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**Land off New Mill Road, Holmfirth,
Huddersfield HD9 7LN**

Priestroyd

**Flood Risk and Drainage Strategy
Overview**

February 2020



P3052

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Contents

1	<i>INTRODUCTION</i>	5
2	<i>PROPOSED DEVELOPMENT</i>	5
3	<i>FLOOD RISK ASSESSMENT CRITERIA</i>	6
4	<i>HISTORICAL FLOODING</i>	7
5	<i>EXISTING FLOOD DEFENCES</i>	7
6	<i>SOURCES OF FLOODING</i>	7
6.1	Flooding from Rivers / Watercourses	7
6.2	Flooding from the Sea.....	7
6.3	Land	7
6.4	Flooding from Groundwater.....	8
6.5	Flooding from Sewers	8
7	<i>FLOOD RISK SUMMARY</i>	8
8	<i>INCREASE TO OFFSITE FLOODING</i>	9
9	<i>FLOOD RISK VULNERABILITY</i>	9
9.1	Finished Floor Levels.....	9
9.2	Existing Flood Volumes	10
9.3	Flood Routing	10
9.4	Emergency Access	10
9.5	Flooding Risk from Reservoirs	10
10	<i>CLIMATE CHANGE ALLOWANCES</i>	11
11	<i>EXISTING SITE DRAINAGE</i>	11
12	<i>DRAINAGE CONSULTATION</i>	12
13	<i>PROPOSED DRAINAGE STRATEGY</i>	12
13.1	Surface Water.....	12
13.2	Foul Water.....	13
14	<i>PROPOSED DRAINAGE SCHEME</i>	13
14.1	Surface water	13
14.2	POLLUTION HAZARD CLASSIFICATION	17
14.3	DRAINAGE IMPACT	17
15	<i>GENERAL REMARKS</i>	18
16	<i>RECOMMENDATIONS</i>	18
	<i>APPENDIX A</i>	19
	<i>Site Development Proposal</i>	19
	<i>APPENDIX B</i>	20
	<i>LLFA Consultation Response</i>	20

APPENDIX C Watercourse Network Map21

APPENDIX D Yorkshire Water Sewer Records.....22

1 INTRODUCTION

Avie Consulting Ltd has been commissioned by Priestroyd Construction Limited to carry out an initial Flood Risk Assessment and high-level Drainage Strategy report to support the planning application for the proposed development of 25 residential units on land off New Mill Road, Holmfirth, Huddersfield.

2 PROPOSED DEVELOPMENT

The site comprises an irregular shaped area of grass and scrub covered land with some mature trees to the northwest of New Mill Road, Holmfirth and the current plot of “Pentlands” dwelling house. The site extends to approximately 0.515 hectares and is expected to support a development of around 25 residential units.

The site is located on the northwestern side of New Mill Road, Holmfirth at Ordnance Survey grid reference SE148091, with the nearest post code being HD9 7LN.

The site is bounded as follows:

To the East and South – The A635 New Mill Road at some 2m above general site levels.

To the West and North – Mature woodlands bound the site and fill the land between the site and the River Holme with levels grading towards the River. The residential dwelling identified as Glen View sits directly to the north of the site.

The site falls from southeast to northwest with levels at the southeastern boundary being of the order of 181m dropping to approximately 178m at the northern most corner of the site.

Site location plan is shown in Figure 1



Figure 1

3 FLOOD RISK ASSESSMENT CRITERIA

The EA flood data was obtained, the site under consideration is within Flood Zone 1 according to the latest version of the Indicative Floodplain Map produced by the Environment Agency. See Figure 2 below.

As the site lies within Flood Zone 1 the flood risk assessment needs to consider the following:

- Flooding from other sources such as rivers, tidal, sewers and overland flooding
- The potential for the development to increase flooding elsewhere through the addition of hard surfaces
- The effect of the new development on surface water run-off
- EA data set accuracy



Figure 2

4 HISTORICAL FLOODING

Kirklees Metropolitan Borough Council (KMBC) as the Lead Local Flood Authority (LLFA) has been consulted through the pre-application process for a different proposed development layout. Their comments have been taken on board in producing this assessment and the associated drainage strategy.

