



Seacon Terminals, Tower Wharf Lower Road, Northfleet, Kent DA11 9BD

Drainage Strategy Report

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1. Project Information Brief

Project	Seacon Terminals, Tower Wharf
Project Location	Lower Road, Northfleet, Kent, DA11 9BD
Client	Klair Group Ltd.
Project Status	Planning
Construction Value	TBC

Project**Seacon Terminals, Tower Wharf**

Our Reference

LM25100-D-01

2. Introduction

Leimen Ltd. has been commissioned by Klair Group Ltd, to provide details of both the surface water and foul water drainage solution to support the planning application for the proposed redevelopment of part of the wider Seacon Terminals site off Lower Road, Northfleet, Gravesend, Kent.

The proposed development is for the demolition of the existing warehouse and construction of a new manufacturing facility and structures in the west part of the wider Seacon Terminals site.

Site Description and Location

The site is an existing brownfield located on the eastern side of an unnamed access road off Lower Road – 0.2 miles to the north-east of the A226 Stonebridge Road. The site is located in Northfleet, Gravesend, Kent, at approximate postcode DA11 9BD.

The application site forms the north-west part of the wider Seacon Terminals and is thus immediately surrounded by warehouses associated with a corrugated packaging company (W.E. Roberts) to the east and an open storage yard to the south. Additional warehouses associated with a building materials supplier (Discount Builders Merchants) and a ventilating equipment manufacturer (Lindlab) are immediately bounded to the west and bounded to the south are open yards associated with a ready-mix concrete supplier (CPI Mortars). The site is situated approximately 115m to the east of the River Thames.

The application site is rectangular in shape and covers an approximate area of 0.71 hectares (0.71ha), the centre of which is situated on OS coordinates E: 561409, N: 175172.

The existing site is a fully impermeable (100%) from the roof area of the existing industrial building to be demolished and hard landscaped yard area, to the south.

The site surrounding areas are predominantly industrial in all directions within 250m. The site is located approximately 39m to the west of the River Thames and 45m to the south-east of a large nature reserve (Botany Marshes). The site therefore sits within Zone 3 of the EA's flood maps.

A location plan of the site (outlined in red) is below in Figure 1.

