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OA13 - JOWKIN LANE, ROCHDALE

SITE APPRAISAL – DRAINAGE AND FLOOD RISK

APRIL 2017

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Draft – For Comment

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1 PROJECT BACKGROUND

1.1 APPOINTMENT AND BRIEF

1.1.1 WSP have been instructed by Peel Investments (North) Limited (hereafter referred to as 'the Client') to undertake a high level drainage appraisal to support the allocation of the site located at Jowkin Lane in Bamford, Rochdale, for residential development within the Greater Manchester Spatial Framework (referenced as OA13).

1.2 AIM OF STUDY

1.2.1 The purpose of this study is to provide an overview of the drainage opportunities and constraints on the development site from a drainage and flood risk perspective. The study is entirely desk based and is predominantly our interpretation of publicly available information. Flood risk mapping data, including fluvial, tidal, surface water and reservoir flood maps were obtained from the Environment Agency webpage. The key sources of information are noted below, namely:

- The Greater Manchester Strategic Flood Risk Assessment;
- Rochdale Metropolitan Borough Council Preliminary Flood Risk Assessment;
- The Environment Agency webpage; and
- The British Geological Survey (BGS Online) Geology of Britain Viewer.

1.3 REFERENCE

1.3.1 The scope of this Flood Risk Appraisal has been developed based on the requirements of the Client and a review of all relevant policy information.

1.3.2 It is anticipated that this report will fulfil the required criteria and provides a preliminary appraisal of flood risk within the proposed site. As the site exceeds 1 hectare in area and will be subject to a change of use, there will be a requirement to provide a detailed Flood Risk Assessment, including a Drainage Strategy, to support any future planning application for the site.

1.4 LIMITATIONS

1.4.1 This report is based on the interpretation and assessment of data provided by third parties.

1.4.2 Whilst every care has been taken to ensure this information is accurate and up-to-date, WSP cannot guarantee the accuracy of third party data, and the findings of this report may change if the data is amended or updated after consultation.

1.5 CONSULTATION

1.5.1 Whilst formal consultation with the relevant statutory consultees will be undertaken during the production of a detailed Flood Risk Assessment, it is understood that Rochdale Metropolitan Borough Council have confirmed that Porrit Lane, located to the south of the site, has previously been impacted by flooding and that the proposed development should take this into consideration.

2 PLANNING POLICY AND CONSULTATION

2.1 RELEVANT LOCAL PLANNING POLICY AND STRATEGY DOCUMENTS

2.1.1 The following documents were reviewed as part of this Flood Risk Assessment:

- Defra Sustainable Drainage Systems Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015)
- Environment Agency Climate Change Guidance (February 2016 – updated February 2017)
- Flood and Water Management Act (April 2010)
- National Planning Policy Framework (March 2012) and Planning Practice Guidance (March 2014)
- Sustainable Drainage Systems Written Statement HCWS161 (December 2014)
- The Greater Manchester Strategic Flood Risk Assessment; and
- Rochdale Metropolitan Borough Council Preliminary Flood Risk Assessment (2016)

2.2 NATIONAL PLANNING POLICY

NATIONAL PLANNING POLICY FRAMEWORK

2.3 THE ENVIRONMENT AGENCY

2.3.1 The National Planning Policy Framework (NPPF) ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest flood risk.

2.3.2 Where new development is exceptionally necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

2.3.3 On the 6th March 2014 the Department for Communities and Local Government launched the Planning Practice Guidance web resource to supplement the framework. On this date, PPS 25 (Development and Flood Risk) was cancelled and replaced by the Flood Risk and Coastal Change Planning Practice Guidance.

DEFRA SUSTAINABLE DRAINAGE SYSTEMS NON-STATUTORY TECHNICAL STANDARDS FOR SUSTAINABLE DRAINAGE SYSTEMS (MARCH 2015)

2.3.4 This document sets out non-statutory technical standard for sustainable drainage systems. It should be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance.

2.3.5 For developments which were previously developed, the peak run-off rate from the development to any drain, sewer or surface water body for the 1 in 1year rainfall event and the 1 in 100year rainfall event must be as close as reasonably practicable to the greenfield run-off rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

2.3.6 Where reasonably practicable, for developments which have been previously developed, the run-off volume from the development to any highway drain, sewer or surface water body in the 1 in 100year, 6hour rainfall event must be constrained to a value as close as is reasonably practicable

to the Greenfield run-off volume for the same event, but should never exceed the run-off volume from the development site prior to re-development for that rainfall event.

- 2.3.7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event,
- 2.3.8 The drainage system must be designed so that, unless an area is designate to hold and/ or convey water as part of the design, flooding does not occur during a 1 in 100year rainfall event in part of: a building (including a basement); or in any utility plan susceptible to water (e.g. Pumping Station or Electricity Sub-station) within the development.
- 2.3.9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100year rainfall event is managed in exceedance routes that minimise the risks to people and property.

SUSTAINABLE DRAINAGE SYSTEMS WRITTEN STATEMENT HCWS161 (DECEMBER 2014)

- 2.3.10 The Secretary of State for Communities and Local Government laid a Written Ministerial Statement in the House of Commons on 18th December 2014 setting out changes to planning that will apply for major development from 6th April 2015. This confirms that in considering planning applications, local planning authorities should consult the relevant Lead Local Flood Authority on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.
- 2.3.11 Therefore from 6th April 2015, local planning policies 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.
- 2.3.12 A “Major Development” is a development involving any one or more of the following:
- The winning and working of minerals or the use of land for mineral-working deposits;
 - Waste development;
 - The provision of 10 dwellings or more;
 - The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
 - Development carried out on a site having an area of 1 hectare or more.

ENVIRONMENT AGENCY CLIMATE CHANGE ALLOWANCES (FEBRUARY 2016)

- 2.3.13 On the 19th February 2015, the Environment Agency updated the Climate Change Allowances for rainfall, rivers flows and sea level rises for Flood Risk Assessments. This revised guidance came into effect immediately and is applicable to proposed development sites in England and Wales. The changes apply to all new planning applications within the NPPF. Further information regarding the allowances applicable to the proposed development herein is provided within Section 8.
- 2.3.14 It should also be noted that on 3rd February 2017 the guidance was further updated to clarify the climate change considerations for increased flood levels in relation to Flood Zone 1 site (low risk).