The LLFA consultation response is enclosed in Appendix B

5 EXISTING FLOOD DEFENCES

The site does not benefit from any flood defences.

6 SOURCES OF FLOODING

As part of the flood risk assessment consideration should be given to the following sources of flooding and what effect these could have on the development.

6.1 Flooding from Rivers / Watercourses

The River Holme passes to the west of the site at a distance of some 60m away at its closes point. From the flood maps and the KMBC Strategic Flood Risk Assessment, the site is entirely within Flood Zone 1 and the risk of flooding from watercourse is considered to be **LOW**.

Please refer to Appendix D for the Watercourse network map.

The risk of flooding from this source is considered to be **LOW**.

6.2 Flooding from the Sea

The site is more than 80Km from the sea, as such the risk of flooding from this source is considered to be **LOW**.

6.3 Land

The effect of intense rainfall needs to be considered and the local Topography of the land assessed.

The development area falls from South to North and the flood mapping available from the government website shows some surface water flood risk associated with the vehicular access to the neighbouring property and what appears to be an existing (disused) access onto the site itself. It is expected that the discussed site access will be reinstated as a boundary to the site as part of the proposed development and this will prevent the overland flows entering the site. Similarly, the flows from the adjacent vehicular access are expected to be prevented from entering the site by the proposed boundary treatment. See figure 3.



Figure 3

6.4 Flooding from Groundwater

Groundwater flooding occurs when water levels in the ground rise above surface elevations, particularly in low lying areas. The Enviro check data sheet classifies the site as having negligible risk potential for Groundwater Flooding, the risk of groundwater flooding is **LOW** Please refer to Appendix E.

6.5 Flooding from Sewers

Sewer records have been obtained from Yorkshire Water; NO sewers cross the site. Please refer to Appendix D.

We consider the risk of flooding from this source is **LOW**.

7 FLOOD RISK SUMMARY

Sources of Flooding	Risk			Control Measures
	High	Medium	Low	
Rivers:			X	Not expected to be an issue
Sea			X	None
Land			X	Ensure flood routes are maintained and plot FFL to be at least 150mm above existing ground
Groundwater			X	Not expected to be an issue
Existing sewers			X	Not expected to be an issue

8 INCREASE TO OFFSITE FLOODING

The surface water is proposed to be discharged to ground and will therefore not represent an increase to flooding risks offsite.

9 FLOOD RISK VULNERABILITY

The vulnerability of the proposed development is assessed in accordance with the Technical Guidance to the National Planning Policy Framework published by the Department for Communities and Local Government in March 2012.

The report should consider if the development is acceptable for the Flood Zone Classification in accordance with Table 3 within the NPPF.

The proposed development is Residential and is classified as **“More vulnerable”** according to the NPPF.

The site is indicated on the flood maps to be in Flood Zone 1.

Table 3: Flood Risk Vulnerability and Flood Zone ‘Compatibility’

Flood Risk Vulnerability Classification (from Table 2)		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b	Exception Test required	✓	✗	✗	✗

✓ Development is appropriate

✗ Development should not be permitted

Utilising the Flood Zone Compatibility Table above, the development is deemed appropriate for the site and flood risk classification Flood Zone 1

As part of the assessment the following development constraints require consideration and recommendation made as to how to mitigate any flood risk appropriately

9.1 Finished Floor Levels

The EA flood mapping indicates that some Surface water flooding flows across the site, refer to Figure 4.



Figure 4

To mitigate against localised flooding caused by heavy / intense rainfall events, the internal ground floor level of the plots should be set a minimum of 150mm above existing ground levels.

9.2 Existing Flood Volumes

No loss of existing flood volume will be experienced due to the development of this site within flood zone 1.

