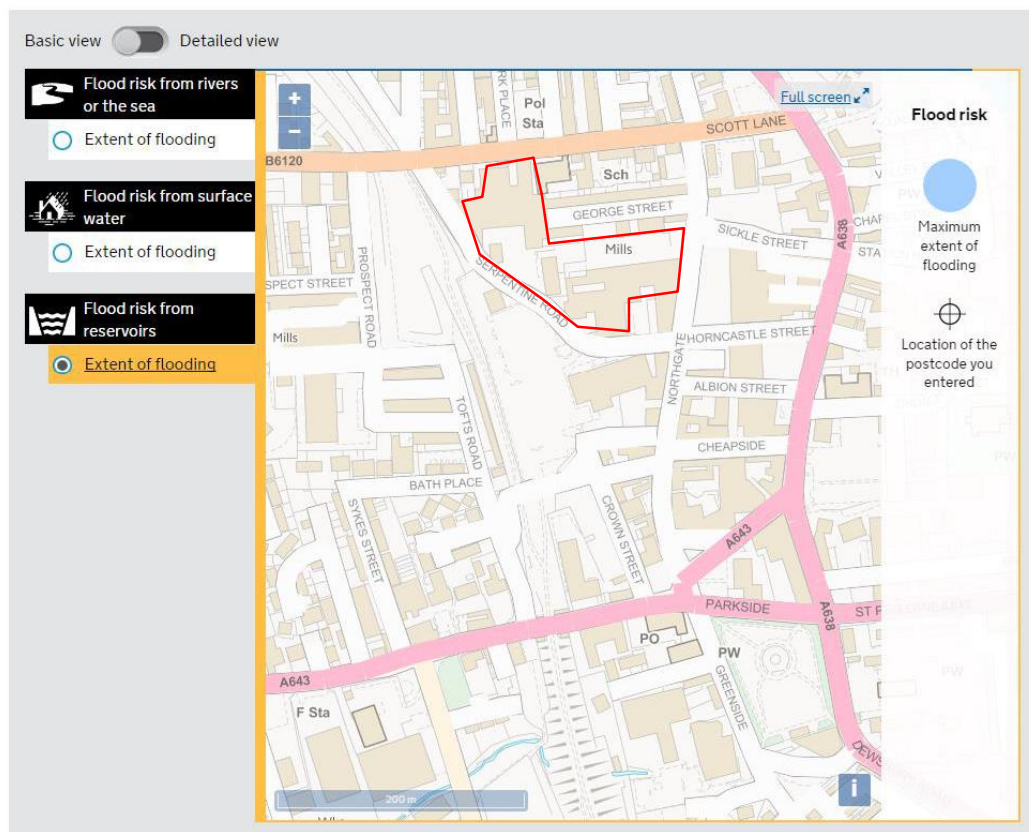


### Groundwater Flood Risk

- 2.4 Subject to completion of site investigation to confirm we would assume that natural ground water level is located well below the site surface and the nature of the strata means it unlikely that there will be perched water above this level.
- 2.5 We therefore do not consider there is a risk of groundwater flooding affecting the development subject to final confirmation upon completion of suitable site investigation.

### Flood Risk from Reservoirs & Large Waterbodies

- 2.6 Reservoir failure flood risk mapping has been prepared by the Environment Agency, this shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst case scenario and is only intended as a guide. An extract from the mapping is included as **Figure 1.3**.



**Figure 1.3 - Environment Agency Reservoir Failure Flood Risk Map**

- 2.7 Mapping demonstrates the site and possible access routes are far removed from the flood extent associated with flooding from large reservoirs. A review of Ordnance Survey mapping shows no other substantial lakes or waterbodies in the vicinity of the site.