2.4 LOCAL PLANNING POLICY

ROCHDALE METROPOLITAN BOROUGH COUNCIL CORE STRATEGY (OCTOBER 2016)

2.4.1 The Rochdale Metropolitan Borough Council Core Strategy was adopted in October 2016 and contains the following Policies relating to flood risk and drainage:

“G8 – Managing water resources and flood risk

We will ensure that new development (including flood risk mitigation measures) does not lead to any form of increased flooding locally or further downstream, does not impeded natural water and flood risk management, is not detrimental to existing or potential flood storage areas, contributes where possible to alleviating existing flood risk, is itself well protected from flood risk and ensures prudent use of water resources. We will require:

a. Compliance with a ‘sequential’ approach to new development and flood risk, directing development away from areas of high risk, in accordance with the National Planning Policy Framework;

b. Full regard to and compliance with the advice of the Environment Agency (or equivalent agency) and the objectives and priorities for flood risk management set out in the Local Flood Risk Management Strategy, including any mitigation measures recommended for particular sites;

c. Full regard to the published evidence of local flood risk and its significance as included in Strategic Flood risk Assessments, Surface Water Management Plans and other recognised sources of flood risk data and the production of additional Flood Risk Assessments (FRAs) as appropriate;

d. Incorporation of appropriate measures of the management of surface and flood water, including flood storage areas. Sustainable Urban Drainage Systems (SUDS) and the protection of ‘overland flow paths’;

e. Compliance with any Surface Water Management Plan or drainage strategies produced, such as for the identified critical drainage areas of Littleborough and Heywood;

f. The avoidance of culverting, and support the opening of culverts wherever possible;

g. The incorporation of measures for the conservation of water to minimise potable water consumption, including rainwater collection measures, which should be integral to the design of buildings and spaces;

h. Development that does not directly or indirectly lead to pollution of existing water resources such as watercourse and groundwater or the degradation of the quantity of groundwater;

i. The incorporation of measures to improve water quality and;

j. The taking of opportunities to improve the habitat value of watercourses and waterbodies.

In addition, we will identify additional flood storage areas which will be protected from development.”

In addition Policy “G1 – Tackling and adapting to climate change” states the following in relation to the use of sustainable drainage to address the impacts of climate change:

“...the incorporation of appropriate water conservation and management measures such as Sustainable Drainage Systems (SuDS), including ensuring that the rate of run-off on ‘Greenfield’

sites not increase and on 'Brownfield ' sites is significantly reduced, and avoiding the use of impermeable surfaces..."

3 EXISTING SITE

3.1 SITE LOCATION

- 3.1.1 The site is located approximately 4km west of Rochdale Town Centre and is situated between Jowkin Lane and Norden Road.
- 3.1.2 An approximate postcode for the site is OL11 5PN with approximate Ordnance Survey Co-ordinates for the centre of the site of: (386004 Easting, and 413224 Northing). A site location plan has been included in **Appendix A** of this report.

3.2 SITE DESCRIPTION

- 3.2.1 The site is currently predominantly Greenfield, with some limited hardstanding areas.
- 3.2.2 Figure 3-1 below, describes the general site characteristics.

Figure 3-1 – General Site Characteristics

Characteristic	Description	
Area	The overall site area is approximately 33.7 hectares in size. The site is currently allocated for 450 residential dwellings.	
Existing Usage	The site is currently predominantly occupied by Greenfield land with some limited hardstand areas. A number of Sports Pitches are present across the site. A series of Electricity Pylons are present along the western boundary of the site.	
Boundaries	North	Residential dwellings associated with Norford Way and Greenvale.
	South	Bamford Chapel and residential dwellings associated with Norden Road.
	East	Norden Road and associated residential dwellings.
	West	Jowkin Lane beyond which lies further Greenfield land.
General Topography	Reference to Ordnance Survey contours indicates that the site slopes from a level of approximately 160m AOD in the north to approximately 145m AOD in the south.	

3.3 EXISTING WATERCOURSES

- 3.3.1 Naden Brook is located approximately 120m west of the site at its nearest point. The brook is defined as a “Main River” in accordance with the records maintained by the Environment Agency. It is noted to be flowing in a southerly direction before joining Cheesden Brook (another Environment Agency designated “Main River”), before eventually discharging into the River Roch, which is also designated as a “Main River” by the Environment Agency.

3.3.2 Whilst no other watercourses have been identified, reference to Ordnance Survey (OS) mapping indicates a Spring emerging in the north western corner of the site. Whilst OS mapping does not indicate the route of the spring, a review of the contours within the site indicates that any potential route would flow in a south easterly direction towards Norden Road.

3.4 EXISTING FLOOD DEFENCE INFRASTRUCTURE

3.4.1 The Environment Agency Flood Map for Planning indicates that there are no flood defences in the immediate vicinity of the site.

3.5 EXISTING DRAINAGE

3.5.1 Due to the predominantly Greenfield nature of the site, the presence of an existing private drainage network within the footprints of the site is unlikely. Although some localised land drainage may be present to improve drainage to the sports pitches.

3.5.2 Based on the existence of residential dwellings on Norden Road (to the south and east of the site) and Norford Way and Greenvale (to the north of the site), the presence of a network of public sewer serving the existing properties located in the immediate vicinity of the site is highly likely. There will be a requirement to confirm the presence and existing condition of the existing public sewers as part of a Detailed Flood Risk Assessment for the site.

3.6 GEOLOGY AND HYDROGEOLOGY

3.6.1 The British Geological Survey Geology of Britain Viewer¹ indicates that the site is predominantly underlain by superficial deposits of Glacial Till. The southern area of the site is shown to be underlain by glacial fluvial sand and gravels. This may make the site suitable for the incorporation of some Sustainable Urban Drainage (SuDS) features incorporating infiltration. There will be a requirement for Infiltration Tests to confirm the suitability of these types of SuDS on the site.