9.3 Flood Routing

Flood Routing paths are to be maintained on site by keeping the raising of levels to a minimum and keeping the general direction of falls similar to the existing.

9.4 Emergency Access

The site is in flood zone 1 according to the level information reviewed and as such emergency access is not an issue and no specific route requires to be defined.

9.5 Flooding Risk from Reservoirs

The Site is NOT in an area that is of Risk from flooding due to reservoir failure, please refer to figure 5. As such we consider the risk of this occurrence is **LOW**.

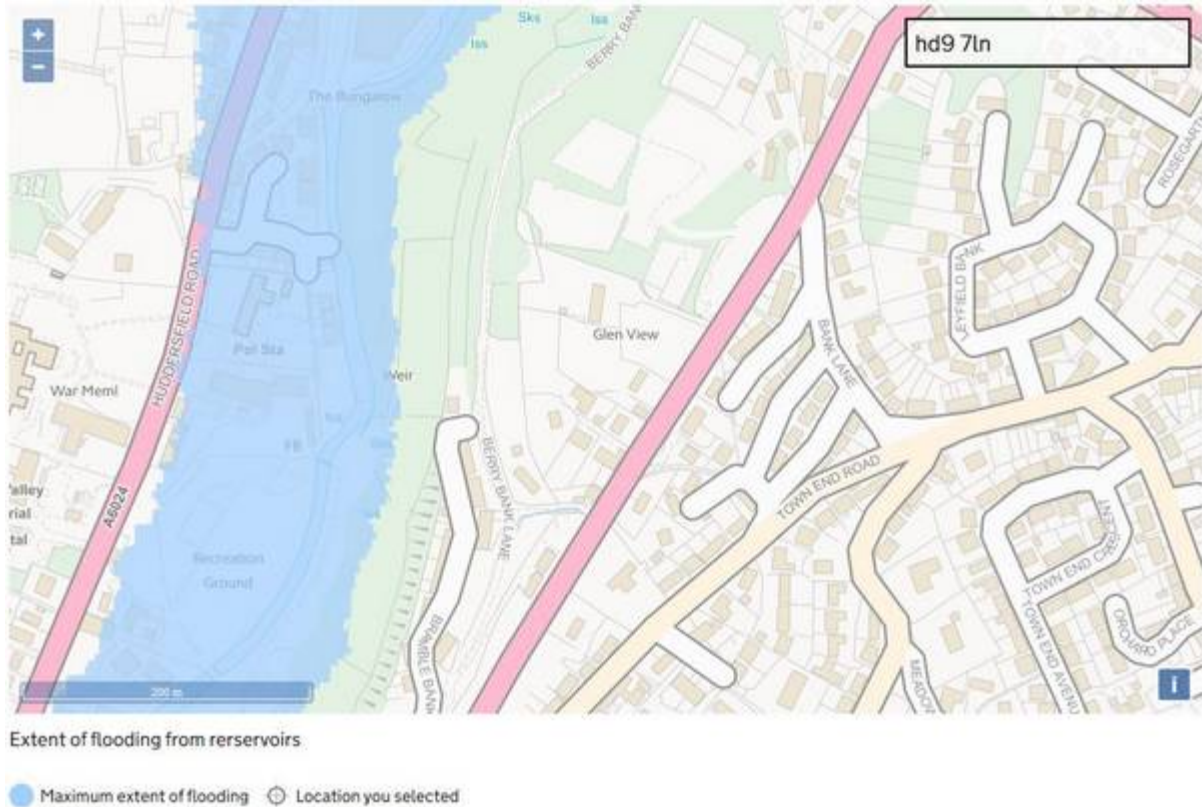


Figure 5

10 CLIMATE CHANGE ALLOWANCES

The EA have published revised climate change allowances rainfall intensity, such the climate change allowance are as follows in table2.

Table 2 peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 2.

