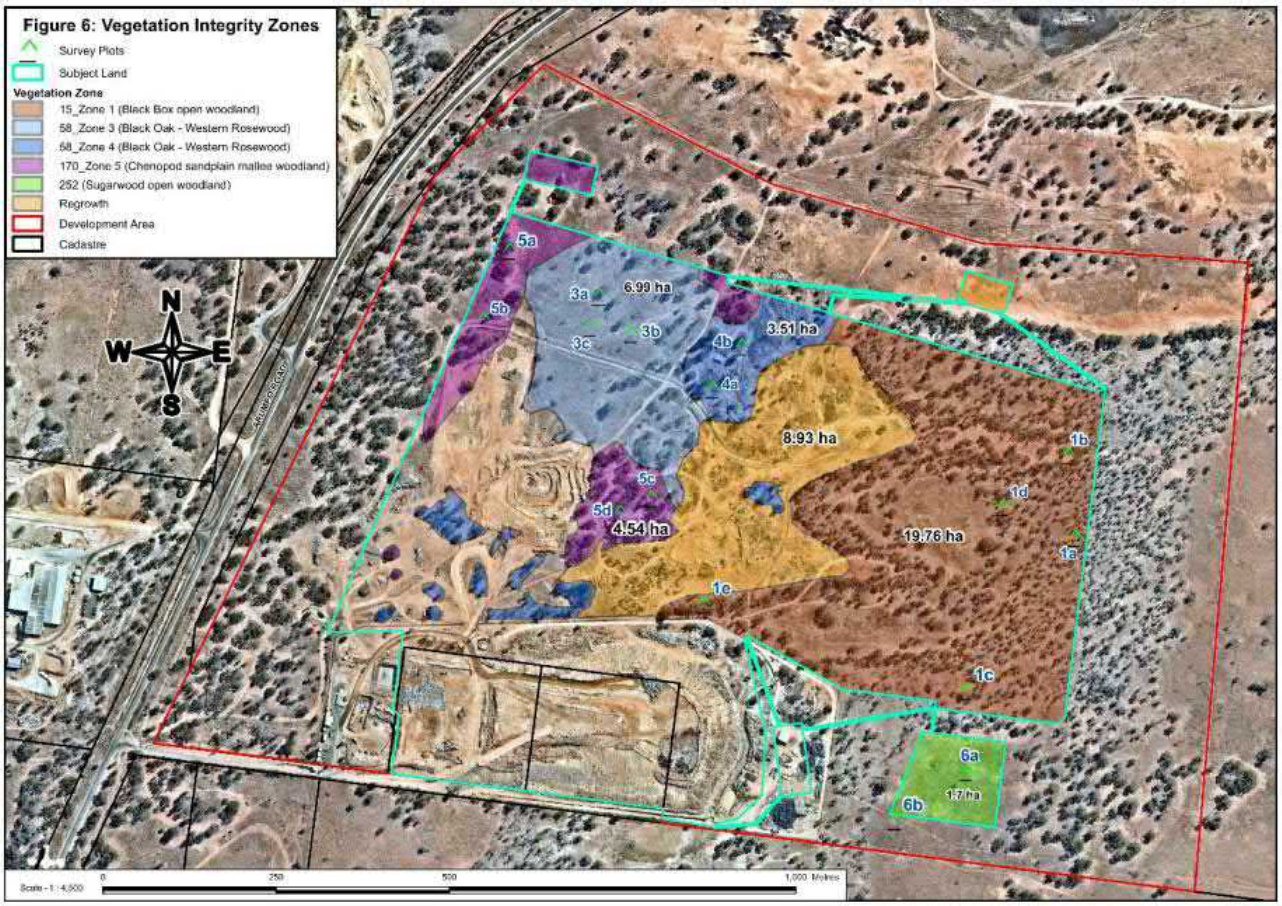

Figure 19 Vegetation Integrity Zones (extracted from Pinion, 2021)

Table 6.18 Vegetation Zones and Integrity Within and Outside existing Consent Area

PCT	Zone ID	Location	Condition	Impacted Area (ha)	Zone area (ha)	Integrity score*
15 Black box	15_Zone 1	Consent area	Good quality vegetation aligns closely to the representative PCT benchmark. There is little bare ground or litter within this zone	0.57	0.57	57.1
		Remainder		19.19	19.2	
58 Black oak-Rosewood	58_Zone 3	Consent area	Poor quality vegetation aligns closely to the representative PCT benchmark. This zone shows very little disturbance from earthworks and vehicles//machinery	6.99	6.99	24.2
	58_Zone 4	Consent area	Moderate-quality vegetation aligns closely to the representative PCT benchmark; however, there is significant disturbance from earthworks and vehicles/machinery. This zone has a wider range of understory plants which increased the subsequent diversity of flora	3.38	3.51	40.8
		Remainder	Poor quality vegetation aligns closely to the representative PCT benchmark. This zone shows very little disturbance from earthworks and vehicles/machinery	0.12	0.12	
170 Chenopod	170_Zone 5	Consent area	Moderate-quality vegetation aligns mostly with the representative PCT benchmark; there is significant degradation in areas from litter and roadways; however, the majority of old growth is healthy.	4.49	4.54	49.5
		Remainder	Moderate-quality vegetation aligns with the representative PCT benchmark; however, there is significant disturbance from earthworks and vehicles/machinery. This zone has a wider range of understory plants which increased the subsequent diversity of flora	0.05	0.05	
252 Sugarwood	252_Zone 6	Remainder	Poor quality vegetation. Very sparse overstory of Sugarwood with a low diversity of understory dominated by shrubs	1.70	1.70	14.2

* Integrity Score is for total area. The score for outside the consent area is the same as the total area, though individual scores vary

6.6.3.2 Threatened Species

No threatened species were observed during the survey. The Biodiversity Assessment Method Calculator (BAM-C) was used to determine:

- ecosystem credit species. Based on the PCTs present, the BAM-C identified twenty-two fauna species classified as Vulnerable under the *Biodiversity Conservation Act 2016 (NSW)* may be present within the Project area, of which four were bats and the remainder birds. None of these species are listed under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.
- species credit species. Three flora species and nine fauna species are predicted to occur with the Project area; however one flora species and three fauna species have been identified as unlikely to occur due to habitat constraints and so are excluded. The remaining species which will require targeted assessment are listed in Table 6.19.

Table 6.19 Species Credit Species Requiring Further Assessment and Outcome of Targeted Survey

Scientific Name	Common Name	NSW Status	Survey Months	Present
Austrostipa metatoris	Spear-grass	Vulnerable	October to November	No
Burhinus grallarius	Bush stone-curlew	Endangered	February to December	No
Eucalyptus leucoxylon subsp. pruinosa	Yellow gum	Vulnerable	All year	No
Hieraaetus morphnoides	Little eagle	Vulnerable	August to October	No
Lophochroa leadbeateri	Major Mitchell's cockatoo	Vulnerable	September to December	No
Lophoictinia isura	Square-tailed kite	Vulnerable	September to January	No
Ninox connivens	Barking owl	Vulnerable	May to December	No
Pimelea serpyllifolia subsp. serpyllifolia	Thyme rice-flower	Endangered	July-November	No

Based on the suitable survey months for the species requiring further assessment (Table 6.19), all species were likely to be able to be observed during October, if present. Based on the Community survey responses and surveys undertaken in October, the species are not present within the Project area.

