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NMGH- WP14 Car Park
Drainage Technical Note

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Site Address: North Manchester General Hospital - Car Park, Central Drive

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Surface Water Technical Note

1.1. Project Background

Curtins has been appointed by the NHS Trust to provide a Technical Note detailing the proposed Drainage Strategy for the proposed Car Park located on Central Drive at the North Manchester General Hospital.

The report provides information on the nature of flood risk at the site and follows Government guidance regarding development and flood risk.

The report is based on currently available information and preliminary discussions.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Curtins shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins.

1.2. Proposed Development

The proposed development currently comprises rough open ground which was previously used as a contractor compound to facilitate the construction of the recently completed New Park House (North View). However, prior to this, the site was considered as greenfield.

The proposed development includes provision of a surface level car park for up to 65 car parking spaces and cycle spaces which will be accessed from the existing access on Central Drive.

The site location is shown in *Figure 1.*

Figure 1: Site Location



Masterplan Drainage Strategy

The surface water drainage strategy for this car park has been developed in accordance with the overall drainage strategy proposed for the overall re-development of the North Manchester General Hospital (NMGH). The proposed strategy has also been informed by the recent site investigation completed on the proposed site for the car park which included soakaway testing and assessment through the SuDS surface water discharge hierarchy.

Surface Water Drainage Strategy:

Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

In May 2022, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Rather than nationwide allowances, each area has its own peak rainfall allowances. In the case of the proposed site area, this is the Irwell Management Catchment. Table 4 demonstrates the climate change allowances with central and upper end allowances being considered for the 1% event.

Table 1: (Extract Environment Agency Guidance) Peak Rainfall Intensity Allowance in small and urban catchments

Irwell Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	35%
2070s	30%	40%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	40%
2070s	30%	45%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

Based on the nature of the development, a lifespan of 8-10 years is anticipated. Therefore, the potential climate change allowance for up to the 2050's is 25% and therefore the design accommodates an additional 25% increase in rainfall.

In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

1) Discharge to ground – Having completed suitable soakaway testing it was concluded that the strata below the site is impermeable and would not sustain infiltration as a method of surface water disposal.
2) Discharge to Water course – The nearest watercourse to the site is the River Irk which is located some distance to the north of the site. Due to the distance and also levels it is not feasible to provide a direct outfall to this watercourse. As part of the development of the overall surface water strategy for the re-development of NMGH there is an aspiration that the majority of the new development will ultimately discharge direct to the River Irk, and as such removing surface water from the wider United Utilities network.
3) Discharge to Surface Water Sewer – The NMGH hospital site is served by a number of private drainage networks which then discharge to different United Utilities public sewer networks which surround the site. All of these private networks ultimately connect to the wider combined public sewer network currently. There is an existing private surface water sewer within Central Drive and on this basis, the proposed drainage network is to connect to this surface water system.
4) Discharge to Combined Sewer – Based on the above preference is to connect to the surface water system on site.

In the development of the surface water drainage strategy the site is considered as greenfield. The masterplan surface water strategy made allowance for the site to be discharged at a maximum pass forward flow rate of 5 l/s. This rate would allow the system to maintain a minimum 100mm diameter outfall to aid in the prevention of blockages caused by detritus material whilst maintaining a greenfield type of scenario.

The design of the surface water network will account for storm events up to and including the 1 in 100yr plus climate change events while where possible maintaining the following levels of service:

- No surcharging – 1 in 2-year event
- No flooding – 1 in 30-year event
- Controlled Flood Permitted – 1 in 100-year event

The network also accommodates potential surface water run-off from the existing landscaped banking along the southern boundary (North View). An allowance of a 0.35 coefficient has been applied to the surface area draining towards the car park based on the assumption of heavy soils on a steep (1 in 3) banking, resulting in a portion of overland flows entering the car park area.

The design has also considered exceedance events up to the 100 Year +45% event to determine flow routes for surface water to ensure that it doesn't impact on existing development (buildings).

Through the introduction of a restricted surface water discharge allowance there will be a requirement to provide attenuation to accommodate the volumes generated within the site. The car park will be of a permeable gravel finish contained within a plastic matrix for strength which will be laid above a voided stone sub-base (Type 3) layer which will provide capacity for the attenuated run-off, before connecting to a perforated pipe and discharging to the surface water sewer within Central Drive at a maximum of 5 l/s.

The minimum stone (type 3 subbase) layer required for vehicle loading is 300mm, however as the surface profile of the car park is sloped at approximately 1 in 30 in a south-east to north-west direction, this will in result in the surface water collecting with the lower level areas of the car park and as such will require a deeper sub-base thickness in this area of the site. Where the stone is used for attenuation, the stone layer has been increased to 800mm depth to provide the necessary volume provision based on a void ratio of 30%.

The construction is a permeable pavement solution and as such there will be no requirement for the more traditional infrastructure to capture the surface water run-off and required attenuation.

The depth of the stone will be such that at it will provide the necessary attenuation volume. A series of perforated pipes running within the 30% void stone subbase will convey the surface water to the outfall.

In addition, the stone will provide pollution treatment in accordance with CIRIA SUDs before discharge into the private surface water sewer within Central Drive.