Environmental Assessment and Management Plan

Wangara Waste Transfer Station

Prepared for City of Wanneroo

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1 Introduction

The City of Wanneroo (the City) is in the process of developing a Waste Transfer Station (WTS) at Lot 522, 86 Motivation Drive, Wangara, Western Australia (WA) (the Site). The Site was previously used as a Materials Recovery Facility (MRF) and is proposed to be repurposed as an interim WTS to support the City's waste logistics while long-term WTS infrastructure is developed at the Neerabup Resource Recovery Precinct (NRRP) at Lot 600, 570 Wattle Ave, Neerabup, WA.

The City operates the Wangara Recycling Facility (WRF) on Lot 9005, adjacent to the Site, where low-hazard green waste is accepted and transported offsite for shredding, returned for temp storage and resale. While some existing infrastructure on Lot 9005, including site access, the weighbridge and gatehouse, will be shared between the WRF and WTS operations, they are not part of this application as no changes to them are proposed.

The proposed Wangara WTS will receive waste from the City's kerbside collection services, along with minor volumes from public place collections, for transfer to recycling and recovery facilities located in the southern Perth Metropolitan Region. In doing so, it will ensure continuity of essential waste consolidation services in the short to medium term and support the City's broader transition towards regionalised waste infrastructure at the NRRP. The City intends to have the Wangara WTS operational by early 2026 enable a smooth transition of waste management services ahead of the planned closure of the Tamala Park landfill. The facility will have a lifespan of approximately 5 years, to serve as an interim facility and also protect against any delays with the delivery of the NRRP WTS.

The WTS elements that the City is seeking approval for include:

- Repurposed WTS building;
- Supporting infrastructure:
  - Truck refuelling station;
  - Truck washdown bay;
  - Surface water and leachate management system (SWLMS); and
  - Fire management system.

1.1 Background

Talis Consultants Pty Ltd (Talis) assisted the City in developing the NRRP Master Plan, which outlines the co-location of key waste infrastructure including a WTS, MRF, Waste to Energy (WtE) facility, and Community Recycling Centre (CRC). The NRRP is intended to serve as the City's long-term hub for resource recovery and waste management requirements while also servicing the wider north suburbs of Perth.

During the master planning process, it became evident that the anticipated closure of Tamala Park Landfill in the near future, would create an urgent need for interim waste consolidation capacity. Once Tamala Park Landfill ceases operations, residual waste will be transferred to the WtE facilities in the south of Perth for energy recovery, while commingled recyclables will be processed by one of the MRFs in the Perth Metropolitan Area. The City's current processing contract is with the Regional Resource Recovery Group (RRG) MRF in Canning Vale. The significant distance to the WtE facilities and the MRFs (the Recovery Facilities) highlights the need for a strategically located local WTS to enable cost-effective bulk haulage during the interim period.

In response, the City commissioned Talis to assess whether the Site and the existing MRF building could be repurposed into a temporary WTS. Following a detailed site assessment, multiple concept designs and cost evaluations were prepared. While the NRRP remains the City's preferred long-term

site for WTS operations, the Wangara WTS was identified as the most viable short-term solution to ensure continuity of waste services between the closure of Tamala Park and the completion of infrastructure at the NRRP.

The Wangara WTS will therefore play a critical transitional role in the City's broader waste infrastructure strategy and represents an important step in the staged implementation of regional-scale services at the NRRP.

1.2 Purpose of the Report

This Environmental Assessment and Management Plan (EAMP) has been developed to support the application for a Works Approval and Licence required for the development of the Wangara WTS. The objectives of this EAMP are to:

- Describe the current environmental and social values on and surrounding the Site;
- Describe in detail the proposed development, including design, operations and associated benefits;
- Identify any potential impacts to environmental and social aspects associated with the construction and operation of the proposed infrastructure;
- Develop environmental engineering and management measures to ensure that all potential impacts are managed to appropriate standards; and
- Understand the residual risks following the proposed management measures.

2 Site Information

This section provides background information in relation the location, current and proposed site infrastructure, development area, licencing, zoning, surrounding land uses and industry separation distances.

2.1 Site Location and Access

The Site is located at 86 Motivation Drive within the Wangara Industrial Area and spans approximately 1.79 hectares. It comprises Lot 552 on Deposited Plan 406640 and is zoned 'General Industry' under the City's Local Planning Scheme. Access to the Site is via Motivation Drive, which connects to major transport routes including Ocean Reef Road and Wanneroo Road. Vehicle entry and exit are managed via a sealed access road located on Lot 9005, which is directly south of the Site. As listed in Section 2.3, an additional exit onto Opportunity Street is also proposed as part of the development.

The location of the Site is shown in Figure 1 in Appendix B.

2.2 Development Area

The development area takes up entirety of the Site. All new infrastructure proposed under this Works Approval application as listed in Section 2.3 will be located within this area.

As detailed in the following section, the adjacent Lot 9005, situated directly south of the Site accommodating the WRF, accommodates existing infrastructure which will support the Site's operations but do not form part of the development area, as no modifications or upgrades are proposed to them as part of this application. The remainder of Lot 9005, east of the WRF processing area, comprises a historically closed landfill.

The development area is shown in Figure 2 in Appendix B.

2.3 Current and Proposed Site Infrastructure

The Site and Lot 9005 contain existing infrastructure that supports the Site's ongoing use for waste operations. This application focuses solely on proposed works within Lot 552.

Existing infrastructure within Lot 9005 includes:

- Weighbridge and gatehouse;
- Site access; and
- Site exit for Transfer Trailers.

Proposed Infrastructure includes:

- Large, enclosed shed previously used as an MRF for the sorting and storage of recyclable materials.
    - The eastern half (existing receival hall) is proposed to be repurposed as a WTS building while the western half will be demolished and will provide Truck parking space;
- Sunken and roofed load-out lane (2m below ground level) adjoining the WTS for Transfer Trailer loading;
- Truck refuelling station;

- Truck washdown bay;
- Fire management system;
- Hardstand extensions including fence line extension to allow space for the washdown bay and the reversing apron;
- Truck reversing apron will include twin side PC panel and a maximum 1.5m high post retaining wall south of the WTS building;
- Site exit for kerbside collection vehicles exiting from the northeast of the Site onto Opportunity Street.
- Two pads to be demolished and replaced with new sealed hardstand areas; and
- Perimeter fencing extended to enclose the expanded operational area.

The current Site layout is shown in Figure 3 in Appendix B.

2.4 Ownership and Licencing

The Site is owned and managed by the City and has been in operation since 2013. The City currently holds Licence L9230/2019/1 for the Site as a Category 62 – Solid waste depot Prescribed Premises under Part V of the *Environmental Protection Regulations 1987* as shown in Table 2-1. In the current Licence, the Site boundary is defined as the cadastre boundary of Lot 522. The City is required to seek a Licence Amendment for the current license as it allows for up to 30,000 tonnes per annual period which will have to be increased to 100,000 tonnes to allow for the projected maximum waste throughput for the accepted waste types as detailed in Section 6.1.

The City also holds Licence L8403/2009/3 for the WRF, located on Lot 9005 adjacent to the Site. This licence, issued under Part V of the *Environmental Protection Act 1986*, authorises the acceptance and processing of up to 50,000 tonnes of low-hazard green waste per year under Category 67A (Compost manufacturing and soil blending). Processing is limited to offsite shredding, with mulch returned to the site for temporary storage and resale.

Table 2-1: Proposed Prescribed Premises Categories

Category	Category Description	Production or Design Capacity
62	Solid waste depot: premises on which waste is stored, or sorted, pending final disposal or re-use.	500 tonnes or more per year

2.5 Site Investigations

Following the selection of the Site for the Wangara WTS, the City conducted a series of site investigations to determine the Site's key environmental and social attributes and potential constraints/limitations. The investigation reports that were prepared to support this EAMP and the environmental approval application for the Wangara WTS are listed in Table 2-2 and included in Appendix A.

Table 2-2: Site Investigation Reports & Management Plans

Study/Discipline	Author	Status
Odour Impact Assessment	Environmental & Air Quality Consulting Pty Ltd (EAQ)	Complete
Environment Noise Assessment	Talis	Complete
Stormwater and Leachate Management Plan	Talis	Complete
Geotechnical Investigation	WSP	Complete
Vegetation Assessment	Talis	Complete

2.6 Zoning and Surrounding Land Uses

The Site is owned and managed by the City and is located within the Wangara Industrial Area. It is currently zoned 'General Industry', consistent with the zoning of the surrounding lots. Lot 9005, located directly south of the Site, contains the City's existing WRF, a Prescribed Premises situated on Motivation Drive, Wangara. The land north of ocean reef road is classed as 'Rural', 'Rural residential' and 'Parks and recreation'. The respective separation distances are discussed in Section 2.7.

The surrounding land zoning and uses are shown in Figure 4 in Appendix B.

2.7 Separation Distances

The WA Environmental Protection Authority's (EPA's) *Guidance Statement No. 3 – Separation Distances between Industrial and Sensitive Land Uses 2005* (Guidance Statement 3) contains the recommended minimum separation distances between industrial activities, including waste management facilities and sensitive land uses.

Sensitive land uses are defined as those that are sensitive to industrial emissions and include residential developments, schools, hospitals, shopping centres and other public areas and buildings. The recommended minimum separation distances between sensitive land uses and the proposed industry activities for the new WTS is shown in Table 2-3.

Table 2-3: EPA Recommended Separation Distances from the Proposed Industry Activities

Category	Industry	Impacts					Recommended Separation Distance (m)
		Gaseous	Noise	Dust	Odour	Risk	
62	Solid waste depot		✓	✓	✓		200

The closest single residence is approximately 595m north-west of the facility on the opposite side of Ocean Reef Road. Ocean Reef Road is located approximately 325m north of the WTS building. Consequently, the proposed activities meet the recommended separation distances for category 62.

The sensitive receptors are shown in Figure 5 in Appendix B.

The potential impacts of odour, noise and dust from the proposed waste management activities will be managed to appropriate best practice standards and are discussed further within Section 8.

3 Environmental Attributes

The following sections outline the environmental attributes of the Site with relevance to the establishment of the Wangara WTS.

3.1 Climate

The local climate is characterised by hot, dry summers and mild, wet winters, with low to moderate and highly variable annual rainfall, predominantly occurring during the winter months. The average monthly rainfall, the mean maximum and mean minimum temperatures and Pan evaporation from 1994 to 2024 are provided in Table 3-1. This data has been sourced from SILO, which is a database of Australian climate data from 1889 to the present that is hosted by the Queensland Department of Environment and Science (DES). SILO constructs datasets from observational data obtained from BOM, using mathematical interpolation techniques to infill gaps in time series and construct spatial grids.

Table 3-1: Monthly Climate Statistics Summary from 1994 – 2024

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Rainfall (mm)	14	16	17	36	92	139	152	122	76	40	25	8	736
Mean Evaporation (mm)	299	253	217	135	88	63	64	78	105	160	215	276	1,952
Mean Max Temp (°C)	31	32	29	26	22	19	18	19	20	23	26	29	24
Mean Min Temp (°C)	18	18	17	14	11	10	9	9	10	11	14	16	13

The average annual rainfall recorded at Wangara since records began is 736 mm, with the minimum and maximum values ranging from 8 mm and 152 mm per month, respectively. The average annual potential evaporation rate is approximately 1,952 mm, which is nearly three times the average annual rainfall and occurs at higher rates during the warmer, drier months of the year.

The wind direction generally ranges from easterly to northeasterly in the morning (9am), changing direction to south-westerly to westerly in the afternoon (3pm). Winds at the Site are typically moderate in the morning and the afternoon. The wind rose for morning and afternoon winds can be seen in Diagram 4-1. The provided Wind data was recorded at Perth Metro weather station (BOM Station Number: 009225).