6.6.3.3 Matters of National Environmental Significance

A Protected Maters search tool (PMST) report including a 10 km buffer was used to identify matters of National Environmental Significance (MNES). Protected matters relating to biodiversity include:

- Wetlands of International Importance (RAMSAR). The closest wetland is over 170 km from the Project and unlikely to be impacted by the Project
- Listed Threatened Ecological Communities. No threatened ecological communities occur within 10 km of the Project;
- Listed Threatened species. Two species have potential habitat within the Project area, being:
  - *Falco hypoleucos* Grey Falcon
  - *Nyctophilus corbeni* Corben's Long-eared Bat
- Listed migratory species. None were identified with potential habitat within the Project area;

- State and Territory reserves. The closest reserve is Kings Billabong Park which is upstream and there is no connection from the Project Area to the Murray River, hence it was determined there will be no impact from the Project on these reserves.
- Nationally important wetlands. Kings Billabong Wetlands is within the Kings Billabong Park and located on the Victorian side of the Murray River and upstream of the Project so there will be no impact from the Project.

6.6.4 Mitigation Measures

The direct impacts are limited to the clearing of native vegetation and habitat, with indirect impacts including habitat fragmentation and loss, competition from the introduction and/or encouragement of weeds and/or pests, contamination and collisions/accidents. A summary of the mitigation measures for design and construction and for operational phases of the facility is provided in Table 6.20.

Table 6.20 Mitigation Measures Summary for Construction and Operational Phases

Impact	Design and Construction Measures	Operational Measures
Contamination - soil, groundwater, waste, leachate, sediment-laden water	Design and construct landfill cells in line with best management practices Prepare a Construction Environmental Management Plan including erosion and sediment control plan Topsoil removed during cell construction should be transported to area/s awaiting rehabilitation. Stockpile height to be limited to 1.5 m. Maintain separation between topsoil and overburden during removal, transport and storage.	Implement measures from Landfill Environmental Management Plan to contain all waste to landfill cells and collect leachate. Use appropriately sized and bunded areas for containment of liquid wastes within the Recycling Facility Maintain separation between topsoil and overburden during storage
Pest plants and animals	Priority noxious weeds are management under the *Biosecurity Act 2015*, including developing a Weed Control Plan which includes monitoring of weed infestations in winter. Implement a pest animal control plan, including maintenance of fences to exclude domestic stock and feral goats, as described in the LEMP	
Native fauna injury, fatality and displacement	Engage a suitably qualified ecologist prior to clearing a new cell to provide detailed advice Establish controls to prevent work occurring outside the construction area Engage a suitably qualified ecologist to identify habitat trees with logs/hollows for relocation and to relocate native fauna which may be displaced Inspect trenches left open overnight for entrapped wildlife and contact suitably qualified fauna relocation services, if trapped animals are found Inspect pipes and conduit for fauna prior to placement. Seal pipe ends overnight to prevent fauna entrapment	Establish controls to prevent works from occurring outside the subject land Identify suitably qualified fauna re-location services Prevent illegal collection of firewood through fencing and signage

Impact	Design and Construction Measures	Operational Measures
Odour, gas, noise, vibration and dust. Landscape and visual amenity	Include endemic vegetation in rehabilitation Construct compacted rubble haul roads Maintain 200 m buffer to provide wildlife corridors and refuges and reduce visual amenity impact	Restrict tip face and daily covering of waste Implement adequate dust control measures
Traffic collisions	Limit site speeds for construction and operation traffic. Restrict traffic to operational areas by providing established haul roads and clear signage	
Native flora destruction, habitat loss	Inform and train staff and contractors of areas not to be cleared Plan construction activities for January to April to facilitate revegetation in May (optimal time). Avoid clearing in Spring when breeding most likely to occur Clearly identify extent of disturbance using on-ground markers Locate waste management infrastructure in already disturbed areas to the extent practical Relocate cleared logs and hollows in buffer zone or rehabilitated areas Construct a temporary fence between construction area and buffer zone for cell adjacent to buffer. New tracks to be established outside the drip line of trees Progressively develop and rehabilitate substages and cells	Undertake rehabilitation as soon as practical. Maintain temporary fence between cell and buffer zone for cells adjacent to the buffer zone Prepare a Rehabilitation Management Plan which includes site preparation measures (light contour ripping, surface stabilisation, mulching), weed control, suitable species selected from PCT15 and PCT58 and of local provenance, placement of logs/hollow trees, monitoring and on-going weed and pest control. Maintain perimeter fencing to prevent illegal dumping of rubbish outside of operational hours. Maintain fire breaks to limit spread of wildfire

6.6.4.1 Credits and Offsets

Following completion of the targeted threatened species in October 2021, it has been identified that no entities are at risk of serious and irreversible impact.

The impacts of the Project require offset due to the area and vegetation integrity scores. The ecosystem credit requirements based on the floristic survey data are presented in Table 6.21 for the impacted areas within the current consent area (BAM Case No 00024930) and for the remaining impacted area which is outside the consent area (BAM Case No 00025590). No threatened species were identified in the targeted survey and hence there is no species credit requirement.

Table 6.21 Ecosystem Credits for Plant Community Types

PCT	Zone ID	Credits Required	
		Consent Area	Remainder
15 Black box	15_Zone 1	14	479

PCT	Zone ID	Credits Required	
		Consent Area	Remainder
58 Black oak-Rosewood	58_Zone 3	74	
	58_Zone 4	60	2
170 Chenopod	170_Zone 5	83	1
252 Sugarwood	252_Zone 6		0

6.7 Aboriginal Cultural Heritage

An Aboriginal Cultural Heritage Assessment was completed by Landskape and is presented in Appendix N.

6.7.1 Methodology

An Aboriginal Cultural Heritage Assessment was undertaken to support the application for development approval of the Buronga Landfill Expansion (the Project) with consideration of the requirements in the following guidance:

- *Aboriginal cultural heritage consultation requirements for proponents 2010 (Part 6 National Parks and Wildlife Act 1974),* NSW Department of Environment, Climate Change and Water (DECCW, 2010a).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* NSW Department of Environment, Climate Change and Water (DECCW, 2010b).
- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW,* NSW Office of Environment and Heritage (OEH, 2011).
- *Burra Charter,* The Australia International Council on Monuments and Sites (ICOMOS) (Australia ICOMOS, 2013).
- *NSW National Parks and Wildlife Service Aboriginal Cultural Heritage: Standards and Guidelines Kit,* NSW National Parks and Wildlife Service (NPWS, 1997).
- *Ask First; A Guide to Respecting Indigenous Heritage Places and Values*, Australian Heritage Commission (AHC, 2002).

The principal objectives of the ACHA were to:

- Consult the local Aboriginal community (consultation with the Aboriginal community followed Aboriginal cultural heritage community consultation requirements for proponents [DECCW, 2010a]), including in relation to cultural values of the Buronga Landfill Expansion area.
- Conduct a desktop assessment to delineate areas of known and predicted cultural heritage potential within the Buronga Landfill Expansion area.
- Undertake an archaeological survey of known and predicted Aboriginal cultural heritage potential areas identified in the desktop assessment, with representatives of the local Aboriginal community. The field survey was undertaken on 23 June 2021 with representatives from the Registered Aboriginal Parties (RAPs). The survey was undertaken by examining the ground surface and all mature trees along transects every 10 metres across the Project site. This achieved a high level of coverage given the open and relatively bare ground conditions
- Record any Aboriginal cultural heritage sites within the Buronga Landfill Expansion area and assess their significance.
- Identify the nature and extent of any potential impacts of the Buronga Landfill on Aboriginal cultural heritage.
- Devise options in consultation with the community to avoid or mitigate potential impacts of the development on Aboriginal cultural heritage sites and items.

Landskape employed both desktop and field studies in order: to establish the environmental context of the site (i.e. to identify key landforms and vegetation), to establish the Aboriginal cultural heritage context of the site (i.e. to determine which heritage items are likely to occur within Buronga landfill based on archaeological investigations onsite and in the broader region), to search for heritage items onsite, and to assess the archaeological significance of discovered heritage items.

Consultation with RAPs and other stakeholders (e.g. Heritage NSW, WSC, Dareton Local Aboriginal Land Council, Western Local Land Service) was undertaken and included:

- registering interest in the Project;
- reviewing and commenting on the Proposed Methodology;
- participating in field survey;
- reviewing the draft ACHA.

