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FLOOD RISK ASSESSMENT AND SURFACE WATER/SUDS STRATEGY REPORT FOR A PROPOSED DEVELOPMENT ON LAND AT LUNDHILL ROAD, WOMBWELL

Prepared for

PERSIMMON HOMES WEST YORKSHIRE

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1 INTRODUCTION

1.1 iD Civils Design Ltd (iD), have been appointed by Persimmon Homes West Yorkshire (PHWY) to prepare a Flood Risk Assessment (FRA) and Surface Water Drainage/SUDS strategy report for the proposed residential development on land at Lundhill, Wombwell.

1.2 The report will be undertaken in accordance with Environment Agency, Barnsley Metropolitan Borough Council (BMBC), and Yorkshire Water (YW) development control policies and will focus on:

Site Use and Current Drainage regime, Flooding History, Ground Conditions and use of SUDS, Impact of development and proposed drainage strategy, pluvial flooding routes and the overall impact of development on the site and surrounds.

1.3 The report is for the sole use of PHWY and presents comments and conclusions based on information available at the time of writing. iD Civils reserve the right to amend conclusions if further information is made available.

2 BACKGROUND

2.1 PHWY is seeking planning consent to develop land to the east of Lundhill Road, Wombwell. It is proposed that the site is developed to provide 150 new residential dwellings with associated access roads, sewers and open space.

2.2 This Flood Risk Assessment has been undertaken with reference to the following reports and documents/agencies:

- Environment Agency Flood Zone Maps (EA website)
- Environment Agency Surface Water Flooding Maps (EA website)
- Environment Agency Flood Warning Plans (EA website)
- Barnsley MBC Strategic Flood Risk Assessment
- Barnsley MBC Development Control Guidance
- National Planning Policy Framework (NPPF)
- Technical Guidance to NPPF

- Sewers for Adoption 7th edition
- Public Sewer Records (YW)
- Proposed Site Layout (Persimmon Homes)
- Phase 1 site investigation report (Lithos Geoenvironmental)
- CCTV Sewer Survey of sewer crossing site
- SuDS Manual (Ciria C753)
- EA Technical Guidance

2.3 In addition, iD Civils has reviewed commercially available information including aerial photographs and historic ordnance survey maps of the area during the preparation of the report.

2.4 **Site Walkover:** A site visit was undertaken in July 2016 and a further site visit accompanied by a representative of the Lead Local Flood Authority was undertaken in February 2017. During the site walkover, overland flood routes onto and from the site were inspected in order to assess the risk of flooding from external sources. An inspection was made of the Elsecar Canal some considerable distance to the east and west of the site to identify overflow structures to the local watercourse plus inspection of the pond and watercourse to the west of the site.

2.5 The Elsecar Canal is primarily a recreational facility and is no longer navigable as part of the national canal network. As such the canal is disused for the purpose it was constructed and ownership of the canal has been transferred from British Waterways to the local authority.

3 REGULATORY GUIDANCE

3.1 National Planning Policy Framework (NPPF), along with the Technical Guidance to NPPF provides the regulatory framework and guidance for planning authorities in relation to Flood Issues for new developments. Any application submitted to a local planning authority will be considered in conjunction with this guidance and local development control policies, and dependant on the nature and location of the application, the planning authority may request a Flood Risk Assessment as part of the planning application submission.

3.2 The Environment Agency is a statutory consultee to the Planning Authority in relation to flood risk issues.

3.3 Barnsley Metropolitan Borough Council (BMBC) is the Planning Authority, and has their own internal Flood Management/Drainage Department which would advise on drainage issues and work with the EA on strategic issues within the area.

3.4 BMBC are also the Local Lead Flood Authority (LLFA) and are a statutory consultee to the planning process.

3.5 The Environment Agency has, in April 2015, provided guidance for local planning authorities regarding the relevant consultees to the planning process in terms of flood risk. In summary, this advises that the Lead Local Flood Authority should be consulted for major developments in all flood zones, with the Environment Agency also consulted if the development is within 20 metres of a main river. If the site is more distant to a main river then the Environment Agency should only be consulted for Flood Zone 2 and 3 developments, with the exception of water compatible developments in Flood Zone 2 where consultation is not needed.

3.6 The Environment Agency have undertaken a national study of flood risk across England and published flood maps covering the country. The maps can be viewed on the agency web site at **www.gov.uk/government/organisations/environment-agency**. Specific locations can be studied by searching either using postcode or address.

3.7 The EA flood maps identify 3 zones.

Flood Zone 1: This zone comprises land with a less than 1 in 1000 annual probability of river or sea flooding in any one year (<0.1%)

Flood Zone 2: This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-0.1%) in any year. This flood zone is denoted by light blue shading on the EA flood zone maps.

Flood Zone 3: The zone comprises land assessed as having a 1 in 100 year 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. This flood zone is denoted by dark blue shading on the EA flood zone maps.

3.8 Flood risk should be assessed from the following sources;

- Tidal and river
- Surface water overland flow
- Groundwater
- Sewers (Pluvial Flooding)
- Artificial sources e.g. canals, reservoirs water mains.

3.9 Flood zone plans reflect the undefended flood scenario for a particular area. Many flood areas are defended with flood defences of varying types and design life. Areas benefiting from flood protection are shown hatched on the EA plans. The EA have also published additional flood risk mapping, the Risk of Flooding from Rivers and the Sea, which shows the defenced scenario.

3.10 The EA have published a series of Surface Water Flood Maps which demonstrate overland flood routes on the basis of a 100-year storm event assuming that the natural drainage system is blocked or at capacity (pluvial flooding). Whilst this premise may be a low risk, the plans assist designers in identifying areas at risk so that the necessary flood mitigation measures can be designed to produce a safe development.

3.11 The level of detail and complexity of a Flood Risk Assessment can vary considerably, dependant on the scale, nature and location of the planned development. EA guidance sets out the criteria for the level of information which should be included within the FRA.

3.12 The developed areas of the site are shown to lie within **Flood Zone 1** on the Environment Agency's Flood Map for Planning and on the Risk of Flooding from Rivers and the Sea plan.

3.13 The site is not within or adjacent to an EA flood warning area.

3.14 The Planning Practice Guidance to the NPPF refers to vulnerability classifications, which are based on the sensitivity of different forms of development. In accordance with the guidance (Table 2) the residential end use planned for this development is classed as *'More Vulnerable'*.

3.15 Table 3 in the NPPF technical guidance provides information in relation to the appropriate vulnerability classes within each of the flood risk zones. The table is presented below:

Table 4554.1 – Flood Risk Vulnerability and Flood Zone compatibility

Flood Risk Vulnerability Classification (Table 2 NPPF)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	√	√	√	√	√
Zone 2	√	√	Exception Test Required	√	√
Zone 3a	Exception Test Required	√	x	Exception Test Required	√
Zone 3b	Exception Test Required	√	x	x	x

3.16 Based on the above table it can be seen that the intended use of the development is consistent with NPPF guidance for residential development.

3.17 **The Sequential Test:** In accordance with NPPF, LPA's allocating land for development should apply the Sequential Test, to demonstrate that there are no available sites in the area with a lower risk of flooding. As the site is in Flood Zone 1 a Sequential Test is not needed.

3.18 **The Exception Test:** The exception test is relevant if, following the application of the sequential test; it is not possible for the development to be allocated in zones of lower probability of flooding. The test provides a method of managing flood risk while still allowing necessary development to occur. The development is within Flood Zone 1; thus, the Exception Test will not be required.

3.19 Yorkshire Water work within the framework of 'Sewers for Adoption', which sets the standard for adoptable surface water and foul waters sewers. They also apply development control standards which are consistent with current best practice and Building Regulations. Yorkshire Water are currently working to the 7th edition of SFA.

3.20 Developers are encouraged to make 'predevelopment' enquiries to YW to ensure that there is sufficient time for the company to fully assess the capacity of their network and treatment works. This process also ensures that drainage strategies are acceptable in principle, prior to planning permission and helps avoid any objections from YW during the planning process. The response to the predevelopment enquiry is included in appendix A of this report. Further to the development reply, a meeting was held with YW to discuss drainage options.

3.21 BMBC, as Lead Local Flood Authority, is a statutory consultee to the Local Planning Authority regarding SuDS matters on major developments. At the present time, there is no obligation for local authorities of LLFA's to adopt SuDS features. ID Civils have liaised with BMBC Flood Management Department and their response is included in appendix D of this report

3.22 It is understood that the current position of BMBC is that they will not adopt SUDS features which serve development sites but seek assurance in terms of the long-term maintenance of SUDS features in order to protect the development and surrounding areas in perpetuity.

4 SITE DESCRIPTION AND HISTORY

4.1 A site location plan is included as Drawing No. 4554-FRA-001. Site details are summarised in the Table below.

Table 4554.2 - Site Location Summary

Detail	Remarks
Location	East of Lundhill Road, south of Dove Road, Wombwell
NGR	SE 405,019
Area	5.30 Ha
Current Use	Grassland

4.2 **Topography and Surrounding Land Uses:** The site is an irregular polygon in shape, comprising two fields. The boundaries of the site are principally hedgerows and fences from existing properties to the north and east of the site.

4.3 To the north of the site there is an existing residential estate which appears to be cc 40 years old comprising houses on Dove Road. The estate is generally higher than the site in elevation.

4.4 To the east of the site the housing estate extends with properties on Dove Close.

4.5 To the west of the site is Lundhill Road which falls south and runs below the A6195.

4.6 To the south of the site is the Elsecar Canal and also a farmhouse/barn. The canal is owned by BMBC and is disused for navigation purposes but well used as a fishing and recreation facility. Houses on Dove Road have rear gardens backing onto the canal. The properties are generally in excess of 1m above the canal bank.

4.7 There is an existing large pond approximately 80m south of the site adjacent to Lundhill Road and behind the Lundhill Tavern.

4.8 The Dearne Valley Parkway (A6195) runs parallel to the disused canal approximately 30m south of the canal.

4.9 The existing site, which is accessed from a field gate off Lundhill Road falls steeply generally from north to south with a low point in the south-eastern corner of the site adjacent to the disused canal at a level of 34.2m AOD. The high point of the site is in the north-western corner with a level of 48.7m AOD. The site topography splits from falling south easterly (approx. 60% of the site) to south westerly (approx. 40% of the site). Typical gradients across the site are 1:15 to 1:30 with a flatter low lying area adjacent to the canal.

4.10 **Existing Hardstanding:** There are no hardstanding areas within the site and the site appears to be undrained.

4.11 **Hydrology:** A plan depicting the local hydrology is appended to this report as drawing 4554-FRA-06. The nearest waterbody is the disused Elsecar Canal which abuts the southern boundary of the site. The canal terminates approximately 200m east of the site. The disused canal continues to the west of the site for cc 2Km. The disused canal receives water from the existing development to the north via a 225mm/300mm pipe. Enquiries to BMBC Highways indicated that this is a culverted watercourse which also drains the public highway. In addition the disused canal will receive overland runoff from higher land to the north along its route.