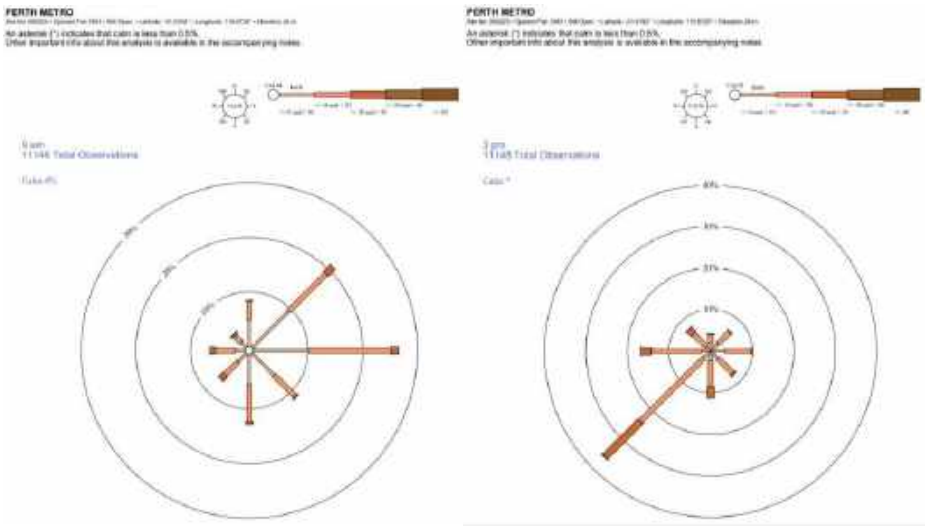

Diagram 4-1: 9am (left) and 3pm (right) Wind Rose for Perth Metro Station

3.2 Topography

The topography at the Site ranges from approximately 68m Australian Height Datum (AHD) in the northwest to 61mAHD in the southeast. Across the majority of the existing hardstand area, ground levels remain relatively consistent between 67mAHD and 68mAHD. However, the southeastern corner of the Site features a notable slope, with a drop from 67mAHD to 61mAHD over a short distance. A hardstand extension is proposed in this area and therefore, earthworks will be required to regrade the southeastern portion of the Site to approximately 67.5mAHD.

The topography for the Site is shown in Figure 6 in Appendix B.

3.3 Geology

According to Landgate, the surface geology of the WTS comprises of the soil profile Qdc: Coastal sand dunes, beach sand, barrier beaches, foredune, beach ridges; calcareous and siliceous, locally shelly and/or cemented (beach rock); locally reworked.

A geotechnical investigation was conducted in February 2025 by WSP. The investigation included cone penetration testing, hand augering, permeability testing and laboratory analysis. The investigation concluded that the Site is underlain by sand derived from the Tamala Limestone formation, which is characterised as fine to coarse-grained, sub-angular to sub-rounded quartz sand with minor feldspar content (WSP, 2025). Based on site conditions, the area has been classified as Class A in accordance with AS 2870-2011, indicating low ground reactivity (WSP, 2025). Infiltration testing supports a design infiltration rate of 5 metres per day for stormwater management systems installed at approximately 1 metre depth, subject to appropriate separation distances from foundations and subsurface structures (WSP, 2025). The geotechnical investigation report is provided in Appendix A.

The surface geology at the Site is shown in Figure 7 in Appendix B.

3.4 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring soils that contain iron sulphide (iron pyrite) minerals that, if disturbed and exposed to air (i.e., by excavation, dewatering or drainage), can be oxidised resulting in release of acidity and potentially causing adverse environmental impacts.

ASS risk mapping considers existing geomorphological, geological and hydrogeological information to develop broad scale mapping for regions of the State for planning purposes. ASS risk mapping data generated by the Department of Water and Environmental Regulation (DWER) shows that the Site is not located in an ASS rated area. The closest ASS risk areas are approximately 756m north of the Site which are mapped as 'high to moderate risk'. Therefore, while it may be unlikely that ASS is present at the Site, any ASS encountered will be managed in accordance with the DWER's guidelines on 'Treatment and management of soil and water in acid sulfate landscapes' (June 2015).

The ASS around the Site is shown in Figure 8 in Appendix B.

3.5 Groundwater

During the geotechnical investigation by WSP (Rfere to Section 3.3) groundwater was not encountered, and regional groundwater mapping indicates the water table is located approximately 28 metres below the surface as detailed in Section 3.5.

Desktop investigations on groundwater levels were carried out using geospatial data from the *Gnangara–Jandakot Depth to Groundwater Contours – 2019 (Maximum)* dataset, published by the DWER and accessed via the Data WA catalogue. This dataset provides modelled estimates of the maximum depth to groundwater, expressed in metres below ground level (mBGL), across the superficial aquifer system in the Perth region.

The groundwater contours confirmed that the groundwater level on the Site ranges from 21mBGL to 28mBGL. Across the majority of the existing hardstand the groundwater level is at 28mAHD which increases to 25 mAHD towards the northeastern site boundary. In the southeastern corner of the Site, south of the existing hardstand, the groundwater level increases to 21mBGL in the area close to the existing drainage sump.

The groundwater contours are shown in Figure 9 in Appendix B.

3.6 Surface Water

There are no permanent natural surface water bodies on the Site. The nearest surface water body is Lake Badgerup, approximately 1,300 m north of the Site while a public drinking water source area is located over 2km wets of the Site as shown in Figure 10 in Appendix B.

Uncontaminated stormwater from the receival building and hardstand areas is managed via the existing SWMS, which includes a pit and pipe system directing flows to the existing drainage sump indicated in Figure 2 in Appendix B. The existing SWMS is detailed in Section 5.2.3.

3.7 Flora, Vegetation and Fauna

Due to historical clearing of the Site, little vegetation remains. Most of the vegetation consists of trees and shrubs located growing along the existing perimeter fence. Talis' ecologist undertook a site visit on 28 May 2025 and concluded that the vegetation along the northern fence line appears planted as the main tree trunks have a linear arrangement. The dominant species are *Adenanthos cygnorum*, *Callistemon* sp. and *Callitris* sp. The vegetation along the southern internal fence line appears to have recolonised the area after previous clearing. The dominant species are a single tree (*Eucalyptus marginata* (Jarrah)), *Acacia saligna* and *Chamelaucium uncinatum* over a suite of annual weeds.

3.7.1 Threatened and Priority Ecological Communities

In WA 'Threatened Ecological Communities' (TECs) are defined by the WA TECs Scientific Advisory Committee and are assigned to one of four categories (Presumed Totally Destroyed, Critically Endangered, Endangered, Vulnerable). While they are not afforded direct statutory protection at a State level (unlike Declared Rare Flora under the Wildlife Conservation Act 1950) their significance is acknowledged through other State environmental approval processes (i.e., Environmental Impact Assessment process pursuant to Part IV of the EP Act 1986). Priority Ecological Communities (PECs) are ecological communities that are under consideration for listing as a TEC, but do not yet meet the criteria. The PEC is placed into a Priority Rating between 1-5 that ranks the PEC based on known occurrences, threats and management of the community.

A desktop assessment of available GIS datasets indicates that the Site does not intersect any mapped TECs or known occurrences of priority or threatened fauna species or their habitat. The Site is located within a developed industrial precinct and has been subject to substantial historical disturbance, reducing the likelihood of supporting significant ecological values. The closest mapped TECs have been recorded in an area 180m north from the Site boundary. The closest Priority Fauna has been recorded over 800m west of the Site while the closest Threatened Fauna has been recorded 500m north of the Site. Accordingly, the proposed works are not expected to impact any TECs or listed fauna.

The location of TEC's and Fauna are shown in Figure 11 in Appendix B.

3.7.2 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared in Environmental Protection (Clearing of Native Vegetation) Regulations 2004 as areas that cover any and/or all of the following conservation significant areas:

- A declared World Heritage property as defined in section 13 of the *Environment Protection and Biodiversity Conservation Act 1999*;
- An area that is included on the Register of the National Estate, because of its natural heritage value under the *Australian Heritage Council Act 2003*;
- A defined wetland and the area within 50 metres of the wetland;
- The area covered by vegetation within 50 metres of rare (threatened) flora, to the extent to which the vegetation is continuous with the vegetation in which the rare (threatened) flora is located;
- The area covered by a TEC;
- A Bush Forever site listed in "Bush Forever" Volumes 1 and 2 (2000), published by the WA Planning Commission, except to the extent to which the site is approved to be developed by the WA Planning Commission;
- The areas covered by the following policies:
- The Environmental Protection (Gnangara Mound Crown Land) Policy 1992 - available from EPA website. This policy has been repealed;
- The Environmental Protection (Western Swamp Tortoise) Policy 2002 - refer to the "EPP 2003 Western Swamp Tortoise Policy Boundary";
- The areas covered by the lakes to which the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 applies. This policy has been repealed;
- Protected wetlands as defined in the Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998. This policy has been repealed; and

- Areas of fringing native vegetation in the policy area as defined in the Environmental Protection (Swan and Canning Rivers) Policy 1998. This policy has been repealed.

The Site is located within a mapped ESA associated with TEC under the Environmental Protection (ESA) Notice 2005. The clearing of vegetation within the Site is discussed in Section 8.1.

The ESA's within and surrounding the Site are shown in Figure 12 in Appendix B.

3.8 Bushfire Prone Areas

The Department of Fire and Emergency Services (DFES) has developed Bushfire Prone Areas mapping to identify land in WA that has the potential to be impacted by bushfires. Additional planning and building requirements may apply to new developments within a Bushfire Prone Area. A further assessment of bushfire risk may also be required to ensure future developments in Bushfire Prone Areas are safer.

As shown in Figure 13 in Appendix B, the Site is not located in in bushfire prone area.

4 Social Attributes

The social attributes of the Site include Native Title, Aboriginal Heritage, European Heritage and Mining Tenements and are discussed in the following sections.

4.1 Native Title

Under Australian Law, Native Title is a form of land title that recognises the unique connections Aboriginal groups have to the land. Native Title exists where Aboriginal people have maintained a traditional connection to their land and waters, since sovereignty, and where acts of government have not removed it.

A search of National Map (nationalmap.gov.au) indicates that Native Title does not exist within the Site and in the surrounding area as shown in Figure 14 in Appendix B.

4.2 Aboriginal Heritage

Aboriginal Heritage sites (registered or not) are protected under the *Aboriginal Heritage Act 1972* (AH Act) and the *Aboriginal Cultural Heritage Act 2021* (ACH Act). An Aboriginal Heritage Site under Section 5 of the AH Act is defined as:

> *(a) any place of importance and significance where persons of Aboriginal descent have, or appear to have, left any object, natural or artificial, used for, or made or adapted for use for, any purpose connected with the traditional cultural life of the Aboriginal people, past or present;*
>
> *(b) any sacred, ritual or ceremonial site, which is of importance and special significance to persons of Aboriginal descent;*
>
> *(c) any place which, in the opinion of the Committee, is or was associated with the Aboriginal people and which is of historical, anthropological, archaeological or ethnographical interest and should be preserved because of its importance and significance to the cultural heritage of the State;*
>
> *(d) any place where objects to which this Act applies are traditionally stored, or to which, under the provisions of this Act, such objects have been taken or removed.*

A search for relevant Aboriginal Heritage sites was conducted using the Department of Aboriginal Affairs (DAA) online Aboriginal Heritage Inquiry System (AHIS). Reported Aboriginal Heritage sites are categorised according to the assessment status of each place under the AH Act, as listed in Table 4-1.

Table 4-1: Aboriginal Heritage Site Assessment Categories

Category	Sub- Category	Assessment Status	Protected under the AH Act
Registered Aboriginal Site	N/A	Site has been assessed as meeting Section 5 of the AH Act	Yes
Other Registered Place	Lodged	Information has been received. Assessment has not been completed to determine if a site meets Section 5 of the AH Act	Yes (temporary)
	Stored Data/Not a Site	Site has been assessed as not meeting Section 5 of the AH Act	No

The results of the search indicated that the Site is not located within an area classified of aboriginal heritage. The closest lodged aboriginal heritage site, Gnangara Site 3 (GN#3) (Place ID 16801), is located over 750m northeast of the Site. The closest registered aboriginal heritage site, Gnangara aboriginal Cemetery (Place ID 1017), is located over 1.7km northeast of the Site.