RAPs were encouraged to provide feedback and input throughout the assessment process. No comments were received on the proposed methodology from the RAPs.

6.7.2 Existing Environment

6.7.2.1 Site Setting

Over the past 60 million years, the area was shallow seas and lakes which were then overlaid by wind-blown sediments comprising low, undulating sand hummocks vegetated by low-open shrublands and woodlands with tall shrublands on sandier hummocks and black box woodland toward Lake Gol Gol. From the second half of the 19th century, the site has been used for sheep and cattle grazing as well as soil stripping and sand quarrying.

The earliest evidence of human occupation of Australia is from the south-western area of NSW with artefacts dating to 46,000 to 50,000 years ago at Lake Mungo, 75 km north east of the Project. Aboriginal people of the Barkindji, Kureinji, Latje, Maraura and Yerre Yerre language groups appear to have occupied the Murray River near the junction with the lower Darling River at the time of first contact with Europeans. They were noted to be hunter-fisher-gatherers suggested to live in large groups along the river in the warmest months and dispersing as smaller groups to the dune fields to collect food after winter rains. Based on previous archaeological surveys, the main artefacts likely to occur at the Project site are shown in Table 6.22.

Table 6.22 Site Predictive Model Summary

Type	Description	Likelihood within Project
Stone artefact scatters	Flakes of sandstone debris from the making and resharpening of stone tools. Typically located near permanent or semi-permanent water sources on level, well-drained ground elevated above the water source. In the Lower Darling commonly located on river terraces, creek-lines and around the margins of lakes, swamps ad clay pans	Possible but low density
Evidence of cooking and food preparation	Includes campfire hearths which consist of lumps of burnt clay or stone cobble hearthstones. May also contain remnants of burnt animal bones, eggshells and stone artefacts. They are often located in dune swales, particularly on claypans, near soaks and on floodplain terraces	Possible but low density

Type	Description	Likelihood within Project
Shell middens	Deposits of shell and other food remains typically as thin layers or small patches. Commonly occur along the Darling River and its tributaries. There is no permanent water source within the Project Area	Unlikely
Earth mounds	Used as cooking ovens or campsites and range from 3-35 wide and 0.5-2 m tall and may contain oven material, stone artefacts, food refuse or foundation. Many are difficult to detect or have disappeared due to ploughing	Possible but low density
Quarry sites	Sites for obtaining stone or ochre for tools, art or decoration. Chert, silcrete, quartz and quartzite were commonly used but are scarce in the lower Darling region and stone would have been sourced from Murray River or long-distance trade links. There are no suitable rock outcrops on the Project site	Unlikely
Modified trees	slabs of bark were removed from trees for uses such as shelter roofs, canoes, shield and containers and scars were incised to facilitate tree climbing to collect honey to capture tree-dwelling animals. River Red Gum or Black Box are the most commonly scar species in the lower Darling and the scar must be more than 150 years old to be considered related to Aboriginal activities. Black box occurs within the Project site and are likely to be old	Likely
Stone arrangements, ceremonial rings, dreaming sites	Stone arrangements in many configurations or specific natural features used for or associated with ceremonies or associated with ancestral creators. Stone arrangements are uncommon in the Lower Darling Region; however consultation with local Aboriginal communities is required to assess	Unlikely
Burials	Maybe singular or multiple interments. Typically located in sandy areas above the floodplain and frequently in sand dunes and ridges, lunettes and levees along watercourses	

6.7.2.2 Site Survey

Surveys undertaken of the project site have identified four artefacts within the Project site (Table 6.23). One was identified from a 2016 and, although not relocated in a subsequent survey, a permit to disturb was obtained and this artefact no longer exists. Three new objects, all stone artefacts, were located in the north-eastern corner of the Project area within the sandplains (Figure 20); there were no modified trees identified. The low number of finds was attributed to the landscape setting of the Project away from permanent water, and historical disturbance for sand quarrying.

LEGEND

- EXISTING CONTOUR (0.5m INTERVAL)
- DESIGN CONTOUR MAJ (5.0m INTERVAL)
- DESIGN CONTOUR MIN (1.0m INTERVAL)
- STAGE BOUNDARY
- CAP CROWN
- CAP DRAIN
- STORMWATER DRAIN
- STAGE 1 SERVICE ALIGNMENT
- STAGE 2 SERVICE ALIGNMENT
- STORMWATER POND
- LEACHATE POND
- ABORIGINAL ARTEFACT SITE

THIS DRAWING IS TO BE VIEWED IN COLOUR AS SOME FEATURES / SYMBOLS ARE DIFFERENTIATED BY COLOUR. DRAWING NOT TO BE RELIED ON IF PRINTED IN GREYSCALE.

0 25 50 100 150
1:2500 (A1); 1:5000 (A3)
100mm ON ORIGINAL DRAWING - DO NOT SCALE DRAWING

SHEET SIZE
A1

REV	AMENDMENT / REASON FOR ISSUE	DATE	DES.	DWN.
A	FOR INFORMATION	14.09.21		

COORDS: MGA94 ZONE 54
DATUM: ALL LEVELS TO A.H.D.
SCALE: AS SHOWN
SURVEYED:PRICEMERRET
SURVEY DATE:03.03.21
APPROVED / PROJECT LEADER

PUBLIC UTILITIES:
THE SERVICES SHOWN ARE DERIVED FROM PLANS OBTAINED FROM THE RELEVANT SERVICE AUTHORITIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ARRANGE WITH THE RELEVANT SERVICE AUTHORITIES FOR CONFIRMATION OF SERVICES AND THEIR LOCATION BEFORE EXCAVATION WORK COMMENCES.

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NOT FOR CONSTRUCTION

WENTWORTH SHIRE COUNCIL

BURONGA LANDFILL EXPANSION
FIGURE 20
LOCATION OF ABORIGINAL ARTEFACTS

FILENAME: 202597 CONCEPT DESIGN.DWG
PROJECT NUMBER 202597
DRAWING NUMBER 014
REVISION A

C:\USERS\TONY GEORGE\APPDATA\LOCAL\TEMP\ACPUBLISH_24028\202597 CONCEPT DESIGN.DWG -C014- (15-09-21 7:39:28PM)

Table 6.23 Artefacts Identified at the Project Site

AHIMS Site Number	Site Name	Location	Landform	Contents	Status
46-3-0192	Buronga Landfill Artefact Scatter 1	610565 m E; 6223164 m N	Sandplain	Broken sandstone core	Destroyed under permit
NEW	Buronga Landfill Artefact 1	611253 m E; 6223510 m N	Sandplain	Silcrete flake	In place
NEW	Buronga Landfill Artefact 3	611366 m E; 6223560 m N	Sandplain	Broken sandstone muller	In place
NEW	Buronga Landfill Artefact 3	611562 m E; 6223536 m N	Sandplain	Silcrete angular fragment	In place

6.7.3 Assessment

The Project may be assessed in terms of significance to Aboriginal people, science (archaeology), aesthetics or history. Consultation with the RAPs, particularly during the field survey, did not uncover any specific information pertaining to the Project area and suggested that the Project area was unlikely to contain abundant physical remains of past Aboriginal occupation due to the past disturbance by sand quarrying. The value of the objects to science was rated as low overall as the artefacts were small, few and not unique and affected by to the disturbance and erosion. Their aesthetic and historical values were also considered to be low.

Landskape assessed the direct and indirect potential impacts of the proposed expansion on Aboriginal cultural heritage. Direct and indirect impacts were considered as described below and are summarised in Table 6.24.

- Potential Direct Impacts:
  - the loss of information which could otherwise be gained by conducting research today;
  - the loss of the archaeological resource for future research using methods and addressing questions not available today; and
  - the permanent loss of the physical record.
- Potential Indirect Impacts:
  - deposition of dust generated by earthworks and vehicular traffic;
  - accidental disturbance by peripheral activities;
  - and inappropriate visitation including the unauthorized removal of Aboriginal objects.

