Project Tiger – Prologis Developments Ltd
HBC Fields Widnes

Drainage Design Philosophy Statement

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Contents

1.0 INTRODUCTION

This document describes the on-plot surface and foul water drainage strategy for Project Tiger, the construction of a new distribution centre and associated external car parking and lorry loading/manoeuvring areas.

The site will be served by a new Highway Access – built over the existing WCML rail line to the North of the site, and a new Rail Sidings, built along the northern boundary. Both of these already have separate planning permissions.

The site has an area of 31.8 hectares and is located between Hale Bank Road and the WCML Rail Line, Ordnance Grid 348250,384370, approximately 2Km to the West of Widnes. The area forms part of the plans for the 'Merseyside Multimodal Gateway – 3MG' and is incorporated into Halton Borough Council's Unitary Development Plan.

The majority of the site currently comprises former agricultural land, but which now forms an informal open space with a number of footpaths, and some landscaping features to the Southern and Eastern boundaries. A pond also exists along the Southern boundary – 'Pond A'.

The site generally falls towards the rail line in a North Easterly direction, with levels varying from 12.0mAOD in the SW corner to 5.0mAOD in the NE corner.

The project involves the construction of a warehouse with a footprint of approximately 82,300sqm with associated offices and ancillary areas. Externally the development will comprise -

- A 800 space paved car park
- A 450 space overflow car park
- A concrete paved lorry hardstanding – serving an in-bound and out-bound dock face on the warehouse, and also a concrete ramp serving the rail sidings.
- Sprinkler tanks and pump house
- Gatehouse
- Balancing pond – in the NW corner 'Pond B'

The surface water drainage system serving the site will in general be designed in accordance with CIRIA publication C697 – 'The SUDS Manual'.

A substantial amount of work has already been undertaken by Atkins, Peter Brett Associates and AMEC with respect to drainage and flood risk at the HBC Fields site (see references). This has been in part related to the construction of the new Highway Access forming a link to the existing A5300/A562 interchange.

Drainage from the new link road south of the WCML will discharge into Pond 'B' – being built as part of the new development. Drainage from the access

road to the North of the WCML will outfall to the Newstead Road Culvert and watercourse and will not be considered further in this report.

A Flood Risk Assessment was undertaken by Peter Brett Associates in February 2007 to support a planning application for the Ditton Strategic Rail Freight Park at the HBC Fields site. Phase 1 of the work related to a landscaping contract – this comprised perimeter bunding to provide a screen for the site for the existing residential areas to the South and East. It also included the construction of pond 'A' – in the SE corner. A second FRA was undertaken by Amec for Halton Borough Council in January 2008 for the proposed link road.

2.0 SURFACE WATER DRAINAGE

As noted above the topography of the site is such that the land drains towards the WCML rail embankment along the northern boundary of the site. Two culverts exist under the rail embankment – hereby referred to as the Eastern Culvert and Western Culvert. These comprise an oval brick lined culvert (1100mm wide x 1235mm high) and a 600mm diameter pipe respectively. A survey of these culverts was carried out by Atkins in April 2009, and is documented in their report – '*HBC Fields Development and 3MG A5300 Link Road – Drainage outfalls to Ditton Brook'.*

It is proposed that the runoff from the development is discharged to these culverts via a balancing pond. Pond 'A', already constructed, will take approximately 50% of the site runoff, before discharging to the Eastern Culvert. Pond 'B' will take the remaining site discharge, and also run-off from the new Highway Access. As noted above Pond 'A' has already been constructed, and Pond B will be constructed as part of the new development. Flow control devices (hydro brakes) will be fitted to the outlets on both ponds to ensure that the discharge does not exceed the current 'Greenfield' run-off from the site, however the determining factor in terms of controlling run off will be the adequacy of the on-site drainage network to store stormwater run-off when the outfalls (Eastern and Western culverts) to Ditton Brook are submerged during tidal/fluvial flooding.

The site itself is protected from tidal (1:200) and fluvial (1:1000) flooding and this is covered in more detail in a separate Flood Risk Assessment Report by Peter Brett Associates.

Drainage to the lorry yard areas will in the main comprise proprietary slot drains such as Gatic, and kerb drainage. The siphonic roof drainage system shall be split equally between Pond A (Eastern half of roof) and Pond B (Western half of roof).

The site drainage will allow for controlled flooding of the lorry yard areas to a maximum depth of 300mm when considering the effects of the submerged outfalls. The various storm design scenarios are listed in section 3.0 below accounting for tidal and fluvial flooding. The tidal and fluvial flood levels have

been verified by a Flood Risk Assessment undertaken in a separate report by Peter Brett Associates. The northern and western yard areas will drain to Pond 'B', and the Southern and Western yard areas will drain to Pond 'A'.

No flooding detrimental to buildings shall be permitted in either a tidal or fluvial flooding situation; the finished floor level will be a minimum of 600mm above any temporary flood levels within the external yard areas. No surface water run-off from paved or other impermeable surfaces shall be permitted to escape onto the surface of adjacent sites or roadways. When considering off-site flooding to areas to the north of the railway embankment – specifically Mr Gladstone's filed at Newstead Road Embankment and at the WCML embankment on the Eastern culvert, these have been dealt with as part of the Atkins report.

