TECHNICAL DESIGN NOTE

Hydrock

Project name	Wykham Park Farm, Banbury		
Design note title	Technical Note - Response to Condition 10 Planning Comments		
Document reference	C04583		
Author	Sean Mitchinson		
Revision	P1		
Date	1 July 2020	Approved	☐

This Technical Note has been produced in response to Oxfordshire County Council comments dated 09th June 2020 and should be read in conjunction with the Hydrock Drainage Strategy Report (Ref: WPF-HYD-XX-XX-RP-C0003) and Wardell Armstrong Flood Risk Assessment (Ref: CA10769 dated November 2014)

1.1 Calculations

1.1.1 The Micro Drainage calculations for the whole surface water network have been updated using FEH catchment descriptors. The updated calculations have been included within Appendix E of the Drainage Strategy Report (ref: WPF-HYD-XX-XX-C-RP-0003). In addition to this the volumetric runoff coefficient value has been updated to 0.9 for all calculations. These calculations have also been carried out for all return periods including 1 in 1, 1 in 30 & 1 in 100 year + 40% allowance for climate change and durations from 15mins to 10080 mins.

There are two proposed attenuation basins within the development one serving Catchment 1 and one serving Catchment 2. The critical storm for catchment 1 is the 48hr 1 in 100 year event, this event introduces a maximum storage volume in to the basin of 18584m³. This gives a half drain time of 3910mins, 2.7 days. The critical storm event for catchment 2 is the 48hr 1 in 100 year event, which introduces a volume of 2599m³ in to the basin. This equates to a half drain time of 4331mins 3 days. Half drain times are shown in Table 5 within the Drainage Strategy Report.

1.1.2 The previously approved Flood Risk Assessment (ref: Wardell Armstrong CA10769) calculations have been carried out to determine the effect of the catchment on the downstream field drainage ditch/ordinary watercourses. As the site is located within Flood Zone 1 there will be no direct effect on flood flow routes or floodplain storage. As the site is currently greenfield with no hardstanding the development will result in an increase in the impermeable area of the site, which could result in increased surface water run-off rates & volumes. It is therefore necessary to reduce the proposed run-off rates for the development to pre-development rates.

The Environment Agency were consulted in 2013 with regard to the proposed discharge rate and a discharge rate of 2l/s/ha was agreed as acceptable. The FRA document proposed that a maximum proposed development area of 20ha was assumed giving a total run-off rate for the site of 60l/s. Based on the calculated impermeable areas for the site for catchment 1 & catchment 2 the maximum discharge rate has been reduced to 44.6l/s, base on a contributing area for catchment 1 of 19.8ha and a contributing area for catchment 2 of 2.62ha.

1.1.3 The detailed drainage designs in Appendix B show the pipe numbers shown within the Micro Drainage calculations. These are drawings WPF-HYD-XX-XX-C-0601 to 0604. Catchment 1 discharges to the

existing watercourse in the south east corner at a rate of 39.64l/s (based on 2l/s/ha and an impermeable area of 19.82ha) Catchment 2 discharges to the same watercourse at a rate of 5l/s via a connection to the south off Wykham Lane.

1.1.4 Urban creep calculations have been applied to all the proposed residential development parcels. The proposed impermeable area for catchment 1 is 19.82m² with urban creep added this gives a total impermeable area of 21.255ha. Table 3 in the drainage strategy report shows the areas for each parcel and the additional area added for urban creep. The proposed impermeable areas for catchment 2 is 2.49ha with urban creep added this gives a total of 2.65ha. Table 4 in the Drainage Strategy Report shows the areas for each parcel and the additional area added for urban creep. The total areas including urban creep have been imputed in to the Micro Drainage model, however the discharge rate has been calculated with the original areas i.e. not including urban creep.

1.1.5 The final discharge rate calculated for QMED is ??l/s/ha. However as detailed in the Flood Risk Assessment (ref: Wardell Armstrong CA10769 section 4.3.3) a minimum discharge rate of 2l/s/ha has been agreed after consultation with the Environment Agency.

1.2 Design

1.2.1 The green spaces within the development have been maximised for SuDS use. Green corridors have been developed between the residential parcels to incorporate a swale network to convey surface water at surface level to a main attenuation basin before discharging to the local watercourse network. The green corridors will also include a network of leisure routes to open up the developments to pedestrians and cyclists.

1.2.2 Blue & green roofs may be utilised on commercial buildings such as the primary school or sports pavilion, however this drainage strategy deals purely with the main infrastructure drainage and not with the on-plot drainage. There may also be opportunities to utilise over the edge filter strips for direct to swale discharge, however as the internal parcel road layouts are not known this cannot be shown, in addition this also does not relate to the main infrastructure drainage being considered under this condition.

