

Date 18/02/2016

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By Email

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Dear Matt

Subject: Kingsmere Local Centre – Surface Water and Foul Water Drainage Strategy Statement

INTRODUCTION

A reserved matters application (reference number 06/00967/OUT) was submitted to Cherwell District Council (CDC) for the provision of a new Local Centre, including a community centre, youth centre, nursery, convenience store, retail space and associated infrastructure and landscaping.

Following the application the Planning Officer at CDC has made the following comment relating to the drainage strategy for the Local Centre (Ref. 15/02103/REM, dated 14th January 2016): *“In terms of drainage, the application makes reference to storing water back by porous pavement but does not provide any details of this kind of pavement or what type of restriction device is intended to be used in restricting the outfall to 8l/s. This information must be provided.”*

This Drainage Strategy Statement has been prepared to address the above CDC comment by the provision of drainage strategy information for both the surface water and the foul water systems.

This Drainage Strategy Statement supersedes the “Drainage” section (paragraphs 6.26 – 6.27) of the South West Bicester (Kingsmere), Reserved Matters Application – Local Centre report prepared by Terence O Rourke (November 2015).

SURFACE WATER DRAINAGE STRATEGY

INTRODUCTION

The surface water drainage strategy has been developed in accordance with the principles set out in the Kingsmere Bicester Design Code, July 2008, and the agreed site wide surface water strategy and the enclosed catchment layout drawing 1903/D/006 Rev U.

In accordance with these overarching design criteria the preferred method of surface water removal for storms up to the 1 in 10 storm event is via infiltration techniques, subject to the sub-soil providing suitable infiltration rates. If the soil rates are not conducive to infiltration then surface water is to be discharged into the strategic surface water network at the 1 in 10 storm maximum permitted rates stated on drawing 1903/D/006 Rev U (6.0l/s for the Local Centre and 2.2l/s for the car park (pedestrian area) to the south west of the local centre). These rates supersede the 8l/s quoted in the Reserved Matters Application. However a controlled discharge

rate of 2.2l/s for the car park area is not practicable, therefore in line with best practice 5l/s is the minimum attenuation flow to mitigate the risk of blockage and associated maintenance liabilities.

For both infiltration and non-infiltration systems, storms in excess of the 1 in 10 year event shall be allowed to “overflow” into the strategic drainage network at an unrestricted rate. The water levels within the attenuation system for the 1 in 30 year storm event shall have a minimum freeboard of 300mm to the finished levels. The highway drains and swales will lead to the surface water attenuation and storage facilities that are designed to store the excess runoff from a 100 year storm including an allowance for climate change (30%), in line with the principles in the Kingsmere Bicester Design Code.

The car park to the south west of the local centre is to be connected directly to the strategic drainage network with zero attenuation as set out in enclosed drawing 1903/D/006 Rev U. The detailed design of the car park has been completed and is presented in drawing 1903/LCP/500 Rev J.

PROPOSED SURFACE WATER DRAINAGE REGIME

For the purpose of this Drainage Strategy Statement it has been assumed that infiltration is not possible and that therefore the surface water is to be attenuated and discharged into the strategic site wide network. Infiltration testing should be undertaken at the detailed design stage to the requirements of BRE 365 and, if practicable, the drainage should be designed to provide for partial or full infiltration via the same pervious paving installations as set out in this Drainage Strategy Statement.

Both drainage strategies are based on the masterplan (received February 2016) enclosed in drawing 1903/D/122 Rev B.

LOCAL CENTRE DRAINAGE REGIME

An assessment of the proposed masterplan identified a catchment area of 0.547 ha; due to the nature of the site it has been assumed that this area is 100% impermeable.

Using Quick Storage Estimate (Design Suite for Micro Drainage) the approximate attenuation volumes have been calculated based on the agreed discharge rate of 6 l/s as part of the outline planning application. The approximate attenuation volume required based on the 85th percentile is 126m³; refer to the enclosed Area 2 Calculations.

