TUNNEL SEGMENTS FACILITY

for the

ALKIMOS DESALINATION PLANT

STORMWATER/SURFACE WATER

And

WASTEWATER MANAGEMENT

Lot 72 Eveline Road Viveash Middle Swan

SUBMISSION HISTORY

Rev	Date Submitted	Issued to	Issued by	Reason
A	12/08/24	Accendo Australia	F.Mendoza / APS	Response to DWER item 9.1

SECTION 1 - BACKGROUND

Australian Precast Solutions (APS) has been contracted to supply precast tunnel segments for the Alkimos Desalination Plant intake and outfall tunnels. The intent is to refurbish the old Midland Brick Site Facility to suit to a Precast Tunnel Segment Manufacturing Facility comprising of

(1) Carousel System for manufacturing precast tunnel segments, including a steam curing system,

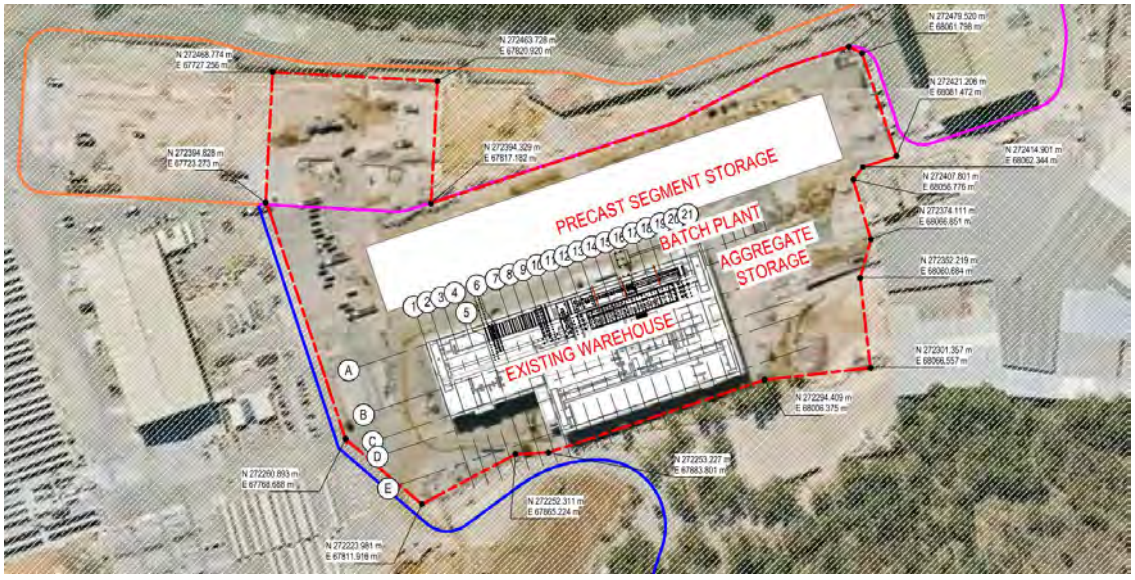
(2) Precast Batching Plant and associated material and testing infrastructure to supply batched concrete direct to the carousel

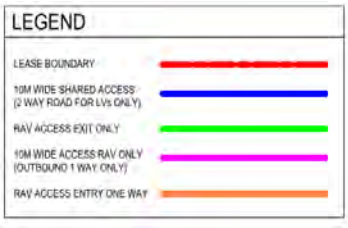
(3) Sufficient craneage to provide for efficient and safe handling and loading of precast tunnel segments

1.1 PURPOSE

The purpose of this document is to provide comprehensive details on the proposed stormwater and wastewater management system, with a strong focus on environmental sustainability. This includes an overview of the existing stormwater management practices implemented by the site owner, as well as the enhancements proposed to ensure the system's alignment with current environmental standards and the Department of Water and Environmental Regulation (DWER) guidelines.

