

- Infrastructure Design
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Our Ref: 26043 / LC / 001

Your Ref:

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Re: Development at Surfleet Road, Pinchbeck – Planning Condition 17 – Surface Water Drainage Design

This letter outlines the detailed surface water drainage design for the new residential development of 37 dwellings at Surfleet Road, Pinchbeck, Lincolnshire.

The development was granted planning consent in December 2022 (decision notice ref: H14-0117-22). Included within the approved documents listed on the planning decision notice is the *Combined Flood Risk Assessment Report & Drainage Strategy report '1-198 Revision B'* produced by Civilistix. The FRA report outlines the proposed surface water drainage strategy for the development, including proposed SUDs features, attenuation volumes and discharge rates. The approved strategy has now been developed at detailed design stage to include number of amendments to improve the operation and maintenance requirements for the drainage system.

Previously Approved Surface Water Drainage Strategy

The surface water drainage strategy approved at planning stage is for surface water runoff from the new hardstanding and roof areas to be collected and conveyed via a piped network to a detention basin. The basin provides attenuation to allow all flows to be pumped via a new surface water pumping station and rising main, and discharge at a controlled rate to the existing ditch network located along the southern boundary of the site.

Section 6.2 of the FRA report states the discharge rate is to be limited to 1.4l/s/ha (the 1 in 1-year greenfield runoff rate) for all storm events up to and including the 1 in 100-year events plus 40% climate change allowance. The greenfield runoff rate calculations included with the FRA report appendices show that for the total site area of 1.7485ha, the 1 in 1-year greenfield runoff rate is 2.14 l/s.

All private driveway areas are shown to be permeable paved, lined with an impermeable membrane. The permeable paving is to provide an additional stage of surface water treatment for runoff from private driveways, and is not required to provide attenuation (all attenuation is provided by the detention basin).

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Proposed Amendments to the Drainage Strategy

The detailed drainage design follows the principles of the FRA report, however the following amendments have been made:

- Due to the high groundwater level and trench instability encountered during ground investigations undertaken post-planning, finished site levels have been lifted above existing to reduce required excavation depths, in accordance with CDM requirements. This has allowed for a gravity outfall to the existing ditch, in place of the surface water pumping station. The headwall outfall to the existing ditch has been relocated further downstream, however remains within the site extents.
- The detention basin has been made shallower to reduce the depth of excavation required due to the high groundwater. The reduced depth of the basin will also improve access for maintenance. The basin remains suitably sized to accommodate all flows up to the 1 in 100-year storm events plus 40% climate change allowance, and a suitable freeboard has been provided.
- The discharge rate has been set to the 1 in 1-year greenfield runoff rate as per the FRA report. The greenfield runoff rate has been calculated as 2.0 l/s based on a development area of 1.586ha. Refer to the enclosed greenfield runoff rate calculations.
- The storage has been sized to accommodate additional runoff from the existing impermeable road area along Surfleet Road where this falls into the site.
- Additional swales have been added to provide additional stages of treatment to surface water flows.
- Private driveway areas are shown to be permeable paved, lined with an impermeable membrane, apart from the shared driveway fronting plots 13 to 18. This is due to the proposed adoptable sewers running below this area, and therefore surface water runoff from this driveway is to shed directly to the detention basin. A filter strip is provided between the driveway and basin to provide a stage of surface water treatment in place of permeable paving.

The amended strategy removes the maintenance burden of a surface water pumping station whilst still maintaining the principles of the FRA report. Refer to the enclosed JPP design drawings and hydraulic calculations for further details.

Accordance with the requirements of Condition 17

Condition 17 of the planning decision notice lists a number of requirements for the drainage design to meet. These requirements are listed below, along with confirmation of how these are achieved by the detailed drainage design.

LPA requirement 1: *‘The scheme shall be based on sustainable drainage principles and an assessment of the hydrological and hydrogeological context of the development’*

JPP response: The proposed drainage design is based on the sustainable drainage principles and assessment of the hydrological and hydrogeological context of the development detailed in the approved FRA report.