1.2.3 A combination of swale side slopes are utilised to produce a more varied profile, which will be developed as part of a wider landscaping design. The swale network also provides connectivity for pedestrians and cyclists therefore it will be necessary in some areas to provide access in to the swale profile from the adjacent parcels, this will require slopes at a maximum of 1 in 20.

1.2.4 Freeboard level for attenuation features added to the Drainage Strategy Report in Table 5. In addition to this the freeboard levels have been added to the attenuation basin cross section plan (ref WPF-HYD-XX-XX-DR-C-2101). Freeboard levels have been kept to a minimum of 300mm.

1.2.5 There may be opportunities to provide additional source control methods within the development parcels such as permeable paving, additional shallow swales or bioretention systems. However, the drainage system covered by this drainage condition relates only to the main infrastructure drainage.

1.2.6 Section 3.3.2 within the Drainage Strategy Report details the water quality aspects of the drainage network. Taken from the SuDS Manual the pollution hazard indices for the development are shown in Table 5. This gives figures for suspended solids, metals and hydro-carbons for the different elements of the development. Table 6 in the report shows the mitigation indices of the SuDS features provided within the strategy. Table 6 demonstrates that the treatment train provided is sufficient to remove the pollutants created within the surface water system.

1.2.7 The only hardstanding areas within the infrastructure works is the provision of the spine road. This spine road is to be constructed from a standard bituminous material in accordance with Oxfordshire County Highways standards. Due to the traffic volumes experienced by the spine road and its use by HGVs and buses, permeable materials would not be suitable for the long-term maintenance of the carriageway.

1.2.8 An additional drawing has been produced (ref WPF-HYD-XX-XX-DR-C-2200) showing surface water conveyancing routes identifying surface routes and below ground routes. Cascading site storage is also identified on the plan.

1.3 Other Requirements

1.3.1 As stated above water quality from the site will be improved through the use of a swale network for surface water conveyance to attenuation basins before surface water is discharged to the local watercourses. Table 5 and Table 6 in section 3.3.2 has details of water quality improvements.

1.3.2 Due to the topography of the site for catchment 1 falling from north west to south east, exceedance flows will be conveyed via the swale running along the southern boundary to the open space where the attenuation basin is situated where it will be held. Due to the width of the swales and the tiered design, there is a large amount of additional capacity within the swale network and an additional 400mm of freeboard within the attenuation basin to deal with exceedance flows within catchment 1. Exceedance flows from catchment 2 will be directed towards the attenuation basin via the spine road which fall from west to east following the natural contours. Any exceedance volumes

1.3.3 Cross sectional plans of the swale profiles and attenuation basins are shown on drawing WPF-HYD-XX-XX-DR-C-2101.

1.3.4 A draft Management and Maintenance Plan for the various SuDS elements are included within the Drainage Strategy Report in Table 8. A standalone document can be produced once the responsibility for each SuDS element has been determined.

1.3.5 The Wardell Armstrong Flood Risk Assessment (ref CA10769) states that the site is wholly located within flood zone 1 and is at low risk from both fluvial flooding and surface water flooding. The Environment Agency flood map for fluvial flooding is available in Appendix 2 of the FRA, which highlights flooding along the Sor Brook.

Surface water flooding is also considered to be low risk for the site. The Cherwell DC Strategic Flood Risk Assessment lists a number of sites that may be at risk of surface water flooding. The proposed site is not included on that list. The Environment Agency's surface water flood maps are also included within the FRA in section 4.1.26. The FRA report concluded that there was low risk of flooding from pluvial sources through out the site and that the installation of drainage systems will manage surface water run-off from across the site. The Environment Agency mapping identified one area to the north west corner adjacent to the A361 which is at increased risk from surface water flooding, however this flow does not enter the site and the area is to remain as public open space therefore the drainage regime for this part of the site will function as it presently does.

As it has already been demonstrated that the risk from existing overland surface water flow is low and that proposed drainage systems to be installed as part of the development which mimic the existing topography will mitigate any of the low risk that existed. It is not considered necessary to produce a post development overland flow plan.

1.3.6 Regarding safe ingress/egress the FRA document has demonstrated that provision for safe dry site access is considered to be high. This is based on information taken from the Level 2 SFRA, which states that flood hazard to people for site access is considered low.

1.3.7 It is noted that as built plans of all drainage features are to be submitted upon completion in both pdf and shapefile format, along with photographs of all features.