The location of the aboriginal heritage sites around the Site is shown in Figure 15 in Appendix B.

4.3 European Heritage

To protect cultural heritage places in WA, the Heritage Council maintain a list of places that are either 'Statutory Listings' or 'Other Listings and Surveys'. Statutory Listings are heritage places that can affect or may affect the use and development of land and buildings, and Other Listings and Surveys include heritage places that do not have any effect on the use and development of land and buildings (HC, 2017).

A search of the Government of WA Heritage Council's inHerit online database indicated that there are no European Heritage sites located within the Site. The closest European Heritage site, Artefacts (Place ID 9537), is located over 900m northeast of the Site as shown in Figure 16 in Appendix B.

5 Infrastructure Description and Design

The following section provides a description of the Wangara WTS and its key design elements.

5.1 Waste Transfer Station

The key piece of infrastructure proposed for the Site is the WTS building, which will receive residual and recyclable waste from kerbside collection, along with minor volumes from public place collections. Waste will be temporarily stored onsite prior to transport to the recycling and recovery facilities in the southern suburbs. The purpose of a WTS is to provide waste generators, waste collectors and waste handlers options to dispose of their materials within relatively close proximity to where they are generated. The Wangara WTS will reduce travel requirements for kerbside collection vehicles and decrease the number of vehicle movements to and from the recycling and recovery facilities by consolidating waste for bulk haulage.

5.1.1 Design Principles

The following best practice design principles have been applied to the development of the WTS Facility, adapted to suit its temporary nature:

- Fully enclosed, structurally sound building;
- Suitable access in and out of the building with automatic roller doors;
- Adequate ventilation for maintaining air quality;
- Extraction and exhaust system providing six air changes per hour;
- Limited interaction between waste collection trucks and other vehicles;
- Durable surfaces for the handling of waste;
- Sufficient space for machinery to operate safely and efficiently;
- Designated waste bunkers to maximise the separation of materials into clean waste streams for reuse, recycling or recovery; and
- Leachate collection system.

5.1.2 Entrance and Exit

Vehicles destined for the WTS will enter the Site via the Site entrance on Lot 9005. The vehicles will follow the road to the automated weighbridge prior to proceeding to the WTS. The WTS loader operator will inform the drivers via Ultra High Frequency (UHF) radio which door to use to enter the WTS building.

5.1.3 WTS Building

The eastern half of existing MRF building will be repurposed to a fully functional WTS building. The remaining western half of the building will be demolished as shown in drawing C-101 in Appendix C.

The WTS will be a fully enclosed warehouse building with a footprint of 1,348m^2 (33.7m x 40m). The height will vary but the building will have a minimum clearance height of 7.27m at the eaves. The design height of the facility ensures that sufficient clearance is provided for collection vehicles as they unload onto the tipping floor within the WTS. The preferred model for the WTS is a Flat Floor configuration. The materials will be deposited directly onto the concrete hardstand floor of the WTS and then stored in designated bunkers prior to being loaded by a front-end loader into specialist

Transfer Trailers (B-Double or semi-trailers) for transport off site to the recycling and recovery facilities. The waste will not be mechanically compacted.

The WTS has been designed to a capacity of 20,000 tonnes per annum (tpa) recyclable and 80,000 tpa residual waste, with one-day storage capacity based on one day of operation.

The WTS floor will be constructed with reinforced 125mm thick (minimum) concrete. The floor of the waste storage bunker area has been designed with a fall to allow water to flow towards collection points and divert potential leachate to a containment tank below ground external to the WTS, which will be pumped out by an external contractor as required for collection and off-site treatment. Wash water from the loadout lane will also be directed to the collection sump via a drainage pipe system.

Internally, the WTS building consists of three key areas:

- Unloading/tipping area;
- Waste storage bunker area divided into separate sections for:
  - Residual waste; and
  - Recyclable waste.
- Bulk load out area.

The unloading/tipping area is located in the southern section of the building. The unloading area is accessible via the kerbside collection vehicle entrance at the south of the WTS building. The entrance consists of a reversing apron of 592m^2 external to the building that leads to four access doors. These are roller doors that will minimise fugitive emissions from the WTS. The slope of the reversing apron falls away from the WTS building to prevent the ingress of stormwater.

The kerbside collection vehicles will access the WTS building via one of the four access doors. The kerbside collection vehicles use the reversing apron to make a comparatively simple reverse turn into the WTS. Once completely inside the building, the roller door closes. The kerbside collection vehicle reverses into the unloading area whereupon it end-tips the waste on the concrete floor. Upon completion, the driver returns the kerbside collection vehicle's body to its normal position and drives out the WTS in a straight manner. If required, the drivers can sweep out the kerbside collection vehicle. Once outside, the kerbside collection vehicle turns left and leaves the Site via the new site exit located on Opportunity Street at the northeast of the Site.

The waste storage bunker area is located in the northern section of the building and is bounded on three sides by 3m high bunker walls. The bunker is split into two sides, separating residual waste from recycling.

When necessary, the waste storage bunker area will be washed down. The water will flow towards collection points and divert potential leachate to a containment tank below ground external to the WTS.

After the kerbside collection vehicle tips the waste onto the floor and leaves the unloading area, the front-end loader within the building will transport the waste to the appropriate stockpile within the waste storage bunker area. If the waste is stockpiled, it will typically not remain in the WTS building for long periods of time to mitigate odour and reduce the attraction of vermin.

A roofed loadout lane will be constructed adjoining the WTS building, featuring a 4.5 m x 6 m access door to accommodate Transfer Trailers. These vehicles will reverse into the load-out lane, where a front-end loader will transfer residual waste and recyclables from the storage bunker into the transfer trailer. Once loaded, the vehicle will pull forward, exit the Site via the weighbridge and transport the waste to the designated downstream recycling and recovery facilities.

A summary of the WTS design specifications is shown in Table 5-1.

Table 5-1: WTS Design Specifications

Aspect	Details
Size	1,348m^2
Design Capacity	100,000 tpa
Maximum estimated input	83,000 tpa (2029/30 Financial Year)
Storage	1 day

The WTS conceptual design and structural drawings are provided in Appendix C.

5.1.4 Ventilation System

The ventilation system for the Wangara WTS has been designed to ensure safe and effective air exchange within the enclosed facility, primarily addressing odour and emissions from vehicle movements and airborne dust.

The following key parameters, components, and operational controls have been included in the ventilation system:

- Key design parameters:
  - Target air change rate: 6 air changes per hour (ACH), equivalent to 18,000 L/s (approx. 13.5 L/s/m^2); and
  - Forced air make up: Provided at 75% of the exhaust volume (12,900 L/s), using four wall-mounted supply fans; and
  - Load Out Lane: Minimum required ventilation of 3,000 L/s, covered within the main system capacity.
- System components:
  - 6 roof-mounted exhaust fans (3,000 L/s each), located along the western side of the Load Out Lane, with low-, mid-, and high-level exhaust grilles to address thermal layering of vehicle exhaust;
  - 4 wall-mounted make-up air fans on the eastern wall (above the 3 m high bunker wall), with external/internal grilles; and
  - Optional passive ventilation: 5 wall-mounted weatherproof louvres (1200 x 600 mm) above the northern bunker wall.
- Operational Controls:
  - Timeclock operation;
  - Manual override switch;
  - Carbon dioxide sensor in load out lane to auto-start fans when levels exceed threshold; and
  - Dust mitigation is further supported by the proposed use of mist sprays within the enclosure.

The ventilation layout is provided in drawing C-101 in Appendix C.

5.1.5 WTS Hardstands

Table 5-2 provides summary information of the relevant hardstand areas that comprise the WTS area.

Table 5-2: Summary of Hardstands at the WTS

<table>
<tr><th>Area Description</th><th>Specification Description</th></tr>
<tr><td>WTS</td><td>Roads / high-traffic areas will comprise of sealed asphalt installed in accordance with Institute of Public Works Australia (WA Branch) and Australian Asphalt Pavement Association (WA Branch) Technical Specification, Tender Form and Schedule for Supply and Laying of Asphalt Road Surfacing. The building will be on a concrete hardstand comprising as follows:
<table>
<tr><th>Concrete Element</th><th>F'c (MPA)</th><th>Concrete Class & Grade</th><th>Max Aggregate Size (mm)</th><th>Target Slump (mm)</th></tr>
<tr><td>Footings</td><td>25</td><td>N25</td><td>20</td><td>80</td></tr>
<tr><td>Slab-on-ground all other</td><td>32</td><td>N32</td><td>20</td><td>80</td></tr>
<tr><td>Collumns</td><td>40</td><td>N40</td><td>20</td><td>80</td></tr>
<tr><td>Walls</td><td>40</td><td>N40</td><td>20</td><td>80</td></tr>
</table>
</td></tr>
</table>

5.2 Supporting Infrastructure

5.2.1 Truck Refuelling Station

To assist with operations, the City proposes to construct a refuelling station west of the WTS immediately north of the Site entry. The refuelling station will consist of a 200mm thick (minimum) reinforced concrete hardstand. There will be a 30,000 litre (L) self-contained fuel tank within a concrete bunded area, which vehicles will be able to pull up alongside for refuelling. The floor of the refuelling area, where the vehicles will be parked, will be sloped to contain any spills via a sump.

Table 5-3 provides summary information of the relevant hardstand area at the refuelling station.

Table 5-3: Summary of Hardstand at Refuelling Station

<table>
<tr><th>Area Description</th><th>Specification Description</th></tr>
<tr><td>Refuelling Station</td><td>Roads / high-traffic areas will comprise of sealed asphalt installed in accordance with Institute of Public Works Australia (WA Branch) and Australian Asphalt Pavement Association (WA Branch) Technical Specification, Tender Form and Schedule for Supply and Laying of Asphalt Road Surfacing. The building will be on a concrete hardstand comprising as follows:
<table>
<tr><th>Concrete Element</th><th>F'c (MPA)</th><th>Concrete Class & Grade</th><th>Max Aggregate Size (mm)</th><th>Target Slump (mm)</th></tr>
<tr><td>Footings</td><td>25</td><td>N35</td><td>20</td><td>80</td></tr>
<tr><td>Slab-on-ground all other</td><td>32</td><td>N32</td><td>20</td><td>80</td></tr>
<tr><td>Retaining Walls</td><td>32</td><td>N32</td><td>20</td><td>100</td></tr>
</table>
</td></tr>
</table>

5.2.2 Truck Washdown Bay

To support site operations and maintain vehicle cleanliness, the City proposes to construct a truck washdown bay with a total area of 4m x 12m located in the northern corner of the Site. At the washdown bay, the internal body of kerbside collection vehicles is flushed to remove residual waste or debris. The floor of the washdown bay, where the vehicles will be parked, will be sloped to contain any spills via a sump and 2000L containment tank which is emptied by a licensed external contractor for external treatment and disposal.

5.2.3 Surface Water Management System

The surface water runoff from all Site infrastructure, excluding the washdown bay, will be directed into the Site's existing SWMS to mitigate onsite flooding of the Site.

The existing SWMS consists of:

- An existing pit and pipe network throughout the southern section of the Site to divert run-off to an existing drainage sump located outside the southern boundary of the Site; and
- An existing soak well system to manage runoff Stormwater runoff from hardstands in the northern section of the Site.

As the proposed infrastructure modifications are not expected to significantly impact surface water runoff, the existing SWMS is anticipated to remain suitable without requiring modification.

To prevent the offsite transfer of hydrocarbons or other pollutants, surface water runoff from the refuelling station will be treated by an oil-water-separator and directed into the pit and pipe network.

The layout for the existing SWMS is provided in Appendix C.

Further details regarding the Site's existing SWMS is discussed in the Site's Stormwater and Leachate Management Plan, provided in Appendix D.