Based on the nature of the site, the following Sustainable Drainage Systems (SuDS) could be implemented to provide the required attenuation volume based on the above:

- Porous Paving; and
- Storage Tank, such as cellular storage

In accordance with the SuDS hierarchy in the Kingsmere Bicester Design Code a porous paving system should be used. However, porous asphalt is prone to damage from HGV movements and is therefore not considered to be an appropriate surface finish for the service yard area. Instead, it is proposed to use a traditional impermeable asphalt pavement construction but with an open graded sub-base as used for porous paving installations; traditional gullies and /or linear drainage systems will collect surface water and discharge into the open graded sub-base. This system retains the surface water attenuation and pollution control properties of porous paving whilst mitigating against the risk of HGV damage. If, at the detailed design stage, the open graded sub-base alone is found to provide insufficient attenuation then additional storage in the form of cellular tanks shall be used.

No infiltration shall be permitted within 5m of buildings.

An area of 0.203 ha has been identified as suitable for the open graded sub-base (refer to drawing 1903-D-122 Rev B). Assuming 250mm asphalt construction overlying a sub-base construction depth of 500mm and 30% porosity, calculations indicate that this area would be sufficient to provide the required attenuation volume whilst complying with the above design criteria for the 1 in 10 year, 1 in 30 year and 1 in 100 year plus climate change storm events. The depth of the sub-base should be reviewed at the detailed design stage.

The above permeable paving has been modelled within source control (Design Suite for Micro Drainage) with a maximum discharge of 6.0 l/s for the 10 year rainfall event, and weir overflow for storms in excess of this event. The simulation shows that the permeable pavement design complies with the requirements of the Kingsmere Bicester Design Code as set out in the introduction above; the full calculations are enclosed.

The finished levels are currently unknown, therefore check dams maybe required within the permeable pavement design, and this should be investigated at the detailed design stage.

The Local Centre surface water drainage is to be connected into Manhole S85 (as shown on the strategic drainage network detailed design drawing 1903/D/107 Rev V), via a 150mm diameter pipe with a connection invert level of 70.740mAOD (refer to 1903-D-117-G, for the manhole schedule) by a conventional gravity system. It is proposed that the outflow from the Local Centre Drainage Regime will be controlled by either a hydrobrake or orifice plate to restrict discharge for storms up to the 1 in 10 year event and with a weir overflow for storms in excess of the 10 year event. The full details of the flow control device will be determined at the detailed design stage.

For details of the drainage strategy for the Local Centre Drainage Regime, refer to WSP | Parsons Brinckerhoff drawing 1903-D-122.

CAR PARK DRAINAGE REGIME

As mentioned above, the detailed design of the car park itself has been completed in accordance with the overarching requirements and is shown in drawing 1903/LCP/500 Rev J. Similar to the highway network, this comprises of an un-attenuated system that discharges directly into the strategic network and is attenuated in the detention basin at the downstream end of the strategic network before being discharged off site.

However, the pedestrian area to the north of the car park (shown on 1903/LCP/500 Rev J) will be drained separately and attenuated prior to connection to the wider site network.

As part of the outline planning application the discharge rate from this area was set to 2.2 l/s. However, in line with best practice, flow control devices restricting flows to less than 5l/s are considered impracticable because of the high risk of blockage and associated maintenance liabilities. Therefore, the proposed discharge rate from the pedestrianized area has been increased to 5 l/s.

An assessment of the proposed masterplan identified a catchment area of 0.169 ha. As with the Local Centre drainage regime this has all been assumed to be 100% impermeable (refer to drawing 1903-D-122).

Using Quick Storage Estimate the approximate attenuation volumes have been calculated based a maximum discharge of 5 l/s. The approximate attenuation volume required based on the 85th percentile is 28m³; refer to the enclosed for full calculations.

Based on the nature of the site, the following Sustainable Drainage Systems (SuDS) could be implemented to provide the required attenuation volume based on the above:

- Permeable Paving; and
- Storage Tank, such as cellular storage

In accordance with the SuDS hierarchy in the Kingsmere Bicester Design Code permeable paving is to be used. If, at the detailed design stage, permeable paving alone is found to be insufficient then additional storage in the form of cellular tanks shall be used.

