

**WEST ROAD, BARNSELEY**  
**Proposed Commercial Warehouse Unit**  
**Flood Risk Assessment and Drainage Strategy**

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**Client**

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## 1 Background and Context

### 1.1 Introduction

- 1.1.1 MJM Consulting Engineers Ltd (MJM) have been commissioned by Blue Check Consulting / V.Simpson (the Applicant) to prepare a Flood Risk Assessment (FRA) and Drainage Strategy (DS) to accompany a planning application for a Proposed Commercial Warehouse Unit at West Road, Barnsley (the Site).

### 1.2 Site Location

- 1.2.1 The site is located in the Pogmoor area of Barnsley, approximately 2.4km to the west of Barnsley town centre. Broadly, the site is bound to the north and east by existing industrial units, to the west by a driving test centre and to the south by a railway line. A site location is provided in **Appendix A** of this report.
- 1.2.2 The site location is demonstrated in **Figure 1-1** below.

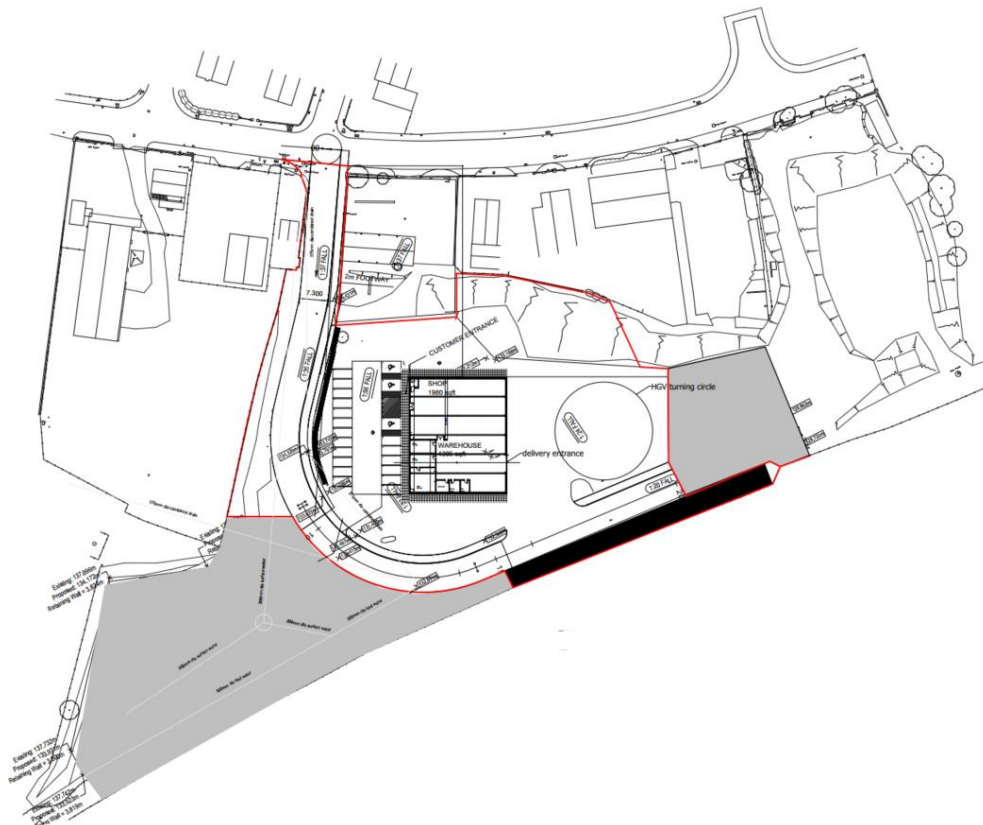


Figure 1-1 Site Location Plan

### 1.3 Development Proposals

- 1.3.1 The proposed development at West Road comprise the erection of a 584sqm warehouse / trade sales operation. The gross area for the commercial unit roof is 777.7sqm.
- 1.3.2 The proposals are accompanied by an existing road into the site, to be improved, 18 car parking spaces and 3 disabled spaces, with a service yard located to the rear of the unit.
- 1.3.3 A site plan is provided in **Appendix C** of this report

## 1.5 Report Structure

### 1.5.1 Following this introductory section:

- **Section 2** describes the planning policy context within which the proposals will be assessed;
- **Section 3** details the existing site, considering any site specific information and current survey information which has been gathered;
- **Section 4** discusses the potential sources of flooding for the site;
- **Section 5** summarises a surface water management strategy for the site, considering any existing site drainage, the proposed point of discharge and the appropriateness of Sustainable Drainage Systems (SuDS);
- **Section 6** deals with any requirement for foul water drainage;
- **Section 7** offers a summary and conclusions

## 2 Relevant Policy and Guidance

### 2.1 National Planning Policy

#### National Planning Policy Framework (NPPF)

2.1.1 With regard to flood risk, the National Planning Policy Framework (NPPF) requires that:

*"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere."*

2.1.2 The NPPF sets out that the Sequential Test should be applied to steer development to the areas of lowest probability of flooding and states that development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.

2.1.3 To establish the appropriateness of development at a specific site the NPPF refers to the Flood Zones, which are shown on the Environment Agency Flood Map, and establishes the range of uses which are appropriate, or compatible, land uses for each Flood Zone.

2.1.4 The Flood Zones can be summarised as follows:

- **Zone 1:** Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year. (<0.1%)
- **Zone 2:** Medium Probability. This zone comprises land assessed as having between 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
- **Zone 3a:** High Probability. This zone comprises land assessed as having 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
- **Zone 3b:** Functional Flood Plain. This zone comprises land where water must flow or stored in times of flood. Strategic Flood Risk Assessments should identify this zone.

2.1.5 Paragraph 162 of the NPPF goes on to state that "The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from **any** source...The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding."

2.1.6 According to the NPPF, if following the application of the Sequential Test it is not possible, consistent with wider sustainability objectives, for the development to be in zones of lower probability of flooding, the Exception Test can be applied.

2.1.7 As part of this process, it is necessary to consider the type and nature of the development. The Planning Practice Guidance: Flood Risk and Coastal Change defines the type and nature of different development classifications in the context of their flood risk vulnerability. This has been summarised in Table 2.1 below.

Table 2.1: Flood Risk Vulnerability and flood zone compatibility

| Flood Risk Vulnerability | Essential Infrastructure | Water Compatible | Highly Vulnerable       | More Vulnerable         | Less Vulnerable |
|--------------------------|--------------------------|------------------|-------------------------|-------------------------|-----------------|
| Zone 1                   | ✓                        | ✓                | Exception Test Required | ✓                       | ✓               |
| Zone 2                   | Exception Test Required  | ✓                | Exception Test Required | ✓                       | ✓               |
| Zone 3a                  | Exception Test Required  | ✓                | ×                       | Exception Test Required | ✓               |
| Zone 3b                  | Exception Test Required  | ✓                | ×                       | ×                       | ×               |

✓ Development is appropriate    × Development should not be permitted.

- 2.1.8 Footnote 55 to the NPPF states that a site-specific FRA should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an FRA should accompany all proposals involving: sites of 1 hectare or more, land which has been identified by the Environment Agency (EA) as having critical drainage problems; land identified in a strategic FRA as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 2.1.9 Paragraph 169 of the NPPF also states that Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should take account of advice from the lead local flood authority, have appropriate proposed minimum operational standards, have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development and where possible, provide multifunctional benefits

### Planning Practice Guidance (PPG)

- 2.1.10 To accompany the NPPF, the web-based Planning Practice Guidance (PPG) provides additional technical guidance on flood risk and coastal change. The PPG retains key elements of former Planning Policy Statement (PPS) 25 Development and Flood Risk (rescinded on adoption of the NPPF) as an interim measure, pending a wider review of guidance to support planning policy. The original technical guidance published in 2012 has now been replaced by the web-based PPG resource.
- 2.1.11 In terms of the general planning approach to development and flood risk, the Flood Risk and Coastal Change PPG sets out the following main steps to be followed:
- Assess Flood Risk;
  - Avoid Flood Risk; and
  - Manage and Mitigate Flood Risk.
- 2.1.12 The guidelines also state that in plan-making, local planning authorities apply a sequential approach to site selection so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future uses to flood risk. In plan-making this involves applying the 'Sequential Test' to Local Plans and, if needed, the 'Exception Test' to Local Plans. Guidance on when and how should the 'Sequential' and 'Exception' Tests be applied to planning applications is also provided in the PPG.

- 2.1.13 In addition, the guidelines reiterate that local planning authorities and developers should seek flood risk management opportunities (e.g. safeguarding land) and reduce the causes and impacts of flooding (e.g. through the use of Sustainable Drainage Systems (SuDS) in developments).
- 2.1.14 Additionally, the guidelines note that when considering a major development, as defined in the Town and Country Planning (Development Management Procedure) (England) Order 2015, SuDS should be provided unless demonstrated to be inappropriate.
- 2.1.15 Table 1 within section 25 Flood and Flood Risk Tables of the PPG, defines the Flood Zones and the respective level of flood risk. Zone 1 depicts an area of low (<1 in 100 year) probability. In contrast, zone 3b represents a functional floodplain, where water has to flow or be stored in times of flooding.
- 2.1.16 The PPG also contains a section on water supply, wastewater and water quality. This guidance indicates that water supply is unlikely to be a consideration for most planning applications as water supply is normally addressed through the Local Plan. With regards to water quality, the guidance states that it is only likely to be a significant planning concern when a proposal would:
- Involve physical modifications to a water body such as flood storage areas, channel diversions and dredging, removing natural barriers, construction of new locks, new culverts, major bridges, new barrages/dams, new weirs (including for hydropower) and removal of existing weirs; and/or
  - Indirectly affect water bodies, for example:
    - As a result of new development such as the redevelopment of land that may be affected by contamination, mineral workings, water or wastewater treatment, waste management facilities and transport schemes including culverts and bridges; and
    - Through a lack of adequate infrastructure to deal with wastewater.

