Commercial Development
South Heywood

Foul & Surface Water Drainage Strategy
A117337

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Prepared on behalf of
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1.0 Introduction

1.1 Purpose of this report

WYG Engineering Ltd have been commissioned by Russells South Heywood Limited to undertake a Foul and Surface Water Drainage Strategy to support a Reserved Matters planning application to Rochdale Borough Council (RBC) for a commercial development within land to the south west of Harehills Road, Heywood. The planning application will include Reserved Matters details for a new large distribution warehouse on Plot 1, including access, service yard, parking and landscaping together with the new development spine road. The application will also include earthworks to create development plateaus within the remaining areas of the red line application boundary in readiness for future development.

The proposed site layout is contained within Appendix A.

1.2 Requirement for this Report

1.2.1 Requirement for the Flood Risk Assessment

This report has been prepared to support a reserved matters application pursuant to Hybrid application 16/01399/HYBR. A Flood Risk Assessment was submitted with the original hybrid application and the principle of the development and flood risk considerations deemed acceptable under that application.

Conditions 18, 19 and 20 of permission 16/01399/HYBR require a Drainage Strategy to be submitted with any reserved matters application. This Report is therefore submitted to respond to this requirement.

1.2.2 Requirement for the Drainage Assessment

The NPPF aims to ensure that development does not increase flood risk elsewhere and reduces flood risk where possible[1]. To this end, surface water runoff from a developed site should be managed to avoid increasing the risk of surface water flooding and, as far as it is practicable, reduce the risk to the site itself and areas elsewhere.

From 6 April 2015, Ministerial Statement HCWS 161 requires that planning policy and decisions on planning applications relating to major development are required to ensure that sustainable drainage systems (SuDS) are used for the management of surface water.

[1] NPPF paragraph 155

1.3 Scope of this Report

1.3.1 Scope of the Flood Risk Assessment

The FRA will be undertaken in accordance with the national policy and guidance from the NPPF, Planning Practice Guidance (PPG) (Flood Risk and Coastal Change)[2] and Environment Agency[3] as well as local policy and guidance from Rochdale Borough Council as both Local Planning Authority (LPA) and as Lead Local Flood Authority (LLFA).

The FRA will consider all potential sources of flood risk including Main Rivers, Ordinary Watercourses (not shown on the Environment Agency's flood maps), surface water and overland flow routes, groundwater, sewers, reservoirs and canals.

1.3.2 Scope of the Drainage Assessment

The drainage assessment will be undertaken with reference to the requirements of the planning conditions and in accordance with the Non-Statutory Technical Standards for Sustainable Drainage[4] and RBC Sustainable Drainage Pre-Application Standing Advice[5]. The assessment will inform a drainage strategy for the site such that surface water runoff and foul drainage from the development site are managed appropriately.

1.4 Limitations of this report

This report has been prepared by WYG Engineering Ltd on behalf of Russells South Heywood Limited in connection with the scope of the report as described in Section 1.4 above and takes into account the particular instructions and requirements. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

WYG Engineering Ltd accepts no duty or responsibility (including in negligence) to any party other than Russells South Heywood Limited and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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[2] Ministry of Housing, Communities and Local Government (March 2014), *Flood risk and coastal change*
[3] Environment Agency (February 2017), *Flood risk assessment in flood zone 1 and critical drainage areas*
[4] DEFRA (March 2015), *Non-statutory technical standards for sustainable drainage systems*
[5] Rochdale Borough Council Sustainable Drainage Pre-Application Standing Advice (January 2016)

2.0 Background

2.1 Planning History

The Commercial development at South Heywood was granted outline planning approval as part of the hybrid planning application ref: 16/01399/HYBR. The hybrid application includes detailed planning consent for approximately 2km of new link road (South Heywood Link Road) between M62 J19 and Pilsworth Road. This work includes road re-alignment, junction improvements and road widening; a new access into the proposed commercial development will be formed as part of this work.

The outline part of the planning consent included a mixed-use employment and residential development scheme including a new school, small local retail parade and playing fields.

The current reserved matters planning application seeks to progress the employment proposals, previously consented in outline, and to address planning conditions attached to the approval in relation to the current proposed phase. With regard to drainage and flood risk, the relevant conditions include Condition 18, Condition 19 and Condition 20 which are reproduced below.

Condition 18 (as amended under 20/00933/ANM)

The submission of any reserved matters application should be accompanied by an updated Drainage Strategy for foul and surface water based on sustainable drainage principles. The strategy shall be in accordance with the principles established in Chapter 12 Drainage and Flood Risk of the submitted Environmental Statement and Appendix 12.1 Flood Risk Assessment and Surface Water Management Strategy of the submitted Environmental Statement. The updated Foul and Surface Water Drainage Strategy shall include the following details as a minimum:

a. the proposed foul connection points to the existing public sewerage infrastructure for that phase;

b. no surface water, highway drainage or land drainage shall discharge directly or indirectly into the existing public sewerage systems;

c. any drainage infrastructure connections (foul and surface water) including the volume of flows between the different phases / development parcels of the development defined by Condition 13;

d. details and timing for the abandonment and disconnection of existing foul and surface water drainage arrangements from the buildings to be demolished; and

e. identify any parts of the site where pumping is necessary. Thereafter, the strategy shall minimise the number of pumping stations throughout the site.

The Foul and Surface Water Drainage Strategy shall also include an assessment of the site conditions and the potential for an infiltration solution for that phase in accordance with paragraph 12.88 of the submitted Environmental Statement. Where infiltration is identified as feasible by the site investigations, an infiltration scheme shall be implemented.

Condition 19

No development shall take place within any phase of development until a foul drainage scheme for that phase including full details of any connections to the foul sewer network and any necessary infrastructure has be submitted to and approved in writing by the local planning authority. The details shall include the timing arrangements, storage requirements and rate of discharge for any pumped foul discharge. Foul and surface water shall drain on separate systems. The details for each part or phase must be consistent with the updated Foul and Surface Water Drainage Strategy submitted and approved pursuant to Condition 18 above. No housing or other development shall be occupied for that phase until the approved foul drainage scheme for that phase has been completed in accordance with the approved details.

Condition 20

No development shall take place within any phase of development until a surface water drainage scheme for that phase has been submitted to and approved in writing by the local planning authority. The submitted scheme shall include details of a: surface water regulation system and means of disposal for that phase or part phase, based wholly on sustainable drainage principles and the hierarchy of drainage options in the national planning practice guidance with evidence of an assessment of site conditions and an assessment of the potential for infiltration shall be submitted to and approved by the local planning authority in writing. A management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements is also required to be submitted.

The details for each part or phase must be consistent with the updated Foul and Surface Water Drainage Strategy submitted and approved pursuant to Condition 18 above. No housing or other development shall be occupied for that phase until the approved surface water drainage

scheme for that phase has been completed in accordance with the approved details.

2.2 Proposed Development

This Foul and Surface Water Drainage Strategy has been written in support of a reserved matters planning application for the commercial development and associated access and infrastructure works. The Reserved Matters application includes the construction of a new distribution warehouse within Plot 1, including access, service yard, parking and landscaping together with the new development spine road. The application will also include earthworks to create development plateaus within the remaining areas of the red line application boundary in readiness for future development.