1.2 Site Image



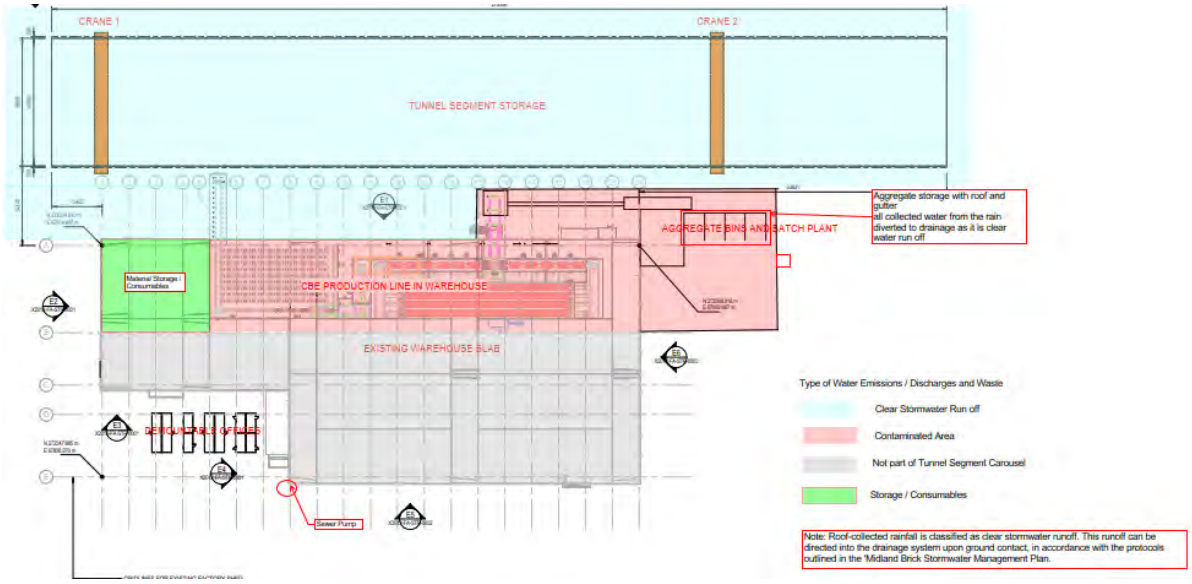


1.3 Water Management and Waste Discharge Protocols for Tunnel Segment Facility

The Tunnel segments facility comprises of (1) Batch plant, (2)aggregate storage, (3) precast segment storage and Carousels are the major components and structures and equipment and within this major components there are sub components which is shown on figure 3.

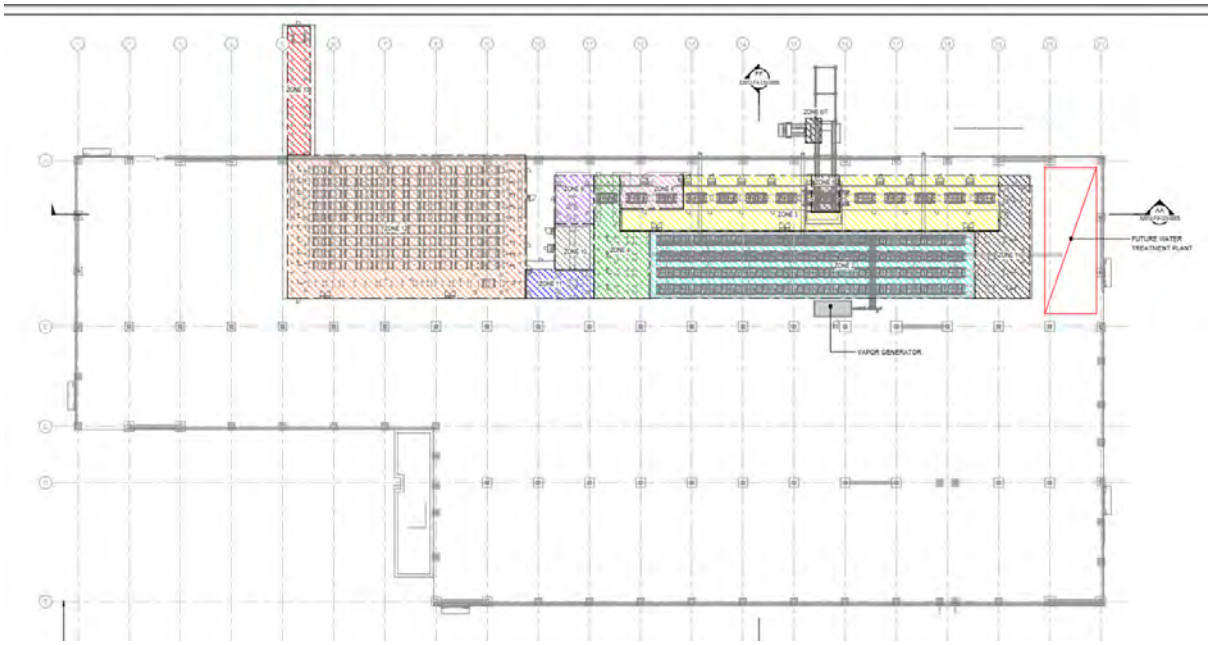
Out of the major components of the tunnel segments, it has been identified the batch plant, aggregate storage and Carousels area are the area that discharges waste and water emissions which this area will then be called as contaminated area. All water that discharges within this area must be treated before leaving the site. The batch plant has its own Water Treatment plant that can able to process any contaminated water before leaving it from site this will also allow us to become sustainable within this area.