### **3 Existing Site**

#### **3.1 Site Specific information**

- 3.1.1 This section of the report contains information gathered from our Client, the Environment Agency (EA), Barnsley Metropolitan District Council (BMDC) and the Barnsley Strategic Flood Risk Assessment (SFRA).

#### **3.2 Topographical Survey**

- 3.2.1 The site is at its highest where it adjoins the existing West Road to the northern boundary at a level of approximately 136mAOD. From this point the site slopes down to the south to its lowest points alongside the boundary with the existing railway line at a level of 129m AOD. A topographical survey is provided in **Appendix B** of this report.

#### **3.3 Geotechnical Investigation**

- 3.3.1 BGS Geological Mapping suggests the site is underlain by Made Ground over a bedrock of Pennine Middle Coal Measures Formation, made up of interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit.
- 3.3.2 A Phase I Geo-Environmental report was produced for the site in November 2010 by Ashton Bennett. Furthermore, intrusive Phase II investigations were also carried out in June 2007 and revised March 2023.
- 3.3.3 These reports confirm that ground conditions were fairly similar across the site of made ground, underlain by Coal Measures mudstones weathered in their upper portion to firm clay. Made ground was encountered to depths of 1.00m to 7.00m bgl but was generally 1.00m to 3.00mbgl. This comprised of loose black ash and clinker with fragments of coal, gravel and cobbles of sandstone and reworked mudstone.
- 3.3.4 Beneath this made ground layer, the bedrock was weathered to a firm to stiff yellow brown and grey silty clay often with lithorelics of mudstone. The clay was generally 0.20m to 0.90m in thickness and underlain by mudstone. Bedrock comprised moderately to highly weathered weak mudstone of the Coal Measures. In trial pits and boreholes bedrock was encountered at 1.00m to 7.20m bgl
- 3.3.5 Five of the trial pits and two of the boreholes encountered groundwater at depths of 3.20m to 5.45mbgl. The site is generally dry to a depth of 3.00m bgl.
- 3.3.6 Soakaway testing was not carried out during these investigations.

## 4 Potential Sources of Flooding

4.1.1 As required by NPPF, all sources of flooding have been assessed as part of this FRA report. The specific issues relating to each source and its impact on this development are discussed below.

### 4.2 Fluvial and Tidal Flooding

4.2.1 The Environment Agency's Flood Map for Planning is shown below

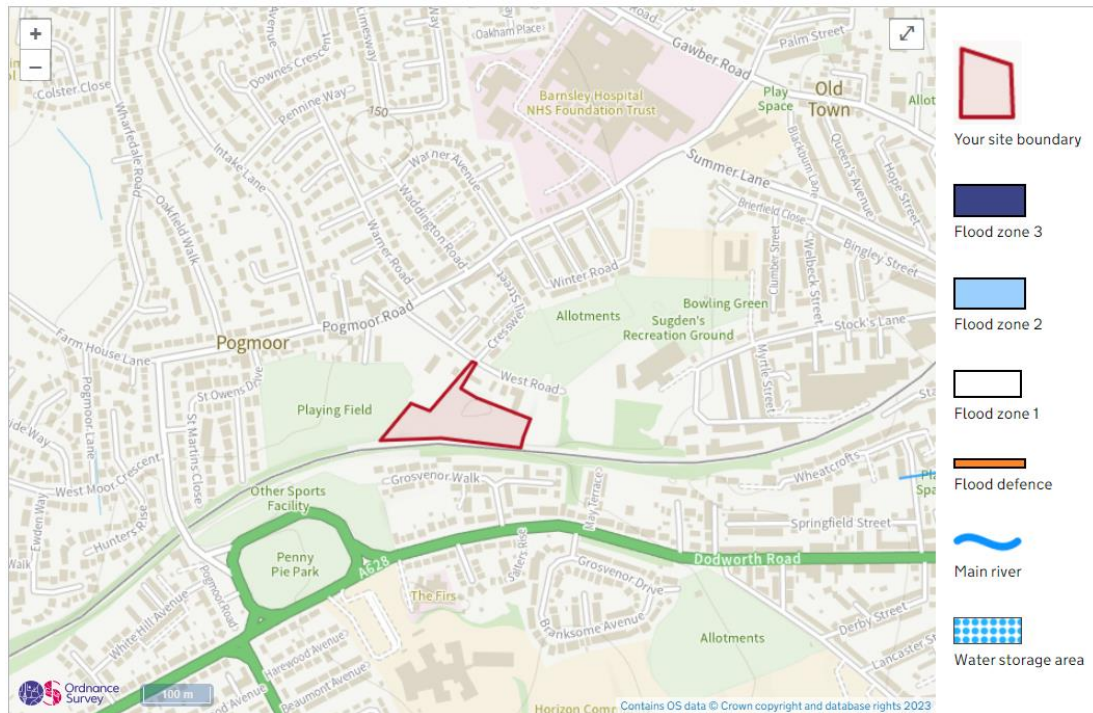


Figure 4-1 EA Flood Map for Planning.

4.2.2 The above Flood Map for Planning demonstrates the site is within Flood Zone 1 and therefore has a low probability of flooding from rivers and the sea.

4.2.3 The proposed Commercial Warehouse Unit is classed as 'less vulnerable' and all buildings, and service yards are to be located in Flood Zone 1.

4.2.4 Based on the above, the risk of flooding from the site from fluvial and tidal flooding is considered low

### 4.3 Flooding from Land (Overland flow & Surface Water Flooding)

4.3.1 The Environment Agency's surface water flood risk map is shown in Figure 4.2 below.

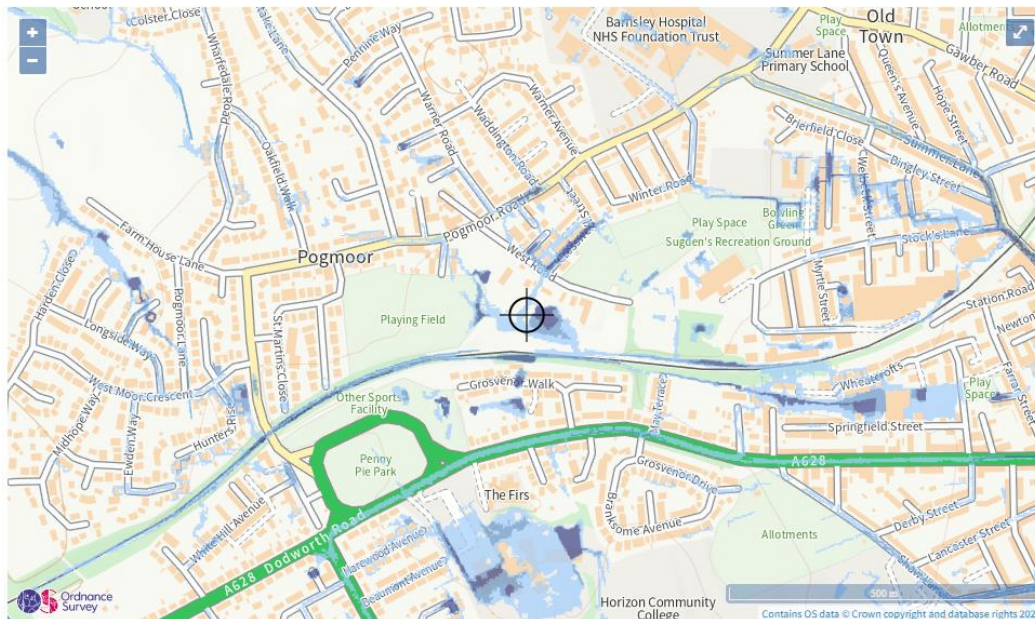


Figure 4-2 EA Surface Water Flood Map

4.3.2 The majority of the site is in a 'Low Risk' area on the Environment Agency's indicative Flood Maps for Surface Water (FMfSW). Some areas of 'Medium Risk' and 'High Risk' are identified on the flood map however. These appear to be caused by flooding to nearby highways and the playing field to the west in extreme rainfall events making their way to their nearest low point, which is the proposed site.

4.3.3 We would suggest positive drainage on the proposed access road are provided to cut off this overland flooding before it enters the development site, to discharge to the proposed underground drainage system. Filter drains should also be provided around the affected boundaries of the site which will collect overland storm water before it traverses the site.

4.3.4 Based on the above, the risk of flooding from the site from groundwater flooding is considered **low** as long as sensible measures are implemented to divert overland flood routes below ground to be attenuated and discharged safely.

#### 4.4 Ground Water Flooding

4.4.1 Groundwater flood susceptibility maps are not available within the Barnsley SFRA. However, it is noted within the SFRA that "Likely candidates for groundwater flooding in the Barnsley MBC area are: Kingstone area of Barnsley; Kingwell area of Worsbrough; Millhouses area of Hoyland; and Upperwood area of Darfield."

