DATE 17 September 2025

Attention:

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City of Karratha

Perdaman Project Helios – Site F Drainage Technical Memorandum

This Drainage Technical Memorandum (DTM) has been prepared by Perdaman Chemicals and Fertilisers Pty Ltd (the Owner) for submission to the City of Karratha. It outlines the proposed drainage and stormwater management strategy for Project Helios, incorporating a solar farm to be constructed on Site F, covering both the design and construction phases.

1. INTRODUCTION

Perdaman Chemicals and Fertilisers Pty Ltd (the Owner) is committed to the development of Project Ceres and expanding the development of Site F to include Project Helios, which includes the construction of a solar farm adjacent to the urea plant non process infrastructure. Project Helios is required by Perdaman to generate renewable energy that will be integrated into the urea plant's power network.

This DTM outlines the drainage and stormwater management strategy for Site F during both the design and construction phases. The strategy aims to ensure effective water flow control, mitigate environmental impact and comply with local regulatory requirements set by the City of Karratha.

Figure 1-1 Project Site Areas

As illustrated in Figure 1-2:

- The red-marked area is reserved for non-plant buildings.
- The white-marked area is designated for the installation of photovoltaic (PV) panels.
- The blue-marked area indicates the preferred location for the solar substation.

Figure 1-2 Project Helios (white-marked area)

2. SCOPE & CONTEXT

This DTM has been developed to supplement the Surface Water Management Plan (PCF-PD-EN-SWMP) and is also aligned to the current Construction Environmental Management Plan (CEMP) and Water Quality, Erosion and Sediment Control Management Sub-Plan prepared for Project Ceres.

In addition to supporting environmental compliance, this DTM provides detailed technical information on the drainage philosophy currently adopted for Site F under existing development approval, updated to consider Project Helios. It outlines the approach to managing surface water and stormwater during both the design and construction phases, ensuring alignment with regulatory requirements and best practices.

3. ENVIRONMENTAL SETTING & VALUE

The inland water values (surface water and groundwater) are summarised in the Surface Water Management Plan (PCF-PD-EN-SWMP), and the potential impacts to these values by construction activities for Project Ceres have been summarised in the CEMP and Water Quality, Erosion and Sediment Control Management Sub-Plan. Construction activities for Project Helios are not expected to present any potential impacts in addition to those already considered in these documents.

There are no permanent surface water bodies (including wetlands) located within the development envelope. Surface water flow occurs along ephemeral creek lines mainly during significant rainfall events. During periods of heavy rain and extreme spring tides, the supratidal flats between sites C and F are subject to inundation (Environmental Review Document, Cardno, March 2020).

Tetra Tech Coffey (2022) identified two hydrostratigraphic units beneath the site consisting of a low yielding granophyre bedrock aquifer overlain by a shallow superficial aquifer consisting of a variety of deposits including clays, gravels and calcrete. Both units are unconfined and hydraulically connected.

Groundwater flow is to the northwest on Site F, with discharge to the supratidal area and eventually into King Bay to the west. Groundwater is influenced by tidal variations, and it is likely that flow direction is altered during periods of high tides.

4. ENVIRONMENTAL PROTECTION ACT 1986 - PART IV APPROVALS

The Government of Western Australia's Environment Protection Authority (EPA) assesses significant and strategic proposals under Part IV Division 1 of the Environmental Protection Act 1986 (EP Act) and granted Perdaman (OWNER) approval to implement the Project through Ministerial Statement 1180 (MS 1180).

In its assessment, the EPA identified Inland Waters as a Key Environmental Factor. The EPA Objective for Inland Waters is as follows:

- To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.

Approval to amend MS1180 was granted by the EPA under Section 45C of the EP Act was granted on 21 January 2025. The Section 45C amendment approves the inclusion of power generation (installed solar) for Site F and notes that the solar installation is not expected to result in a significant effect on the environment.

MS 1180 specifies that the OWNER shall implement the Project to achieve the following environmental objectives:

- Minimise project attributable impacts on groundwater quality, flow direction and/or depth to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.
- To maintain the hydrological regimes and quality of surface water so that environmental values are protected.