3.0 Site Description

3.1 Existing Site

The site is located south west of Heywood, approximately 11km north of Manchester. The application red line boundary encloses a total area of approximately 40.8 ha of land located to the south west of Harehills Road, Heywood. The section of Pilsworth Road and Hareshill Road adjacent the site are subject to widening and junction improvement works as part of a wider highway infrastructure improvement scheme being undertaken by Rochdale Borough Council (as approved under the previous Hybrid Planning application).

The site is bounded by Pilsworth Road and Heywood Distribution Park to the north west. To the north east the site is bounded by Hareshill Road and Broadfield Industrial Park. Agricultural land lies to the west and south. The site location is shown in Figure 1 below; the nearest postcode is OL10 2TD and the site's grid reference is SD 84558 09270.

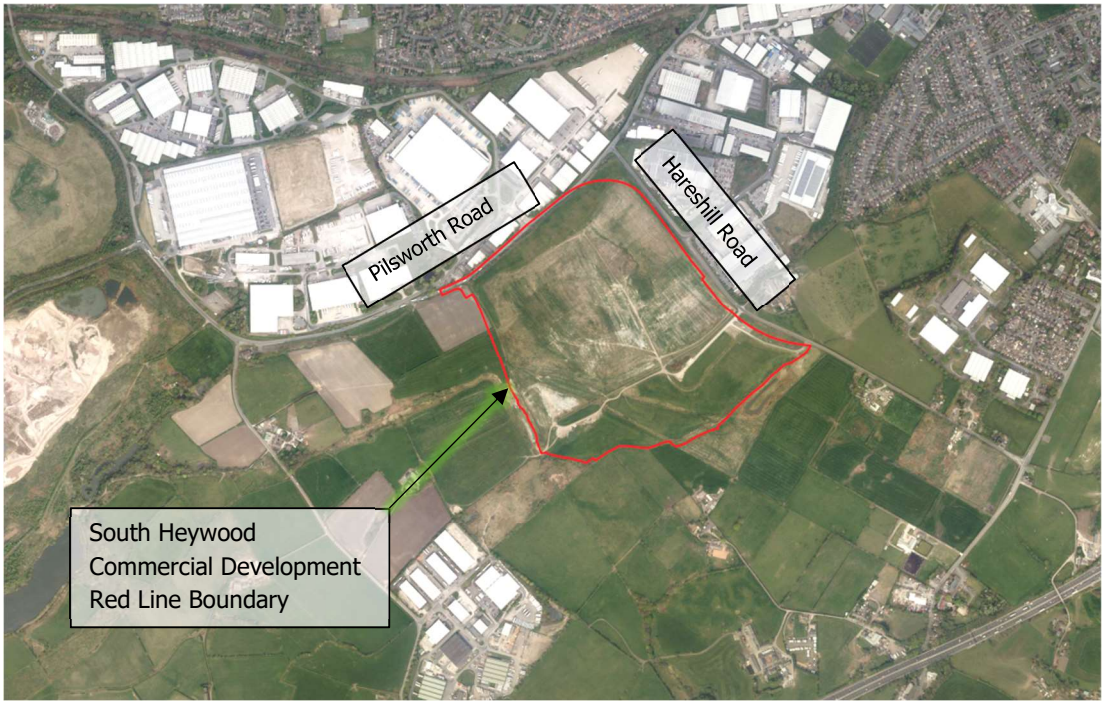


Figure 1 – Site Location Plan

A topographical survey of the site was undertaken by Survey Ops in Sept 2020 and a copy of the survey drawing is included within Appendix B.

The survey drawing indicates that the highest ground levels are located midway along the eastern edge of the site (just west of Hareshill Road) where the ground surface forms a peak. From the peak the ground slopes away in all directions towards the north, west and south. The north western boundary of the site (along Pilsworth Road) forms a low point in the topography locally with ground levels sloping down from circa 118m AOD near the junction of Hareshill Road and Pilsworth Road to approximately 113m AOD in the north western corner of the site. Similarly, to the south of the site, ground levels slope towards lower ground on the southern boundary where a watercourse (part ordinary watercourse and part main river) flows in an easterly direction. Ground levels along the edge of the watercourse to the south of the site vary between approximately 122m AOD in the south east to approximately 114m AOD midway along the western boundary. The ground slopes are illustrated within Figure 2.

Access to the majority of the existing site can be gained via an existing access track leading into the site from Hareshill Road in the east. On the western boundary of the site, the Brightley Brook Tributary (main river) flows just inside the boundary before turning and flowing through agricultural land to the west. The site comprises greenfield open land, however it is understood

that a significant part of the land has historically been used as a tip. Access roads and stockpiled material / earth associated with this former use are shown on the survey drawing.

3.2 Existing Drainage

3.2.1 Main Rivers

A tributary of the Brightley Brook (main river) flows part way along the western boundary as shown in Figure 2 below. The Brightley Brook flows towards the west, joining with the Whittle Brook and then flowing to a confluence with the River Roch approximately 3km west of the site.

The Brightley Brook is in open ditch as it flows through the site.

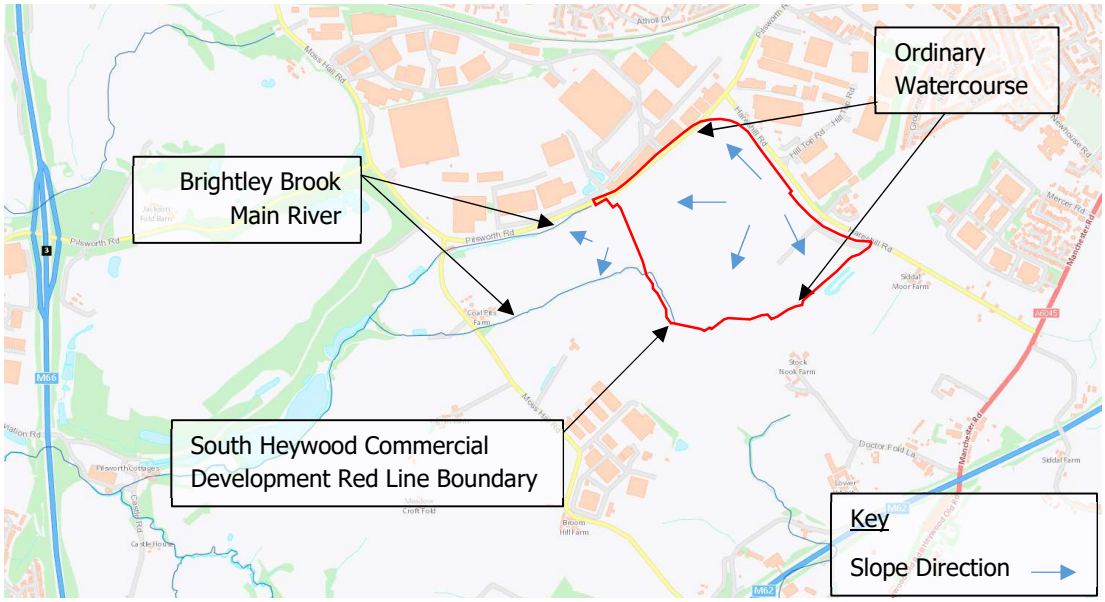


Figure 2 – Local Hydrology[6]

3.2.2 Ordinary & Manmade Watercourses

In addition to the Brightley Brook (main river) there is also a ditch which extends along the north western boundary of the site and a further ditch which runs along the southern site boundary as far as Harehills Road. These watercourses are designated Ordinary Watercourses. The watercourse on the southern site boundary continues to the east of the site in a culvert under Hareshill Road.