3.6.2 The site is underlain by bedrock deposits from the Pennine Lower Coal Measures Formation which is described as comprising Mudstone, Siltstone and Sandstone. The site is also underlain by bedrock deposits of Old Lawrence Rock which is described as comprising Sandstone.

3.6.3 The Land Information System Soilscales Map² classifies the soil beneath the site as “slowly permeable seasonally wet acid loamy and clayey soils”.

3.6.4 The Environment Agency Groundwater Maps indicate that the superficial deposits of Glacial Till are classified as Secondary (undifferentiated) aquifer. The Glaciofluvial Sand and Gravel is classified as Secondary “A” Aquifer. The underlying bedrock is also classified as a Secondary “A” Aquifer.

3.6.5 The site lies outside of a Groundwater Source Protection Zone.

3.6.6 Copies of relevant Geotechnical Maps have been included in Appendix B of this report.

¹ mapapps.bgs.ac.uk/geologyofbritain

² landis.org.uk/soilscales

4 DEFINITION OF FLOOD RISK

- 4.1.1 The risk of flooding to the site from all current and future potential sources of flooding has been assessed in accordance with NPPF and BS 8533 2011 - assessing and managing flood risk in development - code of practice.
- 4.1.2 Table 4-1 summarises the findings of the assessment. A more detailed explanation of the flood risk issues on the site and determination of flood risk ratings are presented in Sections 4.2 to 4.7 below.
- 4.1.3 It should be noted that the designation of risk outlined below is prior to the inclusion of any mitigation measures, which may subsequently act to reduce the risk.

Figure 4-1 - Degree of risk from each source of flooding

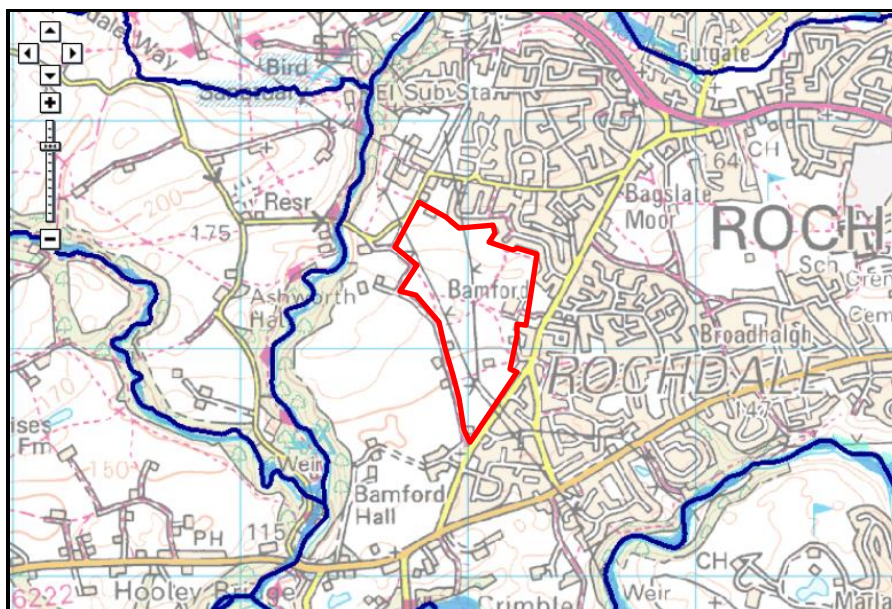
SOURCE		RISK
Fluvial		Low
Tidal		Not at risk
Groundwater		Low
Surface Water		Low
Sewer		Low
Artificial Sources	Reservoir	Not at risk
	Canal	Not at risk

4.2 FLUVIAL FLOOD RISK

FLOOD MAPS

- 4.2.1 The National Planning Policy Framework (NPPF) categorises flood risk as follows:
- Zone 1 (low probability) is assessed as having less than a 1 in 1,000 annual probability of river or sea flooding (<0.1%);
 - Zone 2 (medium probability) is assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year; and
 - Zone 3 (high probability) is assessed as having a 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.
- 4.2.2 The Environment Agency Flood Map for Planning indicates that the site lies within Flood Zone 1. An extract of the flood map is included in Figure 4.2 below.
- 4.2.3 On the basis of the above, the proposed development site can therefore be assessed to have a low risk of fluvial flooding.

Figure 4-2 – Extract from the Environment Agency’s Flood Map for Planning



4.3 TIDAL / COASTAL FLOOD RISK

4.3.1 The site is located a significant distance away from the coast and is therefore not considered to be at risk from tidal or coastal flooding.

4.3.2 The risk of tidal and coastal flooding has therefore been assessed to be low.

4.4 GROUNDWATER FLOODING

4.4.1 The Greater Manchester Strategic Flood Risk Assessment (2008) states that there has been no recorded incident of groundwater flooding within the district.