From reviewing the masterplan an area of 0.096 ha has been identified as suitable for Permeable Paving. Assuming a sub-base construction depth of 400mm and 30% porosity, calculations indicate that this area would be sufficient for the required attenuation volume whilst complying with the above design criteria for the 1 in 10 year, 1 in 30 year and 1 in 100 year plus climate change storm events. The depth of the sub-base should be reviewed at the detailed design stage.

The above permeable paving has been modelled within source control (Design Suite for Micro Drainage) with a maximum discharge of 5.0 l/s for the 10 year rainfall event, and weir overflow for storms in excess of this event. The simulation shows that the permeable pavement design complies with the requirements of the Kingsmere Bicester Design Code as set out in the introduction above; the full calculations are enclosed.

The finished levels are currently unknown, therefore check dams maybe required within the permeable pavement design, and this should be investigated at the detailed design stage.

The car park surface water drainage is to be connected, via a 150mm diameter pipe, into the proposed upstream car park chamber at an invert level of 70.950mAOD (refer to drawing 1903-LCP-500 Rev J), which subsequently discharges into Manhole S50 as shown on the site wide drainage strategy (drawing 1903/D/006/U) by a conventional gravity system. It is proposed that the outflow from the car park Drainage Regime will be controlled by either a hydrobrake or orifice plate to restrict discharge for storms up to the 1 in 10 year event, and with a weir overflow for storms in excess of the 10 year event. The full details of the flow control device will be determined at the detailed design stage.

For details of the drainage strategy for the car park Drainage Regime, refer to WSP | Parsons Brinckerhoff drawing 1903-D-122 Rev B.

SURFACE WATER TREATMENT TRAIN

It is proposed the drainage system implemented for the two areas discussed above will be designed in accordance with the SuDS Management Train ideology presented within CIRIA C753 "SuDS Manual" and the Kingsmere Bicester Design code.

The stages of the SuDS Management Train will include:

- Gully Pots (discharging to a porous sub-base) and Permeable Paving draining areas of hard standing;
- Onsite attenuation basins, providing attenuation for events in excess of the 10 year storm event.

MAINTENANCE REGIME

WSP | Parsons Brinckerhoff recommend that the maintenance regime of the SuDS features implemented onsite are undertaken in accordance with best practices and in accordance with the recommendations of the CIRIA C753 "SuDS Manual". The maintenance regime for permeable paving is contained within Table 20.1.5 of The SuDS Manual.

It is assumed that maintenance for these structures will be undertaken by a private maintenance company.

FOUL WATER DRAINAGE STRATEGY

INTRODUCTION

The foul water drainage strategy has been developed in accordance with the principles set out in the Kingsmere Bicester Design Code, July 2008, and the agreed site wide foul water strategy and catchment layout drawing 1903/D/005 Rev R.

PROPOSED FOUL WATER DRAINAGE REGIME

Foul flow generation from the Local Centre development is assumed to be 1.8l/s as set out in the overarching foul water drainage strategy drawing 1903/D/006 Rev U. The flow generation should be reviewed at the detailed design stage.

Finished onsite levels are currently unknown, however, based on the surrounding levels it is envisaged that a connection can be made to Manhole F65 at 70.613mAOD (refer to manhole schedule on drawing 1903-D-118 Rev E) by a conventional gravity system.

CONCLUSION

In conclusion, the surface and foul water strategies as set out in this Drainage Strategy Statement are compliant with the requirements of the Kingsmere Bicester Design Code, overarching site drainage strategies on drawings 1903/D/005 Rev R and the SuDS Manual.

Yours sincerely,


James Brimson
Principal Engineer

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List of Enclosed:

Full Calculations

Drawing Numbers:

1903-D-006-U
1903-LCP-500-J
1903-D-122-B
2779-ATR-005-A
1903-D-107-V
1903-D-117-G
1903-D-005-R
1903-D-108-W
1903-D-118-E