[6] © Crown copyright and database rights 2020 Ordnance Survey 0100031673

3.2.3 Sewers

United Utilities (UU) own and operate the public sewer infrastructure in the area surrounding the site. A copy of the UU sewer record plans show that there are no public sewers within the site boundary. In addition, the record plans do not show public sewers within either Heywood Distribution Park to the north or Broadfield Industrial Park to the east and it is assumed that these are served by private drainage networks.

The nearest sewer to the site, shown on the record plans, is at manhole 7902 located in Pilsworth Road to the north east. This is a 450mm diameter combined sewer. A copy of the UU sewer record plans is included within Appendix C.

There is however an additional length of combined sewer laid upstream of MH 7902 which extends along Pilsworth Road towards the site and ends in the carriageway near to the junction of Hareshill Road and Pilsworth Road. A CCTV survey of approximately 345m of sewer has been undertaken along the length of pipe between the existing UU sewer at MH 7902 and the manhole (referenced as MH01) near to the junction of Hareshill Road and Pilsworth Road. The survey was undertaken by Drain Doctor in November 2018 and a copy of the report and accompanying plan is included within Appendix C. The existing sewer receives flows from the Pennine Business Park north of the site.

UU has been consulted in respect of the length of sewer between MH01 and the UU sewer at MH 7902, and it has been established that this length of sewer transferred to UU in 2011 under the Transfer of Private Drainage Legislation. A copy of the correspondence is included in Appendix C and it is understood that the sewer will be added to UU asset record plans in due course.

The nearest surface water sewer to the site is a 300mm diameter pipe shown within Hareshill Road, flowing from a location south of Hares Hill Farm and discharging into a 600mm pipe which crosses under Hareshill road and out falling to the Ordinary Watercourse in the south east of the site.

3.3 Ground Conditions

3.3.1 Geology

A review of the British Geological Survey (BGS) online mapping[7] indicates that the site is underlain by a solid geology of Pennine Lower Coal Measures Formation (Mudstone, Siltstone

[7] British Geological Survey (2019), *Geology of Britain viewer*

and Sandstone). No superficial deposits are recorded within the central eastern part of the site, however the northern, southern and western edges of the site are shown to be underlain by superficial deposits comprising Devensian Glacial Till (Diamicton).

It is noted that much of the site has historically been used as a tip, there is therefore a significant depth of made ground in the central areas of the site.

3.3.2 Hydrogeology

DEFRA's 'Magic' mapping[8] indicates that the bedrock is designated a secondary A aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The superficial deposits, where present are designated a Secondary (undifferentiated) aquifer. These aquifers have been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

The site is not located within a groundwater Source Protection Zone (SPZ).

3.3.3 Ground Investigation

A Ground Investigation was undertaken by WYG between the 23rd June and 3rd July 2020 and the findings of the investigation works are summarised within the Ground Investigation Interpretative Report dated September 2020.

The ground investigation included trial pits, cable percussive boreholes and rotary holes with follow up geotechnical testing. The ground conditions generally comprise an imported Made Ground/Topsoil over an imported Made Ground backfill which has been identified as up to approximately 12m depth at Plot 1. Underlying the backfill are Glacial Deposits which are absent in some parts of the site. These are underlain by Coal Measures. The made ground encountered within these areas of the site are associated with the former Casey's Tip.

Groundwater was encountered within the WYG ground investigation and during previous studies undertaken within the site. The depth of groundwater varies however at its shallowest it can reach the ground surface, whilst the deepest observations of groundwater are at a depth in excess of 9m bgl.

[8] DEFRA (2019), *Magic*

4.0 Development Proposals

4.1 Proposed Development

This Foul and Surface Water Drainage Strategy has been written in support of a reserved matters planning application for the commercial development and associated access and infrastructure works. The Reserved Matters application includes the construction of a new distribution warehouse within Plot 1, including access, service yard, parking and landscaping together with the first phase of the new development spine road. The application will also include earthworks to create development plateaus within the remaining areas of the red line application boundary in readiness for future development.

Appendix A includes the proposed site layout.

4.2 Local Planning Policy

4.2.1 Rochdale Core Strategy 2016

Within Strategic Objective 4 – "To promote a greener environment" of the Rochdale Core Strategy there is a section on managing water resources and flood risk. It states that the council will ensure that new developments do not increase flooding locally or downstream, do not interfere with flood storage areas, has sustainable use of water resources, help with flood risk and is itself protected.

To enforce this, as the Lead Local Flood Authority (LLFA), they will require:

- Developments to be directed away from areas of high flood risk
- Incorporation of appropriate measures for the management of surface and flood water, including flood storage areas, Sustainable Urban Drainage Systems (SUDS) and the protection of 'overland flow paths'
- The avoidance of culverting and supporting opening existing culverts where possible
- Incorporation of measures to conserve water
- Measures to ensure that the development does not lead to any water pollution or the degradation in the quantity of groundwater
- Incorporation of measures to improve water quality

4.2.2 Bury, Oldham and Rochdale Strategy Flood Risk Assessment 2009

The Bury, Oldham and Rochdale SFRA highlight that Heywood is a Critical Drainage Area. The area has a significant risk of surface water flooding associated with the valley of the Millers Brook and Pilsworth Road. This risk is predicted to significantly increase in the future. The SFRA recommends that a Surface Water Management Plan is undertaken for Heywood, to for example identify suitable areas for SuDS.

4.2.3 Greater Manchester Surface Water Management Plan 2012

The Greater Manchester Surface Water Management Plan addresses Heywood's significant flood history. Serious flood events occurred in 2001, 2004 and 2006 where surface water runoff naturally pooled to a low point. For example, in in 2004 over 200 properties were flooded with up to 900m contaminated water.

4.2.4 Rochdale Borough Council Sustainable Drainage Pre-application Standing Advice (Jan 2016)

This document sets out Rochdale Borough Councils requirements as LLFA in respect of the design of SuDS and the level of information required to support outline and full planning applications.

4.2.5 Summary

Based on the site's location, away from Heywood centre, and the low risk of flooding identified within the Flood Risk Assessment, it is likely the issues mentioned in local policy will not impact this development. However, the measures recommended by Rochdale Borough Council will be applied within the proposed drainage strategy.

4.3 Development & Flood Risk

4.3.1 Flood Risk to the Development

The site is considered to be at low risk of flooding from all sources. The proposals are therefore considered to be in agreement with the NPPF and Rochdale Core Policy regarding directing development to areas of low flood risk. The principle of the development and flood risk considerations have already been approved at outline stage

4.3.2 Finished Floor Levels

Finished floor levels for the proposed buildings at ground floor level are generally to be set a minimum of 150mm above existing ground levels to protect the buildings from surface water flooding. There are locations where a level threshold will be required however these will be protected by ensuring that all external finished ground levels slope away from the building.