4.12 There are overflows from the disused canal to Knoll Beck which lies to the south. The nearest overflow is approximately 100m east of the site and comprises a 600mm wide x 250mm high opening formed in stonework with a slab across below the southern towpath. This overflow spills to a cascade 900mm wide and down to a headwall with twin 600mm diameter pipework (stacked) which flows below the A6195 to Knoll Beck.

4.13 There is a second outfall from the disused canal to Knoll Beck approximately 650m west of the site which comprises a 2.6m wide spillway.

4.14 The lowest point on the application site southern boundary is approximately 1.2m below the level of the disused canal bank. The lowest point on the site being 34.33m AOD and the canal bankside being 35.55m AOD. This low area is reflected on the EA surface water flood risk plans.

4.15 There is an unnamed open watercourse flowing at the base of the A6195 embankment to the south west of the site. This watercourse originates in land to the west of Lundhill Road and flows south east. The pond adjacent to the Lundhill Tavern appears to be linked to the watercourse via a shuttle pipe. The watercourse runs below the canal and the A6195 discharging to Knoll Beck.

4.16 Approximately 40% of the site appears to be in the catchment of this watercourse and therefore not hydraulically linked to the disused canal. Areas linked to the canal are indicated on the hydrology plan attached to this report.

4.17 **Groundwater:** A phase 1 site investigation (desk top based) has been undertaken by Lithos Consulting, however there has been no phase 2 report undertaken as yet. The site investigation comprised a review of desk based geological and environmental information. Lithos did not identify any significant risk of high groundwater through the site. It is expected that groundwater may be shallow at the southern boundary of the site adjacent to the disused canal during winter periods due to the low-lying topography.

4.18 **Existing Drainage:** Apart from the culvert identified as a culverted watercourse crossing the site there do not appear to be any other drainage system crossing the site.

4.19 **Ground Conditions:** The phase 1 site investigation indicates that there should be no natural drift deposits and strata below the site should consist of shallow bedrock comprising mudstone, siltstone and sandstone.

4.20 The site investigation confirms that infiltration drainage is unlikely to provide a solution for surface water. This should be verified on undertaking the phase 2 investigation.

5 EXISTING SITE DRAINAGE

5.1 iD has obtained a copy of Yorkshire Waters Sewer Record plans for the area. A summary is presented below, and a copy of the sewer record is included within Appendix A:

Table 4554.3 – Existing Drainage Summary

Sewer Type	Comment
Surface Water	YW records show that there are no surface water sewers within the site. There are no surface water sewers within 200m of the site.
Combined Water	YW plans do not indicate any combined sewers crossing the site. There is a combined sewer south of the disused canal within the landscape belt between the canal and A6195.
Foul Sewers	The record plans show that there are no foul water sewers crossing the site. There is a foul sewer network within the estate to the north and east of the site which connects to the combined sewer to the south.
Highway Drainage	iD Civils do not have any highway drainage records for the area.
Land Drainage	iD Civils do not have records of the existing on-site land drainage system.

Sewer Type	Comment
Culverted Watercourse	There is a 225/300mm diameter pipe crossing the site from North to South. Enquiries to BMBC Highway section indicates that this pipe is likely to be a culverted watercourse. Persimmon Homes has undertaken a drainage survey of the culvert and it is shown on the drainage strategy plan with this report. The precise catchment is not known as this would involve extensive third party drainage surveys, however is estimated at approximately 3.86 Ha (gross) and an assumed 1.90 Ha net drained. The outlet to the disused canal can be seen from the bankside. BMBC have confirmed that highway drainage for the development to the north is also taken into this culvert. YW have confirmed that they do not regard this pipe as a public surface water sewer and it would not have been adopted as part of the private public transfer.

5.2 The proposed development site is greenfield. By review of the topographical survey it can be seen that only part of the site falls towards the disused canal. This area has been measured as 2.61 Ha (excluding area of open space left adjacent to the canal which is at high risk of surface water flooding and partially within FZ3.

5.3 BMBC development control guidance states that a greenfield Qbar rate of 5 l/s should be assumed across the borough. The rates derived from BMBC guidance is therefore 13.15 l/s. Rates for storm of higher intensity than Qbar would be greater.

5.4 In terms of greenfield flows, as the southern edge of the site is below the disused canal bank, the site will drain to this area and as water fills up the residual storage created by the low spot, the site would discharge into the canal. This linkage would only occur during severe, storm events and there would be no linkage during lower intensity events.

6 PROPOSED DEVELOPMENT

6.1 It is proposed that the site is developed to provide 150 dwellings accessed from a new junction with Lundhill Road on the western boundary. The layout has been designed to be totally within area designated as Flood Zone 1 in the EA maps.

6.2 The layout retains a standoff from the disused canal in the area currently deemed at risk from surface water flooding (discussed later in this report).

6.3 Highways within the site will be adopted under a section 38 agreement with BMBC. All design will be undertaken in accordance with the Highways Design guide. Vertical alignments will be designed to promote safe overland exceedance routes within the highway as shown on the drainage strategy drawing.

6.4 Sewers within the site will be adopted by Yorkshire Water under a section 104 agreement.

6.5 The proposed foul and surface water water pumping station would be adopted as part of the section 104 agreement.

6.6 An accurate assessment of the detailed surface water site catchment areas is outside of the scope of this report and will be undertaken as part of the detailed section 104 design. The drainage strategy for the development is thus based on an impermeable fraction of 55% of the 4.12 ha net developed area. On this basis, the total design catchment is 2.27 Ha and that figure has been used in all storage calculations in this report.

7 FLOOD HISTORY AND SITE VULNERABILITY

7.1 Flooding can occur from a variety of sources, including tidal, rivers, watercourses, overland run-off, sewers and culverts. NPPF and BMBC guidance requires flood risk from all sources to be evaluated and suitable mitigation provided where required.

7.2 Environment Agency mapping shows that the proposed developed areas of the site are located within Flood Zone 1. The surface water flood maps show an area of the site adjacent to the disused canal is it high risk of surface water flooding caused from the catchment to the north (the site). This area of high risk surface water flooding corresponds to the low-lying land discussed previously.

7.3 The overall risk to the development is considered low. The risk to the open space adjacent to the disused canal is considered high, although the development will significantly change the catchment of this high-risk area effectively reducing. the risk.

7.4 **Climate Change:** NPPF provides guidance with respect to the implications of climate change and suggests appropriate additional allowances for climate change with respect to rainfall intensities.

7.5 Subsequent to the NPPF the Environment Agency have, in February 2016, provided updated guidance on climate change allowance

In terms of peak rainfall allowance the guidance, which applies across all areas of England, gives central and upper end allowances. For flood risk assessment and strategic flood risk assessments both allowances should be assessed to understand the range of impact.

Table 4554.5 – Peak Rainfall Allowances

Scenario	2010-2039	2040-2059	2060-2115
Upper End	+10%	+20%	+40%
Central	+5%	+10%	+20%

7.6 The technical guide to NPPF recommends that residential development should be regarded as having a design life of 100 years. Allowances of 20% and 40% should therefore be considered when assessing attenuation features on this development. Designers should assess which of the allowances is appropriate depending on individual site constraints and risks.

7.7 Although the site itself is considered at low risk overall, adjacent existing development to the east falls very close to FZ3 areas and also the existing Dearne Valley Parkway is within FZ3. Due to the proximity of FZ3 areas, in particular the existing dwellings to the east, it is considered that climate change calculations should be based on the upper allowance of 40% so as to provide a robust storage volume and greater mitigation.

8 FLOOD IMPACT AND MITIGATION MEASURES

8.1 NPPF guidance requires the risk from a range of potential sources to be evaluated. The range of flood sources identified in NPPF is reviewed below:

8.2 **Flood Risk General:** Based on the site walkover survey, a review of Ordnance Survey level data and EA surface water flood maps, the risk of flooding to the development is considered to be **low/high** prior to mitigation.

8.3 **Flood Risk from Rivers/Watercourses or the Sea – Fluvial Flooding:** Environment Agency mapping shows that the proposed developed areas of the site are located within Flood Zone 1. The open space area to the southern boundary is within flood zones 2/3. There are no rivers close to the site and the nearest open watercourse is cc 100m to the west of the site.

8.4 The disused canal is a static body of water which is linked to the watercourse via a series of overflows i.e. the disused canal is significantly higher than the watercourse which is some way to the south. The canal does not pose a fluvial flood risk but is discussed in the following section.

8.5 There is a small culverted watercourse running through the site. The diameter of the culvert as it enters the site is 225mm. The diameter of the culvert running through the site is 300mm so has greater capacity than the upstream system.

Mitigation: Layout designed to include all developed areas within flood zone 1.

The site has been designed so that there is a break in development between plots 22-23 which is the point where the culverted watercourse water drain enters the site and also the point where there is a risk of overland surface water entering the site. External levels in this area should be designed so that and exceedance flows can be directed along the driveway and into the new estate road where it can pass along a safe exceedance route through the site.

The culverted watercourse will need to be diverted through the site, along a suitable route to minimise any risk to new dwellings. A route is indicated on the strategy plan but subject to detailed design and agreement with BMBC.

8.6 **Flooding from Overland Surface Water:** The Environment Agency's risk of flooding from surface water plans shows that there is a potential high risk of surface water flooding in the southern area of the site. This area corresponds to a low-lying area on the topographical survey and is cc 1m below the towpath of the disused canal. This area is the low point in the topography for the site and surrounding area and as such the EA modelling process will show this as a high-risk area. The total volume of storage within this area is estimated as 1750m^3.

8.7 Discussion with BMBC also highlights that this area has been prone to flooding in the past. Discussions with BMBC indicate that flooding was caused by an overtopping of the disused canal banks, resulting in this low are filling with water and also collecting water from the upper catchment and the site.

8.8 During periods of intense rainfall water will flow from the site and surrounding areas down to this point, filling the low land and the canal. The disused canal has only limited overflow to Knoll Beck and only a single overflow for the eastern 1.5KM of the canal. This overflow is 600mm wide x 250mm high and would be capable of discharging cc 350 l/s.

8.9 It is estimated that the eastern end of the canal has a potential overland greenfield catchment of 2.6 Ha (assuming all storage in the low area is taken up), an unknown section of the Dearne Valley Parkway plus two outlets from the residential estate to the north. Based on broad brush figures, the total discharge could be in the order of;

Table 4554.6 – Estimated Drainage Discharge in the event of extreme rainfall to Eastern Disused Canal Basin

Source	Comment	Rate
Overland Greenfield flow	Based on SRV of 50% and total catchment of 2.63 ha with max intensity rainfall of 90 mm/hr. This is assuming that residual storage on site is taken up.	329
Outfalls from residential areas to the north of the	Total estimated development area discharging to the canal of 6 ha. Assumed 45% net drained area and	675

Source	Comment	Rate
site	90mm/hr rainfall rate	
Highway Drainage from A6195	Assuming 500m of carriageway and 20m average drained area per m run provides a total catchment of 1 Ha	250
	TOTAL	1254 l/s

Mitigation: It is considered that the potential rate of inflow into the disused canal in an extreme storm event is in excess of the rate of discharge to the watercourse, and therefore the canal water levels will rise to the point where the bank will be breached and water overtops onto the site and adjacent gardens. Ground levels to the north of the canal adjacent to the site are lower than the canal bank so that low lying land is potentially at risk of inundation. Garden levels to existing dwellings to the east are generally comparative to the canal bank in the bottom half of the gardens rising to the actual dwelling. There is therefore a risk of flooding to gardens adjacent to the disused canal east of the application site.