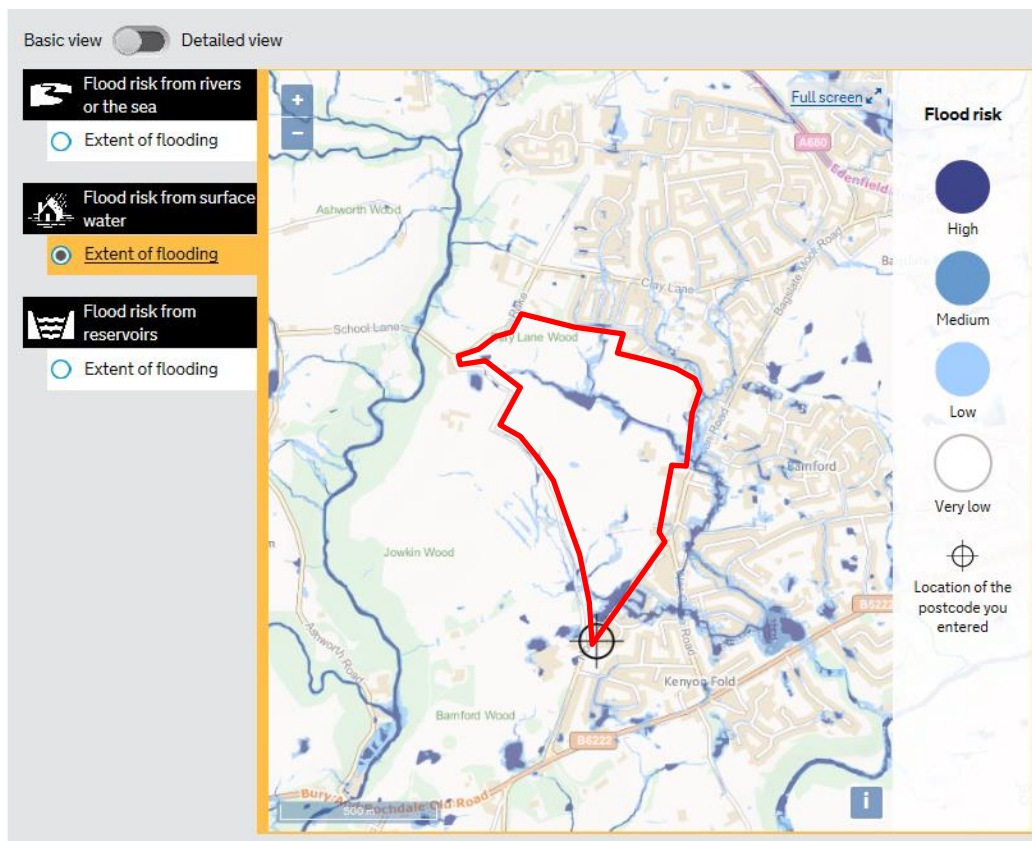
4.4.2 Based on the above, the risk of groundwater flooding has been assessed to be low.

4.5 SURFACE WATER FLOODING

4.5.1 The Environment Agency’s Surface Water Flood Map indicates that the site has a very low risk of surface water flooding. Notwithstanding this, a surface water flow path is identified in the northern area of the site and is considered to have a variable risk of surface water flooding (low to high). In addition, the southern area of the site is also identified to have a variable risk of surface water flooding. Based on the presence of a spring in the north western corner of the site, the surface water mapping could potentially indicate the route of the spring through the site. This will require further investigation within the Flood Risk Assessment. It is likely that flow paths within the site can be considered as future SuDS corridors and incorporated in to any proposed Green Infrastructure / POS. In addition, any Flood Risk Assessment will require the consideration of an appropriate level of mitigation to ensure surface water flooding does not impact any future development. This could include (but is not restricted to) the raising of floor levels above local ground levels.

4.5.2 It is understood via discussions with the Local Authority that surface water flooding occurs to Porrit Close to the south of the site. The surface water mapping below correlates with this reported situation.

Figure 4-3 – Extract from the Environment Agency’s surface water mapping



4.6 SEWER FLOODING

4.6.1 The Rochdale Metropolitan Borough Council Preliminary Flood Risk Assessment indicates that residential properties in the vicinity of the proposed development site have suffered from sewer flooding in the past.

4.6.2 As the site has been allocated for future housing development within the Greater Manchester Spatial Framework, United Utilities (the statutory undertakers for the region) have an obligation to provide offsite sewerage facilities for the development site. Further consultation with United Utilities will be required during the planning stage. In addition, discharge rates from the proposed development site to the existing public sewer network will have to be agreed with United Utilities to ensure that there is no increase in the risk of sewer flooding to the site.

4.6.3 If connection to the northern existing networks is required then pumping of foul flows would be required.

4.7 RESERVOIR/ ARTIFICIAL SOURCES FLOODING

4.7.1 Non-natural or artificial sources of flooding can include reservoirs, lakes, canals etc. The potential effects of flood risk management infrastructure and other structures needs to be considered.

RESERVOIRS

- 4.7.2 Following the June 2007 floods and the incident at Ulley Reservoir, Sir Michael Pitt was asked by the government to carry out a review of the emergency services' response. He called for reservoir flood maps to be made available to the public and to local emergency planners to allow them to respond quickly to a reservoir flood.
- 4.7.3 As a result, reservoir flood maps have been created for over 2000 reservoirs in England and Wales. These maps show the likelihood of flooding from large reservoirs that retain at least 25,000 cubic meters of water above natural ground level. The maps show the largest area that might be flooded if a reservoir were to fail in a credible worst case scenario.
- 4.7.4 The Environment Agency's Online Reservoir Flooding Map shows that the site is outside the extent of any reservoir flooding. As a result, the proposed development site has therefore been assessed to have a low risk of flooding from reservoirs.

5 DRAINAGE

- 5.1.1 Surface water arising as a result of development will be contained within the site via an appropriately designed surface water management strategy developed in accordance with NPPF and national and local surface water management strategies. Based on the current Greenfield nature of the site, it is likely that surface water run-off from future development will be restricted to the Greenfield run-off rate in accordance with the Non-statutory technical standard for sustainable drainage systems and Policy G1 within the adopted Rochdale Core Strategy..
- 5.1.2 The existing Greenfield run-off rate for a range of rainfall return periods has been calculated using the Interim Code of Practice for Sustainable Drainage Systems method (ICP SuDS). The results are summarised in Table 4.3 below.
- 5.1.3 In addition, indicative storage requirements have been calculated using the Quick Storage Module in WinDES Micro-Drainage 2016 Software. Implementing the indicative storage requirements will ensure that anticipated surface runoffs from the proposed development site will be maintained at existing Greenfield run-off rates in accordance with the Local Planning Policy G1. The calculations have been based on the following assumptions namely:
- 5.1.3.1 Surface runoffs from all rainfall events up to and including the 1 in 100year rainfall event plus 40% allowance for climate change are managed safely on the site;
- 5.1.3.2 Development on the site has been assessment in this review based on a 30dph basis with the remaining elements of the site allocated as POS and informal open space. This has been estimated to equate to approximately 15Ha of developable area. For the preliminary calculations below WSP has assumed that 65% of the developable area area would be classed as impermeable (9.8 ha).