4.4.2 The above would suggest there is not a historic risk of groundwater flooding in the area of Pogmoor where the site is to be located

4.4.3 Furthermore, we have no historical record that groundwater flooding has ever taken place at the site. Based on the above, the risk of flooding from the site from groundwater flooding is considered **low**.

#### 4.5 Flooding from Sewers

4.5.1 In urban areas, rainwater is frequently drained into surface water sewers or sewers containing both surface and wastewater known as "combined sewers". Flooding can result when the sewer is overwhelmed by heavy rainfall, becomes blocked, or is of inadequate capacity; this will continue

until the water drains away. When this happens to combined sewers, there is a high risk of land and property flooding with water contaminated with raw sewage as well as pollution of rivers due to discharge from combined sewer overflows.

- 4.5.2 Yorkshire Water sewer record drawings show that there is a public combined sewer and a surface water sewer crossing the site. There are also foul, surface water and combined sewer systems in the residential and built up areas to the north, east and west of the site.
- 4.5.3 There is no history of flooding from sewers on the site that we are aware of. Yorkshire Water have also not expressed concern over capacities of sewers in this area. Consequently, the risk of flooding to the proposed development from this source is considered **low** provided discharge from the site is controlled to not exacerbate existing sewer flows.

#### **4.6 Flooding from Reservoirs, Canals and other Artificial Sources**

- 4.6.1 Non-natural or artificial sources of flooding can include reservoirs, canals and lakes where water is retained above natural ground level, operational and redundant industrial processes including mining, quarrying and sand and gravel extraction, as they may increase floodwater depths and velocities in adjacent areas. The potential effects of flood risk management infrastructure and other structures also need to be considered. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and/or as a result of dam or bank failure.
- 4.6.2 The Environment Agency's flood risk from reservoirs map shows that the site is not at risk from flooding from reservoirs, canals or other artificial sources. The risk of flooding from this source is therefore considered **low**.

#### **4.7 Climate Change**

- 4.7.1 Based on a typical lifespan for this type of development of 100 years, the contingency allowances for climate change set out in Table 4 and 5 of the Technical Guidance to the NPPF, up to 2115 are for up to 15mm per year net sea level rises and a 30% increase in peak rainfall intensity.
- 4.7.2 The projections for the UK in relation to climate change are that the UK will experience more frequent short-duration, high-intensity rainfall and more frequent periods of long-duration rainfall of the type that has been responsible for the large flood events recently experienced in the UK.
- 4.7.3 The DEFRA Climate Change Allowance Map suggests an upper end allowance of 40% be made for peak rainfall intensities.
- 4.7.4 As such, drainage for the site will be designed such that no flooding occurs for up to the 1 in 30 year design storm and will ensure exceedance flows are retained on site for up to the 1 in 100 year plus 40% allowance for climate change.

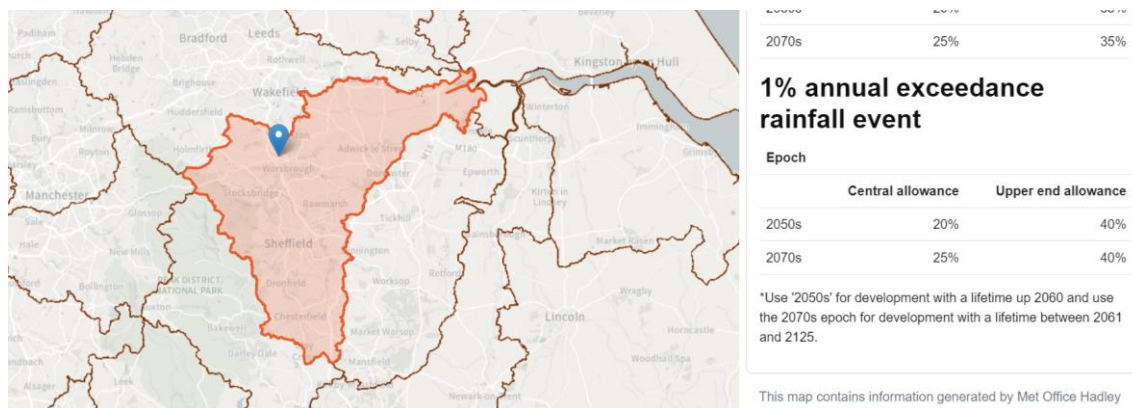


Figure 4-3 DEFRA Climate Change Allowance Map

## 4.8 Flood Risk Summary

- 4.8.1 As can be seen from the various searches and maps above, the proposed site is located within Flood Zone 1. It is therefore considered that the site will be at low risk of flooding from Fluvial and Tidal flooding.
- 4.8.2 Risks from overland surface water flooding have been identified, and as such the floor levels of buildings will be maintained above the flood level of existing overland flood water levels. Furthermore, positive drainage will be provided to ensure surface water flows are captured before they enter the site and diverted below ground via filter drains and gullies / channels as appropriate.
- 4.8.3 The risk of groundwater flooding is low. The site is also not located in an area susceptible to sewer flooding or artificial sources such as canals or reservoirs.
- 4.8.4 NPPF guidance must be followed with particular reference to Paragraph 162: "The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from **any** source". This would suggest that a sequential test is therefore not required for the site given no risk of flooding from any source has been identified.

## 5 Surface Water Management Strategy

### 5.1 Drainage Hierarchy and Existing Drainage

5.1.1 NPPF Planning Practice Guidance Paragraph 080 states that:

5.1.2 "Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer."

5.1.3 Public sewer records indicate the presence of a combined sewer within the site boundary. The site is considered brownfield, however no existing drainage connections have been identified into this combined sewer and no existing gullies / channels / rainwater pipes are evident. There is knowledge of the site having been previously connected to the public sewer however locations of these connections are not known.

5.1.4 Soakaway testing has not yet been carried out on the site. BGS Geological Mapping suggests the site is underlain by Made Ground over a bedrock of Pennine Middle Coal Measures Formation, made up of interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit.

5.1.5 Given the existing ground is made ground, the Site Investigation identifies Clay material beneath this made ground layer and the variability of the Pennine Middle Coal Measures formation underneath, it is considered the use of soakaways is unfeasible.

5.1.6 There are no water courses or surface water bodies close to the site.

5.1.7 There is an existing Yorkshire Water combined water sewer crossing the site. It is therefore considered, given infiltration is unlikely and there is no surface water body available, that this is the most appropriate method to discharge surface water from the site.

### 5.2 Sustainable Drainage Systems (SuDS)

5.2.1 Section 1.1 of the SuDS Manual (Ciria C753) states the following:

- "Sustainable drainage systems (SuDS) can deliver multiple benefits. Surface water is a valuable resource, and this should be reflected in the way it is managed and used in the built environment. It can add to and enhance biodiversity, beauty, tranquillity and the natural aesthetic of buildings, places and landscapes and it can help make them more resilient to the changing climate.
- The philosophy of sustainable drainage systems is about maximising the benefits and minimising the negative impacts of surface water run-off from developed areas.
- The SuDS approach involves slowing down and reducing the quantity of surface water runoff from a developed area to manage downstream flood risk and reducing the risk of that runoff causing pollution. This is achieved by harvesting, infiltrating, slowing, storing, conveying and treating runoff on site and, where possible, on the surface rather than underground. Water then becomes a much more visible and tangible part of the built environment, which can be enjoyed by everyone."

5.2.2 The SuDS Manual describes the four pillars of SuDS design as Water Quality, Water Quantity, Amenity and Biodiversity as illustrated in Figure 5.1 below which is a representation of The SuDS Manual Figure 2.1. Each pillar is discussed in detail on the following pages.

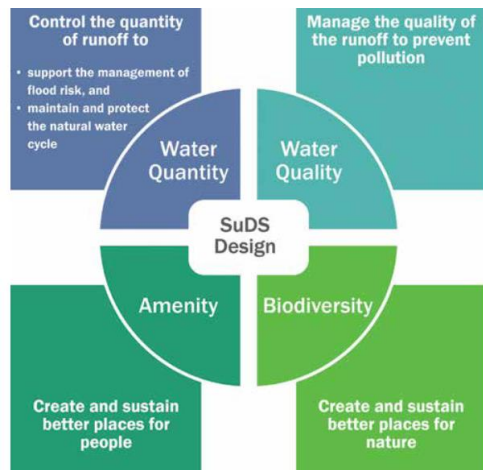


Figure 5.1: Extract Representation of Figure 2.1 of The SuDS Manual

## 5.3 SuDS and the Proposed Development

### Water Quantity

- 5.3.1 The proposed surface water drainage strategy for the scheme is to provide attenuation storage for no flooding for up to the 1 in 30 year design storm and to retain flows on site for up to the 1 in 100 year plus climate change (40%) event. Surface water run-off would ideally discharge at a restricted rate equivalent to the 1 in 1 year greenfield run-off rate, which has been calculated at 1.7l/sec on this plot. It should be noted that this includes the areas to the east and west of the site identified for future development areas. This is considered unfeasible to restrict to, so based on best practice guidance we would recommend restricting surface water discharge from the site at 5.0l/sec.
- 5.3.2 Preliminary calculations indicate that approximately 800m<sup>3</sup> of storage will be required for the development. Surface water storage is proposed in online storage tanks, serving the plot and future development areas with a control device such as a Hydro Brake to limit the discharge to 5l/sec.
- 5.3.3 The Development is likely to lead to an increase in Storm Water Volume. As this cannot be disposed of via infiltration techniques it will be stored on site and discharged at the 5l/sec rate as above.