Therefore, the site drainage design should be checked utilising Climate Change Allowances of 40% and 20%

11 EXISTING SITE DRAINAGE

Whilst there may be some field edge drainage ditches present within and on the boundary of the site, there are no expectations of further drainage being present on the site.

The site falls generally towards the northwest. The flooding from surface water maps show an expectation of overland flow of surface water from the A635 onto site in the northeast corner. This is expected to be associated with the existing vehicular access to the neighbouring property and a disused, but still present, gate location into the site itself. These are expected to be dealt with as part of the site development.

12 DRAINAGE CONSULTATION

The response from Kirklees Metropolitan Borough Council (LLFA) is included in Appendix B it should be noted that whilst the consultation was for a different proposed development on the site, the principles in relation to drainage and flooding remain relevant. Yorkshire Water records are included in Appendix D.

13 PROPOSED DRAINAGE STRATEGY

13.1 Surface Water

The site lies some two metres below the level of the A635 New Mill Road. The existing surface and foul sewers run along A635 New Mill Road. To remove the need to pump surface water from the development, it is proposed to make use of shallow soakaway trenches to infiltrate surface water to ground. Previous investigations on the site have shown that the In accordance with good practice and council policies new offsite surface water flows should be reduced by the introduction of an attenuation system following the hierarchy as laid out in the approved document H of Building Regulations with respect to Sustainable Urban Drainage Systems (SuDS).

The following destinations must be considered for surface runoff in order of preference:

- Discharge into the ground
- Discharge to a surface water body
- Discharge to a surface water sewer
- Discharge to a combined sewer

Discharge to Ground

Previous investigations on the site have shown that the soils are suitable for infiltration to ground. As this is the preferred method of surface water discharge according to the NPPF, it is proposed to collect surface water and infiltrate it to ground.

Discharge to a Surface Water Body

The River Holme is some 60m away from the site across third party land. Whilst some of the surface water from the site may currently discharge to the River Holme by overland flow in severe weather, this cannot be proven. This method of discharge has therefore been discounted.

Discharge to Surface Water Sewer

A public surface water sewer exists in A635 New Mill Road but this is expected to be at higher level than the site drainage and as the LLFA have stated that pumping of surface water from the site to the sewer is not acceptable, a discharge to public surface water sewer has been discounted.

Discharge to Combined Sewer

No Combined Sewers are present near to the site as such NO connection would be possible.

13.2 Foul Water

There is an existing foul sewer with A635 New Mill Road shown on the Yorkshire Water record plan in appendix D. It is proposed that foul sewage generated on the site be discharged to the public foul sewer in A635 New Mill Road. This will be subject to discussions and agreements with Yorkshire Water.

14 PROPOSED DRAINAGE SCHEME

14.1 Surface water

The use of Sustainable Urban Drainage Systems (SUDS) allow the following benefits to be achieved when appropriate.

1. Reduced Water Quantity
2. Improved Water quality,
3. Increased amenity
4. Improved biodiversity.

The site is a Greenfield Development, the underlying ground conditions have been shown to be suitable for infiltrating surface water to ground. The information available in respect of the previous infiltration testing will need to be re-done to prove the consistency of the soils for infiltration and to ensure that the testing is undertaken in accordance with appropriate standards and evidenced to the satisfaction of the LLFA.

The previous investigations determined an infiltration rate of 1.736×10^{-5} m/s.

The surface water drainage strategy is based upon this rate. Further testing will need to be undertaken prior to start of construction to ensure that this rate is applicable to all areas where surface water is proposed to infiltrate to ground.

Water Quality Assessment

In accordance with CIRIA SuDS manual C753 the minimum water quality management requirements should be assessed to Table 4.3.