To the southern bank of the disused canal, ground levels drop markedly to a low valley in the woodland. There are two 600mm diameter pies which can convey water below the Dearne Valley Parkway to Knoll Beck. Assuming a gradient of 1 in 100 below the carriageway, these pipes are capable of accommodating cc1300 l/s total flow. The constraint, in terms of flood risk, appears to be the small outlet from the canal to the spillway leading down to the twin pipes.

The development site will be restricted to a maximum rate into the canal of 13.15 l/s which is equivalent to the Qbar greenfield runoff rate (discussed later in this report). As the potential rate of overland flow from the site in extreme events is upwards of 300 l/s the development of the site and provision of 1660m^3 of on-site storage (discussed later), is effectively mitigating the risk of flooding to the canal.

In order to ensure that there is no net increase in flow to the canal in low intensity storms and also to produce a net benefit to the flood risk of the area as a whole, an additional outlet from the canal to the twin 600mm diameter overflow pipes will be created. It is considered that the construction of an additional overflow at a similar level to existing, adjacent to the existing overflow would significantly increase the potential discharge from the canal by in the order of 350 l/s. The additional inflow from the development to the canal would be 13.15 l/s, equivalent to normal greenfield flows, therefore producing a net benefit of cc 337 l/s flow out of the canal in storm conditions.

The construction of any additional overflow from the canal is subject to local authority permission as landowner and LLFA. Costs could be met in part or whole by the developer subject to negotiation.

8.10 **Flooding from Sewers:** YW Water record plans show that there are no surface water sewers within or adjacent to the site.

Mitigation: None required from existing sewers. New sewers serving the development will be designed to current adoptable drainage and planning standards which means that there will be no sewer flooding in the 1 in 30 year storm event and that all flooding from site will be contained on site for the 1 in 100 year plus climate change event.

8.11 **Flooding from Artificial or Other Sources:** Environment Agency mapping shows that the site is not at risk from reservoir flooding. There are no known large water mains within the site or adjacent to the site.

Mitigation: None required

8.12 **Groundwater:** The intrusive site investigation should establish the level of groundwater below the site but at present is not considered likely to be a risk.

Mitigation: None required

9 SUDS

9.1 Building Regulations (Part H), the National Planning Policy Framework, YW and BMBC development control policies and Environment Agency advice notes, require the consideration of sustainable drainage techniques for new developments.

9.2 Surface Water drainage should be considered in accordance with a prescribed hierarchy aimed at minimising the impact of development. Surface Water flows should be designed to discharge to:

1. Infiltration based or sustainable drainage systems
2. Watercourses
3. Surface water Sewers
4. Combined water sewers

Guidance on SUDS techniques can be found in the SUDS Manual (Ciria 2015). There are various forms of technique available as summarised below:

Table 4554.7 – Forms of SuDS Drainage

Technique	Description
Trenches	Shallow excavations filled with rubble or stone that create temporary storage and either filter into the ground or convey water to an outlet. Known as 'French drains'

Technique	Description
Swales	Shallow linear vegetated drain ditches which can either convey flows to an outlet or infiltrate via a granular sub base to the sub strata.
Pervious Pavements	Material which allows water to permeate into underlying sub strata – best utilised on flat sites with permeable sub strata. Permeable paving can be used on clay sub strata but will require a piped drainage outlet from the sub base to a positive system.
Geocellular Systems/Tank systems	Modular plastic geocellular systems which have a high void ratio and allow water to be storage below ground. Large diameter pipework or purpose designed tanks to allow below ground storage.
Infiltration Basins	Vegetated depressions which allow water storage and slow infiltration into the ground.
Detention Basins	Surface water storage basins which remain dry when not in use and allow flood water to collect and discharge to a design flow rate.
Ponds	Ponds can provide both attenuation and treatment, together with landscape and ecology value. Run off through storms is attenuated in an upper level above ambient pond depths.

9.3 The use of SUDS techniques is designed to mitigate the impact of development on receiving watercourses or sewers by mimicking pre-development conditions as far as possible. New development should not worsen flooding downstream and should attempt to improve flooding wherever practical.

9.4 Sustainable Drainage can take many forms dependant on site use, ground conditions and topography. In terms of the hierarchy of sustainable options, infiltration based systems should be considered in the first instance i.e. soakaways/infiltration swales/basins etc. The use of infiltration systems will be subject to the infiltration characteristics of the natural ground below the site and any environmental constraints which may apply i.e. sensitivity of the groundwater or risk of increasing water flow through the ground. In this instance the site is not suitable to infiltration drainage due to the very low percolation rates.

9.5 In areas with cohesive sub soils it is unlikely that sufficient percolation can be provided to allow the implementation of infiltration techniques.

9.6 Sustainable Drainage in areas of cohesive sub soils can be provided by a range of flow attenuation devices to suit the proposed development, policies of adopting authorities and planning authority requirements. Attenuation ponds and swales can provide ecological benefits by the creation of wetland habitats and also improve the quality of water by adding a treatment element to the drainage process.

9.7 It is understood that BMBC do not adopt SUDS at this time. It is essential that SUDS features have a long-term maintenance plan so that the attenuating properties are maintained throughout the development lifetime.

9.8 An assessment of the available SUDS source control, pre-treatment and components mentioned in the SUDS Manual has been completed and is summarised in the table below:

Table 4554.8 – Site Specific SuDS Consideration

Source Control Feature	Included Y/N	Comment
Green Roof	N	Not appropriate to the form of development which is traditional steep pitched roofs. Householders are not appropriate to maintain this specialist form of roof covering
Soakaways	N	Soakaway drainage is unlikely to work given the shallow mudstone/siltstone rock head.
Water Butts	Y	Can be included in the development as part of the builder's standard specification.
Rainwater Harvesting	N	High capital cost and high maintenance and running costs make this form of SuDS inappropriate for this development. The development can be served by new water mains so there is not restriction to supply in this area. Harvesting tanks need to be on an individual property basis therefore it is unlikely that householders will be sufficiently aware of their ongoing maintenance obligations and it is considered that in the long term they will be less effective.
Pre-Treatment Feature		
Silt Traps/Sumps	Y	Plot drainage and driveway drainage will feature trapped gullies and sumps which will collect silts and sediments as a pre-treatment feature. Householders will need to maintain the system within their property curtilage.
Vortex Separator	N	The form of development is low risk and there is no requirement under EA Pollution Prevention Guidance to install such features on a plot basis. Separators would not be adopted by any of the regulators or water authority.
Filtration System	N	The form of development is low risk and there is no requirement under EA Pollution Prevention Guidance to

		install such features on a plot basis. Filtration systems would not be adopted by any of the regulators or water authority.
Oil Separators	N	The form of development is low risk and there is no requirement under EA Pollution Prevention Guidance to install such features on a plot basis. Separators would not be adopted by any of the regulators or water authority.
SuDS Component		
Filter Strips	N	Not appropriate to the form of development and layout as these systems deal with sheet runoff and require large areas to accommodate. Mainly used for car parking and large hardstanding areas.
Trenches	N	Not appropriate in a residential setting. Their use would be limited as runoff from driveways tends to be towards the footway or plot and gravel filled trenches could not be accommodated in these locations. Not appropriate for adopted estate roads.
Swales	N	Not appropriate for the development as swales should be laid at nominal gradient and both YW and BMBC will not adopt them as part of the system.
Bio retention	N	Unsuitable for this form of residential layout. There are very few opportunities within the layout to create this form of SuDS component.
Permeable Paving	N	BMBC do not adopt permeable paving in public highways. Given the sloping nature of the site road and driveway gradients will not be suitable for permeable paving which should be laid at nominal gradient to maximise storage.
Geocellular Systems	N	YW will not adopt geocellular drainage systems due to the difficulty of maintaining them.
Infiltration Basin	N	Infiltration basins would not be suitable due to the underlying soils.
Detention Basin	Y	YW will adopt dry detention basins subject to meeting their design criteria. Given the topography in the south of the site and the volume of storage necessary it would be impossible to meet the design standards for an adoptable basin in this site.
Ponds	N	YW or BMBC will not adopt ponds as part of the drainage network.
Wetlands	N	Gradients across the site are not conducive to creating wetlands and neither YW or BMBC would adopt a wetland area.
Tanks/Oversized Pipes	Y	A tank or oversized pipe could be utilised as the storage for the development and would be adopted by YW as part of the public sewer system for storm volumes up to the 1 in 100 years plus climate change event. It is considered that this option is the most suitable for the site.

10 PROPOSED DRAINAGE STRATEGY

10.1 The development will require new drainage systems designed to suit the final approved layouts, and in compliance with current Building Regulations and Sewers for Adoption.

10.2 A predevelopment enquiry was submitted to YW which has provided detail of connection points for the foul and surface water systems.

10.3 **Foul Water:** YW have confirmed that the foul sewer serving the site can be discharged to the existing 225mm diameter foul sewer to the south east of the site located in Brendon Close.

10.4 The point of connection is offsite and will require an easement through third party land or a sewer requisition under section 98 utilising Yorkshire Waters powers to lay sewers through third party land. Additional survey work is required to establish the accurate cover and invert levels of this system compared to the end of the site system., It is anticipated that the foul system will require pumping and therefore an on-site pumping station has been indicated on the Drainage Strategy Plan. This assumption is subject to further assessment and design.

10.5 **Surface Water:** Yorkshire Water do not have any suitable surface water sewers in which to discharge and in their pre-development reply notes that surface water should be taken to the watercourse south of the site.

10.6 In accordance with the hierarchy contained within Part H of the building regulations, NPPF and the SuDS guidance, the surface water strategy should be considered in order of the sustainable hierarchy. The hierarchy and ability of the site to support the particular elements of the hierarchy are discussed below:

10.7 **Discharge to infiltration drainage/soakaway:** The ability of any development to discharge to infiltration drainage is wholly reliant on the ground conditions across the site. The phase 1 site investigation states that the site will be underlain by mudstone/siltstone/sandstone rock head with no superficial soils. The report states that infiltration drainage would not be considered an option for surface water disposal.

10.8 Soakaway testing should be undertaken in the phase 2 site investigation if the ground below the site is considered likely to be appropriate for soakaway drainage. For the purposes of this report it is assumed that a positive outfall will be required.

10.9 **Discharge to Watercourse:** There is a culverted watercourse crossing the site (300mm diameter pipe). The nearest open watercourse to the site is the watercourse to the south adjacent to the Dearne Valley Parkway. This watercourse is an open channel running along the base of the dual carriageway embankment and appears to supply the existing pond.