### Water Quality

- 5.3.4 The SuDS design for the development site should ensure the quality of any receiving water body is not adversely affected and preferably enhanced in accordance with Ciria SuDS Manual C753. Table 26.2 in the Ciria SuDS Manual shows that the development has a medium pollution hazard based on the proposed commercial yard and delivery areas. It is proposed to implement fuel interceptors, silt traps, trapped gullies and trapped drainage channels to intercept oils and silt entering the water system.

Table 5.2: Extract of Table 26.2 of The SuDS Manual

| TABLE 26.2 Pollution hazard indices for different land use classifications                                                                                                                                                                                                                                             |                        |                              |                                                                            |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|----------------------------------------------------------------------------|------------------|
| Land use                                                                                                                                                                                                                                                                                                               | Pollution hazard level | Total suspended solids (TSS) | Metals                                                                     | Hydro-carbons    |
| Residential roofs                                                                                                                                                                                                                                                                                                      | Very low               | 0.2                          | 0.2                                                                        | 0.05             |
| Other roofs (typically commercial/ industrial roofs)                                                                                                                                                                                                                                                                   | Low                    | 0.3                          | 0.2 (up to 0.8 where there is potential for metals to leach from the roof) | 0.05             |
| Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day                                                                               | Low                    | 0.5                          | 0.4                                                                        | 0.4              |
| Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways <sup>1</sup>                                                                                                                                 | Medium                 | 0.7                          | 0.6                                                                        | 0.7              |
| Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways <sup>1</sup> | High                   | 0.8 <sup>2</sup>             | 0.8 <sup>2</sup>                                                           | 0.9 <sup>2</sup> |

**Notes**

- 1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).
- 2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

### Amenity and Biodiversity

- 5.3.5 Wherever possible, Sustainable Drainage Systems have been introduced within the proposed surface water system to provide treatment trains. This will consist of filter drains and swales within car park areas, oil separators and silt interceptors.

## 6 Proposed Surface & Foul Water Drainage

### 6.1 Drainage Layout

6.1.1 The drainage system and ground levels will be designed such that:

- Unless an area is designed to hold and/or convey water, flooding does not occur on any part of the site for a 1 in 30-year rainfall event.
- Flooding does not occur during a 1 in 100-year storm event (including allowance for up to 40% increase to allow for the anticipated impacts of climate change) in any part of a building (including a basement) or in any utility plant susceptible to water within the development.
- Flows resulting from rainfall in any event exceeding the 1 in 100-year rainfall event are managed in exceedance routes to minimise as far as practicable the risk of flooding to people and property both on and off site.
- Flows from footways will flow directly onto the soft landscaping if they cannot be directed to positive drainage.
- The management of surface water on site will ensure that there is no increased risk of flooding on and offsite as a result of the development.
- The SuDS design for the development site should ensure that the quality of any receiving water body is not adversely affected and preferably enhanced in accordance with Ciria SuDS Manual, Chapter 4.

6.1.2 Greenfield run-off rates have been determined for the plot (see Section 5) and it is considered a 5l/sec restriction is the lowest reasonably practical to achieve. An attenuation structure is proposed for the plot which will discharge to the existing Yorkshire Water combined water sewer located beneath the proposed access road.

6.1.3 Refer to **Appendix D** for the preliminary attenuation storage calculations and **Appendix E** for the proposed surface water drainage layout.

6.1.4 Foul water from the site will discharge to the existing Yorkshire Water Combined Sewer crossing the southern portion of the site. This is shown on the drainage layout within **Appendix E**

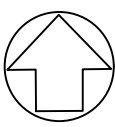
### 6.2 Drainage Maintenance Strategy

6.2.1 For the proposed drainage system to function efficiently, it is important that the network is inspected and maintained on a regular basis. The surface and foul water drainage will not be adopted and is to remain private, therefore it is anticipated that the drainage system will be maintained by the owner. Refer to **Appendix F** for the drainage maintenance plan.

## 7 Conclusions

- 7.1.1 The NPPF Technical Guide classifies the flood risk vulnerability of general industry, storage and distribution as a less vulnerable use and Table 3 of the Technical Guide indicates that such development is compatible with Flood Zone 1.
- 7.1.2 All forms of flood risk to the site have been assessed and it has been determined that there is **low** risk of flooding to the proposed development. A strategy has been proposed to deal with existing overland surface water flood risk.
- 7.1.3 The development proposals are in accordance with both National and Local Policy and Guidance relating to Flood Risk and Surface Water Management.
- 7.1.4 Site Wide Measures are designed to ensure external ground levels will be designed to direct any surface water flow away from building thresholds.
- 7.1.5 The design surface water flow from the proposed development will discharge to the existing Yorkshire Water combined sewer which crosses the site, subject to the approval of Yorkshire Water.
- 7.1.6 The SuDS strategy will be developed as part of the detailed design to meet the following criteria:
- Unless an area is designed to hold and/or convey water, flooding will not occur on any part of the site for a 1 in 30-year rainfall event.
  - Flooding does not occur during a 1 in 100-year storm event (including an allowance for a 40% increase in rainfall intensity due to climate change) in any part of a building (including a basement) or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.
  - In order to achieve the above, sufficient storm water attenuation will be provided to manage the storm water discharging from site.
  - Flows resulting from rainfall in any event exceeding the 1 in 100-year rainfall event are managed in exceedance routes to minimise as far as practicable the risk of flooding to people and property both on and off site.
  - The SuDS design for the development site should ensure that the quality of any receiving water body is not adversely affected and preferably enhanced in accordance with Ciria SuDS Manual C753, Chapter 4.
- 7.1.7 Foul water will be discharged to the existing Combined Sewer crossing the site, subject to the approval of Yorkshire Water.

## Appendix A – Site Location



| DESIGNER RISK INFORMATION                                                                                                                                                               |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:-                                                              |  |  |
| CONSTRUCTION:<br>EXISTING SERVICES CROSSING SITE TO BE CONFIRMED PRIOR TO ANY WORKS TAKING PLACE. HISTORIC USE OF SITE SUGGESTS POTENTIAL CONTAMINANTS, SUGGEST FULL SURVEY CARRIED OUT |  |  |
| MAINTENANCE/CLEANING:<br>REFER TO MJM DRAINAGE MAINTENANCE DOCUMENT FOR DETAILS                                                                                                         |  |  |
| DECOMMISSIONING/DEMOLITION:                                                                                                                                                             |  |  |
| IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.                                                 |  |  |