4.3.3 Flood Risk Arising from the Development

The proposals include the provision of new roof areas and hardstanding. It is therefore necessary to manage surface water runoff on site to avoid increasing the risk of flooding to areas elsewhere by the introduction of these new impermeable surfaces, as required by the NPPF and the local RBC policies.

4.4 Surface Water Management

In accordance with planning conditions 18 and 20 the surface water management strategy for the scheme will be developed in line with the arrangements outlined within the South Heywood Development Opportunity Flood Risk & Surface Water Management Strategy report prepared by Campbell Reith in November 2016 to support the outline planning application for the wider development.

In relation to the management of surface water runoff from the site these planning conditions require that the strategy must be based on sustainable principles; that no surface water, highway drainage or land drainage is to discharge to the public sewer and an assessment of ground conditions is required to establish whether there is potential for infiltration solutions.

4.4.1 Drainage Hierarchy

The management of runoff should be considered via a sequential approach, in line with Building Regulations[9] and RBC Drainage Planning Policy[10]. The following options for the disposal of surface water runoff have been considered, in order of preference:

- Discharge to an adequate soakaway or some other adequate infiltration system (i.e. to ground);
- Discharge to a watercourse; and
- Discharge to a sewer.

Discharge to Ground

The ground conditions described in Section 3.3.3 indicate significant depths (up to 12m) of made ground associated with the former Casey's Tip within the site. Beneath the made ground are superficial deposits of Glacial Till overlying a solid geology of Coal Measures.

The Made Ground is not suitable for infiltration drainage and would present a risk of mobilising contaminants into the underlying groundwater. Groundwater was encountered at shallow depths within a number of borehole locations.

Both the made ground and the underlying soils and bedrock have relatively variable particle size from location to location and are described as either cohesive or granular. Overall these materials are of low permeability. Infiltration testing undertaken as part of the Ground Investigation which accompanied the previous application included soakaway tests at three locations. All three locations were outside of the current application boundary and within land not subject to the constraints of Casey's Tip, however, do give an indication of the permeability of land with broadly similar underlying geology. At two of the test locations the fall in water level was too small to return an infiltration rate using the BRE Digest 365 methodology and at the third location a low rate of 2.6×10^{-6} m/s was recorded.

As a result of these combined factors, infiltration drainage methods are not suitable for this development.

Discharge to Watercourse

Land within the site currently drains to the ordinary watercourses on the northern and southern boundaries and to a section of the Brightley Brook Tributary (main river) located on the

[9] HM Government (2010), *The Building Regulations 2010, Approved Document H (Part H3)*
[10] Rochdale Borough Council (2016), *Sustainable Drainage Pre-application Advice*

western boundary. It is proposed to maintain the existing drainage regime within the site with controlled outfall to the various sections of watercourse to match the existing greenfield runoff rates.

Discharge to Sewer

There are no suitable public surface water sewers within the vicinity of the site.

4.4.2 Drainage Principles

In order to comply with, and to discharge the planning conditions appended to the grant of permission of the previous hybrid application the detailed drainage strategy must be in accordance with the principles established in Chapter 12 Drainage and Flood Risk of the submitted Environmental Statement and Appendix 12.1 Flood Risk Assessment and Surface Water Management Strategy.

The Flood Risk Assessment and Surface Water Management Strategy prepared by Campbell Reith in November 2016 sets out the principles of the approved drainage strategy and the commercial site is referenced as area 4. The overriding principal is that surface water runoff from the developed site will be restricted so that runoff rates will not exceed the equivalent greenfield runoff rate for the same return period. An allowance of 30% has been included within the calculations in consideration of the future impacts of climate change.

Greenfield runoff rates were assessed as part of the Campbell Reith report for each plot. The greenfield runoff rates for each return period are shown in Table 1 below and are expressed as a rate per ha of developed land.

Table 1 – Greenfield Runoff Rates taken from Campbell Reith Report

Return Period 1 in X yrs	Greenfield Runoff Rate (l/s/ha)
1	7
30	13
100	16

Various SuDS options were discussed in the Campbell Reith report and the drainage strategy plan provided shows all of the attenuation storage provided within below ground geocellular storage tanks. However, as geocellular storage tanks do not provide any significant water quality treatment, the reserved matters masterplan for plot 1 and the spine road makes allowance for 3No SuDS basins suitably sized for their respective catchments.

4.4.3 Pre and Post-Development Areas

The proposed development of the site falls into three areas / catchments as follows;

- The construction of a new warehouse, offices, service yard, access and parking within plot 1;
- The construction of the new access road into the site;
- The earthworks to form plateaus for the future development.

Table 2 below summarises the existing and proposed development areas, estimated from the topographical survey and proposed site layout, respectively.

Table 2 – Pre and Post-Development Areas

Location	Status	Permeable Area (ha)	Impermeable Area (ha)
Plot 1	Pre-development	15.00	0.00
	Post-development	2.84	12.16
Access Road	Pre-development	1.13	0.00
	Post-development	0.00	1.13
Earthworks	Pre-development	23.97	0.34
	Post-development	24.31	0.00

4.4.4 Pre and Post-Development Discharge Rates

The greenfield runoff rates for the development areas of the site have been obtained using the greenfield runoff rates determined as part of the Campbell Reith Flood Risk Assessment and Surface Water Management Strategy. Table 3 below shows the greenfield runoff rates and proposed runoff rates for each of the development areas.

Table 3 – Existing and Proposed Runoff Rates

Location	Status	1 in 1 year (l/s)	1 in 30 year (l/s)	1 in 100 year (l/s)
Plot 1	Greenfield Runoff	85.1	158.0	194.5
	Post-development	85.1	158.0	194.5
Access Road	Greenfield Runoff	7.9	14.2	18.1
	Post-development	7.9	14.2	18.1
Earthworks	Greenfield Runoff	170.2	316.0	389.0
	Post-development	170.2	316.0	389.0

In line with the approved surface water management strategy post development runoff rates will be attenuated to match the greenfield runoff rates for each return period. On site attenuation storage will be provided to retain excess surface water and ensure that there is no increase in flood risk within the site and surrounding area.

Additional storage is provided to accommodate a 30% increase in rainfall as a consequence of climate change without increasing discharge rates above the current day 1 in 100 year greenfield rates (for all design storms up to and including the 1% AEP event).

4.4.5 Proposed Surface Water Drainage Strategy

The drainage strategy for each development area has been developed in line with the arrangements outlined in the Campbell Reith Surface Water Management Strategy. Condition 18 requires that the drainage strategy be based on sustainable principles and therefore opportunities to incorporate above ground SuDS basins have been sought and included in the developed strategy for surface water.