5.2.4 Fire Management

The City has received the following general advice from an independent building surveyor for achieving a National Construction Code (NCC) compliant design:

- Automatic fire sprinkler system: Not required under Deemed-to-Satisfy (DtS) provisions. Provisions for a future retrofit will be allowed for in the roof design.
- Fire hydrants: Full internal coverage provided in accordance with *AS 2419.1:2021 – Fire hydrant installations – System design, installation and commissioning and NCC Volume 1, Clause E1.3,* with minimum flow and pressure of 20 L/s at 200 kPa. Existing site water pressure will be verified at detailed design stage.
- Fire hose reels: Installed to achieve full coverage of internal areas in accordance with AS 2441:2005 – Installation of fire hose reels. Locations coordinated with hydrant layout to ensure accessibility.
- Portable fire extinguishers: Positioned to ensure a maximum travel distance of 20 metres from any point within the building, in accordance with *AS 2444:2001 – Portable fire extinguishers and fire blankets – Selection and location and NCC Volume 1, Table E1.6* and NCC Table E1.6.
- Fire detection and alarm system: Existing system will be modified and extended to include smoke, heat and carbon monoxide (CO) detectors. The system will be integrated with the Building Management System (BMS) in accordance with AS 1670.1:2018 – Fire detection, warning, control and intercom systems – System design, installation and commissioning – Fire and NCC Volume 1, Clause E2.2a.
- Emergency lighting and exit signage: Emergency luminaires and illuminated exit signs will be installed throughout the facility in accordance with AS 2293.1:2018 – Emergency escape lighting and exit signs for buildings – System design, installation and operation to ensure visibility in the event of power loss.
- Exit provisions:
    - A minimum of two pedestrian access (PA) doors will be provided at ground level to ensure all egress travel distances comply with NCC Part D1;
    - A third egress route via an external stair or ladder will be provided where required for access to elevated or roof-mounted areas; and
    - All exits will be clearly marked, unobstructed, and equipped with compliant hardware.

In the event of a fire, fire water runoff will be directed into the loadout lane which is the lowest point of the Site and acts as a sump. The accumulated fire wash water runoff will subsequently remove from site by a licensed liquid waste contractor. The loadout lane has a capacity of approximately 340 cubic meters (m^3).

5.2.5 All Other Supporting Infrastructure

Other infrastructure required to support the operation and environmental management of the Site include the provision of access roads, services areas, a perimeter fence, ablutions, external lighting and security cameras/CCTV monitoring.

5.3 Project Timeline

The current estimated project timeline is shown in Table 5-4 based on the assumption that the DWER can complete the works approval assessment within the current target timeframe of 80 days. The

timeframe shown in Table 5-4 includes the environmental approvals, procurement, and construction phases for the new WTS.

Table 5-4: Project Timeline

Task	Duration	Start	End
Works Approval Assessment	3 months	May 2025	August 2023
Detailed Design	6 months	January 2025	June 2023
Procurement (Advertisement, Evaluation, Award and Contractor Mobilisation)	2 months	June 2025	August 2025
Construction	6 months	November 2025	February 2026

5.4 Time Limited Operations

The City requests that the DWER grant approval for time limited operations for the new WTS until such time an amended licence is granted. It is understood that the recommended maximum period for time limited operations is 180 days and therefore the City wish to seek this timeframe to mitigate any potential risks associated with delays during the assessment stage for the amended Licence application. This request has been reflected within Part 4 of the DWER Application form. As it is the City's aim to establish the new WTS as soon as possible, the time limited operations period will ensure the Site is operational as soon as it is constructed, in accordance with the Works Approval conditions and detailed designs.

6 Operational Aspects

The following sections outline the operational aspects of the Wangara WTS at the Site, including estimated material volumes, waste acceptance, equipment and machinery, materials transport, staffing and operational hours.

6.1 Estimated Material Volumes

Each area of the new WTS has been designed to adequately handle the projected/estimated throughputs based on the City's historical data. Table 6-1 sets out the estimated material volumes for the Wangara WTS which add up to a total of approximately 83,000 tpa.

Table 6-1: Estimated Waste Volumes

Cat No.	Facility	Waste Types Accepted	Waste Codes (where relevant)	Maximum Estimated Throughput (tonnes per annum)	
62	WTS	General waste	N/A	Recyclable	Residual
				18,000	65,000

6.2 Equipment and Machinery

A front-end loader will be used to carry out Site operations.

6.3 Staffing

Staffing numbers required for the new WTS will be determined by the City. It is anticipated that a minimum of four (No. 4) staff members will be required. The anticipated management structure for the Site is shown in Diagram 6-1.

Diagram 6-1: Management Structure and Responsibilities

All staff will be suitably qualified and/or trained to undertake their relevant roles. Onsite training will include health, safety and environmental management.

6.4 Operational Hours

The proposed hours for Site operations will be:

- Monday to Friday: 6am to 6pm;
- Saturday, 6am – 6pm (as required);
- Sunday, closed; and
- Public holidays 6am to 6pm (Excluding Christmas Day, Good Friday and New Years Day).

7 Benefits

There are a number of benefits associated with the establishment of the new WTS, which includes alignment with the *Waste Avoidance and Resource Recovery Strategy 2030* (WARR Strategy), resource recovery, reducing environmental impacts, providing the community with additional waste services, increasing operational efficiency and job opportunities. Each of these benefits is discussed further in the following subsections.

7.1 Co-Location of Waste Services

The Wangara WTS will benefit from the co-location of existing waste operations on the adjacent Lot 9005, which accommodates the WRF and the Site's existing weighbridge and access road. This proximity supports operational efficiency through shared infrastructure and streamlined vehicle movements. Importantly, the Site is already recognised as a waste facility under existing DWER licensing, with a long-established history of waste-related use, including its former function as an MRF. The continuation of waste management activities in this location builds on existing land use, reduces the need for greenfield development and aligns with community and regulatory expectations for industrial waste operations in the area.

7.2 Centralised Collection Point

WTSs are utilised to aggregate waste materials within close proximity to their sources of generation to allow for greater efficiencies in the transportation of these materials to treatment and disposal facilities, which are mainly located on the outer fringes of metropolitan areas. The Site is centrally located within the population dense region of the City and easily accessible from major roads, including Ocean Reef Road. This will also for consolidation of recycling and residual waste for efficient haulage to the MRF in Canning Vale and the Waste to Energy facilities in Kwinana and Eat Rockingham respectively.

7.3 Reduced Haulage Costs and Emissions

A reduction in the number of vehicles transporting waste materials, along with reduced travel time and distances, results in a net reduction in carbon emissions. Waste can be transferred from small vehicles, such as kerbside collection vehicles which are designed to collect recycling and waste materials and not to transport waste significant distances, to large Transfer Trailers which are designed for the purpose of transporting large volumes of materials great distances. Therefore, by utilising the WTS, waste materials can be collected from numerous small vehicles and transferred into specialist high volume Transfer Trailers. This reduces the number of vehicles carrying waste great distances to the recycling and recovery facilities in Canning Vale and either East Rockingham and Kwinana respectively, as well as returning significant costs saving for the various waste generators including the City and its rate payers.

7.4 Strategic Interim Solution

The Wangara WTS provides a strategically located interim solution to maintain continuity of waste transfer services between the closure of Tamala Park Landfill and the commissioning of the NRRP. With Tamala Park expected to reach capacity within the near future and the NRRP WTS not anticipated to be operational until approximately 2030, the Wangara WTS fills a critical service gap. Its existing infrastructure, established access, and central location within the population dense part of the City make it an ideal short- to medium-term facility for consolidating residual and recyclable waste for bulk

haulage. This ensures uninterrupted service delivery and cost-effective transition to the long-term infrastructure planned at the NRRP.

7.5 Job Opportunities

Jobs will be created both directly and indirectly through the construction and operation of the WTS. Skills and services required will include civil contracting, material handling, administration, accounting, equipment and earthworks suppliers and operators. New and existing suppliers in the area will have the opportunity to tender for contracts to assist with the construction as well as the operation and maintenance aspects of the facility.

Furthermore, the Site is expected to employ up to four full-time staff at a minimum once operational. In addition, a number of speciality Transfer Trailer drivers are expected to be contracted by the City for transport of the waste material from the WTS to the recycling and recovery facilities.

8 Environmental Aspects and Management

The construction and operation of the Wangara WTS at the Site have the potential to result in or cause impacts to the following:

- Vegetation, Flora and Fauna;
- Air Emissions:
  - Odour;
  - Noise;
  - Dust;
- Stormwater and Leachate;
- Traffic;
- Weeds;
- Vermin and Feral Animals;
- Fire;
- Litter;
- Security; and
- Vehicle Emissions.

To ensure the potential environmental impacts identified are avoided and/or minimised, the City will implement a variety of engineering and management measures, which are described in the following sub-sections. In addition, it is important to note that the City is committed to achieving best practice outcomes at the facility to mitigate potential environmental and social risks.

8.1 Vegetation, Flora and Fauna

Minor vegetation clearing will be required along the northern boundary and southern portion of the Site to accommodate the installation of a truck washdown bay, a truck reversing apron, and an additional site exit. The total clearing footprint is minimal, remains well below five hectares, and is confined to a previously disturbed industrial area. A total of 0.07 hectares along the northern boundary will be cleared, comprising approximately 0.05 hectares for the hardstand extension associated with the washdown bay and 0.02 hectares for the new site exit. The proposed clearing area for the reversing apron in the south comprises approximately 0.074 hectares.

Talis' ecologist undertook a site visit on 28 May 2025 to assess the ecological significance of the vegetation within these areas. The findings are summarised below:

- Northern Boundary: The total area comprised of vegetation, consisting of 13 to 15 small trees and large shrubs. The vegetation appears planted, with linear trunk arrangements, and is dominated by Adenanthos cygnorum, Callistemon spp., and Callitris spp.
- Southwestern Corner: The proposed clearing area comprises approximately 0.074 hectares of sparse regrowth vegetation is present, likely recolonised after historical clearing. Dominant species include a single Eucalyptus marginata (Jarrah), Acacia saligna, Chamelaucium uncinatum, and a suite of annual weeds.

Although the Site is located within a mapped ESA associated with a TEC, the vegetation in both areas was assessed as not representative of native vegetation as defined under the Environmental Protection Act 1986 and the Clearing of Native Vegetation Regulations 2004. The species composition and structure do not resemble any known conservation-listed ecological communities, and the areas are either planted or highly disturbed regrowth following prior clearing around 2009.

Accordingly, a clearing permit is not expected to be required, as the vegetation does not meet the definition of native vegetation under the Act and Regulations. Nonetheless, the City will retain the vegetation assessment as evidence and may seek confirmation from DWER if required.

The proposed clearing is limited to what is operationally necessary and includes infrastructure that delivers environmental benefits, such as the truck washdown bay, which will capture and manage wash water and sediment, preventing contaminants from entering surrounding areas and supporting site water quality objectives.

Given the limited extent and disturbed nature of the vegetation, any ecological impacts are expected to be low. Nonetheless, the City have and will adopt the following management measures to minimise environmental impact during clearing:

- Have avoided and minimised vegetation removal as far as practicable;
- Undertaken a pre-clearance assessment to identify any significant species or habitat;
- Implement weed control to prevent spread of introduced species; and
- Ensure all vegetation management aligns with relevant legislation and approvals.

A clearing permit under Part V of the Environmental Protection Act 1986 will be obtained if required. Supporting materials, including site layout plans and ESA mapping, are provided in Figures 2 and 11 in Appendix B in this submission to demonstrate the limited extent and operational necessity of the proposed clearing.

The proposed clearing areas are outlined in Figure 3 in Appendix B.

8.2 Air Emissions

8.2.1 Odour

Odour emissions from the Wangara WTS are expected to be minimal due to the waste types accepted and the operational controls in place. The facility will accept residual waste and co-mingled recyclables from kerbside collections, which are not expected to generate significant odour when managed appropriately.

All waste will be unloaded and temporarily stored within a fully enclosed receival building equipped with a mechanical ventilation system. This system extracts air through high-level discharge vents, preventing fugitive emissions. Additionally, residual and recyclable waste will be transferred off-site daily, reducing the likelihood of odour accumulation within the building.