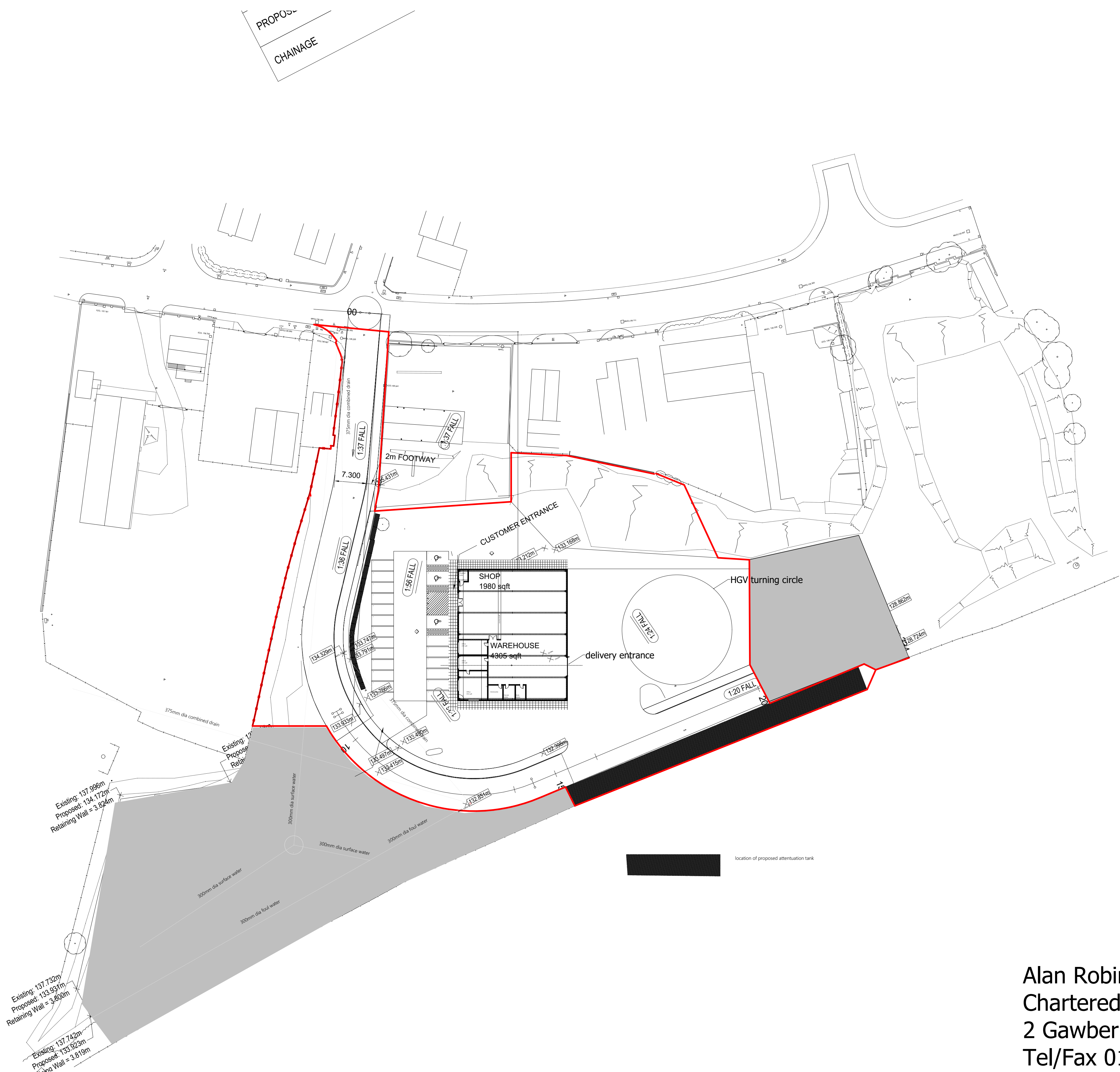
|                                                                                                                                                                                                                                                                                                   |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                   |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
| P01                                                                                                                                                                                                                                                                                               | 31/05/23 | FOR INFORMATION                                                                       |  |                                                                                          | TM                                                                                    | TM                                                                                    |
| Rev                                                                                                                                                                                                                                                                                               | Date     | Amendment                                                                             |  |                                                                                          |  |  |
| <div><div></div><div><div>Consulting<br/>Engineers</div><div>Ltd</div></div></div> <div>Southgate House, 38 Southgate, Wakefield WF1 1TL<br/>T: 01924 811 000 <a href="http://mjm.co.uk">mjm.co.uk</a></div> |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
| Project:<br>WEST ROAD<br>POGMOOR                                                                                                                                                                                                                                                                  |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
| Client:<br>POWERTOOLSGB                                                                                                                                                                                                                                                                           |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
| Drawing Title:<br>SITE LOCATION                                                                                                                                                                                                                                                                   |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
|  TM                                                                                                                                                                                                          |          |  |  |  TM |                                                                                       |                                                                                       |
| MJMC Ref:<br>8529                                                                                                                                                                                                                                                                                 |          | Scale:<br>1:1000                                                                      |  | Sheet Size:<br>A1                                                                        |                                                                                       |                                                                                       |
| Revision<br>Status:<br>P01                                                                                                                                                                                                                                                                        |          | Suitability<br>Status:<br>S2                                                          |  | Date:<br>MAY 23                                                                          |                                                                                       |                                                                                       |
| Suitability Description:<br>FOR INFORMATION                                                                                                                                                                                                                                                       |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |
| Drawing Reference:<br>Project - Originator - Zone - Level - File Type - Discipline - Number<br>8529-MJM-XX-XX-DR-D-0001                                                                                                                                                                           |          |                                                                                       |  |                                                                                          |                                                                                       |                                                                                       |

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## Appendix B – Topographic Survey



## Appendix C – Proposed Site Plan



Part G water efficiency calculations are to be provided prior to completion.

Whole sale water supply to be provided by the water supply undertaker.

All baths are to be fitted with a suitable device to limit the hot water temperature to a maximum of 40 degrees C (Thermostatic mixer valves)

All hot water taps to be installed on the left hand side.

A notice confirming that the hot water system has been properly commissioned, and issued by a person competent to do so, is to be provided on completion.

Windows to bedrooms at ground floor level to be suitable for means of escape.

Sockets and switches to be located between 450 - 1100mm from finished floor level.

Any alteration works or new works to existing heating systems to be carried out by a Gas safety registered installer.

Contractor to provide details of Gas Safety Engineer.

All electrical installation works are to be carried out under a competent persons scheme

The contractor is to check all dimensions before commencing work. He is to ensure that he has received all the necessary information and drawings before commencing work.

Any discrepancies found on site with regards to structural items are to be reported back to the architect.

All contractors must ensure that they calculate the finished floor level to finished floor level from first floor level to second floor level when carrying out works to loft conversions. Ensure that the staircase can be constructed in accordance with current building regulations, including all necessary head rooms required under the regulations.

The architect cannot be held responsible for any discrepancies if the contractor starts work on site following the deposit of the full plans drawings under the current building/planning regulations.

If the client or contractor changes the design of the building/extension following the approval of the Town Planning/Building Regulation approval drawings and further information is requested by either the Planning or building regulation department then this will result in an additional fee being charged to the client by the architect.

The architect is unaware at the time of the survey/drawing time that there were any problems with regards to ground conditions. Contractors wishing to start on site prior to full building regulations approval are advised to contact the LAB CO and confirm if there are any structural ground problems of any nature.

The drawings supplied are for building regulations and town planning approval only they are not complete working drawings.

All new doors marked thus are to be FD30 35mm th fire doors onto 13mm rebated frame

SD

Self contained smoke alarm systems should be permanently wired to a separately fused circuit at the distribution board. They may be operated at a low voltage via a mains transformer cable for the power supply to, and interconnection of, self contained smoke alarms need have no special fire survival fitted with battery back up.

Each self contained smoke alarm should be fitted to the ceiling at least 300mm from any wall or light fitting. A central position is preferable. Units designed for wall mounting should be fitted between 150 - 300mm below the ceiling, the method of fixing should comply with the manufacturers instructions. All smoke alarms are to be interconnected between the ground, first and second floor, with battery back up.

| RevID | ChID | Change Name                                                                   | Date   |
|-------|------|-------------------------------------------------------------------------------|--------|
|       |      |                                                                               |        |
|       |      |                                                                               |        |
|       |      |                                                                               |        |
|       |      |                                                                               |        |
|       |      |                                                                               |        |
|       |      |                                                                               |        |
|       |      |                                                                               |        |
| A     |      | areas resized windows added to elevations toilets relocated kitchenette added | 2/5/23 |

Client:

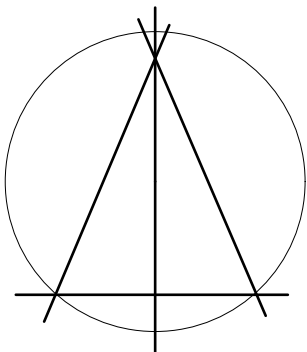
Project:

Drawing Title:

Scale: 1:500 Date:27/06/2023

Drawn By: AR Rev: A

Drawing Nr:



Alan Robinson  
Chartered Architect BA Dip Arch RIBA BSc (Hons)  
2 Gawber Road, Barnsley S75 2AF  
Tel/Fax 01226 286066  
Mob: 07947808933