Plot 1 drainage

The surface water drainage strategy for plot 1 is shown on drawing SHOW-WYG-00-XX-C-52-0100 in Appendix E. Surface water runoff from new roofs and hardstanding will be collected in a network of below ground drains. Runoff from the service yard areas will pass through a full retention oil separator whilst the car parking areas will be served by bypass separators. The piped drainage network will flow through two new detention basins located on the eastern edge of the plot.

The discharge from the detention basins will be restricted to mobilise the storage available. The downstream flow control will restrict the discharge from the plot 1 development to greenfield runoff rates using a complex flow control comprising of a chamber containing a

hydro-brake and orifice plate mounted at different levels to mimic the greenfield 1 in 1; 1 in 30 and 1 in 100 year discharge rates.

The restricted runoff from the plot one area will discharge to the ordinary watercourse in the north west corner of the plot in line with the existing greenfield runoff regime. The final connection point will be made via a manhole connection to the short section of the watercourse which is culverted to allow the public right of way to cross the channel. Providing the connection to the piped section of the watercourse in addition to the use of cascading manholes down the bank on the north western edge of the plot will keep the outfall velocities to a minimum and prevent scouring of the watercourse.

Access Road

The surface water drainage strategy for the access road is shown on drawings A104444-8-TTE-00-XX-H-C-Ph1.0501 and A104444-8-TTE-00-XX-H-C-Ph1.0502 in Appendix E. The strategy involves draining the highway surfaces via gulley connections into a new highway drain within the carriageway. The majority of the new section of road will be served by a new off-line detention basin adjacent the eastern edge of plot 1. A hydro-brake flow control on the line of the highway drain will restrict the passage of water from the upper section of the highway into the drains serving the lower section. Excess flows will back up into the off-line basin via a 375mm diameter pipe. The stored water within the detention basin will be released into the drainage network via the same 375mm diameter pipe when the flows subside.

It is envisaged that ultimately the new access road will extend further south providing access into land for future development. At that time the drainage network will continue within the access road, and outfall to the watercourse at a point downstream of the current phase of works. Under the current development proposals, the highway drainage will outfall to a ditch flowing in an easterly direction from the access road to the existing watercourse on the eastern boundary of the site. A weir and orifice plate within the upper section of the ditch will be used to control flows to the required rate of flow for the current phase of works and mobilise attenuation storage within the open ditch.

The flow control within the ditch will restrict the discharge from the highway to greenfield runoff rates using a flow control comprising of an orifice plate mounted on a weir set within the ditch to mimic the greenfield 1 in 1; 1 in 30 and 1 in 100 year discharge rates. The weir provides a safe means of overflow should the storage provided be exceeded by a storm event

in excess of the 1 in 100 year climate change event, or in the event of a blockage. The maximum depth of water in the upper section of the ditch is set at 700mm prior to overflow.

The restricted runoff from the highway surface will discharge to the ordinary watercourse in the south east corner of the site, via the new ditch in line with the existing greenfield runoff regime. The outfall will be made by extending the new ditch into the existing ordinary watercourse.

Earthwork development plateaus

The proposed reprofiling work to create development plateaus for future development will not increase the impermeable area of the site and no significant change to the rate of runoff from these areas is anticipated. The reprofiling will however change the hydrology of the site to some extent and therefore land drainage will be required to ensure suitable drainage of the site between the completion of construction works and any future development.

The drainage is to be provided by means of new filter drains and ditches / swales which will collect runoff towards the lower part of the site adjacent to the watercourse. The new filter drains and ditches will discharge into the watercourse.

Schematic drainage arrangements for the earthworks area are shown on drawing A104444-8-21-C-SK013A in Appendix E.

4.4.6 Required Attenuation

In order to restrict runoff from the site to the greenfield runoff rates outlined above, it is necessary to provide attenuation within the new surface water drainage system on the site. Drainage network models have been constructed using Micro Drainage software and simulations have been undertaken to demonstrate the performance of the proposed SuDS drainage scheme for plot 1 and the spine road.

Plot 1 Attenuation

Table 4 below provides a comparison between the greenfield runoff rates for the 1yr, 30yr and 100yr rainfall events and the calculated discharge rates from the proposed plot 1 drainage network for the same events. The table also confirms the calculated runoff from the proposed network for the 1 in 100 yr + 30% climate change event, and the total stored volume within the SuDS features. A full copy of the Micro Drainage calculations is provided within Appendix F.

Table 4 – Summary of Plot 1 Drainage Calculations

Return Period 1 in x	Greenfield Runoff Rate (l/s)	Calculated Post Development Runoff Rate (l/s)
1 Year	85.1	85.0
30 Year	158.0	97.3
100 Year	194.5	-
100 Year + 30% CC	-	185.8
Attenuation Storage Required 1 in 100 + 30% CC		
Basin 1	3,890m^3	
Basin 2	1,640m^3	

The model indicates some very minor exceedance during the 1 in 100 year + 30% climate change event, which sums to approximately 17.3m^3 over 5 manhole locations. The flooding at each location is 5m^3 or less and since all of the exceedance occurs within the large service yard between the warehouse and basin 2, this can easily be retained within the yard at shallow depth.

Spine Road Attenuation

Table 5 below provides a comparison between the greenfield runoff rates for the 1yr, 30yr and 100yr rainfall events and the calculated discharge rates from the proposed spine road drainage network for the same events. The table also confirms the calculated runoff from the proposed network for the 1 in 100 yr + 30% climate change event, and the total stored volume within the SuDS features. A full copy of the Micro Drainage calculations is provided within Appendix F.

Table 5 – Summary of Spine Road Drainage Calculations

Return Period 1 in x	Greenfield Runoff Rate (l/s)	Calculated Post Development Runoff Rate (l/s)
1 Year	7.9	7.9
30 Year	14.2	10.2
100 Year	18.1	-
100 Year + 30% CC	-	12.1
Attenuation Storage Required 1 in 100 + 30% CC		
Highway Basin	600m^3	
Storage in Ditch	42m^3	

The calculations show that runoff rates from the spine road for each return period are equal to or less than the equivalent greenfield rates. During the 1 in 100 year + 30% CC event a small amount of flooding is predicted at 2 locations, summing to 11 m^3. This flooding can be retained within the carriageway and exceedance flows will follow the gradient of the spine road towards the watercourse in the south. It is anticipated that the excess flow will re-enter the below ground drainage network at a point where capacity is available downstream of the point where it surcharged.

4.5 Exceedance Flows

The modelled flooding from the drainage system during all storm events up to the 1 in 100 year return period plus 30% allowance for climate change can be retained within the site as described above.

There remains a residual risk of a storm event that exceeds the capacity of the drainage system, as events beyond the 1 in 100 year plus 30% allowance for climate change storm event will not be catered for explicitly. Flooding could also occur as a result of a blockage or failure of the drainage system. In this instance the buildings are protected by providing external surfaces which slope away from the buildings. In this most onerous circumstance, if

runoff is not intercepted by the site drainage downstream of the blockage / failure, flows would ultimately drain to the watercourse.

5.0 Sustainable Drainage

5.1 Review of SuDS Options

In order to comply with the national guidelines and policies set by the NPPF and the Non-Statutory Technical Standards for Sustainable Drainage[11] and local policies and guidance from RBC, the design of the surface water drainage system should seek to maximise the use of SuDS techniques. This section reviews the suitability of the different SuDS features applicable to the application site.