The Tunnel segment storage area on which the cured concrete segment will be stored for delivery has been identified as Clear water run off and the water can be directly divert into existing Midland Brick Stormwater Drainage System. Refer to figure 3 Midland Brick Stormwater system.



Designated Areas of Contaminated and Not Contaminated

Figure 2



ZONE LEGEND FOR CBE PRODUCTION LINE			
ZONE #	**ZONE NAME**	**ZONE DESCRIPTION**	**COMMENTS**
ZONE 1	TRANSFER GANTRY TR1	GANTRY TRANSFERING THE MOULDS	FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 2	CURING ROOM	CURING ENVIROMENTS OF MOULDS	FULLY INSIDE THE EXISTING WAREHOUSE, DRAINAGE AS PER X2012-FA-CIV-0003
ZONE 3	WORKING LINE		FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 4	TRANSFER GANTRY TR2	GANTRY TRANSFERING THE MOULDS	FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 5	CONCRETING CABIN	BUCKET/HOPPER AND MOULD VIBRATOR	FULLY INSIDE THE EXISTING WAREHOUSE, LOCATED ON AN FULLY ISOLATED SLAB
ZONE 6/7	HOPPER AND BUCKET WASHING		OUTSIDE THE WAREHOUSE. IN BUNDED AREA. REFER WATER MANAGEMENT PLAN FOR DRAINAGE
ZONE 8	DEMOULDING TROLLEY		FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 9	TILTING MACHINE		FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 10	LIFTING TABLES		FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 11	STACKER TROLLEY		FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 12	PRE-STORAGE		FULLY INSIDE THE EXISTING WAREHOUSE
ZONE 13	EXIT FROM PRE-STORAGE		ONLY CURED PANELS WILL EXIT THE FACILITY

Figure 3. Sub-components in the Carousel

SECTION 2 - WASTE WATER MANAGEMENT PLAN

2.1 Batch Plant and Carousel Area Wastewater Management Plan

The wastewater generated from the batch plant and carousel operations has been identified as contaminated, predominantly consisting of slurry water from concrete processes. This wastewater requires treatment prior to its discharge on-site to ensure compliance with environmental regulations, as depicted in Figure 7.

The sources of wastewater in the batch plant include mixing operations and the cleaning of hoppers and flying buckets. Additionally, the carousel system generates wastewater during the cleaning of moulds and the curing of concrete in the curing chamber. Detailed calculations of the wastewater volumes generated in these areas are provided in Table 1.1.

In alignment with APS's commitment to sustainability, we propose the construction of a water treatment plant within the facility. This plant will treat the wastewater, enabling its reuse for general purposes such as toilet flushing, floor washing during maintenance, and mould cleaning. This initiative ensures that all treated water meets the required criteria before being discharged on-site.

The water treatment system will utilize an existing pit within the facility, which has a capacity of 50,000 liters, as illustrated in the figure below.

2.1.1 Waste Waste from the Batch Plant

Wastewater from the batch plant, in the form of slurry, will be collected in a bunded area and directed into the primary wedge pit (waste). Here, solids will be separated using gravity and then grated into the secondary wedge pit. From there, the wastewater will be pumped to the water tank, while the waste solids will be directed to the water treatment plant for further processing. Please refer to Figure 4 for a detailed illustration of this process.