10.10 A connection to the culverted watercourse within the site just prior to the outfall to the disused canal is considered to be the most sustainable option for surface water drainage. A connection prior to the outfall means that the structural integrity of the canal wall will not be compromised. Due to site topographical levels which feature low lying land to the south east it is not possible to drain the site surface water by gravity without substantial lifting of floor levels to plots in the south eastern corner. Therefore it is considered that the pumping of surface water is required to drain the site and achieve acceptable floor levels against existing adjacent development.

10.11 Only approximately 40% of the site drains naturally down to this watercourse.

10.12 As the culvert running through the site is riparian ownership the final outfall connection can be made within the site without the need to form a new connection to the disused canal.

10.13 **Connection to Surface Water Sewer:** A connection to a public surface water sewer has been discounted as there are no surface water sewers within or adjacent to the site.

10.14 **Connection to Canal:** The surface water can be connected to the culverted watercourse prior to its discharge into the canal.

10.15 **Strategy Outline:** It is proposed that a connection to the culverted watercourse is made within the site just prior to its discharge to the disused canal. The rate if discharge should be 13.15 l/s which is reflective of the greenfield rate of discharge for the developed part of the site which falls within the canal catchment. The rate should be maintained through all storms up to the 1 in 100-year event plus a factor of 40% for climate change. Residual storage should be located on site in a location which poses no risk to flooding.

10.16 **Storage Required for New Development:** If new surface water flows from the site were unrestricted then, based on a 50mm per hour design flow, the rate of surface water runoff would be in the order of 320 litres/second in a 1 in 1-year event. An assessment of the volume of storage required to attenuate flows from the site has been based on a flow restriction of 13.15 litres/second and an estimated impermeable area of 2.27 Ha.

Table 4554.9 – Storage requirement for varying storm events – discharge rate 13.15 litres/second, impermeable area 2.27 Ha

Storm Return Period (years)	Volume of Storage (m^3)
2	356
30	871
100 + 20% climate change	1362
100 + 40% climate change	1660

10.17 **Method of Storage:** In order to comply with YW adoption requirements, storage must either be wholly contained in tanks or oversized pipework or alternatively can be stored in a combination of oversized pipework and a dry basin. Given the location and levels of the southern open space, the use of a tank is considered the most practical option to achieve the storage required. Water from the storage tank would be pumped to the connection pointThis arrangement is subject to detailed design and approval by YW under a section 104 agreement.

10.18 Water will be stored within the adoptable system for the 1 in 100 year plus climate change event and therefore the maintenance of the SUDS system will be secured by that adoption agreement with YW.

10.19 Flows from the new development would be restricted by the pump rate to a maximum of 13.15 l/s. This flow control prior to the pumping station and the pumping station would be adopted by YW as part of the public sewer system.

Overland Exceedance Flows

10.20 The drainage strategy plan indicates overland flows in the event of the system being blocked or subject to a storm of greater intensity than the design storm. Flows entering the storage system will be at the lowest part of the site and therefore any exceedance from the tank will flow south into the low-lying area adjacent to the canal canal rather than into the development.

10.21 A detailed design for the diversion of the culverted watercourse needs to be undertaken, however it is anticipated that the pipe will be diverted in the route shown on the attached strategy plan. The existing 300mm outfall will be retained and a connection formed back onto the existing pipe immediately prior to its discharge into the canal.

Development Levels

10.22 In order to provide floor level consistent with ground levels in the developed area, it will be necessary to pump surface water and foul water flows to their respective outfalls. The properties on site are within flood zone 1 areas and will be approximately 1m above the canal bankside.

10.23 The low lying southern area adjacent to the canal should be retained as far as possible as natural passive storage. This is indicated on the strategy plan attached.

11 IMPACT OF DEVELOPMENT AND RESIDUAL RISK

11.1 A detailed Flood Risk Assessment and outline drainage management plan has been undertaken with respect to the planned development on land at Lundhill Road, Wombwell.

11.2 The FRA has been undertaken in accordance with Environment Agency, YW and BMBC development control guidance, and considers the setting of the development and likely impact on surrounding areas. A surface water and foul water drainage strategy has been outlined in the report which will manage flows from the site and not pose an increased risk of flooding to downstream properties.

11.3 It has been established that the developed area of the site is located within fluvial Flood Zone 1 and there is a moderate risk of overland surface water flooding from the north of the site flowing in a southerly direction to the canal. Proposals to mitigate this risk have been outlined which include layout design and a designed overland flood route. In addition, surface water flows created from the development have been limited to current greenfield rates and mitigation to protect the canal from the additional flow during low and medium intensity storm events has been suggested.

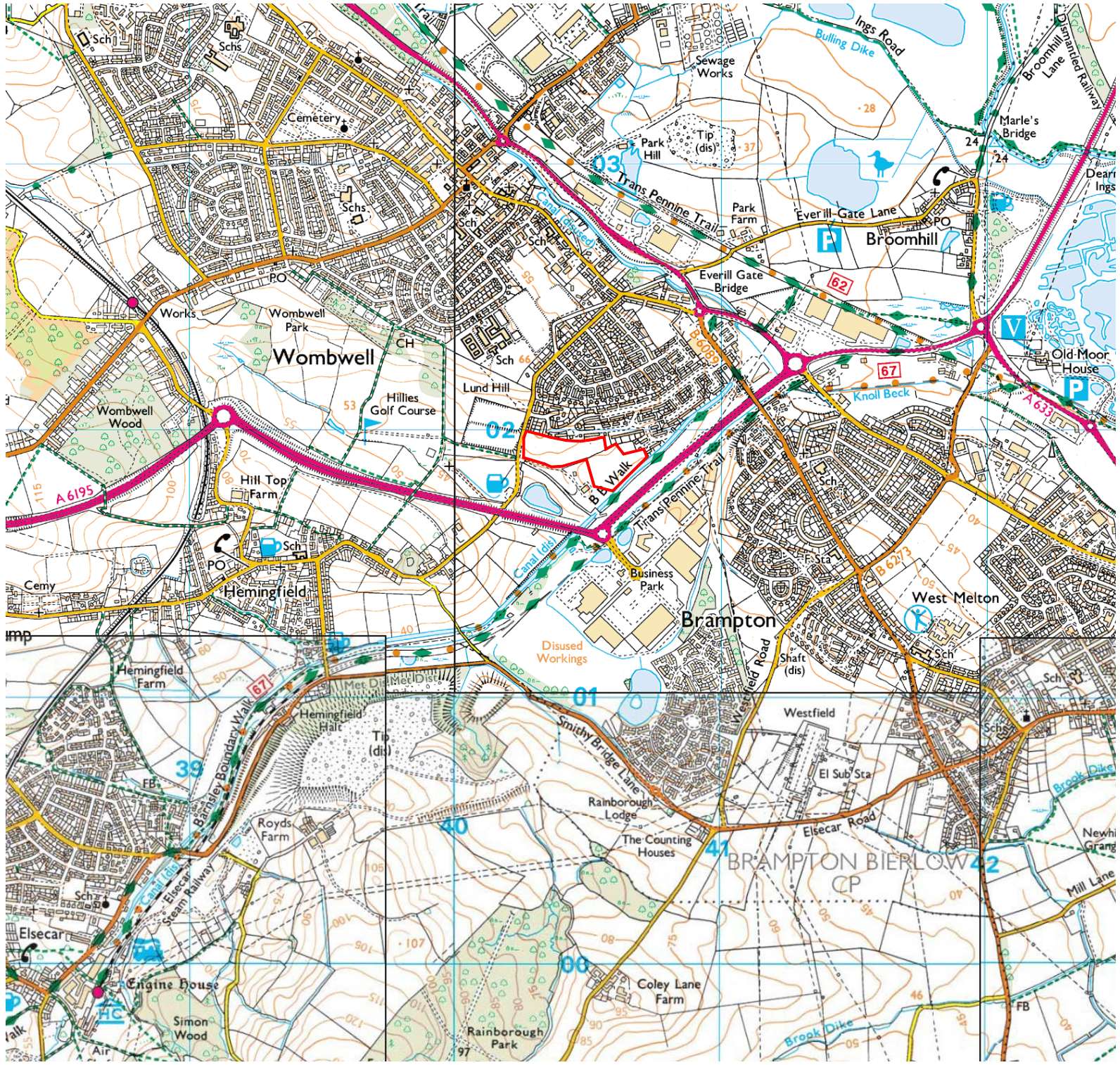
11.4 NPPF guidance states that development should contribute towards a reduction in flood risk wherever possible. The construction of a new overflow from the disused canal will mitigate development flows and also provide considerable additional protection to existing properties from the effect of water levels rising in the canal.

11.5 The assessment has identified the current site drainage characteristics and also established the current level of risk from flooding. A summary of the risks and mitigation identified is presented below:

Table 4554.10 - Summary of Main Issues

Issue	Summary	Residual Risk
Flood Zone	The proposed development area of the site is located within Flood Zone 1. The proposed development is compatible to the flood setting.	**Low**
Fluvial Flooding	The development is not located in an area at risk of fluvial flooding and there is no tidal flood risk due to the sites inland location.	**Low**
Pluvial Flooding	Environment Agency mapping shows that there is a moderate risk pluvial flood route across the site. Measures have been taken to mitigate the risk of flooding from this source which are detailed in the report.	**Low**
Artificial Sources	There are considered to be no significant flood risks from artificial sources.	**Low**
Groundwater	The groundwater level is expected to be at depth beneath the site and as such does not provide a flood risk.	**Low**

Surface Water Management	The site is not suitable for infiltration drainage. The hierarchy in Building Regulations has been reviewed and a connection to the adjacent canal has been recommended as the most sustainable means of surface water drainage. The connection outfall rate has been recommended as 13.15 l/s which reflects greenfield rates for the area of the site within the natural catchment of the disused canal. Storage for up to the 1 in 100-year storm event plus 40% climate change factor will be provided on site within the adoptable drainage network	**Low**



Scale:1:25,000

Scale:1:10,000

Site Area: 5.30 ha
Postcode: S73 0SN
OS Ref: SE 40506 01908

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iD Civils Design
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Rev	Description	By	Date