Landskape concluded that the direct and indirect impacts of the proposed works pose no loss of value to the discovered artefacts. However, there is a moderate likelihood of encountering previously undiscovered Aboriginal objects (likely stone flakes and grindstones) during the proposed works.

Table 6.24 Impact summary for Aboriginal object discovered at Buronga Landfill.

AHIMS Site No.	Site Name	Type of Harm	Degree and Consequence of Harm
46-3-0192	Buronga Landfill Artefact Scatter 1	Direct (already harmed under AHIP)	Total loss of value (already harmed under AHIP)
N/A	Buronga Landfill Artefact 1	None	No loss of value

AHIMS Site No.	Site Name	Type of Harm	Degree and Consequence of Harm
N/A	Buronga Landfill Artefact 2	None	No loss of value
N/A	Buronga Landfill Artefact 3	None	No loss of value

6.7.4 Mitigation Measures

The ACHA recommends the following mitigation measures:

- WSC avoids harm to the three isolated finds of stone artefacts (Buronga Landfill Artefact 1-3) near the proposed disturbance areas. A permanent protective barrier fence should be erected around the sites. Fences should be maintained and personnel directed not to enter fenced areas except to complete appropriate land management maintenance and weed control.
- If any previously unidentified Aboriginal objects are encountered during construction of the proposal all works likely to affect the material must cease immediately and Heritage NSW and the RAPs consulted about an appropriate course of action prior to recommencement of work.
- In the unlikely event that human skeletal remains are encountered during construction the proposal, all work with the potential to impact the remains must cease. Remains must not be handled or otherwise disturbed except to prevent further disturbance. If the remains are thought to be less than 100 years old the Police or the State Coroner's Office (tel: 02 9552 4066) must be notified. If there is reason to suspect that the skeletal remains are more than 100 years old and Aboriginal, WSC should contact the Environmental Line (tel: 131 555) for advice. In the unlikely event that an Aboriginal burial is encountered, strategies for its management would need to be developed with the involvement of the local Aboriginal community.
- WSC should provide training to all on-site personnel regarding the Aboriginal cultural heritage management activities strategies relevant to their employment tasks.
- WSC should continue to involve the registered Aboriginal parties and any other relevant Aboriginal community groups or members in matters pertaining to the proposal.
- Prepare a Heritage Management Plan to co-ordinate and implement management and mitigation strategies.

6.8 Noise and Vibration

A Noise and Vibration Assessment was conducted by Sonus and is presented as Appendix O.

6.8.1 Methodology

Potential noise impacts associated with the proposed landfill expansion were assessed in accordance with the EPA's 2017 *Noise Policy for Industry* and the Department of Environment, Climate Change and Water's 2011 *NSW Road Noise Policy*. Potential vibration impacts were assessed in accordance with the Department of Environment and Conservation's (DEC) 2006 *Assessing Vibration: a technical guideline* (Vibration Guideline).

6.8.1.1 Background Noise Assessment

A noise logger was placed by Sonus in the northwest corner of the proposed expansion area to record background noise between May 6 and 14. The noise logger location was chosen to capture background noise sources while avoiding the noise associated with landfill operations. Noise levels over a given period of time are described in terms of Sound Pressure/Power Levels and are expressed in a mathematically weighted form of decibels (dB) known as A-weighted decibels (dB(A)). The background noise recordings were used to calculate Rating Background Level (RBL) values over day (7 am-6 pm), evening (6 pm to 10

pm) and night (10 pm-7 am) time periods. The RBL values provide a single figure that represents the background noise level for assessment purposes.

6.8.1.2 Operational Noise Assessment

Potential noise impacts of a proposal are assessed against Project Noise Trigger Levels (PNTLs). If proposed activities are expected to exceed PNTLs, then noise impact avoidance and/or mitigation measures should be implemented to minimise the adverse effects of operational noise on sensitive receptors. PNTLs are the lower of either the Project Intrusiveness Noise Levels (PINL) or the Project Amenity Noise Levels (PANLs). The PINL aims to protect against acute or short-term noise generation, while the PANL aims to protect against cumulative noise impacts from industry and to maintain amenity for particular land uses.

The PINL of an industrial noise source is considered acceptable if the level of noise from the source measured over a 15-minute period ($L_{Aeq,15min}$) does not exceed the RBL by more than 5 dB(A). The outcome of this approach aims to ensure that the intrusiveness noise level is being met for at least 90% of the time periods over which annoyance reactions can occur (taken to be periods of 15 minutes).

The PANL is aligned with the planning zone in which nearby noise sensitive premises with the potential to be impacted by the proposed development are located. The PANL for a new industrial development is set at 5 dB(A) below the Recommended Amenity Noise Level (RANL) defined by the *Noise Policy for* Industry for the nearby planning zone.

Projected noise levels were estimated using the SoundPLAN noise modelling suite. Noise measurements taken during the site visit were supplemented with a range of previously acquired noise measurements and observations at other similar facilities, including noise from operation of civil earthmoving equipment (front end loader and an excavator), road truck movements, articulated dump truck movements, a road truck depositing waste material, a dump truck depositing fill and an air compressor. Based on observations on-site of existing operations, the following assumptions about onsite activities were made for modelling purposes: a single road truck accessing the site and depositing waste material; continuous operation of a front end loader processing waste throughout the assessment period; a single return haul truck movement between the excavator site, and the waste processing area; continuous operation of an excavator throughout the assessment period; and continuous operation of the air compressor throughout the assessment period. It was also assumed that all operational activities would be located in the southwestern corner of the proposed expansion area (i.e. as close as possible to the sensitive noise receptors); and that there was a direct line of sight between the noise source and receptor. These assumptions were made to provide a conservative estimate of noise impact on nearby noise sensitive receivers.

6.8.1.3 Traffic Noise Assessment

Road traffic noise assessment criteria are described from the NSW Road Noise Policy and are dependent on the road type (freeway/arterial/sub-arterial road or local road), the type of noise sensitive receptor, (residential or non-residential), and whether the assessment applies to a new or existing road. Category/ type 6 assessment criteria which apply to "existing residences affected by additional traffic on existing local roads generated by the land use developments" were deemed to be the most suitable for this assessment. Category 6-day (7 am-10 pm) and night (10 pm-7 am) road noise thresholds ($L_{Aeq,1hour}$) are 55 and 50 dB(A), respectively.

The effect of additional traffic on road traffic noise levels at residences in the vicinity of Arumpo Road to the south of the site were estimated using the SoundPLAN noise modelling suite.

6.8.1.4 Vibration Impact Assessment

Potential vibration impacts are typically divided into two categories: amenity (i.e. human annoyance) and structural damage. Human annoyance occurs at lower vibration levels than structural damage, so adherence to human annoyance criteria ensures structural damage does not occur. The criteria are derived from the DEC's Vibration Guideline, which is based on BS 6472:1992 *Guide to Evaluation of Human*

Exposure to Vibrations in Buildings (1 Hz to 80 Hz). The daytime assessment criteria for continuous operation were considered as landfill operations take place within normal operating hours and, at worst, could be continuous.

The vibration levels associated with the following activities were measured during the site visit: a loader operating at high and low power settings and a dump truck moving and dumping fill. Vibration was measured 100 m from the loader and 50 m from the dump truck. These activities are expected to generate the highest levels of vibration (currently and during the proposed landfill expansion). Measurements are weighted for assessment purposes using a conservative screening method described in Appendix A of DEC's Vibration Guideline.

6.8.2 Existing Environment

The planning zone for the nearest noise sensitive premises is "Rural 1" with the nearest residences over 900 m from the current and proposed landfill activities. The primary noise sources in the area are: Buronga Landfill; a bentonite mining operation immediately west of the landfill (Arumpo Bentonite, 291 Arumpo Road), a gypsum mining operation northwest of the landfill (Morello Gypsum), farming activity to the southwest of the landfill, and road traffic on Arumpo Road serving these facilities and as general transit.