Figure 5-1 – Indicative attenuation volumes for existing Greenfield runoff rates

Rainfall Return Period	Greenfield Run-off rate (l/s)	Indicative Surface Water Storage Requirement (m³)
1 in 1	296.47	277 - 774
1 in 2.2 (QBAR)	340.27	404 - 991
1 in 30	576.10	852 - 1934
1 in 100	707.49	2205 - 4330

- 5.1.4 There will be a requirement to develop a suitable surface water drainage strategy as part of any Flood Risk Assessment developed to support a planning application. This will ensure that the above surface runoff rates and indicative storage volumes are validated in consultation with the Lead Local Authority and United Utilities.
- 5.1.5 The drainage strategy will consider discharging surface water using the following hierarchy:

- Infiltration to the ground, if not possible then;
- Discharge to a watercourse, if not possible then;
- Connection to a surface water sewer, if not possible then;
- Connection to a combined sewer.

- 5.1.6 The presence of Glaciofluvial Sands and Gravels and Sandstone within the site should ensure that the use of infiltration based SuDS techniques have potential to be used on the site. However, there will be a requirement to undertake further site investigations to confirm the permeability of the underlying strata on the site and the site specific design criteria that would be used.
- 5.1.7 The provision of an appropriately designed drainage strategy will ensure that there is no increase in surface water flooding downstream as a result of the proposed development. Surface water arising from the proposed development will be retained on site prior to discharging to the receiving body at an appropriate rate. Consultation will be undertaken with the Lead Local Flood Authority, United Utilities and the Environment Agency to confirm an appropriate discharge rate.
- 5.1.8 A high level indicative SuDs Plan is included as **Appendix C**. This indicates areas of the site that could be used for the provision of attenuation. Further design and consideration will be required during the production of a Flood Risk Assessment and Drainage Strategy.
- 5.1.9 By controlling run-off, the downstream areas can be better protected from the variability of rainfall events.
- 5.1.10 Much of the surface water flow within the southern part of the site is generated within the site boundaries. As such the proposed development will be able to control these much more than the current situation.

6 NPPF SEQUENTIAL AND EXCEPTION TEST

6.1 THE SEQUENTIAL TEST

- 6.1.1 The Sequential Test, as defined in the National Planning Policy Framework, aims to steer all new developments to areas at the lowest risk of flooding and to ensure that the development type proposed is appropriate by reference to the flood risk.
- 6.1.2 According to the records maintained by the Environment Agency, the site is noted to be located within Flood Zone 1 area, and therefore a Sequential Test is not required and residential development would be appropriate on this site in flood risk terms.

6.2 THE EXCEPTION TEST

- 6.2.1 Table 2 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2014) classifies different types of development depending upon their vulnerability. It classes the proposed development as “More Vulnerable”.
- 6.2.2 Table 3 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2014) shows that “More Vulnerable” land uses are appropriate development in Flood Zone 1 areas and that no Exception Test is required.