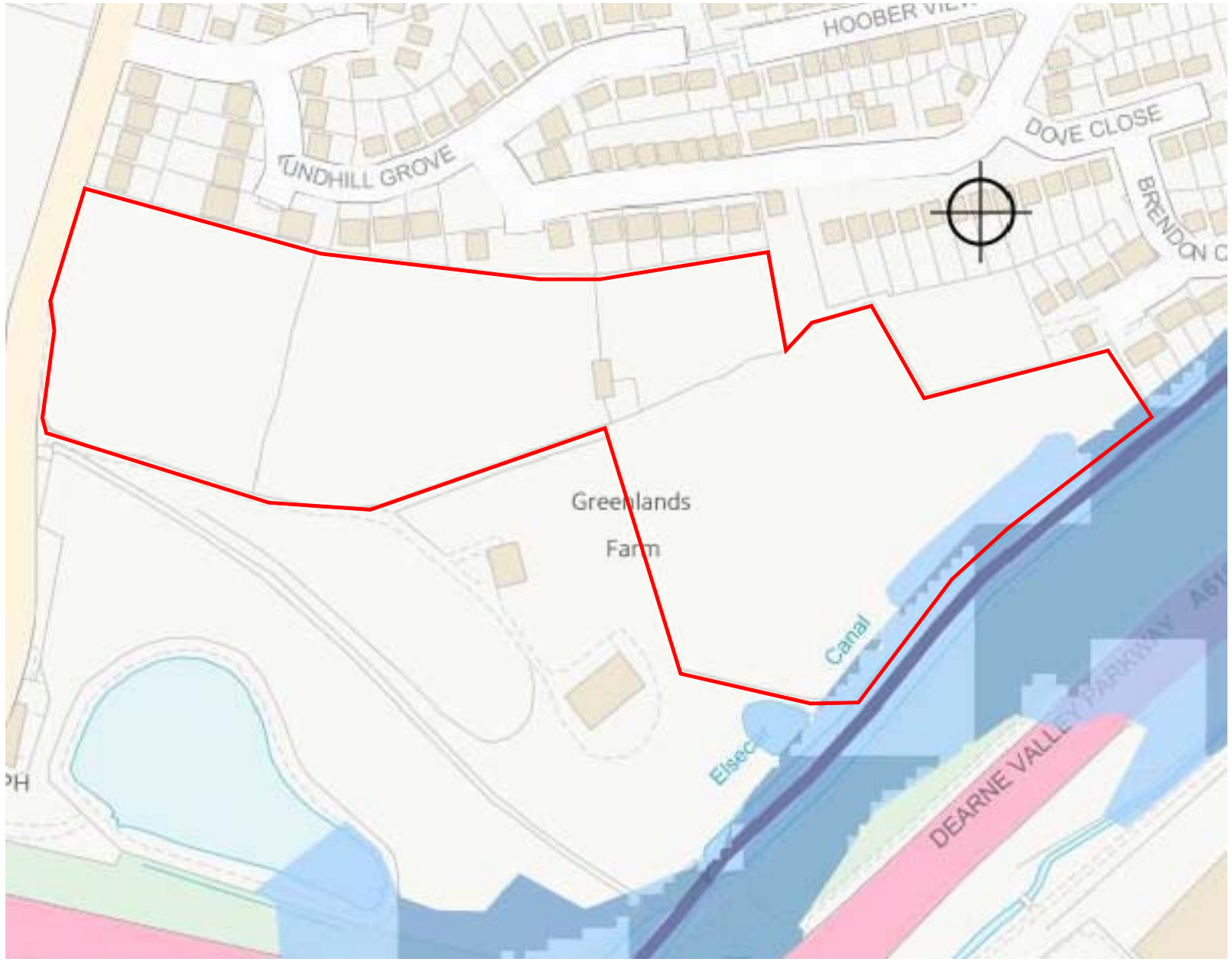
Scale	Date
As Shown @ A3	23.03.16

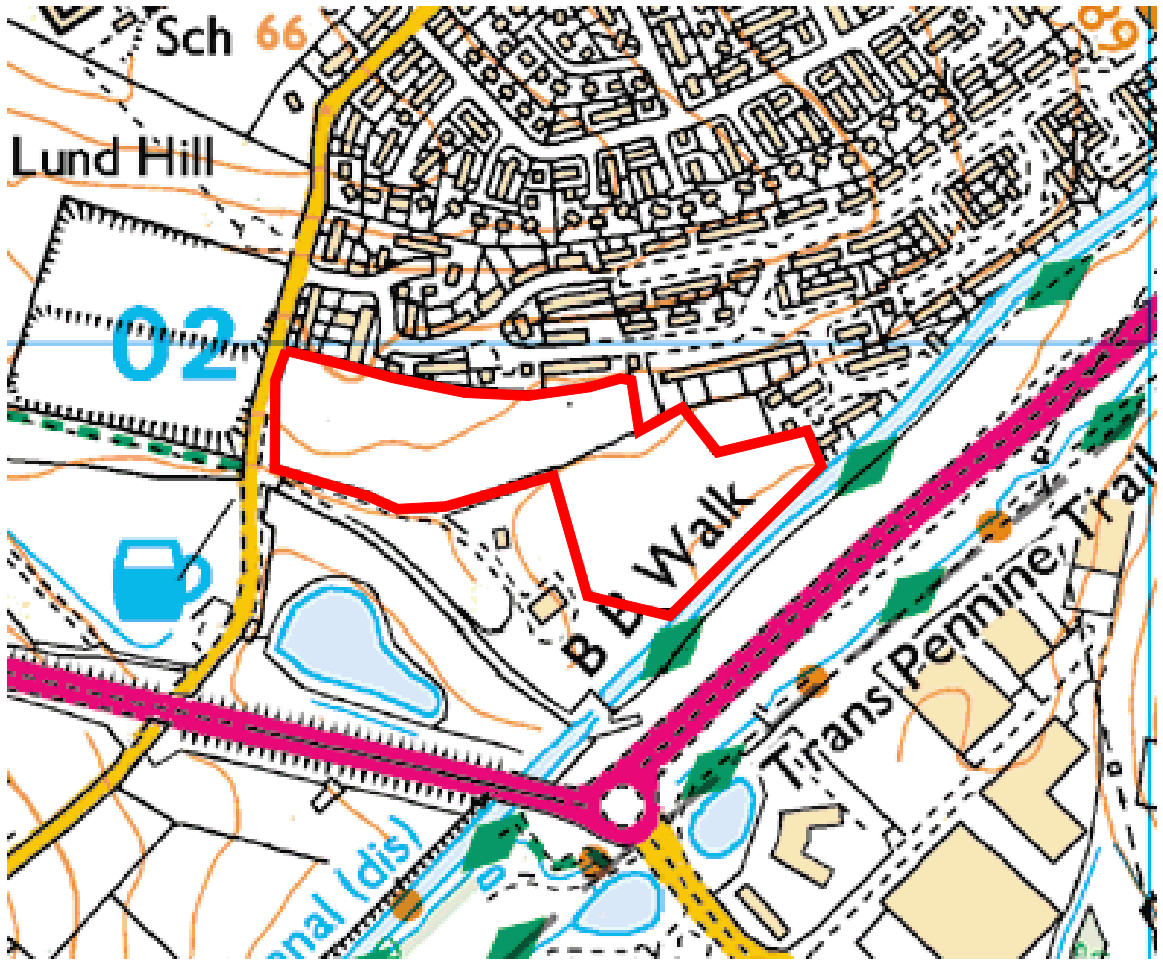
Client:
Persimmon

Project Title:
Lundhill Wombwell

Drawing Title:
Location Plan

Drawing No	Revision	Status
4554-FRA-01	0	Final





High — 1 in 30 year

Medium — 1 in 30 - 1 in 100 year

Low — 1 in 100 - 1 in 1000 year

Very low — >1 in 1000 year

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Rev	Description	By	Date

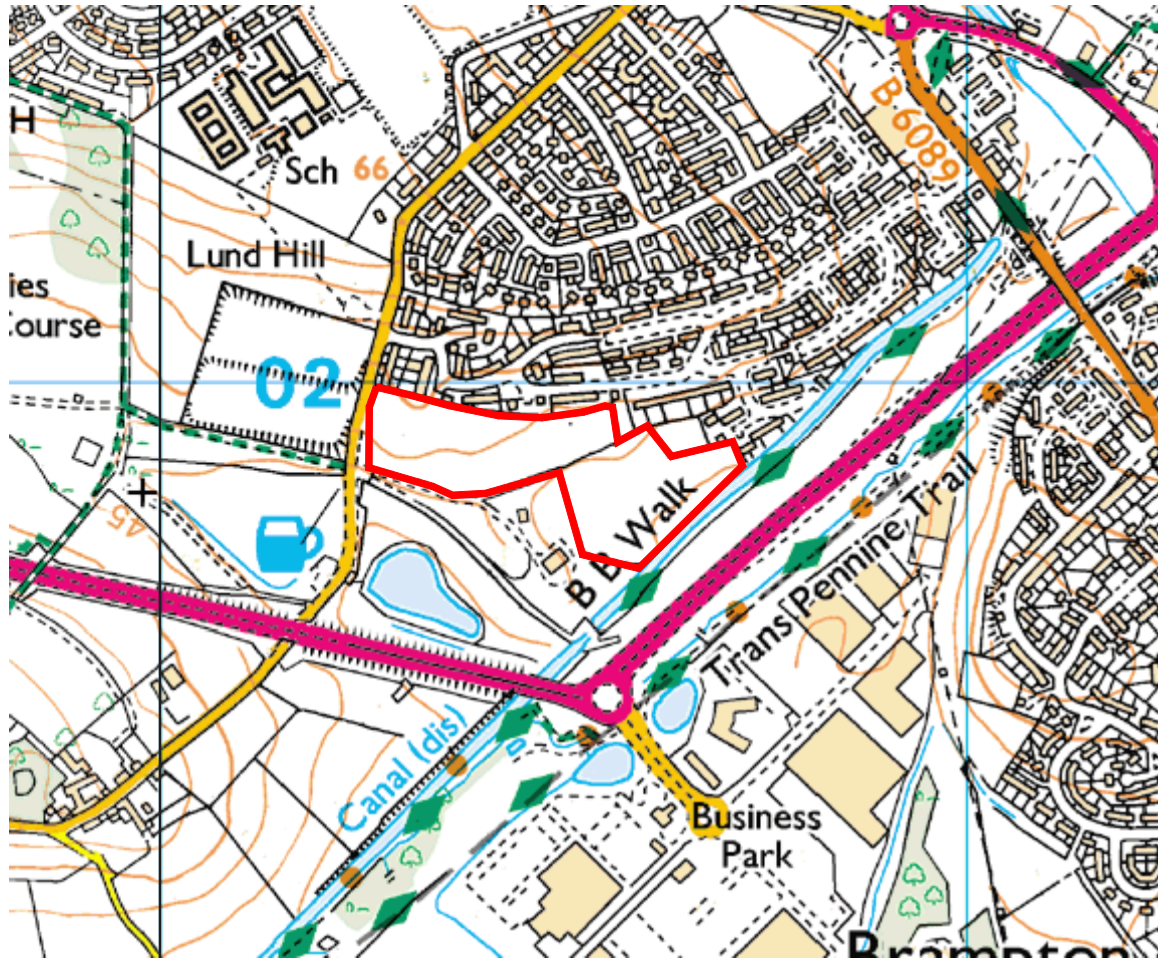
Scale	Date
NTS @ A3	23.03.16

Client: Persimmon

Project Title: Lundhill Wombwell

Drawing Title: Flood Zone Plan

Drawing No	Revision	Status
4554-FRA-02	0	Final



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Rev	Description	By	Date

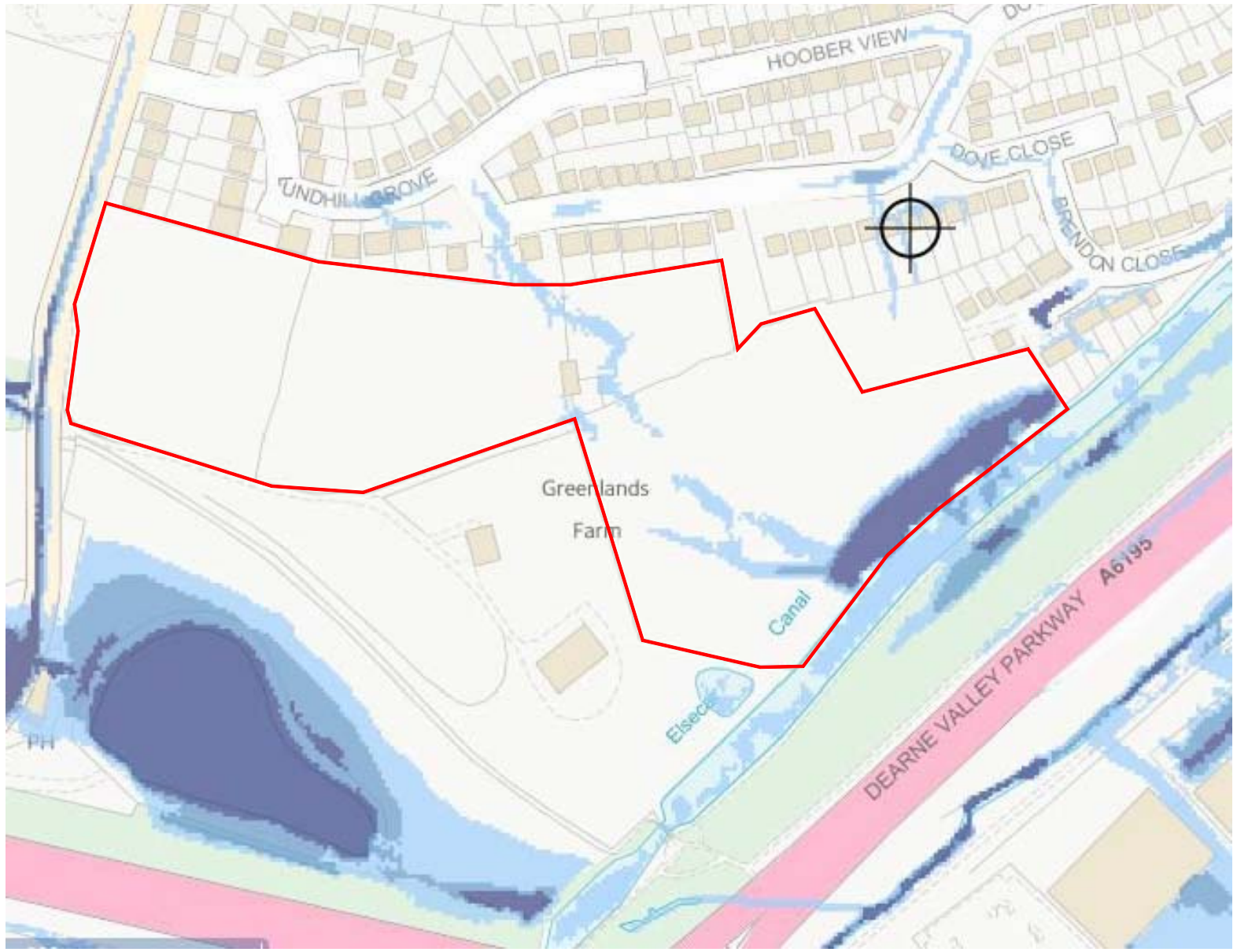
Scale	Date
NTS @ A3	23.03.16

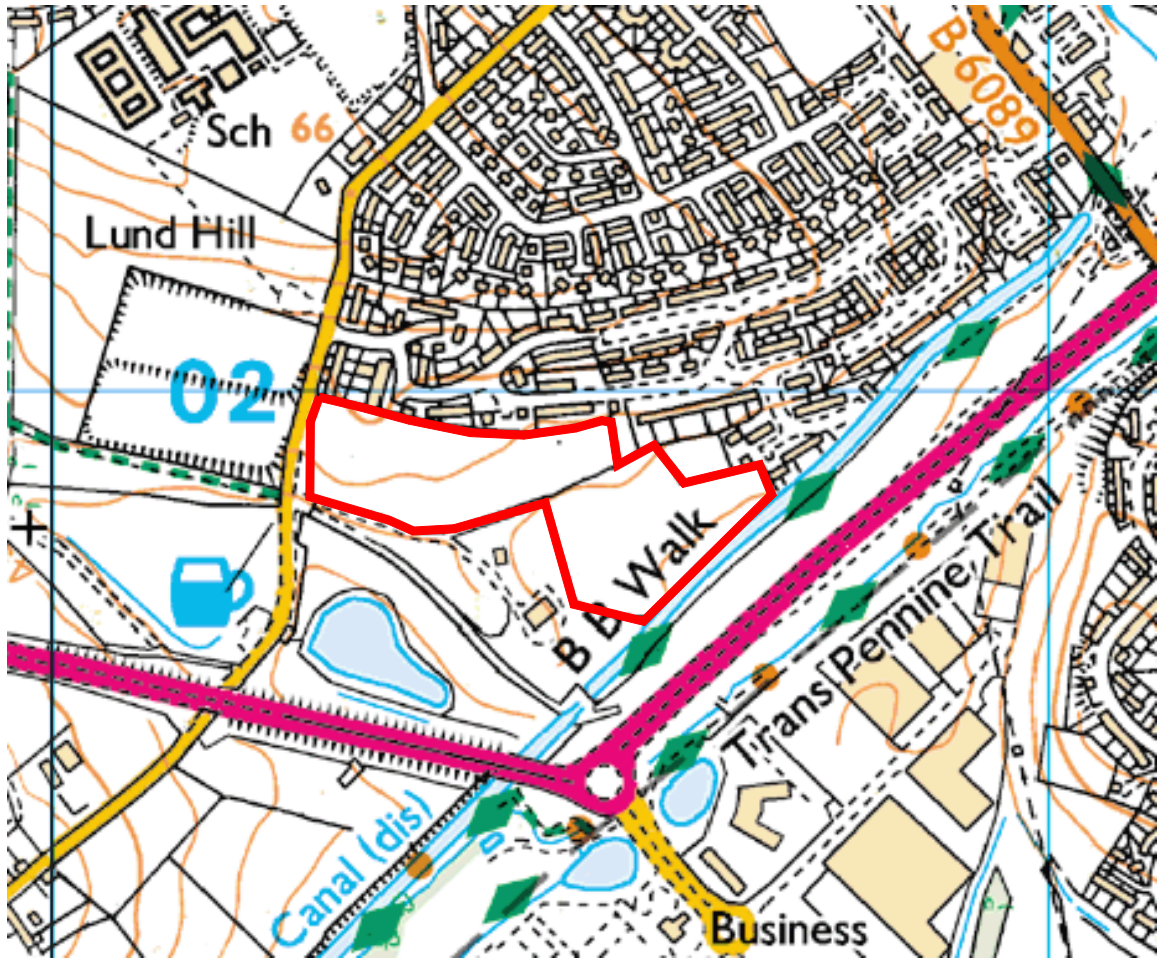
Client: Persimmon

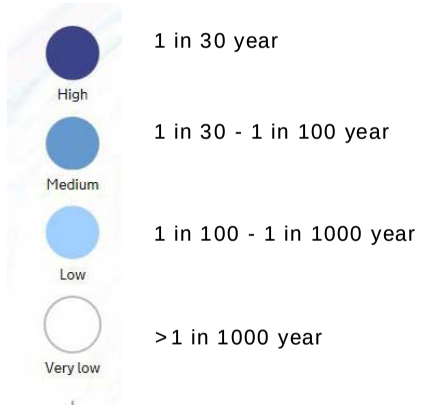
Project Title: Lundhill Wombwell