An Odour Impact Assessment (OIA) was undertaken by Environmental & Air Quality Consulting Pty Ltd (EAQ) to evaluate potential odour emissions from the Wangara WTS. The assessment included detailed analysis of emission sources, dispersion pathways, meteorological trends, and risk levels associated with offsite impacts. The findings, detailed in Appendix A, indicate that odour impacts are expected to be mid-level onsite, low-level on a local offsite scale, and minimal at a broader scale. The risk of odour emissions reaching nearby residential receptors was assessed as low, with occurrences considered rare and limited to exceptional circumstances. The likelihood of the risk occurring is considered "Unlikely", where the risk event will probably not occur in most circumstances. Based on this assessment of the risk criteria, under an exceptional event where uncontrolled odours are released to the environment, the future risk is considered to be Medium. The assessment concluded that the proposed design and operational measures, coupled with the separation distances to sensitive receptors, provide effective mitigation of potential odour impacts. On this basis the Risk Treatment would therefore be:

- Acceptability – "Acceptable, generally subject to regulatory controls"

- Treatment – "Risk event is tolerable. We may apply some regulatory controls, including outcome-based conditions where practical and appropriate".

To minimise the generation of odours the following management measurements will be implemented:

- As nominated in Section 2 of the OIA:
  - The WTS will have an emission extraction system (Ventilation System) as detailed in Section 5.1.4 to control odour emissions and overcome fugitive odour losses;
  - All incoming waste collection vehicles will remain covered during transport;
  - Waste will only be accepted if it complies with licence conditions;
  - Residual and recyclable wastes will be stockpiled separately on the WTS floor;
  - Highly odorous wastes (e.g. food waste during holiday periods) will be prioritised for immediate removal to Transfer Trailers;
  - A clean floor policy will be implemented, with no putrescible waste retained overnight or on weekends;
  - The WTS floor will be washed down as needed to remove leachate and maintain hygiene;
  - Liquid waste residues within the WTS will be managed via leachate collection points and containment in a storage tank as detailed in Section 8.3; and
  - Waste loading will cease if the extraction system is not operational, with corrective actions (e.g. equipment replacement, manual fan control) implemented as required.
- Further management measures include:
  - A complaints register will be maintained to ensure that the community can express their comments or concerns regarding the operations of the Site; and
  - Odour levels across the Site will be continuously monitored by staff and action taken, if required.

It is anticipated that these odour management measures will enable the City to appropriately manage potential odour impacts onsite and offsite. The OIA is provided in Appendix A.

8.2.2 Noise

Noise emissions will be generated from the construction and operation of the new WTS. The majority of these emissions will be generated from vehicle movements, material handling activities and fixed infrastructure such as ventilation fan.

An Environmental Noise Impact Assessment (ENIA) was undertaken by Talis to determine if the new WTS will comply with the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations). The ENIA, provided in Appendix A, considered all concurrent activities under worst-case meteorological conditions during both day and night-time periods. The model accounted for truck and vehicle movements, the front-end loader operating within the transfer building, and continuous operation of the extraction fans.

The results of the modelling confirmed the following:

- Predicted noise levels at all nearby noise sensitive receivers comply with the assigned levels under both day and night-time conditions; and
- Predicted noise levels exceed the assigned levels at the Site's industry boundary due to heavy vehicle movements.

To manage noise emissions and ensure ongoing compliance, the following measures will be implemented:

- As nominated in the ENIA:
  - A 2.4 m high solid Colorbond fence will be installed to reduce emissions to adjacent industrial premises;
  - All site vehicles and mobile equipment will be fitted with broadband reversing alarms;
  - All equipment will be maintained in accordance with manufacturer specifications to avoid excessive noise emissions; and
  - These controls are expected to ensure that noise emissions from the facility remain within acceptable levels and do not cause adverse impacts on surrounding sensitive land uses.
- Further management measures include:
  - Vehicle movements within the Site will be limited to 10 km/h, with speed limits clearly signposted and reinforced through the site induction process.

As a result, there are no limitations to operating times during nighttime, daytime hours including public holidays. The operating hours, as detailed in Section 6.4, are compliant by the ENIA.

It is anticipated that these noise management measures will enable the City to appropriately manage noise emissions onsite and offsite and ensure compliance with the Noise Regulations.

The ENIA is provided in Appendix A.

8.2.3 Dust

Activities at the Site have the potential to generate dust, with the possibility of impacts to nearby vegetation, reducing amenity and health impacts. Dust may also be generated through clearing, construction and material processing activities. The key activities that will generate dust include the removal of vegetation and topsoil during site clearing, earthworks during construction and the movement of vehicles and machinery throughout the Site. During operation, the transport, material handling and processing of materials may also generate dust.

Due to the location of the Site, the potential for impacts offsite are considered low, with dust impacts restricted to surrounding industrial area and site staff. While the Site is located within the Wangara Industrial Area, where surrounding land uses are also industrial in nature, it remains important to manage potential off-site impacts to avoid nuisance and maintain compliance with relevant environmental standards. Dust emissions have the potential to affect nearby industrial premises, reduce local amenity, and impact vegetation within or adjacent to the Site.

To manage potential impacts arising from dust, a number of factors were considered including separation distances, clearing, construction, operational, waste types accepted and treatment processes. A summary of the key management measures to be implemented include:

- Minimisation of disturbed surfaces during construction;
- Use of water carts or sprinklers for dust suppression where required during construction;
- Vehicles to maintain a maximum speed of 10 km/hr unless otherwise signed;
- All roads are sealed to mitigate dust generated through the movement of vehicles in and out of the facility;
- Limiting vehicle speeds on site;

- All waste loading, unloading and storage will be confined to within the enclosed WTS building; and
- Regular sweeping or cleaning of hardstand areas and vehicle movement paths.

It is anticipated that the implementation of these management measures will be sufficient to manage potential impacts from dust at the Site. Given the relatively small scale of earthworks and the short residence time of dry waste materials, and the enclosed nature of the WTS building, the risk of off-site dust impacts is considered to be low, particularly within the context of an industrial precinct.

8.3 Stormwater and Leachate

Surface water run-off will be generated as a result of precipitation and storm events, which has the potential to cause flooding within the Site and result in damage to infrastructure. As all waste handling and storage activities will occur within the fully enclosed WTS building, the likelihood of surface water becoming contaminated through contact with waste is minimal.

However, leachate may be generated within the WTS building and load out lane during routine floor cleaning, which is carried out to minimise odour emissions and maintain hygiene standards. Any water that comes into contact with waste materials or waste residues within the building is classified as leachate and will be managed accordingly.

If not appropriately managed, leachate could be released into the surrounding environment. This may impact vegetation outside of the facility and cause contamination of groundwater. Uncontrolled release of contaminated leachate could result in adverse impacts to downstream ecosystems and users of surface water resources.

The City will therefore implement stormwater and leachate management measures to ensure appropriate treatment and/or discharge, where relevant. It should be noted the exact specifications will be determined at the detailed design stage of the Project and therefore these measures are the minimum requirements. The proposed stormwater and leachate management measures include:

- A fully enclosed WTS building to minimise exposure of waste to rainfall;
- The floors of the WTS building have been designed with a fall to allow water to flow towards collection points and divert potential leachate to a containment tank located below ground and external to the structure. The leachate will be removed from site by a licensed contractor for offsite treatment and disposal;
- Stormwater runoff from uncontaminated hardstands of the Site will be managed by the Sites existing SWMS which includes:
    - An existing drainage system throughout the southern section of the Site to divert run-off to an existing drainage sump located outside the southern boundary of the Site;
    - An existing soak well system to manage runoff Stormwater runoff from hardstands in the northern section of the Site;
- The external perimeter of all buildings will be sloped away from doorways and openings to prevent ingress of surface water during rainfall events;
- All stormwater engineering features will be inspected regularly, and maintenance works scheduled appropriately;
- The road surfaces across the Site will be delineated with kerbs and will utilise suitable slope gradients to guide the flow of surface water to the Site's SWMS;
- Weather will be monitored on a daily basis; and

- Implementation of a SWLMP, provided in Appendix D;

These management measures will allow the City to effectively manage stormwater and leachate at the Site. Detailed designs for the Site's stormwater and leachate management systems will be undertaken at a later date by suitably qualified engineers to ensure the final management measures are adequate for the Site.

8.4 Traffic

While traffic volumes are expected to increase in comparison to the former MRF operations, the number of daily vehicle movements remain low. Given the site's location within an industrial precinct, the incorporation of a one-way system and separate traffic streams and the addition of a new site exit to distribute flow, the development is not expected to materially impact the performance of the external road network. As such, a formal Traffic Impact Assessment is not considered necessary by the City of Wanneroo's planning and engineering departments.

Onsite traffic movements have the potential to generate noise, dust and create an occupational health and safety risk to staff. The following traffic movements are anticipated to occur onsite:

- Kerbside collection vehicles and Transfer Trailers accessing the Site via the main entrance;
- Kerbside collection vehicles proceeding to the weighbridge while Transfer Trailers proceeding to the load out lane;
- Kerbside collection vehicles proceed to dispose of recycling and residual waste in designated bunker areas within the WTS building as directed by loader operator via UHF radio comms;
- Front-end loaders transferring waste from receival areas to the storage bunker before loading it into the Transfer Trailers;
- Kerbside collection vehicles exit via the new exit onto Opportunity Street;
- Transfer Trailers proceed through the weighbridge and exit via the existing exit onto Motivation drive;
- Staff and light vehicles using internal roads and parking areas for operational access; and
- Occasional contractor or maintenance vehicle access during routine servicing or construction periods.

The flow through of traffic has been considered during the development of the Site designs to ensure any potential traffic issues are minimised as much as practicable. To minimise any potential impacts of traffic movements at the Site, the following management measures will be implemented:

- One way traffic flow for all vehicles to minimise vehicle conflicts on site;
- Signage providing directions, traffic control measures and safety instructions will be established and maintained at appropriate locations around the Site;
- Vehicles will be restricted to a maximum speed limit of 10km/hour;
- Employees and contractors shall wear high visibility and reflective clothing when working in areas where vehicle movement occurs;
- All vehicles will be maintained in good working condition and drivers instructed to use conservative driving techniques; and
- All employees and contractors will be inducted with the Site's Occupational Health and Safety (OHS) and traffic management procedures.

Through the adoption of these management measures, all potential impacts associated with traffic movements on and surrounding the Site will be controlled to appropriate standards.

Swept paths have been provided in drawing C-115 in Appendix C, illustrating vehicle movements on site.

8.5 Weeds

It is noted that the following key activities have the potential to spread weeds at the Site:

- Construction and establishment of any new infrastructure; and
- Fauna activity within and around the Site.

Routine vehicle and truck movements are confined to sealed hardstand areas, effectively eliminating the risk of weed spread via vehicle movement within the Site.

As a result, the City will implement a variety of environmental management measures to manage, mitigate and control the potential impacts of weeds at the Site; including the following:

- Awareness of declared/noxious weed management through the Site induction. The Site induction will include information pertaining to weeds of concern occurring at the Site, as well as the hygiene and reporting requirements associated with weed management;
- Vehicles entering/exiting the Site will be free of soil, mud, and vegetative material;
- Vehicles to adhere to established roads and tracks to prevent the spread of weeds within the Site;
- Regular monitoring of weeds across the Site to be undertaken by all Site staff; and
- Regular weed management methods to be undertaken via manual removal and/or or by chemical application prior to flowering periods by a qualified third-party contractor.

It is anticipated that these weed management measures will enable the City to appropriately manage potential weed impacts onsite and offsite.

8.6 Vermin and Feral Animals

Vermin such as rats, mice, birds and insects may be attracted to waste management facilities particularly those with poor housekeeping practices. If uncontrolled, vermin can present a health risk to staff and surrounding land users. Therefore, the City proposes to implement the following management measures to mitigate, minimise, and control the attraction of vermin and feral animals at the Site:

- The site will be confined by a proposed colorbond fence (2.4m), as detailed in Section 8.2.2, which surrounds the majority of the Site. The existing perimeter fence measuring 1.8 meters in height will only remain in the southern section of the Site. The fences will be regularly monitored and maintained to ensure ongoing security and integrity;
- All waste loads are to be covered during transport to and from the Site;
- Ensuring that wildlife and feral or vermin species have limited opportunities to access food and water at the Site;
- While the secure nature of the Site makes feral animal intrusion unlikely, site staff will remain observant for any signs of feral cats, foxes or wild dogs during daily operations and manage them as necessary;

- Any suspected and/or known shelters or breeding grounds for vermin on the Site will be eliminated;
- Should any feral animal or vermin issues be experienced, professional services will be utilised to implement appropriate control/eradication methods;
- The roller doors into the WTS will only be open as required; and
- Regular litter collections onsite and immediate surrounds as required.