5.2 The SuDS Management Train

The main purpose of a SuDS system is to manage the surface water runoff generated by a development within the site, attenuating the additional runoff whilst providing water quality treatment to the runoff and amenity and landscape benefits to the community. The different SuDS features can be categorised as follows:

- Source Control: manage runoff at its source
  - Water butts, green/brown roofs, permeable pavements, rainwater harvesting systems, bio-retention systems.
- Site Control: manage runoff generated by a wider area
  - Swales, ponds, infiltration devices, filter strip, French drains.
- Regional Control: manage runoff generated by several sites
  - Basins, ponds and wetlands

The following is an illustration of the SuDS principles and how they may be applied to a development via a SuDS Management Train.

[11] DEFRA (March 2015), *Non-statutory technical standards for sustainable drainage systems*

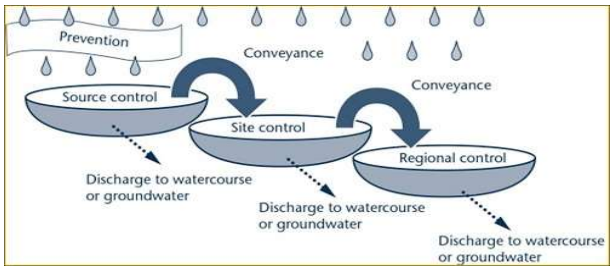


Figure 6 – SuDS Management Train

Table 6 below summarises the suitability of the different SuDS features for the proposed development site.

Table 6 – Review of SuDS features for the proposed development site

SuDS Feature		Description	Applicability to the Site
Source Control	Water butts	Small storage tanks on building.	Unlikely to be appropriate.
	Rainwater harvesting	Recycling of water from roofs and impermeable areas.	May be appropriate.
	Green roofs	Vegetated roofs that reduce runoff and remove pollutants.	Not appropriate for this development, flat roof required.
	Pervious surfaces	Pavements that allow surface water to flow into underlying layers of the pavement and either infiltrate or drain to an on-site drainage network.	Non-infiltration system may be appropriate within proposed parking bays.
	Rain gardens & Bioretention systems	Shallow depressions with free draining soil and planted with vegetation that withstands occasional flooding.	Not appropriate for this type of development.
Site & Regional Control	Swales	Vegetated channels to convey, store and treat runoff.	May be appropriate.
	Detention basins & ponds	Shallow areas of open space that temporarily hold water and collect silt.	
	Filter drains	Linear drains or trenches filled with granular material that allow infiltration to the surrounding ground.	Not appropriate due to ground conditions.
	Infiltration basin	Shallow depression that stores runoff before it infiltrates into the subsoil.	Not appropriate due to ground conditions.
	Infiltration devices	Generally granular trenches or soakaways that store water and allow infiltration to the surrounding ground.	Not appropriate due to ground conditions.

5.3 Proposed SuDS Principles

The proposed drainage strategy in Section 4.5.5 incorporates detention basins with surface water discharging to a watercourse.

5.4 Water Quality

The SuDS design should seek to provide an appropriate management train of SuDS features to effectively mitigate the pollution risks associated with the proposed land uses.

In accordance with Table 26.2 of The SuDS Manual CIRIA C753, the pollution hazard level is considered to be 'Medium' for the proposed land use. Therefore, the requirements for discharge to surface waters state that the 'Simple index approach' should be used. Step 1 of the simple index approach is to identify the pollution hazard indices for the proposed land use as set out in Table 7 below, which is an extract of Table 26.2.

Table 7 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorway.	Medium	0.7	0.6	0.7

Step 2 of the simple index approach is to select SuDS features with a total pollution mitigation index that equals or exceeds the pollution hazard index. Table 26.3 of The SuDS Manual states the mitigation indices for discharges to surface waters. These are shown below in Table 8 below.

Table 8 – SuDS Mitigation Indices

SuDS Feature	TSS	Metals	Hydrocarbons
Detention basin	0.5	0.5	0.6
Downstream Defender	0.5	0.4	0.8
Total Index	0.75	0.7	1.0

The treatment train of detention basin downstream defender (proprietary product by Hydro International) does provide sufficient treatment to mitigate the potential pollution hazard indices.

It should be noted that alternative SuDS options may also be considered during the detailed design stage which achieves or exceeds the water quality objective. Provided that the mitigation indices of the treatment techniques are greater than or equal to the hazard indices for the proposed development then there should be no reduction in the overall water quality within the receiving system.

5.5 SuDS Maintenance

By their nature, SuDS require regular maintenance to keep them working effectively. Table 9 below shows the maintenance responsibilities for the various areas of the drainage system in the short term and long term.

Table 9 – Maintenance responsibility

Location	Maintenance Responsibility	
	Short Term	Long Term
Plot 1 private surface water and foul drainage and on-site SuDS	Russells Homes / Management Company	End User
Spine Road and associated SuDS basin	Russells Homes / Management Company	Rochdale Borough Council via S38 adoption
Plateaus for future development	Russells Homes / Management Company	End User

The responsible company will perform the maintenance tasks required by the various elements of the drainage scheme. Table 10 below shows the maintenance requirements of the potential SuDS features.

Table 10 – Maintenance tasks and frequency required

SuDS Feature	Maintenance Task	Recommended Frequency
Detention Basin	- Remove litter and debris	- Monthly
	- Cut grass & vegetation management	- Monthly in Spring and Summer or as required
	- Remove sediments from main basin	- Every 12 months
	- Repair erosion and other damages	- As required
	- Wash and/or replace filter medium	- As required
Vortex Separator	- Inspect unit for oil and sediment	- Every 6 Months
	- Remove sediment and oil	- Once per year or as required

6.0 Foul Drainage Assessment

6.1 Proposed Foul Drainage Strategy

As part of this application only the plot 1 area will generate foul flows. The existing public foul sewer system in the area surrounding the site is described in section 3.2.3. and the nearest foul manhole available for connection is referenced as MH01 on the Drain Doctor CCTV report. Whilst not currently shown on the UU asset record drawings, the sewerage authority has confirmed that this is a public foul sewer and will be incorporated into their records in due course.

A gravity foul drainage connection from the proposed distribution warehouse on plot 1 will be made to MH01 in Pilsworth Road. The offsite length of foul gravity sewer within Hareshill Road / Pilsworth Road is to be provided by Rochdale Borough Council as part of the highway improvement scheme. The proposed on-site foul drainage provision is shown on drawing SHOW-WYG-00-XX-C-52-0100 and the off-site sewer works by RCC are shown on drawing 784/015/001 (Appendix E).

The Rochdale Borough Council foul sewer within Hareshill Road will extend up to the proposed junction where the new spine road meets Hareshill Road. This will provide a means of discharge from future commercial developments which will be pumped into this sewer, however, is not required for plot 1. The requirement for pumping has been minimised in accordance with planning condition 19.