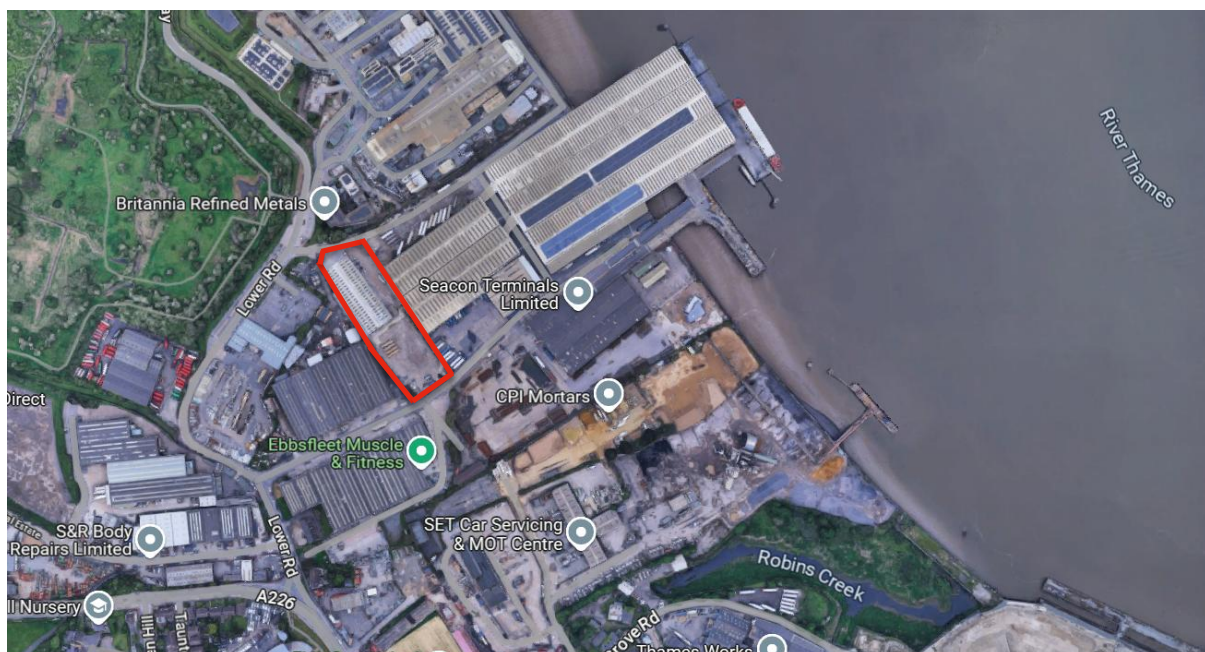


Figure 1: Site Location Plan

3. Existing Drainage and Ground Conditions

Existing Site Drainage

Currently, surface water runoff from all impermeable areas of the existing site – roof area of the existing building and surface runoff from the hardstanding yard area – discharge unattenuated via a 300mm dia surface water pipe system running northward through the yard to the front access of the site and west through Lower road to discharge into an existing pond feature in the Botany marshes immediately west of Lower Road.

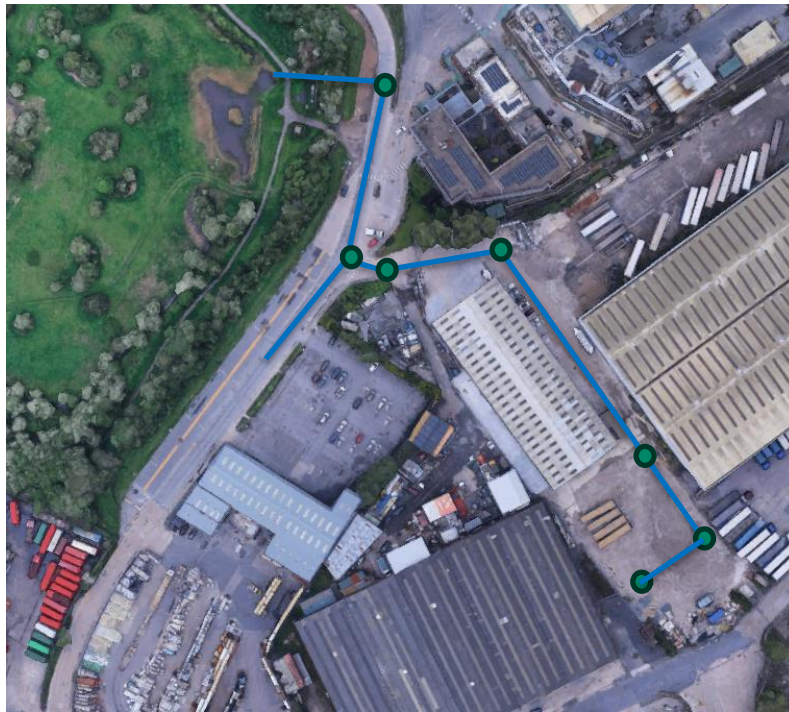


Figure 2: Existing Site SW Sewer Network (© Google Maps)

It is proposed to restrict surface water discharge out of the site and attenuate runoff on site via sustainable drainage (SuDS) measures in accordance with requirements of the lead local flood authority (LLFA), Kent County Council, CIRIA SuDS Manual C753, and industry best practice. Details of the proposed drainage solution for the proposed site are provided in Chapter 4 of this report.

Existing Ground Conditions and Geology

Phase 2 Geoenvironmental Ground Investigation report for the site, undertaken in August 2022 by Site Analytical Services Ltd. (ref. SAS 22/35405-1) revealed the site's ground conditions and geology as; Made Ground up to 4m underlain by superficial geology of Alluvium, Taplow Gravel Member (Secondary Undifferentiated Aquifer) and bedrock geology of Lewes Nodular Chalk Formation, Seaford Chalk Formation and New Haven Chalk Formation (Principal Aquifer).

The report identified the environmental setting of the site to be within 250m of the River Thames and existing above ground pond in Botany Marshes where surface water runoff from the site ultimately discharges unattenuated, and within 250m of Landfill Sites and Waste Management Facilities.

The report also confirmed that groundwater was encountered during the investigation with monitored levels over four to six weeks from installed standpipes recording groundwater consistently between 1.42m and 2m below ground level.

The above ground conditions, geology, and environmental setting of the site, as confirmed by the ground investigation report confirms that soakaway drainage is not feasible for the site.