LPA requirement 2: *‘provide details of how run-off will be safely conveyed and attenuated during storms up to and including the 1 in 100-year critical storm event, with an allowance for climate change, from all hard surfaced areas within the development into the existing local drainage infrastructure and watercourse system without exceeding the run-off rate for the undeveloped site.’*

JPP response: The enclosed drainage design drawings provide full details of the proposed drainage system, including:

- Fully detailed surface water drainage network including manhole cover levels, invert levels, pipe sizes, pipe lengths, pipe gradients, and pipe codes
- Manhole schedules and longitudinal sections
- Position of gullies, permeable paving and linear kerb-drainage systems
- Drained areas plan showing the impermeable areas draining to each pipe within the network
- Construction details for all adoptable and private drainage elements
- Detailed sections for the detention basin, swales and outfall to the existing ditch.
- Flow control chamber details
- Microdrainage simulation results for storm events up to and including the 1 in 100-year storms including 40% climate change allowance.

LPA requirement 3: *‘provide attenuation details and discharge rates which shall be restricted to 1.4 litres per second.’*

JPP response: Full details and calculations have been provided for the attenuation volumes (detention basin details) and discharge rates. As detailed in the previous section, the FRA provides states within section 6.2 of the report that the discharge rate is to be limited to 1.4l/s/ha (the 1 in 1-year greenfield runoff rate). The Greenfield runoff rate calculations included with the FRA report appendices show that for the total site area of 1.7485ha, the 1 in 1-year greenfield runoff rate is 2.14 l/s.

We have re-calculated the greenfield runoff rate based on the same parameters and to suit the total development area of 1.586ha. Please refer to the enclosed greenfield runoff rate calculations showing the 1 in 1-year greenfield runoff rate to be 2.0 l/s. The proposed discharge rate is therefore limited to 2.0 l/s for all storm events the 1 in 100-year storms including 40% climate change allowance. This is detailed within the enclosed MicroDrainage calculations and simulation results.

LPA requirement 4: *‘provide details of the timetable for and any phasing of implementation of the drainage scheme.’*

JPP response: It is not envisaged any phasing of the drainage scheme will be required. A timetable for the construction of the drainage system will be provided once finalised.

LPA requirement 5: *‘provide details of how the scheme shall be maintained and managed over the lifetime of the development, including any arrangements for adoption by any public body or Statutory Undertaker and any other arrangements required to secure the operation of the drainage system throughout its lifetime’*

JPP response: The main drainage runs, swales, headwalls, detention basins and flow control chamber are to be offered to Anglian Water for Section 104 adoption. Should Anglian Water not accept the detention basin for adoption, this will be maintained by the management company. The plot drainage and permeable paved driveways for rented plots are to be maintained by Accent Housing or management company. The plot drainage and permeable paved driveways for shared ownership plots are to be maintained by the plot owner. Maintenance schedules have been provided on the construction detail drawings for each element of the drainage system.

Yours sincerely

LUKE CLARKE MEng (Hons)
Associate Director for JPP Group

Encl.

Drawings:

26043 - 101(1) to 101(3) – Longitudinal Sections Sheets 1-3
26043 – 102 – Manhole Schedules
26043 – 102(1) & 103(2) – Adoptable Drainage Construction Details Sheets 1 & 2
26043 – 105 – Section 104 Layout
26043 – 106 – Section 38 Layout
26043 – 108 – Surface Finishes Layout
26043 – 109 – External Levels Layout
26043 – 110 – Private Drainage Layout
26043 – 111 – Highway Drainage Catchment Plan
26043 – 112 Drained Areas Plan
26043 - 116(1) & 116(2) – Private Drainage Construction Details Sheets 1 & 2
26043 – 120 – Private Pavement Construction Details
26043 – 122 – Detention Basin Cross Sections
26043 – 123 – Flow Control Chamber Construction Detail

Calculations:

26043 – Greenfield runoff rate calculation
26043 – SW MicroDrainage Design & Simulation Results