The confirmed Surface Water Management Plan (PCF-PD-EN-SWMP) describes the mitigation strategies to comply with MS1180 requirements.,

5. DRAINAGE MANAGEMENT DURING CONSTRUCTION OF PROJECT HELIOS (SITE F)

During the earthworks phase for Site F, the Contractor for Project Ceres (SCJV) is responsible for managing surface water across Site F (as described in the Perdaman Project Ceres DTM dated 14 September 2023). This will be achieved through the installation of drainage, erosion, and sediment control measures prior to the commencement of construction. These controls are designed to minimise uncontrolled offsite discharge and reduce the potential for changes in groundwater and surface water quality that could adversely affect environmental receptors.

The drainage methodology for Site F incorporates the following key elements:

- Perimeter Infiltration Trenches: Installed at the base of embankments to intercept and divert upstream surface water away from the Project Area. These trenches will direct flow toward the east and west boundaries of Site Fand to a sediment basin for treatment prior to discharge into the surrounding environment.
- Southern Diversion Bund: Surface runoff generated within Site F will be directed toward a diversion bund located along the southern boundary. This bund channels flow into sediment ponds, which are designed to manage water quality before discharge.
- Culvert Discharge: Treated water from sediment ponds will be discharged through culverts beneath the Hearson Cove Road (HCR), ensuring controlled release and minimising erosion or downstream impacts.