TABLE 4.3 Minimum water quality management requirements for discharges to receiving surface waters and groundwater

Land use	Pollution hazard level	Requirements for discharge to surface waters, including coasts and estuaries ²	Requirements for discharge to groundwater
Residential roofs	Very low	Removal of gross solids and sediments only	
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads (eg cul de sacs, home zones, general access roads), non-residential car parking with infrequent change (eg schools, offices)	Low	Simple index approach ³ Note: extra measures may be required for discharges to protected resources ¹	
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	Simple index approach ³ Note: extra measures may be required for discharges to protected resources ¹	Simple index approach ³ Note: extra measures may be required for discharges to protected resources ¹ In England and Wales, Risk Screening ⁴ must be undertaken first to determine whether consultation with the environmental regulator is required. In Northern Ireland, the need for risk screening should be agreed with the environmental regulator.
Trunk roads and motorways	High	Follow the guidance and risk assessment process set out in HA (2009)	
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites	High	Discharges may require an environmental licence or permit ⁵ . Obtain pre-permitting advice from the environmental regulator. Risk assessment is likely to be required ⁵ .	

Notes

The minimum water quality management requirements for discharges to receiving surface waters and groundwater are presented here. (For Northern Ireland, this guidance should be considered as interim until such time as Northern Ireland publishes its own legislation/policy/guidance.)

- These are not required in Scotland and Northern Ireland. For England and Wales, see Step 3 of the simple index approach (Section 26.7.1).
Protected surface water resources will include those designated for drinking water abstraction or for other environmental protection reasons. Protected groundwater resources are represented by GPZs in England and Wales.
- In Scotland, the Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011 General Binding Rules, Rule 10 (d) (iv) effectively provides an exemption from requiring SuDS for coastal discharges. However, control of any contaminants likely to be present in surface water runoff is still required, but can be delivered using alternative methods such as proprietary treatment products. As the term 'SuDS' in this manual includes proprietary treatment products, this exemption is not valid in this context.
- The application of the simple index approach should follow the approach outlined in Section 26.7.1 (or equivalent approved).
- Risk screening is an assessment to identify high risk scenarios where the Environment Agency or Natural Resources Wales (NRW) would wish to be consulted regarding infiltration of water from surface runoff in order to agree the proposed design approach. The risk screening method is provided in Section 26.7.2.
- The risk assessment should determine the appropriate design approach to mitigate risk to acceptable levels following the guidance outlined in Section 26.7.3. This assessment should be approved by the environmental regulator.

The site comprises residential roofs, private driveways and low speed roadways therefore a simple assessment can be made in accordance with the simple index approach.

Simple Index Approach

The following process should be followed

CIRIA SuDS Manual 2015

TABLE 26.2 Pollution hazard indices for different land use classifications

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

Notes

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

Where a site land use falls outside the defined categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required, where:

$$\text{Total SuDS mitigation index} = \text{mitigation index}_1 + 0.5 (\text{mitigation index}_2)$$

Where:

$$\text{mitigation Index}_n = \text{mitigation index for component n}$$

A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

Land Use - Residential roofs

(Hazard Index from table 26.2)

Pollution hazard Very **LOW**

TSS – 0.2

Metals – 0.2

Hydrocarbons -0.05

SUDS Pollution Mitigation

Mitigation - roof water to be connected to Soakways or Permeable paving systems

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates ¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5, 6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Mitigation Indices

TSS – 0.7

Metals – 0.6

Hydrocarbons -0.7

TOTAL SuDS mitigation index ≥ pollution hazard Index

Land Use – Drive Ways and low traffic roads

(Hazard Index from table 26.2)

Pollution hazard **LOW**

TSS – 0.5

Metals – 0.4

Hydrocarbons -0.4

SUDS Pollution Mitigation

Mitigation - Drive surface water to be connected to Soakways or Permeable paving systems.

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates ¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5, 6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Mitigation Indices

TSS – 0.7

Metals – 0.6

Hydrocarbons -0.7

TOTAL SuDS mitigation index ≥ pollution hazard Index

SUDS Treatment

In order to ensure a treatment train is provided the proposal is to allow for porous paving to ALL driveways with roof water paving connecting the sub-base, silt traps are to be provided on the surface water system prior to connection to ensure suspended solids are removed.

