CAMBRIDGE ROAD ESTATE – PLANNING APPLICATION 20/02942/FUL

PHASE 1 DRAINAGE STATEMENT – APRIL 2021

UPDATED DOCUMENT

A revised Phase 1 Drainage Statement was issued in April 2021 and has not been subject to any revisions since.

consulting engineers

Cambridge Road Estate Regeneration
Kingston
KT1 3EF

Drainage Strategy

Date: 09th April 2021

Project Number: A6424

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1.0 Brief

1.1 CTP was commissioned by Cambridge Road (RBK) LLP to undertake a Drainage Strategy for the proposed foul and surface water drainage at the proposed Phase 1 development of the Cambridge Road Estate scheme. The site is located at Cambridge Road Estate, Kingston, KT1 3EF. This Drainage Strategy supports the information provided in the overall scheme Flood Risk Assessment REF: A6424 – Cambridge Road Estate FRA.

1.2 Outline Planning Consent is being sought for the scheme; however, this proposal is being submitted as Full Detailed Planning application for Phase 1.

1.3 This Drainage Strategy has been prepared to support the full detailed part of the planning application and will demonstrate how the proposed drainage design will comply with the CTP Flood Risk Assessment REF: A6424 – Cambridge Road Estate FRA.

1.4 The site is considered to be a brownfield site as it has been previously developed. However, it is intended that the proposed surface water run-off will be as given by the CTP figures in the FRA, which has been agreed with Thames Water.

1.5 CTP has no responsibility to any other parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents of this report solely at their own risk.

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2.0 Existing Site Parameters

2.1 Existing Masterplan Site Area:

Type of Area	Impermeable	Permeable	Total
Roof, Road and Parking	7.12		7.12
Grass Areas		1.74	1.74
Total (ha)	**7.12**	**1.74**	**8.86**

2.2 Proposed Masterplan Site Area:

Type of Area	Impermeable	Permeable	Total
Roof , Road and Parking	6.93		6.93
Grass Areas		1.93	1.93
Total (ha)	**6.93 (net decrease)**	**1.93 (net increase)**	**8.86**

2.3 Therefore, the proposed construction results show a decrease in impermeable area.

3.0 Design Criteria

3.1 Foul water:

The total discharge unit design method will be used at detail design as described in BS12056-2-2000. It is proposed that the new foul network discharges into the existing network via gravity.

3.2 Surface water:

In the absence of the more accurate FEH rainfall values, a design rainfall of 26.25mm/hr will be adopted. The rainfall will be modelled for several storm frequencies and a range of durations using the Windes Micro-drainage software. It will also take into account a 40% increase for climate change.

The discharge rate for the surface water will be attenuated to match the proposed rate which has been calculated in the FRA by CTP as: 10l/s cumulative for the Phase 1 development for the 1 in 100-year event +40% climate change.

In accordance with the overall flow rates agreed with Thames Water in the masterplan drainage strategy, Phase 1 is required to limits its surface water discharge rate to 10 l/s (based on the size ratio of Phase 1 to the whole site).

Phase 1 is split into two areas A and B. Phase 1A has an area of 1.272 ha and is thus permitted to discharge at 6.0l/s. Phase 1B has an area of 0.878 ha and is thus permitted to discharge at 4.0 l/s.

Refer to Appendix F for Thames Water correspondence.

4.0 Existing Drainage networks

4.1 The following information is based on the topographical survey (Appendix C), the Thames Water Asset Plan (Appendix D) and also a CCTV survey report by SurvaTec (not included in this report due to the size of the file, but can be issued upon request).

4.2 Foul Water Drainage:

The foul system flows towards the East of the site and falls towards the West of the site, with the pipe sizes increasing from 150mmØ up to 300mmØ.

Foul water discharges from the site in two locations. One run discharges in the North-West corner of the site and connects into a large existing 525Ø foul sewer running along Cambridge Road. The other discharges from the site via drainage in Somerset Road flowing Westwards.

Based on the capacity check undertaken by Thames Water, it has been confirmed that the existing system can accommodate the additional flow generated by the development. See appendix F for Thames Water correspondence.

All pipes have been confirmed by CCTV survey information, however, some do not show on the Thames Water Asset plans.

The number of appliances discharging into these sewers are still to be confirmed during detail design.