Through the adoption of these proposed management measures, any potential attraction by vermin and feral animals associated with Site operations are anticipated to be adequately managed.

8.7 Fire

Fires may occur at waste management facilities through faulty equipment, machinery, waste acceptance, landfill fires or arson. Fire may cause damage to infrastructure and pose a threat to staff and customers.

As detailed in Section 5.2.4 the following fire management measures will be implemented:

- Fire hydrants and hose reels to be installed throughout the building in accordance with relevant standards;
- Portable fire extinguishers to be provided to ensure adequate coverage;
- Existing fire detection system to be upgraded to include smoke, heat and CO detectors and will be integrated with the Building Management System;
- Emergency lighting and exit signage to be installed throughout the facility;
- At least two ground-level exits to be provided, with a third route (e.g. stair or ladder) where required;
- All exits to be clearly marked and accessible.

It is anticipated that these management measures will enable the City to appropriately manage potential fire risks at the Site.

8.8 Litter

Litter may be generated as a result of waste acceptance and handling, particularly during windy conditions. As well as reducing visual amenity and causing health problems to wildlife, litter can attract vermin to the Site which may affect surrounding land uses if these vermin migrate offsite.

To ensure that the generation of litter is minimised and appropriately managed at the Site, the following management measures will be implemented:

- Waste loads entering and leaving the Site will be covered to prevent uncontrolled release of litter;
- Recycling and residual waste will only be stored within the enclosed WTS building ;
- The perimeter fence minimises any litter escaping;
- The perimeter fence will be inspected regularly, and any maintenance works scheduled accordingly; and
- Any litter generated around and immediately outside the Site will be collected on a regular basis.

These management measures will enable the City to appropriately manage any litter generated at the Site.

8.9 Security

A breach of security may result in injury to persons or damage to infrastructure. To minimise potential security breaches, the following management measures will be implemented:

- Appropriate signage will be installed at the Site entrance;
- Lighting and CCTV will be installed in relevant areas including at the main Site access road and key buildings;
- A perimeter fence will be established around the Site;
- The perimeter fence will be monitored and maintained on a regular basis; and
- All access gates and buildings will be locked securely outside of operational hours.

Through the adoption of these management measures all potential security impacts will be appropriately controlled.

8.10 Vehicle Emissions

The operation of diesel-powered kerbside collection vehicles within the WTS will generate a range of emissions predominantly CO, carbon dioxide (CO_2), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2). Diesel emissions will also generate a mixture of other irritant gases, particulate matter (PM) and heat. These emissions can impact on amenity and present health risks. To manage the occupational, health and safety (OHS) of personnel, there are range of management measures that will be employed, including the following:

- A ventilation system will be installed within the WTS building and the load out lane including roof-mounted exhaust fans, wall-mounted make-up air fans, and optional passive ventilation through weatherproof louvres installed above the northern bunker wall as detailed in Section 5.1.4;
- All mobile machinery operating within each building will have emission standard engines, particulate filters, catalytic converters and/or wet scrubbers;
- Emissions will also be reduced through minimising idling times;
- Regular maintenance of mobile plant and vehicles; and
- Low emission fuels and sulphur lubricants will be used as much as practicable.

It is anticipated that these management measures for vehicle emissions will enable the City to appropriately manage its potential impacts.

8.11 Dangerous Goods and Hazardous Materials

To manage potential risks arising from dangerous goods and hazardous materials, several key aspects have been considered including operational activities, equipment, plant, machinery and vehicles and relevant guidelines and standards.

Fuels and other hydrocarbons will be used onsite through the operation of equipment, plant, machinery and vehicles.

Dangerous goods will be handled and stored in accordance with the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007* (DGS Regulations 2017) and 'Australian Standard 1940:2017 – The storage and handling of flammable and combustible liquids' (AS 1940-2017) to ensure the risks associated within these materials are mitigated. The quantity of chemicals and fuels stored on the Site will be kept to a minimum and stored according to manufacturer specifications. Appropriate bunding with sufficient capacity will be installed for liquid storage areas. All fuelling of machinery and vehicles will be undertaken in the bunded refuelling bay.

All staff and visitors to the Site will be required to wear appropriate PPE when handling dangerous goods and hazardous materials. Safety Data Sheets (SDS) will also be required to be reviewed for any chemicals used or stored on the Site. Up to date records of all the SDS will be kept onsite.

To mitigate potential electrical and mechanical faults that may result in hydrocarbon spills, all machinery, plant and vehicles will undergo regular maintenance. In the event that a hydrocarbon spill occurs, appropriately sized hydrocarbon spill kits will be available in suitable locations around the Site, particularly near the refuelling bay.

To ensure all personnel are aware of the appropriate handling, storage or disposal of dangerous goods and hazardous materials, Site inductions and appropriate training will be provided to all relevant staff members.

To manage the risk of fires caused from dangerous goods, fire suppression equipment will be readily available and located in appropriate areas around the Site. Further fire management measures are outlined in Section 8.7.

In summary, the key management measures relating to dangerous goods and hazardous materials that will be implemented at the Site include:

- Site staff will be trained in the safe handling of hydrocarbons and hazardous materials according to the DGS Regulations 2017 and AS 1940-2017;
- Storage of hazardous materials at the facility will be in accordance with AS 1940-2017;
- The materials storage area will be constructed with appropriate bunding with sufficient capacity to capture any spills;
- The quantity of chemicals and fuels stored on the Site will be monitored and kept to a minimum;
- Site staff will be trained in the appropriate use of PPE;
- Site staff will use Safety Data Sheets for recording information on dangerous goods and hazardous materials and will maintain up to date SDS;
- Regular maintenance and inspections of equipment, plant, machinery and vehicles will be undertaken at the Site;
- All fuelling of machinery and vehicles will be undertaken in the designated bunded fuelling bay;
- Suitably sized hydrocarbon spill kits will be located in suitable areas around the Site; and
- Fire suppression equipment will be located in relevant areas across the Site.

These management measures will enable the City to appropriately manage risks associated with the storage and use of dangerous goods and hazardous materials at the Site.

8.12 Summary of Proposed Management Measures

A summary of the proposed management measures to be implemented at the Site is shown in Table 8-1.

Table 8-1: Summary of Proposed Management Measures

Aspect	Management Measures
Vegetation, Flora and Fauna	• Vegetation on Site has been assessed by • Have avoided and minimised vegetation removal as far as practicable; • Undertaken a pre-clearance assessment to identify any significant species or habitat; • Implement weed control to prevent spread of introduced species; and • Ensure all vegetation management aligns with relevant legislation and approvals.
Odour	• The WTS will have an emission extraction system (Ventilation System) as detailed in Section 5.1.4 to control odour emissions and overcome fugitive odour losses; • All incoming waste collection vehicles will remain covered during transport; • Waste will only be accepted if it complies with licence conditions; • Residual and recyclable wastes will be stockpiled separately on the WTS floor; • Highly odorous wastes (e.g. food waste during holiday periods) will be prioritised for immediate removal to Transfer Trailers; • A clean floor policy will be implemented, with no putrescible waste retained overnight or on weekends; • The WTS floor will be washed down as needed to remove leachate and maintain hygiene; • Liquid waste residues within the WTS will be managed via leachate collection points and containment in a storage tank as detailed in Section 8.3; • Waste loading will cease if the extraction system is not operational, with corrective actions (e.g. equipment replacement, manual fan control) implemented as required. • A complaints register will be maintained to ensure that the community can express their comments or concerns regarding the operations of the Site; and • Odour levels across the Site will be continuously monitored by staff and action taken, if required.
Noise	• A 2.4 m high solid Colorbond fence will be installed around the majority of the Site to reduce emissions to adjacent industrial premises; • All site vehicles and mobile equipment will be fitted with broadband reversing alarms; • All equipment will be maintained in accordance with manufacturer specifications to avoid excessive noise emissions; and • These controls are expected to ensure that noise emissions from the facility remain within acceptable levels and do not cause adverse impacts on surrounding sensitive land uses. • Vehicle movements within the Site will be limited to 10 km/h, with speed limits clearly signposted and reinforced through the site induction process.

Dust	• Minimisation of disturbed surfaces during construction; • Use of water carts or sprinklers for dust suppression where required during construction; • Vehicles to maintain a maximum speed of 10 km/hr unless otherwise signed; • All roads are sealed to mitigate dust generated through the movement of vehicles in and out of the facility; • Limiting vehicle speeds on site; • All waste loading, unloading and storage will be confined to within the enclosed WTS building; and • Regular sweeping or cleaning of hardstand areas and vehicle movement paths.

Stormwater & Leachate	• A fully enclosed WTS building to minimise exposure of waste to rainfall;
	• The floors of the WTS building have been designed with a fall to allow water to flow towards collection points and divert potential leachate to a containment tank located below ground and external to the structure. The leachate will be removed from site by a licensed contractor for offsite treatment and disposal;
	• Stormwater runoff from uncontaminated hardstands of the Site will be managed by the Sites existing SWMS which includes:
	  ○ An existing drainage system throughout the southern section of the Site to divert run-off to an existing drainage sump located outside the southern boundary of the Site;
	  ○ An existing soak well system to manage runoff Stormwater runoff from hardstands in the northern section of the Site;
	• The external perimeter of all buildings will be sloped away from doorways and openings to prevent ingress of surface water during rainfall events;
	• All stormwater engineering features will be inspected regularly, and maintenance works scheduled appropriately;
	• The road surfaces across the Site will be delineated with kerbs and will utilise suitable slope gradients to guide the flow of surface water to the Site's SWMS;
	• Weather will be monitored on a daily basis; and
	• Implementation of a Stormwater and Leachate Management Plan (SWLMP), provided in Appendix D;

Traffic	• One way traffic flow for all vehicles to minimise vehicle conflicts on site; • Signage providing directions, traffic control measures and safety instructions will be established and maintained at appropriate locations around the Site; • Vehicles will be restricted to a maximum speed limit of 10km/hour; • Employees and contractors shall wear high visibility and reflective clothing when working in areas where vehicle movement occurs; • All vehicles will be maintained in good working condition and drivers instructed to use conservative driving techniques; and • All employees and contractors will be inducted with the Site's Occupational Health and Safety (OHS) and traffic management procedures.
Weeds	• Awareness of declared/noxious weed management through the Site induction. The Site induction will include information pertaining to weeds of concern occurring at the Site, as well as the hygiene and reporting requirements associated with weed management; • Vehicles entering/exiting the Site will be free of soil, mud, and vegetative material;

	• Vehicles to adhere to established roads and tracks to prevent the spread of weeds within the Site; • Regular monitoring of weeds across the Site to be undertaken by all Site staff; and • Regular weed management methods to be undertaken via manual removal and/or or by chemical application prior to flowering periods by a qualified third-party contractor.
Vermin & Feral Animals	• The site will be confined by a proposed colorbond fence (2.4m), as detailed in Section 8.2.2, which surrounds the majority of the Site. The existing perimeter fence measuring 1.8m in height will only remain in the southern section of the Site. The fences will be regularly monitored and maintained to ensure ongoing security and integrity; • All waste loads are to be covered during transport to and from the Site; • Ensuring that wildlife and feral or vermin species have limited opportunities to access food and water at the Site; • While the secure nature of the Site makes feral animal intrusion unlikely, site staff will remain observant for any signs of feral cats, foxes or wild dogs during daily operations and manage them as necessary; • Any suspected and/or known shelters or breeding grounds for vermin on the Site will be eliminated; • Should any feral animal or vermin issues be experienced, professional services will be utilised to implement appropriate control/eradication methods; • The roller doors into the WTS will only be open as required; and • Regular litter collections onsite and immediate surrounds as required.
Fire	• Fire hydrants and hose reels to be installed throughout the building in accordance with relevant standards; • Portable fire extinguishers to be provided to ensure adequate coverage; • Existing fire detection system to be upgraded to include smoke, heat and CO detectors and will be integrated with the Building Management System; • Emergency lighting and exit signage to be installed throughout the facility; • At least two ground-level exits to be provided, with a third route (e.g. stair or ladder) where required; • All exits to be clearly marked and accessible.
Litter	• Waste loads entering and leaving the Site will be covered to prevent uncontrolled release of litter; • Waste is exclusively handled within the WTS building while the roller doors are closed; • The perimeter fence minimises any litter escaping; • The perimeter fence will be inspected regularly, and any maintenance works scheduled accordingly; and • Any litter generated around and immediately outside the Site will be collected on a regular basis.
Security	• Appropriate signage will be installed at the Site entrance; • Lighting and CCTV will be installed in relevant areas including at the main Site access road and key buildings; • A perimeter fence will be established around the Site;