Drawing Title: Aerial View

Drawing No	Revision	Status
4322-FRA-03	0	Final







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Rev	Description	By	Date

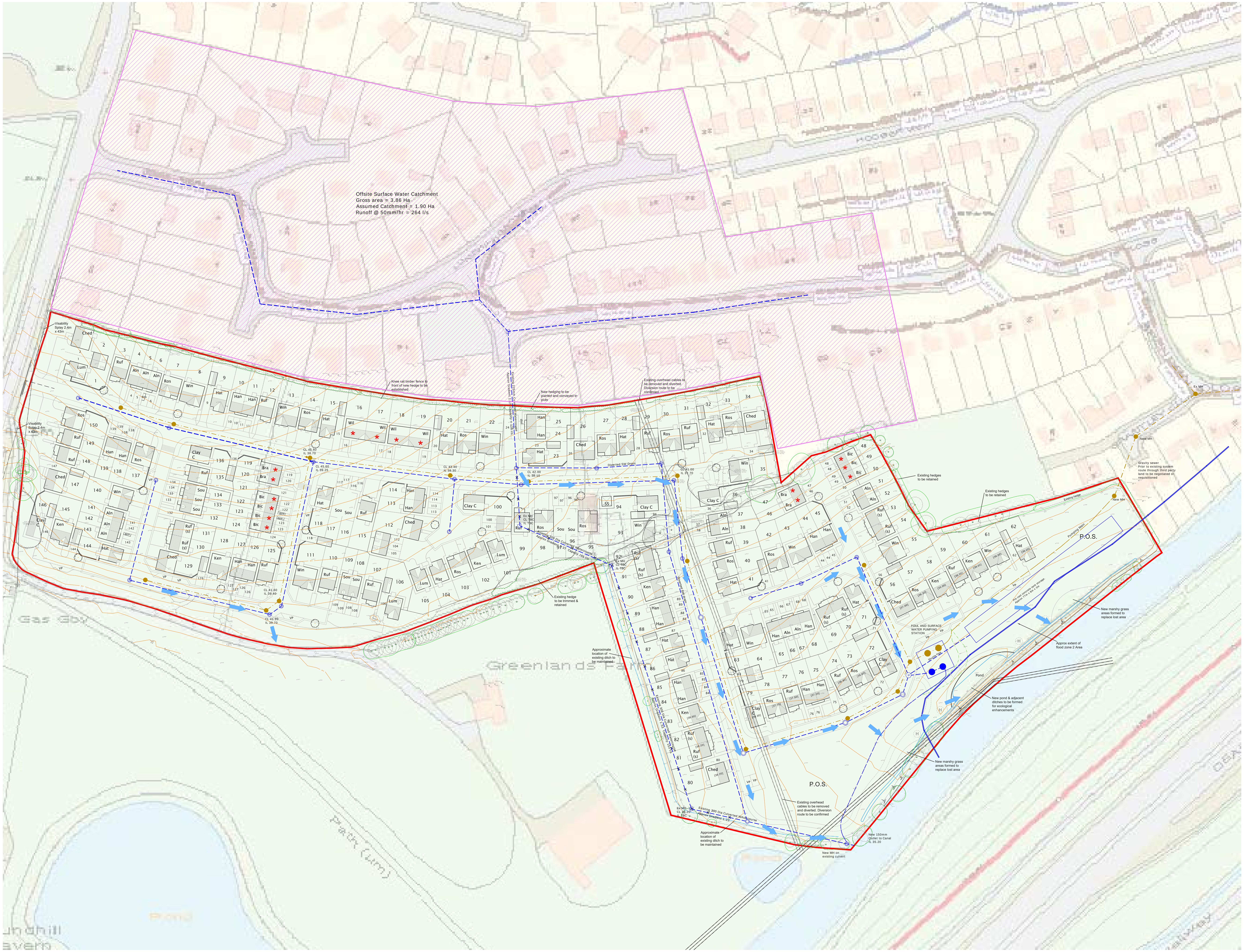
Scale	Date
NTS @ A3	23.03.16

Client:
Persimmon Homes West Yorkshire

Project Title:
Lundhill Wombwell

Drawing Title:
Surface Water Flood Zone Plan

Drawing No	Revision	Status
4554-FRA-04	0	Final



Health and Safety Notes/CDM Regulations 2007

In line with the above regulations we are obliged to inform the Contractor of the abnormal risks that may be encountered in the construction of these works. As part of the design process all the salient health & safety aspects are given full consideration and these are observed within the designs viewed on this document. Although considerable effort is undertaken to eliminate risks, the very nature of the project gives rise to some hazards and risks.