4.3 Surface Water Drainage:

The existing surface water drainage consists of smaller diameter pipes (225mmØ and 300mmØ) in the east of the site which increase in size as the system moves towards the West of the site.

There are two large surface water sewers to the West of the site of 525mmØ and 600mmØ. Thames Water sewer records indicate that both of these sewers discharge into the network in Cambridge Road flowing Westwards. **Please refer to the proposed drawings A6424-1550-P1 Proposed Phase 1A Drainage Layout and A6424-1551-P1 Proposed Phase 1B Drainage Layout enclosed in Appendix B.**

There is no information to indicate that there is any form of attenuation is present within the existing surface water network. It is assumed that run off is discharged at an uncontrolled rate directly into the sewer running along Cambridge Road/Hawks Road.

5.0 Proposed Drainage Networks

5.1 **The proposed drainage will be designed and constructed to adoptable standards in accordance with Water UK Design and Construction Guide. (http://www.water.org.uk/sewerage-sector-guidanceapproved-documents/).**

The majority of the existing drainage will be abandoned and replaced to suit the proposed layout. As the development is being constructed in phases, there are existing properties that need to be served by the existing drainage network while earlier phases of construction are completed. This will govern at which stage in the construction of the proposed development the necessary diversion works will take place. See Appendix E for preliminary diversion routes and during which phase they will be carried out.

The diversion routes shown are subject to more detailed investigation of the existing drainage networks.

5.2 Foul water drainage:

The proposed foul water system will need to serve the demand from all the residential blocks.

It is proposed to connect all internal soil and vent pipes for the units to new inspection chambers and manholes situated outside the buildings. These inspection chambers and manholes will feed into the proposed foul pipe system around the blocks.

The existing foul network will require increases in pipe sizes due to the increase in flow resulting from the number of properties. See Appendix B for the proposed Drainage Strategy.

5.3 Surface water drainage:

As the site is located within the Greater London area, it is subject to complying with The London Plan. Policy 5.13 Sustainable Drainage states "Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1) store rainwater for later use
2) use infiltration techniques, such as porous surfaces in non-clay areas
3) attenuate rainwater in ponds or open water features for gradual release
4) attenuate rainwater by storing in tanks or sealed water features for gradual release
5) discharge rainwater direct to a watercourse
6) discharge rainwater to a surface water sewer/drain
7) discharge rainwater to the combined sewer.

Based on the latest Masterplan area, the Greenfield Run-off rates for each storm event are as per the table below. From a previous area calculation, the rate agreed with Thames Water to be used is 43.4l/s. The proposed discharge rates below equate to significantly less than the existing brownfield discharge rates and therefore provide significant betterment to the area. The betterment will be quantified for each phase during the detail design processes. A copy of the calculations is located in Appendix H.

	Brownfield Runoff Rates l/s	Greenfield Runoff Rates l/s
Qbar Urban	48.8	13.1
Qbar 1 year storm event	41.4	11.1
Qbar 30 year storm event	84.7	29.7
Qbar 100 year storm event	97.7	41.8

In accordance with the overall flow rates agreed with Thames Water in the masterplan drainage strategy, Phase 1 is required to limits its surface water discharge rate to 10 l/s (based on the size ratio of Phase 1 to the whole site).

Phase 1 is split into two areas A and B. Phase 1A has an area of 1.272 ha and is thus permitted to discharge at 6.0l/s. Phase 1B has an area of 0.878 ha and is thus permitted to discharge at 4.0 l/s.

In order to achieve these rates, using the Quick Storage Estimate method in Microdrainage Windes, Phase 1A will require a storage volume of between 821-1099m3 and Phase 1B will require a storage volume of between 571 – 765 m3. Please refer to Appendix G.

The storage volume stated above has been calculated for a design storm of 1 in 100 year + 40% climate change.

Therefore it is proposed to use the higher value calculated to provide a conservative design at this stage.