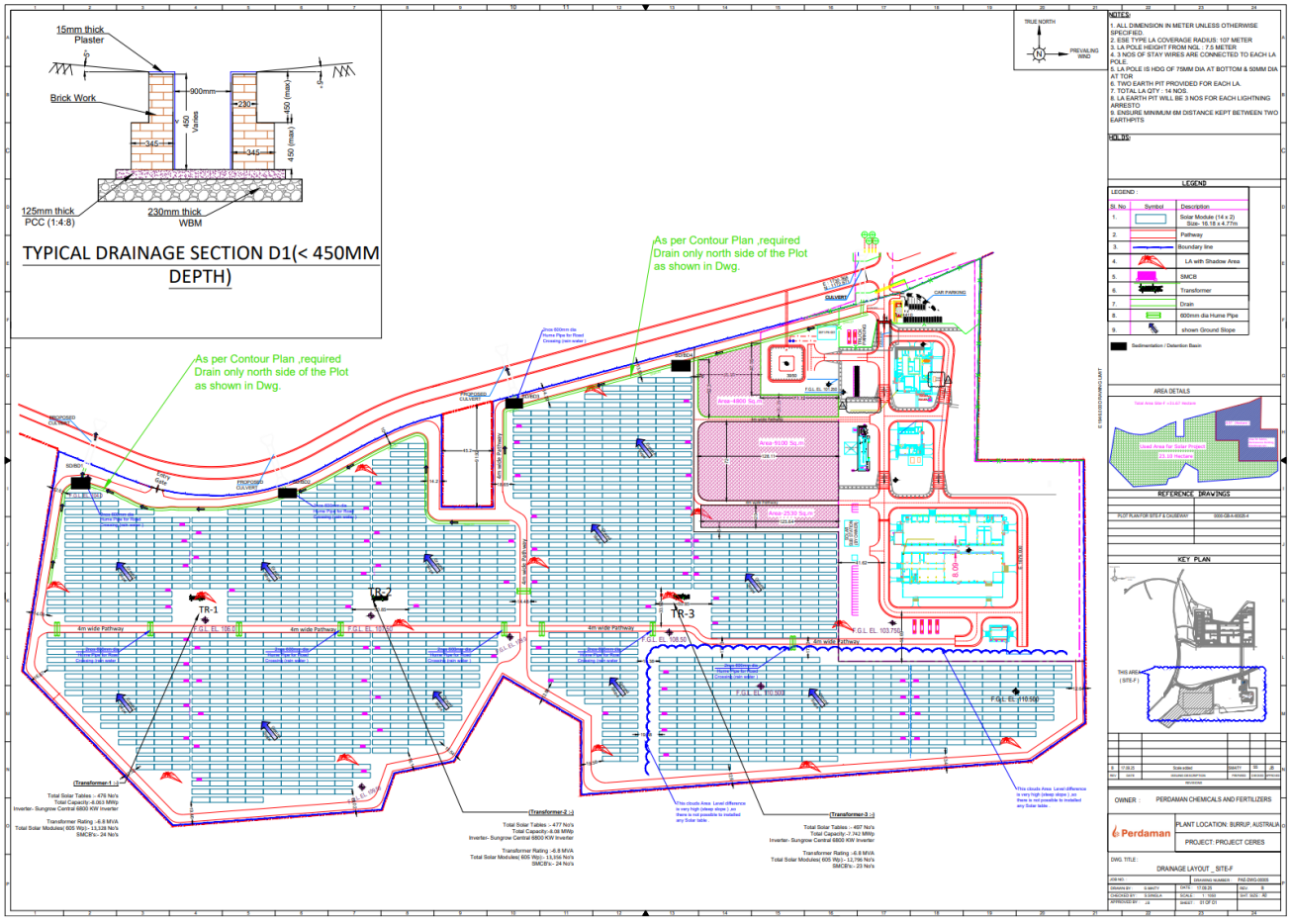

Figure 5-1: Sedimentation/Depletion Basin layout for Project Helios

6. SITE F STORMWATER MANAGEMENT PHILOSOPHY - OPERATIONS

The stormwater management approach for Perdaman Site F will consider biomimicry that fits the site's development context. This approach is in line with the Western Australia Government's DWER Decision Process for Stormwater Management.

Main objectives include:

- Maintaining the existing hydrological regimes
- Minimising water contamination.
- Incorporating stormwater systems in the development to safeguard the surrounding environment.
- Integrating stormwater planning with the site's land and water planning.
- Creating custom stormwater systems tailored to the site's specific features and limitations.

Stormwater management will be addressed to ensure compliance with the SWMP.

Site-specific limitations will be taken into consideration, notably the MRWA design and culvert placements. Historically, culverts were not present, however their introduction will inevitably impact water flow patterns.

The proposed design for Project Helios (still in development) will be evaluated to understand its impact on water flow. Key considerations include:

- Rainfall reflection from the surface.
- Site F's gradient and resulting runoff.
- Comparing Site F's water flow with MRWA culvert capacities.

It's widely understood that engineered surfaces may significantly impact rainfall responses. Our design shall focus on

- Water retention in the environment.
- overland water flow patterns, volumes, and speeds.

Design solutions shall include:

- Where surface water is identified to move slowly across the surface, we may employ stone aggregate bio-retention overland flow paths of varied grades, horizontal and vertical geometry.
- Where surface water is identified to be conveyed across the surface, we may employ ‘swales’ – a defined conveyance approach.

6.1 SITE F DRAINAGE DESIGN

The detailed design of drainage on Site F is under development and is expected to be completed in Q4 2025. However, the following Environmental Design Criteria shall be adopted.

Within Site F, stormwater generated on site is foreseen to be managed as follows:

- Stormwater from Project Helios will not be treated but will be directed to sedimentation/detention basins.
- Basins shall be designed to accommodate the allowable capacity of culverts along HCR such that the overflow from Site F basins will be conveyed through HCR culverts and ultimately discharged to the intertidal zone

The stormwater drainage system shall be designed in accordance with Australian Rainfall and Runoff (ARR) guideline, and shall adopt the guidance from DWER Water Quality Protection Note 52: Stormwater Management at Industrial Sites

6.1.2 Erosion Control

Rock armoring and other erosion controls shall be installed in areas of high erosion potential including steep gradients, bends and discharge points.

To prevent erosion, scouring and sedimentation in natural or unlined channels, velocities of frequent/regular storm flows (1 in 5 year ARI storms) should be limited to velocities of less than 0.8 m/sec.