4. Proposed Site Drainage

Surface Water Drainage

The site is an existing brownfield with the existing roof and hardstanding areas of the site fully impermeable. Currently, surface water runoff from the site discharge unattenuated into the above ground pond in Botany Marshes to the west of Lower Road. The proposed redevelopment of the site is to demolish the existing warehouse building and construct a new manufacturing facility that extends the existing roof area over the hardstanding yard to the site. ultimately, the impermeable area of the redeveloped site will be the same as the existing with a zero net change.

Drawing LM25100-XX-D-XX-100 shows the impermeable areas of both the existing and proposed site.

In accordance with the principles of sustainable drainage based on the CIRIA SuDS Manual (C753) guidance and the requirements of the LLFA, it is proposed to restrict surface runoff discharge from the site to an 80% betterment on the existing unattenuated flow from the site. This would be achieved by the installation of a Hydro-Brake flow control device in a new chamber at the front of the site prior to discharging into the existing sewer in the access road up to Lower Road. The restriction of flows from the site will also require upgrading the existing 300mm dia main sewer in the yard to 450mm dia and providing an underground storage via a geo-cellular crate system in the front yard, to achieve the required attenuation volume based on the hydraulic modelling undertaken for the site, as detailed below.

Table 1 below indicates the SuDS features and measures provided by the design to achieve the benefits listed below, including pollution control in runoff water through the onsite system have been included to improve water quality before discharging out of the site.

The benefits of incorporating SuDS into a drainage solution include:

- i. Reducing runoff volumes, peak flows and discharge rates to watercourses or sewers subsequently reducing the risk of flooding downstream (Water quantity)
- ii. Improving the water quality into receiving bodies by removing or reducing the pollutants in runoff water (Water quality)
- iii. Creating and sustaining better places for nature (Biodiversity)
- iv. Creating and sustaining better places for people (Amenity)
- v. Allowing development to adapt to the effects of climate change.

Drawing LM25100-XX-D-XX-500 provides the surface water drainage strategy proposed for the site.

Hydraulic Design

An assessment of the current unattenuated surface water discharge from the site carried out by the Modified Rational formula of the Wallingford Procedure confirmed the current discharge from the site to be 98.8l/s. Therefore, applying an 80% betterment provides a discharge limit of **19.8l/s** which has been used in the hydraulic design of the proposed surface water drainage solution for the site, to be achieved via a Hydrobrake® flow control device.

A copy of the surface water discharge assessment calculation can be found in appendix B.

A hydraulic design of the proposed surface water drainage network has been undertaken using Causeway Flow modelling package for the storm events required by Kent County Council (LLFA) – 1 in 1-year, 1 in 30-year, 1 in 100-year plus 20% climate change and the 1 in 100yr plus 40% climate change event. The simulation of the network's performance has also been carried out with the restricted discharge rate of 19.8l/s, and attenuation tank appropriately sized to a total of 200m³ for the storage storm events up to and including the 100yr rainfall event with 40% Climate Change. No flooding occurs in the drainage network proposed for this development.

Detailed calculations of the hydraulic modelling and simulation results can be found in Appendix B.

Operation and Maintenance Plan

The proposed surface water network for the redeveloped site shall be maintained by the owner's own management company in accordance with the maintenance regime recommended in Table 1 below.

Table 1 SW System Operation and Maintenance

SuDS Feature	Operation and Maintenance
Cellular Attenuation Tank	Inspect twice in the first year and after major storm events, desilt as required. Tank to be 'accessible' type with inspection chambers for maintenance.
Hydro-Brake®	The Hydro-Brake device has no moving parts and no power requirements and provides reliable, low-maintenance, engineered flood management. Periodic desilting of the Hydrobrake sump as well as checking the emergency drain down mechanism is in good working order. The sump should be emptied/checked at least as follows (but with an annual inspection and additional cleansing if required): On completion of drainage works, Year 1, Year 3, then every 5 years.
Trap Gullies	Regularly inspect and take off grating to remove debris and silt deposits collected in the sump.
Catchpit chambers and Manholes	Inspect six-monthly, empty every 12 months and after every major storm or local flood event
Bypass oil separator (Klargester or similar)	Maintain in accordance with the manufacturer's specification and guidance documents.

Foul Drainage

It is proposed to utilise the separate standard gravity pipe foul system which runs to the south of the site for foul drainage from the new building. Drawing LM25100-XX-D-XX-500 indicates the foul drainage proposal for the site.