Significant risks that cannot be eliminated by design and could not be foreseen by a competent contractor are noted in the risk assessment boxes on the drawings.

LEGEND

Symbol	Description
F1	Proposed foul water manhole and sewer.
S1	Proposed surface water manhole and sewer.
[13.35]	Proposed D.P.C. level.
	Exceedance Flow Route
	Foul and Surface Water Pumping Station
	Offsite Catchment Draining Through Site

Rev	Description	By	Date

Client:
Persimmon Homes West Yorkshire

Project Title:
Lundhill, Wombwell

Drawing Title:
Drainage Strategy Plan

Scale	Date	
1:500 @ A0	March 2017	
Drawing No	**Revision**	**Status**
4554-FRA-05	0	Comment

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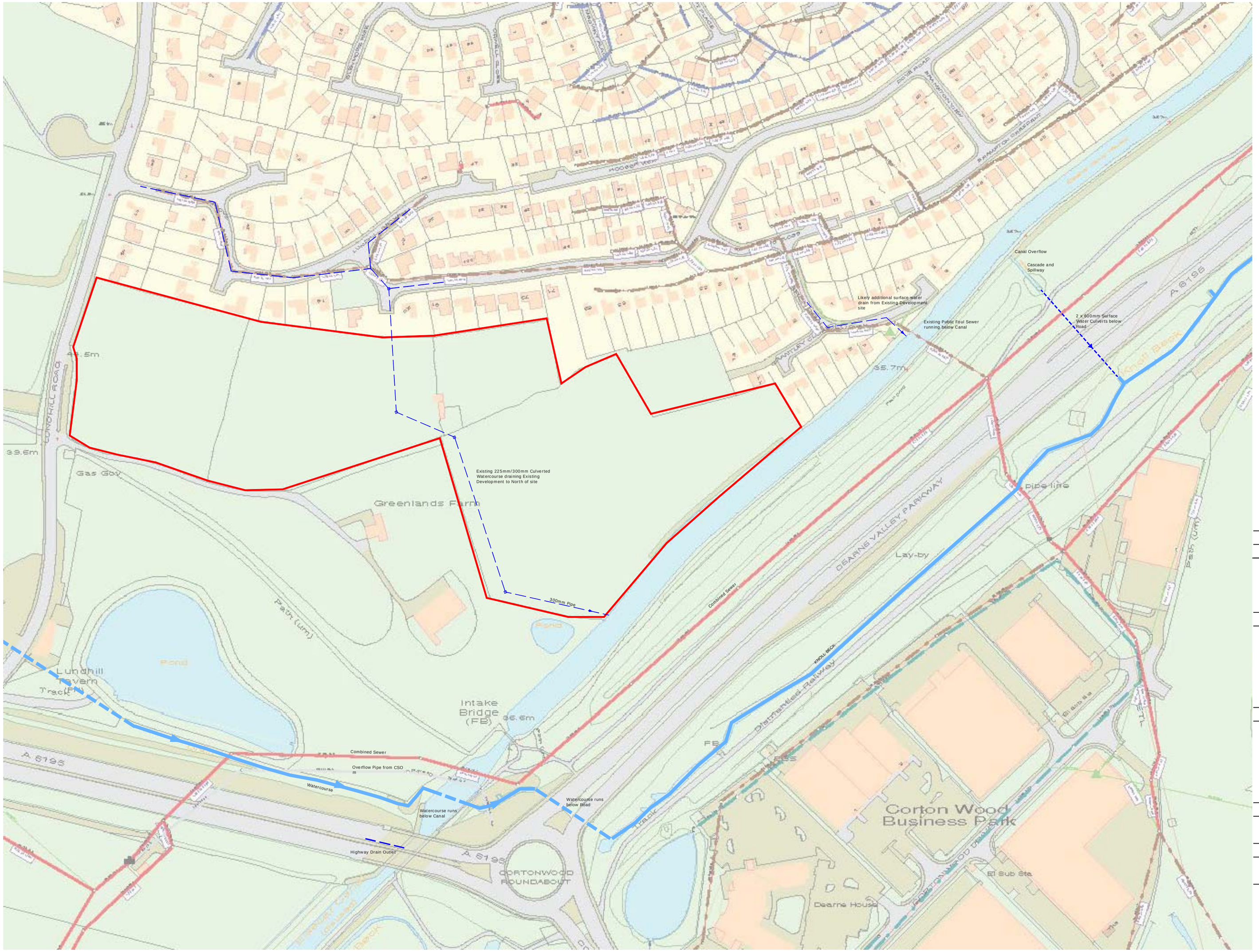

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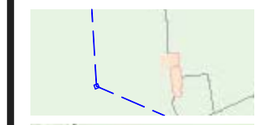
LEGEND



Culverted Watercourse crossing site

Existing watercourse

Application Boundary

Rev	Description	By	Date

Client:

Persimmon Homes West Yorkshire

Project Title:

Lundhill, Wombwell

Drawing Title:

Existing Hydrology Plan

Scale	Date
1:1000 @ A2	March 2017

Drawing No	Revision	Status
4554-FRA-06	0	Final

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Appendix A

YorkshireWater

Mr D Linklater
iD Civils Design Ltd
5 The Stables
Askeham
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North Yorkshire
DL10 5HG

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482
Fax: (01274) 372 834

Email:
Technical.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

Your Ref:
Our Ref: S005202

9th April 2016

Dear Mr Linklater,

Lundhill Road, Lund Hill, Wombwell - Pre-Planning Sewerage Enquiry on R139570

Thank you for your recent enquiry. Our charge of £150.00 (plus VAT) will be added to your account with us, reference MMi096. You will receive an invoice for your account in due course.

Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months.

Existing Infrastructure

(Please note:- due to the change in legislation on 01/10/2011 there may be public sewers within the site boundary which is not recorded on the Statutory Sewer Map the presence of which should be taken into account in the design of the scheme)

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

From the information supplied, it is not possible to determine if the whole site will drain by gravity to the public sewer network. If the site, or part of it, will not drain by gravity, then it is likely that a sewage pumping station will be required to facilitate connection to the public sewer network. If sewage pumping is required foul water discharge must not exceed 4 (four) litres per second.

Foul water domestic waste should discharge to the 225 mm diameter public combined sewer recorded in Brendon Close, at a point to the east of the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

As the proposal site is currently undeveloped no surface water is known to have previously discharged to the public sewer network

As such, the local public sewer network does not have capacity to accept any surface water from the proposed site. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse (if any nearby*) for discharge.

It is understood that a watercourse is located to the south of the site. This appears to be the obvious place for surface water disposal (if SuDS are not viable).

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0345 120 84 82.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team (telephone 0345 120 84 82) for further information.

The public sewer network is for domestic sewage purposes. This generally means foul water for domestic purposes and, where a suitable surface water or combined sewer is available, surface water from the roofs of buildings together with surface water from paved areas of land appurtenant to those buildings. Land and highway drainage have no right of connection to the public sewer network. No land drainage to be connected/discharged to public sewer.

As a last resort, highway drainage may be accepted under certain circumstances. If it can be demonstrated, through satisfactory evidence, that SUDS are not a viable option, there are no watercourses or highway drains available and if capacity is available within the public sewer network, highway drainage discharges to the public sewer network may be permitted. In this event, the developer may be required to enter into a formal agreement with Yorkshire Water Services under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network.

The site is within an area that may be affected by river, coastal or estuarine flooding. We would advise you to contact the Environment Agency for details.

All the above comments are based upon the information and records available at the present time. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith.