2.1.2 Waste Waste from the Carousel

The wastewater collection within the carousel system is designed using a gravity and drainage system, graded to create a fall that directs the wastewater for collection. The volumes of wastewater that the carousel can produce are listed in Table 1.1. This wastewater will also be treated in the water treatment plant, as shown in Figure 5.

2.1.3 Waste Waste from the Aggregate Storage and Ramps

The wastewater collection system for the aggregate storage area and ramps has been designed with environmental considerations in mind. The aggregate storage area will be equipped with a roof and gutter system, ensuring that any water collected is classified as clear water runoff. This runoff can be safely diverted to the existing site stormwater system.Additionally, the aggregate storage area will be sealed and bunded to prevent contamination. A sump pit with a submersible pump will be installed to collect any wastewater that accumulates on-site, ensuring proper management and treatment. The layout and details of this system are illustrated in Figure 6.

Item	Location	Description	Volume of Wastewater
1	Carousel	Curing Chamber	573 KL / month 19,100 Litres per day Data is based on Historical data from CTP
2	Carousel	Washing of Moulds	
3	Batch Plant	Washing of Flying Bucket	
4	Batch Plant	Washing of Hoppers	
5	Batch Plant	Slurry	
6	Aggregate Storage	Aggregate Bins	

Table 1.1 Wastewater Volume Calculation

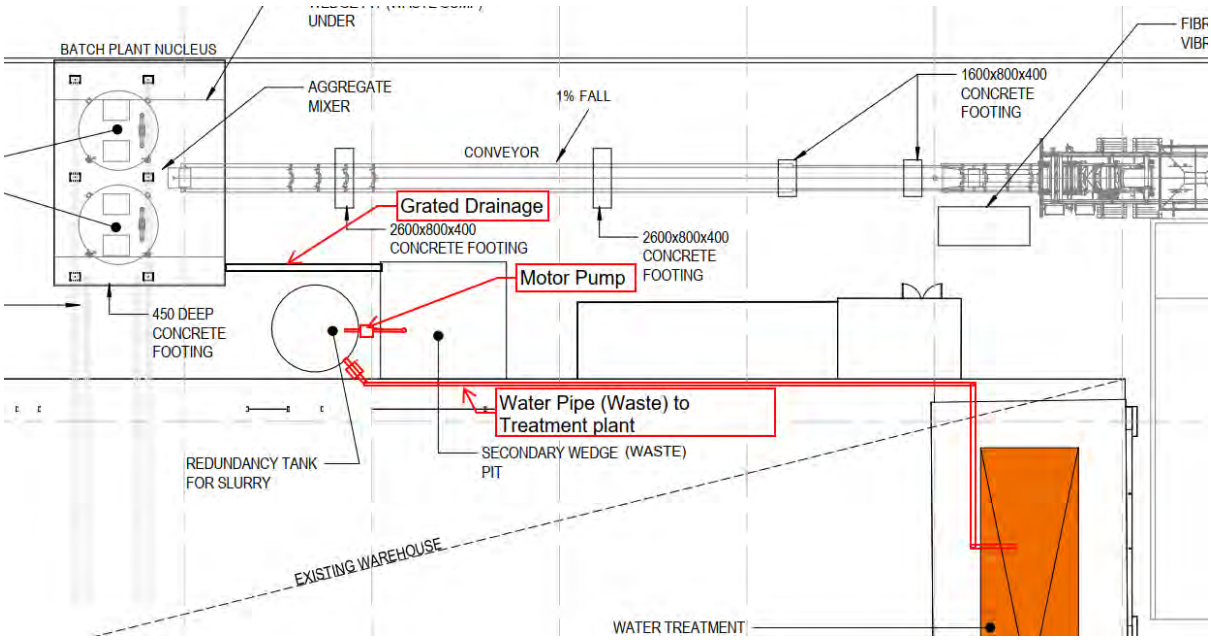


Figure 4: Batch Plant Wastewater Collection and Treatment

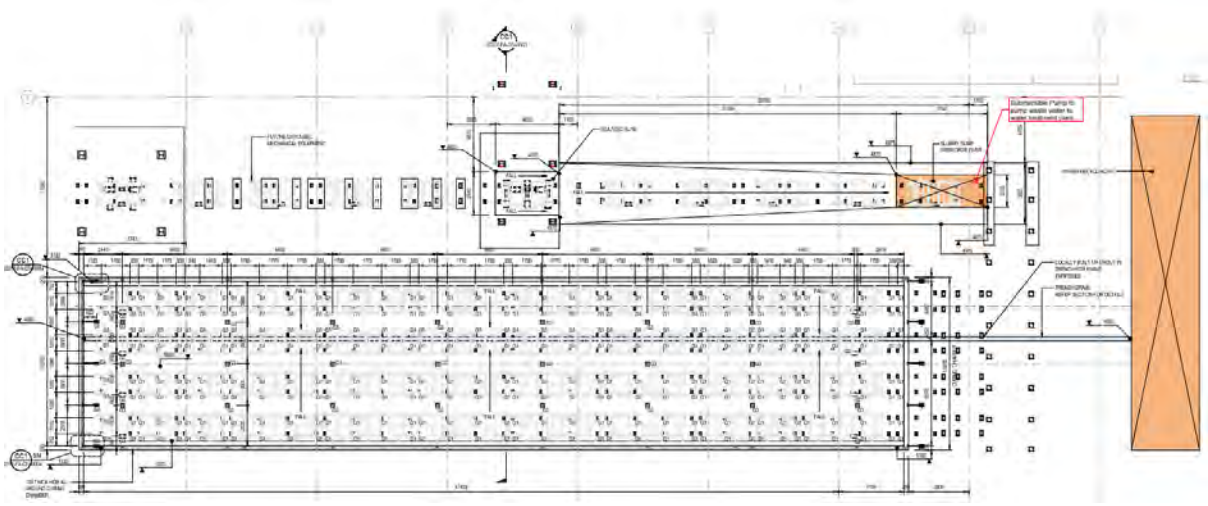


Figure 5: Carousel Wastewater Collection and Treatment

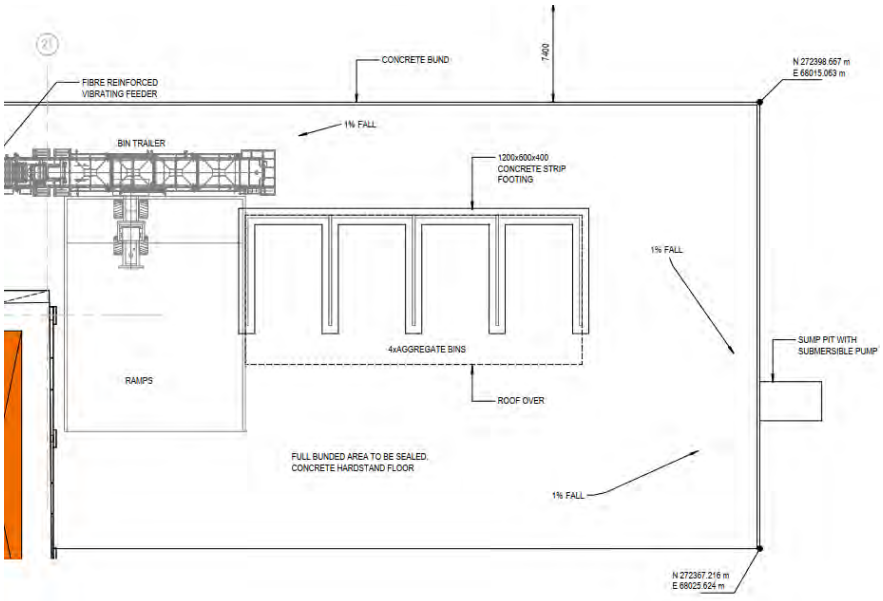


Figure 6: Aggregate Storage Area

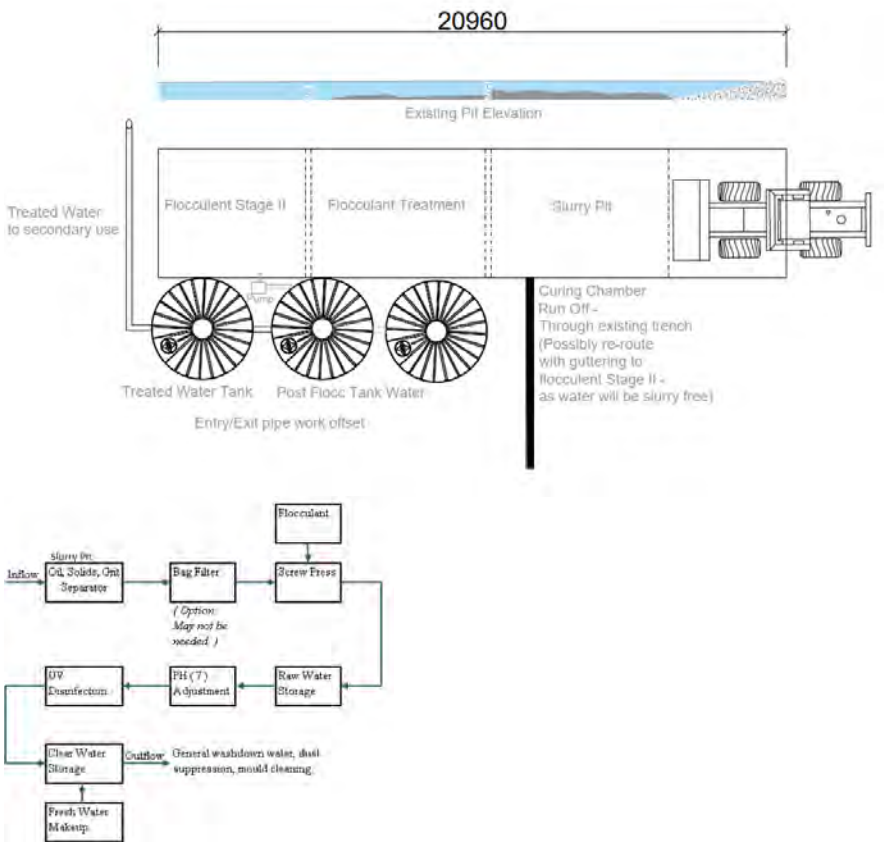


Figure 7: Water Treatment Plant

SECTION 3 - STORMWATER/ WATER SURFACE RUN-OFF

Stormwater on the site can be categorized into two types: contaminated stormwater and clear water runoff. While both originate from rainfall, the distinction between them is significant. Contaminated stormwater occurs when rainfall comes into contact with areas where surface contaminants are present, potentially causing environmental harm and this area have been identified and marked up.

At our proposed site, all concrete works will be conducted inside the existing facility, ensuring that contaminated areas are properly bunded, and all resulting wastewater is treated. Once the concrete segments have been fully cured, they will be transported to a designated storage area. It is important to note that once concrete is cured, it no longer poses a risk to the environment. Consequently, any rainfall that comes into contact with cured segments will be classified as “clear water runoff,” which can be safely diverted to the site’s drainage system.