## Appendix D - Preliminary Attenuation Storage Calculations



|                                                             |                     |                           |                              |                                |                           |                       |                                                                                     |
|-------------------------------------------------------------|---------------------|---------------------------|------------------------------|--------------------------------|---------------------------|-----------------------|-------------------------------------------------------------------------------------|
| M J M C                                                     |                     |                           |                              |                                |                           |                       | Page 2                                                                              |
| Southgate House<br>Southgate<br>Wakefield WF1 1TL           |                     |                           |                              |                                |                           |                       |  |
| Date 04/07/2023 12:17<br>File West Rd Greenfield.SRCX       |                     |                           |                              | Designed by tomm<br>Checked by |                           |                       |                                                                                     |
| Micro Drainage                                              |                     |                           |                              | Source Control 2020.1.3        |                           |                       |                                                                                     |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                     |                           |                              |                                |                           |                       |                                                                                     |
| Storm<br>Event                                              | Max<br>Level<br>(m) | Max<br>Depth<br>(m)       | Max<br>Infiltration<br>(l/s) | Max<br>Control<br>(l/s)        | Max<br>Σ Outflow<br>(l/s) | Max<br>Volume<br>(m³) | Status                                                                              |
| 30 min Winter                                               | 99.402              | 0.402                     | 0.0                          | 5.0                            | 5.0                       | 335.9                 | O K                                                                                 |
| 60 min Winter                                               | 99.525              | 0.525                     | 0.0                          | 5.0                            | 5.0                       | 438.6                 | O K                                                                                 |
| 120 min Winter                                              | 99.654              | 0.654                     | 0.0                          | 5.0                            | 5.0                       | 547.1                 | O K                                                                                 |
| 180 min Winter                                              | 99.725              | 0.725                     | 0.0                          | 5.0                            | 5.0                       | 606.4                 | Flood Risk                                                                          |
| 240 min Winter                                              | 99.774              | 0.774                     | 0.0                          | 5.0                            | 5.0                       | 647.1                 | Flood Risk                                                                          |
| 360 min Winter                                              | 99.841              | 0.841                     | 0.0                          | 5.0                            | 5.0                       | 702.7                 | Flood Risk                                                                          |
| 480 min Winter                                              | 99.883              | 0.883                     | 0.0                          | 5.0                            | 5.0                       | 737.9                 | Flood Risk                                                                          |
| 600 min Winter                                              | 99.911              | 0.911                     | 0.0                          | 5.0                            | 5.0                       | 761.3                 | Flood Risk                                                                          |
| 720 min Winter                                              | 99.929              | 0.929                     | 0.0                          | 5.0                            | 5.0                       | 777.0                 | Flood Risk                                                                          |
| 960 min Winter                                              | 99.949              | 0.949                     | 0.0                          | 5.0                            | 5.0                       | 793.4                 | Flood Risk                                                                          |
| 1440 min Winter                                             | 99.949              | 0.949                     | 0.0                          | 5.0                            | 5.0                       | 793.6                 | Flood Risk                                                                          |
| 2160 min Winter                                             | 99.918              | 0.918                     | 0.0                          | 5.0                            | 5.0                       | 767.2                 | Flood Risk                                                                          |
| 2880 min Winter                                             | 99.879              | 0.879                     | 0.0                          | 5.0                            | 5.0                       | 735.2                 | Flood Risk                                                                          |
| 4320 min Winter                                             | 99.789              | 0.789                     | 0.0                          | 5.0                            | 5.0                       | 660.0                 | Flood Risk                                                                          |
| 5760 min Winter                                             | 99.693              | 0.693                     | 0.0                          | 5.0                            | 5.0                       | 579.3                 | O K                                                                                 |
| 7200 min Winter                                             | 99.575              | 0.575                     | 0.0                          | 5.0                            | 5.0                       | 480.9                 | O K                                                                                 |
| 8640 min Winter                                             | 99.472              | 0.472                     | 0.0                          | 5.0                            | 5.0                       | 394.8                 | O K                                                                                 |
| 10080 min Winter                                            | 99.386              | 0.386                     | 0.0                          | 5.0                            | 5.0                       | 322.9                 | O K                                                                                 |
|                                                             |                     |                           |                              |                                |                           |                       |                                                                                     |
| Storm<br>Event                                              | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³) | Discharge<br>Volume<br>(m³)  | Time-Peak<br>(mins)            |                           |                       |                                                                                     |
| 30 min Winter                                               | 86.152              | 0.0                       | 313.6                        | 40                             |                           |                       |                                                                                     |
| 60 min Winter                                               | 56.713              | 0.0                       | 440.7                        | 70                             |                           |                       |                                                                                     |
| 120 min Winter                                              | 35.885              | 0.0                       | 556.3                        | 128                            |                           |                       |                                                                                     |
| 180 min Winter                                              | 26.921              | 0.0                       | 623.1                        | 186                            |                           |                       |                                                                                     |
| 240 min Winter                                              | 21.875              | 0.0                       | 670.9                        | 244                            |                           |                       |                                                                                     |
| 360 min Winter                                              | 16.309              | 0.0                       | 735.8                        | 360                            |                           |                       |                                                                                     |
| 480 min Winter                                              | 13.215              | 0.0                       | 765.8                        | 476                            |                           |                       |                                                                                     |
| 600 min Winter                                              | 11.214              | 0.0                       | 767.3                        | 592                            |                           |                       |                                                                                     |
| 720 min Winter                                              | 9.799               | 0.0                       | 761.7                        | 706                            |                           |                       |                                                                                     |
| 960 min Winter                                              | 7.911               | 0.0                       | 747.5                        | 932                            |                           |                       |                                                                                     |
| 1440 min Winter                                             | 5.836               | 0.0                       | 719.6                        | 1360                           |                           |                       |                                                                                     |
| 2160 min Winter                                             | 4.293               | 0.0                       | 1218.4                       | 1708                           |                           |                       |                                                                                     |
| 2880 min Winter                                             | 3.447               | 0.0                       | 1297.5                       | 2168                           |                           |                       |                                                                                     |
| 4320 min Winter                                             | 2.530               | 0.0                       | 1337.6                       | 3112                           |                           |                       |                                                                                     |
| 5760 min Winter                                             | 2.033               | 0.0                       | 1553.8                       | 4032                           |                           |                       |                                                                                     |
| 7200 min Winter                                             | 1.717               | 0.0                       | 1639.8                       | 4824                           |                           |                       |                                                                                     |
| 8640 min Winter                                             | 1.496               | 0.0                       | 1713.4                       | 5536                           |                           |                       |                                                                                     |
| 10080 min Winter                                            | 1.332               | 0.0                       | 1776.4                       | 6248                           |                           |                       |                                                                                     |
|                                                             |                     |                           |                              |                                |                           |                       |                                                                                     |
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| M J M C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                | Page 3                                                                              |                |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|----------------|-------------|---------------|-----|-----------------------|-----|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|----------------------|-------|---------------|-----|------------------|-----|-------------|------|-------------|------|-------------|------|-----------|------|-----------|------|-----------|------|-----|-------|-----|-------|------|-------|
| Southgate House<br>Southgate<br>Wakefield WF1 1TL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |  |                |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Date 04/07/2023 12:17<br>File West Rd Greenfield.SRCX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Designed by tomm<br>Checked by |                                                                                     |                |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                | Source Control 2020.1.3                                                             |                |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| <p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>20.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.300</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+40</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.950</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> <th>From: To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0 4</td> <td>0.317</td> <td>4 8</td> <td>0.317</td> <td>8 12</td> <td>0.317</td> </tr> </tbody> </table> |                                |                                                                                     | Rainfall Model | FSR         | Winter Storms | Yes | Return Period (years) | 100 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 20.000 | Shortest Storm (mins) | 15 | Ratio R | 0.300 | Longest Storm (mins) | 10080 | Summer Storms | Yes | Climate Change % | +40 | Time (mins) | Area | Time (mins) | Area | Time (mins) | Area | From: To: | (ha) | From: To: | (ha) | From: To: | (ha) | 0 4 | 0.317 | 4 8 | 0.317 | 8 12 | 0.317 |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FSR                            | Winter Storms                                                                       | Yes            |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 100                            | Cv (Summer)                                                                         | 0.750          |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | England and Wales              | Cv (Winter)                                                                         | 0.840          |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 20.000                         | Shortest Storm (mins)                                                               | 15             |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.300                          | Longest Storm (mins)                                                                | 10080          |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Summer Storms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Yes                            | Climate Change %                                                                    | +40            |             |               |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| Time (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Area                           | Time (mins)                                                                         | Area           | Time (mins) | Area          |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| From: To:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (ha)                           | From: To:                                                                           | (ha)           | From: To:   | (ha)          |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
| 0 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.317                          | 4 8                                                                                 | 0.317          | 8 12        | 0.317         |     |                       |     |             |       |        |                   |             |       |            |        |                       |    |         |       |                      |       |               |     |                  |     |             |      |             |      |             |      |           |      |           |      |           |      |     |       |     |       |      |       |
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|                                                       |                                |                                                                                     |
|-------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
| M J M C                                               |                                | Page 4                                                                              |
| Southgate House<br>Southgate<br>Wakefield WF1 1TL     |                                |  |
| Date 04/07/2023 12:17<br>File West Rd Greenfield.SRCX | Designed by tomm<br>Checked by |                                                                                     |
| Micro Drainage Source Control 2020.1.3                |                                |                                                                                     |

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 99.000 Safety Factor 2.0  
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 880.0                  | 0.0                         | 1.300     | 0.0                    | 0.0                         |
| 0.100     | 880.0                  | 0.0                         | 1.400     | 0.0                    | 0.0                         |
| 0.200     | 880.0                  | 0.0                         | 1.500     | 0.0                    | 0.0                         |
| 0.300     | 880.0                  | 0.0                         | 1.600     | 0.0                    | 0.0                         |
| 0.400     | 880.0                  | 0.0                         | 1.700     | 0.0                    | 0.0                         |
| 0.500     | 880.0                  | 0.0                         | 1.800     | 0.0                    | 0.0                         |
| 0.600     | 880.0                  | 0.0                         | 1.900     | 0.0                    | 0.0                         |
| 0.700     | 880.0                  | 0.0                         | 2.000     | 0.0                    | 0.0                         |
| 0.800     | 880.0                  | 0.0                         | 2.100     | 0.0                    | 0.0                         |
| 0.900     | 880.0                  | 0.0                         | 2.200     | 0.0                    | 0.0                         |
| 1.000     | 880.0                  | 0.0                         | 2.300     | 0.0                    | 0.0                         |
| 1.100     | 0.0                    | 0.0                         | 2.400     | 0.0                    | 0.0                         |
| 1.200     | 0.0                    | 0.0                         | 2.500     | 0.0                    | 0.0                         |

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0105-5000-1000-5000  
Design Head (m) 1.000  
Design Flow (l/s) 5.0  
Flush-Flo™ Calculated  
Objective Minimise upstream storage  
Application Surface  
Sump Available Yes  
Diameter (mm) 105  
Invert Level (m) 99.000  
Minimum Outlet Pipe Diameter (mm) 150  
Suggested Manhole Diameter (mm) 1200