7 CONCLUSIONS

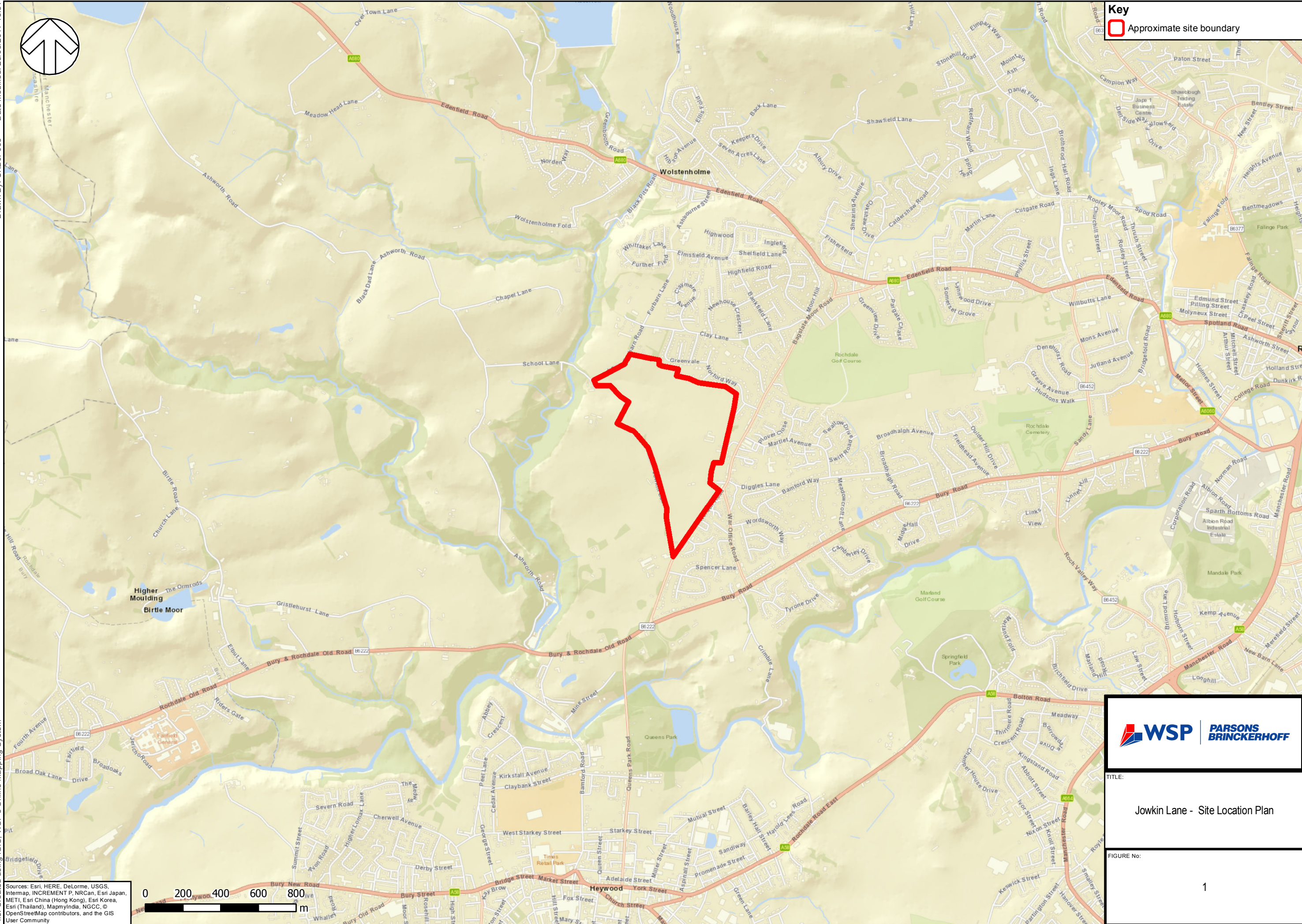
- 7.1.1 This Flood Risk Appraisal has been produced to support the Client's proposed housing allocations within the Greater Manchester Spatial Framework.
- 7.1.2 The Environment Agency Flood Map for Planning locates the site within Flood Zone 1 (low risk). Land located in Flood Zone 1 is assessed as having less than a 1 in 1,000 annual probability of flooding from river or sea flooding.
- 7.1.3 The Environment Agency Online Reservoir Flooding Map shows that the site is outside the extent of reservoir flooding. It is therefore not at risk from reservoir flooding.
- 7.1.4 Information contained within the Greater Manchester Strategic Flood Risk Assessment indicates that the site has a low risk of groundwater flooding.
- 7.1.5 The Rochdale Metropolitan Borough Council Preliminary Flood Risk Assessment indicates that the residential dwellings presently located within the vicinity of the site have previously experienced sewer flooding. As the site has been allocated for future housing development within the Greater Manchester Spatial Framework, United Utilities (the statutory undertakers for the region) have an obligation to provide offsite sewerage facilities for the development site. Further consultations will be required at planning stage.
- 7.1.6 Although the Environment Agency's Surface Water Flood Map indicates that the site has a very low risk of surface water flooding, there is however a surface water flow path identified in the northern area of the site which is considered to have a variable risk of surface water flooding (low to high). A small area in the south of the site is also identified to have a variable risk of surface water flooding. Overland flow routes will need to be considered in detail within a Flood Risk Assessment.
- 7.1.7 As the site area is greater than 1 hectare and will be subject to a change of use, a detailed Flood Risk Assessment and supporting Drainage Strategy will be required to support a planning application for the site.
- 7.1.8 The Flood Risk Assessment will consider in detail the risk of surface water flooding within the site. In addition, consultation will be undertaken with the Environment Agency, United Utilities and the Lead Local Flood Authority in order to ensure early statutory authority involvement and to secure any necessary agreements.
- 7.1.9 Rochdale Metropolitan Borough Council have identified that Porrit Lane, located to the south of the site, has previously experienced flooding. This is likely to be as a result of surface water or sewer flooding and therefore an appropriately designed drainage strategy for the future development will ensure there is no increase in flood risk downstream.
- 7.1.10 The Flood Risk Assessment and Drainage Strategy will be produced in accordance with National and Local Planning Policies.
- 7.1.11 Based on the above, the site is considered suitable for residential development.

Appendix A

SITE LOCATION PLAN



Key
Approximate site boundary



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, OpenStreetMap contributors, and the GIS User Community