	• The perimeter fence will be monitored and maintained on a regular basis; and • All access gates and buildings will be locked securely outside of operational hours.
Vehicle Emissions	• A ventilation system will be installed within the WTS building and the load out lane including roof-mounted exhaust fans, wall-mounted make-up air fans, and optional passive ventilation through weatherproof louvres installed above the northern bunker wall as detailed in Section 5.1.3.1; • All mobile machinery operating within each building will have emission standard engines, particulate filters, catalytic converters and/or wet scrubbers; • Emissions will also be reduced through minimising idling times; • Regular maintenance of mobile plant and vehicles; and • Low emission fuels and sulphur lubricants will be used as much as practicable.
Dangerous Goods and Hazardous Materials	• Site staff will be trained in the safe handling of hydrocarbons and hazardous materials according to the DGS Regulations 2017 and AS 1940-2017; • Storage of hazardous materials at the facility will be in accordance with AS 1940-2017; • The materials storage area will be constructed with appropriate bunding with sufficient capacity to capture any spills; • The quantity of chemicals and fuels stored on the Site will be monitored and kept to a minimum; • Site staff will be trained in the appropriate use of PPE; • Site staff will use Safety Data Sheets for recording information on dangerous goods and hazardous materials and will maintain up to date SDS; • Regular maintenance and inspections of equipment, plant, machinery and vehicles will be undertaken at the Site; • All fuelling of machinery and vehicles will be undertaken in the designated bunded fuelling bay; • Suitably sized hydrocarbon spill kits will be located in suitable areas around the Site; and • Fire suppression equipment will be located in relevant areas across the Site.

8.13 Complaints Management

The City provides opportunities for community members to offer feedback and raise concerns in order to support continuous improvement in service delivery. Complaints are managed in accordance with the City's *Customer Experience Policy*, which outlines the process for ensuring they are handled professionally, impartially, and in a timely manner.

All complaints relating to environmental management, amenity impacts (such as noise, odour, dust, or traffic), or general concerns regarding Site operations can be submitted through the City's established customer service channels. The following process will be followed:

- All complaints will be logged by the City's Customer Liaison Officer (CLO) and acknowledged. The CLO and/or relevant officers from the appropriate Service Unit will investigate and determine an appropriate course of action. This may include:
  - Taking no further action and advising the complainant of the reasons;
  - Resolving the complaint through mediation, informal discussion, or negotiation; or

    - Discontinuing the assessment if the matter is better referred to another body, with the complainant advised accordingly.
- Anonymous complaints will only be investigated where sufficient detail is provided to enable a meaningful assessment; and
- Where unreasonable conduct is exhibited by a complainant, the City may apply communication restrictions in accordance with its policy on unreasonable complainant behaviour.

This system enables the City to monitor trends, identify recurring issues, and improve environmental performance and operational practices.

9 Residual Risk Assessment

Each of the potential risks was assessed as per the DWER *Guidance Statement: Risk Assessments - Part V, Division 3, Environmental Protection Act 1986 (February 2017)* (Risk Assessment Guideline). The objective of the Residual Risk Assessment is to ensure the potential risks associated with the proposed activities are understood and managed appropriately so that there is no unacceptable residual risks. The sources of hazards, pathways and receptors of hazards identified are outlined in the following sub-sections.

9.1 Sources of Hazards

For the purpose of this assessment, a source is defined as a primary risk with the potential to cause significant contamination or harm to the environment. With regards to the environment and public health, sources and its potential hazards which may arise from the various future activities have been identified and are shown in Table 9-1.

Table 9-1: List of Potential Hazards

Source	Description of Hazards
Odour	• Odour from waste can cause amenity issues.
Noise	• High levels of occupational noise can impact personnel onsite; and • Noise can cause reduced amenity for surrounding sensitive receptors.
Dust	• Dust generated during construction works and operational activities onsite may be inhaled by Site personnel potentially resulting in health impacts and reduced visibility; and • Excessive dust may impact surrounding vegetation and flora.
Stormwater and Leachate	• Excessive stormwater not properly managed can lead to flooding and damage to infrastructure; and • Leachate can contaminate groundwater and impact native fauna and flora if released into the environment.
Traffic	• Possibility for vehicles to collide with Site personnel, customers, structures or other vehicles; and • Poor design of traffic flow and operations can lead to unpredictable traffic routes and create safety hazards for Site personnel and users.
Weeds	• The spread of weeds may impact surrounding vegetation and flora.
Vermin and Feral Animals	• Putrescible waste can attract vermin which may impact nearby ecological values and present disease risks to humans and animals; • Feral animals can be attracted to putrescible waste causing nuisance; • Introduced flora (weeds) can negatively impact the quality and growth of native vegetation; and • Vegetation clearing can impact the habitat of native fauna and flora.
Fire	• Potential for onsite fires in offices/workshops, equipment and waste storage areas; and • Potential for offsite bushfires impacting Site staff, users, equipment and infrastructure

Litter	• Windblown waste can reduce visual amenity; and • Litter may be ingested by fauna.
Security	• Unauthorised personnel may access the Site resulting in a security breach of the Site facilities, plant and equipment.
Vehicle Emissions	• Exhaust emissions generated within the WTS and MRF can accumulate causing health impacts to staff
Dangerous Goods and Hazardous Materials	• Spills and inappropriate handling and storage of these materials can present risks to personnel and the environment including potential fires

9.2 Pathways for Hazards

For the purpose of this assessment, a pathway for a hazard is defined as the route by which potential contamination or harm can migrate. The key migration pathways at a waste facility generally include the following:

- Air, through which lightweight materials, such as dust, litter and odour can travel;
- Surface, along which the sources of contamination or harm can travel or be present at (e.g., surface water run-off, litter, persons walking or working over the surface); and
- Sub-surface, whereby the underlying soils, bedrock, aquifers and infrastructure permit infiltration of leachate, chemicals and other hazardous materials.

9.3 Receptors of Hazards

For the purpose of this assessment, a receptor is defined as the location where the impact of the contamination or harm is registered. The possible generic receptors of the contamination or harm cause by the identified hazards are summarised in Table 9-2.

Table 9-2: Generic Receptors that may be Impacted by Potential Contamination or Harm

Receptor	Description of the Receptor
Surrounding Land Users	• People who work or live beyond the boundary of the Site. Some of these are referred to as sensitive receptors.
Site Users	• Persons authorised to traverse across the Site, including: o Customers using the site; o Operational staff; o Contractors carrying out maintenance or monitoring; and o Visitors inspecting the Site.
Site Infrastructure	• Buildings that are semi-permanently or permanently occupied and used for work or residential purposes; and • Site management systems (i.e., stormwater).
Vegetation	• Offsite vegetation and flora species.
Fauna	• Fauna species whose habitat is within or surrounding the Site.

Groundwater	• Groundwater that exists beneath the Site either as a local perched system or as a regional aquifer from which a water supply may be extracted for industrial or potable purposes.

9.4 Risk Analysis and Management

As outlined previously, this Risk Assessment has been undertaken to identify and evaluate the potential environmental and health risks associated with the proposed activities and to determine the risk rating following development of the Site. The risk assessment methodology analyses potential 'Source-Pathway-Receptor' scenarios to determine what level of risk may exist following the development works.

Where there is no complete linkage between source, pathway and receptor, there is no definitive risk of an impact occurring. Where there is a potential linkage then a risk of an impact may arise. In the absence of detailed investigations to support the Risk Assessment a risk level can only be subjectively assessed, and potential risks flagged.

9.5 Risk Rating Matrix

To assess the various risks, the potential hazards identified in Table 9-2 were classified according to the DWER's Risk Assessment Guideline shown in Table 9-3.

Table 9-3: Risk Rating Matrix

		Consequence				
		Slight	Minor	Moderate	Major	Catastrophic
Probability	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Medium	Medium	Medium	High
	Rare	Low	Low	Medium	Medium	High

9.6 Risk Profile

Risk management measures refers to the key management strategies that will be adopted onsite to ensure that all hazards and potential risks identified are controlled to an appropriate level, and that strategies are in place to react to any potential incidents or accidents. In most cases these risk management measures decrease the probability and/or consequence of identified hazards and therefore lower the risk rating.

The current risk rating and revised probability and consequence for each identified hazard following the implementation of defined management measures is shown in Table 9-4.

Table 9-4: Residual Risk Profile

Source	Receptor	Pathway	Risk	Probability	Consequence	Risk Rating	Management Measures	Revised Probability	Revised Consequence	Revised Risk Rating
Odour	Site Staff	Air	Certain waste streams that are accepted onsite (i.e., residual waste) can produce strong odours	Likely	Minor	Medium	• The WTS will have an emission extraction system (Ventilation System) as detailed in Section 5.1.4 to control odour emissions and overcome fugitive odour losses; • All incoming waste collection vehicles will remain covered during transport; • Waste will only be accepted if it complies with licence conditions; • Residual and recyclable wastes will be stockpiled separately on the WTS floor; • Highly odorous wastes (e.g. food waste during holiday periods) will be prioritised for immediate removal to Transfer Trailers; • A clean floor policy will be implemented, with no putrescible waste retained overnight or on weekends; • The WTS floor will be washed down as needed to remove leachate and maintain hygiene; • Liquid waste residues within the WTS will be managed via leachate collection points and containment in a storage tank as detailed in Section 8.3; • Waste loading will cease if the extraction system is not operational, with corrective actions (e.g. equipment replacement, manual fan control) implemented as required. • A complaints register will be maintained to ensure that the community can express their comments or concerns regarding the operations of the Site; and • Odour levels across the Site will be continuously monitored by staff and action taken, if required.	Rare	Slight	Low
	Surrounding Land Users	Air		Unlikely	Moderate	Medium		Rare	Slight	Low
Noise	Site Staff	Air	Noise impacts from activities onsite	Possible	Moderate	Medium	• A 2.4 m high solid Colorbond fence will be installed around the majority of the Site to reduce emissions to adjacent industrial premises; • All site vehicles and mobile equipment will be fitted with broadband reversing alarms; • All equipment will be maintained in accordance with manufacturer specifications to avoid excessive noise emissions; and • These controls are expected to ensure that noise emissions from the facility remain within acceptable levels and do not cause adverse impacts on surrounding sensitive land uses. • Vehicle movements within the Site will be limited to 10 km/h, with speed limits clearly signposted and reinforced through the site induction process.	Possible	Slight	Low
	Surrounding land users	Air		Possible	Minor	Medium		Rare	Slight	Low
Dust	Site Staff	Air	Visibility may be impaired and inhalation of dust may occur during site activities	Possible	Minor	Medium	• Minimisation of disturbed surfaces during construction; • Use of water carts or sprinklers for dust suppression where required during construction; • Vehicles to maintain a maximum speed of 10 km/hr unless otherwise signed; • All roads are sealed to mitigate dust generated through the movement of vehicles in and out of the facility;	Unlikely	Slight	Low