In accordance with SEPA Pollution Prevention Guideline document PPG3 '*Use and design of Oil Separators in Surface Water Drainage Systems'*, all surface water drainage from the lorry parking and manoeuvring areas will pass through a Class 1 Full Retention Separator, with alarm. Car parking areas shall drain through a Class 1 by-pass separator with alarm. The separators will comply with BS EN 858 part 1 and 2 in full.

Roof drainage shall not pass through a separator, but will discharge directly to either balancing pond A or B.

3.0 SURFACE WATER DRAINAGE - HYDRAULIC DESIGN PARAMETERS

Drainage calculations will be completed on Micro–Drainage WinDES software and parameters based on "Modified Rational Method" for simulation.

Global Variables

Rainfall: Storm intensities based on FSR methodology

Design Return Period: 1**,** 10, 30 and 100 years.
Storm Duration: 15, 30, 60, 120, 240, 360, 480, 960 and 1440 minutes
M5-60: 20mm
"r" Ratio: 0.420
Volumetric Runoff coefficient: 0.75
Global time of entry: 4min
Infiltration: Ignore for peak flow design
Backdrops : Allow in design
Min pipe cover: 900mm

The following scenarios will be modelled –

- **Free outfall** – 1 in 1 year, 1 in 30 year and 1:100 year storms modelled no allowance for climate change.

  No surcharging for 1 year storm, no surface flooding for a 30 year storm. For storm returns of between 1:30 and 1:100 year, flooding is to be controlled on site and limited to lorry parking areas, to a maximum depth of 300mm.

- **Submerged outfall - Fluvial Flooding** (1 in 100 years) – Flood Level to be taken as constant at **6.37mAOD,** no allowance for climate change.

  Storm events in excess of a 1 in 30 year storm – floodwater controlled within the site boundary, and flooding limited to the lorry yard areas, to a maximum depth of 300mm.

- **Submerged outfall - Tidal Flooding** (1 in 200 years) – Flood Level to be taken as **7.28mAOD,** 20% allowance for climate change.

  1 in 30 year storm – floodwater controlled within the site boundary, and flooding limited to lorry parking areas, to a maximum depth of 300mm.

- **Submerged outfall - Tidal Flooding** (1 in 1 year) – Flood Level to be taken as **6.55mAOD,** no allowance for climate change.

  1 in 30 year storm – floodwater controlled within the site boundary, and flooding limited to lorry parking areas, to a maximum depth of 300mm.

4.0 SUDS FEATURES

The site drainage shall include the following sustainable drainage features -

(I) Porous paving – will be used in the 450 space overflow car park. This will comprise porous geo-synthetic blocks with topsoil/gravel infill on a laying course and aggregate sub base with geo-membrane – a ‘Type C’ (no infiltration) system. The hydraulic design of the permeable paving will be undertaken in accordance with Chapter 12 of CIRIA Guide C697 ‘The SUDS Manual’.

(II) Attenuation Pond B – The attenuation pond will be lined and will be designed to accommodate a 1:100 storm event on a high tide cycle with sufficient freeboard. It will collect the surface water drainage run off from 50% of the site (The existing Pond 'A' taking the remaining area). The minimum treatment volume shall be taken as 15mm x area of drainage. The design of the attenuation pond will in general follow the recommendations of Chapter 17 of CIRIA Guide C697 ‘The SUDS Manual’.

Infiltration features are not considered suitable for the site given the ground conditions which comprise boulder clay to a depth of approximately 13m. Permeability testing has been carried out on site to confirm this.

5.0 FOUL WATER DRAINAGE

Foul Drainage from the development shall discharge to the existing United Utilities sewer in Hale Bank Road as per Option 1 of the Atkins Utility Report undertaken in 2008 (Document Reference 290.24605). United Utilities have given a Part 1 approval for this connection in their letter dated 7/08/08, based on a maximum discharge of 10l/s.

The connection point will be to either manhole 6301 (IL 10.68mAOD) or manhole 8101 (IL 9.47m AOD).

Historic water use data for industrial buildings supplied by ProLogis Developments based on a 24hour operation, 7 day week indicates an average consumption of 0.0078 l/s/1000sqm.

Based on the size of building proposed this would give a total average consumption of 0.86l/s and a corresponding peak flow of 5.7l/s with allowance of 10% for infiltration.

Reference Sewers for Adoption 6th Edition, section 2.12 a figure of 0.6l/s/hectare of developable land is recommended for the domestic foul flow discharge. Based on a developable area of 129,000 sq. m (excluding car parking, landscape and balancing pond features) this would give a design discharge of 7.7l/s.

Therefore the foul flows from the proposed development are not expected to exceed the maximum discharge of 10l/s

6.0 DRAINAGE DRAWINGS

The following drawings have been prepared in accordance with the preceding drainage network design model, simulation and SUDS calculations. These drawings constitute the package of supporting drawings for the approval and construction of the underground surface and foul water network. A full list of the drawings is shown below:

- 16803/A1/P0300 Surface and Foul Water Drainage Layout
- 16803/A1/P0600 Proposed Finished Levels
- 16803/A1/P0315 Attenuation Pond ‘B’ construction details
- 16803/A1/P0320 Porous Paving Details – Overflow Car Park

The following Appendices are excluded from Appendix 10A of Chapter 10 of this ES.

Appendix 1 – Windes Calculations
Appendix 2 – References

Appendix 10B

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