United Utilities has been consulted regarding the additional flows to their foul drainage network. United Utilities responded to the development enquiry on the 8th September 2020 and has confirmed that the foul water from the development will be permitted to drain into the public foul / combined sewer system and that the preferred point of connection is the 300mm diameter combined sewer in Pilsworth Road as proposed. United Utilities correspondence is included within Appendix C.

7.0 Consents Required

7.1 Environmental Permit

Under the Environmental Permitting (England and Wales) Regulations 2016, an environmental permit for flood risk activities is required from the Environment Agency for any works within the watercourse such as construction of the new outfall structure or works that will alter the main river profile. A permit will therefore be required in respect of the alterations to the section of main river in the south west of the site.

Consultation with the EA has commenced, and it has been agreed that a Water Framework Directive Assessment (WFD) will be included with the FRAP application. Although not a requirement for the planning application the FRAP documents are in preparation and will be submitted shortly to allow a timely determination. The EA are aware of this strategy and have subsequently been consulted throughout this process and are therefore well aware of the works and structures included.

Additionally, since the works will involve alterations to the ordinary watercourse, including new outfalls, a separate consent (Land Drainage Consent) will need to be sought for this work through Rochdale Borough Council.

7.2 Drainage Permits

New connections to the UU public foul / combined sewer network will be subject to a Section 106 approval with the sewerage undertaker. Adoption of the new off-site foul sewer will be subject to agreement under Section 104 of the Water Industry Act. If the new premises will generate any trade effluent then this will be subject to a trade effluent consent to be agreed with UU.

The highway drainage is proposed for adoption by the Highway Authority under a Section 38 agreement.

8.0 Conclusions

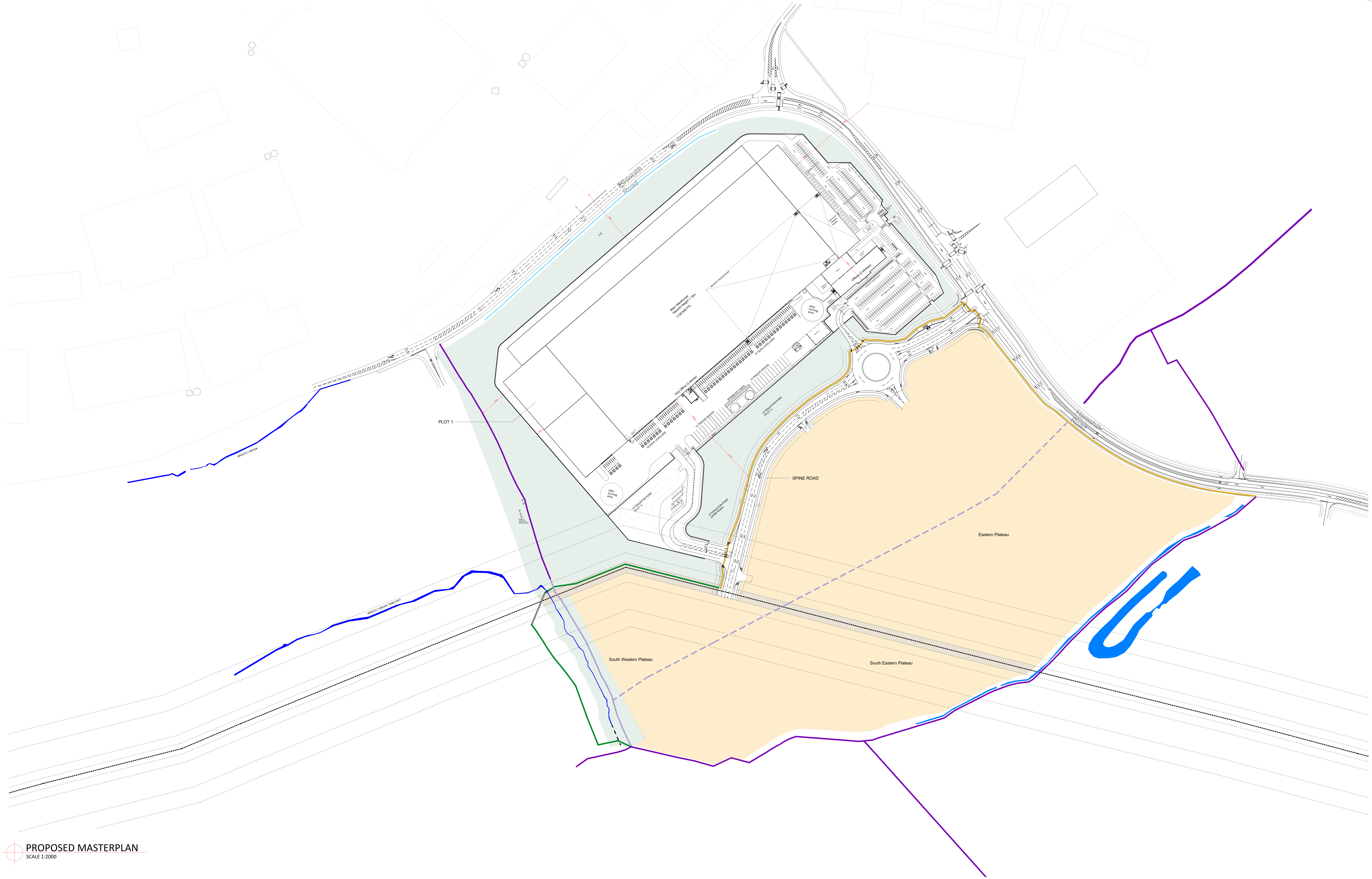
This assessment has made the following conclusions.

- The proposed development includes the construction of a new distribution warehouse within Plot 1, a new spine road and earthworks to create development plateaus within the remaining areas of the red line application boundary.
- The principle of the development has already been established by the hybrid permission 16/01399/HYBR.
- The ground investigation indicates significant depths (up to 12m) of made ground associated with the former Casey's Tip within the site overlaying superficial deposits of Glacial Till and a solid geology of Coal Measures.
- Groundwater was encountered at shallow depths within a number of borehole locations.
- The Made Ground is not suitable for infiltration drainage and would present a risk of mobilising contaminants into the underlying groundwater.
- Ordinary watercourses are present along the northern and southern boundaries of the site. A section of Main River (Brightley Brook tributary) flows in a northerly direction within the south western area of the site.
- The discharge from the proposed development will outfall to the existing watercourses at greenfield runoff rates.
- This detailed surface water drainage strategy has been prepared based on sustainable drainage principles. The strategy is consistent with the principles established in the Flood Risk Assessment and Surface Water Management Strategy submitted and approved as part of the hybrid application for the wider development and satisfies the requirements of conditions 18 and 20 of the decision notice.
- It is proposed to provide attenuation up to the 1 in 100 year event plus 30% allowance for climate change within above ground detention basins and oversized pipes.
- The surface water will discharge to the watercourse via a flow control chamber which will restrict discharge to greenfield runoff rates.
- The proposed SuDS features will provide sufficient water quality treatment.