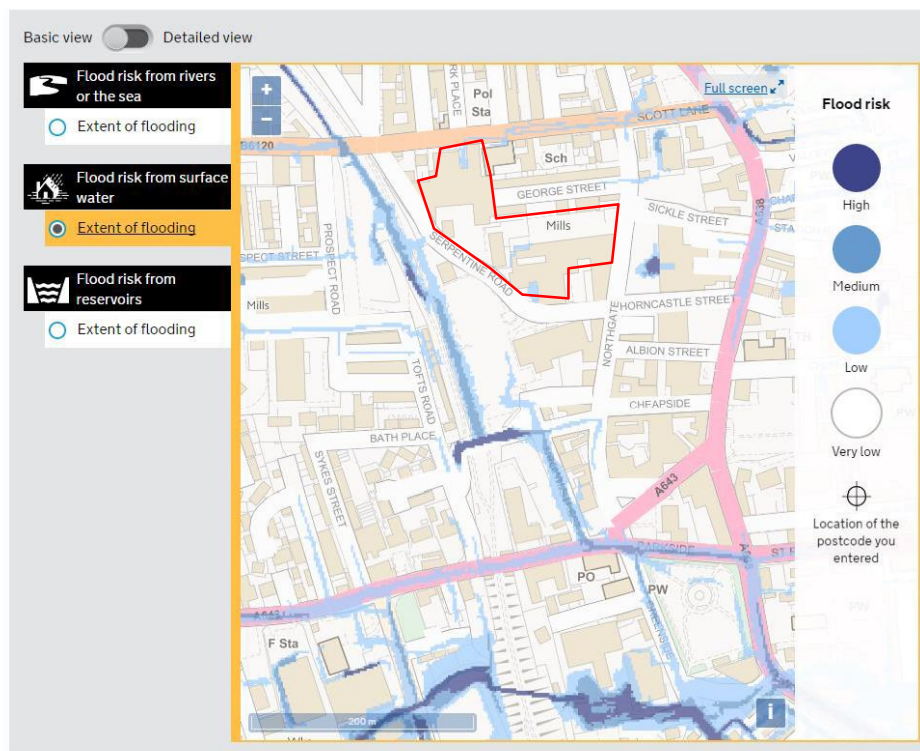
2.8 As such, the risk posed from this source is considered negligible.

### Flood Risk from Sewers

2.9 The site is located in a largely urban setting surrounded by residential properties. The closest sewers to site run adjacent in the adopted highways to the site. The sewers are maintained by Yorkshire Water and as they are a managed asset is assumed to be low risk of flooding.

### Pluvial Flood Risk

2.10 Risk of flooding from surface water mapping has been prepared by the Environment Agency, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. An extract from the mapping is included as **Figure 1.4**.



**Figure 1.4 - Risk of Flooding from Surface Water Mapping**

2.11 The mapping produced by the Environment Agency shows the site is in an area of low pluvial flood risk. Given the site is at risk of pluvial flooding mitigation measures have been considered in Section 3.0 of this report to address any risk.

## **Effect of Development on Wider Catchment**

### *Development Drainage*

- 2.12 The current site is considered to be a Brownfield and the development proposals reduce the impermeable area, however we note to comply with industry standards and Yorkshire Water requirement a 30% reduction in the 1in1 year flow rate will be applied and be the SW flow rate the development will be restricted to up to the 1in100 year event plus climate change.
- 2.13 An appropriate surface water drainage strategy will be required to ensure the proposed development does not adversely affect flood risk elsewhere as a result of changing patterns of surface water runoff/development drainage.

## **3.0 FLOOD RISK MITIGATION**

- 3.1 **Section 2.0** has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be considered within the proposed development detail design to address and reduce the risk of flooding to within acceptable levels.

### **Site Arrangements**

#### *Sequential Arrangement*

- 3.2 The Flood Zone mapping shows the site to be located within Flood Zone 1.

#### *Finished Levels*

- 3.3 Given the site's location within Flood Zone 1, there are no specific requirements for finished floor levels with regard to flood risk. These levels may be set in accordance with wider design requirements.
- 3.4 Nevertheless, it is recommended that a nominal elevation above immediately surrounding ground levels should be provided to deter from the pluvial flood risk identified. The FFL should be set within a range of 150mm to 300mm above existing ground levels.
- 3.5 In addition external areas should be designed to fall away from the proposed building in order to provide additional protection to pluvial flooding.

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

- 4.1 This Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 4.2 This report demonstrates that the proposed development is not at significant flood risk, and simple mitigation measures have been recommended to address any residual risks that may remain. The identified risks and mitigation measures are summarised within **Table 4.1**.

**Table 4.1 - Summary of Flood Risk Assessment**

Flood Source	Proposed Mitigation Measure
Fluvial	Site is shown to be in Flood Zone 1.
Pluvial	FFL set above existing ground levels (150mm to 300mm). External areas to be designed to fall away from building.
Impact of the Development	Strategic surface water drainage strategy prepared for wider development will ensure a sustainable approach to surface water management.