Source	Receptor	Pathway	Risk	Probability	Consequence	Risk Rating	Management Measures	Revised Probability	Revised Consequence	Revised Risk Rating
	Surrounding vegetation	Air	Excessive dust may cause detrimental impacts to surrounding vegetation	Possible	Minor	Medium	• Limiting vehicle speeds on site; • All waste loading, unloading and storage will be confined to within the enclosed WTS building; and • Regular sweeping or cleaning of hardstand areas and vehicle movement paths.	Unlikely	Slight	Low
Stormwater and Leachate	Site Infrastructure	Surface	Excessive stormwater that is not properly managed can lead to flooding onsite resulting in damage	Possible	Moderate	Medium	• A fully enclosed WTS building to minimise exposure of waste to rainfall; • The floors of the WTS building have been designed with a fall to allow water to flow towards collection points and divert potential leachate to a containment tank located below ground and external to the structure. The leachate will be removed from site by a licensed contractor for offsite treatment and disposal; • Stormwater runoff from uncontaminated hardstands of the Site will be managed by the Sites existing SWMS; • The external perimeter of all buildings will be sloped away from doorways and openings to prevent ingress of surface water during rainfall events; • All stormwater engineering features will be inspected regularly, and maintenance works scheduled appropriately; • The road surfaces across the Site will be delineated with kerbs and will utilise suitable slope gradients to guide the flow of surface water to the Site's SWMS; • Weather will be monitored on a daily basis; and • Implementation of a Stormwater and Leachate Management Plan (SWLMP), provided in;	Rare	Slight	Low
	Groundwater, Vegetation and Flora	Surface	Wash water that interacts with waste can result in leachate causing contamination of surrounding environment	Possible	Moderate	Medium		Rare	Minor	Low
Traffic	Site Staff	Surface	Poor design of traffic flow and operations can lead to unpredictable traffic routes and create safety hazards for site personnel	Rare	Major	Medium	• One way traffic flow for all vehicles to minimise vehicle conflicts on site; • Signage providing directions, traffic control measures and safety instructions will be established and maintained at appropriate locations around the Site; • Vehicles will be restricted to a maximum speed limit of 10km/hour; • Employees and contractors shall wear high visibility and reflective clothing when working in areas where vehicle movement occurs; • All vehicles will be maintained in good working condition and drivers instructed to use conservative driving techniques; and • All employees and contractors will be inducted with the Site's Occupational Health and Safety (OHS) and traffic management procedures.	Rare	Slight	Low
Weeds	Vegetation & Flora	Surface	The spread of weeds can impact the growth and quality of vegetation and flora onsite	Likely	Slight	Medium	• Awareness of declared/noxious weed management through the Site induction. The Site induction will include information pertaining to weeds of concern occurring at the Site, as well as the hygiene and reporting requirements associated with weed management;	Unlikely	Slight	Low

Source	Receptor	Pathway	Risk	Probability	Consequence	Risk Rating	Management Measures	Revised Probability	Revised Consequence	Revised Risk Rating
							• Vehicles entering/exiting the Site will be free of soil, mud, and vegetative material; • Vehicles to adhere to established roads and tracks to prevent the spread of weeds within the Site; • Regular monitoring of weeds across the Site to be undertaken by all Site staff; and • Regular weed management methods to be undertaken via manual removal and/or or by chemical application prior to flowering periods by a qualified third-party contractor.			
Vermin and Feral Animals	Site Staff	Surface	Exposed waste and water bodies can attract vermin presenting risk of disease and reduced amenity	Possible	Minor	Medium	• The site will be confined by a proposed colorbond fence (2.4m), as detailed in Section 8.2.2, which surrounds the majority of the Site. The existing perimeter fence measuring 1.8m in height will only remain in the southern section of the Site. The fences will be regularly monitored and maintained to ensure ongoing security and integrity; • All waste loads are to be covered during transport to and from the Site; • Ensuring that wildlife and feral or vermin species have limited opportunities to access food and water at the Site; • While the secure nature of the Site makes feral animal intrusion unlikely, site staff will remain observant for any signs of feral cats, foxes or wild dogs during daily operations and manage them as necessary; • Any suspected and/or known shelters or breeding grounds for vermin on the Site will be eliminated; • Should any feral animal or vermin issues be experienced, professional services will be utilised to implement appropriate control/eradication methods; • The roller doors into the WTS will only be open as required; and • Regular litter collections onsite and immediate surrounds as required.	Rare	Slight	Low
	Surrounding Land Users	Surface	Exposed waste and water bodies can attract vermin presenting risk of disease	Possible	Minor	Medium		Rare	Slight	Low
Fire	Site Staff	Surface	Risk of fires onsite arising from waste acceptance, waste stockpiles, faulty equipment/machinery, bushfires	Unlikely	Major	High	• Waste loads entering and leaving the Site will be covered to prevent uncontrolled release of litter; • Recycling and residual waste will only be stored within the enclosed WTS building ; • The perimeter fence minimises any litter escaping; • The perimeter fence will be inspected regularly, and any maintenance works scheduled accordingly; and • Any litter generated around and immediately outside the Site will be collected on a regular basis.	Rare	Minor	Low
	Site Infrastructure	Surface		Unlikely	Major	High		Rare	Minor	Low

Source	Receptor	Pathway	Risk	Probability	Consequence	Risk Rating	Management Measures	Revised Probability	Revised Consequence	Revised Risk Rating
	Vegetation/Flora	Surface		Unlikely	Major	High		Rare	Minor	Low
Litter	Surrounding land users	Air	Windblown litter reducing amenity of surrounding land	Unlikely	Minor	Medium	• Waste loads entering and leaving the Site will be covered to prevent uncontrolled release of litter; • Waste is exclusively handled within the WTS building while the roller doors are closed; • The perimeter fence minimises any litter escaping; • The perimeter fence will be inspected regularly, and any maintenance works scheduled accordingly; and • Any litter generated around and immediately outside the Site will be collected on a regular basis.	Rare	Slight	Low
	Fauna	Air	Potential for fauna to ingest waste	Unlikely	Minor	Medium		Rare	Minor	Low
Security	Site Infrastructure	Surface	Unauthorised personnel may access the site resulting in a security breach of the site facilities, plant and equipment. There is a security fence surrounding the whole site	Unlikely	Minor	Medium	• Appropriate signage will be installed at the Site entrance; • Lighting and CCTV will be installed in relevant areas including at the main Site access road and key buildings; • A perimeter fence will be established around the Site; • The perimeter fence will be monitored and maintained on a regular basis; and • All access gates and buildings will be locked securely outside of operational hours.	Unlikely	Slight	Low
Vehicle Emissions	Site Staff	Air	Vehicle emissions impacting the health of operators within the WTS	Likely	Moderate	High	• A ventilation system will be installed within the WTS building and the load out lane including roof-mounted exhaust fans, wall-mounted make-up air fans, and optional passive ventilation through weatherproof louvres installed above the northern bunker wall as detailed in Section 5.1.3.1; • All mobile machinery operating within each building will have emission standard engines, particulate filters, catalytic converters and/or wet scrubbers; • Emissions will also be reduced through minimising idling times; • Regular maintenance of mobile plant and vehicles; and • Low emission fuels and sulphur lubricants will be used as much as practicable.	Possible	Minor	Low
Dangerous Goods and Hazardous Materials	Site Staff & Vegetation	Surface	Spills and inappropriate handling and storage of these materials can present risks to personnel and the environment including potential fires	Possible	Major	Medium	• Site staff will be trained in the safe handling of hydrocarbons and hazardous materials according to the DGS Regulations 2017 and AS 1940-2017; • Storage of hazardous materials at the facility will be in accordance with AS 1940-2017; • The materials storage area will be constructed with appropriate bunding with sufficient capacity to capture any spills; • The quantity of chemicals and fuels stored on the Site will be monitored and kept to a minimum; • Site staff will be trained in the appropriate use of PPE; • Site staff will use Safety Data Sheets for recording information on dangerous goods and hazardous materials and will maintain up to date SDS; • Regular maintenance and inspections of equipment, plant, machinery and vehicles will be undertaken at the Site; • All fuelling of machinery and vehicles will be undertaken in the designated bunded fuelling bay;	Unlikely	Minor	Low

Source	Receptor	Pathway	Risk	Probability	Consequence	Risk Rating	Management Measures	Revised Probability	Revised Consequence	Revised Risk Rating
							• Suitably sized hydrocarbon spill kits will be located in suitable areas around the Site; and • Fire suppression equipment will be located in relevant areas across the Site.			

9.7 Residual Risk Assessment Conclusion

The Residual Risk Assessment identified the current sources of hazards as well as possible sources of hazards arising from the proposed works. The risk rating prior to the implementation of management measures ranged from 'Low' to 'High'. The revised risk ratings were all downgraded to 'Low' once management measures were applied. Given the proposed management measures, the City will ensure any potential health, environment, and amenity impacts are avoided or minimised.

10 Conclusion

The Wangara WTS will accept recycling and waste from the City's kerbside collection services and transfer it to recycling and recovery Facilities in the southern region of the Perth Metropolitan Area. In doing so, it will ensure continuity of essential waste consolidation services in the short to medium term and support the City's broader transition toward regionalised waste infrastructure at the NRRP. The City intends to have the Wangara WTS operational by early-2026 to enable a smooth transition of waste management services with the planned closure of the Tamala Park landfill in the near future. The facility is expected to operate for approximately five years, serving as a contingency in the event of delays to the delivery of the NRRP, particularly the associated WTS.

The Wangara WTS will provide a temporary storage facility for recycling and waste prior to transport to the downstream recycling and recovery facilities. It will accept residual and recyclable waste from within the City and deliver the following key benefits:

- Centralised collation point for efficient waste consolidation;
- Reduced haulage costs and vehicle emissions;
- Support for the City's long-term disposal strategy; and
- Local employment opportunities.

The Site is located within an established industrial area and is appropriately zoned for waste-related activities. A desktop assessment has confirmed that there are no mapped TECs or significant habitat for priority fauna within the Site boundary. Although the Site intersects a mapped ESA, it is situated within a historically disturbed commercial and industrial precinct.

The WTS will be constructed on an existing hardstand, with minor clearing proposed to enable vehicle circulation and site improvements. Waste handling will occur entirely within a fully enclosed building, and all leachate from the WTS will be directed to the underground leachate tank. Uncontaminated stormwater will be directed to the existing sump. Environmental risks such as dust, odour and noise will be mitigated through engineering controls, operational procedures and management plans.

Given the Site's compliance with recommended separation distances, the implementation of a fit-for-purpose design incorporating key best practice elements, and the proposed environmental management measures, the resulting 'Low' residual risk levels indicate that the construction and operation of the WTS can be achieved in a manner that appropriately manages potential environmental impacts.

References

Department of Water and Environmental regulation (2017). Guidance Statement: Risk Assessments - Part V, Division 3, Environmental Protection Act 1986 (February 2017)

Environmental Protection (Noise) Regulations 1997

Environmental Protection Authority (Western Australia) (2015). Draft Environmental Assessment Guideline for Separation Distances between Industrial and Sensitive Land Uses (September 2015)

Sustainability Victoria (2009) Guide to Best Practice at Resource Recovery Centres; Melbourne, Victoria

Waste Authority (2019). Waste Avoidance and Resource Recovery Strategy 2030, February 2019

Waste Management Association Australia (2009) Guidelines for Management Workplace Health and Safety within the Waste Management and Recycling Industries in Western Australia

APPENDIX A
Site Investigation Reports

- Odour Impact Assessment
- Environment Noise Assessment
- Geotechnical Investigation
- Vegetation Summary

APPENDIX B
Figures

APPENDIX C
Drawings

Drawing C-101: General Arrangement

Drawing C-115: Swept Path

APPENDIX D
Site Management Plans

Stormwater and Leachate Management Plan

Assets | Engineering | Environment | Noise | Spatial | Waste

Talis Consultants
ABN 85 967 691 321

Head Office
Level 1, 604 Newcastle Street,
Leederville
Western Australia 6007

PO Box 454,
Leederville
Western Australia 6903

NSW Office
76 Bridge Road, Nowra
New South Wales, 2541

PO Box 1189, Nowra
New South Wales, 2541

P: 1300 251 070
E: info@talisconsultants.com.au