Permeable paving to the road network to infiltrate to ground where possible with subbase drainage collection in non-infiltration area.

14.2 POLLUTION HAZARD CLASSIFICATION

The hazard index for the contributing land uses are either **Very Low to Low** in accordance with table 26.2 from CIRIA C753, therefore the overall hazard classification for the site is **LOW**

14.3 DRAINAGE IMPACT

Utilising infiltration techniques means that the proposed development will have little to NO impact on the upstream or downstream water environment in flood risk terms.

15 GENERAL REMARKS

This report is for the sole use of Priestroyd Construction Limited and their immediate advisors in connection with the development of the subject site for residential use. It shall not be reproduced in whole or in part or relied upon by third parties for any use whatsoever without the express permission of Avie Consulting Ltd. Avie Consulting Ltd shall have no liability for any use of this report other than for the purposes for which it was originally prepared.

16 RECOMMENDATIONS

- The site is located in Flood Zone 1 according to the latest version of the Indicative Floodplain Map produced by the Environment Agency, **as such in Flood Risk terms the proposed development is appropriate for the site.**
- There are No recorded historical flooding events directly affecting the site. The risk of flooding to the site is considered to be **LOW**.
- Infiltration drainage is proposed to be used for disposal of surface water from this site.
- Residential Development is classified as “More Vulnerable” and is appropriate under the National Planning Policy Framework on this redevelopment site in terms of Flood Risk in flood zone 1.
- We recommend mitigating against localised flooding caused by heavy / intense rainfall events by raising the internal ground floor level of the plots a minimum of 150mm above existing ground levels.
- The proposed development will not affect flood routing, and as such flows/ flood routing will be maintained as per the pre-development scenario.
- The hazard index for the contributing land uses are either **Very Low to Low** in accordance with table 26.2 from CIRIA C753, therefore the overall hazard classification for the site is **LOW**
- Foul water discharge should connect to the existing foul sewer in A635 New Mill Road as identified on the Yorkshire Water sewer record map in Appendix D.
- All details are subject to a full CCTV survey and connection level confirmation survey

APPENDIX A
Site Development Proposal

APPENDIX B

LLFA Consultation Response

Strategic Drainage Consultation

Consultation on Application Number: 2014/91492

Address: rear of Pentlands, New Mill Road, Holmfirth, HD9 7LN

Proposal: Outline application for residential development (4 dwellings)

DC Officer: Farzana Tabasum

Drainage Officer: Paul Farndale

Comments:-

Flood Risk

This site is located in main river flood zone 1 – Low Risk.

There are no known surface water flood issues in the immediate vicinity of the site.

Surface Water Drainage Strategy

The Applicant has indicated on the application form an intention to use Sustainable Drainage Systems but has given no further indication as to what these are and how they can be accommodated into the site (making space for water). **Further information is advised.**

The use of infiltration techniques would need to be examined for this site.

Kirklees Flood Management & Drainage would **OBJECT** to the pumping of surface water as this does not mimic the current drainage of the site and introduces a risk of flooding due to electrical and mechanical failure that is not currently present. Unlike foul pumping stations, flows cannot be adequately controlled in a breakdown event.

