

Technical Note

Project: Barnsley Town Centre Redevelopment - Drainage TEN

Client: Barnsley M.B.C

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1.0 Introduction

Barnsley M.B.C propose to redevelop approximately 2.75ha of land in the centre of Barnsley for commercial purposes.

Alan Wood and Partners have been commissioned to provide drainage advice for the proposals.

The intention of this Technical Note (TEN) is to provide a brief review of the existing site and the proposals in relation to drainage.

2.0 Sources of Information

The information collected to assess the existing and proposed drainage is derived from a number of sources, which are summarised below.

- Topographical Survey of the site
- Yorkshire Water (YWS) public water main and sewer network plans dated 30/6/14
- WYG Indicative Drainage layout dated 4/5/11
- WYG Proposed diversions drawing dated 31/3/11
- IBI Parameter plans drawing (BBTC_IBI_XX_A_F100_PL00_001)
- IBI Site section drawing BBTC_IBI_MC_A_F100_SE (AA-DD)

3.0 Yorkshire Water Requirements

Yorkshire Water's requirements are for separate systems for foul and surface water drainage. Current guidelines also recommend that a degree of improvement is made to the current drainage system from existing sites.

4.0 Existing Runoff

The site is located in the middle of Barnsley town centre and as such the existing development is 100% impermeable. Based on this we have calculated the existing surface water run-off to be 382 litres per second for a 1 in 1 year storm. As previously mentioned, Yorkshire Water guidelines recommend that a degree of improvement is made to the current drainage system. With this in mind a 30% reduction in surface water run-off will be incorporated in the new development reducing the permitted flow to 267 litres per second.

5.0 Surface Water Flows

5.1 Proposed System

The site investigation identifies that the use of soakaways for the disposal of surface water will not be possible due to the ground on the site.

A traditional type system with positive outfall is therefore proposed.

The proposed system will be non-adoptable. However, the surface water drainage system should be designed in accordance with Sewers for Adoption as this is best practice. The sewer layout proposed will be as shown on the preliminary layout drawing. It will consist of sewers laid beneath the underground carpark and service areas. The system must be designed to cater for a 1 in 100 year rainfall event including an allowance for climatic change of 20%.

Surface water balancing will be required due to the reduction in flow outlined above. Oversized carrier sewers are proposed in this instance. These are indicated on the drainage layout drawing, and will be up to a maximum size of 1350mm diameter.

Due to the topography of the site the new development will have two outfalls which will both discharge into Sough Dyke, an existing culverted watercourse running along the northern and eastern extents of the site. The first of the outfalls will be located to the north west of the site, beyond the extents of the proposed underground carpark/servicing area. The level at this position is approximately 5m higher than the position of the second outfall. It has been estimated that this outfall will service 0.7ha of the site and the flow will be restricted to 65l/s accordingly.

Prior to the second outfall, the existing Sough Dyke culvert will be abandoned and rerouted via new 1500mm diameter pipework as the existing culvert runs through the footprint of the proposed development.

The second outfall is located to the east of the site at the point where the proposed diversion to Sough Dyke reintegrates with the existing culvert section. It has been estimated that this outfall will service 2.05ha of the site. A flow control device will be installed in the manhole prior to the outfall restricting flow to 202l/s.

5.2 Attenuation Estimation

Based upon an impermeability of 100% for the development the following storage volumes will be required.

30 year storm event – approx. 183.6m³

100 year storm event + 20% climatic change – approx. 424.6m³

5.3 Storage

Attenuation storage can be provided in a number of ways: oversized pipes, culverts, geo-cellular crates, basins or with the drainage network. However due to the location of the pipework, the use of oversized pipes is proposed in this instance.

5.4 Sustainable Drainage Systems (SuDS)

The use of SuDS is always encouraged, however due to the commercial nature of the site as well as the location the use of soft SuDS techniques are not appropriate, and storage below ground is proposed.

6.0 Foul Water Flows

6.1 Proposed System

For the proposed development foul flows should be collected in a separate private below ground foul water sewer system designed to meet the standards of the Building Regulations Part H.

The foul drainage proposed will consist of runs of 150mm diameter pipework, laid at a minimum gradient of 1 in 150 in accordance with Sewers for Adoption.

Part of the existing 600mm diameter combined sewer will be abandoned as it runs directly through the proposed new building to the north east of the site. This section will be replaced by new 600mm diameter pipework diverting the sewer around the outside of the new building. The foul flows from the new development will connect into the existing manhole directly downstream of the abandoned sewer. From here it will run into the existing 600mm sewer section which is being retained. The pipes downstream of this point are upsized to 750mm diameter. No increase in the existing flow is anticipated as a result of the development and as such we do not anticipate capacity to be an issue.

6.2 Miscellaneous

The information included in this report is subject to detailed design and co-ordination with the project team.

6.3 Limitations

As noted previously, a full hydraulic model of the existing system has not been constructed, only simplified estimates have been used.

At the detailed design stage it is recommended that a detailed model is built.

7.0 Conclusion

It can be concluded that the foul drainage system serving the site will discharge into the existing combined sewer by gravity.

The surface water run-off will be discharged into Sough Dyke via two gravity outfalls. A peak rate of 267 litres per second will be split between the two outfalls with the flows in excess of this being balanced in over-sized pipework.

Diversions of both the existing culverted Sough Dyke and the 600mm diameter combined sewer will be required to route both structures around the proposed development where they cannot currently pass underneath. Liaison with both the Environment Agency (Sough Dyke) and Yorkshire Water (combined sewer) will be required in order to progress these diversions.