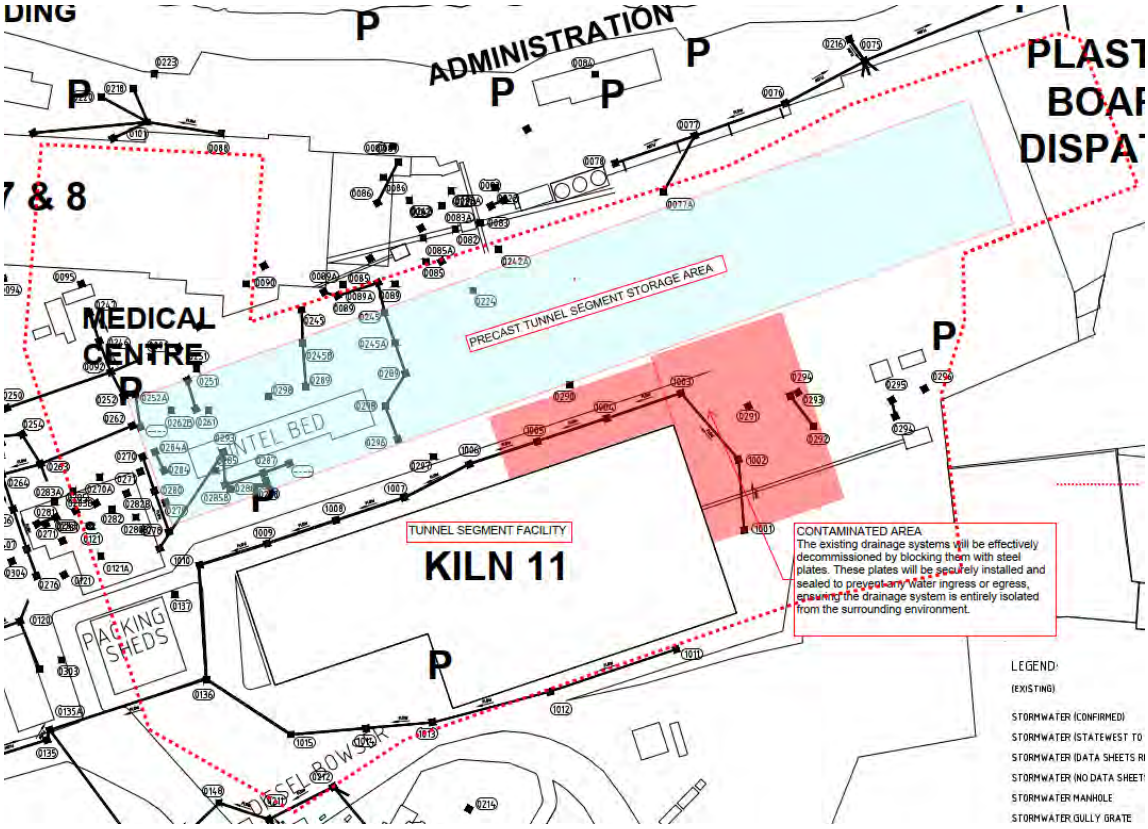
The site is equipped with an existing stormwater drainage system, developed by the landlord in consultation with their environmental consultant. APS is committed to adhering to the guidelines and protocols established for stormwater management on-site.

3.1 Rainfall Design Criteria

The waste water system has been designed to ensure that it is at least sufficient for the treatment of all wastes produced onsite along with a 24 hour 1% annual exceedance probability storm event. Rainfall intensity has been calculated using the Bureau of Meteorology (BoM) Intensity-Frequency-Duration (IFD) data system (BoM, 2024), which yields the 24 hour 1% annual exceedance probability event for the site at 135 mm. As the waste water system is only treating water for the contaminated stormwater area and the area over which the rainfall will be collected is approximately 0.5 ha a holding volume of 675 m^3 is required. As discussed the waste water system is capable of treating 50,000 litres per day and the estimated waste water produced is likely to be 19,100 L per day, there is sufficient capacity in the waste water treatment system to accommodate extreme weather events.

Stormwater outside of the designated ‘contaminated’ area will be processed through the wider Lot drainage system which is covered in the Midland Bricks water management plan.

3.2 Existing Stormwater Drainage



3.3 Midland Brick Stormwater / Surface Water Management

The function of the Midland Brick stormwater management system and its offsite discharges which the lease area is a part of is described as follows :

- The site lies between two watercourses which receive stormwater runoff from the site; the Swan River to the north and a tributary of Blackadder Creek to the south.
- Due to clay soils onsite infiltration is limited and stormwater is managed through offsite discharge. The current stormwater system for the Midland Brick site comprises of various storage ponds for attenuation and settlement of stormwater and a series of outlets to the Swan River (north of the site) and Blackadder Creek tributary (to the south).
- In general terms, minor event flows are discharged to the Blackadder Creek tributary (located south of the site), while more major events have an outlet to the Swan River.
- Stormwater from the site flows to an existing sump located near Kiln 8 (the main site pump), where it is then pumped to the southern storage ponds located in the south west corner of the Midland Brick site.
- Water from the southern storages then flow south through a further series of vegetated ponds and ultimately discharge via a piped outlet to the Blackadder Creek tributary upstream of Muriel St.
- The Blackadder Creek tributary flows into a piped drainage system downstream of Muriel St before joining Blackadder Creek which then flows through a wetland area in Ray Marshall Park before discharging via a weir control to the Swan River.


Flow to River -
max flow unchanged
for larger events
Main Site
Sump & Pump
Pressure
Main
Southern Settling Storage
Blackadder Creek Tributary
Flow to Creek
via Existing Outlet
0
50
100
150
200
Meters