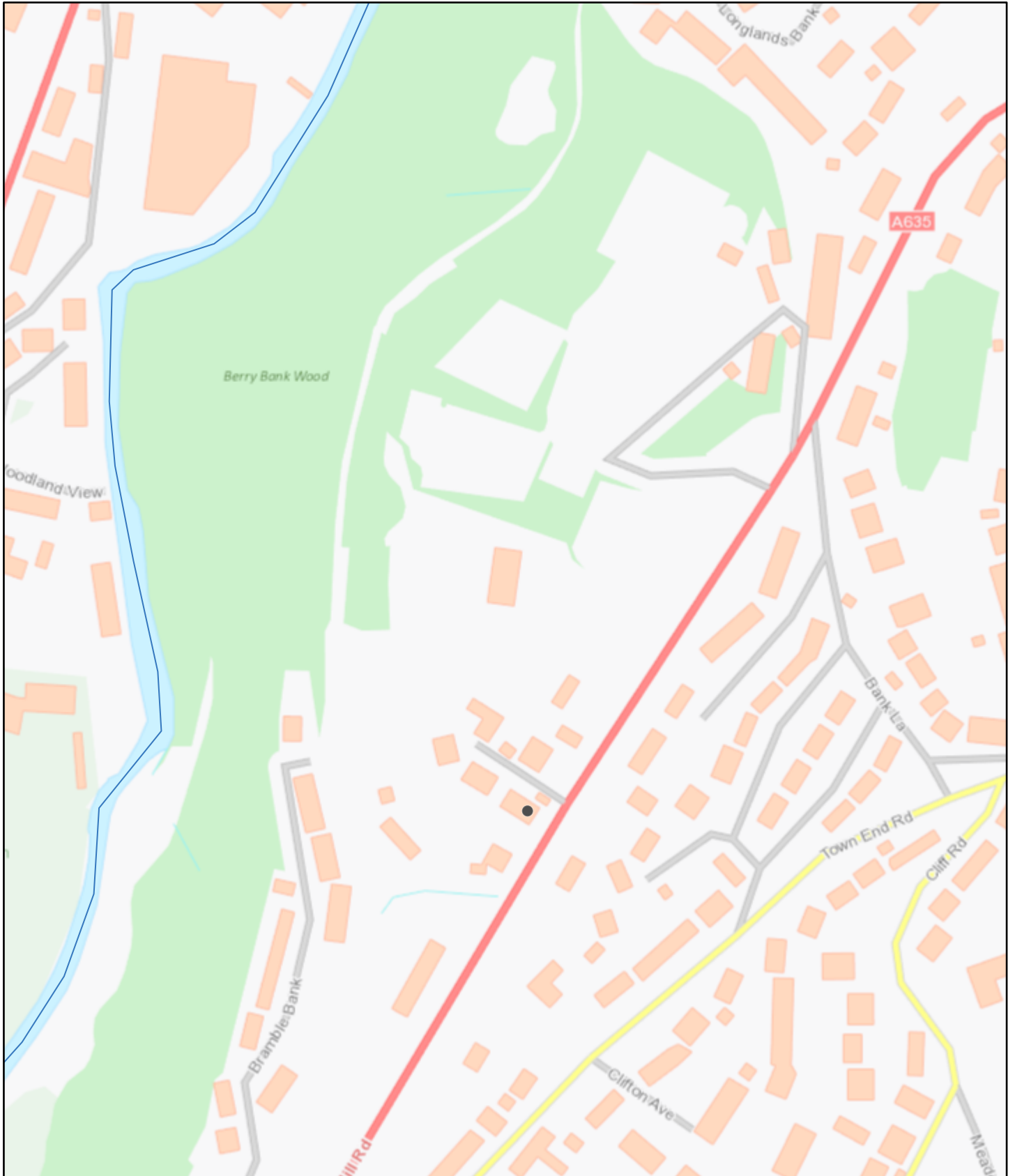
It is unclear therefore as to whether there is a workable solution for surface water drainage. Further research is therefore required.