- Details of a management and maintenance plan are outlined within section 6.5 as required by planning condition 20.
- It is proposed to discharge foul flows to the existing United Utilities 300mm combined sewer within Pilsworth Road via an off-site gravity sewer to be laid by Rochdale Borough Council as part of the highway improvements. The connection point has been agreed with United Utilities.
- The foul drainage from the plot 1 development can drain via a gravity sewerage connection. Future developments within the commercial park will require a pumped discharge into the new off-site sewer within Hareshill Road. The proposed foul drainage arrangements are considered to be consistent with the requirements of Conditions 18 and 19.
- This assessment has identified that the proposed development can be implemented in accordance with the relevant flood risk and drainage national and local planning policies.

Appendices

Appendix A – Proposed Site Layout Plan



PROPOSED MASTERPLAN
SCALE 1:2000

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ashton smith to be notified of discrepancies in figured dimensions
Contractors must check all dimensions from site
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For other information refer to the latest revision of any cross referenced drawing

LOCATION PLAN

NORTH

FOR SURFACE DETAILS PLEASE REFER TO:
20019-ASA-ZZ-SI-DR-A-1001-P7-Unit 1 Surface Plan

A104444-8_21_C_H.S38.01.01 - P2 - S38 SPINE ROAD GENERAL ARRANGEMENT SHEET 1

A104444-8_21_C_H.S38.01.02 - P2 - S38 SPINE ROAD GENERAL ARRANGEMENT SHEET 2]

FOR BOUNDARY TREATMENT REFER TO:

20019-ASA-ZZ-SI-DR-A-1002-Unit 1 Fence Details

SOHW-WYG-00-XX-C-52-0107 - P01 - SPINE ROAD FWPS GA AND DETAILS

REFER TO ARBORICULTURAL IMPLICATIONS STATEMENT FOR DETAILS ON EXISTING TREES AND HEDGEROWS IN CONTEXT TO THE PROPOSED DEVELOPMENT.

REFER TO LANDSCAPE PLANS FOR PROPOSED NEW AND REPLACEMENT PLANTING.

NOTES

PROW

- RETAINED EXISTING FOOTPATH
- NEW FOOTPATH
- NEW FOOTPATH / CYCLE WAY CONNECTING TO EXISTING FOOTPATHS
- DIVERTED FOOTPATH
- FOOTPATH CLOSED

WATER COURSES

- LLFA ORDINARY WATERCOURSE OPEN CHANNEL
- EA MAIN RIVER OPEN CHANNEL
- ASSUMED LINE OF LLFA ORDINARY WATERCOURSE OPEN CHANNEL

- GAS MAIN
- PROPOSED EARTHWORKS AND LANDSCAPING OUTSIDE OF PLOT 1 AND SPINE ROAD DEMISE
- PROPOSED EARTHWORKS OUTSIDE OF PLOT 1 AND SPINE ROAD DEMISE
- NO EARTHWORKS

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
P19	06/04/21	NOTES AND UPDATES AS DISCUSSED VIA TELECON.	NJB	RR
P18	01/04/21	NOTES AND UPDATES AS DISCUSSED VIA TELECON.	NJB	RR

REVISIONS

PROJECT TITLE
SOUTH HEYWOOD

DRAWING TITLE
PROPOSED MASTERPLAN
RESERVED MATTERS

DRAWING NO.	REVISION	ISSUE DATE	DRAWN BY
0202	P19	06.10.2020	LN
SCALE	**SHEET**	**STATUS**	**CHECKED BY**
1:2000	A1	PLANNING	RR

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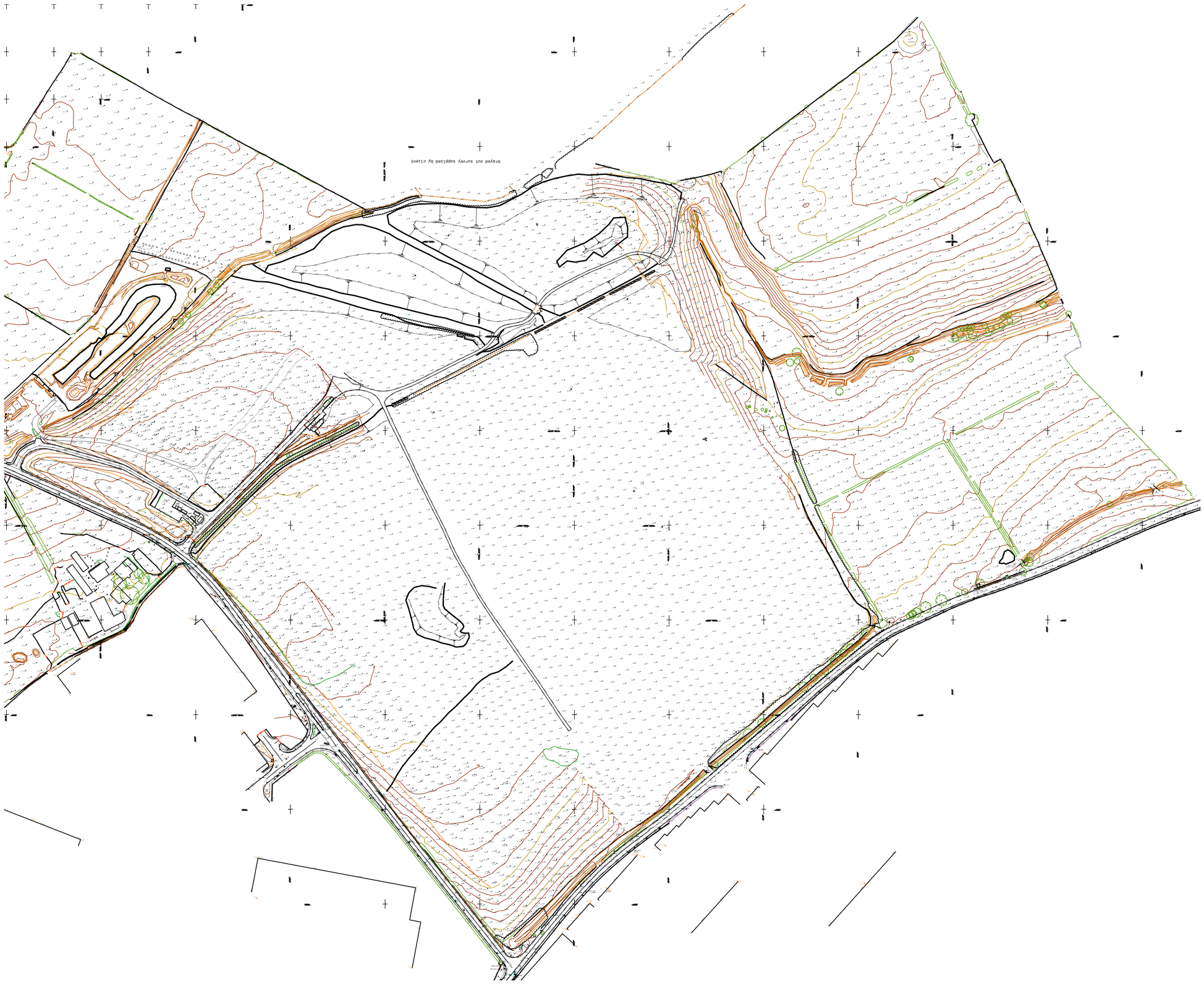
Appendix B – Topographical Survey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