The background noise levels ranged from approximately 20-80 dB(A), with three maximum noise levels ranging from 80-100 dB(A) which occurred outside the landfill operating hours (Appendix O). The RBL values calculated from these measurements (Table 6.25) were less than the minimum RBL values set out in the EPA's *Noise Policy for Industry* so the minimum RBLs were used to calculate the PINLs. The PANLs were greater than the PINLs and hence were used as the PNTLs. The modelling predicted that the noise level at the closest practicable distance to the residences and with direct line of site (e.g. at the top of the landfill with no shielding) is 38 dB(A).

Table 6.25 Noise Assessment Criteria and Prediction

Parameter	Unit	Daytime	Evening	Night-time
Measured Rating Background Level (RBL)	dB(A)	26	17	16
Minimum RBL	dB(A)	35	30	30
Project Intrusiveness Noise Level (PINL)	$L_{Aeq,15min}$ dB(A)	40	35	35
Recommended Amenity Noise Level (RANL)	$L_{Aeq,15min}$ dB(A)	53	48	43
Project Amenity Noise Level (PANL)	$L_{Aeq,15min}$ dB(A)	48	43	38
Project Noise Trigger Level (PNTL)	**$L_{Aeq,15min}$ dB(A)**	**40**	**35**	**35**
Predicted Noise Level with direct line of sight	**dB(A)**	**35**	**n/a**	**n/a**

NOTES:
Daytime –from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sunday and Public Holidays
Evening –from 6 pm to 10 pm
Night-time – the remaining periods
n/a – not applicable as landfill operations only occur during daytime

6.8.3 Assessment

6.8.3.1 Operational Noise Assessment

The predicted noise level for the Project is 38 dB(A) at the closest practicable distance to the residences and with direct line of site (e.g. from the higher levels of the landfill with no shielding). The predicted noise level is within the rise and fall of the ambient environment during the daytime period and so a penalty for annoying characteristics was not applied. The predicted noise level is below the day PNTL and is therefore compliant with the EPA's *Noise Policy for Industry*.

6.8.3.2 Traffic Noise Assessment

The proposed development is not likely to result in a significant increase in traffic on the local road network in short to medium term but rather a gradual increase. The road traffic noise assessment was based on the peak site traffic generation predicted in the Traffic Impact Assessment (Table 6.10) being 261 vehicles per day associated with future operation and construction traffic thus representing a worst-case scenario. Based on these predictions, a 1-hour average noise level of 51 dB(A) is predicted at the most affected house which is below the day assessment criteria threshold of 55 dB(A). The noise levels predicted from the proposed development achieve the assessment criteria and therefore satisfy the *Road Noise Policy*.

6.8.3.3 Vibration Impact Assessment

Observations on-site suggested that vibration from even the most intensive operations could not be perceived at distances in the order of 100 m from activity. As residences are over 900 m from the site, vibration would not typically require further consideration; however, the SEARs required an assessment be undertaken.

The results of the vibration measurements in relation to the relevant assessment criteria are shown in Table 6.26. All measured vibration levels were below assessment criteria. Additionally, vibration was measured at 50-100 m from the source, while the nearest sensitive receptor is over 900 m away from the landfill. As such, potential vibration impacts are expected to be negligible and meet the requirements of the applicable guidelines.

Table 6.26 Summary of Vibration Assessment

	X Axis (rms, m/s^2)		Y Axis (rms, m/s^2)		Z Axis (rms, m/s^2)	
	Measured	Criteria	Measured	Criteria	Measured	Criteria
Loader – low power	0.001	0.0071	0.003	0.0071	0.001	0.01
Loader – high power	0.001	0.0071	0.002	0.0071	0.001	0.01
Dump truck	0.002	0.0071	0.002	0.0071	0.001	0.01

6.8.4 Mitigation Measures

The noise and vibration levels associated with the proposed activities are well below action trigger thresholds. Consequently, no impact avoidance/mitigation measures have been recommended.

6.9 Social and Economic

6.9.1 Current Environment

The Buronga Waste Facility provides waste management services to the majority of WSC's population. The closest population is located in Buronga, over 4 km from the Project area. The surrounding uses are for industrial facilities, being Arumpo bentonite and Morello gypsum suppliers, and agricultural properties with extensive grazing to the north and irrigated horticulture to the south toward the Murray River. The Site is zoned SP2 Infrastructure and the surrounding land is rural. The current use of the expansion area is for soil borrow pits with previously use for sand mining. Morello Earthmoving holds a Mining Lease over the project area (Figure 21).

Census data from 2016 shows that Buronga, Gol Gol and Wentworth account for 60% of the WSC local government area (LGA) (Table 6.27). Mildura has a significantly larger population than the entire Wentworth LGA. Mildura, Buronga and Gol Gol have a similar median age and are similar to the entire NSW and Victorian populations which are 38 years and 37 years, respectively; Wentworth has an older population. Gol Gol is the most affluent suburb with higher median household income and property mortgages and very low unemployment percentage. Compared with Mildura, Buronga has higher household income and lower rent and unemployment. Wentworth has the lowest household income, mortgage and rent, which would be affected by its older population and higher unemployment compared with the other nearby suburbs.

WSC currently employs six people directly with contractors engaged for construction activities every 5 to 10 years. Additional WSC personnel are engaged in the management and administration of the landfill and collection of domestic waste. Additional employment is generated from transporting recyclables, such as recycling chemical drums, and chipping of green waste and crushing of masonry from construction and demolition activities.