- 4.3 In compliance with the requirements of National Planning Policy Framework, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.

#### **PREPARED BY**



Andy Dyson

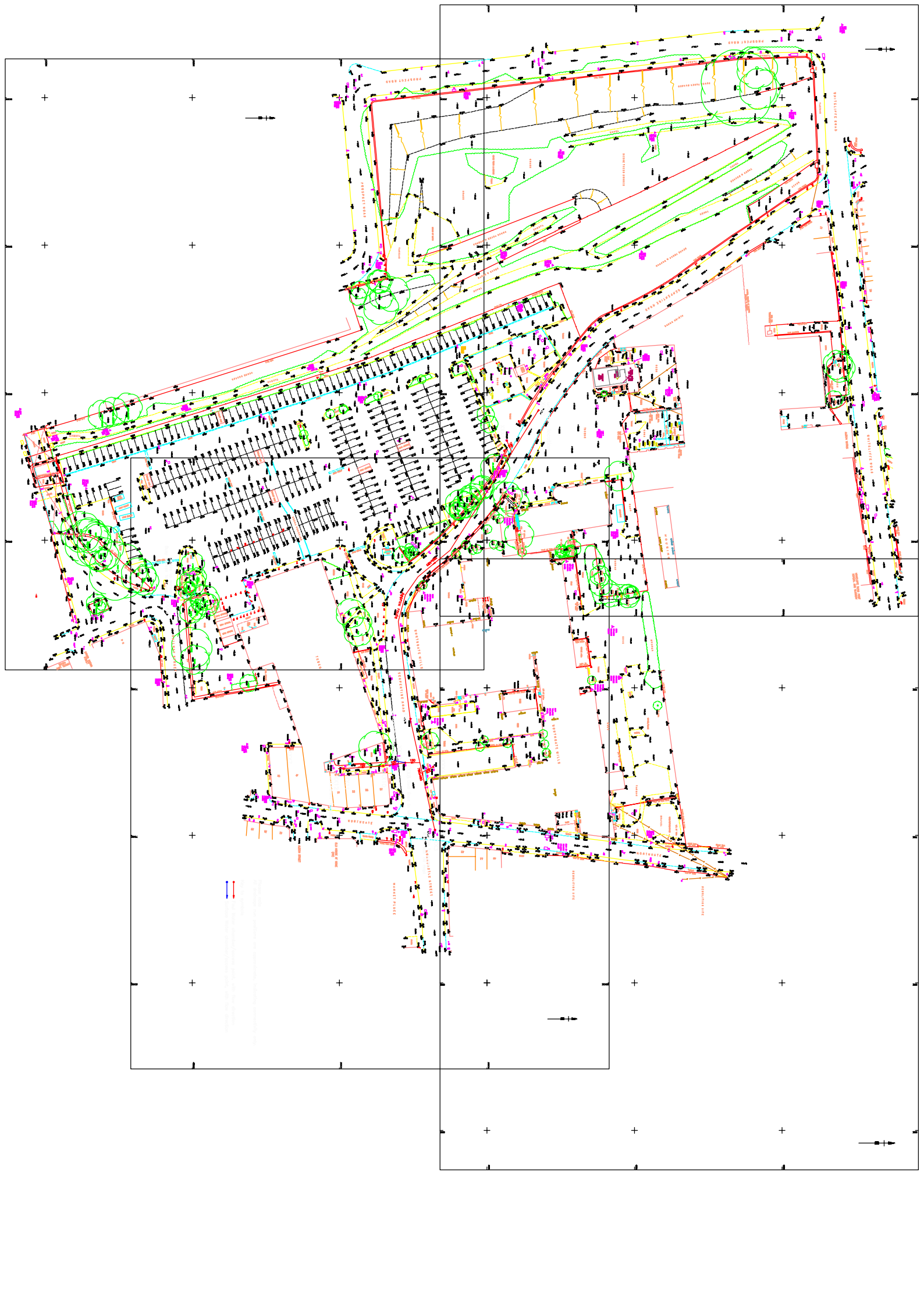
On Behalf of Topping Engineers



## Appendix A

### Topographical Survey

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## **Appendix B**

### **Development Proposals**

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