Signed: Paul Farndale

Date: 2nd July 2014

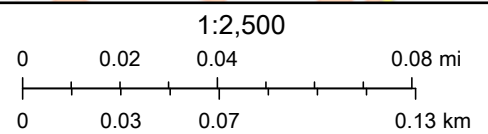
APPENDIX C
Watercourse Network Map

Main River Map: Rationalising Main River Network



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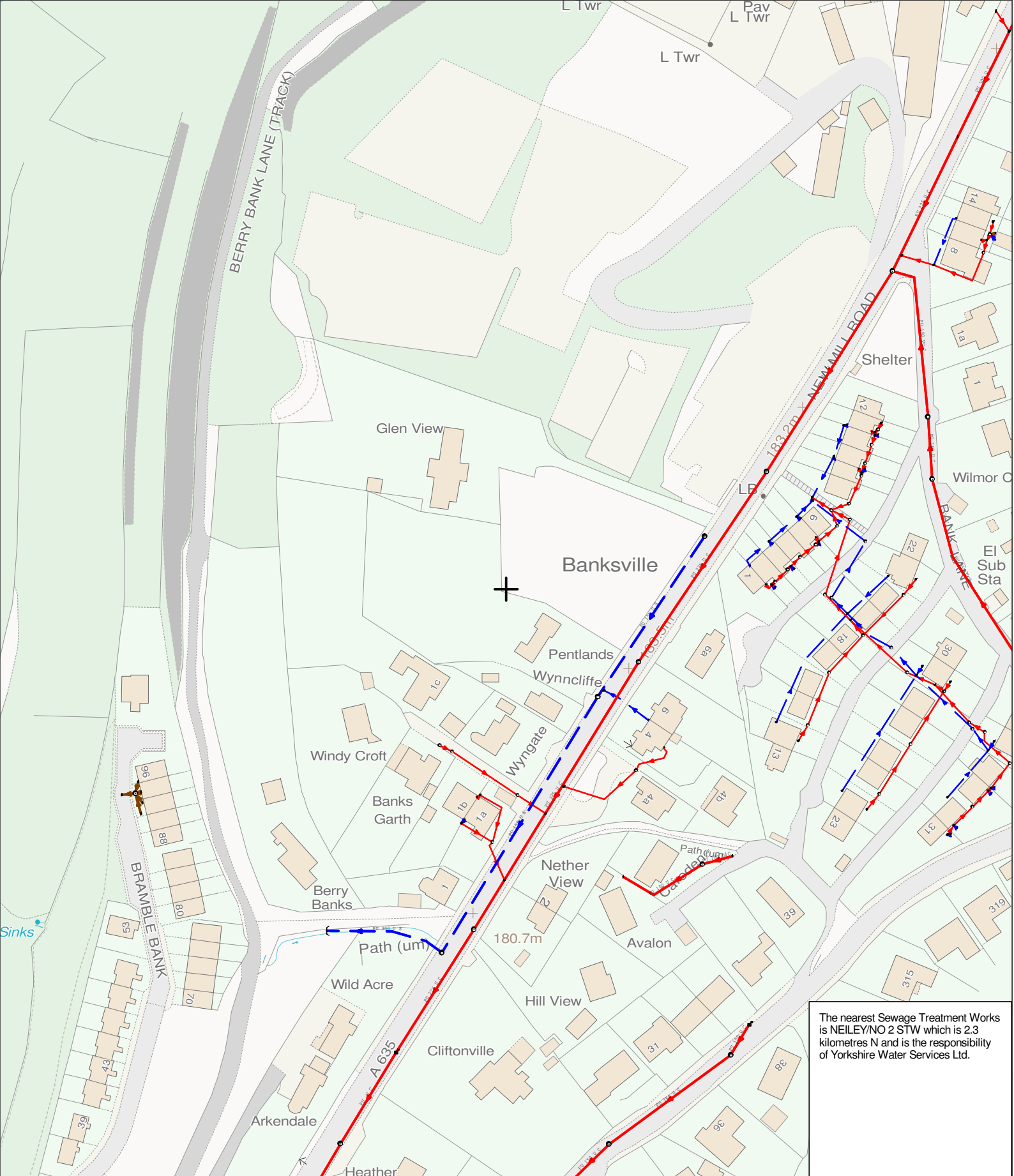
— Statutory Main River Map



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Environment Agency
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APPENDIX D
Yorkshire Water Sewer Records



Public Waste Water Network 12/09/2019 15:21:04 OS Grid Coordinates: 414637 : 408971 Map Name : SE1408NE KAYA