YorkshireWater

Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

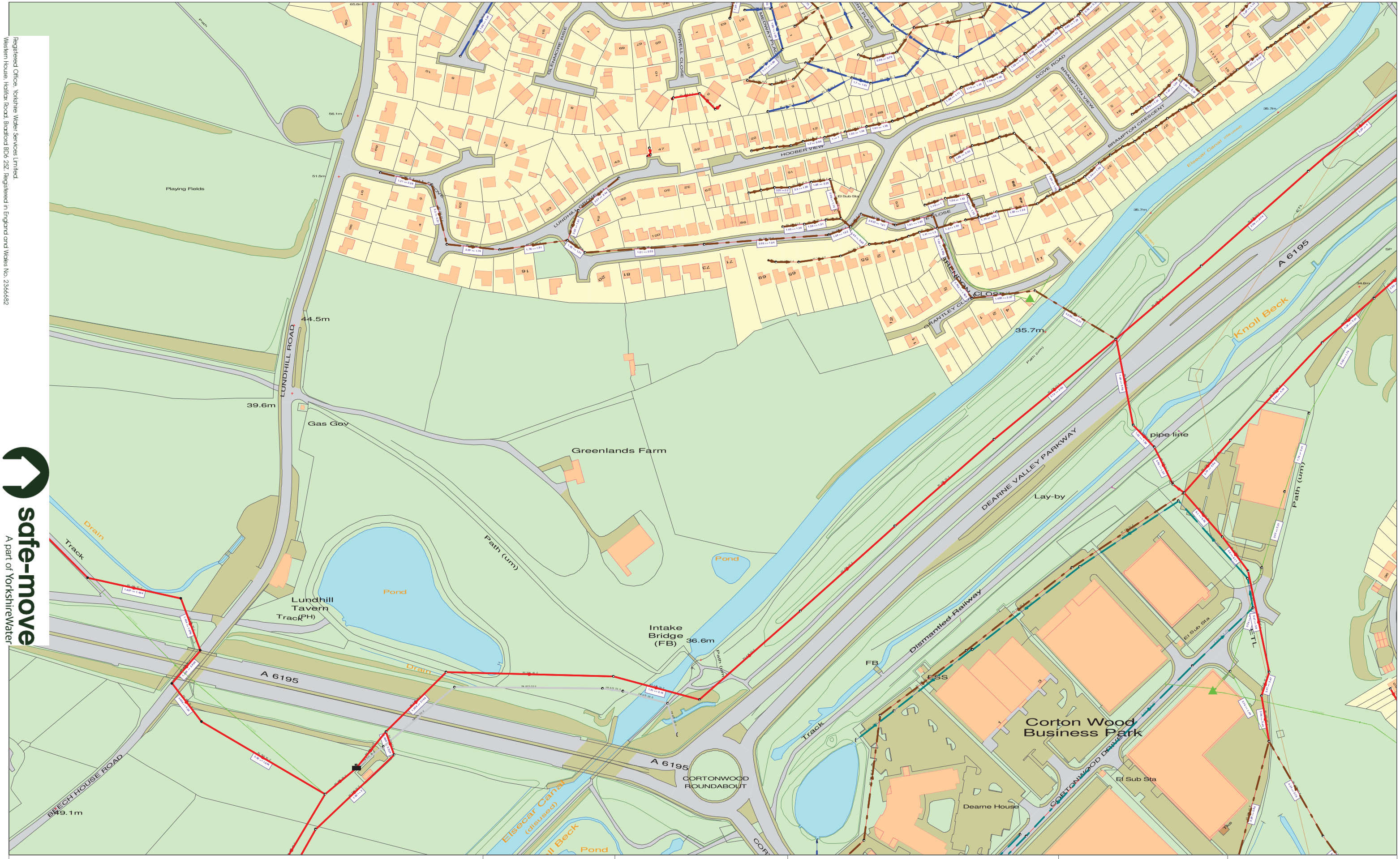
Yours sincerely

Chris Roberts
Sewerage Technician
Developer Services

INVESTING IN VOLUNTEERS FOR EMPLOYERS
CUSTOMER SERVICE EXCELLENCE CSE

safe-move
A part of YorkshireWater

Registered Office: Yorkshire Water Services Limited,
Western House, Halifax Road, Bradford BD6 2SZ. Registered in England and Wales No. 2366682



440114 : 401601	Map Name : SE4001NW	Title	Partial Key
	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : jacklin Contact Tel :	Notes	Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
		(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432	Date Req : 22/03/2016, 16:23:39 Source : Sewer Network Enquiry

This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.

Date Gen : 22/03/2016, 16:23:41

UPN: Undefined Originator: jacklin, ,

Appendix B

Lundhill, Wombwell - Site Photographs

Overflow From Canal to east of Site

Spillway from Overflow

Pipes below Dearne Valley Parkway at end of Spillway

Southern Edge of site adjacent Canal

Existing Pond to South of Site

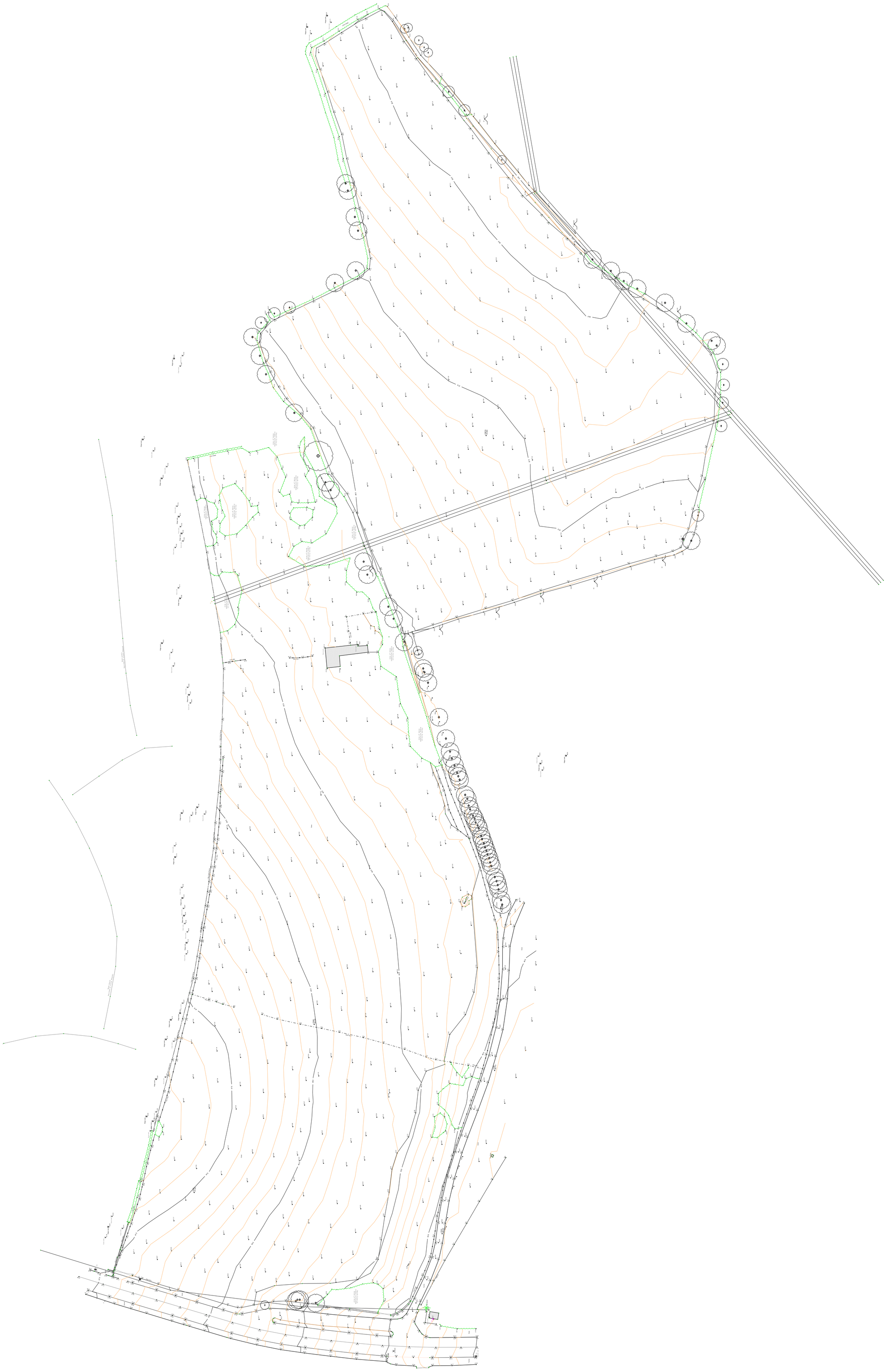
Properties east of site with gardens adjacent to canal at risk of flooding

End of 300mm private surface water pipe discharging into canal

End of Highway drain into canal below A6195 approximately 200m south of site. Assumed

To drain part of carriageway.

Appendix C



Appendix D

Darren Linklater

From: Bell , Derek <DerekBell@barnsley.gov.uk>
Sent: Monday, August 8, 2016 10:34 AM
To: Darren Linklater
Subject: RE: Proposed Development at Lundhill Ropad, Wombwell

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Darren,

Please the responses to your queries as highlighted below …

Regards ~ Derek

Derek Bell
Principal Network Resilience Manager
Environment & Transport
Barnsley Metropolitan Borough Council, Westgate Plaza 1, PO Box 601, Barnsley, S70 9FA*

** Sat Nav Reference - **S70 2DR***

Tel: Ext - 01226 787654 Int - 6654
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E-mail: DerekBell@barnsley.gov.uk

From: Darren Linklater [mailto:darren.linklater@id-gsc.co.uk]
Sent: 30 March 2016 15:20
To: Bell , Derek
Subject: Proposed Development at Lundhill Ropad, Wombwell

Hi Derek,

We have been appointed by Persimmon Homes to undertake a Flood Risk Assessment for the above site which is potentially 165 dwellings.

In order for us to complete the report I would be grateful if you could reply to the following queries:

1. Is the authority aware of any previous flooding of the site? We note that part of the eastern edge of the site is within FZ3 and is shown as a high risk of surface water flooding. ***YES – This area was affected during the floods of 2007 and again in subsequent flooding events following this time.***

2. If previous flooding is recorded, are the authority aware of the flood source/extents/depths. ***The Council has no formal records of the flooding affecting this area but it is known that the extent of impact area extended from the proposed development site down to the Deane Valley Parkway (DVP).***

3. Is the authority aware of any potential sources of flood risk i.e. overland flows, groundwater, reservoirs, land drainage systems, culverts etc. We note low risk areas of surface water flooding on the EA maps. ***The cumulative impact of overland flows from the upper catchment and the ability for the local watercourses to cope with increase flows pose the greatest risk of flooding in the area. Therefore it is imperative that any local culverts are kept free from debris to ensure that flows within them are maintained.***

4. Is the authority aware of any culverted watercourses crossing the site? ***NO. We have no records of watercourse at the proposed development site.***

5. Is the authority aware of any flood alleviation works downstream of the site either planned or recently completed?. ***YES. Some minor maintenance works on the watercourses which discharge into Knoll Beck.***

6. Is the authority aware of any flooding constraint to development other than the flood zone 3 area? ***No additional constraints are known.***

7. Would the authority accept a Greenfield rate derived via IoH124 as the basis for the assessment or do the authority have a generic Greenfield rate which is applied across the region. ***Greenfield runoff for this site should be based on 5ltrs/sec/ha***

8. Are the authority willing to accept the adoption of SUDS ponds or drainage features if incorporated into the layout. If so, would a commuted sum be levied?. ***NO. The ongoing management and maintenance of all SuDS and all associated surface water drainage features would be the responsibility of the developer and NOT the Council. Appropriate maintenance plans and schedules would need to be submitted as an integral part of the drainage proposal prior to drainage conditions being signed off for the planning application. You should also note that any relevant legal agreements required for the establishment of a Management Company to undertake the management/maintenance of the SuDS would also need to be submitted, where applicable.***

9. Do the authority have any current SUDS guidance standards or will the authority accept the principles outlined in the SUDS Manual? ***YES. The Councils guideline are based on the CIRIA SuDS Manual C753, however you should seek specific advise on your proposal to confirm their viability.***

10. Do the authority have any specific point/points of connection to the surface water system which they would prefer. I note the Elsecar Canal which is noted as disused. Would this be under the control and ownership if the authority and would this be a suitable outfall if soakaways did not work? ***YES. Given that parts of the proposed development site sits within the floodplain discharge into the disused canal would not be considered as a suitable option as this has the potential to increase flood risk to the canal and have a negative impact in areas away from your site. Should you wish to pursuit a drainage solution which utilises discharge into the canal you would be required to undertake an hydraulic study of the receiving catchment to confirm that a negative flood risk impact would not be experienced as a consequence of the development. The usual requirement for an FRA would still apply for a development on this scale.***

An alternate option would be to discharge into the culverted unnamed watercourse to the south west of the site that runs adjacent to the Dearne Valley Parkway, this flows under the canal and discharges into Knoll Beck. The unnamed watercourse is one whose management falls to the LLFA (ie, Barnsley MBC) and as such any connection and/or works on it will need consent for works in ordinary watercourse from the LLFA who will in due course consult the Environment Agency who manage Knoll Beck. To pursuit this option you will also need to cross third party land and a connection to this watercourse will require you to negotiate the appropriate access and easements to enable this as an option.

Thank you for your time in replying to my queries.

Regards

Darren Linklater
Director
For and on behalf of
iD Civils Design Ltd

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