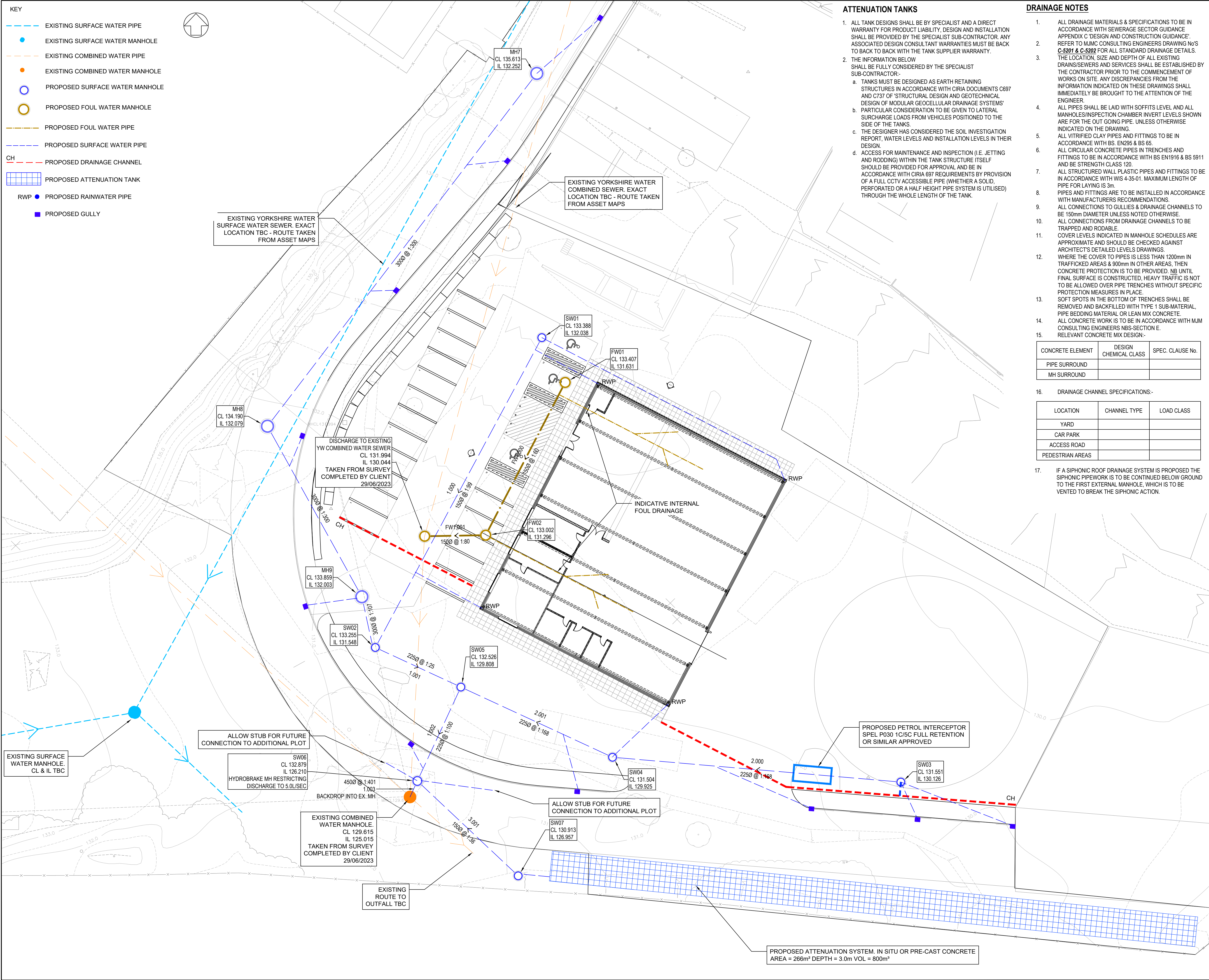
| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.000    | 5.0        |
| Flush-Flo™                | 0.296    | 5.0        |
| Kick-Flo®                 | 0.637    | 4.1        |
| Mean Flow over Head Range | -        | 4.3        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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## Appendix E - Proposed Drainage Layout



ATTENUATION TANKS

- ALL TANK DESIGNS SHALL BE BY SPECIALIST AND A DIRECT WARRANTY FOR PRODUCT LIABILITY. DESIGN AND INSTALLATION SHALL BE PROVIDED BY THE SPECIALIST SUB-CONTRACTOR. ANY ASSOCIATED DESIGN CONSULTANT WARRANTIES MUST BE BACK TO BACK TO BACK WITH THE TANK SUPPLIER WARRANTY.
- THE INFORMATION BELOW SHALL BE FULLY CONSIDERED BY THE SPECIALIST SUB-CONTRACTOR:-
  - TANKS MUST BE DESIGNED AS EARTH RETAINING STRUCTURES IN ACCORDANCE WITH CIRIA DOCUMENTS C697 AND C737 OF 'STRUCTURAL DESIGN AND GEOTECHNICAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE SYSTEMS'
  - PARTICULAR CONSIDERATION TO BE GIVEN TO LATERAL SURCHARGE LOADS FROM VEHICLES POSITIONED TO THE SIDE OF THE TANKS.
  - THE DESIGNER HAS CONSIDERED THE SOIL INVESTIGATION REPORT, WATER LEVELS AND INSTALLATION LEVELS IN THEIR DESIGN.
  - ACCESS FOR MAINTENANCE AND INSPECTION (I.E. JETTING AND RODDING) WITHIN THE TANK STRUCTURE ITSELF SHOULD BE PROVIDED FOR APPROVAL AND BE IN ACCORDANCE WITH CIRIA 697 REQUIREMENTS BY PROVISION OF A FULL CCTV ACCESSIBLE PIPE (WHETHER A SOLID, PERFORATED OR A HALF HEIGHT PIPE SYSTEM IS UTILISED) THROUGH THE WHOLE LENGTH OF THE TANK.

DRAINAGE NOTES

- ALL DRAINAGE MATERIALS & SPECIFICATIONS TO BE IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE APPENDIX C 'DESIGN AND CONSTRUCTION GUIDANCE'.
- REFER TO MJC CONSULTING ENGINEERS DRAWING No'S **C-5201 & C-5202** FOR ALL STANDARD DRAINAGE DETAILS. THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS/SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS ON SITE. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
- ALL PIPES SHALL BE LAID WITH SOFFITS LEVEL AND ALL MANHOLES/INSPECTION CHAMBER INVERT LEVELS SHOWN ARE FOR THE OUT GOING PIPE. UNLESS OTHERWISE INDICATED ON THE DRAWING.
- ALL VITRIFIED CLAY PIPES AND FITTINGS TO BE IN ACCORDANCE WITH BS. EN295 & BS 65.
- ALL CIRCULAR CONCRETE PIPES IN TRENCHES AND FITTINGS TO BE IN ACCORDANCE WITH BS EN1916 & BS 5911 AND BE STRENGTH CLASS 120.
- ALL STRUCTURED WALL PLASTIC PIPES AND FITTINGS TO BE IN ACCORDANCE WITH WIS 4-35-01. MAXIMUM LENGTH OF PIPE FOR LAYING IS 3m.
- PIPES AND FITTINGS ARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- ALL CONNECTIONS TO GULLIES & DRAINAGE CHANNELS TO BE 150mm DIAMETER UNLESS NOTED OTHERWISE.
- ALL CONNECTIONS FROM DRAINAGE CHANNELS TO BE TRAPPED AND RODABLE.
- COVER LEVELS INDICATED IN MANHOLE SCHEDULES ARE APPROXIMATE AND SHOULD BE CHECKED AGAINST ARCHITECT'S DETAILED LEVELS DRAWINGS.
- WHERE THE COVER TO PIPES IS LESS THAN 1200mm IN TRAFFICKED AREAS & 900mm IN OTHER AREAS, THEN CONCRETE PROTECTION IS TO BE PROVIDED. NB UNTIL FINAL SURFACE IS CONSTRUCTED, HEAVY TRAFFIC IS NOT TO BE ALLOWED OVER PIPE TRENCHES WITHOUT SPECIFIC PROTECTION MEASURES IN PLACE.
- SOFT SPOTS IN THE BOTTOM OF TRENCHES SHALL BE REMOVED AND BACKFILLED WITH TYPE 1 SUB-MATERIAL, PIPE BEDDING MATERIAL OR LEAN MIX CONCRETE.
- ALL CONCRETE WORK IS TO BE IN ACCORDANCE WITH MJC CONSULTING ENGINEERS NBS-SECTION E. RELEVANT CONCRETE MIX DESIGN:-

| CONCRETE ELEMENT | DESIGN CHEMICAL CLASS | SPEC. CLAUSE No. |
|------------------|-----------------------|------------------|
| PIPE SURROUND    |                       |                  |
| MH SURROUND      |                       |                  |
- DRAINAGE CHANNEL SPECIFICATIONS:-

| LOCATION         | CHANNEL TYPE | LOAD CLASS |
|------------------|--------------|------------|
| YARD             |              |            |
| CAR PARK         |              |            |
| ACCESS ROAD      |              |            |
| PEDESTRIAN AREAS |              |            |
- IF A SIPHONIC ROOF DRAINAGE SYSTEM IS PROPOSED THE SIPHONIC PIPEWORK IS TO BE CONTINUED BELOW GROUND TO THE FIRST EXTERNAL MANHOLE, WHICH IS TO BE VENTED TO BREAK THE SIPHONIC ACTION.