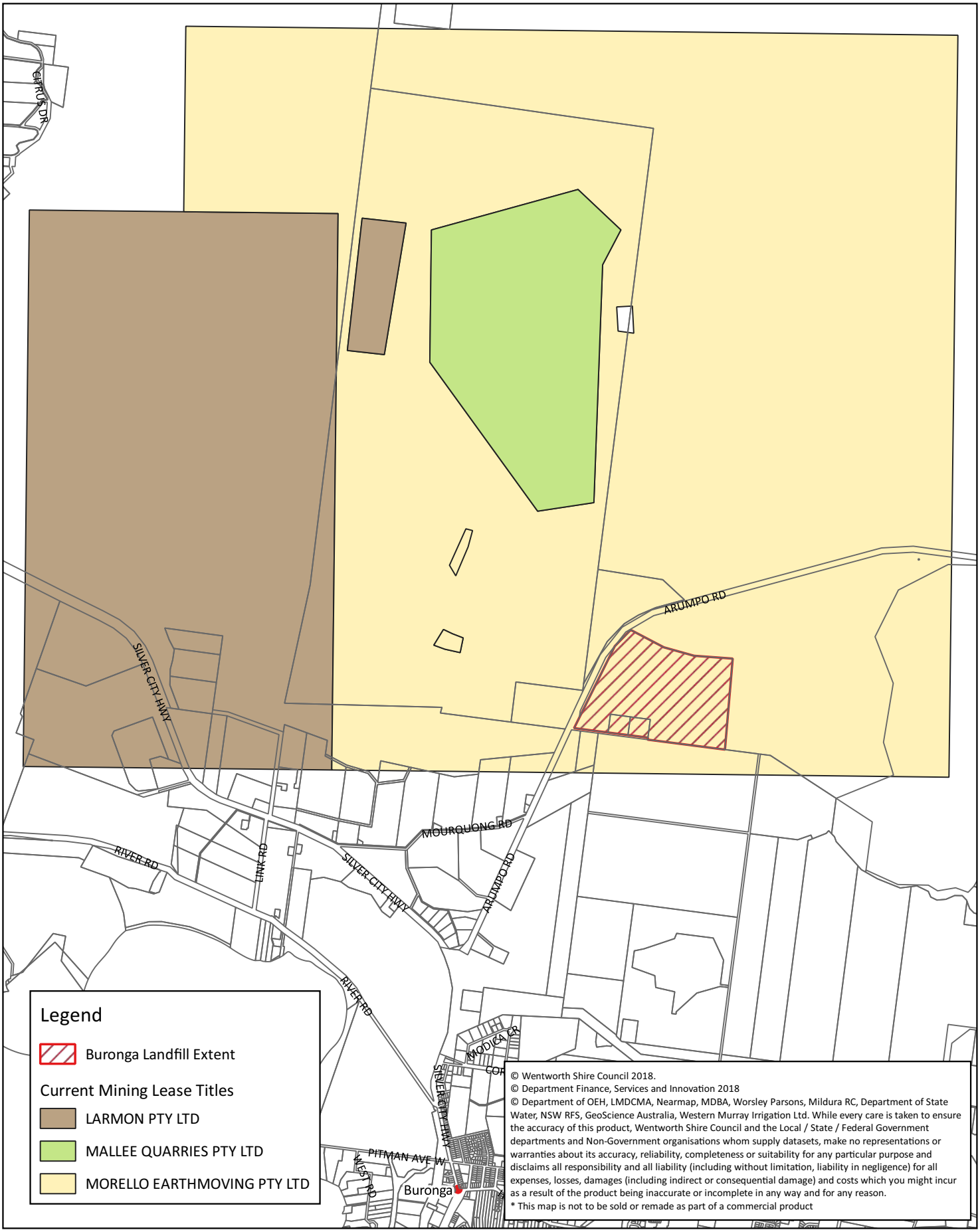

Figure 21 **Buronga Landfill Mining Leases**

WENTWORTH SHIRE COUNCIL
WORTH THE DRIVE
P.O. Box 81 Wentworth 2648.
Tel. (03) 5027 5027 Fax. (03) 5027 5000
E: council@wentworth.nsw.gov.au
W: www.wentworth.nsw.gov.au

Created by: Richard Waters
Date: 13/08/2021
Scale: 1:50,000
Datum/Projection: GDA94 / MGA 54

N

0 1,000 2,000 3,000 m

Original sheet size: A4

Table 6.27 2016 Census Data for Local Government Areas (LGA) and State Suburbs near the Project

LGA or Suburb	Total	Median Age	0-19 Year	20-64 Years	65+ Years	Median Weekly household income	Median Monthly Mortgage	Median Weekly Rent	Unemployed
Wentworth Shire LGA	6,794	44	1,675	3,739	1,381	$1052	$1200	$160	106 (6.1%)
Buronga	1,212	38	332	704	188	$1,149	$1,235	$190	39 (6.8%)
Gol Gol	1,523	38	481	816	225	$1,527	$1,517	$205	24 (3.1%)
Wentworth	1,437	56	255	699	495	$792	$888	$170	47 (9.2%)
Mildura Rural City LGA	53,878	40	13,749	30,047	10,077	$1,064	$1,200	$210	1,784 (7.3%)
Mildura	32,738	39	8,203	18,278	6,254	$1,023	$1,231	$225	1,218 (8.5%)

Unemployed % - People who reported being in the labour force, aged 15 years and over

6.9.2 Assessment

The demographics of Buronga are similar to the closest towns of Gol Gol and Mildura. There are no specific data for the areas directly around Buronga landfill. The data for Buronga suggest that the demographics and socio-economic status is comparable with Mildura, though Gol Gol, with its more extensive river frontage, has attracted a population with higher household incomes. The existing Buronga Landfill does not appear to have detrimentally affected the demographics of Buronga compared with Mildura suggesting that the proposed expansion is also unlikely to affect the house prices or incomes of the surrounding area.

The estimated direct full-time equivalent employment per 10,000 tonnes of waste is 9.2 for recycling and 2.8 for landfill disposal and indirect employment is expected to result in a multiplier of 1.84 (Access Economics, 2009). Six staff are currently directly employed at Buronga Landfill which is less than estimated for 24,000 tonnes of waste but this does not include rubbish collection staff. The improvement in recycling infrastructure should facilitate an increase in recycling rate in the short term and will double the number of full-time employees (Table 6.28). Once waste is accepted from surrounding LGAs and assuming a recycling rate of 33% recycling (which is likely to be conservative based on national recycling of over 60%), direct employment could increase to 26 full-time equivalent and almost 50 full-time equivalents as an indirect labour force. Although this is not a large number of people, in the context of the smaller populations of Buronga, Gol Gol and Wentworth, this could have a significant impact on unemployment.

Table 6.28 Estimated Employment based on Access Economics (2009) for Future Waste Scenarios

Scenario	Assumed Annual Waste (tpa)		Employment (full-time equivalent)	
	Disposal	Recycling	Direct	Indirect
Current	32,940	5,652	6	
Improved recycling and population increase (< 5 years)	33,600	10,000	14.4	26.5
Additional waste for disposal from LGAs (5-30 years)	45,000	15,000	26.4	48.6
100,000 @ 60% recycling	40,000	60,000	66.4	122.2

The Buronga Landfill is estimated to cost approximately $90M over the next 120 years generating employment through increased staff and purchase of goods and services to assist its development, based on the Concept Design Cost Estimate (Appendix D). With the exception of specialised services for supply and installation of geosynthetic materials (approximately $17M) the remainder of goods (quarry rubble, etc.) and services (e.g. earthworks contractors, surveyors) can be supplied from the WSC LGA or Mildura area.

Overall, the Project is expected to have no impact on the demographics of Buronga and a beneficial impact through the generation of additional local employment, particularly for increased recycling.

6.9.3 Mitigation Measures

There are no detrimental impacts estimated to occur so no mitigation measures are proposed.

6.10 Visual and Design

6.10.1 Exiting Environment

The Project area is located in an industrial and agricultural use area with Morello Gypsum and Arumpo Bentonite as its nearest neighbours on the western side of Arumpo Road. To the south is irrigation agriculture/horticulture and to the north and east is broadscale agriculture. The Silver City Highway, a major thoroughfare between Mildura and Broken Hill is over 2.5 km south and the Buronga residential area commences over 4 km south. Irrigated orchards and scattered remnant vegetation are present between Buronga and the Project and provides a staggered screen to the landfill area.

The district elevations range from topographical lows of 30-40 m AHD and highs of 60 m AHD. Arumpo Road is at approximately 44 m AHD at the south western corner of the site and decreases to around 40 m AHD toward the north-western corner. From the roadway the elevation increases by up to 4 m over a 50-100 m length to form a long low ridge between the landfill and the roadway (Figure 22). This effectively screens the existing operations, which rise to 56 m AHD, from the roadway.

Figure 22 View from Landfill Entrance looking north (top) and North-West Boundary Looking South (bottom).

The new sheds and other structures (fire water tank) will be constructed from materials with non-reflective subdued or dull colours, such as pale eucalypt, to limit reflection and blend into the natural vegetation. The new office area will be non-reflective white, as is typical for ATCO huts, to assist with cooling. These structures are not visible from the road. All structures are less than 4 m above ground level and will not be visible form the road.

6.10.2 Mitigation Measures

The mitigation measures proposed are:

- Structures to be non-reflective and subdued colours, e.g. pale eucalypt colorbond steel;
- Maximum height of structures is 5 m;
- After construction, a drive-by along Arumpo Road and from Buronga will be undertaken to assess visual impact. Where structures or the landfill are easily visible, additional planting within the buffer areas will be undertaken to assist with screening and soften the visual impact;
- Rehabilitation using endemic plant community types.

7 Mitigation Measures

Three main ways exist for an impact to be conditioned (Department of Planning and Environment, 2017):

• performance-based conditions identify performance criteria that must be complied with to achieve an appropriate environmental outcome but do not specify how the outcome is to be achieved;

• prescriptive conditions require action to be taken or specify something that must not be done;

• management-based conditions identify one or more management objectives that must be achieved through the implementation of a management plan.

