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Appendix A – Foul Water and Surface Water Drainage Strategy Drawings

Appendix B – Surface Water Drainage Calculations – Microdrainage & Tubosider
1.0 Introduction

Pick Everard has been appointed to provide the Civil Engineering design for the construction of a new 3 story teaching block at Kettering Science Academy.

This report provides details of the proposed strategy for both foul water and surface water drainage.

Details are also provided of the proposed pavement construction across the site.

This report should be read in conjunction with the relevant Planning Drawings included as an Appendix to this report.
2.0 Site Description

2.1 Existing Site

The proposed site for the new teaching block lies within the boundary of the existing Kettering Science Academy grounds. The site is currently grassed, and mostly level, with a significant adjacent change in level leading to the lower playing field area.

2.2 Proposed Site

The development is to include a 3 story teaching block, with associated external paving to link to the existing site footpaths.

3.0 Foul Water Drainage Strategy

3.1 Existing Foul Water Drainage

The existing site is served by a part-adopted foul water drainage network, which drains in a generally easterly direction before leaving the site. It is understood that the site drainage discharges to the public foul water sewer network adjacent to the River Ise.

3.2 Proposed Foul Water Drainage

The foul water drainage to the building will discharge via several vertical risers to new chambers located on the existing adjacent foul water drainage. A diversion of the existing site foul water drain will be required to re-route around the proposed building location.

4.0 Surface Water Drainage Strategy

4.1 Existing and Proposed Surface Water Drainage

The attached A0 plan, dated 18 March 2019, shows the extent of the existing site, and also the surface water drainage network that serves it. The existing school was constructed around 10 years ago, and as you will see incorporates several surface water drainage features, including open detention ponds with permanent standard water, detention basins without permanent water which only fill during times of storm, and filter drains and reed beds partly to deal with flows from vehicular areas.

In addition, the existing drainage network includes a large below ground attenuation tank in the form of twin oversized pipes. This is the last feature on the surface water drainage network before the surface flows discharge to an off-site 450mm diameter surface water sewer. It is understood that this in turn discharges to the adjacent River Ise.

On the attached plan we have marked up the area of the proposed new building. As you will see this is a very small area compared to the site as a whole. The approach we have taken is to utilise the existing surface water drainage network wherever possible to serve the new building.
Unfortunately, part of the proposed construction site overlays the existing below ground surface water attenuation tanks. We therefore propose to shorten the tanks by 5m at the northern end and re-provide this storage capacity on the southern end where we have sufficient space.

In addition to this, we have considered the surface water flows from the new building. Microdrainage calculations, Appendix B, have been undertaken to determine the attenuation storage volume that would be required to serve the new building alone. This assumes that we will not amend the existing final flow control from the site, which is currently a hydrobrake located at the downstream end of the oversized pipe attenuation storage. Currently this limits the flow to 5l/s.

On this basis we have determined, Appendix B, that we need to provide an additional 168m³ of attenuation storage, based on the 100yr storm plus 40%. This equates to 17.1m of twin oversized pipe to match the existing attenuation storage pipe sizes.

We therefore propose to extend the attenuation tanks at the southern end by 23m overall to take account of the new building, and also the re-provided storage to serve the existing site.

A Flood Risk Assessment was considered. Since the proposed development lies in flood zone 1, is less than one hectare and is not in a critical drainage area, a flood risk assessment is not required.

5.0 Site Hard Landscaping

The hard landscaping at this site is limited to a new path that will run between the new teaching block and the existing school buildings. Drainage is provided to convey surface water flows to the attenuation tank mentioned in 4.1 above, and sufficient volume is provided for this. Further details of the surfacing material will be developed as the design progresses.
6.0 Sustainability and Environmental Considerations

6.1 Foul Water Drainage

The most sustainable solution is to connect the new system into the existing foul drainage system. The provision of a local treatment unit e.g. Klargester offers no advantages at this location.

6.2 Surface Water Drainage

The proposed surface water solution is SUDs compliant. The proposal effectively reduces the impact on the environment and potentially reduces pollution due to the use of the underground retention tanks.

We appreciate that this proposal does not necessarily include some of the more visible SUDS features. However, given the extensive features that are already provided at this site, we feel that this is the most appropriate solution in this instance. We are of course limited by the fact that this is an operational school site, and therefore open surface water features are generally not acceptable, although we acknowledge that there are a number of such features already within the site boundary. It should be noted that this school does not permit pupils to access the green spaces at break or lunchtime, only for sports which are clearly supervised by teachers. Therefore, locating an open surface water feature near to the sports pitches, as our new building is, would likely not be acceptable to the client.
Appendix A – Foul Water and Surface Water Drainage Strategy Drawings
Appendix B – Surface Water Drainage Calculations – Microdrainage & Tubosider
Global Variables require approximate storage of between 168 m³ and 168 m³. These values are estimates only and should not be used for design purposes.

Enter M5:60 between 8.000 and 35.000
**Microdrainage Calculations:**

- **Impermeable Area:**
  - 960 m² (N.B. Footprint)
  - 300 m² (Footpaths)
  - 1260 m²

  \[ \frac{960}{1260} = 0.76 \text{ Ha} \]

- **Discharge Rate:**
  - Zero l/s

- **Worst case:**
  - 168 m³ (see email, 15/1/19)

**Length of Tubosider required**

- **Existing 2 no. 150m long, 2 1/2 m Ø.**

  **Volume:**
  \[ V = \pi r^2 l \]
  \[ 168 m^3 = 3.142 \times 1.25^2 \times l \]
  \[ l = \frac{168}{3.142 \times 1.25} \]
  \[ l = \frac{168}{4.909} \]
  \[ l = 34.22 \]

If we use 2 no. pipes side by side as existing then we need 2 no. 17.11m

\[ l = 30 \text{ yd} = 2 \times 10 \text{m} \]
\[ 1 \times 100 \text{ yd} (100%) = 2 \times 15.9 \text{m} \]
\[ 1 \times 100 \text{ yd} (100%) = 2 \times 17.11 \text{m} \]

**REQUIRED STORAGE**

- 2 no. 2.5 m Ø x 17.11 m Tubosider