DESIGNER RISK INFORMATION

- IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:-
- CONSTRUCTION:**  
EXISTING SERVICES CROSSING SITE TO BE CONFIRMED PRIOR TO ANY WORKS TAKING PLACE. HISTORIC USE OF SITE SUGGESTS POTENTIAL CONTAMINANTS, SUGGEST FULL SURVEY CARRIED OUT
- MAINTENANCE/CLEANING:**  
REFER TO MJC DRAINAGE MAINTENANCE DOCUMENT FOR DETAILS
- DECOMMISSIONING/DEMOLITION:**
- IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.
- ALL DRAINAGE COVERS IN PEDESTRIAN AREAS ARE TO BE FITTED WITH HEEL SAFE LIDS.
  - ALL PETROL INTERCEPTORS ARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND FITTED WITH ALARMS AND VENTS TO LOCATIONS AS AGREED WITH THE CLIENT.
  - IF A PILED OR SUSPENDED SLAB IS PROPOSED ALL INTERNAL DRAINAGE IS TO BE SUSPENDED FROM THE SLAB WITH ROCKER PIPES USED AT THE EDGES OF THE BUILDING.
  - ALL DOMESTIC FOUL DRAINAGE MUST BE KEPT SEPARATE FROM CONDENSATE DRAINAGE UNTIL OUTSIDE THE BUILDING WITH STEPS TAKEN TO TRAP ANY ODOURS.
  - ALL FOUL RUNS MUST BE VENTED IN ACCORDANCE WITH BUILDING REGULATIONS. VENT LOCATIONS TO BE PROVIDED BY THE ABOVE GROUND DRAINAGE DESIGNER.
  - REGARDLESS OF MANHOLE POSITIONS SHOWN ON THIS DRAWING, THE ACCESS LIDS ARE TO BE POSITIONED AWAY FROM MAIN WHEEL LINES AND BE SQUARE TO KERBS AND OTHER SURFACE FEATURES SUCH AS YARD SLAB JOINTS.
  - ALL TEMPORARY DRAINAGE IS THE RESPONSIBILITY OF THE CONTRACTOR.
  - THE CONTRACTOR SHALL PROVIDE LAND DRAINAGE AS NECESSARY TO PREVENT RUNOFF FROM LANDSCAPED AREAS WASHING SILT ONTO HARDSTANDINGS AND THIRD PARTY LAND.
  - THE CONTRACTOR IS RESPONSIBLE FOR SEWER CONNECTION APPROVALS UNLESS NOTED OTHERWISE.
  - ALL MANHOLE LIDS TO BE PAINTED BLACK IMMEDIATELY PRIOR TO PRACTICAL COMPLETION.
  - JUST PRIOR TO PRACTICAL COMPLETION OF THE PROJECT THE CONTRACTOR SHALL CLEAN ALL DRAIN RUNS BY JETTING AND REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE PUBLIC SEWER AND/OR WATERCOURSE SYSTEM. ONCE THE DRAINAGE SYSTEM HAS BEEN FULLY CLEANED OUT A CCTV SURVEY OF THE COMPLETE PIPE NETWORK (INCLUDING ATTENUATION TANKS AND CARRIER CHANNELS) SHALL BE CARRIED OUT, WITH A COPY BEING SENT TO THE ENGINEER. VISUAL INSPECTIONS (THROUGH CCTV SURVEY) SHALL BE CARRIED OUT BY A QUALIFIED AND APPROVED CONTRACTOR, AND IN ACCORDANCE WITH THE 'WSA/FRA MODEL CONTRACT DOCUMENT FOR SEWER CONDITION INSPECTIONS'. THE AS BUILT INVERT AND COVER LEVELS SHALL BE RECORDED BY THE CONTRACTOR AND PASSED TO THE ENGINEER FOR REVIEW.
  - ALL SEWERS AND DRAINS ARE TO BE TESTED IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE APPENDIX C, SECTION E7.

|     |          |                           |    |    |
|-----|----------|---------------------------|----|----|
| PO3 | 15/08/23 | AMENDED TO CLIENT COMMENT | TM | TM |
| PO2 | 04/07/23 | AMENDED TO CLIENT COMMENT | TM | TM |
| PO1 | 31/05/23 | FOR INFORMATION           | TM | TM |
| Rev | Date     | Amendment                 |    |    |

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Project: **WEST ROAD POGMOOR**

Client: **POWERTOOLSGB**

Drawing Title: **PROPOSED DRAINAGE LAYOUT**

|                                                                                                 |                               |                       |
|-------------------------------------------------------------------------------------------------|-------------------------------|-----------------------|
| TM                                                                                              |                               | TM                    |
| MJC Ref: <b>8529</b>                                                                            | Scale: <b>1:200</b>           | Sheet Size: <b>A1</b> |
| Revision Status: <b>PO3</b>                                                                     | Suitability Status: <b>S2</b> | Date: <b>MAY 23</b>   |
| Suitability Description: <b>FOR INFORMATION</b>                                                 |                               |                       |
| Drawing Reference: <b>Project - Originator - Zone - Level - File Type - Discipline - Number</b> |                               |                       |
| <b>8529-MJM-XX-XX-DR-D-5200</b>                                                                 |                               |                       |

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## Appendix F - Drainage Maintenance Plan

## **Proposed Commercial Warehouse unit at West Road, Barnsley Surface Water Drainage Maintenance Plan – May 2023**

The following surface water management plan applies to the development of a Commercial Warehouse Unit at West Road Barnsley.

The underground surface water drainage within the site boundary will be maintained by the proposed tenant - Blue Check Consulting /V. Simpson. All proprietary systems will be maintained in accordance with manufacturer's recommendations. The current recommendations, where appropriate, are included below. However, the guidance provided below should be reviewed as and when manufacturer's guidance is updated. All installation and maintenance guides for proprietary systems will be retained on the premises in the Health & Safety file.

In addition to the following guidance on the underground drainage system, the above ground roof rainwater drainage system should be maintained strictly in accordance with the designer's guidance to ensure that roof run-off is conveyed in to the underground system as intended.

### **Gullies**

Road gullies draining the site hardstandings should be inspected regularly to ensure that they continue to operate effectively, and are free from damage and blockage by debris or solid objects.

They should be cleaned at least once a year, and incorporated into a planned maintenance schedule.

Any debris or blockages near to the surface of the gully should be removed by hand or by jet-vac. The trap element of the gully can be cleaned through the use of a high-pressure hose.

The seating areas for grates should be cleaned before they are replaced. If grates are allowed to move within their frame, this may cause damage to the frame or seating.

### **Drainage channels**

Drainage channels should be inspected regularly to ensure that the system continues to operate effectively, and is free from damage and blockage by debris or solid objects.

The system should be cleaned at least once a year, and incorporated into a planned maintenance schedule. Channel units can be cleaned through the use of a high-pressure hose. This can be fed into the channel system through access units which are strategically placed along the channel run.

The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface liquids into the drainage channel. Any debris within the throat should be removed.

The seating areas for covers and grates should be cleaned before they are replaced. The covers and grates should be locked into position to prevent these being removed, stolen or dislodged by traffic. Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If grates/ covers are allowed to move within their frame, this may cause damage to the frame or seating.

### **Pipes and manholes**

Manholes are to be inspected annually for signs of blockage, with pipes jet washed and CCTV inspections carried out to the pipelines as appropriate should a blockage occur.

## **Petrol interceptor**

The full retention interceptor will be installed with an alarm, which is activated when 90% of the oil storage volume of the interceptor has been reached. This notifies the occupant that the unit is required to be emptied. Should the interceptor fail to be emptied at this time, excessive oil could pass through the interceptor, thus polluting the downstream environment.

The interceptor should be serviced in accordance with the manufacturer's recommended service interval in order to ensure proper operation of the equipment. This should be done routinely without waiting for the alarm to sound. The on-going functional assessment of the unit and oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

## **Attenuation tank**

The attenuation tank is equipped with access manholes at each inlet and outlet location.

The tank should be maintained in a similar manner to the network of pipes and manholes. It is to be inspected bi-annually for signs of build-up or blockages, with CCTV inspections used appropriately to identify the source and location. Any sediment build-up at inlet or outlet locations should be removed by Jetvac. Entry to the tank, if possible, should be carried out by someone who has successfully completed a confined space training course.

The flow control device located downstream from the tank is also to be checked bi-annually for blockages.

## **Swale**

The following inspection and maintenance regime is recommended:

- Monthly maintenance
  - Mow turf (seasonal)
- Bi-annual maintenance
  - Inspect vegetation for invasive species
- Annual maintenance
  - Inspect the outlet and catchpit manhole for damage, monitor for signs of sediment build-up, and ensure outlet remains operational
- As needed maintenance
  - Repair undercut or eroded areas, particularly following heavy precipitation, to ensure the form of the swale is maintained

Vegetation and landscaping to the swale should be carried out in accordance with the Landscape Architect's maintenance regime for the development. This takes precedence over any intervals stated above for the maintenance of vegetation.

Any lifesaving equipment present on the bank should be routinely maintained and replaced in accordance with the manufacturer's recommended schedule.

### **Filter Drains**

Filter drains are to be inspected regularly for weeds and growth of any other vegetation. Removal should be carried out by hand pulling or spot treating individual weed growth using non-toxic and biodegradable weed killer and ensuring it does not enter filter drain.

Regularly inspect the filter drain to check for siltation at surface. Where siltation at the surface has occurred; remove surface stone layer and separating geotextile that protects the stone drain below. Replace geotextile and top stone layer.

Where there is no protective geotextile; remove all stone and perforated pipe, replace as original spec. and include separating geotextile as above.

### **General guidance for the safe inspection of underground systems and confined spaces**

- Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on equipment which could potentially contain contaminated water should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.
- When covers are removed precautions should be taken against personnel falling into the unit.
- The working area should be adequately lit and the inspector should be familiar with the area and access points
- Correct posture should be maintained, particularly when lifting. Appropriate lifting equipment should be used when necessary. Proper footing and balance should be maintained at all times, taking care to avoid any sharp edges.