5.4 **With reference to Page 166 in Chapter 7 of the Landscape Architects Report Ref no: 503-PTA-MP-XX-RP-A-9002_Ch07_Landscape Design, the following hierarchy of suds features are proposed in the design for Phase 1:**

Drainage item	Incorporated (Yes or No)	Reasons
SUDS Hierarchy 1 Store Rainwater	Y	Rainwater harvested from the building roofs and first floor gardens will be stored in water butts for use in irrigation of podium landscaping. Plot C will have a central tank within the courtyard. Plot E will have a central tank integrated in the podium car park which will recirculate rainwater back into the podiums for irrigation of the podium gardens.
SUDS Hierarchy 2 Infiltration Techniques	Y	The site is located over the Langley Silt Member which comprises clay and silt. The underlying bedrock geology comprises the London Clay Formation. Therefore it is a relatively impermeable soil. However where rainwater falls on soft landscaping, it will for the most part be used by the planting for self-irrigation. This applies to brown roofs as well as planted areas at ground floor and podium level. Rainwater will also be diverted below the root-balls of street tree pits to be used by the trees.
SUDS Hierarchy 3 Attenuate rainwater in ponds or open water features	Y	Where rainwater falls on soft landscaping or permeable paving areas it will be captured and attenuated, partially to be used by the planting for self-irrigation with the remaining being gradually released into the network. This applies to green and brown roofs, podium gardens, soft planting at ground floor, tree pits and paving to parking bays. Crated storage is also provided adjacent to Plot C for attenuation.
SUDs Hierarchy 4 Attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Where open water features are not appropriate or desirable in the landscaping strategy, for example where larger hard paved areas allow greater on street activity, crated storage will be buried below ground to be held before release into sewers at greenfield rates.
SUDs Hierarchy 5 Discharge rainwater direct to a watercourse	N	There is not a watercourse nearby.
SUDs Hierarchy 6 Discharge rainwater to a surface water sewer/drain	Y	Where surface water falls on an adopted street, it must be discharged directly into the surface water drainage network.

SUDs Hierarchy 7 Discharge rainwater to the combined sewer.	N	This is the existing solution and we are NOT increasing the surface water flow.

Infiltration methods for the scheme were investigated, however infiltration has not been recommended due to the result in the Site investigation.

The new impermeable area for the proposed development has decreased from the existing development. However, prior to the surface water discharging off site, the run-off will be attenuated on site, following the above SuDS Hierarchy.

It is proposed to positively drain the new impermeable areas using one or more of the following methods:

i) Tanked permeable paving in the car parking and footway areas.
ii) All surface water run-off to flow through a Hydrobrake flow control which limits the discharge to the approved rate of 10l/s for the whole Phase 1 site.

It is intended that all of the surface water run-off from the roofs and hard-standing areas will eventually be discharged into the attenuation tanks. The water once collected from the gutters will flow through a series of inspection chambers, connected by a network of carrier pipes. Prior to entering into the attenuation tanks, the water will flow through a catch pit manhole. The discharge from the attenuation tanks will be controlled by hydro-brake flow control devices.

It is intended that of the surface water run-off from the external hardstanding areas will be discharged into tanked granular fill in the tanked permeable car parking bays. These tanked permeable bays are shown on the A6424-1550-P1 Proposed Phase 1A Drainage Layout and A6424-1551-P1 Proposed Phase 1B Drainage Layout enclosed in Appendix B.

The water, once collected from the channel drains and gullies, will flow through a series of carrier pipes before entering into the tanked granular fill below the permeable paving. The flows from the tanked granular fill areas will discharge to the attenuation tanks before entering the public sewer.

The quality of the run-off water will be also be improved by passing through the tanked granular fill under the permeable paving.

The indicative depth of the granular fill under car parking areas is 600 mm. This is based on a 1 in 100-year storm plus 40% climate change.

The storage volume for each type of SuDS for both Phase 1A and 1 B is also stated on Drawing No. A6424-1550-P1 Proposed Phase 1A Drainage

Layout and A6424-1551-P1 Proposed Phase 1B Drainage Layout enclosed in Appendix B.

6.0 Further Surveys and Investigations

CCTV surveys have been undertaken which prove the layout of the existing drainage. These surveys have identified additional sewers on site which were not shown on the original Thames Water Asset plans, but have been assumed to be adopted by Thames Water when all non-private sewers were transferred to the water authorities in 2011.

The survey information has allowed the existing drainage to be accurately plotted and tied into the information shown on the Thames Water Asset plans.

7.0 Conclusion

By following this strategy during the detailed design stage, the proposed drainage design will comply with the latest London Plan and the FRA undertaken by CTP. This strategy will reduce the risk of future flooding as the proposed flow rates discharging off site will be less than the existing brownfield site rates.

In addition, the overall quality of the water run-off from the car parking areas will be improved using catch-pit manholes and tanked permeable paving and the discharge off site will be attenuated to 10l/s.