For a landfill, the POEO Licence and approved LEMP will provide the prescribed criteria for the operation of the landfill. It is expected that the existing licence conditions will be strengthened to reflect the proposed scale of the Project. Table 7.1 below details a summary of the risks identified in this EIS and the proposed conditions and mitigation measures to be implemented in the design, construction and operation of the Project.

Table 7.1 Summary of Environmental Risk and Mitigation Measures

Impact	Potential Impact	Criteria, Measurements and Plans	Mitigation Measure	Residual Impact
Community concern	Community concern is not addressed and the community's sentiment becomes negative	Criteria: Community is supportive of Buronga Landfill and not impacted by operations Measure: A community complaints register will be maintained to measure the level of community concern Plan: Prepare a Community Consultation Plan for the on-going operation of the Landfill in line with WSC's existing community engagement policies and procedures.	Ensuring that all those contacted as part of this stage are notified by email when the EIS is submitted and on exhibition. Information about the proposal should be provided through WSC newsletters and communication and via the website. Further meetings or information session should be offered during the EIS exhibition period. This may be just an advertised time when people can attend at WSC Offices, view maps and have any questions answered with WSC personnel available. This will be particularly important for resolving the issues raised around Arumpo Road and the use of smaller roads. Ensuring that all near neighbours have a contact name and number for a person in WSC who can address any operational concerns on site or incidents such as illegal dumping. Information should be provided to the agricultural community but available to all stakeholders about the operations and controls. This is to reassure those with concerns about the impact on local activities including food production.	By consulting with the community, any issues should be addressed quickly and are unlikely to escalate. Overall, the residual impact to the local and broader WSC communities should be positive.
Air – dust	Air pollution. Particulate matter (dust) and other air impurities generated during construction and operation exceeding prescribed air quality limits and/ or adversely affecting the health or quality of life of nearby sensitive receptors (e.g. neighbouring residents and native and domesticated animals).	Criteria: No complaints on dust received Measure: A community complaints register must be maintained as a metric of dust impacts. Multiple complaints over a 6-month period will trigger air quality monitoring to assess compliance with air quality assessment criteria described in the *National Environment Protection (Ambient Air Quality) Measure 1998*. Plan: Include requirements in updated LEMP	Watering and windbreaks for the active landfill cell Revegetation of inactive cells Watering of sealed roads Limiting on-site vehicle speeds on unsealed roads to 50 km/hr	Minor increases in dust may be observed; however these are within acceptable criteria or are a rare occurrence
Air - odour	Air pollution. Odour generated during operation exceeding prescribed air quality limits and/ or adversely affecting the health or quality of life of nearby sensitive receptors (e.g. neighbouring residents and native and domesticated animals).		Limit active tip face to < 600 m^2; Place 150 mm daily cover over the tip face by the close of business Place interim cap on finished areas Construct final cap and revegetate within 2 years of completion, where feasible	No residual impact is expected form the Project as predicted odour is below criteria
Air - greenhouse	Greenhouse gas emissions generated during construction and operation exceeding quantities deemed to be unreasonably excessive in relation to the size of the facility and its operations.	Criteria: Boundary concentrations and surface concentrations on capped areas: ≤ 1.0% vol/vol methane and < 1.5% vol/vol carbon dioxide Measure: Report NPI and NGERs Plan: Prepare a LFG Management Plan, including a risk assessment and monitoring requirements.	Construct a LFG passive or active management system Repair and/or construct interim or final capping Rehabilitate thin or cracked areas Apply surface mulch or compost where additional capping is not feasible	The expected contribution to greenhouse gas is estimated to be <0.32% of Australia' inventory and likely to be less given the semi-arid environment likely to lead to low LFG generation

Impact	Potential Impact	Criteria, Measurements and Plans	Mitigation Measure	Residual Impact
Traffic	Increased traffic loading adversely impacts the efficacy of the local and/or broader road network and increases the likelihood of traffic related incidents.	Criteria: No crashes or incidents related to waste management transport Roads meet Austroads requirements No use of Mourquong Road by waste transporters Measure: Reported incidents	Construct basic right turn from Arumpo Road into the Buronga Landfill and Basic left turn into Arumpo Road from the Buronga Landfill. Concept designs are provided in the TIA (Appendix H); Consult with TfNSW and residents to determine appropriate treatment for Arumpo Road. Advise transporters, including staff of requirement to use Arumpo Road to access site and not Mourquong Road Ensure sign-posting on Mourquong Road advises of weight limit	Minor increases in traffic are predicted but will not detrimentally impact George Chaffey Bridge or Silver City Highway.
Soil - quality	Contamination of topsoil (undisturbed or stockpiled) due to spills or contact with contaminated fill.	Criteria: No visual contamination of stockpiled capping soil Measure: If contaminated is suspected, undertake chemical testing and assessment criteria to ensure ENM	Ensure vehicles/ machinery are used and maintained according to the manufacturer's instructions for use. Conduct any inspections, maintenance or refuelling on hardstand areas and ensure a spill kit is available on hand. Stockpile capping materials in dedicated areas away from main haul routes	Unlikely to be any residual impact
Soil - erosion	Erosion of topsoil (undisturbed or stockpiled) resulting in net export of soil/ sediment offsite.	Criteria: No movement of sediment into undisturbed buffers Stockpiles with rills < 0.3 m deep and/or wide Measure: Routine visual observation of stockpile areas	Sandy topsoils, which are prone to erosion, are dominant onsite. However, the low annual rainfall (250-300 mm/yr) and flat topography greatly lower the risk of net erosion. Implementation of adequate stormwater and erosion control infrastructure (e.g. drains, stormwater detention basins, sediment fences) – as described in *Managing Urban Stormwater: Soils and construction - Volume 2B: Waste Landfills*	No residual impact likely
Groundwater	Contamination of groundwater (e.g. due to leaching of the fill).	Criteria: Groundwater remains within 10% of background concentration or below NEPM Measure: Groundwater depth and chemistry Plan: Prepare and Groundwater Monitoring Plan	Site investigation indicates groundwater is located 7-9 m bgl and may be partially confined by a clay layer. The vertical and lateral movement of groundwater is anticipated to be low due to low rainfall, flat topography and low subsoil permeability. Cells constructed in accordance with best management practices as per the Landfill Guideline and maintain a minimum 2 m separation to groundwater	There is no residual impact to groundwater expected from the Project
Hazards	Potential impact to the environment or people from the uncontrolled release of hazardous or offensive material	Criteria: No penalty or warning notices issued by EPA Plan: Incorporate appropriate management into LEMP	Site operated in accordance with POEO Licence and Landfill Guideline	Minor potential exists for impacts to staff from the receipt of unknown hazardous waste or from accidents; however the proposed management and mitigation has reduced the risks to low
Fire	Fire arising on- or off-site causing harm to people, fauna and flora, and/or infrastructure and equipment.	Criteria: No fires to leave the premises Measure:	Maintain 16 m asset protection zone; Construct office buildings with non-combustible cladding Provide an additional 45,000 L static water supply to the north of the site Construct roads able to be traversed by fire-fighting appliances	Fire remains a risk on from on-site and off-site but the risk has been reduced to low