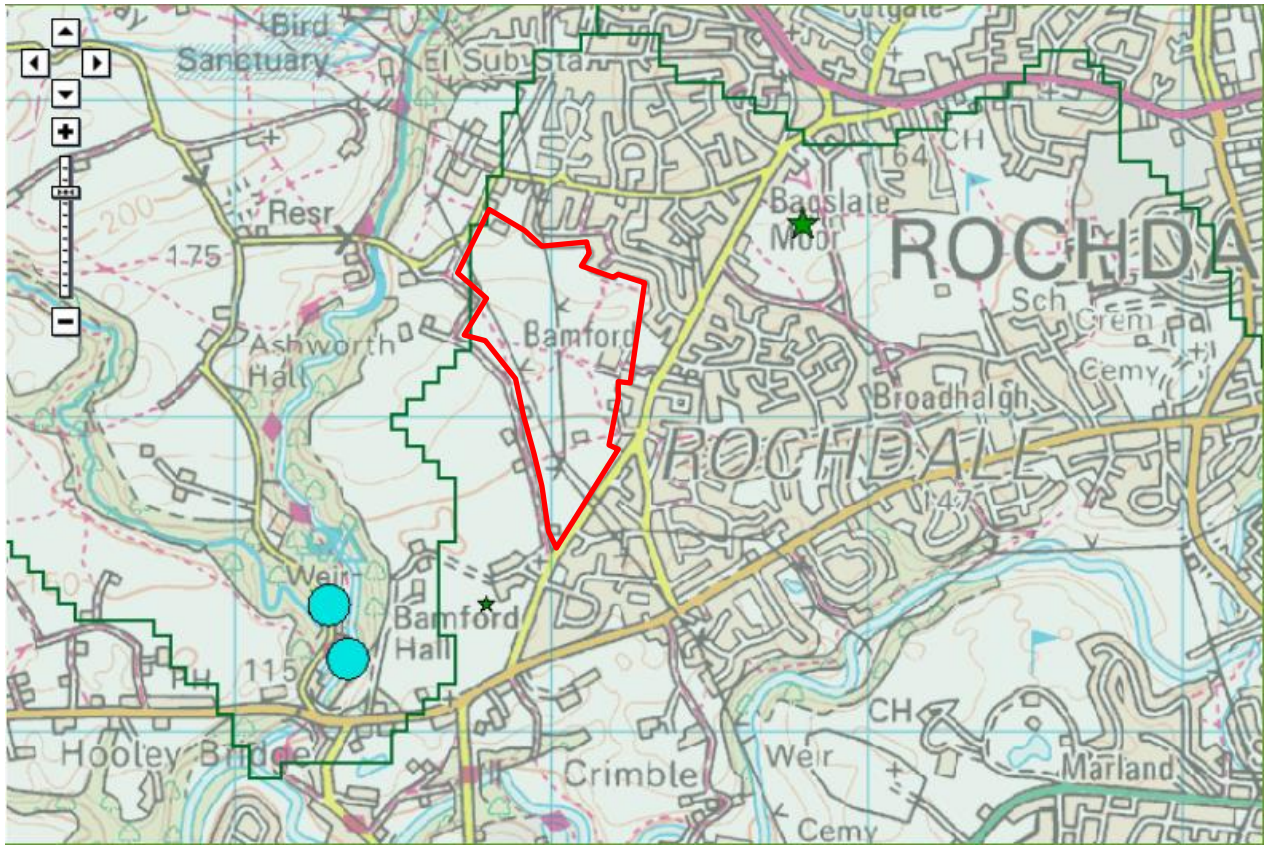


TITLE:
Jowkin Lane - Site Location Plan

FIGURE No:
1

Appendix B

COPIES OF RELEVANT GEOTECHNICAL MAPS



APPENDIX B-1

ENVIRONMENT AGENCY WATER ABSTRACTION LICENSES MAP

Map legend

Enter your Postcode to find your location then click within the Nitrate Vulnerable Zone to see more details about that designation

Proposed 2017 Nitrate Vulnerable Zones [i](#)

- Surface Water NVZ Area
- Groundwater NVZ Area
- Eutrophic NVZ Area

G8 **ET4** NVZ Number
S221

Existing Nitrate Vulnerable Zones [i](#)

- Surface Water NVZ Area
- Groundwater NVZ Area
- Eutrophic NVZ Area

Designation Notice Tranche [i](#)

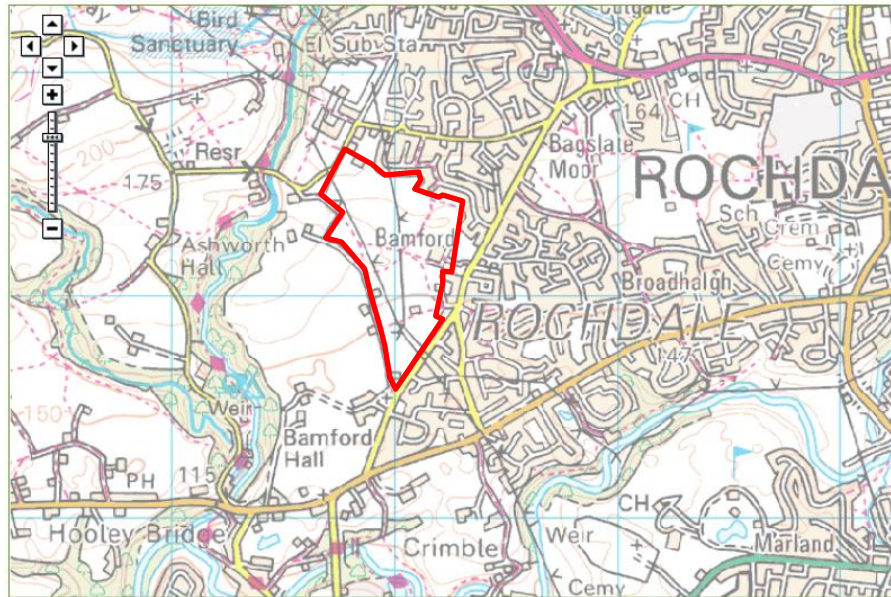
- Tranche 1
- Tranche 2
- Tranche 3

Other national environmental organisations [i](#)

- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of OL11 5PN at scale 1:20,000

Other maps [Data search](#) [Text only version](#)



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Nitrate Vulnerable Zones

Nitrate Vulnerable Zones (NVZs) are designated areas of land that drain into nitrate polluted waters, or waters which could become polluted by nitrates

Proposed 2017 NVZ designations

The map shows Nitrate Vulnerable Zones (England) 2017 to 2020, published on 1 December 2016 by the Environment Agency on behalf of the Secretary of State for Environment, Food and Rural Affairs.
[How to appeal](#)
Information on how the NVZs were designated is provided in [Designation method documents](#)

APPENDIX B-2

ENVIRONMENT AGENCY NITRATE VULNERABLE ZONES

Map legend

Enter your Postcode to find your location then click within the Nitrate Vulnerable Zone to see more details about that designation

Proposed 2017 Nitrate Vulnerable Zones [i](#)

- Surface Water NVZ Area
- Groundwater NVZ Area
- Eutrophic NVZ Area

G8 **ET4** NVZ Number
S221

Existing Nitrate Vulnerable Zones [i](#)

- Surface Water NVZ Area
- Groundwater NVZ Area
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Designation Notice Tranche [i](#)

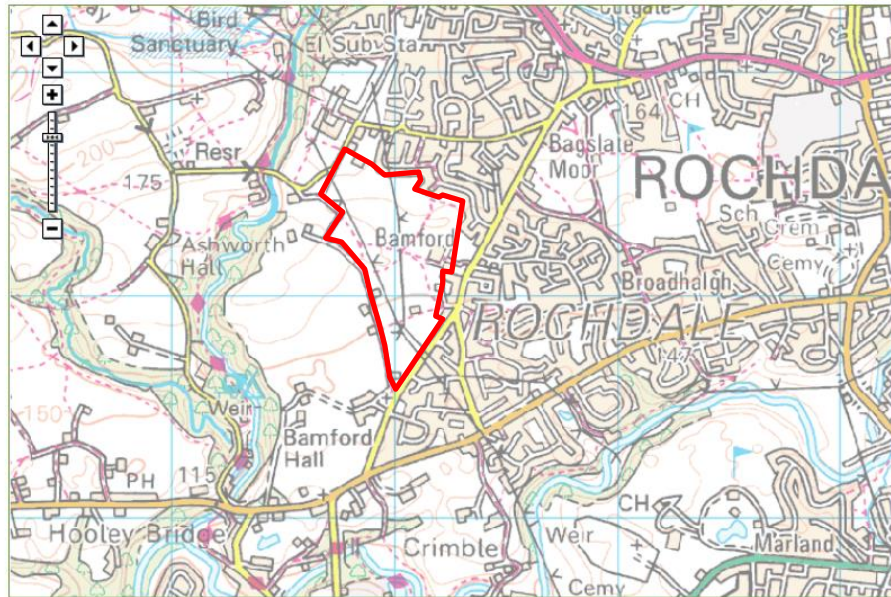
- Tranche 1
- Tranche 2
- Tranche 3

Other national environmental organisations [i](#)

- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of OL11 5PN at scale 1:20,000

Other maps [Data search](#) [Text only version](#)



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APPENDIX B-3

ENVIRONMENT AGENCY LANDFILL MAPPING

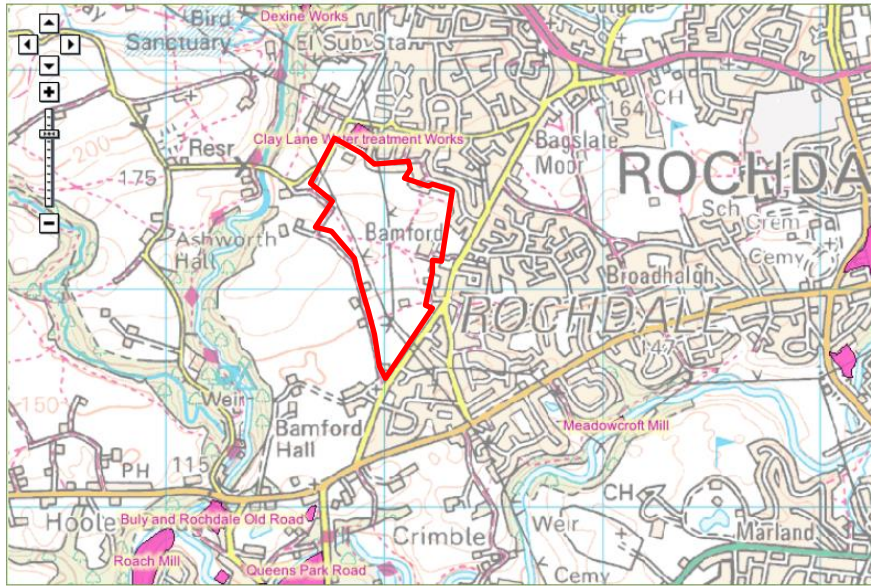
Map legend

Click on a feature for details of that site

- Authorised Landfill [i](#)
- Site boundary
- Historic landfill [i](#)
- Site boundary
- Mining Waste [i](#)
- Closed Mining Waste Sites
- Other national environmental organisations [i](#)
- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of X: 386,268; Y: 412,968 at scale 1:20,000

[Other maps](#) [Data search](#) [Text only version](#)



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APPENDIX B-4

ENVIRONMENT AGENCY POLLUTION MAPPING

Map legend

Click on a feature for details of that site

Pollution Incidents

- Major
- Significant

Industrial Pollution

- Fuel & Power
- Metal
- Mineral
- Chemical
- Waste
- Water
- Radioactive
- Associated
- Other
- Not Classified

Industrial Operator Scores (OPRA) 2011

- Band A
- Band B
- Band C
- Band D
- Band E
- Band F

Compliance Rating Scores

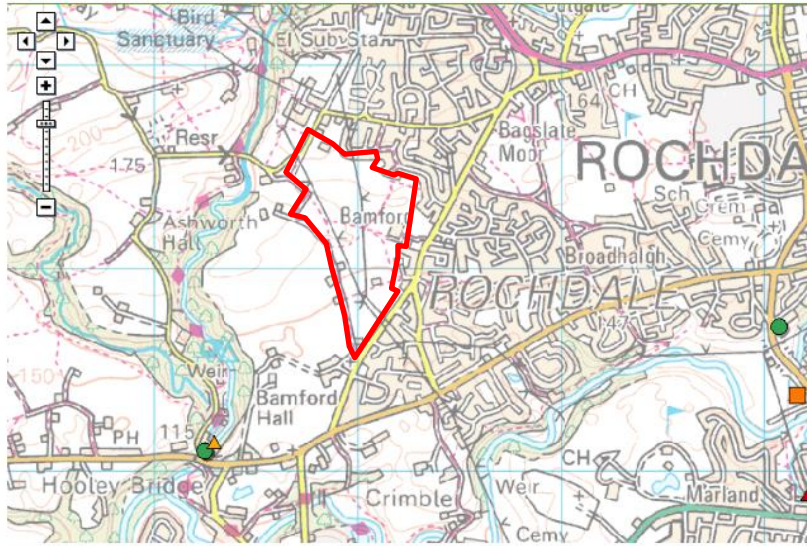
- Very Good
- Good
- Moderate
- Fair
- Poor
- Bad

Other national environmental organisations

- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of X: 386,268; Y: 412,968 at scale 1:20,000

Other maps Data search Text only version



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Tell me more about Pollution:

Pollution Incidents

Find out how we categorise incidents and their possible effects on health and the environment

Industrial Pollution

Every industrial process could theoretically pose a risk to human health and the environment. Find out how we measure this risk and how we score operators on their potential to impact the environment.

Industrial Operator Scores (OPRA)

Industrial Operator Scores reflect two of the five attributes that make a site's Operational risk appraisal (Opra) profile. The Compliance Rating band reflects the number of non-compliances with permit conditions we have recorded at the site over the course of a year. The Operator Performance band is influenced by the type of management system the operator has in place and any formal enforcement action we have taken at the site.

More information about OPRA

Compliance Rating Scores

Compliance Rating Scores is our report of the level of permit breaches we've recorded at sites during the year. We include both the number of breaches and also our assessment of the severity of these breaches, as determined by our Compliance Classification Scheme (CCS).

Appendix C

INDICATIVE SUDS PLAN