Impact	Potential Impact	Criteria, Measurements and Plans	Mitigation Measure	Residual Impact
		All fires known to or thought to have originated on the premises will be recorded as an incident and investigated in line with the *Work Health and Safety Act 2011*. Plan: Prepare a Bushfire Emergency Management and Evacuation Plan	Provide and additional emergency exit in the north-west corner	
Flora and Fauna	Unauthorised damage or removal of State or Nationally protected flora or fauna (including habitat) during landfill construction and operation activities (e.g. clearing, excavation). Proliferation of listed weeds or pest animals resulting in environmental harm.	Criteria: No removal of unauthorised vegetation No listed weeds growing in buffer areas Plan: Prepare a Weed Control Plan Prepare Pest Animal Control Plan Prepare a Rehabilitation Management Plan which includes site preparation measures (light contour ripping, surface stabilisation, mulching), weed control, suitable species selected from PCT15 and PCT58 and of local provenance, placement of logs/hollow trees, monitoring and on-going weed and pest control	Engage a suitably qualified ecologist prior to clearing to identify habitat trees with logs/hollows for relocation and to relocate native fauna which may be displaced Inspect trenches left open overnight for entrapped wildlife and contact suitably qualified fauna relocation services, if trapped animals are found Inspect pipes and conduit for fauna prior to placement. Seal pipe ends overnight to prevent fauna entrapment Establish controls to prevent works from occurring outside the subject land Identify suitably qualified fauna re-location services Prevent illegal collection of firewood through fencing and signage Include endemic vegetation in landfill rehabilitation. Maintain 200 m buffer to provide wildlife corridors and refuges and reduce visual amenity impact Plan construction activities for January to April to facilitate revegetation in May (optimal time). Avoid clearing in Spring when breeding most likely to occur. Clearly identify extent of disturbance using on-ground markers Locate waste management infrastructure in already disturbed areas to the extent practical Relocate cleared logs and hollows in buffer zone or rehabilitated areas Construct a temporary fence between construction area and buffer zone for cell adjacent to buffer. New tracks to be established outside the drip line of trees Progressive develop and rehabilitate substages and cells Undertake rehabilitation as soon as practical. Maintain temporary fence between cell and buffer zone for cells adjacent to the buffer zone Maintain perimeter fencing to prevent illegal dumping of rubbish outside of operational hours. Maintain fire breaks to limit spread of wildfire	Impact to ecosystems is expected and will require payment of offset
Aboriginal Heritage	Damage/ disturbance of Aboriginal heritage items during construction and operation activities (e.g. clearing and excavation).	Criteria: No disturbance to known artefacts Minimise potential for disturbance or harm of unknown items	Construct a permanent protective barrier fence around the known artefacts	There is a low risk of impact to aboriginal heritage from the Project given the low

Impact	Potential Impact	Criteria, Measurements and Plans	Mitigation Measure	Residual Impact
		Measure: Staff trained in appropriate cultural heritage management procedures Plan: Prepare a Heritage Management Plan, including aa procedure for accidental finds.	Train staff in all requirements, including no access to fenced area except for land management practices (e.g. weed control) Continue to liaise with RAPs as needed	potential of finds and the low quality of the finds to date
Noise	Noise generated by landfill activities exceeding prescribed limits or adversely affecting the health or quality of life of nearby sensitive receptors.	Criteria: No complaints received. Measure: A community complaints register must be maintained as a metric of impacts. Multiple complaints over a 6-month period will trigger noise or vibration monitoring to assess compliance with *Noise Policy for Industry* Plan: Include requirements in updated LEMP	Limit construction and operation activities to normal operating hours.	Noise levels are well-below action trigger thresholds, so no impact is predicted
Visual Amenity	Reduction of visual amenity due to a line of site between sensitive receptors (e.g. neighbouring residents and tourists) and the landfill.	Criteria: No complaints received. Measure: A community complaints register must be maintained as a metric of impacts. After construction, a drive-by along Arumpo Road and from Buronga will be undertaken to assess visual impact. Plan: Include requirements in updated LEMP	Maintain vegetated 200 m buffer along Arumpo Road Structures to be non-reflective and subdued colours, e.g. pale eucalypt colorbond steel; Maximum height of structures is 5 m; Where structures or the landfill are easily visible, additional planting within the buffer areas will be undertaken to assist with screening and soften the visual impact; Staged construction to commence in the south-west to provide screening to future landfill operations. Rehabilitate existing and future operations by planting endemic vegetation as soon as practicable.	The landfill is at distance from residents and screened by vegetation along Arumpo Road. Short term reduction in visual amenity will occur whilst a cell is being filled and prior to final capping and rehabilitation occurring.

8 Evaluation and Conclusion

The Buronga Landfill is located in a semi-arid environment with no sensitive receptors within 1 km of the site; its neighbours are industrial activities for bentonite and gypsum supply. The site is a former quarry and has been used as a soil borrow pit and hence is a degraded site. The geology of the site is stable and the environment naturally leads to lower leachate and LFG generation than more temperate environments. The current licence as reflected in the LEMP, requires best management practices at the landfill and its ownership by a local council authority ensure the interests of the community are well represented. Alternative sites have not been investigated given the suitability of the existing site.

If the expansion is not approved, then the Buronga Landfill will be nearing closure. An alternative site in Wentworth Shire is unlikely to be found, given that this site is an existing use as a landfill. The nearest landfill in Mildura (Vic) is nearing closure and other nearby landfills are unlicensed or closed. The closest licenced landfills in NSW are at Broken Hill and Deniliquin, both over 300 km away, showing significant distances would need to be travelled to dispose of non-recyclable waste.

The Project has been modified during its development to:

- Reflect concerns from residents on the traffic along Arumpo Road have commenced investigations into improvements for Arumpo Road and limitations for Mourquong Road;
- Reduce potential impact to native flora and fauna, particularly to the vegetation to the east by:
  - The FERF, and RRA have been redesigned and moved to existing disturbed areas.
  - The landfill footprint is focussed on the already disturbed areas from quarrying and commences construction in these areas. This increases the potential that future waste management improvements may negate the need for Stage 2 to be developed;
  - stormwater ponds and leachate ponds have been moved and designed as smaller ponds to concentrate construction on areas which have been disturbed or have lower quality vegetation;
- Include the use of phytocapping techniques to allow for revegetation of the finished cap using endemic vegetation. This has the benefit of providing offset to vegetation clearing by restoring ecology and habitat and reducing the visual amenity impact;
- Avoid impact to aboriginal heritage items by locating stormwater ponds away from artefacts;

The remaining potential impacts to air quality, soil and groundwater, fire, noise and vibration were all found to have a low potential for detrimental impact to occur. Beneficial impact was most likely to employment as the upgrade and expansion of the FERF and RRA is likely to generate additional jobs as well as the on-going construction which will utilise locally produced materials, such as bentonite, and employ local consultancy and earthmoving/construction contractors.

The expansion of Buronga Landfill is the optimal solution and on the balance of impacts and benefits favour the public interest as:

- Aggregation of waste improves recycling opportunities;
- Consolidation of landfill facilities improves management and utilisation of best management practices;
- The site is an existing landfill meets the siting requirements for a landfill in this region;
- No other facilities are available within economic distances from Wentworth and Buronga;
- Improved economies of scale should reduce cost to current rate payers.

For these reasons, we endorse the expansion of Buronga Landfill as proposed herein.

9 References

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Appendix A. A1 Drawings

Appendix B. EPA Licence 20209

Appendix C. Secretary's Environmental Assessment Requirements (SEARS) for SSD-10096818

Appendix D. Quantity Survey

Appendix E. Buronga Landfill Concept Design – Basis of Design Report (Tonkin, 2021)

Appendix F. Community and Stakeholder Participation Report (PlanCom Consulting, 2021)

Appendix G. Air Quality Assessment (Vipac Engineers & Scientist, 2021)

Appendix H. Stage 3 - Traffic Assessment (Tonkin, 2021)

Appendix I. Geotechnical Investigation (Tonkin, 2021)

Appendix J. Groundwater Impact Assessment (Tonkin, 2021)

Appendix K. Hazard Assessment

Appendix L. Bushfire Assessment (Building Code and Bushfire Hazard Solutions, 2021)

Appendix M. Biodiversity Development Assessment Report (Pinion Advisory, 2021)

Appendix N. Aboriginal Cultural Heritage Assessment (Landskape, 2021)

Appendix O. Noise and Vibration Assessment (Sonus, 2021)